

**CONTRIBUTION TO THE KNOWLEDGE OF EGNATIINAE
(ORTHOPTERA: ACRIDIDAE) FROM ISRAEL AND IRAN, WITH
DESCRIPTIONS OF A NEW GENUS AND FOUR NEW SPECIES**

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ABSTRACT

The following new Egnatiinae taxa are described: *Paracharora*, a new genus closely related to *Charora*, with *Paracharora popovi*, *Leptoscirtus dubius* (both from Iran), *Egnatioides mendelssohni* and *E. blondheimi* (both from southern Israel). Notes on additional species of Egnatiinae are given, and the systematic relationships of the new and of other species of Egnatiinae are discussed. A key to the genera of Egnatiinae is provided.

KEYWORDS: Acrididae, Egnatiinae, new taxa, grasshopper, Israel, Iran.

INTRODUCTION

The Egnatiinae are a small subfamily of grasshoppers distributed from central Asia to the eastern Mediterranean (Bei-Bienko and Mishchenko, 1951), with a few species extending to North Africa (Chopard, 1943), and some to Southwest Africa. All of the species are relatively minute and easily distinguishable from other grasshopper taxons by the structure of the mesosternal suture, which arches posteriorly between the mesosternal lobes (Fig. 3), and occasionally by the peculiar vertical stridulatory ridges located on the sides of abdominal terga IV-VIII in males of some of the genera (Fig. 12). To date, this subfamily includes 6 genera: *Charora* Saussure, 1888; *Egnatiella* Boliver, 1914; *Egnatioides* Vosselier, 1902; *Egnatius* StAl, 1876; *Leptoscirtus* Saussure, 1888; and *Paregnatius* Uvarov, 1933. Of these, *Charora* and *Paregnatius* are typical to the Iranian deserts, *Egnatiella* is endemic in Morocco, species of *Egnatioides* and *Egnatius* are common in North Africa and East Mediterranean countries, and species of the genus *Leptoscirtus* are found from Central Asia to Southwest Africa. Johnston (1956) and Laveaux and Ben-Halima (1986) listed 10 species of this subfamily in Africa. Recent studies of specimens collected in Israel and material housed in various museum collections revealed the existence of several new species belonging to this group, and these are described here.

The following acronyms are used throughout the text: BM = Natural History Museum, London (formerly British Museum of Natural History); TAU = Entomological Collection, Zoological Museum, Tel Aviv University.

TAXONOMY

KEY TO THE GENERA OF EGNATHIINAE

1. Tegmen and wing well developed 2
— Tegmen rudimentary, wing absent *Paregnatius* Uvarov
2. Pronotum with strong median carina in prozona and feebly marked lateral carina (Fig. 7); abdominal terga IV–VIII in male laterally with vertical, dense carinulae, or carinulae absent (Fig. 12); cingulum valves in aedeagus of equal length, each with anteroventral projection (Fig. 1A); posterior process of epiphallic lophus short (Fig. 1C) 3
— Pronotum without median carina in prozona, or carina feeble; abdominal terga of male without vertical carinulae; cingulum valve in aedeagus shorter than anteroventral projection (Fig. 1B); posterior process of epiphallic lophus pointed (Fig. 1D)
. *Leptoscirtus* Saussure
3. Tegmen wide; wing with strong veins at anterior lobe, with wide field between neighboring veins at posterior end of this lobe; pronotum with prominent carinulae in metazona; aedeagal valves robust, elongate; epiphallic lophus broad and rounded (Fig. 1A,C) 4
— Tegmen narrower, wing without strong veins and wide field in anterior lobe; aedeagal valves shorter (Fig. 1E); epiphallic lophus narrow and high 5
4. Abdominal terga IV–VIII in male laterally with numerous (15–18) vertical, regular carinulae (Fig. 12B); smaller species, maximal body length 13 mm; wing length 10 mm; posterior process of epiphallic lophus minute *Charora* Saussure
— Abdominal terga IV–VIII in male with fewer, crude, irregular carinulae (Fig. 12A); larger species, body length 16–18 mm; wing 14–16 mm; posterior process of epiphallic lophus short, but well visible *Paracharora* n. gen.
5. Antenna short, in male 1.5 times as long as head and pronotum combined, in female almost equal in length to head and pronotum; facial ridge protrudes between antennae (Fig. 7); lateral facial carinulae gradually converge towards antennal bases
. *Egnatioides* Vosselier and *Egnatiella* Bolivar
— Antenna long, in male twice as long as head and pronotum combined, with swollen apical segments, in female 1.5 times as long as head and pronotum; facial ridge does not protrude between antennae; lateral facial carinae parallel at clypeus and strongly S-curved at antennal bases *Egnatius* Stål

Leptoscirtus Saussure, 1888*Leptoscirtus* Saussure, 1888:72

Small, compressed and elongated. Antenna filiform, short, slightly thicker at apex. Head smooth, often opisthognathous, with miniature fastigial foveolae. Pronotum intersected by 3 transverse sulci, without lateral carinae in prozona and metazona; median carina visible. Prosternum inflated. Tegmen narrow, long, with false intercalary vein in median field, and in female often also in cubital field. Wing with normal venation. Abdominal terga IV–VIII in

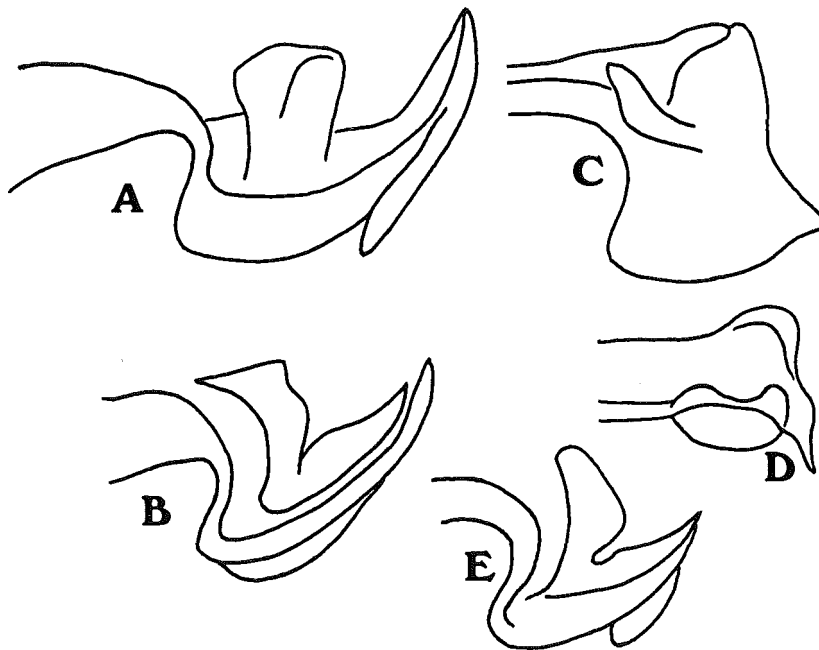


Fig. 1. Aedeagal parts of Egnatiinae. A. *Paracharora popovi*, cingulum valves. B. *Leptoscirtus dubius*, cingulum valves. C. *P. popovi*, epiphallic lophus. D. *Leptoscirtus dubius*, epiphallic lophus. E. *Egnatioides desertus*, epiphallic lophus.

male laterally smooth; in female most posterior sternite angular and with protruding margins. Aedeagal valves pointed, dorsal shorter than ventral (Fig. 1B); epiphallic lophus narrow, with sharp posterior process (Fig. 1D).

This genus was erected by Saussure in 1888, with the type species *L. aviculus* Saussure, 1888, and placed by him in *Oedipodinae*, closely related to *Sphingonotus* Fieber, 1852. After the characteristic posterior curvature of the mesosternal suture was recognized, this genus was found to be close to *Egnatius* and assigned to the Egnatiinae (Uvarov, 1929a).

Five species belong to this genus. They are distributed from North Africa and the Sinai Peninsula to Iran.

***Leptoscirtus dubius* n. sp.**

(Figs. 2, 3)

Holotype ♂

Head: Smooth, punctated; frontal ridge flat between antennal bases, obliterated above clypeus and depressed with sharp margins on middle ocellus (Fig. 3A); lateral facial carina sharply raised, gradually converging towards respective ocelli; foveola on fastigium slightly sunken, almost trapezoid; eye long, vertical diameter 1.5 times longer than subocular groove; antenna filiform, most segments as wide as long, basal one flattened.

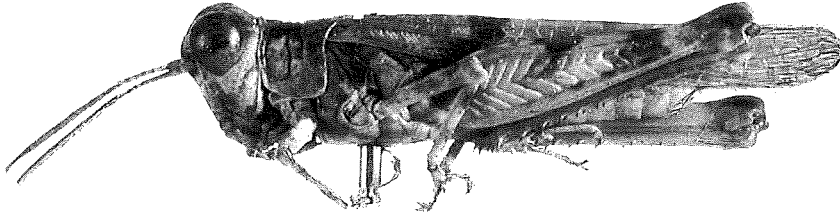


Fig. 2. *Leptoscirtus dubius*, male.

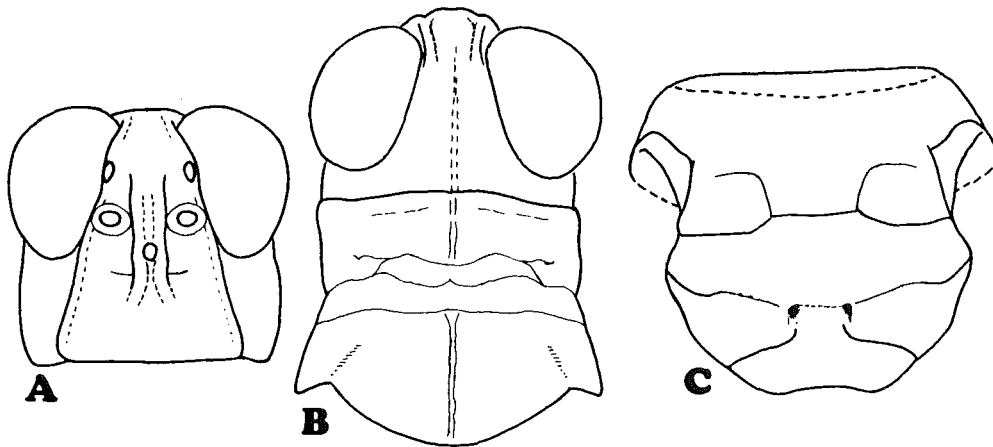


Fig. 3. *Leptoscirtus dubius*. A. Frontal view of head. B. Dorsal view of head and pronotum. C. Sternal plate.

Thorax: Pronotum slightly saddle-shaped, with median carina obliterated between 3 transverse sulci; prozona and metazona of equal length (Fig. 3B); lateral lobe higher than long; posterior margin of metazona obtuse-angled; lateral margin sinuate, latero-posterior angle rounded; prosternum with wide inflated tubercle, 2.5 times wider than long, its surface crenulated; sternal plate as long as wide, mesosternal suture forms a posteriorly directed trapezoid space between mesosternal lobes, twice as wide as long (Fig. 3C); metasternal space wide and short, three times wider than long (Fig. 3C).

Abdomen: Supra-anal plate triangular, with wide base; epiphallus long, with valves of unequal length.

Wings: Tegmen narrow, without intercalary vein in median field and with open cubital field; radius and radial sector with single branch; anal field of wing with 7 large cells.

Legs: Hind femur slender; hind tibia with 7 spines dorsally and 9 spines ventrally; hind spur 0.5 as long as tarsus.

Measurements: Body length 10.5 mm; pronotum length 1.7 mm; antenna 4.5 mm; tegmen length 9.2 mm; post-knee 2.2 mm; hind femur length 5.8 mm; width 1.6 mm; length/width ratio 3.6.

Color: Pale ochraceous; face and gena whitish, with few dark spots; tegmen hyaline, ochraceous, with small dark blotches and brown transverse band close to base; hind femur ventrally yellow, dorsally with brown spots, anteriorly with two brown blotches; brown bands also on fore and mid-legs; hind tibia pale bluish, tibial spines blackish brown.

Allotype ♀

Generally similar to male, larger; inflated prosternum narrower; frontal ridges partly parallel; face slightly punctated. *Measurements*: Body length 16.0 mm; pronotum 3.2 mm; tegmen length 13.4 mm; post-knee 3.6 mm; hind femur length 8.2 mm; width 2.6 mm; length/width ratio 3.15. *Color*: As in male, but hind femur ventrally with two brown blotches.

Paratype ♂

Differs from the holotype by slightly obliterated intercalary vein in tegmen and by 9 large cells in anal field of wing. *Measurements*: Body length 11.0 mm; pronotum 2.0 mm; tegmen length 11.0 mm; hind femur length 6.2 mm. *Color*: More ochraceous, tegmen brownish; hind femur ventrally yellow with diffuse brown blotch, dorsally with dark band; knee brown.

MATERIAL EXAMINED. Holotype ♂, IRAN: Near Yezd [North Iran], 30.v.1950, G.B. Popov (Brit. Mus. 1950-616) (BM). Allotype ♀: IRAN: near Kerman, v.1951, G.B. Popov (B.M. 1951-335). Paratypes: IRAN: Khanch Sorkh, 5.vi.1951 (1♂); Hajiabad, north of Bandar Abbas, iii.1951 (B.M. 1961-355) (1♀), both G.B. Popov (BM).

REMARKS. This species appears to be closely related to *Leptoscirtus isphanicus* Uvarov, 1929a, from Isphahan, Iran. It is much smaller than *L. isphanicus*: male 10.5–11.0 mm compared to 13.5 mm in *L. isphanicus*, and female 16.0 mm compared to 20 mm in *L. isphanicus*. In *L. dubius*, prozona and metazona are of equal length, and with clear median carina, whereas in *L. isphanicus* prozona is slightly longer. Lateral lobes of pronotum in *L. dubius* are higher than long, whereas in *L. isphanicus* they are of the same dimensions. Differences are also found in the shape of the prosternal inflation and tegmen venation.

Leptoscirtus aviculus Saussure, 1888

Leptoscirtus aviculus Saussure, 1888:72.

Smooth, delicate, laterally compressed.

Head: Slightly opisthognathous, raised above pronotum; facial ridge flat, indication of sulcus only below ocellus (Fig. 4A); face punctated, lateral carina partly obliterated, slightly raised and bent towards lateral ocellus; gena swollen, punctated; fastigial foveola minute, flat; occiput with low median carina and small carinulae; antenna as long as head and pronotum combined, 10 basal segments flattened, apical ones rounded, not swollen.

Thorax: Pronotum with prozona slightly larger than metazona, median carina slightly visible only in metazona; posterior margin of pronotum arcuate, lateral margin oblique, posterior corner rounded; sternal plate square, mesosternal space 1.5 times as wide as

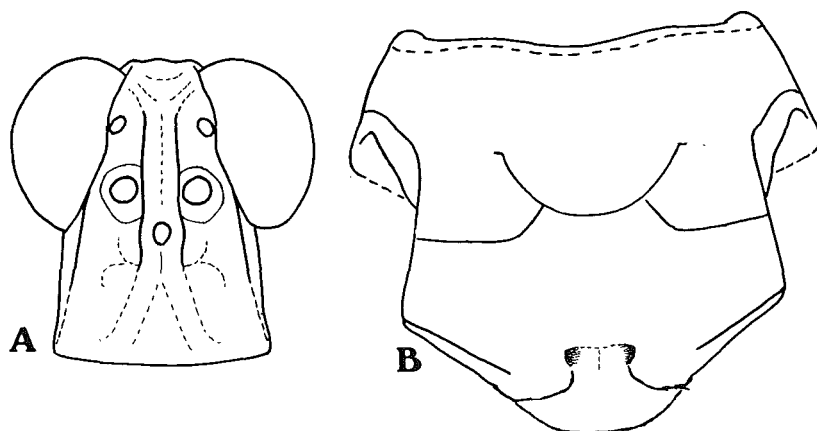


Fig. 4. *Leptoscirtus aviculus*. A. Frontal view of head. B. Sternal plate.

mesosternal lobe (Fig 4B); mesosternal suture arcuate, protruding posteriorly up to two-thirds width of lobe; metasternal space almost square.

Abdomen: Terga densely punctated; valves of ovipositor tuberculate at base.

Wings: Tegmen elongate, extending beyond ovipositor; radial sector with single branch, median field open, with feeble intercalary vein.

Legs: Hind femur delicate; hind tibia with 10 spines ventrally and 7 dorsally.

Measurements: Body length 15 mm; pronotum and head 3.7 mm; tegmen length 10.68 mm; width 1.9 mm; length/width ratio 5.62; hind femur length 7.56 mm; width 1.50 mm; length/width ratio 5.0.

Color: Pale, sandy, gena and face white; antenna with brownish rings; tegmen ochraceous, with brownish transverse band basally and blotches; wing transparent; hind femur with one brown blotch dorsally; hind tibia bluish.

MATERIAL EXAMINED. EGYPT: Sinai, Loc.: 883678 Egypt grid, 23.v.1969, J.L. Werner (1♀, TAU).

REMARKS. The studied female matches the rather short description of the type given by Saussure (1888). The type specimen was a male collected in "Aegyptus." According to Uvarov (1929b), this type can no longer be traced. My own recent efforts to find it were also unsuccessful. However, I am withholding a neotype designation until more specimens have been collected.

Leptoscirtus niloticus (Saussure, 1888)

Leptoscirtus niloticus Saussure, 1888:85.

This species, apparently the largest in the genus, was described by Saussure from Egypt, and is represented by a female in the Sinai collection made by Bodenheimer and Theodor (1929). This female differs from the Israeli species of *Leptoscirtus* in that it has an almost flat frontal ridge, obliterated foveola, smooth occiput and vague subocular groove. The

pronotum is rounded, as is its lateral lobe. Tegmen with delicate venation and without intercalary veins. Measurements of female: Body length 18 mm; head and pronotum 5.2 mm; tegmen length 15.5 mm; post-knee 3.5 mm; hind femur 9.5 mm.

MATERIAL EXAMINED. EGYPT: Sinai, Et Tur [labeled: "Tor"], vii.1927, Theodor & Bodenheimer (2♀, BM).

Egnatioides Vosselier, 1902

Egnatioides Vosselier, 1902:361.

Egnatioides mendelssohni sp. n.

(Figs. 5, 6)

Holotype ♂

Minute, compressed and slender.

Head: Strongly opisthognathous and markedly raised above pronotum (Fig. 5); facial ridge wide at clypeus, then converging, sinuate, and deeply incised below median ocellus (Fig. 6A); its carina strongly protrudes above ocellus and between antennal bases, separated by very narrow sulcus; this carina protrudes on vertex and forms inner margin of minute, triangular fastigial foveola; lateral facial carina slightly sinuate, extending from clypeus towards lateral ocellus; subocular groove partly obliterate, its length almost equal to eye diameter; vertex depressed, eye protruding above it; occiput with clear median longitudinal carina; antenna filiform, 1.5 times as long as head and pronotum combined, with 22 segments; basal 7 segments flat, more distal segments rounded and elongated.

Thorax: Pronotum compressed in the middle, with clear median carina, obliterated between the three transversal sulci; prozona and metazona equal in length (Fig. 6B); lateral lobe of pronotum markedly longer than high; frontal margin of prozona protrudes over occiput, posterior margin rounded, posterolateral corner wide, rounded; prosternum inflated, almost square, 1.25 time as wide as long; sternal plate much longer than wide, mesosternal space almost rounded between lobes, sulcus arcuate, extending posteriorly almost to rounded end of mesosternal lobe (Fig. 6C); metasternal space small, only slightly wider than long.

Abdomen: Cercus thick, sharp, half as long as supra-anal plate.

Wings: Tegmen narrow and membranous, radial sector with single branch, median field with intercalary false vein. Wing with strong black veins in anterior lobe.

Legs: Hind femur with wide dorsal space, anteriorly twice as thick as posteriorly before knee. Hind tibia slightly hairy, shorter than femur, with 7 spines dorsally and 9 spines ventrally; distal tarsal segment as long as metatarsal; arolium obsolete.

Measurements: Body length 13.1 mm; antenna 6.5 mm; pronotum 1.9 mm; tegmen length 12.0 mm; post-knee 2.0 mm; hind femur length 7.24 mm; width 1.7 mm; length/width ratio 4.2; hind tibia length 6.14 mm.

Color: Pale ochraceous, brown punctated. Gena white, dorsally framed by dark brown margin, forming extension of brown band of lateral pronotal lobe; ventral part of lateral lobe white. Tegmen brownish, with diffuse pattern of brown blotches. Hind femur yellow ventrally, with two brown blotches dorsally, proximal blotch triangular. Hind tibia yellowish, spines with dark brown tips.

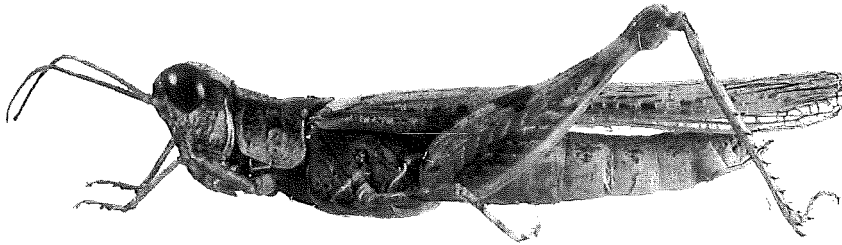


Fig. 5. *Egnatioides mendelssohni*, male.

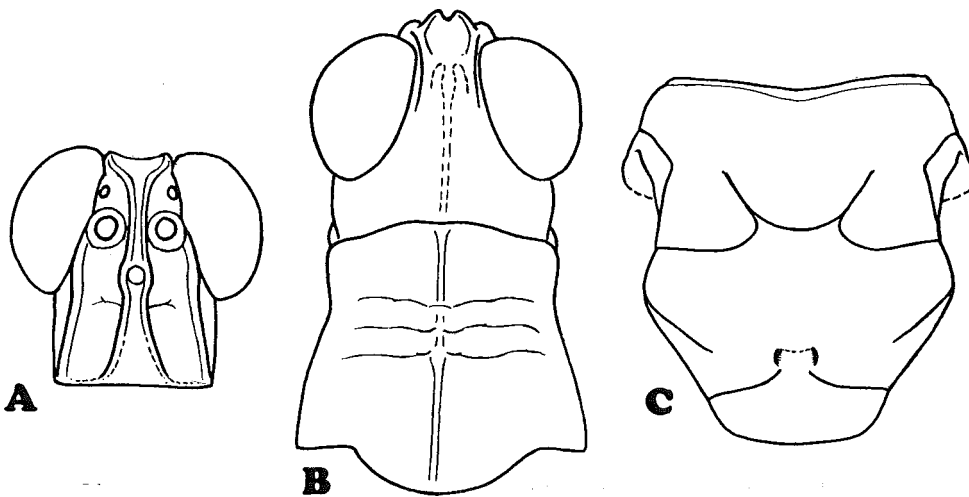


Fig. 6. *Egnatioides mendelssohni*. A. Frontal view of head. B. Dorsal view of head and pronotum. C. Sternal plate.

Allotype ♀

Body more robust than in male. Opisthognathous; facial ridge slightly protruding between antennal bases, carina slightly sinuate above clypeus; subocular groove as long as eye; occiput with longitudinal carina and minute carinulae radiating from eye; antenna as long as head and pronotum combined, with 18 segments, with 7 basal segments flat and smaller than distal segments; mesosternal interspace less rounded, valve of ovipositor sharp, ventral valve with preapical tooth. Tegmen: radial sector with single branch, intercalary vein straight; wing with strong veins in anterior lobe. Hind tibia with posterior spurs long, longest spur almost equal to tarsal segment. *Color*: Generally as in male, pale ochraceous, with transparent wing and white and brown on pronotum; tegmen brown-blotched; hind femur dorsally ochraceous,

with brown blotches and pale bluish stripes; hind tibia bluish gray. *Measurements*: Body length 17.2 mm; pronotum 3.1 mm; tegmen length 14.5 mm; post-knee 3.7 mm; hind femur 8.5 mm; hind tibia 7.2 mm.

All paratypes are practically identical morphologically with the holotype and allotypes.

MATERIAL EXAMINED. Holotype ♂, ISRAEL: [Bor] Mashash 10 km south of Be'er Sheva, 25.iv.1960, L. Fishelson (TAU). Allotype ♀, ISRAEL: 15 km S. Be'er Sheva, 4.vi.1975, M.P. Pener ("Faunistics") (TAU). Paratypes: 4♂, 1♀, same locality, 30.v.1968, 23.v.1972, 4.vi.1975, M.P. Pener; Bor Mashash, 1.ix.1955, L. Fishelson (1♀) (all TAU).

ETYMOLOGY. The species name honors Dr. H. Mendelssohn, one of Israel's outstanding zoologists and an enthusiastic researcher of the Israeli fauna.

BIOLOGY. The adults of *E. mendelssohni* are observed from April to September; ripe females from June to July, and hoppers in April. It therefore appears that their egg-pods with the embryos remain in the sand for 8–9 months.

This is apparently the most characteristic species of Egnatiinae on the sand dunes extending across the Negev south of Beer Sheba (Haluzza sands). Together with the grasshoppers *Eremogryllus hamadae*, *Leptopternis gracilis*, *Hyalorhipis calcarea* and the following new species, *Egnatioides blondheimi*, it forms a very typical group of psammobiotic grasshoppers.

Egnatioides blondheimi n. sp.

(Figs. 7, 8)

Holotype ♂

Minute, slender.

Head: Opisthognathous, raised above pronotum (Fig. 7); eye large, projecting above sunken fastigium; facial ridge strong; carinae raised, converging above clypeus, sunken below middle ocellus, then narrow, parallel, protruding between antennal bases (Fig. 8A), diverge towards eyes, forming inner limit of frontal foveola; lateral facial carina straight, gradually approaching lateral ocellus; vertex deeply sunken, divided by cross-carinula between eyes; occiput with strong median carina and numerous transverse carinulae (Fig. 8B); eye globular, diameter greater than subocular groove; antenna filiform, 1.5 times longer than head and pronotum combined, with 7–8 distal segments much longer than wide, rounded and punctated, more basal segments flattened.

Thorax: Pronotum slightly compressed (Fig. 8B); prozona with feeble median carina and slightly marked lateral carina; metazona strongly punctated, with prominent frontal margin raised above occiput, posterior margin obtuse-angulate; lateral lobe with sinuate margin; prosternum inflated, oblique and almost square, mesosternal space wide, mesosternal suture arcuate posteriorly to half width of mesosternal lobe, rounded (Fig. 8C); metasternal space wider than long.

Abdomen: Terga laterally without any vertical carinulae; cercus strong, hairy.

Wings: Tegmen elongate, radius and radial sector without branches; median field with intercalary vein, open.

Legs: Hind femur wide at base, with pointed lobe of knee; hind tibia with 10 spines ventrally and 6 spines dorsally. Longest posterior spur much shorter than metatarsus.

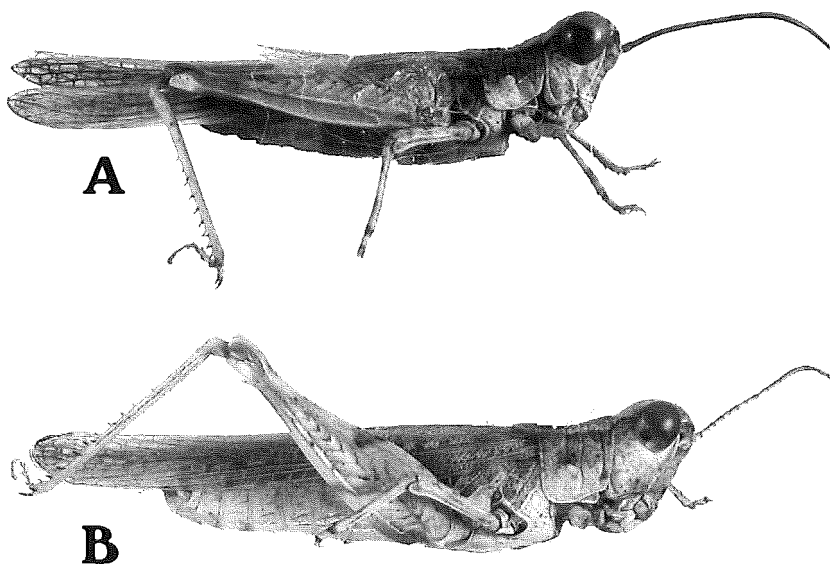


Fig. 7. *Egnatioides blondheimi*. A. Male. B. Female.

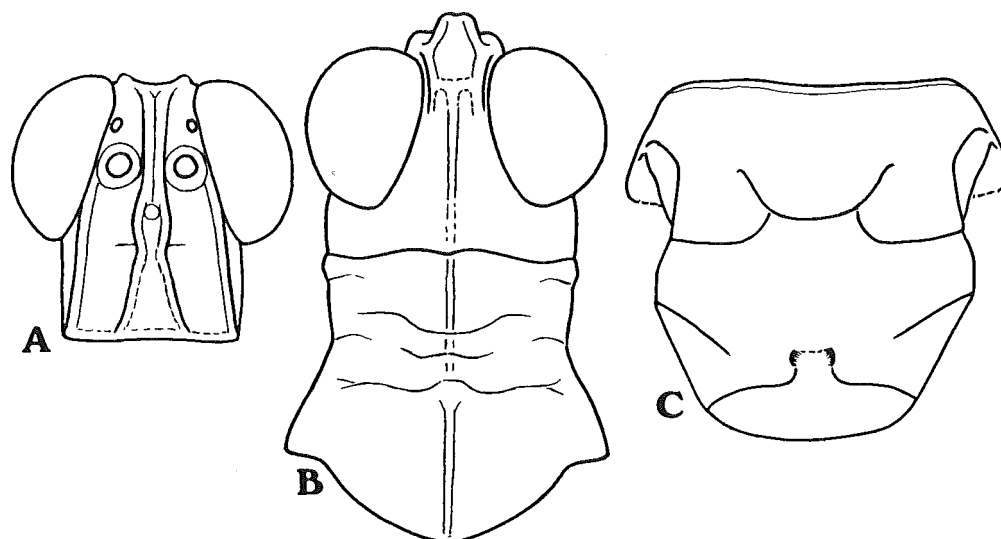


Fig. 8. *Egnatioides blondheimi*. A. Frontal view of head. B. Dorsal view of head and pronotum. C. Sternal plate.

Measurements: Body length 9.8 mm; tegmen length 10.7 mm; width 2.1 mm; post-knee 3.0 mm; length/width ratio 5.0; hind femur length 6.5 mm; width 2.0 mm; length/width ratio 3.25 mm; hind tibia length 5.3 mm.

Color: Ochraceous dorsally, whitish in front and laterally, with brown band from lateral pronotal lobe extending towards eye; ventrally whitish. Tegmen ochraceous; wing transparent, with blackish veins. Hind femur dorsally with two dark brown blotches, ventrally pale. Hind tibia pale, spines brown.

Allotype ♀ (Fig. 7B)

Head: Raised above pronotum, slightly opisthognathous, facial ridge less protruding than in holotype; eye as long as subocular groove. Antenna 16-segmented, as long as head and pronotum combined, almost all segments long, not flattened. *Thorax:* Pronotum with median carina, also visible between transverse sulci; all three sulci also deep on lateral lobe; metazona with raised shoulder, lateral lobe as high as long; sternal plate slightly longer than wide, mesosternal suture less rounded apically, metasternal space 1.5 times wider than long. Ovipositor valves pointed, lower pair tuberculate on ventral surface. Hind tibia with 10 spines ventrally and 6 spines dorsally. Other characters as in holotype. *Measurements:* Body length 12.8 mm; tegmen length 13.4 mm; post-knee 4.3 mm; hind femur length 8.5 mm; width 2.5 mm; length/width ratio 3.4 mm; hind tibia 6.7 mm. *Color:* Brown ochraceous, gena and lateral lobe of pronotum whitish, with brown bands passing from pronotum to eyes. Tegmen brownish punctated, wing transparent, with dark veins in anterior lobe.

MATERIAL EXAMINED. Holotype ♂, ISRAEL: Arad (northern Negev), 4.vi.1963, Pener & Blondheim (TAU). Allotype ♀, ISRAEL: Arad, 13.v.1969, Blondheim & Broza (TAU). Paratypes, ISRAEL: Arad, 4.vi.1963 (1♂, 4♀); Makhtesh Ramon, 13.v.1969, Blondheim & Broza (1♀), Nahal Zin, 5.vi.1963, Pener & Blondheim (1♂, 2♀) (all TAU).

REMARKS. There is almost no intraspecific variation. However, some specimens show a darker complexion or stronger rising facial carina or occipital carinulae, and some of the females are slightly larger than the allotype.

The two new species of *Egnatioides* described in this paper, *E. mendelsohni* and *E. blondheimi*, are very similar in color and other characters and appear to be very closely related. They must have been isolated by adaptation to two different habitats: sand dunes for *E. mendelsohni* and gravel stones for *E. blondheimi*. Neither species possesses the vertical carination on the abdominal terga in the male. This means that both species must possess a method of communication that differs from other species of *Egnatioides* or *Egnatius*. Despite the close relationship, *E. blondheimi* is much smaller than *E. mendelsohni* (9.8 mm body length in male and 12.7 mm in female of the former species, compared to 13.0 mm in male and 17.2 mm in female of the latter species), and the two species also differ in other characters (Table 1).

ECOLOGY. This very uniform population is possibly associated with small, sandy pockets between cobbles and stones, typical for Arad. In June, the females were all with eggs ready for spawning.

ETYMOLOGY. This species is named after the late Dr. C. Blondheim, a devoted student of Israeli grasshoppers, who also collected the study material.

TABLE 1
Comparison between *E. mendelssohni* and *E. blondheimi*

Character	<i>E. mendelssohni</i>	<i>E. blondheimi</i>
Facial ridge	sinuate	straight
Occiput	smooth	numerous carinulae
Facial lateral carina	sinuate	straight
Foveola	triangular	rounded
Sternal plate	oblong	square
Subocular groove to eye	equal	shorter
Radial sector	single branch	no branch

Egnatioides coerulans (Krauss, 1893)
(Fig. 9)

Egnatius coerulans Krauss, 1893:95.

Egnatioides coerulans Uvarov, 1942:345 (new combination).

?*Egnatioides coerulans* Bei-Bienko, 1951:393 (cited from Shumakov (1963)).

?*Egnatioides bey-bienkoi* Shumakov, 1963:113 (new name for *E. coerulans* Bei-Bienko).

Krauss (1893) described the species from Algeria. Uvarov (1942) transferred this species to *Egnatioides*. Bei-Bienko and Mishchenko (1951), apparently unaware that this name was occupied, used it for a new species from Central Asia. Schumakov (1963) renamed this Asian species as *E. bey-bienkoi*. Material previously recorded from Israel (Fishelson, 1985) matches the description by Krauss, but newly studied material (recorded below) appears to bridge the two species, and it is possible that we are dealing with two populations, probably at a sub-specific level of their speciation. The most typical characters, which separate this species from all other congeners in Israel, are the flattened facial ridge (Fig. 9), feeble lateral carina in prozona, and blue wing. In addition, *E. coerulans* differs from *E. mendelssohni* n. sp. and

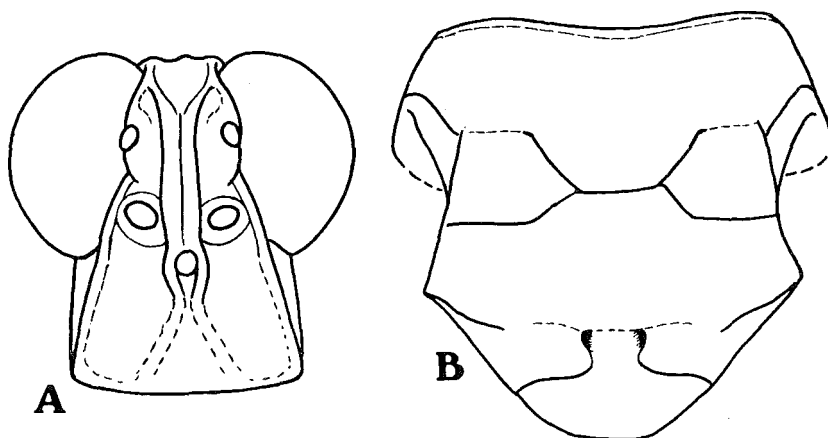


Fig. 9. *Egnatioides coerulans*. A. Frontal view of head. B. Sternal plate.

E. blondheimi n. sp. mainly in having the facial ridges more pronounced. Also, in *E. coeruleans* the mesosternal suture is very shallow and slightly arcuate between the mesosternal lobes (Fig. 9B), whereas in *E. mendelssohni* and *E. blondheimi* this suture arcuates posteriorly, almost reaching the ends of the lobes (Fig. 7C).

MATERIAL EXAMINED. EGYPT (Sinai): Nahal Tlach, 13.viii.1968, Miko (1♀); Ein-Shnar, 11.vii.1969, A. Freidberg (1♀); near St. Katherina, 16.vii.1977, L. Fishelson (1♀); F. el Frea, 15.vii.1974, L. Kinarty (1♀). ISRAEL: Ashqelon, 30.v.1969, J. Margalit (1♂); Bor Mashash, 1.ix.1955, L. Fishelson (1♂); Mishor Rotem (et Tureibe), 23.ix.1953, L. Fishelson (1♀) (all TAU).

Egnatioides pasquieri Morales, 1950

Egnatioides pasquieri Morales, 1950:22.

Morales (1950) described this species from Lebanon, and its occurrence on Mt. Hermon slightly extends its distribution to the south. The comparison of the male recorded below with the holotype (deposited in BM) and descriptions (a redescription is given by Dirsh (1951)), leaves no doubt as to its identity. The Mt. Hermon specimen is slightly darker, but this difference can be attributed to the types of soil inhabited by the different populations.

MATERIAL EXAMINED. ISRAEL: Mt. Hermon, 2000 m, 15.viii.1976, A. Freidberg (1♂, TAU).

Egnatius Stål, 1876

Egnatius Stål, 1876:25.

Egnatius apicalis Stål, 1876

Egnatius apicalis Stål, 1876:25

This female generally matches the description given by Stål and cited by Uvarov (1929b), and Bei-Bienko and Mishchenko (1951), and corresponds to the material in the Entomological Collection of the Natural History Museum, London. It will be possible to establish the final taxonomic position of this form and species from Sinai or southern Israel only after more specimens, especially males, have been collected.

MATERIAL EXAMINED. EGYPT: Sinai, Mt. Katherina, 21.vi.1974, L. Kinarty (1♂), 2500 m, 13.vii.1974, A. Freidberg (1♀), 16.vi.1977, A. Freidberg (1♀?); Mt. Abbas, 2300 m, 17.vii.1974, A. Freidberg and F. Kaplan (2♂, 1♀); W. Tlach, 28.vii.1975, D. Gerling (1♀) (all TAU).

Paracharora n. gen.

Type species: *Paracharora popovi* n. sp., by present designation.

Head: Opisthognathous, antenna 1.5 times as long as head and pronotum combined, terminal segment slightly swollen, rounded and punctated. Pronotum with lateral carina in prozona and metazona, median carina raised in frontal part of prozona, frontal transverse

sulcus arcuate posteriorly (Fig. 11B); posterior margin of pronotum obtuse angled. Prosternum straight anteriorly, arcuate posteriorly, mesosternal suture arcuate, metasternal space square (Fig. 11C). Tegmen with non-branching radius, closed median field with intercalary vein. Male with strong, irregular, vertical carinulae on abdominal terga IV–VIII (Fig. 12A).

REMARKS. *Paracharora* differs from the closely-related genus *Charora* Saussure 1888 by irregular and relatively few vertical carinulae in its stridulatory apparatus on the abdominal terga, compared to regular and numerous carinulae in *Charora* (Fig. 12B). *Paracharora* differs from *Egnatius* by the prominent lateral carina on the prozona and metazona of pronotum. *Paracharora popovi*, the only included species, is also much larger than most of the species of *Charora* and *Egnatius*.

ETYMOLOGY. The name *Paracharora* is derived from the Greek *para*, meaning alongside, similar, and *Charora*, the name of the closely related genus of Egnatiinae.

***Paracharora popovi* n. sp.**
(Figs. 10–12)

Holotype ♂

Head: Slender, opisthognathous, raised above the pronotum; antenna about 1.6 times as long as head and pronotum combined, with distal segment oblong and rounded, punctated, with more proximal segments flattened; facial ridge with carina converging towards middle ocellus, then parallel, up to fastigium, raised, continuing parallel to eye (Fig. 11A); sulcus between carinae of ridge depressed, punctated, slightly obliterate above ocellus; lateral facial carina strong and sinuate; widest distance between eyes greater than eye diameter; fastigium rugose, fastigial foveola triangular; eye oblong, as long as subocular groove, apex of head with median carina and two smooth rounded spots laterally; occiput with numerous oblique carinulae.

Thorax: Pronotum with raised median carina and prominent lateral carina intersected by three transverse sulci, of which frontal one bends caudally (Fig. 11B); median carina raised in prozona and forms tubercles between transverse sulci; metazona wider than prozona, with shoulderlike lateral carina and angulated posterior margin; lateral lobe higher than long, punctated, with few tubercles and oblique carina, lower margin sinuated, posterior angle obtuse; prosternum inflated, oblique, truncate in front and arcuate posteriorly; sternal plate punctate; mesosternal suture arcuate, posteriorly bending to less than half width of mesosternal lobe (Fig. 11C); metasternal space square.

Abdomen: Abdominal tergites IV–VIII each laterally with 4–7 deep and irregular vertical carinulae (Fig. 12A); subgenital plate swollen and short, supra-anal plate rounded, apically pointed; cercus short and pointed, punctate and hairy; aedeagal valves elongated and of equal length (Fig. 1A); epiphallal lobe flat and wide, with short posterior process (Fig. 1C).

Wings: Tegmen short, 5 times as long as wide; radius without branches, median field closed, with feeble intercalary vein. Wing with strong dusky, black veins.

Legs: Hind femur wide, with raised, sharp carina anteriorly; 2.5 times as wide at base as at knee; hind tibia shorter than femur, with 11 spines ventrally and 8 spines dorsally; posterior spur compressed and sharp; arolia minute.

Measurements: Body length 17.0 mm; pronotum length 2.5 mm; tegmen length 13.5 mm; post-knee 3.0 mm; hind femur length 7.5 mm; width 2.5 mm; length/width ratio 3.0.

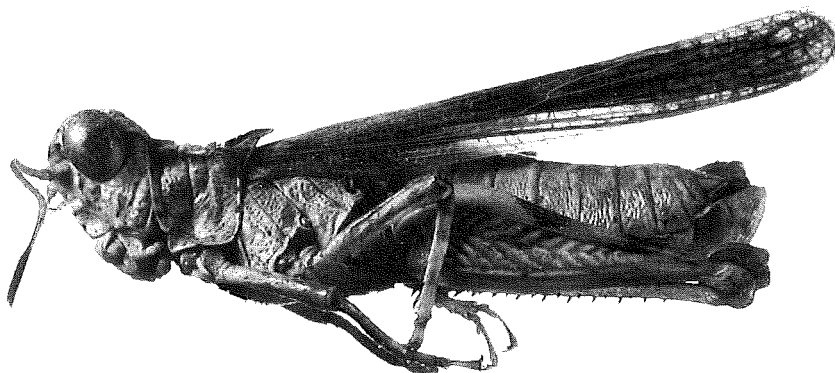


Fig. 10. *Paracharora popovi*, male.

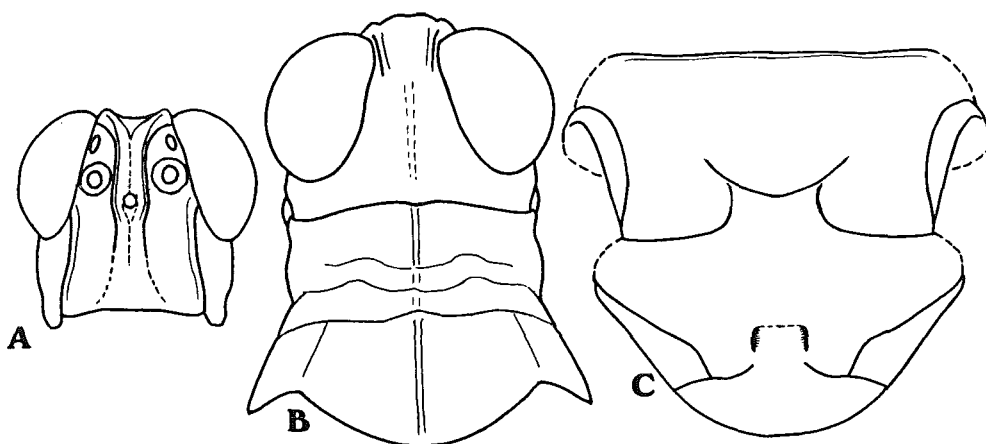


Fig. 11. *Paracharora popovi*. A. Frontal view of head. B. Dorsal view of head and pronotum. C. Sternal plate.

Color: Brown ochraceous, with pale and dark punctations; distal part of antenna blackish; prozona of pronotum brown; hind femur dorsally with black blotches, anterior blotch triangular; ventrally at base black, then yellow, with dark extension from dorsal blotch; hind tibia slightly bluish, tarsus yellowish.

Allotype ♀

Head: Robust, oblong. Head and pronotum granulated and crenulated, slightly opisthognathous. Antenna almost 1.5 times as long as head and pronotum combined. Facial carina converging from clypeus, then almost parallel; lateral facial carina strongly sinuate; face and

gena punctated; foveola deep, vertex triangular, very rugose, with carinulae radiating from eye; deep transverse carina between eyes; median carina on occiput with various rugosities laterally. *Thorax*: Pronotum metazona larger than prozona, median carina raised in prozona and metazona; metazona with numerous tubercles; lateral lobe of pronotum higher than wide, with oblique carinulae and tubercles; sternum as in male. *Abdomen*: Ovipositor valves wide, inflated at base and with sharp, flat, preapical tooth; supra-anal plate triangular, sharp. Tegmen 5.2 as long as wide, widened at base, apically rounded, with dense network between costa and media. Wing 16 mm long and 9 mm wide, with dusky frontal part. Hind femur wide, 2.2 times as wide at base as at pre-knee. Hind tibia robust, with 10 spines ventrally and 8 spines dorsally. *Measurements*: Body length 21.6 mm; pronotum length 3.5 mm; tegmen length 17.1 mm; post-knee 3.9 mm; hind femur length 10.5 mm; width 3.0 mm; length/width ratio 3.5. *Color*: Brownish, with pale blotches and black punctation. Wing dusky at anterior lobe.

MATERIAL EXAMINED. Holotype ♂, IRAN: near Aliabad, 5.vi.1951, G.B. Popov (BM). Allotype ♀, Same collecting data as holotype (B.M. 1951-335) (BM). Paratypes: 3♂, 3♀, same collecting data as holotype (all BM).

ETYMOLOGY. The specific epithet *popovi* honors Dr. G.B. Popov, the prominent researcher of grasshoppers, who not only donated the study material, but whose ideas also richly contributed to this paper.

REMARKS. *Paracharora popovi* n. sp. seems to be closely related to *Charora persa* Uvarov 1933, from Iran. The two species mainly differ in the dimensions (*Ch. persa* male is 14.5 mm and female 16.0 mm long, whereas *P. popovi* male is 17.0 mm and female 21.6 mm long), and in the fine regularity of carinulae in the stridulatory ridges of *Ch. persa*, as compared to the crude and irregular carinulae in *Paracharora popovi* (Fig. 12A). This last and important character of *Paracharora* appears to establish a link between several groups of Egnatiinae species, of which one, including species of *Charora*, such as *Ch. persa*, *Ch. pentagrammica* Boliver 1899, and *Ch. crassivenosa* Saussure 1888, possesses in males a stridulatory organ composed of numerous, regular, dense carinulae on the abdominal terga (Fig. 12B). The

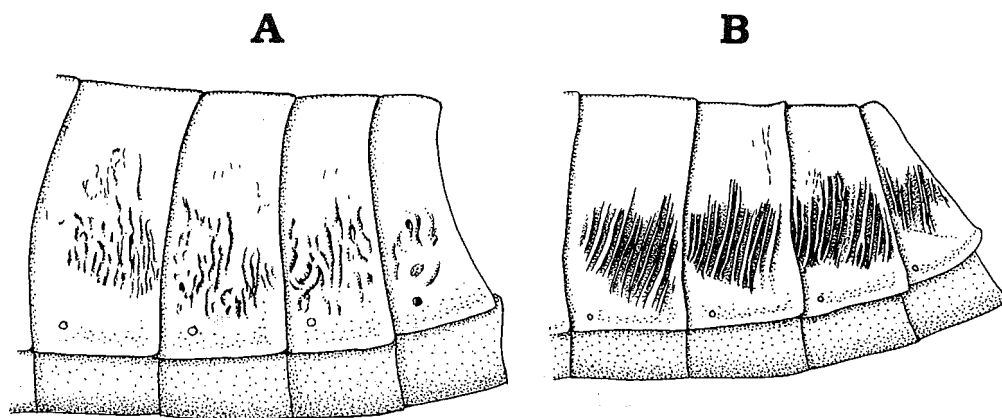


Fig. 12. Abdominal stridulatory ridges. A. *Paracharora popovi*. B. *Charora pentagrammica*.

second group includes *Egnatioides sphaerifer* Bei-Bienko 1951, *E. desertus* Uvarov 1926, *E. kiritshenkoi* Uvarov 1933, and the new *Paracharora popovi*, in which the carinulae are fewer in number, crude and irregular (Fig. 12A). The third group includes some additional species of *Egnatioides* (*E. lizae* Fadt, 1970; *E. pasquieri*) with weakly developed ridges that are often very shallow and almost invisible. The new species described in this paper, *E. mendelssohni* and *E. blondheimi*, probably also belong here. The fourth group includes the genus *Leptoscirtus*, which has no stridulatory ridges on the male abdominal terga.

It is possible that this variability in the structure of the stridulatory apparatus marks an evolutionary pathway along which, from the crudely ridged structure such as that of *Egnatius apicalis*, specializations lead either in one direction to more precise and delicate mechanisms, producing the regular stridulatory structure of *Charora*, or in the second direction, towards the abolishment of the structure, as in *Leptoscirtus* and some *Egnatioides* species. These assumptions can only be verified by obtaining fresh specimens for comparative biochemical and taxonomic analyses.

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