THE GENUS EPHEDRUS HALIDAY OF TAIWAN

(HYMENOPTERA: APHIDIIDAE)

By

Ching-Shen Liu

In Taiwan only one species, *Ephedrus japonicus* Ashmead, had been descripted by Gahan in 1926, after that time there is no report about aphid parasites recorded.

Acknowledgment

I wish to express my sincere thanks to Miss S. C. Chiu for her continuous kind direction and Mr. C. C. Tao for his kindness in identifying aphids. Thanks are also due to Mr. K. S. Lin for sending me his collected specimens.

Genus Ephedrus Haliday, 1833

Ephedrus Haliday 1833, Ent. Mag. 1: 261, 485.
Type-specimens: *Bracon plagiator* Nees
Elassus wesmael 1835, Nouv. Mém. Acad. Sci. Bruxelles 19: 248
Type-specimens: *Aphidius parcicornis* Nees

Head transverse, as wide as or wider than thorax. Antennae 11—12 segmented in both sexes. Parasidal furrows always at least partially distinct. Venation of wings nearly complete (in rank of subfamily). Fore wing: Pterostigma triangular and more or less prolongated at either end, pterostigmal cell complete, radial vein reaching wing-margin, median vein complete, three radial cells developed, cubital vein from greatest part distinct, median cell complete; basal cell of hind wing distinctly complete. Propodeum either distinctly areolated, with areolae smooth or slightly rugose along carinae, or rugose, with carinae more or less distinct. Abdomen lanceolate, compressed apically in females and ovate in males; first abdominal segment either slender and long or nearly square, with various sculpture (coarsely rugose to nearly smooth); ovipositor sheaths either slender and long, with single hairs and nearly edged or rounded at apex, or wide, relatively quickly narrowing towards apex, densely pubescent on all surface and bluntly pointed at apex.

Stary separated a new subgenus *Lysephedrus* from *Ephedrus* in 1958 by the especial characters, that of ovipositor sheath are wide, on the proximal third relatively quickly and strongly narrowing towards apex, densely pubescent, bluntly pointed and slightly curved on the apex. But no specimens were collected by writer in Taiwan belong to the subgenus *Lysephedrus*.

Subgenus Ephedrus s. str.

Ephedrus s. str., Stary 1958, Acta Faun. Ent Mus. Nat. Pragae 3: 66—67 Type-specimens: *Ephedrus plagiator* (Nees)

Head transverse, as wide as or wider than thorax; antennae short, 11—12 segmented and the same in both sexes. Mesonotum with the notaulices incomplete. Propodeum areolated. Abdomen lanceolate, sparsely haired; first abdominal tergite rugose or smooth partially; ovipositor sheaths long and narrow, gradually nearly straightly narrowing towards apex, with single hairs; straight or slightly curved. Apex of ovipositor sheaths nearly edged or rounded. This subgenus is easily recognized by the shape of straight ovipositor sheath and compressed abdomen in females.

General distribution of species: Pleaearctic, Nearctic, Aethiopian, Oriental, Australian region.

Key to the Taiwanese species of subgenus *Ephedrus*

1. Mesoscutum in the confluent point of notaulices with distinctly deep fovea; 1st abdominal tergite (fig. 5) robust, only a little longer than its width.·····*persicae* Froggatt
- Mesoscutum without fovea in the confluent point of notaulices; 1st abdominal tergite two times as long as wide or more ····· 2
2. 1st abdominal tergite about 2 or 2.2 times as long as wide at spiracles; ovipositor sheath short, relatively narrowing to apex. ····· 3
- 1st abdominal tergite 2.5 or 3 times as long as wide at spiracles ; ovipositor sheath slender. ····· 4
3. 2nd abscissa of radial vein more twice of 2nd interradial vein (fig. 16) about 2.4:1 in ratio; ovipositor sheath quickly relatively narrowing towards the apex(fig. 13)····· ····· *nacheri* Quilis
- 2nd abscissa of radial vein shorter than two times of 2nd interradial vein (fig. 17) about 1.8:1 in ratio; ovipositor sheath a little stout, gradually relatively narrowing towards the apex (fig. 12)·····*robustus* n. sp.
4. 1st interradial vein longer than intermedian vein about 3:2 in ratio (fig. 18); 1st abdominal tergite 2.5 times as long as wide at spiracles; propodeum (fig. 21) with distinctly lateral carinae around either spiracles····· *campestris* Stary
- 1st interradial vein as long as intermedian vein (fig. 19); 1st abdominal tergite 3 times as long as wide····· *japonicus* Ashmead

1. *Ephedrus* (*Ephedrus*) *persicae* Froggatt

Ephedrus persicae Froggatt, 1904, Agric. Gaz. Sydney 15: 611—612
Ephedrus nevadensis Baker, 1909, Pomona J. Ent. 1:23
Ephedrus nitidus Gahan, 1917, Proc. U. S. Nat. Mus. 53(2197):195.
Ephedrus vidali Quilis M. P., 1931, Eos, 7:72—74
Ephedrus pulchellus Stelfox, 1941, Proc. R. Irish Acad. 46(B):133—139.
Ephedrus interstitialis Watanabe, 1941, Ins. Matsum. 15:139—140.
Ephedrus impressus Granger, 1949, Mém. Inst. sci. Madagascar 2(A):412.
Ephedrus (*Ephedrus*) *holmani* Stary, 1958, Acta Faun. Ent. Mus. Nat. Pragae 3:63, 68—70.

Ephedrus (Ephedrus) palaestinensis Mackauer, 1959, Beitr. Ent. 9:867—868.

This species is most easily recognized by the long notaulices and the dimple-like impression on the mesonotum near the scutellar suture.

♀: Body length 1.9mm, fore wing 1.9mm, antennae 1mm. Head (fig. 10) transverse, slightly dilated behind eyes and strongly narrowing posteriorly, smooth, shiny, sparsely haired, wider than thorax at tegulae, as wide as 2.2 times of transfacial line; transfacial line as wide as twice of clypeuo-antennal line; occipital carinae distinctly margined; the mutual distance of occelli about diameter of antennal socket; clypeus slightly oval, convex, with 6—9 long hairs, completely separated from face by narrow groove; tentorial pits deep; eyes slightly prominent, longitudinal eye-diameter 1.5 as long as wide; temple roundly convex and as wide as transverse eye-diameter. Antennae 11 segmented, rather short, only reaching the apex of thorax, 1st flagellar segment 1.4 as long as 2nd and 4 times as long as wi-de, apical segment acute, preceeding segment subequal to apical one.

Thorax smooth, shiny, sparsely haired; mesoscutum prominent above pronotum, notaulices completely reching 3/4 apical mesoscutum, with deep and well marked fovea in confluing point; scutellum convex, prolongatly triangular, margined laterally, very rising the level of mesonotum; mesopleuron smooth, shining. Fore wing (fig. 15) transparent; pterostigma triangular, 4 times as long as wide; 1st abscissa of radial vein slightly shorter than 2nd interradial vein, as long as 0.4 of 2nd radial abscissa; 1st interradial vein in its insertion point on median vein and 2nd interradial vein colourless. Hind metatarsus as long as three following segments combined. Propodeum (fig. 20) areolated, with wide pentagonal areolae.

Abdomen lanceolate, slightly longer than the head and thorax combined; tergite 1 (fig. 5) robust, only a little longer than width, slightly roundly prominent, rugose, with more or less distinctly central carinae and two lateral longitudinal carinae reaching about 5/6 apex, without lateral depression. Following segments smooth, shining, sparsely haired. Genitalia (fig. 11).

Coloration: Brownish black to black except ventral scape and pedicel brownish, and legs brownish yellow.

♂: unknown.

Distribution: Almost cosmopolitan.

Specimens examined: 3♀♀; 28 IV 1966 Wushe, Taiwan; 4♀♀, 5 IV 1966, 12♀♀, 13 III 1967, Taipei, Taiwan.

Habitat: This species occurs rather commonly in secondary forest habitats. It may also be found in peach where the host of *M. persicae* usually existed. Sometime it occurs in vegetable field near the secondary forest.

Hosts: *Myzus persicae* Sulzer, *Lipaphis erysimi* Kaltenbach.

Occurrence in Taipei area: IV.

Notes This species attacks *Myzus munecola* Matsumura and *Trichosiphoniella momonis*(Matsumura) in Japan, but mainly attacks *Myzus persicae* in Taiwan, so the *E. persicae* may be regarded as a valuable perasite for biological control of *Myzus* aphid.

2. *Ephedrus* (*Ephedrs*) *nacheri* Quilis

Ephedrus nacheri Quilis M. P., 1934, Eos, 10:17—19; Stary 1962, Opusc. Ent. 27:93—94

According to Stary's description, the writer examined the specimens of this species collected in Taiwan as same as that of Stary collected in Czechoslovakia.

This species differs from other species in the long 2nd radial cell. (The following description after Stary)

"♀: Head transverse, smooth, shiny, sparsely haired, wider than thorax at tegulae, Temple equal to width of transverse eye-diameter. Gena as wide as 1/3 of longitudinal eye-diameter; clypeus with about 9 hairs. Tentorio-ocular line equal to half of intertentorial line. Antennae 11 segmented, filiform, as long as head and thorax combined. F_1 3 times as long as wide at apex. F_1 and F_2 of equal length. F_1-1 (rarely 0), F_2-2, F_3-3. Praeapical and apical segements distinctly separated. Distance between antennal socket and eye-margin shorter than socket-diameter.

Mesoscutum smooth, shiny, with sparse long hairs at base, margins and along effaced notaulices. Notaulices distinct in ascedent part, deep, feebly crenulate. Propodeum areolated (fig. 23). Upper areola with 6—8, lower with 3—6 hairs. Dics of areolae shiny, almost smooth, in the neighbourhood of carinae feebly rugose. Wing (fig. 16); Pterostigma 4 times as long as wide. Interradial vein 1 about 1/3 shorter than radial abscissa 2. Radial abscissa 1 shorter than width of pterostigma.

Abdomen lanceolate. Tergite 1 (fig. 6) twice as long as wide at spiracles, with strongly prominent central and less prominent lateral longitudinal carinae; with deep lateral impressions in the hind third before apex. Surface shiny, slightly rugose, sparsely haired. Spiracular tubercles feebly prominent, situated at the end of the first third of the segment. Width at apex somewhat more than at spiracles. Following tergites smooth, shiny, sparsely haired. Genitalia (fig. 13).

Coloration: Head black; mouthparts yellow brownish to brownish. Antennae brown black, apex of pedicel, basis of F_1 more or less yellowish. Thorax black propodeum sometimes brownish. Wings slightly brownish. Venation brown. Legs yellow brownish, coxae, femora and apical parts of tibiae darkened. Abdominal tergite 1 light brown to brown, following tergites brown.

Length of body 1.5—2.1mm.

♂: Similar to the female except sexual differences."

Specimens examined: 2♀♀, 5 III 1966; 1♀, 4 IV 1957, Taipei, Taiwan. 1♂, 1150m, 13 X 1957, Chi-tou, Nan-tou hsien, Taiwan.

Distribution: Czechoslovakia, Taiwan.

Occurrence in Taipei area: III, IV.

Notes: The samples of this species of Taiwan were collected with sweeping method, so the host and habitat are unknown.

3. *Ephedrus* (*Ephedrus*) *robustus* n. sp.

This species differs other species from the stout ovipositor sheath.

♀: Body length 1.8mm, fore wing 1.7mm, antennae 1mm. Head (fig. 9) transverse, rounded, smooth, shining, sparsely haired, quickly narrowing posteriorly, wider than thorax at tegulae; temple as wide as transverse eye-diameter; longitudinal eye-diameter as long as 2.6 times of gena; transfacial line as long as twice of clypeuo-antennal line; eyes oval, prominent; clypeus roundly convex, separated by distinguish groove; tentorial pits deep and wide. Antennae 11 segmented, beyond the apex of abdominal tergite 1; 1st flagellar segment 1.1 times as long as 2nd, 3 times as long as wide; apical segment gradually acuted towards apex, slightly longer than preceeding one.

Thorax smooth, shining, sparsely haired; medium lobe of mesoscutum prominent in front part in lateral profile; notaulices wide, smooth, only on base; scutellum roundly convex, laterally margined, a little rising the level of mesoscutum in lateral profile. Propodeum (fig. 22) rather roundly prominent in lateral profile, carinae forming central broad pentagonal areola and lateral small areola around either spiracles. Fore wing (fig. 17); pterostigma triangular, 2nd abscissa of radial vein only a little longer than intermedian vein. Legs normal, sparsely haired. Hind metatarsus as long as three following segments.

Abdomen lanceolate, longer than head and thorax combined. Tergite 1 (fig. 7) about 2.2 time as long as wide at spiracles, with a central and two lateral longitudinal carinae, rather depressed apically and laterally Following segments smooth and shining. Genitalia (fig. 10); ovipositor sheath stout, a little wide on base and relatively narrowing towards apex.

Coloration: Brownish black. Head black; face, mouthparts, propodeum and abdominal tergite 1 dark brown; Legs brownish yellow; other parts of body are brownish black.

♂: 1st flagellar segment about 2.5 times as long as wide. Abdomen only a little longer than head and thorax combined. Otherwise similar to female except sexual difference.

Holotype: ♀, 10 II 1966, Taipei, Taiwan, reared from *Aphis spiraecola* Patch on citrus; Allotype: ♂, same date of holotype but in 7 II 1966; Paratypes: 4♀♀, 7 II 1966, Taipei, Taiwan, reared from *Aphis spiraecola* Patch on citrus; 4♀♀, 3 IV 1966, Taipei, Taiwan, reared from *Longiungius sacchari* (Zehntner) on sorghum.

Distribution: Taiwan.

Hosts: *Aphis spiraecola* Patch on citrus, *Longiungius sacchari* (Zehntner) on sorghum.

Habitat: This species is very valuable in attacking to *Aphis spiraecola* Patch on citrus in February and to *Longiungius sacchari* (Zehntner) on sorghum in May, in Taipei area.

Occurrence in Taipei area: II, V.

4. *Ephedrus* (*Ephedrus*) *campestris* Stary

Ephedrus (*Ephedrus*) *campestris* Stary 1962, Opusc. Ent. 27 (1-2): 87-90.

According to Watanabe's description of *E. japonicus* Ashmead in 1941, this species

differs from *E. japonicus* Ashmead in the following points: the 1st interradial vein longer, the abdominal tergite 1 shorter, the ovipositor sheath short only a little longer than the half of hind metatarsus and the distinctly lateral small areola around either spiracle on propodeum; and differs from *E, plagiator* (Nees) in equal length of 1st interradial vein and 2nd radial abscissa.

♀: Body length 2–2.5 mm, fore wing 2–2.5 mm, antennae 1.2–1.4 mm. Head (fig. 3) transverse, rounded, smooth, shiny, sparsely haired, quickly narrowing posteriorly, wider than thorax at tegulae; temple as wide as transverse eye-diameter; gena as long as 1/3 of longitudinal eye-diameter; transfacial line subequal to the half of width of head, as long as twice of clypeuoantennal line; eyes oval, slightly prominent, sparsely shortly haired; clypeus straightly frontly margined, with 5–7 long hairs, separated by distinguish groove; tentorial pits deep and wide. Antennae 11 segmented, reaching beyond the apex of abdominal tergite 1, 1st flagellar segment 1.2 as long as 2nd and 4 times as long as wide, apical segment gradually acuted towards apex and a little longer than preceding one.

Thorax (fig. 24); pronotum smooth, shiny; median lobe of mesoscutum comparatively prominent in front part in lateral profile; notaulices deep, wide and rugose on base, smooth afterwards; scutellum roundly convex, laterally margined, very rising the level of mesonotum in lateral profile. Propodeum (fig. 21) areolated; carinae forming central pentagonal areola and distinctly small lateral areola around either spiracles. Fore wing (fig. 18); pterostigma triangular, 2nd abscissa of radial vein 1.5 times as long as 2nd interradial vein and only little longer than intermedian vein, 1st interradial vein 1/3 longer than intermedian vein. Legs normal, slender, sparsely haired; tibia apically and tarsi more densely haired. Hind metatarsus as long as four following segments.

Abdomen lanceolate, longer than head and thorax combined about 10:7 in ratio. Tergite 1 (fig. 8) slender, about 2.5 times as long as wide at spiracles, deeply excavated basally, strongly convex, with two longitudinal carinae runing out from base and more or less distinct central longitudinal carinae, depressed apically and two lateral impressions. Following abdominal segments smooth and shining. Genitalia (fig. 14).

Coloration: Brownish black. Head black; clypeus, mouthparts, base of 1st and 2nd flagellar segment, scape, pedicel and abdominal tergite 1 dark brown. Legs brownish yellow. Venation of wing pale brown. The other parts of body brownish black.

♂: Antennae densely haired, reaching the apex of abdominal tergite 1, 1st flagellar segment as long as 3 times of its width. Otherwise similar to female except sexual difference.

Specimens examined: 7♀♀, 12♂♂, 17 II 1966; 9♀♀, 16♂♂, 21 II 1966; 1♀, 6♂♂, 15 II 1966; 1♀, 8♂♂, 19 II 1966, Taipei, Taiwan.

Distribution: Europe, Far East.

Habitat: It occours commonly in various kinds of steppe type habitates. In Taipei area mainly attacks the *Dactynotus* sp.,

Hosts: *Dactynotus formosanus* (Takahashi), *Dactynotus* sp.

Occurrence in Taipei area: II.

Note: The problem of that the specimens collected by the writer from the hosts of

Aphis spiraecola Patch, *Sinomegoura citricola* (Van der Goot) and *Acyrthosiphon pisum* Harris belong to *plagiator* Nees or *campestris* Stary is being under taking.

5. *Ephedrus* (*Ephedrus*) *japonicus* Ashmead

Ephedrus japonicus Ashmead 1906, Proc. U. S. Nat. Mus. 30:187; Gahan 1926, Proc. U. S. Nat. Mus. 70:7.

The writer has not obtained the specimens of *E. japonicus* Ashmead which were identified by Gahan or Ashmead, and therfore the following descriptions were in accordance with Watanabe's.

"♀: Black; mouth-parts fusco-testaceous, sometimes dark brown; antannae dark brown, the two basal joints tinged with yellow, and the 3rd and 4th joints yellowish at the base. Legs rufo-testaceous, all the coxae more or less infuscated. Wings hyline; stigma and veins pale brown; tegulae dark brown. Abdomen black, with a large pale spot on the 2nd tergite; 1st tergite sometimes fusco-testaceous.

Head transverse, smooth and shining with whitish pubescence; antennae a little longer than the head and thorax united, 11-jointed; 3rd joint a little longer than the 4th. Thorax almost smooth and shining; parasidal furrows impressed anteriorly. Propodeum nearly smooth and shining, strongly carinated, with a rather broad median pentagonal areola. Stigma rather large, slightly elongated towards the base, the distance from the extreme base to the junction of the stigma and the radius about 2.5 times the breadth of the stigma; 1st abscissa of the radius about one-third the length of the 2nd, which is a little less than twice the length of the intercubitus; recurrent nervure inserted in the 2nd cubital cell; nervulus postfurcal; nervus parallelus inserted in the 2nd discoidal cell, not interstitial with the medial nervure. Abdomen longer than the head and thorax united, lanceolate; 1st tergite linear, 3 times as long as broad, deeply excavated basally, smooth in the excavated portion, from which the surface strongly convex, coarsely rugose, sometimes nearly smooth, with a median longitudinal carina dividing at the middle, enclosing a triangular area, and with a broad transverse impression near the apex; 2nd and following tergites smooth and shining; ovipositor sheath a little shorter than the hind metatarsus, slender, conical, truncate at the apex.

Length, 2.5-3 mm.

♂: Closely resembles the female in general structure and colour, but differs from the latter in the following points:-

Darker than the female in colour; antennae rather shorter, 11-jointed, the 3rd joint as long as the 4th, which is stout, shallowly impressed at the inner side near the base. Length, 2-2.5 mm.

Distribution: Japan, Formosa.

Hosts: *Brachysiphoniella graminis* (Takahashi), *Aphis rumicis* (Linne).

References

Gahan, A. B. 1911, Aphidiinae of North America. Bull. Marylland Agr. Expt. Sta. 152: 147-200.

Gahan, A. B. 1929, Some braconid and chalcid flies from Formosa, parasitic on Aphids Proc. U. S. Nat. Nus. 70(8): 1-7.

Mackauer, M. 1962, Aphid parasites from the Canary Island. Eos, 38(3): 435-443.

Mackauer, M. 1963, A re-examination of C. F. Baker's collection of Aphid parasites. Canadian Ent. 95: 921-935.

Mackauer, M. 1963, Bemerkungen zur systematik, Verbreitung umd wirtsbindung des. *Ephedrus persicae*-Komplexes. Sonderdruck aus Z. ang. Ent. Bd, 52 (4) S. 343-354

Smith, C. F. 1944, The aphidiinae of North America. Ohio State Univ. Contr. Zoo. Ent., Columbus 6: 154 pp.

Stary, P. 1958, A taxonomic revision of some aphidiine genera with remarks on the subfamily Aphidiinae. Acta Faun. Ent. Mus. Nat. Pragae 3: 53-96.

Stary, P. 1962, Notes on the European species of the genus *Ephedrus* Haliday. Opusc. ent. 27: 87-98.

Stary, P. 1966, Aphid parasites of Czechoslovakia. Czech. Acad. Sci. 242 pp.

Watanabe, C. 1941, On two species of Genus *Ephedrus* Haliday. Ins. Matsu. 15 (4): 136-140.

臺灣蚜蟲寄生蜂 Ephedrus 屬分類

劉　清　淳

中 文 摘 要

本文所述包括臺灣產蚜蟲寄生蜂 Ephedrus 屬共五種，其中一新種屬臺灣土產 *E. robustus* n. sp. 主要寄生於黍蚜 *Longiungius sacchari* (Zehntner) 及捲葉蚜 *Aphis spiraecola* Patch 。文中先述本屬及亞屬特徵，次立檢索表便於查定，每一種附有異名、形態、分佈、寄主、習性及臺北區發生之時期，以便應用於蚜蟲生物防治上參考。

本屬臺灣五種寄生蜂所寄生蚜蟲之寄主範圍如下：

桃蚜 *Myzus persicae* Sulzer, 僞菜蚜 *Lipaphis erysimi* Kal. 黍蚜 *Longiungius sacchari* (Zehntner), 捲葉蚜 *Aphis spiraecola* Patch, 白尾紅蚜 *Dactynotus formorsanus* (Taka.), ，月桔蚜 *Sinomegoura* citricola (van der Goot) 豌豆蚜 *Acyrthosiphon pisum* Harris, 禾草粉蚜 *Brachysiphoniella graminis* (Tak.)，羊蹄蚜 *Aphis rumicis* (Linne).

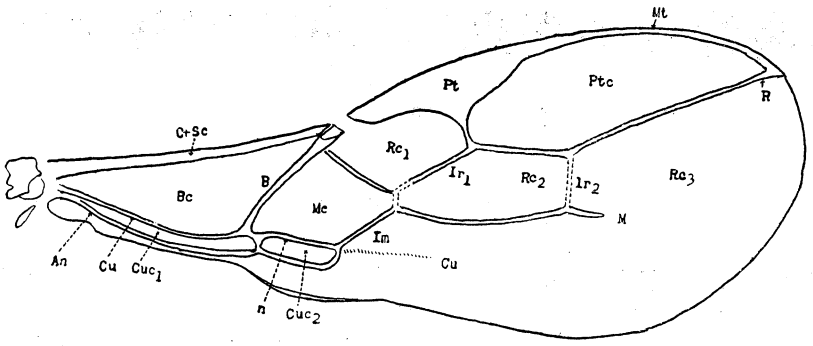


Fig. 1. Nomenclature of fore wing: An-anal vein; B-basal vein; Bc-basal cell; C-costal vein; Cu-cubital vein; Cuc $_{1, 2}$-cubital cell 1, 2 ; Im-intermedian vein; Ir $_{1, 2}$-interradial vein 1, 2; M-median vein; Mc-median cell; Mt-metacarpus; n-nervulus; R-radial vein; Rc $_{1, 2, 3}$-radial cell 1, 2, 3, ; Pt-pterostigmal cell; Sc-subcostal vein.

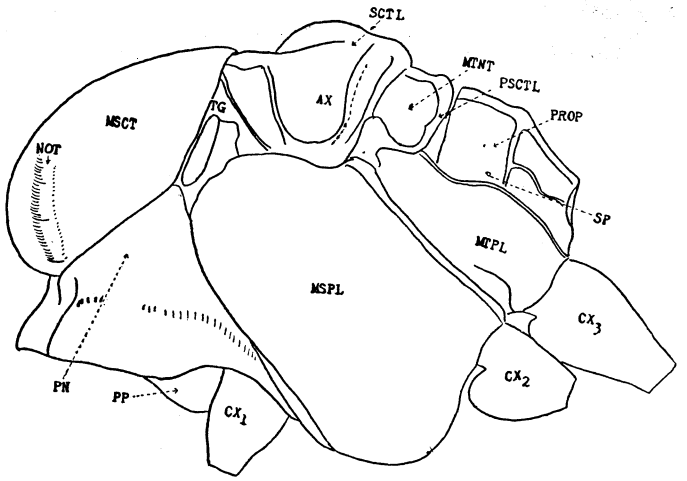


Fig. 2. Nomenclature of thorax: AX-axillae; CX $_{1, 2, 3}$-coxae 1, 2, 3; MSCT-mesoscutum; MSPL-mesopleuron; MTNT-metanotum; MTPL-metapleuron; NOT-notaulic; PN-pronotum; PROPO-propodeum; PP-propleuron; SCTL scutellum; SP-spiracles; TG-tegulae.

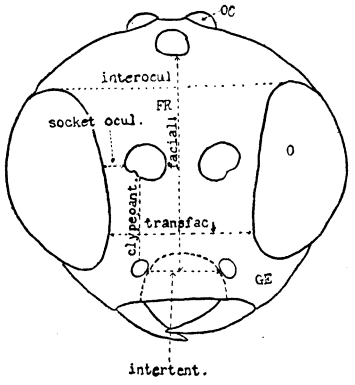


Fig. 3. Nomenclature of head and distances: clypeoant. -clypeoantennal line, facial-facial line, FR-fron, GE-gena, interocul-interocular line, intertent-inter tentorial line, MD- mandible, O-eye, OC-ocellus, socket ocul-socket ocular line.

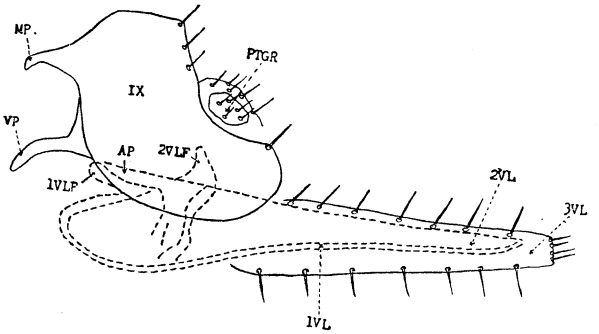


Fig. 4. Nomenclature of genitalia: IX-→ tergite 9, 1VL-valvulae 1, IVLF-first valvifer, 2VL-valvulae 2, 2 VLF-second valvifer, 3 VL-va -lvulae 3, Ap-anterior prong, MP-median prong, PTGR-proctiger, VP-ventral prong.

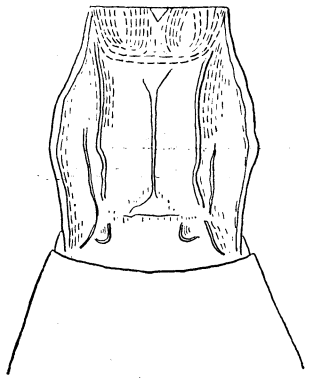


Fig. 5. 1st abdominal tergite of *E. persicae* Froggatt

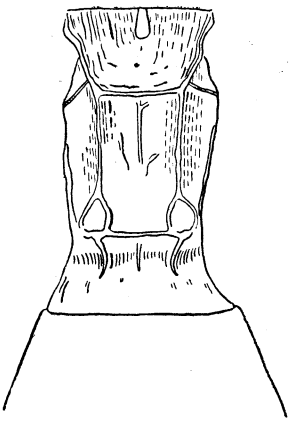


Fig. .6 1st abdominal tergite of *E. nacheri* Quilis;

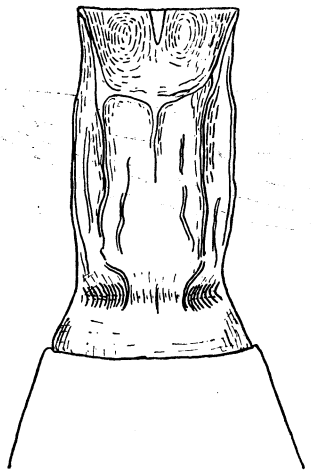


Fig. 7. 1st abdominal tergite of *E. robustus* n. sp.,

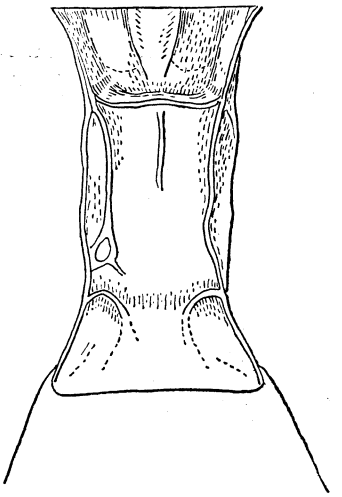


Fig. 8. 1st abdominal tergite of *E. campestris* Stary

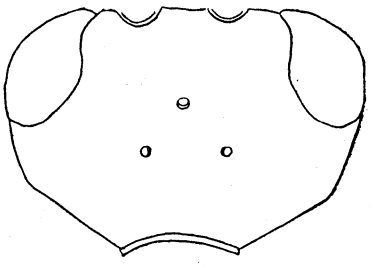


Fig. 9. Head of *E. robustus* n. sp.

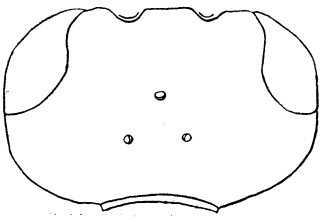
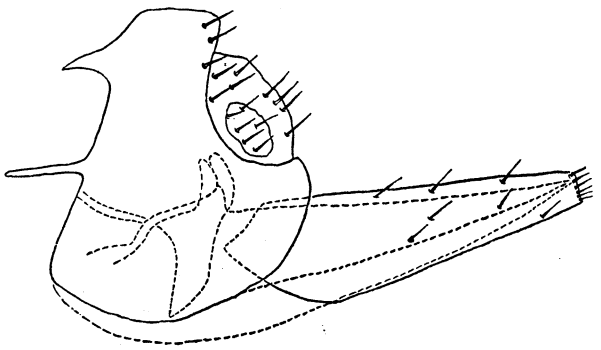


Fig 10. Head of *E. persicae* Froggatt



← Fig. 11. Genitalia of *E. persicae* Froggatt

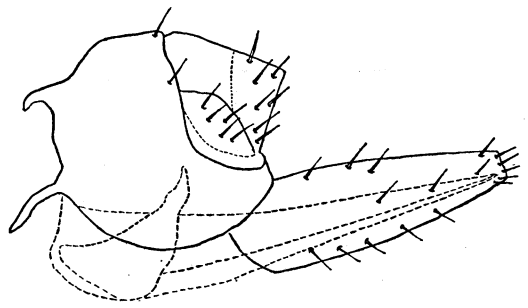
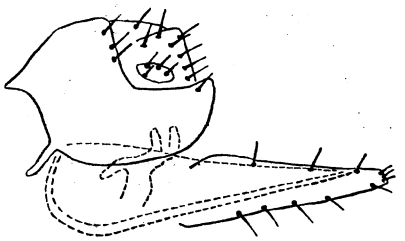


Fig. 12. Genitalia of *E. robustus* n. sp.



← Fig. 13 Genitalia of *E. nacheri Quilis*;

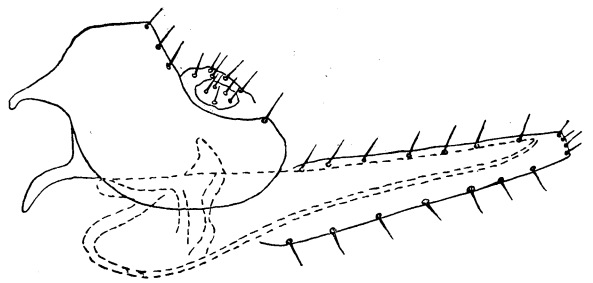
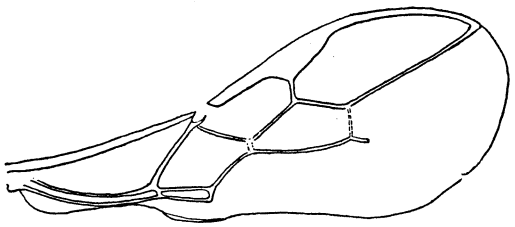
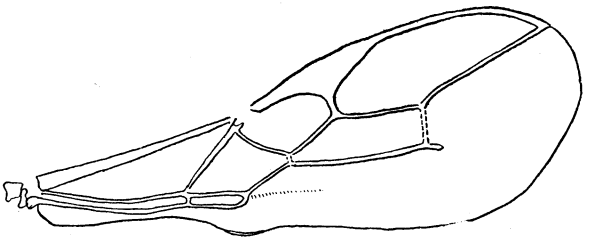


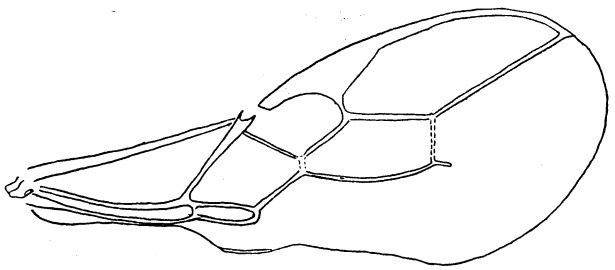
Fig. 14. Genitalia of *E. campestri* Stary;



← Fig. 15. Fore wing of *E. persicae* Froggatt.

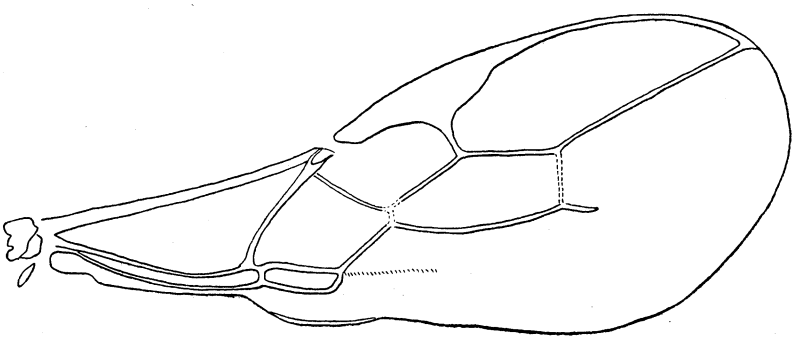
Fig. 16. Fore wing of *E. nacheri* Quilis; →

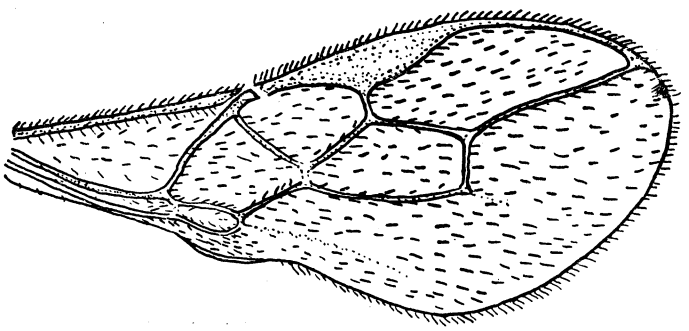




← Fig. 17. Fore wing of *E. robustus* n. sp.;

Fig. 18. Fore wing of *E. campestris* Stary. →





← Fig. 19. Fore wing *of E. japonicus* Ashmead (after Watanabe)

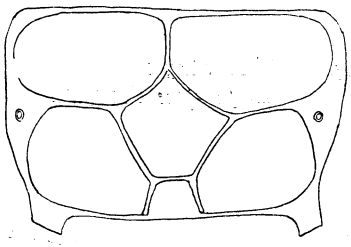


Fig 20. Propodeum of *E. persicae* Froggatt

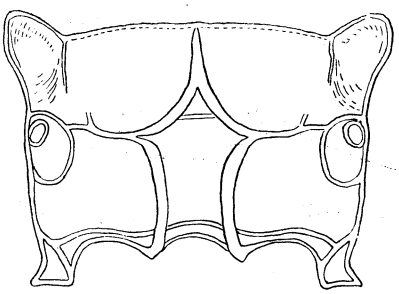


Fig 21. Propodeum of *E. campestris* Stary;

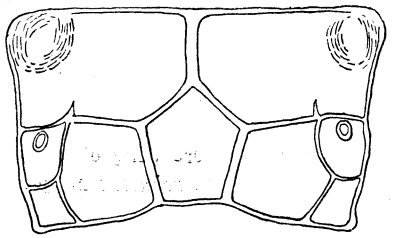


Fig. 22. Propodeum of *E. robustus* n. sp.;

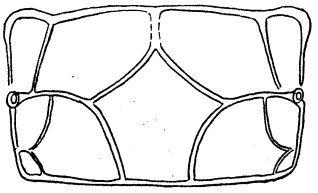


Fig. 23. Propodeum of *E. nacheri* Quilis

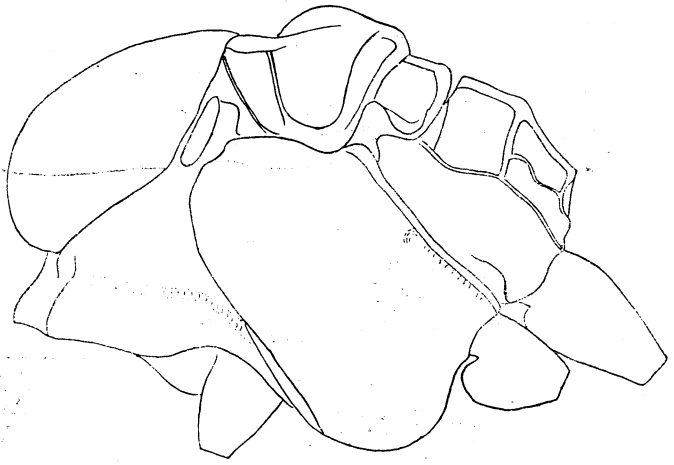


Fig 24. Thorax of *E. campestris Stary.*