

Studies on the Ichneumonidae (Hymenoptera) in Korea
IV. A Systematic Revision of the Genus *Habronyx* Foerster,
Therion Curtis and *Heteropelma* Wesmael by
using Scanning Electron Microscope.

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韓國產 Ichneumonidae (맷시벌科)에 대한 研究

Ⅳ. 走査電子顯微鏡을 利用한 韓國產 긴가락지자루맷시벌속,
가락지자루맷시벌속과 장수자루맷시벌속에 대한 分類學的 研究

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적 요

맷시벌科 (Ichneumonidae)는 外部形態形質에 있어서 매우 유사한 점이 많아 서 種을 同定하거나 研究하는데 어려움이 많다. 著者들은 走査電子顯微鏡을 利用하여 지금까지 기재되어 있지 않거나 기재가 불충분한 形質들을 찾아서 재기재하였으며, 韓國產 맷시벌科中 Gnues *Habronyx* (장수자루맷시벌속), Genus *Therion* (가락지자루맷시벌속)과 Genus *Heteropelma* (긴가락지자루맷시벌속)을 정리한 결과 未記錄 1種 (*Habronyx (Camposcopus) Sonani* (Uchida), 1958)을 추가하게 되었다.

INTRODUCTION

Genus *Habronyx*, *Therion* and *Heteropelma* are small to moderate sized genera belonging to the tribe Theriini of subfamily Anomaloniinae. Kim (1955) catalogued five species in those genera. In 1965, Townes *et al.* catalogued two species in *Habronyx*, one species in *Therion* and two species in *Heteropelma* from Korea. Four species of *Heteropelma* were added to Korean fauna by Lee *et al.* Kim (1983).

In the present work, ten species are reported, of which *Habronyx (Camposcopus) sonani* (Uchida), 1958 is newly recorded from Korea.

The taxonomical key and descriptions were made on the basis of characters viewed under scanning electron microscope.

MATERIALS AND METHODS

Materials we used were derived from the field collections and materials preserved at the Korean Entomological Institute were also examined.

The specimens were killed in 95% ethanol and preserved 85% ethanol during two or three days. Preserved materials were classified under the stereomicroscope. Classified specimens were washed in pure ethanol four or five times and dried for two days. Finally specimens sputtered with gold and examined in the scanning electron microscope (JSM-T-300, Japan).

In the present paper, morphological terminology and some indices follows that used by Gauld (1976 a.b.c., 1980).

SYSTEMATICS

Key to Korean species

1. Male hind second tarsal segment with flattened area2.
- Male hind second tarsal segment simple, without flattened area
an any other carina(Genus *Habronyx*) 8.
2. Hind tarsal claws simply curved, not lobate, not pectinate; first
to fourth segments of male hind tarsi ventrally with flattened,
glabrous area with a longitudinal carina*Therion circumflexium*.
- Hind tarsal claws often pectinate, curved less than 90°; male
second hind tarsal segment ventrally with impressed, pubescences
area bearing flattened sensory hairs(Genus *Heteropelma*) 3.
3. Apical margin of clypeus with strong lateral protuberances;
impressed area of male hind second tarsal segment flat or concave.....7.
- Apical margin of clypeus without strong lateral protuberances;
impressed area of male hind second tarsal segment flat or convex4.
4. Apical margin of clypeus evenly round, in profile almost flat; labium
exposed5.
- Apical margin of clypeus truncate, in profile weakly convex;
labium not exposed.....6.
5. Eye surface with short, erect pubescences sparsely distributed
between ommatidium*Heteropelma calcator*.
- Eye surface with long erect pubecences sparsely distributed
between ommatidium.....*Heteropelma nigrum*.

6. Ommatidium almost square; male with an impressed area on hind second tarsal segment.....*Heteropelm fulvitarse*.
- . Ommatidium almost hexagonal; male without an impressed area on hind second tarsal segment*Heteropelma elongatum*.
7. Impressed area of male hind second tarsal segment flat and more narrow*Heteropelma changwhani*.
- . Impressed area of male second hind tarsal segment weakly concave and broad*Heteropelma amictum*.
8. Apical margin of clypeus evenly round; hind tarsal claws not pectinate..... *Habronyx (Camposcopus) sonani*.
- . Apical margin of clypeus pointed with a median tooth; hind tarsal claws pectinate.....9.
9. Eye surface with long erect pubescences sparsely distributed between ommatidium; hind tarsal claws curved, pectinated basally*Habronyx (H.) insidiator*.
- . Eye surface with short erect pubescences sparsely distributed between ommatidium; hind tarsal claws geniculate, pectinated to apex*Habronyx (H.) heros*.

Subfamily Anomaloninae

Tribe Theriini Verick

Genus 1. *Habronyx* Foerster

Habronyx Foerster, 1868. Verh. naturh. Ver. Press Rheinl, 17:140.

Subgenus *Habronyx* Foerster

Habronyx Foerster, 1868. Verh. naturh. Ver. Press Rheinl, 17:145.

1. *Habronyx (Habronyx) heros* (Wesmael), Figs. 1~6.

Anomalon heros Wesmael, 1849. Bul. Acad. Roy. Sci. Let. Beaux-Arts Belgique, 16(2):125.

Antennal flagellum with two kind of hairs, one extremely short, geniculate to backward the other relatively long, straight to forward, these four times longer than those; digitiform sensilla (Honomichi, 1981) densely scattered between hairs. Tip of antennal scape with long, apically bilobated mechanical sensory hairs. Apical margin of clypeus convex, in profile almost flat, with a medio-clypeal tooth; clypeal angle about 120°; Lateral clypeal margin without protuberances, with long thin pubescences sparsely. Lowerface centrally with short pubescences, laterally with long pubescences. Hind tarsal claws geniculate, pectinate to apex covered with minute scale. Distance between orbit and anterior tentorial less than length of malar space. Gonolacina abruptly angled about 60° distally; Distivol-sella slender; Clasping surface concave, distally swollen with teeth diagonally arranged on proximal face of swelling, centre of distivol-sella with two kind of hairs, one long, the

other minute. Compound eye with sparsely short, dull seta between ommatidium.

Forewing length: 18~22 mm, Lowerface: 0.70~0.78, CI: 1.2~1.4.

Specimens examined: Paldang, Kyönggi-do, 21 V 1967, 4♀♀, 12 VI 1966, 1♀ 21 V 1966, 1♂; Ch'önmasan, Kyönggi-do, 8 VI 1968 1♀; P'okwangsa, Kyönggi-do, 6 VI 1973, 1♂; Tobongsan, Seoul, 6 VI 1961, 1♀; Dasolsa, Chollabuk-do, 26 V 1974, 1♂.

Distribution: Korea, Japan, Belgium, Russia, Germany, Sakhalin, Kuriels.

2. *Habronyx (Habronyx) insidiator* (Smith), Figs. 13~18.

Anomalon insidiator Smith, 1874. *Trans. Ent. Soc. London*, 1874:396.

Antennal flagellum with extremely short, geniculate to backwarded hairs, moderate long erect, straight hairs and long, straighted to forwarded hairs; Digitiform sensilla densely scattered between hairs. Tip of antennal scape with long, not lobate mechanical sensory hairs. Apical margin of clypeus simply convex, in profile almost flat, with a medio-clypeal tooth; Lateral clypeal margin without protuberances; Clypeal angle about 150°. Lowerface entirely long, thin pubescences sparsely scattered; Labium not exposed. Distance between orbit and anterior tentorial pit equal or longer than length of malar space. Compound eye with sparsely long seta between ommatidium. Hind tarsal claws 90°, with basal teeth, not pectinate to apex, no basal lobe. Gonolacina abruptly angled about 60° distally; Distivolsella slender, clasping surface convex, with 17~20 dull teeth and 3~4 hairs arranged on proximal face of swelling.

Forewing length: 22~24 mm, Lowerface: 0.69~0.79, CI: 1.3~1.6

Specimens examined: Hallasan, Cheju-do, 5 VI 1968, 1♀, 2♂♂.

Distribution: Korea, Japan, China, Russia, Sakhalin.

Subgenus *Camposcopus* Foerster

Camposcopus Foerster, 1868. *Verh. naturh. Ver. Press Rheinl*, 17:145.

3. *Habronyx (Camposcopus) sonani* (Uchida), Figs. 7~12.

Blatocampus sonani Uchida., 1958. *Insecta Matsumura*, 21:99.

Antennal flagellum with two kinds of hair and digitiform sensilla; 4th antennal segment 2.0 times as long as broad. The tip of antennal scape with apically slender mechanical sensory hairs. Apical margin of clypeus evenly round, in profile flat, without median-clypeal tooth; Lateral clypeal margin without any protuberances; Clypeal angle about 110°; Clypeus with long thin pubescences sparsely without punctures. Distance between orbit and anterior tentorial pit shorter than length of malar space. Compound eye with sparsely long, tapered to apically seta between nearly squared ommatidium. Tarsal claws small, weakly curved, not pectinate, not basal lobe. Gonolacina abruptly angled about 80° distally; Distivolsella slender; clasping surface weakly convex, with long dull teeth apically aggregated centre of distivolsella, with long hairs.

Forewing length: 8 mm, Lowerface: 0.75, CI: 0.45~0.58.

Specimens examined: Muju guch'öndong, Chollabuk-do, 21 V 1983, 3♂♂.

Distribution: Korea, Japan.

Remarks: This species recorded for the first time in Korea.

Genus 2. *Therion* Curtis

Therion Curtis, 1829~1930. A Guide to the Arrangement of British Insects, P.110.

4. *Therion circumflexum* (Linnaeus), Figs. 19~26.

Ichnemon circumflexum Linnaeus, 1758. *Systema naturae...*, edition 10, 1:566.

Antennal flagellum with two kinds and digitiform sensilla; 4th antennal segment 1.14 times as broad. The tip of antennal scape with apically slender mechanical sensory hairs in large hole. Apical margin of clypeus truncate, in profile flat, without a median apical tooth; Lateral clypeal margin without protuberances. Distance between orbit and anterior tentorial pit equal or less than the length of malar space; Labium exposed, round. Compound eye with sparsely long seta between ommatidium. Ommatidium exactly hexagonal. Tarsal claws moderately curved, more than 90°, not pectinate, no basal lobe. Aedeagus in profile geniculate, apically truncate, evenly sclerotized except for membranous area; Apicolateral region of aedeagus with two row of large spines, distal end bearing spines; ventral region not laterally extended. Hind tarsi of male swollen, ventral surface of 1st to 4th tarsal segments flattened, with a median longitudinal carina; carina consist with long, dense hairs.

Forewing length: 12~15 mm, Lowerface: 0.85~1.00, CI: 0.85~1.30.

Specimens examined: Sörakksan, Kangwön-do, 4 VI 1975, 1♂; Kyebangsan, Kangwön-do, 21 VII 1981, 2♂♂; Sokyebangsan, Kangwön-do, 22 VII 1981, 1♂, 1♀; Taebecksan, Kangwön-do, 26 VI 1976, 1♀; Odaesan, Kangwön-do, 18 IX 1971, 1♂, 20 IX 1971, 11 4♂♂, 6 VI 1976, 1♀; Kach'ilbong, Kangwön-do, 23 VII 1981, 8♀♀; Kangch'eön, Kangwön-do, 5 VI 1977, 2♀♀, 10 V 1970, 1♂; Wangbangsan, Kangwön-do, 15 VI 1975, 4♂♂; Yongmunsan, Kyönggi-do, 5 VI 1955, 1♀, 20 IX 1971, 2♀♀, 17 VI 1973, 2♀♀, 27 V 1982, 2♀♀, 28 V 1982, 1♂; Ch'onmasan, Kyönggi-do, 2 X 1980, 1♀, 11 VI 1981, 2♀♀; Kap'eöng, Kyönggi-do, 22 V 1976, 1♀; Ch'öngp'yong, Kyönggi-do, 6 VI 1971, 1♂; Kumdansan, Kyönggi-do, 12 VI 1977, 1♀; Munsan, Kyönggi-do, 9 X 1972, 2♀♀; Kwangnung, Kyönggi-do, 28 V 1972, 1♀, 13 VII 1981, 1♀, 3 X 1981, 1♀; Ch'öngkyesan, Kyönggi-do, 6 IX 1981, 1♂, 15 V 1983, 1♀, 7 VII 1974, 1♂; Namhansansung, Kyönggi-do, 24 IX 1972, 1♀; Pokwangsa, Kyönggi-do, 13 V 1972, 1♂, 26 V 1978, 1♀, 13 V 1979, 1♂; Kwanaksan, Seoul, 3 X 1974, 1♂; Kyeryongsan, Chungch'ongnam-do, 26 IX 1974, 1♂; Sobaeksan, Kyönsangbuk-do, 21 VII 1974, 1♀, 23 VII 1974, 1♀, 5 VI 1981, 7♀♀, 2♂♂, 6 VI 1981, 17♀♀, 6♂♂, 28 VII 1981, 1♀, 1♂; Hwanghaksan, Kyöngsangbuk-do, 4 VI 1974, 1♀, 2 VI 1978 1♀, 4 VI 1978, 3♀♀; Naejangsan, Chollabuk-do, 17 VI 1973, 1♀; Mujükuch'eöndong, Chollabuk-do, 9 VI

1972, 1♀, 10 VI 1972, 1♂, 22 VIII 1977, 1♀, 21 V 1983, 1♀; Jirisan, Kyōnsangbuk-do, 7 VII 1976, 1♂, 15 VII 1979, 1♀, 26 VI 1982, 1♀; Ch'ongkoksa, Chollabuk-do, 20 V 1978, 1♀, 24 V 1978, 1♀; Dasolsa, Chollabuk-do, 26 V 1974, 2♀♀; Kayasan, Kyōnsangbuk-do, 5 VII 1960, 1♀; Jukyong, Kyōngbuk-do, 23 IX 1977, 1♀; Cheju-do, 2 VI 1968, 1♀.

Distribution: Korea, Japan, China, England, Finland, India, Africa, Belgium, Canada, Israel, Mongolia, North America, Russia, Sakhalin.

Genus 3. *Heteropelma* Wesmael

***Heteropelma* Wesmael, 1849. Bull. Acad. Roy. Sci. Ver. Beaux-Arts Belgique, 16(2):120.**

5. *Heteropelma calcator* Wesmael, Figs. 27-34.

***Heteropelma calcator* Wesmael, 1849. Bull. Acad. Roy. Sci. Ver. Beaux-Arts Belgique, 16(2):120**

Antennal flagellum with two kinds of hairs and digitiform sensilla. The tip of antennal scape with minute mechanical sensory hairs in centre of large hole. Apical margin of clypeus truncate, in profile weakly convex, without protuberances. Distance between orbit and anterior tentorial pit shorter than the length of malar space; Labium exposed, round. Compound eye with small seta rarely between ommatidium. Hind tarsal claws geniculate, basally strong lobe; male hind tarsal segments with an impressed ventral area bearing flattened hairs; Impressed area somewhat flat, broad and flattened hairs scattered distal part of hind 2nd tarsal segments, also hind 1st tarsal segments with long, flattened hairs sparsely.

Forewing length: 8~11 mm, Lowerface: 0.6~0.7, CI: 0.55~0.80.

Specimens examined: Ch'ongp'yōng, Kyōnggi-do, 22 IX 1963, 1♂; Wangbangsan, Kyōnggi-do, 16 V 1975, 1♀; Hwanghaksan, Kyōngsangbuk-do, 5 V 1978, 1♀; Sobaeksan, Kyōngsangbuk-do, 24 VII 1974, 1♀.

Distribution: Korea, China, Japan, USSR, Belgium, Kuriles, Sakhalin.

6. *Heteropelma nigrum* Lee et Kim, Figs. 41-46.

***Heteropelma nigrum* Lee et Kim, 1983. Ent. Res. Bull. Korea Univ., 9:46**

Antennal flagellum with two kinds of hairs and long digitiform sensilla. The tip of antennal scape with long, slender mechanical sensory hairs. Apical margin of clypeus truncate, thin, in profile almost flat, without a median apical tooth; lateral clypeal margin without protuberances. Distance between orbit and anterior tentorial pit shorter than the length of malar space. Labium exposed. Compound eye with long slender seta between hexagonal ommatidium. Male hind tarsal segments with an impressed ventral area bearing broad, short flattened hairs; impressed area weakly convex, broad and flattened hairs scattered only distal part of impressed area, development of lobe somewhat weakly and

apically.

Forewing length: 10 mm, Lowerface: 0.60~0.89, CI: 0.71.

Specimens examined: Sökp'o-ri, Ongiji, Kyönggi-do, 7 VII 1981, 1♀; Ch'önmasan, Kyönggi-do, 5 VIII 1963, 1♂, 29 V 1982; Tobongsan, Seoul, 6 VII 1982, 1♀, 29 VIII 1981, 1♀.

Distribution: Korea.

7. *Heteropelma fulvitarse* Cameron, Figs. 35-40.

Heteropelma fulvitarse Cameron, 1889. *Mem. Proc. Manch. Lit. Phil. Soc.*, 43

(1):111.

Antennal flagellum with two kinds of hairs and digitiform sensilla. The tip of antennal scape with long, slender mechanical sensory hairs. Apical margin of clypeus truncate, thick, in profile convex, without a median apical tooth; lateral clypeal orbit and anterior tentorial pit equal the length of malar space; Labium not exposed. Compound eye with long, slender seta between square ommatidium. Male hind tarsal segments with an impressed ventral area bearing short flattened hairs; impressed area convex, broad and flattened hairs scattered densely distal part of impressed area, proximally, sparsely.

Forewing length: 10~15 mm, Lowerface: 0.6~0.7, CI: 0.55~0.85.

Specimens examined: Kwangnung, Kyönggi-do, 10 VI 1973, 1♂, 14 V 1972, 1♂; Ch'önmasan, Kyönggi-do, 16 VII 1977, 1♂, 12 VI 1978, 1♂, 15 VI 1978, 2♀♀, 28 V 1978, 1♀, 2♂♂; 16 VI 1978, 2♂♂; Tobongsan, Seoul, 6 VI 1961, 1♀; Uidong, Seoul, 21 VI 1978, 1♂; Hwanghaksan, Kyöngsangbuk-do, 5 VI 1978, 1♂.

Distribution: Korea, Taiwan, China, India, USSR, West Germany, U.S.A.

8. *Heteropelma elongatum* Uchida, Figs. 53-58.

Heteropelma elongatum Uchida, 1928. *Jour. Fac. Agr. Hokkaido Imp. Univ.*,

21:238.

Antennal flagellum with two kinds of hairs and long digitiform sensilla, the one extremely short, geniculate to backward hairs, the other long, straight to forward hairs. The tip of antennal scape with short to long mechanical sensory hairs. Apical margin of clypeus truncate, thick, in profile weakly convex without protuberances. Distance between orbit and anterior tentorial pit shorter than the length of malar space; labium not exposed; clypeus with long, thin hairs, sparse puncture. Compound eye with medium sized seta between hexagonal ommatidium. Male hind tarsal segments without impressed area ventrally. Labial palpi 4 segments; Maxillary palpi 5 segments. Cardo basally lobate. Claspings face of distivolsella reticulately carinated with teeth sparsely.

Forewing length: 12~17 mm, Lowerface: 0.65~0.69, CI: 0.53~0.68.

Specimens examined: Ch'iaksan, Kangwön-do, 29 VII 1975, 1♀; Yongmunsan, Kyönggi-do, 29 VII 1982, 1♂, 28 V 1982, 1♂.

Distribution: Korea, Japan.

9. *Heteropelma amictum* (Fabricius), Figs. 47-52.

Heteropelma amictum Fabricius, 1775. **Sys. Ent. Sistens. Ent. Sistens. Insecturum. Classes, Oreines, Genera, Species etc.:** 341.

Antennal flagellum with two kinds of hairs and long digitiform sensilla. The tip of antennal scape with short to long mechanical sensory hairs. Apical margin of clypeus with strong lateral protuberances, in profile swollen to excised. Distance between orbits and anterior tentorial pit shorter than the length of malar space. Labium not exposed. Compound eye with medium sized seta between hexagonal ommatidium. Male hind tarsal segments with an impressed ventral area bearing short, broad and flattened hairs. Impressed area almost flat; flattened hairs scattered apically and apical part of 2nd tarsus.

Forewing length: 7~16 mm, Lowerface: 0.55~0.70, CI: 0.68~1.10.

Specimens examined: Odaesan, Kangwŏn-do, 20 IX 1971, 1♀; Aengmubong, Kyŏnggi-do, 10 VI 1978, 1♂; Kumdanri, Ganam-myŏn, Kyonggi-do 25 V 1975, 1♀; Yongmunsan, Kyŏnggi-do, 28 V 1982, 1♂; Hwanghaksan, Kyŏngsangbuk-do, 4 VI 1982, 1♂; Sŏnamsa, Chollanam-do, 7 VIII 1976, 1♀; Kyebangsang, Kyŏnsangbuk-do, 21 VII 1981, 1♂; Sobaeksan, Kyŏngsangbuk-do, 20 IX 1971, 1♀.

Distribution: Korea, Japan, China, Formosa, India, Kuriles, USSR, Sakhalin, Belgium, England.

10. *Heteropelma changwhani* Lee et Kim, Figs. 59-64.

Heteropelma changwhani Lee et Kim, 1983. **Ent. Res. Bull. Korea Univ.** 9:48.

Antennal flagellum with two kinds of hairs and digitiform sensilla. The tip of antennal scape with short to medium sized mechanical sensory hairs. Apical margin of clypeus with lateral protuberances, in profile convex to excised. Distance between orbits and anterior tentorial pit shorter than the length of malar space. Labium not exposed. Compound eye with small to medium sized seta between hexagonal ommatidium. Male hind tarsal segments with an impressed ventral area bearing short, broad and flattened hairs. Impressed area weakly convex, narrow; flattened hairs scattered only apically, entirely lobated.

Forewing length: 9~11 mm, Lowerface: 0.49~0.63, CI: 0.71~1.10.

Specimens examined: Ch'aksan, Kangwŏn-do, 29 VIII 1975, 2♂♂; Yongmunsan, Kyŏnggi-do, 28 VIII 1975, 2♂♂, 29 V 1982 1♂; Ch'onmasan, Kyŏnggi-do, II VI 1982, 1♂; Munkyeongsejae, Kyŏngsangbuk-do, 10 VII 1977, 1♂; Yongmunsan, Kyŏnggi-do, 27 V 1982, 1♂, 29 VI 1975, 1♂; Sobaeksan, Kyŏngsangbukdo, 24 VII 1974, 1♂, 23 VI 1977, 1♂; Soyosan, Kyŏnggi-do, 1♂.

Distribution: Korea.

SUMMARY

In the present paper, Genus *Habronyx* Foerster, Genus *Therion* Curtis and Genus *Hete-*

ropelma Wesmael of tribe Theriini were studied by using scanning electron microscope. The authors tried to find out distinct new characters for those genera because tribe Theriini was very similiar to each other.

Ten species are recognized, of which *Habronyx (Camposcopus) sonani* (Uchida), 1958 is newly recorded from Korea.

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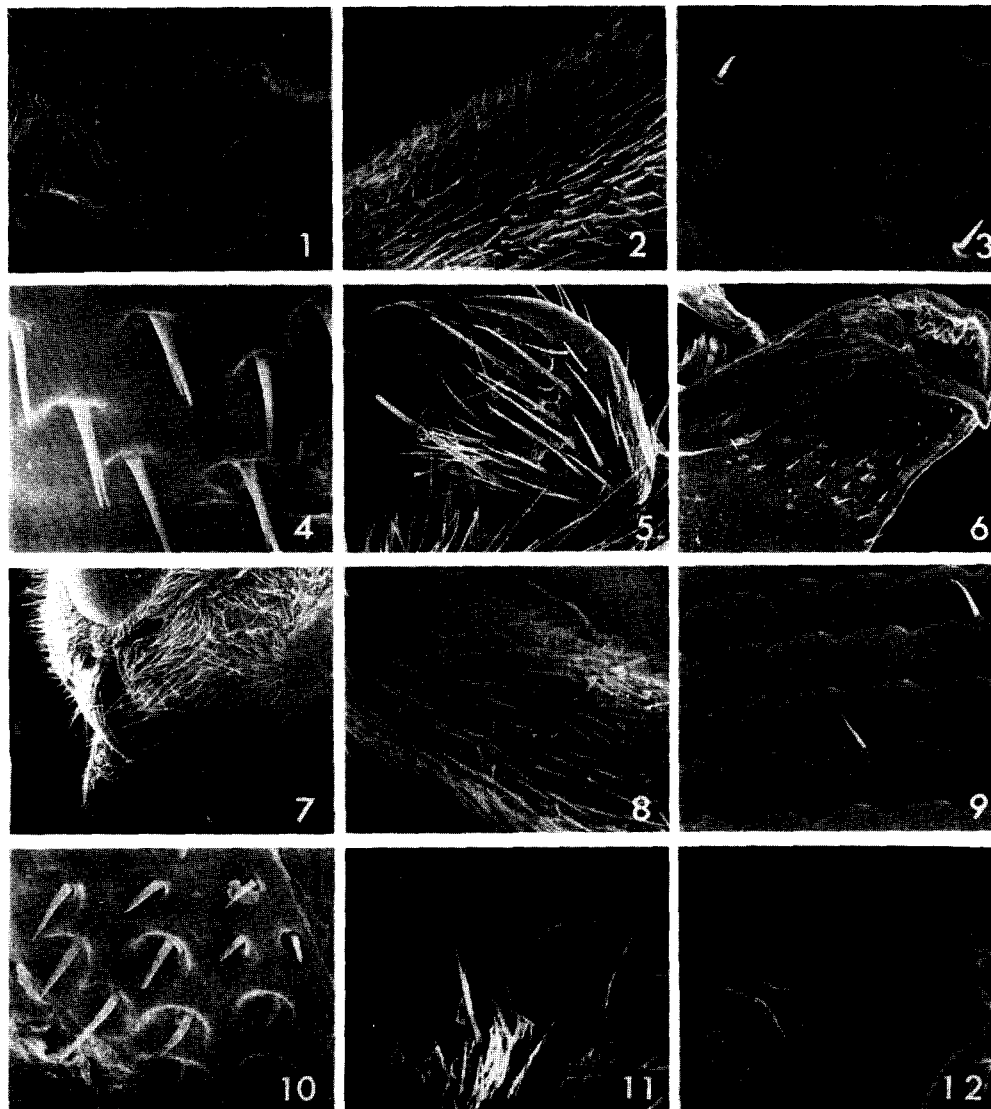


Fig. 1- 6. *Habronyx (Habronyx) heros*

1. Clypeus ($\times 50$) 2. 4th antennal segment ($\times 200$) 3. Compound eye ($\times 1000$) 4. Tip of antennal scape ($\times 1000$) 5. Hind tarsal claw ($\times 200$) 6. Genital clasper. ($\times 200$)

Fig. 7-12. *Habronyx (Camposcopus) sonani*

7. Clypeus ($\times 75$) 8. 4th antennal segment ($\times 350$) 9. Compound eye ($\times 1000$) 10. Tip of antennal scape ($\times 1000$) 11. Hind tarsal claw ($\times 500$) 12. Genital clasper ($\times 200$).

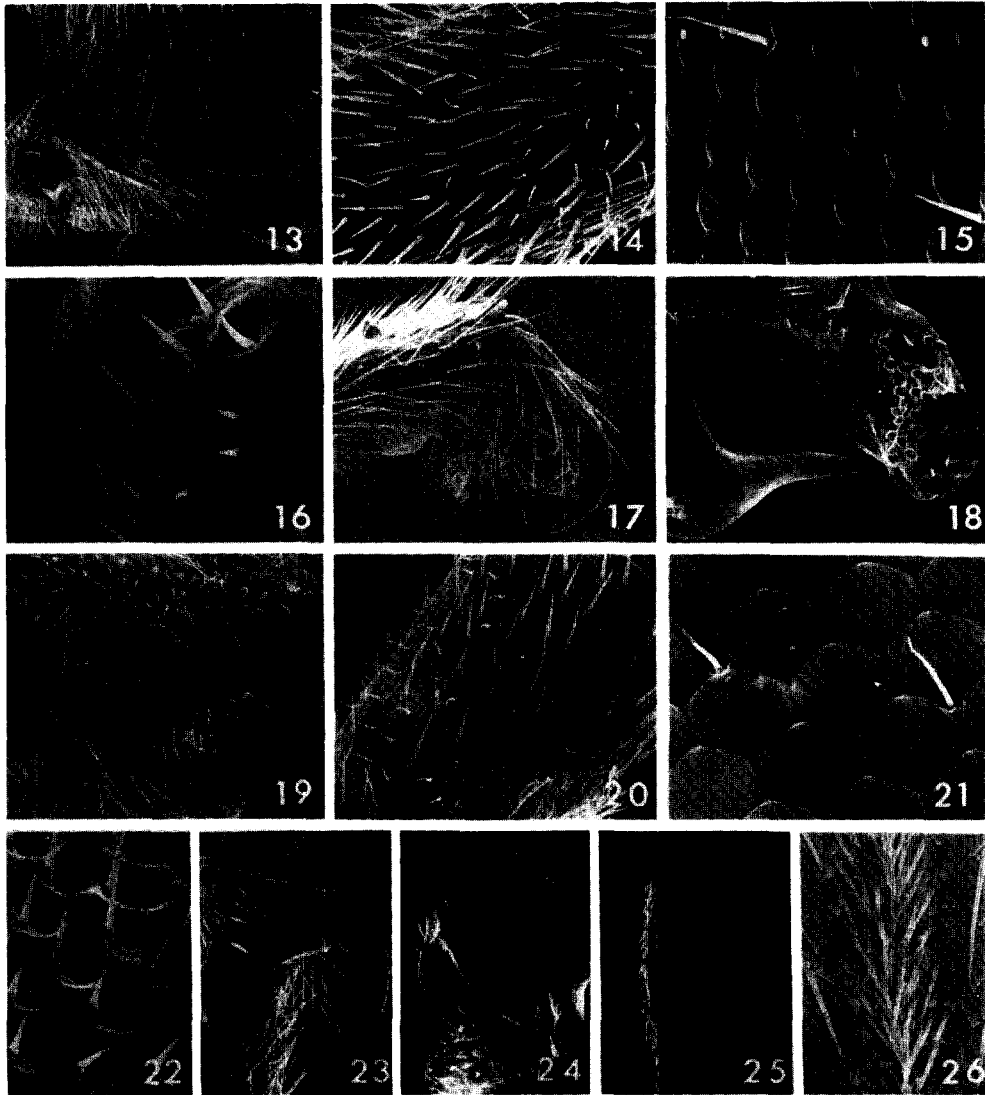


Fig. 13-18. *Habronyx (Habronyx) insidiator*

13. Clypeus ($\times 75$) 14. 4th antennal segment ($\times 350$) 15. Compound eye ($\times 1000$)
 16. Tip of antennal scape ($\times 1000$) 17. Hind tarsal claw ($\times 200$) 18. Genital clasper
 ($\times 200$)

Fig. 19-26. *Therion circumflexum*

19. Clypeus ($\times 75$) 20. 4th antennal segment ($\times 350$) 21. Compound eye ($\times 1000$)
 22. Tip of antennal scape ($\times 1000$) 23. Hind tarsal claw, ($\times 200$) 24. Aedeagus
 ($\times 50$) 25. Ventral view of male hind tarsus ($\times 75$) 26. Same as 25 ($\times 1000$)

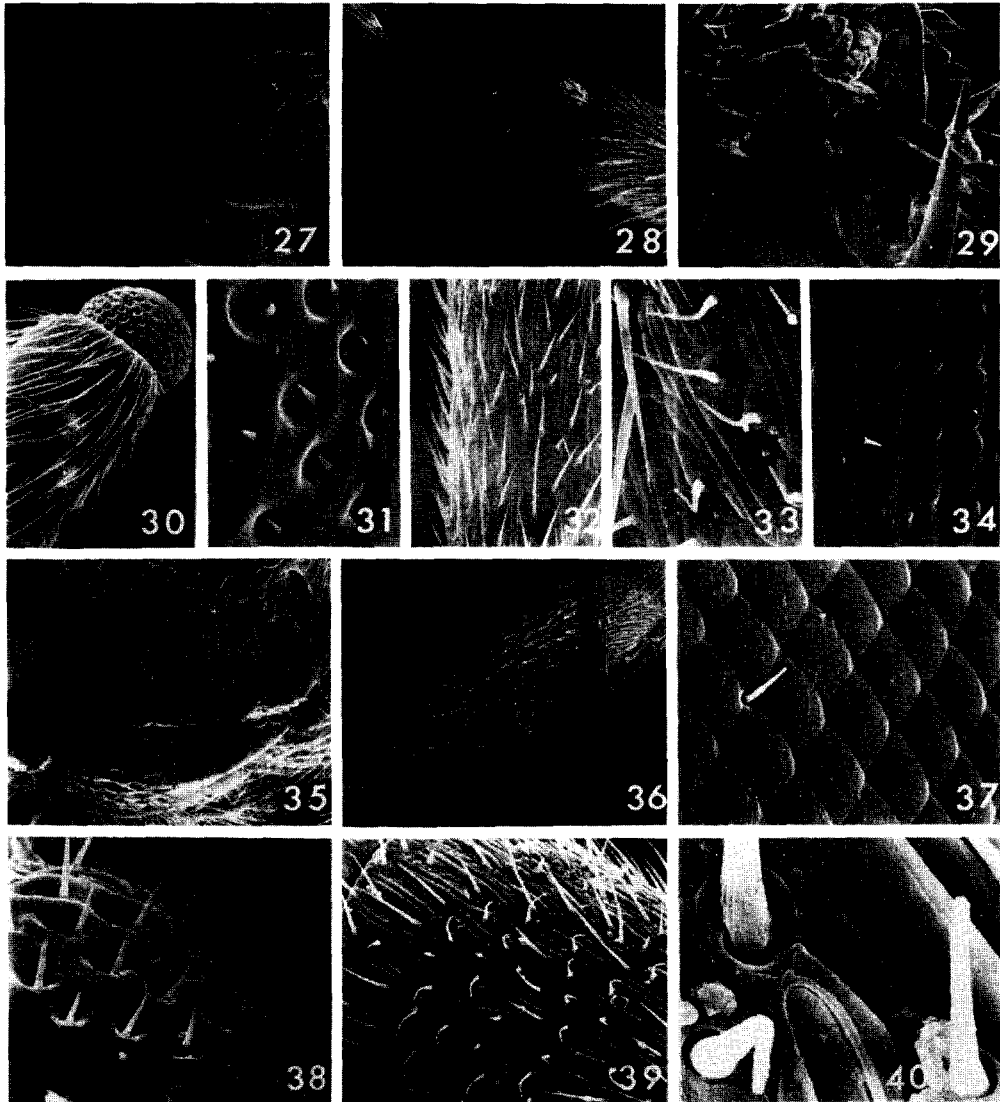


Fig. 27-34. *Heteropelma calcator*

27. Clypeus. ($\times 75$) 28. Ventral view of male hind tarsus ($\times 75$) 29. Hind tarsal claw ($\times 350$) 30. Tip of antennal scape ($\times 150$) 31. Same as 30 ($\times 1000$) 32. 4th antennal segment ($\times 350$) 33. Same as 32 ($\times 1000$) 34. Compound eye ($\times 1000$)

Fig. 35-40. *Heteropelma fulvitarise*

35. Clypeus ($\times 75$) 36. Hind tarsus ($\times 50$) 37. Compound eye ($\times 1000$) 38. Tip of antennal scape ($\times 1000$) 39. 4th antennal segment ($\times 350$) 40. Same as 39 ($\times 500$)

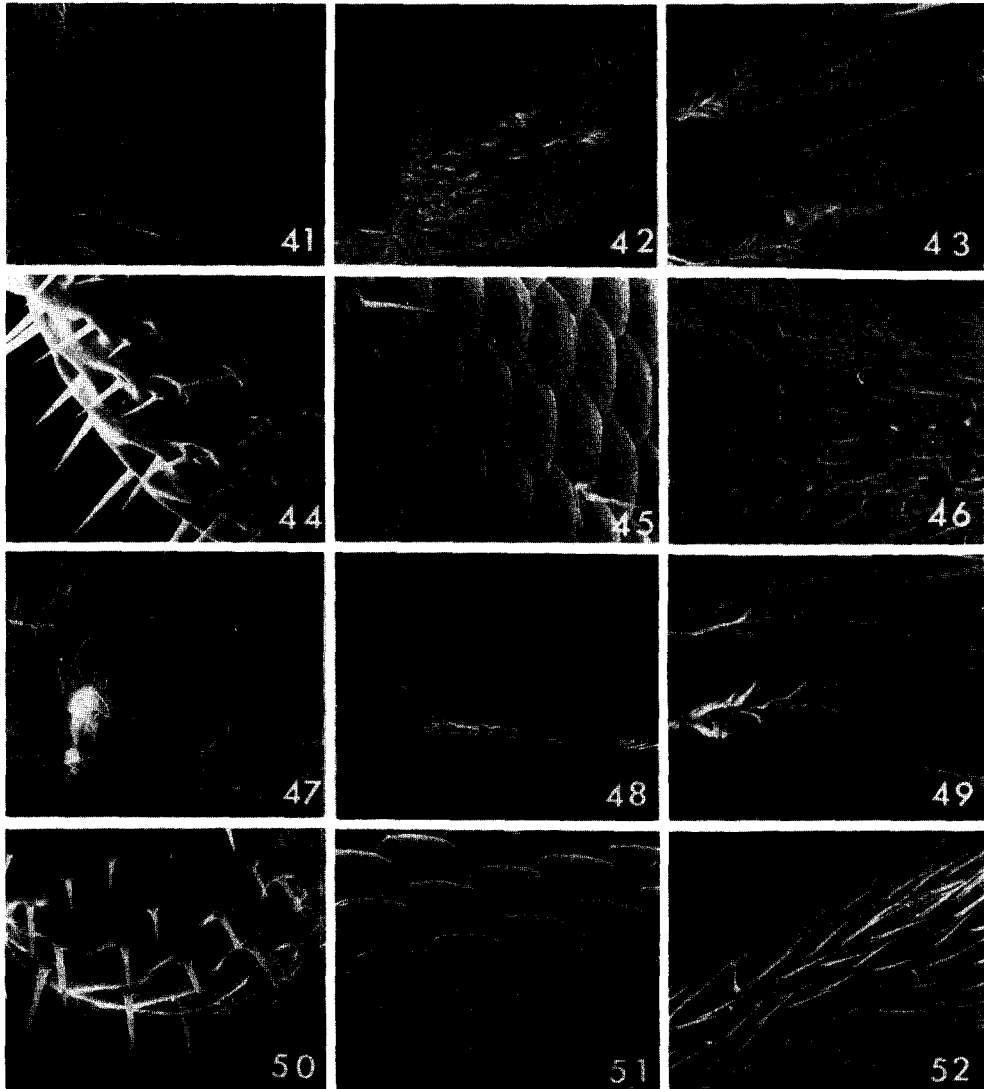


Fig. 41-46. *Heteropelma nigrum*

41. Clypeus ($\times 75$) 42. Ventral view of male 2nd tarsus ($\times 75$) 43. Flattened hairs of male 2nd tarsal segment ($\times 750$) 44. Tip of antennal scape ($\times 1000$) 45. Compound eye ($\times 1000$) 46. 4th antennal segment ($\times 350$)

Fig. 47-52. *Heteropelma amictum*

47. Clypeus ($\times 75$) 48. Ventral view of male hind tarsus ($\times 75$) 49. Same as 48. ($\times 1000$) 50. Tip of antennal scape ($\times 1000$) 51. Compound eye ($\times 1000$) 52. 4th antennal segment ($\times 350$)

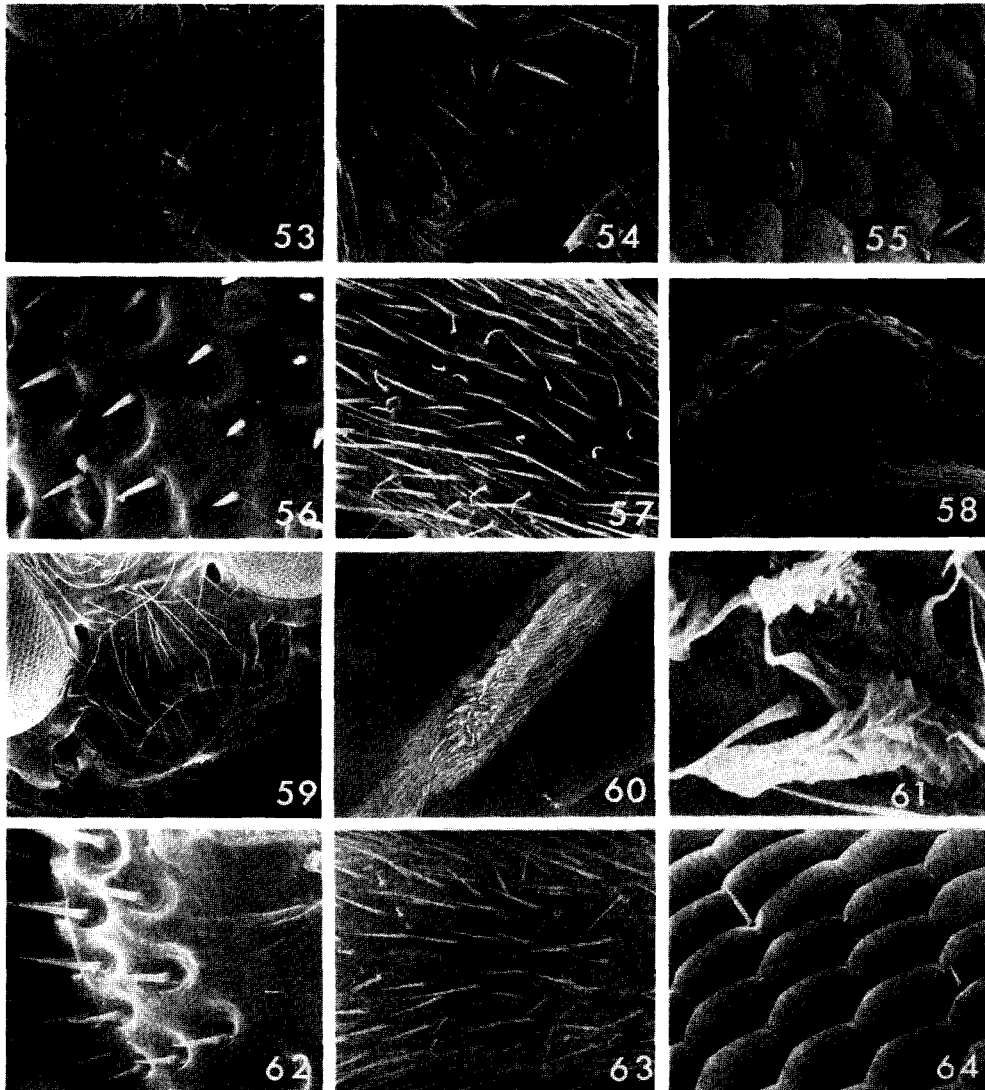


Fig. 53-58. *Heteropelma elongatum*

53. Clypeus ($\times 75$) 54. Ventral view of mouth part ($\times 75$) 55. Compound eye ($\times 1000$) 56. Tip of antennal scape ($\times 1000$) 57. 4th antennal segment ($\times 350$) 58. Surface of distivolsella. ($\times 1000$)

Fig. 59-64. *Heteropelma changwhani*

59. Clypeus ($\times 75$) 60. Ventral view of male 2nd hind tarsus ($\times 50$) 61. Same as 60 ($\times 1500$) 62. Tip of antennal scape ($\times 1000$) 63. 4th antennal segment ($\times 350$) 64. Compound eye ($\times 1000$)