A.F. Emeljanov, (1979) THE PROBLEM OF THE FAMILY DISTINCTION BETWEEN THE FULGORIDAE AND THE DICTYOPHARIDAE (HOMOPTERA, AUCHENORRHYNCHA). In: Phylogeny and Systematics of Insects. Acad. Sci. of the USSR, Proc. of the Zoological Institute, 82, 3 - 22.

In the system of the superfamily of the Fulgoroidea the lantern flies (Fulgoridae) and nosatki (Dictyopharidae) form sister group (further F - D) belonging to higher Fulgoroidea.

POSITION OF THE SISTER GROUP FULGORIDAE - DICTYOPHARIDAE IN THE SYSTEM OF SUPERFAMILY FULGOROIDEA

All leafhoppers, except not numerous cases of reduction (Tettigometridae, Meenoplid have primary ovipositor developed already in common ancestors of all Pterygota. In superfamilies Cicadelloidea, Cercopoidea and Cicadoidea and also in lower Fulgoroidea (Cixiidae, Delphacidae) it fulfills the function of piercing-pilling. In higher Fulgoroidea the ovipositor consisting of the same homologous parts is modified for raking up particles of soil and stirring them with sticky secretion of ovipositing glands to coat eggs which subsequently are dispersed on soil or are attached to any solid substrate, mostly to bark (Keshaw, Kirkaldy, 1910; Silvestri, 1934; Müller, 1942; Cobben, 1965).

In Fulgoroidea piercing-pilling ovipositor acquired some characters of secondary specialization among which is the occurrence of basal unpaired apodeme of the second valvae; the apodeme exists also in all other Fulgoroidea having raking up - stirring ovipositor.

Among Fulgoroidea with the raking up - stirring ovipositor there are two natural groups separated by Muir (1930) on the base of structure of the second segment of hind feet. In the group to which belong F - D (Derbidae, Achilidae, Fulgoridae, Dictyopharidae) on upper surface of the second segment there is a row of 4 or more teeth; in the other group there are only two teeth (no teeth being able to bear subapical setae). However, families Derbidae and Achilidae reflect earlier stage of the evolution when compared to F - D because they differ from the later by more primitive coupling apparatus on hind вертлюг [trochanter] [head of the femur] of nymphs. The coupling apparatus [German: Springapparates] (Sander 1956) occurs in nymphs of all Fulgoroidea except Tettigometridae. The primitive type of coupling (Cixiidae, Delphacidae, Derbidae, Achilidae) is characteristic by presence of about 20 thin валик [teeth of spur] occupying an elongated oval area on вертлюг [head of the femur]. Advanced type of coupling (Tropiduchidae, Dictyopharidae, Fulgoridae, Lophopidae, Flatidae, Ricaniidae, Issidae) is characteristic by presence of about 12 not differentiated short strong валик [ridge] occupying square elongate area.

Phylogeny of leafhoppers including Fulgoroidea in fact is not established yet and for that discuss of the origin and position of F - D in the system has to be restricted to very general outlines based on not numerous characters.

In general appearance and in numerous morphological characters convergent with Dictyopharidae are numerous Tropiduchidae recognized as separate family contrary to F - D and belonging to the second branch of higher Fulgoroidea (Tropiduchidae, Ricaniidae, Nogodinidae, Issidae, Acanaloniidae).

The characteristic feature of the sister group F - D is structure of phallotheca of male with large membraneous chambers divided into bubbles above and below. Such structures are not characteristic of other Fulgoroidea, including Tropiduchidae. Tropiduchidae considerably differ from F - D also in structure of ovipositor that is characteristic for all tropiduchinous branch. In Tropiduchidae there are teeth on lower lobe of the third valva of ovipositor. Nymphs of Tropiduchidae are preserving generally primitive type of morphology that differs very much from F - D in the scheme of distribution of sensory pits and in some other characters. Totally similarity between F - D and Tropiduchidae shows characters of plesiomorphies and differences - apomorphies of different derivation.

OUTLINES OF SIMILARITY OF FULGORIDAE AND DICTYOPHARIDAE

The sister group F - D id characteristic by its uniformity that is well reflected by even recent confussion with assignation of genera, tribes or even subfamil to one of the families in question. The analysis discloses that the characters up to now applied by systematists to differentiate these two families were ever formal by themselves or were formally applied. Among groups that could not be placed in discussed families were tribes Dichopterini, Lyncidini, Strongylodematini, Capenini, genera Dorysarthrus, Aluntia, and some others. Particularly frequent were mistakes in assignation of brachypterous representatives.

The similarity of Fulgoridae and Dictyopharidae concerns general appearance and structure of main parts of their body that vary similarly in both families. Convergent is the type of head structure that can be short or long. As the example of a short head can be mentioned Cladypha (Dictyopharidae) and Phenax (Fulgoridae); as the example of a long head Callodictya (Dictyopharidae) and Hotinus (Fulgoridae). Common in the family of lantern flies type of head with secondarily compressed, bent toward vertex head process (Enchophorinae and others) occurs also among Dictyopharidae e.g. in Centromeria. Examples of articulation of head process with head occurs in lantern flies - Dorysarthrus and in nosatki - Rhaphiophora. At the same time three last pairs of analogy do not occur in other families. There is, apparently the case of great convergency of homologous lines of variability (evolu tionary) in families that are near to each other. In Fulgoridae and Dictyopharidae

great similarity exists also in structure of chest, wings, legs, abdomen. Partly the male genitalia, mentioned already, have quite similar structure that is not repeated in other families. Excluding differences in method of laying eggs the considerable similarity, contrary to other families, can be observed in female genitalia too, especially in structure of 2nd and 3rd valves of ovipositor. Particularity of the groups F - D is demonstrated by free, active, similar to adults way of life of nymphs that does not occur so distinctly in other related Fulgoroidea.

OUTLINES OF DIVERGENCY OF FULGORIDAE AND DICTYOPHARIDAE

Separating of nearly related groups is always connected with estimation of reliability, evolutionary stability that is applied for distinguishing characters, it means with a problem of possibility of existence of convergent characters of the same structure or their expression in terms of reversibility - restoration of characters that were lost earlier. Complexity of distinguishing sister groups can also result from preservation of representatives reflecting early stages of the divergency of the groups when not all characteristic for final, typical representatives peculiarities became finally shaped and established, it means from the fact of occurrence of the primitive representatives in which it is not fully expressed the morphofunctional complex determining success of the group on the historical arena.

In the sister group F - D there are many representatives having transitional morphological character (e.g. Aluntiinae) and a number of alternative characters which mostly or almost exclusively characterize one of the families but in separate cases occur in the other too.

As a matter of fact presence of the great similarity between lantern flies and nosatki and quite common cases of transition in characters put under question their separate identity. This problem did not rise for the formal estimation of the border between the families, basically there was character of size, colouration and richnes of the additional venation that were mutually dependent and owing to these character the big representatives of F - D were referred to lantern flies and small to nosatki.

More precise analysis reveals that in size of the representatives of both families are reflected differences in their way of life that enable in mass tell the difference between them. However size and way of life are not quite conservativ in the group to exclude deviations in this or other direction, also secondary ones concerning genus rank, tribe and even higher. Lantern flies predominantly arboreal group, nosatki opposite, they live on grasses, more exactly they are shrub-grass inhabitants, it means they are adapted to live among lower plants. Arboreal lantern flies are characteristic by large size and occurrence in humid forests. With their large size and active in day-light way of life is connected their bright colouration

Also rich secondary venation is connected with size. With life on trees is connected their way of lying eggs - the most truthworthy character to distinguish this family from nosatki. Lantern flies lay eggs on bark of trees, attaching them in rows and covering with wax. Owing to this nymphs immediately occur on the place of living, — highly on tree. Changing the way of laying eggs from scattering them on soil to the attaching to the bark of tree, apparently was the pivotal adaptation that led to emergency of the family of lantern flies. Simultaneously, ancestral raking up - stirring ovipositor acquired some new functions (attaching) , modified some previous functions (coating) and lost one of principal final functions - raking up. In nosatki as in evolutionary ancestral families Derbidae and Achilidae eggs are simply scattered on soil, ovipositing takes place on soil so that eggs preliminarily are coated with raked up soil. Ovipositor of nosatki has all typical and working functions of raking up - stirring ovipositor, that indicate connections with habitat on the surface of soil and adequately with lower and grassy vegetation. With the conditions of live inside thicket of vegetation near soil are connected smaller dimensions of nosatki and their gained cryptic colouration, usually sordid browmish or green. Nosatki predominantly are inhabitants of open landscapes and while in forests they are connected with grass and shrub vegetation of flood-land, edges etc. Connection with open areas in nosatki exists in accordance with some xerofily. It is interesting to notice that forest inhabiting South American tribe Cladyphini got piercing-pilling ovipositor that can be called tertiary as it derives from — raking up - stirring one that on its part appear to be a result of transformation of primary piercing-pilling ovipositor. It is possible that Cladyphini adopted arboreal way of life. Connection with soil or with grassy and lower vegetation is observed in majority of more primitive families of Fulgoroidea (Cixiidae, Delphacidae, Meenoplidae, Tettigometridae) and also in related superfamily Cercopoidea.

Below will be considered numerous morphological characters that allow to differentiate the lantern flies and nosatki or basically characteristic for one or the other of the families.

1. Supplementary veins on tegmen and, what especially important, on clavus are very characteristic for lantern flies and do not occur in nosatki, with the exception of monotypical genus Aselgeia Walk. Other representatives recognized as nosatki (up to now) that have even one transverse vein on clavus, for combined set of characters should be placed in Fulgoridae (Aluntia Stål, Dichoptera Spin., Dorysarthrus Put.).

(Megadictya)

2. In lantern flies clavus is almost always open, in nosatki it is always closed. This character is not exposed in narrow short winged representatives of both families for distinct patches of veins vanish and whole venation is disorganized. In some lantern flies, however, clavus can be closed - in secondarily small or subbrachypterous forms (Limois Stål, Dichoptera Spin., Benamatapa Dist., Dorysarthrus Put.).

Opening of the clavus in lantern flies is apparently connected with larger size – such a clavus increases (spidy) of the bigger and more heavily chitinized (leather--like) wings. Predominance of the open clavus in primitive and typical forms of lantern flies speaks in favour of understanding of this character as ancestral for the family.

3. In nosatki there is supplementary mechanism of benting under of the margin of hind wing that is folden on a jugal fold. That mechanism is not expressed only in subbrachypterous representatives of the genus Scolops Schaum in connection with reduction of wing size. In lantern flies such a benting under is never observed, it is absent, partly, in genera Aluntia Stål and Dorysarthrus Put. In the genus Dichoptera Spin. it is observable suplementary folding of the hind wing but following other pattern and in other region of the wing – between hind Cu and Postcubitus there is Z-shape move along two flexion lines.

4. In lantern flies there are almost always absent hind discal keels of pronotum in imago as well as in nymphs; exception concerns Lyncides Stål and, maybe some Capenini. In the genus Dorysarthrus Put. hind discal keels are developed only in nymphs. In nosatki hind distal keels are often present but as a whole they are unstable, often vary within one species and can be differently developed in different species within one genus.

5. Hind margin of pronotum in lantern flies is always almost straight and in all winged nosatki it is strongly concave.

6. Longitudinal postfurcal keels of mesosternum in lantern flies are divergent caudad, in nosatki they are convergent caudad.

7. In nosatki on the first and second segment of 1st and 2nd feet there are almost always two transparent specialized setae (sarkochetae), exception consists of Saigona Mats., Tigrahauda Osh. and tribe Orgeriini. In lantern flies in respective position all setae are simple and pigmented.

8. In nosatki teeth on top of 1st and 2nd segment of hind feet always bear subapical setae. In lantern flies these teeth are almost always without setae, however the setae are present in the primitive genus Aluntia Stål and in [? slowly moving] Aphaena G.-M.

9. Hind tibiae on their apices in inner (ptimaryventral) group have almost always 2 teeth in lantern flies and always 3 in nosatki. The only exception is short winged lantern fly Lyncides Stål, appearance of the third tooth here is apparently connected with stressing of function of legs in connection with lost the ability to fly.

10. In lantern flies commonly anterior ТАЗИКИ coxae plur. [~~coxae~~ trochanters]

long, overlaping apex of anteclypeus, in nosatki - short, not reaching apex of anteclypeus.

11. Hind femori and tibiae in nosatki almost always longer than in lantern fl.

12. In lantern flies arolium often not developed (Fulgorinae, Phenacinae, Dichopterinae), in nosatki it is always well developed.

13. Sutures dividing first tergite of abdomen into anterior and posterior parts differently shaped in lantern flies and in nosatki.

14. In connection with different way of lying eggs, that was discussed earlier, in lantern flies and nosatki there are differences in structure of 1st and 3rd valvae of ovipositor. Secondary modification in lantern flies includes rounding and broadening of the teeth on outer lobes of the 1st valva, reduction and thickening and desclerotization of the inner lobes of the 1st valvae and also disappearance of the separated appendix on outer lobes of the third valvae.

15. In connection with that [? No. 14] eggs of lantern flies have lateral small roof through which the nymph emerges. In nosatki eggs are without roof, they are coated with soil particles.

16. Harpagones (styli) in nosatki always have apical tooth; in lantern flies in most cases it is absent, however it is present in Aluntia, Dichoptera and in some species of the genus Zanna.

17. In nymphs of lantern flies линочный шов [? moulting ~~nymphal~~] suture overlapi the first tergite of abdomen, by this means the middle tergal keel is doubled; in nosatki линочный шов [? moulting ~~nymphal~~] suture does not exceed metatergum, central (middle) keel on all tergites simple. In the primitive genus of lantern flies Aluntia Stål the central keel ~~the central keel~~ on the first tergite of the abdomen simple, as in nosatki.

18. Sensory pits of nymphs of lantern flies and nosatki also differ. In lantern flies they are high, crater-like, usually scattered without arrangement, these which are arranged in rows often considerably differ in size, at the same time there are often the pits on the costal field of nymphal fore wings and on anteocular area of the head. In nosatki the pits shallower, bordered with only a narrow extending margin, placed in more or less arranged rows and little differing in size from each other. They are almost always absent on costal area and always absent on anteocular area.

The mentioned characters applying detailed analysis and sufficient material allow to separate families Fulgoridae and Dictyopharidae distinctly. They are also, as it seems to me, sufficient for prooving separate identity of these families. The most controversial remains position of the genus Aluntia Stål, which apparently appears to be phylogenetic relict reflecting somewhat initial stage of separation

of the family Fulgoridae. Other cases of overlaping of the characters of both families apparently bear secondary character.

Among six groups which, in my opinion, necessarily to transfer from Dictyopharidae to Fulgoridae and rise their status (Aluntiinae, Dorysarthrinae, Dichopterinae, Lyncidinae, Strongylodematinae, Capeninae), only four first of them are described below, these were studied on the collected material. Because of the restricted material, position of the genera Aluntia Stål, Dichoptera Spin. and Lyncydes Stål is also discussed basing on not total amount of above mentioned alternative characters. So, among genera Dichoptera and Lyncides in available material nymphs were not present, scarce material of Lyncides does not allow deeper study of the male genitalia etc. Only of the genus Dorysarthrus Put. there was sufficient material.

BASIC DIRECTIONS OF THE MORPHOLOGICAL EVOLUTION OF LANTERN FLIES

For the taxons described again and transferred from Dictyopharidae to Fulgoridae it is necessary to determine their place in the system of the family Fulgoridae and for that there should be considered at least in very outline the basic stages of the morphological evolution of the family.

For the lack of the material being unable to make basic revision of the family based on all genera of the world fauna, I am introducing four new subfamilies linking them to the separated earlier ones. Differences joined with the new subfamilies in all aspects do not fall behind the scale of differences between old subfamilies, for that such approach seems to be justified.

The newest system of lantern flies of Lallemand (1959) appear to be modification of the system of Metcalf (1938, 1947) with the Lallemand's rising some tribes of Metcalf to the status of subfamilies (Xosopharini, Enchophorini, Zannini) and conducted a number of other less important changes. Both authors used practically the same characters for separation of the groups. Classification by Lallemand as well as classification by Metcalf up to now remains weekly based; accepted by Lallemand 9 subfamilies are mostly poorly and unclearly characterized, their rank might be overestimated.

Vast part of the subfamilies including also newly introduced Dorysarthrinae and Lyncidinae can be divided into two groups: long-head lantern flies (Zanninae, Dorysarthrinae, Hotininae, Fulgorinae, Amyclinae) and contracted-head lantern flies (Enchopharinae, Aphaeninae, Lyncidinae, Poiocerinae and Xosopharinae). Phenacinae join, as it will be shown later, to long-head, Aluntinae and Dichopterinae remain in separate position.

In straight-head lantern flies the head is strongly produced on its whole width before eyes, forming directed forward an arch-shaped process on which there is

detectable distinct primary pattern of keels that is characteristic except for Fulgoridae also for Dictyopharidae.

In condensed-head lantern flies if head process is present, the head before eyes becomes narrow, the process is narrow, strongly bent backwards, often pressed to the head or there is no process and upper margin of frons wrinkled under margin of vertex and compressed in a form of a transverse slit or sulcus.

In straight-head lantern flies the head process starting from the first instar nymph to imago gradually becomes longer reaching maximum in imago. Among straight--head lantern flies separated are subfamilies Fulgorinae, Hotininae and Amyclinae with straight border between frons and postclypeus as in condensed-head lantern flies and also subfamilies Zanninae and Dorysarthrinae having postclypeus deeply jut into frons. The two last subfamilies are similar also in shape of legs, pronotum and postocular cone-like swellings. Zanninae, contrary to all higher lantern flies, in many representatives have upper hook of harpagones (styli) as characteristic for nosatki and lower lantern flies Aluntiinae and Dichopterinae. Except that - judging from external appearance and type of colouration Zanninae can be put at the other side against all others "common" lantern flies, it means subfamilies Hotininae - Poiocerinae (see the drawing). In Dorysarthrinae harpagon has no upper tooth. Maybe the upper tooth in Zanninae reappears as a certain kind of atavizm, but nevertheless it advocates in favour of counterbalance of Zanninae together with very near Dorysarthrinae against remaining "common" lantern flies.

Subfamily Phenacinae has short not contracted head of a simple appearance that at the first sight seems to be evidence of primitiveness. Metcalf and Lallemand put this subfamily at the first place in their systems. However pattern of distribution of keels on head (in Phenax, less distinctly in Pterodictya) completely deviates prom the primary pattern Fulgoridae - Dictyopharidae. Above, between keels which seem to be lateral margins of frons and intermediate keels there are also supplementary keels. In many characters, partly in the form of postclypeus and epiclypeal lobes of frons bearing keel on the part of gena and also in reduction of arolium Phenacinae are very similar to Fulgorinae. If to suppose that head of Phenacinae become such as a result of strong gradual shortening of the head process of Fulgorinae or Hotininae type then the supplementary keels of the frons can be interpreted as true (primary) lateral keels of frons and those in upper part of frons that seem to be lateral keels can be interpreted as praeocular keels. Sculptur of the frons in Pterodictya allows to suppose that its nymph has more produced head. Structure of ovipositor in Phenacinae is also highly specialized.

In contracted-head lantern flies took place a multistage evolution of head process toward its reduction. Advancing steps of this process can be observed in subfamilies Enchophorinae, Aphaeninae, Poiocerinae, Xosopharinae. In Enchophorinae

is
the process narrowly compressed in front of eyes and the narrowed part is strongly bent backward, anterior part [of its] broad (hind) half jut in and separated by indistinct secondary keel from its anterior half. In Aphaeninae the process is still more shortened and narrowed and except that it is pressed to hind part of vertex or jut in it. Within the subfamily there are observable stages of shortening of the process up to complete reduction, when head became secondarily simply constructed. In the course of reduction of the process lateral margins of the frons near its apex deviate from it join at each side with a short keel to the upper parts of the intermediate keels, forming common (uninterrupted) continuous keel that is perceived as upper border of frons. In Poiocerinae and Xosopharinae a fold in anterior part of vertex in connection with complete reduction of head process, displaces anteriad accordingly to the reduction, it passed from vertex to the bordering upper part of frons which is folded up in a shape of a groove or a slit. Vertex secondarily acquired uniformly flat surface. But the frontal margin of a groove (anterior or lower) in its middle part is shaped as if intermediate keels were passing one into another.

Nymphs of the many representatives of Aphaeninae (Lycorma, Limois) demonstrate that in subsequent instars their head process increases but undergoes reverse development during moulting into imago. Shape of the head process of the mentioned nymphs resembles the same of the imago of some Amyclinae, for that in the face of scarce data it is possible to suppose that Amyclinae are near to contracted-head lantern flies. Metcalf put Amyclinae near Xosopharinae and Poiocerinae, treating Amyclinae and Xosopharinae as tribes of the subfamily Amyclynae s. lato (Metcalf, 1938, 1947).

Subfamily Lyncidinae (genus Lyncides) has shape of frons and vertex as in Aphaeninae, while head process is strongly reduced. There is a plica between frons and vertex, protuberance on the apex of frons (more exactly in place of convergency of intermediate keels), intermediate keels of frons situated near the central keel. Many characters of peculiarity of Lyncidinae are connected with brachyptery.

Analysis of the systematic position of all newly introduced subfamilies is given below along with their descriptions, there are considered phylogenic interrelations of the two supposingly the most primitive ones and at the same time also of the deviating subfamilies Aluntiinae and Dichopterinae.

All genera (Aluntia Stål, Dichoptera Spin., Dorysarthrus Put., Lyncides Stål) which are considered here as representatives of the separate subfamilies of the family Fulgoridae, up to now were placed in various subdividings of the family Dictyopharidae, what found reflection in part in the catalogue of the world fauna of Homoptera (Metcalf, 1946).

Fam. FULGORIDAE

Subfam. ALUNTIINAE Emeljanov, subfam.n.

Type genus Aluntia Stål, 1866.

Middle size insects, in outward appearance and size similar to Dictyopharidae, distinctly smaller than most of Fulgoridae. Head strongly produced forming straight head process. Postocular area strongly expanded to a half of length of longer diameter of the eye. Postocular swelling not distinct as such, instead there is a blunt thick longitudinal keel getting weaker toward neck region of the head. Antennae strongly shifted backwards and bent anteriorly downwards along with head capsule, in such a position their apices (apices of the second segment) hardly reaching hind margin of eye. First segment of antenna narrow, ring-like, second segment sausage-like, three times longer its breadth. A small number of rhinaria present (as in Dictyopharidae). From upper margin of eye to neck margin outside of lateral keel of vertex there is a distinct suture parallel to the keel. Ocelli under hind margin of eyes well developed. Anteriorly of eyes, between lateral keels of frons and vertex there is a longitudinal not sharp but distinct keel. Vertex narrow, groove-like, almost parallel sided, slightly narrowing anteriad, pointed in front, central keel not expressed, instead there is a weak furrow in the corresponding position. Frons 2 - 3 times broader than vertex, in general parallel-sided, slightly narrowed between eyes. Intermediate keels of frons appear only in front of eyes, n distinctly emerging from the central keel and thus becoming parallel, slightly diverging apicad and in a course of parabole merging with each other. Lateral surfaces of frons in upper part of head process pass toward lateral sides of head; they are covered by slightly broadened inner fields there. Vertex and frons in side view almost parallel, vertex straight up to its apex, frons subapically convexly elevated as is characteristic for long-head Fulgoridae. Lateral margins of frons before apex similarly but more abruptly bent up and reach toward keels of vertex, diverging from apex of head. Clypeal margin of frons obtuse angle sharply bent inwards. Lateral margins of postclypeus and frons below (behind) eyes not broadened leaf-like and not elevated. On anteclypeus lateral keels developed only in anterior (upper) part as in Fulgoridae. Beak reaching up to level of hind trochanters.

Protosternum elongated, conically broadening caudad. Anterior margin of pronotum mildly arcuately convex, the hind one blunt-angle concave. There are developed strictly straight lateral and central keels of disc, upper and lower keels of sides of pronotum, lateral keels of disc - all of them divergent caudad. Scutum rhomboid quite elongated with three parallel longitudinal keels being continuation of keels on disc of pronotum.

Tegmina elongated, broadened caudad with broad rounded hind margin, apical parts of membranes prominently overlaping. Except essential narrow longitudinal and transverse veins, the last spotted only in apical part of membrane, there are supplementary, weaker, nodate, sometimes branching veins. Costal area thickened, without transverse veins. Pterostigma not expressed. Radius and media diverge immediately after leaving arc. Clavus open, at apex of the claval vein ($PCu + A_1$) there is visible transverse vein running from wing margin to the claval suture, the claval suture continues cutting off next 1 - 2 submarginal veins and disappears behind them (it); there claval suture runs parallel to the hind margin of the wing. Hind wings at rest without supplementary [?volvulus] зabopoт that is characteristic for Dictyopharidae.

Legs thin and long. Anterior trochanters, however, respectively short, not reaching apex of clypeus. Anterior trochanters without sharp keels, second trochanters without meracanthus. Apex of hind tibiae bearing 6 teeth alternating in respect of length, in primary ventral ventral group there are two teeth as in Fulgoridae. Feet of 1st and 2nd legs without specialized setae below on their 1st and 2nd segment Hind feet with subapical setae on distal teeth of 1st and 2nd segments.

Abdomen elongated, slender, sternites IV - VI roughly twice longer than the third one which remains in usual proportions.

Male genitalia (not dissected) have proportions and characters typical for Dictyopharidae, harpagones are with apical hook. Anal tube has incision on hind margi

Female genitalia (not dissected) have very peculiar characters, with features of proximity to typical Fulgoridae: lower blades of the 3rd valvae of ovipositor without appendix, with soft hind margin.

Nymph (V instar). Looks like imago but abdomen still narrower and longer. Contrar to imago on frons intermediate keels near one another reach clypeus, central keel absent; lateral lobes of frons subapically cut through by supplementary keel as in some Fulgoridae. Sensory pits spread on whole length of the lateral lobes from clypeus up to the apex. On prosternum developed lower keel of the flank and uninterrupted prodiscal-postocular-upperflank keel. Hind discal keels completely absent. By this means keels on pronotum in nymph are differently situated than in imago. Flanks of pronotum long and low. Sensory pits occur on all parts that are separated by keels. Nymphal wings of the ordinary shape with ordinarily distributed sensory pits, in costal area there is a sensory pit too. First segment of abdomen with only one keel which is, like in Dictyopharidae, not bifurcated. Subsequent III - VI segments have well developed sublateral, intermediate and central keels; on the II segment there are intermediate and central keel. On VI segment its posterior quarter is occupied by wax-glands; on VI - VIII segments almost whole tergal surface, except anterior margin is occupied by a pair of wax glands which are separated from each other by the central keel; other keels not developed. Sensory pits, starting from

III tergite up to VI, present in all their cells, on lateral and sublateral fields they are distributed in a scattered groups as in Fulgoridae, in medial fields (betw intermediary keels) there are also separate sensory pits (in Dictyopharidae they occur there only on VI - VII tergites). On VII and VIII tergites [sensory] pits displaced by wax glands.

Material. Aluntia hova Nast: 1 ♂, 1 ♀, 2 nymphs of the V instar, Madagaskar, Analamazotra, Périnet, XI, 1930 (Olsufiev).

Composition and distribution. Genus Aluntia Stål (= Dendrophora Mel.) is the only representative of the described family. The genus comprises 4 species occurring in Oriental and Ethiopian regions (Nast, 1949).

Systematic position. Available for renouncing morphological characters that could allow assignement of the genus Aluntia to Fulgoridae or Dictyopharidae are extremely contradictory. Apparently only large material of the all stages of ontogeny will allow to reach the final solution. For assignation to Fulgoridae speaks the following (1)[x] supplementary venation of tegmen, (2) open clavus, (3) lack of the secondary benting under of the jugal fold of hind wing, (7) lack of the specialized setae - sarochetae on first and secont feet, (9) two teeth in primary-ventral group on apices of hind tibiae, (14) ovipositor with membraneous hind margin of the lower lobe of the 3rd valvae and without appendix. Against (for assignation to Dictyopharidae) speaks (5) concave hind margin of pronotum, (8) subapical setae on the teeth of 1 - 2 segments of the hind feet, (10) short anterior trochanters, (16) harpagone with apical tooth, and (17) lack of double keel-suture on the 1st tergite of abdomen.

Such a composition of characters indicates rather not purely convergent similarity of Aluntiinae to Dictyopharidae but primitiveness of Aluntiinae which are still preserving some characters of the common ancestor F - D, that was near nosatki Explanation of assignement of Aluntiinae to one of the families of the pair F - D embarassed also with that almost all characters used for differentiation of these families are more or less connected with size and can invert accordingly. Small (as in Dictyopharidae) size of representatives of Aluntiinae can have primary as well as secondary character. Secondary character connected with size can have also such for example features as subapical setae on teeth of 1 - 2nd segments of hind feet or absence of a suture on first tergite of abdomen; the last character

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[x] Numbers in brackets indicate alternative characters of Fulgoridae and Dictyopharidae mentioned previously in the list (p. 6 - 7).

apparently appears to be an adaptation that eases moulting while body size increases what is characteristic generally for lantern flies. Increase sensory pits in number and disturbing their developed for F - D one row arrangement on abdomen of nymphs of Aluntiinae can be connected with pulling out the abdomen and do not prove any direct relation to Fulgoridae.

All circumstances listed above demonstrate necessity of further more detailed studies of Aluntiinae based on large material to solve definitely its status and relationships.

Supposed primitivness of the subfamily Aluntiinae matches with the high originality of their elongated body and long legs.

Laying eggs on plants, characteristic for Fulgoridae (also for Aluntia judging after its ovipositor) determined their transfer to trees (see p. 5) ; however, this way of laying eggs can be adopted also in grassy flood land, river banks vegetation etc. The biology of Aluntia is unfortunately unknown but if to use, let us say, palaeontological method, then the general appearance of Aluntia speaks in favour of its living in grassland and even in grass-sedge habitats. It is not excluded that Aluntiinae are early side branch of Fulgoridae that retreated from trees to floated grasses.

Subfam. DICHOPTERINAE (Melichar, 1912), stat.n.

Dichopterini Melichar, 1912, fam. Dictyopharidae.

Large insects with weakly produced head; appearance as usual for Fulgoridae and Dictyopharidae. Head with a short process bent up, roughly 3 times narrower than pronotum; vertex almost equally broad to eyes; before eyes vertex depressed under obtuse or right angle, bent into two parts, the border of the benting is without plica. Hind horizontal part slightly longer than broad or both are equal, with parallel keel-like sides and less sharp arcuately depressed hind margin. Central keel practically not expressed. On a benting line the vertex sharply, by means of a step became 2 - 3 times narrower, its lateral keels above the benting line initiall go parallel, then acute or obliquely-angled merge together toward apex. Above (in front of) apex of vertex goes quite long apical keel, situated on a continuation of flatness of upper part of vertex. Frons triangular in outline, slightly convex up to its apex when seen in profile, confluent at apex under acute angle with apical keel that continues line of vertex. (?Central, ~~middle~~) срединный (Median) keel of frons starts distinctly deviating from base and continues toward apex; it is thickened in its midlength. Intermediate keels of frons start below the central one slightly deviating from base of frons, independently near each other or merge together arcuately there; in middle part they go parallel thus gradually converge toward narrowly rounded apex. Lateral keels of frons in front and below antennae are flattened into convex blades,

slightly covering antennal cavities. Lateral lobes of frons broad at base, then progressively narrowing toward apex; in front of eyes they are approximately equally broad as the central (middle) [lobes]; in upper part the lateral lobes are turned away toward lateral sides of head. There are no praeocular keels. Ocelli well developed, situated above antennae close to eyes and out of margin of frons. Antennae small with short cylindrical first and thicker roundish second segment on which rhinaria are moderately groupped and the primary pattern of their distribution is not observable. Clypeus with a sharp central keel and sharp lateral ones that on anteclypeus are developed only in basal half and merge together in its midlength.

Pronotum as characteristic for Fulgoroidea, developed lower keel of flank and the upper keel that anteriorly uninterruptly passes into postocular one. The disc produces anteriorly in a form of an acute near right angle, its antero-lateral margins bordered with keels (anterodiscal), central keel of the disc sharp; from the central keel the pronotum mildly roof-like bents down to sides. Between postocular and anterodiscal keels there is a small interruption but the keels look like if they were continuation of each other. Hind margin of pronotum above is basically straight, at sides anteriorly of tegulae it is bent out antero-laterad, as usually. Scutum with three longitudinal keels approximately parallel to each other. Epimers of mesosternum without keel directed to the costal margin that is characteristic for Dictyopharidae as well as for Fulgoridae.

Fore wings transparent (in some areas with sordid brown patches) without supplementary transverse veins, basic trunks many times branched before reaching apex, as in Fulgoridae; media has up to 15 terminal branches, and at the margin of wing among terminal branches approximately from media to anterior cubitus there are longitudinal folds (lines of a weak flexion). Nodal line runs from base of pterostigma roughly to apex of clavus, it is marked by builded into one angulate (zigzac--shape) line of transverse veins, and it distinctly divides the wing into poor in veins corium and rich in veins terminal membrane, for all trunks passing this line branch twice or three times; density of veins increases suddenly 2 - 3 times. Prior to the nodal chain of veins media divides into 3 branches subsequently sending off 2 branches anteriorly or posteriorly and cubitus anterior divides. Radius and media diverge at hind (distal) margin of basal cell. Clavus closed with one transverse vein in middle part joining cubitus posterior with postcubitus. Hind wing also practically without supplementary transverse veins. Media has about 5 terminal branches, cubitus anterior 6 - 7. Branches of the 1st anal vein only slightly diverge, apical part of its hind branch broadened against margin. Second anal vein broadened on its whole length and do not reach wing margin. Distinctly expressed are longitudinal folds, medial and anterior and posterior cubital.

Legs moderately slim. Anterior trochanters long, reaching behind apex of clypeus. Medial trochanters with distinct meracanthus. Hind tibiae with 2 teeth in primary-ventral group and 4 in primaryanterior one. Teeth on apices of 1st and 2nd segments of hind feet without subapical setae.

Abdomen of the usual construction. Stigmas large as is characteristic for most of Fulgoridae.

Male genitalia (not dissected). Anal tube near base curved in an obtuse angle outline in profil, narrow, with a weak incision at apex. Harpagone with solid apical hook (tooth).

Female genitalia (not dissected). Ovipositor of the type of Fulgoridae without separated appendix on hind margin of lower lobes of the 3rd valvae, upper lobes well developed.

Nymphs not described, unknown to me.

Material. Dichoptera hyalinata F.; 1 ♂, 1 ♀; D. hampsoni Dist.: 1 ♂ , 1 ♀; Dichoptera sp.: 1 ♂.

Composition and distribution. Only genus Dichoptera Spinola is to be truthworthy included into subfamily Dichopterinae; the subfamily is restricted in distribution to the Oriental region.

Systematic position. Majority of characters that facilitate to make answerable the material available to me speak in favour of assignation Dichopterinae to Fulgoridae. The characters are as follows: (3) absence of the supplementary benting under of the jugal fold in hind wing, (4) lack of hind discal keels, (5) hind margin of pronotum straight, (6) longitudinal postfurcal keels of mesonotum divergent caudad (7) there are no specialized setae (sarcochaetae) on apices of 1st and 2nd segments of pro- and mesotarsi, (8) there are no subapical setae on apices of 1 - 2nd segments of mesotarsi, (9) there are only 2 primaryventral teeth on apex of tibia, (10) anterior trochanters long, exceed apex of clypeus, (12) arolium reduced, (14) ovipositor without appendix on the lower lobe of the 3rd valvae, its hind margin soft. Some characters as, for example, length of legs (11) or suture on 1st tergite of abdomen (13) do not allow to make choice. Against assignation of Dichopterinae to Fulgoridae speak characters mostly characteristic for Dictyopharidae, as: (1) lack of secondary transverse veins on tegmen, (2) closed clavus, (16) developed upper tooth of harpagone of male. However, secondary transverse veins quite probably could have disappear secondarily (tertiarily), closed clavus occurs secondarily in some undoubtful Fulgoridae of which close relation to the forms having open clavus was already proved, and, finally, upper tooth (of harpagone) is not always absent in Zanninae and, maybe in some other typical representatives of Fulgoridae. All this summarising allows quite truthworthy to include Dichopterinae to a number of primitiv

but already sufficiently formed Fulgoridae and to suppose that lack of supplementary transverse veins on tegmen is secondary.

On the phylogenetic tree Dichopterinae evidently have to be put between Alunti-inae and Zanninae despite of some characters as if they were shifting them close to Enchophorinae and Aphaeninae.

Dichopterinae have above that also some characters of particular specialization (apparently secondary) that can not be used as evidence of relation Dichopterinae to any of the alternative families. This is, for example, lack of keel on epimere of mesosternum that would go parallel to the costal margin of wing, subapical thickening of hind branch of the first anal vein and zigzag-shape plica in hind cubital field.

Subfam. DORYSARTHRINAE Emeljanov, subfam.n.

Type genus Dorysarthrus Puton, 1895.

Medium size insects, comparable with Dictyopharidae in respect of size and general appearance. In outward appearance closely resemble also Zanninae but smaller Head strongly produced into straight cylindrical process, in front of eyes the process is separated by means of semi-ring-shape plica from the head proper and in living specimens it can bent up along this articulation. Frontal part of head below the plica weakly sclerotized and easily bents without suture. Postocular swelling with its apex blunted and bent backwards. Antennae small with ball-like second segment Keels on vertex got smooth, vertex transversely convex. Lateral keels of frons also strongly become smooth in front of eyes but got prominency again toward apex. Intermediate keels of frons merge together in an arrow-shape arch on the lower anterior side of swelling. Midlength of fronto-vertical margin and a point of merging of intermediate keels of frons joined by means of quite long apical keel. Margin of vertex in front of articulation plica goes down the lateral sides of head, pushes aside (narrowers) praeocular field and passes into arch-shape convex edge of the plica. Postclypeus deeply trapezoid-shape juts into frons. Sides of frons and postclypeus bordered with distinct low keel, central keel on postclypeus absent. On anteclypeus central keel is distinct and there are rudiments of lateral keels in basal part as characteristic for most of Fulgoridae.

Pronotum with weakly concave hind margin and strongly getting smooth keels, hind lower angles of flanks of pronotum slightly pulled out backward and rounded at apices. Scutum triangular also bearing strongly smoothered keels.

Tegmen elongated with more or less parallel hind and anterior margins, apex more or less rounded. Venation as usual for Dictyopharidae and Fulgoridae but branch of longitudinal veins not integrated together, supplementary veins on remigium also not expressed. Clavus closed, there is one normal transverse vein joining claval suture (CuP) and postcubitus before its merging with 1st anal vein; sometimes there

are supplementary veins expressed by means of pigmentation. Terminal membranes only slightly overlaping. Hind wings at rest without supplementary 3АБОРОТ peculiar for Dictyopharidae.

Legs relatively short and thick, of that general structure as in Zanninae. Anterior trochanters long, continue backwards behind apex of clypeus. Hind tibiae with 7 (8) teeth at apex; in distinctly separated primaryventral group always only 2 teeth. The 1st and 2nd segments of hind feet with subapical setae on teeth of the distal margin.

Abdomen of the usual structure, without fields of wax glands.

Male genitalia with harpagones devoid of apical hook. Penis with expanded bubles (chambers), short straight hooks with blunt apices slightly extending outside of the mouth of theca.

Female genitalia of Fulgoridae - type, without appendix of lower lobe of the 3rd valvae of ovipositor.

Nymph (V instar). Nymph has appearance of imago but head process is without traces of articulation and practically it is slightly longer than in imago. Keels of head and [ея] whole anterior part of body sharp. Central keel of frons not expressed. Lateral lobes of frons bear on their whole length scarce sensory pits, groupped into two indistinct rows, at apex of frons the pits are crowded. Central keel of vertex substituted by sulcus. On pronotum, like on other two [? compounds] segments ТЛЕНИК of chest the central keel doubled, it means expressed in form of a suture with keel-like excavated lateral margins. Lateral keels of disc fully expresse the disc as a whole has a shape of antero-posteriorly elongated six-angular figure. Lower keel of flanks of pronotum behind eyes passes into anterior keel of the upper side of pronotum. Hind parts of upper keels of flanks show uniformity with postocella keel, that is considerably bent out of anterior margin of pronotum. Anterior part of upper keel of flank hardly observable. Sensory pits are situated on disc near its lateral keels in one row of 4 pits and one supplementary pit in the second row. Sides of upper side of pronotum bearing 4 - 5 basal pits at anterior margin and two not distinct and incomplete supplementary rows. In supra-keel part there are two rows of sensory pits, in the outside (lower) one there are usually 5 pits, in the inside row 3. In infrakeel part 3 - 5 pits are arranged in one or two rows. On meso- and meta-thorax there are roundish groups of pits outside of discal keels. On nymphal wings except these there are 2 indistinct groups of pits in central and apical (hind) part there are no pits on costal field. On feet of hind legs two first segments are with subapical setae on some of the teeth. Abdomen of an usual appearance. First segment without sensory pits, with double keel-suture. Subsequent II - VIII tergites with straight central keel, III - VIII segments except that have sublateral keels and IV - VIII also have sensory pits. On lateral fields sensory pits expressed only on

VII - VIII tergites, on IV - VI tergites toward inside of sublateral keels there are 1 + 3 or 1 + 2 sensory pits; on VII - VIII toward inside of sublateral keel, where spread fields of wax glands, sensory pits absent. On IX tergite 2 sensory pits on each side. Wax glands fields absent.

The new subfamily differs from relatively near subfamily Zanninae in nymphs by presence hind discal keels on pronotum and strong development of lower keels of flan and also by absence of a field of wax glands on VI - VIII tergites of abdomen.

Material. Dorysarthrus mobilicornis Puton: 1 o, Iran, Farsistan, Abade, 10 VII 1955 (Steinberger), 1 nymph of V instar, Israel, Ein Gedi, 14 VI 1958 (Linnavuori); Dorysarthrus sumakovi Oshanin: large series of imago and nymphs from various parts of Soviet Middle Asia.

Composition and distribution. The genus Dorysarthrus, single in described subfamily, comprises of 4 species (separate identity of most of them doubtful) whic are distributed in southern Turan (from south of Manghyshlak, south of Ust-urt and south of eastern Kyzyl-kum), Iran, Syria, Israel, Egypt and south Arabia.

Systematic position. The overwhelming part of alternative characters allows to assign Dorysarthrinae to Fulgoridae: (1) supplementary veins on tegmen, (2) lack of supplementary plica on hind wings, (5) straight hind margin of pronotum, (6) diverge caudad postfurcal keels of mesosternum, (7) lack of specialized setae - sarcochetae on 1 - 2 segment of 1st and 2nd feet, (9) presence of only 2 primaryventral teeth apices of hind tibiae, (10) long anterior trochanters, (11) legs relatively short, (14) ovipositor without appendix on lower lobes of the 3rd valvae, (16) harpagone without apical hook, (17) линочный [?moulting] suture on the 1st abdominal tergite, (18) sensory pits with elevated margins. Some characters do not provide exa answer. Similarity to Dictyopharidae is expressed in 3 characters: (2) clavus closed (4) presence of hind discal keels in nymphs, (8) subapical setae on 1 - 2 segments of hind feet. However, these characters not that much based and it can be supposed their secondary development when there are taken under consideration special conditi of way of life of the genus (kserofil in deserts) and small size of representatives.

Serving as supplementary evidences for belonging Dorysarthrinae to lantern flies are characters of similarity of Dorysarthrus with Zanna (Zanninae), listed above (p.

Subfam. LYNCIDINAE (Schmidt, 1915)

Lyncidini Schmidt, 1915, fam. Dictyopharidae

Lyncidinae: Emeljanov, 1969, fam. Dictyopharidae.

Elongate-oval, slightly dorso-ventrally flattened insects with short head, shortened up to the half of abdomen convex tegmens and developed hind wings of which margin at rest reaches margins of tegmens, legs long.

Head short, only slightly produced in front of eyes. Frons and vertex narrow,

breadth of vertex equal to transverse diameter of eye. Breadth and length of vertex comparatively equal, hind margin of vertex without sharp border with occiput, anteric margin arrow-like parabole convexly rounded and bordered with a thick keel, lateral margins of vertex strongly leaf-like broadened and rised up under an angle. Central keel of vertex distinguished as a weak furrow. Border of frons and vertex with transverse furrow divided in middle by small tuber-like protruding of the frons that is separated from vertex by a distinct plica. This allows to recognize the head structur as a variant that is characteristic for subfamilies Aphaeninae and also Poiocerinae. The keels closing fronto-vertical (upper frontal) furrow from sides and continuing lateral keels of frons up to the vertex appear, by that means, to be praeocular keels and that the lower keel of the upper frontal furrow has composed construction. The tr lateral keels of frons as in majority of Aphaeninae, within the furrow become reduced and praeocular field got fused with upper parts of lateral lobes of frons. Upper part of frons under the furrow slightly bent out on the surface of vertex, remaining part of frons flat. Frons broadened before clypeus, the broadening takes place at a cost of leaf-like laterally compressed lateral keels of frons which below antennae roundis extend laterad; from antennae up to the vertex the lateral margins of frons depresse , narrowing toward fronto-vertical [sulcus ? furrow] исполбок where almost under right angle they pass into frontal (lower) margin of the furrow, and praeocular keels serve as straight continuation of keels of the sides of frons. Intermediate keels of frons run side by side near to central keel and close in with it, before base and before apex of frons they became indistinct. Lateral lobes of vertex, each separately at upper margin roughly 1.5 times broader than the inner ones combined; lateral lobes of frons below on blades are roughly 2 times broader than at apex. Border of frons an clypeus straight. Bases of antennae situated in not deep cavity on upper margin of which there is situated normally developed ocellus. Ring-like first segment of antenn surrounded by membraneous sleeve-like elevation. Second segment of antenna elypse-sha directed obliquelly dorsad, third segment with flagellum situated on outer lateral wall on some distance from top [?of the 2nd segment]. The second segment covered with not groupped rhinaria which are distributed in accordance with a distinct пятисмен [? five times repeated] scheme that is characteristic for Dictyopharidae and which is supressed in most of Fulgoridae by means of a secondary groupping. Around the 3rd segment there are distributed 5 rhinaria, from four of them (two lower and two latera go along lower surface four parallel rows of rhinaria, 5 in each row; above there is also observable final scheme of distribution of rhinaria that is characteristic for Cixiidae, Dictyopharidae and many other families. Postocular plicas (extending folds) are expressed in form of thick blunt keel which is parallel to the hind margin of eye Postclypeus with 3 sharp keels, lateral keels at frons higher. On anteclypeus lateral

keels expressed only in basal part, they are sharp there, distinctly shaped.

Pronotum with narrow and narrowing anteriad trapezoid disc, the lateral margins of which reach hind margin. Central keel hardly observable. There are upper and lower keels of flanks of pronotum, the upper keel anteriorly fluently passes into postocula one which does not reach keels of disc. Hind margin of flanks of pronotum bent backwards and supresses from outside the bases of tegmen, lower keel of the flank goes at upper margin of the expanded part further back than the upper one which ends befor tegula, on its part the tegula is situated above bent backwards already described bla Hind margin of upper side of pronotum slightly convex in the centre almost straight and before tegulae with quite sharp incision laterally, the incision hosts tegula and outside passes into margin of hind expanded blade of flanks of pronotum. Scutum of mesonotum with distinct central keel and sharp lateral ones which anteriorly fluently curve inside, then pass into anterior keel which is interrupted in the middle.

Tegmens (elytrae)together form single elongated antero-posteriorly moderately convex surface. Hind margins of tegmens at suture not broadly rounded, costal margins with depression at the border of chest and abdomen. Tegmens with keel-like sharply extending longitudinal veins and slightly less sharp transverse ones which are groupped in apical part of wing and also on costal field behind incision and along the rudiment of claval suture. As results from counting of veins from claval suture and from construction of the costal field, in the costal field from the base of wing goes secondary longitudinal vein which in distal part of the costal field zigzag-shap curves and get lost among the network of transverse veirs; in basal part of the costa field this secondary vein although little differs from the essential longitudinal veins by thickness it curves fluently and flat wave-shape. Ordinary essential longitudinal veins maintain distinct shape and straightness practically up to the very margi of wing and maintain usual scheme of location and subsequent distribution that is characteristic for Dictyopharidae and Fulgoridae. Radial vein (R + true Sc) in the middle of wing bifurcates, its anterior branch straight and keel-like sends off behind not keel-like lower hind branch which curves and soon goes parallel to the anterior one. Media straight keel-like and unbranched up to the apex. Anterior cubitus straight and also unbranched, in its hind part weakened; hind cubitus , vice versa, weakened in its anterior part and becames keel-like in hind part, more or less opposite of tip of clavus it sends off weakened hind branch. Postcubitus and first anal branch go, as usually, and merge together near midlength of clavus, but first anal vein and continuing it the unified vein are very sharply keel-like elevated, while free postcubitus is distinctly less sharp. Hind end of claval vein ($PCu + A_1$) is interrupted by transverse vein joining it with the vein of hind margin (A_2). Rudiment of a claval suture goes down hind cubital vein behind apex of claval vein turns off parall

to the hind margin of wing and get lost among network of transverse veins, it means clavus is open. Peripheral membrane developed in a shape of more broad field only along suture of tegmens starting from transverse vein bordering claval vein from behind. Since venation is slightly dezorganized, sometimes near claval suture two parallel branches of Cu and PCu can in some points merge together and separate again. Hind wings do not show at rest any supplementary SAbopoT as in Dictyopharidae, their venation not studied.

Legs slim and long, anterior and middle ones with thin tibiae and an incised step on femori before their apices at slightly broadened here anteroventral keel. Anterior trochanters quite long, a little bit do not reach apex of anteclypeus. Media trochanters without meracanthus. Hind tibiae at apex with three teeth of primaryventral group and with 4 teeth of primaryanterior one.

Male genitalia not dissected. Harpagones apparently without upper tooth.

Female genitalia. Anal tube simple quite narrow and long, parallel-sided with parabole-shaped hind margin. The 3rd valvae of ovipositor very much convex, almost ball-like, behind anal tube up to the bases of 1st valvae tidy closed to central line of body with their straight margins. Upper lobes of the 3rd valvae narrow, completely fused with the lower ones and covered with the anal tube. The lower lobes without any trace of appendix that is characteristic for Dictyopharidae. General plan of structure of the 1st valvae common. Lower lobes fleshy and up to the base longitudinally divided into three, upper lobes with transverse row of teeth-combs showing something like a piece of gear. Second valvae of ovipositor simple, without character of particuliarity. Merging together lobes of the 3rd valvae of ovipositor characteristic as for many subfamilies of Fulgoridae, in part also Aphaeninae, however in all these cases the very apex of the upper lobe is preserved in a shape of separated small blade. In Lyncides such a blade disappeared.

Nymph not described and unknown to me.

Material. Lyncides conquerelii Sign.: Madagascar, Périnet, 1 o, 12 III 1932 (Seyrig); Analamazotra: pr. Périnet, 1 ♂ , 1 o, XI 1930 (Clsufev).

Composition and distribution. To this subfamily truthworthly refers only one endemic for Madagascar monotypic genus Lyncides Stål.

Systematic position. Most of the characters of Lyncides speaks in favour of its assignation to Fulgoridae: (1) supplementary veins on tegmen, (2) open clavus, (3) lack of supplementary folding of hind wings, (5) straight hind margin of pronotum, (7) lack of specialized setae - sarcochetae on 1 - 2 segments of anterior and second feet, (8) lack of subapical setae on teeth of 1st and 2nd segments of hind feet, (14) ovipositor without appendix on the lower lobe of 3rd valvae. Against assignation to Fulgoridae speak some characters of legs, connected apparently with stressing their role in connection with lost of flight ability: (11) legs, also

hind, long, but (10) trochanters do not exceed apex of anteclypeus, (9) at apices of hind tibiae 3 primaryventral teeth. Elongation of anterior trochanters to certain extend is connected with arboreal way of life, in elongation of tibiae and femori there is no such correlation.

Belonging Lyncidinae to Fulgoridae is supplementary confirmed by characters of similarity to supposingly near to them superfamilies [sic!] Enchophorinae and, in particular, Aphaeninae, mentioned earlier (p. 10).

Diagram.

Outline of the scheme of phylogenetic relations in family Fulgoridae and connections of families Fulgoridae and Dictyopharidae.

Key for Subfamilies of the Family Fulgoridae

The Key is adapted from Lallemand (1959) and supplemented with newly introduced subfamilies.

1 (24) Head with distinct head process or upper margin of frons (border of frons and vertex) in a form of a narrow furrow or slit

2 (5) At well defined head process no trace of praeocular keel nor tooth on its place

3 (4) Subapical setae on teeth of the first two segments of hind feet. There is a keel on the epimere of mesosternum, the keel is parallel to costal margin of wings at rest. Lateral postocular part of occiput very long .Aluntiinae

4 (3) No subapical setae on teeth of the first two segments of hind feet. No keel on the epimere of mesosternum under costal margin of wing in resting position. Postocular part of occiput in form of not broad postocular ~~cylinder~~ flange [extending plica] . . . . . .Dichopterinae

5 (2) Praeocular keel or tooth on its place

6 (15) Head produced forward forming head process. Whole surface of vertex flat horizontal, not bend forming two surfaces nor provided with transverse fold

7 (10) Border of frons and clypeus strongly curved. Clypeus deeply jut into frons

8 (9) Head process simple (unbroken), praeocular keel situated on shorter distanc to eye than the eye width

9 (8) Head process interrupted from above and from sides by plica-junction which margins at sides correspond to praeocular keel. Distance between the keel and eye longer than the eye width . . . . . Dorysarthrinae

10 (7) Border between frons and clypeus more or less straight, transverse

11 (14)Head with eyes much narrower than pronotum

12 (13)A sharp tooth before eye . . . . . .Fulgorinae

13 (12)A straight regular praeocular keel before eye . . . . Hotininae

14 (11) Head as broad as pronotum . . . . . .Amyclinae

15 (6) Head not produced into process or the process narrow and bent backward, then vertex bent onto two surfaces and its apical part turned down

16 (23) Primarily ventral cluster of teeth at apices of hind femora consists of two teeth. No longitudinal false vein on costal area

17 (20) Head as broad as pronotum or only slightly narrower

18 (19) Head slightly narrower than pronotum, often more or less prominently produced forward of eyes, a small protrusion on praeocular area Xosopharin

19 (18) No keel, thorn nor tubercle on praeocular area . . . . Poiocerinae

20 (17) Head with eyes always narrower than pronotum. On praeocular area keel or tubercle before eye

21 (22) Head with longer or shorter head process not jut into hind part of verte- Pronotum roof-shape [trapezoidal] with very narrow medial keel Enchophorin

22 (21) Frons and basal part of vertex divided by furrow, sometimes there is very small head process bent backward and jut into vertex . . . Aphaeninae

23 (16) Primarily ventral cluster of teeth on apices of hind tibiae consists of three teeth. There is secondary vein between costa and radius (it means on costal area). The vein is similarly developed as others [at its base] but soon becoming less distinct and loosing its straightness. Fore wing shortened reaching end of abdomen . . . . . .Lyncidinae

24 (1) Head short with transverse anterior margin being simply border of frons and vertex . . . . . Phenacinae