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## 【Research report】

### 臺灣捕植瑞科種類之拾遺 (瑞蟬亞綱：中氣門目) 【研究報告】

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## Abstract

### 摘要

就以生物防治上防治植食性瑞蟬類而言，捕植瑞科是最具價值及最具有實用潛力之種類。本科臺灣過去有江原氏 (1970)，羅幹成 (1970)，曾義雄 (1972,1973,1975,1976) 及張弘毅及曾義雄 (1979) 等發表過，共記錄28種。本文加上19種，使臺灣捕植瑞科之種類達47種；在此19種中有9種為新種：A. (A.) pascalis, A. (A.) bellatulus, A. (A.) tienhsainensis, A. (A.) trisetosus, A. (A.) alpinia, T. (T.) obseus, T. (T.) elegidus, T. (T.) neocrassus 及 T. (T.) pseudoserrulatus；10種為臺灣之新記錄。本文除詳細描述這些19種之形態學外，並另簡要重新敘述 monomacrosetosus Tseng 及 longispinosus (Evans)，同時為便於實用上之方便，乃利用臺灣47種之不同形態特徵，製成檢索表，茲供查定種名。根據 Schicha (1981) 認為全世界有9種與彼在澳洲發現之 benjamini Schicha 相似。但筆者參閱及比較標本後認為彼所列之 chascomensis (Scheals) 應排除於 benjamini Schicha 相似種類之外，因此這些之相似種類共有9種，在此筆者將之成立一新的種群 (species group) 名為 paspalivorus group，本種群之生活習性均發現草本植物中之單子葉植物。A. (A.) pseudolongispinosus Xin et al, 1981 是在中國大陸浙江、上海一帶發現，其主要與 womersleyi Schicha 之不同是在於固定指之齒數，剛毛長短及前肛孔之相互距離。筆者有機會比較了東南亞地區及在臺灣不同作物和大量飼養之標本，發現上述特徵只是微小之形態變異，故把它列入 womersleyi 之下為同物異名。A. (A.) parapeltatus Wu et Chou 1981 在中國之廣東省發現，本種與 ovatus (Garman) 並無不同；另 peltatus Van der Merwe 在南非與泰國發現，此種筆者亦認為是 ovatus (Garman) 之同物異名。本文所用之分類系統乃是根據筆者 (1975) 之分類體系。模式標本均保存於經濟部商品檢驗局臺南分局植物檢疫室。

Key words:

關鍵詞:

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## FUTHER STUDY ON PHYTOSEIID MITES FROM TAIWAN (ACARINA: MESOSTIGMATA)

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### ABSTRACT

The new taxa include one new group of *paspalivorus*; 9 new species: *A. (A.) pascalis*, *A. (A.) bellatulus*, *A. (A.) tienhsainensis*, *A. (A.) trisetosus*, *A. (A.) alpinia*, *T. (T.) obseus*, *T. (T.) elglidus*, *T. (T.) neocrassus*, *T. (T.) pseudoserrulatus*. These are described and illustrated. In addition, 10 undescribed and 2 redescribed species as well as key to the known species from Taiwan are also provided in present paper.

### INTRODUCTION

The phytoseiid mites are most important predatory feeding upon the phytophagous mites. The taxonomical knowledge of the phytoseiid mites of Taiwan has been based largely upon the Ehara (1970), Lo (1970), Tseng (1972, 1973, 1975, 1976) and Chang & Tseng (1979), and 28 species have previously been recorded in the literature. The present paper I add 18 species to the fauna in Taiwan, 9 being described new to science, 10 species new to Taiwan. Illustrations, descriptions of these species and redescrptions of 2 species together with key to the known species from Taiwan are provided in the paper. Up to present data, 47 species of phytoseiid mites are known throughout this island. To the best of my knowledge these are still preliminary, I believe that more species will be found in the future.

Specimens mounted directly in Hoyer's medium, and placed in incubator to warm for 48-72 hrs. Identifications were made under phase contrast microscope with magnifications of 100X, 200X, 400X, 800X.

The systematics used in the paper is based on Tseng (1975).

Type materials will be deposited in Plant Quarantine Laboratory, Tainan Branch, Bureau of Commodity Inspection and Quarantine, Tainan, Taiwan, Rep. of China.

### KEY TO THE KNOWN SPECIES FROM TAIWAN

1. 6 pairs of prolateral setae . . . . . 2  
4 or 5 pairs of prolateral setae . . . . . 12
2. 2 pairs of sublateral setae are set on interscutal membrane. . . . . *Typhrodromus* . . . . . 3  
One pair of sublateral setae, anterior sublateral setae set on dorsal shield, posterior sublateral setae absent . . . . . *Shiehia multispinosa* Tseng
3. Lateral setae barb with knobbed tip, equal or longer than the intervals between them, 3 pairs of ventral setae . . . . . *transvaalensis* (Nesbitt)  
Lateral setae no equal or longer than the intervals between them; 4 pairs of ventral setae . . . 4
4. Peritreme very long, with anterior ends touching, and strong curved downward . . . . .

- ..... *gracilentus* Tseng  
 Peritreme moderate long, with anterior ends not touching, and not curved downward ..... 5
5. 10 pairs of lateral setae are stout and barb; one pair of macrosetae on leg IV; macroseta on basitarsus IV slight longer than segment. .... 6  
 10 pairs of lateral setae are smooth, except for  $L_{10}$  smooth or barb; more than 3 pairs of macrosetae on leg IV ..... 7
6.  $M_2$  and  $L_8$  are arranged in a transverse line;  $M_2$ - $L_8$  much closer together than  $M_2$ - $L_9$ ;  $M_2$  with hyaline knob ..... *neocrassus* n. sp.  
 $M_2$  located between  $L_8$  and  $L_9$ ;  $M_2$ - $L_8$  equal length of  $M_2$ - $L_9$ ;  $M_2$  pectinated, without hyaline knob ..... *obesus* n. sp.
7.  $VL_3$  stout, about twice as long as  $VL_1$  ..... *changi* Tseng  
 $VL_3$  as long as  $VL_1$  ..... 8
8.  $L_9$  much shorter than  $L_7$  ..... 9  
 $L_9$  as long as  $L_7$  ..... *tridentiger* Tseng
9.  $L_{10}$  seta-shaped;  $L_1$  more or less 3 times longer than  $L_2$  ..... *lanyuensis* Tseng  
 $L_{10}$  barbed, with hyaline knob ..... 10
10. Dorsal setae short;  $M_2$  twice as long  $L_9$  ..... *ryukyuensis* Ehara  
 Dorsal setae longer than *ryukyuensis*;  $M_2$  more 4 times longer than  $L_9$  ..... 11
11.  $M_2$  5 times longer than  $L_9$ ; macroseta on genu IV as long as basitarsus IV and much longer than pseudoserrulatus ( $22\mu$ ) ..... *eleglidus* n. sp.  
 $M_2$  4 times longer than  $L_9$ ; macroseta on genu IV shorter than those of on basitarsus IV,  $9\mu$  long ..... *pseudoserrulatus* n. sp.
12. 5 pairs of prolateral setae ..... 13  
 4 pairs of prolateral setae ..... 18
13. Anterior sublateral setae set on dorsal shield. .... *Phytoseius* ..... 14  
 Anterior and posterior setae set on interscutal membrane; setae  $L_1$ ,  $L_3$ ,  $L_5$ ,  $L_6$ ,  $L_7$  and  $L_8$  long ..... *Chiliseius lienii* Tseng
14. Posterior sublateral setae absent ..... *P. (Dubininellus)* ..... 15  
 Posterior sublateral setae present, set on interscutal membrane. .... *P. (Phytoswius)* ..... 16
15. Dorsal setae flat enveloped ..... 17  
 Dorsal setae slender, not flat ..... *coheni* Swirski & Shechter
16.  $L_5$  longer than  $L_6$  ..... *haungi* Ehara  
 $L_5$  as long as  $L_6$ , or slightly shorter than  $L_6$  ..... *rugatus* Tseng
17.  $L_1$  much longer than  $L_2$  ..... *hogkongensis* Swirski & Schechter  
 $L_1$  slightly longer than  $L_2$  ..... *minutus* Narayanan et al
18. Dorsal interscutal membrane sclerotized; the relative length of dorsal setae  $M_2 > L_5 > L_9 = D_4 > L_3 > V > D_3 > L_2 > L_7 > L_8 > L_1 > D_1 = D_2 > V > cl > S_1 = S_2$  ..... *Iphiseius formosanus* Ehara  
 Dorsal interscutal membrane not to form sclerotized ..... 19
19. Anterior or posterior sublateral seta sets on dorsal shield. .... *Platyseiella* ..... 20  
 2 pairs of sublateral setae set on interscutal membrane ..... *Amblyseius* ..... 22
20. 2 pairs of sublateral setae; posterior sublateral seta sets on dorsal shield ..... *P. (Noeledius)* ..... 21  
 One pair of sublateral setae; posterior sublateral setae absent; anterior sublateral setae sets on dorsal shield. .... *P. (Platyseiella)* (No species found from Taiwan)
21. Lateral margins with an incision near  $S_2$  ..... *subtropicus* (Ehara)  
 Lateral margins without incision near  $S_2$  ..... *formosanus* (Tseng)
2. The fourth pair of ventral setae much long and pectinate, arising from the dorso-posterioral

- interscutal membrane. . . . . *A. (Paraphytoseius)*. . . . . 23
- The fourth pair of ventral setae short, or relative long, smooth or pectinate, arising from the venterior after 3rd ventral setae . . . . . *A. (Amblyseius)*. . . . . 24
23. Postscutum with 4 pairs of postlateral setae . . . . . *hyalinus* Tseng
- Postscutum with 3 pairs of postlateral setae . . . . . *multidentatus* (Swirski & Schechter) = *subtropicus* Tseng
24. Dorsal shield much smaller than idiosoma; 4 pairs of lateral setae on postscutum. . . . . *liturivorus* Ehara
- Dorsal shield slightly smaller than idiosoma; 5 pairs of lateral setae on postscutum. . . . . 25
25. 2 pairs of dorsocentral setae; genital and ventrianal shield reticulate, the latter much wider than the former. . . . . *salebrosus* (Chant) (= *taoi* Lo)
- 3 or 4 pairs of dorsocentral setae . . . . . 26
26. All setae on dorsal shield except V. cl and L<sub>8</sub> very long; longer than the intervals between them. . . . . 27
- Some setae on dorsal shield beside V. cl and L<sub>8</sub> short or minute. . . . . 28
27. L<sub>8</sub> minute, smooth, more or less 0.25 as long as L<sub>9</sub> . . . . . *longispinosus* (Evans)
- L<sub>8</sub> moderate long, barb, more or less 0.55 longer than L<sub>9</sub> . . . . . *womersleyi* Schicha
28. L<sub>4</sub>, L<sub>9</sub> and M<sub>2</sub> whip like. . . . . 29
- L<sub>4</sub>, L<sub>9</sub> and M<sub>2</sub> not to form whip like . . . . . 37
29. Ventrianal shield vase-shaped. . . . . *herbicolus* (Chant) = (*deleoni* Muma & Denmark)
- Ventrianal shield rectangular or pentagonal . . . . . 30
30. 3 pairs of dorsocentral setae . . . . . 31
- 4 pairs of dorsocentral setae . . . . . 33
31. M<sub>2</sub> and L<sub>9</sub> are strong curl, M<sub>2</sub> longer than L<sub>9</sub>. . . . . *ovatus* (Garman)
- M<sub>2</sub> and L<sub>9</sub> not curl, M<sub>2</sub> shorter than L<sub>9</sub> . . . . . 32
32. Cervix of spermatheca longer than wide, tuber-shaped . . . . . *pubes* Tseng
- Cervix of spermatheca wider than long, bowl-shaped . . . . . *asetus* (Chant)
33. Cervix of spermatheca tuber-shaped or cylindrically. . . . . 34
- Cervix of spermatheca bowl or long bell like. . . . . 36
34. Cervix of spermatheca cylindrically, at least 5 times longer than wide . . . . . 35
- Cervix of spermatheca short tuber-shaped, less than 3 times longer than wide . . . . . *pascalis* n. sp.
35. Cervix of spermatheca 22.5  $\mu$  long; the distance of crescentic pores wider than to caudal preanals; posterior extension of peritreme plate not far free from coxa IV . . . . . *maai* Tseng
- Cervix of spermatheca 14  $\mu$  long; crescentic pore located in a transverse line with caudal preanals and their distance equal to the distance of pore to caudal preanals; posterior extension of peritreme plate far distance free from coxa IV . . . . . *alpinia* n. sp.
36. Cervix of spermatheca bell-shaped, longer than wide; M<sub>2</sub> as long as L<sub>4</sub> . . . . . *bellatulus* n. sp.
- Cervix of spermatheca bowl-shaped, as long as wide; M<sub>2</sub> distinctly longer than L<sub>4</sub>. . . . . *trisetosus* n. sp.
37. Ventrianal shield vase-shaped or allied . . . . . 38
- Ventrianal shield pentagonal or rectangular . . . . . 40
38. Peritreme long, extending forward to the level of V . . . . . 39
- Cervix spermatheca long and narrow; peritreme short, extending forward to between L<sub>1</sub> and L<sub>2</sub> . . . . . *ovalis* (Evans)
39. Cervix of spermatheca narrow and long, more 5 times longer than wide, narrow tuber-shaped . . . . . *newsami* (Evans)
- Cervix of spermatheca broad, about twice longer than wide, short test tuber-shaped. . . . .

- ..... *vestificus* Tseng
40. Dorsal shield more twice longer than wide; ventrianal shield rectangular, posterior margin truncated. .... 41  
Dorsal shield less twice longer than wide; ventrianal shield pentagonal, posterior margin angulation ..... 42
41. Cresentic pores much closer together than to caudal preanals; cervix of spermatheca bowl-shaped. .... *baraki* Athias-Henroit  
Cresentic pores just behind the caudal preanals; cervix of spermatheca cup-shaped. .... *taiwanicus* Ehara
42. Leg IV with one macroseta on basitarsus IV only. .... 43  
Leg IV with 3 macrosetae: on genu IV, on tibia IV and on basitarsus IV ..... 44
43. Cervix of spermatheca bottle-shaped, bottleneck about 1/3 as long as cervix, and half as wide as remaning area, major duct of spermatheca very broad. .... *oahuensis* Prasad  
Cervix of spermatheca not to form a bottle-shaped, long and gentle narrow toward the apex, major duct tapering ..... *monomacrosetus* Tseng
44. Dorsal shield heavily sclerotized with reticulation; macrosetae on genu IV and on tibia IV tapering in form with blunted tip, on basitarsus IV seta-like. .... *tienhsaienensis* n. sp.  
Dorsal shield reticulate except for central part, or without reticulation on dorsal shield; macrosetae on leg IV seta-like (*okinawanus* with a blunt tip macroseta on genu IV) ..... 45
45. Dorsal setae rather long, as long as or slight shorter than the intervals between them; cervix broad, slight longer than wide, apex of cervix round and very little narrow than the base ....  
..... *spineus* Tseng  
Dorsal setae minute, except for  $L_9$  rather long ..... 46
46. Cervix of spermatheca conical; macroseta on genu IV with blunted tip ..... *okinawanus* Ehara  
Cervix of spermatheca longest, slender; macroseta on genu IV seta-like ..... 46
47. Prolateral setae tiny, subequal in length;  $M_2$  shorter than  $M_2-L_7$  or much shorter than  $M_2-L_8$ ; atrium of spermatheca to form a knob-shaped; cresentic pores much wider than to caudal preanals ..... *anuwati* Ehara  
Prolateral setae longer than formers,  $L_4$  distinct longer than others;  $M_2$  1.6 longer than  $M_2-L_7$ , or as long as  $M_2-L_8$ ; atrium of spermatheca broad, 2.5 as long as wide ... *makuwa* Ehara

#### 1. *Amblyseius (Amblyseius) pascalis* New Species (Figs. 1-6)

This species is closely related to *cinctus* Copruz et Rimando and is readily differentiated by macroseta on tibia IV longer than on basitarsus IV; the shape of spermatheca.

Female. Dorsal shield smooth, well sclerotized, much longer than wide,  $365\ \mu$  long,  $230\ \mu$  wide, the shield with 17 pairs of dorsal setae: 9 pairs of lateral setae; 2 pairs of median setae; 4 pairs of dorsocentral setae; one pair each belong to paravertical and clunal setae. 2 pairs of sublateral setae on interscutal membrane,  $S_1$  more or less 1.7 as long as  $S_2$ . The relative length of dorsal setae:  $L_9 > M_2 > L_4 > L_1 > V > S_1 > S_2 > L_5 = L_6 = L_7 > L_2 > L_3 > L_8$   $D_1 = D_2 = D_3 = D_4 = cl$ ;  $L_4$ ,  $M_2$  and  $L_9$  are long, remaning setae are short and minute. Sternal shield as long as wide, with 3 pairs of sternal setae and 2 pairs of sternal pores; 1st pair of pores located posterior to 1st pair of sternal setae, 2nd pair of pores located anterior to 3rd pair of sternal setae; between the 1st sternal setae, there with 2 or 3 indistinct transverse lines. Anterior to sternal shield, on interscutal membrane with 3 distinct oblique transverse lines. Metasternal shields oval, with one pair of metasternal setae. Genital shield slight narrower than ventrianal shield wide, with one pair of genital setae. Ventrianal shield longer than wide,  $118\ \mu$  long,  $107\ \mu$  wide, irregular in lateral margins, with 3 pairs of preanal setae; one pair of cresentic pores located posterointerior side of

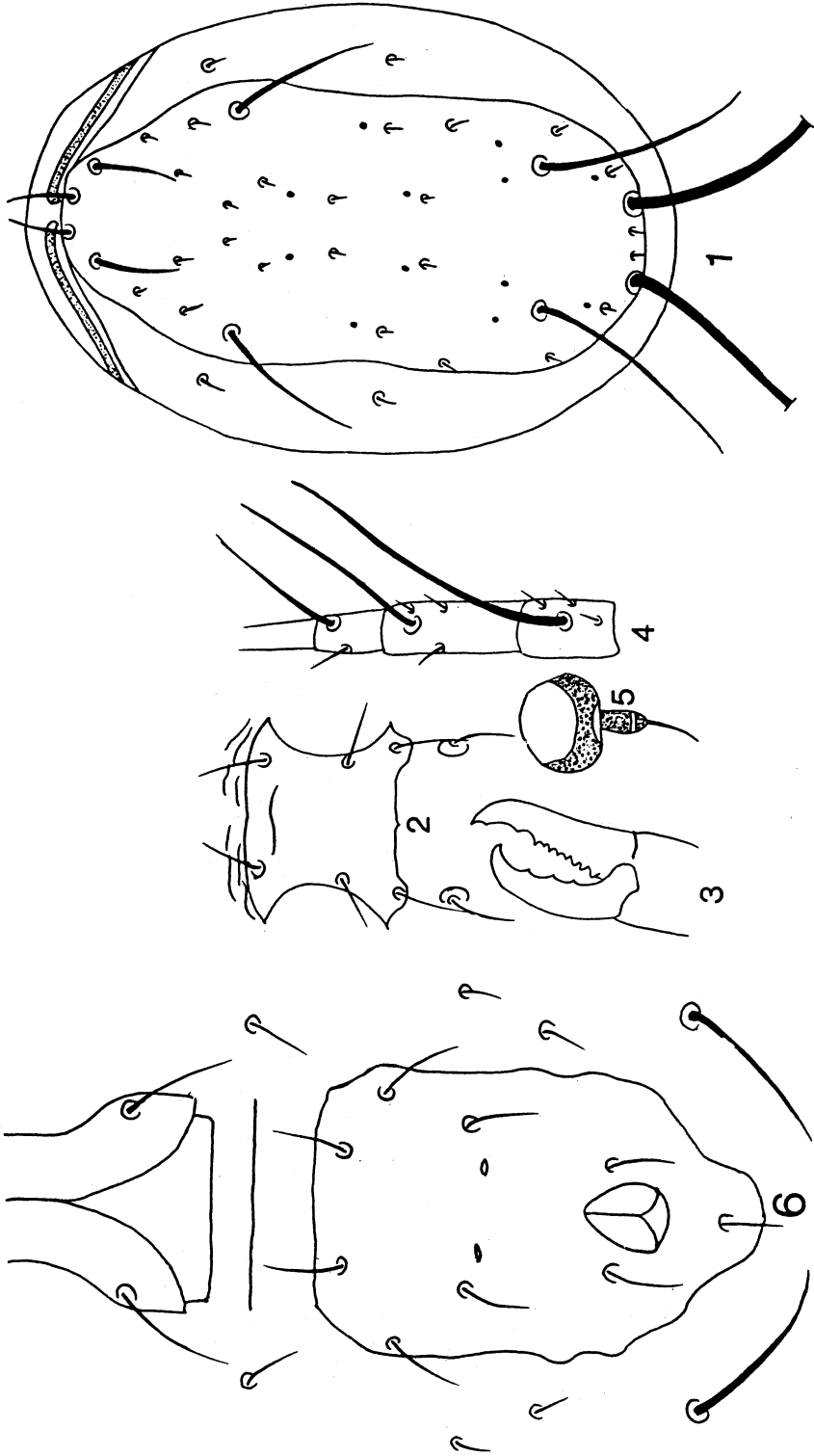


Fig. 1-6. *A. (A.) pascalis* n. sp. (♀)  
1. dorsal aspect 2. sternal shield 3. chelicera 4. leg IV 5. spermatheca  
6. genital and ventrianal shield

caudal preanals, the distance between pores about 0.4 in length to the distance between caudal preanals. 2 pairs of metapodal platelets, primary platelet triangular, about twice as long as wide,  $17\ \mu$  long,  $8\ \mu$  wide, accessory platelet tapering in form,  $12\ \mu$  long. Between genital and ventrianal shields, on interscutal membrane, there with a transverse chitinous ridge. 4 pairs of ventrior setae on interscutal membrane surrounding ventrianal shield,  $VL_4$  long, about 9 times longer than others. Spermatheca shown as illustration, cervix short and cylindrically,  $9\ \mu$  long. Fixed digit with 10 teeth, movable digit with 3 teeth. Peritreme long, extending forward beyond to level of paravertic setae, ending curved downward. The chaetotaxy of genu I-IV:  $2\frac{2}{1}\frac{2}{0}2, 2\frac{2}{0}\frac{2}{0}1, 1\frac{2}{1}\frac{2}{0}1, 1\frac{2}{1}\frac{2}{0}1$ ; macroseta on tibia IV longer than on basitarsus IV  $91\ \mu$ , on genu IV  $120\ \mu$ , on basitarsus IV  $74\ \mu$ .

Male: Unknown

Measurements. V  $27\ \mu$ ,  $L_1\ 53\ \mu$ ,  $L_2\ 6\ \mu$ ,  $L_3\ 5\ \mu$ ,  $L_4\ 93\ \mu$ ,  $L_5\ 8\ \mu$ ,  $L_6\ 8\ \mu$ ,  $L_7\ 8\ \mu$ ,  $L_8\ 5\ \mu$ ,  $L_9\ 267\ \mu$ ,  $M_2\ 105\ \mu$ ,  $D_1\ 3\ \mu$ ,  $D_2\ 3\ \mu$ ,  $D_3\ 3\ \mu$ ,  $D_4\ 3\ \mu$ ,  $cl\ 3\ \mu$ ,  $S_1\ 24\ \mu$ ,  $S_2\ 14\ \mu$ ,  $VL_4\ 82\ \mu$ .

Collection data. Holotype, ♀, Lishand, Nantou Hsien, ex weeds, 13-III-1980, H. Y. Chang; paratype, 4 ♀♀, the same data as holotype; 1 ♀, Wuling farm, Nantou Hsien, ex pear, 23-X-1980, H. Y. Chang.

## 2. *Amblyseius (Amblyseius) bellatulus* new species (Figs. 7-13)

This new species resembles *hidakai* Ehara by having macroseta on basitarsus IV longer than on genu IV, by having rather short dorsal setae. But the former differs from *hidakai* by setae  $L_9$  long, more twice longer than  $M_2$ ; by having long arms on sternal shield; the shape of spermatheca.

Female. Dorsal shield poorly sclerotized, anterolateral margins reticulation,  $331\ \mu$  long,  $178\ \mu$  wide, with at least 5 pairs of pores and 17 pairs of setae: 9 pairs of lateral setae, 2 pairs of median setae, 4 pairs of dorsocentral setae, one pair each belong to paravertic and clunal setae. Dorsal setae short except for V,  $L_1$ ,  $L_4$ ,  $M_2$  and  $L_9$  long,  $M_2$  and  $L_9$  with minute barb, remaining dorsal setae smooth; the relative length:  $L_9 > M_2 > L_4 > L_1 > V > S_1 > L_6 > L_2 = L_3 = S_2 > cl > L_7 > D_4 = D_3 = L_5 > D_1 = D_2 = D_3 = M_1 = L_8$ . 2 pairs of sublateral setae on interscutal membrane. Sternal shield smooth, well sclerotized, with long arms in anterolateral position, posterior margin straight, the shield with 3 pairs of sternal setae. Metasternal shields broad oval, with one pair of metasternal setae. Genital shield very little narrower than ventrianal shield, with one pair of genital setae. Ventrianal shield pentagonal, longer than wide,  $106\ \mu$  long,  $81\ \mu$  wide, slightly concave in mediolateral margins, the shield with 3 pairs of preanal setae; one pair of large crescentic pores closed together, the distance between them almost half as long as the distance between caudal preanals. Between genital and ventrianal shields, on interscutal membrane, there with a transverse chitinous ridge. 4 pairs of ventrior setae on interscutal membrane surrounding ventrianal shield,  $VL_4$  slight longer than  $L_1$ . 2 pairs of metapodal platelets, primary platelet long olive-shaped,  $21\ \mu$  long,  $5\ \mu$  wide, accessory platelet tapering in form. Spermatheca shown as illustration, cervix bell-shaped, longer than wide,  $11\ \mu$  long,  $8\ \mu$  wide. The chaetotaxy of genu I-IV:  $2\frac{2}{1}\frac{2}{1}2, 1\frac{2}{1}\frac{2}{0}1, 1\frac{2}{1}\frac{2}{0}1, 1\frac{2}{1}\frac{2}{0}1$ ; macrosetae on basitarsus IV longer than those on genu IV,  $60\ \mu$ , on tibia IV  $38\ \mu$ , on genu IV  $43\ \mu$ . Fixed digit with 10 sharp teeth, movable digit with 3 teeth, which the posterior one indistinctly.

Measurements. V  $24\ \mu$ ,  $L_1\ 36\ \mu$ ,  $L_2\ 10\ \mu$ ,  $L_3\ 10\ \mu$ ,  $L_4\ 42\ \mu$ ,  $L_5\ 6\ \mu$ ,  $L_6\ 11\ \mu$ ,  $L_7\ 7\ \mu$ ,  $L_8\ 5\ \mu$ ,  $L_9\ 110\ \mu$ ,  $M_1\ 5\ \mu$ ,  $M_2\ 43\ \mu$ ,  $D_1\ 5\ \mu$ ,  $D_2\ 5\ \mu$ ,  $D_3\ 6\ \mu$ ,  $D_4\ 6\ \mu$ ,  $cl\ 8\ \mu$ ,  $S_1\ 18\ \mu$ ,  $S_2\ 10\ \mu$ .

Male: Unknown

Collection data. Holotype, ♀, Mingchien, Nantou Hsien, ex *Morus alba*, 9-IX-1979, H. Y. Chang.

## 3. *Amblyseius (Amblyseius) monomacrosetus* Tseng (Fig. 14)

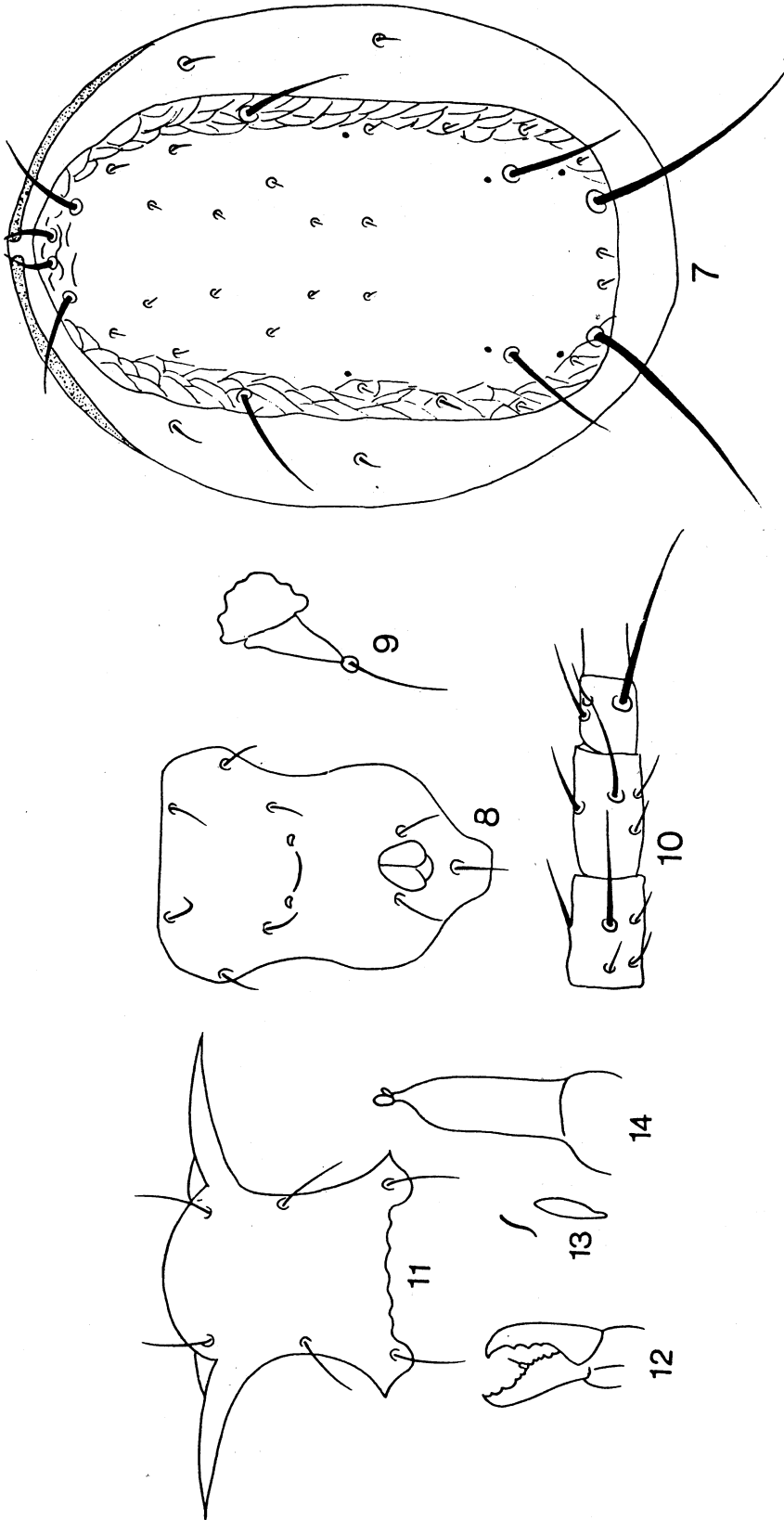


Fig. 7-13. *A. (A.) bellatulus* n. sp.

7. dorsal aspect 8. ventrianal shield 9. spermatheca 10. leg IV 11. sternal shield  
12. chelicera 13. metapodal platelets

Fig. 14 *A. (A.) monomacrosetus* ♀ : spermatheca



*Amblyseius (Amblyseius) monomacroseta* Tseng, 1976, Jour. Agr.

Ass (China) New series., 94:121-123

Type locality: Taiwan

This species closely resembles *Amblyseius (Amblyseius) mckenziei* Schuster and Pritchard for having leg IV with one macroseta on basitarsus IV. But it differs from the latter by the shape of spermatheca; by having  $L_8$  much shorter than  $L_7$ ; crescentic pores sparsely, the distance between crescentic pores twice longer than crescentic pore to caudal preanals.

Female. Dorsal shield smooth, well sclerotized, with 17 pairs of dorsal setae: 9 pairs of lateral setae, 4 pairs of dorsocentral setae, 2 pairs of median setae, one pair each belong to paravertical and clunal setae;  $M_2$  rather long and stout,  $31\ \mu$  long, located in a transverse line with  $L_7$  and 1.7 longer than  $L_7$ ;  $L_7$   $19\ \mu$  long;  $L_8$  minute, spiniform, shorter than those of dorsal setae,  $12\ \mu$  long;  $L_9$  longest, stout and barbed. Ventrianal shield with 3 pairs of preanal setae, one pair of crescentic pores much sparsely, the distance between pores twice the length in pore to caudal preanals. Leg IV with one macroseta only, macroseta on basitarsus IV  $62\ \mu$ ; the chaetotaxy of genu 1-IV:  $2\ \frac{2}{1}\ \frac{2}{1}\ 1, 1\ \frac{2}{1}\ \frac{2}{1}\ 1, 1\ \frac{2}{1}\ \frac{2}{1}\ 1$ .

Collection data. Type collected from pineapple, Tainan Hsien, 22-I-1971, Y. H. Tseng; addition collected data: 2 ♀ Chishan, Kaohsiung Hsien, ex corn leaf, 30-VI-1979, Y. H. Tseng; 1 ♀, Chung Hsing Univ., Taichung city, ex weeds, 10-IX-1980, H. Y. Chang.

#### 4. *Amblyseius (Amblyseius) aetus* (Chant) (Figs. 15-22)

*Typhrodromus (Amblyseius) aetus* Chant, 1959, Can. Ent. XCL: 80-81

Type locality: West Virginia

*Amblyseius (Amblyseius) aetus*, Schuster and Pritchard, 1963, Hilgardia 54(7):243-246

Female. Dorsal shield with anterolateral reticulation,  $389\ \mu$  long,  $216\ \mu$  wide, with 16 pairs of dorsal setae: 9 pairs of lateral setae, 2 pairs of median setae, 3 pairs of dorsocentral setae, one pair each belong to paravertical and clunal setae. Dorsal setae except V,  $L_1$ ,  $M_2$ ,  $L_4$  and  $L_9$  are minute,  $L_1$  very little longer than V,  $L_4$  3 times longer than V,  $M_2$  3.7 as long as V,  $L_9$  more or less 5.7 longer than V,  $D_4$  absent, those of position placed by one pair of pores; the relative length:  $L_9 > M_2 > L_4 > L_1 > V > L_2 = S_1 > S_2 > L_7 = L_8 > L_3 = L_6 > L_5 > D_1 = D_2 = D_3 = M_1$ . At least 9 pairs of pores on dorsal shield. Sternal shield as long as wide, with lateral reticulation, wave-shaped in anterior margin, the shield with 3 pairs of sternal setae, 1st pair of sternal setae longer than 2nd and 3rd pair of setae. Metasternal shields broad, anteroninterial margins strong concave, with one pair of metasternal setae. Genital shield narrower than ventrianal shield, with one pair of genital setae. Ventrianal shield pentagonal,  $110\ \mu$  long,  $91\ \mu$  wide, slightly concave in anterolateral margin, with 3 pairs of preanal setae; one pair of crescentic pores slight posterior to caudal preanals, the distance between pores about 0.7 as long as the distance pore to caudal preanal. Between sternal and ventrianal shield, on interscutal membrane, there with 2 pairs of transverse chitinous ridges. 4 pairs of setae on interscutal membrane surrounding ventrianal shield,  $VL_4$  very little shorter than  $M_2$ . Spermatheca shown as illustration, cervix very broad, bowl-shaped, about 1.8 wider than long,  $5\ \mu$  long,  $9\ \mu$  wide, atrium distinctly,  $3\ \mu$  long. 2 pairs of metapodal platelets, primary platelet truncate in anterior position, but posterior is angulation,  $23\ \mu$  long,  $5\ \mu$  wide, accessory platelet tapering in form,  $16\ \mu$  long,  $2\ \mu$  wide. The chaetotaxy of genu 1-IV:  $2\ \frac{2}{1}\ \frac{2}{1}\ 2, 2\ \frac{2}{1}\ \frac{2}{1}\ 1, 1\ \frac{2}{1}\ \frac{2}{1}\ 1, 1\ \frac{2}{1}\ \frac{2}{1}\ 1$ ; 3 pairs of macrosetae on legs IV: macroseta on genu IV slight shorter than on basitarsus IV,  $50\ \mu$ , on tibia IV  $31\ \mu$ , on basitarsus IV  $55\ \mu$ . Peritreme long, extending forward to the level of paravertical setae; posterior extension of peritreme plate fuse with coxa IV. Chelicera of fixed digit with 8 teeth, movable digit smooth, without tooth.

Male: Unknown

Measurements. V  $19\ \mu$ ,  $L_1$   $25\ \mu$ ,  $L_2$   $12\ \mu$ ,  $L_3$   $7\ \mu$ ,  $L_4$   $58\ \mu$ ,  $L_5$   $5\ \mu$ ,  $L_6$   $7\ \mu$ ,  $L_7$   $8\ \mu$ ,  $L_8$   $8\ \mu$ ,  $L_9$

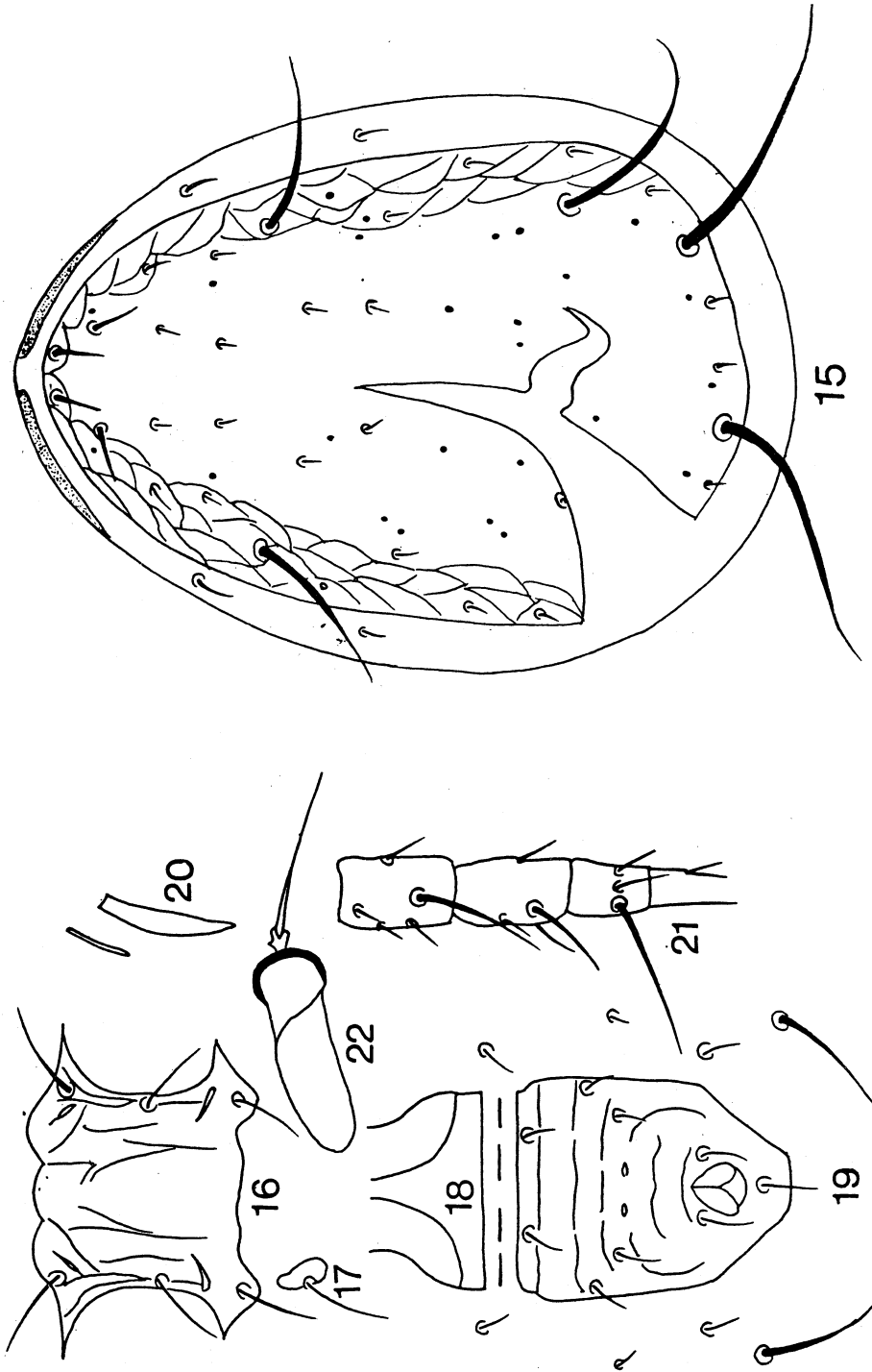


Fig. 15-22. *A. (A.) asetius* (♀)

15. dorsal aspect 16. sternal shield 17. metasternal shield 18. genital shield  
19. ventrianal shield 20. metapodal platelets 21. leg IV 22. spermatheca

108  $\mu$ , D<sub>1</sub> 3  $\mu$ , D<sub>2</sub> 3  $\mu$ , D<sub>3</sub> 3  $\mu$ , M<sub>1</sub> 3  $\mu$ , M<sub>2</sub> 70  $\mu$ , cl 3  $\mu$ , S<sub>1</sub> 12  $\mu$ , S<sub>2</sub> 9  $\mu$ , VL<sub>4</sub> 67  $\mu$ .

Collection data. 1 ♀, Chung Hsing Univ. Taichung city, ex weeds, 3-VII-1980, H. Y. Chang.

5. *Amblyseius (Amblyseius) ovatus* (Garman) (Figs. 23-29)

*Amblyseius ovatus* Garman, 1958, Ann. Ent. Soc., 51(1):78

Type locality: Ecuador at Brownsville, Texas

*Typhrodromus (Amblyseius) ovatus*, Chant, 1959, Can. Ent.

Suppl., 12 (XCL):90-91

*Amblyseius (Amblyseius) peltatus* Van der Merwe, 1968, Ent.

Mem. Dept. Agr. Tech. Serv. R.S.A. 18:119, new synonym

Type locality: South Africa

*Amblyseius (Proprioiseiopsis) peltatus*, Blommers, 1976, Bijdr.

Tot. Dierk., 46:100

*Amblyseius (Proprioiseiopsis) peltatus* Van der Merwe, Ehara, 1977.

Jour. Fac. Educat. Tottori Univ., 27(2):71-73

*Amblyseius (Amblyseius) parapeltatus* Wu et Chou, 1981, Zool.

Res. (China) 2(3):273-274, new synonym

Type locality: Guangdong, China.

Many specimens on hand are *ovatus* (Garman). This species was described by Garman (1958) from Ecuador at Brownsville, Texas. The relative length of L<sub>9</sub> and V setae at hand would, however, differs from Garman's original figured of *ovatus* by having L<sub>9</sub> longer than V rather than subequal in length (Not measurement in originals). By the way, species *ovatus* (Garman) was redescribed by Chant and Baker (1965), they recognized L<sub>9</sub> longer than V. It is therefore, I suspect these are variable characters, for this reason, species *parapeltatus* Wu et Chou (1981) is treated as a synonym in present paper. It appears probably that *peltatus* may be a synonym of *ovatus* (Garman) from South Africa and Thailand further materials were studied by Van der Merwe and Ehara by having L<sub>9</sub> longer than V and others. These slight different characters, the author suggests are morphological variations too.

Female. Body oval. Dorsal shield heavily sclerotized, reticulae on posterior D<sub>3</sub>, 389  $\mu$  long, 250  $\mu$  wide, with 16 pairs of setae: 9 pairs of lateral setae, L<sub>4</sub> and L<sub>9</sub> very long, L<sub>9</sub> strong curling; 2 pairs of median setae, M<sub>2</sub> same as L<sub>9</sub>, curled, longer than L<sub>9</sub>; 3 pairs of dorsocentral setae; one pair each belong to paravertical and clunal setae. At least 15 pairs of pores on the shield. The relative length: M<sub>2</sub> > L<sub>9</sub> > L<sub>4</sub> > L<sub>1</sub> > L<sub>2</sub> > V > L<sub>3</sub> > L<sub>5</sub> = L<sub>6</sub> > S<sub>1</sub> > L<sub>7</sub> > L<sub>8</sub> = S<sub>2</sub> > D<sub>1</sub> = D<sub>2</sub> = D<sub>3</sub> = M<sub>1</sub>. 2 pairs of sublateral setae arising from interscutal membrane, S<sub>1</sub> longer than S<sub>2</sub>. Sternal shield heavily sclerotized, reticulation, wider than long, with 3 pairs of sternal setae. Genital shield heavily sclerotized, with rather longitudinal reticulation on anterolateral margins and with one pair of genital setae. Ventrianal shield sclerotized, pentagonal, as wide as long, 102  $\mu$  long, 102  $\mu$  wide, with 3 pairs of preanal setae. One pair of crescentic pores located in a transverse line with caudal preanals. 4 pairs of venterior setae on interscutal membrane surrounding ventrianal shield. VL<sub>1</sub> longer than VL<sub>2</sub> and VL<sub>3</sub>, and about 1/3 as long as VL<sub>4</sub>. Between genital and ventrianal shields, on interscutal membrane, there with 2 pairs of transverse chitinous ridges, 4 pairs of rather round platelets located on the venterior of metapodosoma. 2 pairs of metapodal platelets, primary platelet long and cylindrically, 29  $\mu$  long, 5  $\mu$  wide, accessory platelet long olive-shaped, 10  $\mu$  long, 3  $\mu$  wide. Spermatheca shown as illustration, cervix to form a long bell-shaped, 17  $\mu$  long. The chaetotaxy of genu I-IV: 2  $\frac{2}{1}$   $\frac{2}{1}$  2, 2  $\frac{2}{0}$   $\frac{2}{0}$  1, 1  $\frac{2}{1}$   $\frac{2}{0}$  1, 1  $\frac{2}{0}$   $\frac{2}{1}$  1; 3 macrosetae on leg IV, macroseta on basitarsus straight, longer than others, 77  $\mu$  long, on tibia IV 31  $\mu$ , on genu IV 48  $\mu$ . Peritreme shield very broad, peritreme long, extending forward to anterior of paravertical setae, ending slightly curved downward.

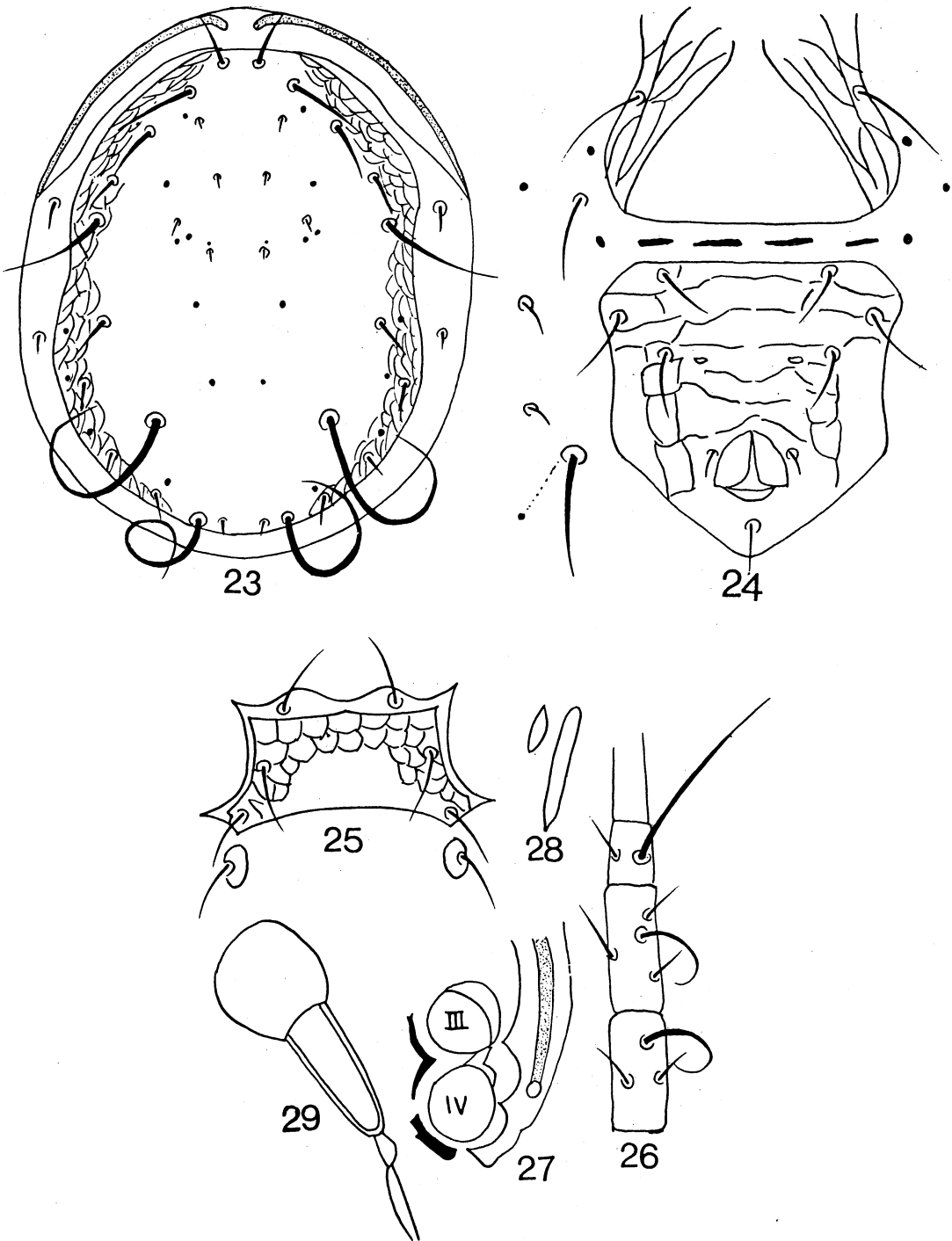


Fig. 23-29. *A. (A.) ovatus* (♀)

23. dorsal aspect, 24. genital and ventral shields, 25. sternal shield 26. leg IV

27. posterior extension of peritreme plate 28. metapodal platelets 29. spermatheca

Male: Unknown

Measurements. V 31  $\mu$ , L<sub>1</sub> 58  $\mu$ , L<sub>2</sub> 32  $\mu$ , L<sub>3</sub> 19  $\mu$ , L<sub>4</sub> 86  $\mu$ , L<sub>5</sub> 17  $\mu$ , L<sub>6</sub> 17  $\mu$ , L<sub>7</sub> 12  $\mu$ , L<sub>8</sub> 7  $\mu$ , L<sub>9</sub> 89  $\mu$ , M<sub>2</sub> 101  $\mu$ , M<sub>1</sub> 4  $\mu$ , D<sub>1</sub> 4  $\mu$ , D<sub>2</sub> 4  $\mu$ , D<sub>3</sub> 4  $\mu$ , cl 7  $\mu$ , S<sub>1</sub> 14  $\mu$ , S<sub>2</sub> 7  $\mu$ .

Collection data. 3 ♀♀, tapu, Chiayi Hsien, ex weeds, 28-IX-1975, Y. H. Tseng; 2 ♀♀, Taichung city, ex weeds, 20-IV-1979, H. Y. Chang; 1 ♀, Paulei, Kaohsiung Hsien, ex unknown plants, 11-IX-1981, Y. H. Tseng; 2 ♀♀, Holi, Taichung Hsien, ex weeds, 19-IX-1981, H. Y. Chang; 2 ♀♀, Puli, Nantou Hsien, ex weeds, 7-III-1982, Y. H. Tseng.

#### 6. *Amblyseius (Amblyseius) newsami* (Evans) (Figs. 30-35)

*Typhrodromus newsami* Evans, 1953, Ann. Mag. Nat. Hist., 12(6):450

Type locality: Malaya

*Typhrodromus (Amblyseius) newsami*, Chant, 1959, Can. Ent. 91 Suppl., 12:96

*Amblyseius (Amblyseius) newsami*, Ehara, 1966, Mushi., 39(2):24

Female. Dorsal shield well sclerotized, reticulate only along anterolateral margins, 307  $\mu$  long, 202  $\mu$  wide, with 17 pairs of dorsal setae: 9 pairs of lateral setae are short, smooth except for L<sub>9</sub> long; 2 pairs of minute median setae; 4 pairs of dorsocentral setae more or less equal in length to M<sub>1</sub>; one pair each belong to vertical and clunal setae, vertical setae rather long and stout, more or less 3 times longer than L<sub>2</sub>. 2 pairs of sublateral setae arising from interscutal membrane are subequal in length. The relative length of dorsal setae: L<sub>9</sub> > V > D<sub>4</sub> = S<sub>1</sub> = S<sub>2</sub> = L<sub>5</sub> = L<sub>6</sub> = M<sub>2</sub> > L<sub>7</sub> = L<sub>4</sub> L<sub>2</sub> = L<sub>8</sub> > D<sub>3</sub> > L<sub>1</sub> = L<sub>3</sub> = M<sub>1</sub> = D<sub>1</sub> = D<sub>2</sub> > cl. Sternal shield as long as wide, with 3 pairs of sternal setae. Metasternal shield broad oval, with one pair of metasternal setae. Genital shield narrower than ventrianal shield, 84  $\mu$  wide, with one pair of genital setae. Ventrianal shield pentagonal, 115  $\mu$  long, 84  $\mu$  wide, widest at anterior level of anus, with three pairs of preanal setae; one pair of crescentic pores located behind the caudal preanals. 4 pairs of venterior setae on interscutal membrane surrounding ventrianal shield. VL<sub>4</sub> longer than others. 2 pairs of metapodal platelets. Fixed digit with 8 teeth, movable digit with 3 teeth. The chaetotaxy of genu 1-IV: 2  $\frac{2}{1}$   $\frac{2}{0}$  1, 1  $\frac{2}{1}$   $\frac{2}{0}$  1, 1  $\frac{2}{1}$   $\frac{2}{0}$  1, 2  $\frac{2}{1}$   $\frac{2}{1}$  2; 3 macroseta on leg IV, macroseta on basitarsus IV longer than on genu IV, 53  $\mu$ , on tibia IV 43  $\mu$ , on genu IV 50  $\mu$ . Spermatheca shown as figured. Peritreme long, extending forward to the level of paravertic setae.

Male: Unknown

Measurements. V 24  $\mu$ , L<sub>1</sub> 8  $\mu$ , L<sub>2</sub> 10  $\mu$ , L<sub>3</sub> 8  $\mu$ , L<sub>4</sub> 11  $\mu$ , L<sub>5</sub> 12  $\mu$ , L<sub>6</sub> 12  $\mu$ , L<sub>7</sub> 11  $\mu$ , L<sub>8</sub> 10  $\mu$ , L<sub>9</sub> 38  $\mu$ , D<sub>1</sub> 8  $\mu$ , D<sub>2</sub> 8  $\mu$ , D<sub>3</sub> 9  $\mu$ , D<sub>4</sub> 12  $\mu$ , M<sub>1</sub> 8  $\mu$ , M<sub>2</sub> 12  $\mu$ , cl 5  $\mu$ , S<sub>1</sub> 12  $\mu$ , S<sub>2</sub> 12  $\mu$ , VL<sub>4</sub> 14  $\mu$ .

Collection data. 2 ♀♀, Kungdaw Mt. Miaoli Hsien, ex Litchi chiensis, 9-XII-1978, H. Y. Chang; 5 ♀♀, Wufeng, Taichung Hsien, ex *Averrhoa carambola*, 3 ♀♀, ex *Citrus* sp, 18-IX-1978, H. Y. Chang; many ♀♀, Taichung city, ex *Hibiscus sabdariffa*, 23-IX-1978, H. Y. Chang; 3 ♀♀, Toobian-keng, Taichung Hsien, ex *Passidium gujava*, 22-X-1978, H. Y. Chang.

#### 7. *Amblyseius (Amblyseius) anuwati* Ehara et Bhandhufalck (Figs. 36-41)

*Amblyseius (Amblyseius) anuwati* Ehara et Bhandhufalck, 1977, J. Facul. Educa. Totorri Univ., 27(2):63-66

Type locality: Thialand

Female. Dorsal shield well sclerotized, reticulate on lateral margins, 307  $\mu$  long, 202  $\mu$  wide, with 17 pairs of dorsal setae, minute and smooth, except for L<sub>9</sub> stout and finely barb: 9 pairs of lateral setae, 2 pairs of median setae, 4 pairs of dorsocentral setae, one pair each belong to paravertic and clunal setae. 2 pairs of sublateral setae arising from interscutal membrane. The relative length: L<sub>9</sub> > M<sub>2</sub> > V > L<sub>7</sub> = D<sub>4</sub> > L<sub>6</sub> = S<sub>1</sub> > L<sub>2</sub> = L<sub>4</sub> = L<sub>5</sub> > L<sub>3</sub> = D<sub>3</sub> > L<sub>8</sub> = M<sub>1</sub> = D<sub>1</sub> = S<sub>2</sub> = cl > D<sub>2</sub>. Sternal shield as long as wide, with 3 pairs of sternal setae. Metasternal shields oval, with one pair of metasternal setae. Genital shield slight narrower than ventrianal shield, 67  $\mu$  wide in

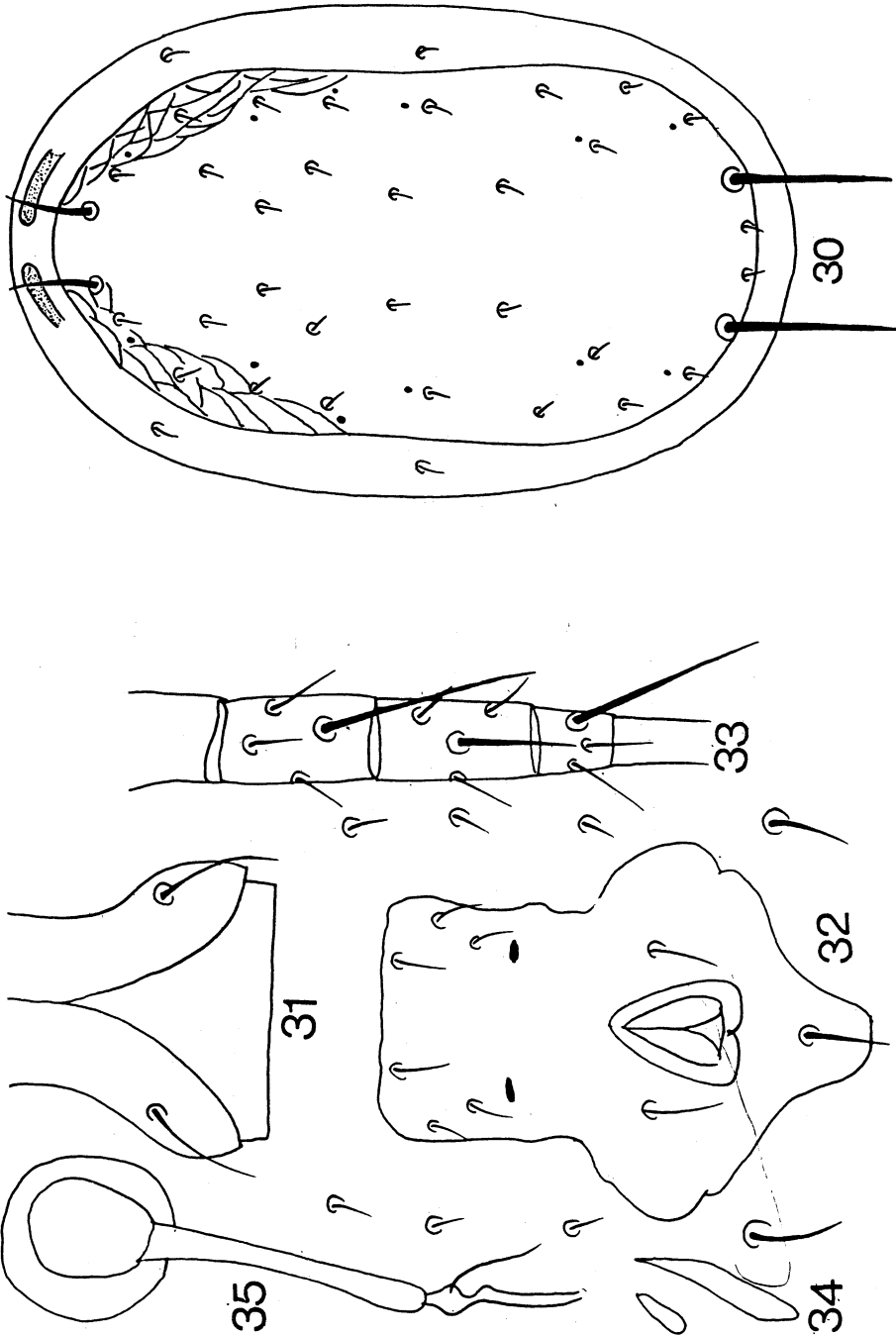


Fig. 30-35. *A. (A.) newsami* (♀)  
30. dorsal aspect 31. genital shield 32. ventrianal shield 33. leg IV  
34. metapodal platelets 35. spermatheca

base, with one pair of genital setae. Ventrianal shield pentagonal, slight longer than wide,  $91\ \mu$  long,  $86\ \mu$  wide, with 3 pairs of preanal setae; one pair of pores located posterointerior of caudal preanals. 4 pairs of venterior setae arising from interscutal membrane surrounding ventrianal shield,  $VL_1$  and  $VL_2$  subequal length,  $VL_3$  0.7 longer than  $VL_1$ ,  $VL_4$  twice as long as  $VL_1$ . 2 pairs of metapodal platelets. Spermatheca shown as illustration. Chelicera of fixed digit with 9 teeth, movable digit with 2 teeth. Peritreme long, extending forward to the level of paravertical setae. The chaetotaxy of genu II-IV:  $2\ 2\ 2\ 1, 1\ 2\ 2\ 1, 0\ 2\ 2\ 1$ ; 3 pairs of macrosetae on leg IV: macroseta on genu IV as long as on basitarsus IV,  $31\ \mu$ , on tibia IV slight shorter than on genu IV,  $26\ \mu$  long.

Male: Unknown

Measurements. V  $17\ \mu$ ,  $L_1\ 14\ \mu$ ,  $L_2\ 13\ \mu$ ,  $L_3\ 11\ \mu$ ,  $L_4\ 13\ \mu$ ,  $L_5\ 13\ \mu$ ,  $L_6\ 14\ \mu$ ,  $L_7\ 15\ \mu$ ,  $L_8\ 10\ \mu$ ,  $L_9\ 60\ \mu$ , cl  $10\ \mu$ ,  $M_1\ 10\ \mu$ ,  $M_2\ 20\ \mu$ ,  $D_1\ 10\ \mu$ ,  $D_2\ 7\ \mu$ ,  $D_3\ 11\ \mu$ ,  $D_4\ 15\ \mu$ ,  $S_1\ 14\ \mu$ ,  $S_2\ 10\ \mu$ ,  $VL_4\ 20\ \mu$ .

Collection data. 3 o, Kuandaushi mt. Mantou Hsien, ex *Coffea arabica* & *Prunus persica*, 31-X-1978, H. Y. Chang; many oo, Chuanglong, Taichung Hsien, ex *Prunus pyrifolia*, 25-XI-1978, H. Y. Chang.

#### 8. *Amblyseius (Amblyseius) tienhsainensis* new species (Figs. 42-48)

This new species is related to *anuwati* Ehara et Bhandhufalck, but it differs from latter by having  $M_2$  longer than distance between  $M_2$  and  $L_9$ , and located posterior to  $L_7$ ; dorsal shield with reticulation and the shape of spermatheca.

Female. Dorsal shield heavily sclerotized, reticulation;  $278\ \mu$  long,  $168\ \mu$  wide, with 17 pairs of dorsal setae: 9 pairs of lateral setae, rather short, about half shorter than in the intervals between them, except for  $L_9$  long, stout and barb; 4 pairs of dorsocentral setae; 2 pairs of median setae,  $M_2$  rather stout and with minuted barb, more 3 times longer than  $L_8$ , and located posterior to  $L_7$ , the length ratio of  $M_2-L_7/M_2-L_8 \approx 1$ ; One pair each belong to paravertical and clunal setae, the formers about 1.7 as long as those of dorsocentrals, and the latter shorter than those of dorsocentrals. 2 pairs of sublateral setae arising from interscutal membrane. The relative length of dorsal setae:  $L_9 > M_2 > L_4 > L_1 = L_7$ ,  $L_2 = L_3 = L_5 = L_6 > V > L_8 = D_1 = D_2 = D_3 = D_4 = M_1 > cl$ . Sternal shield as long as wide, anterior with transverse lines. 3 pairs of sternal setae arising from the shield. Metasternal shields oval, with one pair of metasternal setae. Genital shield narrower than ventrianal shield, with one pair of genital setae. Ventrianal shield triangular, as long as wide,  $108\ \mu$  long,  $106\ \mu$  wide, anterior to caudal preanals smooth, behind of caudal preanals with rather transverse reticulation; the shield with 3 pairs of preanal setae, subequal length, one pair of large sparse crescentic pores located in a transverse line with caudal preanals, their distance about 3.5 wider than the pore to caudal preanals. 4 pairs of venterior setae arising from interscutal membrane surrounding ventrianal setae,  $VL_4$  as long as  $M_2$ . 2 pairs of metapodal platelets rather broad, primary platelet  $19\ \mu$  long,  $4\ \mu$  wide, accessory platelet  $10\ \mu$  long. peritreme long, extending forward beyond to the level of paravertical setae, ending curved downward, posterior extension of peritreme plate smooth and rather broad rounded. The chaetotaxy of genu I-IV:  $2\ \frac{2}{1}\ \frac{2}{1}\ 2, 2\ \frac{2}{0}\ \frac{2}{0}\ 1, 1\ \frac{2}{1}\ \frac{2}{0}\ 1, 1\ \frac{2}{1}\ \frac{2}{0}\ 1$ ; 3 pairs of macrosetae on leg IV; on genu IV shorter than on basitarsus IV, tapering in form,  $32\ \mu$ ; on tibia IV tapering in form,  $24\ \mu$ ; on basitarsus IV seta-like,  $38\ \mu$ .

Male: Unknown

Measurements. V  $12\ \mu$ ,  $L_1\ 17\ \mu$ ,  $L_2\ 14\ \mu$ ,  $L_3\ 14\ \mu$ ,  $L_4\ 19\ \mu$ ,  $L_5\ 14\ \mu$ ,  $L_6\ 14\ \mu$ ,  $L_7\ 17\ \mu$ ,  $L_8\ 7\ \mu$ ,  $L_9\ 58\ \mu$ ,  $D_1\ 7\ \mu$ ,  $D_2\ 7\ \mu$ ,  $D_3\ 7\ \mu$ ,  $D_4\ 7\ \mu$ ,  $M_1\ 7\ \mu$ ,  $M_2\ 24\ \mu$ , cl  $7\ \mu$ ,  $L_1-L_2\ 31\ \mu$ ,  $L_2-L_3\ 26\ \mu$ ,  $L_3-L_4\ 34\ \mu$ .

Collection data. Holotype, ♀, Tienhsain (h: 2000 m), Hualien Hsien, ex flower, 4-X-1976, Y. H. Tseng.

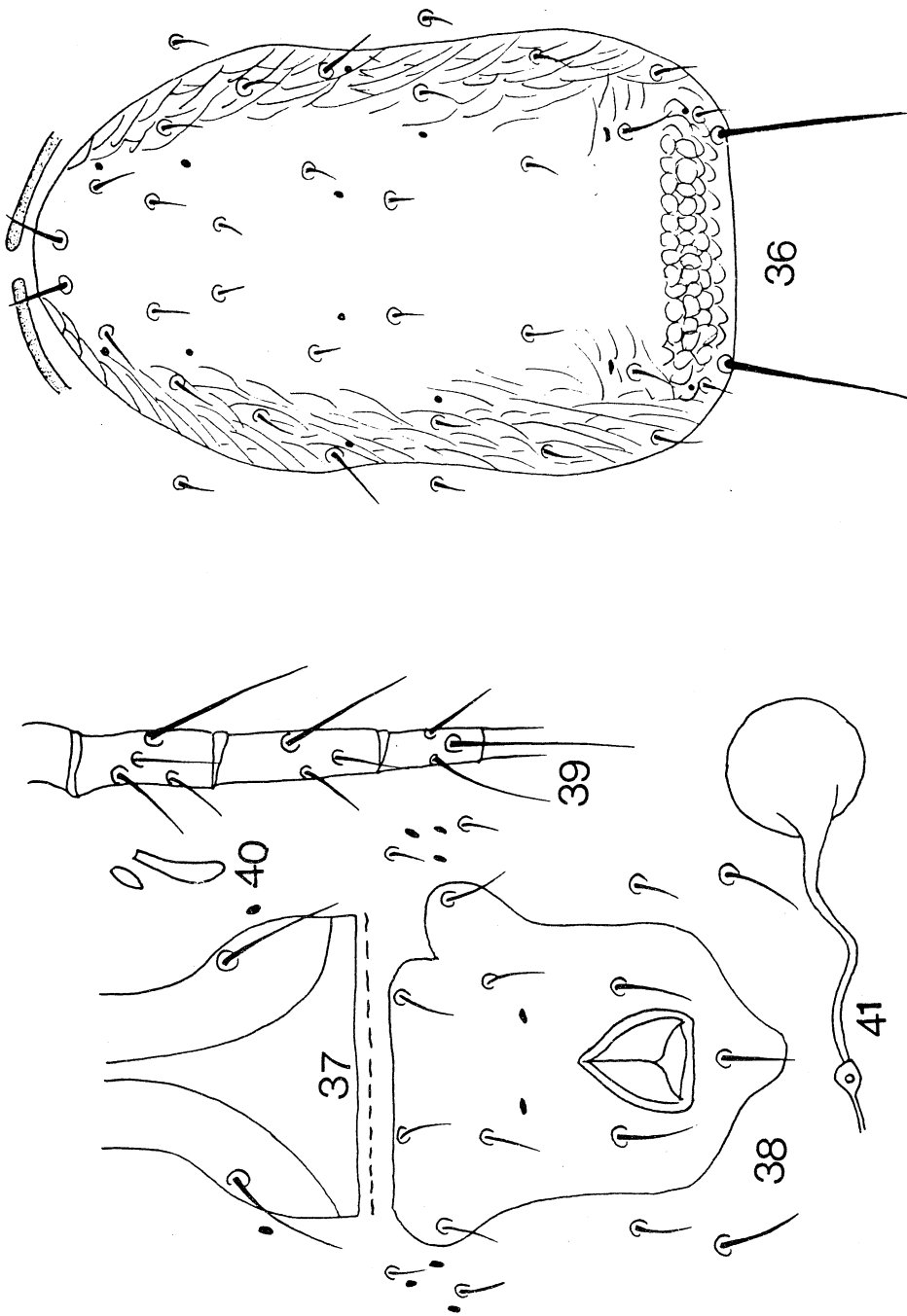


Fig. 36-41. *A. (A.) anuwati* (♀)

36. dorsal aspect 37. genital shield 38. ventrianal shield 39. leg IV

40. metapodal platelets 41. spermatheca



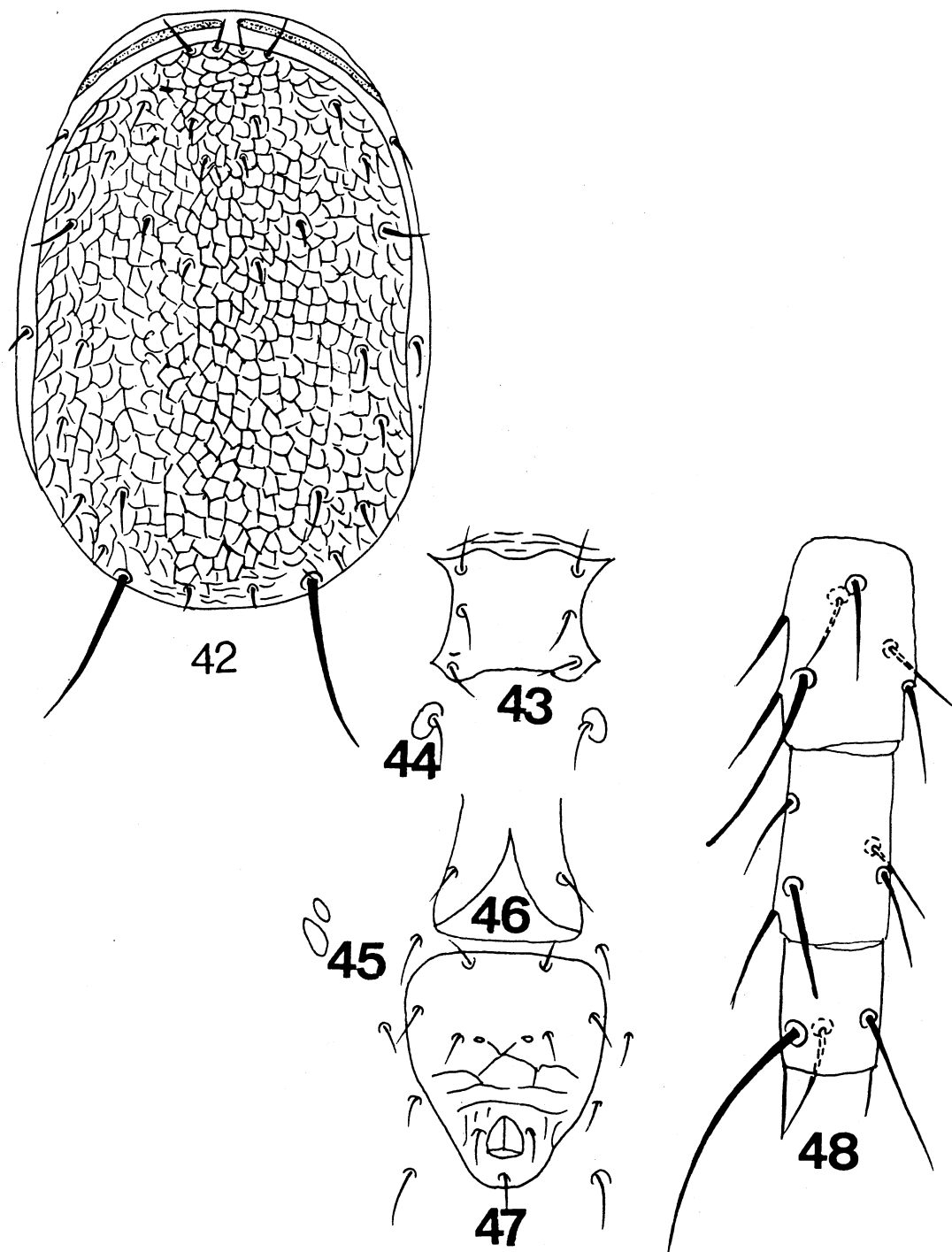


Fig. 42-48. *A. (A.) tienhsainensis* (♀)

42. dorsal aspect 43. sternal shield 44. metasternal shield 45. metapodal platelets  
46. genital shield 47. ventrianal shield 48. genu and tibia IV

### 9. *Amblyseius (Amblyseius) trisetosus* new species (Figs. 49-56)

This new species closely resembles *A. (A.) floridanus* (Muma), but it can be distinguished by having crescentic pores on ventrianal shield are much closer together than to caudal preanals, by having cervix of spermatheca as long as wide.

Female. Dorsal shield well sclerotized, smooth, 317  $\mu$  long, 216  $\mu$  wide, with 17 pairs of dorsal setae: 9 pairs of lateral setae,  $L_1$ ,  $L_4$ ,  $L_9$  and  $M_2$  long, remaining setae short, spiniform, the distance  $L_1$ -V very little longer than  $L_1$ - $L_2$ , and about 2 times as long as  $L_2$ - $L_3$ ; 4 pairs of dorso-centrals, setae minute, half as long as  $L_3$ ; 2 pairs of median setae,  $M_1$  as long as dorsocentrals,  $M_2$  stout, and minutized barb, longer than  $L_4$ , which located much closer  $L_7$  than  $L_8$ , the length ratio  $M_2$ - $L_7$ / $M_2$ - $L_8$  =  $\frac{1}{2}$  (17  $\mu$ /36  $\mu$ ); One pair each belong to paravertical and clunal setae, V equal length between their distance. 2 pairs of sublateral setae arising from interscutal membrane. The relative length of dorsal setae:  $L_9 > M_2 > L_4 > L_1 > V > L_2 = S_1 > L_3 = L_6 > L_2 > L_7 = L_8 > L_5 > \approx L_1 = D_2 = D_3 = D_4 = M_1 = cl$ . Sternal shield as long as wide, anterolateral reticulation, posterior margin slight concave, the shield with 3 pairs of sternal setae. Anterior to sternal shield, there with chitinous lines. Metasternal shields broad oval, with one pair of metasternal setae. Genital shield narrower than ventrianal shield, slight convex in posterior margin, with one pair of genital setae. Ventrianal shield reticulation, pentagonal, as long as wide, 96  $\mu$  long, 94  $\mu$  wide; lateral margins approximately parallel to anterior level of anal opening then converging posteriorly, the shield with 3 pairs of preanal setae, one pair of crescentic pores much closer together than to caudal preanals, the ratio means of pore-pore/pore-caudal preanal = 1/1.6 (12  $\mu$ /19  $\mu$ ). 2 pairs of metapodal platelets, primary platelet triangular, 17  $\mu$  long, 6  $\mu$  wide, accessory platelet 10  $\mu$  long, 4  $\mu$  wide. Spermatheca shown as illustration, cervix bowl-shaped, as long as wide, 10  $\mu$  long, atrium short tuber-shaped, longer than wide, 3  $\mu$  long, major duct tapering in form. 4 pairs of ventrior setae on membrane surrounding ventrianal shield,  $VL_4$  rather long, more or less as long as  $L_4$ . Between sternal and ventrianal shields, on interscutal membrane, there with a transverse chitinous ridge. The chaetotaxy of genu I-IV: 2  $\frac{2}{1}$   $\frac{2}{1}$  2, 2  $\frac{2}{1}$   $\frac{2}{0}$  1, 1  $\frac{2}{1}$   $\frac{2}{0}$  1, 1  $\frac{2}{0}$   $\frac{2}{1}$  1; 3 pairs of macrosetae on leg IV, on genu IV tapering, 36  $\mu$  long, on tibia IV tapering 15  $\mu$ , on basitarsus IV seta-like, longer than genu IV, 48  $\mu$  long. Peritreme rather long, extending forward to the level of paravertical setae, posterior extension of peritreme plate rather narrow rounded.

Male: Unknown

Measurements. V 14  $\mu$ ,  $L_1$  24  $\mu$ ,  $L_2$  12  $\mu$ ,  $L_3$  10  $\mu$ ,  $L_4$  48  $\mu$ ,  $L_5$  5  $\mu$ ,  $L_6$  10  $\mu$ ,  $L_7$  7  $\mu$ ,  $L_8$  7  $\mu$ ,  $L_9$  86  $\mu$ ,  $M_1$  4  $\mu$ ,  $D_1$  4  $\mu$ ,  $D_2$  4  $\mu$ ,  $D_3$  4  $\mu$ ,  $D_4$  4  $\mu$ ,  $M_2$  62  $\mu$ ,  $S_1$  12  $\mu$ ,  $S_2$  8  $\mu$ ,  $VL_4$  53  $\mu$ .

Collection data. Holotype, o, Lushang (1350 m), Nantou Hsien, ex litter, 13-II-1981, Y. H. Tseng.

### 10. *Amblyseius (Amblyseius) alpinia* new species (Figs. 57-64)

This species closely resembles *A. (A.) maai* Tseng, but it differs from *maai* by having large crescentic pores located in a transverse line with caudal preanals and much closer together than caudal preanals. *alpinia* is also related to *aerialis* (Muma), but it can be distinguished by the  $L_2$  and  $L_3$  are subequal in length, by crescentic pores arranged in a transverse line with caudal preanals, and much closer together than caudal preanals. *multidentatus* (Chant) fits to this new species, but the former has rather long ventrianal shield and short cervix of spermatheca. Referred to species *cinctus* Corpuz et Rimando, the crescentic pores widely separated, shape of spermatheca and numbers of teeth on fixed digit were differentiated from this new species. *alpinia* can be easily distinguished the other known *Amblyseius* by having posterior extension of peritreme plate narrow rounded, and far distance from coxa IV.

Female. Dorsal shield well sclerotized, slight concave near  $L_5$ , 307  $\mu$  long, 211  $\mu$  wide, with 17 pairs of dorsal setae,  $L_1$ ,  $L_4$ ,  $L_9$ ,  $M_2$  and V long, remaining setae tiny: 9 pairs of lateral setae, 2

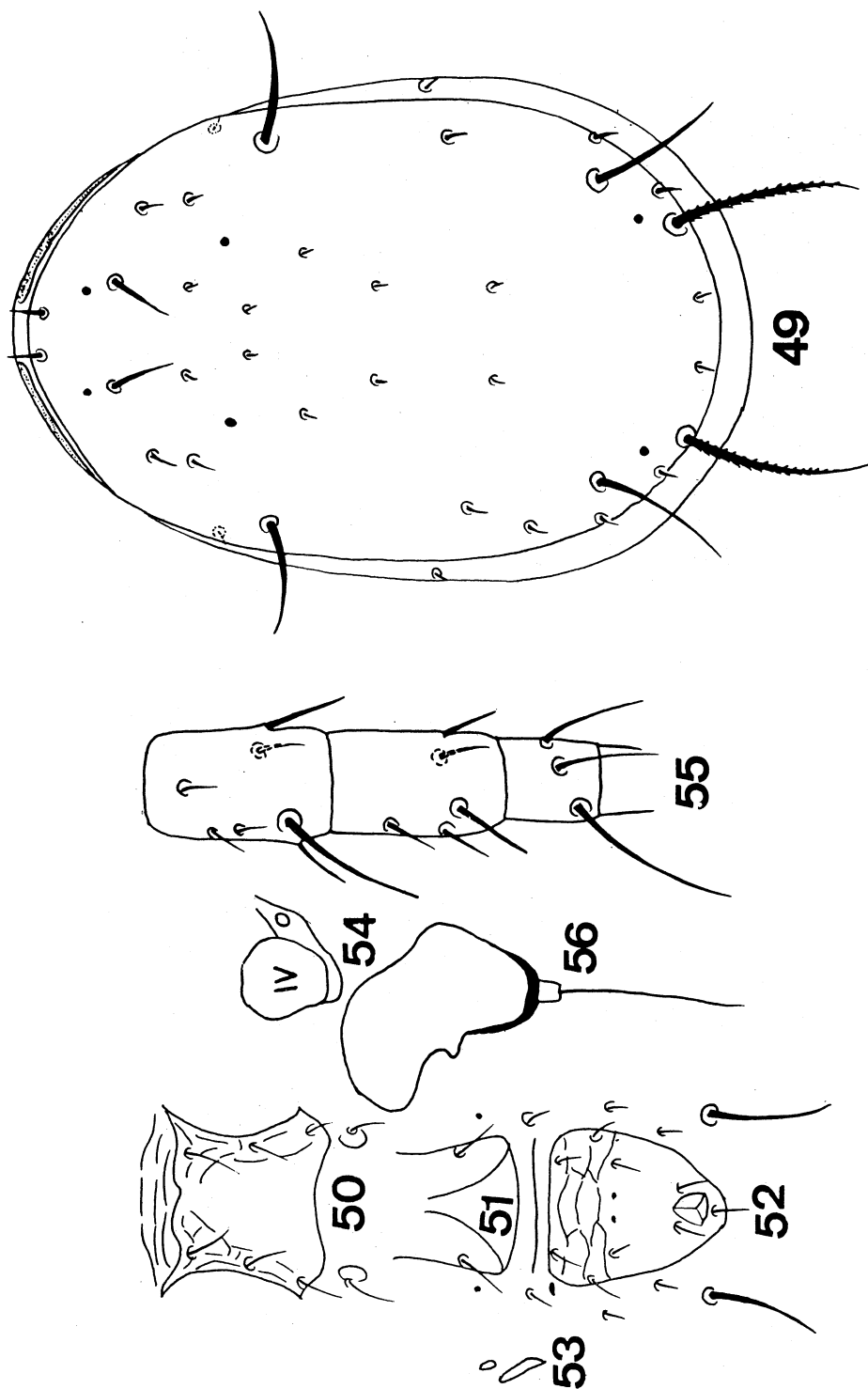


Fig. 49-56. *A. (A.) trisetosus* (♀)

49. dorsal aspect 50. sternal shield 51. genital shield 52. ventrianal shield

53. metapodal platelets 54. posterior extension of peritreme plate 55. leg IV 56. spermatheca

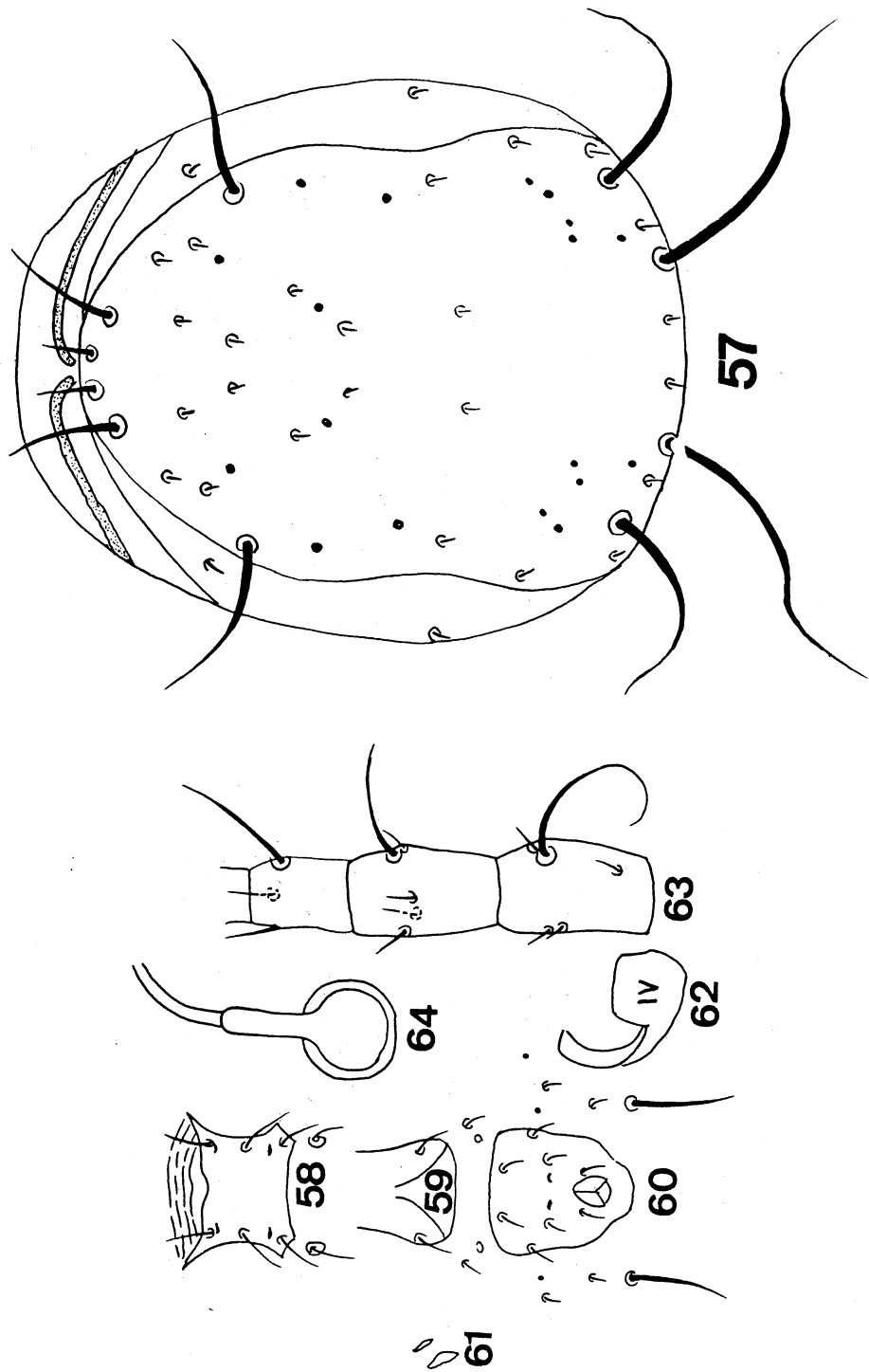


Fig. 57-64. *A. (A.) alpinia* (♀)  
57. dorsal aspect 58. sternal shield 59. genital shield 60. ventrianal shield  
61. metapodal platelets 62. posterior extension of peritreme plate 63. leg IV 64. spermatheca

pairs of median setae,  $M_2$  locateral in a transverse line with  $L_7$ , the distance  $M_2-L_7/M_2-L_8 = 1/1.8$  ( $24 \mu/43 \mu$ ); 4 pairs of dorsocentral setae; one pair each belong to paravertic and clunal setae. 2 pairs of sublateral setae arising from interscutal membrane. The relative length of dorsal setae:  $L_9 > M_2 > L_4 > V > S_1 > L_2 = L_3 = L_5 = L_6 = L_7 @ L_8 = D_3 = D_4 = M_1 = cl = S_2 > D_1 > D_2$ . Sternal shield wider than long, with 3 pairs of sternal setae. Metasternal shields oval, with one pair of metasternal setae. Genital shield narrower than ventrianal shield, with one pair of genital setae. Ventrianal shield longer than wide, pentagonal,  $96 \mu$  long,  $87 \mu$  wide, lateral margins of ventrianal shield approximately parallel for most of length, then converging posteriorly; 3 pairs of preanal setae on the shield, and one pair of large crescentic pores located in a transverse line with caudal preanals, the ratio mean of pore-pore/pore-caudal preanal = 1 ( $12 \mu$ ). 4 pairs of venterior setae arising from interscutal membrane surrounding ventrianal shield.  $VL_1$  twice longer than  $VL_2$  and  $VL_3$ .  $VL_4$  long, more or less as long as  $L_4$ . 2 pairs of metapodal platelets, primary platelet shown as figures,  $19 \mu$  long,  $6 \mu$  wide, accessory platelet cylinder,  $12 \mu$  long. Spermatheca shown as figure, cervix long tuber-shaped.  $14 \mu$  long,  $2 \mu$  wide. Chelicera with 10 robust teeth on fixed digit, 3 teeth on movable digit. Peritreme long, extending forward beyond to the level of paravertic setae. ending curve downward, posterior extension of peritreme shield with rather narrow rounded, far distance free from coxa IV. The chaetotaxy of genu I-IV:  $2 \frac{2}{1} \frac{2}{1} 1$ ,  $2 \frac{2}{1} \frac{2}{0} 1$ ,  $1 \frac{2}{1} \frac{2}{0} 1$ ,  $1 \frac{2}{0} \frac{2}{1} 1$ ; 3 macrosetae on leg IV, macroseta on genu IV  $94 \mu$  long, on tibia IV  $60 \mu$ , on basitarsus IV  $60 \mu$ .

Male: Unknown

Measurements.  $L_1$   $46 \mu$ ,  $L_2$   $5 \mu$ ,  $L_3$   $5 \mu$ ,  $L_4$   $76 \mu$ ,  $L_5$   $5 \mu$ ,  $L_6$   $5 \mu$ ,  $L_7$   $5 \mu$ ,  $L_8$   $5 \mu$ ,  $L_9$   $204 \mu$ ,  $M_2$   $96 \mu$ ,  $D_1$   $4 \mu$ ,  $D_2$   $2 \mu$ ,  $D_3$   $5 \mu$ ,  $D_4$   $5 \mu$ ,  $M_1$   $5 \mu$ ,  $cl$   $5 \mu$ ,  $S_1$   $8 \mu$ ,  $S_2$   $5 \mu$ .

Collection data. Holotype, ♀, Neiman, Kaohsiung Hsien, ex *Alpinia speciosa*, 19-VI-1981, Y. H. Tseng.

#### 11. *Amblyseius (Amblyseius) makuwa* Ehara (Figs. 65-72)

*Amblyseius (Amblyseius) makuwa* Ehara, 1972, Mushi., 46(12):154-156

Type locality: Kyushu, Japan.

Female. Dorsal shield well sclerotized, smooth  $331 \mu$  long,  $226 \mu$  wide, with 17 pairs of dorsal setae: 9 pairs of lateral setae, each prolateral setae about half longer than the interval between them,  $L_8$  distinct shorter than other laterals,  $L_9$  twice longer than  $L_4$ , with finely barb; 2 pairs of median setae,  $M_1$  shorter than those of dorsocentrals,  $M_2$  longer than  $L_4$ , located slightly anterior to base of  $L_7$  and about 1.6 as long as the distance between  $M_2-L_7$  or as long as to base of  $L_8$ ; 4 pairs of dorsocentral setae are subequal length, these are arranged in linear series; one pair each belong to paravertic and clunal setae. 2 pairs of sublateral setae arising from interscutal membrane. The relative length of dorsal setae:  $L_9 > M_2 > L_4 > L_6 > L_2 = L_3 = L_7 = S_1 > V = L_8 > D_1 = D_2 = D_3 = D_4 = S_2 > cl > M_1$ . Sternal shield smooth, posterior margin slight concave, with 3 pairs of sternal setae. Metasternal shield broad oval, with one pair of metasternal setae. Genital shield smooth,  $65 \mu$  wide in its base, with one pair of genital setae. Ventrianal shield pentagonal, reticulation, longer than wide,  $108 \mu$  long,  $98 \mu$  wide, with 3 pairs of preanal setae; one pair of large crescentic pores located slight posterior to caudal preanals, and their distance equal length to caudal preanals, and their distance equal length to caudal preanals ( $19 \mu$ ). Between genital and ventrianal shields, on interscutal membrane, there with a transverse chitinous ridge. 4 pairs of venterior setae arising from interscutal membrane surrounding ventrianal shield. 2 pairs of metapodal platelets, primary platelet triangular, broader in median,  $29 \mu$  long,  $5 \mu$  wide; accessory platelet short tapering in form,  $7 \mu$  long. Spermatheca shown as illustration, cervix long and tuber like,  $27 \mu$  long, atrium broad,  $10 \mu$  long,  $4 \mu$  wide. The chaetotaxy of leg I-IV:  $1 \frac{2}{1} \frac{2}{2} 2$ ,  $2 \frac{2}{0} \frac{2}{0} 1$ ,  $1 \frac{2}{1} \frac{2}{0} 1$ ,  $1 \frac{2}{1} \frac{2}{0} 1$ ; 3 pairs of macrosetae on leg IV, one on genu IV, 2 on basitarsus IV, tibia IV without macroseta; macroseta on genu IV 0.6 as long as 1st pair of macrosetae on basitarsus IV  $36 \mu$ ; 1st

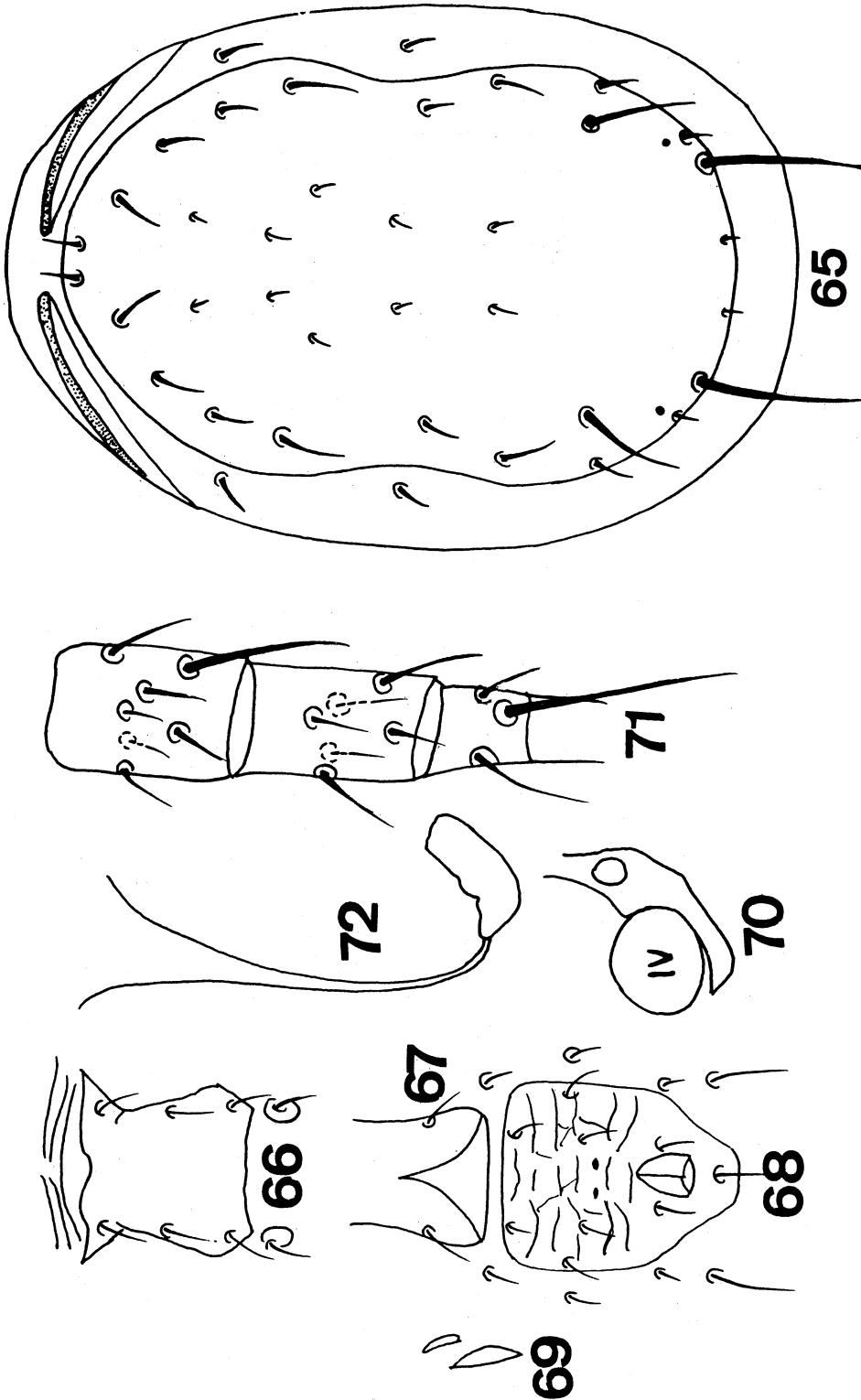


Fig. 65-72. *A. (A.) makuwa* (♀).

65. dorsal aspect 66. genital shield 67. ventrianal shield  
69. metapodal platelets 70. posterior extension of peritreme plate 71. leg IV 72. spermatheca

pair of macrosetae on basitarsus IV (a) 58  $\mu$ , 2nd pair (b) 29  $\mu$ . Chelicera with 5 teeth on fixed digit, movable digit with one tooth. Peritreme rather long, extending forward beyond to the level of paravertical setae; posterior extension of peritreme plate narrow rounded, and slightly free from coxa IV.

Male: Unknown

Measurements. V 14  $\mu$ , L<sub>1</sub> 22  $\mu$ , L<sub>2</sub> 17  $\mu$ , L<sub>3</sub> 17  $\mu$ , L<sub>4</sub> 26  $\mu$ , L<sub>5</sub> 14  $\mu$ , L<sub>6</sub> 22  $\mu$ , L<sub>7</sub> 17  $\mu$ , L<sub>8</sub> 14  $\mu$ , L<sub>9</sub> 58  $\mu$ , M<sub>2</sub> 38  $\mu$ , M<sub>1</sub> 8  $\mu$ , D<sub>1</sub> 12  $\mu$ , D<sub>2</sub> 12  $\mu$ , D<sub>3</sub> 12  $\mu$ , D<sub>4</sub> 12  $\mu$ , S<sub>1</sub> 17  $\mu$ , S<sub>2</sub> 12  $\mu$ , V-V 13  $\mu$ , L<sub>1</sub>-L<sub>2</sub> 31  $\mu$ , L<sub>2</sub>-L<sub>3</sub> 28  $\mu$ , L<sub>3</sub>-L<sub>4</sub> 36  $\mu$ , M<sub>2</sub>-L<sub>7</sub> 24  $\mu$ , M<sub>2</sub>-L<sub>8</sub> 38  $\mu$ , VL<sub>4</sub> 38  $\mu$ .

Collection data. 2 ♀♀, Tari, Taipei Hsien, ex Whithin lowest leaf sheath of wheat, 1-XII-1976, P. K. C. Lo; 1 ♀, San-Tsi, ex *Ischaemum indicum*, 7-IX-1977, C. C. Ho; 1 ♀, Chington, Taipei Hsien, ex lichen, 8-XII-1978, Y. H. Tseng.

## 12. *Amblyseius (Amblyseius) liturivorus* Ehara (Figs. 73-79)

*Amblyseius (Indoseiulus) liturivorus* Ehara, 1982, Appl. Ent. Zool., 17(1):42-45

Type locality: Kisigawa, Wakayama Pref, Japan

3 specimens at hand from Taiwan I have studied; the ratio means of dorsal shield length/ idiosoma length and dorsal shield width/ idiosoma width are shown considerable variations: 0.68 (0.61-0.75) and 0.60 (0.55-0.68) rather than those of type 0.9 and 0.81. These differences I do not consider for a new species importance, only the local morphological variations.

Female. Idiosoma oval rounded. 422.4-528  $\mu$  long, 347-430.3  $\mu$  wide. Dorsal shield much smaller than idiosoma, well sclerotized, 323  $\mu$  (316.8-326.4  $\mu$ ) long, 219  $\mu$  wide (211.2-225.6  $\mu$ ), with 16 pairs of tiny setae: 8 pairs of lateral setae, 4 on prolateral position, L<sub>7</sub> absent; 2 pairs of median setae, M<sub>2</sub> located slightly near lateral margin; 4 pairs of dorsocentral setae, D<sub>2</sub> to D<sub>1</sub> much closer together than others; one pair each belong to paravertical and clunal setae. 2 pairs of sub-lateral setae arising from interscutal membrane. The relative length of dorsal setae: L<sub>9</sub> > L<sub>1</sub> > V = L<sub>4</sub> = L<sub>8</sub> > L<sub>3</sub> = L<sub>5</sub> = L<sub>6</sub> > D<sub>4</sub> = M<sub>2</sub> > L<sub>2</sub> = D<sub>1</sub> = D<sub>2</sub> = D<sub>3</sub> = M<sub>1</sub>. Sternal shield slight longer than wide, posterior margin shown as figure, with 3 pairs of sternal setae and 2 pairs of pores. Metasternal rather long oval-shaped, with one pair of metasternal setae. Genital shield well sclerotized, 77  $\mu$  wide in its base, posterior margin straight, with one pair of genital setae. Ventrianal shield indistinctly, rather oval line in lateral margins from posterior of caudal preanal setae, 91  $\mu$  long, 65  $\mu$  wide in widest part; the shield with 3 pairs long preanal setae; one pair of large crescentic pore located behind the caudal preanals, and equal to distance between caudal preanals; one pair of paraanal and one of postanal setae are shorter than those of preanal setae, the formers located in a transverse line with anterior of anal opening. Metapodal platelet absent in those of specimens collected from Taiwan. Fixed digit multidenticles probably with 11 teeth, movable digit with 2 teeth. spermatheca shown as figure, cervix to form a tapering. Peritreme rather long, extending beyond to level of L<sub>1</sub>, posterior extension of peritreme plate fused to coxa IV. The chaetotaxy of genu I-IV: 2  $\frac{2}{1}$   $\frac{2}{1}$  2, 2  $\frac{2}{0}$   $\frac{2}{0}$  1, 1  $\frac{2}{1}$   $\frac{2}{0}$  1, 1  $\frac{2}{1}$   $\frac{2}{0}$  1; 3 pairs of macrosetae on leg IV: on genu IV shorter than others, 34  $\mu$ , on tibia IV as on basitarsus IV 43  $\mu$ .

Male: Unknown

Measurements. V 17  $\mu$ , L<sub>1</sub> 19  $\mu$ , L<sub>2</sub> 12  $\mu$ , L<sub>3</sub> 16  $\mu$ , L<sub>4</sub> 17  $\mu$ , L<sub>5</sub> 16  $\mu$ , L<sub>6</sub> 16  $\mu$ , L<sub>8</sub> 17  $\mu$ , L<sub>9</sub> 24  $\mu$ , M<sub>1</sub> 11  $\mu$ , M<sub>2</sub> 11  $\mu$ , D<sub>1</sub> 12  $\mu$ , D<sub>2</sub> 11  $\mu$ , D<sub>3</sub> 12  $\mu$ , D<sub>4</sub> 14  $\mu$ , cl 12  $\mu$ , leg I-IV: 432  $\mu$ , 371  $\mu$ , 371  $\mu$ , leg IV 459  $\mu$ .

Collection data. 3 ♀♀, Young Park, ex *Caltric papaya* 26-X-1978, H. Y. Chang.

## 13. *Amblyseius (Amblyseius) womersleyi* Schicha (Figs. 80-86)

*Amblyseius womersleyi* Schicha, 1975, J. Aust. Ent. Soc., 14:101-106

Type locality: New South Wales, Australia

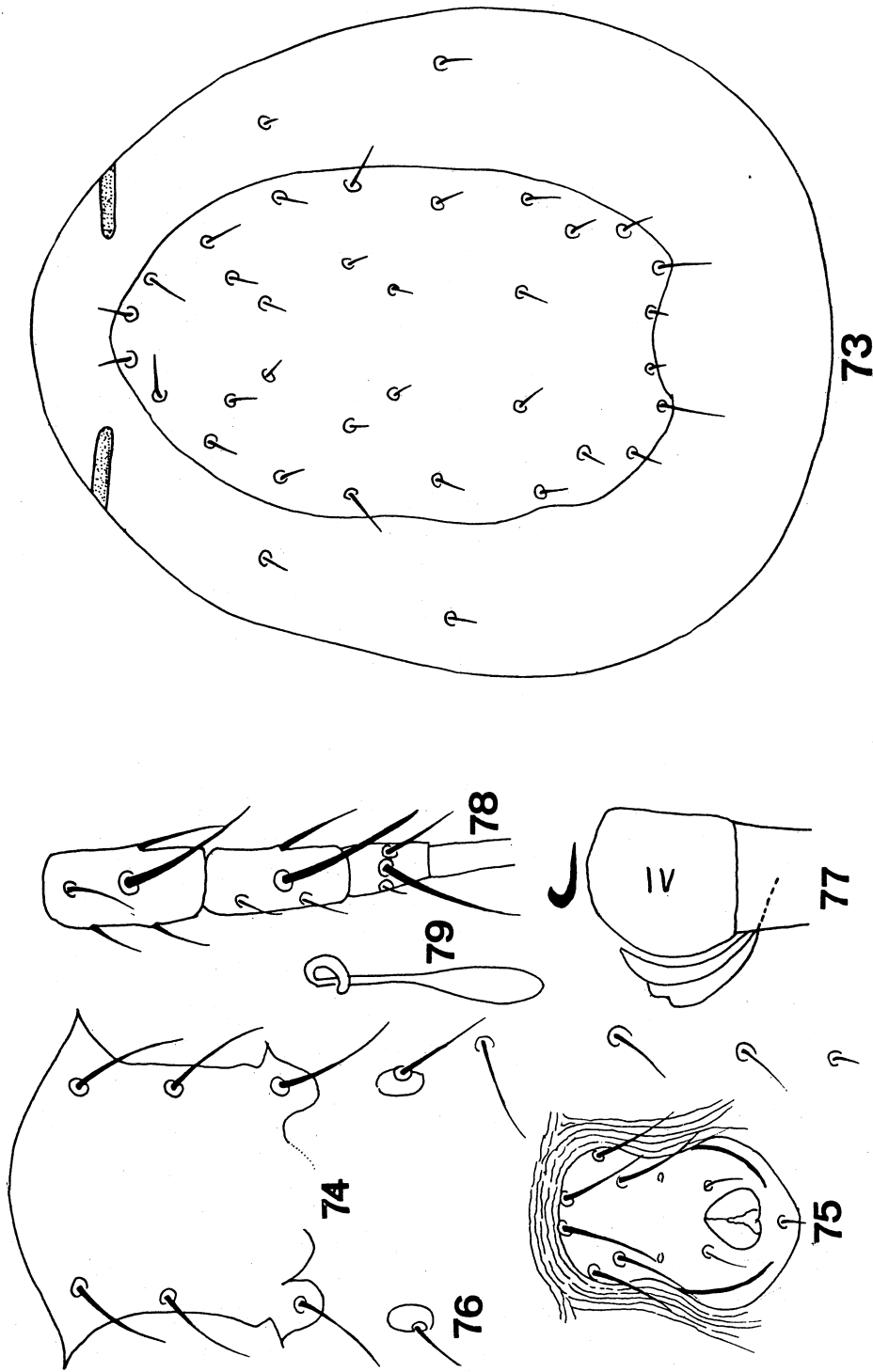


Fig. 73-79. *A. (A.) liturivorus* (♀)

73. dorsal aspect 74. sternal shield 75. ventrian shield 76. metasternal shield

77. posterior extension of peritreme plate 78. leg IV 79. spermatheca



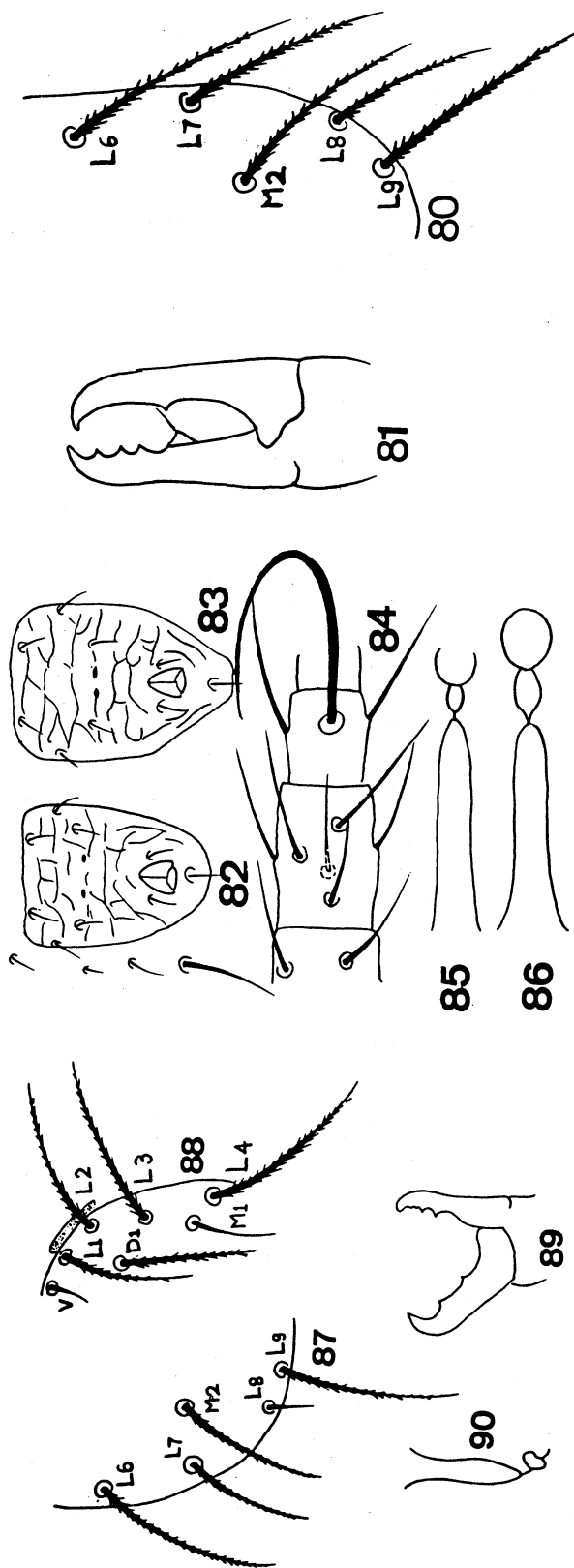


Fig. 80-86. *A. (A.) womersleyi*  
 80. lateral setae of postscutum 81. chelicera 82, 83. ventrianal shields  
 84. leg IV 85, 86. spermatheca

Fig. 87-90. *A. (A.) longispinosus* (♀)  
 87. lateral setae of postscutum 88. lateral setae of proscutum  
 89. chelicera 90. spermatheca

*Amblyseius pseudolongispinosus* Xin et al, 1981, Internat. J. Acarol., 7:75-80 new synonym

Type locality: Shanghai, China

I am unable to find any difference which I would consider significant for separating *womersleyi* Schicha, and consider as synonym. Original described of type *pseudolongispinosus* Xin et al (1981) differs from *womersleyi* in relative length of  $J_1$  (V) and  $J_5$  (cl), the distance between the preanal pores and number of teeth on fix digit, but I do not consider these the significant differences. I have compared a good series of specimens from different crops in Taiwan, and also examined the mass production specimens. They are easily found some differences in the arrangement of preanal pores, 3 to 4 teeth on fixed digit and found the tendency for corresponding to the relationship of the relative length between dorsal shield and dorsal setae.

This species fits near *A. (A.) longispinosus* (Evans), and is differentiated by having  $L_8$  rather long and pectinate, about 0.6 as long as  $L_9$ .

Female. Dorsal shield elongate, anterolateral margin with reticulation and 17 pairs of dorsal setae on dorsal shield, these are pectinate and longer than interval between them: 9 pairs of lateral setae, 2 pairs of median setae,  $M_1$  distinct shorter than  $M_2$ , 4 pairs of dorsocentral setae, one pair each belong to paravertical and clunal setae are short. 2 sublateral setae arising from interscutal membrane. Sternal shield wider than long, reticulate, with 3 pairs of sternal setae. Metasternal shield oval, with one pair of metasternal setae. Genital shield narrower than ventrianal shields, 70  $\mu$  wide in its base, with one pair of genital setae. Ventrianal shield pentagonal longer than wide, 115  $\mu$  long, 82  $\mu$  wide, with 3 pairs of preanal setae; one pair of large crescentic pores located slight behind caudal preanals (many specimens found more or less located in a transverse line with caudal preanals) the distance between pores longer than pore to caudal preanals (many specimens found the distance between pores as long as pore to caudal preanals). 4 pairs of venterior setae arising from interscutal membrane surrounding ventrianal shield. 2 pairs of metapodal platelets. Chelicera of fixed digit with 3-4 teeth, movable eight with 2 teeth. Spermatheca shown as figure cervix long tuber-shaped, 17  $\mu$  long (15-19  $\mu$ ). The chaetotaxy of genu II-IV:  $2 \frac{2}{0} \frac{2}{0} 1$ ,  $1 \frac{2}{1} \frac{2}{0} 1$ ,  $1 \frac{2}{1} \frac{2}{0} 1$ ; macroseta on basitarsus IV only. 67  $\mu$  (61-74). Peritreme rather long, extending forward between V and  $L_1$ .

Male. Spermatodactyl T-shaped.

Measurements. V 15  $\mu$ ,  $M_1$  29  $\mu$ ,  $L_6$  72  $\mu$ ,  $L_7$  58  $\mu$ ,  $L_8$  41  $\mu$ ,  $L_9$  74  $\mu$ ,  $M_2$  67  $\mu$ ,  $M_2$ - $L_7$  26  $\mu$ ,  $M_2$ - $L_8$  34  $\mu$ .

Collection data. Widespread over Taiwan.

14. *Amblyseius (Amblyseius) longispinosus* (Evans) (Figs. 87-90)

*Typhrodromus longispinosus* Evans, 1952, Ann. Mag. Nist., 12(5):413

Type locality: Indonesia

*Typhrodromus (Amblyseius) longispinosus*, Chant, 1959, Can. Ent. 91, Suppl., 12:14

*Amblyseius longispinosus*, Ehara, 1959, Acarologia 1:228

*Amblyseius (Amblyseius) longispinosus*, Ehara, 1966, Mushi., 39:21

This is the common species throughout much of Asia and the pacific ocean bordering countries. It is widespread over Taiwan and probably main infests on the leaf of vegetation plants.

This species fits near *womersleyi* Schicha. The only difference which I see is that of  $L_8$  short and smooth, about 0.24 as long as  $L_9$ . Measurements of V 17  $\mu$ ,  $L_1$  58  $\mu$ ,  $L_2$  62  $\mu$ ,  $L_3$  65  $\mu$ ,  $L_4$  72  $\mu$ ,  $D_1$  59  $\mu$ ,  $L_6$  70  $\mu$ ,  $L_7$  58  $\mu$ ,  $L_8$  17  $\mu$ ,  $L_9$  70  $\mu$ ,  $M_2$  65  $\mu$ . The distance between preanal pores 1.4 longer than pore to caudal preanals (20  $\mu$ /14  $\mu$ ). Peritreme long, extending to the level of  $L_1$ . Cervix of spermatheca 17  $\mu$  long. Macroseta on basitarsus IV 74  $\mu$ .

15. *Amblyseius (Amblyseius) oahuensis* Prasad (Figs. 91-99)

*Amblyseius oahuensis* Prasad, 1968, An. Ent. Soc., 61(6):1518.

Type locality: Manoa, Oahu

This species closely resembles *A. (A.) mckenziei* Schuster and Pritchard by having rather long dorsal setae. But it differs from the latter by the chelicera with 3 distinct sharp median teeth 2 indistinct subapical teeth on fixed digit, and the shape of spermatheca and very broad major duct.

Female. Dorsal shield well sclerotized, reticulated on anterolateral margins, 350  $\mu$  long, 178  $\mu$  wide, with 17 pairs of dorsal setae are rather long and smooth, except  $M_2$  and  $L_9$  long and with minute barb: 9 pairs of lateral setae, 2 pairs of median setae, 4 pairs of dorsocentral setae, one pair each belong to paravertical and clunal setae; 2 pairs of sublateral setae arising from interscutal membrane. The relative length of dorsal setae:  $L_9 > M_2 > L_4 > L_1 = L_6 > L_2 = L_5 = L_7 > V > L_3 = L_8 = D_4 = S_1 > M_1 = S_2 > D_1 = D_2 = D_3$ . Setae  $M_2$  located in a transverse line with  $L_7$ , the distance  $M_2-L_8/M_2-L_7 = 1.6$ . Sternal shield as long as wide, with 3 pairs of sternal setae; anterior to 1st sternal setae, there with transverse lines, posterior margin of shield slightly convex. Metasternal shield broad oval, with one pair of metasternal setae. Genital shield 0.7 as wide as ventrianal shield, 70  $\mu$  wide, with one pair of genital setae. Ventrianal shield slight longer than wide, 118  $\mu$  long, 101  $\mu$  wide, with 3 pairs of preanal setae are longer than those of paraanal setae; one pair of large crescentic pores, locate posterointernal of caudal preanals. the distance between pores equal length in pore to caudal preanals. Between genital and ventrianal shield, on interscutal membrane, there with indistinct transverse chitinous ridge. 4 pairs of venterior setae arising from interscutal membrane surrounding ventrianal shield,  $VL_1$  1.5 longer than  $VL_2$  and  $VL_3$ ,  $VL_4$  minute barb, more 3 times longer than  $VL_2$ . 2 pairs of metapodal platelets, primary platelets long, 26  $\mu$  long, 6  $\mu$  wide, accessory platelets 10  $\mu$  long. Peritreme long, extending forward to the level of V, posterior extension of peritreme plate free from coxa IV. Fixed digit with 5 teeth, posterior 3 are large and sharp, proximal 2 are small and indistinctly; movable digit with one small tooth. Spermatheca shown as figured, cervix 19  $\mu$  long, posterior half twice wider than anterior half; atrium distinct bifurcated, 5  $\mu$  long, 3  $\mu$  wide; major duct much broad 7  $\mu$  in widest part. The chaetotaxy of genu I-IV: 1  $\frac{2}{1}$   $\frac{2}{2}$  2, 1  $\frac{2}{1}$   $\frac{2}{0}$  1, 1  $\frac{2}{1}$   $\frac{2}{0}$  1, 1  $\frac{2}{0}$   $\frac{2}{1}$  1; leg IV with one macroseta on basitarsus IV, 62  $\mu$  long.

Male: Unknown

Measurements. V 17  $\mu$ ,  $L_1$  24  $\mu$ ,  $L_2$  19  $\mu$ ,  $L_3$  17  $\mu$ ,  $L_4$  28  $\mu$ ,  $L_5$  19  $\mu$ ,  $L_6$  24  $\mu$ ,  $L_7$  19  $\mu$ ,  $L_8$  17  $\mu$ ,  $L_9$  51  $\mu$ ,  $M_1$  14  $\mu$ ,  $M_2$  36  $\mu$ ,  $D_1$  12  $\mu$ ,  $D_2$  12  $\mu$ ,  $D_3$  12  $\mu$ ,  $D_4$  17  $\mu$ , cl 10  $\mu$ ,  $S_1$  17  $\mu$ ,  $S_2$  14  $\mu$ ,  $VL_1$  22  $\mu$ ,  $VL_2$  14  $\mu$ ,  $VL_3$  14  $\mu$ ,  $VL_4$  48  $\mu$ ,  $pr_1$  22  $\mu$ ,  $pr_2$  22  $\mu$ ,  $pr_3$  22  $\mu$ ,  $M_2-L_7$  28  $\mu$ ,  $M_2-L_8$  43  $\mu$ .

Collection data. Holotype, ♀ Yuili, Hualien Hsien, ex Watermelon, 13-VII-1979, Y. H. Tseng.

#### 16. *Amblyseius (Amblyseius) baraki* Athias-Henriot (Figs. 100-105)

*Amblyseius baraki* Athias-Henriot, 1966, Bull. Sci Bourgne., 24:211

Type locality: Algeria

*Amblyseius (Amblyseius) baraki*, Ehara and Bhandhufalck, 1977, Jour. Faculty Edu. Tottori Univ., 27(2):54-56

*Amblyseius baraki* Athias-Henriot, Schicha, 1981, Internat. J. Acarol., 7:207-208

It is closely related to *taiwanicus* Ehara from Taiwan, and *mumai* (Denmark) from Florida, but it is differentiated by having preanal pores much closer together than caudal preanals. Closely resembling *paspalivorus* (Deleon) but the chelicera with 11 teeth on fixed digit.

According to Schicha (1981) 9 species closely related to *benjamini*. But the present author suggests that 9 species of *paspalivorus* (Deleon), *lula* Prichard and Baker, *mumai* (Denmark) *baraki* Athias-Henriot, *taiwanicus* Ehara, *shambati* El Badry, *aceriae* Gupta, *bheraensis* (Chandhri), *tabularis* (Chaudhri) and *benjamini* Schicha are established a *paspalivorus* group. members of this group have dorsal shield twice longer than wide, heavily sclerotized and reticulation, with 17 pairs

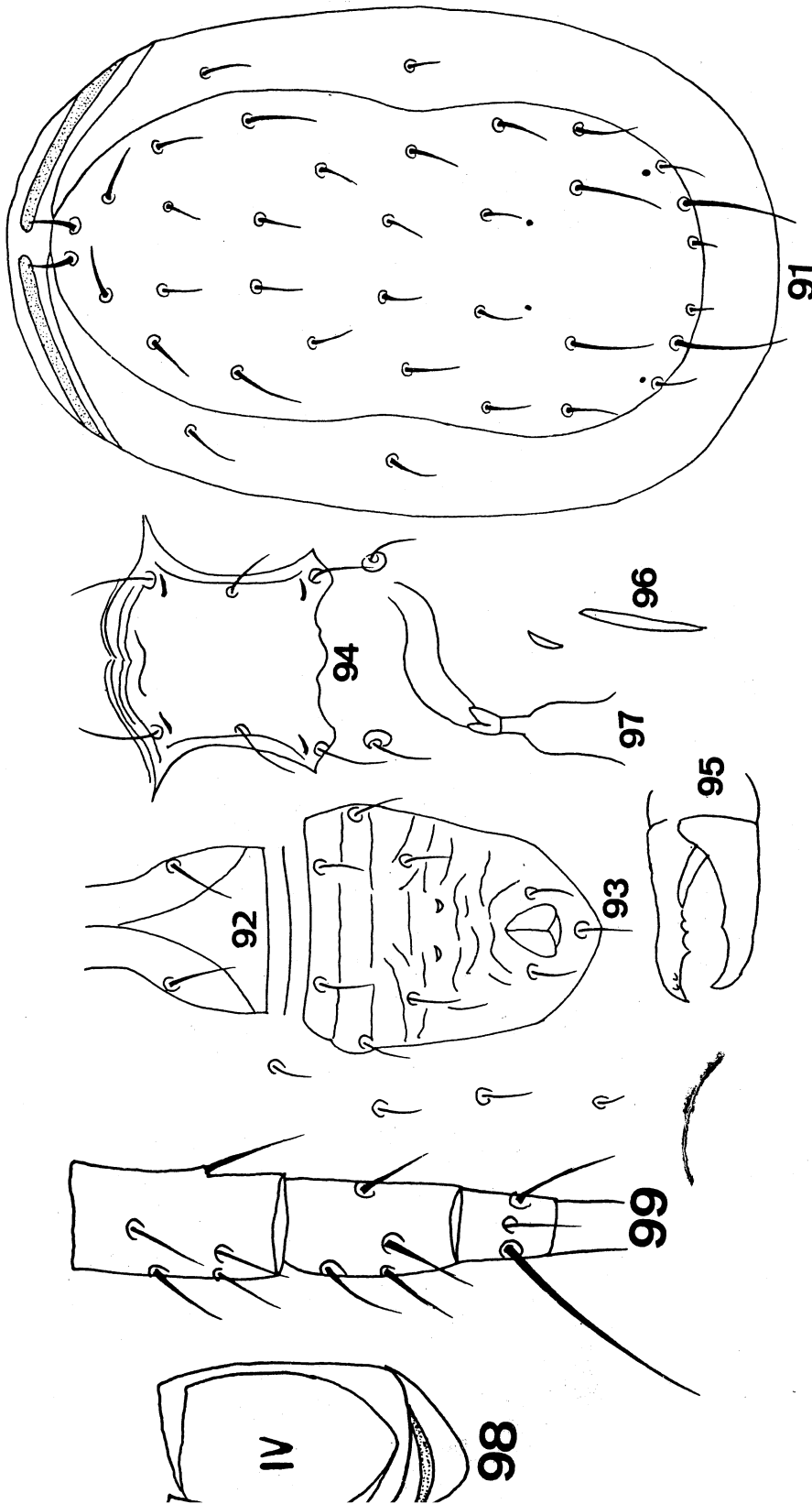


Fig. 91-99. *A. (A.) oahuensis* (♀)

91. dorsal aspect 92. genital shield 93. ventrianal shield 94. sternal shield 95. chelicera

96. metapodal platelets 97. spermatheca 98. posterior extension of peritreme plate 99. leg IV

of dorsal setae short, smooth and subequal length except for  $L_9$  rather long and pectinate (9 lateral, 2 median, 4 dorsocentral, one pair each belong to paravertical and clunal); 2 sublateral; ventrianal shield rectangular, straight in posterior margin, much longer than wide, with 3 pairs of preanal setae and one pair of crescentic pores; macroseta on basitarsus IV only and shorter than  $L_9$ ; spermatheca with short cervix much wider than long, short bell, cup or bowl shaped. The biological indicator for habitats are shown as herbaceous plants. One species *chascomensis* (Sheals) from Argentina not included in this group for having no reticulation on dorsal shield; by having long sack-shape cervix of spermatheca; by having pentagonal ventrianal shield as long as wide. and having macroseta on basitarsus IV longer than  $L_9$

Key to the known of the *paspalivorus* group of the world

1. Spermatheca cup of bowl like;  $M_2$  slight shorter or longer than  $L_7$  and  $L_8$  ..... 2  
Spermatheca bell-shaped;  $M_2$  much shorter than  $L_7$  and  $L_8$  ..... *aceriae* Gupta
2. Ventrianal shield with one pair of crescentic pores ..... 3  
Ventrianal shield without crescentic pore ..... 8
3. Crescentic pores located just behind the caudal preanal setae. .... 4  
Crescentic pores much closer together than to caudal preanal setae. .... 6
4. Macroseta on basitarsus more than  $30\ \mu$ ; Chelicera with 9 teeth on fixed digit. ....  
..... *mumai* (Denmark)  
Macroseta on basitarsus less than  $25\ \mu$ ; Chelicera with 6 or 4 teeth on fixed digit. .... 5
5. Spermatheca small, slight wider than long; macrosetae on basitarsus IV shorter than the segment long; fixed digit with 6 teeth ..... *paspalivorus* (Deleon)  
Spermatheca large, more or less twice as wide as long; macroseta on basitarsus IV longer than the segment; fixed digit with 4 teeth ..... *taiwanicus* Ehara
6. Metasternal shield absent;  $M_2$  as long as  $L_7$  ..... *benjamini* Schicha  
Metasternal shield present;  $M_2$  slight shorter than  $L_7$  ..... 7
7. Spermatheca bowl-shaped;  $M_2$  located between  $L_7$  and  $L_8$ ;  $M_2$  about 1.7 longer than  $L_4$  ....  
..... *baraki* Athias-Henriot  
Spermatheca cup-shaped;  $M_2$  and  $L_7$  are arranged in a transverse line, and more or less subequal in length ..... *lula* Pritchard and Baker
8. Fixed digit with 3 teeth ..... *shambati* ElBadry  
Fixed digit 8 or 9 teeth. .... 9
9.  $M_2$  longer than  $L_7$ ; Movable digit with one tooth, fixed digit with 8 teeth .....  
..... *bheraensis* (Chaudhri)  
 $M_2$  shorter than  $L_7$ ; movable digit with 2 teeth, fixed digit with 9 teeth .....  
..... *tabularis* (Chaudhri)

Female. Dorsal shield heavily sclerotized, reticulation, elongated, more twice longer than wide,  $365\ \mu$  long,  $163\ \mu$  wide; the shield with 17 pairs of setae, rather short, smooth and more or less subequal in length, except for  $L_9$  rather long and minuted barb. The relative length:  $L_9 > L_7 > M_2 > L_8 > L_1 > V = L_6 > L_4 = D_3 = L_5 = S_1 > D_4 > L_2 = L_3 = cl > D_2 = D_1 > M_1 > S_2$ . Sternal shield longer than wide, reticulation, with 3 pairs of sternal setae. Metasternal shields long olive-shaped, with one pair of metasternal setae. Genital shield narrower than ventrianal shield, with one pair of genital setae. Ventrianal shield rectangular, longer than wide,  $118\ \mu$  long,  $96\ \mu$  wide, reticulation, with 3 pairs of preanal setae; one pair of crescentic pore located posterinteral of caudal preanals, closely together, the distance between pores less half than the distance between caudal preanals ( $17\ \mu/38\ \mu$ ) 2 pairs of metapodal platelets, primary platelet elongate,  $41\ \mu$  long,  $4\ \mu$  wide, accessory platelet slight curve,  $7\ \mu$  long,  $2\ \mu$  wide. 4 pairs of venterior setae arising from

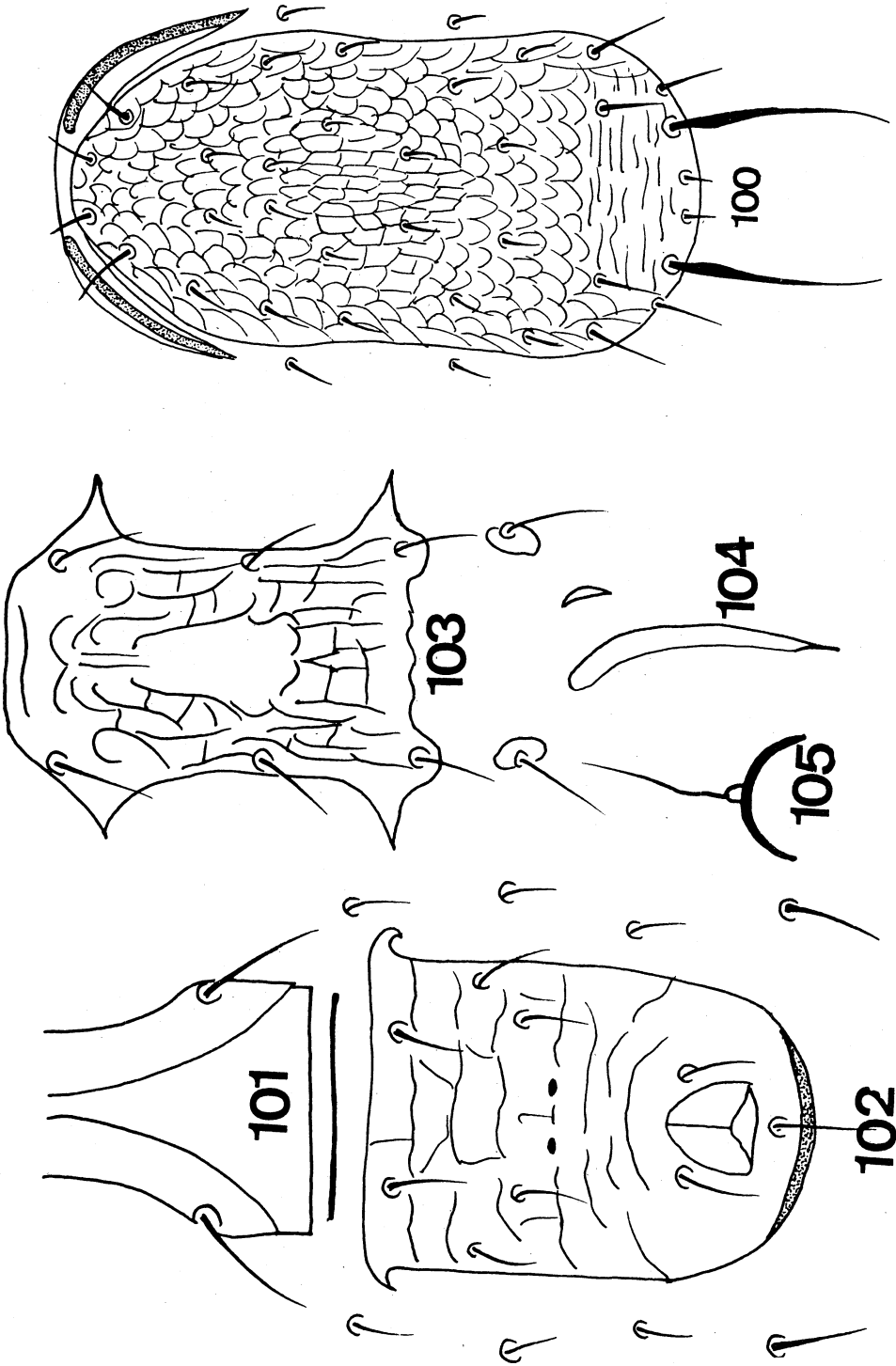


Fig. 100-105. *A. (A.) baraki* (♀)  
100. dorsal aspect 101. genital shield 102. ventrianal shield 103. sternal shield  
104. metapodal platelets 105. spermatheca

interscutal membrane surrounding ventrianal shield. Between genital and ventrianal shields, on interscutal membrane, there with a rather broad chitinous ridge. At least 7 pairs of small round platelets on interscutal membrane. Peritreme rather long, almost extending to the level of paravertic setae. Chelicera with 11 teeth on fixed digit, movable digit with 2 teeth. Spermatheca shown as illustration, cervix bowl-shaped, much broader than long,  $5\ \mu$  long,  $14\ \mu$  wide. Macroseta on basitarsus IV,  $42\ \mu$ ; the chaetotaxy of genu I-IV:  $2\ \frac{2}{1}\ \frac{2}{1}\ 2$ ,  $2\ \frac{2}{0}\ \frac{2}{0}\ 1$ ,  $1\ \frac{2}{1}\ \frac{2}{0}\ 1$ ,  $1\ \frac{2}{1}\ \frac{2}{0}\ \frac{2}{0}$ .

Male: Unknown

Measurements. V  $17\ \mu$ , L<sub>1</sub>  $18\ \mu$ , L<sub>2</sub>  $12\ \mu$ , L<sub>3</sub>  $12\ \mu$ , L<sub>4</sub>  $14\ \mu$ , L<sub>5</sub>  $14\ \mu$ , L<sub>6</sub>  $17\ \mu$ , L<sub>7</sub>  $26\ \mu$ , L<sub>8</sub>  $22\ \mu$ , L<sub>9</sub>  $65\ \mu$ , D<sub>1</sub>  $11\ \mu$ , D<sub>2</sub>  $11\ \mu$ , D<sub>3</sub>  $14\ \mu$ , D<sub>4</sub>  $13\ \mu$ , M<sub>1</sub>  $10\ \mu$ , M<sub>2</sub>  $24\ \mu$ , cl  $12\ \mu$ , S<sub>1</sub>  $14\ \mu$ , S<sub>2</sub>  $9\ \mu$ , VL<sub>4</sub>  $26\ \mu$ .

Collection data. 2 ♀♀, Tari, Taipei Hsien, ex Leaf sheath of grass, 7-XII-1976, P. K. C. Lo; 3 oo, Talee, Taichung Hsien, ex In leaf sheath of weeds, P. K. C. Lo; 1 ♀, Tsoying, Kaohsiung Hsien, ex corn, 9-VII-1979, H. Y. Chang; many ♀♀, Alian, Kaohsiung Hsien, ex rice leaf sheath, 23-X-1980, Y. H. Tseng.

17. *Typhrodromus* (*Typhrodromus*) *transvaalensis* (Nesbitt) (Figs. 106-112)

*Kampimodromus transvaalensis* Nesbitt, 1951, Zool. Verb., 12:55-56

Type locality: Transvaal, South Africa

*Typhrodromus jackmickleyi* De Leon, 1958, Fla. Ent., 40:75

Type locality: Florida, U.S.A.

*Typhrodromus pectinatus* Athias-Henriot, 1958, Bull. Soc. Hist. Nat. l'Afrique du Nord 49:179

Type locality: Algeria

*Neoseiulus transvaalensis*, Muma, 1961, Bull. Fla. State Mus., 5(7):295

*Clavidromus jackmickleyi*, Muma, 1961, Bull. Fla. State Mus., 5(7):296

*Clavidromus transvaalensis*, Muma and Denmark, 1968, Fla. Ent., 51:238

Female. Dorsal shield heavily sclerotized, reticulation,  $331\ \mu$  long,  $173\ \mu$  wide, strong concave in lateral margins between setae L<sub>6</sub> and L<sub>7</sub>, with 18 pairs of dorsal setae are serrate and with knob except L<sub>9</sub> smooth and spiniform; 9 pairs of lateral setae are equal or longer than distance between there base, and with distinct knob on terminal; 2 pairs of setae on median, 4 pairs of dorsocentral setae are arranged in linear series; one pair each belong to paravertic setae and clunal setae, the latter shown as spine like. 2 pairs of sublateral setae on interscutal membrane, S<sub>1</sub> shorter than S<sub>2</sub>. The relative length of dorsal setae: L<sub>1</sub> > M<sub>2</sub> > L<sub>8</sub> = L<sub>7</sub> > L<sub>6</sub> > L<sub>5</sub> > L<sub>3</sub> = L<sub>4</sub> = S<sub>2</sub> > L<sub>1</sub> > D<sub>3</sub> = D<sub>4</sub> > D<sub>1</sub> > D<sub>2</sub> = S<sub>1</sub> = V > M<sub>1</sub> > L<sub>2</sub> > cl > L<sub>9</sub>. Sternal shield as long as wide, anterior 1st pair of sternal setae, with 3 to 4 transverse reticulation, posterior margin strong convex; 2 pairs of sternal setae, 3rd pair of sternal setae off sternal shield, bearing from interscutal membrane. Metasternal shields present, oval, with one pair of metasternal setae. Genital shield as wide as ventrianal shield, with one pair of genital setae. The distance between genital and ventrianal by half as long as ventrianal shield. Ventrianal shield longer than wide  $106\ \mu$  long,  $65\ \mu$  wide, pentagonal, with 3 pairs of preanal setae, no crescentic pore present in the shield. 4 pairs of venterior setae on interscutal membrane surrounding ventrianal shield, VL<sub>1</sub> longer than VL<sub>2</sub> and VL<sub>3</sub>, VL<sub>4</sub> serrate, the shape as dorsal setae, VL<sub>2</sub>-VL<sub>2</sub>/VL<sub>2</sub>-VL<sub>1</sub> = 1.8. 2 pairs of metapodal platelets, primary platelets shown as illustration,  $24\ \mu$  long,  $3\ \mu$  wide, accessory platelets  $9\ \mu$  long. Legs rather long, the chaetotaxy of genu II-III:  $2\ \frac{2}{1}\ \frac{2}{0}\ 1$ ,  $1\ \frac{2}{1}\ \frac{2}{0}\ \frac{2}{0}$  1; leg IV with 5 pair of macrosetae: genu IV with 2 macrosetae, proximals  $22\ \mu$  long, with knob, distals rounded tip,  $17\ \mu$ ; 2 on tibia IV, proximals with knob  $26\ \mu$ , distals rounded tip,  $22\ \mu$ ; one on basitarsus IV with knob,  $58\ \mu$ . Peritreme rather long, extending forward to level of L<sub>2</sub>; posterior extension of peritreme plate free from coxa IV, and with one tooth in inner edge, but round in outer edge.

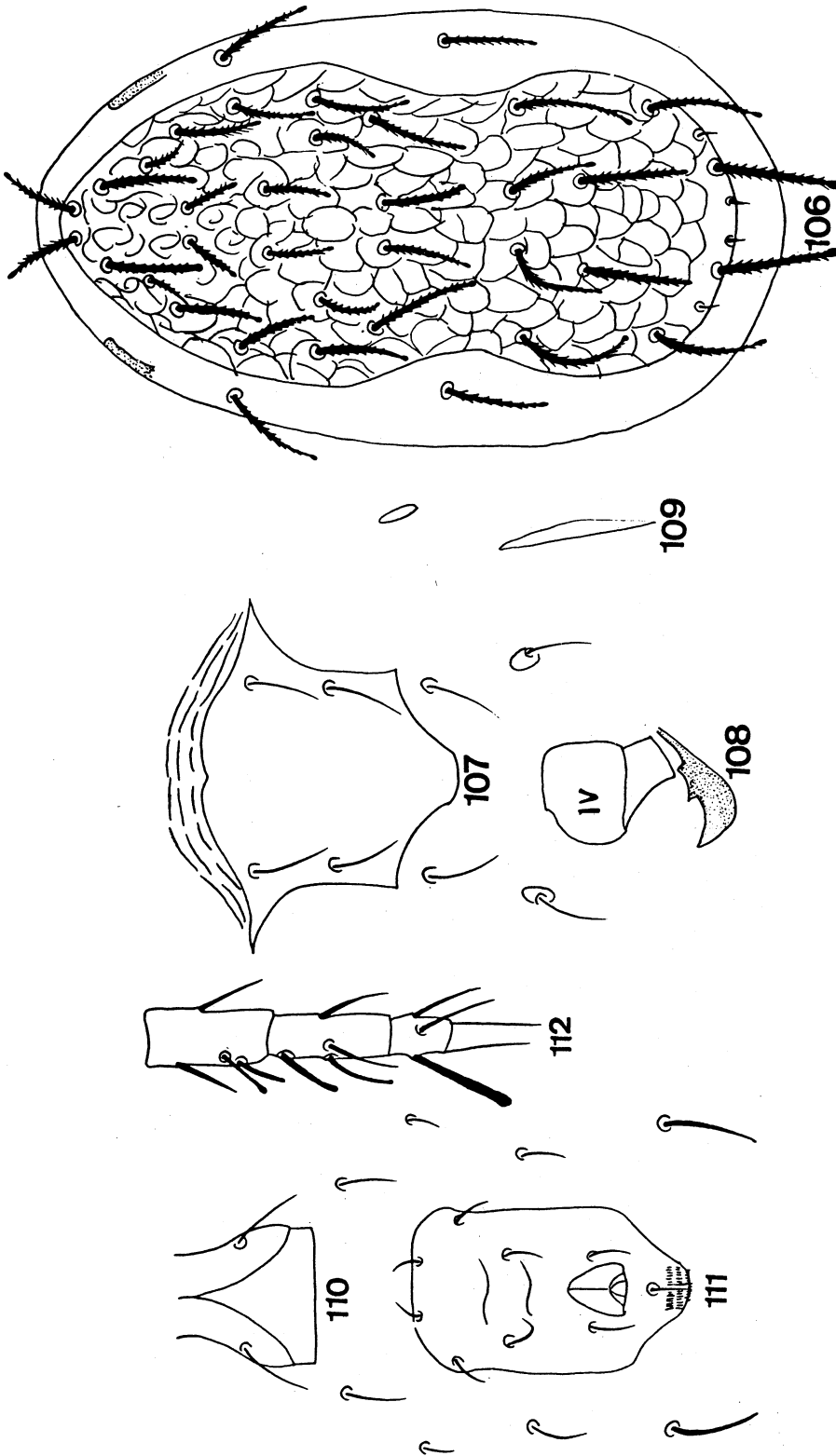


Fig. 106-112. *T. (T.) transvaalensis* (♀)  
 106. dorsal aspect 107. sternal shield 108. posterior extension of peritreme plate  
 109. metapodal platelets 110. genital shield 111. ventrianal shield 112. leg IV



Male: Unknown

Measurements. V 26  $\mu$ , L<sub>1</sub> 35  $\mu$ , L<sub>2</sub> 22  $\mu$ , L<sub>3</sub> 36  $\mu$ , L<sub>4</sub> 36  $\mu$ , L<sub>5</sub> 41  $\mu$ , L<sub>6</sub> 46  $\mu$ , L<sub>7</sub> 50  $\mu$ , L<sub>8</sub> 50  $\mu$ , L<sub>9</sub> 6  $\mu$ , L<sub>10</sub> 56  $\mu$ , M<sub>1</sub> 24  $\mu$ , M<sub>2</sub> 53  $\mu$ , D<sub>1</sub> 28  $\mu$ , D<sub>2</sub> 26  $\mu$ , D<sub>3</sub> 34  $\mu$ , D<sub>4</sub> 34  $\mu$ , cl 10  $\mu$ , S<sub>1</sub> 26  $\mu$ , S<sub>2</sub> 36  $\mu$ .

Collection data. 2 ♀♀, Tsuchi, Chiayi Hsien, ex Bean, 21-II-1976, Y. H. Tseng.

#### 18. *Typhrodromus (Typhrodromus) obesus* new species (Figs. 113-119)

This new species resembles *T. (T.) februs* Van der Merwe for having the same shape of L<sub>10</sub>, but it can be distinguished the latter species by having rather long ventrianal shield, by the chelicera of fixed digit with a large and sharp tooth on median of cutting edge, by the shaped of spermatheca. *T. (T.) obesus* also is related to *saevus* Van der Merwe for having the same shape of spermatheca and ventrianal shield, but this new species differs from the latter by having no distal knob in L<sub>10</sub>. This new species differs from the species *februs* and *saevus* by the having dorsal lateral setae pectinate. and M<sub>2</sub> located equal distance to L<sub>8</sub> and L<sub>9</sub>.

Female. Dorsal shield heavily sclerotized, rugose, 346  $\mu$  long, 178  $\mu$  wide, with 18 pairs of dorsal setae are rather stout and short: 10 pairs of lateral setae are barb; 4 pairs of dorsocentral setae are smooth; 2 pairs of median setae, M<sub>1</sub> the same as D<sub>2</sub>, M<sub>2</sub> distinct plumose, located equal distance to L<sub>8</sub> and L<sub>9</sub>. (M<sub>2</sub>-L<sub>8</sub> = 34  $\mu$ ); one pair each belong to paraverticlar and clunal setae, V are barb. 2 pairs of sublateral setae arising from interscutal membrane. Sternal shield with 2 pairs of sternal setae, 3rd pair of sternal setae off sternal shield, and arising from interscutal membrane. Metasternal shields present, with one pair of metasternal setae. Genital shield more or less as wide as ventrianal shield, 63  $\mu$  wide, with one pair of genital setae. Ventrianal rectangular, 1.5 longer than wide, 125  $\mu$  long, 84  $\mu$  wide, with 4 pairs of preanal setae, one pair of large crescentic pore behind to the 3rd pair of preanals, the distance between pores as long as 3rd preanals. Between genital and ventrianal shield, on interscutal membrane, there with indistinct chitinous ridge. 4 pairs of setae on interscutal membrane surrounding ventrianal shield, VL<sub>4</sub> 36  $\mu$  long. Chelicera with 2 teeth on fixed digit, median one is sharp and larger than proximals, movable digit with one tooth. The chaetotaxy of genu 1-IV: 1  $\frac{2}{1}$   $\frac{2}{2}$  2, 2  $\frac{2}{0}$   $\frac{2}{0}$  1, 1  $\frac{2}{0}$   $\frac{2}{1}$  2, 1  $\frac{2}{1}$   $\frac{2}{1}$  1; one pair of macrosetae on leg IV only, macroseta on basitarsus tapering in form, 22  $\mu$  long, slight longer than basitarsus IV. (20  $\mu$  long). Spermatheca shown as illustration. Peritreme long, extending forward to the level of paraverticlar setae; posterior extension of peritreme plate round, smooth posterior margin and free from coxa IV.

Male: Unknown

Measurements. V 17  $\mu$ , L<sub>1</sub> 15  $\mu$ , L<sub>2</sub> 14  $\mu$ , L<sub>4</sub> 17  $\mu$ , L<sub>5</sub> 17  $\mu$ , L<sub>6</sub> interrupted, L<sub>7</sub> 17  $\mu$ , L<sub>8</sub> 24  $\mu$ , L<sub>9</sub> 26  $\mu$ , L<sub>10</sub> 36  $\mu$ , M<sub>2</sub> 17  $\mu$ , D<sub>4</sub> 14  $\mu$ , D<sub>3</sub> 14  $\mu$ , D<sub>2</sub> 14  $\mu$ , D<sub>1</sub> 12  $\mu$ , M<sub>1</sub> 12  $\mu$ , S<sub>1</sub> 17  $\mu$ , S<sub>2</sub> 20  $\mu$ .

Collection data. Holotype, ♀, Hualien, ex Unknown, plant, 18-XI-1978, Y. H. Tseng.

#### 19. *Typhrodromus (Typhrodromus) eleglidus* n. sp. (Figs. 120-126)

This species resembles *T. (T.) serrulatus* Ehara, but it is distinguished by having stout dorsal setae, M<sub>2</sub> 5 times longer than L<sub>9</sub>. Macrosetae on basitarsus IV as long as on genu.

Female. Dorsal shield rugose, heavily sclerotized, longer than wide, 274  $\mu$  long, 158  $\mu$  wide, with lateral and anterior longitudinal reticulation, and with 18 pairs of setae: 10 pairs of lateral setae, stout, pointed tip, L<sub>9</sub> minute, spiniform, L<sub>10</sub> long, barb and with hyaline knob; 4 pairs of dorsocentral setae are arranged in linear series, anterior 2 pairs seta-like, posterior 2 pairs seem to those of lateral setae; 2 pairs of median setae, M<sub>1</sub> similar to dorsocentrals, M<sub>2</sub> long and stout, located slightly anterior to L<sub>8</sub>, and equal in length to distance M<sub>2</sub>-L<sub>8</sub>, the ratio mean M<sub>2</sub>-L<sub>8</sub>/M<sub>2</sub>-L<sub>9</sub> = 1/1.4; one pair each belong to paraverticlar and clunal setae. 2 pairs of sublateral setae on interscutal membrane. The relative length of dorsal setae: L<sub>10</sub> > M<sub>2</sub> > V = L<sub>5</sub> = L<sub>6</sub> > L<sub>1</sub> = L<sub>1</sub> =

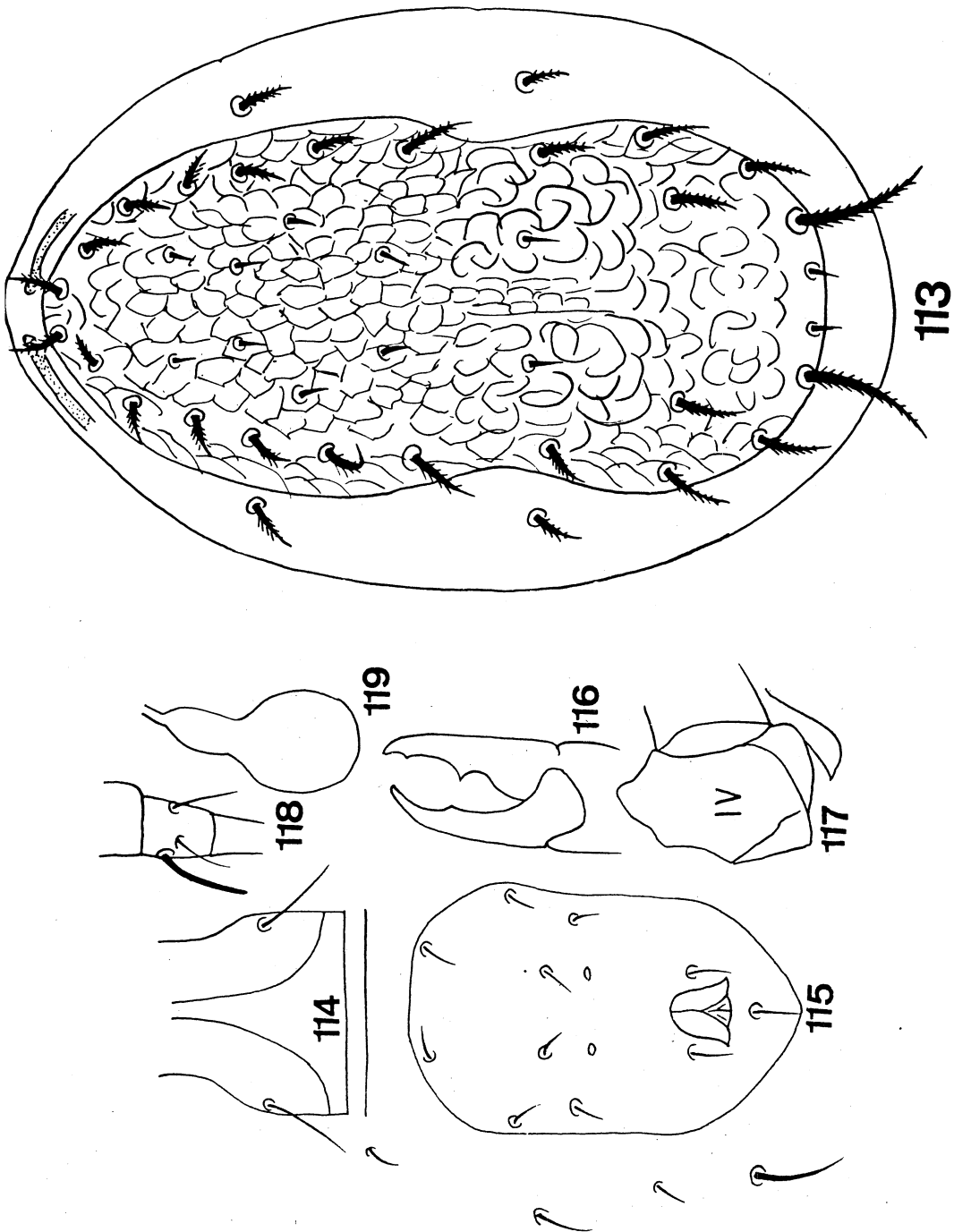


Fig. 113-119. *T. (T.) obesus* (♀)

113. dorsal aspect 114. genital shield 115. ventrianal shield 116. chelicera  
117. posterior extension of peritreme plate 118. basitarsus IV 119. spermatheca

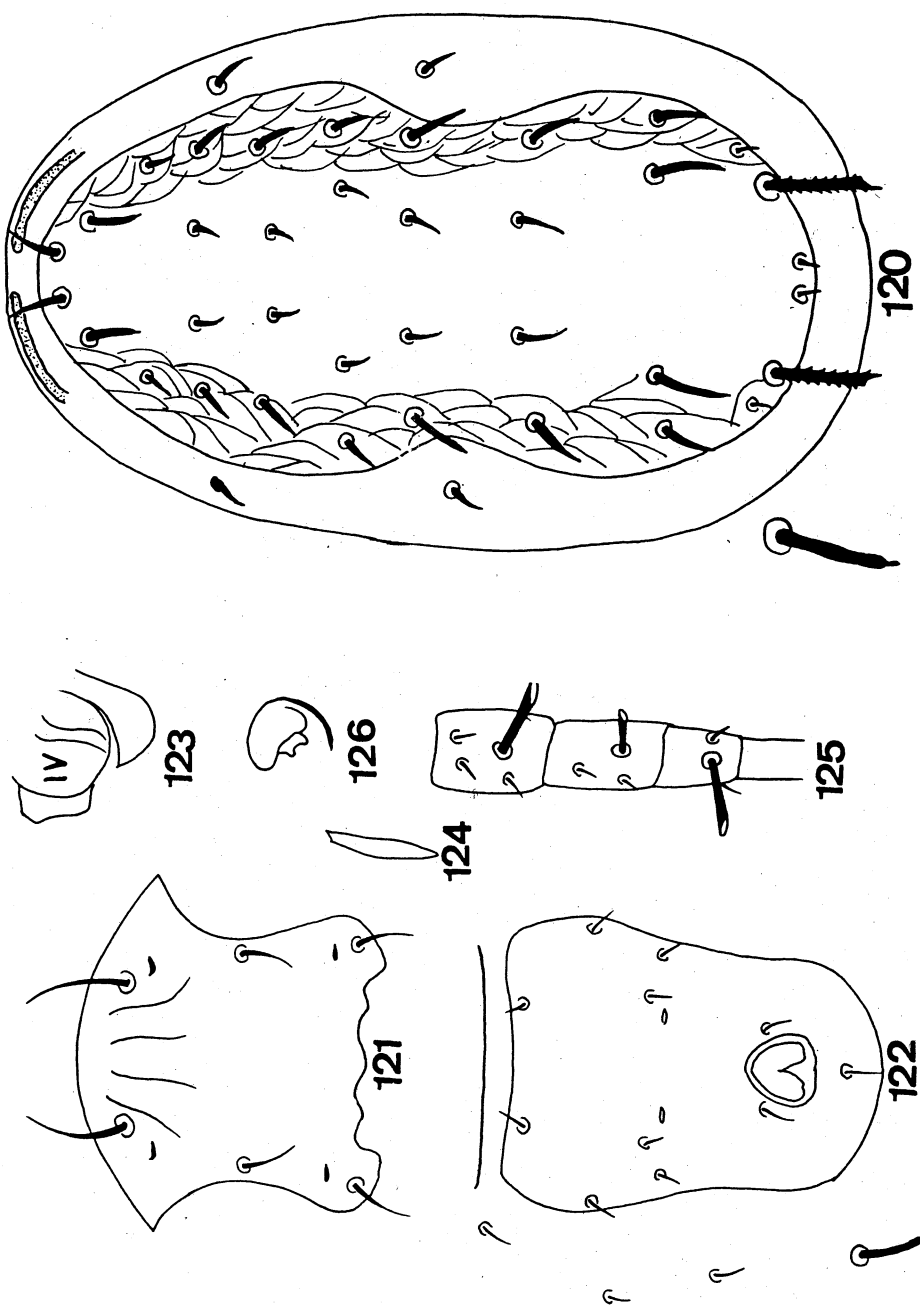


Fig. 120-126. *T. (T.) elegidus* (♀)

120. dorsal aspect 121. sternal shield 122. ventrianal shield

123. posterior extension of peritreme plate 124. metapodal platelets 125. leg IV

126. spermatheca

$L_7 = D_4 > L_4 = L_8 > D_3 = M_1 > L_3 > D_1 = D_2 > L_2 = S_1 > L_9 = S_5 = \text{cl}$ . Sternal shield as long as wide, posterior margin irregular, with 3 pairs of sternal setae, 1st sternal setae distinct longer than others. Metasternal shields broad, with one pair of metasternal setae. Genital shield wide as ventrianal shield, with one pair of genital setae. Ventrianal shield longer than wide, lateral margin slightly concave, with 4 pairs of short and minuted preanal setae; one pair of large crescentic pore located posterior of 3rd preanals, the ratio mean of the between crescentic pores and 3rd preanals distance 1.7. One pair of metapodal platelets, 17  $\mu$  long, 3  $\mu$  wide. Between genital and ventrianal shield, on interscutal membrane, there with a transverse chitinous ridge. 4 pairs of venterior setae on interscutal membrane surrounding ventrianal shield.  $VL_4$  long. Peritreme long, extending forward beyond to the level of V; posterior extension of peritreme plate rather broad round and free from coxa IV. Legs normal the chaetotaxy of genu I-IV:  $1^1 2^2 2, 2^2 2^2 1, 1^1 2^2 1, 1^1 2^2 1$ ; 3 pairs of macrosetae on leg IV, capitate apex: on genu IV as long as on basitarsus IV, 22  $\mu$ , on tibia IV 12  $\mu$ . Spermatheca shown as illustration.

Measurements. V 19  $\mu$ ,  $L_1$  17  $\mu$ ,  $L_2$  10  $\mu$ ,  $L_3$  12  $\mu$ ,  $L_4$  16  $\mu$ ,  $L_5$  19  $\mu$ ,  $L_6$  19  $\mu$ ,  $L_7$  17  $\mu$ ,  $L_8$  16  $\mu$ ,  $L_9$  5  $\mu$ ,  $L_{10}$  38  $\mu$ ,  $M_1$  13  $\mu$ ,  $M_2$  27  $\mu$ ,  $D_1$  11  $\mu$ ,  $D_2$  11  $\mu$ ,  $D_3$  14  $\mu$ ,  $D_4$  17  $\mu$ , cl 5  $\mu$ ,  $S_1$  10  $\mu$ ,  $S_2$  5  $\mu$ .

Collection data. Holotype, o, Paintienyen, Chiayi Hsien, 29-III-1980, ex Litchi chinensis, Y. H. Tseng; paratype, 3 oo, the same data as holotype.

## 20. *Typhrodromus (Typhrodromus) neocrassus* n. sp. (Figs. 127-134)

This new species resembles *T. (T.) crassus* van der Merwe, but it differs from the latter by having dorsal setae are stout and plumose,  $L_9$  not distinctly shorter than  $L_8$ ,  $M_2$  with hyaline knob.

Female. Dorsal shield slightly angulation in anterior, heavily sclerotized, reticulation, with 18 pairs of dorsal setae markedly thickened and barbed: 10 pairs of lateral setae,  $L_1$  equal length to the distance  $L_1-L_2$ ,  $L_2$  slightly shorter than the distance  $L_2-L_3$ ,  $L_3$  less half the length of  $L_3-L_4$ ,  $L_4$  half as long as  $L_4-L_5$ ; 2 pairs of median setae,  $M_1$  about as long as dorsocentrals,  $M_2$  rather long with hyaline knob, located in a transverse line with  $L_8$ , the ratio means of  $M_2/M_2-L_8/M_2-L_9 = 1/0.9/1.5$ ; 4 pairs of dorsocentral setae are arranged in linear series; one pair of setae each belong paravertical and clunal. Sternal shield about as long as wide, posterior margin marked shown as figure, 2 pairs of sternal setae, 3rd pair of sternal setae off sternal shield and bear from interscutal membrane, Metasternal shield tiny, with one pair of metasternal setae. Genital shield narrower than ventrianal shield 62  $\mu$  wide in base, with one pair of genital setae. Ventrianal shield rectangular, as wide as long, 100  $\mu$  long, 98  $\mu$  wide, parallel in lateral margin then gentle concave, the shield with 4 pairs of preanal setae, crescentic pore not found in Type specimens. Between genital and ventrianal shield, on interscutal membrane, there with 2 pairs of transverse chitinous ridge. 4 pairs of ventral setae on interscutal membrane surrounding the ventrianal shield.  $VL_4$  as long as  $M_2$ , and with hyaline knob. 2 metapodal platelets are long olive-shaped, primary platelet 17  $\mu$  long, 5  $\mu$  wide, accessory platelet 8  $\mu$  long, 2  $\mu$  wide. peritreme long, extending forward to level of paravertical setae; ending curved downward, Peritreme plate large, fused to coxa IV. Dorsal and lateral setae on leg I-IV are rather stout; the chaetotaxy of genu I-IV:  $2^2 \frac{2}{1} 2, 2^2 \frac{2}{0} 2, 1^1 \frac{2}{1} 2, 1^1 \frac{2}{0} 1$ . Macroseta on basitarsus IV with hyaline knob. 26  $\mu$ . Spermatheca shown as figure.

Measurements. V 17  $\mu$ ,  $L_1$  17  $\mu$ ,  $L_2$  14  $\mu$ ,  $L_3$  16  $\mu$ ,  $L_4$  17  $\mu$ ,  $L_5$  19  $\mu$ ,  $L_6$  19  $\mu$ ,  $L_7$  23  $\mu$ ,  $L_8$  26  $\mu$ ,  $L_9$  22  $\mu$ ,  $L_{10}$  35  $\mu$ ,  $S_2$  17  $\mu$ ,  $S_1$  12  $\mu$ ,  $M_1$  16  $\mu$ ,  $M_2$  26  $\mu$ , cl 8  $\mu$ ,  $D_4$  19  $\mu$ ,  $D_3$  17  $\mu$ ,  $D_2$  16  $\mu$ ,  $D_1$  16  $\mu$ .

Dollection data. Holotype, ♀, Taichung city, ex guajava, 7-I-1979, H. Y. Chang; paratype, 3 ♀♀, the same data as holotype.

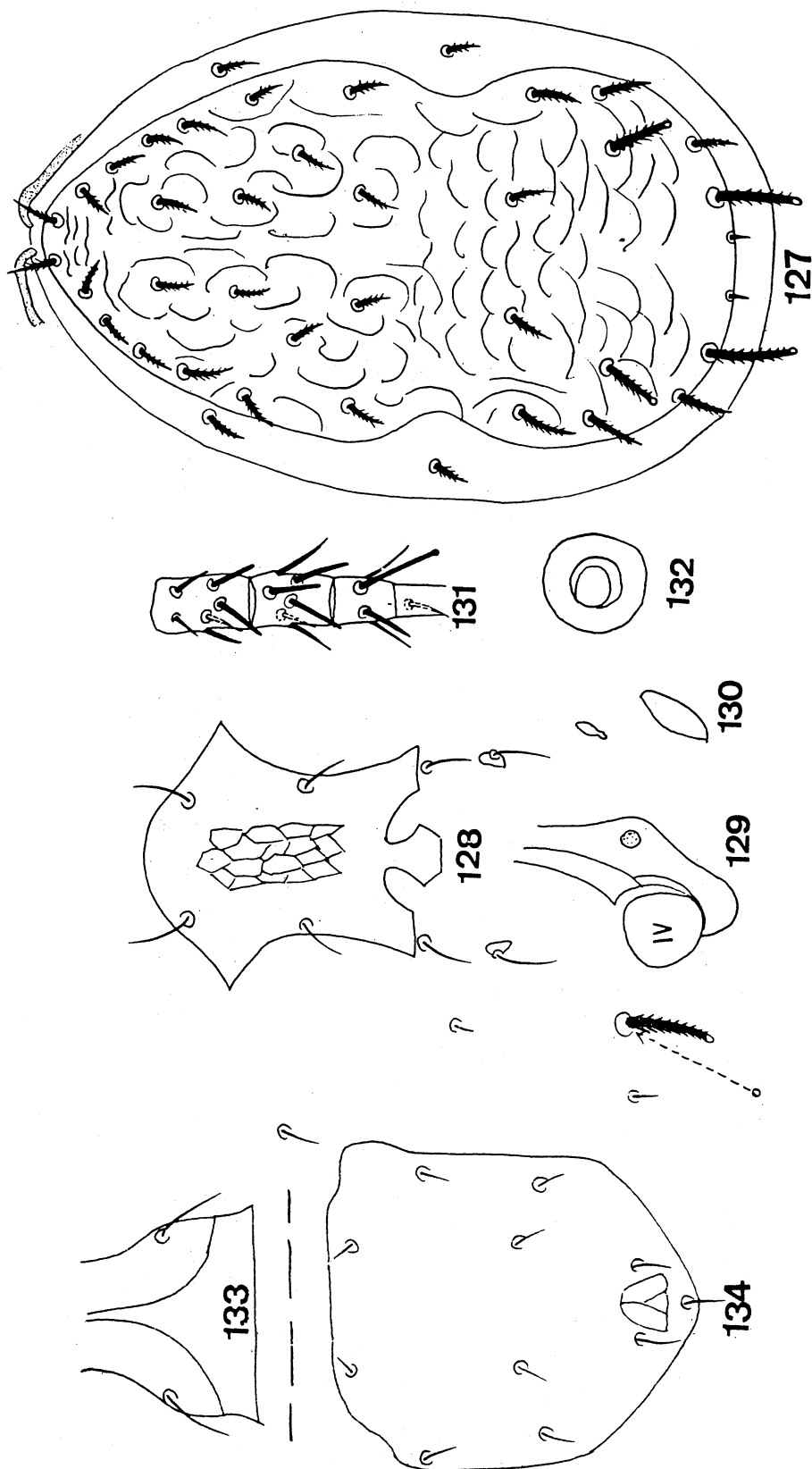


Fig. 127-134. *T. (T.) neocrassus* (♀)  
 127. dorsal aspect 128. sternal shield 129. posterior extension of peritreme plate  
 130. metapodal platelets 131. leg IV 132. spermatheca 133. genital shield  
 134. ventrianal shield

The comparison of original measurements ( $\mu$ ) of closely related species of subgenus *Typhrodromus*

[illegible]

	R	S	T	U	V	W	X	Y	
V	17	22	21	16	16	12	20	16	A: <i>miyarai</i> Ehara
L <sub>1</sub>	17	18	20	20	25	15	12	13	B: <i>rykyuensis</i> Ehara
L <sub>2</sub>	14	20	20	18	16	12	8	8	C: <i>insularis</i> Ehara
L <sub>3</sub>	16	20	20	18	20	12	18	16	D: <i>yasumatsui</i> Ehara
L <sub>4</sub>	17	22	24	20	20	16	18	22	E: <i>pseudoserrulatus</i> Tseng
L <sub>5</sub>	19	26	20	20	24	16	24	25	F: <i>chinensis</i> Ehara
L <sub>6</sub>	19	28	20	24	25	20	32	28	F: <i>borealis</i> Ehara
L <sub>7</sub>	23	29	28	24	26	20	32	33	H: <i>kiso</i> Ehara
L <sub>8</sub>	26	32	28	28	32	22	24	36	I: <i>hirashimai</i> Ehara
L <sub>9</sub>	22	18	16	24	20	12	20	32	J: <i>serrulatus</i> Ehara
L <sub>10</sub>	35	48	48	36	44	44	52	56	K: <i>yamashitai</i> Ehara
D <sub>1</sub>	16	20	16	18	25	10	8	10	L: <i>incasus</i> Chaudhri
D <sub>2</sub>	16	20	16	16	18	11	12	16	M: <i>maracus</i> Chaudhri
D <sub>3</sub>	17	20	16	16	20	16	16	20	N: <i>serratus</i> Chaudhri
D <sub>4</sub>	19	25	20	20	25	20	16	24	O: <i>crassus</i> Van der Merwe
cl	8	8	6	12	8	8	6	8	P: <i>vescus</i> Van der Merwe
M <sub>1</sub>	16	20	16	18	20	14	12	16	Q: <i>eleglidus</i> Tseng
M <sub>2</sub>	26	33	28	28	36	24	32	44	R: <i>neocrassus</i> Tseng
S <sub>1</sub>	12		25	20	20	16		20	S: <i>chrysanthem</i> Gupta
S <sub>2</sub>	17	32	24	20	18	16		24	T: <i>kodaikanalensis</i> Gupta
G				16		8	25		U: <i>neotransvaalensis</i> Gupta
T				20		12	28		V: <i>rhododendroni</i> Gupta
B	26	28		26	25	20	35	40	W: <i>bambusicolus</i> Gupta
VL					32				X: <i>manipurensis</i> Gupta
M <sub>2</sub>	1/2	1/2	1/2	1/2	1	1/3	1	1	Y: <i>neorhenanus</i> Gupta
<u>L</u>	T	T	P	P	M	P	P	M	<u>M<sub>2</sub></u> : M <sub>2</sub> /M <sub>2</sub> -L <sub>9</sub>
<u>P</u>	/	F	<u>cl</u>	F	F	F	F	F	L: Location of M <sub>2</sub> ; A: anterior to L <sub>8</sub>

P: posterior to L<sub>8</sub>T: Transverse line with L<sub>8</sub>

P: pore-pore/pore-3rd preanals

F: pore-pore &gt; pore-3rd preanals

E: pore-pore = pore-3rd preanals

cl: pore-pore < pore-3rd preanals

G: macroseta on genu IV

T: macroseta on tibia IV

B: macroseta on basitarsus IV

21. *Typhrodromus* (*Typhrodromus*) *pseudoserrulatus* new species

*Typhrodromus* (*Typhrodromus*) *serrulatus* Ehara, Chang & Tseng, 1978, Plant Prot. Bull (Taiwan) 20(4):343 misidentification

This new species closely related to *serrulatus* Ehara from Japan but differs by its  $L_9$  short, about 0.17 as long as  $L_{10}$  or 0.23 as long as  $M_2$  rather 0.36 longer than  $L_{10}$  and 0.65 as long  $M_2$ , by having short macrosetae on leg IV. It would run near *chinensis* Ehara & Lee from Hongkong, but is differentiated by having short  $L_9$  and short macrosetae on leg IV. It is also most closely related to *eleglidus* n. sp, but the dorsal setae of the latters more stouter and shorter than the formers, macrosetae on legs of the formers much shorter than the latters.

Female. Dorsal shield well sclerotized, reticulate on anterolateral margins, slight concave on lateral margins near  $L_6$ , 228  $\mu$  long, 202  $\mu$  wide, with 18 pairs of dorsal setae are smooth except for  $L_{10}$  serrated, with hyaline knob;  $M_2$  located anterior to  $L_8$ , which longer than the distance to the base of  $L_8$ , and almost 2/3 as long as to the base of  $L_9$ ;  $L_9$  tiny, about 0.17 as long as  $L_{10}$  or 0.23 as long as  $M_2$ ; 4 pairs of dorsocentral setae are arranged in linear series; 2 pairs of sublateral setae arising from interscutal membrane. The relative length of dorsal setae:  $L_{10} > M_2 > L_6 = L_7 > L_5 = D_4 > L_1 > V = L_4 = L_8 > L_3 > L_2 = M_1 = D_1 = D_3 = S_1 = S_2 > D_2 > L_9 = cl$ . Sternal shield as long as wide, posterior margin wave-shaped, the shield with 3 pairs of sternal setae. Metasternal shield oval, with one pair of metasternal setae. Genital shield slight narrower than ventrianal shield, with one pair of genital shield. Ventrianal shield pentagonal, slight concave on lateral margins behind the 3rd pair of preanal setae, 90  $\mu$  long, 71  $\mu$  wide, with 4 pairs of preanal setae; one pair of large crescentic pore locate behind and inner side of 3rd preanals, the distance of pores equal to the distance of pore to 3rd preanals. Between genital and ventrianal shield, on interscutal membrane, there with many pairs of chitinous platelets. 2 pairs of metapodal platelets, primary platelet 21  $\mu$  long, 3  $\mu$  wide, accessory platelet 5  $\mu$  long. 4 pairs of ventral setae arising from interscutal membrane surrounding ventrianal shield,  $VL_4$  35  $\mu$  long blunted tip. Spermatheca with long conical cervix, 16  $\mu$  long. Chelicera with 7 teeth on fixed digit, movable digit with 3 or 4 teeth. Peritreme long, extending forward beyond to the level of V. The chaetotaxy of genu II-III:  $2 \frac{2}{0} \frac{2}{0}$  1,  $1 \frac{2}{1} \frac{2}{0}$  1; 3 pairs of macrosetae on leg IV, capitate, short, on genu IV 9  $\mu$ , on tibia IV 9  $\mu$ , on basitarsus IV 12  $\mu$ .

Male: Unknown

Measurements. V 18  $\mu$ ,  $L_1$  21  $\mu$ ,  $L_2$  14  $\mu$ ,  $L_3$  16  $\mu$ ,  $L_4$  18  $\mu$ ,  $L_5$  23  $\mu$ ,  $L_6$  25  $\mu$ ,  $L_7$  25  $\mu$ ,  $L_8$  18  $\mu$ ,  $L_9$  7  $\mu$ ,  $L_{10}$  41  $\mu$ , cl 7  $\mu$ ,  $M_1$  14  $\mu$ ,  $M_2$  30  $\mu$ ,  $D_1$  14  $\mu$ ,  $D_2$  12  $\mu$ ,  $D_3$  14  $\mu$ ,  $D_4$  23  $\mu$ ,  $S_1$  14  $\mu$ ,  $S_2$  14  $\mu$ .

Collection data. Holotype, ♀, Fengkang, Dingtung Hsien, ex *Euphoria longana*, 12-VIII-1978, H. Y. Chang; paratype, 2 ♀♀, the same data as holotype.

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## 臺灣捕植蝨科種類之拾遺（蝨蟬亞綱：中氣門目）

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就以生物防治上防治植食性蝨類而言，捕植蝨科是最具價值及最具有實用潛力之種類。本科臺灣過去有江原氏（1970），羅幹成（1970），曾義雄（1972，1973，1975，1976）及張弘毅及曾義雄（1979）等發表過，共記錄28種。本文加上19種，使臺灣捕植蝨科之種類達47種；在此19種中有9種為新種：*A. (A.) pascalis*, *A. (A.) bellatulus*, *A. (A.) tienhsainensis*, *A. (A.) trisetosus*, *A. (A.) alpinia*, *T. (T.) obseus*, *T. (T.) elegidus*, *T. (T.) neocrassus* 及 *T. (T.) pseudoserrulatus*；10種為臺灣之新記錄。本文除詳細描述這些19種之形態學外，並另簡要重新敘述 *monomacrosetosus* Tseng 及 *longispinosus* (Evans)，同時為便於實用上之方便，乃利用臺灣47種之不同形態特徵，製成檢索表，茲供查定種名。

根據 Schicha (1981) 認為全世界有9種與彼在澳洲發現之 *benjamini* Schicha 相似。但筆者參閱及比較標本後認為彼所列之 *chascomensis* (Scheals) 應排除於 *benjamini* Schicha 相似種類之外，因此這些之相似種類共有9種，在此筆者將之成立一新的種群 (species group) 名為 *paspalivorus* group，本種群之生活習性均發現草本植物中之單子葉植物。

*A. (A.) pseudolongispinosus* Xin et al, 1981 是在中國大陸浙江、上海一帶發現，其主要與 *womersleyi* Schicha 之不同是在於固定指之齒數，剛毛長短及前肛孔之相互距離。筆者有機會比較了東南亞地區及在臺灣不同作物和大量飼養之標本，發現上述特徵只是微小之形態變異，故把它列入 *womersleyi* 之下為同物異名。

*A. (A.) parapeltatus* Wu et Chou 1981 在中國之廣東省發現，本種與 *ovatus* (Garman) 並無不同；另 *peltatus* Van der Merwe 在南非與泰國發現，此種筆者亦認為是 *ovatus* (Garman) 之同物異名。

本文所用之分類系統乃是根據筆者 (1975) 之分類體系。模式標本均保存於經濟部商品檢驗局臺南分局植物檢疫室。