

Central Finland. Ann. Zool. Fenn. 5, p. 188 – 193. — PALM, T. 1933. Några iakttagelser i samband med ett massuppträdande av insekter vid stranden av Vättern. Ent. Tidskr. 54, p. 103 – 105. — PALMÉN, E. 1944. Die anemohydrochore Ausbreitung der Insekten als zoogeographischer Faktor, mit besonderer Berücksichtigung der baltischen Einwanderungsrichtung als Ankunftswege der fennoskandischen Käferfauna. Ann. Zool. Soc. Vanamo 10, p. 1 – 259. — PALOSUO, E. 1965. Duration of the ice along the Finnish coast 1931 – 1960. Merentutkimuslait. Julk. 219, p. 1 – 49. — PLATONOFF, S. 1940. Beobachtungen über windgetriebene Insekten im Petsamofjord an der finnischen Eismeerküste. Notulae Ent. 20, p. 10 – 13. — RUDINSKY, J. A. 1962. Ecology of Scolytidae. Annual Rev. Ent. 7, p. 327 – 348. — SAALAS, U. 1923. Die Fichtenkäfer Finnlands II. Ann. Acad. Sci. Fenn. A 32, p. 1 – 746. — 1931. Über die Verbreitung der Borkenkäfer (Ipidae) in Finnland. Verh. Deutsch. Gesellsch. angew. Ent. E. V. Rostock 1930, p. 65 – 71. — SILFVERBERG, H. 1968. On the distribution of Coleoptera in the Tvärminne archipelago. Notulae Ent. 48, p. 1 – 21. — STENIUS, G. 1936. Beiträge zur Kenntnis der Coleopterenfauna im Kilpisjärvi-Gebiet. Acta Soc. Faun. Flor. Fenn. 58: 6, p. 1 – 18.

Preliminary key for the identification of the nymphs of North European Homoptera Cicadina.

I. Delphacidae.

J. VILBASTE

Institute of Zoology and Botany Academy of Sciences of the Estonian S.S.R.

Hitherto, the nymphs of *Homoptera Cicadina* have been considered to be undeterminable, and very few descriptions of nymphs of different species have been published. As far as the author is aware, the only investigation devoted to the determination of some European *Delphacidae* species is that published by HASSAN (1939) and even his key is mainly based on colour characters.

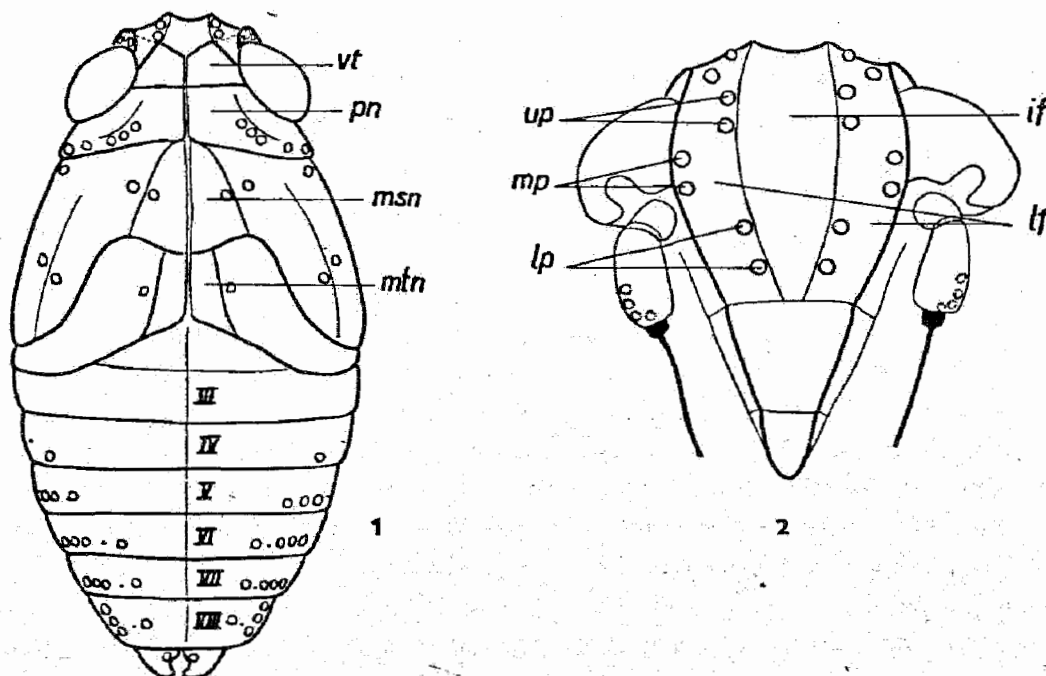
During his investigations on the Estonian *Cicadina* the author has collected nymphs as well. In the absence of any special keys for their identification, it was necessary to resort to indirect methods. Adults and nymphs occurring simultaneously in a sample were considered to belong to the same species. If the nymphs present with several different samples of a given species proved to be identical, the author concluded that his determinations were correct. To a certain extent, rearing experiments were also undertaken. A number of species were also received from the following colleagues: Dr. W. WAGNER (Hamburg), Dr. H. STRÜBING (Berlin), Dr. M. RAATIKAINEN (Helsinki) and Dr. J. DLABOLA (Prague). The

author expresses his sincerest thanks to them all. The author is also very grateful to the Board of the Finnish Entomological Society for having included this article in their journal.

Although this key is somewhat incomplete (comprising only about 3/4 of the genera) and despite possible errors in it (due to the indirect method of identification) the author hopes that the present publication will serve to promote knowledge of this very unexplored field of homopterology.

Description of nymphs of Delphacidae.

As is well known, the nymphs of *Cicadina* (Fig. 1) mainly differ from the adults in the absence of wings, although their oriments (the so-called wing pads) appear as early as the second instar. The instars are distinguishable from each other by the stage of development of the wing-pads (Fig. 3). They are also distinguishable by the measurements of different parts of the body (total length, length of hind femur, breadth of head, etc., whereas their index of increase is usually 1.3—1.5), by the increasing number of teeth on the calcar, etc.



Figs. 1 - 2. — 1. A *Delphacidae* nymph (*Struebingianella lugubrina*), dorsal view: vt = vertex, pn = pronotum, ms = mesonotum, mt = metanotum, II—VIII = abdominal tergites. — 2. Face of a *Struebingianella lugubrina* nymph: if = interfrons, lf = laterofrontes, up = upper pits, mp = median pits, lp = lower pits. — Orig.

As indicated by various authors, e.g. ŠULC, 1928; LINDBERG, 1939; LINNAVUORI, 1951; LIEBENBERG, 1956; LE QUESNE, 1960; WAGNER, 1962, etc., in almost

all nymphs of *Fulgoromorpha* special organs — sensory pits — exist. These were investigated by ŠULC (1928) and more recently by LIEBENBERG (1956). These pits consist of round or elliptical depressions in the cuticle, in one edge of which is inserted a hair-like structure, which lies horizontally across the depression. They occur in all the known species of *Delphacidae* and also in the adults of the genus *Achorotile* FB. (and the North American genus *Laccocera* VD.). These sensory pits are probably modified hairs, transformed to sense organs as an adaptation to life among dense vegetation.

LINDBERG (1939) was the first to show that the number and arrangement of these pits is constant up to the second nymphal instar. This observation has been confirmed by the author. It is the number and arrangement of the sensory pits that provide the most reliable characters for identification of *Delphacidae* nymphs.

H e a d. The nymphs of *Delphacidae* have keels like those that occur in the adults, except that on the frons there are always two median keels (cf. WAGNER, 1962). The hind part of the head (called hind cavities by various authors) comprises the vertex. The hind parts of the spaces between the median and lateral carinae also belong to the latter. In most species an oblique suture cuts off a small triangular sclerite. The fore part of the dorsal surface of the head anterior to these sclerites apparently belongs to the frons.

The frons always has two median carinae. These are usually situated quite near to one another, so that the space between them — the interfrons — is narrower than the lateral areas — laterofrontes. Only in a few genera is the interfrons of the same breadth in the middle as the laterofrontes or even somewhat broader (*Stiroma* FB., *Stiromella* WG., *Struebingianella* WG., *Ditropis* FB., *Criomorphus* CT.). In *Chloriona* FB. the interfrons is considerably broader than the laterofrontes. The interfrons is usually broadest in the middle and becomes narrower downwards, where the frontal keels can unite with one another. In one species (probably *Eurysula lurida* FB.) they have rather a long common stem. In South European *Asiraca* LT. they are situated quite close in the upper part of the frons and become continuously wider separated downwards.

On the laterofrontes there are usually three pairs of sensory pits on both sides, named as the upper, median and lower pits respectively (Fig. 3). The upper and lower pits are situated beside the median keels, whereas the median pits lie near the lateral keels. On the fore part of the head there is one more pit at the lateral keel and already on the dorsal surface of the head two pits at the medial keel. As these latter pits do not show specific variability they are not named. In *Asiraca* the number of pits is somewhat greater and their arrangement is somewhat different.

T h o r a x in nymphs of *Delphacidae* is relatively uniform. The lateral keels of the pronotum usually appear only in the last two instars. They do not generally reach the hind margin. Only in *Stenocranus* FB., *Chloriona* FB. and *Megamelus* FB. are they turned towards the hind margin, finishing somewhat

before it. Behind the lateral keels there are usually 3 sensory pits. In genera with the lateral keels turned towards the hind margin, two of these pits are medial of the end of the keel, the third being lateral of it. In *Asiraca* there are only two pits, one of which lies medially, the other laterally. At some distance from this group

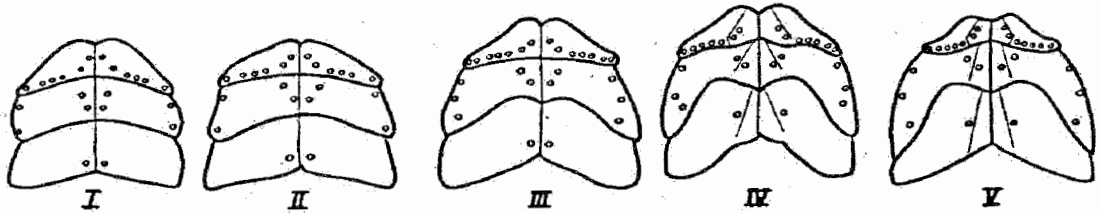


Fig. 3. Development of thorax in *Delphacidae* nymphs (schematically): instars I - V. (After LINDBERG, 1939).

there is one pit (behind the hind corner of the eye) and somewhat more laterally still 3-4 pits (in *Asiraca* only 2). Of these, usually only the median pit is visible from above, whereas the others lie on the side lobe of the pronotum. In the two younger instars the mesonotum, to which the steadily enlarging wing-pads are attached, has two sensory pits in the middle and two in the lateral parts (on the wing-pads), while in the three older instars one accessory pit exists in the fore corner (absent in *Asiraca*). The medial pits and pits on the wing-pads are separated by a somewhat oblique longitudinal keel. In the metanotum there is only one sensory pit lateral of the oblique longitudinal keel.

In the legs a steadily increasing number of spines and teeth are observed. As they are rather difficult to identify, they are not used in the key.

The abdomen consists of 9 segments. The first three tergites are rather small and they appear from above as short \pm trapezoidal sclerites between the halves of the metanotum. The hind tergites are \pm quadrangular cross-plates. Only in *Asiraca* is there a sharp, strongly toothed ridge on the abdomen. The last 4-6 tergites also bear sensory pits and their number and arrangement is of systematic value. In most North European species tergite VIII bears 1 + 2 or 1 + 3¹ pits on both sides. In certain more highly evolved species there appears a tendency for the pit number to increase. In *Asiraca*, on the contrary, there are two median pits and one lateral one (2 + 1), while in East Asiatic *Saccharosydne procera* (M.M.) there are only 1 + 1 pits. Tergites VI-VII have 1 + 2 (in the more ancient forms), 1 + 3 or 1 + 4-5 (only in *Stenocranus*) pits on each side. Here, again, a tendency to increase the pit number is noted. But in all cases observed to the present day, this tendency is sporadic — it occurs only on one side, whereas on

¹) In the formulae of abdominal pits the number of median pits is always given first and after + the number of lateral ones.

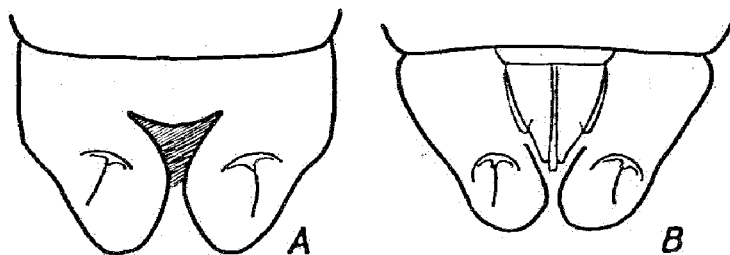


Fig. 4. Hind end of the body of a final instar nymph: A — male, B — female. (After LINDBERG, 1939).

the other side there is the normal number of pits. A decrease of number has not been observed yet. Tergites IV and V bear 0—3 pits each, depending on the species. The last segment (IX) usually bears 3 pits on each side. The median one is situated on the dorsal surface, whereas the two lateral ones are at the lower margin. Besides the sensory pits, very small, usually colourless pits also exist. In tergites VI—VIII they always lie between the median pit and the lateral group, in the front tergites usually near the side margin. The structure and function of these depressions is still obscure. The lower side of the body bears stigmata and trichobothria. The latter are also arranged in groups and their number increases steadily during development. They are not used in the keys.

Genital appendages mostly appear in the third instar of the nymph. In females they appear as two \pm prolonged structures (oriments of the gonapophyses of the ninth sternite — ovipositor) between two round lobes (Fig. 4 B). In males no oriments of the genital plates can be observed (Fig. 4 A).

Key to families of Fulgoromorpha.

- A (B) Postclypeus not distinct from frons. Median coxae short, their bases set close together. Body without sensory pits *Cicadomorpha*
- B (A) Postclypeus distinct from frons. Median coxae long, their bases widely separated (except *Tettigometridae*). Body usually with sensory pits *Fulgoromorpha*
- 1 (2) Head without sharp keels. Body strongly flattened dorsoventrally *Tettigometridae*
- 2 (1) Head with distinct keels and with sensory pits at least on frons. Body not dorsoventrally flattened
- 3 (4) Hind femora with foliaceous or awl-like calcar at apex (in young instars usually very small) *Delphacidae*
- 4 (3) Hind femora without calcar at apex
- 5 (6) Second segment of hind tarsi with teeth only on sides *Issidae*
- 6 (5) Second segment of hind tarsi with a row of teeth
- 7 (8) Tergites VI—VIII with »wax spots» (as white patches on a brownish ground). In tergites IV—V the rows of sensory pits extend almost to the mid-line of the tergite. The edges of the vertex rounded, not bordered by keels. Ground colour brown. Nymphs live in the ground *Cixiidae*

- 8 (7) Tergites VI—VIII without »wax spots»; white spots, if present, situated on the sides of the tergites. Sensory pits on tergites IV—V are situated on the sides. Vertex bordered with keels. Ground colour whitish or greyish. Nymphs live in decaying trees, where they probably feed on pore fungi *Achiliidae*

Key to genera of Delphacidae.

In delimiting genera, the author has principally followed WAGNER (1962), FENNAH (1963), etc., with the following emendations: From the genus *Eurysa* FB. (t.g. *Delphax lineata* PR.) the species *lurida* is separated and a new genus *Eurysula* n.gen. (t.g. *Eurysa lurida* FB. 1866) is created for it. From the genus *Muirodelpfax* WG. the species *albo-carinata*, *distincta* and probably also *haglundii* (unknown to the author) are separated and a new genus *Tyrphodelphax* n.gen. (t.g. *Delphax distincta* FL. 1861) is created for them. The subgenus *Acanthodelphax* LQ. 1964 is raised to generic rank. The very heterogeneous genus *Struebingianella* WG. (t.g. *Delphax lugubrina* BH.) is split up. For *elegantula* a new genus — *Hyledelphax* n.gen. (t.g. *Delphax elegantula* BH. 1847) — is created (to connect this species with the genus *Laodelphax* FNN. (LE QUESNE, 1964) is probably not correct either) and for the species *leptosoma* and *parlyphasma* *Florodelphax* n.gen. (t.g. *Delphax parlyphasma* FL. 1861) is created.

Most of these emendations are founded partly on the nymphal characters.

- 1 (2) Abdominal tergite VIII with 2 + 1 sensory pits. Fore legs laminately dilated *Asiraca* LT.
[*A. clavicornis* (F.)]
- 2 (1) Tergite VIII with 1 + 2 or 1 + 3 (4) pits. Fore legs not dilated
- 3 (34) Tergites VI and VII usually with 1 + 2 pits
- 4 (11) Head considerably longer than width between the eyes
- 5 (6) Interfrons much wider than laterofrons *Chloriona* FB.
- 6 (5) Interfrons narrower than laterofrons
- 7 (8) Keels delimiting vertex from the front ill-defined; vertex usually opens over the interfrons. Nymph unicoloured yellow or with wide dark bands on both sides extending from the eyes to the hind end of the body *Kelisia* FB.
- a (b) Unicoloured yellow *K. pallidula* (BH.)
- b (a) Abdomen on sides with ± dark longitudinal band (in very light specimens at least side parts of pro- or mesonotum darkened)
- c (d) The darkest part of this band lies on the sides of the pronotum. Tergite IV with one pit *K. ribauti* WG.
(here apparently also belongs *K. monoceros* RB.)
- d (c) The darkest part of the lateral band lies on the sides of the mesonotum or it is equally dark on both pro- and mesonotum. Tergite IV without pits
- e (f) Dark band equally dark in pro- and mesonotum *K. vittipennis* J. SB.
- f (e) Lateral band darkest on sides of mesonotum *K. guttula* (GRM.)
- 8 (7) Vertex delimited from the front with ± clear keels. Colour different

- 9 (10) Tergite V with only 1 pit (lies ca 5 σ^1 from the lateral edge of the tergite). Abdomen darkly marbled *Megamelus* FB.
[*M. notula* (GRM.)]
- 10 (9) Tergite V with 2 pits. The dorsal surface with dark brown pattern, considerably darker on the fore part of the body *Unkanodes* FNN.
[*U. excisa* (ML.)]
- 11 (4) Head as long as width between the eyes or wider than long
- 12 (13) Interfrons clearly wider than laterofrons. (Dorsal surface almost entirely dark brown) *Stiromella* WG.
[*S. obliqua* (WG.)]
- 13 (12) Interfrons as wide as or narrower than laterofrons
- 14 (15) Interfrons \pm as wide as laterofrons. Tergites IV and V without pits. Wholly ochreous yellow, including tips of katepisternites *Xanthodelphax* WG.
[*X. flaveolus* (FL.), *X. stramineus* (ST.)]
- 15 (14) Interfrons clearly narrower than laterofrons. Tergites IV or V bear sensory pits. Not wholly ochreous yellow. Katepisternites with darkened tips.
- 16 (25) Tergite V (sometimes also IV) usually with two pits
- 17 (18) Frons very wide, about as wide as long. Lower of upper pits of frons lies \pm at the same level as the higher medial pit. Pits of tergites VI and VII are situated at \pm equal distances from one another. Fore and median legs \pm diffusely ringed *Euryssa* FB.
[*E. lineata* (PR.)]
- 18 (17) Frons clearly longer than wide. Lower of upper pits is always somewhat dorsal to the higher median pit. In tergites VI and VII the median pit is usually somewhat farther from the others. Legs unicoloured or with longitudinal bands
- 19 (20) Keels of frons \pm straightly converging, almost uniting beneath. Abdomen dark brown, with \pm sharply delimited whitish patches *Hyledelphax* n.gen.
[*H. elegantula* (BH.)]
- 20 (19) Keels of frons \pm parallel, in the middle somewhat further apart from each other, widely separated ventrally. Colour of abdomen different
- 21 (22) Abdomen on the sides with a wide, dark brown band narrowing backward, with light pits. Side parts of thorax light brown, in pronotum dark brown. Lowest pit of frons very near clypeal suture (less than 1 σ) *Gravesteiniella* WG.²
- 22 (21) Colour pattern different, composed of spots or indistinct. Lowest pit of frons situated at a distance of at least 1 σ from clypeal suture
- 23 (24) Abdomen dark brown, with whitish and partly ochreous-yellow patches. Beside the light median line and light patches around the sensory pits there are black-brown dots. Thorax dark-striped, edges of sensory pits not darkened .. *Ribautodelphax* WG.
a (b) Median pit of tergite V lies 1.5 σ from the lateral one and clearly median of the pit of tergite VI. Dorsal surface of abdomen with wide (ca 1/2 width of tergite) light band along its entire length *R. albostratus* (FB.)
b (a) Median pit of tergite V lies 1 σ from the lateral ones and at the same level as the pits of tergite VI. Dorsal surface of abdomen with narrow median longitudinal stripe and with a row of light, posteriorly diminishing patches lateral of it *R. collinus* (BH.)
- 24 (23) Dorsal surface of abdomen light, colour pattern diffuse, without dark dots. Edges of sensory pits of thorax darkened on one side *Koswigianella* WG.
[*K. exigua* (BH.)]

¹ The symbol σ = diameter(s).

² The description is made from the Asiatic subspecies (*G. boldi tschikoica* Ks.).

- 25 (16) Tergite V with only one sensory pit
- 26 (31) Fore and middle tibiae \pm darkly ringed
- 27 (28) Dorsal surface of body and face transversely striated. Higher median pit of frons situated considerably beneath (1.5—2 σ) the lower of the upper pits *Delphax* ST.
[*D. crassicornis* (Pz.)]
- 28 (27) Dorsal surface and face without dark transverse bands. Higher median pit of frons lying at the same level as or only a little beneath the lower of the upper pits
- 29 (30) Lowest pit of frons lies very near (under 1 σ) the clypeal suture. The whole fore body and abdomen \pm unicoloured light brown; keels and median longitudinal line of abdomen somewhat lighter *Euconomelus* HPT.
[*E. lepidus* (BH.)]
- 30 (29) The lowest pit of the frons lies farther (1.5—2 σ) from the clypeal suture. Fore body marbled brown. Abdomen in addition to the light median line with a longitudinal row of light spots on both sides *Conomelus* FB.
[*C. anceps* (GRM.)]
- 31 (26) Fore and middle tibiae \pm unicoloured or longitudinally striated
- 32 (33) Lower of upper pits of the frons lies \pm at the same level as the higher median pit. Keels of the frons straight, \pm parallel. Body on sides with broad black-brown longitudinal bands, extending from eyes to tip of abdomen. Frons black in the upper part *Muellerianella* WG.
[*M. fairmairei* (PR.)]
- 33 (32) Lower of upper pits of frons lies clearly higher than the higher middle pit. Keels of frons clearly arched. Thorax with dark patches; abdomen with dark margins of tergites. Frons with dark longitudinal lines between light keels *Laodelphax* FNN.
[*L. striatella* (FN.)]
- 34 (3) Abdominal tergites VI and VII with 1 + 3 or 1 + 4-5 sensory pits
- 35 (36) Abdominal tergites VI, VII and also VIII with 1 + 4 or 1 + 5 sensory pits *Stenocranus* FB.
- 36 (35) Tergites VI and VII with 1 + 3 sensory pits, tergite VIII with 1 + 2 or 1 + 3 sensory pits
- 37 (38) Keels of frons united anteriorly of the lower third of the frons. At the site of the common stem only two lower sensory pits are present. Tergite V with 1 + 2 pits, the lateralmost of which is situated somewhat posterior to the others *Eurysula* n.gen.
[*E. lurida* (FB.)]
- 38 (37) If frontal keels unite, then only at the clypeal suture. Two pairs of lower sensory pits always present. In tergite V the median sensory pit is missing (0 + 3), the others are situated in a transverse row or the lateral one is situated somewhat anterior to the others
- 39 (42) Head much longer than width between the eyes. (Tergite IV without pits, tergite V with 1—3 pits.)
- 40 (41) Frontal keels almost united beneath, against clypeal suture. Lowest pit of frons lies not more than 3 σ from the clypeal suture. Higher median pit lies at the level of the upper pits. Small species — V instar (N_5) up to 2.8 mm. *Tyrphodelphax* n.gen.
a (b) Abdomen with two wide, dark brown longitudinal bands from the thorax to the end of the abdomen. Light band between them not interrupted by dark fore-margins of tergites *T. albocarinatus* (ST.)
b (a) Abdominal tergites bordered with dark bands, especially dark at sides, and with a light median line. This pattern become lighter posteriorly. Sometimes the whole abdomen is darkened, so that there only remain round light patches medially of the pits *T. distinctus* (FL.)

- 41 (40) Frontal keels clearly separated beneath. Lowest pit of frons lies about 4 ϕ from the clypeal suture. Higher median pit lies clearly below the lower of the upper pits. Large species — N_5 about 3.5 mm. *Calligypona* J. Sv.
[*C. reyi* (Fb.)]
- 42 (39) Head as long as or shorter than width between the eyes. Abdominal tergite V always with 3 pits.
- 43 (52) Tergite IV with pits (one or two) (see also Couplet 50)
- 44 (45) Tergite IV usually with two pits (rarely one). Totally ochreous yellow, including front parts of the head between the keels *Stiroma* Fb.
[*S. bicarinata* (H.-S.), *S. affinis* Fb.]
- 45 (44) Tergite IV usually with one pit (rarely absent — see Couplets 50 and 57). Colour different; if ochreous yellow, then fore parts of the head darkened
- 46 (47) Frontal keels usually unite beneath, sometimes with a short joint stalk. Almost totally ochreous yellow, only fore parts of head between keels darkened *Delphacinus* Fb.
[*D. mesomelas* (Bh.)]
- 47 (46) Frontal keels separated beneath. Usually with brown or black-brown colour pattern. Tips of katapisternites blackish
- 48 (49) Higher median pit of the frons lies clearly below the lower of the upper pits. Tergite VIII with 1 + 2 pits. Ochreous yellow, with dark brown longitudinal bands. Abdomen on both sides with two bands. *Megadelphax* Wg.
[*M. sordidulus* (St.)]
- 49 (48) Higher median pit of the frons lies at \pm the same level as the lower of the upper pits. Tergite VIII with 1 + 3 pits. Abdomen transversely striated (with dark fore and hind margins of tergites)
- 50 (51) Ochreous yellow with dark brown marbling. Interfrons almost as wide as laterofrons. Frontal keels diverging \pm straightly to the clypeal suture. (Pit on sternite IV may be absent) *Criomorphus* Cr.
[*C. albomarginatus* Cr., *C. borealis* (J. Sv.)]
- 51 (50) Totally dirty ochreous yellow, Interfrons considerably wider (about 1/3) than laterofrons. Frontal keels beneath the median dilatation almost parallel *Acanthodelphax*, LQ.
[*A. denticaudus* (Bh.)]
- 52 (43) Tergite IV usually without pits (see also Couplets 50 and 57)
- 53 (54) Tergite V with 1 + 3 pits. Median pit of the lateral groups in tergites V—VIII somewhat apart from the others (the distances increase in the fore tergites). Abdomen on sides with dark longitudinal lines *Muirodelphax* Wg.
[*M. aubei* (Pr.)]
- 54 (53) Tergite V without median pit (0 + 3, 0 + 2 or 0 + 1). Lateral pits of tergites V—VII forming a \pm continuous row. Abdomen without pattern or with dark transverse lines
- 55 (56) Tergite V with two pits, of which the lateral one is somewhat smaller. The lateral pits of tergites VI—VII are also smaller and lie somewhat anterior to the others *Ditropis* Wg.
[*D. pteridis* (Bh.)]
- 56 (55) Tergite V with 1 or 3 (equal-sized) pits. Lateral pits of tergites VI—VII are not smaller and usually lie in one row
- 57 (58) The higher median pit of the frons lies considerably below (about 1 ϕ) the lower of the upper pits. Ground colour ochreous yellow with brown longitudinal bands on thorax and transverse bands on abdomen. Tergite IV sometimes with one pit *Struebingianella* Wg.
[*S. lugubrina* (Bh.)]

- 58 (57) The higher median pit of the frons lies at about the same level or only somewhat below the lower of the upper pits (so that the upper edge of the former is at least at the same level as the lower edge of the latter). Colour different
- 59 (60) Legs with weak dark rings. Tergite VIII with 1 + 3 pits, the lateral ones situated in a longitudinal row. Tergite V with only one pit. Abdomen with dark spots between the pits *Euides* FB.
[*E. speciosa* (BH.)]
- 60 (59) Legs without rings. If in tergite VIII 1 + 3 pits exist, they are situated in a triangle. Tergite V mostly with 3 pits (only in *Javesella dubia* — usually 1). Abdomen with indistinct pattern
- 61 (62) In tergites V—VII the median pit of the lateral group is apart from the lateral ones (their distances increase in the fore-tergites). Totally ochreous yellow, only keels and longitudinal midline of abdomen whitish. Surroundings of the pits ± weakly darkened. Tips of the katapisternites light *Dicranotropis* FB.
[*D. hamata* (BH.)]
- 62 (61) Lateral pits of tergites V—VII form a continuous row. Ground colour greyish or dark brown. Tips of katapisternites always dark *Javesella* FNN.
- a (h) Tergite V with 3 pits.
- b (c) Tergite IV with one pit. Dorsal surface ochreous yellow, with brown marbling *J. stáli* (Mc.)
- c (b) Tergite IV without pits. Dorsal surface almost totally dark brown
- d (e) Frons unicoloured, the keels not evidently lighter *J. forcipata* (BH.)
- e (d) Keels of frons evidently lighter than frons between them
- f (g) Tergite VIII with 1 + 2 pits. Frontal keels united beneath *J. discolor* (BH.)
- g (f) Tergite VIII with 1 + 3 pits. Frontal keels clearly separated beneath *J. obscurella* (BH.)
- h (a) Tergite V with one (or two) pit(s)
- i (j) Ground colour whitish brown to blackish. Frons with dark bands between the keels *J. pellucida* (F.)
- j (i) Ground colour brownish grey. Frons of ground colour, keels light. In the lower part of the frons there is a light patch *J. dubia* (KB.)

References: FENNAH, R. G. 1963. New genera of Delphacidae (Homoptera: Fulgoroidea). Proc. R. ent. Soc. Lond. (B) 32, p. 15 – 19. — HASSAN, A. I. 1939. The biology of some British Delphacidae (Homopt.) and their parasites with special reference to the Strepsiptera. Trans. R. ent. Soc. Lond. 89, p. 345 – 371. — LE QUESNE, W. J. 1960. Hemiptera (Fulgoro-morpha). Handbooks for the identification of British Insects, 2, p. 1 – 68. — 1964. Some taxonomic observations on the British Delphacidae (Hemiptera). Proc. R. ent. Soc. Lond. (B), 33, p. 56 – 58. — LIEBENBERG, K. 1956. Die Borstengruben — ein wenig bekanntes Sinnesorgan von *Calligypona pellucida* F. Zool. Beitr. Berlin, N. F. 2, p. 441 – 446. — LINDBERG, H. 1939. Der parasitismus der auf Chlorionia- Arten (Homoptera Cicadina) lebenden Strepsiptere *Elenchinus chlorionae* n.sp. sowie die Einwirkung derselben auf ihren Wirt. Acta Zool. Fenn. 22, p. 1 – 179. — LINNAVUORI, R. 1951. Hemipterological observations Ann. Ent. Fenn. 17, p. 51 – 65. — ŠULC, K. 1928. Voskové žlázy a jejich výrobky u larev Sbf. Cixiinae (Homoptera). Biol. Spisy Vys. Školy Zverolekarske, Brno, 7, p. 1 – 32. — WAGNER, W. 1962. Dynamische Taxonomie, angewandt auf die Delphaciden Mitteleuropas. Mitt. Hamburg. Zool. Mus. 60, p. 111 – 180.

The author's address: J. Vilbaste, Institute of Zoology and Botany Academy of Sciences of the Estonian S.S.R., 21 Vanemuise Street, Tartu, Estonian S.S.R.