

ON THE PROBLEM OF DIVISION OF THE FAMILY CIXIIDAE (HOMOPTERA, CICADINA)*

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The first attempt to create a system of division in the family Cixiidae Spinola, 1839 was by F. Muir, who reformed the taxonomy of the whole superfamily Fulgoroidea. At first, in describing the genus *Euryphlepsia* he formally erected the tribe Oecleini (Muir, 1922, p. 115), which he never again mentioned. Then (Muir, 1923, 1925) he divided the family into the 2 tribes Cixiini and Bothriocerini; the tribe Oecleini thus became part of Cixiini and was completely forgotten. Fifteen years later, Metcalf (1938) elevated the tribes Cixiini and Bothriocerini to the rank of subfamily and created in both divisions new tribes. The work of Metcalf, however, was not well received in the following 2-3 decades and in reports from various regions the division into tribes was not put into practice and was not discussed. More recently, out of the Cixiini the tribe Pentastirini has been separated with two subtribes (Emel'yanov, 1971). To date, in the system of division of the family there is much that is formal, many divisions remain collective, such as for example besides the Cixiini, the Bennini, separated by Metcalf (Hoch, 1987), and the Bothriocerinae, in which the Stenophlepsiini was mistakenly placed. The Stenophlepsiini, in turn certainly mistakenly include the genus *Borysthene* Stål.

KEY TO SUBFAMILIES OF CIXIIDAE

- 1 (4). Membrane of forewing significantly extending beyond line of commissural margin of clavus. Antennal segment II reniform with recess of distal end holding segment III (base of flagellum).
- 2 (3). Extravenal pterostigma formed by thickened expansion of peripheral membrane (Fig. 22), $ScRA_1$ as strong as all other veins. Epistomal suture arched, protruding toward postclypeus (Fig. 4). Genal carina below antennae next to eye (Fig. 3), immediately below antennal foramen of head capsule. Posterior margin of forewing begins at obtuse angle at apex of clavus (Fig. 22). Tubercles on antennal segment II on dorsal and ventral sides of flagellum Bothriocerinae Muir, 1923.
- 3 (2). Pterostigma lacking, its area not thickened, $ScRA_1$ completely weak from base to fluted flexible band similar to peripheral vein of membrane and contributing to costal curve (Fig. 5). Epistomal suture straight across (Fig. 2). Genal carina below antennae, remote from antennal foramen and terminating posteriorly below eye, separated from eye by distinct depression (Fig. 1). Posterior margin of clavus turned back from apex of claval vein ($Pcu+A_1$) and forming smooth arch with adjoining segments of margin of membrane (Fig. 5). Tubercles on antennal segment II are before and behind flagellum. Borystheneinae subfam. n.
- 4 (1). Membrane of forewing (Fig. 24, 33, 35) not or only slightly exceeding

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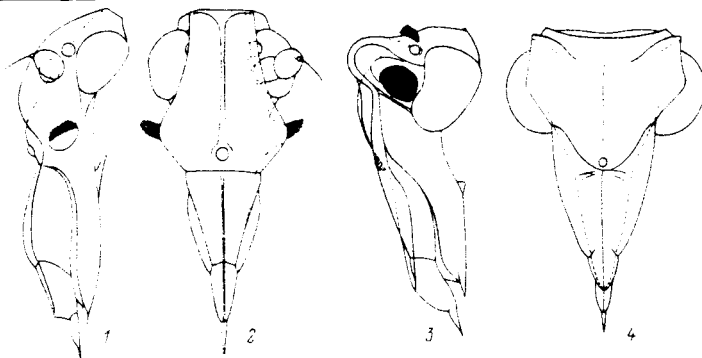


Fig. 1-4. Bortstheninae and Bothriocerinae. Head. 1, 2) *Borysthenes fatalis* sp. n.: 1) head in lateral view; 2) head in anterior view; 3, 4) *Bothriocera* sp.: 3) head in lateral view, less antenna; 4) head in anterior view, antenna not shown.

comissural margin of clavus. Antennal segment II not reniform, without concavity at point of articulation with 3rd segment . . . Cixiinae Spinola, 1839.

BORYSTHENINAE Emeljanov, subfam. n.

Muir (1923, 1925) placed the genus *Borysthenes* Stål in the Bothriocerini with *Bothriocera* Burm., *Euryphlepsia* Muir, and *Stenophlepsia* Muir. Later, Metcalf (1938), elevated Muir's tribes to the rank of subfamily, having distinguished within the Bothriocerinae, in addition to the nominate tribe, the Stenophlepsiini ("Stenophlepsini"), in which he placed, judging indirectly, *Borysthenes*. The tribe and subfamily named for the genus *Bothriocera* were isolated by the formal character of the presence of a subantennal prominence and depression of the antennae into the resulting pit. The Stenophlepsiini also were separated rather formally, *Stenophlepsia* having extremely little resemblance in terms of general structure of the wings and venation to *Borysthenes*, and its venation is sufficiently close to the common plan of the Cixiinae. At the same time, the venation and structure of the forewing in *Bothriocera* and *Borysthenes* are not characteristic of other Cixiidae and more closely resemble those of Achilidae in that their membranes at rest strongly overlap one another. However, the resemblance of wing shape and part of the head near the antennae in *Bothriocera* and *Borysthenes* is superficial because the nodal region of the forewings is structured completely differently and the subantennal prominence is not homologous. *Borysthenes* has no cixiid pterostigma, and the subantennal prominence does not reach the eyes. All this forces us to consider it necessary to separate a new subfamily for *Borysthenes*, and to consider the tribes Bothriocerini and Stenophlepsiini unrelated. The Stenophlepsiini alone should be placed in the Cixiinae and compared with the Oecleini (= Myndini), as Muir himself did (1922).

Head, compared to typical case in the family, moderately modified (Fig. 1, 2). Metopon* [frons] without break in middle, such as is diagnostic for *Bothriocera*. Subantennal carina noticeably below antenna, not reaching eye with posterior end; between carina and eye posteriorly a deep depression formed, covered by a lobate projection of sides of pronotum. Antennal segment II with 2 projections before and behind base of flagellum; 3 ocelli present.

The posterior margin of scutellum sharply truncate. Forewing (Fig. 5) with hypertrophic membrane in length and width, projecting backward strongly beyond

*Terminology for parts of the head of Fulgoroidea are based on Anufriyev and Emel'yanov (1988).

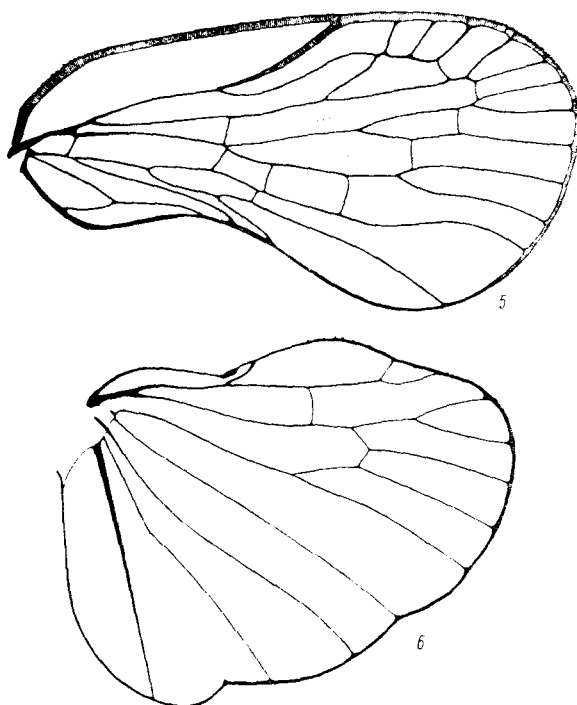


Fig. 5, 6. *Borysthenes fatalis* sp. n. Wings. 5) forewing; 6) hindwing.

comissural margin of clavus, bend here beginning at apex of claval vein, and not at apex of clavus, as in Achilidae. Stigmal expansion of margin of blade distad of nodus in forewings. Costal vein weakened almost from very base, nodal vein also appearing as soft fluted pathway as far as it extends. Margin of forewing weakened to soft fluted vein almost from very base to apex of claval vein $Pcu+A_1$, in subbasal and anterior terminal area bearing nodule with small sensory pits. RA and RP diverge almost immediately from basal cell. Usual anastomosis in the family of $RA_2 + RP$ at apex of stigmal cell sometimes lacking, RA_2 then appearing clearly unbranched.

Transverse vein connecting CuA_2 with margin of wing distad of apex of clavus strongly tapered and elongate, simulating longitudinal vein. Hindwing (Fig. 6) expanded with curving anterior margin and 2 protuberances divided by sloping emargination bearing coupling. Distad of 2nd protuberance (with end of RP), wing margin also slightly emarginate. Peripheral vein along anterior margin bearing small nodules with sensory pits. RP furcate or more rarely not branching as in *B. fusconotata* (Melichar, 1914). Vein M trifurcate in form of posterior comb, CuA bifurcate, not stalked with MC, and with rather long mcu. Arculus significantly weakened. Folds in wing extending atypically because of additional fold in wing surface across cubital veins; 1st fold extending behind CuA, 2nd behind Cu; when vein folded, CuP extending forward across base in front of CuA. At apex of CuP with weak notch in wing margin.

Hindtibiae without lateral teeth, at apex are 6 teeth (1+5). Hindtarsus on 1st segment with 7 and on 2nd segment with 5 teeth.

Borysthenes fatalis Emeljanov, sp. n. (Fig. 1, 2, 5-13)

Male. Whitish with well developed dark brown, partly brown markings. Corypha

[vertex] and temporal region pale. Metopon as if dirty, below middle distinctly darkened, darkening noticeably not extending to lateral carinae, their ridge linearly blackened. Clypeus and genae below setaceous keel brown, postclypeal disk a little lighter. Pronotum completely white. Mesonotum yellow-brown. Tegulae bright brown. Venter white, sides of mesothorax brownish. Legs brown, fore- and midlegs sometimes dark brown.

Forewings usually with spotted markings; clavus darkened, except anal field; basal cell and medial field up to nodal veins light; precubital field darkened along claval suture to CuA branch and completely between CuA₂ and CuP beyond CuA branch; radial fields of RA and RP darkened 2/3 of length from base to nodal veins; costal field darkened to nodal veins, but intersected by sloping arcuate bright band from wing margin and, expanding and extending to the prenodal region of corium until fusing with cubital longitudinal light spot described above. Postnodal region of corium darkened in transverse band from near base of RA₂ to CuA₂; before anterior radius fusing with posterior costal spot obliquely toward base of wing. Broad spot distad of nodus traversing RP slightly and distally reaching 2nd stigmal vein. Inner medial fields darkened from band to 1st ir, and whole last apical radial cell darkened. Cell between 2nd and 3rd mcu light; dark cross spot along 3rd mcu and behind it another light spot extending to MP fork, extending anteriorly into adjoining medial field, and posteriorly fusing with light segment of 1st cubital field and marginal cubital field of membrane. Darkening of 1st cubital field terminating middle belt of wing, protruding distally to middle of 1st light medial spot. Distad of stigmal dark spot and costad of MP₁ subterminal portion of membrane light and terminal part dark; from MP to CuA darkening extending from 2nd medial spot to apex; situation reversed between CuA₁ and CuA₂ at terminal margin light spot present and subterminal area darkened; darkening along CuA₂ extending in form of a Y to wing margin and bordering from behind previously noted light spot.

The abdomen brown; posteriorly, including genitalia, dark brown.

Genitalia. Pygophore slightly compressed laterally, posterolaterally with blunt projections; posteroventrally with diagnostic process delimited laterally by narrow incisions. Anal tube stout, short, with asymmetrical processes, left longer and right shorter, with wide upper part folded over and appressed to wall. Styli with bifurcate apices; true apex thinner and longer; secondary apex, a thicker and little shorter posteroventral projection. Penis characteristic of the genus, with reduced distal segment covered with soft denticles or papillae. Proximal segment ventrally with flat long projection and 4 retrorse processes at apex; right one with rather short thick conical process, 2 long ones on left side reaching apex of base of theca, and 4th process separating from apex of proximal segment ventrally, turning first forward and forming small subbasal lateral branch, then arching and reaching base of theca and turning back to left and dorsally.

Female not known.

Length of ♂: 7.8-8.6 mm.

Material. Vietnam, Vinhphu Prov., Tamdao, 8-14.IV.1986, 1 ♂ holotype and 1 ♀ paratype (Gorokhov).

By structure of the genitalia the new species is close to *B. acuminatus* Fennah, 1956 from S China. It also has a short anal tube with asymmetrical processes. However, the structure of the penis in these species is sharply different: *B. acuminatus* has a 3-tipped penidial process and a process turned backward across the top, while *B. fatalis* sp. n. lacks a multi-tipped process and processes turned backward across the top.

Borysthenes ponomarenkoi Emeljanov, sp. n. (Fig. 14-21)

Reddish brown, with white forewings bearing dark brown pattern in form of partly

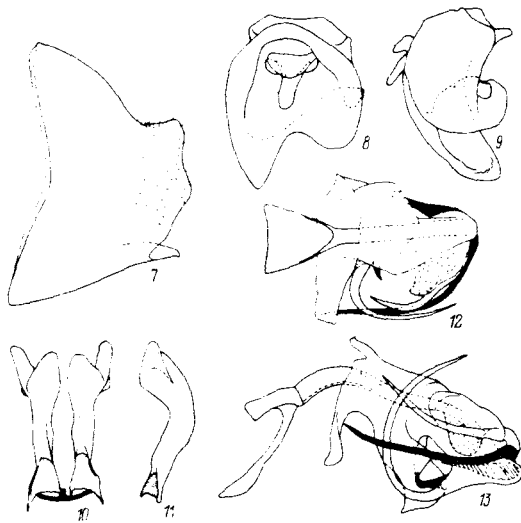


Fig. 7-13. *Eorysthenes fatalis* sp. n. Male genitalia. 7) pygophore left lateral view; 8, 9) anal tube; (8 - posterior view; 9 - right lateral view; 10) stylus in ventral view; 11) left stylus in lateral view; 12) penis in dorsal view; 13) penis and endophallus in left lateral view.

fused bands. Head reddish brown, with dark ridges of lateral frontal carinae; antennae lighter; eyes dark. Pronotum and dorsum of mesothorax of same color as head; paranotal lobes of pronotum and tegulae lighter, whitish. Venter reddish brown; legs darker to a brown darkening of fore- and midtibiae and tarsi.

Costal vein of forewings dark brown; clavus becoming dark brown, its veins dark brown except whitish margin. Oblique dark belt extending from middle of costal field to rm of nodal row, then turning and extending to apex of clavus along nodal region; dark band extending along R from basal cell to this belt. Middle of membrane with dark band. From nodal line along and between CuA dark band extending distally and turning anteriorly before dark belt of membrane and fusing with it at fork of posterior branch of M. Costal margin with dark spot occupying apex of costal field and, across white ScR₁, base of stigmal cell; from this spot to previously noted band on membrane along interradiial field longitudinal dark band also extending, past band to margin of wing along posterior branch of RA. Apex of membrane less sharply darkened, darkening protruding into anterior branch of media and meeting band. Veins in membrane at dark elements of pattern darker than cells; MP and CuA obscure here and in light element. Veins of corium outside dark bands and spots whitish.

Hindwings also in places are dark brownish, RP bifurcate.

Abdominal sclerotization is brownish to brown, membranous sections reddish brown.

Male genitalia. Pygophore slightly laterally compressed, asymmetrical; left incision of upper margin of lateral lobe sharper; ventrally bearing V-shaped process slightly turned downward and delimited laterally by narrow incisions. Anal tube elongate, narrow, asymmetrical, with right margin lower; apex deeply, narrowly cleft, left apex shorter. Styli with stout preapical medial shelf. Penis with basal segment sharply shifted to wall of left lobe of pygophore. Apex of basal segment bearing long retrorse dextral process with apex turned upward and 2 V-shaped cruciate sinistral retrorse processes as well as a 3rd slenderer, almost straight one.



Fig. 14-21. *Borysthenes ponomarenkoi* sp. n. Male genitalia. 14) genitalia in lateral view; 15) anal tube in posterodorsal view; 16) genitalia in dorsal view; 17-19) penis (17 - in right lateral view, base of phallosome not shown; 18) in left lateral view; 19) in ventral view); 20) left stylus in posterior view; 21) styli in ventral view.

Length of ♂ 4.7-5.0 mm, of ♀ 5.1 mm.

Material. Vietnam, Kondao Island, 6.IV.1987, 1 ♂ holotype and ♂ and ♀ paratypes (A. Ponomarenko).

By structure of the genitalia, the species is close to *B. nisanor* Fenn., but differs by lacking a two-tipped penidial process and by other configuration details as well as in pattern of the forewings on which *B. nisanor* does not have the longitudinal bands characteristic of *B. ponomarenkoi*.

BOTHRIOCERINAE Muir, 1923

The subfamily includes *Bothriocera* Burm. and *Adanella* Fenn., the latter having been described as a subgenus of the former (Fennah, 1971).

Head significantly modified (Fig. 3, 4). Corphypha anteriorly delimited by blunt keel projecting forward and median keel lacking. Metopon with median keel, upper 1/3 in approximately same horizontal plane as corypha, lower portion joined to upper portion by steep, but rounded bend, and turned as usual anteroventrally. Epistomal suture running parabolically into postclypeus, lateral angles of postclypeus projecting dorsally past their usual position. Lateral keels of postclypeus, continuing to anteclypeus, meeting medially at acute angle. Three ocelli present. Antenna in pits behind bend of metopon, lower margin of pit formed by shelf-like carina of genal margin abutting lower margin of eye. Antennal segment II bearing 2 projections dorsad and ventrad of base of flagellum. Rostrum long, characteristic, extending beyond trochanter to midlength of distal segment.

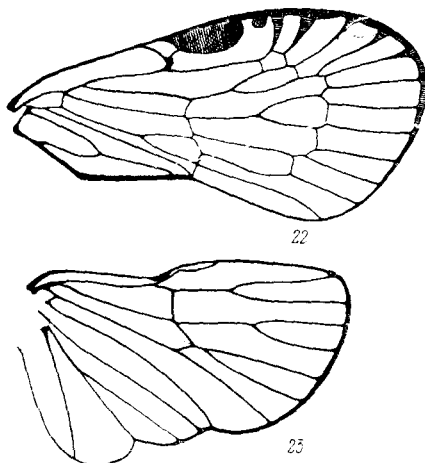


Fig. 22, 23. *Bothriocera* Burm. Wings. 22) forewing; 23) hindwing.

Forewings (Fig. 22) with short corial part and large expanded membrane extending back beyond comissural margin and occupying more than half length of wing. A typically cixiid recession of costal vein sharply developed, but postmarginal vein stigma indistinct. Branches of radius preapically expanding V-wise and becoming weakly depressed. Platelet of same consistency as pterostigma lying between stigma and bifurcate RA at wing margin. RP trifurcate in the anterior branch with ir vein, RP diverging from general trunk of R not far from basal cell. M diverges from basal cell at same point with R, its 1st fork lying on nodal line. MA trifurcate in posterior branch, MP bifurcate, branching in median part of membrane. CuA branching in distal 1/3 of clavus, branch running into wing margin where terminal segment smoothly becomes posterior. Anterior branch of CuA connected with M by 2 mcu veins--nodal and postnodal--with icua vein and vein of intercubital field lying between them continuing icua into tip of clavus; vein mcu also diverging anteriorly and distally from point of 2st fork of M. Clavus with Pcu + A₁ long, comissural margin straight to apex, beyond which membrane immediately slants away.

Hindwings with venations typical of family (Fig. 23), ScR₁ making unique break almost touching the costal margin of wing with its bend.

Forelegs with blunt projection in apical 1/3 of ventral surface of femur. Hindtibiae without lateral denticles, 3 + 3 apical denticles present, separated by space as in Oecleini. Hindtarsus with 7 denticles on segment I and 5 on segment II; subapical setae lacking.

Bothriocerinae resemble Oecleini in a number of characters: forewings with icu running into claval apex; fossarial denticles pronounced on forefemora in nymphs. It is possible, and the presence of the subantennal carina supports this, that the subantennal carina of *Stenophlepsiini* is homologous with that of Bothriocerinae.

CIXIINAE Spinola, 1839

The development of a weighted and reliably based system for the Cixiinae is a matter for the future; however, certain improvements may be suggested at present. These include treating Oecleini and Myndini as synonyms and possibly the *Stenophlepsiini* also, and the division of the Bennisini into two tribes. It is clear, too, that the Cixiini remain collective and is in need of careful study. For comparison with representatives of the Bothriocerinae and Borystheninae I use wing patterns of the type species of the type genus of the family--*Cixius nervosus* L. (Fig. 35, 36).

In describing the tribe Bennini, Metcalf included *Bennarella* Muir, 1930 from South America. However, it is completely obvious that the American representatives of the tribe (*Bennarella* and *Amazobenna*) are not related to the Asian ones, their abdominal appendages being attached completely differently and that these 2 groupings cannot be in a single tribe (Hoch, 1987). In the oriental (true) Bennini the appendages are only on segment III, they have the shape of long, narrow rods articulated with the segment by an apical expansion forming a kind of cup. Pits on the appendage do not correspond to a sensory hair socket. In the American representatives there are no rods nor articulated appendages, and there is a labiate expansion of the pleural region bearing large hair sockets with unique furcate setae (Penny, 1980). *Bennarella* Muir and *Amazobenna* Penny should be separated into a separate tribe Bennarellini trib. n., the origin and relation of which remain to be elucidated.

Below, a narrow natural characterization of the Bennini is given exclusive of the Bennarellini.

Vertex short, transverse, with pronounced straight anterior margin, with posterior margin concave, making vertex shorter in middle than at eyes. Three ocelli present. Legs well-proportioned, hindtibiae more than twice as long as femora, apices of tibiae with denticles in two groups of 3 each; lateral denticles lacking. Segments I and II of hindtarsi with 8-9 denticles. Wings steeply tectate, forewings (Fig. 24) expanded apically, there somewhat obliquely truncate and with pronounced (narrowly rounded) postapical angle, membranes extended slightly past commissural line of clavus, bend beginning at clavus beyond tip of claval vein. Costal margin diverging from base, slightly curved. Costal vein in the middle of the corium gradually expands and thickens, becomes a wide corrugated margin corresponding to a pterostigma. Behind 1st vein RP stigma more steeply becoming normal narrow peripheral corrugated vein in middle of posterior margin of membrane again becoming a strong rounded vein. Indistinct expanded corrugated margin around stigma lacking sharp borders proximally and distally, constituting a specific trait of the tribe.

Hindwings with usual familial structure, RP bifurcate, anastomosis of MP and CuA₁ short, as in figure by Walker (1857).

Benna nasti Emeljanov, sp. n. (Fig. 24-27)

Light brown, whitish, in places white. Metopon brown. Pronotum light, disk brownish, but carinae light. Scutellum brown, including carinae. Tegulae also brownish. Forewings hyaline, barely brownish, veins markedly darkened, to a dark brown, except costal vein with pterostigma, basal half of RA, basal portion of CuA from base to 1st fork and two tips of CuA running into posterior margin of membrane; clavus evenly dark brown, veins not distinguished by coloring, at apex of claval vein with dark brown irregular spot taking up whole width of clavus, narrow here. Cylindrical appendages of abdominal segment III completely dark brown.

Fennah (1970) reduced the *Bennaria* Mel. to a synonym of *Benna* Walk., however, acknowledgement of this fact does not deal with the question of the subdivisions of *Benna* s. lato into subgenera. Base on drawings of genitalia of species of the genus earlier considered to belong to *Bennaria* that appeared in the study by Nast (1950), and on those in Fennah (1970), there is within the genus a distinct group of species that includes those we are describing: *B. Fennahi* Nast, *B. venosa* V. D., *B. gorgyra* Fenn. The ♂ genitalia of this group are characterized by lateral lobes of the anal tube attached at its tapered tip, zig-zag-shaped styli, and denticle on the ventral (turned up here) of the distal segment of the penis.

The shape of the forewings of the described species noticeably differs from that typical of *Benna* Walk. and *Bennaria* Mel., by having a sharply pronounced angle between the posterior and terminal margins of the membrane. The posterior branch of the medial system falls in this angle, the posterior margin of this membrane in this case is strictly straight. (Hindwings of the only existing specimen are badly damaged.) These characters in combination with a dissimilar wing pattern (in *Bennaria*

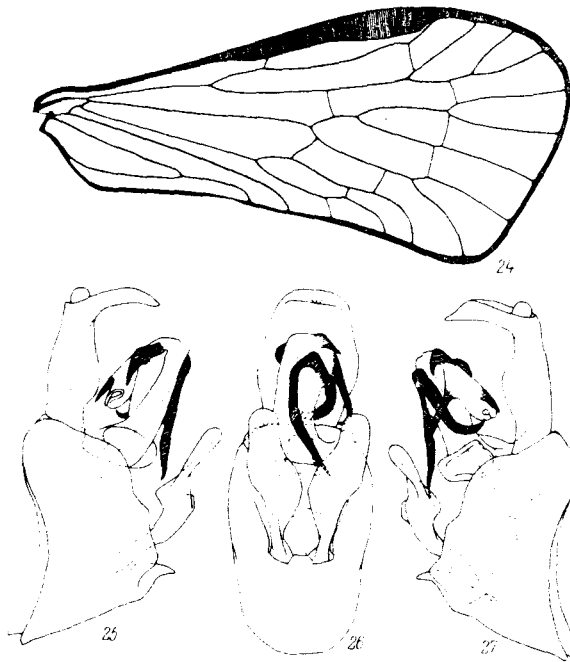


Fig. 24-27. *Benna nasti* sp. n. 24) forewing; 25-27) ♂ genitalia (25 - left view, 26 - posterior view, 27 - right view).

bimaculata Mel. there is a spot on the corium, spots are lacking on the clavus) make it possible to separate a new species *B. nasti* sp. n. into a separate subgenus *Gonibenna* subgen. n. (type species *B. nasti* sp. n.) together with the 3 listed above which differ by the characters just mentioned from the type.

Length of male 6.7 mm.

Material. Solomon Islands, Gizo, III.1985, 1 ♂--holotype (N. L. H. Krauss).

OECLEINI Muir, 1922

= *Myndina* Metcalf, 1938.

In a recent revision of the Nearctic Cixiidae, Kramer (1979) reduced the American genus *Haplaxius* Fowler, 1904 (together with *Paramyndus* Fennah, 1945) to synonyms of *Myndus* Stål. 1862, the type-species of which is the European (West Palearctic) species *Flata musiva* Germar, 1825. Such treatment of *Myndus* is extremely broad, there being 2 characters which distinguish the American species from *Myndus* s. str.: these are the absence of a denticle at the distal end of the lateral carina of the fore-coxae and the passage of a lateral pronotal vertical carina into its postventral angle (Fig. 28). In Palearctic species of Oecleini--*Myndus*, *Pinacites*, *Trigonocranus*--the vertical carina runs into the middle of the lower lateral pronotal margin (Fig. 29). It is more correct to consider *Haplaxius* Fowl. (= *Paramyndus* Fenn.) an independent genus and place within its species of the New World which Kramer placed in *Myndus* s. lato. I studied the type species *Haplaxius laevis* Fowl. and *Paramyndus crudus* V. D. (= *coccis* Fenn.). In the collection of the Zoological Institute of the USSR Academy of Sciences, a new species was also found belonging to a new genus from *Myndus* s. lato. Below a table is given for distinguishing Holarctic genera close to *Myndus* s. str. along with a description of the species and genus.

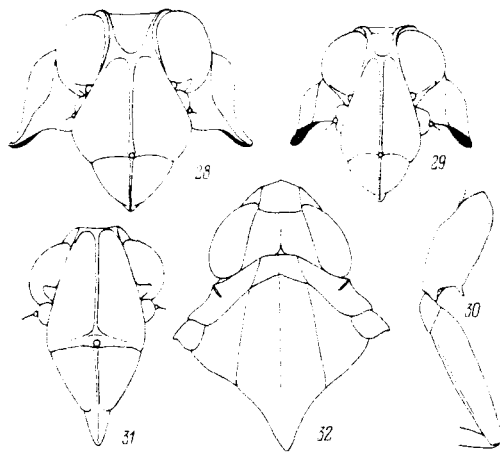


Fig. 28-32. Details of external structure of Oecleini. 28) *Haplaxius laevis* Fowl., head and pronotum in anterior view; 29, 30) *Myndus musivus* Germar (29 - head and pronotum in anterior view; 30 - forecoxa, trochanter, and femur in anteroventral view); 31, 32) *Perindus binundatus* gen. et sp. n. (31 - head in anterior view; 32 - anterior portion of body in dorsal view).

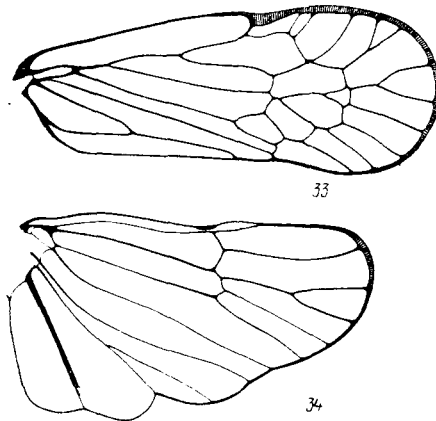


Fig. 33, 34. *Pinacites calvipennis* Em. Wings. 33) forewing; 34) hindwing.

HOLARCTIC GENERA CLOSE TO *Myndus*

- 1 (2). Continuation of postocular pronotal carina on paranota running into its posterior ventral angle (Fig. 28). Forecoxae lacking denticle on distal margin of lateral carina *Haplaxius* Fowl. (= *Paramyndus* Fenn.).
- 2 (1). Continuation of postocular pronotal carina on paranota running into middle of its lower margin (Fig. 29). Forecoxae with denticle on distal margin of lateral carina (Fig. 3).
- 3 (6). Macrocorypha narrow with concave lateral margins diverging in anterior 1/3, posteriorly more than twice as wide as in middle. Postocular carinae dorsally

greatly divergent from eyes before terminating. RP in hindwings simple (Fig. 34).

- 4 (5). Macrocerypha lacking transverse carina (anterior carina of corypha). Lateral carinae of disk fusing with posterior margin of pronotum. Branches of CuA at claval apex fusing (Fig. 33) *Pinacites* Em.
- 5 (4). Macrocerypha with transverse carina. Lateral carinae of disk, posteriorly turning to follow margin of pronotum. Branches of CuA at claval apex close or fused *Myndus* Stål.
- 6 (3). Macrocerypha relatively wide with straight lateral margins, at rear only 1.5 times as wide as along transverse carina. Postocular carinae dorsally before terminating not diverging from eyes. RP bifurcate in hindwings *Ferindus* gen. n.

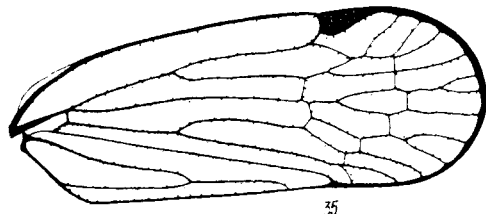
Genus *Ferindus* Emeljanov, gen. n.

Type species *Ferindus binundatus* Emeljanov, sp. n.

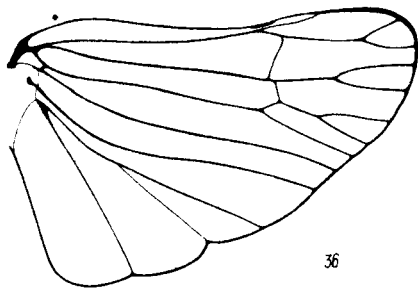
Head relatively large, approximately 2/3 as wide as pronotum. Macrocerypha with straight lateral carinae, in posterior view approximately twice as wide as in anterior view, anterior margin protruding slightly at obtuse angle, transverse carina (anterior carina of corypha) straight, distinct, lying slightly anterior to middle of macrocerypha; acrometopon somewhat longer than wide; corypha in posterior view approximately equal in width and length, posterior margin weakly obtusely concave; corypha with indistinct longitudinal carina, with vestiges on acrometopon. Eumetopon in ventral view almost 4 times as wide as in dorsal view, lateral margins in dorsal view straight, protruding along clypeal margin below antennae, slightly convergent anterior of border. Median carina of eumetopon sharp, median ocellus distinct, large. Postclypeus with distinct median and lateral carinae, lateral margins almost straight, converging toward anteclypeus. Rostrum reaching approximately anterior margin of hindcoxae. Pronotum short, from middle to sides hardly enlarging, almost parallel to dorsal part of posterior margins of eyes. Pronotal disk narrower than margin of corypha, is broad, wider than lateral length. Lateral carinae of disk meet posterior margin across vertex. Postocular carinae in dorsal view terminating abruptly, closer to anterior margin than to posterior. Scutellum relatively long with rather steeply descending lateral parts. Wings when folded rather steeply tectate, steeper than in *Myndus* and *Pinacites*. Forewings narrow, venation typical, with equally wide fields. Costal margin subbasally slightly concave. RP quadrifurcate, MA trifurcate, MP bifurcate, CuA of usual construction, its branches not reticulate or fused. RP of hindwings bifurcate. Apex of hindtibiae with 6 denticles (3+3), segments I and II of hindtarsi each with 7-8 denticles, segment II with subapical setae on all but marginal denticles.

Ferindus binundatus Emeljanov, sp. n. (Fig. 31, 32)

Female. Pale whitish-yellow, with brown-to-greyish brown indistinct markings. Head pale, intercarinal fields indistinctly brownish. Pronotum with indistinct darkening behind eyes and ventrolaterally before vertical carina. Mesocutum between carinae light, with slight yellowish shading, retreating from lateral carinae, lateral lobes brown, at postlateral margin with 2 indistinct darker spots. Forewings hyaline with whitish veins outside brown spots and bands. Outstanding detail of markings consisting in longitudinal mark broken at obtuse angles in 4 places, extending from base of wing to middle of corium along claval suture, anteriorly approximately bordering media, in distal half of corium turning toward stigma, occupying in front of nodal line postradial and medial fields, further turning backward to middle of posterior margin of membrane without passing over 1st branch of CuA; radial and anterior medial fields in middle of membrane free of markings; further distally turning forward toward apex of wing, leaving light spot across ends of MP₁, MP₂, and CuA₁; dark spots also in costal field bordering stigma, at distal end of stigma, and



35



36

Fig. 35, 36. *Cixius nervosus* L. Wings. 35) forewing; 36) hindwing.

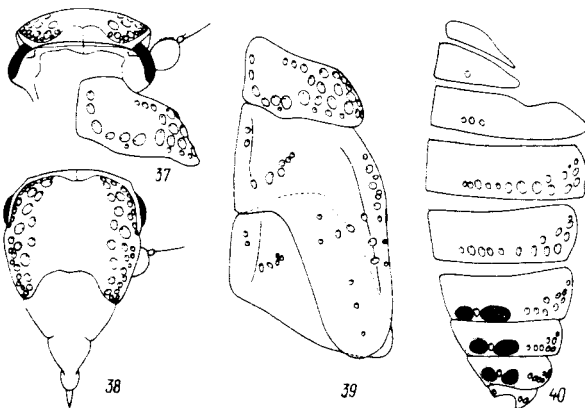


Fig. 37-40. *Cixius* sp. Last nymphal instar (Estonia, Vyru, collection of O. L. Kryzhanovskiy). 37) head and right half of pronotum, dorsal view; 38) head in anterior view; 39) right half of thorax, dorsolateral view; 40) right half of abdomen, dorsolateral view.

in final fan of branches of RP. In distal section of corium and on membrane dots present on longitudinal veins and cross veins remain light. Posterior margin of 1st bend of longitudinal mark, falling within fusion of P_{cu} and A_1 , noted by projection darker than remainder, and spot appearing to fuse with mark. Venter brownish with light sclerite margins, legs lighter.

Male unknown.

Length of ♀ 5.6 mm.

Material. 1 ♀, holotype: Iran, "m." Kyaguraka, Geh, Makran: SE Persia, 27. III.1901 (Zarudnyy).

Tribe CIXIINI Spinola, 1839

Cixius sp., nymph (Fig. 37-40).

In the literature larvae have been described for Pentastirini (Myers, 1929; Cumber, 1952) -- *Oliarus*, *Mnemosyne*, as well as Oecleini (Wilson, Tsai, 1982; Wilson, et al., 1984) -- *Oecleus*, *Haplaxius*, but there are no descriptions of larvae of Cixiini s. str. In my possession are nymphs of 2 Or 3 species of *Cixius* Latr. (*C. bergeniae* Vilb., *C. similis* Kbm., *Cixius* sp.). On the whole, the nymphs resemble in structure and habitus those of Pentastirini, but differ in shape, size and location on the tergites of waxy areas, which occur only in the medial half of the tergites, each in only one narrow stripe with a single sensory pore. Outside of the waxy stripes along the posterior margin there is usually a row of 5 sensory pores; on tergite VI in front of 3 outer ones is another row of pores and a pore in a 3rd row; on tergite VII there are also 2 pores of the 2nd row; on tergite VIII is one pore of the 2nd row; on tergite II is one pore in the medial area; on tergite III are 3 pores in a cross row in the medial area; and on tergites IV and V are a full set each of pores. Thus, species of *Cixius* differ from Pentastirini and Oecleini by having abbreviated waxy areas and from Oecleini also by having simple front tibiae lacking teeth. From the Pentastirini in my possession are a larva each of *Pentastiridius* and *Hyalesthes*, their structure mainly is the same as in *Oliarus* and *Mnemosyne*.

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