

MORPHOTAXONOMICAL STUDIES OF SOME FAMILIES
OF FULGOROIDEA FOUND IN PAKISTAN AND ADJOIN-
ING COUNTRIES (HOMOPTERA : FULGOROIDEA).

SHAKILA MUSHTAQ

A thesis submitted to the University of Karachi
in fulfilment of the requirements for the degree of
Doctor of Philosophy

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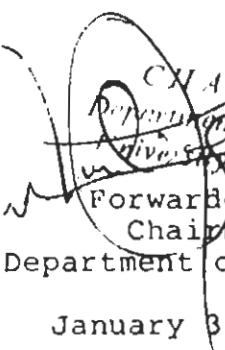
Department of Zoology
University of Karachi
Karachi-32, Pakistan

MORPHOTAXONOMICAL STUDIES OF SOME FAMILIES OF
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by

Miss Shakila Mushtaq
M.Sc. (Kar.)

A thesis submitted to the Faculty of Science
of the University of Karachi in fulfilment
of the requirements for the degree of
Doctor of Philosophy from DEPARTMENT OF ZOOLOGY


CHAIRMAN
Department of Zoology
University of Karachi.
Forwarded by
Chairman
Department of Zoology

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S. HANIFA (Khanum)
Forwarded by
Director of Research

S. I. Khan
Dean, Faculty of Science

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A B S T R A C T

The present work comprises the taxonomical studies of the seven families of Fulgoroidea, that includes Dictyopharidae Spinola, Flatidae Spinola, Achilidae Stål, Ricaniidae Amyot and Serville, Cixiidae Spinola, Lophopidae Stål, and Tropiduchidae Stål. The total number of genera and species that have been studied in the present work are 28 genera and 80 species collected from various parts of Pakistan, Azad Kashmir and Bangladesh out of which 6 genera and 58 species are new to science. Keys to genera and species have been drawn, for description of known genera reference have been made to the original publication, while new genera and species have been described in detail after comparing with the relevant description of the planthoppers available in the literature.

Zoogeographically the areas including Pakistan and Bangladesh fall into the Oriental and Palaearctic regions. The material from Bangladesh is primarily of the Oriental region, while that of Pakistan includes some Palaearctic forms as well.

Most of the species are recorded on grass but a good number of species are recorded on economically important crops such as sugarcane, wheat, maize, rice and fruit plants also.

A C K N O W L E D G E M E N T S

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INTRODUCTION

The members of the superfamily Fulgoroidea, commonly known as planthoppers, are distributed all over the world, and show remarkable assemblage of very diverse forms. They also possess significant economic importance as pests of agricultural crops and some other plants. Practically all workers still use the old definition of planthoppers by Muir (1923) as: "antennae though variable in form, usually placed beneath eyes, tegulae almost always present, empodia well developed, middle coxae elongate, articulate far apart, free and capable of lateral movements, hind coxae immobile, nymphs richly endowed with specialized sensory pits, distributed all over head, wing pads and abdomen." However, in extreme cases the definition is changed to some extent in order to accommodate the curious and peculiar forms of the superfamily. The head area and venation of the apical and costal portions of the fore and hind wing is variable in all the families of Fulgoroidea. The venation of fore wing is important in the identification of all the families and sub-families of the superfamily Fulgoroidea. No other superfamily within the order Homoptera shows so much variations. It shows the complete disappearance or appearance of variable number of diskal and apical cells, and simple or reticulate venation in different families. The ocelli on head are usually two, sometimes three in number, and never found dor-

sally on the crown. The number of carinae, as well as the forms of head vary, including the great development of rostrum in Fulgoridae, Tropicuchidae, Dictyopharidae, and Lophopidae are considered.

The present studies were intended to investigate the generic cum species complex of some families of the superfamily Fulgoroidea of this region. It is by no means a comprehensive study of all the families of the superfamily

Fulgoroidea in the Oriental region. Zoogeographically, Pakistan is located on the north-western boader of the Oriental region, and at the same time touching two other great regions of the world i.e. the Palaearctic and the Ethiopian regions. Thus the area of the present study is a zone of zoogeographical intermixing of species.

Nearly 20,000 sorted specimens collected from various parts of Pakistan (some from former East Pakistan, now Bangladesh) were examined during the present study. The data of material deposited in the Zoological Museum, University of Karachi, showed that it had been collected for over a period of 20 years, by a number of workers indicated in species descriptions. The data of host/food plants revealed that the planthoppers in Pakistan were harboured by several broad categories of plants like trees, bushes, ornamental plants, hedge plants, vegetable plants, agricultural crops, forest plants etc.etc. The

biological studies with special reference to the economic significance of the known species had been done in Pakistan only in a few cases.

The better known genera of the families studied by the present worker from this part of the world are: of Cixiidae: Oliarus Stål, Cixius Latreille; Tropiduchidae: Antabhoga Distant; Achilidae: Epirama Melichar; Flatidae: Melicharia Kirkaldy, Paragomeda Distant, Nakta Distant, Unnata Distant; Lophopidae: Pyrilla Stål, Ricaniidae: Ricania Germar Ricanoptera Melichar; and of Dictyopharidae: Dictyophara Germar and Putala Melichar.

The present study of the fauna of seven families of the superfamily Fulgoroidea deals with 28 genera, of which 22 are known, and 6 newly described. Of the total of 80 species treated in the present work, 22 are already known, and 58 new to science. Keys to the genera, and species have been prepared for the identification of Pakistani taxa of the families. Descriptions of new genera and species have been given according to the format followed by leading planthopper workers of the world and as suggested by International Code of Zoological Nomenclature. The species have been illustrated with the help of 80 series of drawings.

MATERIALS AND METHODS

The present studies are based on the examination of about 20,000 specimens of Fulgoroidea deposited in the Zoological Museum, University of Karachi, Karachi-Pakistan. A large number of these specimens were mounted on paper points with proper data labels, while the remaining were preserved dry in glass vials. The entire material needed for study was properly mounted, and labeled with data.

The various steps involved in these studies were mounting, labelling, sorting, preparation of wing slides, macerating the genitalia, dissecting the components of male genitalia, preparing drawings of venation and male genitalia, and finally preserving the material.

MOUNTING, LABELLING AND SORTING

Specimens collected from the field are to be mounted on the tip of a triangular paper piece glued to the right hand side of the body, normally below the thoracic region, so that the abdomen and wings can be easily detached for detailed study. Special punching machines are available for import, to punch equal sized triangular paper piece, from white paper of moderate thickness. Entomological pins of the size Nos. 2 or 3 are usually passed through the broader part of the paper point with the help of a pinning

block, leaving approximately 1/4 inch uniform distance between label and the pin head. Once the planthopper was mounted with insect gum on paper point, the recorded data has to be transferred, with India ink, on rectangular paper labels (approximately 20 x 10 mm), through which pins bearing the planthoppers on paper point were thrust, and brought to the required height just below the paper point again with the help of the pinning block. The procedure, if followed carefully, would make ready a large number of specimens for examination within a short time. During mounting of specimens the gum should be kept at a moderate thickness with the help of suitable solvent (100% alcohol in some cases), so that the planthopper could be easily glued. The gum should, for convenience, be placed in drops on a flat surface, the dorsal side-tip of the mounted paper should touch the gum, and then the metathorax of planthopper lying backside down with head in front. A little pressure of the paper point would glue the planthopper properly, and bring it in the required posture i.e. the paper point directed towards left, glued to the right side of the planthopper.

Preliminary sorting of specimens into series of similar specimens can now proceed on the basis of external appearance involving size, colour, form and spots on the head, thorax and wings.

The planthoppers were first visually sorted into series of similar specimens on the basis of external morphological characters, i.e. shape of head, carination, size, colour and any other distinct mark of identification. Further sorting of the series was done into sub-series on the basis of finer variations in colour, carination, etc., etc. Finally each sub-series was sorted into males and females. These tentative lots of specimens of similar data and appearance should be numbered, so that the specimens may not get lost, and could be referred back during subsequent studies.

As alary polymorphism is commonly observed in Fulgeroids, resulting in two forms of adult individuals i.e. macropterous, and brachypterous, and as female genitalia do not offer sufficient variations to be utilized in classification, therefore only macropterous males were picked up as representative specimens for detailed studies of each sub-series.

WING SLIDES

The identification of species was based mostly on the wing venation, and the characters of male genitalia, which have to be separated from the body of the planthopper for detailed study. The venation can be studied partly even without removing the wings, by inserting a fine needle between the wings and the abdomen, tilting the wings

away from the body, and viewing them under the low power of a binocular microscope. In such cases the wings were detached from their bases, dropped on a plane glass slide, where a drop of 100% alcohol was placed to flow under the wings, and straighten their curls. As the wings were very light and could be lost with even the pressure of one's breath or very slight air currents, therefore at the time of removing the wings, the specimens should be kept very close to the microscope slide lying below it. The tip of the needle employed in the process should be moistened in alcohol, so that the wings may remain adhered to its tip during transfer. The wings should be removed one by one. When the wings were successfully dropped on slide, they should be arranged longitudinally parallel to each other in a drop of alcohol. At the same time, vannal lobes of the hind wing may also be unfolded from beneath. Soon after, a square cover-slip with its four corners dipped in insect gum, and held with a forcep, should be gently placed on the wings, and kept pressed till the gum dries. The alcohol would soon evaporate, and an air-dry mount of wings is ready for further study. For further reference, the specimens, from which the wings have been detached, as well as the wing slide should bear the same number as that of the series from which the specimen have been picked up, as a representative for study.

PROCESSING OF GENITALIA

To prepare the genitalic structures for study, the entire abdomen was not usually removed. A sharp needle is passed against the eighth abdominal segment and the connective tissue to detach the entire genitalia from the body. The genitalia was then placed in 20% KOH cold solution in a cavity of the porcelain cavityplate. Oman (1949), Young (1952) and Knight (1965) recommended the use of 10% KOH solution, and to heat the KOH solution, to expedite the maceration of abdomen.

The macerated genitalia was then transferred with the help of a needle to an other similar cavity containing clean tap-water, but preferable distilled-water, in which it should be washed for about 10-15 minutes. The macerated soft tissues, and all traces of KOH should be removed. The cleared genitalia should be fully checked, and then transferred to a drop of glycerine in the cavity of a cavity-slide. The slide should bear the number of the series. The genitalia should be kept below the surface of the drop of glycerine, so that air bubbles may not enter the cavity of abdomen.

DISSECTIONS

Once the genitalia was cleared, and placed in glycerine, all the subsequent studies, dissection and permanent

preservation has to be done in glycerine. It is better to study minutely genitalia and its various components for some time before undertaking the dissection of genitalia. To proceed with the dissection of internal components of male genitalia, two needles, one with a sharp end the other with a blunt end are required to do the rest of the dissection. The 9th segment forms what is called the genital capsule. First, orient the genital capsule, so that its dorsal surface touches the base, then insert the blunt needle in the anal tube region to hold the genital capsule, and use the sharp needle to free the aedeagus from the muscles that hold it dorsally. Then reorient the genital capsule with its ventral side touching the base. Again hold the genital capsule in place with the help of the blunt needle, pressing gently against the 8th sternite. Then free the two parameres from their lateral connections, which would free the entire internal male genitalia in one unit, and can be taken out as such. The connective, paramere and the aedeagus can thus be studied from all desired angles, and their drawings prepared.

PREPARATION OF DRAWINGS

The illustrations were prepared with the help of a Camera-Lucida. It is advisable that at the time of preparing illustrations, the magnifications for various components be kept uniform for making their comparison easier. The various magnification for wings, head, genital capsule, para-

mers, connective, and aedeagus could be 32x , respectively. Variations based on the power of eye pieces, and objectives would both make difference in the evaluation of their anatomical characteristics. The illustrations

first prepared with pencil on ordinary bond paper, corrected in details by free observation, then traced on tracing paper, and subsequently inked with India ink, using 6 mm pen for main outlines, and 3 mm for finer details. During the preparation of illustrations, it was suggested to use a streak of adhesive (Boric acid ointment) at the base of the drop of glycerine for anchoring the components of genitalia to be drawn, so that these could be kept at a desired angle when being drawn. The adhesive film could be applied at the base of the cavity before adding the drop of glycerine, and later the macerated genitalia.

STORAGE

The final preservation of genitalia, after successful study and preparation of illustrations, was part of the complete process. The dissected genital components were carefully preserved in glycerine in a flat bottomed, glass microvial, approximately 10 mm in length, and 4 mm in diameter. The opening of the vial was closed with a cork, and then pinned at an angle of 45° below the thorax, head and wings of the specimen from which

the wings of one side and pygofer were detached. If the cork of the vial remains clear above the glycerine, the genital components would not deteriorate during preservation. The head, and thorax are drawn from dry, pinned specimens.

REVIEW OF LITERATURE

The homopterous insects were first introduced to the world nearly 225 years back, when Linnaeus (1758) described one genus and 42 species of the group in his famous book on animal classification, "Systema Naturae". Fieber (1872-1877) was however, the first who studied the small-sized homoptera i.e. Leafhoppers and planthoppers of Europe, North America and some other parts of the world. His (1872) work remained neglected for about thirty years, till Kirkaldy (1900) drew attention to it, while discussing some of the homopterous genera established by Linnaeus (1767) and Sulzer (1776). Fabricius (1775-1798, and Donovan (1797-1800) were the two pioneer workers, during the last quarter of the eighteenthth century, who made significant contributions on the Homoptera of Europe and India respectively.

The knowledge of homopterous insects increased considerably during the nineteenth century as a result of large scale studies of the group in several major geographical regions of the world. Workers like Latreille (1804) Herrich-Schaffer (1835), Duponchel (1840), Amyot and Serville (1843-48), Walker (1851), Spinola (1850), Stål (1853-70), Dahlbom (1850), Atkinson (1885-89), Ashmead (1890), Melichar (1898-1923), Kirby (1891-1918), Horvath (1899), and Edwards (1898), not only critically discussed the homo-

pteros species described by earlier workers, but also described new taxa extensively from Europe, Africa, Middle East and India.

During the present century the studies of the various groups of Fulgoroid planthoppers expanded tremendously, particularly of their systematics in the light of new morphological concepts and revised criteria of species and genera. Melichar (1898-1923) who published series of papers on Fulgoroidea, including some monographs of the families Ricaniidae, Acanaloniidae, Flatidae, Dictyopharidae, Tropicuchidae and Lophopidae. He (1903) published the "Homopterous Fauna Von Ceylon" in which he dealt with twelve families of Fulgoroidea and described a total of 67 genera and 148 species from the Oriental region. A comparatively detailed study of the Oriental Fulgoroidea was undertaken by Distant (1906-1916) who erected twelve families in his work on Rhynchota in the series of publications on the Fauna of British-India including Ceylon and Burma. His work was considerably handicaped as is apparent from introductory remarks:

"With the conclusion of this the third volume of the Rhynchota. The account of Indian species belonging to that order is carried to the end of the family Fulgoridae. The preparation of this volume has been an arduous piece of work as the insects described in it are obscure and little known. More specially does it apply to the forms included in the Fulgoroidea. The admirable classification of Fulgoroidea was initiated by Stal (1862) and continued by Melichar (1903), and

left untouched a large amount of material that had to be examined and worked out. Though it is hoped that the present volume which throws much additional light on the natural sequence and affinities of the minor groups of the group, it must yet be born in mind that the work as a whole is previously described for collectors in India as an aid to the identification of insects which though probably numerous enough in that country."

Similar observations were made by Singh-Pruthi (1930), when he pointed out several discrepancies in Distant's work. He remarked:

"Working in England Distant was far away from India, naturally his work could not be a complete one and the collecting trips undertaken during the last two or three years by myself and my colleagues in the Zoological Survey of India have yielded numerous new and interesting genera and species, some of which are described in the present paper. Distant is the author of over 60 per cent genera and species described from India, but unfortunately his description of new forms usually based on a single specimen, and those too sometimes carried and mutilated are very inadequate. He hardly took-into consideration the important structures like the genitalia, whose importance in affording reliable generic and specific characters is recognized by workers on all most groups of insects. Further more with a few exceptions Distant did not make any remarks on the position of the new forms he established."

Muir (1913-1926) made remarkable contributions in his studies on the Fulgoroids of United States of America, South Africa, and Australia to a limited extent, but mostly in his revision of the genera of the Fulgoroid families Achilidae, Delphacidae, Cixiidae, Meenoplidae, Tettigometridae and Derbidae studied from Oriental region, specially

from the Philippines, Sumatra, Malaya and Indian Archipelago, Baker (1915-1927) carried out studies on the homoptera of the Philippines and described a number of new Fulgoroid genera with remarks on the economic importance of some of the species. His work deals with the families Tettigometridae and Lophopidae subfamily Angitinae, of the Philippines and some other parts of South East Asia.

Some more recent other important contributions in the world on Homoptera are those of Diabola (1949-todate), Vilbaste (1958-1972), Nast (1949-1982), Remane (1980-todate),^{and Asche} Asche and Remane (1982) all mostly on European species, of Wilson (1980-todate) and Muir (1913-1930), Beamer (1946-1955) on American and Canadian Planthoppers, and Synave (1953-1969), Linnavuori (1957-1973) and Fennah (1939-todate) on planthoppers of quite varied areas of the world including Indo-Pakistan, Middle East and Africa. Nast (1972-79- 82) published an annotated check list, its addenda and corrigenda of the Palaearctic Auchenorrhyncha, which are extremely useful for workers on planthoppers all over the world. Metcalf (1942) made a very valuable compilation on the bibliography of Auchenorrhyncha Homoptera.

Hamilton (1971-1973) investigated the morphology of planthoppers in general with special reference to their wing venation, similarly Fennah (1941-79) discussed several as-

pects of the phylogeny, taxonomy, and morphology of head, wings, abdomen, and external male genitalia. The terminologies for various components of genitalia and the concept developed by Fennah (1941-1979) are recognized during the course of the present work. He (1941-1979) revised several generic complexes and redefined the families and sub-families of planthoppers from all the zoogeographical regions of the world.

The studies of the Fulgoroidea in Indo-Pakistan are very inadequate. After the pioneer works of Kirkaldy (1900-1905), Distant (1906-1918), and Melichar (1903-1923), the studies in planthoppers remained neglected for several decades, excepting a few minor attempts. Qadri (1943-1977) studied the taxonomy, biology and ecology of a few Fulgorooid planthoppers from Pakistan. Khan (1968-1972) worked on the Delphacid planthoppers of Pakistan including the former East Pakistan (now Bangladesh). Apart from making some observations on the biology and ecology of Pakistani delphacids, she treated 19 genera and described

or redescribed 30 species. Ahmed et al (1970) reported some economically important planthoppers in his account of some commonly found leafhoppers in paddy fields of East Pakistan, Ahmed (1978), Qadri and Mirza (1960), Nast (1965), reported at least a species of planthopper occurring in various parts of Pakistan. Maher et al (1978) and Claridge (1981) discussed the importance of white back planthopper

on rice in Pakistan and Asia respectively.

The present work is an attempt to fill up the gap in our knowledge of the Fulgoroids of Indo-Pakistan. It is mainly concentrated on a study of the families Dictyopharidae, Flatidae, Ricaniidae, Achilidae, Tropiduchidae, Cixiidae, and Lophopidae collected from Pakistan and Bangladesh.

ECCNOMIC IMPORTANCE

The researches on the biology and ecology of plant-hoppers have gained considerable importance, since the recognition of a large number of their species as pests of economic significance and species of crops, grasses, fruit plants etc. Both the adults and nymphs cause damage to the plant by sucking sap from the fronds, which may result in general weakness of the crop, stunting of the plants, and in case of severe feeding activity, "Hoppers Burn" may appear, which may cause complete drying of the plants. Nymphs of some species may excrete "honey dew", on which fungal growth may further damage the plant. A number of species of planthoppers are conformed to be involved in viral transmission in a number of crop species.

et.al.

Hardee (1963) recorded five fulgoroid species as minor pests of grass in United States of America. Fennah (1967) reported one delphacid species causing chronic stunting of grass in Kenya, Africa. Hawkins^{et al} (1979) studied 17.9% loss in average yield of grass in costal areas of United States of America by planthoppers and leafhoppers. Hussain (1963) and Fennah (1974) discovered serious damage to date palm by planthoppers in Iraq and Mexico respectively. Similarly planthoppers of tea were studied by Ghauri (1971) who discovered at least five species of flatids including one new from India, Chaudhry (1966-1970) recorded

47 species in twelve different families on forest plants of Pakistan.

The infestation of planthoppers on paddy, sugarcane, wheat, maize, grass, tamarix, grains, oat, tea, cereals, sorghum, soyabean, palms, coffee, mango, coconut, bamboo, citrus, potato and medicinal plants and some other allied plant species have been rather more serious and have therefore been more extensively studied, from nearly all the rice and sugarcane growing areas of the world. Fletcher (1914-1921) described Fulgoroid planthoppers as minor pests of paddy, Alam (1962-1965) mentioned only one species, Sogatella distincta as a minor pest of paddy in Bangladesh. Ishihara and Lippole (1969) reported several species under eight genera mostly on rice in Bangladesh.

Of the several species of Fulgoroids regarded of economic significance, some quite well known in many parts of the world are e.g. Sogatella furcifera, Sogatella longifurcifera, Nilaparvata lugens, Oliarus hodgarti, Oliarus albifacialis, Oliarus frontalis, Oliarus walkeri, Myndus maculosus, Perkinsiella insignis, Perkinsiella saccharicida, Perkinsiella vitiensis, Perkinsiella vastatix, Pyrilla perpusilla, Pyrilla aberrans, Peregrinus maidis, Purohita Qadrii, Purohita aurandinacea, Purohita cervina, Purohita taiwanensis, Nisia nervosa, Nisia gran-

diceps, Sogatodes cornicaudatus, Sogatodes striatus, Unkanodes spp., Laodelphax spp., Chlociona spp., Delphax spp., Numatodes spp., Epirama melicharia, Anisrus spp., Ricania zebra, Ricania spp., Sardia rostrata, Tosia spp., Tambinia languida, Tambinia spp., Toya propinqua, Toya attenuata and Toya albinotata etc.etc. Some recent workers have reconfirmed in more detail the involvement of planthoppers in crop losses in the world. Wilson (1983) described the association of nymphal stages of five species of planthoppers with rice in Asia. Halode (1983) studied the ecology of some species of planthoppers as pests of rice in India, and noted that Nilaparvata lugens rendered extensive damage to rice from 1976 onwards. Chung-lin (1983) studied the 22 species of the planthoppers on rice, the distribution of some more important species in China. Claridge et al (1983) studied the biotypes and the population of Nilaparvata lugens as an effective pest, particularly of rice in Asia. Ling et al (1983) discussed the various viral diseases transmitted by planthoppers and leafhoppers in which he stated at least five viral diseases i.e. Black streaked dwarf stripe virus disease, Stripe, Grassy stunt, Ragged stunt, Hoja blanca transmitted in rice by nine species of planthoppers i.e. Laodelphax striatellus, Nilaparvata lugens, Nilaparvata bakeri, Nilaparvata muiri, Sogatodes cubanus, Sogatodes orizicola, Terthron albivittatus, Unkanodes albifascia and Unkanodes sapporonus, on the basis of the studies of Kuribayashi

(1931), Kuribayashi and Shinkai (1952), Galvez et al (1960), Kivora et al (1966), Shinkai (1966), Shinkai (1967), Galvez (1969), Hirao (1968), Shinkai (1970), Hibino et al (1977), Ling et al (1977), Iwasaki et al (1980) and Morinaka et al (1981).

In Pakistan and India studies of a number of species of sugarcane planthopper have been made by a number of workers like Fletcher (1914), Misra (1917), Hillai (1921), Hussain (1924-1930), Chopera (1927), Pruthi (1937), Qadri and Aziz (1943); and lastly Khan and Khan⁽¹⁹⁶⁷⁾ studied the bionomics and control of Eyrilla rusana in Peshawar region of Pakistan, and stated the various aspects of its biology which indicted the species as a major pest of sugarcane. Eyrilla perpusilla is known to be more extensively distributed in Pakistan on sugarcane Rahman and Nath (1940), Qadri and Aziz (1943).

In view of the wide recognition of planthoppers as pests of a large number of plant species in the world, their studies have been relatively inadequate, the information of the species of the planthoppers and their biology and ecology in Pakistan are largely wanting. The present account was therefore conceously needed on the fauna of Pakistan.

HOST AND FOOD PLANTS

During the course of present studies, the data accompanying the specimens showed them having been collected from a large number of plants, amongst the cultivated as well as the wild species. Those collected frequently in large number were on sugarcane, corn, rice, wheat etc., etc.

The members of the family Cixiidae and Issidae were mostly grass feeders. Definite host, food plant records are not available for the planthoppers of the family Eurybrachidae. Most of the flatids lived on herbaceous plants. Planthoppers of the families Dictyopharidae and Tropiduchidae were collected both on woody as well as herbaceous plants.

Species of the genera Pyrilla, Eurysa and Perkinsiella live mostly on sugarcane; the genus Purohita on bamboo trees all over Pakistan. Species of the genus Ricania feed usually on citrus, whereas the species of Delphax, Sogata, Sogatella, Laodelphax, of Delphacidae; and Nisia of Meenoplidae preferred, feeding on rice crop etc. Chaudhry (1970) recorded planthopper species belonging to the genus Oliarus, Epiptera, Epirama and Ketumala feeding on a number of forest and fruit trees including deodar, pipalla, banyan, gular and fig. Separate

alphabetically arranged host species and insect species-wise lists based on data of material studied are given below.

LIST OF HOST AND FOOD PLANTS OF PLANTHOPPERS STUDIED

<u>S.No.</u>	<u>Scientific Names of Plants</u>	<u>Planthoppers species collected</u>
1.	<u>Acacia arabica</u> Willd	<u>Melicharia dalbergiae</u>
2.	<u>Alocasia indica</u> L. Arvi	<u>Oliarus hodgarti</u>
3.	<u>Amaranthus blitum</u> L. Cholai	<u>Dictyophara amaranthusae</u>
4.	<u>viridis</u> L.	<u>Dictyophara amaranthusae</u>
5.	<u>Andropogon sorghum</u>	<u>Pyrilla perpusilla</u>
6.	<u>Arachis chypogea</u> Ground-nut	<u>Oliarus hodgarti</u>
7.	<u>Artemisia parviflora</u> Roxb Artimisia	<u>Dictyophara lineata</u> <u>Quadrixa artemisiae</u>
8.	<u>Avena sativa</u> L. Oat	<u>Dictyophara sativae</u>
9.	<u>Chloro dendrion</u> (L) Ornamental hedge	<u>Tambinia languida</u>
10.	<u>Citrus limonus</u> (L) Citrus	<u>Pochazia citri</u> <u>Ricanoptera fenestrata</u> <u>Chiltana baluchi</u>
11.	<u>Cynodon dactylon</u> (L) Grass	<u>Dictyophara abrupta</u> <u>D.asperae</u> <u>D.anwari</u>

D.balakotensis
D.cephalolineata
D.cephalorobusta
D.constricta
D.greeni
D.karachiensis
D.lineata
D.lobosa
D.lyallpurensis
D.mianiensis
D.minuta
D.orangica
D.pallida
D.peshawarensis
D.pirawalensis
D.sacchari
D.sindensis
D.sinica
D.gummari
Putala brachycephala
P.hazarensis
P.rugosa
Gilgitia lobata
Afronersia ramzani
A.quettensis
Viridophara angulata
V.carinata
V.cynodonae
V.tschitralica
Ketumala shahdaraensis
K.truncata
Melicharia greeni
M.lutescens
M.imtiazii
Nakta stoliczkana
Narowalenus globosus
Neovariata punjabensis
Paragomeda gadrii
P.typica
P.viridis
Satapa sicula
Summanus dadarensis
S.reticulata
Unnata gilgitensis
U.bahawalpurensis
U.intracta
Ricania cheemai
R.zebra
Stacota breviceps
Antakhoga gardineri
Cixius murrensis
Oliarus hodgarti
O.albifacialis
O.walkeri

- Oliarus nuwaræ
O.gilgitensis
Adolenda typica
Pitambara montana
Pyrilla aberrans
P.punjabensis
P.perpusilla
P.pusana
P.rahimyarensis
Epirama mirpurensis
12. Dalbergia sisso Roxb Melicharia dalbergiae
Sheeshum Dictyophara sinica
13. Dendrocalamus strictus Epirama melicharia
Bamboo Roxb E.mirpurensis
14. Desmodium concinnum DC Melicharia lahorensis
Wild bush
15. Ficus carica L. Flata spp.
Fig
16. Forest trees Neovariata punjabensis
17. Glycine max (L) Oliarus hodgarti
Soyabean
18. Gossypium herbaceum L. Oliarus hodgarti
Cotton
19. Hordium vulgare L. Oliarus hodgarti
Barley
20. Iberis amara Epormenis turbatensis
Candy
21. Ilex paraguariensis Ketumala bisecta
Tea
22. Kandelia rheedii Dictyophara spp.
Roona

23. On light Dictyophara mianiensis
Afronersia ramzani
24. Lawsonia inermis L. Unnata bahawalpurensis
Mahendi
25. Leucas aspera Dictyophara asperae
Farie D.spinosa
26. Medicago sativa L. Dictyophara punjabensis
Lucern D.striata
D.zeae
D.sativae
Melicharia greeni
M.imtiazii
Paragomed: viridis
P.typica
Satapa sicula
Oliarus hodgarti
Pyrilla aberrans
27. Mentha viridis L. Chiltana baluchi
Mint
28. Olea ferruginea Viridophara tschitralica
Caho
29. Oryza sativa L. Dictyophara sinica
Paddy D.europaea
Afronersia ramzani
Oliarus spp.
O.hodgarti
Pyrilla aberrans
P.punjabensis
P.pusana
P.rahimyarensis
30. Pennisetum typhoides Epirama mirpurensis
Bajra (Burm.f) Oliarus hodgarti
O.sindensis
Pyrilla aberrans
31. typhoideum P.pusana
32. Phyla nodiflora (L) Ricanoptera fenestrata
Weeds Dictyophara karachiensis

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| 33. | <u>Prunus amygdalus</u> Baill
Kagzibadam | <u>Dictyophara pallida</u>
<u>Ricania amygdalusae</u> |
| 34. | <u>Quercus</u> spp. Sm
Pistasio | <u>Dictyophara</u> sp. |
| 35. | <u>Saccharum officinarum</u>
Sugarcane L. | <u>Dictyophara minuta</u>
<u>D. zeae</u>
<u>D. sacchari</u>
<u>Putala rugosa</u>
<u>Pyrilla aberrans</u>
<u>P. punjabensis</u>
<u>P. perpusilla</u>
<u>P. pusana</u>
<u>P. rahimyarensis</u>
<u>Ricania zebra</u>
<u>Pitambara montana</u> |
| 36. | <u>Sorghum vulgare</u>
Jawar | <u>Pyrilla aberrans</u> |
| 37. | <u>sundanensis</u> | <u>P. perpusilla</u> |
| 38. | <u>Suaeda monoica</u> Forsk
W.bush | <u>Melicharia greeni</u> |
| 39. | <u>Tamarix dioica</u> Roxb
Tamarix, Pilchi | <u>Epirama</u> sp.
<u>Oliarus</u> sp. |
| 40. | <u>Tectona grandis</u> L.
Teak | <u>Oliarus hodgarti</u>
<u>O. tectonae</u>
<u>Ricanoptera fenestrata</u> |
| 41. | <u>Trifolium alexandrinum</u> | <u>Dictyophara</u> spp. |
| 42. | <u>Triticum vulgare</u> Vill
Wheat | <u>Oliarus hodgarti</u> |
| 43. | <u>Xanthium strumarium</u> L.
Wild weed | <u>Satapa sicula</u>
<u>Unnata intracta</u> |
| 44. | <u>Zea mays</u>
Maize | <u>Dictyophara zeae</u>
<u>Oliarus hodgarti</u> |

O.gilgitensis
Pyrilla aberrans
P.pusana
P.rahimyarensis
Ricania zebra

LIST OF PLANTHOPPER SPECIES AND
THEIR HOST AND FOOD PLANTS STUDIES

<u>S.No.</u>	<u>Scientific names of planthoppers</u>	<u>Host and food plants</u>
1.	<u>Chiltana baluchi</u>	<u>Mentha viridis</u> L <u>Cynodon dactylon</u> (L)
2.	<u>Dictyophara abrupta</u>	<u>Cynodon dactylon</u> (L)
3.	<u>D.anwari</u>	On light <u>Cynodon dactylon</u> (L)
4.	<u>D.amaranthusae</u>	<u>Amaranthus blitum</u> L
5.	<u>D.asperae</u>	<u>Leucas aspera</u>
6.	<u>D.balakotensis</u>	<u>Cynodon dactylon</u> (L)
7.	<u>D.cephalolineata</u>	<u>Cynodon dactylon</u> (L)
8.	<u>D.cephalorobusta</u>	<u>Cynodon dactylon</u> (L)
9.	<u>D.constricta</u>	<u>Cynodon dactylon</u> (L)
10.	<u>D.greeni</u>	<u>Cynodon dactylon</u> (L)
11.	<u>D.karachiensis</u>	<u>Cynodon dactylon</u> (L) <u>Phyla nodiflora</u> (L)
12.	<u>D.lineata</u>	<u>Cynodon dactylon</u> (L)
13.	<u>D.lobosa</u>	<u>Cynodon dactylon</u> (L)
14.	<u>D.lyallpurensis</u>	<u>Cynodon dactylon</u> (L)
15.	<u>D.mianiensis</u>	On light <u>Cynodon dactylon</u> (L)

16.	<u>D.minuta</u>	<u>Saccharum officinarum</u> L
17.	<u>D.orangica</u>	<u>Cynodon dactylon</u> (L)
18.	<u>D.pallida</u>	<u>Cynodon dactylon</u> (L)
19.	<u>D.peshawarensis</u>	<u>Cynodon dactylon</u> (L)
20.	<u>D.pirawalensis</u>	<u>Cynodon dactylon</u> (L)
21.	<u>D.gummari</u>	<u>Cynodon dactylon</u> (L)
22.	<u>D.sacchari</u>	<u>Cynodon dactylon</u> (L)
23.	<u>D.sativae</u>	<u>Cynodon dactylon</u> (L) <u>Avena sativa</u> L
24.	<u>D.sindensis</u>	<u>Cynodon dactylon</u> (L)
25.	<u>D.sinica</u>	<u>Cynodon dactylon</u> (L) <u>Dalbergia sisso</u> Roxb
26.	<u>D.spinosa</u>	<u>Leucas aspera</u>
27.	<u>D.striata</u>	<u>Cynodon dactylon</u> (L) <u>Medicago sativa</u> L
28.	<u>D.zeae</u>	<u>Medicago sativa</u> L <u>Zea mays</u> L <u>Leucas aspera</u> <u>Cynodon dactylon</u> (L) <u>Saccharum officinarum</u> L
29.	<u>Putala brachycephala</u>	<u>Cynodon dactylon</u> (L)
30.	<u>P.hazarensis</u>	<u>Cynodon dactylon</u> (L)
31.	<u>P.rugosa</u>	<u>Saccharum officinarum</u> L <u>Cynodon dactylon</u> (L)

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|-----|-------------------------------|--|
| 32. | <u>Afronersia ramzani</u> | <u>Oryza sativa</u> L
<u>Cynodon dactylon</u> (L) |
| 33. | <u>A. quettensis</u> | <u>Cynodon dactylon</u> (L) |
| 34. | <u>Viridophara angulata</u> | On light |
| 35. | <u>V. carinata</u> | <u>Cynodon dactylon</u> (L) |
| 36. | <u>V. cynodonae</u> | <u>Cynodon dactylon</u> (L) |
| 37. | <u>V. tschitralica</u> | <u>Olea ferruginea</u> |
| 38. | <u>Epormenis turbatensis</u> | <u>Iberis amara</u> |
| 39. | <u>Ketumala shahdaraensis</u> | <u>Cynodon dactylon</u> (L) |
| 40. | <u>K. truncata</u> | <u>Cynodon dactylon</u> (L) |
| 41. | <u>Melicharia dalbergiae</u> | <u>Dalbergia sisso</u> Roxb.
<u>Acacia arabica</u> (Lam) |
| 42. | <u>M. greeni</u> | <u>Cynodon dactylon</u> (L)
<u>Medicago sativa</u> L
<u>Desmodium concinnum</u> DC
<u>Glycine max</u> (L)
<u>Amaranthus blitum</u> L |
| 43. | <u>M. lahorensis</u> | On wing
<u>Cynodon dactylon</u> (L)
<u>Medicago sativa</u> L
<u>X. strumarium</u> L |
| 44. | <u>M. lutescens</u> | <u>Cynodon dactylon</u> (L)
<u>Zea mays</u> L
<u>Glycine max</u> (L)
<u>Dalbergia sisso</u> Roxb |
| 45. | <u>M. imtiazii</u> | <u>Lawsonia inermis</u>
<u>Cynodon dactylon</u> (L)
<u>Medicago sativa</u> L |

46. Nakta stoliczkana Cynodon dactylon (L)
Dalbergia sisso Roxb
Phyla nodiflora (L)
47. Narowalenus globosus Cynodon dactylon (L)
48. Neovariata punjabensis Cynodon dactylon (L)
49. Paragomeda qadrii Cynodon dactylon (L)
50. P.typica Cynodon dactylon (L)
51. P.viridis Medicago sativa L
Cynodon dactylon (L)
52. Seliza ferruginea On light
Glycine max (L)
Cynodon dactylon (L)
Trifolium alexandrinum
Medicago sativa L
X.strumarium L
Oryza sativa L
53. Satapa sicula Cynodon dactylon (L)
Medicago sativa L
X.strumarium L
54. Summanus dadarensis Cynodon dactylon (L)
55. S.reticulata Cynodon dactylon (L)
Glycine max (L)
56. Unnata gilgitensis Cynodon dactylon (L)
57. U.bahawalpurensis Lawsonia inermis
58. U.intracta Salix sp.
Cynodon dactylon (L)
Dalbergia sisso Roxb
Glycine max (L)

		<u>Medicago sativa</u> L <u>Amaranthus viridis</u> L <u>X.strumarium</u> L
60.	<u>Pochazia citri</u>	<u>Citrus limonus</u> (L)
61.	<u>P.anwari</u>	<u>Cynodon dactylon</u> (L)
62.	<u>Ricania amygdalusae</u>	<u>Prunus amygdalus</u> Baill
63.	<u>R.cheemai</u>	On wing
64.	<u>R.zebra</u>	<u>Cynodon dactylon</u> (L) <u>Zea mays</u> L <u>Saccharum officinarum</u> L
65.	<u>Ricanoptera fenestrata</u>	<u>Tectona grandis</u> L
66.	<u>Tambinia languida</u>	<u>Chloro dendrion</u> <u>Cynodon dactylon</u> (L)
67.	<u>Stacota breviceps</u>	<u>Cynodon dactylon</u> (L)
68.	<u>Antabhoga gardineri</u>	<u>Cynodon dactylon</u> (L)
69.	<u>Adolenda typica</u>	<u>Cynodon dactylon</u> (L)
70.	<u>Cixius murrensis</u>	<u>Sorghum sundanensis</u> <u>Cynodon dactylon</u> (L)
71.	<u>Oliarus albifacialis</u>	<u>Cynodon dactylon</u> (L) <u>Glycine max</u> (L) <u>Oryza sativa</u> L <u>triticum vulgare</u> Vill <u>Medicago sativa</u> L <u>Zea mays</u> L
72.	<u>O.gilgitensis</u>	<u>Cynodon dactylon</u> (L) <u>Zea mays</u> L

73. O.hodgarti Pennisetum typhoidum
Cynodon dactylon (L)
Triticum vulgare Vill
Medicago sativa L
Pennisetum typhoides (Burm.f)
Trifolium alexandrinum
Oryza sativa L
Zea mays L
Tectona grandis
Glycine max (L)
Alocasia indica
74. O.sindensis Pennisetum typhoides (Burm.f)
75. O.tectonae Tectona grandis L
76. Banqoliarus truncatus Cynodon dactylon (L)
77. Pitambara montana Saccharum officinarum L
78. Pyrilla aberrans Saccharum officinarum L
Oryza sativa L
Zea mays L
Medicago sativa L
Pennisetum typhoides (Burm.f)
Sorghum sundanensis
79. P.punjabensis Saccharum officinarum L
Oryza sativa L
Zea mays L
Cynodon dactylon (L)
80. P.perpusilla Saccharum officinarum L
Andropogon sorghum (L)
81. P.pusana Saccharum officinarum L
Oryza sativa
Pennisetum typhoides (Burm.f)
82. P.rahimyarensis Saccharum officinarum L
Oryza sativa L
Zea mays L
83. Epirama mirpurensis Dendrocalamus strictus (Roxb)
Cynodon dactylon (L)

SUPERFAMILY FULGOROIDEA

The superfamily Fulgoroidea was characterized by Dozier (1928) as below:

"Ocelli two in number, rarely three, placed below eyes; very variable in form, but generally reniform, usually in cavities; antennae below eyes, two segmented, terminated into a fine hair or bristle, second segment of particular texture and surface due to the presence of sensitive structures; forms of head very diverse, vertex and frons forming either a continuous curve or forming an acute angle, or both are prolonged to form a long cephalic process; gula absent, beak arising at the latero-ventral extremity of the face, prothorax normally developed, intermediate coxae long, similar to anterior coxae, inserted at a point distant from median line, tegulae always present, male genitalia with great diverse forms of genitalic structures."

Though the present work is not aimed to deal with the details of morphological characters of the superfamily Fulgoroidea, but some characteristics which are commonly utilized for taxonomical identification of the planthoppers, are mentioned here to indicate the concept in which they are used in the main text of this work. The head, its shape, and various sutures and sclerites, shapes of pronotum and mesonotum, texture and venation of wings, appendages, their chaetotaxy and spines, and detailed characters of the components of male genitalia are usually employed at various stages in the study of systematics of planthoppers.

Head

The head in the Superfamily Fulgoroidea is greatly modified particularly in the development of its shape and carination. There are usually two median longitudinal carinae on face, a situation termed as bicarinate, In some cases, there may be a central median carina and two lateral carinae on the face, a condition termed as tricarinate. The carination is obscure at the junction of vertex and face, or there may be several developmental modifications in the final pattern of carinae in many species. The carinae may amalgamate to give rise to a unicarinate condition.

Evans(1938) and Kramer (1950) noted some useful modifications in the postclypeus and genae of the Fulgoroids, whereas Spooner (1938) regarded lora as the lateral modifications of the post clypeus. The number of ocelli usually two, but sometimes three, as in members of the family Cixiidae. The third ocellus, is placed at the anterior margin of the frons, close to the clypeus. Antennae are varied in shape and size, but are generally small, with three segments, and a bristle or hair coming out of third segment.

Thorax

Pronotum generally received little study. However, a better treatment and good comparative study is that of Metcalf (1913, 1917a). In Fulgoroids the head is closely joined to pronotum. It covers the dorsum of pro and mesothorax and extends onwards over most of plural region, It is variable in length, at times it is narrow, usually with three carinae, mostly with variable number of carinae, which are sometimes distinct, and sometimes very indistinct. Mesonotum is a part of metathorax and most of mesothorax, in rare cases it is poorly developed but in most of the cases it ^{is} large, broad, and strongly carinated. The mesonotal carinae are of great utility and most of the workers recognized their importance.

Wings

The wings may be either brachypterous, the forms with abbreviated tegmina and venation, not reaching the tip of abdomen, more or less rounded. Or macropterous, forms with well developed tegmina and venation, longer than abdomen, somewhat thickened, completely covering membranous hind wings, the vanal fold, divides the wing into an anterior ramigium and a posterior vanus, the general pattern of basic wing venation is same throughout Fulgoroidea except some slight changes in venation of different families.

Male genitalia

The ninth segment of male is modified into a ring or cup-like structure, known as pygofer, directed caudo-ventrally, protruding from pygofer a little ventral is a pair of large blunt parameres, each with a hooked projection on dorsal margin known as dorsal apical process, above the paramere is the aedeagus. It is tubular, cylindrical, usually with membranous and sclerotized spinose lobes and processes. The position of gonopore is variable, it is in membranous portion and sometimes in the sclerotized portion of aedeagus, The aedeagus and parameres are connected together by a variously modified bar-like sclerite known as connective, the stem of connective forms an elongate process which extends to the base of aedeagus, and each short arm of this plate articulates with the base of paramere, above the aedeagus is the 10th and 11th segment, both forming a anal segment.

KEY TO THE FAMILIES OF FULGOROIDEA

1. Medium to large sized insects, body laterally compressed, head usually as broad as pronotum, 2nd post tarsal segment smaller than the first segment, apical margin usually truncate or rounded ----- 2.

Small to medium sized insects, body dorsoventrally compressed, head narrower than pronotum, 2nd post tarsal segment greatly smaller than the first segment, apical margin usually subconical or emarginate---7.

2. Frons longer than broad, ocelli lateral to the eyes, head narrower than pronotum, clypeus usually carinate ----- Lophopidae.

Frons usually broader than long, ocelli may be lateral or before eyes, head as broad as pronotum, clypeus without carina ----- 3.

3. Ocelli before eyes, remote from eyes, pronotum usually spotted, tegmina opaque, held horizontally, apex emarginate ----- Eurybrachidae.

Ocelli lateral, below the eyes, pronotum without spots, tegmina semi-opaque, held vertically, apex nearly rounded -----4.

4. Vertex moderately produced, pronotum with carinae weaker or absent, tegmina reduced ----- Hypochthonellidae.

Vertex occasionally produced, pronotum usually carinate, tegmina fully developed -----5.

5. Mesonotum longer than broad, tegmina with basal cell reticulate, tegulae indistinct ----- Acanaloniidae.

Mesonotum broader than pronotum, tegmina with basal cell usually not reticulate, tegulae distinct ----- 6.

6. Frons longer than broad, costal membrane narrow, nodal line present, aedeagus with spinose and membranous apical processes ----- Nogodinidae.

Frons rather broader than long, costal membrane relatively broad, nodal line absent, aedeagus with complicated apical spines or processes ----- Ricanidae.

7. Head moderately produced in front of eyes ----- 11.

Head greatly produced in front of eyes -----8.

8. Tegmina leathery, costal membrane without cross veins, venation simple, prominent ----- Tettigometridae.

Tegmina hyaline, costal membrane with numerous cross veins, venation regular ----- 9.

9. Cephalic process moderately produced before eyes, tegulae small, partly covered with pronotum, venation with a few cross veins ----- Gengidae.

Cephalic process greatly produced before eyes, tegulae large, not covered with pronotum, venation with a number of cross veins ----- 10.

10. Mesonotum large, mostly tricarinate, costal membrane without cross veins, venation posterior to nodal cell, not reticulate, aedeagus complex, sclerotized, with a serrated flagellum at apex ----- Tropiduchidae.

Mesonotum with a transverse groove across the posterior angle, costal membrane with a few cross veins, venation posterior to nodal line often reticulate, aedeagus semi sclerotized with membranous and sclerotized apical processes ---- Dictyopharidae.

10. Body dorsolaterally compressed, ocelli may present or absent, tegmina held vertically, often with reduced venation, basal cell relatively small -----
----- Issidae.

Body dorsoventrally compressed, ocelli present, tegmina held horizontally, with moderately developed venation ----- 11.

11. Vertex rarely produced before eyes, ocelli usually three, median ocellus often present, tubercles on all veins, pronotum collar-like, aedeagus tubular, recurved distally, complex, paramere usually without any projection ----- Cixiidae.

Vertex slightly produced before eyes, ocelli usually two, median ocellus usually absent, tubercles may be present or absent, pronotum may be collar-like or not, aedeagus elongated, may be recurved distally, usually simple, paramere usually with projections ----- 12.

12. Ocelli may be two or three, antennae small, conspicuous, apices slightly convergent, costal membrane wide, clavus not granulose, paramere usually with a bifid median process ----- Kinnaridae.

Ocelli two in number, antennae small, apices mostly convergent, costal membrane usually narrow, clavus granulose or not, paramere usually elongated -----
----- 13.

13. Anterior claval veins with tubercles, vertex with lateral carinae elevated, ocelli large, tegmina fuscous, apices convergent, membrane without cross veins ----- 14.

Anterior claval veins not tuberculate, vertex without elevated carinae, ocelli small, tegmina hyaline, apices may be divergent or convergent----15.

14. Vertex with lateral margins strongly elevated, tegmina fuscous or castaneous, nodal line present, venation granulose, membrane without cross veins, with a series of apical cells, claval suture arcuate, aedeagus with a pair of slender processes
----- Meenoplidae.

Vertex with lateral margins not elevated, usually produced in front of eyes, tegmina hyaline with reduced cubital area, pygofer usually with medioventral process, aedeagus with many subapical processes ----- Derbidae.

15. Post tibia with a long mobile spur at apex, frons with median carina bifurcated, antennae variously modified, tegmina setigerous, clavus with two veins joined apically, anal segment usually with anal hook, aedeagus without periandrium -----
----- Delphacidae.

Post tibia without a mobile spur at apex, frons with median carina, usually single, antennae simple, tegmina hyaline, anal segment usually simple ----
----- 16.

16. Costal cell with numerous cross veins, head moderately produced in front of eyes -----17.

Costal cell without cross veins, head usually greatly produced in front of eyes ----- Fulgoridae.

17. Frons with median carina elevated, basal segment of hind tarsus long with one or more spines-----
----- Flatidae.

Frons with median carina not elevated, basal segment of hind tarsus small, without spines ----- 18.

18. Tegmina relatively long and narrow, tectiform inre-
pose, aedeagus with short, simple, widely tubular
phallobase ----- Achilixiidae.

Tegmina usually over-laping, distally inrepose rar-
ely long and tectiform, aedeagus retracted into
the body, phallobase tubular, usually with appen-
dages----- Achilidae.

FAMILY DICTYOPHARIDAE SPINOLA, 1839

The family Dictyopharidae is one of the larger families of the superfamily Fulgoroidea, and is fairly well represented in Pakistan. Metcalf (1946) characterized the family as below:

"The head is proportionately large, frequently with a distinct cephalic process which may be conically or teretely produced. In other genera the head is not produced in front of the compound eyes, and the vertex rounds into the frons sometimes with and sometimes without a transverse carina separating the one from the other. The vertex is usually broader than the short diameter of the compound eyes; sometimes with, but more frequently without, a median carina. The frons is usually elongate, with strong median, lateral, and intermediate carinae; although any of these may be wanting. The compound eyes are usually semiglobose with the sinus wanting or inconspicuous. The antennae are usually small and inconspicuous; the first segment collar-like; the second usually globose or obovate; the flagellum moderately elongate. The paired lateral ocelli are usually present and are situated on the lateral areas of the head in front of the compound eyes, or sometimes below the eyes.

The thorax is conspicuous, with the pronotum and mesonotum sometimes subequal in length and breadth. Frequently the pronotum is short, broad, and collar-like. Quite frequently it has median and intermediate carinae, with two conspicuous lateral carinae behind the compound eyes. The mesonotum is sometimes rhomboidal in outline, with the anterior margin triangularly produced. The tegulae are usually large, frequently carinate. In the subfamily Orgeriinae the tegulae are absent. The legs are usually slender and elongate but in some genera the fore femora or tibiae or both (*Phylloscelis* Germar) may be greatly expanded. The hind tibiae generally bear three or five stout spines. Second segment of hind tarsi large, with a row of small, stout spines at the apex.

Tegmina macropterous or brachypterous. Rar-

ely both long and short winged forms are found in the same genus (Scolops Schaum, Phylloscelis Germar). The members of the subfamily Orgeriinae are all brachypterous and lack the claval suture, usually characteristic of homopterous tegmina. The venation of the macropterous tegmina is of a fairly constant pattern and may be described briefly as follows: Subcosta and radius united to near the apical third, where subcosta curves toward the costal border and forms a distinct nodal cell which is usually crossed by several branches of subcosta. After the separation from subcosta, radius usually branches irregularly and is united to the first branch of media by one or more cross veins. In many species there is an irregular series of cross veins on the apical third, forming a transverse vein similar to the transverse vein found in the family Tropiduchidae, and for this reason there has been considerable confusion in placing certain genera and species in these two families. However, the two families may be separated readily by the character of the second segment of the hind tarsi which is large in the members of the family Dictyopharidae and small in the species in the family Tropiduchidae. Media and cubitus fork before the transverse vein in many species of Dictyopharidae and the apical area usually has numerous irregular cross veins. In the species with brachypterous tegmina the venation is very irregular and variable.

The hind wings are large in most macropterous forms, with the venation somewhat irregular and with usually numerous cross veins in the apical area but not in the anal area. This character will aid in differentiating certain members of this family from species of the family Fulgoridae, with which they might otherwise be confused. Hind wings are frequently absent in brachypterous forms.

The male genitalia are complex. Muir (1930) says, "There is an inner penis and an outer perianthrium, and the membrane connecting them can be protruded and inflated, and is complex, often bearing armatures."

The family is represented in Pakistan by Six genera and 36 species which are mostly spread over the different climatic parts of the country, they all agree well with

the above characteristics. The species in Pakistan are studied on grasses in general and other plants like Cholai, Sugarcane , Farie plant, Maize, Sheeshum, Lucern, Wild mint, in special.

KEY TO THE GENERA OF THE
FAMILY DICTYOPHARIDAE FROM PAKISTAN

1. Median length of head more than the collective median length of pronotum and scutellum -----
-----Dictyophara Germar.

Median length of head less than the collective median length of pronotum and scutellum ----- 2.

2. Median length of head more than inter ocular width--
----- 3.

Median length of head less than inter ocular width--
----- 4.

3. Aedeagus without appendages; lateral spinose process nearly distad from the base, as the dorsal apical process on the paramere ----- Putala Melichar.

Aedeagus with appendages; lateral spinose process basal to the dorsal apical process on the paramere.
----- Viridophara Novo.

4. Vertex projecting in front of the anterior margin of compound eyes ----- 5.

Vertex with anterior margin ending prior to the anterior margin of compound eyes ----- Chiltana Novo.

5. Aedeagus with a prominent median sac-like lobe; median length of clypeus less than the length of frons --
----- Gilgitia Novo.

Aedeagus without median sac-like lobe; median length of clypeus nearly equal to length of frons -----
----- Afronersia Fennah.

Genus Dictyophara Germar

Dictyophara Germar. Silbersmann Rev. Ent. 1:175, 1833.

Type-species : Fulgora europaea Linnaeus 1767 by subsequent designation of Distant, F.D.I. 111:241, 1906.

Though a number of species of the genus Dictyophara Germar, are known from many parts of the world including India, Pakistan, Europe, U.S.A. etc, yet a comprehensive generic description is not available. The genus is therefore redescribed below:

Head and thorax

Length from anterior tip of cephalic process to posterior tip of tegmina in repose varying from 1.0 cm, to 1.6 cm; females usually longer than the males; vertex extended anteriorly into a cephalic process; usually three to four times longer than width of vertex across base; lateral margins of cephalic process parallel to sub-parallel, sometimes converging along length, with apex of cephalic process more or less smoothly rounded; head in profile with ventral margin mostly slanting upwards towards anterior extremity, head, pronotum, scutellum generally tricarinate, i.e. with one central and two lateral carinae on each, any of carinae may be absent, incompletely or indistinctly developed; pronotum with or without short lateral carinae behind each eye, varying in number, from 1-4; median length of frons 2 to

4 times the length of clypeus, with oblique striations in lateral parts of clypeus.

Tegmina

hyaline, rather large, usually much extending behind abdomen, with apex broader than the rest of tegmina, and rounded; apical part possessing reticulate venation, with transverse veins irregularly arranged in 2 to 3 rows; stigma present in distal half, along anterior margin of tegmina, stigma covering 3 to 6 cells; apical cells, other than those covered by stigma, 15 to 21.

Male genitalia

Anal segment, nearly always moderately long, in lateral view, narrow at base, widening towards apex, with apical margin oblique, ventral margin of anal segment possessing a longitudinal cleft; pygofer, in lateral view, with posterior margin flatly truncate, slightly convex or projected posteriorly in form of a narrow, conical, or finger shaped lobe; aedeagus, in dorsal view, with phallobase short and broad, tubular and moderately long, with one pair of none sclerotized lobes, and single unpaired, or one to three pairs of membranous lobes, both types of lobes varying in shape, from long and narrow to broad and rounded, spines present on lobes variously; paramere usually not exceeding aedeagus posteriorly in length, in lateral view, always broad in

apical than in basal half, apex rounded, dorsal margin possessing an apical dorsal process, arising from the apical half taking usually a conical shape, an other spinose process, present on lateral surface, hook shaped, located near dorsal margin, always at the level of dorsal apical process or slightly basad to it.

25 species of the genus Dictyophara have been studied from Pakistan and treated in the present work. Of these 23 are new to science. A comprehensive key of the Pakistani species of the genus have been given.

KEY TO THE SPECIES OF THE GENUS DICTYOPHARA GERMAR

1. Central carina on vertex distinctly developed from base to the apex or more than half of the length of cephalic process ----- 2.

Central carina on vertex either completely absent, or when present, partially developed, either near the apex of cephalic process, or at the base of the vertex, when fully developed, not distinct, only faintly visible -----7.

2. Central carina absent near the apex of cephalic process ----- D. qumari, n.sp. 3.

Central carina present throughout ----- 3.

3. Lateral frontal carinae fully developed upto the anterior margin of frons ----- 4.

Lateral frontal carinae present on upto the mesal margins of eyes, not developed upto the anterior margin of frons ----- 5.

4. Lateral pronotal carinae behind the compound eyes three in number ----- D. orangica, n.sp.

Lateral pronotal carinae behind the compound eyes two in number ----- D. lobosa, n.sp.

5. Central carina on scutellum absent ----- D. cephalolineata, n.sp. 6.

Central carina on scutellum present ----- 6.

6. Lateral carinae on pronotum fully developed, short lateral carinae behind eyes, three in number -----
----- D. amaranthusae, n.sp.

Lateral carinae on pronotum only partly present, short lateral carinae behind eyes two in number ----
----- D. sacchari, n.sp.

7. Central carina on head present throughout, but only faintly marked ----- 8.

Central carina on head either absent all together, when present only partly developed, always less than half length of head ----- 10.

8. Aedeagus possessing both sclerotized, as well as membranous lobes ----- D. pallida Walker.

Aedeagus possessing only membranous lobes ----- 9.

9. Aedeagus with three pairs of membranous lobes -----
----- D. spinosa, n.sp.

Aedeagus with two pairs of membranous lobes -----
----- D. peshawarensis, n.sp.

10. Central carina absent on head ----- 15.

Central carina present on head, but partly developed-----
----- 11.

11. Central carina on head present, both at the base of vertex and at the tip of cephalic process -----
----- D. pirawalensis, n.sp.

Central carina on head present either at the base of vertex or at the tip of cephalic process, not at both positions ----- 12.

12. Central carina present at the anterior tip of the cephalic process, developed slightly half length of head ----- D. asperae, n.sp.

Central carina on head developed only on vertex or slightly beyond ----- 13.

13. Lateral carinae on pronotum behind the eyes two in number, forewing sparsely reticulate -----
----- D. constricta, n.sp.

Lateral carinae on pronotum behind the eyes three or four, forewing densely reticulate ----- 14.

14. Lateral carinae on pronotum, behind the eyes three in number, aedeagus with well developed sclerotized lobes ----- D. anwari, n.sp.

Lateral carinae on pronotum behind the eyes four in number, aedeagus without sclerotized lobes -----
----- D. mianiensis, n.sp.

15. One central and two lateral carinae completely developed on frons ----- 16.

Either of the central or lateral carinae incompletely developed on frons ----- 17.

16. Lateral carinae on head developed close to each other, almost in the middle on head, pronotum and scutellum without carinae ----- D. minuta, n.sp.

Lateral carinae on head developed in the lateral position apart from each other; pronotum and scutellum tricarinate ----- D. cephalorobusta, n.sp.

17. Central carina on frons either incomplete or when complete, developed indistinctly ----- 18.

- Central carina on frons distinct and complete-----21.
18. Central carina on frons incomplete anteriorly-----19.
- Central carina on frons complete, but indistinct anteriorly ----- 20.
19. Pygofer with postero-dorsal margin convex in shape, aedeagus with long membranous lobes, as well as with short sclerotized lobes-----D. greeni, n.sp.
- Pygofer with postero-dorsal margin produced into lobe, aedeagus with short membranous lobes, sclerotized aedeagal lobes absent ----- D. zeeae, n.sp.
20. Pronotum with distinct tricarinate condition, cephalic process nearly equal to head in width -----
----- D. sindensis, n.sp.
- Pronotum with only central carina; cephalic process prominently narrower than head in width -----
----- D. abrupta, n.sp.
21. Pronotum and scutellum with central carina absent --
----- D. sinica Walker.
- Pronotum and scutellum with central carina present----- 22.
22. Aedeagus with sclerotized lobes absent ----- 23.
- Aedeagus with sclerotized lobes present ----- 24.
23. Pygofer with posterior margin convex; aedeagal membranous lobes short, straight -----
----- D. balakotensis, n.sp.

Pygofer with posterior margin concave; aedeagal membranous lobes long and twisted -----
----- D. sativae, n.sp.

24. Pronotum with both lateral carinae, and carinae behind the eye lacking, paramere with dorsal apical process arising beyond mid length -----
----- D. lyallpurensis, n.sp.

Pronotum with lateral carinae present; carinae behind the eyes three in number, paramere with dorsal apical process arising basal to middle -----
----- D. karachiensis, n.sp.

Dictyopnara gumhari, n.sp.
(Figs. 1 A-I)

Form and colour

Length of male 1.4 cm; vertex much longer than broad across base (4:1); lateral margins of cephalic process subparallel, apex slightly narrowed and rounded; median length of frons nearly four times the median length of clypeus; head, pronotum, scutellum, and frons all tricarinate; central carina on head and lateral carinae on pronotum and frons incomplete, those on frons extending posteriorly upto middle of mesal margin of eyes. General body colour greenish, with occasional tinge of orange colour.

Tegmina hyaline; stigma 3 or 4-celled; transverse veins, in apical half in three rows, rather discontinuous and irregular; apical cells, other than those covered by stigma, 18.

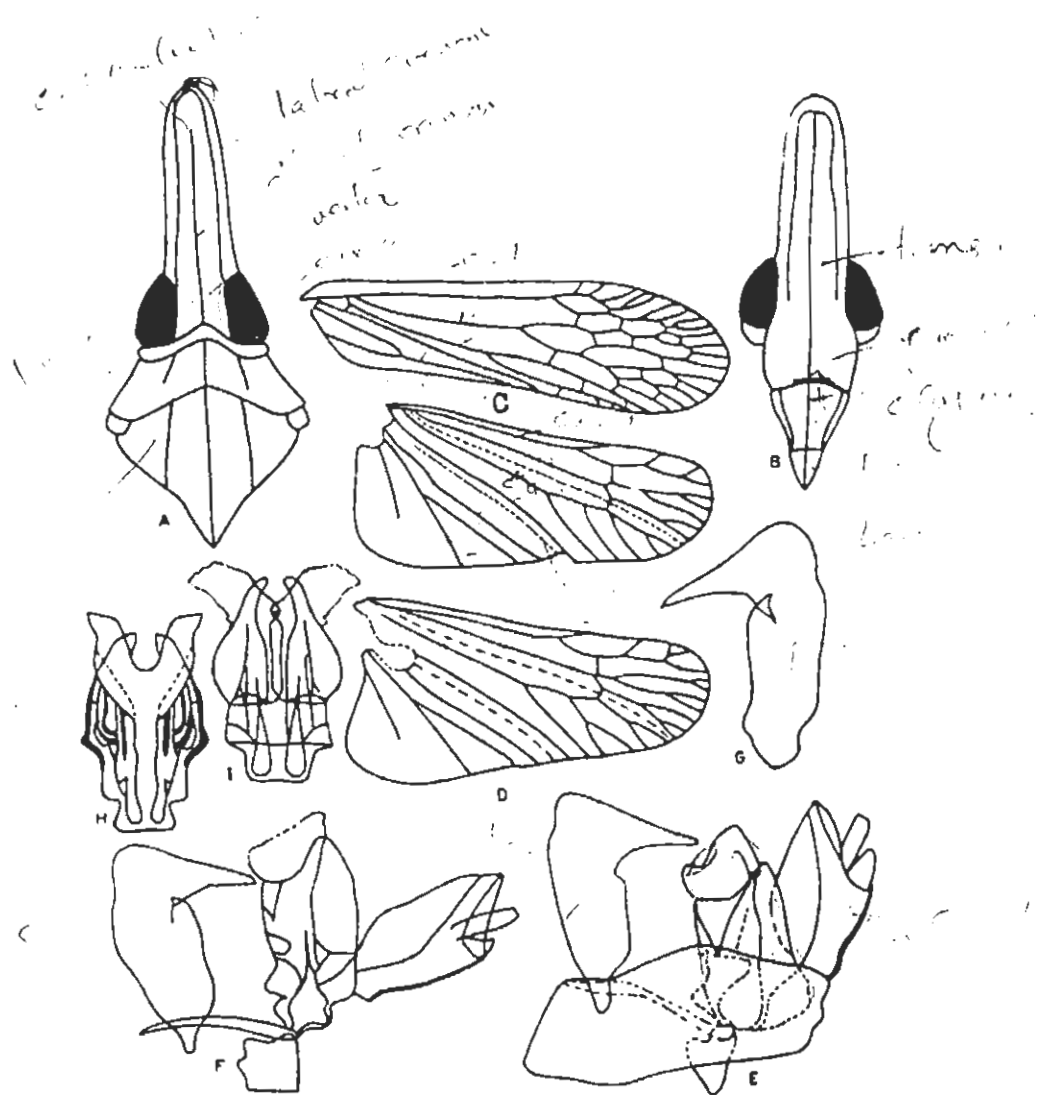
Male genitalia

Anal segment, moderately long, in lateral view, dorsal and ventral margins nearly subparallel, apex oblique; pygofer, in lateral view, with posterior margin dorso-ventrally broad, produced caudad in mildly lobed, convex middle part; aedeagus, with short phallobase, possessing one pair of membranous and one pair of sclerotized lobes, mem-

branous lobes dorsal in position, comparatively longer than ventral sclerotized lobes, in ventral view, broad and sac-shaped in basal part, narrowed and tubular in apical $1/3$, apices of sclerotized lobes converging towards middle line, possessing a bunch of spines on base of each lobe; paramere of nearly uniform width from base to $2/3$ length, apical part smoothly rounded, and curved obliquely, cephalo-dorsad to form a long, prominent, dorsal apical process, length of process nearly half length of entire paramere; dorsal apical process forming an acute angle with dorsal longitudinal margin of paramere, apex of process spinose, short, triangular, present at proximal part of base of dorsal apical process, adjacent to dorsal margin.

Type material

Holotype male, Hyderabad, Sind, Pakistan, on general grasses, 13. VIII. 1976.; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 1 A-I. *Dictyophara gummari*, n.sp., A & B: Head, dorsal and frontal aspects, 8x, C & D: Right fore and hind wings, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Right paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Dictyophara orangica, n.sp.
(Figs. 2 A-F)

Form and colour

Length of male 1.4 cm, of female 1.6 cm; vertex much longer than broad across base (5:1); lateral margins of cephalic process nearly sub-parallel, apex smoothly rounded; median length of frons nearly three times that of clypeus; head, pronotum, scutellum and frons all tricarinate, carinae complete; pronotum with three short lateral carinae behind each eye; head in lateral view slightly slanting upward towards apical part. General body colour greenish, with middle areas of pronotum, scutellum and frons redish orange, eyes, clypeus, legs and abdomen brownish, spotted with dark brown.

Tegmina, hyaline, with stigma 4-celled; transverse veins, in apical half in three rows, as well as some supernumerary veins; apical cells, other than those covered by stigma, 15.

Male genitalia

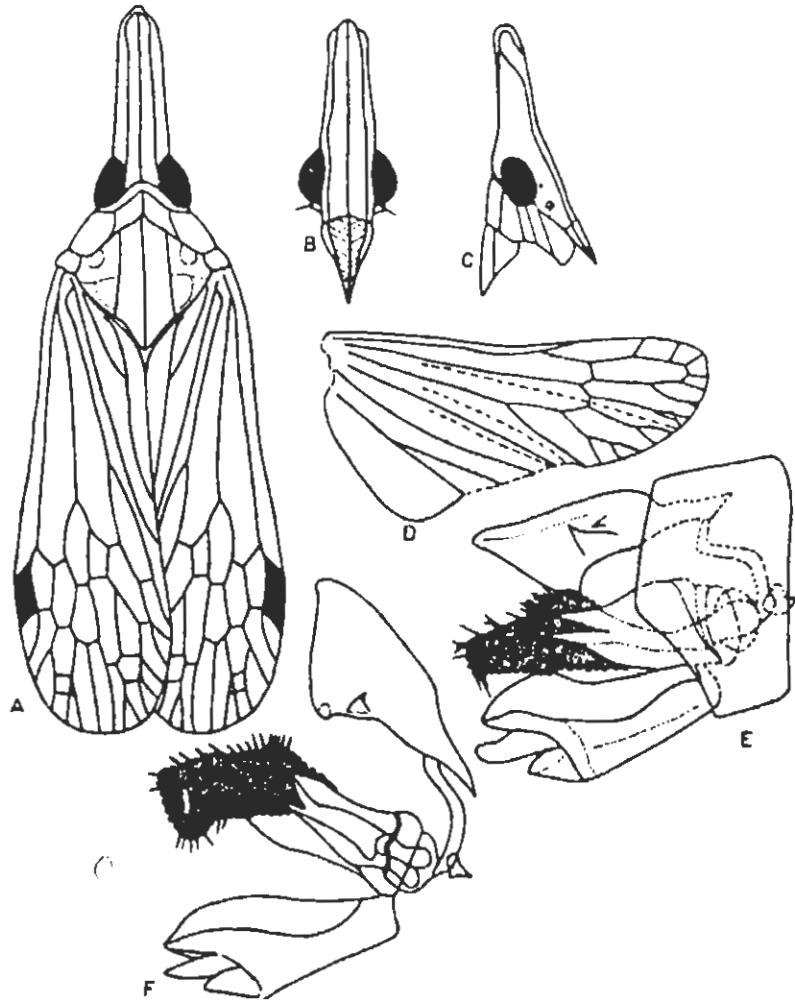
Anal segment, moderately long, in lateral view, ventral margin sinuate in basal half, dorsal margin flat, apex oblique with posterior tip more projected behind; pygofer broad, strip like, in lateral view, narrow in dorsal half, and broad in ventral half, posterior margin forming

an obtuse angle in middle; aedeagus with long phallobase, a pair of long and broad membranous lobes, spines on lobes covering entire surface, aedeagal appendages and sclerotized lobes absent; paramere much broadened beyond mid-length, extreme apex narrowed, dorsal apical margin oblique, dorsal apical process present at the dorsal angle of roughly triangular paramere, process not sharply marked, spinose process slightly basad to dorsal apical process, close to the dorsal margin of paramere.

D. orangica, n.sp., appears close to the hitherto described Pakistani species D. lobosa, n.sp., in general pattern of morphological characters, but differs in the carination of pronotum and frons as well as in some details of aedeagal structures. In contrast with the incomplete lateral carinae on frons and two short lateral carinae on pronotum in D. lobosa, n.sp., the lateral carinae on frons in D. orangica, n.sp., are completely developed and the short lateral carinae on pronotum are three in number. The membranous aedeagal lobes in D. orangica, n.sp., are much larger as compared with those of D. lobosa, n.sp.

Type material

Holotype male, Balakot, N.W.F.P, Pakistan, grass (Cynodon dactylon), Imtiaz Ahmed, 14.IX.1968; allotype female, with same data as of the holotype; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 2 A-F. Dictyophara orangica, n.sp., A: Body, dorsal aspect, 8x, B & C: Head, frontal and lateral aspects, 8x, D: Hind wing, 8x, E & F: Male genitalia, lateral aspects, 32x.

Dictyophura lebossa, n.sp.
(Figs. 3 A-1)

Form and colour

Length of male 1.4 cm, of female 1.4 cm; vertex much longer than broad across base (5:1); lateral margins of cephalic process nearly parallel, apex broadly rounded; median length of frons more than four times length of clypeus; head, pronotum, scutellum and frons all tricarinate, lateral carinae on pronotum indistinct, those on frons also indistinct from level of anterior mesal margin of eyes to the fronto-clypeal suture; pronotum with two short lateral carinae behind each compound eye; ratio between spines on outer margin and distal end of hind tibia 4:7. General body colour greenish, carinae greenish all over, pronotum black laterally, labrum, legs and venter brownish, basal part of vertex orange in colour.

Tegmina, hyaline, stigma 4 or 5-celled; transverse veins, in apical half in three rows, rather irregular; apical cells, other than those covered by stigma, 17.

Male genitalia

Anal segment, in lateral view, moderately broad, with ventral margin possessing a cleft, both dorsal and ventral margins having hairs arranged in rows; pygofer stirp sha-

ped, with posterior margin almost straight dorso-ventrally, slightly concave, produced into an angle posterodorsally; aedeagus with long and tubular phallobase, with

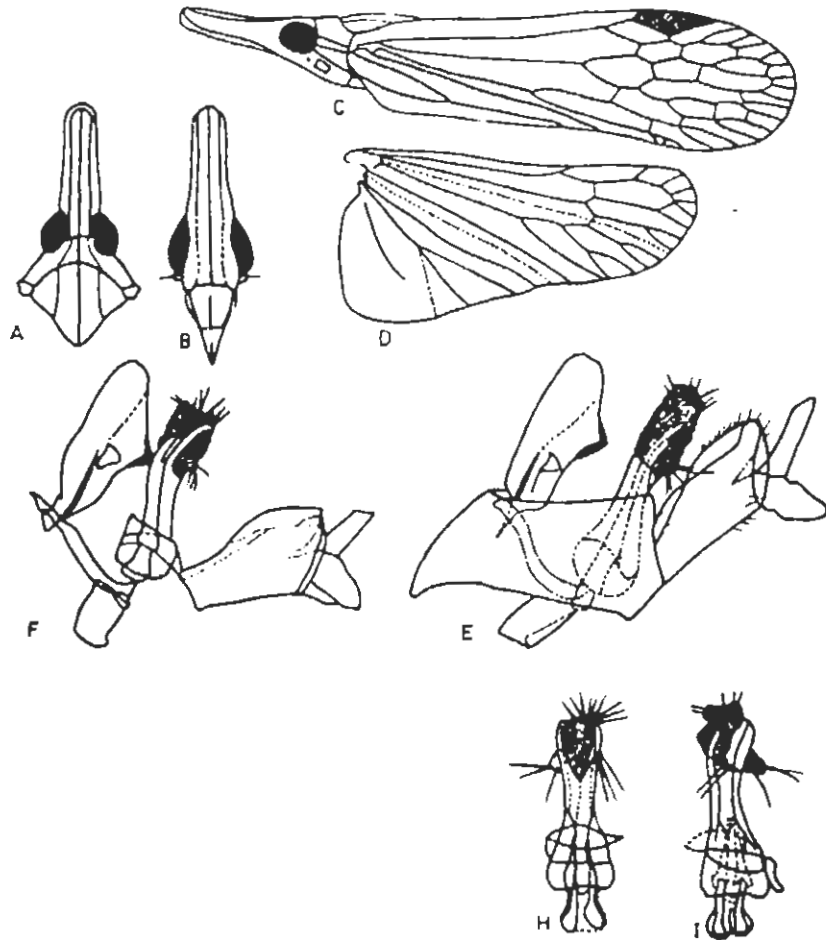
a single, oval shaped, membranous lobe, covered with irregularly arranged bunches of long spines; paramere with a broadly rounded apex, with dorsal apical process present approximately in middle, moderately projected, apical part more sclerotized, spinose process on lateral surface arising in basal half of paramere and located near to dorsal margin.

D. lobosa, n.sp., is close to D. orangica, n.sp., described hitherto, in general pattern of head and venation, differ in details of the aedeagal structures and the carination of pronotum and frons. As compared with the large membranous aedeagal lobes, completely developed lateral carinae on frons and three short lateral carinae on pronotum behind the eyes, in D. orangica, n.sp., The new species D. lobosa, possess short, oval shaped membranous aedeagal lobes, partly indistinct, lateral carinae on frons and two short lateral carinae behind the eyes.

Type material

Holotype male, Hyderabad, Sind, Pakistan, grass, (Cynodon-dactylon), Shujaat, 6.VII.1975; allotype female, and paratypes 16 males, and 15 females, all with same

data as of the holotype; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 3 A-I. Dictyophara lobosa, n.sp., A & B: Head, dorsal and frontal aspects, \times , C: Body, lateral aspect, \times , D: Right hind wing, \times , E & F: Male genitalia, lateral aspects, $32\times$, H & I: Aedeagus, dorsal and ventral aspects, $32\times$.

Dictyophara cephalolineate, n.sp.
(Figs. 4 A-I)

Form and colour

Length of male 1.2 cm, of female 1.3 cm; vertex much longer than broad across base (5:1); lateral margins of cephalic process slightly narrowed to a rounded apex; median length of frons nearly four times length of clypeus; head tricarinate, lateral carinae longitudinally arc shaped, diverging towards lateral sides, joining posteriorly to the mesal margin of eyes; pronotum with lateral carinae incomplete, obliquely converging posteriorly towards middle, with two short lateral carinae behind each eye; scutellum without central carina; frons with lateral carinae incomplete, not reaching posteriorly to the fronto-clypeal suture; ratio between spines on outer margin and distal end of hind tibia 5:7. General body colour ochraceous brown, carinae pale all over, eyes, anteclypeus, parts of venter and lateral areas of scutellum brownish, frons mostly orange in colour.

Tegmina, with stigma 5-celled; transverse veins, in apical half in three rows, as well as some supernumerary cross veins; apical cells, other than those covered by stigma, 16.

Male genitalia

Anal segment, in lateral view, with dorsal and vent-

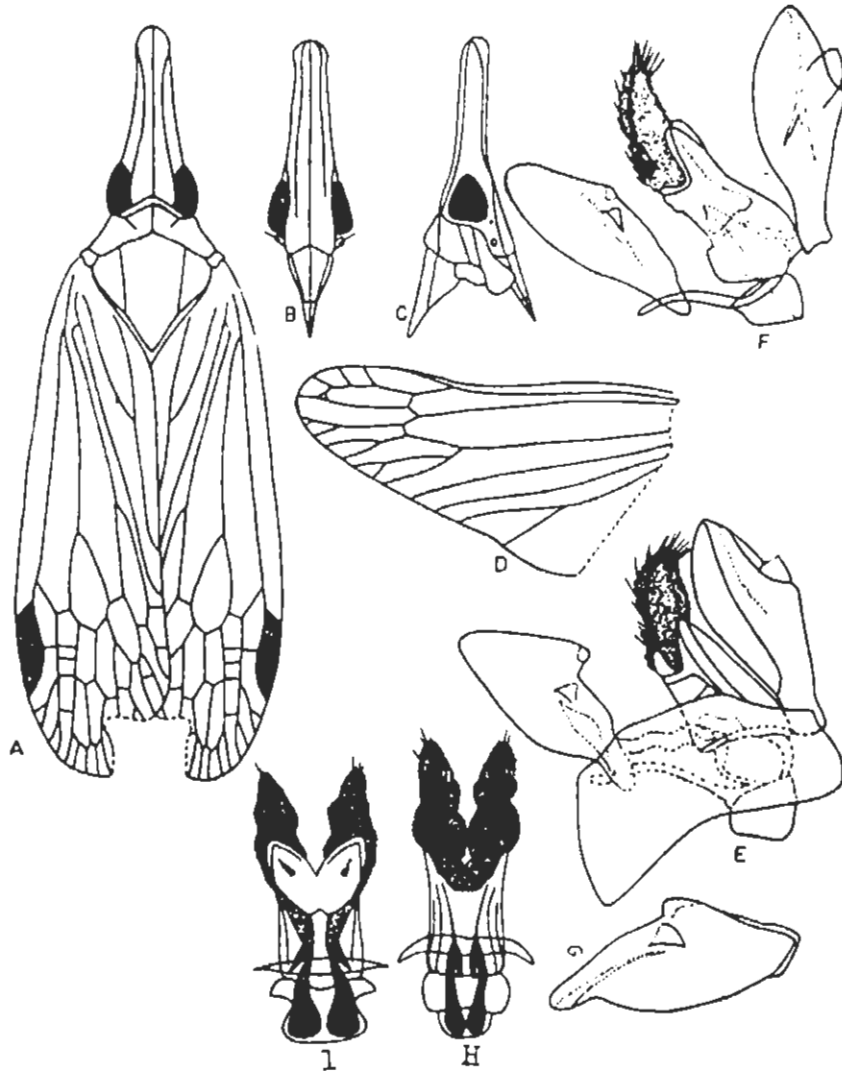
ral margins widening towards an oblique apex, with a longitudinal cleft on ventral margin, from near base to apex; pygofer with posterior margin irregularly convex, nearly flattened in middle; aedeagus with phallobase, in dorsal view, broad and moderately long, with a pair of short sclerotized lobes, each possessing a prominent spine in middle, and a pair of ventrally located, long membranous lobes, margins of membranous lobes irregular and possessing spines; paramere with much narrowed, rounded apex, dorso-apical margin continuous with apex of dorsal-apical process, spinose process arising proximad to dorsal apical process, from near dorsal margin.

D. cephalolineata, n.sp., is quite close hitherto described Pakistani species D. orangica, n.sp., and D. greeni, n.sp., but differs in having the stigma

with 5-cells, lateral carinae on frons being incomplete, where as in D. greeni, n.sp., the stigma is 6 celled, and the lateral carinae on frons are complete. The general body size in D. greeni, n.sp., is much smaller than that of D. cephalolineata, n.sp.

Type material

Holotype male, Murree, Punjab, Pakistan, grass, paratype one male, with same data as the holotype; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 4 A-I. Dictyophara cephalolineata, n.sp., A: Body dorsal aspect, 8x, B & C: Head, frontal and lateral aspects, 8x, D: Left hind wing, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Right paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Dictyophara amaranthusae, n.sp.
(Figs. 5 A-I)

Form and colour

Length of male 1.2 cm, of female 1.3 cm; vertex much longer than broad across base (4.5:1); cephalic process smoothly rounded at apex, with lateral margins slightly incurved ; median length of frons nearly 3.5 times the length of clypeus; clypeus with lateral oblique striations; head, pronotum, scutellum and frons tricarinate, lateral carinae on frons incomplete, reaching posteriorly upto mesal margin of eyes; pronotum with three short lateral carinae behind each eye; ratio between spines on the outer margin and distal end of tibia 4:7. General body colour greenish, pronotum, scutellum and frons mostly orange coloured, eyes, clypeus, legs, venter and lateral parts of scutellum brownish black, ocelli shining transparent.

Tegmina, with stigma 5-celled; transverse veins, in apical half in two rows; apical cells, other than those covered by stigma, 18.

Male genitalia

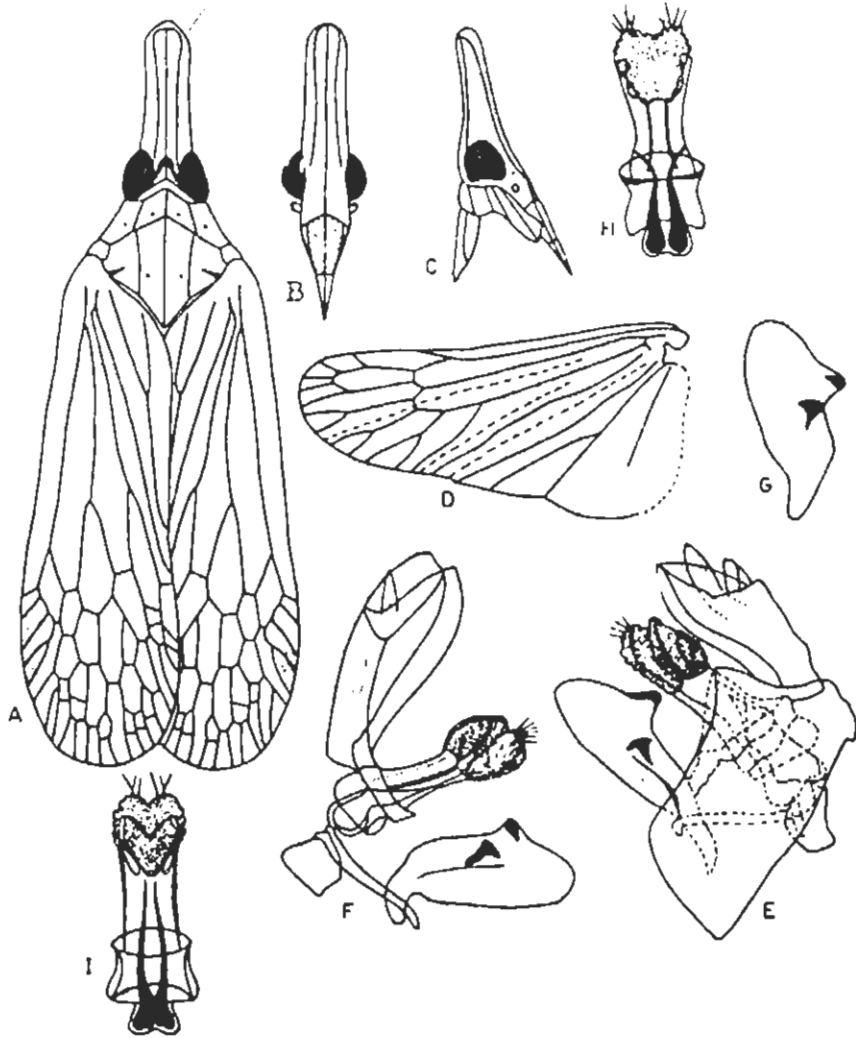
Anal segment, in lateral view, narrow at base, widening towards oblique apical margin, with a longitudinal cleft along ventral margin; pygofer with a conical pro-

jection postero-dorsally, most of posterior margin flattened dorso-ventrally; aedeagus with long, flattened phallobase, sclerotized lobes lacking, membranous lobes three pairs, short, oval shaped, with a bunch of spines on each of ventrally located lobes; paramere with broad, rounded apical part, dorsal apical process projected mildly, conical in shape, spinose process near dorsal margin slightly basad to dorsal apical process.

D. amaranthusae, n.sp., is close to D. sacchari, n.sp., described hitherto, in general pattern of characters, but differs in having lateral carinae on pronotum completely developed, carinae on pronotum behind eyes three in number, and aedeagus with three pairs of membranous lobes in contrast with D. sacchari, n.sp., which has lateral carinae on pronotum incompletely developed, carinae behind eyes two in number and aedeagus with two pairs of membranous lobes.

Type material

Holotype male, Swat, N.W.F.P, Pakistan, Cholai, (Amaranthus blitum), Shadabe 16.IX.1968; allotype female, with same data as of the holotype; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 5 A-I. *Dictyophara amaranthusae*, n.sp., A: Body, dorsal aspect, 8x, B & C: Head, frontal and lateral aspects, 8x, D: Left hind wing, 8x, E & F: Pygofer, and male genitalia, lateral aspects, 32x, G: Left paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Dictyophara sacchari, n.sp.
(Figs. 6 A-I)

Form and colour

Length of male 1.1 cm, of female 1.1 cm; vertex much longer than broad across base (4.5:1); cephalic process smoothly rounded at apex, with lateral margins nearly sub-parallel longitudinally; median length of frons nearly three times length of clypeus; head, pronotum, scutellum and frons all tricarinate, with lateral carinae on head appearing slightly zig-zag, lateral carinae on pronotum incomplete, developed upto about mid-length of pronotum, lateral carinae on frons incomplete, extending posteriorly upto middle of mesal margin of eyes; pronotum with two short lateral carinae behind each eye; ratio between spines on outer margin and distal end of hind tibia 4:7. General body colour greenish, pronotum, scutellum and frons orange coloured, eyes, clypeus, legs and some parts of venter brown, ocelli orange coloured.

Tegmina, with stigma 4-celled; transverse veins, in apical half in three rows; apical cells, other than those covered by stigma, 17.

Male genitalia

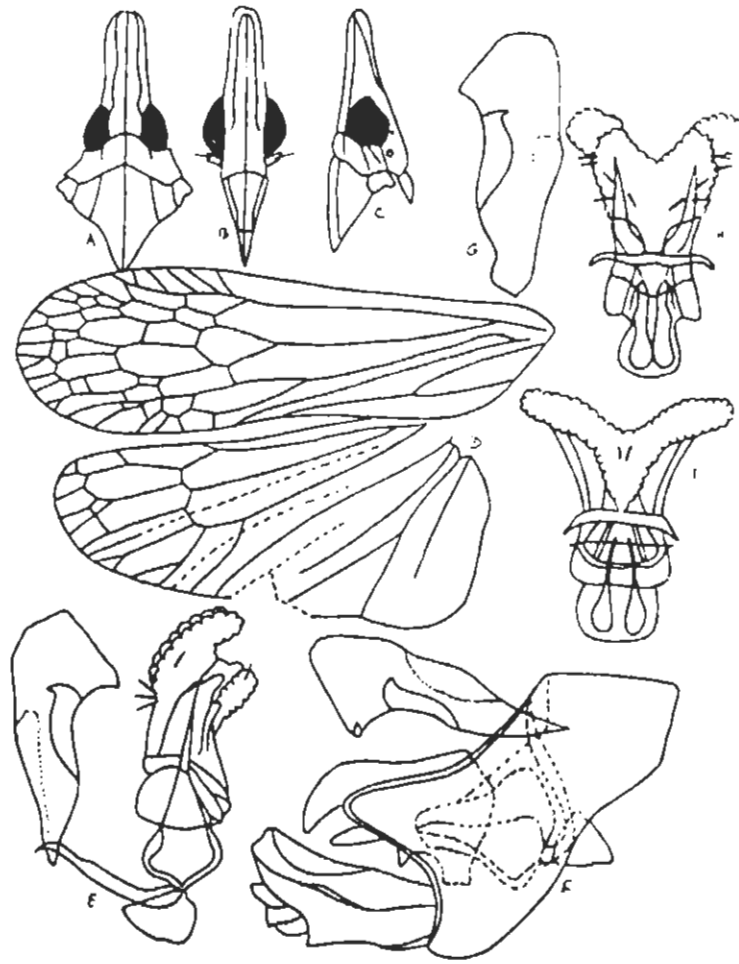
Anal segment, in lateral view, narrow at base, broadened towards apex, with oblique posterior margin, possessing a longitudinal cleft along ventral margin; pygofer

with most of the postero-dorsal and postero-ventral margins arc shaped, posterior margin with a prominent conical projection; aedeagus with a moderately long phallobase, extended posteriorly in a pair of spinose sclerotized prolongations, possessing two pairs of unequal membranous lobes, ventral pair much larger than dorsal pair, each pair possessing a few spines; paramere, in lateral view, broader in apical half than in basal half, with apical margin truncated and broad, dorsal apical process mildly developed as a conical projection in continuation with dorsal apical margin, spinose process present near dorsal margin, slightly basad to dorsal apical process.

D. sacchari, n.sp., is close to D. amaranthusae, n.sp., described hitherto in general appearance, but differs in characters discussed on the preceding pages, particularly in the development of lateral carinae on pronotum. The number and shape of aedeagal lobes also differs in the two species.

Type material

Holotype male, Lyallpur, Punjab, Pakistan, sugarcane, (Saccharum officinarum), Anwar, 18.X.1972; allotype female, grass, Anwar, 7.VII.1973; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 6 A-I. Dictyophara sacchari, n.sp., A, B & C: Head, dorsal, frontal and lateral aspects, 8x, D: Right, fore & hind wings, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Right paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Dictyophara pallida Walker
(Figs. 7 A-I)

Dictyophara pallida Walker, 1851.

D. pallida Walker : Linnavuori, 1962:8.

Dictyophara pallida Walker is known from many parts of the world, Distant (1906), Linnavuori (1962-1965), but a detailed description has not been given. The species is therefore redescribed below on the basis of material studied from Pakistan.

Form and colour

Length of male 1.1 cm, of female 1.2 cm; vertex much longer than broad across base (3:1) median length of frons nearly four times length of clypeus; head, pronotum, scutellum and frons all tricarinate, lateral carinae on frons ending posteriorly at anterior mesal margin of eyes; clypeus with oblique lateral striation; pronotum with three short lateral carinae behind each eye; ratio between spines on outer margin and distal end of hind tibia 4:7. General body colour greenish, carinae green, scutellum with lateral areas pale, vertex, frons and central areas of pronotum, and scutellum of golden colour, eyes, lateral areas of pronotum, lateral and apical part of cephalic process, whole of clypeus, legs and some parts of venter brownish.

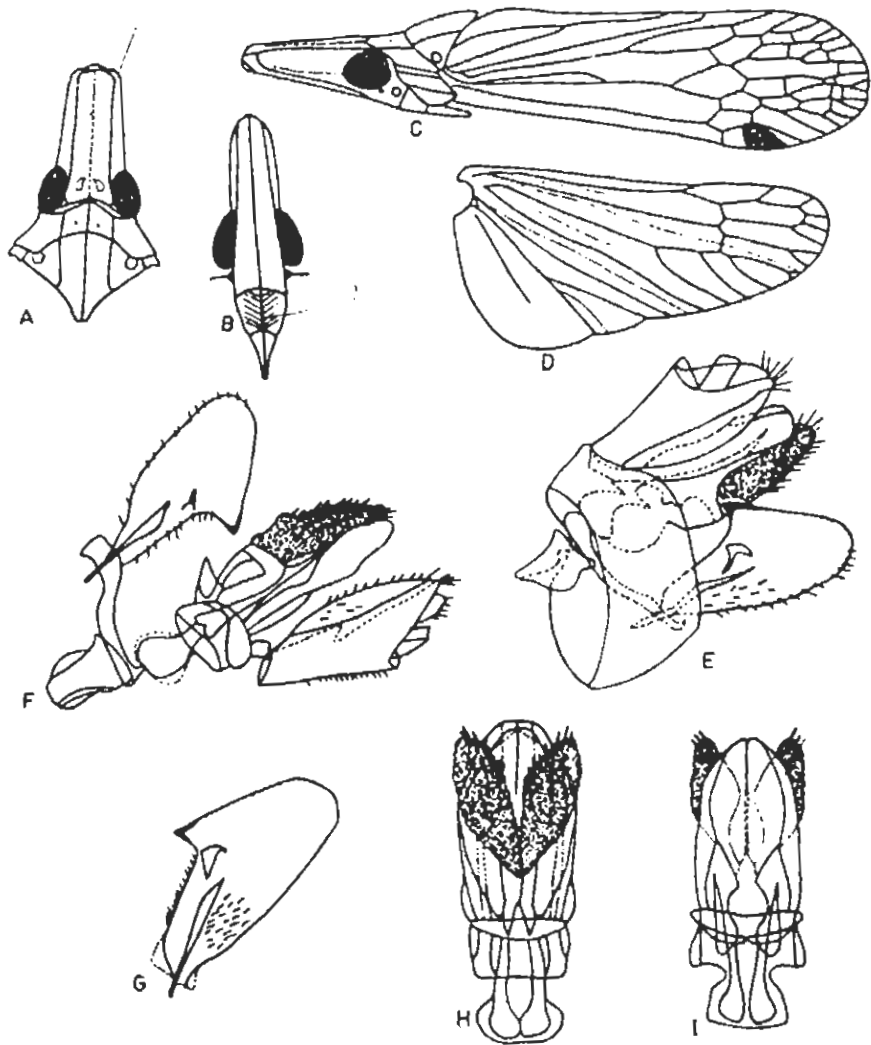
Tegmina, with stigma 4-celled; transverse veins, in apical part in two rows; apical cells, other than those covered by stigma, 14.

Male genitalia

Anal segment, in lateral view, broad and moderate in length, with apical margin oblique, segment possessing a longitudinal cleft along ventral margin; pygofer strip shaped, with posterior margin broadly truncated; aedeagus, in dorsal view with phallobase, broad, moderately long, with a single pair of oval shaped sclerotized lobes, apposed to each other throughout their mesal margin, membranous lobes also one pair, leaf like, applied to each other at their bases, middle and apical parts diverging and possessing fringes of spines; paramere much broader in apical half than in basal half, with apex broad and smoothly rounded, dorsal apical process formed in continuation of dorsal apical margin, process directed antero-dorsad, spinose process present, along dorsal margin, just below dorsal apical process.

Material Examined

5 specimens (4 males and 1 female) collected from Hyderabad, Sind, Pakistan, on general grasses, 7.VIII.1975; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 7 A-I. Dictyophara pallida, Walker., A & B: Head, dorsal and frontal aspects, 8x, C: Body, lateral aspect, 8x, D: Right hind wing, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Right paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Dictyophara spinosa, n.sp.
(Figs. 8 A-I)

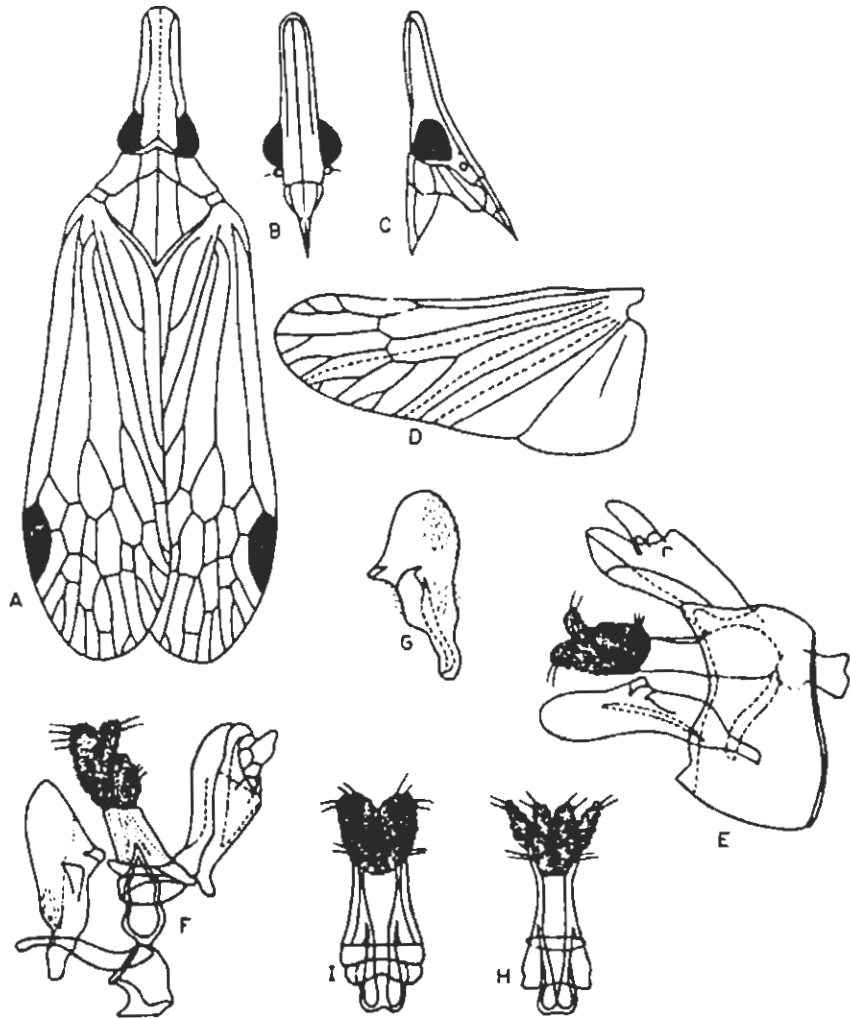
Form and colour

Length of male 1.1 cm, of female 1.2 cm; vertex much longer than broad across base (4:1); median length of frons nearly five times the length of clypeus; head, pronotum, scutellum and frons all tricarinate, with lateral carinae on frons incomplete, ending posteriorly near mesal margin of eyes; pronotum with three short lateral carinae behind each eye; ratio between spines on outer margin and distal end of hind tibia 5:7. General body colour orange brown, carinae pale, labrum, clypeus, legs and some parts of venter brown.

Tegmina, with stigma 4-celled; transverse veins, in apical half in two rows; apical cells, other than those covered by stigma, 16.

Male genitalia

Anal segment, in lateral view, moderately long, ventral margin relatively longer than dorsal margin, and possessing a longitudinal cleft, apical margin of anal segment obliquely sinuate; pygofer broadly strip-shaped, with posterior margin irregularly sinuate; aedeagus, in dorsal view, with long and narrow phallobase, sclerotized lobes lacking, membranous lobes all spinose, three pairs,



Figs. 8 A-I. Dictyophara spinosa, n.sp., A: Body, dorsal aspect, 8x, B & C: Head, frontal and lateral aspects, 8x, D: Left hind wing, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Right paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Dictyophara peshawarensis, n.sp.
(Figs.9 A-1)

Form and colour

Length of male 1.1 cm, of female 1.3 cm; vertex much longer than broad across base (5:1); cephalic process with lateral margins nearly parallel upto apex, apex almost truncated; median length of frons 2.6 times length of clypeus; head, pronotum, scutellum and frons all tricarinate, with central carina on head indistinct, lateral carinae on frons incomplete, ending posteriorly near mesal margin of eyes; pronotum with two short lateral carinae behind each eye; ratio between spines on outer margin and distal end of hind tibia 4:7. General body colour greenish, carinae green, head with a pair of black spots inbetween compound eyes; pronotum, scutellum and frons orange coloured, eyes, clypeus and legs brownish, antennae green, ocelli pale.

Tegmina, with stigma 4-celled; transverse veins, in apical half in four rows; apical cells, other than those covered by stigma, 20.

Male genitalia

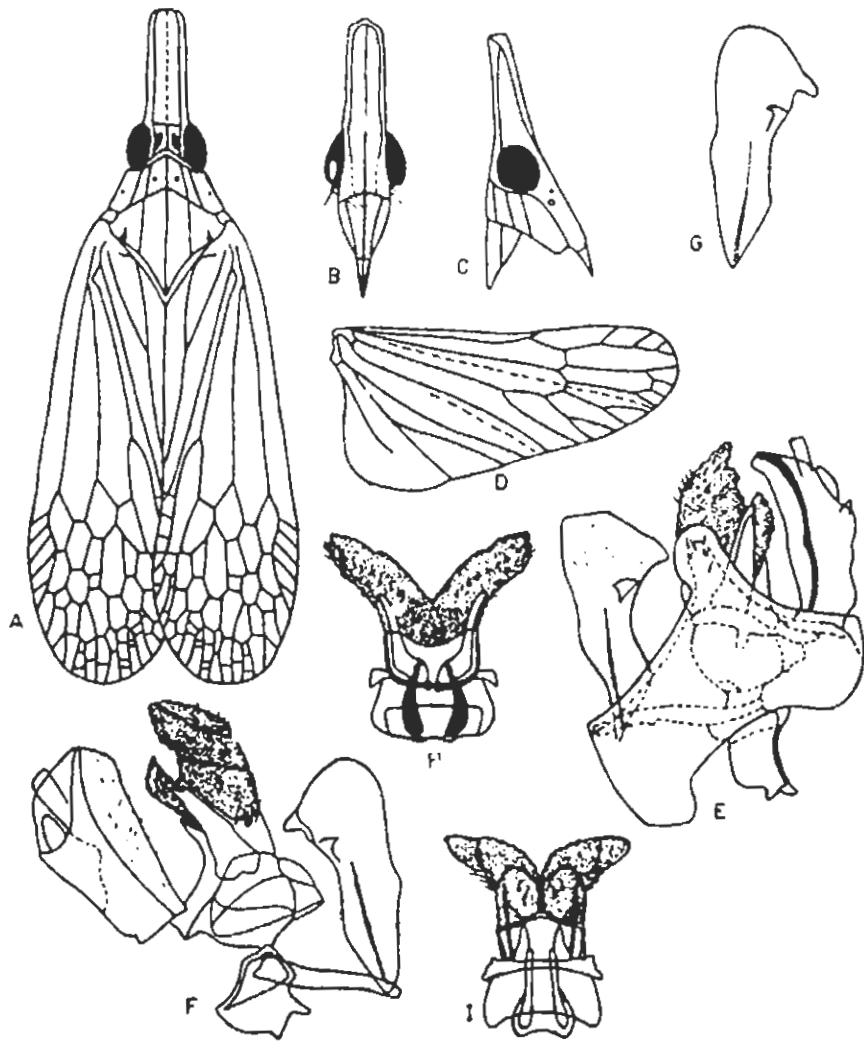
Anal segment, in lateral view, moderately long and narrow, with a longitudinal cleft along ventral margin, apical margin of anal segment oblique; pygofer with post-

ero-dorsal and postero-ventral margins arcuate, margin projected behind in middle into a prominent, narrowed and rounded lobe, lobe is provided with a few spines; aedeagus, with phallobase broad and short, in dorsal view, sclerotized lobes lacking, membranous lobes two pairs, dorsal pair small and simple, ventral pair much longer, and each lobe of the pair twisted around itself, with spines present on both pairs, spines on ventral lobes much numerous; paramere, with basal part narrow and long, apical part short, and broadly rounded, with dorsal apical process quite close to apex, in the form of a short angular protuberance, spinose process beyond midlength of paramere, basad to dorsal apical process.

D. peshawarensis, n.sp., is close to D. spinosa, n.sp., described hitherto, but differs in a number of characters, particularly the shape and number of aedeagal lobes, the shape of pygofer, number of apical cells in the tegmina and the number of short lateral carinae on pronotum.

Type material

Holotype male, Peshawar, N.W.F.P, Pakistan, general grasses, Ramzan, 29.IX.1971; allotype female, with same data as of the holotype; paratypes 4-specimens, with same locality and host plant as of the holotype, in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 9 A-I. Dictyophara peshawarensis, n.sp., A: Body, dorsal aspect, 8x, B & C: Head, frontal and lateral aspects, 8x, D: Right hind wing, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Right paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Dictyophara pirawalensis, n.sp.
(Figs.10 A-I)

Form and colour

Length of male 1.1 cm, of female 1.3 cm; vertex much longer than broad across base (5:1); median length of frons nearly 2.6 times length of clypeus; cephalic process slightly narrowed towards smoothly rounded apex; head, with lateral carinae longitudinally arc shaped, arcs facing laterad, central carina incomplete, its small fragments present only near anterior tip of cephalic process, and posterior margin of vertex; pronotum, scutellum and frons tricarinate, with lateral carinae on frons incomplete, ending posteriorly near mesal margins of eyes; pronotum with short lateral carinae behind each eye; ratio between spines on outer margin and distal end of hind tibia 4:7. General body colour greenish, carinae greenish all over; pronotum, scutellum and frons orange coloured, eyes, cephalic process, clypeus, legs, and lateral areas of scutellum brownish.

Tegmina, with stigma 5-celled; transverse veins, in apical half, in three rows; apical cells, other than those covered by stigma, 16.

Male genitalia

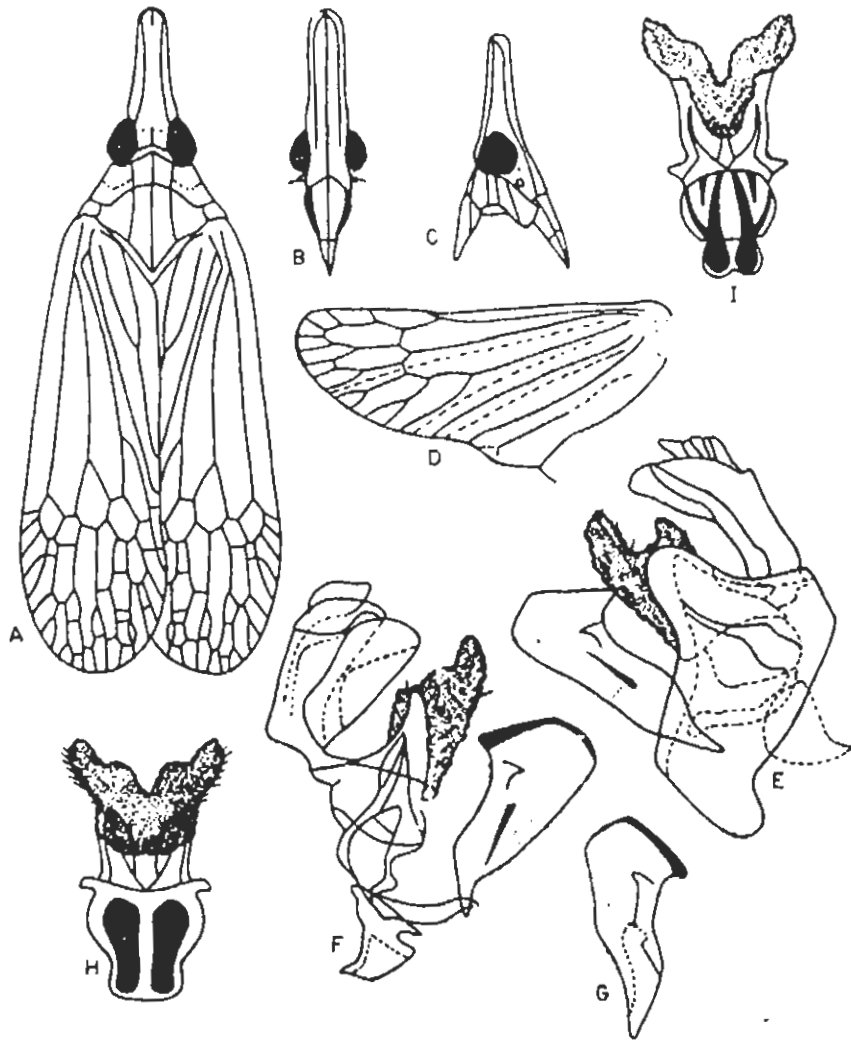
Anal segment, in lateral view, narrow and modera-

tely long, nearly similar to that of D. peshawarensis, n.sp., described hitherto; pygofer also similar to that of D. peshawarensis, n.sp., the spines at tip of posteriorly projected lobes of pygofer lacking; aedeagus, in dorsal view, with phallobase short and broad, sclerotized lobes lacking, membranous lobes two pairs, short dorsal and large ventral lobes developed in continuation of each other, both lobes possessing spines; paramere, with apical and dorso-apical margins sclerotized, part of paramere basad to dorsal apical process, narrow and long, apical part short and broad, with extreme apex almost truncated, dorsal apical process developed in continuation with dorsal apical margin, directed dorso-cephaled, moderate in size, with spinose process present at level of dorsal apical process.

D. pirawalensis, n.sp., is quite close to D. peshawarensis, n.sp., described hitherto in general pattern of male genitalia. The shape of aedeagal lobes and paramere vary in the two species.

Type material

Holotype male, Pirawala, Punjab, Pakistan, general grasses, Fareed 18.IX.1968; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 10 A-I. Dictyophara pirawalensis, n.sp., A: Body, dorsal aspect, 8x, B & C: Head, frontal and lateral aspects, 8x, D: Left hind wing, 8x, E & F: Male genitalia lateral aspects, 32x, G: Left paramere, 32x, H & I: Aedeagus, dorsal and ventral aspect, 32x.

Dictyophara asperae, n.sp.
(Figs. 11 A-I)

Form and colour

Length of male 1.0 cm; vertex much longer than broad across base (4.5:1); median length of frons nearly 3.6 times the length of clypeus; cephalic process somewhat narrowed laterally in middle, with apex smoothly rounded; head tricarinate with central carina incomplete, ending posteriorly slightly before mid-length of cephalic process; a pair of 'M'-shaped black marks on vertex, between two eyes; pronotum, with lateral carinae, running almost parallel to each other; frons tricarinate, with lateral carinae incomplete, ending posteriorly at the level of mesal margin of eyes; ratio between spines on outer margin and distal end of hind tibia 5:7. General body colour pale, with some areas of pronotum and frons orange coloured, eyes, clypeus and legs brownish, with pale markings.

Tegmina, with stigma 3-celled; transverse veins, in apical half in two rows; apical cells, other than those covered by stigma, 17.

Male genitalia

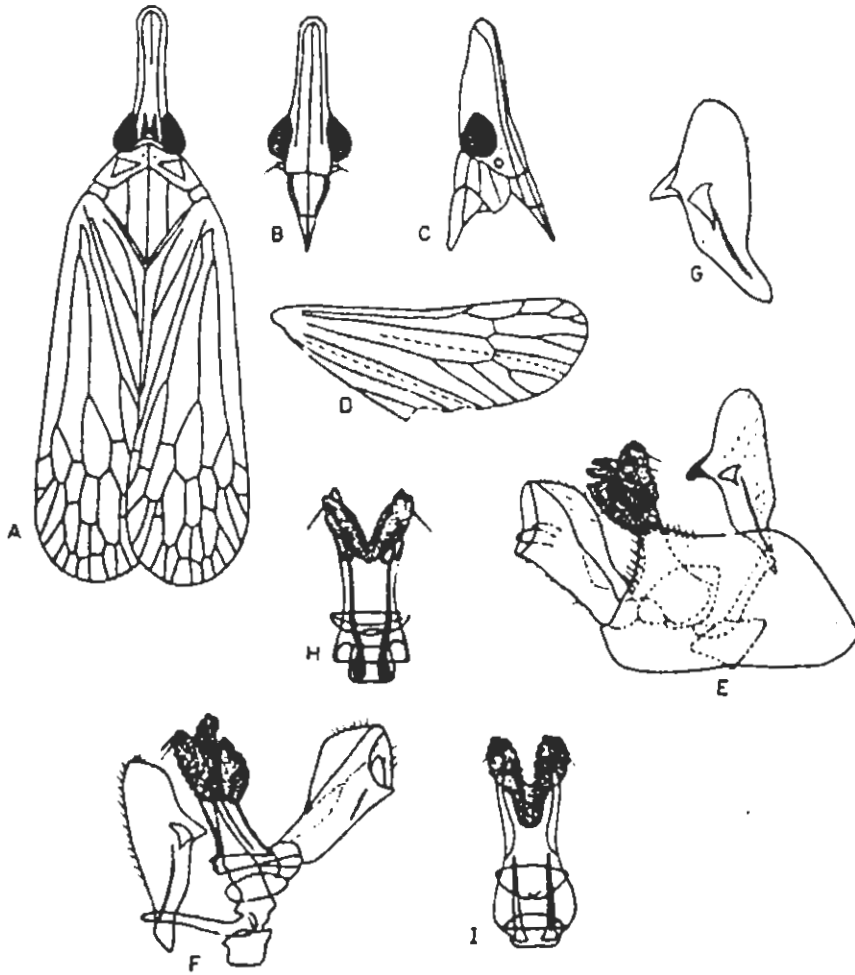
Anal segment, in lateral view, moderately long, with a longitudinal cleft along ventral margin, apex possessing

spines; pygofer, with postero-dorsal margin projected behind in the form of an angular lobe, lobed part possessing spines; aedeagus, in dorsal view, with moderately long phallobase, sclerotized lobes absent, with three pairs of subequal membranous lobes, ventral pair with spines; paramere with apical part broad and smoothly rounded at apex, dorsal apical process quite prominent, in the form of a thin angular projection, directed dorso-cephalad, tip of process distinctly sclerotized, spinose process near dorsal margin of paramere, at level of dorsal apical process.

D. asperae, n.sp., is quite close to D. pirawalensis, n.sp., described hitherto, from which it differs in carination of head, pronotum, and the development of membranous lobes on aedeagus.

Type material

Holotype male, Kaptai, Bangladesh, Farie, (Leucas aspera), Qammar Abbassi, 24.11.1969; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 11 A-I. Dictyophara asperae, n.sp., A: Body, dorsal aspect, 8x, B & C: Head, frontal and lateral aspects, 8x, D: Right hind wing, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Right paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Dictyophara constricta, n.sp.
(Figs. 12 A-H)

Form and colour

Length of male 1.3 cm, of female 1.4 cm; vertex much longer than broad across base (4.8:1); median length of frons nearly 2.8 times length of clypeus; head with lateral carinae complete, central carina present only in between eyes, lacking far most of its length in middle and in front; pronotum with lateral carinae absent, short lateral carinae behind each eye two in number; scutellum tricarinate; frons tricarinate, with lateral carinae present posteriorly upto the level of mesal margin of compound eyes; ratio between spines on outer margin and distal end of hind tibia 4:7. General body colour greenish; vertex with a pair of black spots on area between eyes, veins greenish, eyes and ocelli pale brown.

Tegmina, with stigma 4 to 6-celled; transverse veins, in apical half in two rows; apical cells, other than those covered by stigma, 17.

Male genitalia

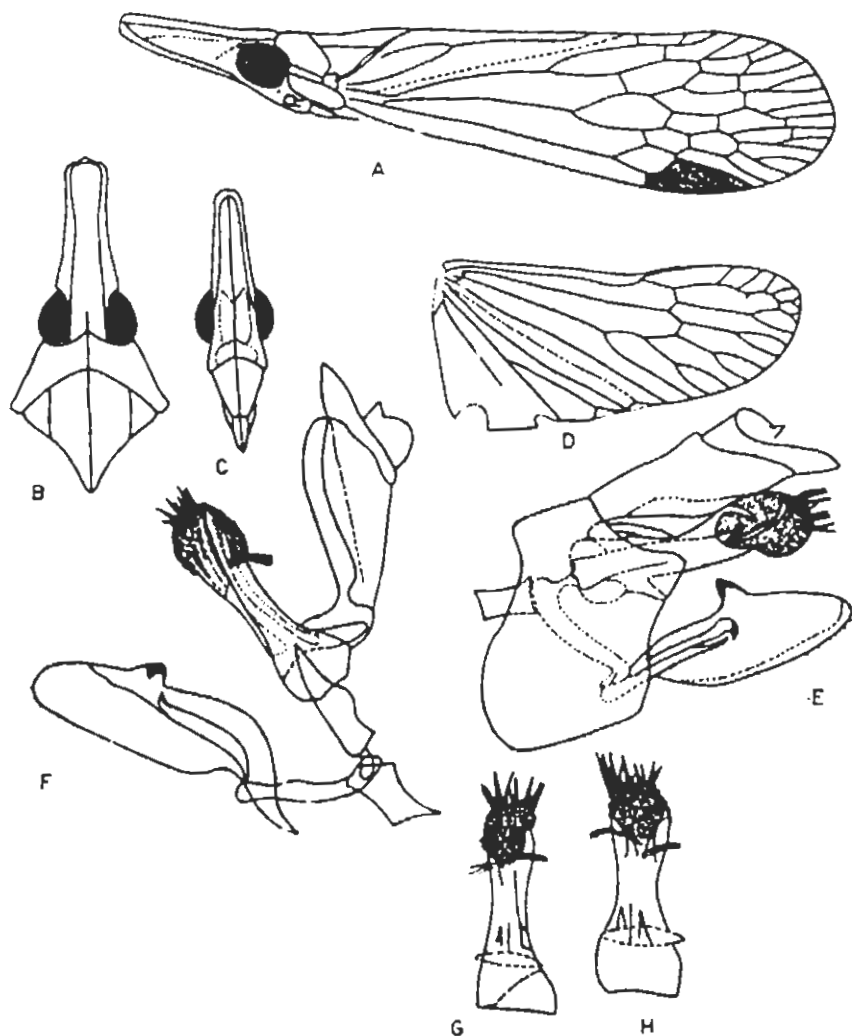
Anal segment, in lateral view, narrow at base, broad near apex, with a longitudinal cleft along ventral margin; pygofer, with postero-ventral margin oblique, posterior margin with a narrow, conical projection postero-

dorsally; aedeagus, in dorsal view, with long and tubular phallobase, sclerotized lobes absent, with a single unpaired membranous lobe, possessing a large number of spines; paramere broad in middle, somewhat narrowed and rounded at apex, dorsal apical process small, conical projection in distal half, spinose process slightly basad to dorsal apical process.

D. constricta, n.sp., is quite close to D. asperae, n.sp., described hitherto, but differs in development of membranous lobes on aedeagus and carination of head. D. asperae, n.sp., possess three pairs of membranous aedeagallobes but there is only a single unpaired lobe in D. constricta, n.sp.

Type material

Holotype male, Islamabad, Punjab, Pakistan, general grasses, Shujaat, 6.VI.1973; allotype female, and seven paratypes, 4 males and 3 females; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 12 A-H. Dictyophara constricta, n.sp., A: Body, lateral aspect, 8x, B & C: Head, dorsal and frontal aspects, 8x, D: Right fore wing, 8x, E & F: Male genitalia, lateral aspects, 32x, G & H: Aedeagus, dorsal and ventral aspects, 32x.

Dictyophara anwari, n.sp.
(Figs. 13 A-J)

Form and colour

Length of male 1.2 cm, of female 1.2 cm; vertex much longer than broad across base (4:1); median length of frons 4 times length of clypeus; head, with lateral carinae complete, central carina incomplete, nearly as in D. constricta, n.sp., described hitherto and developed as a short branch between eyes; pronotum and scutellum tricarinate, all carinae complete; frons tricarinate with lateral carinae incomplete, extending posteriorly upto the mesal margin of eyes only; pronotum with three short lateral carinae behind each eye, ratio between spines on outer margin and distal end of hind tibia 5:7. General body colour greenish yellow, vertex with a pair of oblong spots, pronotum with a pair of large black patches dorsally, frons orange coloured.

Tegmina, with stigma 3-celled; transverse veins, in apical half forming a thick network; apical cells, other than those covered by stigma, 17.

Male genitalia

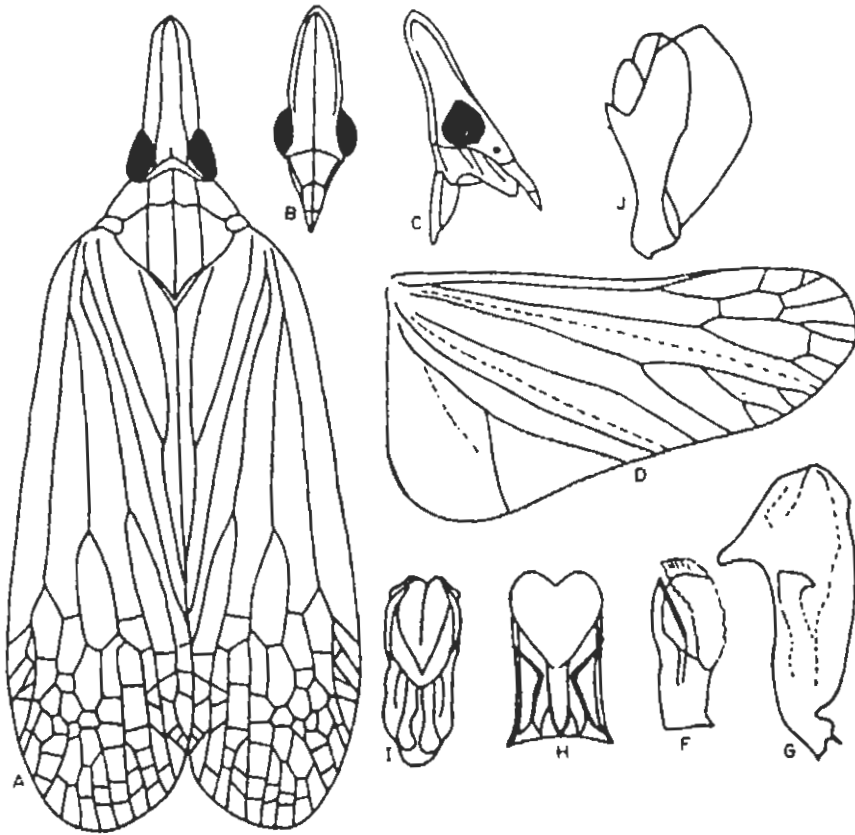
Anal segment, in lateral view, less than moderate in length, with a broad cleft along ventral margin; aedeagus, in dorsal view, with membranous lobes pear-shaped, mildly

incised posteriorly, sclerotized lobes present, longer than broad, deeply incised from posterior side; paramere, with posterior half much broader than basal half, dorsal apical process conical, thin, formed by continuation of dorsal apical and basal margins, spinose process present slightly basad to dorsal apical process.

The species L. anwari, n.sp., appears quite close to D. mianiensis, n.sp., described hitherto but differs as in D. mianiensis, n.sp., the short lateral carinae behind the eyes on pronotum are four in number and the aedeagus does not possess the sclerotized lobes.

Type material

Holotype male, Karachi, Sind, Pakistan, general grasses, Anwar, 2.111.1975; allotype female, with same data, as of the holotype; in Zoological Museum, University of Karachi Karachi-Pakistan.



Figs. 13 A-J. Dictyophara anwari, n.sp., A: Body, dorsal aspect, 8x, B & C: Head, frontal and lateral aspects, 8x, D: Right hind wing, 8x, F, H & I: Aedeagus, lateral, dorsal, and ventral aspects, 32x, G: Paramere, lateral aspect, 32x, J: Anal segment, lateral aspect, 32x.

Dictyophara mianiensis, n.sp.
(Figs. 11 A-I)

Form and colour

Length of male 1.2 cm, of female 1.3 cm; vertex much longer than broad across base (6:1); median length of frons nearly 2.6 times the length of clypeus; cephalic process slightly narrowing towards smoothly rounded apex; head tricarinate, with central carina incomplete, projecting only slightly anterior to eyes; pronotum and scutellum tricarinate, pronotum with short lateral carinae behind each eye, four in number; frons tricarinate, with lateral carinae reaching posteriorly to mesal margin of eyes; ratio between spines on outer margin and distal end of hind tibia 4:7. General body colour pale ochraceous, cephalic process with lateral areas, anteclypeus, femora of forelegs brownish; frons, pronotum, and scutellum mostly orange coloured.

Tegmina, with stigma 4-celled; transverse veins, in apical half in three to four rows; apical cells, other than those covered by stigma, 17.

Male genitalia

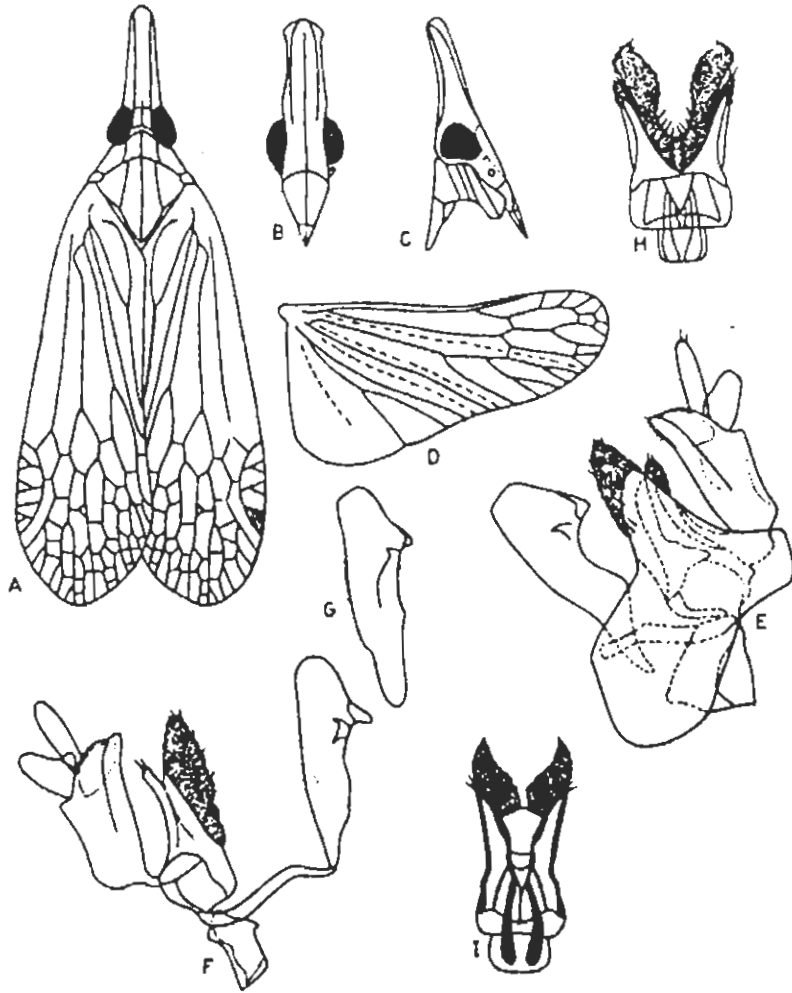
Anal segment, in lateral view, moderate in length, with a cleft along part of the ventral margin; pygofer with posterior margin projected posteriorly in a well de-

veloped conical lobe; aedeagus, in dorsal view, with a short, broad phallobase, sclerotized lobes absent, with a pair of longitudinal membranous lobes joining each other anteriorly, at their bases and widening in a 'V'-shaped manner posteriorly, lobes possessing spines; paramere, in lateral view, narrow throughout, with dorsal apical process, as a small conical projection, quite close to apex, spinose process slightly basad to dorsal apical process.

D. mianiensis, n.sp., is close to D. anwari, n.sp., but differs, apart from the characters discussed earlier in its thin paramere, and in the posterior lobe, projection of pygofer much prominent.

Type material

Holotype male, Miani, Sind, Pakistan, general grasses, Shujaat, 10.VIII.1977; allotype female, and three paratypes (all females), with same data as of the holotype; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 14 A-I. Dictyophara mianiensis, n.sp., A: Body, dorsal aspect, 8x, B & C: Head, frontal and lateral aspects, 8x, D: Right hind wing, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Left paramere, 32x, H & I: Aedeagus, dorsal & ventral aspects, 32x.

Dictyophara minuta, n.sp.
(Figs. 15 A-I)

Form and colour

Length of male 1.2 cm, of female 1.2 cm; vertex much longer than broad across base (8:1); cephalic process slightly constricted beyond mid length, with apex smoothly rounded; head, with lateral carinae unusually close to each other in middle; central carina absent; pronotum and scutellum without carinae; frons tricarinate; ratio between spines on outer margin and distal end of hind tibia 4:7. General body colour brownish, eyes brownish black, vertex pale in middle, antennae, clypeus and venter brown.

Tegmina, with stigma 5-celled; transverse veins, in apical half in three rows; apical cells, other than those covered by stigma, 16.

Male genitalia

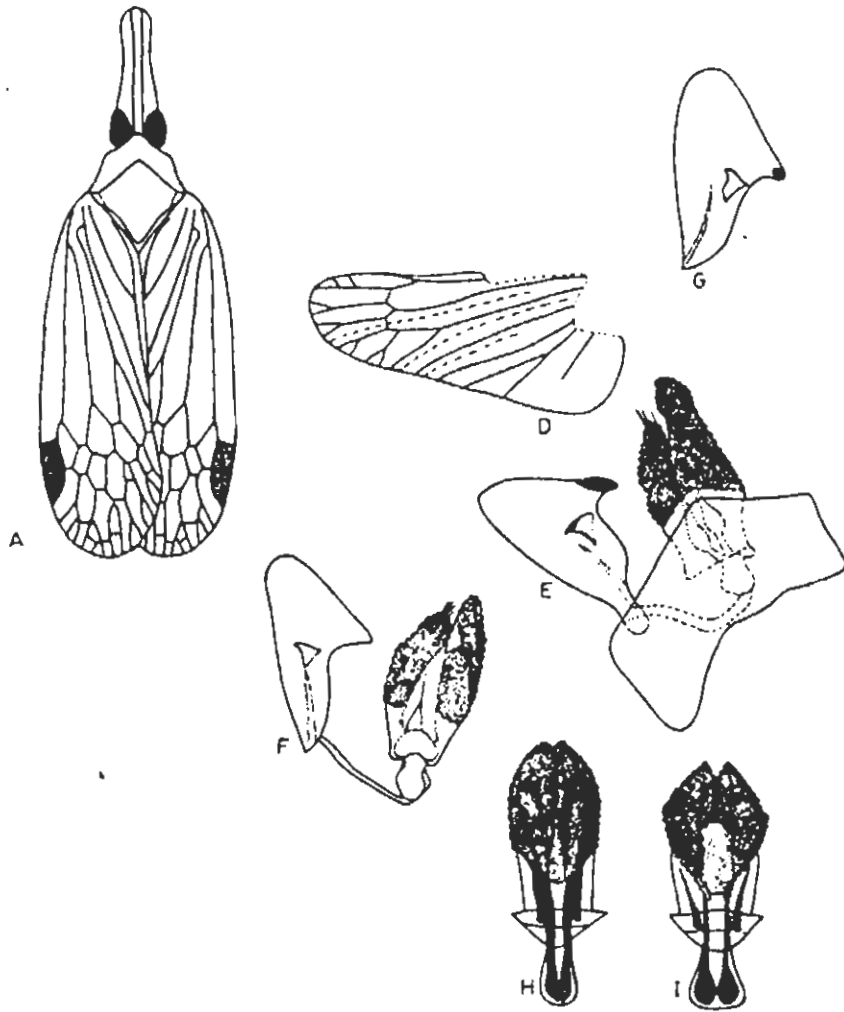
Anal segment, in lateral view, moderate in length; pygofer with posterior margin projected behind at an obtuse angle in middle; aedeagus with sclerotized lobes absent, membranous lobes two pairs, closely applied to each other in middle, bulging out laterally in middle, phallobase, in dorsal view, narrow, and moderately long; paramere, in lateral view, broad in middle, its apex narrow

and rounded, dorsal apical process conical, its distal margin in continuation with the dorsal apical margin of paramere, spinose process in middle, slightly basad to dorsal apical process.

D. minuta, n.sp., differs from all the other species of the genus from Pakistan in complete lack of carination on pronotum and scutellum.

Type material

Holotype male, Faisalabad, Punjab, Pakistan, sugar cane, (Saccharum officinarum), date and collector not known; allotype female; and paratype, one female with same data as of the holotype; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 15 A-I. Dictyophara minuta, n.sp., A: Body, dorsal aspect, 8x, D: Left hind wing, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Left paramere, 32x, H & I: Aedeagus, dorsal & ventral aspects, 32x.

Dictyophara cephalorobusta, n.sp.
(Figs.16 A-I)

Form and colour

Length of male 1.1 cm, of female 1.1 cm; vertex much longer than broad across base (4.2:1); median length of frons 3.7 times the length of clypeus; cephalic process with lateral margins sub-parallel, apex smoothly rounded; head with lateral carinae complete, central carina absent; pronotum, scutellum and frons tricarinate; pronotum with two short lateral carinae behind each eye, second indistinct; clypeus with oblique lateral striations; ratio between spines on outer margin and distal end of hind tibia 4:7. General body colour greenish; pronotum and cephalic process with lateral areas, eyes, posterior tip of abdomen, femur, and legs all brownish in colour; frons mostly orange coloured.

Tegmina, with stigma 5-celled; transverse veins, in apical half in two rows; apical cells, other than those covered by stigma, 17.

Male genitalia

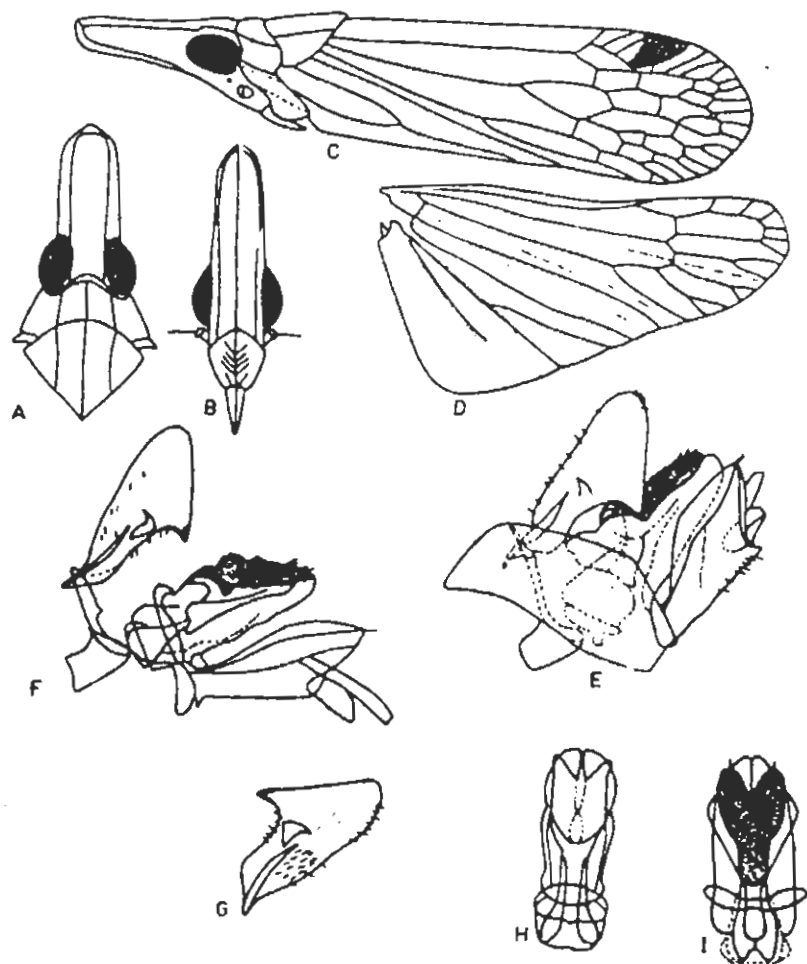
Anal segment, in lateral view, moderate in length, narrow at base, broad at apex, dorsal margin straight throughout, ventral margin convex in apical half, possessing a longitudinal cleft along ventral margin; pygofer, with

posterior margin angularly convex in middle; aedeagus, in dorsal view, with moderately long phallobase, sclerotized lobes present, longitudinally apressed along mesal margin, membranous lobes also one pair, longer than broad, fused mutually, separate only at tip, broadly 'Y'-shaped; paramere, in lateral view, much broad in apical half, than in basal half, dorsal apical process nearly in middle, formed by posterior continuation of dorsal apical margin, and recurving of dorsal basal margin, spinose process at level of dorsal apical process, and nearer to dorsal margin.

D. cephalorobusta, n.sp., is quite similar to D. minuta, n.sp., described hitherto in the shape of pygofer, paramere, and aedeagus, but differs in the carination of pronotum and scutellum. The carinae are completely lacking on pronotum and scutellum in D. minuta, n.sp.

Type material

Holotype male, Gujranwalá, Punjab, Pakistan, general grasses, Aslam, 13.VIII.1975; allotype female, and paratypes two males, with same data as of the holotype; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 16 A-I. Dictyophara cephalorobusta, n.sp., A & B: Head, dorsal and frontal aspects, 8x, C: Body, lateral aspect, 8x, D: Right hind wing, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Right paramere, 32x, H & I: Aedeagus, dorsal, and ventral aspects, 32x.

Dictyophara greeni, n.sp.
(Figs.17 A-1)

Form and colour

Length of male 1.3 cm, of female 1.4 cm; vertex much longer than broad across base (5.2); median length of frons nearly 3.3 times the length of clypeus; cephalic process slightly narrowed towards smoothly rounded apex; head in profile, dorsally raised on ventral surface, central carina on head lacking; pronotum, scutellum and frons tricarinate; pronotum with short lateral carinae behind each eye, three in number; frons with both lateral and central carinae incomplete, lateral carinae ending posteriorly in middle of mesal margin of eyes, central carina extending anteriorly upto mid length of cephalic process; ratio between spines on outer margin and distal end of hind tibia 3:7. General body colour greenish, scutellum and pronotum with central area and frons orange coloured, ocelli pale; eyes, clypeus and legs brownish.

Tegmina, with stigma, 4-celled; transverse veins, in apical half in three rows.

Male genitalia

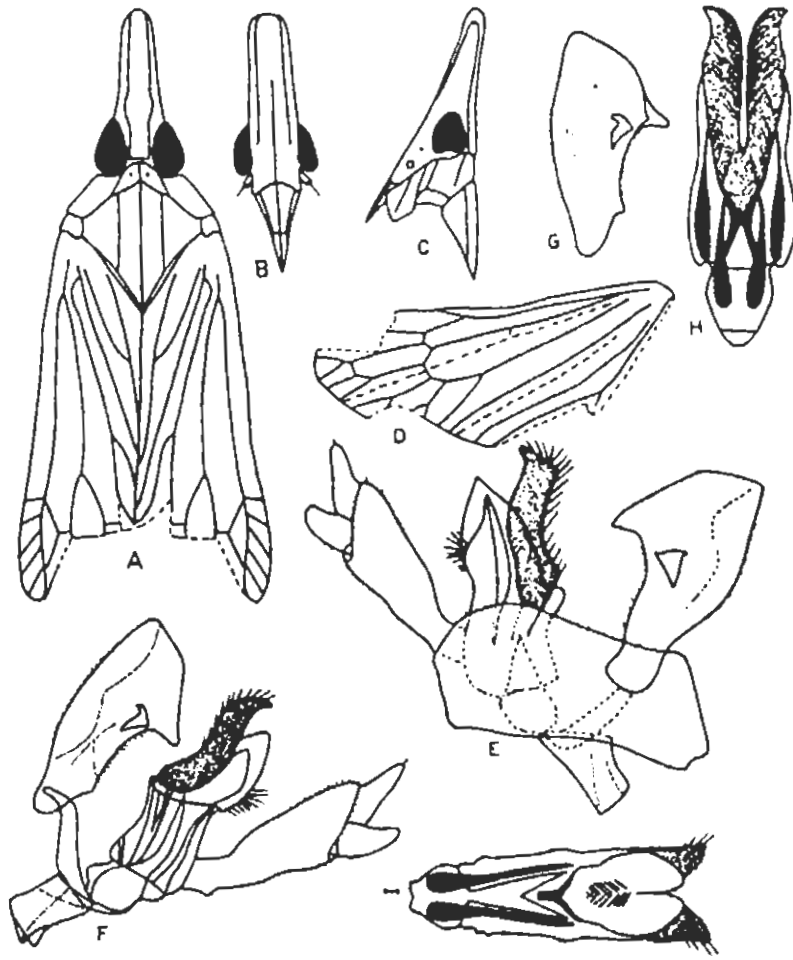
Anal segment, in lateral view, moderately long, somewhat broader in apical half; pygofer with postero-ventral

margin flattened, postero-dorsal margin convex; aedeagus, in dorsal view, with moderately long phallobase, sclerotized lobes present, one pair, fused in middle in basal half, apical part incised, over all oval in shape, possessing on ventral surface, at mid length a bunch of spines, membranous lobes, longer than sclerotized lobes, possessing spines all along their ventral surfaces, one pair, leaflike, fused at base, separate for rest of their lengths, apices diverging; paramere, in lateral view, narrow in basal one third, both dorsal apical and mid ventral margins convex, apex partly blunt, with dorsal apical process formed by posterior continuation of dorsal apical margin and recurving of dorso basal margin, process near dorsal margin at level of dorsal apical process.

D. greeni, n.sp., is quite close to D. zeae, n.sp., described hitherto in the carination of head and frons, but the two species differ in the shape of pygofer and paramere. The pygofer in D. zeae, n.sp., is produced posteriorly in the form of a finger shaped lobe.

Type material

Holotype male, Lyallpur, Punjab, Pakistan, general grasses, Anwar, 7.VII.1974; allotype female, with same data as of the holotype; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 17 A-I. *Dictyophara greeni*, n.sp., A: Body, dorsal aspect, 8x, B & C: head, frontal and lateral aspects, 8x, D: Left hind wing, 8x, E & F: Male genitalia, lateral aspects, 32x, H & I: Aedeagus, dorsal & ventral aspects, 32x.

Dictyophara zeae, n.sp.
(Figs. 18 A-1)

Form and colour

Length of male 1.3 cm, of female 1.3 cm; vertex much longer than broad across base (3.3); median length of frons nearly 3.6 times length of clypeus; cephalic process slightly narrowing towards smoothly rounded apex; head with lateral carinae complete, central carina lacking, a pair of tiny spots near anterior mesal margin of eyes; pronotum and scutellum tricarinate; frons tricarinate with both lateral and central carinae incomplete, lateral carinae ending posteriorly, near posterior margin of eyes, central carina terminating slightly before the apex; pronotum with three short lateral carinae behind each eye, ratio of spines on outer margin and distal end of hind tibia 4:7. General body colour greenish, carinae green, lateral carinae on frons possessing brown spots, eyes, antennae, clypeus, femora, lateral areas of pronotum, and veins of tegmina brownish, pronotum, scutellum, frons and lateral areas of cephalic process are of orange colour.

Tegmina, with stigma 6-celled; transverse veins, on apical half in four rows; apical cells, other than those covered by stigma, 18.

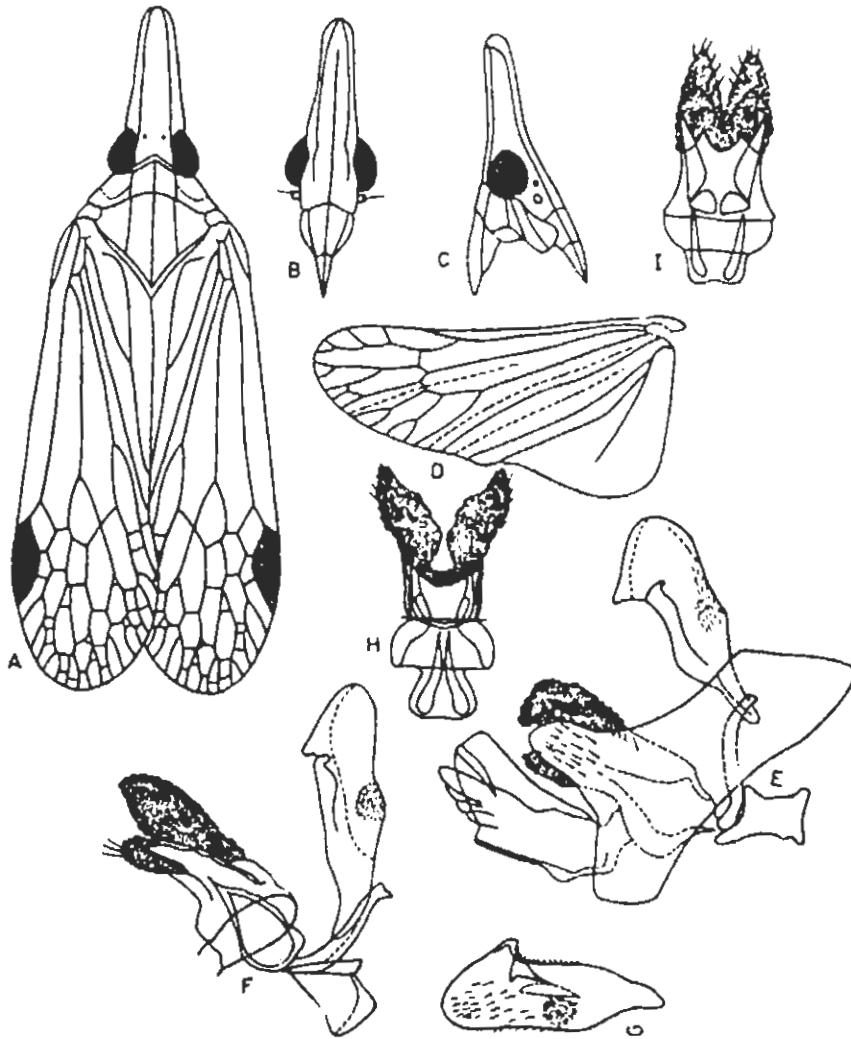
Male genitalia

Anal segment, moderately long, in lateral view, with ventral margin slightly concave, and possessing a longitudinal cleft; pygofer with posterior margin projected behind strongly, in the form of finger shaped, narrow spinose lobe; aedeagus, in dorsal view, with short and broad phallobase, sclerotized lobes absent, membranous lobes longer than broad, their basal portion close to each other in middle, apical halves diverging, possessing spines; paramere, in lateral view, moderately broad towards smoothly rounded apex, with dorsal apical process small, conical, arising from near apex, spinose process slightly basad to dorsal apical process, close to the dorsal margin.

D. zaeae, n.sp., is quite close to D. greeni, n.sp., described hitherto in the shape of head, aedeagus and aedeagal membranous lobes, but differs in the form of pygofer as well as in the sclerotized lobes which are absent in D. zaeae, n.sp.

Type material

Holotype male, Lalshohar, Bangladesh, Maize (Zea-mays), Fareed 14.IX.1968; allotype female, and paratypes two males, with same data as of the holotype; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 18 A-I. Dictyophara zee, n.sp., A: Body, dorsal aspect, 8x, B & C: Head, frontal and lateral aspects, 8x, D: Left hind wing, 8x. E & F: Male genitalia, lateral aspects, 32x, G: Left paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Dictyophara sindensis, n.sp.
(Figs. 19 A-J)

Form and colour

Length of male 1.1 cm, of female 1.3 cm; vertex much longer than broad across base (4:1); median length of frons nearly 2.7 times length of clypeus; cephalic process with lateral margins subparallel, apex smoothly rounded, head with lateral carinae incomplete, ending at anterior margin of eyes, central carina absent; pronotum with lateral carinae much diverging posteriorly, with short lateral carinae behind each eye, two in number; scutellum tricarinate, all carinae parallel; frons with central carina indistinct, lateral carinae incomplete, ending posteriorly in middle of mesal margin of eyes; ratio between spines on outer margin and distal end of hind tibia 4:7. General body colour brownish, ocelli of mustard colour.

Tegmina, with stigma 3-celled; transverse veins, in apical half in two rows; apical cells, other than those covered by stigma, 18.

Male genitalia

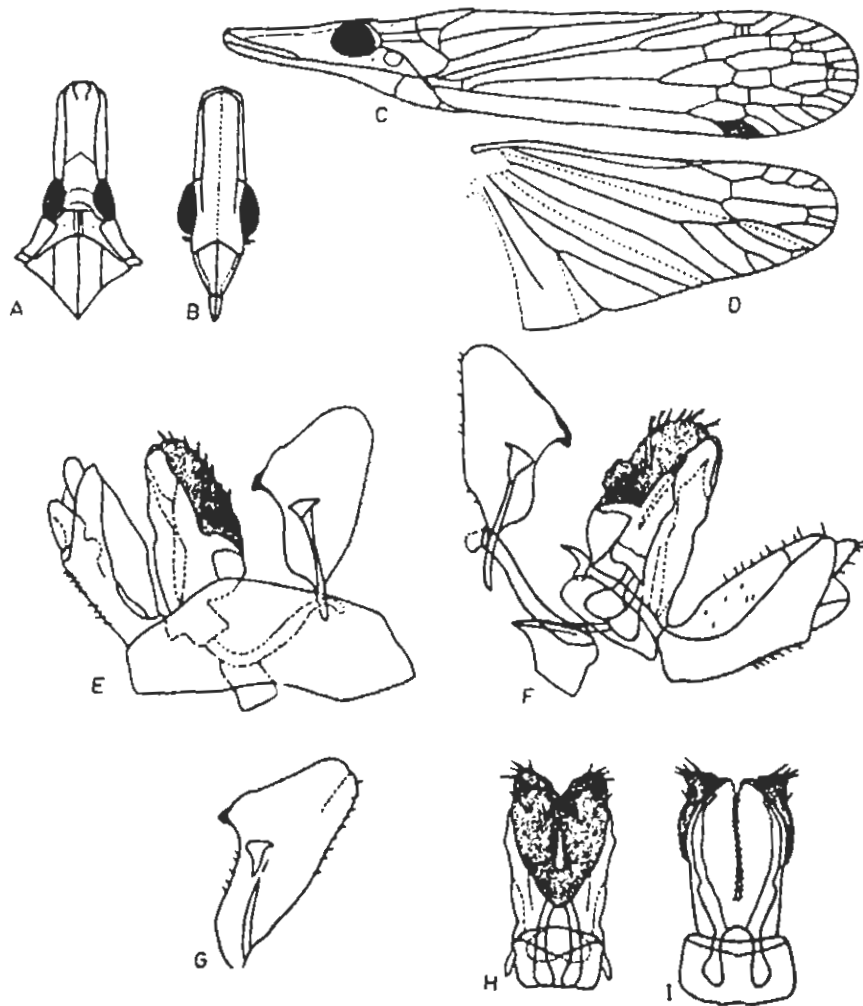
Anal segment, moderately long, in lateral view, broadening towards apex, with a longitudinal cleft on ventral margin; pygofer with posterior margin angular, convex

in middle; aedeagus, in dorsal view, with a short and broad phallobase sclerotized, lobes one pair, longer than broad, fusing mutually near base, 'U'-shaped, closely applied to one another throughout their lengths, membranous lobes also one pair, fused to each other at base, slightly overlapping in distal part, apical part of lobes expanded and possessing spines; paramere, in lateral view, broad in apical half, with apex narrowed and broadly rounded, dorsal apical process directed cephalo-dorsad. spinose process slightly basad to dorsal apical process.

D. sindensis, n.sp., is quite close to D. abrupta, n.sp., in general pattern of pygofer and male genitalia, but differs in the carination of head and pronotum.

Type material

Holotype male, Hyderabad, Sind, Pakistan, general grasses, Shujaat, 7.VIII.1975; allotype female, paratypes 2 females, with same data as of the holotype; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 19 A-I. Dictyophara sindensis, n.sp., A & B: Head, dorsal and frontal aspects, 8x, C: Body, lateral aspect, 8x, D: Right hind wing, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Right paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Dictyophara abrupta, n.sp.
(Figs. 20 A-I)

Form and colour

Length of male 1.0 cm, of female 1.2 cm; vertex much longer than broad across base (5.7:1); median length of frons nearly 2.7 times length of clypeus; cephalic process with lateral margins nearly parallel, running up to smooth rounded apex; head with lateral carinae complete, central carina absent; pronotum with only central carina present, lateral carinae absent, with two short lateral carinae behind each eyes, third indistinct; scutellum and frons tricarinate, with central carina on frons indistinct; clypeus with lateral oblique striations; ratio between spines on outer margin and distal end of hind tibia 4:7. General body colour in freshly collected specimens shining green, becoming ochraceous brown with time, eyes, pronotum, labrum, femur of hind leg, some parts of clypeus and lateral parts of cephalic process all brownish, anterior tip of cephalic process black.

Tegmina, with stigma 3-celled; transverse veins, in apical half with two rows of cross veins; apical cells, other than those covered by stigma, 16.

Male genitalia

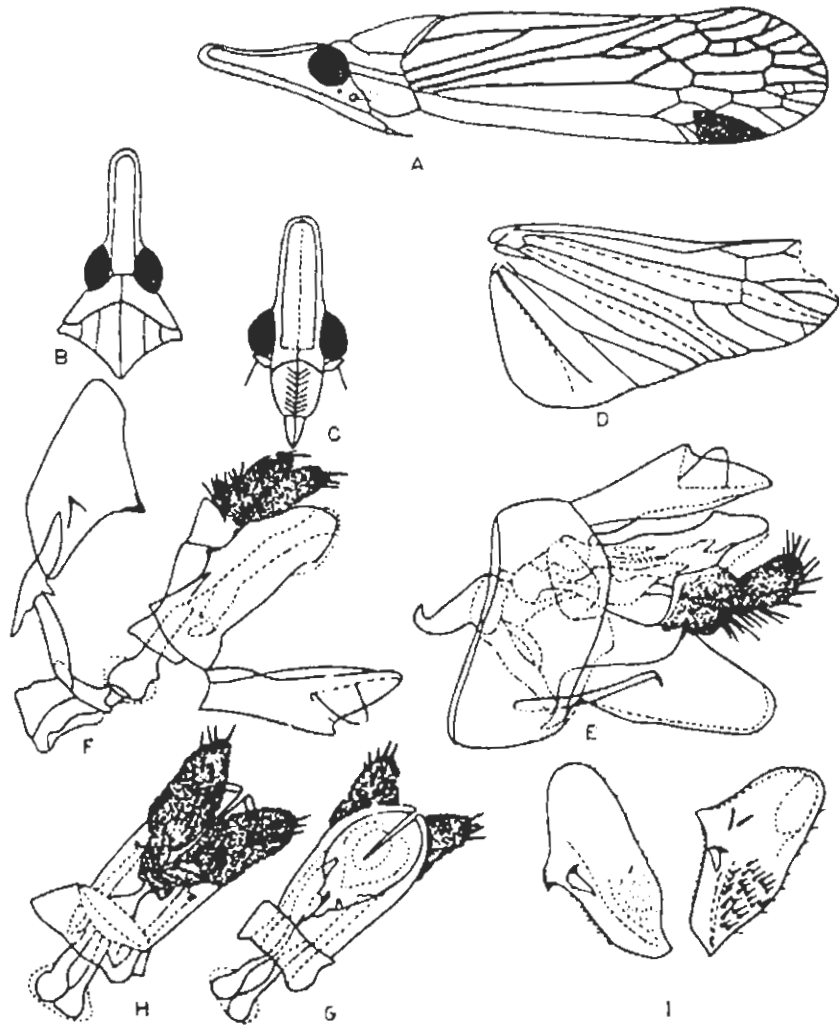
Anal segment, moderately long, in lateral view, with

a longitudinal cleft on ventral margin; pygofer, with posterior margin flat, slightly bulged posteriorly; aedeagus, in ventral view, with a short and broad phallobase, with a pair of sclerotized lobes, mostly fused together in middle, nearly deeply incised posteriorly in middle, lobes broad and long, membranous lobes one pair, diverging posteriorly, fused together in basal half, possessing a number of spines; paramere, in lateral view; broad in middle, slightly narrowed towards base and smoothly rounded at apex, dorsal apical process claw shaped, its finer tip directed cephalo-dorsad, spinose process slightly basad to dorsal apical process, near dorsal apical margin.

D. abrupta, n.sp., is quite close to D. sindensis, n.sp., described hitherto in general pattern of male genitalia, but differs in the carination of pronotum, and the shape of aedeagal lobes.

Type material

Holotype male, Karachi, Sind, Pakistan, general grasses, Ramzan, 20.XI.1969; allotype female, with same data as of the holotype; paratypes, 12 males, 13 females, Hyderabad, grass, Shujaat, 10.X.1965; and several other paratypes from Thatta, and Karachi; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 20 A-I. Dictyophara abrupta, n.sp., A: Body, lateral aspect, 8x, B & C: Head, dorsal and frontal aspects, 8x, D: Left hind wing, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Left paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Dictyophara sinica Walker
(Figs. 21 A-J)

Dictyophara sinica Walker, 1851.

D. sinica Walker is of world wide distribution. It was first described by Walker (1851b) and subsequently listed by Distant (1906) and Linnavuori (1964). As no detailed description of the species is available, it is being redescribed here on the basis of material studied from Pakistan.

Form and colour

Length of male 1.2 cm, of female 1.2 cm; vertex much longer than broad across base (3.2:1); median length of frons nearly 3.6 times length of clypeus; cephalic process with margins nearly parallel, apex rounded; ventral margin of head slanting upwards in profile; head with lateral carinae complete, central carina absent; pronotum with lateral carinae indistinct, central carina absent, short lateral carinae behind each eye absent; scutellum with lateral carinae complete, central carina ending posteriorly near anterior mesal margin of eyes; ratio between spines on outer margin and distal end of hind tibia 5:7. General body colour greenish, carinae pale green, tegmina light green; eyes, labrum, clypeus, venter and legs brownish; central longitudinal area of frons orange

coloured.

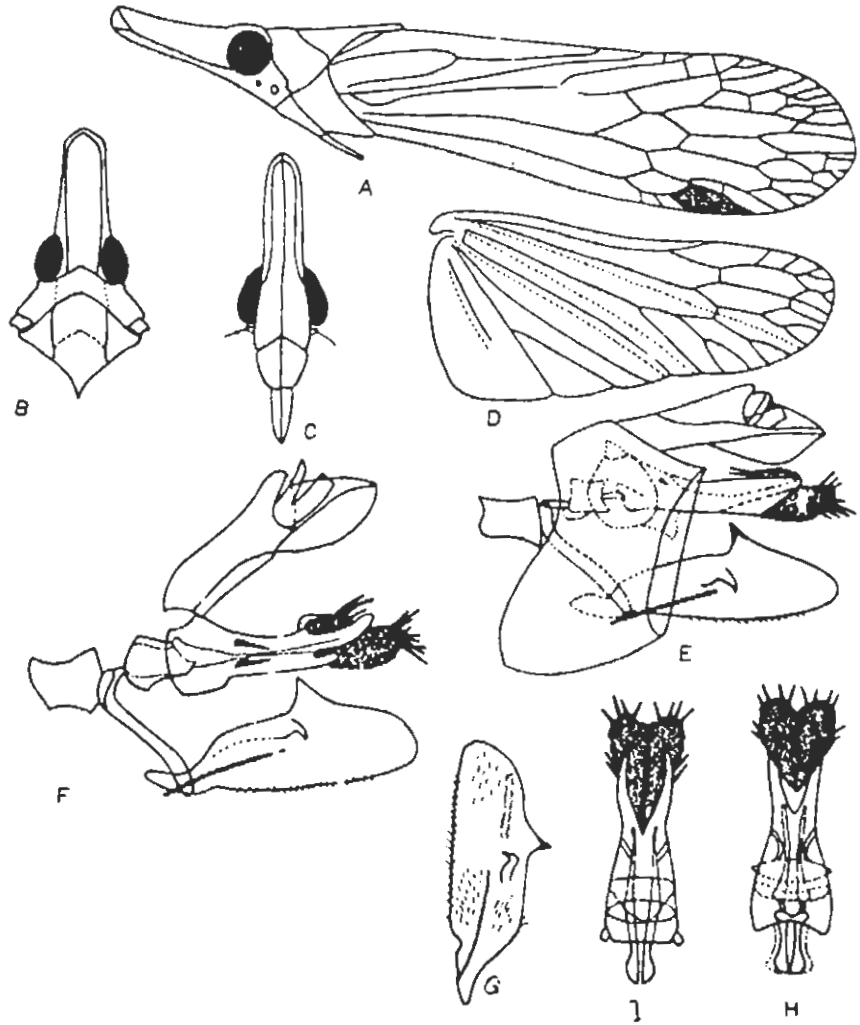
Tegmina, with stigma 4-celled; transverse veins, in apical half forming two incomplete rows; apical cells, other than those covered by stigma, 21.

Male genitalia

Anal segment, moderately long, in lateral view, narrow from base to middle, apical part much wider with a longitudinal cleft along ventral margin; pygofer, in lateral view, with posterior margin flat and blunt; aedeagus, in dorsal view, with a moderately long phallobase, sclerotized lobes absent, membranous lobes one pair, oval shaped, closely applied to each other, not much longer than broad, possessing spines; paramere, in lateral view, nearly uniformly broad, from near base to smoothly rounded apex, dorsal apical process in apical half conical, protruded, directed dorsally, spinose process slightly basad to dorsal apical process, nearer to dorsal margin.

Material Examined

2 males, 2 females, Abbottabad, N.W.F.P, Pakistan, general grasses Khalid, 14.1.1974; 2 females, of same data as above, 6.VI.1973; Shujaat; one female, Abbottabad, sheeshum (Dalbergia sisso), 9.VI.1967; Ahmed; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 21 A-I. Dictyophara sinica, Walker, A: Eody, lateral aspect, 8x, B & C: Head, dorsal and frontal aspects, 8x, D: Right hind wing, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Left paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Dictyophara balakotensis, n.sp.
(Figs. 22 A-H)

Form and colour

Length of male 1.4 cm, of female 1.5 cm; vertex much longer than broad across base (5.7:1); median length of frons nearly 2.6 times length of clypeus; cephalic process with lateral margins, slightly narrowed in middle, apex smoothly rounded; head with lateral carinae complete, central carina, only as a small knob on posterior margin of vertex; pronotum tricarinate, with lateral carinae diverging posteriorly, short lateral carinae behind each eye two in number; scutellum tricarinate; frons tricarinate; with lateral carinae incomplete, reaching posteriorly upto anterior margin of eyes; ratio between spines on outer margin and distal end of hind ^{tibia} 4:7. General body colour greenish, vertex, frons, and lateral areas of pronotum redish orange, eyes, legs and parts of clypeus brownish; ocelli pale.

Tegmina, with stigma 4-celled; transverse veins, in apical half in three rows; apical cells, other than those covered by stigma, 16.

Male genitalia

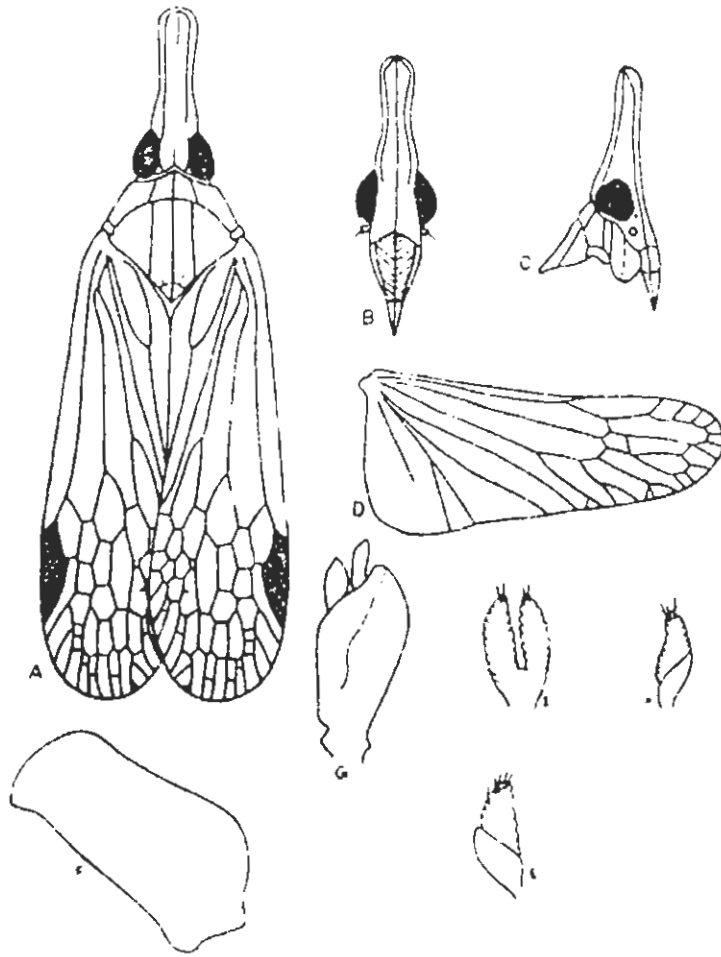
Anal segment, moderately large, in lateral view, widened towards apex; pygofer with postero-ventral margin

convex; aedeagus with a pair of membranous lobes, in dorsal view, appearing fused mutually at base, 'V'-shaped, possessing spines at apex, and along lateral and mesal margins.

D. balakotensis, n.sp., is quite close to D. sativae, n.sp., described hitherto in carination, but differs in the shape of pygofer and aedeagal lobes.

Type material

Holotype male, Balakot, N.W.F.P, Pakistan, general grasses, Qammar Abbassi, 14.IX.1968; allotype female, and paratypes two females, with same data as of the holotype; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 22 A-H. Dictyophara balakotensis, n.sp., A: Body, dorsal aspect, 8x, B & C: Head, frontal and lateral aspects, 8x, D: Left hind wing, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Anal segment, 32x, H: Aedeagus, dorsal aspect, 32x.

Dictyophara sativae, n.sp.
(Figs. 23 A-I)

Form and colour

Length of male 1.2 cm; vertex much longer than broad across base (6.6:1); median length of frons nearly 2.4 times length of clypeus; cephalic process, with lateral margin slightly narrowed in front of eyes, to smoothly rounded apex; head, with central carina absent; pronotum tricarinate, short lateral carinae behind each eye, two in number; scutellum tricarinate; frons tricarinate, with lateral carinae incomplete; ratio between spines on outer margin and distal end of hind tibia 4:7. General body colour light brown, carinae green, clypeus, eyes, wings, and some parts of legs brownish, ocelli pale; central area of scutellum, whole of pronotum, parts of vertex, and central area of frons of orange colour.

Tegmina, with stigma 4-celled; transverse veins, in apical half in three rows; apical cells, other than those covered by stigma, 17.

Male genitalia

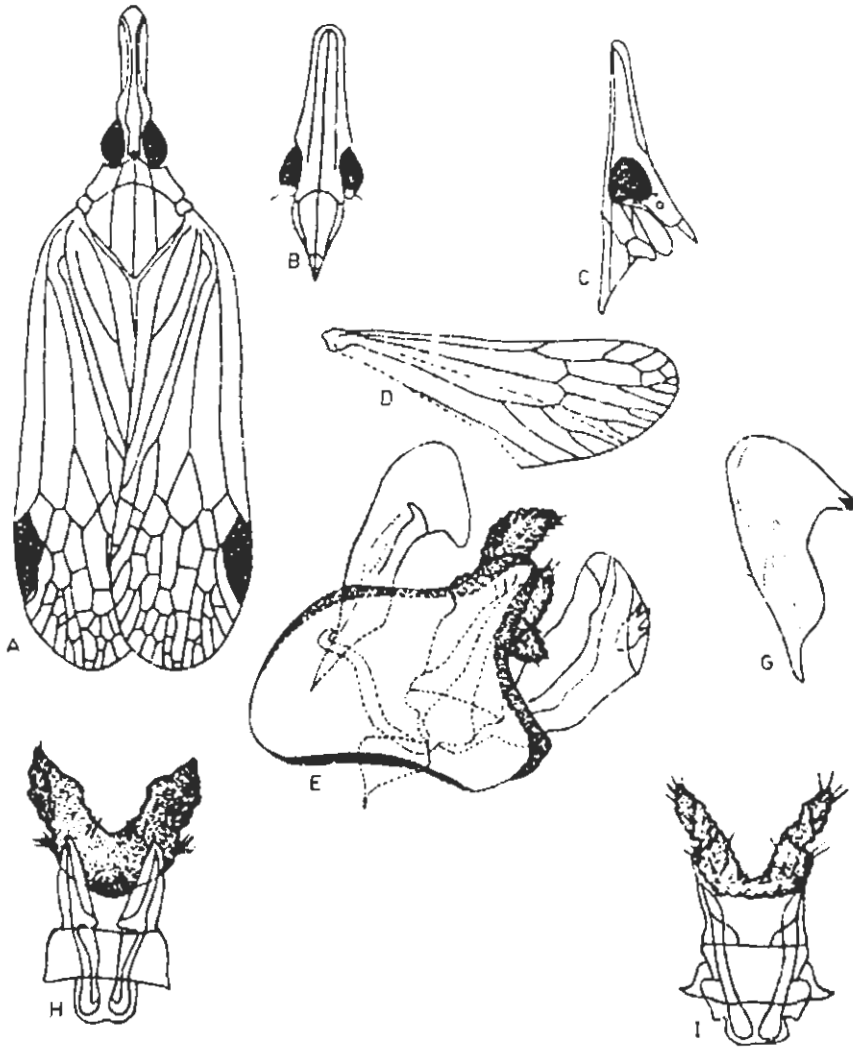
Anal segment, moderately long, in lateral view, slightly broader towards apex, with a longitudinal cleft along ventral margin; pygofer with posterior margin protruded in a conical ring-shaped lobe postero-dorsally;

aedeagus, in dorsal view, with broad and moderately long phallobase, membranous lobes, paired twisted, fused at base, attaining broad 'V'-shaped form, possessing spines; paramere, in lateral view, narrow in basal $2/3$, broadened to a smoothly rounded apex, with dorsal apical process arising near apex, as a continuation of dorsal apical margin, process in form of moderate, conical protrusion, directed dorso-cephalad, spinose process slightly broad to dorsal apical process, close to the dorsal apical margin.

D. sativae, n.sp., is quite close to D. balakotensis, n.sp., described hitherto, but is quite distinct from latter species, in the twisted form of membranous lobes on aedeagus.

Type material

Holotype male, Multan, Punjab, Pakistan, lucern, (Medicago sativa), Fareed, 16.IX.1968; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 23 A-I. Dictyophara sativae, n.sp., A: Body, dorsal aspect, 8x, B & C: Head, frontal and lateral aspects, 8x, D: Right hind wing, 8x, E: Male genitalia, lateral aspect, 32x, G: Right paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Dictyophara lyallpurensis, n.sp.
(Figs. 24 A-I)

Form and colour

Length of male 1.3 cm, of female 1.5 cm; vertex much longer than broad across base (3:1); median length of frons nearly 3.7 times length of clypeus; cephalic process with lateral margins nearly parallel; vertex with a pair of punctures inbetween eyes; head with central carina absent; pronotum with lateral carinae lacking, short lateral carinae behind eyes also lacking; scutellum and frons tricarinate; lateral carinae on frons incomplete; extending posteriorly upto anterior mesal margin of eyes ; ratio between spines on outer margin and distal end of hind tibia 4:7. General body colour greenish, carinae on head greenish, most of pronotum, scutellum and frons of orange colour with brownish tinge eyes, ocelli, antennae, clypeus, and vertex brownish; veins of tegmina green.

Tegmina, with stigma 4-celled; transverse veins, in apical half in three rows; apical cells, other than those covered by stigma, 19.

Male genitalia

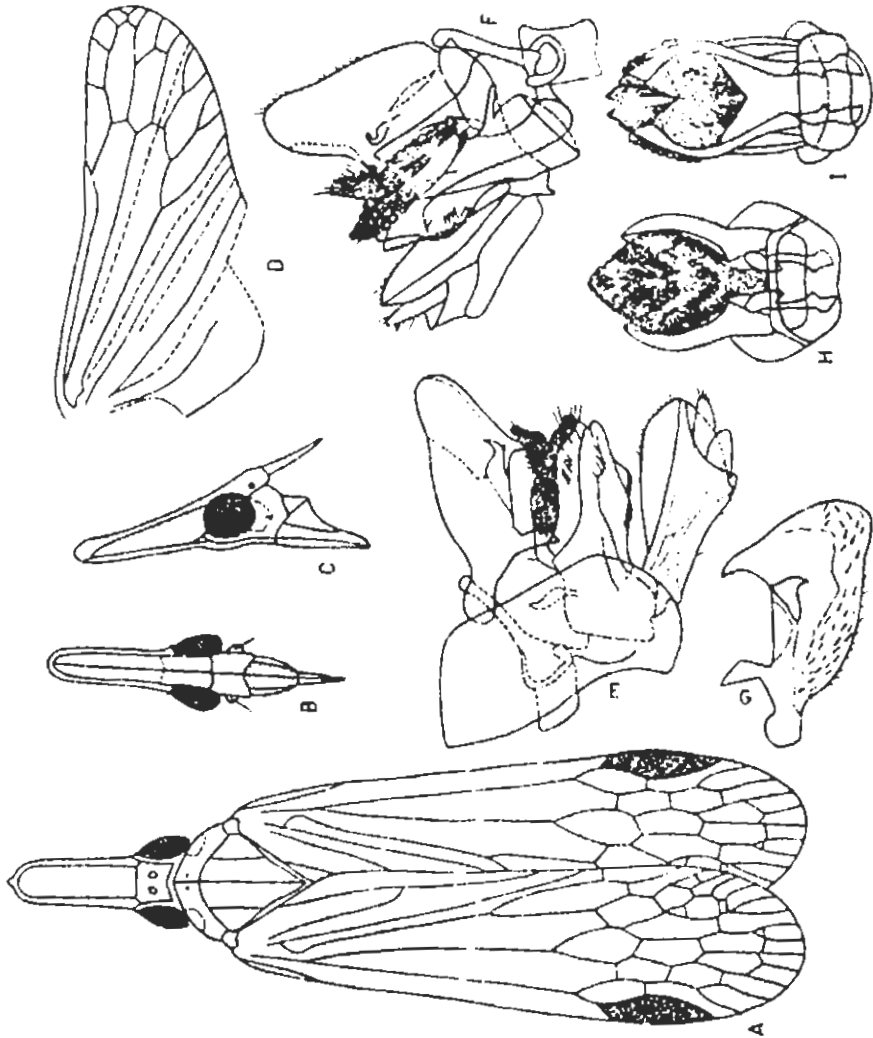
Anal segment, moderate in length, in lateral view, widening towards apex, with a longitudinal cleft along

ventral margin; pygofer, in lateral view, with posterior margin obliquely truncated, with postero-dorsal part slightly projected more posteriorly than postero-ventral margin; aedeagus, in dorsal view, with a short and broad phallobase, sclerotized lobes paired tubular, appearing as lateral brackets, a pair of nearly rounded, oval shaped, membranous lobes; paramere, in lateral view, much broader in apical half, with dorsal apical process quite prominent, conical, spinose process at base of dorsal apical process, along dorsal margin.

D. lyallpurensis, n.sp., is quite close to L. karachiensis, n.sp., described hitherto, but differs in the carination of pronotum and the shape of paramere.

Type material

Holotype male, Lyallpur, Punjab, Pakistan, general grasses, Anwar, 9.VII.1974; allotype female, paratype 11 males, 12 females, all with same data, as of the holotype; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 24. A-I. Dictyophara lwallpurensis, n.sp., A: Body, dorsal aspect, 8x, B & C: Head, frontal and lateral aspects, 8x, D: Right hind wing, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Right paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Dictyophara karachiensis, n.sp.
(Figs. 25 A-I)

Form and colour

Length of male 1.5 cm, of female 1.5 cm; vertex much longer than broad across base (4:1); median length of frons nearly 3.2 times length of clypeus; cephalic process with lateral margins gradually narrowing, vertex with a pair of oblong spots, just in front of eyes, head with central carina absent; pronotum tricarinate, lateral carinae diverging posteriorly, short lateral carinae behind each eye three; scutellum tricarinate; frons also tricarinate, lateral carinae on frons incomplete, extending upto mid length of eyes; ratio between spines on outer margin and distal end of hind tibia 4:7. General body colour green, tip of cephalic process, eyes, genae, some parts of clypeus brown, area beside median carina of frons, central carina of pronotum and mesonotum orange, venation green.

Tegmina, with stigma 5-celled; transverse veins, in apical half in two rows; apical cells, other than those covered by stigma, 15.

Male genitalia

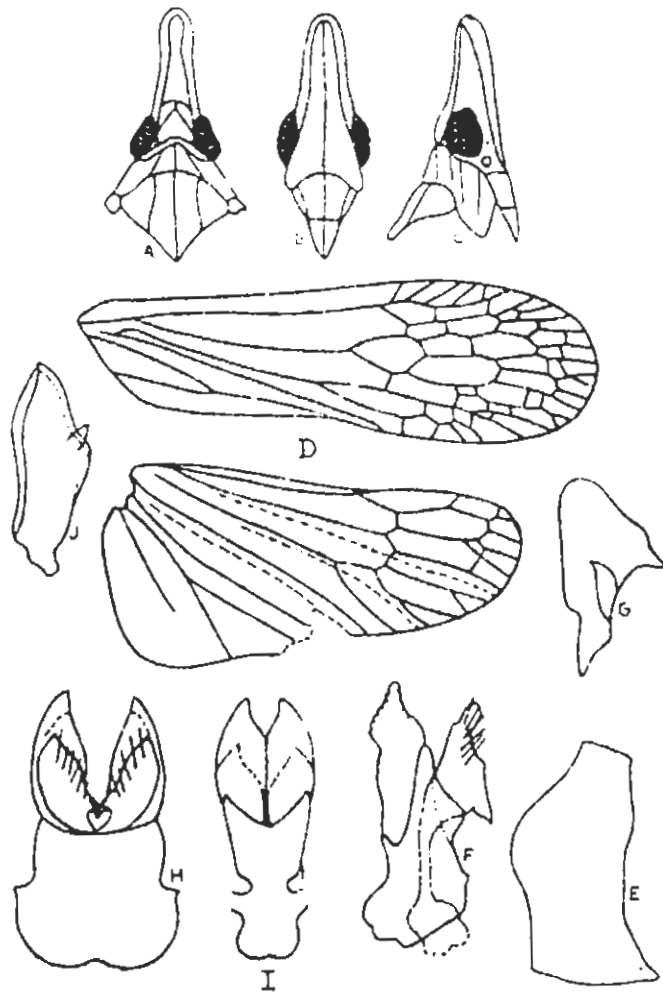
Anal segment, moderate in length, in lateral view, broadening towards apex, with a longitudinal cleft along

ventral margin; pygofer, in lateral view, with posterior margin mostly truncated, with postero-dorsal margin broadly produced; aedeagus, in dorsal view, with a broadly rounded phallobase, sclerotized lobes paired, appearing as latero-ventral covers, apically narrowed, a pair of nearly triangular, with basal end pointed membranous lobes; paramere in lateral view, much broader in apical half, with quite prominent dorsal apical process, sharply pointed, spinose process at base of dorsal apical process.

D. karachiensis, n.sp., is quite close to D. lyallpurensis, n.sp., but differs in the shape of cephalic process, carination of pronotum and in the shape of aedeagus respectively.

Type material

Holotype male, Karachi, Sind, Pakistan, M. Ramzan, grass, 20.IX.1975; allotype female, same data as of holotype; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 25 A-I. Dictyophara karachiensis, n.sp., A, B & C: Head, dorsal, frontal and lateral aspects, 8x, D: Left fore and hind wing, 8x, E: Pygofer, lateral aspect, 32x, F, H & I: Aedeagus, lateral, dorsal and ventral aspects, 32x, G: Left paramere, 32x.

Genus Putala Melichar

Putala Melichar. Homopterous Fauna Von Ceylon, 1903.

Type- species : Putala rostrata Melichar 1903, by subsequent designation of Distant, F.B.I. 111:246, 1906.

Metcalf 1946 listed four species of the genus from Oriental region. However no comprehensive account of the genus is available. The genus is therefore redescribed below:

Head and thorax

Head excluding eyes slightly longer than broad across base, usually 1.4 to 1.6 times longer, projected in front into a conical or strongly convex anterior tip; head with lateral carinae present, complete or incomplete, central carina absent or indistinct; pronotum tricarinate, lateral carinae incomplete or indistinct, and knob like, short lateral carinae behind each eye 1 to 2 in number; scutellum tricarinate, with lateral carinae complete or incomplete, or indistinct; clypeus with lateral oblique striations.

Tegmina

Stigma 4-celled; transverse veins, in apical half in three to four rows; apical cells, other than those covered by stigma, 16-19; additional cross veins in apical half also present.

Male genitalia

Anal segment, in lateral view, broad, with ventral margin strongly convex, possessing a longitudinal ventral cleft; pygofer, in lateral view, flat, truncated or convex; aedeagus, in dorsal view, with short and broad phallobase, sclerotized lobes absent, membranous lobes two pairs, leaf-like, unequal in size; paramere, broad in apical half, dorsal apical process in the form of a mild hook, located in middle or basal to mid-length, spinose process along dorsal margin, slightly distad to dorsal apical process.

The genus Putala Melichar have been studied on the basis of three species, including two new to science from Pakistan and are being treated in the present account.

KEY TO THE SPECIES OF THE GENUS PUTALA MELICHAR

1. Pronotum and frons with lateral and central carinae,
all distinctly and completely developed -----
----- P. rugosa, n.sp.

Pronotum and frons with either the lateral or central
carinae, all not distinctly or not completely deve-
loped----- 2.

2. Lateral carinae on head touching the antero-mesal mar-
gin of eyes, central and lateral carinae on scute-
llum not completely developed -----
----- P. hazarensis, n.sp.

Lateral carinae on head distinct from the mesal margin
of eyes, joining the posterior margin of vertex,
scutellum with completely developed carinae, tri-
carinate ----- P. brachycephala Distant.

Putala rugosa, n.sp.
(Figs. 26 A-I)

Form and colour

Length of male 0.9 cm, of female 0.9 cm; vertex longer than broad across base (2.1:1), only slightly projected in front of head, somewhat narrowed towards smoothly rounded apex; median length of frons nearly 1.6 times length of clypeus; head with lateral carinae complete, central carina absent; pronotum tricarinate, with two short lateral carinae behind each eye; scutellum and frons tricarinate; ratio between spines on outer margin and distal end of hind tibia 5:7. General body colour brownish, legs spotted brown, frons with central area orange coloured; tegmina with a longitudinal dark brown patch at apex.

Tegmina, with stigma 4-celled; transverse veins, in apical half in three rows, some additional cross veins also present; apical cells, other than those covered by stigma, 16.

Male genitalia

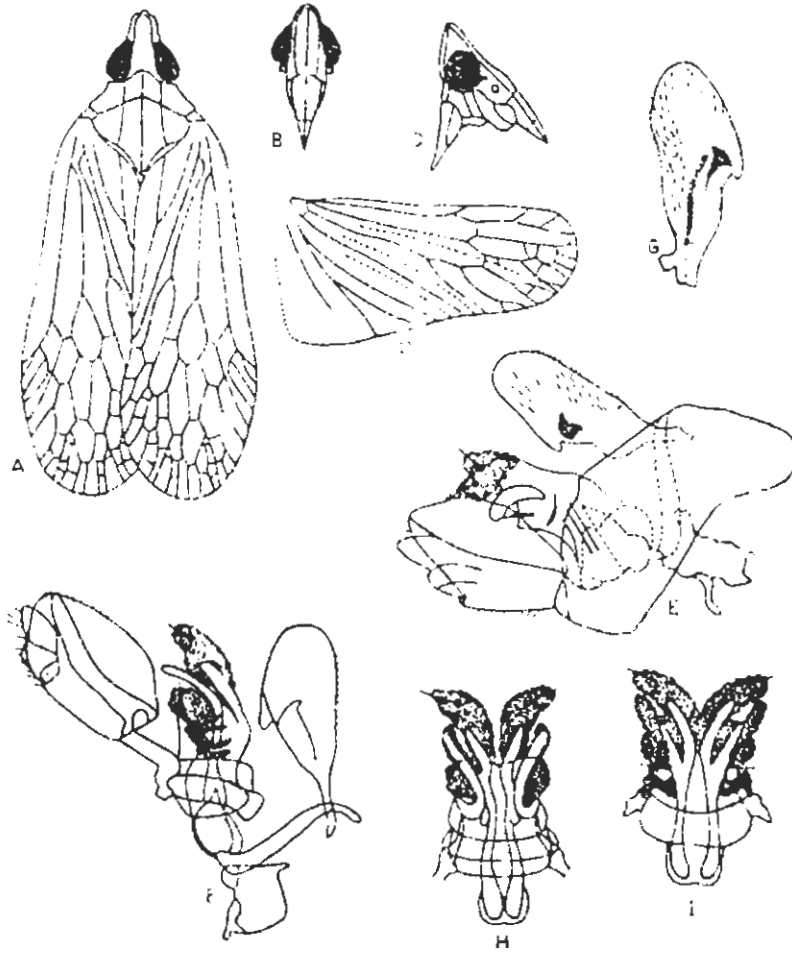
Anal segment, moderately long, in lateral view, with ventral margin possessing a broad longitudinal cleft; pygofer, in lateral view, with posterior margin irregularly convex, partly obliquely truncated; aedeagus, in dorsal view, with broad and short phallobase, with two pairs of

membranous lobes, leaf-like, diverging laterally at apices, with spines; paramere, in lateral view, broad in apical half, apex smoothly rounded, dorsal apical process mildly developed, hook-shaped, spinose process near dorsal margin, slightly distad to dorsal apical process.

P. rugosa, n.sp., appears close to P. brachycephala Distant, in the general pattern of head and male genitalia, but differs in the detailed carination of head, frons and the development of cross veins in tegmina.

Type material

Holotype male, Abbottabad, N.W.F.P, Pakistan, general grasses, Anwar, 20.VII.1972; allotype female, and paratype one male, with same data as of the holotype; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 26 A-I. *Putala rugosa*, n.sp., A: Body, dorsal aspect, 8x, B & C: Head, frontal and lateral aspects, 8x, D: Right hind wing, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Right paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Putala hazarensis, n.sp.
(Figs. 27 A-J)

Form and colour

Length of male 0.9 cm; vertex slightly longer than broad across base (1.4:1), only slightly projected in front of head, narrowed and conical in shape; median length of frons nearly 1.6 times length of clypeus; head with lateral carinae distinct and complete, central carina indistinct; vertex with a pair of black spots in middle, in between the eyes; pronotum with central carina present, lateral carinae absent, with one short lateral carina behind each eye; scutellum with central carina posteriorly incomplete; lateral carinae incomplete and indistinct; frons tricarinate, with lateral carinae incomplete posteriorly; clypeus with lateral oblique striations; ratio between spines on outer margin and distal end of hind tibia 7:7. General body colour brownish, eyes, clypeus and parts of venter blackish brown, tegmina with a longitudinal dark brown patch at apex.

Tegmina, with stigma 4-celled; transverse veins, in apical half in three distinct rows; some additional cross veins also present; apical cells other than those covered by stigma, 19.

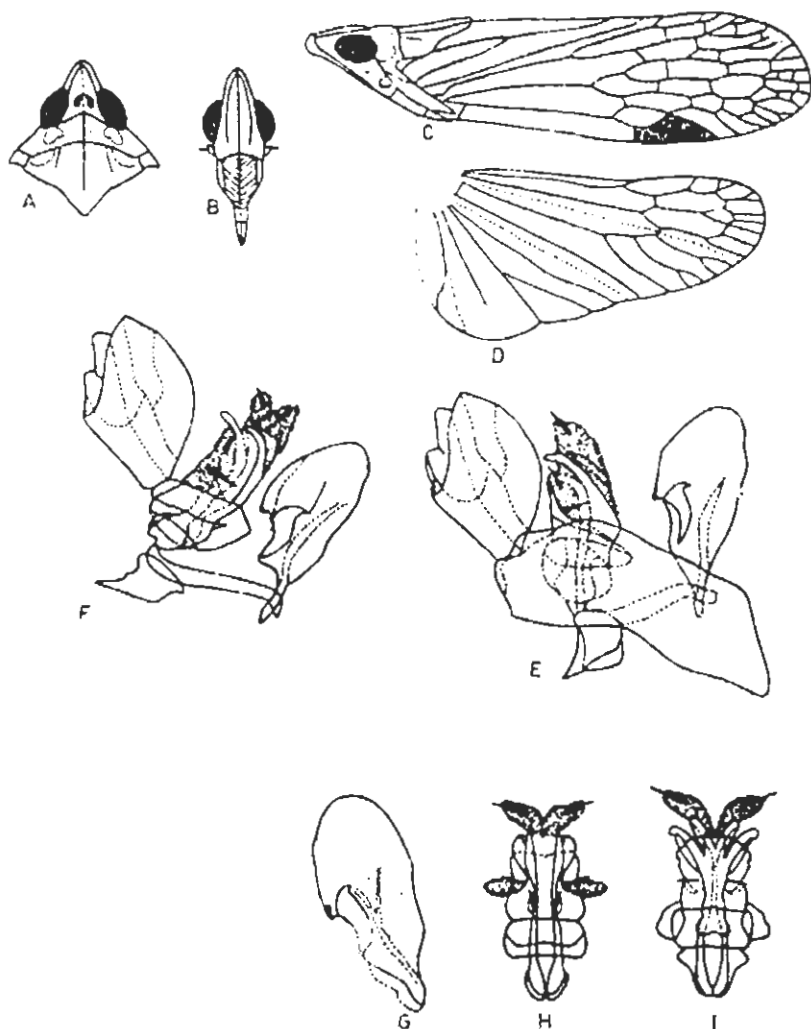
Male genitalia

Anal segment, in lateral view, nearly as broad as long, with a longitudinal cleft along convex ventral margin; pygofer, in lateral view, with posterior margin broadly flattened and slightly convex; aedeagus, in dorsal view, with moderately broad and long phallobase, possessing two pairs of leaf-like membranous lobes, diverging at apices; paramere, in lateral view, broad in apical half, with dorsal apical process mildly developed, nearly at mid length, spinose process along dorsal margin, slightly beyond dorsal apical process.

D. hazarensis, n.sp., is quite close to P. brachycephala Distant, redescribed hitherto, but differs in the carination of scutellum and frons.

Type material

Holotype male, Hazara, N.W.F.P, Pakistan, host, collector and date not known; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 27 A-I. Futala hazarensis, n.sp., A & B: Head, dorsal and frontal aspects, 8x, C: Body, lateral aspect, 8x, D: Right hind wing, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Right paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Putala brachycephala Distant
(Figs. 28 A-I)

Putala brachycephala Distant. Fauna Brit. India, XVIII:
354, 1906.

P. brachycephala Distant, was described by its author on the basis of external appearance only. As this description is not comprehensive, and does not take into account the male genitalia, it is therefore not much helpful in accurate understanding of species. It is therefore being redescribed here on the basis of specimens studied from Pakistan.

Form and colour

Length of male 1.0cm, of female 1.0cm; vertex prominently extended in front of eyes, conical, convex anteriorly, its median length (1.4:1) times its width across base; median length of frons nearly 1.7 times length of clypeus; head with lateral carinae complete, central carina absent, vertex possessing dim spot in middle between eyes; pronotum with central carina complete, lateral carinae small, indistinct knobs on antero-lateral margins, short lateral carinae behind each eye two in number, some other dim spots on pronotum also; scutellum and frons tricarinate, frons with lateral carinae indistinct, ratio between spines on outer margin and dis-

tal end of hind tibia 6:7. General body colour blackish brown; tegmina with a longitudinal blackish brown spot at apex.

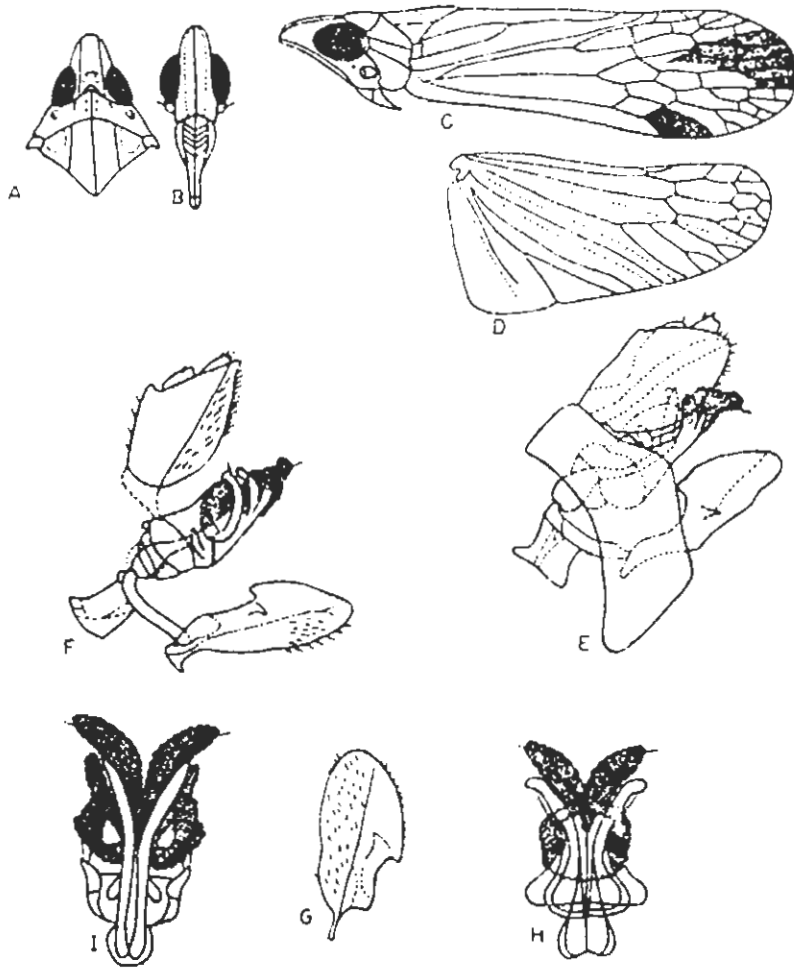
Tegmina, with stigma 4-celled; transverse veins, in apical half in four rows; apical cells other than those covered by stigma, 16.

Male genitalia

Anal segment, in lateral view, much broad, with ventral margin strongly convex, and possessing a longitudinal cleft; pygofer, with posterior margin mostly truncated, flat; aedeagus, in dorsal view, with short and broad phallobase, membranous aedeagal lobes in two pairs, unequal in size; large ventral lobes leaf-like, diverging in the 'Y' shaped form at apex, each apical part possessing a spine; paramere, with apical $2/3$, much broader than basal $1/3$, dorsal apical process mildly protruding as a hook, from dorsal margin in basal half, spinose process slightly distad to dorsal apical process.

Material Examined

One male, one female, Hyderabad, Sind, Pakistan, general grasses, 8.VII.1975; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 28 A-I. Putala brachycephala Distant., A & B: Head, dorsal and frontal aspects, 8x, C: Body, lateral aspect, 8x, D: Right hind wing, 32x, E & F: Male genitalia, lateral aspects, 32x, G: Left paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Genus Viridophara Novo

Type-species : Viridophara cynodona, n.sp.

Head and thorax

Median length of head less than collective median length of pronotum and scutellum: vertex projected in front of anterior margin of eyes, in the form of a cephalic process, less prominent than the genus Dictyophara Germar; inter-ocular width also less than the median length of cephalic process; vertex, pronotum, scutellum and frons all tricarinate; pronotum with 2-3 short lateral carinae behind eyes, median length of frons much more than that of clypeus; frons with lateral margins subparallel.

Tegmina

Tegmina long, with apical half more or less densely reticulate venation.

Male genitalia

Anal segment, moderately long, in lateral view, with lateral apical margin concave, ventrally projected posteriorly, directed ventrad; pygofer, in lateral view, irregularly strip shaped structure, with posterior margin slightly convex; aedeagus, in dorsal view, with moderately long body, apex appearing bilobed, in lateral view,

possessing 1-3 pairs of aedeagal membranous lobes, sclerotized appendages present, membranous lobes of various shapes; paramere, in lateral view, roughly hammer shaped, basal part narrow, margin widening towards apex, apex rounded and broad, curved dorsocephalad, to form short and blunt subapically located dorsal apical process, with spinose process nail shaped, located prominently basad to dorsal apical process.

The genus Viridophara Novo, is close to the genera Dictyophara Germar, and Putala Melichar. Viridophara Novo, however, differs from the genus Dictyophara Germar in possessing cephalic process of much lesser prominence, and from Putala Melichar in possessing a different pattern of aedeagus and paramere, particularly the aedeagus with sclerotized appendages, and the lateral spinose process of the paramere lying basad to the dorsal apical process. Four species of the genus are studied from Pakistan, of which three are new to science and one treated below as V. tschitralica (Dlabola) is being redescribed.

KEY TO THE SPECIES OF THE GENUS VIRIDOPHARA NOVO

1. Lateral carinae on frons incomplete, tip of dorsal, apical process of paramere blackish brown ----- 2.

Lateral carinae on frons complete, tip of dorsal apical process as well as dorsal apical margin of paramere blackish brown ----- 3.

2. Central carina on frons complete, pronotum with two lateral carinae behind each eye, aedeagus with one paired lateral, and a single central appendage ----- V. cynodonae, n.sp.

Central carina on frons incomplete, pronotum with three lateral carinae behind each eye; aedeagus with only one pair of lateral appendages ----- V. angulata, n.sp.

3. Aedeagus with two pairs of membranous lobes ----- V. carinata, n.sp.

Aedeagus with one pair of membranous lobes ----- V. tschitralica (Diabola).

Viridephara cynodonae, n.sp.
(Figs. 29 A-I)

Form and colour

Length of male 1.1 cm, of female 1.2 cm; vertex longer than broad across base (1.7:1); cephalic process with lateral margins converging anteriorly to a conical apex; head, in profile, slightly oblique both dorsally and ventrally; head, pronotum, scutellum and frons tricarinate; pronotum with two short lateral carinae behind each eye, median length of frons nearly 2.3 times the length of clypeus; lateral carinae of frons incomplete posteriorly, slightly falling short of posterior margin; ratio between spines on outer margin and distal end of hind tibia 4:7. General body colour greenish, eyes brownish, scutellum and central area of frons light orange.

Tegmina, with stigma 4-celled; transverse veins, in apical half in three rows.

Male genitalia

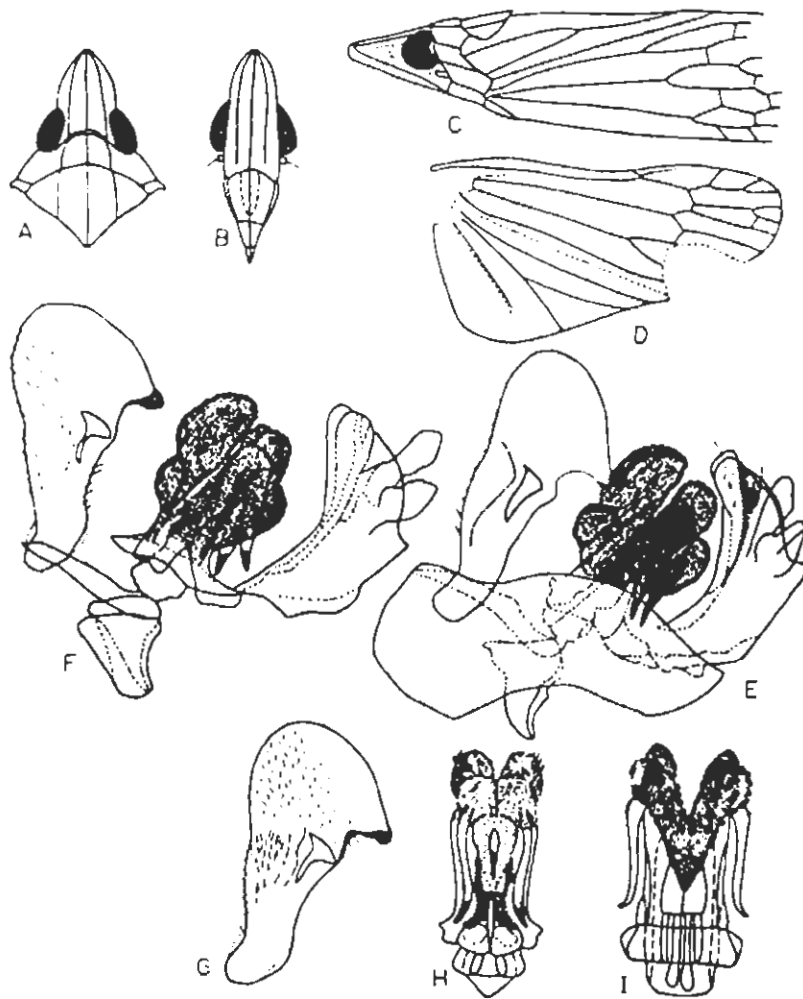
Anal segment, moderately long, in lateral view, ventral margin strongly concave, possessing a longitudinal cleft; pygofer, with posterior margin broadly convex in middle; aedeagus, in dorsal view, with moderately broad and long phallobase, possessing two pairs of oval shaped membranous lobes, and a single unpaired dorsal median lobe, lobes attaining 'V'-shaped appearance in ventral view,

with a pair of spiny appendages along lateral sides, tips of appendages directed cephalad, a single short median, spiny, appendage, visible in dorsal view, arising from the median lobe, lobes possessing short spines; paramere, in lateral view, hammer-shaped, narrow in basal 2/3, much expanded in apical 1/3, apex broad and smoothly rounded, dorsal apical process located in apical part, prominent, conical, formed as a continuation of dorsal apical margin, spinose process located nearly in middle, basad to dorsal apical process.

Viridophara cynodona, n.sp., appears close to V. tschitralica (Dlabola) in general appearance and pattern of head, paramere and anal segment. It however, differs from the latter species in the number of membranous lobes on aedeagus, and to some extent in the details of carination.

Type material

Holotype male, Gujranwala, Punjab, Pakistan, general grasses, Aslam, 13.VII.1975; paratype female, Hyderabad, Sind, Pakistan, grass, Shujaat, 6.VII.1975; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 29 A-I. Viridophara cynodonae, n.sp., A & B: Head, dorsal and frontal aspects, 8x, C: Body, lateral aspect, 8x, D: Right hind wing, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Right paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Viridophara annulata, n.sp.
(Figs. 30 A-I)

Form and colour

Length of male 1.1 cm; vertex longer than broad across base (2.6:1); cephalic process with lateral margins converging anteriorly to a conical apex; head, in profile, with horizontal dorsal surface, and sharply oblique ventral surface, a pair of tiny spots on posterior part of vertex, inbetween eyes; head, pronotum, scutellum and frons all tricarinate; pronotum with two short lateral carinae behind each eye; carinae on frons incomplete, lateral carinae not reaching to posterior margin, and central carina, ending before reaching the anterior tip; median length of frons nearly two times length of clypeus; ratio between spines on outer margin and distal end of hind tibia 4:7. General body colour brownish, carinae pale, eyes, legs and parts of venter brownish.

Tegmina, with stigma 10-celled, highest number of cells due to subdivision by longitudinal cross veins; transverse veins, in apical half not arranged in clearcut rows, normally more numerous than in Dictyophara, apical cells, other than those covered by stigma, 22.

Male genitalia

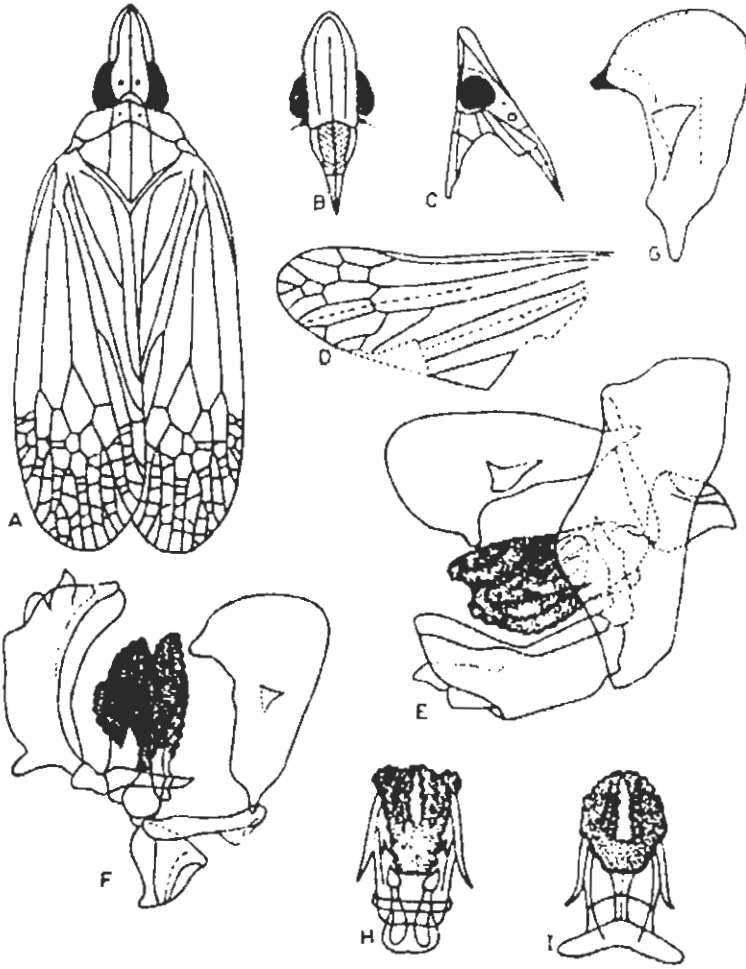
Anal segment, moderately long, in lateral view, with

dorsal margin convex, ventral margin strongly concave, longer than the dorsal margin, with a longitudinal cleft; pygofer, in lateral view, with posterior margin broadly projected into a smooth lobe like, posterior projection in middle; aedeagus, in lateral view, with three pairs of longitudinally arranged membranous lobes, in dorsal view, phallobase narrow and moderately long, lobes incised in middle, approximately 'Y'-shaped possessing spines, middle lobes, each with a spiny appendage, directed-cephalad along lateral sides of phallobase; paramere, in lateral view, hammer shaped, narrow in basal 2/3, expanded in apical 1/3, with dorsal apical process quite prominent, thin conical, in direct continuation with dorsal apical process, apex of paramere smoothly rounded, spinose process in middle broad to dorsal apical process.

Viridophara angulata, n.sp., is compareable to V. cynodonae, n.sp., described hitherto but differs in the larger number of membranous lobes on aedeagus and to some extent to the carination of frons.

Type material

Holotype male, Quetta, Baluchistan, Pakistan, Ahmed, date and host plant not known; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 30 A-I. *Viridophara angulata*, n.sp., A: Body, dorsal aspect, 8x, B & C: head, frontal and lateral aspects, 8x, D: Left hind wing, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Left paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Viridophara carinata, n.sp.
(Figs. 31 A-I)

Form and colour

Length of male 1.1 cm, of female 1.1 cm; vertex longer than broad across base (2.8:1); cephalic process with lateral margins converging anteriorly to a conical apex; head, in profile, with dorsal and ventral surfaces slanting; head, pronotum, scutellum and frons tricarinate, lateral carinae on vertex converging anteriorly, carinae on scutellum diverging posteriorly; pronotum with three short lateral carinae behind each eye, median length of vertex much less than combined median length of pronotum and scutellum, median length of frons, more than twice median length of clypeus; ratio between spines on outer margin and distal end of hind tibia 6:7. General body colour greenish, with a pair of large punctures on pronotum, and a pair of rounded spots on vertex, eyes brownish, frons mostly orange coloured, ocelli yellowish.

Tegmina, with stigma 4-celled; transverse veins, in apical half in three rows.

Male genitalia

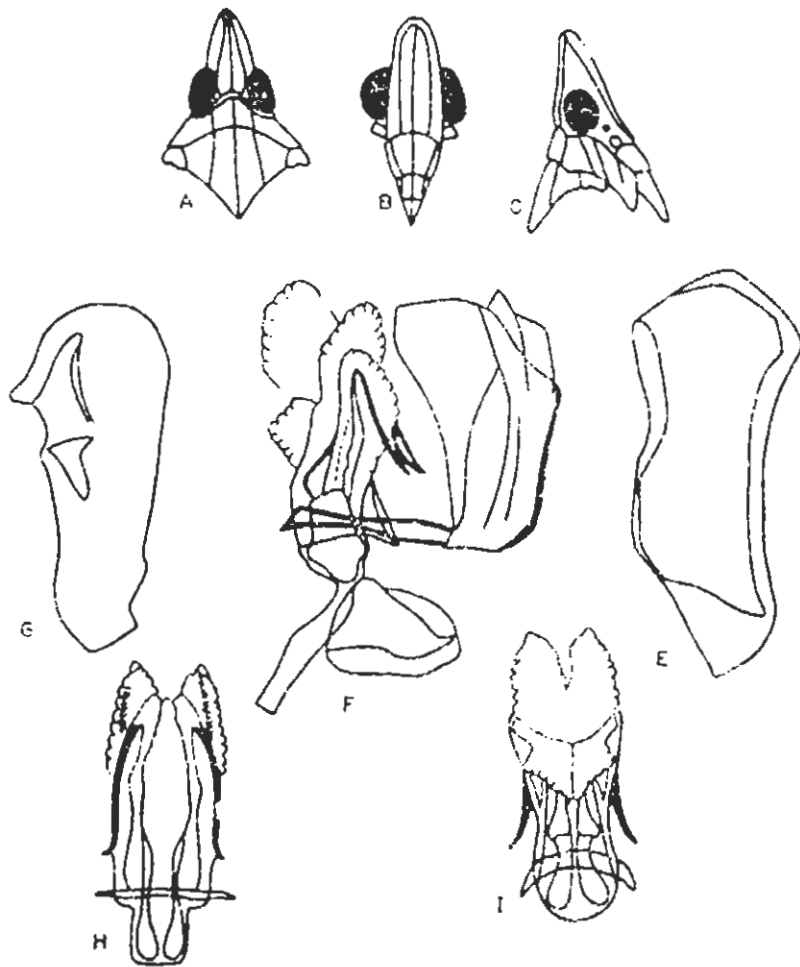
Anal segment, moderately long; pygofer, with posterior margin broad; aedeagus, in lateral view, with two pairs of membranous lobes, ventral lobes with spines pre-

sent on apical halves on ventral surface, aedeagal appendages long, with spinose apices, aedeagus, in dorsal view, with moderately long basal part, second pair of membranous processes appearing bifurcated apically; paramere long, in lateral view, with relatively subparallel basal part, apex broad and rounded, dorsal apical process knob like, spinose process much displaced, nearly in middle.

Viridophara carinata, n.sp., differs in possessing two pairs of membranous processes as compared to one pair in V. tschitralica (Dlabola), the two species are quite close to each other.

Type material

Holotype male, Hyderabad, Pakistan, Ramzan, grass, 25.VIII.1974; allotype female; 6.VII.1975; collected from the same locality by Shujaat; in Zoological Museum, University of Karachi, Karachi-Pakistan.



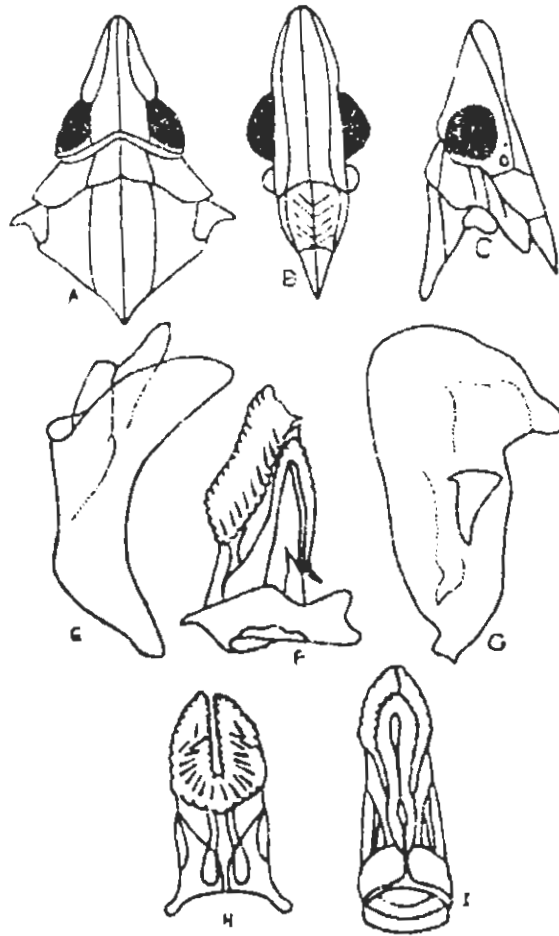
Figs. 31 A-I. *Viridophara carinata*, n.sp., A, B & C: Head, dorsal, frontal & lateral aspects, 8x, E & F: Pygofer, and male genitalia, lateral aspects, 32x, G: Right paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Viricophara tschitralica (Dlabola)
(Figs. 32 A-I)

Dictyophara tschitralica Dlabola. 51-54, (1954-55).

Material Examined

The species was studied from Gujranwala, Punjab, Pakistan, on grass, collected by Aslam, 13.VII.1975; and Peshawar, N.W.F.P, on grass and has been deposited in Zoological Museum, University of Karachi, Karachi-Pakistan. The drawings have been given of the specimen studied from Pakistan.



Figs. 32 A-I. Viridophara tschitralica (Dlabola). A, B & C: Head, dorsal, frontal and lateral aspects, 8x. E: Anal segment, lateral aspect, 32x, G: Right paramere, 32x, H, I & F: Aedeagus, dorsal, ventral & lateral aspects, 32x.

Genus Chiltana Novo

Type-species: Chiltana baluchi, n.sp.

Head and thorax

Head, including eyes much less in width than pronotum; vertex extremely reduced, falling short of anterior margin of eyes in length; anterior part of dorsal surface of head occupied by posterior extending of frons; vertex in the form of a transverse collar, slightly less than transocular width of head; median length of scutellum more than collective length of head and pronotum; frons and clypeus sub-equal in median length; head with lateral carinae present; touching mesal margins of eyes, converging both anteriorly and posteriorly; pronotum with one central carina, short lateral carinae behind each eye two in number; scutellum and frons tricarinate.

Tegmina

Tegmina, with stigma 3-celled; transverse veins, in apical half more closely present at 3 to 4 places, near apex, rows not visible; epical cells, other than those covered by stigma, 19.

Male genitalia

Anal segment, in lateral view, narrow and long; pygofer, in lateral view, with posterior margin flat and trun-

cated; aedeagus, in dorsal view, with phallobase broad and long, with two pairs of membranous lobes, both pairs longer than broad, with a pair of elbow shaped sclerotized appendages arising from apex of phallobase; and directed first dorso-caudad and than dorso-cephalad; paramere, in lateral view, massive, gradually broadening towards middle, than narrowed to a broad truncated extreme apex, dorsal apical process beyond midlength, a small, hook-shaped process directed dorso-cephalad, spinose process along dorsal margin, basad to dorsal apical process.

The genus Chiltana Novo is close to the genera Afronersia Fennah and Gilgitia Novo described hitherto in various characters of head, venation, genitalia, and also possess some fairly important distinguishing characters. Chiltana Novo possesses the smallest dimensions of head had relatively fewer cross veins than found in the known genus Afronersia Fennah and new genera Gilgitia, and Chiltana, it also lacks the median sac-like aedeagal extension as in Gilgitia Novo.

Chiltana Novo is based on a single species C. baluchi, n.sp., studied from Pakistan.

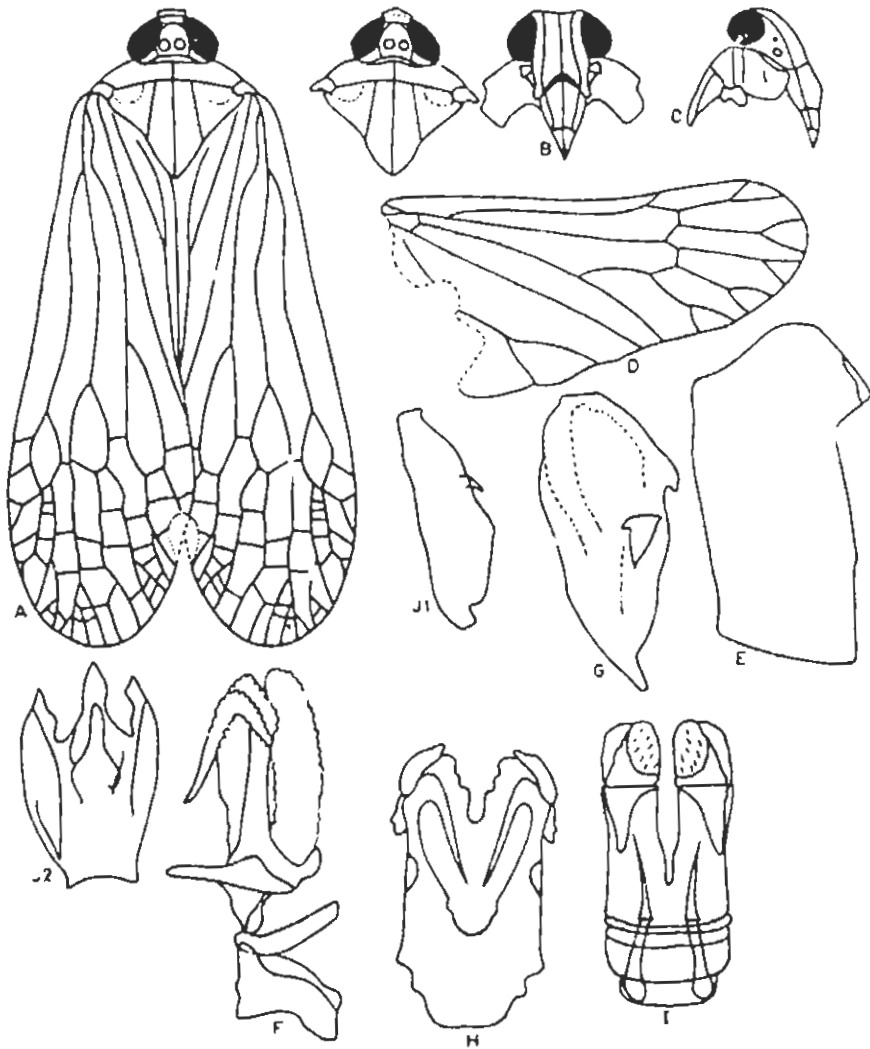
Chiltana baluchi, n.sp.
(Figs. 33 A-I)

Form and colour

Length of male 1.2 cm, of female 1.3 cm; general form as in the generic description. General body colour brownish; pronotum creamish; carinae on frons and scutellum, greenish, frons orange coloured; tegmina brownish, ratio between spines on outer margin and distal end of hind tibia 4:7.

Type material

Holotype male, Chiltan, Baluchistan, Pakistan, S.M. Khan, wild mint, (Mentha-viridis), 6.VII.1964; allotype female, same data as of the holotype; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 33 A-I. Chiltana baluchi, n.sp., A: Body, dorsal aspect, 8x, B & C: Head, frontal and lateral aspects, 8x, D: Right hind wing, 8x, E & F: Pygofer, and male genitalia, lateral aspects, 32x, G: Left paramere 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x, J 1-2: Anal segment, dorsal and lateral aspects, 32x.

Genus Gilgitia Novo

Type-species: Gilgitia lobata, n.sp.

Head and thorax

Head, including eyes, less than pronotum in width; vertex moderately developed, nearly as long as broad at base, slightly produced in front of eyes, with rounded convex anterior margin; frons visible partly on dorsal surface of anterior margin of head; head in profile, with smoothly rounded anterior margin, ventral surface strongly oblique; head and pronotum with central carina only; pronotum with two short lateral carinae behind each eye; scutellum tricarinate, with lateral carinae incomplete, not reaching the postero-lateral margins; frons tricarinate.

Tegmina

Tegmina, with stigma 4-celled; transverse veins, in apical half more numerous and reticulate than in genera-

Dictyophara Germar and Putala Melichar; apical cells, other than those covered by stigma, 15.

Male genitalia

Anal segment, in lateral view, moderately long, narrow at base, broad beyond mid length, with a longitudinal cleft along ventral margin; pygofer, in lateral view, nar-

row, collar shaped, with posterior margin unevenly convex and flat; aedeagus, with phallobase long, nearly equal in length to lobes, possessing two arms; membranous lobes of two unequal pairs; also attached with lobes in median position a transparent sac like structure, nearly as long as the phallobase; paramere, appearing triangular, apical part much broad, smoothly rounded, with dorsal apical process, in the form of a broad knob in apical half, spinose process prominently broad to dorsal apical process.

Genus Gilgitia Novo appears close to the genus Afronersia Fennah, in the general structure of head, venation and shape of paramere, but differs in the structure of aedeagus, from Chiltana Novo. The genus Gilgitia Novo differ in the structure of head. A single species of the genus have been studied from Pakistan.

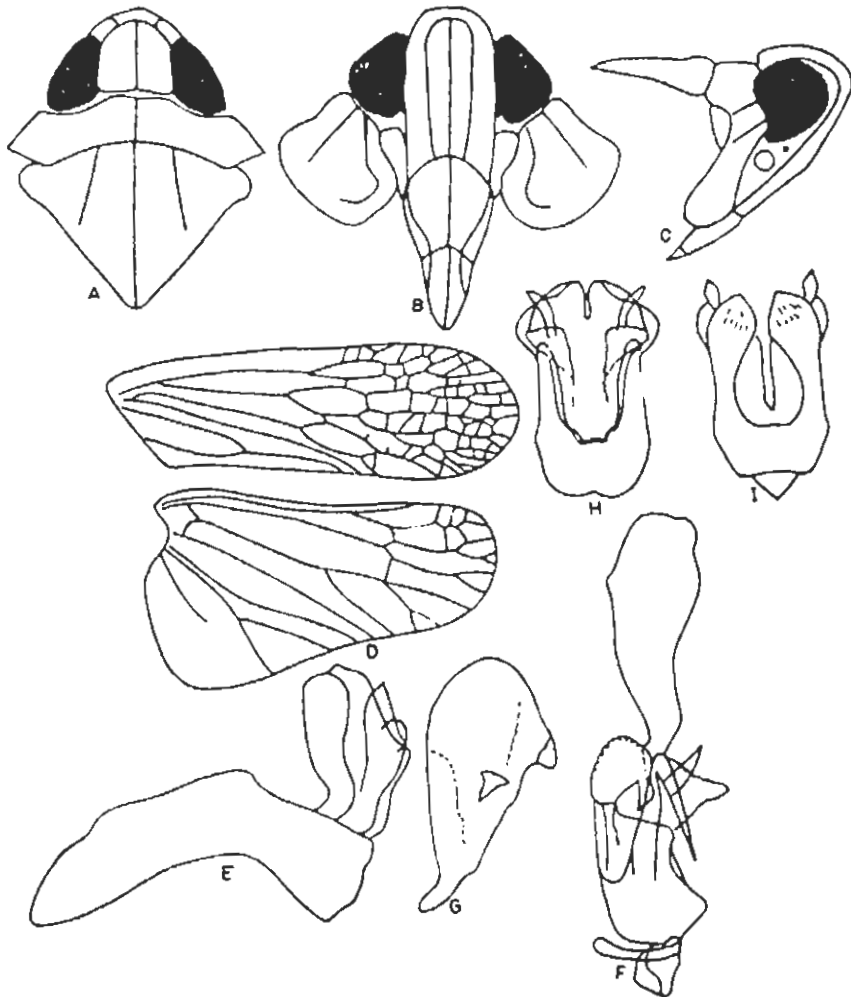
Gilgitia lobata, n.sp.
(Figs. 34 A-I)

Form and colour

Length of male 0.8 cm, of female 0.9 cm; general characters of head and thorax as in generic description; general body colour greenish; ocelli pale; vertex with a pair of rounded spots, pronotum with a pair of large punctures, eyes brownish; ratio between spines on outer margin and distal end of hind tibia 5:7.

Type material

Holotype male, Gilgit, N.W.F.P, Pakistan, general grasses, Shujaat, 21.VII.1974; allotype female, paratypes three males, and twelve females, Karachi, Ziarat and Gilgit, on general grasses, Khalid, Ramzan, and Shujaat; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 34 A-I. *Gilgitia lobata*, n.sp., A, E & C: Head, dorsal frontal and lateral aspects, 32x, D: Right fore and hind wings, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Left paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Genus Afronersia Fennah

Afronersia Fennah, Fulgoroidea from the Belgian Congo. Ann. Roy. Congo. Sci. Zool. 59 (8):65, 1957.

Type-species: Afronersia dionaea Fennah, by original designation.

The genus has been well described by Fennah (1957), on the basis of several species studied from central African countries. The present worker has studied two new species from Pakistan, which agree fairly well with the characters of the genus Afronersia. The species however, differ in the detailed structure of aedeagus and to some extent in the development of carinae on lateral pronotal lobes and tegulae. The new species studied from Pakistan are described below:

Afronersia ramzani, n.sp.
(Figs. 35 A-H)

Form and colour

Length of male 0.9 cm, of female 1.0 cm; vertex nearly as long as broad, or only slightly longer than broad across base (1.1:1), pentagonal, posterior margin mildly concave, apical margin convex; head tricarinate; pronotum tricarinate, with lateral carinae incomplete posteriorly, short lateral carinae behind each eye two in number; head and pronotum with a pair of punctures mid-dorsally on each; scutellum tricarinate, three carinae subparal-

lel; frons tricarinate, longer than broad; median length of clypeus more than one half of length of frons; ratio between spines on outer margin and distal end of hind tibia 6:7. General body colour greenish in freshly collected specimens, brownish in dry mounted specimens, ocelli pale, eyes brownish.

Tegmina, with stigma 4-celled; transverse veins, in apical half 5 to 6 rows; apical cells other than those covered by stigma, 19.

Male genitalia

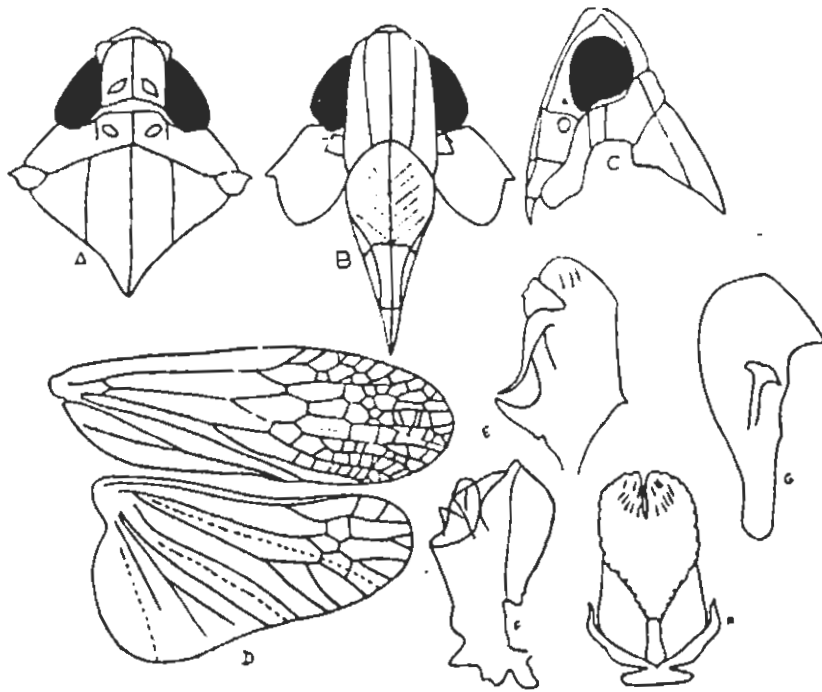
Anal segment; moderately long, in lateral view, ventral margin openly sinuate; aedeagus, in ventral view, with broad and moderately long phallobase, with a pair of broader ventrally located, membranous lobes and a pair of smaller dorsal lobes, the longer lobes narrow at base, expanded into fan-shaped form in middle, apex incised medianly, and possessing approximately eight pairs of spines in lateral areas, a pair of long spiny appendages, directed dorso-cephaled; paramere, in lateral view, much expanded beyond mid length, dorsal apical process prominent, conical, continuous with dorsal apical truncated margin of paramere, spinose process in middle, basad to dorsal apical process.

Afronersia ramzani, n.sp., differs from the African

known species in the complete development of the central carina on head and lesser number of rows of transverse veins in tegmina, in the general shape of head, and paramere it is comparable to A. lysis Fennah.

Type material

Holotype male, Karachi, Sind, Pakistan, general grasses, Ramzan, 27, 11.1973; allotype female and, paratypes two males, and three females, with same data as of the holotype; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 35 A-H. Afronersia ramzani, n.sp., A, B & C: Head, dorsal, frontal and lateral aspects, 16x, D: Left fore and hind wings, 8x, G: Right paramere, 32x, H & E: Aedeagus, lateral and dorsal aspects, 32x, F: Anal segment, lateral aspect, 32x.

Afronersia guettensis, n.sp.
(Figs. 36 A-I)

Form and colour

Length of male 0.9 cm, of female 0.9 cm; vertex nearly as long as broad across base (1:1); pentagonal, tricarinate, with three pairs of minute punctures along central carina, pronotum, collar shaped, narrow, with a pair of large punctures along anterior margin in middle, anterior margin slightly convex, posterior margin mildly concave, with lateral carinae absent, short lateral carinae behind each eye three in number, scutellum tricarinate, all three carinae falling slightly short of the posterior and postero-lateral margins, lateral carinae with longitudinal row of tiny spots, frons tricarinate, median length of frons slightly more than the length of clypeus; ratio between spines on outer margin and distal end of hind tibia 4:7. General body colour greenish, eyes brown.

Tegmina, with stigma 4-celled; transverse veins, in apical half in 5 to 6 rows; apical cells, other than those covered by stigma, 16.

Male genitalia

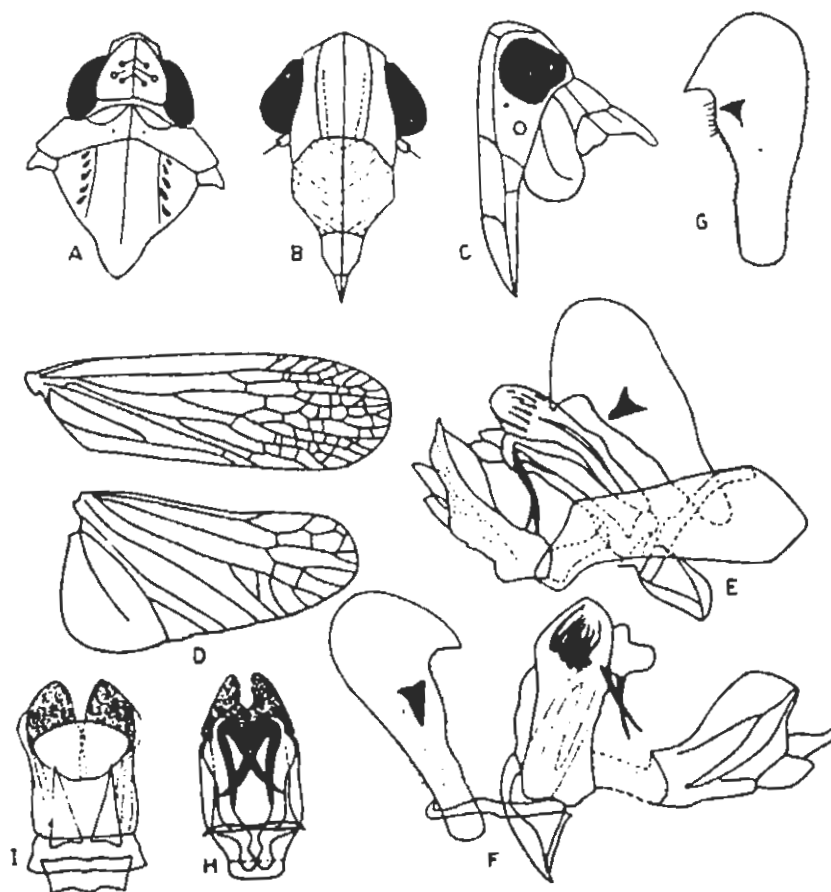
Anal segment, moderately long, in lateral view, with a cleft along distal ventral margin; pygofer, with posterior margin mostly flat, truncated, produced postero-dorsal-

ly in a sub-angular manner; aedeagus, in dorsal view, with broad and moderately long phallobase, with a pair of broad, triangular sclerotized lobes, possessing a bunch of spines on lateral apical surface, a pair of membranous lobes located dorsally, converging toward middle at apices, incised medianly, possessing a pair of stout appendages recurved, and inter crossing in middle; paramere, narrow upto $2/3$, of its length, broad on apical $1/3$, hammer shaped, dorsal apical process, conical, hook-shaped, present on dorsal margin pre-apically; spinose process located slightly beyond mid length, but basad to dorsal apical process.

The species Afronersia quettensis, n.sp. is smaller in size as compared with A. ramzani, n.sp., described hitherto. The two species has also similar paramere and to some extent the aedeagus. But they differ in the carination of head and scutellum, and the shape of pygofer.

Type material

Holotype male, Quetta, Baluchistan, Pakistan, general grasses, Ramzan, 6.VIII.1973; allotype female, paratypes one male, and one female, with same data as of the holotype; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 36 A-I. Afronersia quettensis, n.sp., A,B & C: Head, dorsal, frontal and lateral aspects, 32x, D: Right fore and hind wings, 16x, E & F: Male genitalia, lateral aspects, 32x, G: Right paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

FAMILY FLATIDAE SPINOLA 1839

The family Flatidae includes the planthoppers of cosmopolitan in distribution, adapted to live on vegetation of grate variety. Dozier (1926) considered that they were all vine, shrub, and tree loving forms, which usually occurred in deciduous woods in N. Amer. Distant (1906-1916) treated the flatids under the subfamily Flatinae of the family Fulgoridae, in the Fauna of British India Series, and described or redescribed 43 genera and 86 species from Indo-Pakistan. Dlabola (1957,60,71,72, 1974) studied the Flatidae of Iran and Afghanistan. Linnavuori (1962-1965) described some Flatids in his studies of the Hemiptera of Israel and Eastern Mediterranean countries. Caldwell & Martorell (1951) discussed the Flatidae of Puerto Rico and treated a number of species under seven genera. Metcalf and Bruner (1925 a,b,1930a, 1936a) published a series of papers on the homopterous fauna of Cuba in which they described the family Flatidae in an adequate manner.

The studies on the Flatidae of Indo-Pakistan have progressed to a fairly satisfactory degree so far. This family is one of the larger family of the Super-family Fulgoroidea. Kirkaldy (1905) described 2 genera and 2 species from the Oriental region. Distant (1906-1916) made the largest single contribution on the Indian Flatids. Where he described 86 species of the family under 43 genera.

Melichar (1903) described 9 genera and 28 species, and Datta (1979) described 7 genera and 8 species of the family from India and Ceylon. Ghauri (1971) added two new species to the genus Ketumala Distant of the Family Flatidae from South India.

Metcalf and Bruner (1948) described the main characteristic features of the family Flatidae as below:

" Body strongly compressed or depressed: tegmina and wings ample, held vertically or horizontally in repose. This character alone is sufficient to distinguish this family from the other families of superfamily FULGOROIDEA with the exception of the family ACANALONIIDAE in which the body is greatly compressed and the tegmina are ample and held vertically when at rest. And in the family ACHILIDAE all the species have the body greatly depressed. In the ACANALONIIDAE, however, there is no cross veined costal area and the hind tibiae are without lateral spines. In the ACHILIDAE there is no costal area, and the second tarsus of hind leg is not small. Other characters of the family FLATIDAE may be stated briefly as follows: Head small: compound eyes large, ventral sinus inconspicuous or wanting; two ocelli in the lateral compartments, ventrad to the compound eyes; antennae inconspicuous, first segment usually small, collar like, second segment longer, somewhat capitate, flagellum long; crown short, usually no distinct cephalic process, sometimes triangularly or conically produced; pronotum usually short and broad, separated into a distinct central area and lateral areas by a pair of very distinct intermediate carinae; mesonotum large, frequently tricarinate; tegmina large, vertical or horizontal; a distinct cross veined costal area; venation distinct but reticulate and irregular: legs simple, first and second pairs usually short; hind tibiae elongate with one or more spines usually on the apical third; second hind tarsus short with a pair of spines on the apical margin. The male genitalia furnish the most reliable specific characters; pygofer usually short and simple; genital plates large, united basad and with a large tooth on the dorsal

margin; aedeagus usually tubular, elongate, straight or curved with an apical pair of spines, a preapical pair of spines and a subapical pair of spines; anal segment usually elongate, broad, and flat with apical portion often strongly deflexed, hook like, covering the rest of the genitalia; female genitalia simple and incomplete. The lateral valvifers are large with rows of teeth along the inner ventral margin; ovipositor short, usually curved. "

The present worker has described eleven genera of the family Flatidae from Pakistan. Among these 6 genera and 13 species are new records and 2 genera and 2 species are new to science. The genera studied from Pakistan agree fairly well to the characters of the family described by Metcalf and Bruner (1948) with some minor variations, which are discussed in generic and species account.

KEY TO THE GENERA OF THE FAMILY FLATIDAE
FROM PAKISTAN

1. Pronotum angular or strongly convex antero-medianly,
its anterior margin either inline with the ante-
rior margin of compound eyes or projected promi-
nently infront ----- 2.

Pronotum with anterior margin flattened or convex,
but remaning behind the anterior margin of com-
pound eyes ----- 5.

2. Tegmina, with posterior apical margin narrowed,
angularly produced ----- Satapa, Distant.

Tegmina, with posterior apical margin broad, roun-
ded not angularly produced ----- 3.

3. Paramere, with apex, in lateral view broad, dorsal
apical process thin and curved, cephalad at apex
----- Melicharia Kirkaldy.

Paramere, in lateral view, broadest beyond midlen-
gth, apical part narrowed and projected dorsad
into dorsal apical process ----- 4.

4. Tegmina, with tiny spots in apical cells -----
----- Nakta, Distant.

Tegmina, without spots in apical cells -----
----- Unnata, Distant.

5. Head broad, and nearly horizontally flattened in-
front ----- 6.

Head narrowed, convex or projected infront ---- 9.

6. Apical margin of tegmina smoothly rounded ----- 7.
Apical margin of tegmina truncated ----- 8.
7. Vertex, pronotum and frons without carinae -----
----- Narowalenus, Novo.
Vertex, with central carina, pronotum with lateral
carinae, and frons with central carina -----
----- Neovarita, Novo.
8. Aedeagal appendages with surfaces smooth -----
----- Ketumala, Distant.
Aedeagal appendages with surfaces serrated -----
----- Seliza, Stal.
9. Tegmina, with apical margin broad and nearly rounded -----
----- 10.
Tegmina, with apical margin narrowed and truncated
----- Paragomeda, Distant.
10. Tegmina, with anterior and posterior margins nearly
subparallel, diskal venation reticulate all over
----- Epormenis, Fennah.
Tegmina, with anterior margin convex, diskal venation
not reticulate in basal part -----
----- Summanus, Distant.

Genus Satapa Distant

Satapa Distant. Fauna Brit. India. 111:426, 1906.
Type-species : Satapa sicula Distant, 1906, by
original designation.

The genus Satapa was described by Distant (1906) very briefly on the basis of external morphological characters only as below:

" Head (including eyes) a little narrower than pronotum; vertex much broader than long, its anterior margin a little roundly truncate; face about as broad as long, centrally and marginally carinate; pronotum scarcely as long as vertex, centrally carinate, posterior margin angularly emarginate; mesonotum very obscurely tricarinate; legs short, posterior tibiae not spined; tegmina short, not twice as broad as long, costal margin strongly convexly arched and a little sinuate before apex, apical margin strongly truncately sinuate, the posterior angle broadly subacutely produced, costal membrane about as broad as radial area, sparingly granulose, radial vein moderately dilated, all the veins prominent, on apical area somewhat transversely reticulate, a submarginal apical line formed of transverse nervures defining a marginal series of cellular areas, clavus very broad, its basal posterior area very coarsely granulose; wings with the veins furcate near outer area. "

During the present studies only one known species of the genus was studied from Pakistan, which is being redescribed.

Satapa sicula Distant
(Figs. 37 A-C)

Satapa sicula Distant. Fauna Erit. India. 111:426, 1906.

Form and colour

Length of male 0.8 cm; pronotum convex anteriorly, projected slightly beyond anterior margin of compound eyes; vertex in the form of a narrow strip, broader than long; frons oblong in shape, clypeus broader posteriorly and narrowed anteriorly; pronotum with only central carina, scutellum tricarinate, frons and clypeus without carinae. General body colour ochraceous brown; vertex, scutellum, extreme base of frons, and spines on legs dark brown; pronotum, rest of frons, clypeus, labrum, venter light brown, eyes black; tegmina ochraceous brown, venation dark brown.

Length of tegmina more than $1\frac{1}{2}$ times its maximum width; entire apical and costal margins possessing apical cells, posterior apical margin narrowed and prominently projected postero-laterally, apical margin truncate, basal half of tegmina sparsely granulate, apical half somewhat transversely reticulate, clavus broad.

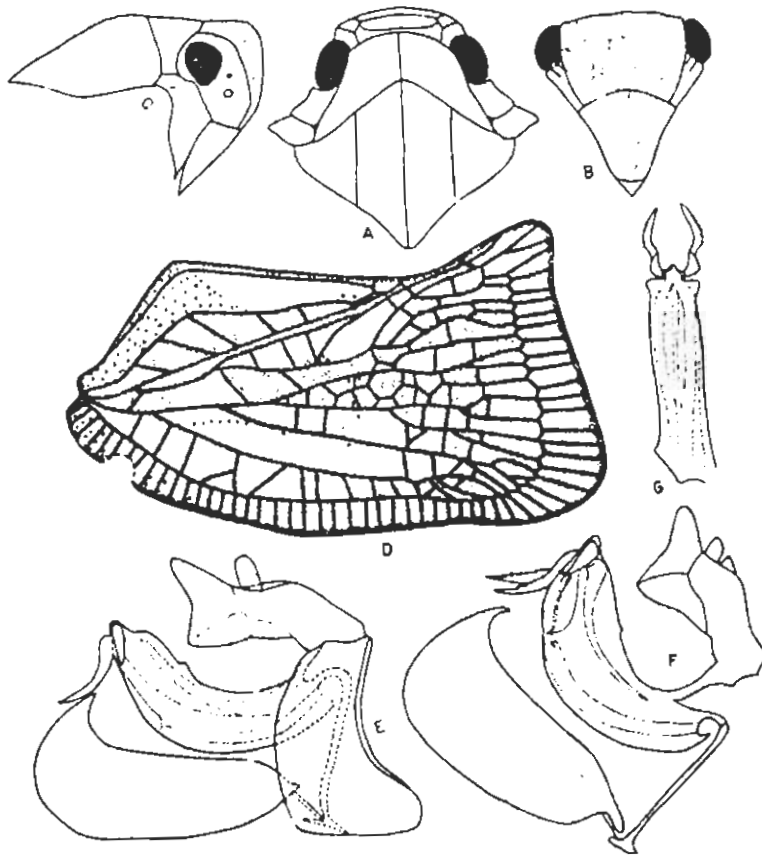
Male genitalia

Anal segment short, in lateral view, appearing as a dorso-ventral rectangular strip; pygofer simple,

collar-shaped; aedeagus, in lateral view, nearly three times as long as broad, arcshaped, curving dorsally in middle, in ventral view, appearing narrow and tubular, with a pair of terminal appendages, directed ventrad, posterior surfaces of appendages serrated, dorsal surface of aedeagus possessing a minute tubercle at about midlength; paramere, in lateral view, progressively broadening towards apex, which finely curved dorsad to form a fine dorsal apical process.

Material Examined

One male, one female, Karachi, Sind, Pakistan, grass, Shujaat, 7.III.1973; one female, Anwar, Gujoo, rice, 21.VI.1981; one female, Karachi, Aziz, lucern, 22.III.1950; one male, one female, Qadri, Lyallpur, grass, 23.III.1969; one male, Ansar, Narowal, grass, 11.X.1972; one male, two females, Qadri, Changamanga, X.strumarium, 24.III.1969; one female, Karachi, Qammar Abbassi grass, 3.IV.1969; two males, 4 females, Karachi, Shujaat, grass, 7.VIII.1973; one male, Karachi University Campus, Mobina, grass, 25.XI.1982; one male, Karachi University Campus. Israr, berseem, 12.III.1972; one male, two females, without data; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 37 A-G. Satapa sicula, Distant, A,B & C: Head, dorsal, frontal and lateral aspects, 8x, D: Right fore wing, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Aedeagus, dorsal aspect, 32x.

Genus Melicharia Kirkaldy

Melicharia Kirkaldy. Entomologist, XXXI:294, 1900.

Type-species: Melicharia quadrata Kirby 1891, by original designation.

Ormenis Melichar. (part.) Ann, Hofmus. Wien, XVII:64, 1902.

The genus was redescribed by Distant (1906:430)

as below:

" Head (including eyes) a little narrower than pronotum; vertex much broader than long, centrally and laterally strongly carinate, a little obliquely broadened anteriorly, the anterior margin truncate; face broad with a central carination extending about halfway from base, the lateral margins very broadly reflexed; clypeus elongate; posterior tibiae with two spines, the apical one short; pronotum a little longer than vertex, distinctly centrally carinate; mesonotum long, tricarinate; tegmina about one and a half times, or nearly twice, as long as broad, the costal margin very slightly rounded, the apical margin truncate, the posterior margin nearly straight, costal membrane a little wider than the radial area, the former strongly transversely veined, some of the veins furcate, the latter more sparingly and somewhat reticulately veined, first longitudinal vein emitted from radial vein close to its base second longitudinal vein from upper end of cell, both strongly furcate before middle, two transverse lines formed of transverse veins on apical area, the outermost nearly obliquely straight defining a series of narrow longitudinal marginal cellular areas, broadest near posterior angle, the inner transverse line less well defined; clavus with very obsolete, scarcely discernible transverse veins in its upper area, strongly granulose beneath claval vein; wings broader than tegmina, with two transverse veins near apex and some of the longitudinal veins outwardly furcate. "

The genus has been studied from Pakistan on the basis of five species, of which four are new to science.

KEY TO THE SPECIES OF THE GENUS MELICARIA KIRKALDY

1. Pronotum with anterior margin hardly reaching the level of anterior margin of compound eyes; vertex visible as a broad area in dorsal view -----
----- M. greeni, n.sp.

Pronotum with anterior margin projected beyond the anterior margin of compound eyes; vertex either not visible dorsally or appearing only as a narrow, transverse strip -----2.

2. Vertex visible dorsally, antero-medianly as a narrow transverse strip ----- 3.

Vertex not visible antero-medianly ----- 4.

3. Scutellum with obliquely transverse striations in middle, between the central and lateral carinae; spots on scutellum absent -----
----- M. lutescens(Walker)

Scutellum with transverse striations absent; three pairs and one median spots present on postero-lateral margin ----- M. lahorensis, n.sp.

4. Aedeagal body almost straight ----- M. imtiazii, n.sp.

Aedeagal body curved dorsad --- M. dalbergiae, n.sp.

Melicharia greeni, n.sp.
(Figs. 38 A-H)

Form and colour

Length of male and female 1.2 cm; vertex broader than long, visible dorsally, anterior to the pronotum and possessing a central carina; pronotum triangular, its anterior tip reaching level of anterior margin of compound eyes, pronotum and frons lacking carinae, and possessing reticulate pattern of green colour; scutellum with central carina. General colour of body pale green; eyes redish brown; tegmina green, veins green to pale greenish.

Tegmina with apical margin truncated, costal, apical and part of posterior apical margin possessing set of transverse veins, diskal part of tegmina with fine reticulate venation allover, clavus granulated.

Male genitalia

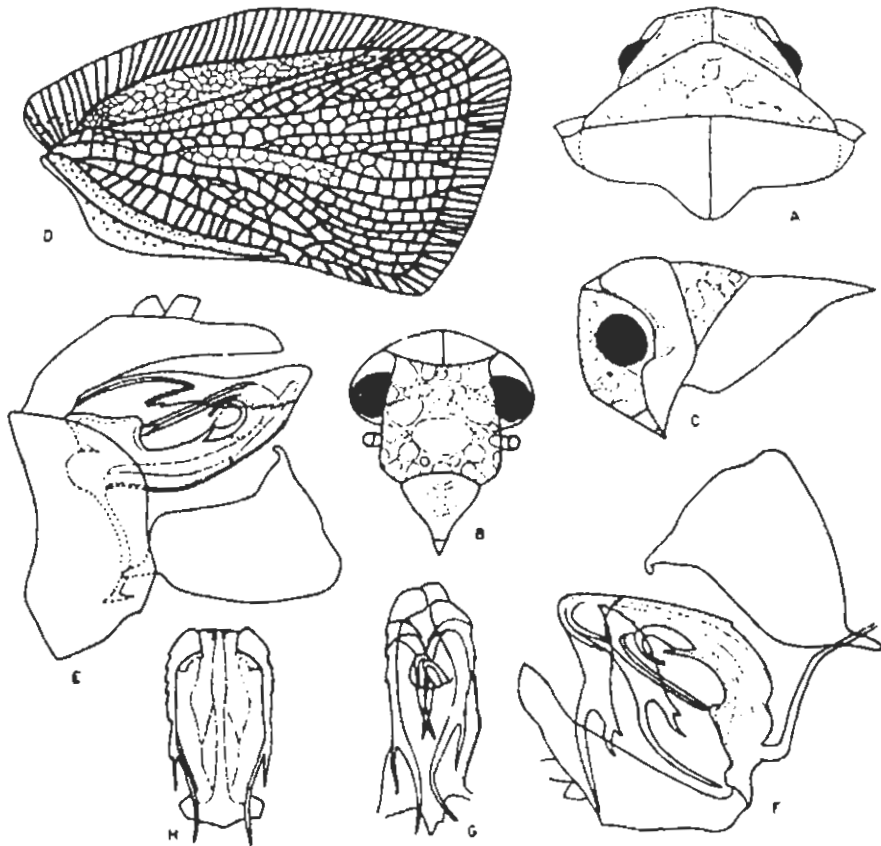
Anal segment, narrowed, elongated towards ventral side; pygofer broadly collar shaped; aedeagus, in dorsal view, moderately long, in lateral view, curved dorsad in middle, with two pairs of dorsal apical processes and a third pair of subapical process, also arising dorsally, second pair of apical processes longer than the aedeagus and possessing three tips; paramere, nearly one and a half times longer than broad, dorsal apical process narrow

and recurved dorsad.

This species differs from all the known species of Pakistan in the reduced development of pronotum and the vertex being prominently visible on dorsal side.

Type material

Holotype male, Karachi, Sind, Pakistan, Shujaat, grass, 2.III.1973; allotype female, with same data as of the holotype; paratype, one male, Islamabad, Nasim, lucern 25.IV.1971; one female, Malir, Ansar, lucern, 6.IV.1971, one male, Karachi, Ansar, grass, 10.IV.1971; one female, Abbottabad, Aquila, wild bush, 30.IV.1971; one female University campus, S. Khan, lucern, 5.IV.1971, one male, Shahdara, S.M.R. Haque, grass, 2.VI.1972; one male, Thatta, Ali Jah, lucern, 22.V.1971; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 38 A-H. Melicharia greeni, n.sp., A, B & C: Head, dorsal, frontal and lateral aspects, 8x, D: Right fore wing 8x, E & F: Male genitalia, lateral aspects, 32x, G & H: Aedeagus, dorsal and ventral aspects, 32x.

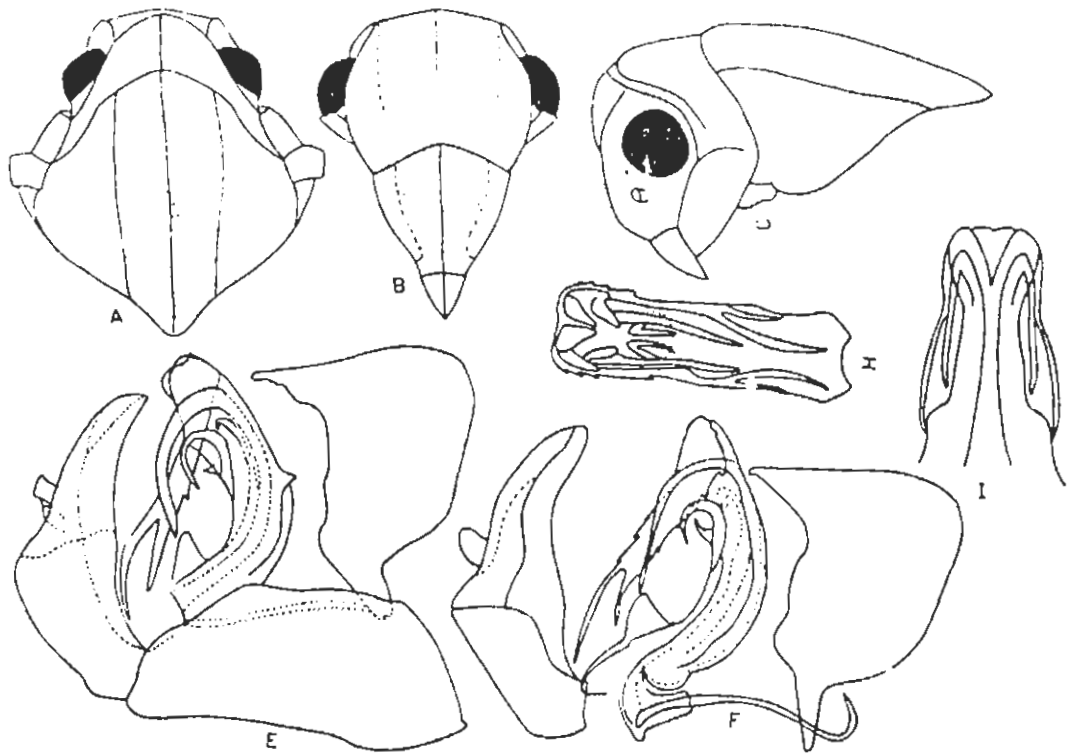
Melicharia lutescens (Walker)
(Figs.39 A-I)

Melicharia lutescens (Walker), 1858.
Poeciloptera lutescens Walker. List Hom. Suppl: 117,1858.
Flata lutescens Stal. Ofv. Vet-Ak.Forh: 490,1862.
Paratella lutescens Melichar. Ann. Hofmus. Wien, XVII:122,
1902.

Melicharia lutescens (Walker) is known from North India and Bombay (1906:431-32), recorded and described by Distant. Male genitalia of the species is illustrated for the first time. Presently this species is recorded from Chichawatni, Punjab, Pakistan.

Material Examined

One male, Chichawatni, Punjab, Pakistan, Ansar, maize, 11.X.1972; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 39 A-I. Melicharia lutescens, (Walker) A, B & C: Head, dorsal, frontal and lateral aspects, 8x, E & F: Male genitalia, lateral aspects, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Melicharia lahorensis, n. sp.
(Figs. 40 A-I)

Form and colour

Length of male 1.1 cm; pronotum with anterior margin strongly convex, projected in front beyond anterior margin of compound eyes; vertex appearing as a transverse strip anterior to pronotum; pronotum with central carina; scutellum tricarinate, its posterior margin possessing three pairs of orange coloured, rounded spots postero-laterally, and one spot postero-medially; median length of frons more than that of clypeus, both possessing a central carina, vertex without carinae. General body colour greenish; eyes and spines brownish, ventral surface ochraceous all over.

Tegmina, with apical margin truncated, costal, apical and a part of posterior margin possessing closely set transverse veins; diskal part with reticulate venation, excepting clavus, clavus granulose.

Male genitalia

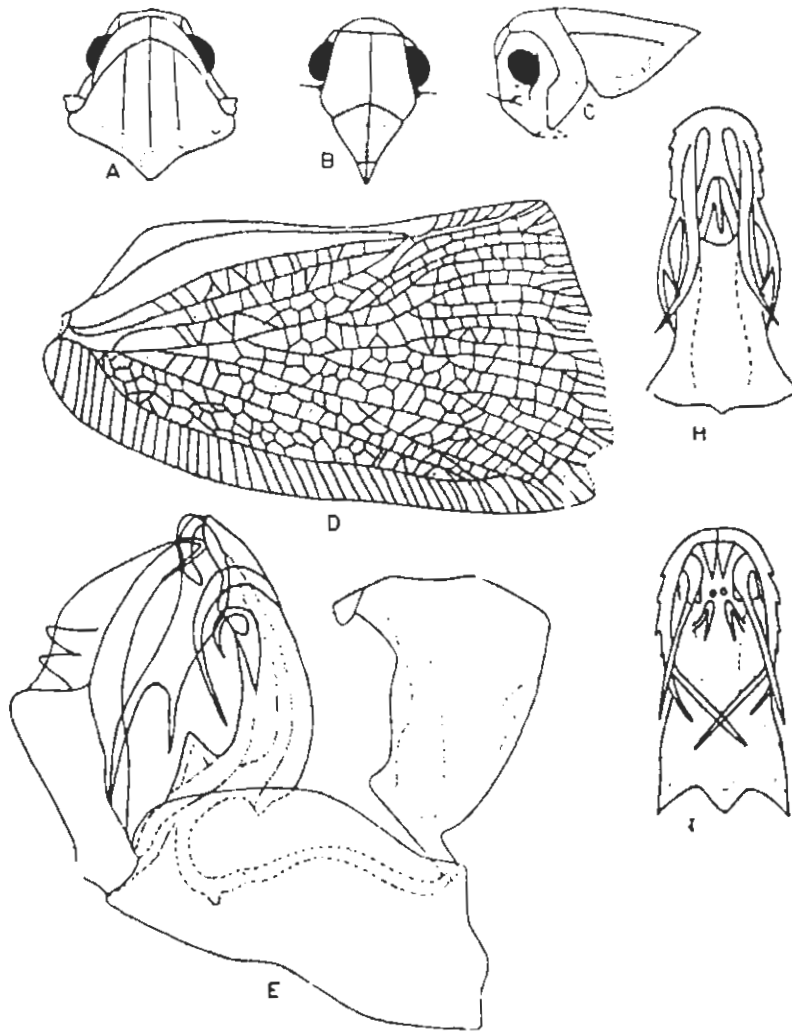
Anal segment, moderately long, much extended posterior to pygofer; pygofer, in lateral view, with posterior margin slightly convex, its dorso-ventral width much more than its antero-posterior length; aedeagus, in dorsal view, moderately long, with apex rounded, in lateral view slightly curved dorsad towards

apex, possessing four pairs of subapical and apical processes, first and second pairs subapical in position, smaller, strongly recurved, third pair apical, longest, reaching base of aedeagus and serrated on both dorsal and ventral surfaces, fourth pair small, flap like, apical in position; paramere; in lateral view, roughly triangular, with dorsal apical process broad, curved cephalad.

M.lahorensis, n. sp. is close to M. dalbergiae, n. sp. from which it differs in a few characters. The third and the longest pair of aedeagal processes possess serration on both the dorsal and ventral surfaces, and the vertex is visible dorsally as a transverse strip in M.lahorensis, n. sp. where as in M.dalbergiae, n. sp. the third pair of processes possess serration on the ventral surface and the vertex is not visible dorsally.

Type material

Holotype male, Ghoragali, Punjab, Pakistan, on wing; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 40 A-I. Melicharia lahorensis, n.sp., A, B & C: Head, dorsal, frontal and lateral aspects, 8x, D: Right fore wing, 8x, E: Male genitalia, lateral aspect, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Melicharia imtiazii, n.sp.
(Figs. 41 A-I)

Form and colour

Length of male 1.1 cm, of female 1.2 cm; pronotum with anterior margin extended far ahead, inbetween compound eyes, and covering most area of head, visible dorsally; scutellum broader than long, much more than pronotum; pronotum with central carina, scutellum tricarinate, ventral surface of head appearing horizontal anteriorly, with median length of frons slightly less than that of clypeus; both possessing central carina. General body color green in fresh specimens; vertex, face, pronotum, and central part of mesonotum of pale colour, lateral areas of mesonotum of ochraceous brown colour, eyes dark brown, spines yellowish, tegmina green, costal margin, clavus and venation of pale green colour.

Tegmina with apical margin truncated, costal area of uniform width, apical half have a closely set transverse veins, diskal part with slightly reticulate venation, clavus moderately granulose.

Male genitalia

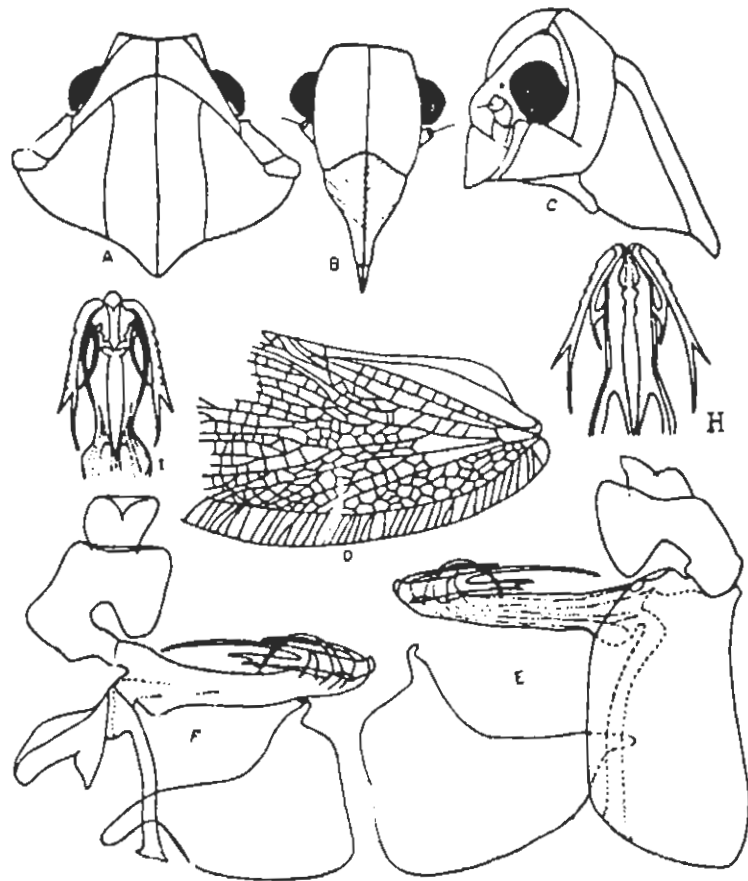
Anal segment, short; pygofer in lateral view, nearly rectangular in shape, posterior margin slightly convex; aedeagus, in dorsal view, moderately long, in lateral view, nearly straight and tubular, with four pairs of

apical and subapical processes, first and second pairs subapical, third and fourth pairs apical in position, third pair long, reaching base of aedeagus, comparatively broad, bifurcated, with serrated ventral surface, fourth pair slender nearly $1/3$ of third apical process in length; paramere, in lateral view, roughly triangular, maximum apical width less than length, dorsal apical process thin, curved, dorsad at apex.

M. imtiazii, n.sp., is quite close to M. dalbergiae, n.sp., and M. lahorensis, n. sp., The main body of the aedeagus is almost straight in M. imtiazii, n. sp., where as it is curved dorsad in the two other species, The anal segment in M. imtiazii, n. sp., is also relatively short.

Type material

Holotype male, Murree, Punjab, Pakistan, Imtiaz Ahmed, grass 20.VI.1969; allotype nil; paratype one male, Mirpursakro, grass, Ali Jah, 28.V.1975; two males, one female, Malir, Karachi, Ansar, lucern, 6.IV.1971; in the Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 41 A-I. Melicharia imtiazii, n.sp., A, B & C: Head, dorsal, frontal and lateral aspects, 8x, E & F: Male genitalia, lateral aspect, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Melicharia dalbergiae, n.sp.
(Figs. 42 A-I)

Form and colour

Length of male 1.0 cm; pronotum with anterior margin narrowed, rounded anteriorly, projected beyond anterior margin of compound eyes, vertex visible on antero-lateral side of pronotum as triangular patch; pronotum with a central carina; scutellum tricarinate, median length of frons nearly twice the median length of clypeus. Body generally green; head, pronotum, scutellum and face ochraceous brown; tegmina pale green.

Tegmina, with costal area as wide as radial area, venation of radial area strongly reticulate, apical line well defined, cross veins in clavus scarce, and area strongly granulose.

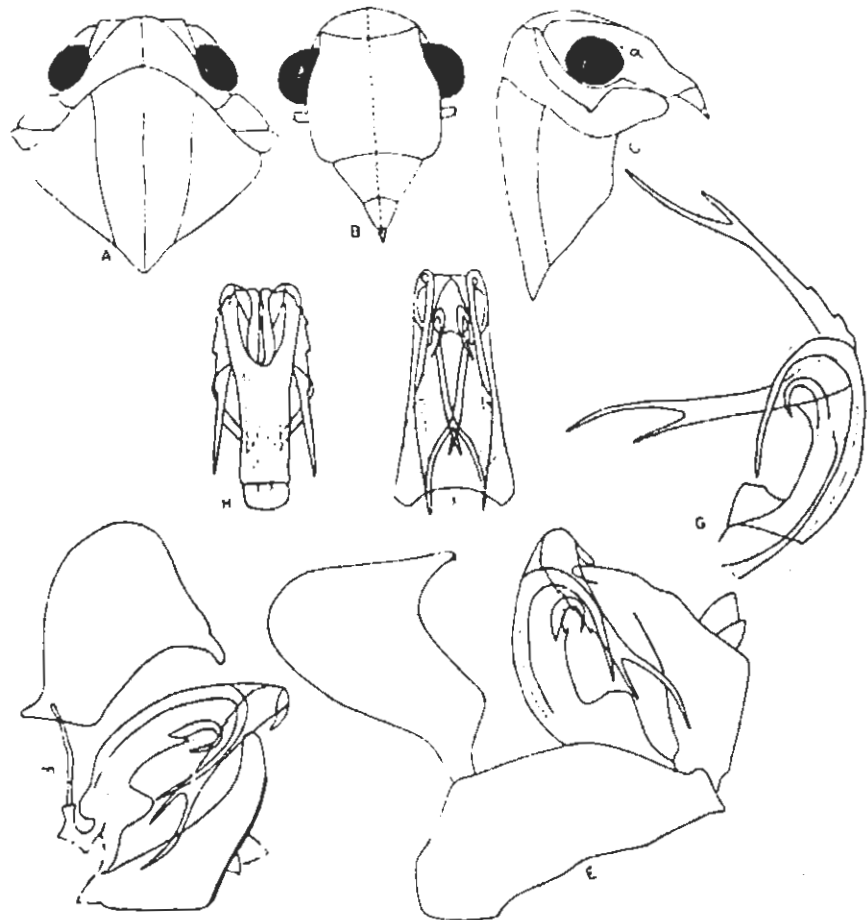
Male genitalia

Anal segment broad, ventral margins partly serrated; pygofer collar shaped, with posterior margin broad and flat; aedeagus, in dorsal view, with moderately long basal part, in lateral view, slightly curved dorsad, with four pairs of terminal processes, of which third pair being long, serrated on ventral surface, and fourth short; paramere, in lateral view, broadly triangular in shape, not much elongated, apical part broad and rounded, curved antero-dorsad to form the dorsal apical process.

M. dalbergiae, n.sp. is quite close to M. lahorensis, n.sp., described hitherto, in the general pattern of wing venation and male genitalia, but differs in the detailed pattern of male genitalia, particularly the serration of the aedeagal processes. The vertex is visible as a transverse strip in M. lahorensis, n.sp., but not so in M. dalbergiae, n.sp.

Type material

Holotype male, Ghoragali, Punjab, Pakistan, sheeshum 2.X11 paratypes two males, with same data as of the holotype; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 42 A-I. Melicharia dalbergiae, n.sp., A, B & C: Head, dorsal, frontal and lateral aspects, 8x, E & F: Male genitalia, lateral aspects, 32x, G, H & I: Aedeagus, dorsal, ventral and lateral aspects, 32x.

Genus Nakta Distant

Nakta Distant. Fauna Brit, India. 111:436, 1906.

Type-species: Nakta stoliczkana Distant 1906, by original designation.

The monotypic genus Nakta was described by Distant (1906:436) on the basis of type-species only. As the description of the genus consisted of mainly the external characters and nothing was known about the male genitalia.

Distant (1906) gave the following description of the genus on the basis of specimens of the type-species collected from Sind:

" Head (including eyes) a little narrower than pronotum; vertex very narrow, the lateral margins laminately raised; face about as broad as long, centrally keeled throughout its entire length, its lateral margins laminately raised; clypeus long, transversely obliquely striate on each lateral area; pronotum at least twice as long as vertex, centrally carinate; mesonotum long, tricarinate; tegmina about half as long again as broad, the costal margin strongly arched, the apical margin truncate with its apical angle rounded, its posterior angle rectangular, costal membrane narrower than radial area, the first transversely veined but the veins scarcely reaching the costal vein prominent, first longitudinal vein emitted from radial vein at a short distance from base, second longitudinal vein from upper end of cell, both strongly furcate, the whole tegmen transversely reticulately veined, anterior area of clavus transversely veined, its posterior area coarsely granulose; wings narrower than tegmina. "

Male genitalia

Anal segment, in lateral view, moderately long, its antero-lateral margins considerably prolonged as tubular extensions, directed ventrad; aedeagus, in lateral view, appearing tubular, arc-shaped, sclerotized, subapically spinose, with three pairs of appendages, of which first and second pairs small, apically tapered, third pair long, stout, serrated on both ventral and dorsal surfaces, processes reaching the base of aedeagus; paramere, in lateral view, broadest in basal half, slightly narrowed in apical half, apex curved dorsad to a narrow tapered, dorsal apical process, directed dorsad.

The genus Nakta Distant differs from the closely related genus Unnata Distant in possessing tiny spots on the marginal cells of the entire costal and apical margin, and in possessing three pairs of aedeagal processes. The genus Unnata is characterized by 1-2 pairs of aedeagal processes and marginal cells of tegmina lacking spots.

The type-species of the genus which was earlier studied by Distant (1906) from Sind valley have now been recorded from a number of localities like Abbottabad, Peshawar, (N.W.F.P.), Ghoragali, Narowal, Islamabad, Changamanga, Rawalpindi (Punjab), Ziarat (Baluchistan), Karachi (Sind), and Gilgit in Northern areas. It appears that the species has a very wide distribution in Pakistan.

The Illustrations in Figs.43 A-G, are based on the specimens collected from Karachi, Sind-Pakistan.

Nakta stoliczkana Distant
(Figs. 43 A-C)

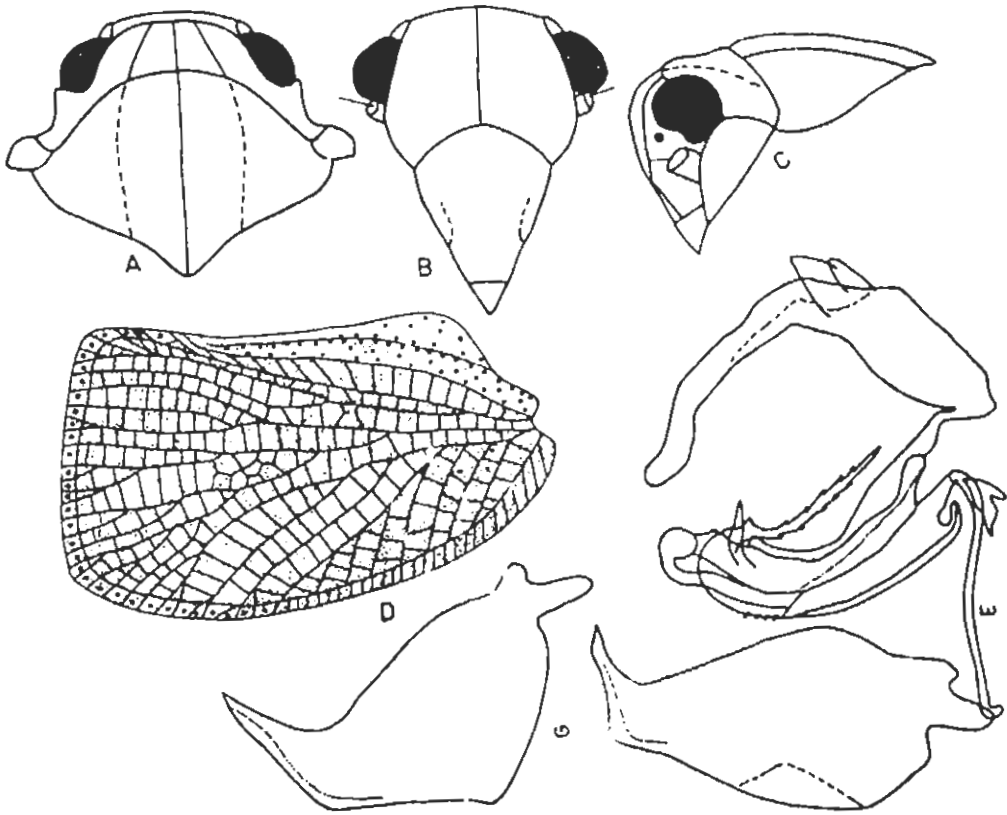
Nakta stoliczkana Distant, Fauna Brit. India 111:436, 1906.
by original designation.

This species is known from Sind, India recorded by Distant (1906), with no information of its host plants and exact locality. Chaudhry (1970) recorded the species from Dir, Swat, Azad Kashmir, Peshawar and Punjab, on a number of host plants. During present studies the species is recorded from Abbottabad, Changamanga, Rawalpindi, Chichawatni, Shahdara, Ayoubpark, Gilgit and Karachi.

Material Examined

Two males, two females, Ziarat, Baluchistan, Pakistan, Ramzan, grass, 29.VI.1975; three males, five females, Abbottabad, Shujaat, grass, 16.VI.1974; one male, one female, Abbottabad, grass, XI.1972; one female, Abbottabad, soyabean, 1.XI.1972; two females, Ayoubpark, Fareed wild plant, 19.VI.1969; one male, one female, Islamabad, Anwar, grass, 26.V.1976; one male, one female, Changamanga, Cholai, Azhar, 7.IV.1972; one male, Changamanga, grass, Qadri, 4.VI.1972; one female, Changamanga, Azhar, X. strumarium, 4.VI.1972; two males, one female, Rawalpindi, Rana, grass, 14.IV.1972; two males, four females, Gilgit, Shujaat, grass, 2.I.1970; one female, Chichawatni, grass, Shujaat, 20.X.1972; one female, Dir, wild bush; Rub Nawaz.

28.7.1966; in Zoological Museum, University of Karachi,
Karachi-Pakistan.



Figs. 43 A-G. Nakta stoliczkana, Distant, A, B & C: Head, dorsal, frontal and lateral aspects, 8x, D: Left fore wing, 8x, E: Male genitalia, lateral aspect, 32x, G: Left paramere, 32x.

Genus Unnata Distant

Unnata Distant. Fauna Brit.India. 111:437, 1906.

Type-species : Poeciloptera intracta, Walker.

List. Hom. Suppl., 116, 1858, by original designation.

Distant (1906), described the monotypic genus on the basis of external morphological characters only, and no mention was made of the male genitalia. In recent studies, the type-species as well as two other new species of the genus were collected from Pakistan and are being treated here, The original generic discription being inadequate, the genus is also redescribed below.

Head and thorax

Head with vertex visible dorsally, broader than long; pronotum projected anteriorly upto middle or mesal margins of eyes or even beyond their anterior margin; vertex with or without central carina; pronotum with either only central carina, or tricarinate; scutellum tricarinate; head including eyes narrower than pronotum, frons widened towards clypeus, anterior margin prominently concave, median length of frons more or less than that of clypeus.

Tegmina

With apical margin truncate, posterior apical margin angulate, anterior apical margin rounded, diskal venation mostly reticulate, excepting the claval area, most of

costal and apical margins possessing short cross veins; length of tegmina greater than its width.

Male genitalia

Anal segment, in lateral view, moderately long, with lateral apical margins possessing spines to tubular prolongations, strongly curved ventrad; prolongations equal to or greater than length of anal segment; pygoiter, narrowed dorsally, broadened ventrally, possessing an irregularly broad form; aedeagus in dorsal view, tubular, curved dorsad, possessing 1-2 pairs of apical aedeagal processes, serrated in one or both surfaces; paramere, much broader in basal half than in apical half, dorsal apical process narrow, directed dorsad, in the form of continuation of apex of paramere.

The genus Unnata Distant is close to genus Nakta Distant in the shape of paramere, aedeagus and anal segment, but differs in pattern of head and venation of tegmina. The aedeagus in the genus Unnata is enclosed basally by a sac which is absent in the genus Nakta.

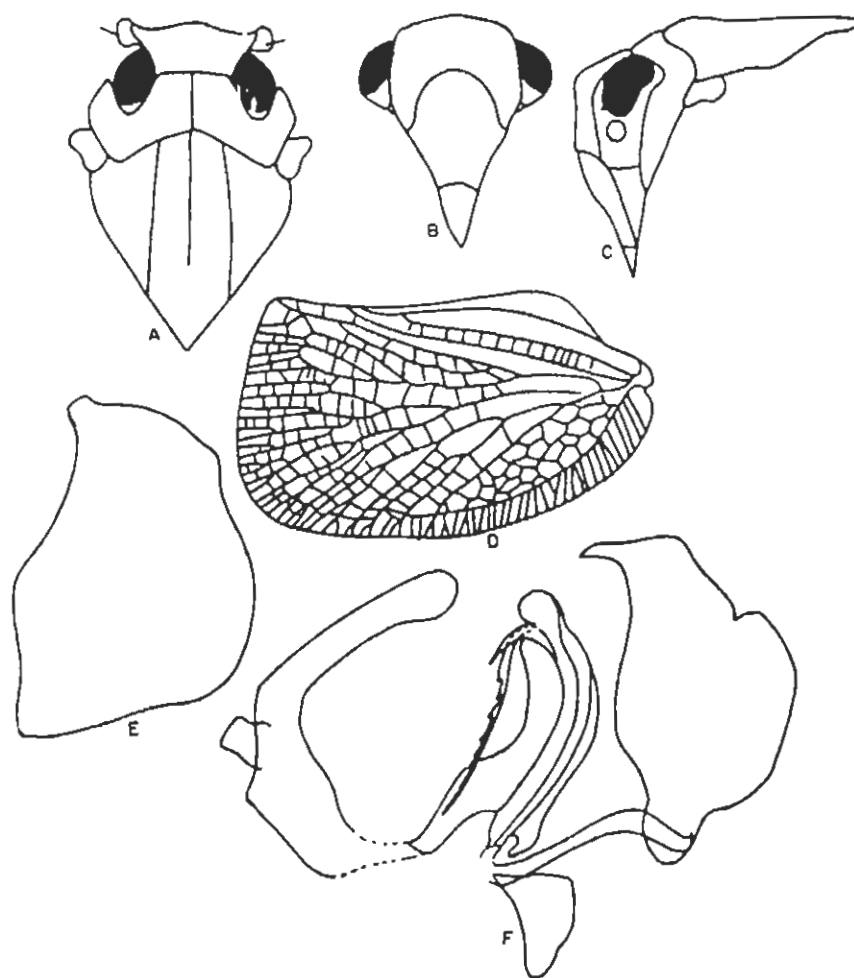
Unnata intracta (Walker)
(Figs. 44 A-F)

Poeciloptera intracta Walker, List. Hom. Suppl:116,1858.
Flata intracta Atkinson, J.A.S.Bengal. V:70,1886.
Sephena intracta Melichar, Ann. Hofmus. Wien, XVII:129,1902.

The species is known from Punjab, India with no information of its host plants and exact locality. Chaudhry (1970), collected the species from a number of localities of Punjab on the plants like citrus, Indigofera sp., Accacia sp., Sarcococca sp., Lonicera sp., wild mint and a medicinal plant known as bhung. During the present studies a number of specimens of the species were collected from grass, sheeshum (Dalbergia sp.), willow (Salix-sp.), lucern, wild weeds (Xanthium trimarium) and (Amaranthus sp.), in several localities of Pakistan.

Material Examined

One male, Chghar mitti, M.A.Ram, Salixsp².VIII.1966; one female, Malir, Ansar, lucern, VI.IV.1971; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 44 A-F. *Unnata intracta*, (Walker), A, B & C: Head, dorsal, frontal and lateral aspects, 8x, D: Left fore wing 8x, E: Pygofer, 32x, F: Male genitalia, lateral aspect, 32x.

Unnata bahawalpurensis, n.sp.
(Figs. 45 A-I)

Form and colour

Length of male 9.0 mm; vertex, a narrow transverse strip in front of pronotum, which itself possesses a convex anterior margin, projecting beyond the anterior margin of compound eyes; transocular width of head less than width of pronotum; pronotum and scutellum tricarinate; frons with transverse posterior margin, broadening anteriorly, with concave anterior margin, median length of frons slightly more than that of clypeus; clypeus possessing lateral oblique striations. General body colour green, abdomen pale, legs green ochraceous, tibiae and tarsi pale testaceous, tegmina mostly dark green, apical and posterior margins pale ochraceous.

Tegmina as in the species U. intracta.

Male genitalia

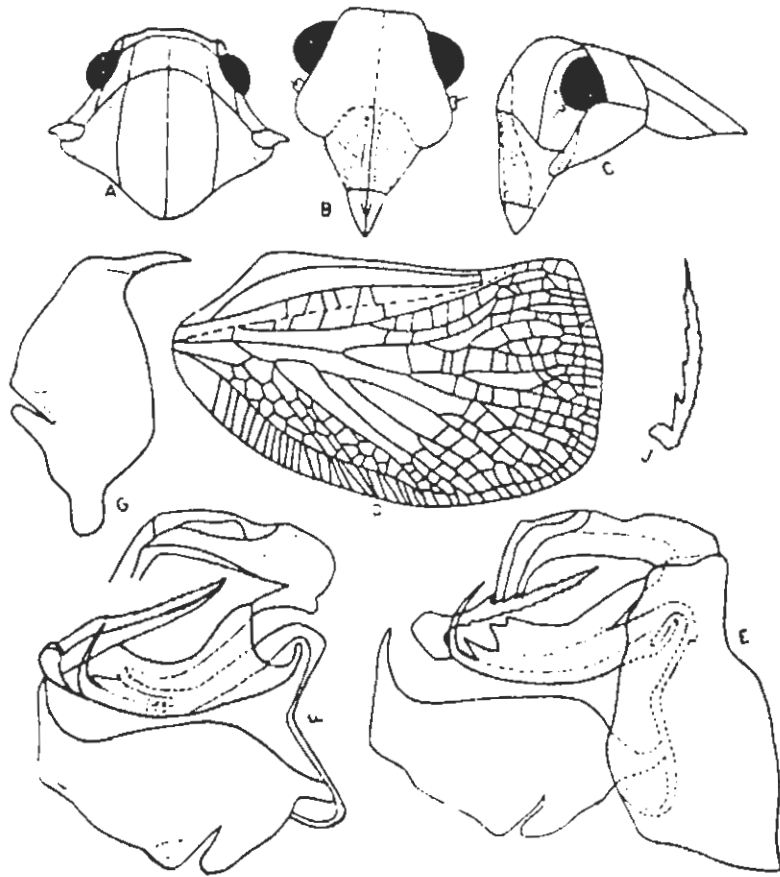
Anal segment, moderately long, with antero-lateral margins prolonged, tapered apically, and directed ventrad; pygofer, in lateral view, broader than long, in form of a dorso-ventral rectangular collar; aedeagus, in dorsal view broad and long in lateral view, tubular, directed caudad, with apex prominently dented, possessing two pairs of apical processes, both directed dorso-

cephalad, the short pair, thinner and finer of two, with smooth margins, the large pair with both surfaces serrated from base to apex; paramere as in U. intracta, the dorsal apical process slightly longer in this species, and the paramere possess a deep dent in basal ventral margin as a result of which a lobe like part is produced, apparent near the base.

U. bahawalpurensis, n.sp., is quite close to the species U. intracta (Walker) but differs in the shape of head, frons, and the detailed structure of paramere.

Type material

Holotype male, Bahawalpur, Punjab, Pakistan, Fareed Ahmed, 13.IX.1968; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 45 A-I. Unnata bahawalpurensis, n.sp., A, B & C: Head, dorsal, frontal and lateral aspects, \times , E & F: Male genitalia, lateral aspects, 32x, G: Left paramere, 32x, J: Aedeagal, appendage aspect, 32x. D: Right fore wing; \times .

Unnata gilgitensis, n.sp.
(Figs. 46 A-F)

Form and colour

Length of male 9.0 mm, of female 7.0 mm; transocular width of head less than the transverse width of pronotum, vertex in form of a narrow transverse strip in front of pronotum, which is projected ahead beyond anterior margin of compound eyes; pronotum, vertex, frons and clypeus possessing central carina; scutellum possessing only lateral carinae; median length of frons less than that of clypeus, frons nearly uniformly broad, slightly bulging out laterally in middle, clypeus narrowing considerably towards the anterior end. General body colour similar to U. bahawalpurensis, n.sp., described hitherto.

Tegmina with shape and venation as in the generic description; with radial area more closely reticulate than rest of diskal part; marginal cross veins not demarcated all over the costal margin.

Male genitalia

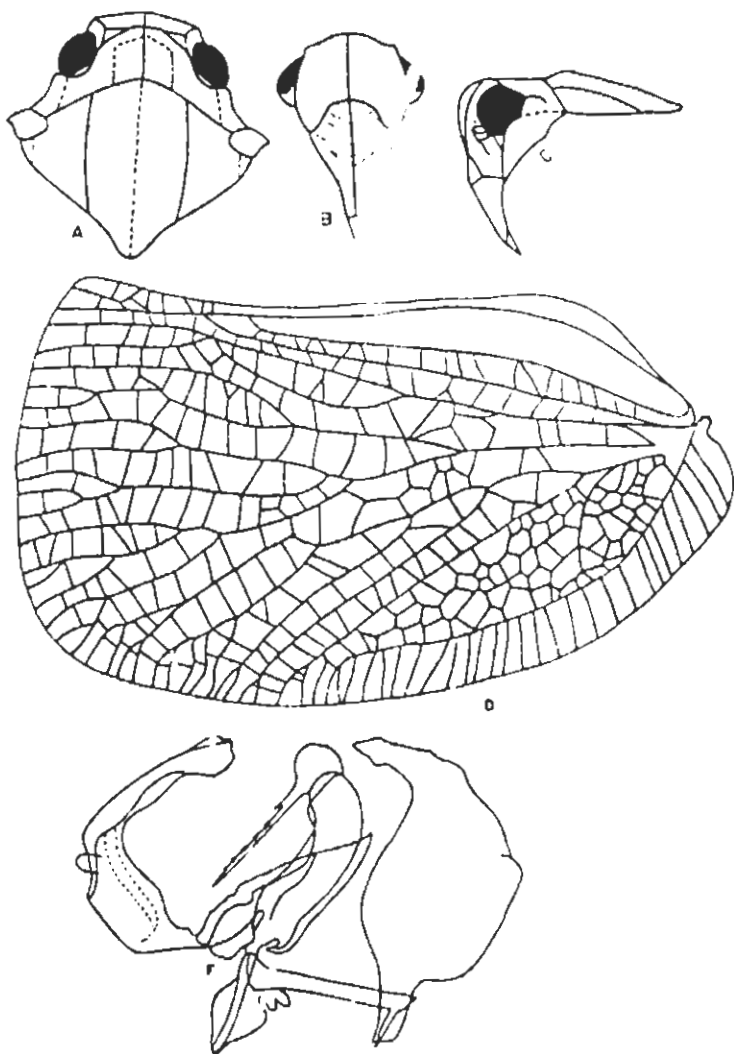
Anal segment short, possessing lateral apical prolongations, directed ventrad; aedeagus, in lateral view, slightly curved dorsad in middle, tubular, smoothly rounded at apex, with one pair of apical appendages, appendage swollen at base, extremely thin and straight for rest

of the part directed cephalad, appendages serrated only on dorsal surface; more than half of basal part of aedeagus, enclosed by a thica like covering; paramere, in lateral view, much broader in basal half than in apical half, ventral margin with a dent in middle, apex curved dorsad, to form a narrow, angulate, dorsal apical process.

The U. gilgitensis, n.sp., is quite close to the species U. bahawalpurensis, n.sp., described hitherto but differs in the pattern of carination of head, proportionate sizes of frons and clypeus, length of anal segment, and appendages of aedeagus.

Type material

Holotype male, Gilgit, N.W.F.P, Pakistan, Shujaat, grass, 20.VII.1978; allotype female, with same data as of the holotype; and paratypes five males, eleven females, with same data as of the holotype; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 46 A-F. Unnata gilgitensis , n.sp., A,B & C: Head, dorsal, frontal and lateral aspects, 8x, D: Left fore wing, 8x, F: Male genitalia, lateral aspect, 32x.

Genus Narowalenus Novo

Type-species : Narowalenus globosus, n.sp.

Head and thorax

Head including eyes distinctly narrowed than transverse width of pronotum, vertex almost rectangular in shape, slightly less than twice as broad as long, with a slight antero-median convexity; pronotum much broader than long, its width nearly equal to that of vertex; scutellum triangular; frons and clypeus confluent, carination absent.

Tegmina, nearly twice as long as broad, with apex smoothly rounded; costal margin convex, posterior margin slightly concave, marginal cross veins all along costal and apical margins, cross veins quite distant, with marginal cells finely granulated, granulation sparse all over disk, more dense in claval region; apical half of disk possessing reticulate venation.

Male genitalia

Anal segment, moderately long, in lateral view, with a ventral apical triangular shaped extension, projected considerably behind the pygofer; aedeagus, in ventral view, moderately long, in lateral view, with a ventral process arising at about mid-length, a pair of semicircular apical

processes and another small, spiny apical process, main body of aedeagus expanded pre-apically, forming a dorsal protuberance; paramere, in lateral view, roughly rectangular, broader at apex than at base, dorsal apical process spiny and prominent.

The new genus Narowalenus appears quite close to the new genus Neovariata described hitherto, from which it differs in the pattern of head and its carination, as well as the shape of aedeagus and to some extent of the paramere.

The genus is known on the basis of type species only from Pakistan.

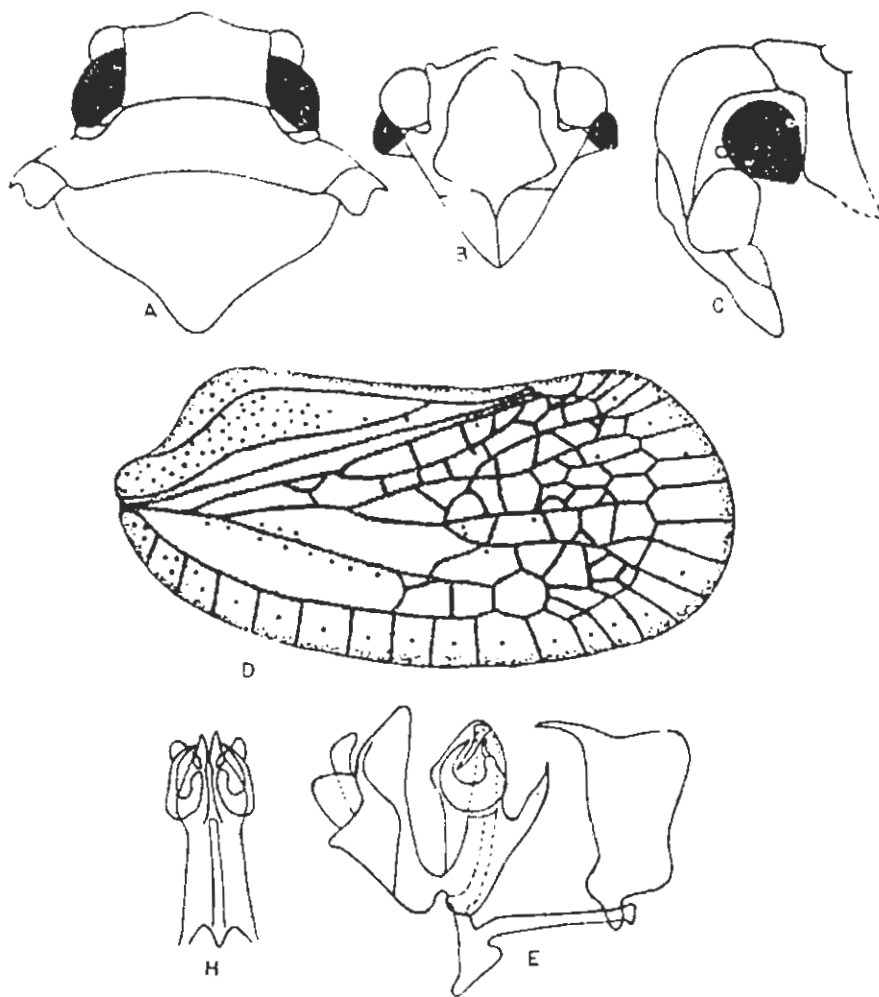
Narowalenus globosus, n.sp.
(Figs. 47 A-H)

Form and colour

Length of male 4.0 mm, of female 4.0 mm; general body colour green, eyes dark brown, tip of labrum brownish, spines on legs blackish, pronotum and mesonotum ochraceous brown, veins green.

Type material

Holotype male, Narowal, Punjab, Pakistan, grass, Anwar, 25.IX.1972; allotype female, with same data as of the holotype; in Zoological Museum, University of Karachi, Karachi- Pakistan.



Figs. 47 A-H. Narowalenus globosus, n.sp., A, B & C: Head, dorsal, frontal and lateral aspects, 8x, D: Right fore wing, 8x, E: Male genitalia, lateral aspect, 32x, H: Aedeagus, ventral aspect, 32x.

Genus Neovariata Novo

Type-species : Neovariata punjabensis, n.sp.

Head and thorax

Head including eyes less than the transverse width of pronotum; pronotum broader than long, nearly rectangular in shape, possessing median carina; pronotum much broader than long, with lateral carinae; scutellum triangular in shape, lacking carinae; median length of frons less than that of clypeus, posterior margin of clypeus conical, convex, both possessing continuous central carina.

Tegmina

With costal margin convex, apical margin rounded all over, posterior margin horizontal; closely-set cross veins present all along the costal and apical margins, granulation present in marginal cells, all over disk, more so in claval area, apical half possessing reticulate venation.

Male genitalia

Anal segment, moderately long, in lateral view, possessing a ventral apical extension; pygofer, narrow dorsally, much broadened ventrally, attaining a triangular or quadri-lateral shape; aedeagus, in ventral view, moderately long, its body tubular, in lateral view, with a spiny process arising mid-ventrally, body of aedeagus po-

ssessing two pairs of internal processes, one of those large and semicircular in shape, other smaller and crescent shaped; paramere, in lateral view, broad in middle, apical margin horizontal, continued as a short dorsal apical process.

The new genus Neovariata is close to the new genus Narowalenus discribed hitherto and differs in characters as in the key of the genera of the family Flatidae and in the discussion of the genus Narowalenus. The genus is known only on the basis of type-species only.

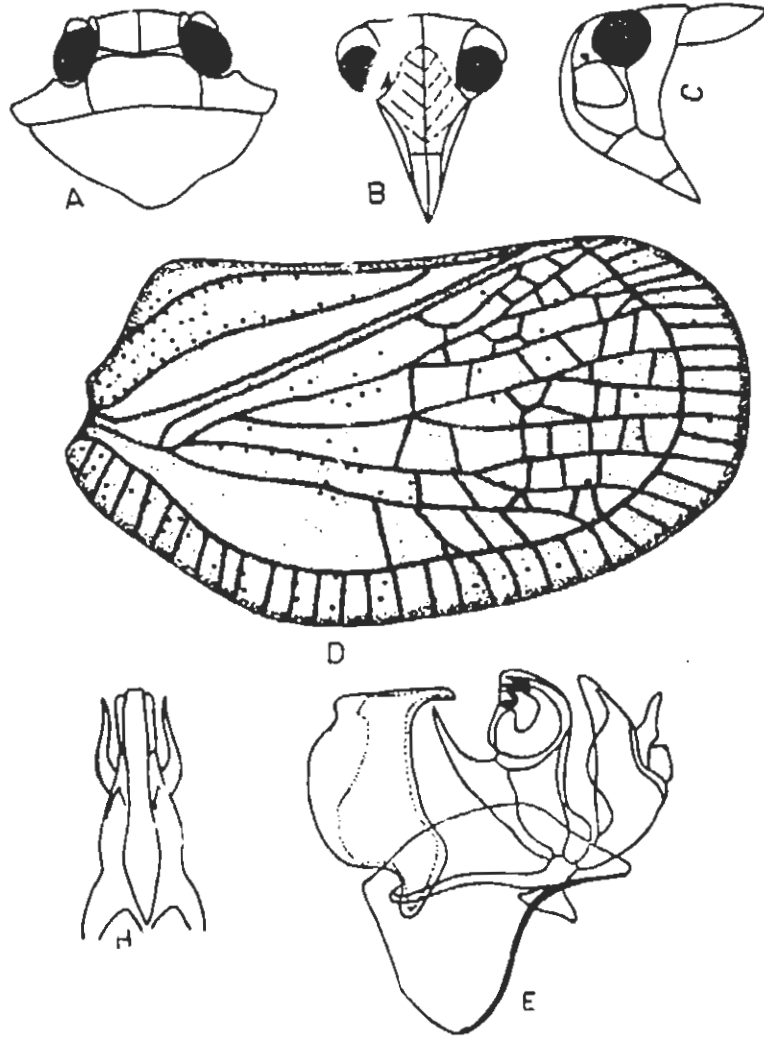
Neovariata punjabensis, n.sp.
(Figs.48 A-H)

Form and colour

Length of male 6.0 mm, of female 6.0 mm; general body colour greenish; eyes and ocelli redish brown, spines on leg blackish, clypeus pale, pronotum and mesonotum green, veins of tegmina greenish.

Type material

Holotype male, Chichawatni, Punjab, Pakistan, Ansar, grass, 11.X.1972; allotype female, with same data as of the holotype; paratypes one male, three females, all with same data as of the holotype; three females, Miani, Punjab, Pakistan, Qadri, grass, 7.1X.1972; one male, three females, Rawalpindi, Rana, grass, 10.111.1972; all in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 48 A-H. Neovariata punjabensis, n.sp., A, B & C: Head, dorsal, frontal and lateral aspects, 8x, D: Right fore wing, 8x, E: Male genitalia, lateral aspect, 32x, H: Aedeagus, ventral aspect, 32x.

Genus Ketumala Distant

Ketumala Distant. Fauna Brit. India, 111:446, 1906.

Type-species : Seliza bisecta Kirby (1891), by original designation.

Distant (1906) described the genus as below:

Head and thorax

"Head, face, clypeus, body beneath, and legs ochraceous; base of vertex and extreme base of face black; pronotum black with its lateral areas chocolate-brown, its lateral margins ochraceous; mesonotum chocolate-brown with a broad central longitudinal black fascia, the extreme lateral margins ochraceous; tegmina with the disk purplish-brown, the costal membrane, radial area, apical margin, and clavus pale fuscous-brown, the claval suture greyish-white, the granulations to clavus piceous; wings pale fuliginous, the veins piceous; the lateral margins of the vertex are ridged and pale ochraceous; on the apical margin of the tegmina the ground-colour between the prominent veins is paler fuscous, the sutural margin wide and prominent."

Distant (1906) redescribed the type-species at the time of erecting the genus Ketumala and latter (1912-1916), described and redescribed three more species of the genus. Ghauri (1971-1973), Datta (1979), described two new and redescribed one of Distant's species of the genus. During the present studies a number of specimens were collected from Pakistan which are being described below as two new species of the genus.

Ketumala shahdaraensis, n.sp.
(Figs. 49 A-F)

Form and colour

Length of male 7.0 mm, of female 8.0 mm; head including the eyes less than pronotum in transverse width; vertex nearly twice as broad as long, with a mild conical protuberance antero-medianly, antero-lateral margin of pronotum conical in shape; pronotum narrow, collar like, roughly arc-shaped, distinct carinae lacking; frons with transversely flat posterior margin, central carina incomplete, median length of frons nearly twice that of clypeus. General body colour ochraceous brown, vertex, pronotum and scutellum dark brown, face with lateral margins greenish, ocelli pale, tegmina green.

Tegmina, nearly half as broad as long, apical margin longer than outer margin, apical and outer angles broadly rounded, transverse veins present all along costal, apical and postero-apical margins, disk with transverse veins only in apical half, clavus granulated.

Male genitalia

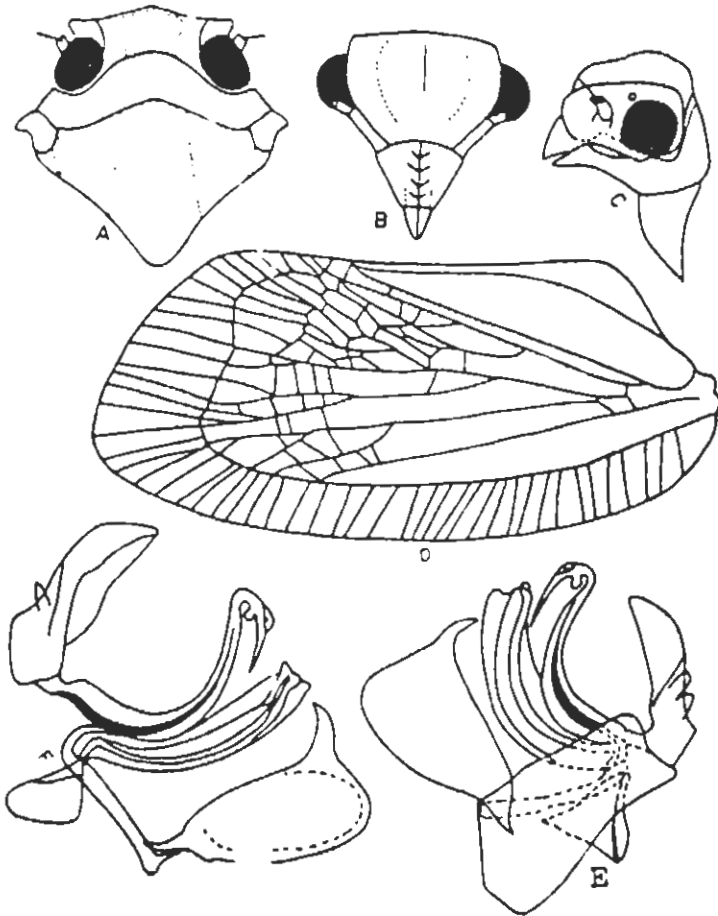
Anal segment short, in lateral view, with lateral apical margins extended posteriorly, posterior prolongation broad, longer than the anal segment; pygofer broad, broader than long, roughly rectangular in shape; aedeagus

in lateral view, strongly curved dorsad, with lateral margin deeply sinuate, aedeagal body tubular, of nearly uniform width, possessing a pair of appendages, arising from base, appendages broad basally, narrowing towards apex, curved ventro-cephalad at apex, possessing sub-apical, lateral knobs on each side; paramere, oval in general shape, broader at apex than at base with a strong dorsal apical process, spiny, and quite prominent,

K. shahdaraensis n.sp., appears close to K. farinosa Distant in the shape of paramere, and general appearance, but differs in the details of aedeagus and shape of head.

Type material

Holotype male, Shahdara, Punjab, Pakistan, grass; 10.9.19
allotype female, paratypes, 3 females, with same data as of the holotype; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 49 A-F. Ketumala shahdaraensis, n.sp., A,B & C: Head, dorsal, frontal and lateral aspects, 8x. E & F: Male genitalia, lateral aspects, 32x.D Tegmina, 8x.

Ketumala truncata, n.sp.
(Figs. 50 A-1)

Form and colour

Length of male 6.0 mm, of female 6.0 mm; vertex with anterior and posterior margins sub-parallel, with median length of vertex much less than that of pronotum; head and pronotum lacking carinae; scutellum with only central carina. General body colour brownish, abdomen and scutellum dark brown, rest of the body pale brown.

Tegmina, nearly half as broad as long; anterior apical margin produced as compared to posterior apical margin, both broadly rounded, transverse veins present all along costal, apical and postero-apical margins, disk with transverse veins only in apical half, clavus granulated.

Male genitalia

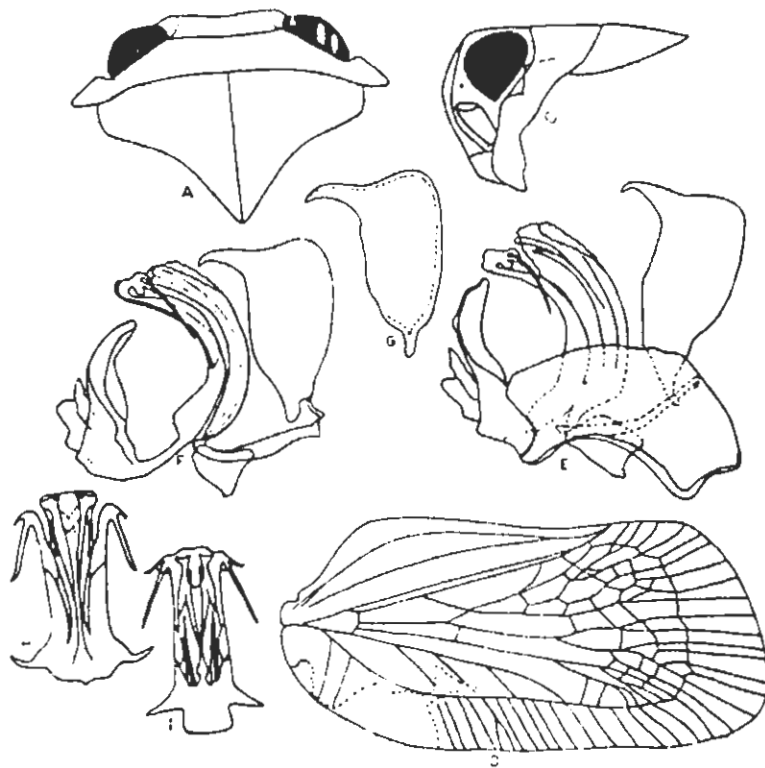
Anal segment, short, in lateral view, with lateral apical margins projected posteriorly in a sabre shaped manner; pygofer collar shaped, with posterior margin convex and anterior margin concave; aedeagus, in dorsal view, broad and moderately long, in lateral view, tubular, of uniform thickness, possessing a pair of appendages, arising from base of aedeagus, appendages broad at base, narrow at apex, bifurcated apically into unequal bran-

ches, both spiny at their tips, paramere, in lateral view, roughly triangular, narrow and angular at base, broadened towards apex, possessing a prominent dorsal apical process as a continuation of apical margin, process curved cephalad.

Ketumala truncata, n.sp., is close to K. shahdaraensis, n.sp., described hitherto in the pattern of male genitalia but differs in the shape of head, where as vertex is much narrower as compared with that of K. shahdaraensis, n.sp.

Type material

Holotype male, Changamanga, Punjab, Pakistan, Ansar, grass, 10.X.1972; allotype female of same data; 1 male Charharn Rest House; 8 males, 7 females, Abbottabad, N.W.F.P, Shujaat, grass, 20.VII.1975; 4 females, Rawalpindi, Khalid, grass, 15.VII.1974; 3 males, 9 females, Changamanga, Punjab, Qadri, grass, 11.VI.1972; 2 males, Narowal, Ansar, grass, 11.X.1973; 1 male, Pindi bahtia, Azhar, S. monsa, 3.VI.1972; 2 males, 1 female, Ziarat, Baluchistan, Ramzan, grass, 29.VI.1975; 1 male, Murree, Punjab, Qadri, grass, 25.X.1972; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 50 A-I. Ketumala truncata, n.sp., A & B: Head, dorsal and lateral aspects, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Right paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x. D forewing 8x

Genus Seliza Stål

Seliza Stål, Bert. ent. Zeitschr. 1V:312, 1862.

Type-species : Poeciloptera vidua Stål (1854), by original designation.

Distant (1906:440), redescribed the genus as below:

"Head (including eyes) narrower than pronotum; vertex slightly prominent, sometimes medially ridged; face a little longer than broad, centrally carinate, lateral margins broadly laterally ridged, clypeus elongate, laterally finely obliquely striate; pronotum nearly as wide as head, centrally carinate; mesonotum tricarinate; tegmina about twice as broad as long, costal margin arched at base, more or less sinuate before apex, apical margin truncately sinuate, apical angle rounded, the posterior angle broadly roundly posteriorly produced, costal membrane about as broad or a little narrower than the radial area, the first closely transversely veined, the latter with a few very obscure transverse veins which are scarcely visible, tegmen more or less transversely veined on apical disk, sometimes also from end of radial area to subapical transverse line, sometimes for only half that distance, a subapical marginal line connected with costal vein defining a series of narrow longitudinal marginal cellular areas; wings about as broad as tegmina; posterior tibia with two spines."

During the present studies only one known species S. ferruginea was collected from Pakistan, which is described below.

Seliza ferruginea (Walker)
(Figs. 51 A-I)

Elidiptera ferruginea Walker, List Hom. 11: 1851.
Seliza ferruginea (Walker) : Distant, 441, 1906.

Form and colour

Distant (1906:441-442) described the form and colour of the species as below:

"Head (including face), pronotum, body beneath, and legs ochraceous, apex of vertex and extreme base of face piceous; mesonotum piceous, its lateral margins narrowly ochraceous; tegmina pale brownish ochraceous, claval and apical areas a little darker; wings pale fuliginous, the veins piceous; the vertex is without a prominent central carination, but the lateral and anterior margins are distinctly ridged, the face has the central carination fine and percurrent, and there is a short sublateral carinate-like fold on each side of basal area; the clypeus has a central pale longitudinal line, and is finely obliquely striate on each side; the lateral carinations to the mesonotum are roundly transversely connected before the anterior margin; the transverse reticulations to the tegmina commence at the latitude of apex to radial area, but only occupy about half the space between that and the subapical transverse line; basal posterior half of clavus coarsely and a little darkly granulose."

Male genitalia

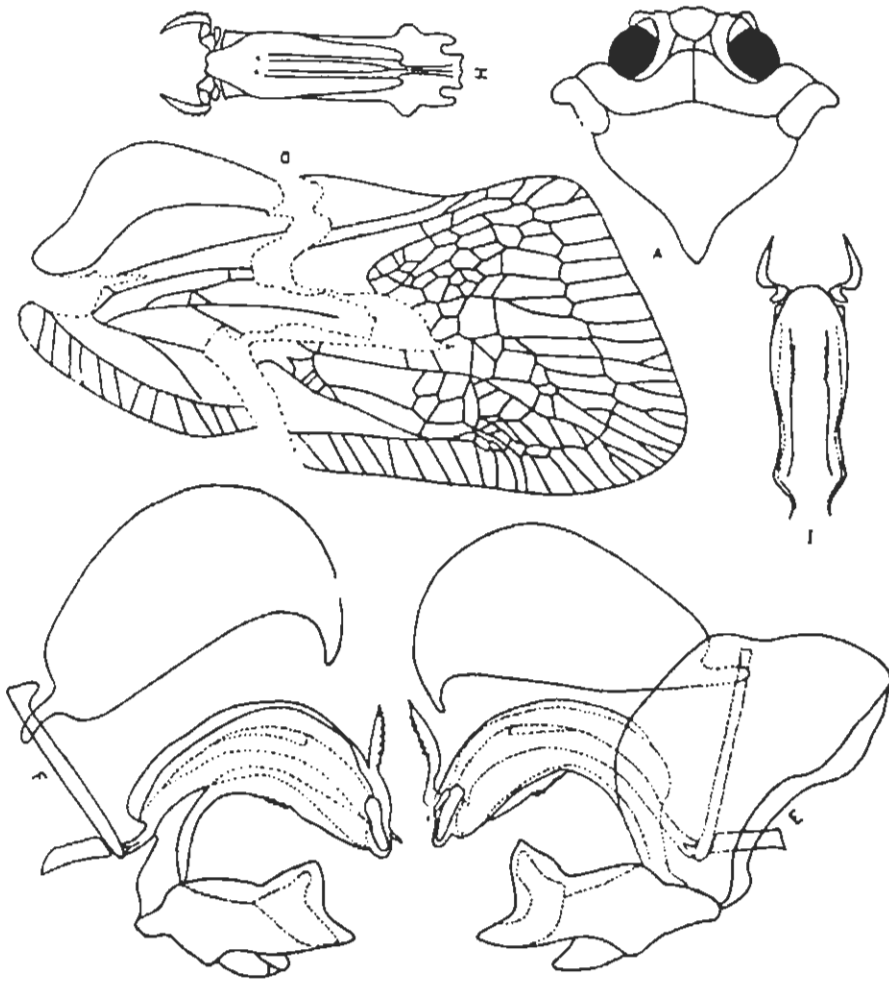
Anal segment, short in lateral view, with lateral apical margin projected posteriorly in a broad bi-pronged extension; pygofer, in lateral view, narrowed dorsally, extended in middle, and on ventral side, with posterior margin convex; aedeagus, in dorsal view, tubular, and

moderately long, with apex smoothly rounded, possessing a pair of recurved small, lateral apical appendages, aedeagus, in lateral view, nearly twice as broad as in dorsal view, with concave dorsal margin, apical appendages appearing directed ventrad, their posterior margins partly serrated; paramere, in lateral view, broad at apex, narrowed at base, all the ventral margin curved and rounded, continued to form a broad, apically pointed dorsal apical process.

The S. ferruginea (Walker) is the only species so far recorded from Pakistan, its exact affinities are therefore difficult to trace.

Material Examined

One female, Changamanga, Punjab, Pakistan, Qadri, X. sturmarium, 4.IV.1972; one male, Punjab, Pakistan, Qadri, grass, 5.X.1971; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 51 A-I. *Seliza ferruginea*, (Walker).., A: Head, dorsal aspect, 8x, D: Right fore wing, 8x, E & F: Male genitalia, lateral aspects, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Genus Paragomeda Distant

Paragomeda Distant. A.M.N.H (8) X111:421, 1914.
Type-species : Paragomeda typica Distant by
original designation.

Distant (1916:124) described the genus Paragomeda, erected by him earlier, and mentioned the external morphological characters. Therefore it is redescribed here. The present worker studied both the already known species as well as one new species of the genus from Pakistan, on the basis of which the male genitalia of the genus, so far not known, is described below, along with redescription of the other characters.

Head and thorax

Head with length of vertex more than inter-ocular width, and median length of pronotum separately, vertex produced in front in a triangular manner, forming an anterior tip, vertex and pronotum possessing only central carina, developed distinctly or faintly; scutellum centrally carinate or tricarinate; frons and clypeus with central carina, frons more or less expanded towards anterior side, its anterior margin concave.

Tegmina

Broadest in basal half, considerably tapered subapically, apex strongly truncate, costal margin with promi-

ment closely set cross veins, cross veins fewer on apical margin, some bifurcated, not appearing as regular cross veins, claval margin with or without granulation, diskal part of tegmina with some cross veins, usually not reticulate, claval as well as basal diskal area lacking cross veins.

Male genitalia

Anal segment, short to moderately long, lateral apical margins prolonged in tubular extensions; pygofor with posterior margin usually flat, or oblique, irregularly broad; aedeagus in dorsal view, tubular and moderately long in lateral view, directed caudad, body broad, plate like in shape, broadened in middle possessing a ventral angular bulging in middle, possessing 2-3 pairs of apical and sub-apical processes, directed variously, all spiny at apex, none serrated at any surface; paramere, slightly longer than broad, attaining a rectangular shape, with dorsal apical process, spiny.

The genus Paragomeda Distant differs from all the known Pakistani genera in the shape of tegmina and its venation as well as in the reduced length of the paramere. It however is also close to the genus Gomeda Distant in the shape of head, and aedeagus, but differs considerably in the form of tegmina, and paramere. Three species, of which two are known and one is new to science are treated here.

Paragomeda typica Distant
(Figs. 52 A-1)

Paragomeda typica Distant. A.M.N.H (8)X111:422, 1914.

Distant (1916:125) described the species very briefly which is inadequate to determine the species accurately.

P. typica is therefore redescribed below:

Form and colour

Distant (1916:125) described the form and colour of the species as under:

"Body above and beneath ochraceous, the legs paler, the abdomen above basally and apically cretaceously tomentose; tegmina pale ochraceous, sparingly spotted with brownish, the apical cells brownish, preceded by a similar series of transverse brownish spots; wings creamy-white; structural characters as in generic diagnosis."

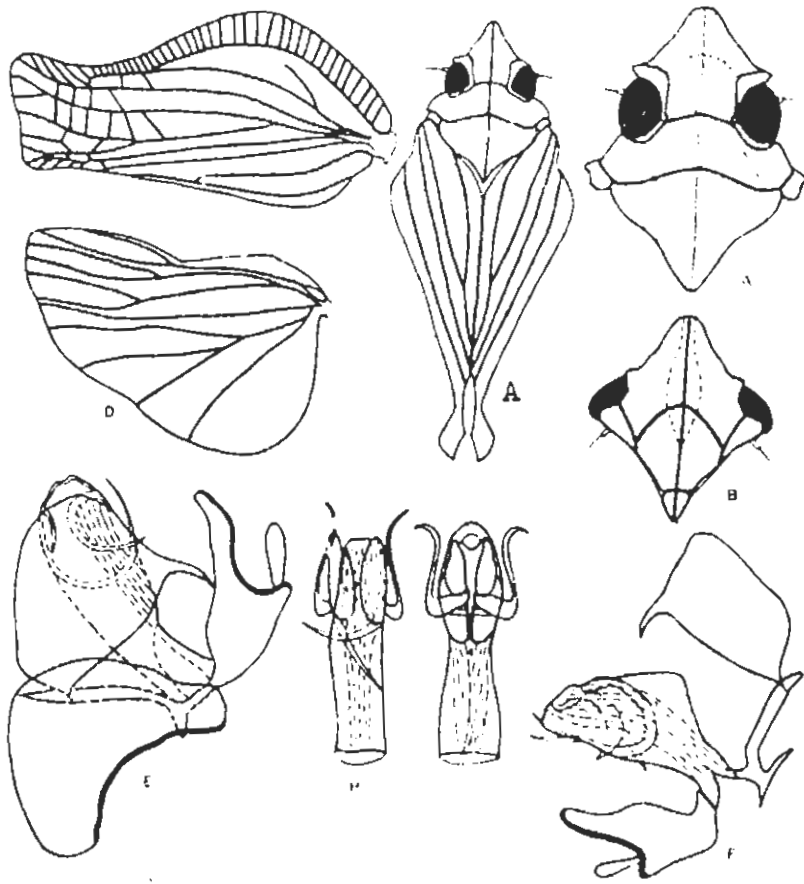
Male genitalia

Anal segment, short, its lateral, apical margins prolonged in a tubular extension, directed ventro-caudad, extended part nearly equal in length to the anal segment; pygofer, in lateral view, narrow dorsally, antero-posteriorly broad, in ventral part, remaining broad upto only basal part of anal segment; aedeagus, in dorsal view, tubular in shape, moderately long, with two pairs of subapical appendages, both pointed apically, one pair arising ventrally semicircular in shape, the other arising

dorsally, somewhat broad; paramere, in lateral view, roughly rectangular in shape, nearly one and a half time as broad at apex as at base, dorsal apical process spiny, short, nearly inline with the flattened apical margin.

Material Examined

Several specimens of the species have been studied from Pakistan with the following data: 7 males, one female, Rawalpindi, Khalid, grass, 15.VII.1975; one female, Karachi, Faiz Sultana, grass, 11.VI.1973; one male, Changamanga, Qadri, grass, 4.VI.1972; one male, Hyderabad, Ramzan, grass, 25.VI.1974; one female, Murree, Ramzan, grass, 27.VI.1974; one male, Changamanga, Ansar, grass, 11.X.1972; one female, Chichawatni, Ansar, grass, 11.X.1972; all in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 52 A-I. Paragomeda typica, Distant, A: Body, dorsal aspect, 8x, B: Head, frontal aspect, 8x, D: Left hind wing, 8x, E & F: Male genitalia, lateral aspects, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Paragomeda viridis Distant
(Figs. 53 A-F)

Paragomeda viridis Distant. A.M.N.H (8)X111:422, 1914.

Form and colour

Distant (1916:125) described the form and colour of the species as below:

"Head, pronotum, and mesonotum virescent; abdomen, body beneath, and legs ochraceous; tegmina virescent, the margins very narrowly pale ochraceous, the apical margin minutely spotted with pale brownish, and a few scattered minute brownish spots on disk; wings creamy-white; vertex only slightly longer than pronotum, which is centrally carinate; mesonotum tricarinate."

Male genitalia

Anal segment, moderately long, in lateral view, appearing tubular in shape, with ventral apical margin, prolonged and directed caudo-ventral; pygofer as in P. typica

Distant; aedeagus, in lateral view, much broader in apical half, forming an angular projection mid-ventrally, with three pairs of sub-apical and apical processes, all spiny in shape, their positions similar to those in P.

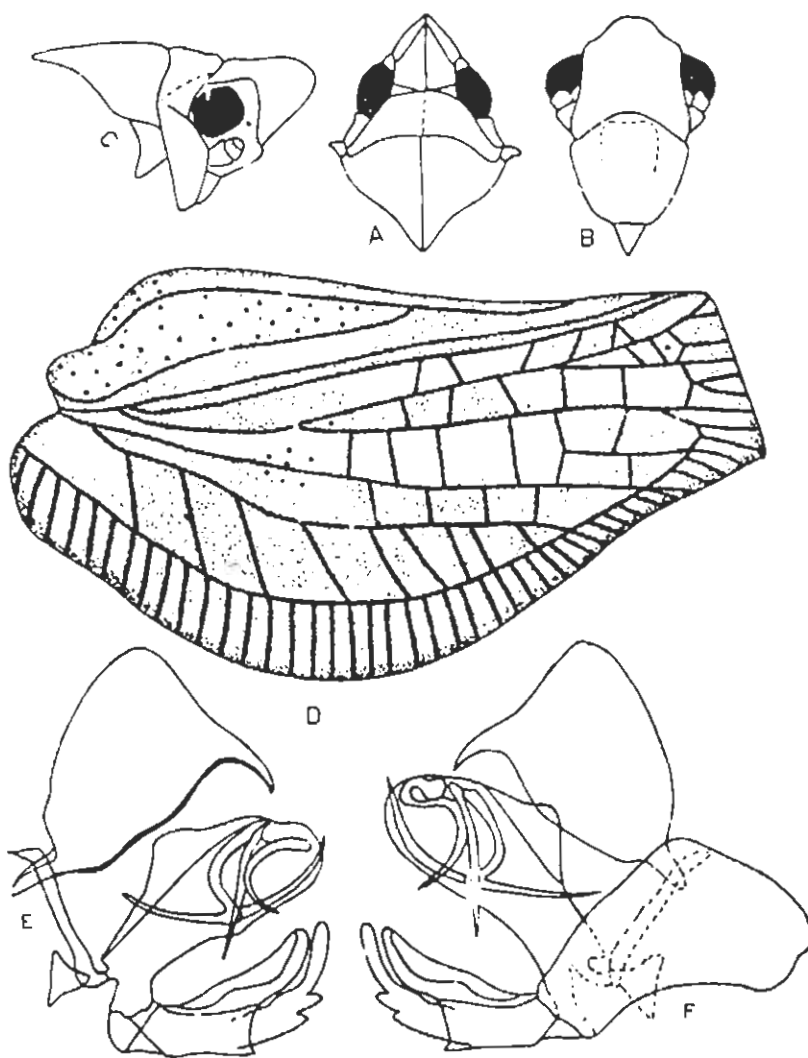
Qadrii paramere, also similar to the paramere of P.

Qadrii

Material Examined

P. viridis has been studied from Pakistan on the ba-

sis of specimens bearing the following data: seven males, Karachi, grass, 28.VIII.1972; one male, Karachi, Pakistan, Khalid, lucern, 5.VIII.1978; two males, two females, Rawalpindi, Pakistan, Nasir, grass, 15.VII.1976; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 53 A-F. Paragomeda viridis, Distant., A, B & C: Head, dorsal, frontal and lateral aspects, 8x, D: Right fore wing, 8x, E & F: Male genitalia, lateral aspects, 32x.

Paragomeda gadrii, n.sp.
(Figs. 54 A-E)

Form and colour

Length of male 7.0 mm, head including eyes narrower than the transverse width of pronotum, vertex attaining a triangular shape, projected in front of eyes, its median length more than that of pronotum, anterior tip of vertex conical and rounded; vertex, frons and clypeus possessing only central carina, whereas pronotum and scutellum are tricarinate; lateral carinae of pronotum appearing only as small lateral knobs; frons triangular in shape, narrowing posteriorly, with anterior margin concave, median length of frons more than that of clypeus. General body colour ochraceous, wings creamy white, quite similar to the P. viridis, Distant redescribed hitherto.

Tegmina similar in general shape as in the generic description; with more or less granulation all over, more thickly so in claval area.

Male genitalia

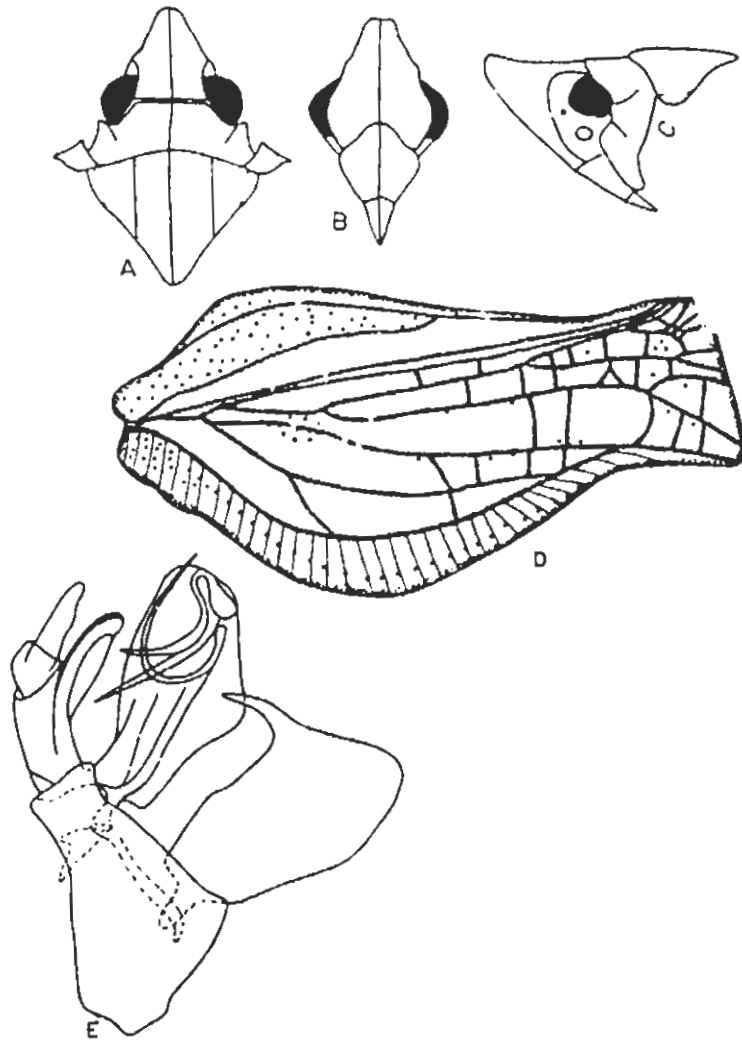
Anal segment, moderately long, in lateral view, narrow and tubular, with ventral apical margin extended posteriorly, extension slightly less than length of anal segment; pygofer much narrower posteriorly; aedeagus in lateral view, much broader, possessing three pairs of apical and subapical processes, all spiny in shape, with

surfaces smooth, the subapical pair recurved caudad; paramere, in lateral view, roughly rectangular in shape, broadened in apical half, with dorsal apical process spiny and much more prominent than in the species P. typica discussed hitherto.

P. qadrii, n.sp., is quite close to P. typica Distant from which it differs in possessing three pairs of aedeagal processes , as compared to two pairs in P. typica.

Type material

Holotype male, Changamanga, Punjab, Pakistan, Qadri , grass, 4.VI.1972; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 54 A-E. Paragomeda gudrii, n.sp., A, B & C: Head, dorsal, frontal and lateral aspects, 8x, D: Right fore wing, 8x, E: Male genitalia, lateral aspect, 32x.

Genus Epormenis Fennah

Epormenis Fennah, Proc. U.S.N.M. 95:491, 1945.

Type-species : Poeciloptera roscida Germar, by original designation.

Ormenis Metcalf. Bull. Mus. Comp. Zool. 82:394, 1938.

The genus Epormenis was described by Fennah (1945) as below:

"Vertex very short; frons as broad as long or broader, median carina present only on basal half, lateral margins curved; clypeus devoid of carinae. Pronotum convex anteriorly, concave posteriorly, smooth, with a small impression on each side of middle line; mesonotum devoid of carinae, or with median carina scarcely indicated at base or apex and lateral carinae at base. Hind tibiae with two spines before apex. Tegmina with anterior and posterior margins sub parallel, costal margin not ampliate, costal membrane generally wider than costal cell, Sc strong, simple to apex, R forking about one-third from base, M forking level with R fork or slightly basad, Cul forking rather basad of M fork, base of R and M granulate, apical and subapical lines of transverse veins even and distinct, a few irregular cross veins between node and apex of clavus, apical veins forked or simple in irregular sequence."

Only one species of the genus which is a new record from Pakistan has been studied, and is described below:

Epormenis turbatensis, n.sp.
(Figs. 55 A-I)

Form and colour

Length of male 1.3 cm, of female 1.6 cm; head including eyes slightly less than the transverse horizontal width of pronotum; vertex short in length, convex anteriorly, projected in front, lacking carinae; pronotum with only central carina, partly present on anterior margin; scutellum with indistinct carinae; frons lacking carinae, possessing a pattern of markings, its antero-lateral margins developed angularly, median length of frons equal to or less than that of clypeus, posterior margin of clypeus angular medianly. General body colour ochraceous brown, pronotum, eyes, antennae and clypeus dark brown, scutellum dark brown, veins dark brown in colour.

Tegmina, a little more than twice as long as broad, costal margin somewhat arched in basal part, basal part wider than the apical part, diskal venation mostly reticulate; marginal cross veins more closely set on costal than on apical margin, claval area mostly granulated.

Male genitalia

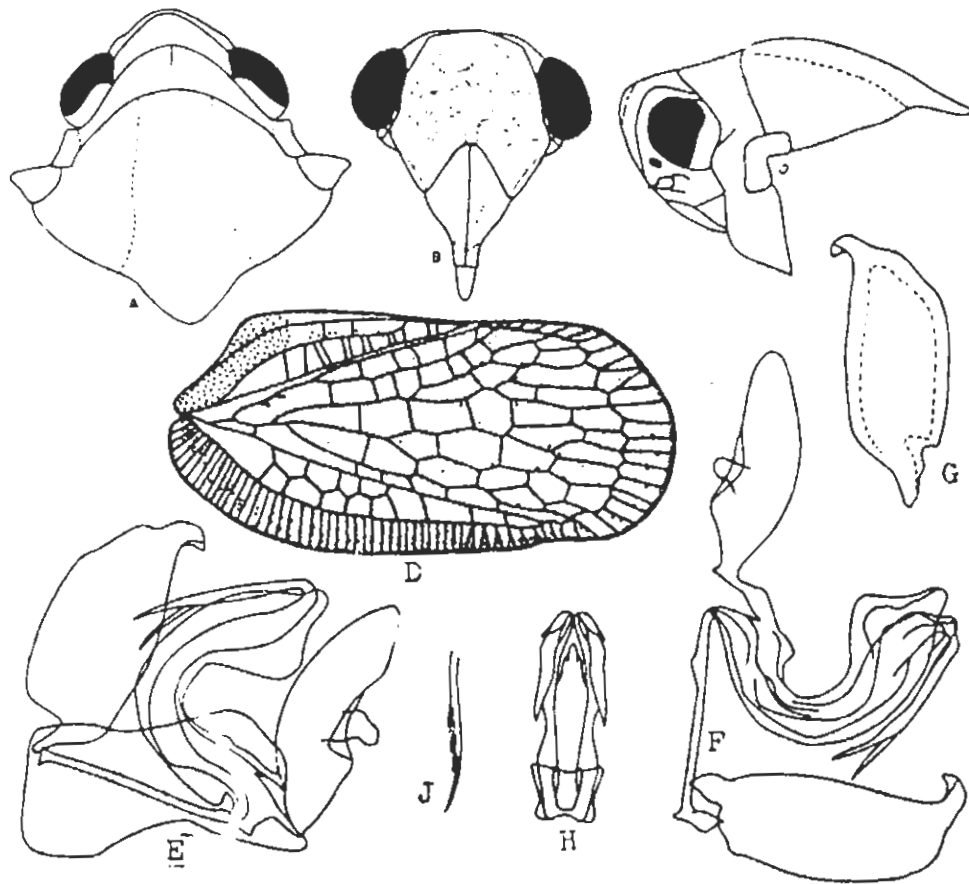
Anal segment, short and broad, with lateral apical margin prolonged posteriorly; pygofer broader than long,

irregularly rectangular; aedeagus, in ventral view, tubular and moderately long in lateral view, strongly curved dorsad, broadened pre-apically, forming a protuberance on the dorsal side, possessing two pairs of apical processes, one pair stouter, long, nearly half long as aedeagus, spiny at tips, directed ventro-cephalad, processes possessing short and thick spines near apex, other pair, short, nearly half long as the first pair; paramere, in lateral view, nearly uniformly broad from near base to near apex, dorsal apical process short, broad, and hook shaped.

Epormenis turbatensis, n.sp., appears close to Epormenis aripensis Fennah, from which it differs in the shape of head, particularly the shape of the anterior margin of vertex.

Type material

Holotype male, Turbat, Baluchistan, Pakistan, Fareed, Candy, 25.IV.1969; allotype female, with same data as of the holotype; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 55 A-I. *Epormenis turbatensis*, n.sp., A, B & C: Head, dorsal-frontal and lateral aspects, 8x, D: Right fore wing, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Right paramere, 32x, H: Aedeagus, ventral aspect, 32x, J: Aedeagal process, lateral aspect, 32x.

Genus Summanus Distant

Summanus Distant, Fauna Brit.India. Vll:117, 1916.
Type-species : Summanus indicus Distant, by original designation.

Distant (1916:117), characterized the genus as below:

" Head (including eyes) a little narrower than pronotum, vertex angularly produced in front of eyes, the apex subconical; face much narrowed anteriorly, less narrowed towards clypeus, broadest between eyes; pronotum slightly shorter than vertex, the lateral margins moderately ampliate, anteriorly truncate, both vertex and pronotum faintly centrally carinate; mesonotum tricarinate; tegmina short and broad, much less than twice as long as broad, gradually broadened from base, the apex broadly rounded, costal membrane transversely veined and continuous with the apical margin, the posterior angle not produced, inner margin straight, the apical area irregularly transversely veined, claval area strongly granulate; wings narrower and shorter than tegmina, with two transverse veins near apex. "

Only one species S. indicus Distant is known from the subcontinent IndiaPakistan. The present worker have studied two species of the genus from Pakistan, which are described below as new to science.

Summanus dadarensis, n.sp.
(Figs. 56 A-F)

Form and colour

Length of male 6.0 mm, of female 6.0 mm; head with vertex convex in front, more so antero-medially, approximately half as long as wide, head including eyes narrower than the pronotum in transverse width; pronotum and scutellum with lateral carinae; frons and clypeus nearly equal in median length; frons possessing lateral carinae. General body colour pale green, eyes, labrum, tarsi brownish, spines black, eyes encircled with orange coloured band.

Tegmina, more than half as broad as long; anterior margin convex, apical part smoothly rounded; posterior margin slightly concave in distal half, apical part angularly rounded, short transverse veins all along costal and apical margins, disk with apical half possessing reticulate venation; entire wing granulated.

Male genitalia

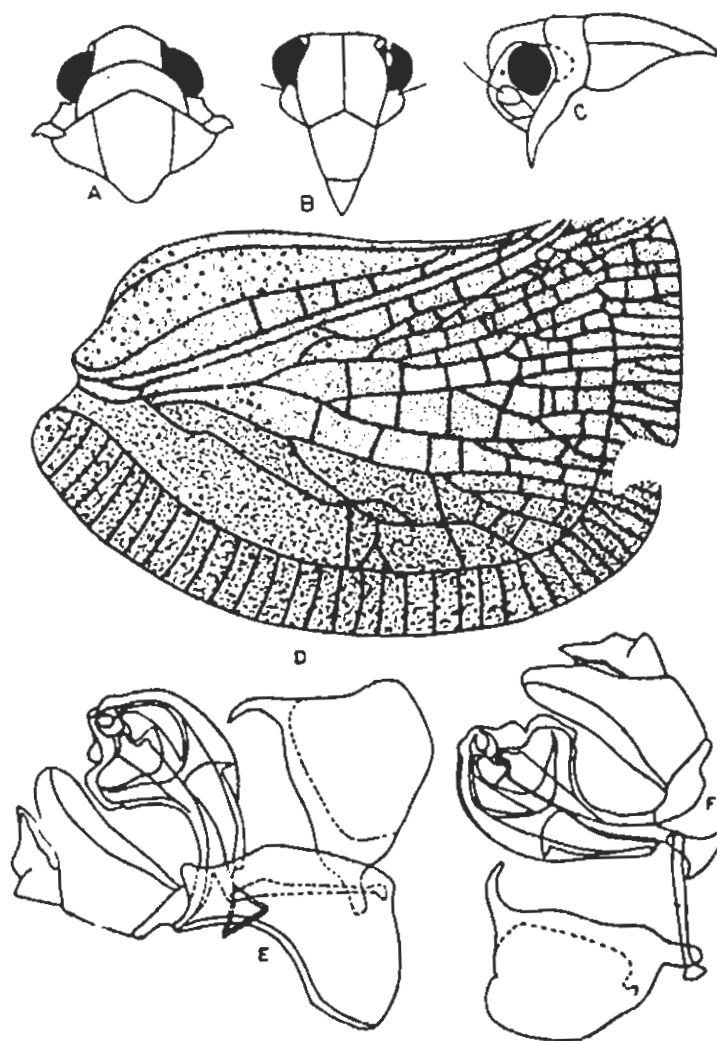
Anal segment, in lateral view, broad and short, with lateral apical margin possessing a broad extension; pygofer, narrow dorsally, broad ventrally, its posterior margin almost flattened; aedeagus, in lateral view, narrow at base, broad in middle, apex bifurcated deeply, with two pairs of unequal sized appendages, the larger pair sub-apical in position, semicircular in shape, recurved

and apically tapered, the smaller pair apical in position and also tapered apically; paramere, in lateral view, roughly triangular in shape, apical part prominently extended, dorsal apical process spiny, curved dorso-cephalad.

Summanus dadarensis, n.sp., can be compared to S. indicus Distant from which it differs in the less angularly projected vertex, and in almost equal median length of frons and clypeus. The colour of S. dadarensis, n.sp., is greenish in general where as that of S. indicus Distant is dark virescent.

Type material

Holotype male, Dadar, N.W.F.P, Pakistan, Khalid, 25.IV.19
allotype female; paratypes 15 males, and 45 females, with same data as of the holotype; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 56 A-F. Summanus dadarensis, n.sp., A,B & C: Head, dorsal, frontal and lateral aspects, 8x, D: Right fore wing, 8x, E & F: Male genitalia, lateral aspects, 32x.

Summanus reticulata, n. sp.
(Figs. 57 A-F)

Form and colour

Length of male 7.0 mm, of female 8.0mm; head with vertex conical in front, slightly produced before eyes; head including the eyes less than pronotum in transverse width; antero-median length of vertex more than that of pronotum, as well as greater than transverse width; frons dilated antero-laterally, clypeus narrowed anteriorly, median length of frons nearly equal to that of vertex and scutellum, possessing distinct central carina, rest of carinae indistinct. General body colour greenish, eyes labrum and tegmina brownish, frons with orange tinge, spines on legs black.

Tegmina, more than half as broad as long; costal and apical margins smoothly rounded, forming a wide arc, and with transverse veins; posterior margin nearly straight, disk with reticulate venation in apical half.

Male genitalia

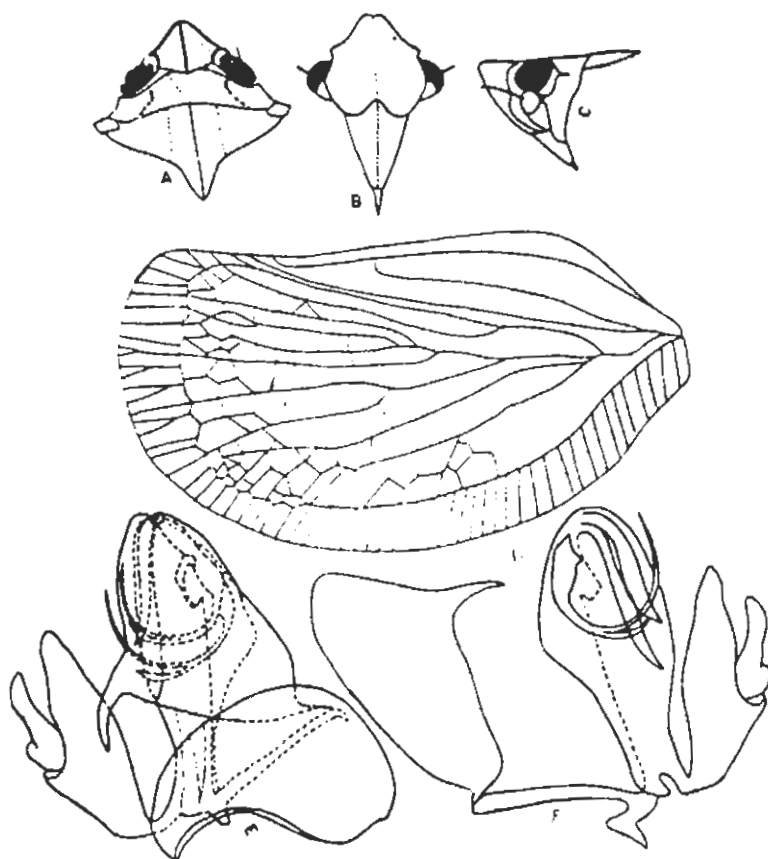
Anal segment, in lateral view, moderately long, lateral apical margins possessing a prominent extension posteriorly; pygofer, with convex collar-shaped posterior margin, pygofer itself narrowed dorsally and broadened ventrally; aedeagus, in lateral view, narrowed at base, at least twice broad in apical half, ventral margin

projected in middle, appendages two in pairs, the ventral pair small, relatively broad and tapered at apex, directed cephalad, and sabre shaped, the second pair dorsal in position, longer, semicircular in shape, and divided in middle into a smaller spoon shaped arm and a larger spiny arm; paramere, in lateral view broadening towards apex, dorsal apical process sub-apical in position, nearly $1/3$, basad from apex, spiny, directed dorsad, slightly cephalad at apex.

Summanus reticulata, n.sp., is closer to Summanus indicus Distant in general shape of head and wings. It however differs from S. dadarensis, n.sp., described hitherto in lesser anteriorly projected head, and different pattern of male genitalia.

Type material

Holotype male, Mirpurkhas, Sind, Pakistan, Khalid, on grass, (Gynodon dactylon) 20.XI.1972; allotype female same data as of the holotype; paratypes 52 males, 111 females, Mirpurkhas, Shujaat, grass, 20.XI.1973; 20 males, 20 females, Tandojam, Qadri, grass, 3.III.1969; one male 5 females, Abbottabad, grass, Anwar, 3.VII.1975; two males, one female, Miani-forest, Qadri, grass, 25.X.1971; two males, Ramzan, Thatta, grass, 26.VI.1973; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 57 A-F. Summanus reticulata, n.sp., A, B & C: Head, dorsal, frontal and lateral aspects, 8x, D: Left hind wing, 8x, E & F: Male genitalia, lateral aspects, 32x.

FAMILY RICANIIDAE AMYOT AND SERVILLE

Metcalf (1955:111) characterized the family Ricaniidae as below:

"The family Ricaniidae is one of the smaller families of the Fulgoroidea. The species in this family are frequently confused with members of the families Flatidae, Nogodinidae, and Acanaloniidae because of the large tegmina and their general resemblance to moths. These four families may be readily separated by the following characters. The Acanaloniidae have the costal vein in the margin of the tegmina and no crossveins on the costal border and usually no subapical line. But the other three families have the costal vein at some distance from the costal margin and numerous crossveins on the costal border, and usually one or two subapical lines on the tegmina. In the Flatidae the basal area of the clavus is pustulate while in the Ricaniidae and Nogodinidae there are no pustules. The Nogodinidae have the basal segment of the hind tarsus usually longer than the second and third segments combined with a spine on each side and roundly or conically produced between the spines. In the Ricaniidae the basal segment of the hind tarsus is very small without lateral spines. The general characters of the family may be briefly summarized as follows. Head, including the compound eyes, usually as wide as the pronotum. Vertex short and broad, nearly rectangular in outline, usually carinate on all margins. Frons rather large with lateral carinae strongly elevated, sometimes with median and infrequently with intermediate carinae; median carina sometimes percurrent. Clypeus much narrower than frons, triangular, usually with a median carina but no lateral carinae. Antennae short, basal segment short, collarlike, second segment usually subglobular, flagellum elongate, usually shorter than the total length of the insect. Pronotum short, with a median carina. Mesonotum large, tricarinate, convex; tegulae usually large. Tegmina large, broadly triangular; costal and commissural margins usually nearly straight, divergent, apical long, usually nearly straight, occasionally broadly rounded; costal membrane broad with numerous cross veins; corium with supernumerary veins and many cross veins; clavus not granulate,

with the claval veins ususally united beyond the middle, the common stem united to the commissral margin before the apex of the clavus or continuing to the apex of the clavus. The tegmina vary greatly in texture, sometimes nearly opaque, with or without semi transparent areas, sometimes entirely translucent or transparent. The venation of tegmina also varies greatly; typically radius, media, and cubitus with supernumerary veins, with usually a definite subapical line or two subapical lines of transverse veins. Costa arising from the base of the basal cell; radius, media, and first and second cubitus all arising from the apex of the basal cell. In other genera the venation is greatly reduced, sometimes with only a few cross veins on the costal border. The wings smaller than the tegmina, venation considerably reduced but cubitus with several branches; cross veins relatively few. Legs simple with the front and middle legs small; hind femora large; hind tibiae elongate with one or more spines on the lateral margin and the apex with a crown of seven or more apical spines; first segment of hind tarsi usually shorter than second and third together without spines at the apex.

The male genitalia have the genital styles elongate, sometimes longer than pygofer; when viewed laterally usually with an elongate dorsal tooth at or near the apex. Aedeagus usually short and stout with a complicated pattern of apical spines and processes. In the few genera that I have examined the female genitalia are incomplete; pygofer undeveloped with the three pairs of valvulae exposed, the third pair often greatly developed."

During the present investigations three genera i.e. Amyot and Serville Pochazia, Ricanoptera Melichar and Ricania Germar with five species are studied from Pakistan on plants like, citrus, grass, almond, teak, maize, sugarcane . All the three genera are already known from Pakistan on the basis of studies of Chaudhry (1970), who recorded Ricania, Pochazia, Ricanoptera feeding on grass, at light, Tectona grandis and Eugenia, spp, from Pakistan.

KEY TO THE GENERA OF THE FAMILY RICANIIDAE
FROM PAKISTAN

1. Frons with lateral carinae complete and distinct, bifurcating at their posterior ends; tegmina with three longitudinal veins, arising from basal cell----- Ricanoptera Melich

Frons with lateral carinae distinct or indistinct, complete or incomplete, not bifurcated posteriorly; tegmina with four longitudinal veins, arising from basal cell ----- 2.

2. Apical margin of tegmina more or less equal to the posterior margin in length; postero-dorsal margin of pygofer with a prominent narrow projection ----- Pochazia Amyot. et. Serville.

Apical margin of tegmina distinctly longer than the posterior margin; postero-dorsal margin of pygofer flat, angular, without any projection ----- Ricania Germar.

Genus Pochazia Amyot. et. Serville

Pochazia Amyot. et. Serville Mem:538, 1843.

Type-species : Flata fasciata Fabricius 1803, by subsequent designation by Kirkaldy, 1903.

The genus Pochazia was redescribed by Distant (1906: 370) as below:

"Head (including eyes) as wide as pronotum, vertex broad and narrow; face broader than long, with central and sublateral carinations, which frequently become evanescent posteriorly; clypeus not marginally ridged; pronotum narrow, centrally ridged; mesonotum very long, with five carinate lines, the central one straight, on each side of which is an inwardly and anteriorly curved line which converge somewhat closely together on anterior margin, and each outwardly bifurcating near middle in a straight longitudinal carination too, or near anterior margin; tegmina strongly amplified apically, broad, triangular, the apical margin longer than the inner margin, the longitudinal veins much furcate, two transverse lines formed by transverse veins on apical arms where the veins are close, numerous, longitudinal, and in many cases furcate, the interior longitudinal veins emitting many ramifications; posterior tibia with two spines."

The present worker studied two species of the genus from Pakistan, both new to science, and described below. The main characteristics of the species agree fairly well with the above generic description differing only in detailed pattern like carination of face, measurements of apical and inner margins to some extent the pattern of male genitalia described in other species.

Pochazia citri, n.sp.
(Figs. 58 A-I)

Form and colour

Length of male 7.5 mm, of female 9.0 mm; head flatly convex in front, vertex much broader than long, pronotum collar like, much broader than long, with a pair of tiny spots in middle; scutellum larger, much longer medianly than the collective median lengths of vertex and pronotum, pronotum with only central carina; scutellum tricarinate, with lateral carinae indistinctly bifurcated near anterior margin, bifurcations curving mesally; frons with flat transverse posterior margin, broader than long, lateral margins bulging outside with a distinct central carina, broadly bifurcating near clypeo-frontal suture, lateral carinae indistinct. General body colour umber brown, ocelli redish, tegmina with a distinct colour pattern as seen in the illustration, hind wing dark brown all over.

Tegmine, with two sets of transverse veins, one apical and one subapical in position; apical transverse veins, continued on anterior margin as a longitudinal vein, demarcating a large number of transverse veins on the anterior margin; longitudinal veins arising from basal cell, three in number.

Male genitalia

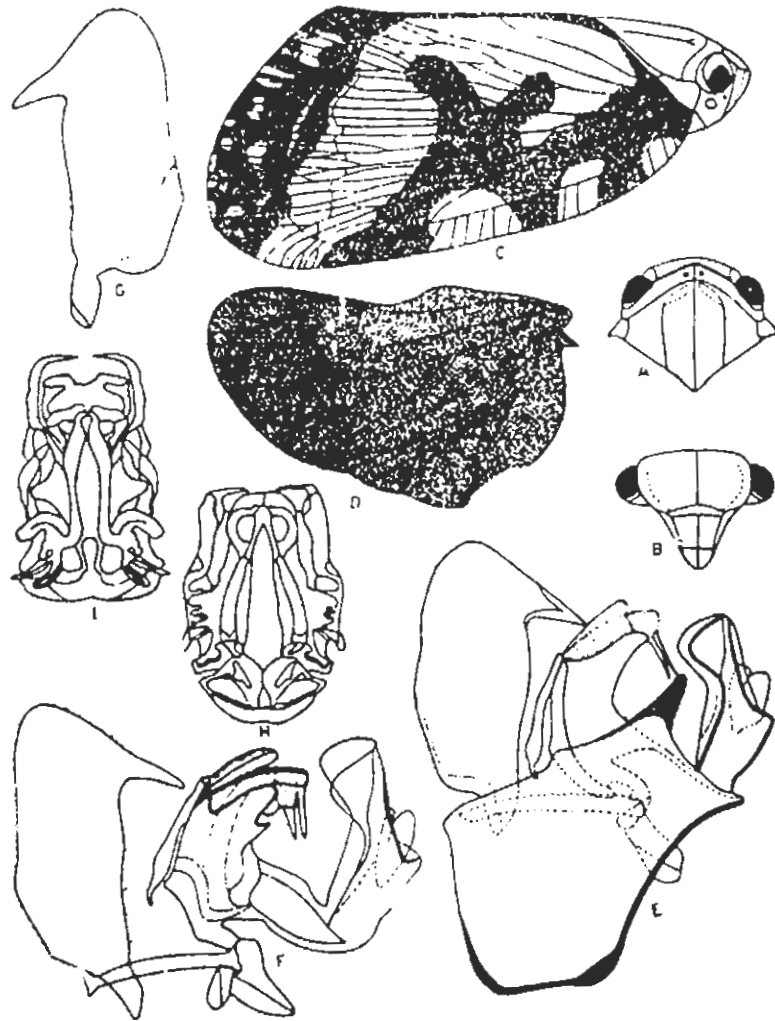
Anal segment, moderately long, in lateral view, with

lateral apical margins projected posteriorly, with a blunt extreme apex; pygofer, in lateral view, with sclerotized dorsal and anterior margins, posterior margin oblique, postero-dorsal margin projected as an angular sclerotized narrow projection; aedeagus, in dorsal view broad, in lateral view, its body also appearing as a broad, flat tube, with irregular dorsal and ventral margins, with two pairs of processes, one apical and one subapical, apical process dorsal in position, membranous, with apices tapered, subapical process ventral in position, sclerotized, directed ventro-cephalad along aedeagal body; paramere, in lateral view, with dorsal and ventral margins sub-parallel, width of paramere nearly uniform throughout; apical margin curved inwards to form a prominent, spinose dorsal apical process.

Pochazia citri, n.sp., appears close to Pochazia triangularis Distant from which it differs in the shape of pygofer, and the proportions and lengths of aedeagal processes.

Type material

Holotype male, Abbottabad, N.W.F.P, Pakistan, citrus, Anwar, 14.VII.1974; allotype female, with same data as of the holotype; paratypes a large number of males, and females, with same data as of holotype; in Zoological Museum, University of Karachi, Karachi, Pakistan.



Figs. 58 A-I. *Pochazia citri*, n.sp., A & B: Head, dorsal and frontal aspects, 8x, C: Body, lateral aspect, 8x, D: Left hind wing, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Right paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Pochazia anwari, n.sp.
(Figs. 59 A-1)

Form and colour

Length of male 7.0 mm, of female 9.0 mm; head with flat and transverse anterior margin, vertex much broader than long; pronotum collar shaped, broader than long, lateral areas curved posteriorly; scutellum large, median length much more than the collective lengths of vertex and pronotum, vertex lacking carinae, pronotum with only central carina; scutellum tricarinate, lateral carinae bifurcated anteriorly, their mesal branches joining each-other on central carina; frons, with posterior and anterior margin flat and transverse, lateral margin slightly bulging out, median length of frons less than its transverse width, central carina complete, lateral carinae incompletely developed. General body colour bronze brown, eyes brownish, with light and dark colour bands, pronotum with a pair of small punctures, tegmina amber brown; with a colour pattern as in the illustration, hind wing dark brown.

Tegmina, hyaline with two sets of transverse veins; three longitudinal veins arising from basal cell.

Male genitalia

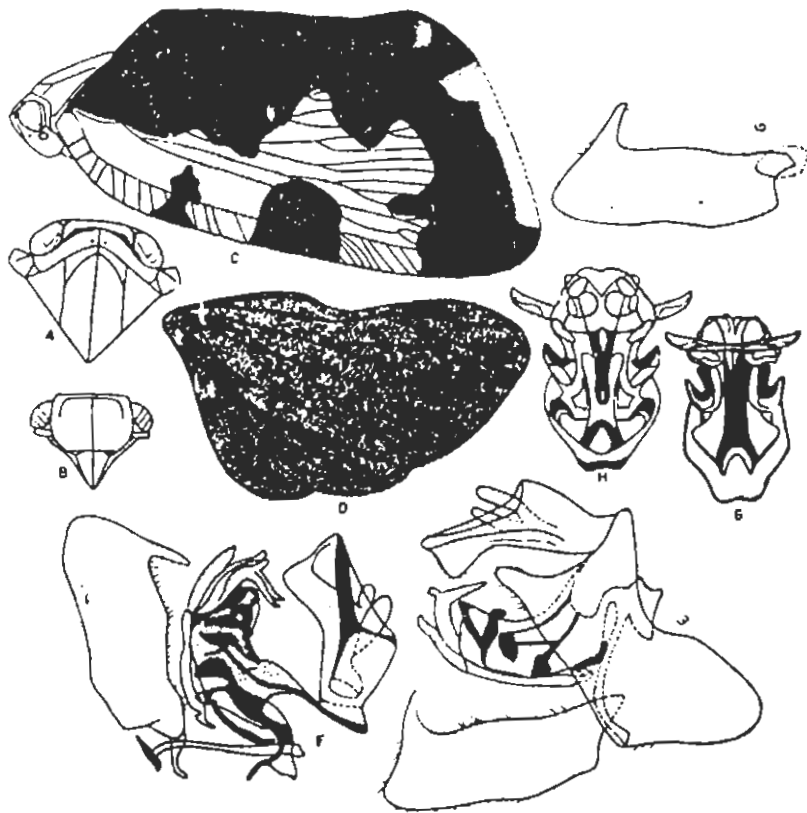
Anal segment, moderately long, in lateral view, with

lateral apical margin much projected behind extreme apex of projection, truncated, flat and broad, sclerotized internally, and directed ventro-caudad; pygofer with oblique posterior margin, postero-dorsal part projected, narrowed posteriorly in an angular form; aedeagus, in dorsal view, broad and moderately long, sclerotized internally, in a number of regions, in lateral view, broad, tubular, with three pairs of processes, apical process membranous, dorsal in position, bifurcated apically, directed dorso-cephalad, ventral pair of processes subapical in position, also membranous and smoothly rounded at apex, third pair subapical, sclerotized, with spoon shaped apex, and directed ventro-cephalad; paramere, in lateral view, with sub-parallel, dorsal and ventral margins, apex rounded, dorsal apical margin curved inwards and continued as a narrow spiny dorsal apical process.

The Fochazia anwari, n.sp., is quite close to Fochazia citri, n.sp., described hitherto in the shape of paramere, pygofer, and anal segment, but differs in the aedeagus, carination of frons, and colour pattern of tegmina.

Type material

Holotype male, Faisalabad, Punjab, Pakistan, grass, Anwar, 7.VII.1974; allotype female, and paratype one male, with same data as of the holotype; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 59 A-I. Pochazia anwari, n. sp., A & B: Head, dorsal and frontal aspects, 8x, C: Body, lateral aspect, 8x, D: Right hind wing, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Left paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Genus Ricania Germar

Ricania Germar. Mag. Ent. 111:221, 1818.

Type-species : Cicada hyalina Fabricius, 1775 by subsequent designation by Stål (1866).

The genus Ricania Germar was redescribed by Distant (1906:375).

"Head (including eyes) as wide as pronotum, vertex broad and narrow; face broader than long, with central and sublateral carinations, the first usually evanescent posteriorly, the latter similarly evanescent but also sometimes practically obsolete; clypeus with the lateral margins not ridged; pronotum and mesonotum as in Pochazia tegmina small, moderately amplified, triangular, the apical margin as long or a little shorter than the inner margin, longitudinal veins furcate, the first and second near their apices, the third emitting many ramifications; two transverse lines on apical area formed by transverse veins; posterior tibia bispinose."

The present worker has studied three species of the genus from Pakistan, which include, two species new to science. As R. zebra Distant is not properly characterized, therefore it is being redescribed here.

Ricania amygdalusae, n.sp
(Figs. 60 A-I)

Form and colour

Length of male 1.1 cm; head broadened flattened, with anterior margin transverse in front, vertex, much broader than long, as a transverse horizontal band like area; pronotum narrowed, much broader than long; its posterior margin strongly concave, possessing a pair of tiny punctures latero-dorsally; frons broader than long; vertex lacking carinae; pronotum with only central carina, scutellum tricarinate, with lateral carinae bifurcated both anteriorly as well as posteriorly, frons tricarinate, all the carinae failing to reach the fronto-clypeal suture. General body colour umber brown; pronotum, antennae, ocelli, and venter light brown; tegmina bronze ^{brown} possessing a dark colour pattern as seen in the illustration, hind wing dark brown in colour.

Male genitalia

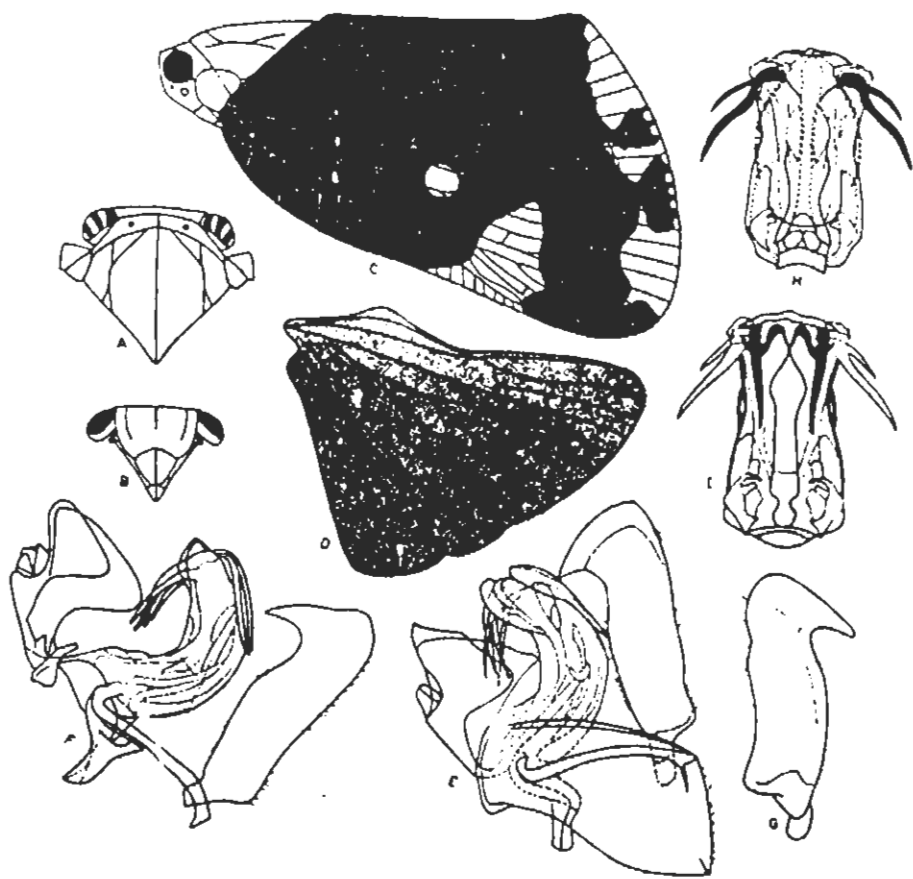
Anal segment short, in lateral view, with lateral apical margin projected posteriorly in the form of a broad extension with relatively much broader extreme apex; pygofer, in lateral view, a roughly rectangular piece relatively broader in ventral part, its posterior margin nearly flat; aedeagus, in dorsal view, broad and moderately long, in lateral view, tubular, with dorsal margin sinuate, and ventral margin convex, with three pairs of

processes, two pairs arising dorsally and subapically, spiny, tapered apically and directed dorso-cephalad, one pair arising ventrally from apex, also spiny, directed ventro-cephalad; paramere, in lateral view, nearly of uniform width throughout, apex rounded, curved, dorso-cephalad to from a spiny dorsal apical process.

Ricania amygdalusae, n.sp., is quite close to Ricania cheemai, n.sp., in the wing pattern and general shape of head, but differs in the carination of scutellum and frons and to some extent to the shape of paramere and pygofer.

Type material

Holotype male, Chittagong, Bangladesh, almond, Zaman, 7.1.1965; a single male in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 60 A-I. *Ricania amygdalusae*, n.sp., A & B: Head, dorsal and frontal aspects, 6x, C: Body, lateral aspect, 8x, D: Right hind wing, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Left paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Ricania cheemai, n.sp.
(Figs.61 A-I)

Form and colour

Length of male 1.2 cm; head nearly similar to Ricania amygdalusae, n.sp., described earlier, with some differences in carination lateral carinae on scutellum bifurcate anteriorly only, not reaching anterior margin of scutellum, their mesal branches meet each other on central carina; frons possessing only a central carina. General body colour similar to R. amygdalusae, n.sp., but colour pattern of tegmina is different as seen in the illustration.

Male genitalia

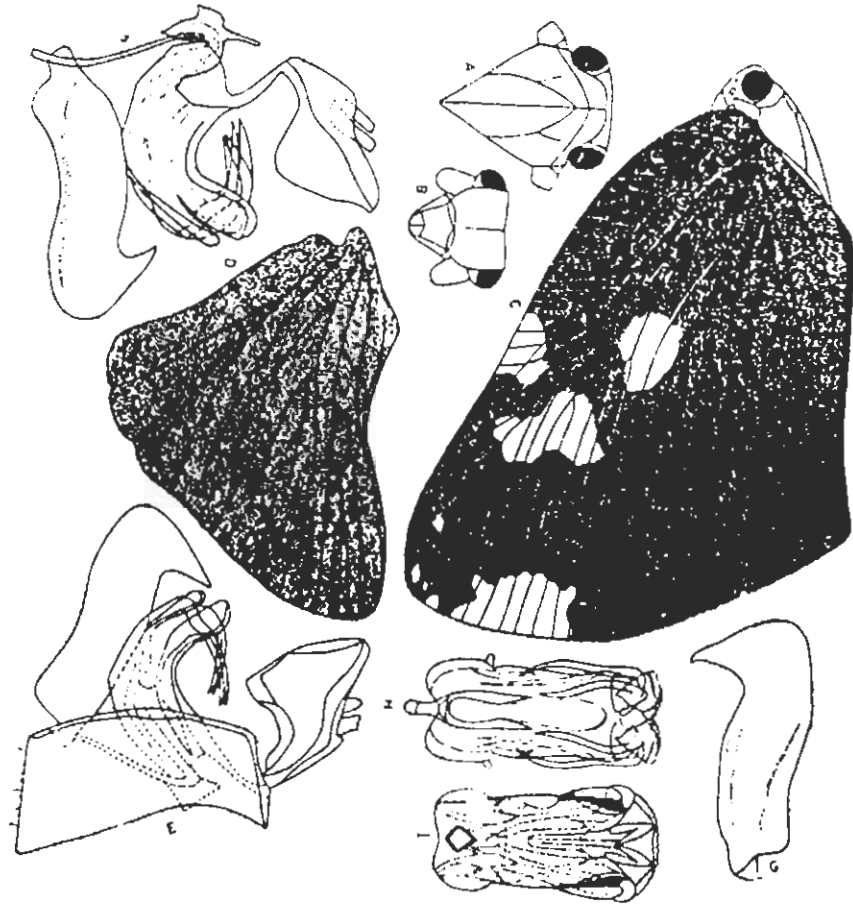
Anal segment, short, in lateral view, possessing a lateral apical extension, extended part broader and longer than anal segment itself; pygofer, in lateral view, a nearly rectangular piece aedeagus, in dorsal view, moderately broad and long, in lateral view, tubular, its dorsal margin deeply sinuate, ventral margin convex; aedeagus possessing three pairs of processes, two pairs dorsal in position, arising apically, tapered distally, and directed dorsocephalad, one pair subapical in position, smaller in size, sclerotized, apically and directed ventro-cephalad; paramere, in lateral view, of nearly uniform width throughout, dorsal margin convex, ventral margin concave, apex rounded, curved, dorso-cephalad, to form spiny dorsal api-

cal process.

Ricania cheemai, n.sp., is close to Ricania amygdalusae n.sp., in general pattern of male genitalia but differs in the colour pattern of tegmina, the position of processes on aedeagus, the detailed shape of paramere and the carination of head areas.

Type material

Holotype male, Dhantore, N.W.F.P, Pakistan, M.A. Cheema, on wing, 8.XI.1963; paratype one male, Karachi, Sind, Pakistan, on grass; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 61 A-I. Ricania cheemai, n.sp., A & B: Head, dorsal and frontal aspects, 12.5x, C: Body, lateral aspect, 12.5x, D: Right hind wing, 12.5x, E & F: Male genitalia, lateral aspects, 50x, G: Right paramere, 50x, H & I: Aedeagus, dorsal and ventral aspects, 50x.

Ricania zebra Distant
(Figs. 62 A-I)

Ricania zebra Distant, Fauna Brit. India. 111:379, 1906.

Distant (1906:379) described the external characters of the species as below:

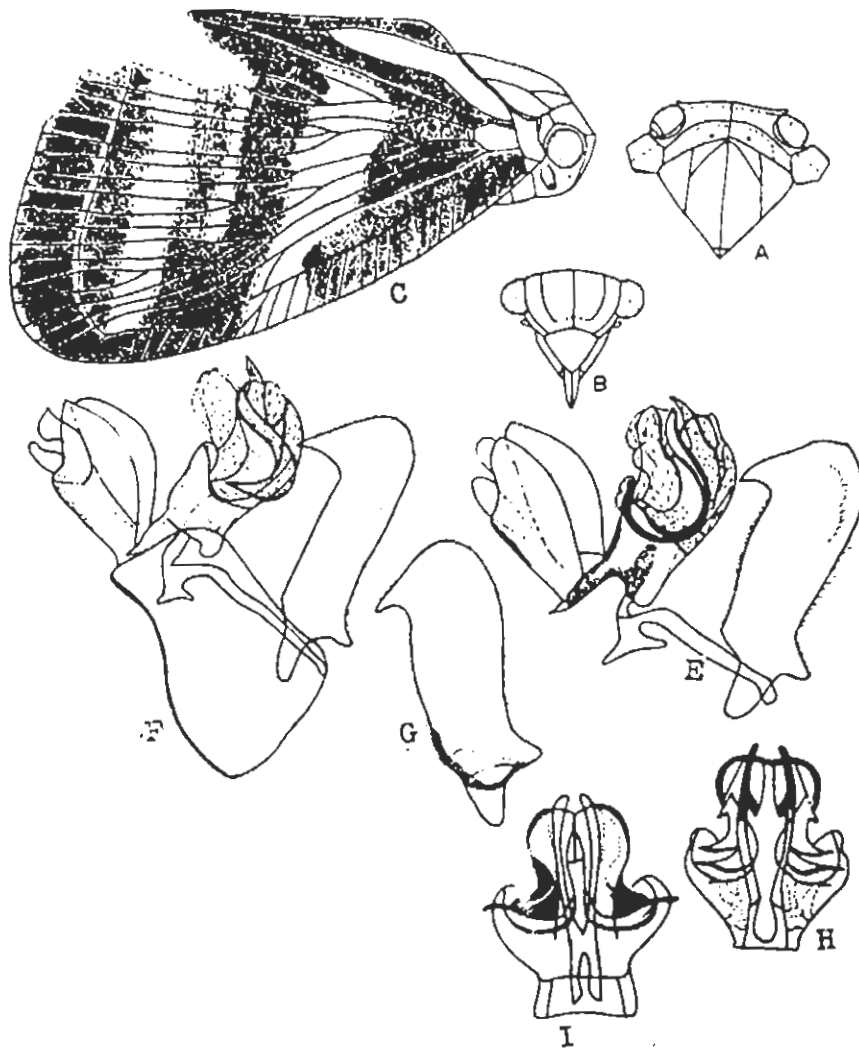
"Body and legs pale tawny-brown, mesonotum sometimes piceous brown; tegmina pale umber-brown, costal membrane dark umber brown, its extreme edge ochraceous and inwardly dentated, a dark umber brown transverse fascia margined on each side with greyish-white near middle, beyond this an other transverse greyish-white fascia which is preceded and followed by a greyish-white line, extreme outer margin greyish-white, inwardly dentated, a small black sub costal spot at anterior end of the dark transverse fascia; wings pale ochraceous-brown; face with a distinct percurrent central carination, on each side of which are two other carinations, the outer most longest, more distinct, and curved."

Male genitalia

Anal segment, moderately long, in lateral view, with a ventral curved extension of lateral and latero-apical margins; pygofer, in lateral view, irregularly rectangular in shape, with posterior margin flattened; aedeagus, in dorsal view, short and broad, membranous apically, with two pairs of apical processes, both directed caudad, unequal in length and thickness; paramere, in lateral view, nearly uniformly broad throughout, apex rounded, curved dorsad to form a spiny dorsal apical process.

Material Examined

Two males, two females, Peshawar, N.W.F.P, Pakistan, grass, Shujaat, 10.VI.1973; two males, Faisalabad, Punjab, Pakistan, grass, Anwar, 7.VII.1974; two males, one female, Tandojam, Sind, Pakistan, grass, Israr, 11.X.1977; one male, Chichawatni, Punjab, Pakistan, maize, Anwar, 10.6.1973; one male, two females, Daska, grass, Khalid, 7.VII.1972; one male, Rajshahi, Bangladesh, two males, two females, Peshawar, grass, Shujaat, 11.VI.1973; one male, Ranga-mati, Bangladesh, Fareed 26.VI.1969; one male, one female, Sirmangal, Bangladesh, grass, Qamar Abbassi, 5.II.1969; one male, one female, Mianchannun grass, sugar cane, Anwar, 2.II.1972; one male, two females, Chichawatni, maize, Anwar, 11.X.1972; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 62 A-I. *Ricania zebra*, Distant., A & B: Head, dorsal and frontal aspects, 8x, C: Body, lateral aspect, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Right paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Genus Ricanoptera Melichar

Ricanoptera Melichar. Ann. Hofmus. Wien: X11, 253, 1898.
Type-species: Ricanoptera inculta Melichar 1898, by
subsequent designation of Distant F:B.I. 111: 383,
1906.

Distant (1906:382) described the genus as below:

"Head, pronotum, and mesonotum generally as in the two preceding genera; tegmina more elliptical, apical margin longer than the inner margin, first and second longitudinal veins emitted from a common stalk at upper end of basal cell, third strongly forked at a short distance from base, an inwardly curved line crossing disk before middle and formed by transverse veins, numerous transverse veins in clavus; posterior tibia with two spines."

During the present studies only one known species of the genus is studied from Pakistan. which is being described hereunder.

Ricanoptera fenestrata Fabricius
(Figs. 63 A-1)

Ricania fenestrata (Fabr). Syst. Ent: 88, 1775.

The external characters of the species were described by Distant (1906:376) as below:

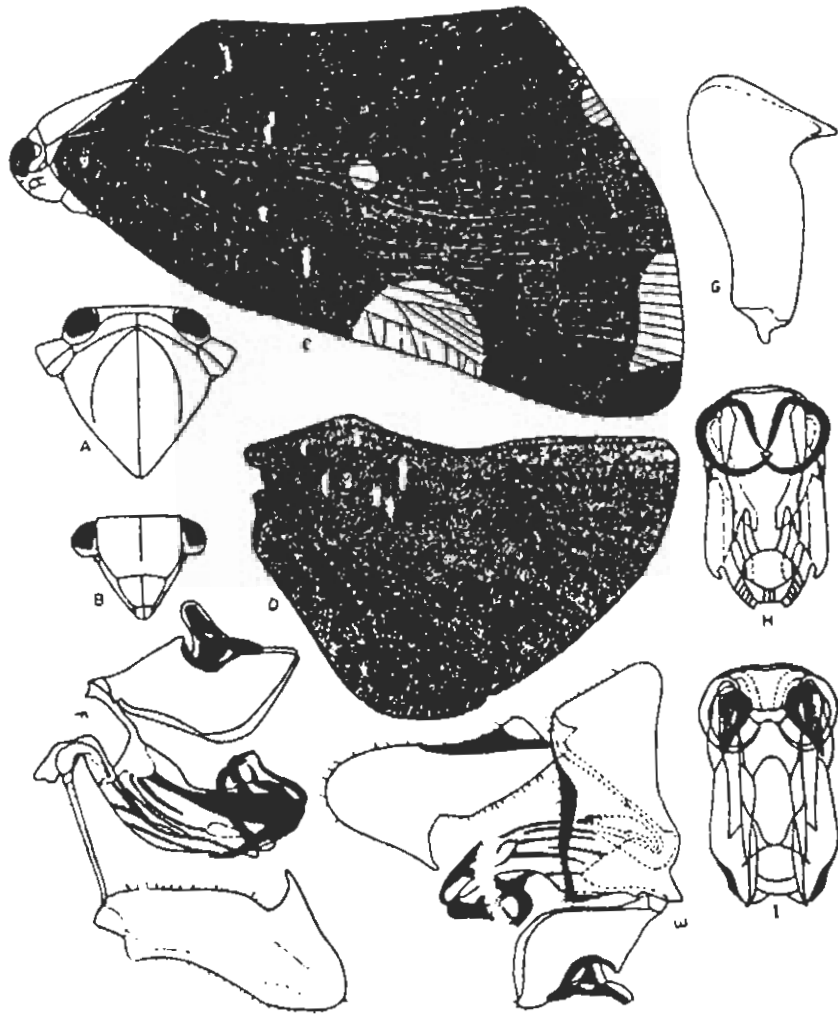
"Head (including face), pronotum, mesonotum, and sternum piceous-black; abdomen testaceous; coxae, legs, and a transverse linear spot at apex of face pale testaceous; tegmina piceous-brown or piceous-black, with a large upper central discal spot united to the costal margin by a smaller spot (these spots sometimes distinctly separated) and two large elongate spots on apical margin, very pale flavescent or greyish-white; wings a little paler than tegmina, with a pale subcostal central streak; face with a distinct almost percurrent central carination."

Male genitalia

Anal segment, short, in lateral view, with a broad extension of lateral apical part, prominent curved ventrad; pygofer, nearly rectangular piece aedeagus, in dorsal view, broad and moderately long, in lateral view, with sclerotized longitudinal ridges, possessing three pairs of processes, all apical in position, slender, sclerotized, tapered apically, two pairs directed dorso-cephalad, one pair ventral in position, and directed ventro-cephalad; paramere, in lateral view, with ventral margin concave, apex of paramere curved ventrad, rounded and somewhat narrowed, dorsal apical margin curved cephalad to give rise a narrow spiny dorsal apical process.

Material Examined

A single male specimen of the species was collected from Andermanik, Bangladesh, teak, Zaman, 11.IV.1965; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 63 A-I. Ricanoptera fenestrata, Fabricius., A & B: Head, dorsal and frontal aspects, 8x, C: Body, lateral aspect, 8x, D: Right hind wing, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Left paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

FAMILY CIXIIDAE SPINOLA

Metcalf (1936:3) characterized the family Cixiidae as below:

"These are, for the most part, medium or medium to small fulgorids. The head is not elaborately developed as it is in many fulgorids but is relatively simple, with simple two-joined antennae each of which has a terminal flagellum. In the tribe Bothriocerini the antenna is sunk into a pit, or the head is provided with sub-antennal processes. The third or median ocellus is often present. Tegulae are present. The wings are usually macropterous and the venation is quite characteristic; subcosta, radius, and media are generally united into a common stem from the basal cell, with the stem of subcosta and radius long or short; typically, the branches of subcosta form a nodal cell. radius and media have a few branches, therefore only a small number of ante-apical and apical cells are formed; the claval suture is distinct; the claval veins unite into a claval stem which ends in the commissural margin. The legs are usually simple; the hind tibiae are long either without or with only a few lateral spines; characteristically there is a circle of apical spines at the apex of the hind tibia. In the male genitalia: the pygofer is usually bulky with the anal segment large and the anal style reduced; the genital styles are generally large, flat and thin; the aedeagus consists of a simple tube, often divided into two segments. The ovipositor is either complete or reduced."

During the present work four genera Cixius Latreille, Adolenda Distant, Oliarus Stål, and Bangoliarus Novo. of the family have been studied from Pakistan. Only one species of the genus Cixius was studied, which is being a new record from Pakistan. Six species of the genus Oliarus which are also fairly widely distributed in

the world, are studied from Pakistan. Of these three species are new to science. And the genus Adolenda is represented only by the known species A. typica, and the new genus Bangoliarus is also represented by a single species.

KEY TO THE GENERA OF THE FAMILY CIXIIDAE SPINOLA
FROM PAKISTAN

1. Apical cells in tegmina less than 10; subapical cells
less than four ----- Adolenda Distant

Apical cells in tegmina more than 10; subapical cells
more than four ----- 2.

2. Aedeagus! with distal half membranous, possessing in-
distinct lobes, not processes; paramere with dor-
sal apical process spiny in shape, and located on
lateral margin beyond mid-length -----
----- Bangoliarus Novo

Aedeagus mostly sclerotized, possessing processes;
paramere without dorsal apical process on lateral
margin ----- 3.

3. Anal segment much elongated; paramere with narrow
base, apical half rounded, and expanded lobe like,
in lateral view, more than three times as wide as
the basal half ----- Cixius Latreille

Anal segment expanded than elongated; paramere in
lateral view, nearly twice as broad as basal half,
apex curved dorsad, than expanded -----
----- Oliarus Stal

Genus Cixius Latreille

Cixius Latreille, Hist. Vat. Ins. 12:310, 1804.
Type-species : Cicada nervosa Linnaeus 1758, by
subsequent designation.

Dozier (1928:69) characterized the genus as below:

"The genus is very closely related to Mono-
rachis and Oliarus. Vertex short, four angled,
together with the large but inconspicuous eyes,
narrower than the pronotum, separated in front
from the frons by a transverse ridge; four com-
partments are formed by the median longitudinal
carina and an anterior transverse one, the two
hind compartments larger than the front ones.
Frons with a median longitudinal carina, at the
apex of which is placed an ocellus. Pronotum
very short, angularly emarginate behind, the la-
teral carinae curved out behind the eyes and at-
taining the lateral margins. Scutellum large and
tricarinate. Elytra longer than the abdomen,
broadly rounded at apex; nervures punctated with
more or less distinct black dots, from which
areas arise fine fuscous hairs; stigma distinct,
wings present. Hind tibiae with two or three sp-
ines, nearly always three."

The genus is widely distributed in the Palaearctic
region, but it is a new record from Pakistan, based on a
new species described below.

Cixius murrensis, n.sp.
(Figs. 64 A-G)

Form and colour

Length of male 4.5 mm, of female 4.9 mm; head short, much reduced in dimensions, visible as a small piece in front of the body, vertex much broader than long; frons visible as a transverse narrow part in front of the vertex; pronotum narrow, collar like, with posterior margin deeply concave in middle, vertex possessing central carina; pronotum lacking carinae; scutellum tricarinate; frons with posterior margin flat, nearly as broad as long, median length of clypeus more than that of frons, clypeo-frontal suture curved smoothly, forming an arc towards frons, frons and clypeus both possessing central carina. General body colour dull brown, carinae dark brown, tegmina hyaline, mildly yellowish, with a dark brown band across the tegmina in middle, and another patch of brown colour at apex.

Tegmina, large as compared to head and thorax, veins accompanied by tiny granulations, transverse veins lacking along costal margin, cross veins present only on the apical 1/3 of the tegmina.

Male genitalia

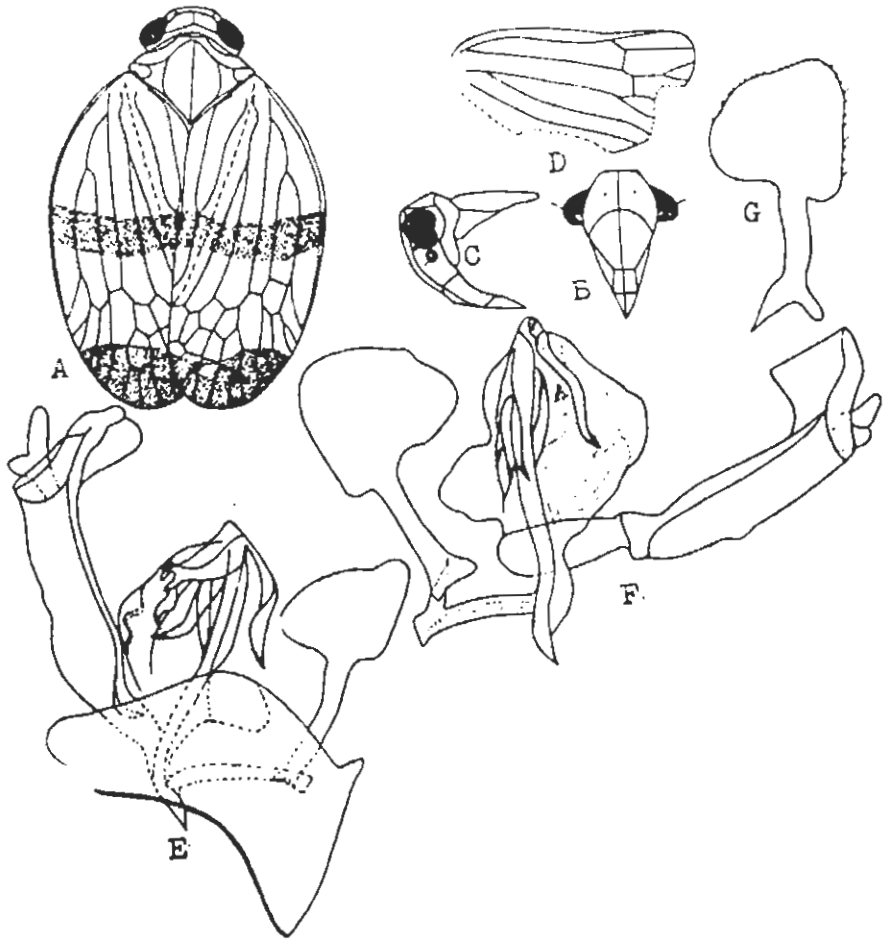
Anal segment, elongated conspicuously, in lateral

view, nearly four times as long as broad, its lateral apical margin slightly extended, extended part broad and curved ventrad; pygofer, in lateral view, dorso-ventrally a rectangular piece its anterior margin slightly sclerotized, posterior margin bulging posteriorly in middle; aedeagus, in lateral view, broad, irregularly symmetrical, ventral margin bulging out, aedeagal body sclerotized internally, possessing a pair of large, spinose processes, arising at apex and directed cephalo-ventrad; paramere, in lateral view, hammer shaped, with a long, narrow, rod like basal half, and irregularly marked expanded apical part, spinose process and dorsal apical process lacking.

Cixius murrensis, n.sp., is comparable to C. (paracixius) distinguendus kbm, from which it differs in the bands on tegmina, shape of frons clypeus, and shape of aedeagus.

Type material

Holotype male, Murree, Punjab, Pakistan, grass, Anwar, 7.6.1973; allotype, female, with same data as of the holotype; paratypes four males, seven females, with same data as of the holotype; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 64 A-G. *Cixius murrensis*, n.sp., A: Body, dorsal aspect, 8x, B & C: Head, frontal and lateral aspects, 8x, D: Right hind wing, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Right paramere, 32x.

Genus Oliarus Stål

Oliarus Stål. Mem, Afric, vol 4:166, 1866.
Type-species : Cixius walkeri Stal, 1859, Fregatten.
Eugenise Res. , Zool. 4:272, by subsequent designation by Distant 1906.

The cosmopolitan genus Oliarus Stål was described by Fennah (1945:419), Caldwell (1951:137), and Fennah (1957:127), on the basis of their studies from various parts of the world. These descriptions were brief, lying emphasis on different characters of the genus, and are reproduced below:

Fennah (1945):

"Mesonotum with five carinae; frons with a percurrent median carina, vertex with an acutely angular or curved transverse carina which joins the middle portion of the apical transverse carina, forming an areolet apically on each side. Fork of M1 and M2 in the tegmina nearer to M1 than is the fork of M3 and M4."

and Martorell

Caldwell (1951):

"vertex usually longer than broad, double carinae present apically forming apical fovae. Mesonotum with five carinae. Fore wing usually hyaline; media arising from basal cell. Ovipositor greatly flattened; female pygofer concave posteriorly, with many wax pores that produce a mass of wax filaments. Aedeagus and periandrium with many prominent processes, periandrium strongly attached to upper pygofer. Anal segment broad, hook-like."

Fennah (1957):

"..... in several species the superficial appearance of the male is strikingly different from that of the female. In such circumstances the po-

sitive identification of isolated specimens may not be easy The fenestrae of Oliarus are lenticular window-like (imperforate) attenuations of the disc of the frons, and a pair is frequently to be found immediately in front of the antennae. In some species of Polynesian Oliarus a second pair of fenestrae may occur on the frontal disc, immediately in front of the lateral ocelli, These structures do not appear to have been described: they differ from what must now be termed the "pre-antennal" fenestrae in their rounder outline and much smaller size scale-like teeth refers to the structure on the distal margin of the second segment of the post tarsus. This usually has a short spine at each latero-apical angle, and a row of minute pigmented projections along the margin between them. Each of these projections represents the distal termination of a minute ridge, and the projection may be acute or almost truncate. From each such projection a narrowly triangular membranous process extends beyond the margin. It is pallid, easily detached, and frequently clotted with foreign matter: this is the "scale", and together with the pigmented projection from the margin forms the "scale-like tooth".

The present worker has studied six species of the genus, from Pakistan, of which three are new to science. These are treated below:

KEY TO THE SPECIES OF THE GENUS *OLIARUS* STÅL

1. Vertex centrally not carinate, longer than broad;
frons gradually broadening towards clypeus---- 2.

Vertex centrally carinate, carinae may be distinct or indistinct, mostly broader than long; frons narrowing towards clypeus ----- 5.

2. Frontotum centrally carinate, transverse carinae meeting the posterior margin of pronotum centrally; aedeagus basally with a sclerotized triradiate process ----- *Oliarus gilgitensis*, n.sp.

Pronotum centrally not carinate, transverse carinae mostly meeting to the anterior margin of pronotum; aedeagus basally without any process ----- 3.

3. Extreme base of frons narrow, gradually broadening towards clypeus, fronto-clypeal suture deeply incised; aedeagus with three pairs of sclerotized aedeagal processes ----- *Oliarus tectonae*, n.sp.

Extreme base of frons may be slightly narrow or broad, narrowing towards clypeus, frons moderately incised or not; aedeagus usually with unpaired aedeagal processes ----- 4.

4. Aedeagus basally broad, apically narrowed, median process spinose, directed posteriorly -----
----- *Oliarus hodgarti* Distant.

Aedeagus not so broad basally, apically broad, with membranous and sclerotized aedeagal processes, ventral process elongated, apically pointed, recurved, directed dorso-cephalad -----
----- *Oliarus albifacialis* Distant.

5. Central carina of vertex complete, transverse carinae on pronotum meeting each other at the mid-length of pronotum; frons with distinct eye like spots ----- Oliarus sindensis, n.sp.

Central carina of vertex only on the basal half, transverse carinae on pronotum not meeting at mid-length of pronotum, but touching the anterior margin of pronotum, short distance from eyes; frons without any characteristic spot -----
----- Oliarus lindbergi Dlabola.

Oliarus hodgarti Distant
(Figs. 65 A-J)

Oliarus hodgarti Distant. A.M.N.H. (8) VIII:736, 1911.

The species was described by Distant (1916:31), inadequately and is therefore being redescribed below:

Form and colour

Length of male 4.5 mm, of female 5.0 mm; median length of vertex less than interocular width; frons appearing as a narrow transverse strip in front of the vertex on dorsal surface; pronotum narrow, collar like, with one carina, transversely located, arched in middle, their both extremities joining the antero-lateral margins of pronotum, posterior margin of pronotum arched in middle; scutellum with five, one central and two pairs of lateral carinae; frons and clypeus possessing central carina only; median length of frons less than that of clypeus and also less than its width. General body colour brownish black, with vertex, pronotum, scutellum, frons, clypeus, labrum and genae blackish, ocelli, eyes and antennae light brown; tegmina in apical half dark brown.

Tegmina, much longer than broad, its width maximum at the level of stigma; membrane with one subapical line

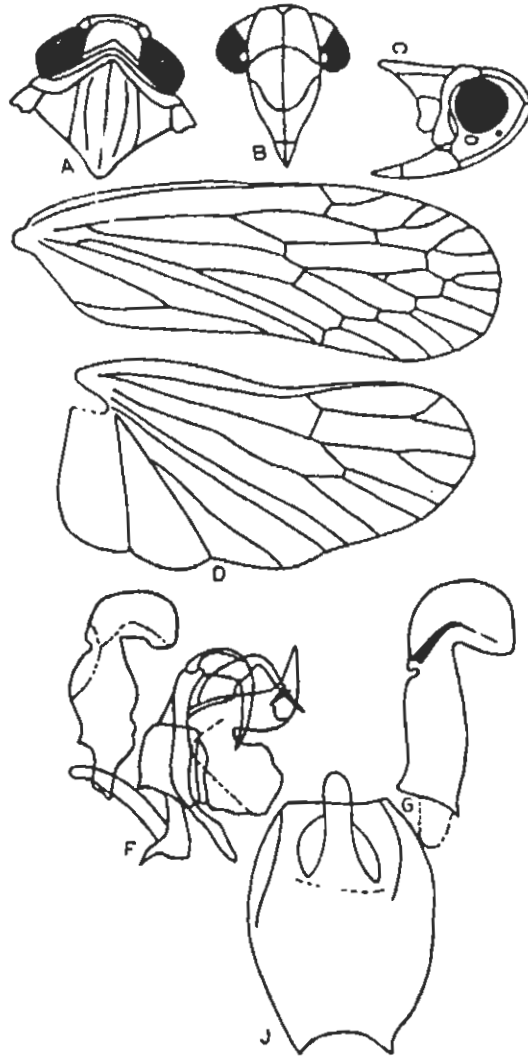
of transverse veins; apical cells, excluding stigma, 12, subapical cells 6, all longitudinal veins arising from basal cell.

Male genitalia

Anal segment, long; pygofer, in lateral view, with postero-lateral margin broadly produced posteriorly; aedeagus, in lateral view, broad at base, its dorsal margin much narrowed preapically, apex continued as a narrow spinose process arising from dorsal surface and then smoothly curved and directed caudad, aedeagus moderately long, basal parts sclerotized, latero-ventral surface also sclerotized in tubular form, continued at apex in the form of spinose process, both curved and directed cephalad; paramere, in lateral view, hammer shaped, its basal 2/3 narrow and possessing parallel margins, apical part abruptly curved dorsad, dorsal apical process and spinose process not distinctly present.

Material Examined

The species occurs throughout Pakistan and has been studied from plants like, grass, wheat, sugarcane,



Figs. 65 A-J. Oliarus hodgarti Distant., A, B & C: Head, dorsal, frontal and lateral aspects, 8x, D: Right fore and hind wings, 8x, F: Male genitalia, lateral aspect, 32x, G: Paramere lateral aspect, 32x, J: Anal segment, dorsal aspect, 32x.

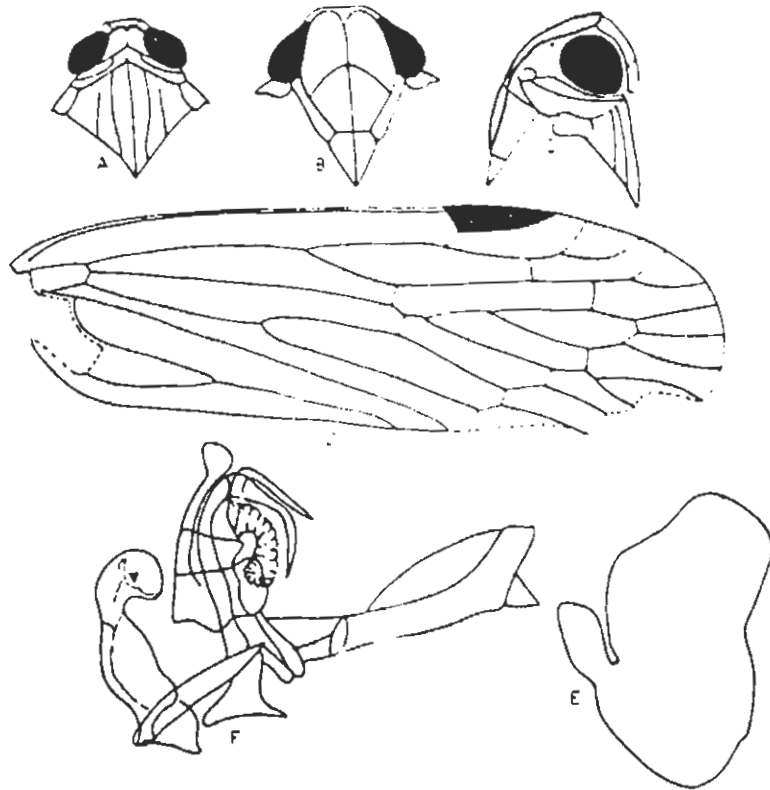
Oliarus lindbergi Dlabola
(Figs. 66 A-F)

Oliarus lindbergi Dlabola. Acta, ent. Mus. Nat.
Pragae XXXI:19-68, 1957.

Dlabola (1957) described the species, during the present studies, the species was recorded for the first time from Pakistan, Sargodha, Punjab, on lucern and wheat.

Material Examined

Four males, eight females, Sargodha, Punjab, Pakistan, Sher Khan, lucern , wheat, 20.111.1975; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 66 A-F. Oliarus lindbergi, Diabola., A, B & C: Head, dorsal, frontal and lateral aspects, 8x, D: Fore wing, 8x, E: Pygofer, lateral aspect, 32x, F: Male genitalia, lateral aspect, 32x.

Oliarus tectonae, n.sp.
(Figs.67 A-I)

Form and colour

Length of male 5.0 mm, of female 7.0 mm; head broad and slightly produced in front of compound eyes; median length of vertex more than interocular width, lateral carinae oblique, placed on anterior region of vertex; genae appearing in dorsal view of head; pronotum narrow, collar like, in the form of broad armed, inverted 'V', lateral carinae transverse, incomplete, not reaching each other in middle; scutellum with a single and two pairs of lateral carinae; frons 'Y', shaped, with posterior part narrow and like stem of 'Y', antero-lateral part produced in form of tubular arms, anterior margin of frons deeply sinuate, median length of frons much less than that of clypeus, both possessing only a central continuous carina, which is bifurcated posteriorly on frons. General body colour brownish to black, vertex, pronotum, scutellum, frons, clypeus, labrum, genae all black, ocelli, eyes, antennae light brown, carinae on scutellum black, all other carinae light brown, tegmina with apical half dark brown.

Tegmina, widest in the region of stigma; apical cells, excluding stigma 12; subapical cells, 6.

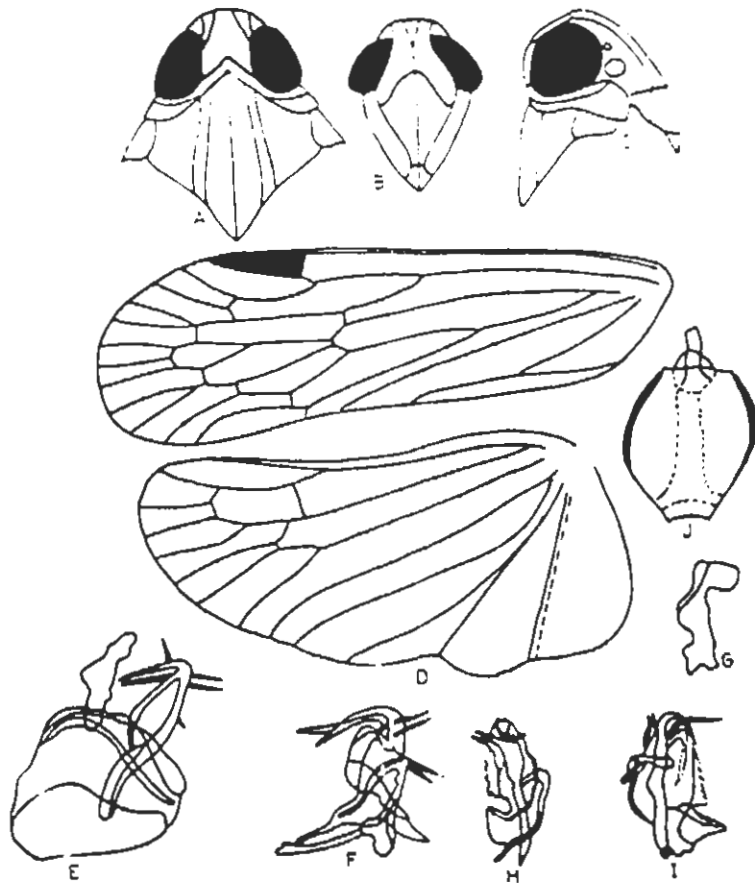
Male genitalia

Anal segment, moderately long, in dorsal view, lateral margin convex and sclerotized, tubular, slightly projected as a thin finger like process; pygofer roughly triangular, its posterior angular margin sclerotized, possessing an irregular lobe, arising from mid posteriorly; aedeagus, in lateral view, short and broad, with three pairs of spinose processes, one pair arising from ventral portion of apex, directed dorsad and longer than the other two pairs, another pair of thin spiny processes arising latero-ventrally from apex, and directed ventro-caudad, the third pair of spiny processes arising in middle from ventral surface and directed ventrad; paramere, small, in lateral view, with margins irregular, apical part mostly curved dorsad, rectangular in shape.

O. tectonae, n.sp., is nearer to O. gilgitensis, n.sp., in the shape of head, paramere, and pygofer, but can be differentiated on the basis of aedeagal processes.

Type material

Holotype male, Sylhet, Bangladesh, Qammar Abbassi, teak, 13.111.1969; allotype, female, with same data as of the holotype; paratypes one male, one female, with same data as of the holotype; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 67 A-I. *Oliarus tectonae*, n.sp., A,B & C: Head, dorsal, frontal and lateral aspects, 8x, D: Left fore and hind wing, 8x, E: Male genitalia, lateral aspect, 32x, G: Left paramere, 32x, F,H & I: Aedeagus, dorsal, ventral and lateral aspects, 32x, J: Anal segment, dorsal aspect, 32x.

Oliarus sindensis, n.sp.
(Figs. 68 A-F)

Form and colour

Length of male 5.0 mm, of female 5.0 mm; head broad in front, vertex much broader than long, its anterior margin nearly inline with anterior margin of compound eyes, convex in front; frons appearing as a transverse narrow strip, slightly in front of the vertex, central carina present on vertex; pronotum narrow, collar like, margins curved towards anterior side in middle; scutellum with two pairs of lateral carinae and a single central carina; frons widening towards anterior end, its maximum width more than median length; median length of clypeus more than that of frons, central carina present on frons and clypeus, carina on frons forked towards posterior end, a pair of eye like spots present antero-laterally on frons. General body colour ochraceous, brown, vertex, pronotum and scutellum light brown, areas beside carinae dark brown, carinae pale, eyes, ocelli, antennae of brown colour, at junction of fronto-clypeus there are two eye like yellow spots; tegmina ochraceous brown.

Tegmina, widest at level of stigma, apical cells, excluding stigma, 11; subapical cells 6; one subdivided into two; longitudinal veins arising from basal cell three.

Male genitalia

Anal segment, in dorsal view, longitudinal and tubular, with two broad and narrow lobes of anal tube; pygofer roughly triangular, posterior angular projection possessing a narrow broad lobe; aedeagus, in lateral view, with a tubular body, slightly curved dorsad, from middle to apex, with a pair of spiny apical processes, directed partly dorsad and dorso-cephalad, with another pair of stout, twice curved, processes arising from basal part of dorsal surface, twice curved dorsad, tapering apically and directed ventrad; paramere, with apical part in lateral view, broad, dorsal apical process not well defined, spinose process indistinct.

Oliarus sindensis, n.sp., appears close^{to} O. albifacialis Distant in the form of pygofer and anal segment, but differs in that, the stout process is arising from the opposite surface of aedeagus and is directed ventrad instead of dorsad. The paramere in O. sindensis, n.sp., is more broad, in lateral view than being narrow and projected dorsad as in O. albifacialis.

Material Examined

Holotype male, Pirpatho, Sind, Pakistan, Ramzan, millet, 19.XI.1972; allotype female, with same data as of the holotype; paratype one male, with same data as of the

holotype; other paratypes, three males, two females, Sakrand, Sind, Pakistan, Khalid, lucern, 29.111.1970; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 68 A-F. Oliarus sindensis, n.sp., A,B & C: Head, dorsal, frontal and lateral aspects, 8x, D: Fore and hind wing, 8x, E: Pygofer, lateral aspect, 32x, F: Male genitalia, lateral aspect, 32x.

Oliarus gilgitensis, n.sp.
(Figs.69 A-G)

Form and colour

Length of male 6.5mm, of female 7.0mm; head slightly produced in front of eyes, vertex nearly twice as long as broad, with short obliquely placed lateral carinae in anterior region only, genae visible from dorsal view, antero-lateral to vertex, central carina on vertex absent; pronotum narrow, collar like, appearing like a wide armed inverted 'V', lateral carinae on pronotum transverse, joining each other in middle, central carina on pronotum present; scutellum with a central and two pairs of lateral carinae, frons widening towards anterior margin; median length of frons less than that of clypeus, both possessing a continuous central carina, which is bifurcated posteriorly. General body colour brown, vertex, scutellum, genae, frons, clypeus black; pronotum, eyes antennae light brown, lateral carinae on frons centrally pale, ocelli transparent; tegmina light brown with some area of apical half dark brown.

Tegmina, widest in the region of stigma; apical cells, excluding stigma 12, subapical cells 6; longitudinal veins arising from basal cell three in number.

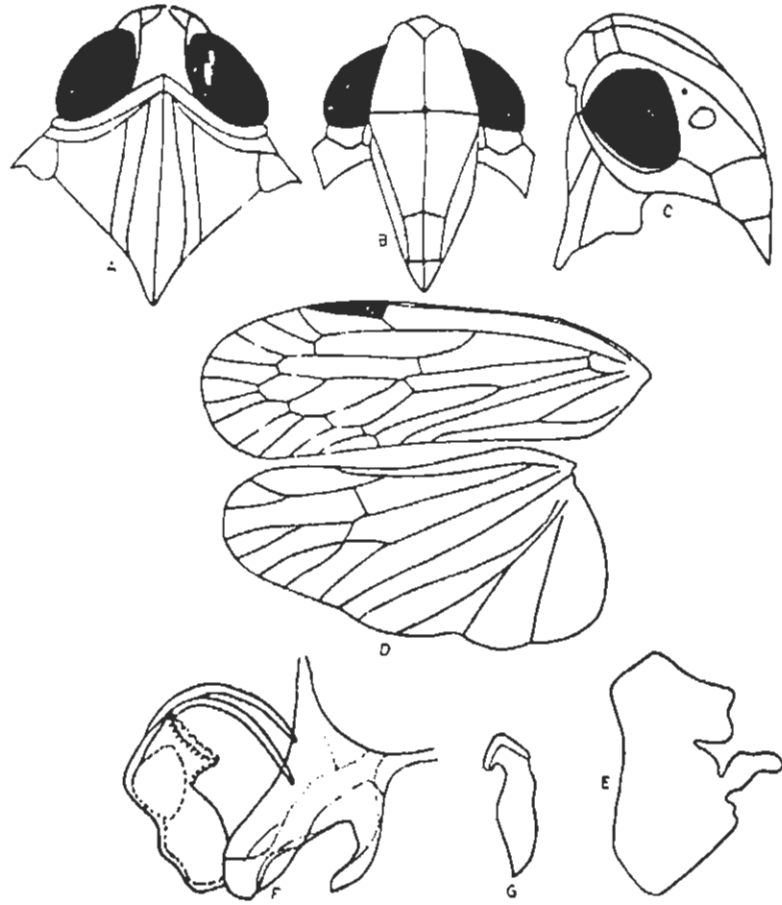
Male genitalia

Anal segment missing; pygofer, in lateral view, with posterior margin triangularly projected posteriorly, possessing a zig-zag tubular process, arising from middle of posterior margin; aedeagus, in lateral view, broad and curved dorsad, truncated apically, with a pair of spiny apical processes, curved dorso-cephalad, length of process nearly equal to that of aedeagal body, a stout process arising from base of aedeagus, dorsal in position, possessing three angularly projected thickenings; paramere, relatively much smaller than the other species of Oliarus known from Pakistan, in lateral view, its apex curved dorsad, finely tapered, and extreme apex directed cephalad.

O. gilgitensis, n.sp., differs from all the known species of the genus Oliarus of Pakistan, in possessing an exceptionally small size of paramere, and a triradiate aedeagal process, arising from the base.

Type material

Holotype male, Gilgit, Azad Kashmir, Pakistan, Shujaat, grass, 20.VII.1974; allotype female, with same data as of the holotype; paratypes, two males, two females, Shujaat, maize, 8.VII.1974; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 69 A-G. Oliarus gilcitis, n.sp., A, B & C: Head, dorsal, frontal and lateral aspects, 8x, D: Fore and hind wings, 8x, E: Pygofer, lateral aspect, 32x, G: Paramere, lateral aspect, 32x, F: Aedeagus, lateral aspect, 64x.

Oliarus albifacialis Distant
(Figs. 70 A-J)

Oliarus albifacialis Distant, 1906.

Distant (1906) described the species inadequately, and it is therefore being redescribed below:

Form and colour

Length of male 5.0 mm, of female 7.0 mm; head broad and slightly produced in front of eyes; frons and central carina on the dorsal side, anterior to the vertex, median length of vertex slightly less than interocular width; pronotum narrow strip, angularly produced in front in middle, taking the form of a broad inverted 'V', vertex lacking carinae; pronotum with transverse carinae from lateral margins to antero-lateral margin; scutellum with two pairs of lateral carinae and a central carina, frons and clypeus possessing only central carina, frons widening towards anterior end, median length, less than maximum width, median length of frons much less than that of clypeus. General body colour blackish brown, scutellum dorsally black, laterally dark brown, vertex, fronto-clypeus, labrum and pronotum brownish black, eyes, ocelli, antenna. light brown.

Tegmina, widest slightly distad to stigma; apical

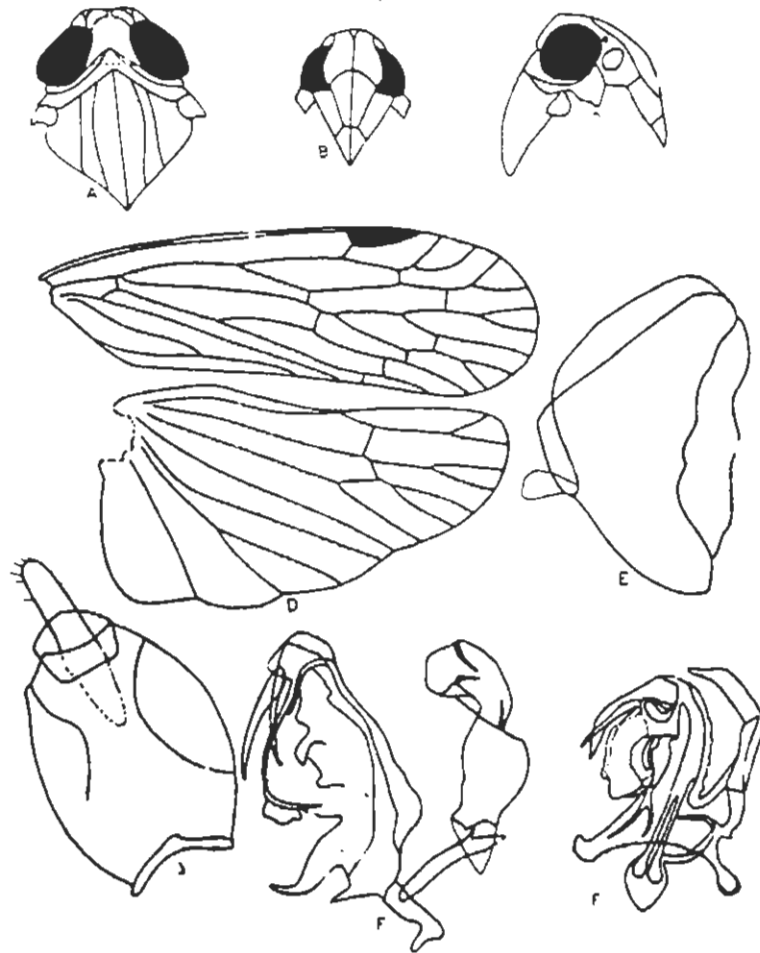
cells, excluding stigma, 12, subapical cells, 5; transverse line of cross veins irregular, longitudinal veins arising from basal cell three.

Male genitalia

Anal segment, in dorsal view, with converging lateral margins, anal tube protruding as a finger like process posteriorly; pygofer, in lateral view nearly triangular; with posterior margin protruding angularly in middle, an additional small knob like process postero-ventrally; aedeagal body in lateral view curved dorsad and then cephalad at apex, a stout process arising from the base on ventral surface, tapered apically and curved along the aedeagal body, ventral margin of aedeagus appearing irregular, pair of spiny processes arising at apex and curved dorso-cephalad, another pair of membranous processes curved towards aedeagal body arising sub-apically; paramere, in lateral view, flexed in middle, curved dorsad, apically spinose, process on apex curved, apical part indistinct.

Material Examined

Two males, three females, Sukker, Sind, Pakistan, Fareed Ahmed, lucern, 17.XI.1968; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 70 A-J. Oliarus albifacialis, Distant., A, B & C: Head, dorsal, frontal and lateral aspects, 8x, D: Fore and hind wings, 8x, E: Male genitalia, lateral aspect, 32x, F: Aedeagus, lateral aspect, 32x, J: Anal segment, dorsal aspect, 32x.

Genus Adolenda Distant

Adolenda, Distant. A.M.N.H (8) VIII:740, 1911.

Type-species: Adolenda typica Distant, by original designation.

Distant (1916:36) described the genus as below:

"Vertex somewhat triangular, the margins strongly ridged, the angle of the face visible from above; face long and slender, narrowest between eyes and distinctly, projecting above them, the margins strongly ridged, a distinct ocellus before clypeus, which is short and bears strong, central, and lateral ridges; pronotum very short, the lateral areas a little ampliate, the posterior margin strongly angularly emarginate; mesonotum a little longer than head and pronotum together, tricarinate, the lateral carinations oblique; abdomen moderately broad and robust; legs slender, posterior tibia unarmed; tegmina three times as long as broad, costal membrane broad and unveined, at its apex a cell enclosing stigma, beneath this three distinct subapical cells, beyond these a central longitudinal cell reaching apex, on each side of which are connected oblique cells, claval vein not reaching apex of clavus; wings broader and shorter than tegmina, two transverse veins on disk and two apical triangular cells."

The present worker has studied one species of the genus from Pakistan.

Adolenda typica Distant
(Figs. 71 A-J)

Adolenda typica. Distant 1916. Fauna Brit. India. Vlll:36, 1916.

Form and colour

Distant (1916:36) described the species as follows:

"Vertex, pronotum, and mesonotum brownish ochraceous, margins of vertex and pronotum, and margins and carinations of mesonotum, dull ochraceous; abdomen above piceous, narrowly ochraceous at base; head, sternum, and legs ochraceous; abdomen beneath piceous; tegmina hyaline, the veins piceous and with the following fuscous-brown spots; a stigmal spot, two below costal membrane, the outermost connected with a short curved fascia which extends submarginally round posterior half of vertex, and three spots on inner margin, the basal one largest; wings hyaline, the veins darker."

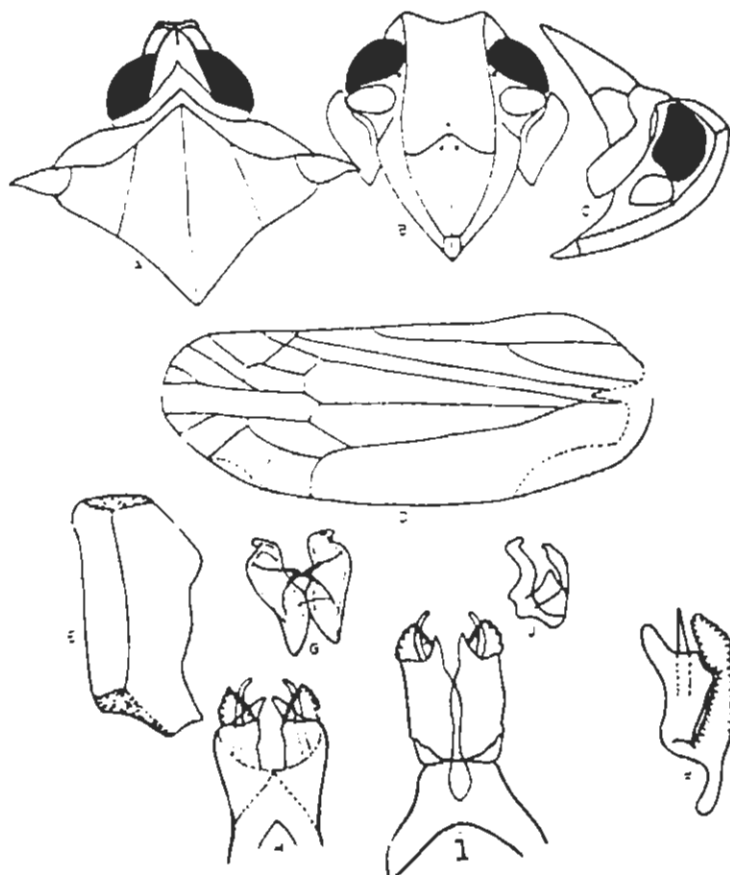
Male genitalia

Anal segment, short in dorsal view, basally broad, apically conically produced, lateral extensions directed caudad, recurved dorsally, apically rounded; in lateral view, rectangular piece, dorsally narrow, ventrally broad, posterior margin mostly flat; aedeagus in dorsal view, straight, tubular, moderately long, in lateral view ventrally sclerotized and dorsally membranous, ventrally produced into lobes, meeting centrally and a pair of long membranous lobes, independently arising from base of aedeagus, and a pair

of long, spinose appendage arising mid-ventrally; paramere, ventrally joined medianly, edges curved ventrally, dorsal apical process distinct.

Material Examined

One male, one female, Murree, Punjab, Pakistan; 24.11.76
Zoological Museum, University of Karachi, Karachi-
Pakistan.



Figs. 71 A-J: *Adolenda typica*, Distant., A, B & C: Head, dorsal, frontal and lateral aspects, 8x, D: Fore wing, 8x, E: Pygofer, lateral aspect, 32x, F, G & H: Aedeagus, dorsal, ventral and lateral aspects, 32x, I: Paramere, lateral aspect, 32x, J: Anal segment, lateral aspect, 32x.

Genus Bangoliarus Novo

Type-species : Bangoliarus truncatus, n.sp.

Head and thorax

Head projecting in front of eyes, with anterior margin of vertex transversely truncated, median length of vertex slightly more than inter-ocular width, lateral carinae short, oblique, approaching each other antero-medially, central area of vertex with a large rounded black spot, covering most of the diskal part; pronotum collar like, narrow, with an inverted 'V', arms greatly diverging laterally and base projected towards vertex, lateral carinae transversely located, joining each other in middle, scutellum tricarinate, lateral carinae diverging towards posterior end; frons broadened towards anterior end, median length nearly equal to that of clypeus, both possessing continuous central carina, lateral carinae present on both, all carinae yellowish white in colour, frons black, clypeus yellowish pale.

Tegmina

Broadest in the region of stigma; apical cells excluding stigma, 12; subapical cells 6, longitudinal veins arising from basal cell three.

Male genitalia

Anal segment, in lateral view, much broad and short; pygofer, in lateral view, with posterior margin irregularly rounded; aedeagus, in dorsal view, short and broad, most of middle and apical part membranous, processes and spines absent, lobes not distinct; paramere, in lateral view, narrow and long, much narrower in basal 1/3, apical part constricted into a short extreme apex, smoothly rounded, and then recurved cephalad into a spiny tip, dorsal apical process sharply spiny, located in the middle of the apical 2/3 .

Bangoliarus Novo, is superficially close to the genus Oliarus Stål in wing venation and general pattern of head, but differs considerably on closer examination, particularly in its tricarinate scutellum, equal lengths of clypeus and frons, narrow and long paramere, with distinct dorsal apical process, and nearly completely membranous aedeagus, as compared to pentacarinata scutellum, unequally long frons, and clypeus, paramere without distinct dorsal apical process, and mostly sclerotized aedeagus in Oliarus.

Only the type species of the genus is known from Pakistan, which is described below:

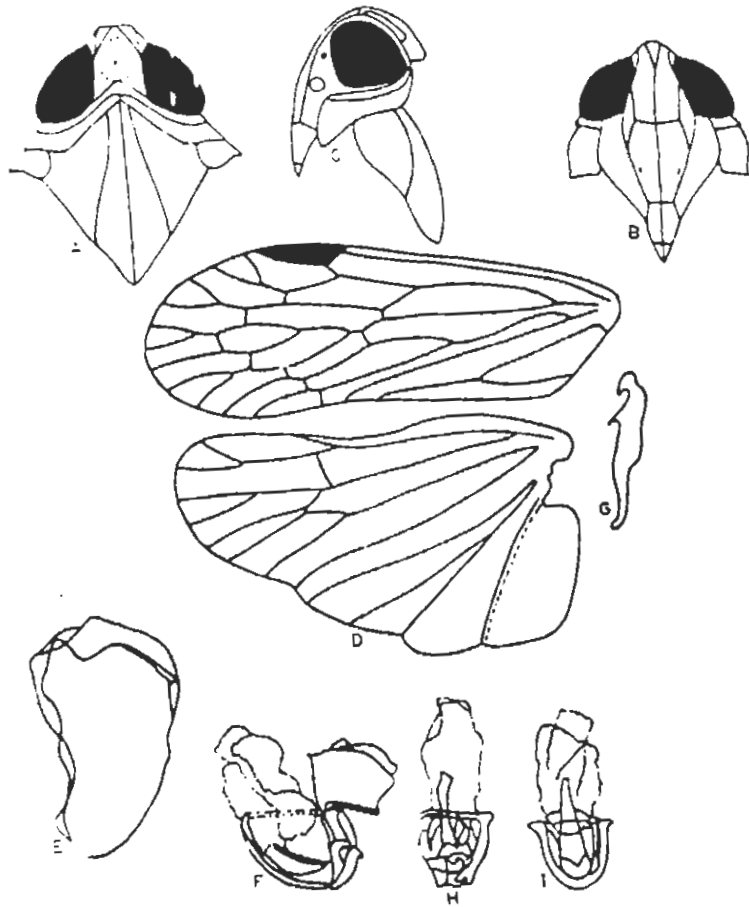
Bangoliarus truncatus, n.sp.
(Figs. 72 A-I)

Form and colour

Length of male 8.0 mm, of female 9.0mm; general body colour ochraceous brown, vertex, frons and scutellum centrally black, lateral areas of scutellum, pronotum, and clypeus yellowish pale, all carinae, eyes, lateral areas of pronotum, light brown, ocelli transparent, tegmina hyaline, venation brown.

Type material

Holotype male, Dacca, Bangladesh , I.A.Khan, grass, 25.X.1963; allotype female, with same data as of the holotype; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 72 A-I. Bangoliarus truncatus, n.sp., A, B & C: Head, dorsal, frontal and lateral aspects, 8x, D: Fore and hind wings, 8x, E: Pygofer, lateral aspect, 32x, F: Male genitalia, lateral aspect, 32x, G: Paramere, lateral aspect, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

FAMILY LOPHOPIDAE STÅL

Metcalf (1955) recharacterized the family Lophopidae as below:

The family Lophopidae is one of the smaller families of Fulgoroidea. Head, including the compound eyes, usually decidedly narrower than the pronotum. Vertex frequently much narrower than its length; sometimes protuberant; lateral margin strongly elevated. Frons elongate, sometimes distinctly angulate below the compound eyes, the lateral margins carinate, sometimes with intermediate carinae or a median carina, sometimes with both. Postclypeus with lateral margins carinate and a distinct median carina. Pronotum short and broad, tricarinate. Mesonotum short and broad, tricarinate; tegulae usually large. Tegmina coriaceous with venation conspicuous; elongate; costal and commissural margins nearly parallel, apical margin broadly rounded, sometimes nearly truncate, with supernumerary longitudinal and crossveins, costal cell with numerous cross-veins; claval veins united before the apex. Fore and middle tibiae generally compressed and expanded. Muir points out that the apical spines of the hind tibiae are arranged in a single apical row, or with some of the spines joined together to form a plate, or spines irregular, not forming an apical row, second segment of hind tarsi small, without apical spines.

In the male genitalia which I have studied the pygofer is usually short. The genital styles are large. The aedeagus is usually robust with a complicated set of apical spines. The tenth segment is elongate with the telson well developed. The female genitalia are incomplete."

The present worker has studied six species under two genera i-e., Pyrilla Stål and Pitambara Distant of the family Lophopidae from Pakistan. Of these two species are new to science.

Genus Pyrilla Stål

Pyrilla Stål, Berl. ent. Zeitschr. 111:326, 1859.

Type-species : Pyrilla protuberance Stål, 1859,
by subsequent designation.

Zamila Walker. Journ. Ent. 1:304, 1851.

Head and thorax

Head long, depressed, with subparallel lateral margins, narrowed and rounded anteriorly, or uniformly broad, and with almost truncated anterior tip, more or less than half of the anterior projection of head covered by vertex, carinae present ; head in profile raised dorsally towards anterior end; pronotum narrow, collar like, sometimes marked by punctures and patterns pronotum and scutellum tricarinate, carinae indistinct or missing.

Tegmina

stigma. absent; nearly uniformly broad throughout, somewhat expanded in apical region, costal and apical margins possessing a large number of cross veins, reticulation of veins present more or less up to the basal part.

Male genitalia

Anal segment, in lateral view, much longer than broad, possessing a lateral apical extension, more or less as long as the anal segment itself, directed ventr-

ad, apically ventral margin of anal segment and its extension sometimes sclerotized and thickened; pygofer, in lateral view, more or less like a rectangular-piece with postero-dorsal margin projected posteriorly forming an oblique angle with the posterior margin; aedeagus, in dorsal view, possessing a moderately long body, with two to three pairs of apical and subapical processes, usually spiny in form, directed variously; paramere, in lateral view, somewhat triangularly rounded, with posterior and ventral margins also rounded, overall length of paramere more than width, spinose process present in posterior half of the paramere, dorsal apical process indistinct.

Five species of the genus from Pakistan are treated in this account. Of these two are new to science. 1-e, Pyrilla punjabensis, n.sp., and Pyrilla rahimyarensis, n.sp., all species are associated with agricultural crops like sugarcane, millet, maize, paddy, grass, sorghum and wheat. Some are known as serious pests.

KEY TO THE SPECIES OF THE GENUS PYRILLA STAL

1. Cephalic process, in dorsal view, nearly uniformly broad throughout its length; vertex tricarinate, with central carina in the form of a double edged ridge ----- P. punjabensis, n.sp.

Cephalic process, in dorsal view, more or less narrowing towards anterior apex; vertex without central carina ----- 2.
2. Cephalic process lacking central carina; lateral carinae distinct, but incompletely developed in posterior part of the process---P. rahimyarensis, n.sp.

Cephalic process with a distinct central carina; lateral carinae absent or indistinct ----- 3.
3. Head with a transverse colour band between cephalic process and the vertex; in lateral view with brown colour striations on part of vertex, on cephalic process in front of eyes ----- P. pusana Distant.

Head without a transverse colour band between cephalic process and vertex; in lateral view without any striations in front of eyes ----- 4.
4. Tegmina with costal and apical veins more than 36; hind wing with costal and apical veins upto anal fold more than 16; connective twisted -----
----- P. perousilla Walker.

Tegmina with costal and apical veins less than 36; hind wing with costal and apical veins upto anal fold less than 16; connective straight -----
----- P. aberrans Kirby.

Pyrilla punjabensis, n.sp.
(Figs. 73 A-I)

Form and colour

Length of male 1.1 cm, of female 1.1 cm; head, projected in front, anterior projection formed by vertex and cephalic process, both equal in length, lateral margins of cephalic process nearly sub-parallel, and anterior tip broad and truncated, cephalic process and vertex tricarinate, head in profile with anterior tip broad and strongly curved upward; pronotum with distinct central carina, lateral carinae indistinct; scutellum lacking central carina, lateral carinae indistinct. General body colour pale yellow, tegmina yellowish white, apical and costal margins dotted with minute black and brown spots.

Tegmina, with costal cell, with 20 cross veins, apical cells 18; three longitudinal veins arising from basal cell, clavus without cross veins.

Male genitalia

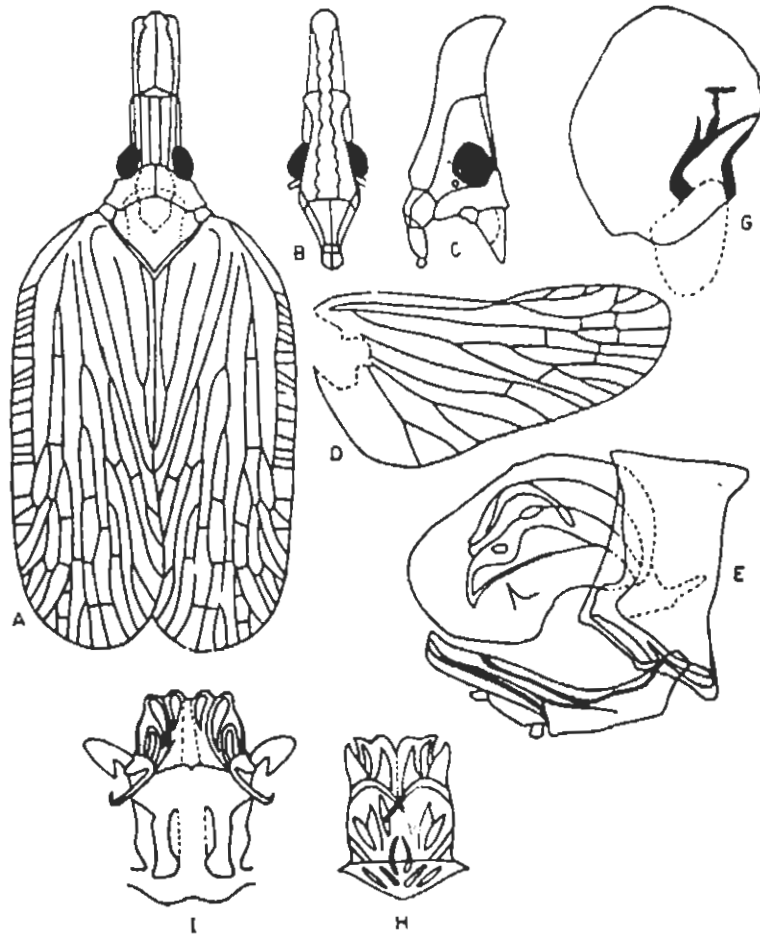
Anal segment, in lateral view, with sclerotized margin all along its ventral surface, as well as of posterior extension; pygofer in lateral view, with postero-dorsal angle not prominently projected aedeagus, in dorsal view, short and broad, with a complex body, with a pair of hook like spiny processes and

a pair of recurved lobes, both directed dorso-laterally;
paramere, slightly longer than broad, ventral margin convex, spinose process present.

Pyrilla punjabensis, n.sp., is different from its cephalic process, being uniformly broad through its length and truncated at apex, and the vertex and cephalic process being tricarinate, none of the other species of Pyrilla known from Pakistan possess similar carination, nor processes similar to cephalic process.

Type material

Holotype male, Kamokei, Punjab, Pakistan, sugarcane 14.IX.
paratypes several hundred specimens collected on sugarcane, maize and grass; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 73 A-I. *Pyrilla punjabensis*, n.sp., A: Body, dorsal aspect, 8x, B & C: Head, frontal and lateral aspects, 8x, D: Right hind wing, 8x, E: Male genitalia, lateral aspect, 32x, G: Left paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Pyrilla rahimyarensis, n.sp.
(Figs. 74 A-I)

Form and colour

Length of male 1.1 cm, of female 1.2 cm; head elongated in front, with median length of vertex and cephalic process nearly equal, cephalic process narrowed and rounded at apex, vertex possessing complete and cephalic process with incomplete lateral carinae; head in profile obliquely curved upwards towards anterior end; pronotum and scutellum tricarinate, frons much longer than clypeus, possessing incomplete lateral carinae; clypeus tricarinate. General body colour ochraceous pale; tegmina yellow, wings grayish pale.

Tegmina, with 10 crossveins in the costal cell; apical half with two transverse lines of cross veins; clavus lacking cross veins, number of apical cells, 22.

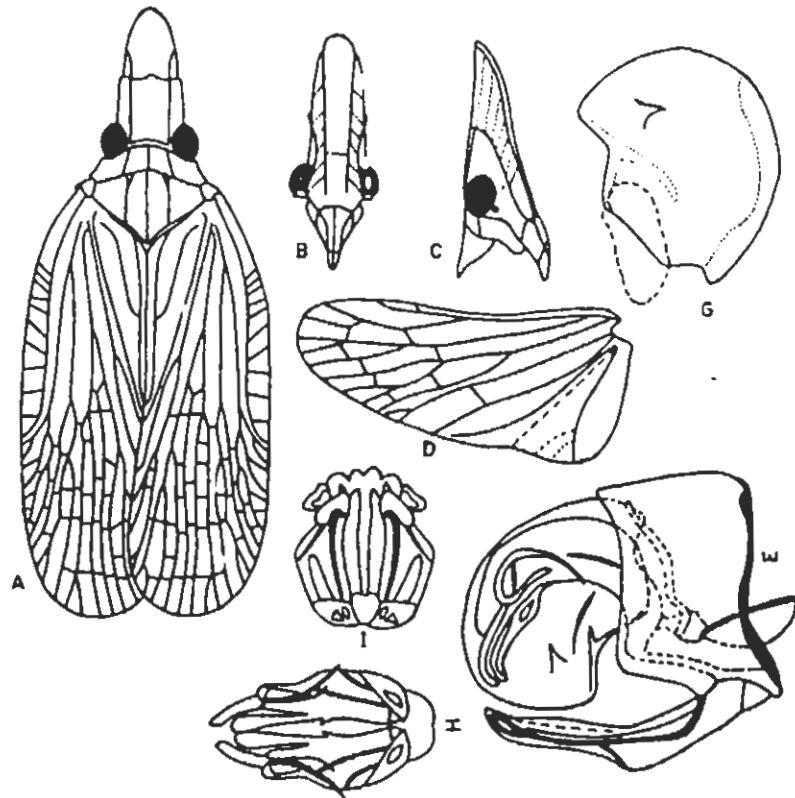
Male genitalia

Anal segment, with ventral surface sclerotized and thickened; pygofer with posterior margin slightly concave, postero-dorsal angle, broadly produced posteriorly; aedeagus, with a pair of subapical processes, both strongly recurved, tapered apically, directed dorsad; paramere, in lateral view, with strongly convex ventral margin, whole paramere appearing bowl shaped, spinose process near posterior margin, dorsal apical process indistinct.

Pyrilla rahimyarensis, n.sp., is close to P. pusana Distant, in the shape of paramere, and head, but differs in the carination, the appearance of head in profile and the shape of processes on aedeagus.

Type material

Holotype male, Rahimyarkhan , Punjab, Pakistan, 24.1.69. sugarcane ; allotype female, same data as of the holotype; paratypes 139 specimens with same data as of the holotype; 20 specimens on paddy, and 155 specimens on maize with same data as of the holotype; in Zoological Museum, University of Karachi, Karachi-Pakistan.

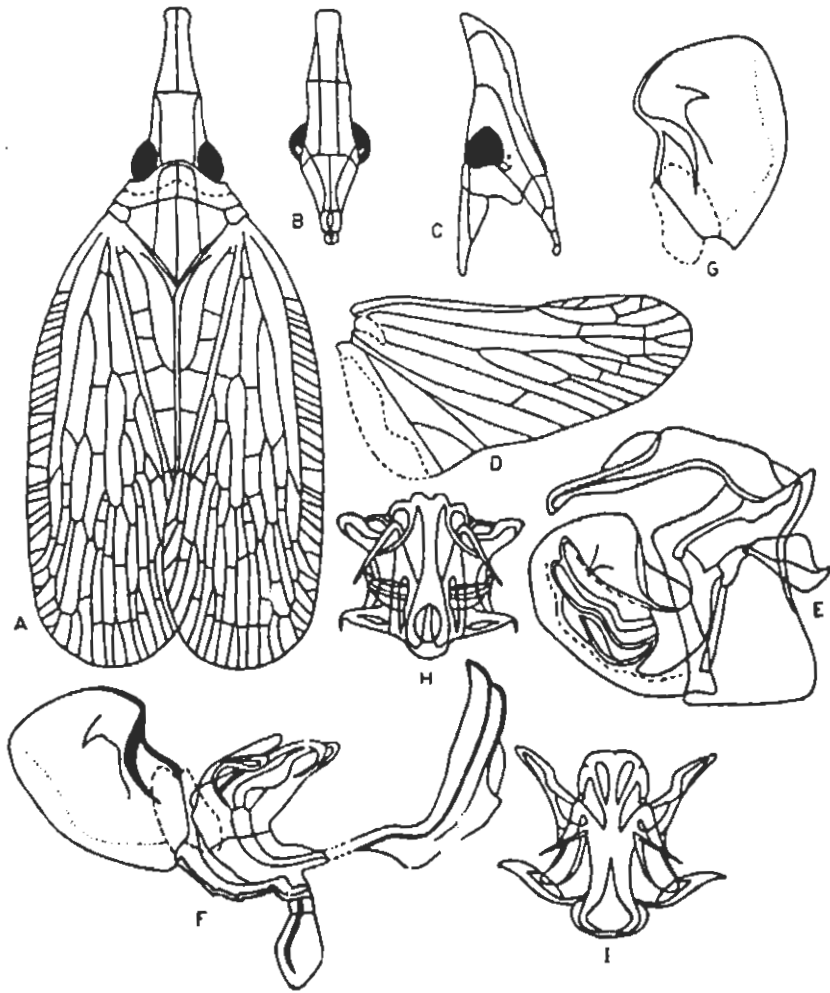


Figs. 74 A-I. *Pyrilla rahimyarensis*, n.sp., A: Body, dorsal aspect, 8x, B & C: Head, frontal and lateral aspects, 8x, D: Right hind wing, 8x, E: Male genitalia, lateral aspect, 32x, G: Right paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Pyrrilla perpusilla Walker
(Figs.75 A-I)

Pyrrilla perpusilla Walker
Pyrops perpusilla Walker. List Hom. 11:269, 1851.

The species is a well known pest of sugarcane in Pakistan and India, on the basis of studies by Qadri and Aziz (1943-50), Rahman and Nath (1940), Misra (1917), Khan and Khan (1967). During the present studies the species have been recorded from many localities of Pakistan in large numbers on sugarcane and millet.

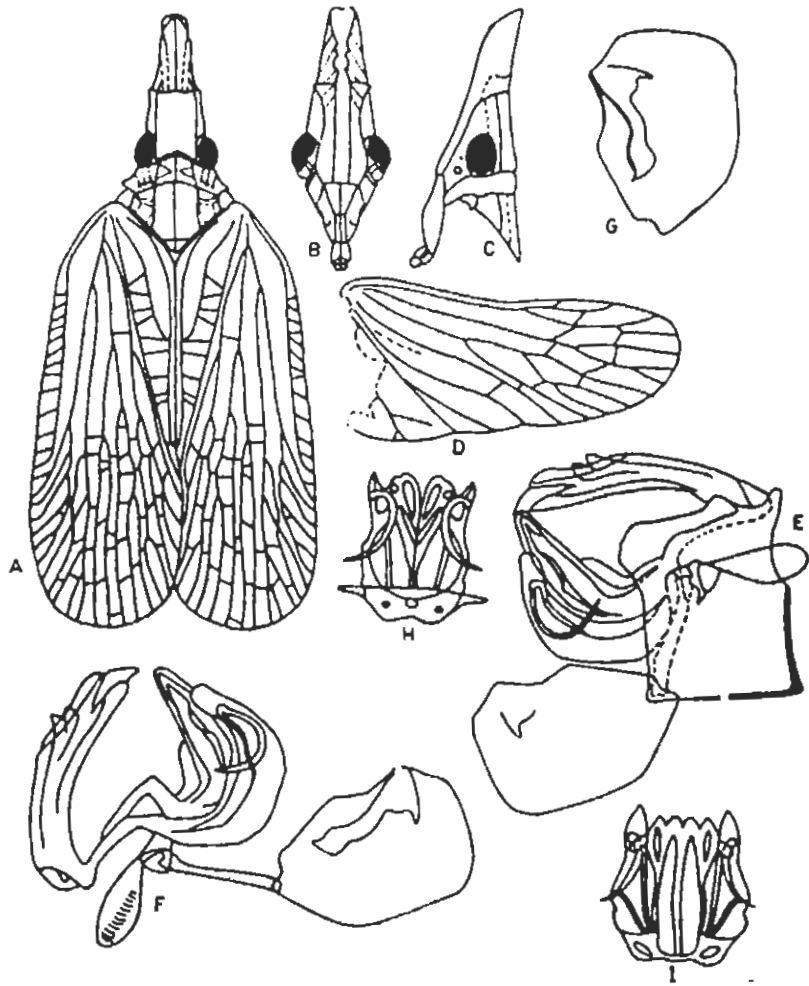


Figs. 75 A-I. *Pvrilla perpusilla*, Walker., A: Body, dorsal aspect, 8x, B & C: Head, frontal and lateral aspects, 8x, D: Right hind wing, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Right paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Eyrilla aberrans Kirby
(Figs. 76 A-I)

Microchoria aberrans Kirby. J. Linn. Soc. Zool. XXIV:148,
1891.

The species was redescribed by Distant (1906:326), Fennah (1963:728) described and critically compared with the species P. perpusilla and P. pusana Pruthi (1938). It was collected in large number from various localities of Punjab, Pakistan, and deposited in Zoological Museum, University of Karachi, bearing the following details: 399 specimens on sugarcane , 51, on lucern, 400 on paddy, 1159 on maize, 61 specimens on millet and 143 specimens on Jawar.

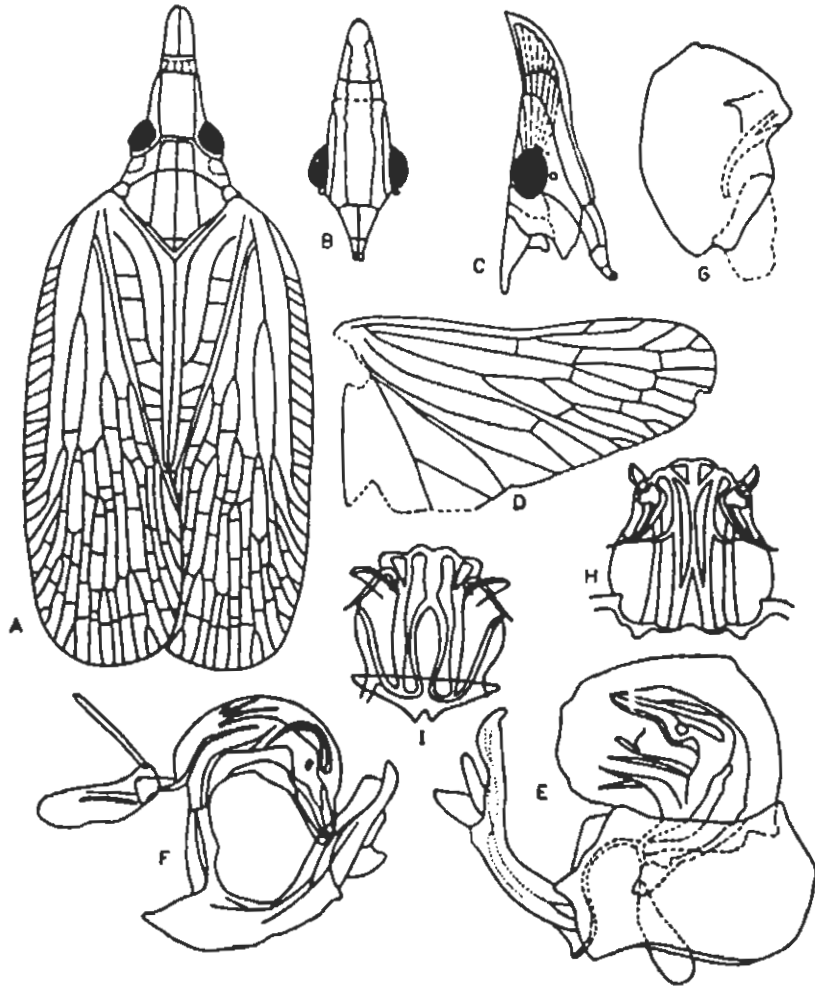


Figs. 76 A-I. Pvrilla aberrans, Kirby., A: Body, dorsal aspect, 8x, B & C: Head, frontal and lateral aspects, 8x, D: Right fore wing, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Right paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Pyrilla pusana Distant
(Figs. 77 A-I)

Pyrilla pusana Distant. A.M.N.H. (8) XIV:326, 1914.
by original designation.

This species is also a pest of paddy and sugarcane , in Pakistan and India as studied by Pruthi (1937), Qadri and Aziz (1943), Khan and Khan (1967), A few specimens of the species have been collected from various localities of Pakistan, on sugarcane , millet and maize, but several hundred specimens of the species were collected from rice growing areas of Punjab, Pakistan.



Figs. 77 A-I. *Pyrilla pusana*, Distant., A: Body, dorsal aspect, 8x, B & C: Head, frontal and lateral aspects, 8x, D: Right hind wing, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Right paramere, 32x, H & I: Aedeagus, dorsal and ventral aspects, 32x.

Genus Pitambara Distant

Pitambara Distant. Fauna Brit.India. 111:319, 1906.

Type-species : Pitambara radians Kirby, 1891 by original designation.

Distant (1906:319) described the external characteristics of the genus as below:

"Head (including eyes) narrower than pronotum; vertex moderately produced in front of eyes, moderately broad, its lateral margins a little laminately elevated, its disk somewhat concave; face much longer than broad, strongly angularly amplified posteriorly, its lateral margins (except on posterior area) laminately dilated, and with two carinae on each of their under surfaces; clypeus tricarinate; eyes beneath slightly sinuate; legs of moderate length, the anterior tibia moderately, not foliaceously dilated, the posterior tibia somewhat dilated with a single spine, the posterior tarsi with the basal joint incrassate; pronotum and mesonotum as in Elasmoscelis; tegmina somewhat short and broad, costal membrane broad (excluding base), distinctly obliquely transversely veined."

During the present studies only one known species of the genus, Pitambara montana Distant was recorded from Pakistan.

Pitambara montana Distant
(Figs. 78 A-F)

Pitambara montana Distant. A.M.N.H (8) 1X:188, 1912.

Form and colour

Distant (1916:83) described the form and colour of the species as below:

"Vertex very pale flavescent, the margins and two small spots at base brownish testaceous; pronotum flavescent, with a sublateral piceous spot on each side; mesonotum black, its apex flavescent; abdomen above piceous, the basal area and narrow segmental margins flavescent; body beneath and legs ochraceous, femora more or less annulated with piceous, tegmina hyaline, largely marked and suffused with piceous, the principal features of which are the basal area, a large spot before end of clavus and about apical third, the latter is oblique and does not reach the apex or apical margin, to the first of which it is connected by the two oblique stripes, the costal membrane is also obliquely, transversely fasciately marked with piceous; wings fuliginous; vertex with the lateral margins strongly ridged, moderately produced in front of eyes; face much longer than broad, posteriorly strongly angularly amplified, its lateral margins (except on posterior area) laminately dilated and with two carinae on each of their under-surface; clypeus centrally and laterally carinate; posterior tibia with a single spine."

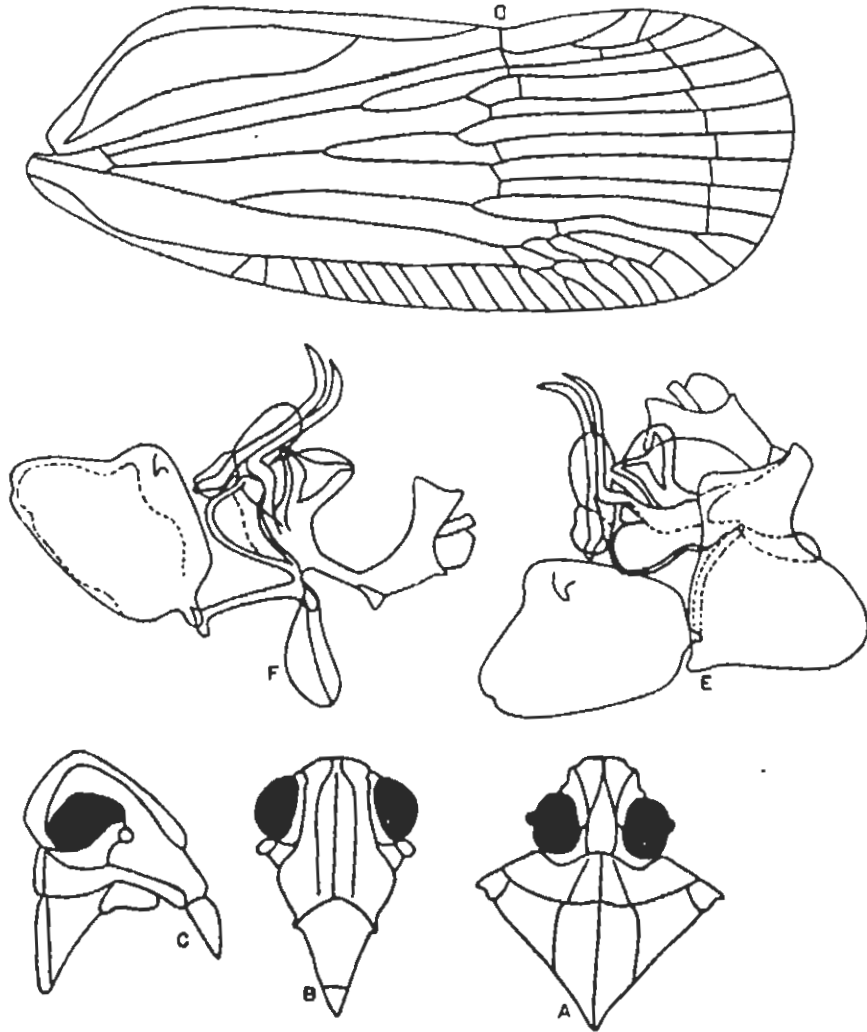
Male genitalia

Anal segment, moderate in length, its lateral extension nearly as long as the segment, apex of extension, in lateral view, broad and truncated; pygofer, in lateral view, broader than long, its dorsal part narrower

than the ventral; aedeagus, in lateral view, narrow at base, broad at apex, possessing a pair of aedeagal processes, arising mid ventrally, curved dorsad than caudad, processes spiny in appearance; paramere, in lateral view, nearly oblong, irregularly rounded posterodorsally, and postero-ventrally, broader at apex than at base, spinose process in postero-dorsal position.

Material Examined

One male, one female, specimens were studied from Chichawatni, Punjab, Pakistan, sugarcane, Anwar, 19.VI. 1974; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 78 A-F. Pitambara montana, Distant., A, B & C: Head, dorsal, frontal & lateral aspects, 8x, D: Left fore wing, 8x, E & F: Male genitalia, lateral aspects, 32x.

FAMILY ACHILIDAE STÅL

The family Achilidae was established by Stål (1866: 130) to include initially thirteen genera, which were formerly included in other families of the super-family Fulgoroidea. Fennah (1950) made a generic revision of the family on the basis of nearly 100 genera of the world and recharacterized the family. Some of the more important characteristics of the family Achilidae described by Fennah (1950:1-14) are reproduced below:

"..... members of the Achilidae show great differences between the extremes of body size. The large species are three and a half times as long as the smallest, All are relatively compact; The vertex is usually broader than long With the anterior margin more or less angulate or convex, and the disk slightly depressed, while the median carina is frequently obsolete or incomplete; The 'frons' (the deflexed portion of the vertex between the most anterior part of the head and the fronto-clypeal suture) is generally elongate, and together with the clypeus is elongate or ovate in outline The clypeus is triangular, more or less flat in profile, with the disk flat or slightly convex; the margins are carinate and usually a median carina is present; The rostrum is five segmented and usually terminates near the level of the post-coxae; the tip of the rostrum is always bluntly conical The genae, or sides of the head below the level of the eyes, are flat or slightly hollowed out. The antennae are remarkably uniform in the family: the basal joint is generally very short and ring-like This form of antenna is unique in Achilidae, The ocelli, always two in number, appear to be universally present; they vary slightly in position and may be widely separated from the eyes Above the ocelli is a pair of what appear to be placoid sensillae: these are not peculiar to Achilidae but are of

wide occurrence in the superfamily. The eyes are usually entire, round in side view and subovate, tapering anteriorly in dorsal view The pronotum is convex on the anterior margin and concave posteriorly its basal width very markedly exceed that of the head Below the lateral margins the pronotum is bent downward and twisted to face forward, and the shape of the lobes so formed The mesonotum is generally slightly broader than long and more or less distinctly tricarinate The tegulae are moderately large and bent through almost at right angle The post-tibiae are almost invariably armed The tegmina vary in relative size, proportions, outline, texture, and venation The costal margin is very slightly convex The apical margin is rounded or rounded-truncate The sutural margin obtusely angulate beyond the apex of the clavus. The clavus is distally truncate and the united claval veins (PCu+Al) enter its apex. The claval suture is sometimes traceable into cell Cu1b as a fold. The costal vein generally lies along the anterior margin..... The clavus is very uniform throughout the group, and the claval veins unite distad of its middle The tegmina are usually of a sober hue with brown, sepia, or deep fuscous pre-dominating; colour is not lacking in the family Wings are universally present and are rather larger than the tegmina. The margin is entire The abdomen is relatively short and depressed so as to appear transversely ovate in section. The sclerites are strongly pigmented brown. A pair of rectangular sclerites lies on each side between the tergite and the ventrite of segments 3 to 8. On the tergites of segments 6, 7, and 8 a pale transverse oval scar is visible: this on the inner wall appears as a short peg-like outgrowth. In the female all the tergites are transverse, but in the male those of segments 6 to 8 may be markedly V-shaped cephalad The anal segment is usually short and rounded in both sexes The pygofer is ring-like: it is normally produced into a short process in the middle of the hind ventral margin: the process may be entire and convex the phallobase is a broad submembranous tube with certain areas sclerotized; the phallus is reduced to a sclerotized ring around the external opening of the genital duct, with a pair of long subequal strip-like appendages which are usually minutely shagreened at the apex; The harpagones or genital styles, are relatively large, narrow basally and irregularly expanded distally:

their inner ventral margins are straight and apposed when at rest; the dorsal margins are produced into an eminence at the middle, while a vertical or curved spine may be present on the inner face near the base. A transverse bar connects the harpagones, and from its mid-point a long arcuate rod or tube extends to the apex of the ductus ejaculatorius."

During the present investigations one new species of the genus Epirama Melichar was studied from Pakistan and is being described here.

Genus Epirama Melichar

Epirama, Melichar. Hom. Fauna: Ceylon; 45, 1903.

Type-species : Epirama conspergata Melichar, (1903)
by original designation.

Fennah (1950:114) redescribed the genus Epirama as
below:

"Head with eyes distinctly narrower than pronotum, vertex not declivous, longer in middle line than broad across base (1.3:1), produced before eyes for two-third of their length, median carina distinct throughout, disk slightly depressed, anterior margin carinate, acutely convex (through 70), lateral margins straight, diverging basad, posterior margin shallowly excavate; frons longer in middle line than broad (1.7:1), widest part wider than base (2.7:1), basal margin convex, median carina distinct, percurrent, lateral margins carinate, weakly foliate laterally, straight to below level of antennae, thence slightly incurved, disk of frons slightly impressed on each side of median carina; clypeus about three-quarters of length of frons, medially and laterally carinate, rostrum with subapical segment shorter than apical, surpassing post-coxae, antennae sub-globose, not sunk in a depression, ocelli not touching eyes, eyes not overlapping pronotum. Pronotum moderately short, not quite as long behind eyes as in middle line, anterior margin of disk convex, posterior margin angulately excavate (110), median carina present, lateral carinae of disk convex, attaining hind margin, each about 1.2 times as long as median carina, pronotum laterad of disk not inclined anteroventrally or only slightly so, margins carinate between eyes and tegulae, ventral margin of lateral lobes oblique; mesonotum longer than vertex and pronotum combined, tricarinate; pro-tibiae equal to profemora with trochanters, post-tibiae unarmed or with a single spine basad of middle.

Tegmina 3.4 times as long as broad, costal margin slightly convex, sutural margin forming a re-entrant angle of about 160 at apex of clavus, Sc+R fork about level with Cur fork, Mforked at

level of node, Cur fork about level with union of claval veins, eight apical areoles around margin distad of stigmal cell; clavus terminating distad of middle of tegmen."

The genus Epirama is known from Pakistan on the basis of a doubtful record of E. conspergata Melichar by Khan and Quadri (1972).

Epirama mirpurensis, n.sp.
(Figs. 79 A-G)

Form and colour

Length of male 4.0 mm, of female 4.0 mm; head very slightly produced in front of eyes; median length of vertex nearly equal to width across base, vertex roughly triangular in shape, i.e., diverging posteriorly and converging towards anterior tip, and pronotum with distinct central carina; scutellum tricarinate; pronotum collar shaped, posterior margin concave, nearly angulate in middle, anterior margin of pronotum with a broad blackish band, each lateral half of pronotum, possessing three rounded, prominent, equally spaced, black spots; frons narrowed posteriorly, widening anteriorly, bulging-out in an arc shaped manner beyond mid-length, median length nearly equal to transverse width, but much more than the median length of clypeus. General body colour dark brown dorsally, and pale ventrally.

Tegmina, more than 3 times as long as wide, apex smoothly rounded, apical one third, somewhat curved towards posterior margin, veins Sc, R forked at about mid-length of tegmina; vein M forked at level of node, apical cells 9+ nodal cell; clavus longer than half the length of tegmina.

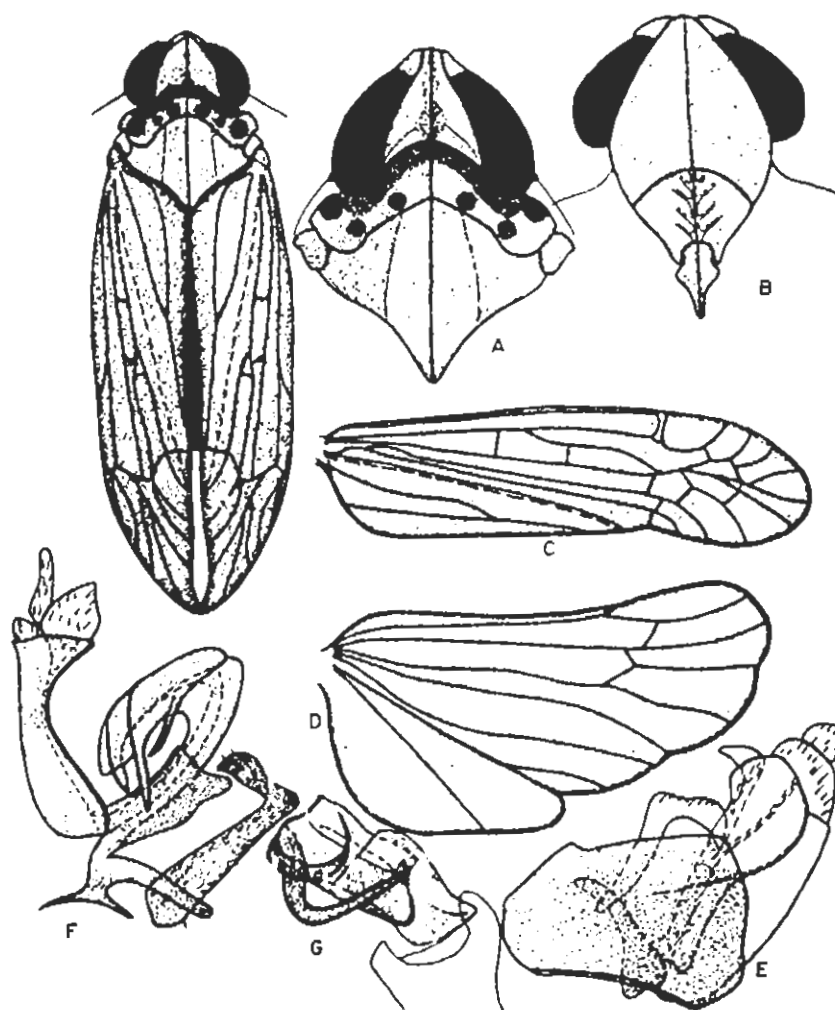
Male genitalia

Anal segment, elongate, in lateral view, with ventral margin prominently sinuate; pygofer, in lateral view, broad; roughly rectangular in shape, somewhat narrow dorsally, broad ventrally, with posterior margin flattened; aedeagus, in lateral view, tubular in shape, with two pairs of spiny processes on lateral sides of the membranous body, aedeagus curved, first dorsad, and then immediately cephalad, taking a 'V' shaped form; paramere, in lateral view, narrow throughout its length, curved dorsad in apical one third, forming an elbow-type dorsal apical process.

Epirama mirpurensis, n.sp., can be compared to only other species recorded from Pakistan. i.e., E. conspergata Melichar, from which it differs in the shape of tegmina and head. The male genitalia, particularly the paramere as described by Khan and Qadri (1972) is quite different from the paramere of E. mirpurensis.

Type material

Holotype male, Mirpurkhas, Sind, Pakistan, Qadri, bamboo, 26.VII.1973; allotype female, with same data as of the holotype; paratypes 646 specimens recorded on grass, millet, bamboo, collected by Ramzan, Shujaat, Khalid, Qadri (1971-1973); in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 79 A-G. *Epirama mirpurensis*, n.sp., A: Body, dorsal aspect, 8x, B: Head, frontal aspect, 8x, D: Right fore and hind wings, 8x, E & F: Male genitalia, lateral aspects, 32x, G: Aedeagus, lateral aspect, 32x.

FAMILY TROPIDUCHIDAE STÅL

The family Tropiduchidae is one of the smaller families of Fulgoroidea . It was recognized as a sub-family by Stål (1866). Walker (1851) and Distant (1906) worked on the Fauna of Oriental region. Melichar (1914) monographed the family and described large number of genera and species from all parts of the world. Latter on Metcalf (1954) listed 106 genera and 280 species, and characterized the family as below:

"Head narrow, usually distinctly produced, the cephalic process usually short, triangularly or obtusely produced, sometimes elongate, slender; pronotum short, tricarinate; mesonotum large, tricarinate; tegmina and wings typically transparent, the former commonly with a basal area with few or no crossveins in the costal cell and an apical membrane with numerous crossveins most frequently arranged in one or two definite subapical lines. The family Tropiduchidae belongs to a different section of the superfamily Fulgoroidea and has the second hind tarsus small with a distinct spine on each side, not large with a crown of small spines at the apex as in the Dictyopharidae.

Head narrower than the pronotum, frequently produced. The crown usually flat, with lateral margins and median line carinate; in the Tribe Peggiogini the head is produced into a long cylindrical process. The frons with the lateral margins elevated, and median carina percurrent or nearly so. The postclypeus with a median carina, usually percurrent. The compound eyes subglobose with the ventral sinus poorly developed. The antennae are relatively inconspicuous with the first segment small; the second segment larger, subglobose or terete; flagellum not very long. Paired ocelli small, usually in front of the compound eyes above the bases of the antennae.

The pronotum is typically short, tricarinate,

distinctly projecting cephalad and triangularly incised on the posterior margin; the lateral margins usually distinctly bicarinate, widening gradually from the narrower anterior margin to the broader posterior margin. Mesonotum large, quadrangular, tricarinate. Tegulae large. Tegmina large, usually transparent; in the Tribe Hiracini the tegmina are subhyaline or leathery; main veins usually simple or bifurcate before the apical membrane; costal cell in some cases with numerous crossveins; in the Tribe Alcestini subcosta has several supernumerary bifurcate veins to the costal margin; apical area with one or two subapical lines, wanting in most genera of the Tribes Hiracini and Tripetimorphini. The venation of the hind wing is sometimes simple with the principal veins bifurcate before the apical margin, in other cases Cul has several irregular veins. The anal area is usually large with simple veins.

The abdomen is relatively large, somewhat depressed typically. The male genitalia have the pygofer moderate; the anal segment elongate; the anal styles usually small; the aedeagus is usually large and complex; and the genital styles are sometimes asymmetrical."

During present studies only the genus Antabhoga is described.

Genus Antabhoga Distant

Antabhoga Distant. A.M.N.H. (8) 1X:185, 1912.

Type-species : Antabhoga gardineri Distant, by original designation.

Distant (1916:48) described the genus Antabhoga as below:

Head (including eyes) narrower than pronotum, vertex very short and broad, conically rounded in front, the anterior margin strongly upwardly ridged, finely centrally carinate; face longer than broad, a little widened towards clypeus, both strongly centrally carinate, lateral margins of face upwardly ridged; pronotum a little longer than vertex, posterior margin strongly sub-angulately emarginate, distinctly centrally carinate, anterior margin carinately ridged; mesonotum longer than vertex and pronotum together, centrally tricarinate, the lateral carinations united anteriorly; abdomen moderately broad and short; posterior tibiae with three spines; tegmina about or nearly three times as long as broad, costal membrane with numerous oblique veins, a transverse, rounded series of subapical veins enclosing short apical cells, and a nearly straight series of transverse veins beyond middle enclosing narrow elongate subapical cells."

Only one known species of the genus Antabhoga Distant is recorded from Pakistan.

Antabhoga gardineri Distant
(Figs. 80 A-G)

Antabhoga gardineri Distant. A.M.N.H. (8) 1X:185, 1912.

Form and colour

Distant (1916:49) described species as below:

Almost uniformly brownish ochraceous; wings fuliginous; the carinations and carinate margins to the head and thorax above distinctly paler in parts; extreme costal and apical margins of tegmina ochraceous, the apical area also slightly mottled with ochraceous; legs ochraceous; other characters as in generic diagnosis."

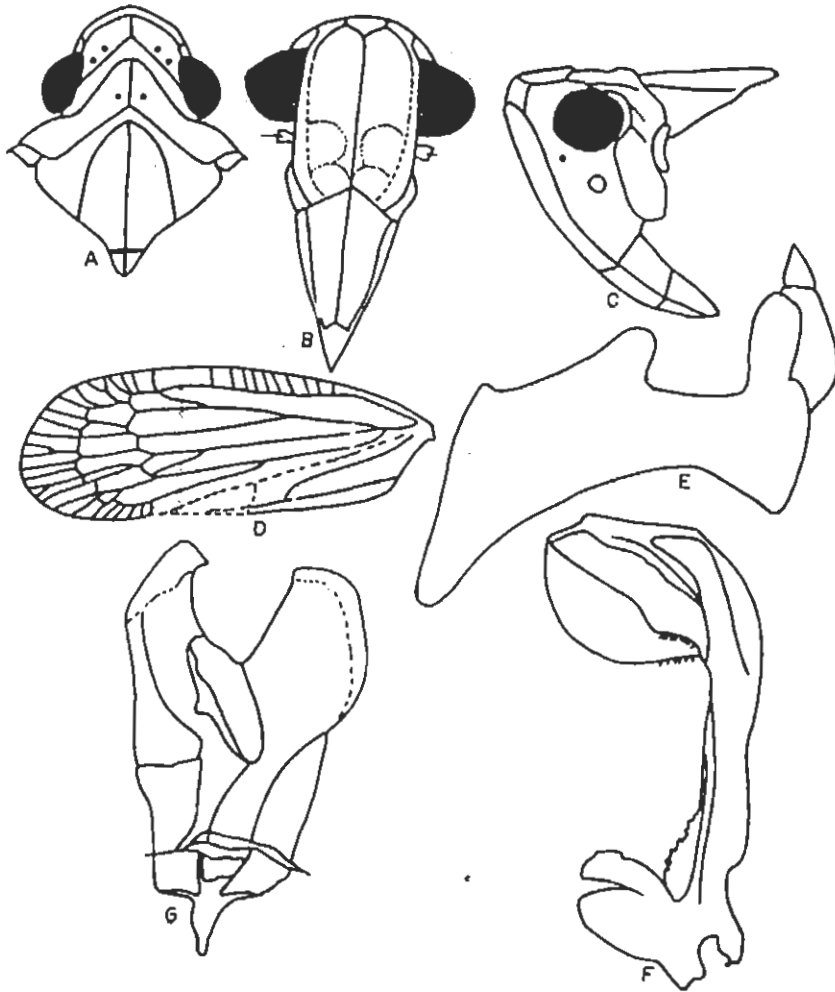
Male genitalia

Anal segment, elongate in lateral view, extending behind pygofer; pygofer, in lateral view, dorsally strip like, ventrally broad, with posterior margin with two prominent projection dorso-laterally; aedeagus, elongated, basal two third narrow, apical one third broadly rounded, recurved cephalad, broad, leaflike, margins serrated, serration directed dorso-cephalad; paramere, elongated, basally narrow, apically broad, ventrally united up to two third of the whole length, apices acute, dorsal process absent, a single stout spinose process arising laterally at middle, directed ventro-caudad.

Material Examined

Two males, one female, Lyallpur, Punjab, Pakistan,

M. Anwar, grass, 7.VII.1972; in Zoological Museum, University of Karachi, Karachi-Pakistan.



Figs. 80 A-G. Antabhogia gardineri, Distant., A, B & C: Head, dorsal, frontal and lateral aspects, 8x, D: Left fore wing, 8x, E: Pygofer, lateral aspect, 32x, G: Paramere, lateral aspect, 32x, F: Aedeagus, lateral aspect, 32x.

CHECK LIST OF THE GENERA & SPECIES
OF THE FAMILIES OF THE SUPERFAMILY
FULGOROIDEA RECORDED FROM PAKISTAN
AND ADJOINING TERRITORIES.

(as taken from Metcalf, 1954, and Zoo. Record since)

FAMILY DICTYOPHARIDAE SPINOLA 1839.

- Afronersia quettensis*, n.sp., Pakistan.
 ramzani, n.sp., Quetta, Pakistan.
- Aluntia ramosa*, (Melichar 1903): Ceylon.
- Awaramada fryeri*, Distant 1914: Ceylon.
- Centromeria cephalica*, Distant 1906: Madras, India.
 manchurica, Kato 1932: China: Manchuria.
 simulata, Distant 1906: Assam, India.
 speilinea, Walker 1875: Tenasserim, India.
 viridistigma, Kirby 1891: Ceylon.
- Chanithus gramineus*, Fabricius 1803: Bengal, Sikkim,
 Afghanistan, India,
 Ceylon, China, Pakistan.
- palidus*, Donovan 1800: Iran, Afghanistan,
 Ceylon, India, China,
 USSR.
- Chiltana baluchi*, n.sp.: Chiltan, Mastung, Baluchistan,
 Pakistan.
- Coppidius semidesertus*, (Mitjaev 1967): USSR: Kazakhstan.
- Dichoptera hampsoni*, Distant 1892: India, Ceylon.
 hyalinata, Fabricius 1781: Bengal, Assam,
 India, Ceylon.
- strigivitta*, Walker 1858: Assam, India.
- Dictyophara abrupta*, n.sp.: Karachi, Pakistan.
- albata*, Dlabola et Heller 1962: Iran,
 Baluchistan.
- albitvitta*, Walker 1851: N. Bengal.
- amaranthusae*, n.sp.: Swat, NWFP, Pakistan.
- anwari*, n.sp.: Karachi, Pakistan.
- asiatica*, Melichar 1912: Iran, USSR.
- asperae*, n.sp.: Kaptai, Bangladesh.
- avoetta*, Oshanin 1879: Iran, USSR: Azerbaijan.
- balakotensis*, n.sp.: Balakot, NWFP, Pakistan.
- centroasiatica*, (Dubovsky 1966): USSR: Tadzkistan.
- cephalolineata*, n.sp.: Murree, Pakistan.
- cephalorobusta*, n.sp.: Gujranwala, Pakistan.
- coimbatorensis*, Distant 1914: Madras,
 Coimbatore,
 India.
- colombonis*, Matsumura 1940: Ceylon.
- constricta*, n.sp.: Islamabad, Punjab,
 Pakistan.
- cummingi*, Distant 1906: Bengal, Karachi,
 Calcutta, India,
 Pakistan.

- dixonii, Distant 1906: Hyderabad, Bengal,
India.
- europaea, (Linnaeus 1767): Pakistan, India,
Afghanistan,
USSR, S. Iran.
- exoptata, Dlabola et Heller 1962: S. Iran,
Baluchistan.
- flavocostata, Jacobi 1943: China: Manchuria.
- gramineus, Fabricius 1803: India, N. Bengal.
- greenii, n.sp.: Lyallpur, Pakistan.
- hastata, (Kusnezov 1929): USSR: Uzbekistan.
- hoberlandtii, Dlabola 1974: Iran, USSR.
- insculpta, Walker 1858: Oriental, N. China.
- iranica, Linnavuori 1962: Iran: Baluchistan.
- karachiensis, n.sp.: Karachi, Pakistan.
- kaszabi, Dlabola 1967: Afghanistan.
- lineata, Distant 1912: Murree, India,
Pakistan.
- lobosa, n.sp.: Hyderabad, Pakistan.
- longirostris, Walker 1851: USSR: SSR.
- lyallpurensis, n.sp.: Lyallpur, Punjab,
Pakistan.
- manchuricola, Matsumura 1940: USSR: Manchuria.
- mianiensis, n.sp.: Miani Forest,
Pakistan.
- minuta, n.sp.: Faisalabad, Pakistan.
- multireticulata, Mulsant et Ray 1858: USSR: SSR.
- nakanonis, Matsumura 1910: China: Manchuria.
- nekkana, Matsumura 1940: China.
- nilgiriensis, Distant 1906: Hyderabad,
Sikkim, India,
Pakistan.
- orangica, n.sp.: Balakot, Pakistan.
- pallida, Walker 1851: N. India, Pakistan, Ceylon.
Abbottabad, Kohat.
- pannonica (Germar 1930): China, USSR.
- patruelis, (Stål 1859): Oriental, China,
USSR: SSR.
- pehshawerensis, n.sp.: Peshawar, Pakistan.
- pirawalensis, n.sp.: Pirawala, Pakistan.
- qummari, n.sp.: Pakistan.
- sacchari, n.sp.: Pakistan.
- sativae, n.sp.: Multan, Pakistan.
- sauropsis, Walker 1862: Bengal, India.
- scolopax, Oshanin 1879: USSR: Uzbekistan.
- seladonica, Melichar 1912: USSR: SSR.
- sindensis, n.sp.: Hyderabad, Pakistan.
- sinica, Walker 1851: Assam, Pakistan, India, China.
- spinosa, n.sp.: Mymensingh, Bangladesh.
- striata, Oshanin 1879: China, USSR: SSR.
- tangiharua, Dlabola 1957: Afghanistan.
- tomon, Matsumura, 1940: China: Manchuria.
- walkeri, Atkinson 1886: N. India.
- zeae, n.sp.: Lalsohanar, Bangladesh.

- Dictyopharina consanguinea*, Distant 1906: Tenasserim,
Indo-China,
India.
viridissima, Melichar 1903: India, Bombay,
Madras, Ceylon.
- Dorysarthrus mobilicornis*, Puton 1895: Iran.
sumakovi, Oshanin 1908: Iran, USSR: Turkmenia.
- Electryone aeruginosa*, Jacobi 1943: China: Manchuria.
- Elysiaca chomutovi*, (Oshanin 1929): USSR: SSR.
elliptica (Oshanin 1871): USSR.
ferganensis, (Oshanin 1912): USSR: Fergana.
fusca (Oshanin 1879): USSR: Kazakhstan.
kiritschenkoi, (Oshanin 1913): USSR: SSR.
kusnetsovi, Emeljanov 1972: USSR.
oshanini, Emeljanov 1972: USSR.
rudrata, Emeljanov 1972: USSR.
sclerosa, Emeljanov 1972: USSR.
similis, (Oshanin 1879): USSR: SSR.
- Gilgitia lobata*, n.sp.: Gilgit, NWFP, Pakistan.
- Haumavarga fedtschenkoi*, (Oshanin 1879): USSR: SSR.
- Kumlika desertorum*, (Oshanin 1913): USSR: SSR.
recurviceps, Oshanin 1913: USSR: SSR.
surda, (Oshanin 1913): USSR: SSR.
- Mesorgerius altaicola*, Vilbaste 1965: USSR.
emammosus, Emeljanov 1972: USSR: SSR.
monticola, Vilbaste 1980: USSR.
rysakovi, Kusnezov 1933: USSR: SSR.
tshujensis, Vilbaste 1965: USSR: Altai.
zaisanensis, (Kusnezov 1933): USSR.
- Miasa smaragdilinea*, Walker 1857: Tenasserim, India.
- Neommatissus typicus*, Distant 1916: S. India.
- Neoputala capitata*, Distant 1914: Indo-China.
- Nymphorgerius alboniger*, Emeljanov 1972: SSR.
angustipes, Emeljanov 1972: SSR.
auriculatus, Emeljanov 1972: SSR.
balchanicus, Emeljanov 1978: SSR.
bucharicus, (Oshanin 1912): SSR.
clariceps, Emeljanov 1972: SSR.
convergens, Emeljanov 1972: Iran.
dimorphus, (Oshanin 1879): USSR: SSR.
eburneolus, Emeljanov 1978: SSR.
emeljanovi, Dlabola 1979: Iran.
fuliginosus, Emeljanov 1972: SSR.
grigorievi, (Oshanin 1912): SSR.
gussakovskii, (Kusnezov 1933): SSR.
horvathi, Oshanin 1913: SSR.
ivanovi, Kusnezov 1928: SSR.
korolkovi, (Oshanin 1879): SSR, Pakistan, India.
longiceps, (Oshanin 1879): SSR.
medius, (Oshanin 1879): SSR.
mullah, Dlabola 1979: Iran.
oxianus, (Oshanin 1913): SSR.
plotnikovi, Kusnezov 1939: SSR.

- reuteri, (Oshanin 1879): SSR.
rotundus, Kusnezov 1939: SSR.
skobelevi, (Oshanin 1879): USSR:SSR.
stali, (Oshanin 1879): SSR.
transcaucasicus, Sidorski 1938: SSR.
- Orgamarella* lata, Emeljanoev 1969: SSR.
oblonga, Emeljanoev 1969: SSR.
- Orgerius* ellipticus, Oshanin 1871: SSR.
chomutovi, Oshanin 1879: SSR.
- Orthopagus* lunulifer, Uhler 1896: India.
splendens, (Germar 1830): E.India, Bombay,
China, Ceylon.
- Ototettix* auritus, Oshanin 1913: SSR.
jaxartensis, Oshanin 1913: SSR.
orbicularis, Oshanin 1913: SSR.
- Padanda* atkinsoni, Distant 1906: Sikkim.
- Paranagnia* fuminervis, (Lethierry 1892): India.
- Phyllorgerius* jacobsoni, Oshanin 1913: SSR.
- Fibrocha* egregia, Kirby 1891: Ceylon.
- Putala* brachycephala, Distant 1906: Bombay, Hyderabad,
India, Pakistan.
hazarensis, n.sp.: Hazara, Pakistan.
maculata, Distant 1906: Bombay, Madras, India.
rostrata, Melichar 1903: Hyderabad, Hazara,
Pakistan, Ceylon, India.
rugosa, n.sp.: Abbottabad, NWFP, Pakistan.
- Scirtophaca* bungei, Emeljanoev 1972: SSR.
candidatus, Emeljanoev 1972: SSR.
evoluta, Emeljanoev 1972: SSR.
narynensis, Emeljanoev 1972: SSR.
subtilis, Emeljanoev 1972: SSR.
tianshanskyi, (Oshanin 1913): SSR.
uralensis, Emeljanoev 1972: SSR.
- Saigona* fulgoroides, (Walker 1858): China.
ishidae, (Matsumura 1905): Bengal, China:Manchuria.
ussuriensis, (Lethierry 1878): India, USSR:Maritime.
- Sphenocratoides* longiceps, (Oshanin 1879): Punjab.
- Sphenocratus* akakius, Emeljanoev 1972: USSR.
barbanigra, Emeljanoev 1972: SSR.
floridus, Emeljanoev 1972: SSR.
griseus, Emeljanoev 1972: SSR.
hastatus, Oshanin 1912: SSR.
heptapotamicus, (Oshanin 1913): SSR.
lukjanovitshi, (Kusnezov 1933): SSR.
megacephalus, (Oshanin 1879): SSR, China.
palaeomastodon, Kusnezov 1927: SSR.
reticulatus, (Oshanin 1913): SSR.
rugosus, Emeljanoev 1964: SSR.
septentrionalis, (Oshanin 1913): SSR.
tarbagataicus, Emeljanoev 1972: SSR.
- Sphenocratoides* longiceps, (Oshanin 1879): Punjab, Pakistan.
- Symplana* viridinervis, Kirby 1891: India, Ceylon.
- Taosa* suturalis, Germar 1830: India.

- Thanatodicty figurata, Singh Fruthi 1925: India.
lineata, Donovan 1800: India, Assam, Bengal.
Tigrahauda ototettigoides, (Oshanin 1913): SSR.
semiglabra, Emeljancev 1972: SSR.
tiarata, Oshanin 1908: USSR, SSR.
zarudnyi, Oshanin 1913: SSR.
Viridophara angulata, n.sp.: Quetta, Pakistan.
carinata, n.sp.: Gujranwala, Pakistan.
cynodonae, n.sp.: Gujranwala, Pakistan.
tschitralica, (Dlabola 1954): China, Hindu-
Kash, Korakuram,
Kashmir, Gujranwala.

FAMILY FLATIDAE SPINOLA 1839

- Adelidoria glauca, Walker 1851: Ceylon.
Anaya ambrosa, Melichar 1902: India.
mesochlora, Walker 1951: Tenasserim.
nicobarensis, Distant 1910: Narcondam.
nigropunctata, Distant 1916: India.
proxima, Melichar 1902: Ceylon.
tumida, Melichar 1902: India.
Anggira typica, Distant 1906: India.
Atracis atkinsoni, Distant 1912: Ceylon.
clypeata, Distant 1914: Ceylon.
consanguinea, Distant 1906: Ceylon.
conspurcata, Melichar 1902: Ceylon.
cretacea, Distant 1906: Malabar, India.
dissimilis, Distant 1914: Madras, India.
emersoniana, Walker 1858: Ceylon.
erosipennis, Stal 1858: Ceylon.
facialis, Distant 1912: Ceylon.
fimbria, Walker 1851: Ceylon, Assam, Bangal.
greeni, Distant 1912: Ceylon.
haragamensis, Distant 1912: Ceylon.
himalayana, Distant 1906: Himalaya.
indica, Walker 1851: India, Ceylon, S.China.
insurgens, Melichar 1902: India, Assam.
moelleri, Distant 1906: Bengal.
munita, Melichar 1912: Ceylon.
nalandensis, Distant 1914: Ceylon, Assam.
nietneri, Stal 1858: Ceylon.
perplexa, Walker 1858: Ceylon.
sadeyana, Distant 1912: India.
pruinosa, Walker 1858: N.China.
Bahufolata fimbria, Walker 1851: Assam, Sylhet, Himalaya,
Ceylon.
insurgens, Melichar 1902: Assam, Khasi Hills,
Ceylon, Bangladesh...

- moelleri, Distant 1906: Bengal, Darjeeling.
nalandensis, Distant 1914: Assam, Ceylon.
punctata, Dlabola 1979: Iran, Baluchistan.
sadeyana, Distant 1912: India.
- Berisa atratula, Melichar 1902: Iran; Makran, Kahuran.
Bochara nebulosa, Distant 1906: Ceylon.
parva, Kirby 1891: Ceylon.
- Bythopsyrrna circulatata, Schmidt 1844: India.
Cerynia albata, Stål 1854: India.
lineola, Melichar 1901: Assam, S.China.
maria, White 1846: Bengal, Sylhet, Sikkim, Assam,
Karachi, Pakistan, Bangladesh,
S.China, India.
- Chaprina nigromaculata, Distant 1911: Pakistan, India.
Chaturbuja comma, Walker 1851: Sylhet, Assam, India.
Cisatra serva, Melichar 1902: Sikkim.
- Colobesthes falcata, Guerin and Meneville 1834: Indian
Archipelago.
semanga, Distant 1892: India, Indian Archipel-
ago.
taprobana, Kirkaldy 1900: Ceylon.
- Copsyrrna maculata, Guerin and Meneville 1829: Sylhet,
Assam,
Perak.
- Cryptoflata guttularis, (Walker 1857): Assam, Karen Hills,
Khasi Hills, N.China,
India.
- Danavara latipennis, Kirby 1891: Ceylon.
tennentina, Walker 1858: Ceylon.
- Derisa atratula, Melichar 1902: Iran, Baluchistan.
Epormenis turbatensis, n.sp.: Turbat, Pakistan.
Eurima astuta, Melichar 1902: Iran.
Exoma medogensis, Chou et Lu 1981: China.
- Farona ferrugata, Fabricius 1803: Punjab, Kashmir, N.
Bengal, Bangladesh,
India.
fuscipennis, Melichar 1902: Assam.
stellaris, Fabricius 1775: E.India, Bengal, Swat,
Pakistan.
- Flata ferrugata, Fabricius 1803: E.India, Pakistan,
Bengal, Hazara, Ceylon,
Nepal, Calcutta, Kash-
mir, China.
obscura, Fabricius 1775: India.
ocellata, Fabricius 1775: Ceylon.
stellaris, (Walker 1851): E.India, Ceylon, Bengal.
- Flatida bombycoides, Guerin & Meneville 1844: Bombay,
Malabar,
India.
deltotensis, Kirby 1891: Ceylon.
flaccida, Walker 1858: India.
inornata, Walker 1851: Assam, India, Tenasserim.
intacta, Walker 1851: Bengal, Sylhet, Assam,
India, S.China.

- linibata, Fabricius 1781: Assam, India, E.India.
marginella, (Olivier 1791): Assam, HazariKhel,
Bangladesh, Sikkim,
N.India, S.China,
Ceylon.
- melichari, China 1925: Indo-China.
montivaga, Distant 1872: Chittagong Hill tracts,
Bangladesh, Pakistan,
India.
- pallida, Olivier 1791: India, Alikong, Pablakheli,
Bangladesh.
- rubicunda, Distant 1883: Tenasserim.
tricolor, White 1846: Assam, E.India.
viridula, (Atkinson 1889): Sikkim, Bombay, Poona,
Travancore, India.
- Flatoides servus, Melichar 1902: Sikkim,
Flatosoma diastola, Schmidt 1909: Assam.
comma, Melichar 1901: Assam.
- Forculus peculiaris, Distant 1912: Ceylon.
gibbosus, Distant 1916: Ceylon.
- Forculusoides rubronervis, Distant 1918: Ceylon.
- Gaja definitiva, Distant 1906: Ceylon.
facialis, Distant 1906: Ceylon.
inconspicua, Kirby 1891: Ceylon.
subtilis, Melichar 1902: Ceylon.
- Geisha distinctissima, (Walker 1858): N.China.
Gomeda abdominalis, Kirby 1891: Nilgiri Hill, Madras, Ceylon.
- Hansenia glauca, Kirby 1891: Ceylon.
- Hilavrita discolorata, Distant 1912: Bengal, India.
fatua, Melichar 1903: Ceylon.
obliqua, Distant 1912: Ceylon.
trimaculata, Distant 1906: Ceylon.
xizangensis, Chou et Lu 1981: China: Xizang.
- Idume plicata, Melichar 1902: Ceylon, India.
- Ketumala bisecta, Kirby 1891: India, Ceylon.
farinosa, Distant 1912: Punjab, India, Ceylon.
fuscomarginata, Distant 1916: India.
nigropunctata, Distant 1916: India.
shahdaraensis, n.sp.: Shahdara, Pakistan.
sinuata, Distant 1912: Ceylon.
thea, Chauri 1971: India, Coimbatore, Chinchona.
truncata, n.sp.: Abbottabad, Rawalpindi, Changa-
manga.
- Lawana candida, Fabricius 1798: Indo-China, India.
conspersa, Walker 1851: Bengal, India, Sikkim,
Ceylon, Assam, China.
imitata, Melichar 1902: Indo-China.
optata, Melichar 1902: Indo-China.
radiata, Distant 1906: Assam, Cachar.
- Lechaea dentifrons, Guerin and Meneville 1844: India,
Bombay,
Madras.

- Melicharia dalbergiae*, n.sp.: Ghoragali, Pakistan.
doddi, Distant 1910: Ceylon.
greeni, n.sp.: Chichawatni, Changamanga,
Pakistan.
huangi, Chow et Lu 1981: China.
imtiazi, n.sp.: Murree, Pakistan.
lactifera, (Walker 1851): Bengal, E.N & S.India,
Ceylon.
lahorensis, n.sp.: Lahore, Pakistan.
lutescens, (Walker 1858): India; Pakistan.
- obtusangula*, Distant 1912: Travancore, India,
Trevandrum, Ceylon.
obtusanguloides, Ghauri 1973: Coimbatore,
Chinchona, Manjo-
lai.
prasina, Schmidt 1904: Ceylon.
quadrata, Kirby 1891: Assam, India, Ceylon.
sinhalana, Kirkaldy 1900: Ceylon, India.
viridis, n.sp.: Karachi, Islamabad, Abbottabad,
Shahdara, Sukkur, Tandoalayar,
Ghoragali, Thatta, Pakistan.
- Mesophantia pallens*, Melichar 1902: S.Iran, E.Afghanistan.
Meulona parva, Zia 1935: Indo-China, S.China.
Morsina persica, Melichar 1902: Iran.
Nakta stoliczkana, Distant 1906: Punjab, Abbottabad,
Ghoragali, Narowal,
Islamabad, Ziarat,
Peshawar, Gilgit, Ayoub-
park, Dair, Changamanga,
Karachi, Pakistan.
- Narowalenus globosus*, n.sp.: Narowal, Pakistan.
Neomelicharia consociata, Walker 1862: India.
cruentata, Fabricius 1803: India.
Neosalurnis reticulatus, Distant 1910: Karen Hill, Bhutan,
N.India.
- Neovariata punjabensis*, n.sp.: Chichawatni.
Nephesa coromandelica, Spinola 1839: India.
Ormenis ambrosa, Melichar 1902: India.
mendax, Melichar 1902: China: Tibet.
- Oryxa truncata*, Linnaeus 1763: N.Bengal, India, Ceylon.
Paragomeda qadrii n.sp.: Changamanga, Pakistan.
typica, Distant 1914: S.India, Rawalpindi,
Changamanga, Hyderabad,
Murree, Chichawatni.
viridis, Distant 1916: S.India, Rawalpindi,
Changamanga, Pakistan,
Quetta.
- Paraketumala anomala*, Distant 1912: Bengal, India.
Paranotus limbatus, Distant 1912: Ceylon.
maculosus, Distant 1912: Ceylon.
Persepolia columbaria, Dlabola et Safavi 1972: S.Iran.
secunda, Dlabola, 1981: S.Iran.

- Fhantia christophii*, Rusiecka 1902: Afghanistan, Iran,
USSR.
cylindricornis, Melichar 1902: Iran, Afghanistan,
SSR.
ferganensis, Dubousky 1966: Iran, SSR.
flavida, Rusiecka 1902: Iran, SSR.
helleri, Linnavuori 1962: Iran.
lactea, Rusiecka 1902: Iran.
putoni, Rusiecka 1902: Assam, Iran.
rubromargirata, Rusiecka 1902: Afghanistan, Iran.
viridula, Putor 1890: USSR. Afghanistan, Iran.
zaitzevi, Melichar 1914: USSR.
- Philbeyella glarea*, Elabola et Heller 1962: Iran.
Phromnia montivaga, Distant 1906: India, Pakistan, Quetta.
albopuncta, Melichar 1902: Ceylon.
deltotensis, Kirby 1891: Ceylon.
inornata, Walker 1851: India.
intacta, Walker 1851: Bengal.
marginella, Olivier: 1791: India.
rubicunda, Distant 1883: India.
tricolor, White 1846: India.
viridula, Atkinson 1888: India.
- Phyllyphanta albopunctata*, Kirby 1891: Ceylon.
angulifera, Walker 1858: India.
producta, Spinola 1839: Indian Archipelago.
sinensis, Walker 1851: Assam, India, Ceylon,
Cochin-China.
- Pulaha contracta*, Distant 1906: Madras, Nilgiri Hills.
Pulastya abbreviata, Distant 1914: Indo-China.
acutipennis, Kirby 1891: Madras, India, Ceylon,
Tenasserim.
- Salurnis marginella*, Guerin and Meneville 1829: Sikkim,
India,
Cochin-
China,
Madras,
Coorg,
China,
Tenasserim.
- Satapa granulosa*, Distant 1906: India, Pakistan.
sicula, Distant 1906: N. India, Karachi, Gujoo,
Malir, Ceylon, Narowal,
Changamanga, Lyallpur,
Pakistan, Ceylon.
tuberculosa, Distant 1914: Pakistan, Karachi,
India, Coimbatore.
- Scarpentina bimaculata*, Distant 1906: India.
modesta, Distant 1906: India.
- Seliza dubitans* (Walker 1858): N. China.
ferruginea, (Walker 1851): N.W. India, Mirpurkhas,
Mastung, Chilton,
Quetta Hills, Pakistan.
lignaria, (Walker 1851): N. China: Oriental.

- nigropunctata, Kirby 1891: Bengal, India, Ceylon.
partita, Melichar 1902: N.W.India.
pusana, Distant 1912: Bengal.
truncata, Walker 1851: N.India.
vidua, Stål 1854: India .
- Summanus dadarensis, n.sp.: Dadar, Skerdu, Pakistan.
indicus, Distant 1916: S.India, Bombay, Mysore,
Nandidurg.
reticulata, n.sp.: Mirpurkhas , Pakistan.
- Tejesa umbrata, Distant 1906: Nilgiri Hills, Madras, India.
- Tisia esfandiarii, Dlabola 1981: S-Iran.
- Unnata bahawalpurensis, n.sp.: Bahawalpur, Pakistan.
gilgitensis, n.sp.: Changamanga, Gilgit.
intracta, (Walker 1851): Punjab, Peshawar, Balakot,
Swat, Batkhela, Azad -
Kashmir, Ashita, Gabral,
Abbottabad, Rawalpindi,
Chichawatni, Shadara,
Karachi.
- Zarudnya atratula, Melichar 1902: Iran.
fusca, Melichar 1902: Iran, SSR.
interstitialis, Melichar 1902: Iran.
- Zecheuna tonkinensis, Zia 1935: Indo-China, S.China.

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- Apachnas nobilis, Distant 1909: Madras, Nil-giri Hills,
India.
- Armacia hyalinata, Donovan 1805: India.
nigrifrons, Walker 1858: Indian Archipelago.
- Euricania clara, Kato 1932: China.
discigutta, Walker 1862: Indian Archipelago,
Borro Hills.
facialis, (Walker 1858): China, India.
gaetulia , Chou et Lu 1981: China, Xizange.
ocellus, (Walker 1851): Assam, Sikkim, Bengal,
E.India, China.
- Gaetulia rubiocellata. Chou et Lu 1977: China.
- Pochazia
angulata, Kirby 1891: Ceylon.
antica, Gray 1832: India, Tenasserim, E.India,
Madras, China.
antigone, Kirkaldy 1902: Madras, Sikkim, Ceylon.
anwari, n.sp.: Pakistan.
atkinsoni, Distant 1906: Sikkim.
chienfengensis, Chou et Lu 1977: China.
citri, n.sp.: Abbottabad, Pakistan.
confusa, Distant 1906: E.India, Bengal, Assam,
Karen Hills, China.

- convergens, Walker 1857: Indian Archipelago.
fasciata, Fabricius 1803: Indian Archipelago.
funebri, Stål 1865: Indian Archipelago.
funerea, Melichar 1912: Indian Archipelago.
gradiens, Walker 1857: Indian Archipelago.
guttifer, Walker 1851: Assam, Tenasserim, Sikkim,
Sylhet, Bengal, India,
Ceylon, China.
interrupta, Walker 1851: Bombay, Malabar,
Madras, Bengal.
obscura, Fabricius 1851: India.
pipera, Distant 1914: Madras, Malabar, India,
China.
sinuata, Stål 1866: Tenasserim, N.India, Sikkim,
Indian Archipelago.
transversa, Melichar 1898: India.
triangularis, Distant 1906: Ceylon.
trinitatis, Chou et Lu 1977: China.
umbrata, Melichar 1896: India, Iran, SSR.
Fochazina fenestrata, Fabricius 1803: Indian Archipelago,
Tenasserim.
zizzata, Chou et Lu 1977: China.
Privesa confinis, Distant 1906: India.
delecta, Melichar 1898: India.
Ricania amygdalusae, n.sp.: Pakistan.
apicalis, Walker 1851: India, Assam, Sikkim, Indo-
China.
bicolorata, Distant 1906: India, Madras.
cacaonis, Chou et Lu 1977: China.
cheemai, n.sp.: Dhantore, Pakistan.
coorgensis, Distant 1916: S.India, Coorg.
depressicollis, Breddin (1898): Ceylon.
episcopalis, Stål 1865: N.China.
episcopus, (Walker 1858): N.China.
flavifrontalis, Kirby 1900: Indian Ocean.
fumosa, Walker 1851: Assam, Indian Archipelago,
Indio-China, China.
hedenborgi, Stål 1865: S-Iran, USSR.
japonica, Melichar 1898: N.India, N.China, SSR.
kwangsiensis, Chou et Lu 1977: China.
luetuosa, Stål 1863: Indian Archipelago.
marginalis, Walker 1851: Tenasserim, India, Coorg,
Bombay, Dacca, Bengal, China.
mitescens, Distant 1906: Tenasserim.
nigra, Walker 1870: Ternat, India.
obliqua, Walker 1851: Nepal.
shantungensis, Chou et Lu 1977: China.
quinquefasciata, Stål 1866: India.
rubrifascia, Distant 1909: Ceram.
simulans, Walker 1851: N.India, China.
speculum, Walker 1851: Sikkim, Assam, India, Bengal,
Madras, Trivandrum, Tenasserim,
Nilgiri Hills, Ceylon,
Cochin-China, China.

- stupida, Walker 1857: Indian Archipelago, Assam,
Ceylon.
taeniata, Stål 1870: India, Indian Archipelago,
China.
zebra, Distant 1906: India, Assam, Pakistan,
Ricanula discoptera, Stål 1865: Indian Archipelago,
Ceylon.
distincta, Melichar 1903: Ceylon.
integra, Melichar 1898: Indian Archipelago,
Indo-China.

limitaris, Walker 1857: Indian Archipelago.
pulverosa, Stål 1865: Bengal, India, Tenasserim,
Assam, Indo-China, Khasi
Hills, Darjeeling, Peshok,
China.
signata, Stål 1870: Indian Archipelago.
spoliata, Melichar 1898: Ceylon.
stigma, Walker 1851: India, Assam, Tenasserim.
taeniata, Stål 1870: India.
trimaculata, Guerin & Meneville 1834: Indian
Archipelago.
Ricanoides flabellum, Noualhier 1896: Assam, India.
Ricanoptera fenestrata, Fabricius 1775: India, Tenasserim
inculta, Melichar 1898: Assam, Great Nicobar, India.
mackenziei, Distant 1916: Bengal, Bihar.
mellerborgi, Stål 1854: India.
opaca, Distant 1906: Ceylon.
phalaena, Distant 1916: Madras, Coimbatore,
Bailure Forest India.
ramakrishna, Distant 1916: Madras, Coimbatore,
Bailure Forest.
variegata, Distant 1912: Ceylon.
Sassula lungchowensis, Chou-et-Lu, 1971: China.
Scolyppa confinis, Distant 1906: Bombay, Coorg, Madras,
India, Sind, Pakistan.
delecta, Melichar 1898: Bombay, India,

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- Antabhoga gardineri, Distant 1912: India, Laccadive Is.
Pakistan.
Barunoides albosignata, Distant 1906: India, Ceylon.
Catullia vittata, Matsumura, 1914: India.
Dolia walkeri, Signoret 1861: India.
Eilithyia insularis, Distant 1912: India, Narcondam,
Islands, Ceylon.
Eodryas melichari, Melichar 1914: Calcutta, Bombay, S.
India, Ceylon, Bengal.

- Epora montana*, Distant 1912: Madras, Bengal, Nilgiri Hills, Calcutta, India.
 subtilis, Walker 1857: Bombay, Bengal, Ceylon.
- Eporiella ceylonica*, Melichar 1914: Ceylon.
- Ficarasa simplex*, Walker 1870: Ceram, Ternat, India.
- Kallitaxila concolor*, Muir 1913: Ceram,
- Kazerunia leguaniforma*, Dlabola 1977: Iran, Baluchistan.
 ochreata, Dlabola 1974: Iran, USSR.
 undulata, Dlabola 1977: Iran.
- Leusaba rufitarsis*, Kirby 1891: Ceylon.
- Mitriophalus macrocephalus*, (Fieber 1865): Afghanistan, USSR; SSR.
- Monopsis sinica*, Walker 1851: Sikkim, India.
- Neommatissus typicus*, Distant 1916: S. India.
- Numicia maculosa*, Ghauri 1976: India.
 pusana, Ghauri 1976: India.
- Olontheus obscurus*, Jacobi 1944: Oriental. SSR.
- Ommatissus bimaculatus*, Muir 1931: Uttar Pradesh, India.
 binotatus, Fieber 1872: India, China.
 lofouens, Muir 1913: India.
- Ossoides lineatus*, Bierman 1910: India, China.
- Paricana dilatipennis*, Walker 1857: Delhi, Perak.
- Paruzelia psyllomorpha*, Melichar 1903: Ceylon.
- Sogana extrema*, Melichar 1914: Tenasserim.
- Stacota breviceps*, Walker 1858: India, Ceylon, Pakistan.
- Stacotoides typicus*, Distant 1916: S. India .
- Stiborus viridis*, Melichar 1903: Ceylon.
- Tambinia atrosignata*, Distant 1906: Ceylon.
 capitata, Distant 1906: Tenasserim, India.
 debilis, Stål 1859: Madras, Ceylon.
 languida, Stål 1859: India, Pakistan, Ceylon.
 maculosa, Distant 1906: India.
 rubromaculata, Distant 1916: Ceylon.
 rufoornata, Stål 1859: Ceylon.
 verticalis, Distant 1916: India, Coorg, Madras.
 zonata, Muir 1931: Madras.
- Tropiduchus viridicans*, Stål 1866: Sikkim.
- Trypetimorpha fenestrata*, A. Costa 1862: USSR. Iran.
- Varma distantii*, Melichar 1914: Assam.
 tridens, Distant 1906: India, Ceylon.
 fervens, Walker 1851: India,
 obliqua, Distant 1909: India.

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- Aluma exigua*, Melichar 1915: Charinchoba, India.
- Augila binghami*, Distant 1906: Tenasserim.
- Bisma greeni*, Distant 1906: Ceylon.
- Brixioides carinatus*, Distant 1906: India, Ceylon.

- Corethrura fuscovaria*, Hope 1843: Assam, Sylhet.
Elasmoscelis perforata, Walker 1862: India, Bengal,
Calcutta, Ceylon.
platypoda, Distant 1906: Bengal, Calcutta,
Ceylon.
Jivatma metallica, Distant 1906: India, Tenasserim.
Kusuma carinata, Distant 1906: India, Bombay, Bihar,
Calcutta, Uttar Pradesh,
Bengal, Pusa.
Lacusa fuscofasciata, Stål 1854: India, Pakistan, Mala-
kand Agency, Dargai.
Lophops carinata, Kirby 1891: India, Bihar.
pallida, Melichar 1902: Iran.
Manchhookhonia granulipennis, Kato 1933: China.
Menosca metallica, Distant 1906: Tenasserim.
Padanda atkinsoni, Distant 1906: British India, Sikkim,
Pitambara monana, Distant 1912: India.
interrupta, Distant 1906: Tenasserim.
radians, Kirby 1891: Ceylon.
sinuata, Distant 1906: India.
Pyrilla aberrans, (Kirby 1891): India, Punjab, Bengal,
Sikkim, Pakistan, Ceylon.
aberrans aberrans, (Kirby 1891): Ceylon, Pundaloya,
India.
aberrans achates, Sub. sp.: Fennah 1963: Madras,
Biligirirangan.
aberrans comes, Sub. sp.: Fennah 1963: Madras,
Naraikkadu.
aberrans consors, Sub. sp.: Fennah 1963: Travancore,
Thekkadi,
Madras,
India.
aberrans palghati, Sub. sp.: Fennah 1863: India,
Travancore.
punjabensis, n.sp.: Kamokie, Lahore, Pakistan.
lycoides, Walker 1862: India, Travancore.
perpusilla, (Walker 1851): India, Pakistan,
Afghanistan, USSR.
China.
perpusilla thekkadiana, Sub. sp.: Fennah 1963:
Travancore, Thekkadi,
India.
perpusilla dhimbami, Sub. sp.: Fennah 1963: India,
Madras, Biligirirangan-
Hills, Dhimbam, Hasanur.
perpusilla chikkaballapurana, Sub. sp.: Fennah 1963:
India, Mysore, Chikka-
ballapura.
perpusilla coimbatorensis, Sub. sp.: Fennah 1963:
Madras, Coimbatore, India.

- perpusilla naraikkaduana*, Sub. sp.: Fennah 1963:
India, Madras, Tinne-
velley Naraikkadu,
India.
- perpusilla lycoices* (Walker 1862): India, Tena-
sserim.
- perpusilla perpusilla*, Sub. sp.: Walker 1851:
India, N. Ben-
gal, Pakistan,
Afghanistan.
- perpusilla pirmedana*, Sub. sp.: Fennah 1963:
India, Travancore.
- perpusilla pusana*, Distant 1914: Bihar, Pusa,
P.U., Bengal,
Punjab.
- perpusilla singhalensis*, Sub. sp.: Fennah 1963:
Ceylon, India.
- protuberans*, Stål 1859: Dacca, India, Pakistan,
Afghanistan.
- pusana*, Distant 1906: India.
- rahimyarensis*, n.sp.: Rahimyarkhan., Pakistan.
- Serida latens*, (Walker 1857): Tenasserim.
- Symplana major*, Fennah 1973: India, Coorg.
- viridinervis*, Kirby 1891: Ceylon.

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- Akotropis flaveola*, Matsumura 1914: Cochin, India.
- fumata*, Matsumura 1914: Oriental.
- malayana*, Matsumura (1914): Ceylon.
- quercicola*, Linnavuori 1962: Iran.
- Ambalangoda fasciata*, Distant 1916: Ceylon.
- insignis*, Distant 1912: Ceylon.
- Callinesia fimbriolata*, Melichar (1903): Ceylon.
- Caristianus indicus*, Distant 1916: Afghanistan, India,
Ceylon, Sikkim.
- Chroneba pallifrons*, Stål (1859): Ceylon.
- Cixidia confinis*, (Zetterstedt 1828): SSR.
- lapponica*, (Zetterstedt 1840): SSR.
- marginicollis*, (Spinola 1839): SSR.
- parnassia*, (Stål 1859): Afghanistan.
- ussuriensis*, (Kusnezov 1928): SSR.
- Deferunda incompta*, Dlabola 1961: SSR.
- lineola*, (Matsumura 1914): SSR.
- rubrostigma*, (Matsumura 1914): Oriental.
- stigmatica*, Distant 1912: Bengal.
- Eliodiptera parnassia*, Stål 1859: Afghanistan, Azad Kash-
mir.

- Epirama conspergata*, Melichar 1903: India, Pakistan, Ceylon.
 melicharia, Khan and Qadri 1972: Pakistan.
 mirpurensis, n.sp.: Pakistan.
Favontilla flava, Muir (1922): Assam.
 pustulata, Walker 1857: Sikkim, India, Assam.
Gordiacea oculata, Melichar 1903: Ceylon, India.
Hamba perplexa, (Walker 1857): India.
Indorupex albivenulosus, Fennah 1965: S.India.
Kempiana maculata, Muir 1922: Assam.
Kosalya flavostrigata, Distant 1906: India, SSR. Burma.
Magadha flavisigna, Walker 1851: India, Darjeeling, Bengal, Assam.
 nebulosa, Distant 1906: India, Ceylon.
Mahuna conspersa, Distant 1907: India,
Majella albomaculata, Muir 1922: Assam.
Paratangia fimbriclata, Melichar 1903: India.
 marginata, Melichar (1903): Ceylon.
 notata, Melichar 1903: Ceylon.
Pleroma fumata, Melichar 1903: Ceylon.
Rhotala graveleyi, Muir (): Bengal.
Robigalia butleri, Distant 1906: India.
Taloka opaca, Walker 1867: India.
Tangina bipunctata, Melichar (1903): Ceylon.
Usana abdominalis, Distant 1916: Sikkim.
 lineolalis, Distant 1906: India, Tenasserim.
 yanonis, Matsumura 1914: Oriental, India.

FAMILY CLXIIDAE SPINOLA 1839

- Adolenda boroumandi*, Dlabola 1981: Iran, Afghanistan.
 decolorata, Dlabola 1957: Afghanistan, Sind.
 satrapa, Dlabola 1981: Iran.
 typica, Distant 1911: Simla, N.India. Pakistan.
Adzapala greeni, Distant 1911: India, Ceylon.
 gremi, Distant 1911: India.
Andes elongata, Distant 1911: Ceylon.
 geometrina, Distant 1911: Ceylon.
 inornata, Distant 1911: Ceylon, India.
 plagosa, Distant 1911: Sikkim, Himalayas, India .
 variolosa, Distant 1911: Himalayas, Sikkim, India.
Anila versicolor, Distant 1911: Sikkim, India.
Bashgultala clara, Dlabola 1957: Afghanistan, Sind, SSR.
Betacixius tonkinensis, Matsumura 1914: Indo-China.
 ussuriensis, Vilbaste 1968: USSR: Maritime.
Borysthenes diversa, Distant 1911: India, Sikkim.
 frascialatus, Muir 1922: India.
 strigipennis, Distant 1911: Sikkim.
 suknanicus, Distant 1911: Sikkim, Himalayas.
Bangoliarus truncatus: Pakistan

- Brixia albomaculata*, Distant 1906: India.
elongata, Distant 1911; Ceylon.
flavomaculata, Distant 1906: India.
geometrina, Distant 1911: Ceylon.
inornata, Distant 1911: Sikkim.
plagosa, Distant 1911: Sikkim.
variolosa, Distant 1911: Sikkim.
- Caneirona indica*, Distant 1915: S.India.
maculipennis, Distant 1916: India South.
- Cixius acceptus*, Anufriev 1970: SSR.
admirabilis, Logvinenko 1976: SSR.
adornatus, Dlabola 1979: Iran.
albergi, Vilbaste 1980: SSR.
albistriga, Walker 1857: India.
altaicus, Mitjaev 1967: SSR.
azofloresi, Remane et Asche 1974: SSR.
bergeniae, Vilbaste 1965: SSR.
brachydentus, Logvinenko 1969: SSR.
cambricus, China 1935: SSR.
carniolicus, Wagner 1939: SSR.
chinai, Synave 1953: China.
cunicularius, (Linnaeus 1767): SSR. India.
desertorum, Fieber 1876: USSR.
distinguendus, Kirschbaum 1868: SSR.
globuliferus, Wagner 1939: SSR, Afghanistan.
graveleyi, Muir 1922: India.
haupti, Dlabola 1949: USSR.
hirundinarius, Logvinenko 1974: SSR.
hispidus, Logvinenko 1967: USSR, SSR.
hylaeus, Logvinenko 1969: SSR.
intermedius, Scott 1870: Afghanistan, SSR.
logvinenkoae, Emeljanoev 1979: SSR.
murreeensis, n.sp.: Murree, Pakistan.
nervosus, (Linnaeus 1758): SSR, China.
pallipes, Fieber 1876: USSR, Iran, Afghanistan.
parumpunctatus, Signoret 1884: SSR.
persicus, Distant 1907: Iran.
pilifer, Melichar 1903: Ceylon.
pilosa, Olivier 1791: SSR.
prognatus, Logvinenko 1974: SSR.
pseudocunicularis, Mitjaev 1971: USSR.
remmi, Vilbaste 1968: SSR.
rufofasciatus, Logvinenko 1974: USSR.
rufus, Logvinenko 1969: USSR, SSR.
selengensis, Emeljanoev 1979: SSR.
sibiricus, Emeljanoev 1979: SSR.
similis, Kirschbaum 1868: SSR.
simplex, (Herrich-Schaffer 1835): SSR.
stigmaticus, (Germar 1818): USSR.
subsimplex, Vilbaste 1968: SSR.
turkestanicus, Dubovsky 1966: SSR.
ukrainicus, Logvinenko 1974: SSR.
vallis, Emeljanoev 1979: SSR.

- badakshanus, Dlabola 1957: Afghanistan.
bahtiaricus, Dlabola 1981: Iran.
barajus, Dlabola 1957: Afghanistan, SSR, Iran.
binghami, Distant 1911: Bengal, Ceylon, India.
bitinctus, Dlabola 1961: Iran, SSR.
bizonatus, Kato 1932: China.
bohemani, Stål 1867: China.
breviceps, Kusnezov 1937: SSR.
caudatus, Walker 1858: India.
concolor, Fieber 1876: USSR:SSR.
convergens, Melichar 1902: India, Iran.
curvatus, Logvinenko 1974: SSR.
cuspidatus, Fieber 1876: Iran, SSR.
cuspidistylus, Dlabola 1961: SSR.
dagestanicus, Kusnezov 1937: SSR:SSR.
diabolculus, Anufriev 1970: SSR.
didanti, Distant 1916: Ceylon.
ecarinatus, Kusnezov 1937: SSR.
- elongatus, Matsumura 1910:
ferganensis, Nast 1972: SSR,SSR.
figuratus, Dlabola 1961: SSR.
formicarius, Mitjaev 1967: SSR.
frontalis, Melichar 1904: India, Pakistan.
fulvus, (Kusnezov 1935): SSR.
furcatus, Signoret 1884: SSR.
fuscofasciatus, Melichar 1902: India, Pakistan,
SSR, Iran.
- gilgitensis, n.sp. Gilgit Pakistan.
globulifrons, Wagner 1939: Afghanistan.
greeni, Distant 1911: India, Ceylon.
haloxyli, Mitjaev 1971: SSR.
haupti, Metcalf 1936: SSR.
hodgarti, Distant 1911: Bengal, India, Pakistan.
indicus Distant 1911: India, Ceylon.
intermedius, Stål 1890: SSR, Afghanistan.
interruptus, Haupt 1917: SSR.
jaxartus, Mitjaev 1969: SSR.
kabulus, Dlabola 1957: Afghanistan, Iran.
kasachstanicus, Emeljanov 1964: SSR.
kempi, Muir 1922: India.
kierpurensis, Muir 1922: India.
kurseongensis, Distant 1911: E.India, Pakistan.
kusnezowi, Soos 1954: USSR:CSR.
leporinus, (Linnaeus 1761): Afghanistan, Iran,
SSR, China.
lindbergi, Dlabola 1957: Afghanistan, Iran, USSR,
Pakistan, SSR.
longivertex, Kusnezov 1937: SSR.
lugubris, Fieber 1876: USSR:SSR.
lukjanowitschi, Kusnezov 1937: SSR.
major, (Kirschbaum 1868): USSR, Iran, Afghanistan.
melanochaetus, Fieber 1876: USSR, Iran.
SSR.

- minusculus, Melichar 1913: SSR.
musiva, Germar 1825: SSR.
nanus, Ivanoff 1885: SSR.
nigrofurcatus, Signoret 1884: Afghanistan, SSR,
Iran.
nigrovenosus, Kusnezov 1937: SSR.
nuwarae, Distant 1911: India, Pakistan.
obscurus, (Signoret 1865): SSR.
pallens, (Germar 1821): Afghanistan, Iran, SSR,
Baluchistan.
panzeri, Low 1883: USSR.
putoni, Signoret 1884: SSR.
pygmaeus, Vilbaste 1961: SSR.
quinquecostatus, (Dufour 1833): SSR, China.
roridus, Fieber 1872: SSR, Afghanistan.
simlae, Distant 1911: Simla, India.
sindensis, n.sp.: Pakistan.
splendidulus, Fieber 1876: China.
stigma, Motschulsky 1863: Ceylon.
tabrobanensis, Melichar 1903: Ceylon.
tectonae, n.sp.: Pakistan.
tsoni, Muir 1925: China.
turae, Muir 1922: India.
verrucosus, Dubovsky 1970: SSR.
walkeri, Stål 1859: India, Pakistan, Bangladesh .
Oliborma nitidum, Emeljancev 1964: SSR.
Paramicrixia diaphana, Distant 1911: Bengal.
Pentastira croceus, Emeljancev 1978: SSR.
erebunii, Emeljancev 1978: USSR.
laevifrons, Mitjaev 1975: SSR.
liocara, Emeljancev 1978: SSR.
megista, Emeljancev 1979: SSR.
paulus, Logvinenko 1978: SSR.
proximus, Logvinenko 1978: SSR.
Pseudoliarus circularis, Dlabola 1981: Iran.
fuscofasciatus, (Melichar 1902): SSR, Iran,
Afghanistan.
strenuus, Emeljancev 1978: SSR.
Pseudyalesthes, carinifrons, Kusnezov 1935: SSR.
Raptalus corpulentus, Emeljancev 1978: SSR.
Tachycixius bidentifer, Dlabola 1971: SSR.
bifurcatus, Logvinenko 1971: SSR.
chevsureticus, Logvinenko et Naparidae 1971: USSR
desertorum, (Fieber 1876): SSR, Iran.
pilosus, (Olivier 1791): SSR, China.
tigrinus, Logvinenko 1971: USSR.
vilbasti, Dlabola 1971: SSR.
Trirhacus globuliferus, (Wagner 1839): Afghanistan.
nawae, (Matsamura 1914): SSR.

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