

SOME NEW ADDITIONS TO THE TYPHLOCYBINE FAUNA OF EAST PAKISTAN

MANZOOR AHMED and KHURSHID SAMAD

*Bioecology Research Project, * Department of Zoology, University of Karachi, Karachi 32*

(Received January 5, 1972; revised April 11, 1972)

Abstract. The typhlocybine fauna (Cicadellidae:Homoptera) reported from East Pakistan consists of 23 species under 13 genera. Present account adds 9 species under 7 genera. Of these *Paolia tangailensis*, *Empoasca profusa*, *Amrasca curvata*, *Helionida dumurae*, *Zygina niazii*, and *Empoasca spinosa*, are new to science, whereas species *Motschulskia serrata* (Matsumura), *Typhlocyba longicephala* Ahmed, and *Empoasca terminalis* Distant are new reports from East Pakistan.

The typhlocybine fauna of East Pakistan, described so far consists of 23 species under 13 genera. Of these two genera belong to tribe Alebrini, two to tribe Dikraneurini, one to tribe Empoascini, two to tribe Typhlocybini, and six to tribe Erythroneurini. Most of this fauna has been reported by Ghauri,^{6,7} Ishihara and Leopold¹⁰ and Ahmed.^{2,3} Present account adds 9 species under seven genera, to the already known typhlocybine fauna of East Pakistan.

Motschulskia serrata (Matsumura)
Mahmoodiana acuta Ahmed and Waheed 1971
Togarittix serratus Matsumura 1907

The species had been originally described from Japan and Korea, as is evident from the data of type material described by Dworakowska.⁵ Ahmed and Waheed⁴ described *Mahmoodiana acuta*, presently being considered as a junior synonym of *M. serrata* (Matsumura) from Lahore (West Pakistan) on the plant rose (*Rosa indica*). The species has now been collected from Dacca (East Pakistan) on grass. It appears to have a wide geographical range.

Paolia Lower 1952

Type species: *Paolia bancrofti* (Evans), Proc. Linnean Soc. N.S.W. 76, 217 (1952).

Paolia tangailensis, n. sp. (Fig. 1)

External Features. Length of male 2.90 mm; head broadly convex in front; median length of crown .30 mm, of pronotum .20 mm, of scutellum .30 mm; interocular width of head .20 mm; transocular width of head .60 mm; transverse width of pronotum .60 mm; entire dorsum greenish pale; coronal index, as discussed by Lower¹¹ less than 15; sternal apodemes on abdomen diverged posteriorly, reaching 6th sternum.

Wings. Forewings with vein R fused preapically with vein M and then forking into vein R_{1b} and M₃₊₄; the vein m-cu connects the vein R_{1b}+M₃₊₄ with Cu₁, so that the three veins, R_{1b}, M₃₊₄ and m-cu, come in contact at one point; the three apical veins (first, second and third) all arise from cell M.

Male Genitalia. Male plate, in ventral view almost uniformly broad up to midlength, narrowed in apical half, distal extremity smoothly rounded, macrosetae sparsely developed on mesal as well as lateral margins, some on ventral surface, mostly in apical half; pygofer with posterior margin narrow, extreme posterior projection possessing about four long marginal macrosetae, pygofer processes absent, anal hook well developed, with tips tapered, directed anteroventrally, basal part broad, bipronged; style slender, extreme apex with 6-7 denticulations mesally, as well as a well developed, stubby spine basad to the denticulations, lateral surface possessing a few long microsetae preapically; connective thickened marginally, membranous in middle, median cephalic surface sinuate, lobe absent; aedeagus with a moderately long preatrium; dorsal apodeme reduced, shaft tubular, sclerotized, directed caudad, tip setaceous, gonopore subterminal.

Female. Seventh sternum massive, projected posteromedially into an acute angle.

Holotype male, Tangail, East Pakistan, 25-I-71 (Nurul), Dumur, allotype female, and seven paratypes same data in Zoological Museum, University of Karachi, Pakistan.

Remarks. On the basis of characterisation by Lower¹¹ and the keys to the genera by Ghauri,⁹ the species *Paolia tangailensis* has been placed in the genus. There does not appear to be any species of the genus *Paolia* so far reported from Indo-Pakistan. Present record is, therefore, the first of genus *Paolia* Lower from Pakistan. The venation of fore and hindwing is identical to *P. bancrofti* (Evans), whereas the development of a stout spine on mesal aspect, in apical region of style is quite unusual. It also differs from *P. bancrofti* in lacking a dorsal hook. The pronotum in the species *P. tangailensis* is also quite narrow, whereas it is moderately broad in *P. bancrofti*.

Empoasca Walsh 1862

Type species: *E. viridescens* Walsh, Praire Farmer, 10, 149 (1862).

Empoasca profusa, n.sp. (Fig. 2)

External Features. Length of male 3.30 mm; head strongly convex anteriorly; median length of

*The Bioecology Research Project is being supported by financial grants from United States Department of Agriculture, ARS, under PL-480, Project No. A17-ENT-30, Grant No. FG-Pa 158.

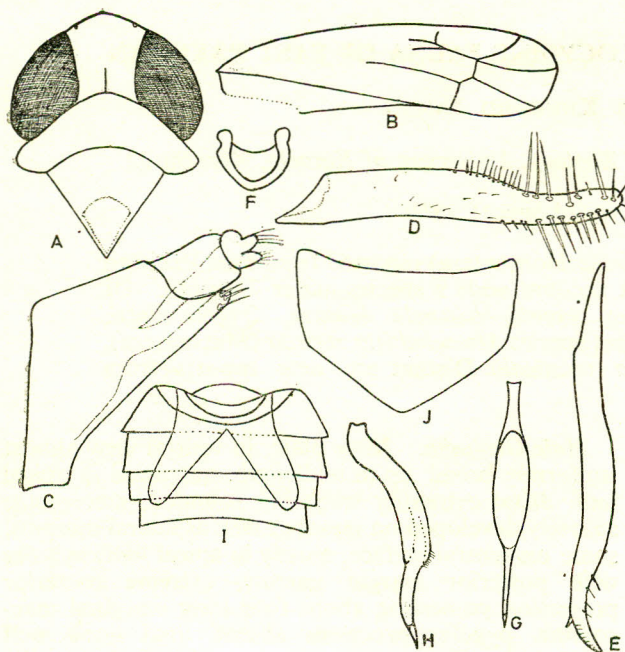


Fig. 1. *Paolia tangailensis*, new species: (A) head and thorax, dorsal view $\times 50$; (B) forewing $\times 25$; (C) pygofer and anal tube, lateral view $\times 100$; (D) male plate, lateral view $\times 100$; (E) style, dorsal view $\times 144$; (F) connective, dorsal view $\times 144$; (G) aedeagus, dorsal view $\times 144$; (H) aedeagus, lateral view $\times 144$; (I) sternal apodemes of male $\times 50$; (J) female seventh sternum $\times 100$.

crown .30 mm, of pronotum .30 mm, of scutellum .45 mm; interocular width of head .40 mm; transocular width of head .70 mm; transverse width of pronotum .70 mm; ocelli present, anteromedian to compound lateral eyes; crown pale green with a mixture of various shades, pronotum and scutellum pale green, with most of area waxy white; forewings mostly tinged with mild green; abdomen pale green; legs dark green; sternal apodemes on abdomen much elongate, reaching beyond midlength of abdomen.

Wings. Forewings with only one apical vein (first) arising from cell M.

Male Genitalia. Male plate, in ventral view broad throughout, slightly narrowed on lateral margin in midlength, apex smoothly rounded, macrosetae numerous on ventral surface from base to apex, mostly on or near mesal margin, lateral margin with long macrosetae in basal half, and short macrosetae in apical half, plate not much sclerotized; pygofer membranous, almost transparent when macerated, posteroventral margin oblique, posterior half narrow as compared to anterior part, posterodorsal margin with a group of about 8 long macrosetae arranged in a row, ventral process of pygofer blunt at tip, mostly remaining inside pygofer lobes, anal tube long with a prominent anteroventrally directed hook; style membranous, with extreme apical part short, in dorsal view abruptly narrowed and curved laterad, with a number of small setae appearing as dents, preapical part also provided with a number of short microsetae; connective broad in middle, its anterolateral margins incurved, anteromedian lobe reduced; aedeagus with a short preatrial part, shaft long,

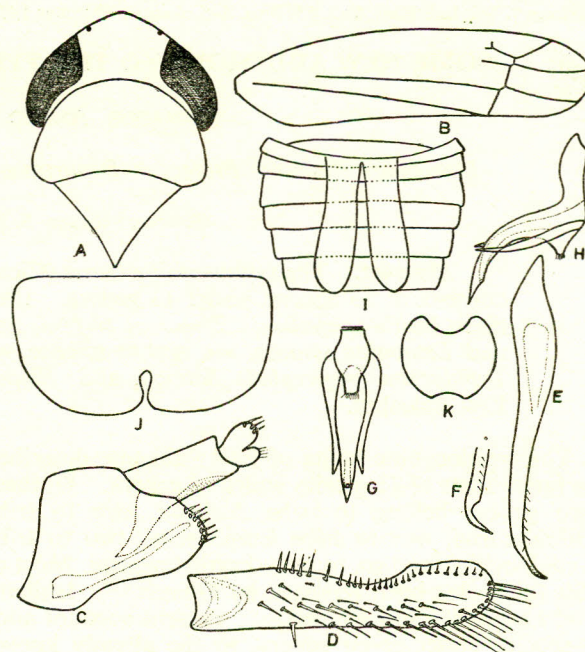


Fig. 2. *Empoasca profusa*, new species: (A) Head and thorax, dorsal view $\times 50$; (B) forewing $\times 25$; (C) pygofer and anal tube, lateral view $\times 100$; (D) male plate, lateral view $100\times$; (E) style, dorsal view $\times 144$; (F) style apex, lateral view $\times 144$; (G) aedeagus, dorsal view $\times 144$; (H) aedeagus lateral view $\times 144$; (I) sternal apodeme of male $\times 50$; (J) female seventh sternum $\times 100$; (K) connective, male, dorsal view $\times 144$.

tubular, curved dorsad, tip narrowed and tapering, gonopore subterminal, apodeme not prominently developed, shaft with a pair of lateral atrial processes, both curved ventrad, their tips appearing below the shaft in lateral view.

Female. Seventh sternum massive, laterally smooth, posteromedian part strongly notched, dividing the posterior part of sternum into prominent halves.

Holotype male, Dacca, East Pakistan, 9-I-71 (Nurul), China rose, allotype female, and seven paratypes same data in Zoological Museum, University of Karachi, Karachi, Pakistan.

Remarks. The species *Empoasca profusa* described hitherto agrees well to the generic differentiation proposed by Ghauri,⁹ as well as Lower.¹¹ It appears close to *Empoasca malvae* (Evans) in its venation of forewing, in chaetotaxy of male plate, but differs in the development of a pair of atrial processes, laterodorsal to shaft, which also differentiate it from all the other known species of *Empoasca*.

Empoasca terminalis Distant (Fig. 3)

The species *Empoasca malayana* Paoli, and *E. parathea* Pruthi were described and illustrated by the authors in 1936 and 1940 respectively.^{12,13} Paoli described his species from Kuala Lumpur (Malaysia),¹² on the plant *Vigna catjang*, whereas Pruthi described his species from Delhi (India) on the plant soyabean.¹³ Ghauri synonymised the two species with *Empoasca terminalis* Distant⁷ collected from East Pakistan on grass.

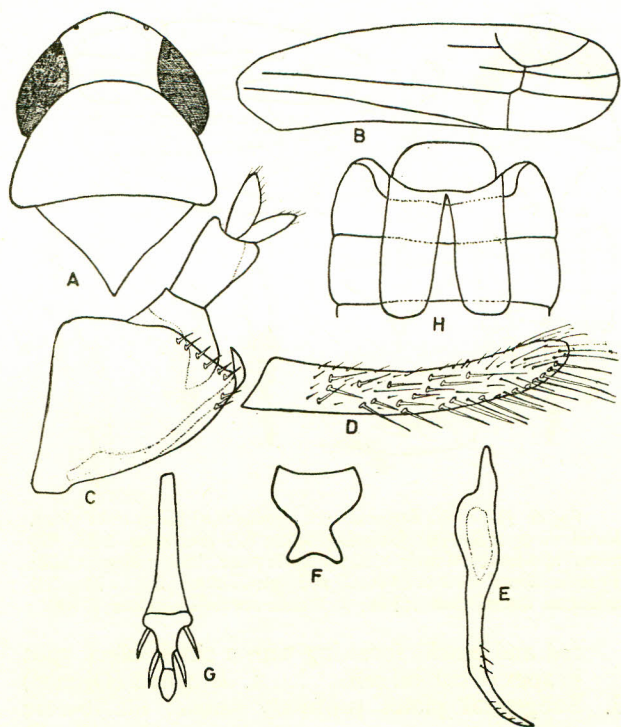


Fig. 3. *Empoasca malayana* Paoli: (A) head and thorax, dorsal view $\times 50$; (B) forewing $\times 25$; (C) pygofer and anal tube, lateral view $\times 100$; (D) male plate, lateral view $\times 100$; (E) style, dorsal view $\times 144$; (F) connective, dorsal view $\times 144$; (G) aedeagus, dorsal view $\times 144$; (H) sternal apodemes of male $\times 50$.

Empoasca spinosa, n. sp. (Fig. 4)

External Features. Length of male 3.50 mm; head broadly convex in front; median length of crown .25 mm, of pronotum .35 mm; interocular width of crown .40 mm; transocular width of head .75 mm; transverse width of pronotum .80 mm; ocelli present as usual in the genus; general colour pale green all over, legs dark green, claws blackish; abdomen pale yellow.

Wings. Forewing as described by Ghauri⁹ for the genus *Empoasca*; only one apical vein emerges out of the cell M.

Male Genitalia. Male plate, in ventral view quite broad in basal half, slightly narrowed in apical half, setae numerous both micro and macro, most of the macrosetae grouped in longitudinal mesal half, four macrosetae at apex on mesal aspect, and four on lateral margin near base; pygofer membranous all over, posterior margin rounded, disc with a few macrosetae posterodorsally, process of pygofer arising internally from ventral half of pygofer, and quite elongated, its tip not sharply pointed, with an angular part projected preapically; anal hook tapered and directed ventrally; style slender, apex curved twice in lateral direction, dentate on mesodorsal surface with a fringe of microsetae prior to lateral curve; connective broad, not elongated; aedeagus simple, without processes.

Female. Seventh sternum narrowed posteromedially, slightly sinuate at its extreme projection.

Holotype male, Dacca, East Pakistan, 14-I-71 (Nurul) Bitter gourd, allotype female, nine paratypes,

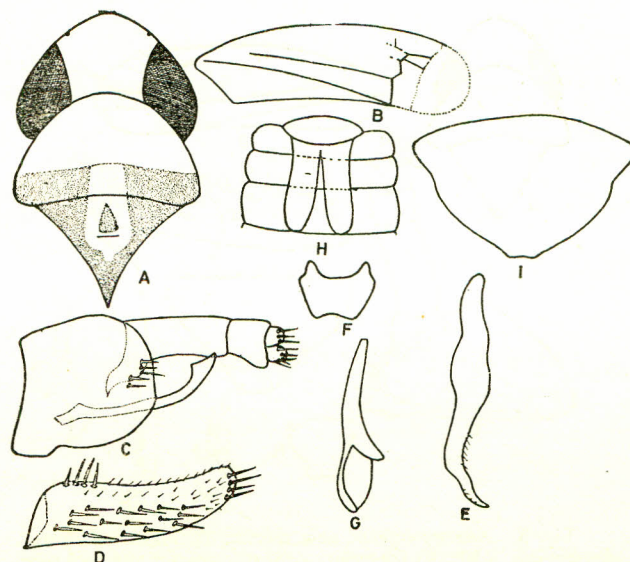


Fig. 4. *Empoasca spinosa*, new species (A) head and thorax, dorsal view $\times 50$; (B) forewing $\times 25$; (C) pygofer and anal tube, lateral view $\times 100$; (D) male plate, lateral view $\times 100$; (E) style, dorsal view $\times 144$; (F) connective, dorsal view $\times 144$; (G) aedeagus, dorsal view $\times 144$; (H) sternal apodemes of male $\times 50$; (I) female, seventh sternum $\times 100$.

same data in Zoological Museum, University of Karachi, Pakistan.

Remarks. The species *Empoasca spinosa* appears very close to the well-known species *E. flavescens*, but differs in considerably heavier chaetotaxy of male plates, the shape of anal hooks and to some extent in the apical part of ventral pygofer process. In the aedeagus, however, the ventral aspect of the shaft is comparatively sclerotized, whereas the rest of the shaft appears membranous.

Amrasca Ghauri 1967

Types species: *A. splendens* Ghauri, Proc. Roy. Entomol. Soc. (London), 36, 161, 1967).

Amrasca curvata, n. sp. (Fig. 5)

External Features. Length of male 2.40 mm; head broad convex in front; median length of crown .20 mm, of pronotum .20 mm, of scutellum .35 mm; interocular width of crown .30 mm; transocular width of head .50 mm; transverse width of pronotum .60 mm; ocelli present anteromedian to eyes; crown mostly bright pale white, with whitish rounded spots, one in each lateral half, and a third anteromedially; pronotum and scutellum slightly dim as compared to crown; abdomen pale yellow; sternal apodemes reduced.

Wings. Forewing with first and second apical veins arising from cell M; third apical vein arising from cell R.

Male Genitalia. Male plate, in ventral view broader in basal half as compared to distal half, apex slightly curved dorsad, with numerous macrosetae on ventral surface, as well as mesal and lateral margins, both short and long, microsetae dispersed all over; pygofer narrowed posterodorsally, with a group of a few macrosetae at posterior angle, process ventral, its tip

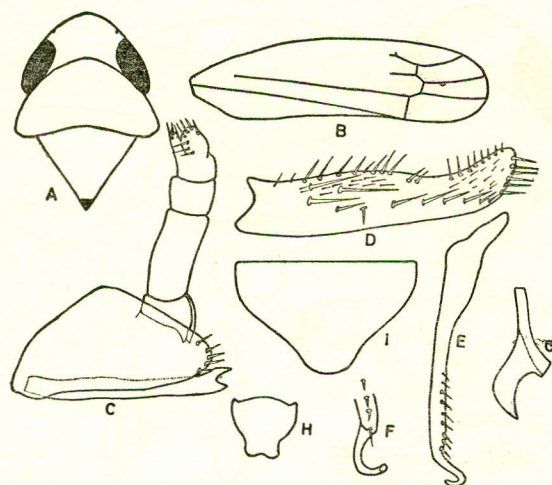


Fig. 5. *Amrasca curvata*, new species: (A) Head and thorax, dorsal view $\times 50$; (B) forewing $\times 25$; (C) pygofer and anal tube, lateral view $\times 100$; (D) male plate, lateral view $\times 100$; (E) style, dorsal view $\times 144$; (F) style apex, lateral view $\times 144$; (G) aedeagus, lateral view $\times 144$; (H) connective, dorsal view $\times 144$; (I) female seventh sternum $\times 100$.

possessing a well defined extension; anal tube elongate, with a short hook; style elongate, apical half provided with a row of lateral macrosetae, extreme apical part curved first laterodorsad, then ventrad, and terminating into rounded instead of sharply spinose tip; connective short, broad posteriorly, narrowed anteriorly; aedeagus simple, with preatrium almost equal in length to the shaft, dorsal apodeme small, shaft in lateral view broad at base, narrowed at apex; gonopore terminal; aedeagal processes lacking.

Female. Seventh sternum oblique laterally with posteromedian region projected into a broad lobe, rounded posteriorly.

Holotype male, Tangail, East Pakistan 27-I-71 (N.I. Khan), Indian plum, allotype female, same data, in Zoological Museum, University of Karachi, Karachi, Pakistan.

Remarks. Ghauri⁹ described the genus *Amrasca* with *A. splendens* Ghauri as its type species. He also considered that the previously known species *Empoasca devastans* Distant, *Empoasca terraereginae* Paoli and *Empoasca bombaxia* Ghauri belonged to *Amrasca* Ghauri. The species *Amrasca curvata* described here has been placed in this genus mainly on the basis of measurement of 'Coronal Index', and venation of forewing as described by Lower¹¹ and Ghauri.⁹ The C.I. of *A. curvata* is less than 15, and the forewing has first and second apical veins arising from cell M.

The following key, which is a slightly modified form of that given by Ghauri⁹ will separate the species *A. curvata* from those already included in the genus.

Key to the Species of *Amrasca*

1. Apex of ventral pygofer process long and flexible 2
Apex of ventral pygofer process short, inflexible 3
2. Head and forewing with extensive red and black markings *A. splendens* Ghauri
Head and forewing not extensively marked with

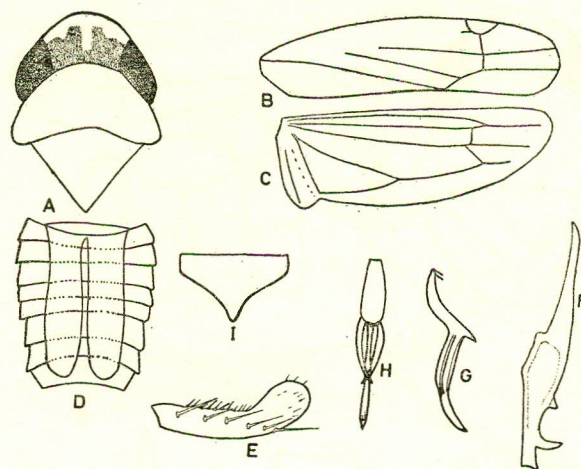


Fig. 6. *Helionidia dumurae*, new species: (A) Head and thorax, dorsal view $\times 50$; (B) forewing $\times 25$; (C) hindwing $\times 25$; (D) sternal apodemes of male $\times 50$; (E) male plate, lateral view $\times 100$; (F) style, dorsal view $\times 144$; (G) aedeagus, lateral view $\times 144$; (H) aedeagus, dorsal view $\times 144$; (I) female seventh sternum $\times 100$.

- red and black; forewing with a single black spot in apex of cubital cell. *A. devastans* (Distant)
3. Subgenital plates profusely setose; macrosetae much long..... *A. terraereginae* (Paoli)
Subgenital plates moderately setose; macrosetae not so long..... 4
 4. Ventral pygofer process setaceous at tip; forewing with a single spot in the apex of cubital cell *A. bombaxia* (Ghauri)
Ventral pygofer process bipronged at tip; forewing without any spot in the cubital cell.
..... *A. curvata*, new species

Typhlocyba longicephala Ahmed

The species was described by Ahmed¹ from Chhanga Manga forests (West Pakistan) on the plant *Butea frondosa*, and from Lahore, West Pakistan on the plant *Ficus bengalensis*. Presently the species has been reported on the plant Dumur, from Tangail (East Pakistan). The species, therefore, appears to have a wide geographical range.

Helionidia Zachvatkin 1946

Type species: *Heliona biplagiata* Zachvatkin, Trans. Roy. Entomol. Soc. (London) **96**, 151 (1946).

Helionidia dumurae, n. sp. (Fig. 6)

External Features. Length of male 2.50 mm; head strongly convex in front; median length of crown .20 mm, of pronotum .25 mm, of scutellum .30 mm; interocular width of head .25 mm; transocular width of head .45 mm; transverse width of pronotum .50 mm; crown yellowish in middle and posterolateral part, with an irregular whitish area anterolaterally; face mostly whitish, pronotum and scutellum whitish yellow, forewings whitish with a greenish yellow tinge, abdomen and legs whitish; sternal apodemes on abdomen much elongated, reaching 8th abdominal sternum posteriorly.

Wings. Forewings with base of first apical cell oblique; second with sides nearly parallel; third apical cell broad based; fourth apical cell short, not reaching wing apex; hindwing typically erythroneurine.

Male Genitalia. Male plate, in lateroventral view, narrow in basal half, broadened apically, with extreme apex rounded, with a row of short macrosetae in basal half, and an oblique row of 6 long macrosetae on ventral surface, apical region with short macrosetae; style slender, with a short tuberculous preapical outgrowth laterally, extreme apex truncated, possessing a lateral spur like outgrowth; aedeagus slender, articulation ventral to connective, preatrium long, curved dorsad, dorsal apodeme short, shaft tubular, narrow, possessing a pair of lateral atrial processes, more than half length of shaft, tips of processes intercrossing ventrally.

Female. Seventh sternum small, most of postero-lateral margins oblique, posteromedian part narrowly projected.

Holotype male, Sylhet, East Pakistan 3-I-71 (Aftab) Dumur, allotype female and six paratypes, same data, in Zoological Museum, University of Karachi, Karachi, Pakistan.

Remarks. The only other species of *Helionidia* Zachvatkin known from East Pakistan is *H. krishnachurae* Ahmed. The new species *H. dumuriae* differs considerably from it in its extreme apex of style being truncated; the aedeagal shape; shaft possessing a pair of atrial processes; in the sternal apodemes on abdomen being much elongated.

Zygina Fieber 1866

Type species: *Z. nivea* (Mulsant and Rey), Verhaudd Zool. Botan. Ges. Wien., 16, 509 (1866).

Zygina niazii, n.sp. (Fig. 7)

External Features. Length of male 2.70 mm; head strongly convex in front; median length of crown .20 mm, of pronotum .25 mm, of scutellum .35 mm; interocular width of crown .40 mm; transocular width of head .60 mm; transverse width of pronotum .60 mm; crown yellowish with violet patches, pronotum and scutellum also yellowish, with violet patches; forewings dim violet, abdomen blackish, legs pale, face mostly pale yellow; sternal apodemes on abdomen reduced.

Wings. Forewing with first apical cell having its base oblique; first apical vein arising from cell M; second and third apical veins arising from cell R; hindwing typically erythroneurine.

Male Genitalia. Male plate, in lateroventral view broad in basal $\frac{1}{3}$, narrowed and almost uniformly broad distally, apex smoothly rounded, curved dorsad, plate with 3 long macrosetae near lateral margin of basal part, plate brownish; pygofer with posteroventral margin sclerotized, its posterodorsal extremity ending into a prominent setaceous projection, quite distinct from the pygofer lobe, with a well developed dorsal process, broad basally and tapering and curved ventrad distally, disc of pygofer beset with short microsetae; style of the Zyginoide type, its preapical lobe in middle of distal part of style, lateral and mesal endings of the

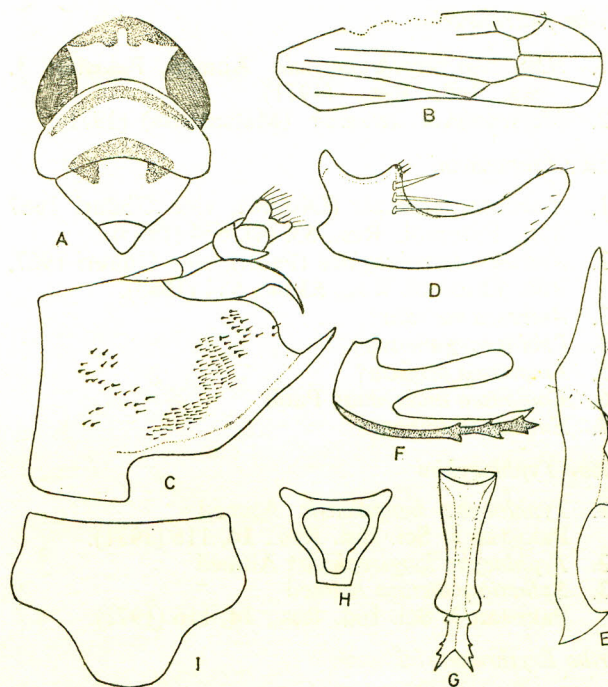


Fig. 7. *Zygina niazii*, new species: (A) Head and thorax, dorsal view $\times 50$; (B) forewing $\times 25$; (C) pygofer and anal tube, lateral view $\times 100$; (D) male plate, lateral view $\times 100$ (E) style, dorsal view $\times 144$; (F) aedeagus, lateral view $\times 144$; (G) aedeagus, dorsal view $\times 144$; (H) connective dorsal view $\times 144$ (I) female, seventh sternum $\times 100$.

truncated apex sharply pointed; connective papilionaceous, sclerotized marginally, membranous centrally, median cephalic lobe not developed; aedeagus with preatrium reduced, dorsal apodeme well developed, shaft grooved longitudinally in middle on ventral surface, its distal half with spiny projections laterally; apex bifurcated.

Female. Seventh sternum massive, its basal parts expanded laterally, posteromedian part narrowed and projected posteriorly in a broad, rounded lobe.

Holotype male, Dacca, East Pakistan, 9-1-71, (Nurul), Palang, allotype female, and two paratypes same data, Zoological Museum, University of Karachi, Karachi, Pakistan.

Remarks. The other species of *Zygina* known from East Pakistan are *Z. pakistanica* Ahmed, *Z. sawarensis* Ahmed, and *Z. binotata* (Distant). Presently described species differ from all these in the pygofer possessing both ventral as well as dorsal processes; the aedeagal shaft flattened longitudinally, grooved on ventral surface, and provided with lateral spiny projections at and near apex.

List of Typhlocybina Fauna of East Pakistan

Tribe Alebrini

1. *Benglebra alami* *Mahmood & Ahmed, S.U. Sci. Res. J., 4, 86 (1969).
2. *Benglebra bipunctata* *Mahmood & Ahmed, S.U. Sci. Res. J., 4, 87(1969).
3. *Hussainiana tripunctata* *Mahmood & Ahmed, S.U. Sci. Res. J., 4, 89 (1969).

Tribe Dikraneurini

1. *Hameedia erythrocephala* Ahmed, Pakistan J. Sci. Ind. Res., (1971).
2. *Motschulskia serrata*† (Matsumura) (1971).

Tribe Empoascini

1. *Amrasca devastans* (Distant), vide Ghauri 1967 Bull. Entomol. Res., **53**, (4), 654 (1963).
2. *Amrasca terraereginae* (Paoli), vide Ghauri 1967. Bull. Entomol. Res., **53** (4), 654 (1963).
3. *Amrasca curvata*†
4. *Paolia tangailensis*†
5. *Empoasca profusa*†
6. *Empoasca malayana*† Paoli
7. *Empoasca spinosa*†

Tribe Typhlocybini

1. *Typhlocyba bengalensis* Ahmed Pakistan J. Sci. Ind. Res., **14**, 116 (1971).
2. *Typhlocyba longicephala*† Ahmed
3. *Sylhetia punctata* Ahmed Pakistan J. Sci. Ind. Res., **14**, 116 (1971).

Tribe Erythroneurini

1. *Zygina pakistanica* Ahmed Pakistan J. Zool., **3**(2), (1971).
2. *Zygina binotata* (Distant) Pakistan J. Zool., **3**(2), (1971).
3. *Zygina sawarensis* Ahmed Pakistan J. Zool., **3**(2), (1971)
4. *Zygina niazii*†
5. *Erythroneura maculifrons* (Motschulsky) *Erythroneura alami* Ahmed Pakistan J. Zool., **2**(2), 183 (1971).
6. *Erythroneura kabiri* Ahmed Pakistan J. Zool., **3**(2), (1971).
7. *Erythroneura setosa* Ahmed Pakistan J. Zool., **3**(2), (1971).
8. *Erythroneura truncata* Ahmed Pakistan J. Zool., **3**(2), (1971)

9. *Erythroneura nagpurensis* (Distant). Pakistan J. Zool., **3** (2) (1971). *Zygina nagpurensis* (Distant), vide Ghauri (1967).
10. *Erythroneura cajanae* Ahmed Pakistan J. Zool., **3** (2), (1971).
11. *Erythroneura verticalis* Ahmed Pakistan J. Sci. Ind. Res., (1971).
12. *Helionidia krishnachurae* Ahmed Pakistan J. Zool., **3**(2), (1971).
13. *Helionidia dumurae*†
14. *Pakeasta notata* Ahmed Pakistan J. Zool., **3**(2), (1967).
15. *Mendera heterostyla* Ahmed Pakistan J. Zool., **3**(2), (1971).
16. *Thaia oryzivora* Ghauri Pakistan J. Zool., **2**(2), 175 (1971)
17. *Thaia subrufa* (Motschulsky) Action, (1971).

References

1. M. Ahmed, Pakistan J. Sci., **22** (56), 269 (1970d).
2. M. Ahmed, (in press).
3. M. Ahmed, (in press).
4. M. Ahmed and A. Waheed, Pakistan J. Sci. Ind. Res., **14**, 116 (1971).
5. I. Dworakowska, Bull. Acad. Polon. Sci. Ser. Sci. Biol., **19**, 579 (1971).
6. M.S.K. Ghauri, Ann. Mag. Nat. Hist. Ser., **5**, 253 (1962).
7. M.S.K. Ghauri, Bull. Entomol. Res., **53**, 654 (1963).
8. M.S.K. Ghauri, Ann. Mag. Nat. Hist., **13**(6), 39 (1963).
9. M.S.K. Ghauri, Proc. Roy. Entomol. Soc. (London), **36**, 195(1967).
10. T. Ishihara and P.C. Leopold, unpublished report (1970).
11. H.F. Lower, Proc. Linnean. Soc. N.S.W., **76**, 190 (1952).
12. G. Paoli, Soc. Entomol. Ital. Mem., **15**, 5(1936).
13. H.S. Pruthi, Indian J. Entomol., **2**, 1 (1940).

*In the present account. †Doubtful placement