

## A revision of the *Hemicheyletia* generic group (Acari: Cheyletidae)

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### Summary

The phylogeny of the *Hemicheyletia* generic group (*Cheletomimus*, *Hemicheyletia* and *Tutacheyla*) was reconstructed by a cladistic method using the software PAUP 3.1. This analysis was based on 21 morphological characters of the female, and showed that these taxa form a monophyletic group. It also revealed that the genus *Tutacheyla* is a sister group of *Hemicheyletia-Cheletomimus*. The genus *Hemicheyletia* is reduced to a subgenus of *Cheletomimus*, and the latter now includes 3 artificial subgenera, *Cheletomimus* s.str., *Hemicheyletia* stat. nov. and *Philippicheyla*. The genus *Cheletomimus* is revised and redefined, leaving it with 36 valid species. Diagnoses with and a key to all known species are provided. Four new species are described: *C. ascutatus* spec. nov., *C. greenwoodi* spec. nov., *C. gracilis* spec. nov. and *C. ochoai* spec. nov.

**Key words:** *Cheletomimus*, *Hemicheyletia*, *Tutacheyla*, *Philippicheyla*, Cheyletidae, systematic, mites, predators

### Résumé

Les auteurs proposent une reconstruction de la phylogénie du groupe générique *Hemicheyletia* (*Cheletomimus*, *Hemicheyletia* et *Tutacheyla*), par une méthode cladistique utilisant le programme PAUP 3.1. L'analyse a été basée sur 21 caractères de la femelle. Cette étude montre que les espèces qui font partie de ces 3 taxa forment dans leur ensemble un groupe monophylétique, et que *Tutacheyla* est étroitement apparenté au groupe *Hemicheyletia-Cheletomimus*. Le genre *Hemicheyletia* est rabaissé au rang de sous-genre du genre *Cheletomimus*. Ce dernier genre comprend maintenant 3 sous-genres: *Cheletomimus* s.str., *Hemicheyletia* stat. nov. et *Philippicheyla*. Après cette révision le genre *Cheletomimus* comprend maintenant 36 espèces valides. Des diagnoses et des clés sont données pour toutes ces espèces. Quatre nouvelles espèces sont décrites ici: *C. ascutatus* spec. nov., *C. greenwoodi* spec. nov., *C. gracilis* spec. nov. et *C. ochoai* spec. nov.

**Mots clés:** *Cheletomimus*, *Hemicheyletia*, *Tutacheyla*, *Philippicheyla*, Cheyletidae, systématique, acariens, prédateurs

### Introduction

The genera *Hemicheyletia* VOLGIN, 1969 *Cheletomimus* OUDEMANS, 1904 and *Tutacheyla* CORPUZ-RAROS, 1972 form a natural generic group (*Hemicheyletia* group) within the tribe Cheyletini VOLGIN 1969 of the family Cheyletidae LEACH, 1815 (Acari: Prostigmata) (BOCHKOV and FAIN, 2001). They are represented by predacious species

that mostly live on plants and they play an important role in the control of some agricultural pests.

In the list of cheyletid mites published by GERSON *et al.* (1999) the genera *Cheletomimus*, *Tutacheyla*, *Hemicheyletia* and *Philippicheyla* totalled 14, 2, 39 and 2 species, respectively. After some taxonomic modifications, detailed below, the genus *Hemicheyletia* is reduced here to a subgenus of *Cheletomimus* with three subgenera, *Cheletomimus* s.str. (4 species), *Hemicheyletia* stat. nov. (29 species) and *Philippicheyla* (3 species).

The systematics of this generic group are very complicated, mainly because many species have been inadequately described, and also by the lack of a recent revision of this group of mites. Although a key to the genus *Cheletomimus* was provided by CORPUZ-RAROS (1998), the exact taxonomic status of most of the species remained questionable and needed a re-evaluation. Another reason for the difficulty in studying these mites is the great variability displayed by some characters. Some authors have completely neglected this variability and even based their new species on these variable characters. This problem has already been evoked previously (FAIN and BOCHKOV, 2001a).

In this paper we investigated the phylogenetic relations of the genera and subgenera belonging to the *Hemicheyletia* group and reviewed all their known species. A key to the females of the valid species of this group is provided.

### History of systematics of the *Hemicheyletia* group

The genus *Cheletomimus* was created by OUDEMANS (1904) for *Cheletomimus berlesei* (OUDEMANS, 1904). In his revision of the Cheyletidae, VOLGIN (1969) erected the genus *Hemicheyletia* for species bearing homeomorphic setae on the dorsum, and a second new genus, *Dendrocheyla* VOLGIN, 1969, for species with heteromorphic dorsal setae. He included in these new genera some other species described previously in the genera *Cheyletia* HALLER, 1884 and *Paracheyletia* VOLGIN, 1955. Moreover, VOLGIN (1969) created the monotypical genus *Andrecheyla* VOLGIN, 1969 for the species *A. scutellata* (DE LEON, 1962), originally described in the genus

*Cheyletia*. He considered the genera *Andrecheyla*, *Cheletomimus*, *Dendrocheyla* and *Hemicheyletia* as being closely related.

SUMMERS and PRICE (1970) synonymized the genera *Dendrocheyla* and *Andrecheyla* with *Hemicheyletia*. This opinion was accepted by most of acarologists (THEWKE and ENNS, 1979; CORPUZ-RAROS, 1998, GERSON *et al.*, 1999 etc ...). These authors separated this genus into two groups: *bakeri* (with homeomorphic medio-dorsal setae on idiosoma) and *wellsi* (with heteromorphic medio-dorsal setae).

After the revision of SUMMERS and PRICE (1970) numerous new species were described in the genera *Cheletomimus* and *Hemicheyletia* (CORPUZ-RAROS, 1972, 1988, 1998; Jeffrey and CAMPBELL, 1975; Shiba, 1976; Tseng, 1973, 1977; SOLIMAN, 1975; VOLGIN, 1978; QAYYUM and CHAUDHRI, 1979; RASOOL and CHAUDHRI, 1979; THEWKE and ENNS, 1979; PATXOT and GOFF, 1985; EHARA and GBDUL GHANI, 1988; GUPTA, 1991; RASOOL *et al.*, 1994; AHEER *et al.*, 1994, 1998).

CORPUZ-RAROS (1972) described two monotypical genera: *Philippicheyla* CORPUZ-RAROS, 1972 and *Tutacheyla* CORPUZ-RAROS, 1972. Later on, she synonymized the monotypical genus *Indonesicheyla* THEWKE, 1980 with *Tutacheyla*. A second species was described in the genus *Philippicheyla* by GERSON (1994).

FAIN and BOCHKOV (2001a) reduced *Philippicheyla* to a subgenus of *Hemicheyletia*. A phylogenetic analysis of the family Cheyletidae (BOCHKOV and FAIN, 2001) has shown that the genera *Hemicheyletia*, *Cheletomimus* and *Tutacheyla* form a monophyletic group.

## Materials and methods

### Materials

The species composition of the genus *Cheletomimus* needs a revision. Until now this genus included 14 species (AHEER *et al.*, 1998; GERSON *et al.*, 1999). The females (males are known only from a few species) bear a pair of lateral hysteronotal shields, a character that is also present in the nymphs of several cheyletid predacious genera. However, the anal region of these nymphs is very characteristic and can easily be distinguished from that of the females by the total absence of the vulva and the genital setae. Moreover, in the cheyletid nymphs the guard seta of tarsus I is always long and situated far from the solenidion  $\omega I$  (VOLGIN, 1969). Eleven species of *cheletomimus* were described from the nymphal stages that were confused with females by the authors. This confusion can be observed in the drawings of the species listed below in which the anal and the surrounding area were depicted. Another immature character is the more basal situation and different structure of setae *ff'* (guard seta). We consider therefore that the 11 following species were described from their nymphal stages and should be considered as *species inquirendae*: *C. binus* TSENG, 1973, *C. bisetosus* TSENG, 1977, *C. cambio* AHEER *et al.*, 1994, *C.*

*cantor* RASOOL *et al.*, 1980, *C. citrosinensis* PATXOT et GOFF, 1985, *C. flecto* AHEER *et al.*, 1998, *C. heredis* QAYYUM and CHAUDHRI, 1979, *C. larmae* AHEER *et al.*, 1994, *C. minutus* SOLIMAN, 1975, *C. zamia* AHEER *et al.*, 1994 and *C. trema* AHEER *et al.*, 1998. It follows that the genus *Cheletomimus* includes only three valid species.

We propose to modify the list of the *Hemicheyletia* species, given by GERSON *et al.* (1999), as follows: The species *H. hissariensis* MATHUR and MATHUR, 1981 is synonymized with *Lepidocheyla caucasica* VOLGIN, 1963 by FAIN and BOCHKOV (2001c) and *H. kureatollensis* GOFF, 1991 was transferred into the new genus *Granulocheyletus* (FAIN and BOCHKOV, 2002). After these corrections the number of species described in the genus *Hemicheyletia*, listed in GERSON *et al.* (1999), now totals 37.

The species *H. indica* GUPTA, 1991 was poorly described and the typical specimens were unavailable for our study. Therefore we propose to consider it as a *species inquirenda*.

Two species, *H. newyorkensis* DELFINADO and KHANG-FIELDS, 1976 and *H. lanceolata* CORPUZ-RAROS, 1998 were described from a single male specimen (DELFINADO and KHANG-FIELDS, 1976; CORPUZ-RAROS, 1998). Unfortunately, it is impossible to compare these species with most the other representatives of the genus *Hemicheyletia*, because males are known only for a few species of this genus. Thus we also include them among the *species inquirendae*.

For this study we have re-examined the collections of *Hemicheyletia* group deposited in the following Institutions:

**NHML** – Natural History Museum, London, UK.

**IRSNB** – Institut royal des Sciences naturelles de Belgique, Bruxelles, Belgium.

**MRAC** – Museum royal de l'Afrique Centrale, Tervuren, Belgium.

**UCD** – University of California, Davis, U.S.A.

**UPLB** – Museum of Natural History, College, Laguna, the Philippines

**USNM** – Smithsonian Institution National Museum of Natural History, Washington, U.S.A.

**ZIN** – Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia.

## Methods

In our descriptions we use the nomenclature of the idiosomal chaetotaxy proposed by FAIN (1979), FAIN *et al.*, (1997) and that of the leg chaetotaxy of GRANDJEAN (1944). All measurements are given in micrometers ( $\mu\text{m}$ ).

A cladistic analysis based on numerical parsimony was used for the study of the phylogenetic relationships between the species of the genera *Hemicheyletia*, *Cheletomimus* and *Tutacheyla*. We included 21 morphological characters in this analysis. Most of the autapomorphic characters and the variable characters such as the number of teeth on palpal claw, the number of tines on inner and outer comb-like setae of palpal tarsus, the number of

peritremal links etc... were rejected. The counts of the setae on the legs do not include the solenidia.

It seems preferable to use in a cladistic analysis the species rather than the supraspecific taxa (YEATES, 1994; PRENDINI, 2001). However, the inclusion of all the known species of the examined genera would seriously impede our analysis. Therefore, we selected 15 species, representing almost all available combinations of the studied characters. *Cheyletus trux* ROHDENDORF, 1940 has been selected as a outgroup.

Character set was unordered and was analyzed with PAUP 4 for Windows 95 using branch and bound algorithm. The list of characters and data matrix is given in the Tables 1 and 2, respectively.

### Results of the cladistic analysis

The initial parsimony analysis produced 56 trees (length, 34; CI=0.706; HI=0.294, RI=0.688; RC=0.485). The PTP test (FAITH and CRANSTON, 1991) was used for the evaluation of our data. This test showed that the null hypothesis (absence of the cladistic covariation) could be rejected at a high significance level (PTP<0.01).

The 50 % majority consensus tree supports the monophyly of the *Tutacheyla-Cheletomimus-Hemicheyletia* group and the monophyly of *Cheletomimus-Hemicheyletia* clade (100 %). The presence of species of the genus *Cheletomimus*, *C. berlesei* and *C. duosetosus*, among the species of *Hemicheyletia* is not surprising. The representatives of

Table 2 — Data matrix

Species	Characters
	111111111122 123456789012345678901
<i>Ch. trux</i>	0010100100 00001101000
<i>T. robusta</i>	000100011110110010100
<i>C. berlesei</i>	210000001111110010111
<i>C. duosetosus</i>	210001001111110010111
<i>H. filipina</i>	310000001110110010011
<i>H. athenae</i>	110011001110110000111
<i>H. bakeri</i>	010001001111110010111
<i>H. bregetovae</i>	010011001111110000111
<i>H. cordovensis</i>	010001101110110010111
<i>H. kysenyiensis</i>	110001001111110010111
<i>H. leytensis</i>	010001001111110011111
<i>H. omissa</i>	010101001111110010111
<i>H. scutellata</i>	110001001111110010111
<i>H. volgini</i>	01000100111?110000111
<i>H. wellsii</i>	010011001110110010111
<i>H. ochoai</i>	310012001110110010111
<i>H. ascutatus</i>	210012001111110010111

Table 1 — List of characters

1. Hysteronotal shield reduced, single (1), reduced, twice (2), completely lacking (3)
2. Dorsal shields strongly punctuated (1)
3. Eyes lacking (1)
4. Dorsal median setae lacking (1)
5. Median setae abnormal (1)
6. Dorsal lateral setae lanceolate (1) or fan-like (2)
7. Setae II situated on hysteronotal shield (1)
8. Peritremes M - shape (1)
9. Palpal femur with 4 setae (1)
10. Teeth covered about half of palpal claw (1)
11. Outer ventral setae of palpal femur narrow fan-like or lanceolate (1)
12. Outer ventral seta of palpal tibia thickened, barbed (1)
13. Guard seta of tarsus I very small (1)
14. Dorso-apical knob of tarsus I well developed (1)
15. Solenidion of tarsus II situated ventrally (1)
16. Solenidion of tibia II absent (1)
17. Tibia I with 4 setae (1)
18. Outer seta of coxa III serrate (1)
19. Legs short, 0.5-0.6 idiosoma length (1)
20. Most of leg setae lanceolate (1)
21. Solenidion and guard seta of tarsus I situated on nipple-like protrusion (1)

*Cheletomimus* differ from *Hemicheyletia* only by the presence of two lateral shields on the hysteronotum. In *Hemicheyletia*, there is only one median shield on the hysteronotum but this shield is very variable in shape from species to species, suggesting that the paired shields are only a form of this variability. Furthermore, *C. ochoai* **spec. nov.**, described below, displays intermediate characters between these taxa, i.e. the paired hysteronotal shields (character of *Cheletomimus*) and the aberrant dorso-median setae (character of the species group *wellsii*, in *Hemicheyletia*).

The search for successive weighting according to RC index yielded 24 most parsimonious trees (length, 21692; CI=0.832; HI=0.168; RI=0.776; RC=0.646). The characters 4 and 18 had the weight 0, the characters 1, 5 and 6 - 563, 500 and 444, respectively; the other characters - 1000. The structure of the strict consensus for the weighted trees (Fig. 1) allows recognition of the same general pattern shown by the initial analysis. The support of the individual clades was estimated with Bootstrap analysis (with heuristic option for 100 replicates). The small set of characters explains the relatively weak support of most branches by this analysis. There are only three nodes with support of more than 50 %: the node *trux* (other species) has 100 % support, the node *robusta* (*Hemicheyletia-Cheletomimus*) - 98% and the node *athenae-volgini*-60 %.

We conclude that the species belonging to these three genera form a monophyletic group, and that *Tutacheyla* is a sister group for the species of *Hemicheyletia-Cheleto-*

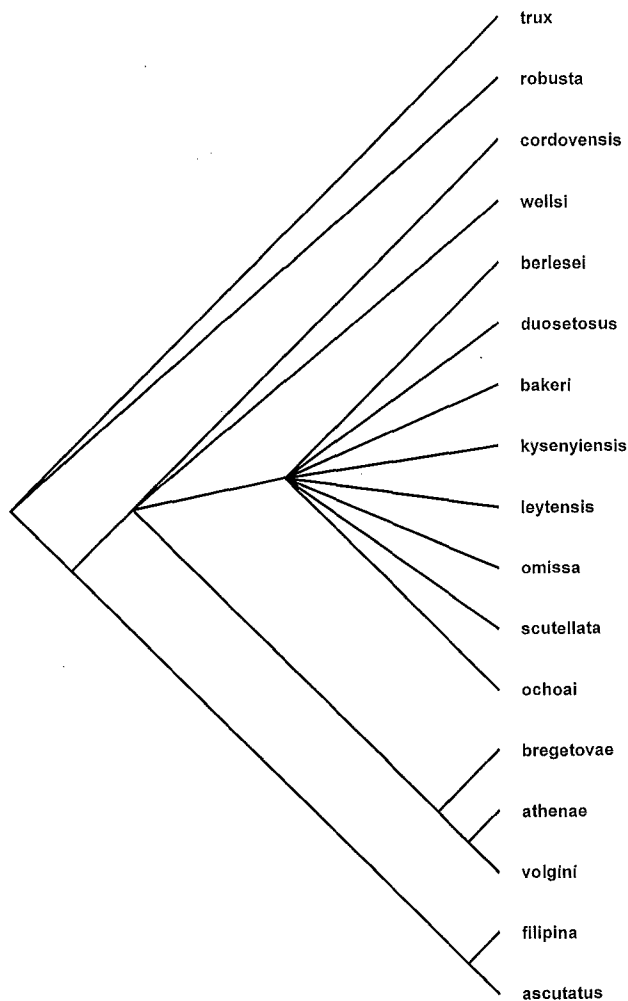


Fig. 1 — Phylogenetic relations between mites of *Hemicheyletia* complex.

*mimus*. As the last group is monomorphic, we reduce the genus *Hemicheyletia* to a subgenus of the genus *Cheletomimus* for the following reasons: the species of *Cheletomimus* are situated in the core of *Hemicheyletia* in the obtained cladogram, and cladistic support for the *C. berlesei*-*C. duosetosus* clade is absent, with at least one species, *C. ochoai* spec. nov., having intermediate characters between these two genera. Thus, the genus *Cheletomimus* now consists of three subgenera, namely *Philippicheyla*, *Hemicheyletia* and *Cheletomimus*. Among these subgenera, only the subgenus *Philippicheyla* might be considered as a natural group. The subgenera *Cheletomimus* and *Hemicheyletia* are artificial.

## Systematics

FAMILY CHEYLETIDAE LEACH, 1815  
 TRIBE CHEYLETINI LEACH, 1815  
 Genus *Cheletomimus* OUDEMANS, 1904

*Cheletomimus* OUDEMANS, 1904a: 163; VOLGIN, 1955: 171-172, 1969: 213-214; SUMMERS and PRICE, 1970: 8-

9; CORPUZ-RAROS, 1998: 263-264; GERSON *et al.*, 1999: 49. This genus has chronological priority over *Hemicheyletia*.

## DEFINITION

**FEMALE: *Gnathosoma*:** Palpal tarsi with 4 setae and a short solenidion: 2 dorsal comb-like setae with numerous teeth and 2 sickle-like ventral setae. Palpal claw with teeth in basal part, these teeth occupying from 1/3 to 1/2 of claw length. Palpal tibia with 3 setae, dorsal and outer ventral setae variable in shape from hair-like to serrate lanceolate, inner seta always fine, hair-like. Palpal genu with 1 dorsal fan-like or lanceolate seta. Palpal femur well granulated dorsally, with 4 setae: 1 fan-like or lanceolate dorsal, 1 fan-like outer lateral (hair-like in *C. rostratula* SUMMERS et PRICE, 1970 and *C. granula* SUMMERS and PRICE, 1970) and 2 hair-like inner lateral (1 inner ventral seta is fan-like in *C. leytensis* CORPUZ-RAROS, 1988). Rostral shield (tegmen and protegmen *sensu* SUMMERS and PRICE, 1970) usually well granulated. Peritremes arch-like. **Idiosoma:** Idiosoma ovoid, about 3 times longer than gnathosoma. **Dorsum:** Eyes present. Propodonal shield present, granulated. Hysteronotal shield present or lacking, variable in shape. All dorsal setae homeomorphic (fan-like or lanceolate) or median setae aberrant, staghorn-like, bulb-like, cloud-like, dendrite-like etc... Dorsal interscutal areas striate-granulate or striate. Propodonotum always bearing lateral setae *vi*, *ve*, *sci*, *sce*, *h*, hysteronotum bearing lateral setae *11-15*, *d5*. Number and shape of median setae variable. **Venter:** Setae *ic1*, *ic3*, *ic4*, *pg1-pg3*, *g1*, *g2* and *a1* smooth hair-like, setae *a2* and *a3* serrate or smooth (*a3* narrow fan-like in *C. gracilis* spec. nov. and *C. ascutatus* spec. nov.). **Legs:** All legs relatively short, about 0.6-0.8 of idiosomal length. All tarsi with claws and empodium. Tarsi I-II, tibiae I-II and genu I with solenidia  $\omega$ ,  $\phi$  and  $\sigma$ , respectively. Guard seta of solenidion  $\omega 1$  (*ft*') very short, situated together with solenidion on nipple-like protrusion. Apical tarsal knob of tarsus I well developed. Angles of tarsal claws lacking. Outer seta of coxae III hair-like, smooth (narrow lanceolate in *C. leytensis*). Most setae of trochanter-tibia I-IV lanceolate. Chaetotaxy (excluding solenidia): tarsi 9-7-7-7, tibia 5(4)-4(3)-4(3)-4(3), genu 2-2-2-2(1), femur 2-2-2-1, trochanter 1-1-2-1, coxae 2-1-2-2.

**Type species:** *Cheletes berlesei* OUDEMANS, 1904.

## Subgenus *Cheletomimus* s.str.

**DIAGNOSIS:** Hysteronotum with a pair of lateral shields.

### 1. *Cheletomimus* (s.str.) *berlesei* (OUDEMANS, 1904) (Figs 2-3)

*Cheletes berlesei* OUDEMANS, 1904a: 154; BAKER, 1949: 293-294; VOLGIN, 1955: 172, 1969: 214-217; YUNKER,

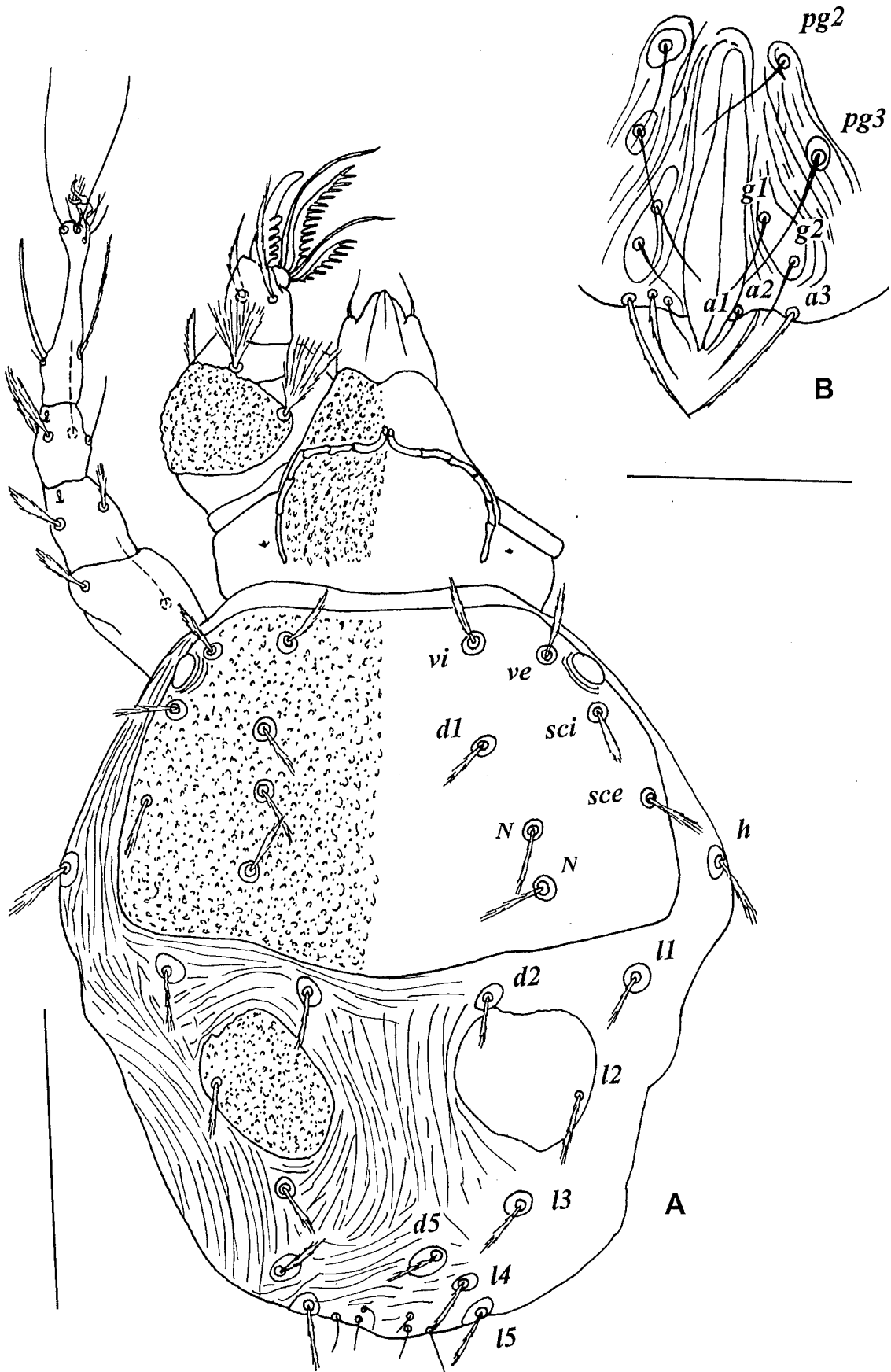


Fig. 2 — *Cheletomimus* (s.str.) *berlessei* (OUDEMANS, 1904), female in dorsal view (A) and vulva in ventral view (B). Scale lines 100  $\mu$ m (A), 50  $\mu$ m (B).

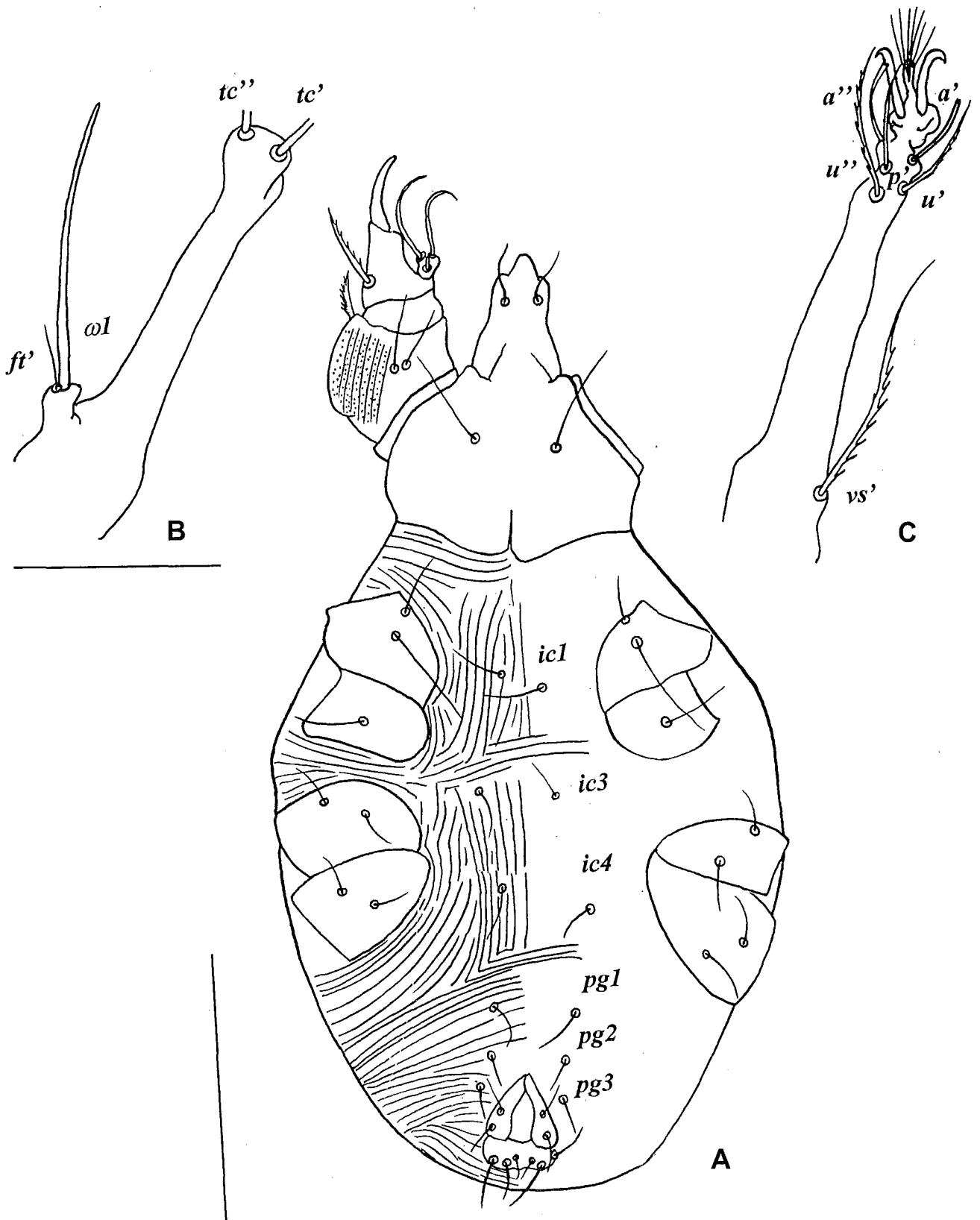


Fig. 3 — *Cheletomimus (s.str.) berlessei* (OUDEMANS, 1904), female in ventral view (A), tarsi I in dorsal view (B) and ventral view (C). Scale lines 100  $\mu\text{m}$ , 50  $\mu\text{m}$  (B,C).

1961: 1032; DE LEON, 1962: 134; SUMMERS and PRICE, 1970: 9.

*Cheletomimus trux* OUDEMANS, 1904b: 163.

*Cheletomimus ornatus* OUDEMANS, 1906: 136-139.

MATERIAL EXAMINED: 10 females, Batumi city, Georgia. 15 females, Krasnodar Terr., Russia. (Coll. N.G. BREGETOVA).

DISTRIBUTION: This species was described from Italy (OUDEMANS, 1904a); it probably, occurs in all countries with a warm climate (VOLGIN, 1969).

DIAGNOSIS: Peritremes with 7 pairs of links. Palpal claw with 6-8 teeth. Palpal tibia: Dorsal and outer ventral setae thickened and plume-like. Dorsal setae of palpal femur and palpal genu fan-like. Dorsal lateral and median setae of idiosoma lanceolate. Propodonal shield with 3 pairs of median setae. Only setae *l2* situated on the hysteronotal shields. Hysteronotum with one pair of median setae (*d2*). Dorsal shields well granulated. Genu IV with 1 seta.

## 2. *Cheletomimus* (s.str.) *duosetosus* (MUMA, 1964)

*Cheletomimus duosetosus* MUMA, 1964: 242, 244; Volgin, 1969: 217-219; Summers and PRICE, 1970: 9-10.

MATERIAL EXAMINED: 1 female, from citrus leaves, Valles, Mexico, 12. II. 1953. (Coll. H.D. SMITH).

DISTRIBUTION: This species was described from U.S.A. (Florida) (MUMA, 1964). It was also recorded from Mexico (SUMMERS and PRICE, 1970).

DIAGNOSIS: Peritremes with 6 pairs of links. Palpal claw with 7-8 teeth. Palpal tibia: Dorsal and outer ventral setae thickened and plume-like. Dorsal setae of palpal femur and palpal genu fan-like. Dorsal lateral and median setae of the idiosoma narrow fan-like. Propodonal shield with 1 pair of median setae. Only setae *l2* situated on the hysteronotal shields. Hysteronotum with one pair of median setae (*d2*). Dorsal shields well granulated. Genu IV with 2 setae.

## 3. *Cheletomimus* (s.str.) *daltoniensis* CORPUZ-RAROS, 1998

*Cheletomimus daltoniensis* CORPUZ-RAROS, 1998: 265-266.

MATERIAL EXAMINED: **Type:** Female holotype (UPLB), on *Bambusa* sp., Dalton Pass, Santa Fe, Nueva Vizcaya, 16. II. 1973. (Coll. CORPUZ-RAROS).

DISTRIBUTION: This species is known only from the Philippines (CORPUZ-RAROS, 1998).

DIAGNOSIS: Peritremes with 5 pairs of links. Palpal claw with 4 teeth. Palpal tibia: Dorsal and outer ventral setae thickened and plume-like. Dorsal setae of palpal femur and palpal genu lanceolate. Dorsal lateral and median setae of the idiosoma lanceolate. Propodonal shield with 1 pair of median setae. Only setae *l2* situated on the hysteronotal shields. Hysteronotum with one pair of median setae (*d2*). Dorsal shields well granulated. Genu IV with 1 seta.

## 4. *Cheletomimus* (s.str.) *ochoi* spec. nov. (Fig. 4)

MATERIAL EXAMINED: **Types:** Female holotype (20546 USNM), from *Howea posteriana* (calix), San Francisco, USA, 23. VIII. 1994.

DISTRIBUTION: This species is known only from USA. It is named for Dr. R. OCHOAI, U.S. National Museum of Natural History, Washington, D.C.

DIAGNOSIS: Peritremes with 5 pairs of links. Palpal claw with 5-6 teeth. Palpal tibia: Dorsal and outer ventral setae thickened and plume-like. Dorsal setae of palpal femur and palpal genu lanceolate. Dorso-lateral setae of the propodonal fan-like, dorso-lateral setae of hysteronotum lanceolate. Propodonal shield with 3 pairs of aberrant median setae. Only setae *l2* situated on the hysteronotal shields. Hysteronotum with one pair of aberrant median setae (*d2*). Dorsal shields well granulated. Genu IV with 2 setae. Holotype: Idiosoma 260 long; gnathosoma 125 long; propodonal shield 125 long and 165 wide; hysteronotal shields 40 long and 45 wide; dorso-lateral setae of idiosoma about 18-25 long; lateral propodonal setae about 10 wide; lateral hysteronotal setae about 5 wide.

REMARKS: This new species differs from all known species of the subgenus *Cheletomimus* s.str. by the aberrant shape of the dorso-median setae. By this character it resembles the species of the *wellsi* group in the subgenus *Hemicheyletia*, but differs by the paired hysteronotal shield.

## Subgenus *Hemicheyletia* VOLGIN, 1969 stat. nov.

*Hemicheyletia* VOLGIN, 1969: 201-202; SUMMERS and PRICE, 1970: 11; TSENG, 1977: 215; CORPUZ-RAROS, 1998: 272-273; GERSON, 1994: 444-445; GERSON *et al.*, 1999: 65.

*Dendrocheyla* VOLGIN, 1969: 205-206.

*Andrecheyla* VOLGIN, 1969: 219-220.

DIAGNOSIS: Hysteronotum with a single median shield.

**Type species:** *Paracheyletia bakeri* EHARA, 1962

This subgenus is divided into three artificial species groups, *bakeri*, *wellsi* and *omissa*.

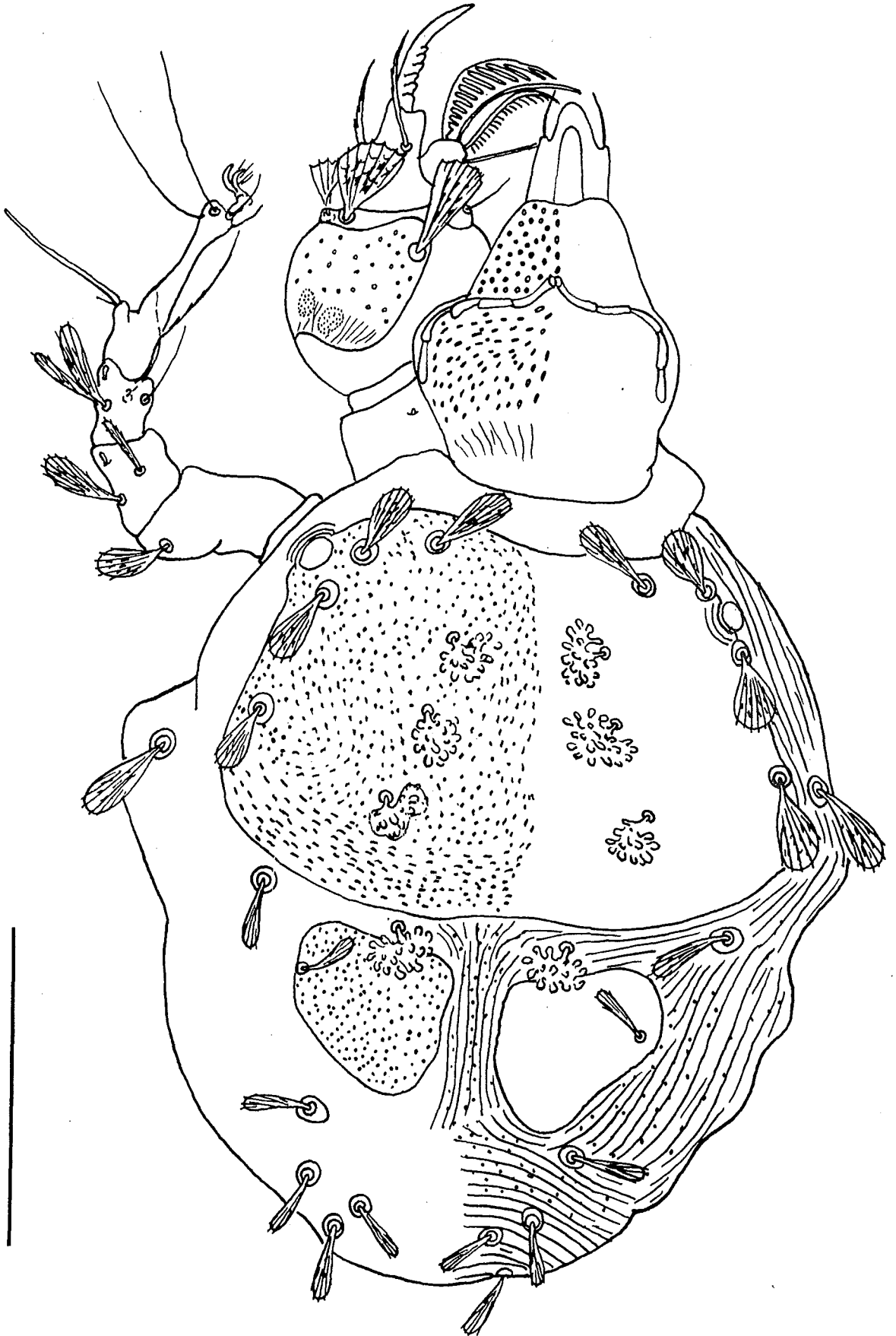


Fig. 4 — *Cheletomimus* (s.str.) *ochoai* spec. nov., holotype female in dorsal view. Scale line 100  $\mu$ m.



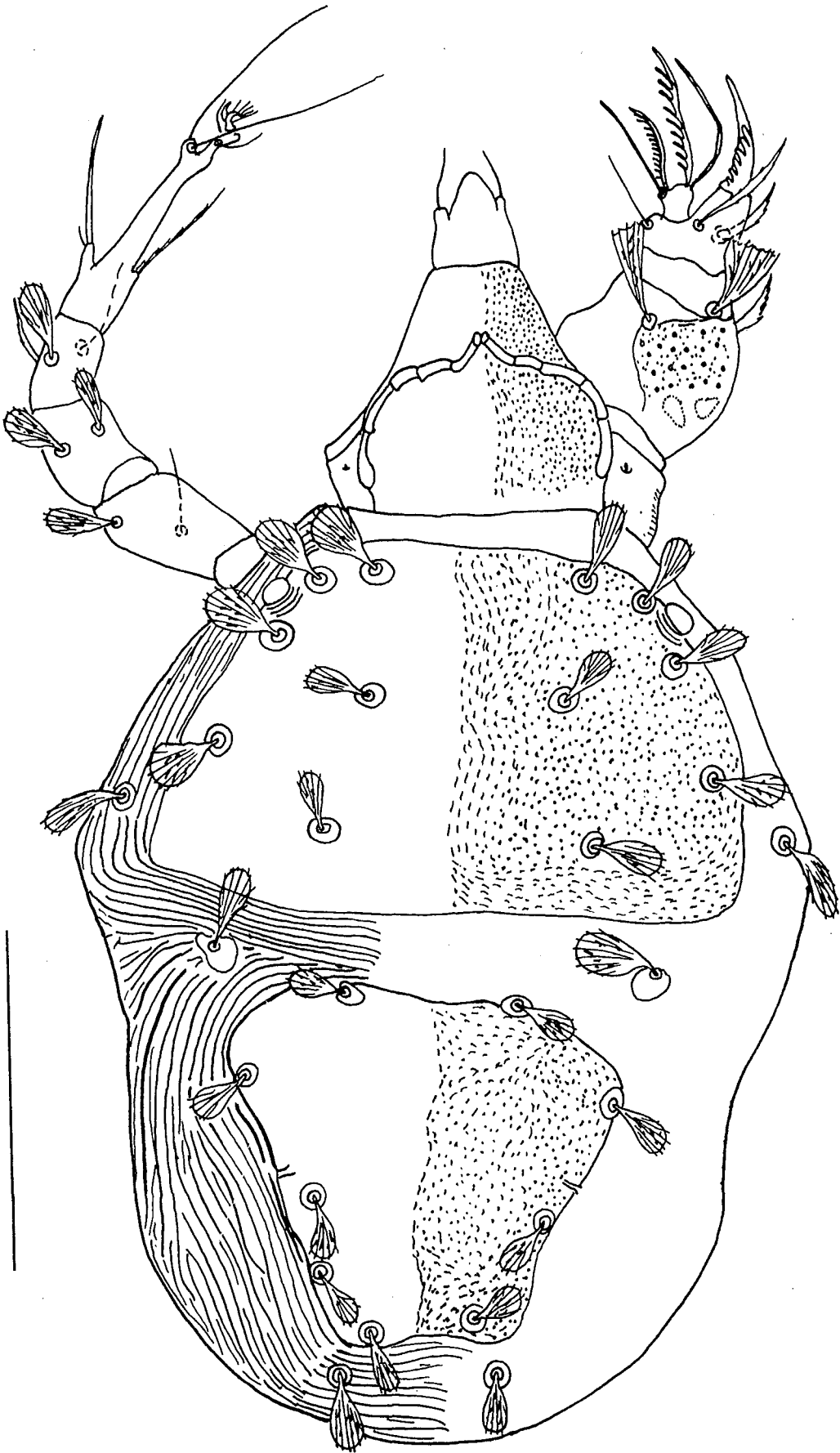


Fig. 5 — *Cheletomimus (H.) bakeri* (EHARA, 1962), female in dorsal view. Scale line 100  $\mu$ m.

**Group bakeri**

Median setae of the dorsum homeomorphic, fan-like or lanceolate. Similar to lateral setae.

**5. *Cheletomimus (H.) bakeri* (EHARA, 1962) comb. nov.**  
(Fig. 5)

*Paracheyletia bakeri* EHARA, 1962: 109-111; MUMA, 1964: 245; GERSON, 1967: 360.

*Hemicheyletia bakeri*, VOLGIN, 1969: 202-203; SUMMERS and PRICE, 1970: 12; CORPUZ-RAROS, 1972: 255-256; TSENG, 1977: 220-221; QAYYUM and CHAUDHRI, 1979: 171-172; GERSON, 1994: 445.

*Hemicheyletia tumidus* QAYYUM and CHAUDHRI, 1979: 169-171, **syn. nov.**

MATERIAL EXAMINED: 47 females, Galapagos. (Coll. Y. MUMCUOGLU). 3 females, from nest of *Cochlearius* sp., El Rosario. Panama, 10.X.1985. (Coll. MENDÉZ). 1 female, from vegetation, Algeria. (Coll. ATHIAS-HENRIOT). 1 female, from soil, Zaire, 28. II. 1985. (Coll. M.I. NOTI). 1 female, on *Canavalia maritima*, Paniquian Island, Mindoro, the Philippines, 18. V. 1963. (Coll. L.A. CORPUZ-RAROS). 1 female, on *Symplocos ahernii*, Siniloan, Laguna, Luzon Isl., the Philippines, 1.XI.1976. (Coll. J.M. SOTTO). 1 female, on flour, Quiapo, Manila, the Philippines, 1.XI.1995. (Coll. S. VILLALUZ). 1 female, laboratory culture of black cutworm, VISCA Campus, Baybay, Leyte Isl., the Philippines, 9.I.1984. (Coll. R. RUIZ). 1 female, from orange, U.S.R. Insectary, Riverside Coll, U.S.A., 31. VIII. 1953. (Coll. M. BADGLEY). 1 female, on cotton, Los Fresnos, Texas, U.S.A., 16. V. 1950 (Coll. H.S. MAYEUX). 1 female, on pineapple leaves, Portland, 8. VI. 1936. (Coll. L.M. SCOTT).

DISTRIBUTION: This species was described from Japan (EHARA, 1962). At the present time, it is also known from Africa (Zaire), Asia (Pakistan, Israel, the Philippines), Galapagos Isles., North and Central America (Canada, U.S.A., Panama) and Australia (MUMA, 1964; GERSON, 1967, 1994; SUMMERS and PRICE, 1970; CORPUZ-RAROS, 1972; TSENG, 1977; QAYYUM and CHAUDHRI, 1979).

DIAGNOSIS: Peritremes with 5-6 pairs of links. Palpal claw with 7-9 teeth. Palpal tibia: Dorsal and outer ventral setae thickened and plume-like. Dorsal lateral and median setae of the idiosoma fan-like. Propodonal shield with 2 pairs of median setae. Median hysteronotal shield well developed, with 4 pairs of lateral and 1 pair of median setae. In some specimens the median setae are situated in front of the hysteronotal shield. Dorsal shields well punctated. Dorsal interscutal areas striate. Setae *II* situated off the hysteronotal shield. Tibia I with 4 setae.

REMARKS. According to the original description (QAYYUM and CHAUDHRI, 1979), *H. tumidus* QAYYUM et CHAUDHRI, 1979 differs from *C. bakeri* by the following characters. In *H. tumidus*, the palpal claw bears 6-8 teeth, the ratio of

leg I/idiosoma is 1.6 and the peritremes have 6 pairs of links. In the holotype of *C. bakeri*, the palpal claw bears 7 teeth, the ratio of leg I/idiosoma is 0.7 and the peritremes have 5 pairs of links. The numbers of teeth of the palpal claw and the peritremal links fall in the limits of variability of *C. bakeri*. The length ratio of leg I/idiosoma is also similar those in *C. bakeri*. Following the original description and the figure, it is obvious that these authors calculated the length ratio of leg I (194  $\mu$ m) to the body (306  $\mu$ m, idiosoma and gnathosoma), rather than the ratio of leg I/idiosoma. Actually, the ratio of leg I/idiosoma is identical in these two species. Therefore, *H. tumidus* does not differ from *C. bakeri* and we consider it as a junior synonym of the latter.

**6. *Cheletomimus (H.) rostellata* (SUMMERS et PRICE, 1970) comb. nov.**  
(Fig. 6A)

*Hemicheyletia rostellata* SUMMERS and PRICE, 1970: 17-18.

MATERIAL EXAMINED: **Types:** Female holotype (363, UCD), from leaf mould, Devil's Post Pile, Mono Co, California, U.S.A.

DISTRIBUTION: This species is known only from California (U.S.A.) (SUMMERS and PRICE, 1970).

DIAGNOSIS: Rostrum 1.4 times longer than wide. Peritremes with 6 pairs of links. Palpal claw with 11-12 teeth. All setae of palpal tibia smooth, hair-like. Outer lateral seta of palpal tibia smooth and hair-like. Dorsal lateral and median setae of the idiosoma fan-like. Propodonal shield with 3 pairs of median setae. Median hysteronotal shield well developed, with 4 pairs of lateral and 3 pairs of median setae. Dorsal shields well punctated. Dorsal interscutal areas striate-granulate. Setae *II* situated off the hysteronotal shield. Tibia I with 4 setae, 3 hair-like and 1 lanceolate.

**7. *Cheletomimus (H.) granula* (SUMMERS et PRICE, 1970) comb. nov.**  
(Fig. 6B)

*Hemicheyletia granula* SUMMERS and PRICE, 1970: 13.

MATERIAL EXAMINED: **Types:** Female holotype (364 UCD), from moss and ant nest, 1 km N, 1 km E of Quezaltepeque, El Salvador, 8.VI. 1961. (Coll. M.E. IRWIN).

DISTRIBUTION: This species is known only from El Salvador (SUMMERS and PRICE, 1970).

DIAGNOSIS: Peritremes with 6-7 pairs of links,  $\Pi$ -shaped. Palpal claw with 4-6 teeth. All setae of palpal tibia smooth, hair-like. Outer lateral seta of palpal tibia serrate

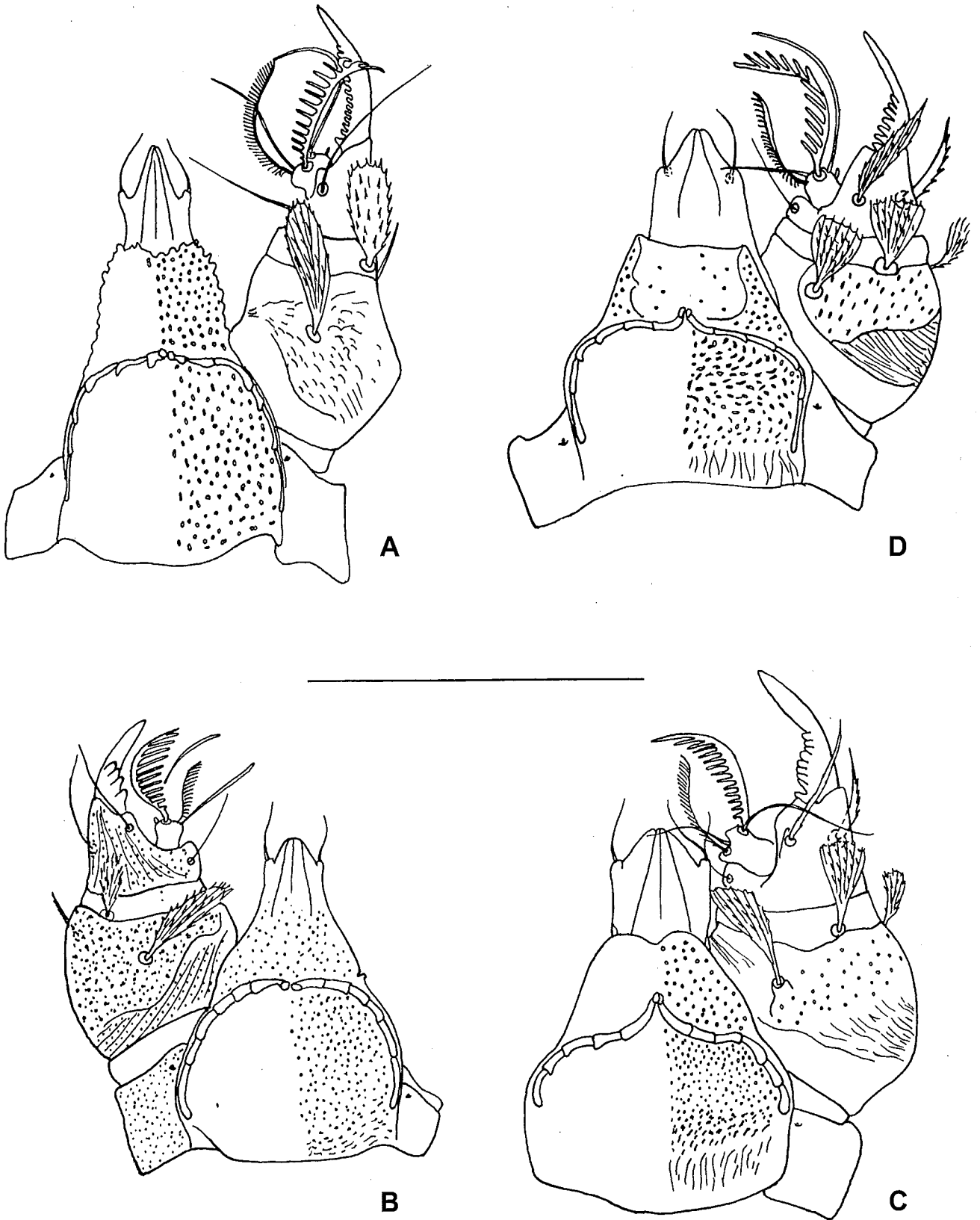


Fig. 6 — *Gnathosoma* of females in dorsal view. *Cheletomimus* (H.) *rostellata* (SUMMERS et PRICE, 1970) (A). *Cheletomimus* (H.) *granula* (SUMMERS et PRICE, 1970) (B). *Cheletomimus* (H.) *congensis* (CUNLIFFE, 1962) (C). *Cheletomimus* (H.) *kysenyiensis* (THEWKE et ENNS, 1979) (D). Scale line 100  $\mu$ m.

hair-like. Dorsal lateral and median setae of the idiosoma fan-like. Propodonotal shield with 3 pairs of median setae. Median hysteronotal shield well developed, with 5 pairs of lateral (including *l1*) and 3 pairs of median setae. Dorsal shields well punctated. Guard seta of tarsus I serrate, as long as 1/3 of tarsus I. Dorsal interscutal areas striate-granulate. Tibia I with 4 setae.

**8. *Cheletomimus (H.) congensis* (CUNLIFFE, 1962)  
comb. nov.  
(Fig. 6C)**

*Paracheyleletia congensis* CUNLIFFE, 1962: 197.

*Hemicheyleletia congensis*, VOLGIN, 1969: 203-204; SUMMERS and PRICE, 1970: 13; CORPUZ-RAROS, 1998: 273-274.

*Hemicheyleletia lacinia* RASOOL and CHAUDHRI, 1979: 2-3, **syn. nov.**

**MATERIAL EXAMINED: Types:** Female lectotype (USNM 2880), on *Acacia* sp., Kysenyi, Congo, 12. V. 1955. (Coll. E.W. BAKER).

**Other specimens:** 2 females, from grassland, UPLB Campus, College, Laguna, the Philippines, 10. v. 1975. Coll. J.M. SOTTO and R.C. GARCIA.

**DISTRIBUTION:** This species was described from Congo (CUNLIFFE, 1962). At the present time it is known from Pakistan (as *H. lacinia* RASOOL et CHAUDHRI, 1979, see Remarks) and the Philippines (RASOOL and CHAUDHRI, 1979; CORPUZ-RAROS, 1998).

**DIAGNOSIS:** Anterior margin of rostral shield with median concavity. Peritremes with 6 pairs of links. Palpal claw with 7-11 teeth. Palpal tibia: Dorsal and outer ventral setae thickened and plume-like. Dorsal lateral and median setae of the idiosoma fan-like. Propodonotal shield with 3 pairs of median setae. Median hysteronotal shield well developed, with 4 pairs of lateral and 1 pair of median setae. Dorsal shields poorly punctated. Dorsal interscutal areas striate-granulate. Setae *l1* situated off the hysteronotal shield. Tibia I with 4 setae.

**REMARKS.** In their differential diagnosis RASOOL and CHAUDHRI (1979) compared *H. lacinia* RASOOL et CHAUDHRI, 1979 only with *C. vesusus* QAYYUM et CHAUDHRI, 1979. Actually, this species is clearly distinguished from *C. vesusus*, but does not differ from *C. congensis*. Therefore we consider *H. lacinia* **syn. nov.** as a junior synonym of the latter.

**9. *Cheletomimus (H.) kysenyiensis* (THEWKE et ENNS, 1979) comb. nov.  
(Fig. 6 D)**

*Hemicheyleletia kysenyiensis* THEWKE and ENNS, 1979: 218-221.

**MATERIAL EXAMINED: Type:** Female holotype (2022122, USNM), on *Acacia* sp., Kysenyi, Congo, 12. V. 1955. (Coll. E.W. BAKER).

**DISTRIBUTION:** This species is known only from Congo (THEWKE and ENNS, 1979).

**DIAGNOSIS:** Peritremes with 6 pairs of links. Palpal claw with 7-9 teeth. Palpal tibia: Dorsal seta narrow fan-like, outer ventral seta thickened and plume-like. Dorsal lateral and median setae of the idiosoma fan-like. Propodonotal shield with 1 pair of median setae. Median hysteronotal shield without setae, a single pair of median setae situated in front of the anterior margin of this shield. Setae *l3* situated far from the posterior margin of the hysteronotal shield. Dorsal shields well punctated. Dorsal interscutal areas striate. Tibia I with 4 setae.

**10. *Cheletomimus (H.) vesusus* (QAYYUM et CHAUDHRI, 1979) comb. nov.**

*Hemicheyleletia vesusus* QAYYUM and CHAUDHRI, 1979: 167-169

*Hemicheyleletia laguncula* RASOOL and CHAUDHRI, 1979: 4-5, **syn. nov.**

This species was not available for study. The female holotype is deposited at the Department of Entomology, University of Agriculture, Faisalabad, Pakistan. Our diagnosis is based on the original description (QAYYUM and CHAUDHRI, 1979).

**DISTRIBUTION:** This species is known only from Pakistan (QAYYUM and CHAUDHRI, 1979).

**DIAGNOSIS:** Peritremes with 5 pairs of links. Palpal claw with 9 teeth. Shape of the setae of palpal tibia unknown. Dorsal lateral and median setae of the idiosoma fan-like. Propodonotal shield with 4 pairs of median setae. Median hysteronotal shield well developed, with 4 pairs of lateral and 3 pairs of median setae. Dorsal shields well punctated. Dorsal interscutal areas striate-granulate. Setae *l1* situated off the hysteronotal shield. Tibia I with 5 setae.

**REMARKS.** According to the original description (RASOOL and CHAUDHRI, 1979), the species *H. laguncula* RASOOL et CHAUDHRI, 1979 differs from *C. vesusus* by the following characters: In *H. laguncula*, setae *l5* are present; the genu I has a solenidion, the tibiae I and II bear 6 and 5 setae, respectively, the formula of chaetotaxy of tarsi I-IV is 8-7-7-7, the length ratio of leg I/idiosoma is 0.56. In *C. vesusus*, setae *l5* are absent, genu I is devoid of a solenidion, tibiae I and II bear 5 and 4 setae, respectively, the formula of chaetotaxy of tarsi I-IV is 6-4-4-4, and the length ratio leg I/idiosoma is 1.7.

The setae *l5* are present in all species of *Cheletomimus*. In *C. vesusus* (QAYYUM and CHAUDHRI, 1979: fig. 1e, p. 168) these setae are depicted in terminal position, but

in the holotype of *C. laguncula* they are depicted dorsally. This difference is probably artificial and was caused during the mounting of the mite (RASOOL and CHAUDHRI, 1979: fig. 2a, p. 5). The small solenidion on genu I is always present in *Cheletomimus* but in some specimens very difficult to see. The difference in the numbers of the setae of the tibiae I and II is a simple misunderstanding. The tibiae I and II in Cheyletidae have no more than 5 and 4 setae, respectively (VOLGIN, 1969, FAIN *et al.*, 1997). However, these segments in *Cheletomimus* also bear a solenidion. RASOOL and CHAUDHRI (1979) included this solenidion in the number of the tibial setae, while QAYYUM and CHAUDHRI (1979) did not count this solenidion among the setae. The number of setae of tarsi I-IV is inaccurate in the description of *C. vescus*. In the figure of tarsi I QAYYUM and CHAUDHRI (1979: fig. 1b, p. 168) depicted 8 or more setae on tarsus I and they related only 6 in their description. In the tarsi II-IV, they depicted 6 setae on the tibia II. We measured the length ratio of leg I/ idiosoma in *C. laguncula* and *C. vescus*, using the original figures. In these two species, the ratio is quite similar. Thus, *C. laguncula* is not different from *C. vescus* and we consider it as a junior synonym of the last species.

**11. *Cheletomimus (H.) cordovensis* (DE LEON, 1962)  
comb. nov.**

*Cheyletia cordovensis* DE LEON, 1962: 129-130.  
*Hemicheyletia cordovensis*, VOLGIN, 1969: 204-205;  
SUMMERS and PRICE, 1970: 14.

This species is known from a single female specimen in bad condition (SUMMERS and PRICE, 1970). Therefore its diagnosis is based on the original description (DE LEON, 1962) and the re-description of SUMMERS and PRICE (1970).

DISTRIBUTION: This species is known only from Mexico (DE LEON, 1962).

DIAGNOSIS: Peritremes with 5 pairs of links. Palpal claw with 8 teeth. All setae of the palpal tibia smooth, hair-like. Dorsal lateral and median setae of the idiosoma fan-like. Propodonal shield with 1 pair of median setae. Median hysteronotal shield well developed, with 5 pairs of lateral (including *II*) and 1 pair of median setae. Dorsal shields well punctated. Dorsal interscutal areas striate-granulate. Tibia I with 4 setae.

**12. *Cheletomimus (H.) asiatica* (VOLGIN, 1978)  
comb. nov.  
(Fig. 7)**

*Hemicheyletia asiatica* VOLGIN, 1978: 149.

MATERIAL EXAMINED: **Types:** Female holotype (T-Ch-46, ZIN), a burrow of tarantula, Sayat Distr., Turkmenia, 5. X. 1967. (Coll. A. DZHUMAYEV).

DISTRIBUTION: This species is known only from Turkmenia (VOLGIN, 1978).

DIAGNOSIS: Peritremes with 5 pairs of links. Palpal claw with 7-8 teeth. Palpal tibia: Dorsal seta thickened, smooth. Outer ventral setae thickened and plume-like. Dorsal lateral and median setae of the idiosoma fan-like. Propodonal shield with 1 pair of median setae. Median hysteronotal shield well developed, with 4 pairs of lateral and 1 pair of median setae. Dorsal shields well punctated. Dorsal interscutal areas striate-granulate. Setae *II* situated off the hysteronotal shield. Tibia I with 4 setae.

**13. *Cheletomimus (H.) makilingensis* (CORPUZ-RAROS,  
1972) comb. nov.**

*Hemicheyletia makilingensis* CORPUZ-RAROS, 1972: 256.

MATERIAL EXAMINED: **Types:** Female holotype (UPLB), on *Schizostachyum lima*, Mt. Makling, Laguna, the Philippines, 18. III. 1967 (Coll. P. DE GUZMAN).

**Other specimens:** 1 female, on *Schizostachyum lima*, UPLB Forestry Campus College, Laguna, the Philippines, 23.IX.1977. (Coll. R.C. GARCIA).

DISTRIBUTION: This species is known only from the Philippines (CORPUZ-RAROS, 1972).

DIAGNOSIS: Peritremes with 6 pairs of links. Palpal claw with 6 teeth. Palpal tibia: Dorsal and outer ventral setae thickened and plume-like. Dorsal lateral and median setae of the idiosoma fan-like. Propodonal shield with 2 pairs of median setae. Median hysteronotal shield well developed, with 5 pairs of lateral (including *II*) and 2 pairs of median setae. Dorsal shields densely granulated. Dorsal interscutal areas striate-granulate. Tibia I with 4 setae.

**14. *Cheletomimus (H.) transversa* (CORPUZ-RAROS,  
1972) comb. nov.  
(Fig. 8)**

*Hemicheyletia transversa* CORPUZ-RAROS, 1972: 257-258; CORPUZ-RAROS and SOTTO, 1977: 170.

*Hemicheyletia morii* EHARA and ABDUL GHANI, 1988: 237-239, **syn. nov.**

MATERIAL EXAMINED: **Types:** Female holotype (UPLB) and male paratype, on *Centrostemma multiflora*, Mt. Makiling, Laguna, the Philippines, 1.V. 1963. (Coll. R.S. RAROS). 1 female paratype, on *Bambusa* sp., UPCA Campus, College, Laguna, the Philippines, 18. V. 1962. (Coll. P.M. RAMIREZ)

**Other specimens:** 13 females and 2 males, on *Anisoptera thurifera*, Makiling Botanic Gardens, Los Baños, Laguna, the Philippines, 21. IV. 1978. (Coll. R.C. GARCIA). 1 female, on *Dipterocarpus warburgii*, same locality

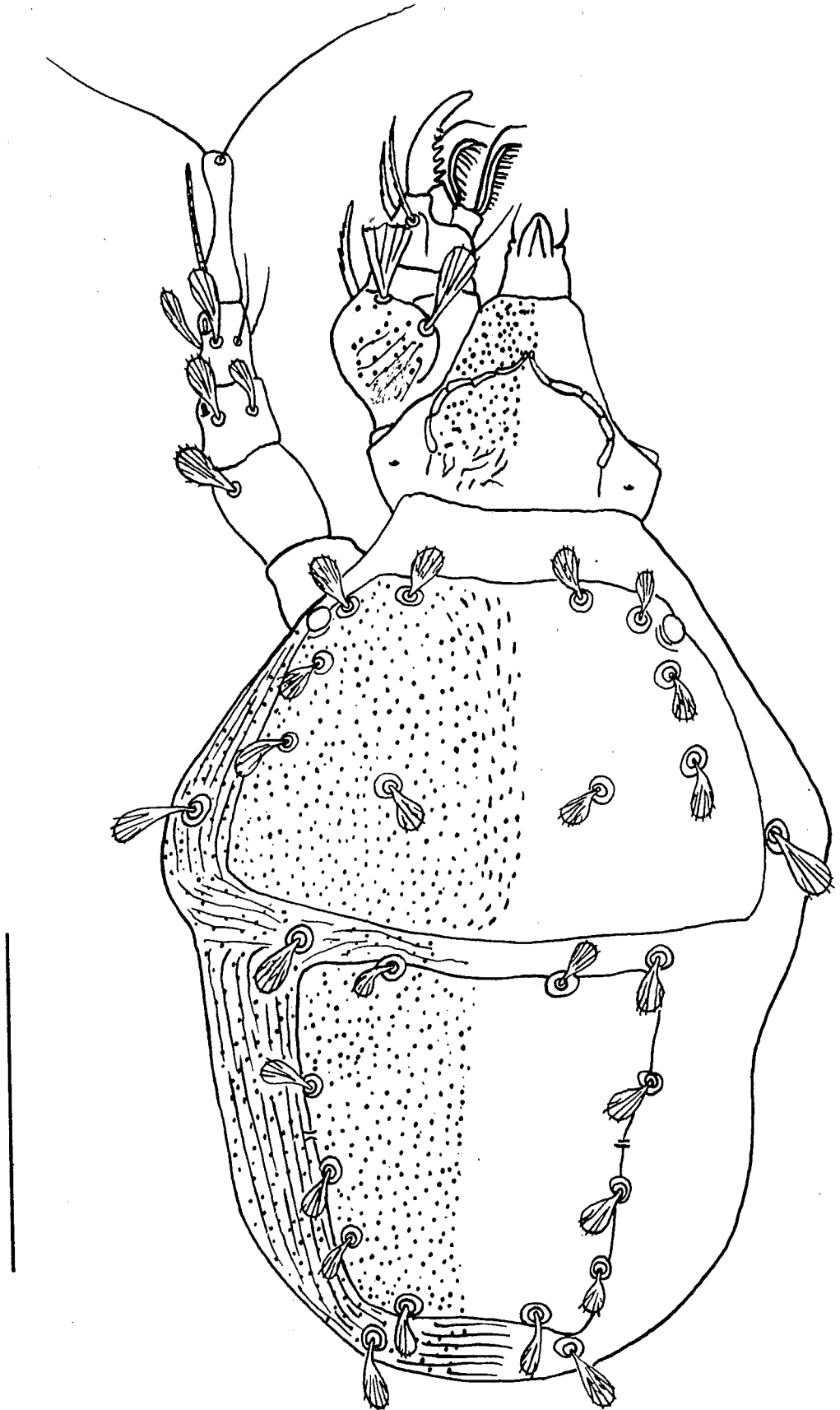


Fig. 7 — *Cheletomimus (H.) asiatica* (VolGIN, 1978), female in dorsal view. Scale line 100  $\mu$ m.



Fig. 8 — *Cheletomimus (H.) transversa* (CORPUZ-RAROS, 1972), female in dorsal view. Scale line 100  $\mu$ m.

as previous, 27.XI.1976. (Coll. J.M. SOTTO). 2 females, on *Pterocarpus indicus*, UPLB Campus, College, Laguna, the Philippines, 15. X. 1997. (Coll. L.D. TAYLO). 1 female, on an unknown plant, Bukit, Timah, Singapore, 15. III. 1967. (Coll. PHOO-HI-LIN).

DISTRIBUTION: This species was described from the Philippines (CORPUZ-RAROS, 1972). It has also been recorded from Malaysia (as *Hemicheyletia morii* EHARA, 1988, see Remarks) (EHARA and ABDUL GHANI, 1988).

DIAGNOSIS: Peritremes with 5-7 pairs of links. Palpal claw with 8-9 teeth. Palpal tibia: Dorsal and outer ventral setae thickened and plume-like. Dorsal lateral and median setae of the idiosoma fan-like. Propodonal shield with 1 pair of median setae. Median hysteronotal shield well developed, with 5 pairs of lateral (including *l1*) and 1 pair of median setae. Dorsal shields densely covered with granules. Dorsal interscutal areas striate-granulate. Tibia I with 4 setae.

REMARKS. According to the original description (EHARA and ABDUL GHANI, 1988), *H. morii* EHARA, 1988 differs from *C. transversa* by the following characters: In *H. morii*, the peritremes have only 5 pairs of links, the setae *l3* are situated relatively far inside on the median hysteronotal shield. In the holotype of *C. transversa*, the peritremes have 7 links, the setae *l3* are situated on the lateral margins of the hysteronotal shield. It is to be noted that some specimens of *C. transversa* have 5 pairs of peritremal links and that the position of the setae *l3* is variable. Therefore, *H. morii* **syn. nov.** is considered here as a junior synonym of *C. transversa*.

**15. *Cheletomimus (H.) reticulata* JEFFREY et CAMPBELL, 1975 comb. nov.**  
(Fig. 9)

*Hemicheyletia reticulata* JEFFREY and CAMPBELL, 1975: 103-105.

MATERIAL EXAMINED: **Types:** Female holotype (1974. 426, NHML), from cheese, Gigha Is., Argyll, Scotland, 30.V. 1973. (Coll. I.B. ANDERSON).

DISTRIBUTION: This species is still known only from Scotland (JEFFREY and CAMPBELL, 1975).

DIAGNOSIS: Peritremes with 5 pairs of links. Palpal claw with 6 teeth. Palpal tibia: Dorsal and outer ventral setae thickened and plume-like. Anterior margin of rostral shield with a pair of lateral teeth. Dorsal lateral and median setae of the idiosoma fan-like. Propodonal shield with 3 pairs of median setae. Median hysteronotal shield well developed, with 5 pairs of lateral (including *l1*) and 3 pairs of median setae. Dorsal shields covered with a network pattern. Dorsal interscutal areas striate-granulate. Tibia I with 4 setae.

**16. *Cheletomimus (H.) scutellata* (DE LEON, 1962) comb. nov.**

*Cheyletia scutellata* DE LEON, 1962: 130.  
*Paracheyletia scutellata*, MUMA, 1964: 246.  
*Andrecheyletia scutellata*, VOLGIN, 1969: 220.  
*Hemicheyletia scutellata*, SUMMERS and PRICE, 1970: 14-15.

The diagnosis is based on the re-descriptions of VOLGIN (1969) and SUMMERS and PRICE (1970).

DISTRIBUTION: This species was described from Florida (U.S.A.) (holotype and part paratypes) and from Mexico (paratypes) (DE LEON, 1962).

DIAGNOSIS: Peritremes with 6 pairs of links. Palpal claw with 5-7 teeth. Palpal tibia: Dorsal seta narrow smooth and slightly inflated, outer ventral seta thickened and plume-like. Dorsal lateral and median setae of the idiosoma lanceolate. Propodonal shield with 1 pair of median setae. Median hysteronotal shield bears only setae *l2*, a single pair of median setae situated before the anterior margin of this shield. Setae *l3* situated far from the posterior margin of the hysteronotal shield. Dorsal shields well punctated. Dorsal interscutal areas striate-granulate. Tibia I with 4 setae.

**17. *Cheletomimus (H.) leytensis* (CORPUZ-RAROS, 1988) comb. nov.**  
(Fig. 10)

*Hemicheyletia leytensis* CORPUZ-RAROS, 1988: 419-420; 1998: 275-276.

MATERIAL EXAMINED: **Types:** Female holotype (UPLB) and 14 female paratypes, from leaf litter, Babatngon, Leyte Is., the Philippines, 15. IX. 1984. (Coll. L.O. ABELLA).

**Other specimens:** six females and 2 males, from decomposing rice hay, Pintor, Gamu, Isabela, Luzon Is., the Philippines, 26. V. 1996. (Coll. L.A. CORPUZ-RAROS).

DISTRIBUTION: This species is known only from the Philippines (CORPUZ-RAROS, 1988).

DIAGNOSIS: Peritremes with 5 pairs of links. Palpal claw with 8-10 teeth. Palpal tibia: Dorsal and outer ventral setae thickened and plume-like. Palpal femur with 3 fan-like setae and 1 (inner ventral) hair-like seta. Dorsal lateral and median setae of the idiosoma fan-like. Propodonal shield with 4-5 pair of median setae. Median hysteronotal shield well developed, with 4 pairs of lateral and 3 pairs of median setae. Dorsal shields densely covered with round granules. Dorsal interscutal areas striate-granulate. Outer seta of coxa III lanceolate. Tibia I with 4 setae.

**Group *wellsi***

Median setae of the dorsum aberrant, differing markedly from lateral setae.



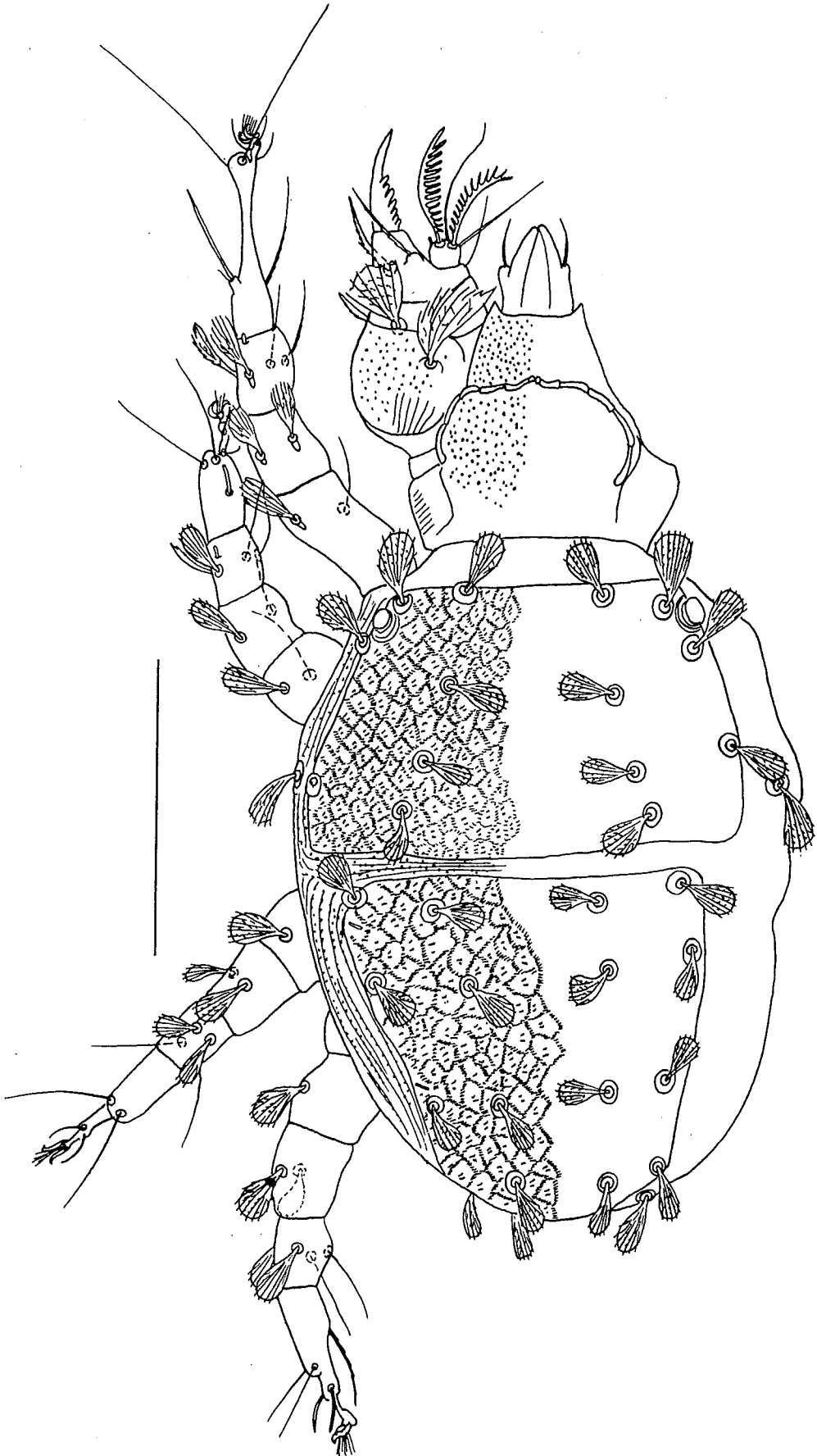


Fig. 9 — *Cheletomimus* (H.) *reticulata* JEFFREY et CAMPBELL, 1975, female in dorsal view. Scale line 100  $\mu$ m.

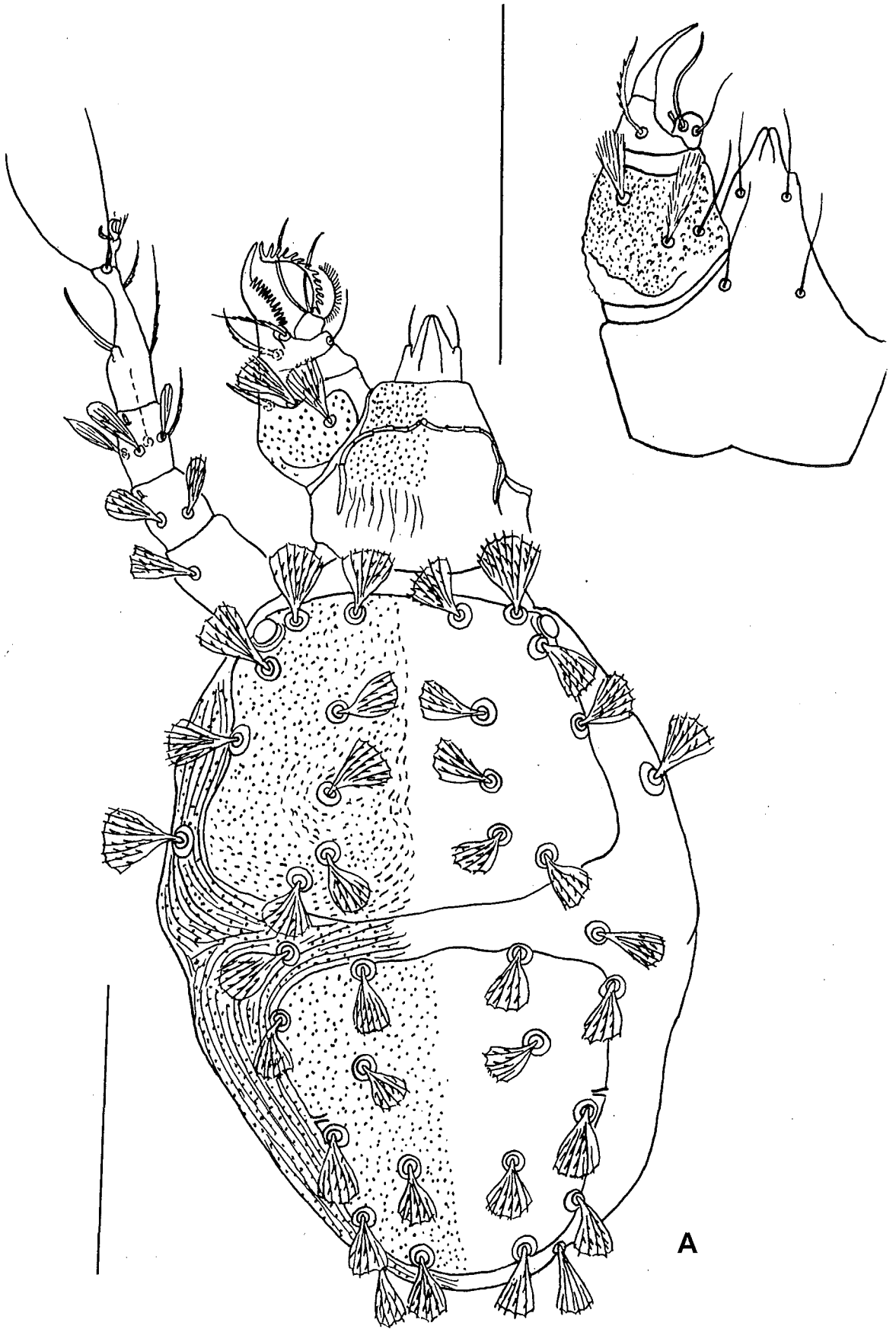


Fig. 10 — *Cheletomimus* (H.) *leytensis* (CORPUZ-RAROS, 1988), female in dorsal view (A). Gnathosoma in ventral view (B). Scale line 100  $\mu$ m.

**18. *Cheletomimus (H.) wellsii* (BAKER, 1949) comb. nov.**  
(Fig. 11)

*Cheyletia wellsii* BAKER, 1949: 300-301; DE LEON, 1962: 132.

*Paracheyletia wellsii*, VOLGIN, 1955: 169; DE LEON: 1962: 132; MUMA: 1964: 245-246.

*Dendrocheyletia wellsii*, VOLGIN, 1969: 211-212.

*Hemicheyletia wellsii*, SUMMERS and PRICE, 1970: 15.

**MATERIAL EXAMINED: Types:** Female holotype (USNM, 1771), on Navel Oranges, Philadelphia, U.S.A., 9. II. 1945. (Coll. A.B. WELLS).

**Other specimens:** 1 female, Boston, U.S.A., 18. I. 1975. 1 female, on lemon, Boston, U.S.A., 18. I. 1975. 1 female, from soil from logs, Hawaii, III. 1962. (Coll. H.A. WOOLFORD). 1 female under floral pieces of coconuts, Dahomey/Kraké, 10.IX.1974 (Coll. M.M. ELLSBURY). 2 females from citrus, Guatemala, 1. IV. 1954. (Coll. C.A. FLESCNER). 1 male from *Juniperus*, Ontario, U.S.A. 1 female, on *Leucosyke capitellata*, Diadi, Nueva Vizcaya, the Philippines, 22. III. 1977. (Coll. R.C. GARCIA). 1 female, on *Artocarpus ovatus*, Mt. Makiling, Mud Spring Area, Laguna, the Philippines, 26.IV.1967 (Coll. F. VELASQUEZ). 1 female, from litter of *Vitex parviflora*, Makiling Botanic Gardens, Laguna, the Philippines, 24.X.1975 (Coll. R.C. GARCIA). 1 female, on *Casuarina equisetifolia*, BSU campus, La Trinidad, Benguet, the Philippines, 23.II.2002. (Coll. R.C. GARCIA).

**DISTRIBUTION:** This species was described from Philadelphia (U.S.A.) (BAKER, 1949). It is a common species in South and Central America and the Philippines (DE LEON, 1962; MUMA, 1964; SUMMERS and PRICE, 1970; CORPUZ-RAROS and SOTTO, 1977). The record of this species in Taiwan (TSENG, 1977), actually belongs to another species, *C. wellsina*. The finding of *C. wellsii* in Australia (GERSON, 1994) should be confirmed, because these specimens could also belong to *C. wellsina*.

**DIAGNOSIS:** Peritremes with 6 pairs of links. Palpal claw with 6-9 teeth. All setae of palpal tibia smooth, hair-like. Dorsal lateral setae of the idiosoma fan-like. Median setae of the idiosoma aberrant, staghorn-like. Propodotal shield with 1-5 pairs of median setae. Median hysteronotal shield well developed, with 4 pairs of lateral and 2 pairs of median setae. Dorsal shields well punctated. Dorsal interscutal areas striate-granulate. Setae II situated off the hysteronotal shield. Tibia I with 4 setae.

**19. *Cheletomimus (H.) wellsina* (DE LEON, 1967) comb. nov.**  
(Fig. 12)

*Paracheyletia wellsina* DE LEON, 1967: 34.

*Hemicheyletia wellsina*, SUMMERS and PRICE, 1970: 18; CORPUZ-RAROS and SOTTO, 1977: 158-161; TSENG, 1977: 216-218; EHARA and ABDUL GHANI, 1988: 239.

*Hemicheyletia arecana* TSENG, 1972 (TSENG, 1972, = TJYING, 1972): 8-9; 1977: 225 **syn. nov.**

*Hemicheyletia wellsii*, TSENG, 1977: 224-225 (misidentification); CORPUZ-RAROS and SOTTO, 1977: 157-158 (misidentification).

*Hemicheyletia uichancoi*, CORPUZ-RAROS, 1972: 261 (Misidentification of "other specimens examined")

**MATERIAL EXAMINED:** 4 females, on Sorgo almacenado, Palmira/Valle, 25. IX. 1974. (Coll. F. GARCIA). 1 female, on sebring litter, McLeod Grove, Florida, U.S.A., 29. I. 1968. 1 female, under floral pieces of coconuts, Dahomey/Krake, 10. IX. 1974. (Coll. M.M. ELLSBURY). 1 female, on *Hibiscus* sp. leaf, Hidalgo, Texas, 1. V. 1936. (Coll. F.E. SWAN). 1 female, on citrus, Guatemala, 1. IV. 1954. (Coll. C.A. FLESCNER). 1 female, on decomposing bark of *Araucaria* sp., UPLB campus, College, Laguna, 5. III. 1972. (Coll. L.A. CORPUZ-RAROS). 4 females, on *Asparagus* sp., College, Laguna, the Philippines, 5.II.1967. (Coll. R.A. OLAGUER). 1 female, on *A. plumosus*, same locality as previous, 21.I.1967. (Coll. L.C. RIMANDO). 1 female, on *Ehretia microphylla*, same locality as previous, 14.II.1967. (Coll. F. VELASQUEZ); 1 female, on *Punica granatum*, same locality as previous, 15.II.1967. (Coll. R.A. OLAGUER). 1 female, on *Arcangelisia flava*, Los Baños, Laguna, Luzon, the Philippines, 29. V. 1993. (R.C. GARCIA). 1 female on *Caryota cumingii*, UPLB Forestry Campus, College, Laguna, the Philippines, 31.IV.1993. (Coll. R.C. GARCIA). 2 females on *Artocarpus sericarpus*, same data as previous. 1 female on litter of *Serialbizia falcataria*, Makiling Botanic Gardens, College, Laguna, the Philippines, 11.VIII.1975. (Coll. R.C. GARCIA). 1 female, same data as previous but collected on 3.VI.1976. 3 females, on *Mikania micrantha*, Mt. Makiling, Los Baños Laguna, the Philippines, 27.V.1993. (Coll. R.C. GARCIA). 1 female, on *Paspalum conjugatum*, same data as previous. 1 female, from litter under coconut-banana, same locality as previous, 2.III.1995 (Coll. R.C. GARCIA). 2 females, on *Clitorea ternatea*, Pintor, Gamu, Isabela, the Philippines, 8. II. 1973. (Coll. L.A. CORPUZ-RAROS). 1 female, on *Castanea crenata*, Baguio City, the Philippines, 29.III.1965 (Coll. C.R. VEGA). 1 female, on *Melaleuca leucodendron*, same locality as previous, 22.IV.1967. (Coll. L.C. RIMANDO). 1 female, on *Wedelia biflora*, Puerto Galera, Mindoro Isl., the Philippines, 18.V.1963 (Coll. L.A. CORPUZ-RAROS). 1 female, on *Lepisanthes schizolenis*, Bislig, Surigao del Sur, Mindanao Isl., the Philippines, 26.V.1977. (Coll. R.C. GARCIA). 1 female, from *Chiropodomys gliroides*, Gombak Forest, Malaysia, 3. XI. 1982. (Coll. F.S. LUKOSCHUS). 3 females, on *Rubus ulmifolius*, Algeria, 7. X. 1956. (Coll. ATHIAS-HENRIOT). 3 females, from nest of *Textor cucullatus*, Astrida, Rwanda, 13. V. 1955. (Coll. A. FAIN). 1 female, from *Oenomys* sp., Bogoro, Astrida, Rwanda, 1. IV. 1968. (Coll. A. FAIN). 1 female, from nest of *Dendromus* sp., Astrida, Rwanda, 12. V. 1955. (Coll. A. FAIN). 1 female, from nest of *Cossypha heuglini*, Astrida, Rwanda, 9. IV. 1970. (Coll. A. FAIN). 1

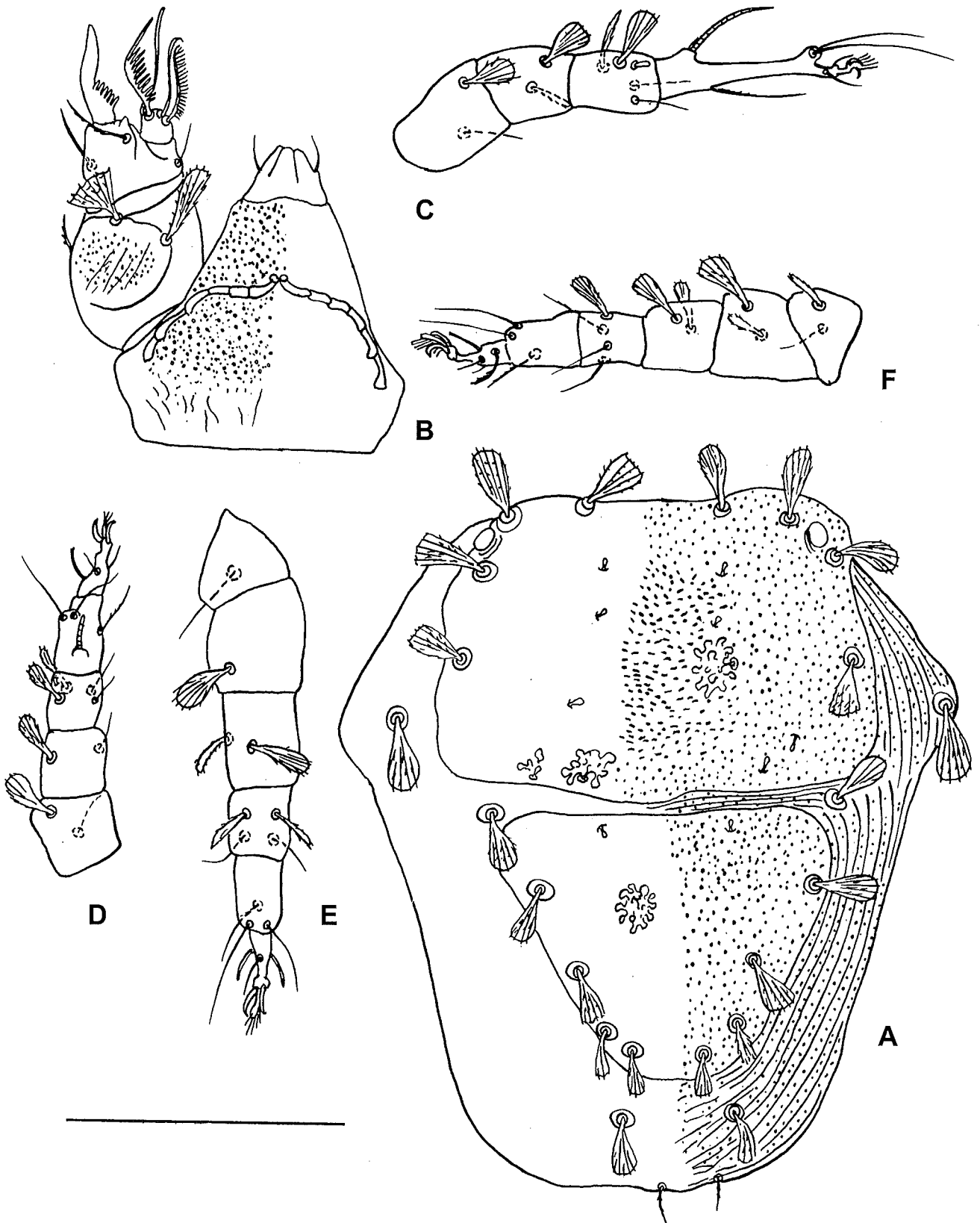


Fig. 11 — *Cheletomimus* (H.) *wellsi* (BAKER, 1949), holotype female in dorsal view (A). Gnathosoma in dorsal view (B), legs I-IV in dorsal view (C-F). Scale line 100  $\mu$ m.

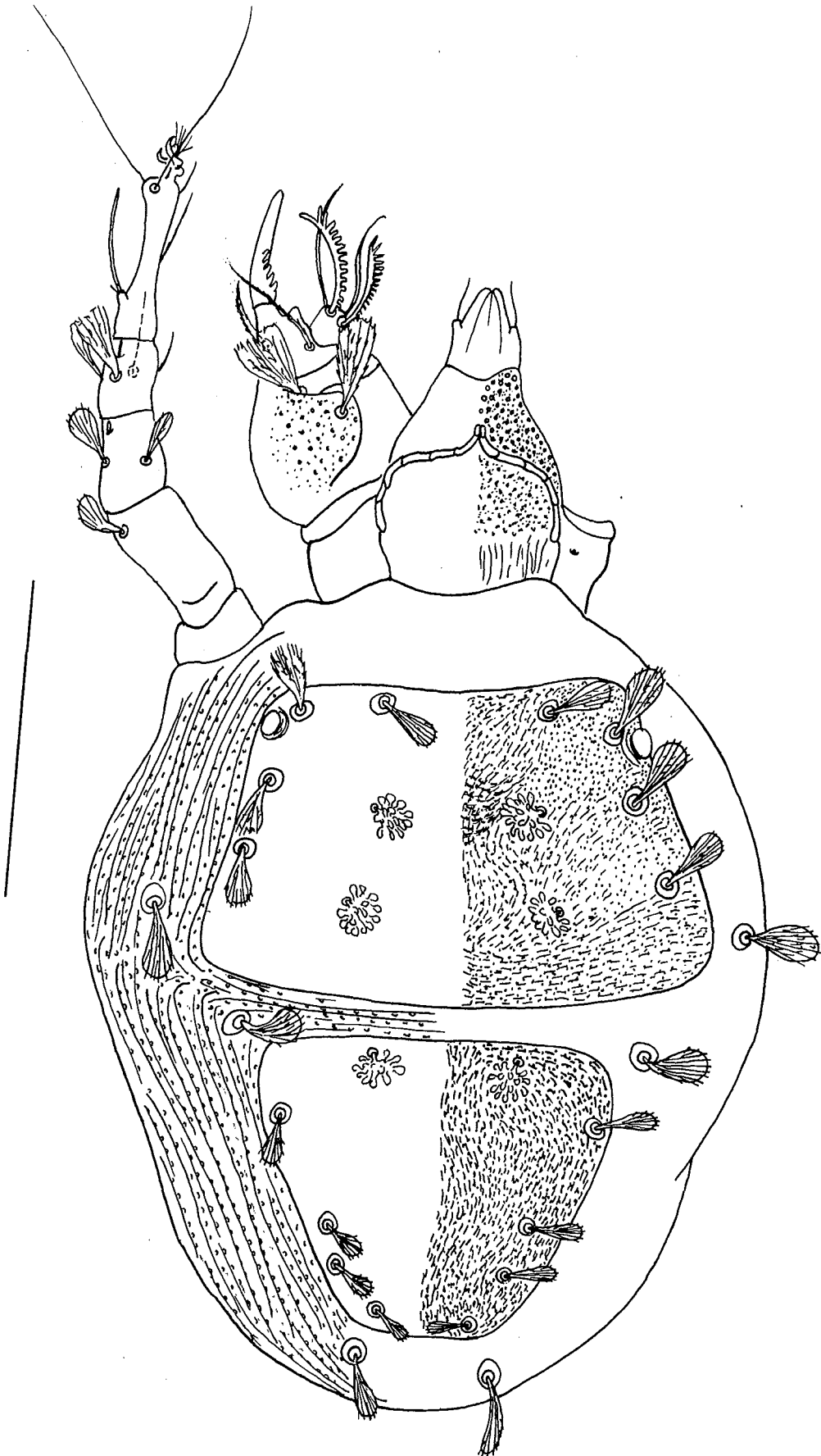


Fig. 12 — *Cheletomimus (H.) wellsina* (DE LEON, 1967), female in dorsal view. Scale line 100  $\mu$ m.

female, from humus, Cameroon, 25. XII. 1975. (Coll. F. PUYLAERT).

**DISTRIBUTION:** This species was described from Trinidad (DE LEON, 1964). At present time, it is known from Malaysia, Taiwan and the Philippines (CORPUZ-RAROS and SOTTO, 1977; TSENG, 1972, 1977; EHARA and GBDUL GHANI, 1988). and Africa (our data).

**DIAGNOSIS:** Peritremes with 5-6 pairs of links. Palpal claw with 6-9 teeth. Palpal tibia: Dorsal and outer ventral setae thickened and plume-like. Dorsal lateral setae of the idiosoma fan-like. Median setae of the idiosoma aberrant, staghorn-like. Propodonal shield with 2-3 pairs of median setae. Median hysteronotal shield well developed, with 2-4 pairs of lateral and 1-2 pair of median setae. Setae *l3* 1.3 times longer than *l4* and *d5*. Dorsal shields well punctated. Dorsal interscutal areas striate-granulate. Setae *l1* situated off the hysteronotal shield. Tibia I with 4 setae.

**REMARKS.** The name of Dr. TSENG had been erroneously translated by this author from Chinese to English into TJYING in his earlier paper (TJYING, 1972).

Following the original description (DE LEON, 1967) *C. wellsina* differs from *C. wellsii* by the number of medial setae on the dorsal shields. However, according to BAKER (1949) and our own observations, this character is highly variable in this species and it should not be used to separate the species. Actually, these species differ from each other by the shape of the outer ventral seta of the palpal tibia which is smooth in *C. wellsii* and serrate in *C. wellsina*.

TSENG (1972, 1977) described *C. arecana* from Taiwan. According to his description, it differs from *C. wellsii* only by the pattern of the ornamentation in the median part of the propodonal shield. However, our observations show that this character is variable. The "true" *C. wellsii* differs from *C. arecana* by the smooth outer ventral setae of the palpal tibia. On the other hand, the original description of *C. arecana* is not separable from that of *C. wellsina*. Therefore, we consider *C. arecana* **syn. nov.** a junior synonym of *C. wellsina*.

Furthermore, we think that the records of *C. wellsii* (mites with serrate dorsal and outer ventral setae of palpal tibia) from Taiwan (TSENG, 1977) and the Philippines (CORPUZ-RAROS and SOTTO, 1977), actually refer to *C. wellsina*.

## 20. *Cheletomimus (H.) tropica* (SHIBA, 1976) **comb. nov.**

*Cheyletia tropica* SHIBA, 1976: 169-171.

*Hemicheyletia tropica*, EHARA and ABDUL GHANI, 1988: 240.

This species was insufficiently described and was unavailable for our study. The diagnosis is based on the original description (SHIBA, 1976).

**DISTRIBUTION:** This species is known only from Malaysia (SHIBA, 1976).

**DIAGNOSIS:** Palpal claw with 5 teeth. Palpal tibia: Dorsal seta ?smooth, outer ventral seta ?plume-like. Dorsal lateral setae of the idiosoma fan-like. Median setae of the idiosoma aberrant, staghorn-like. Propodonal shield with 3 pairs of median setae. Median hysteronotal shield well developed, with 4 pairs of lateral setae; median setae lacking on this shield. Dorsal shields well punctated. Structure of dorsal interscutal areas unknown. Setae *l1* situated off the hysteronotal shield. Setae *l3-l5* and *d5* distinctly narrower than propodonal setae. Tibia I with 4 setae.

**REMARKS.** At first aspect *C. tropica* is very similar to *C. greenwoodi* **spec. nov.**, but it is, clearly distinguished from the latter by the presence of only 4 setae on tibiae I and by the lack of median setae on the hysteronotal shield. However, these differences could be explained by inaccuracies in the original description of *C. tropica*.

## 21. *Cheletomimus (H.) serrula* (SUMMERS et PRICE, 1970) **comb. nov.** (Fig. 13A)

*Hemicheyletia serrula* SUMMERS and PRICE, 1970: 15-16.

**MATERIAL EXAMINED: Type:** Female holotype (366, UCD), from rotting vegetation in rock crevice, Darwin Research Station, Galapagos Isles., 25. I. 1964. (Coll. R.O. SCHUSTER).

**DISTRIBUTION:** This species is still known only from Galapagos Islands (SUMMERS and PRICE, 1970).

**DIAGNOSIS:** Peritremes with 5 pairs of links. Palpal claw with 6-7 teeth. All setae of palpal tibia smooth, hair-like. Dorsal lateral setae of the idiosoma fan-like. Median setae of the idiosoma aberrant, staghorn-like. Propodonal shield with 3 pairs of median setae. Median hysteronotal shield with 2 pairs of lateral and 1 pair of median setae. The posterior margin of the hysteronotal shield situated at the level of setae *l3*. Dorsal shields well punctated. Dorsal interscutal areas striate-granulate. Setae *l1* and *l4* situated off the hysteronotal shield. Tibia I with 4 setae.

## 22. *Cheletomimus (H.) volgini* (CUNLIFFE, 1962) **comb. nov.** (Fig. 13B)

*Paracheyletia volgini* CUNLIFFE, 1962: 197, 200.

*Dendrocheyletia volgini*, VOLGIN, 1969: 210-211.

*Hemicheyletia volgini*, SUMMERS and PRICE, 1970: 14.

**MATERIAL EXAMINED: Types:** Female holotype (2022122,

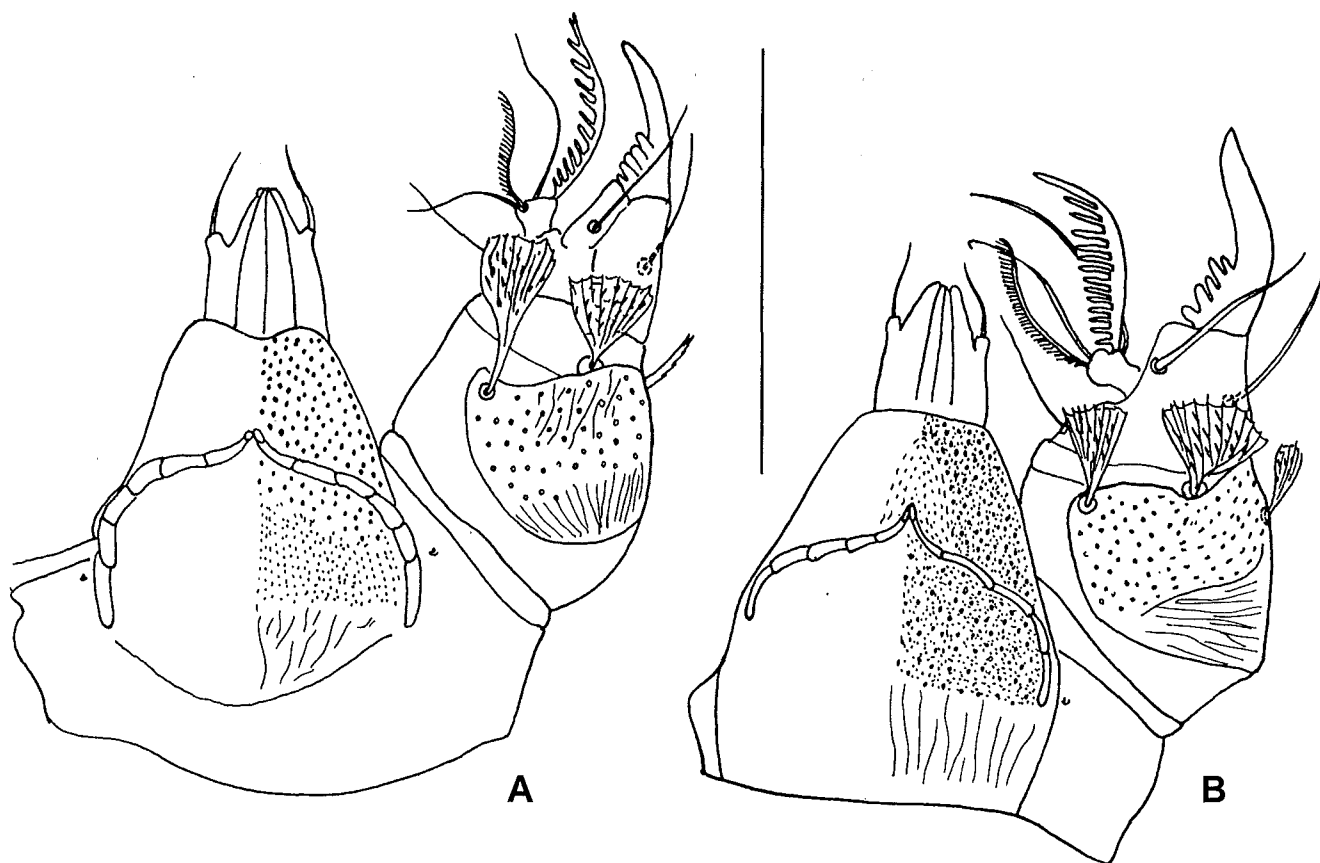


Fig. 13 — *Gnathosoma* of females. *Cheletomimus* (H.) *serrula* (SUMMERS et PRICE, 1970) (A). *Cheletomimus* (H.) *volgini* (CUNLIFFE, 1962) (B). Scale line 100  $\mu$ m.

USNM), on Australian pine, Mulunga, Congo, 18. V. 1955. (Coll. E.W. BAKER).

**Other specimens:** 2 females, from nest of rat, Buhoro, Rwanda, 2. IV. 1968. (Coll. A. FAIN).

**DISTRIBUTION:** This species was described from Congo (CUNLIFFE, 1962). We add a new record from Rwanda.

**DIAGNOSIS:** Peritremes with 6 pairs of links. Palpal claw with 6 teeth. All setae of palpal tibia smooth, hair-like. Dorsal lateral setae of the idiosoma fan-like. Median setae of the idiosoma aberrant, staghorn-like. Propodonotal shield with 3 pairs of median setae. Median hysteronotal shield very small, devoid of setae. Hysteronotum with 1 pair of median setae. Dorsal shields well granulated. Dorsal interscutal areas striate-granulate. Tibia I with 5 setae.

**23. *Cheletomimus* (H.) *darwinia* (SUMMERS et PRICE, 1970) comb. nov.**  
(Fig. 14)

*Hemicheyletia darwinia* SUMMERS and PRICE, 1970: 16-17.

**MATERIAL EXAMINED:** **Type:** Female holotype (365,

UCD), from grass near bay shore, Darwin Research Station, Galapagos Isles., 24. I. 1964. (Coll. R.O. SCHUSTER).

**DISTRIBUTION:** This species is still known only from Galapagos Islands (SUMMERS and PRICE, 1970).

**DIAGNOSIS:** Peritremes with 6 pairs of links. Palpal claw with 7 teeth. Dorsal and outer ventral setae thickened and plume-like. Dorsal lateral setae of the idiosoma fan-like. Median setae of the idiosoma aberrant, amoeboid rosettes. Propodonotal shield with 2 pairs of median setae. Median hysteronotal shield well developed, with 4 pairs of lateral and 1 pair of median setae. Setae *l3*, *l4* and *d5* subequal in length. Dorsal shields well punctated. Dorsal interscutal areas striate-granulate. Setae *l1* situated off the hysteronotal shield. Tibia I with 4 setae.

**24. *Cheletomimus* (H.) *anarbora* (DE LEON, 1967) comb. nov.**  
(Fig. 15)

*Paracheyletia anarbora* DE LEON, 1967: 34.

*Hemicheyletia anarbora*, SUMMERS and PRICE, 1970: 18; RORPUZ-RAROS and SOTTO, 1977: 154; TSENG, 1977: 226-228; EHARA and ABDUL GHANI, 1988: 239.

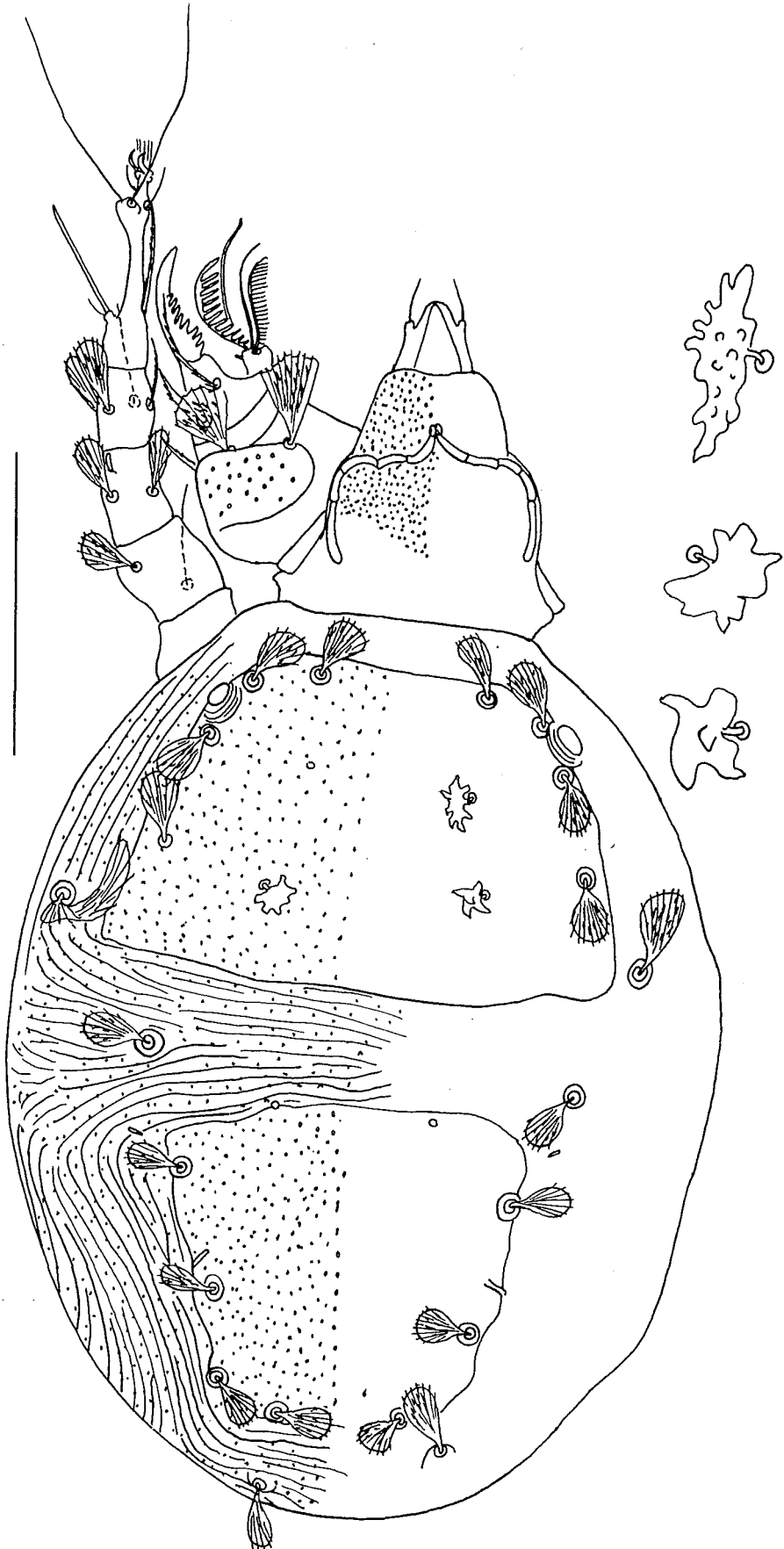


Fig. 14 — *Cheletomimus* (H.) *darwinia* (SUMMERS et PRICE, 1970), female in dorsal view. Scale line 100  $\mu$ m.



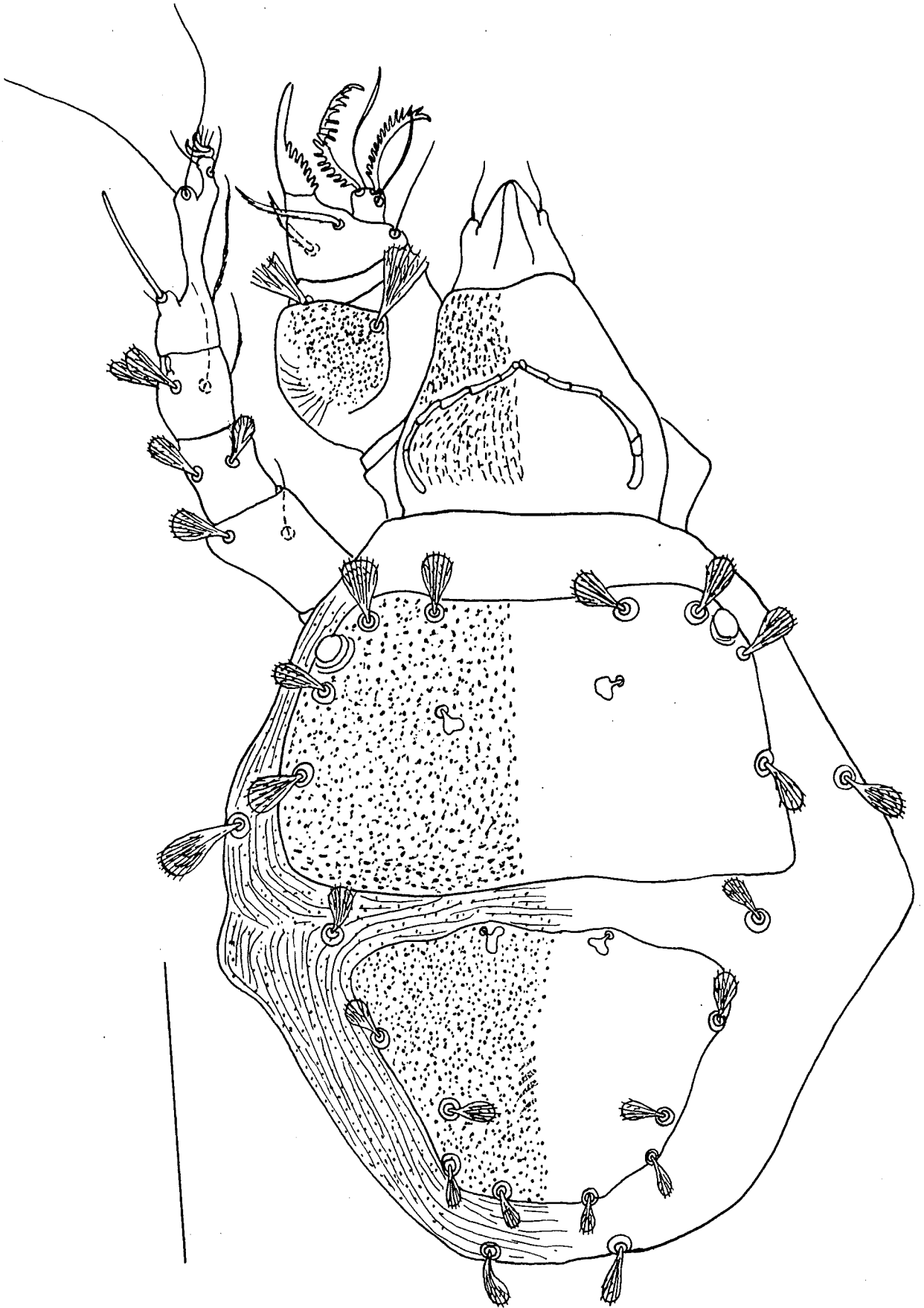


Fig. 15 — *Cheletomimus (H.) anarbora* (DE LEON, 1967), female in dorsal view. Scale line 100  $\mu$ m.

*Hemicheyletia pusillifolium* LIN JIANZHEN, PEN WENFU and CHEN YUMEI, 1994: 143, **syn. nov.**

MATERIAL EXAMINED: 1 female, on *Mallotus philippinensis*, Gonzaga, Cagayan, the Philippines, 30.III.1977. (Coll. R.C. GARCIA). 1 female, on *Euphorbia prunifolia*, Gamu, Isabela, the Philippines, 26.III.1977. (L.A. RORPUZ-RAROS). 2 females from litter under *Leucaena leucocephala*, Villaverde, Nueva Vizcaya, the Philippines 26.X.1962. (Coll. R.S. RAROS). 1 female, on *M. philippinensis*, Dolores, Abra, the Philippines, 23.X.1976. (Coll. J.M. SOTTO). 1 female, on *Luffa acutangula*, Pantabangan, Nueva Ecija, the Philippines, 7.XI.1976. (Coll. L.A. CORPUZ-RAROS). 1 female, on *Desmodium* sp., other data as in previous. 5 females, on *Thuja orientalis*, other data as in previous. 1 female, on cypress, Tagaytay City, Cavite, the Philippines, 11.VIII.1997. (Coll. L.D. TAYLO). 8 females, on *Asparagus plumosus*, UPLB Campus, College, Laguna, the Philippines, 24.III.1962. (Coll. P.M. RAMIREZ). 1 female, on ferns, 16.II.1962, other data as in previous. 9 females, on *Thuja orientalis*, 8.III.1962, other data as in previous. 1 female, on *Asparagus* sp., same locality as previous, 5.II.1967. (Coll. R.A. OLAGUER). 1 female, on *Piper nigrum*, 21.II.1967, other data as in previous. 1 female, on *Schizostachyum* sp., 8.I.1967, other data as in previous. 1 female, on ornamental bamboo, 28.I.1967, other data as in previous. 1 female on *Thunbergia* sp., same locality as previous, 23.II.1967. (Coll. F. VELASQUEZ). 3 females, on bamboo, same locality as previous, 28.III.1980. (Coll. J. SORIANO). 1 female, on cypress, same locality as previous, 30.VIII.1997. (Coll. L.D. TAYLO). 2 females, on *Citrus* sp., Mt. Makiling, Los Baños, Laguna, the Philippines, 27.V.1993, and 8.VI.1993. (Coll. R.C. GARCIA). 4 females, on cypress, 11.VI.1993, other data as in previous. 2 females, on *Lantana camara*, 2.VI.1993, other data as in previous. 2 females, on *Mikania micrantha*, 27.V.1993, other data as in previous. 1 female, on *Diplodiscus paniculatus*, Mt. Makiling, Calamba, Laguna, the Philippines, 10.IX.1976. (Coll. J.M. SOTTO). 1 female, on *Flemingia strobilifera*, other data as in previous. 1 female, on leaf litter, Mt. Banahaw, Sariaya, Quezon, the Philippines, 11.II.1977. (Coll. J.M. SOTTO). 2 females, on ornamental bamboo, Silay, Negros Occidental, Negros Isl., the Philippines, 26.VI.1967. (Coll. R.A. OLAGUER). 3 females, on *Schizostachyum diffusum*, Tungao, Agusan del Norte, Mindanao Isl., the Philippines, 29.V.1977. (Coll. R.C. GARCIA). 1 female, Takabannare, Shima, 7.VI. 1945, (Coll. HARDCASTLE).

DISTRIBUTION: This species was described from Trinidad (DE LEON, 1964). Later it was found in Malaysia, China (Fujian Prov.) (as *H. pusillifolium* LIN JIANZHEN *et al.*, 1994, see Remarks), Taiwan and the Philippines (CORPUZ-RAROS and SOTTO, 1977; TSENG, 1977; EHARA and ABDUL GHANI, 1988; LIN JIANZHEN *et al.*, 1994).

DIAGNOSIS: Peritremes with 6 pairs of links. Palpal claw with 5-8 teeth. Dorsal and outer ventral setae thickened

and plume-like. Dorsal lateral setae of the idiosoma fan-like. Median setae of the idiosoma aberrant, very small, bulb-like. Propodonal shield with 1 pair of median setae. Median hysteronotal shield well developed, with 4 pairs of lateral and 1 pair of median setae. Dorsal shields well punctated. Dorsal interscutal areas striate-granulate. Setae *11* situated off the hysteronotal shield. Tibia I with 4 setae.

REMARKS. According to the original description of *H. pusillifolium* LIN JIANZHEN *et al.*, 1994, this species should differ from *C. anarbora* by the very small leaf-like (bulb-like) dorsal median setae of the idiosoma. These authors described the median setae of *C. anarbora* as small and setiform. However, in the original description of the latter species (DE LEON, 1967), as well as in the re-descriptions by CORPUZ-RAROS and SOTTO (1977) and EHARA and ABDUL GHANI (1988) these setae are mentioned as being bulb-like rather than setiform. It is obvious that the incorrectly depicted setae in the article of TSENG (1977: fig. 15, p. 226) were the cause of this mistake. Moreover, in his re-description, TSENG (1977) did not describe the shape of the dorsal median setae of idiosoma. LIN JIANZHEN *et al.* (1994) obviously did not see the original description or the re-descriptions of *C. anarbora* and were misled by the figure in TSENG's article. Therefore we consider *H. pusillifolium* **syn. nov.** as a junior synonym of *C. anarbora*.

**25. *Cheletomimus (H.) chui* (TSENG, 1977) comb. nov.**  
(Fig. 16)

*Hemicheyletia chui* TSENG, 1977: 218-220.

MATERIAL EXAMINED: 1 female, from nest of *Muscicapa grandis*, Mt. Brinchang, Pahang, Malaysia, 22. IV. 1979. (Coll. NADCHATRAM).

DISTRIBUTION: This species was described from Taiwan (TSENG, 1977). We now record it from Malaysia for the first time.

DIAGNOSIS: Peritremes with 6 pairs of links. Palpal claw with 5-6 teeth. All setae of the palpal tibia smooth, hair-like. Dorsal lateral setae of the idiosoma lanceolate. Median setae of the idiosoma aberrant, staghorn-like. Propodonal shield with 1-2 pair of median setae. Median hysteronotal shield well developed, with 3 pairs of lateral and 1 pair of median setae. Dorsal shields well punctated. Dorsal interscutal areas striate-granulate. Setae *11* and *14* situated off the hysteronotal shield. Tibia I with 4 setae.

**26. *Cheletomimus (H.) mexicana* (THEWKE et ENNS, 1979) comb. nov.**

*Hemicheyletia mexicana* THEWKE and ENNS, 1979: 223-224.



Fig. 16 — *Cheletomimus (H.) chui*, female in dorsal view. Scale line 100  $\mu$ m.

Diagnosis based on the careful description of THEWKE and ENNS (1979). The holotype of this species is deposited in the Canadian National Collection, Ottawa, Canada.

DISTRIBUTION: This species is known only from Mexico (THEWKE and ENNS, 1979).

DIAGNOSIS: Peritremes with 6 pairs of links. Palpal claw with 6 teeth. All setae of the palpal tibia smooth, hair-like. Dorsal lateral setae of the idiosoma lanceolate. Median setae of the idiosoma aberrant, staghorn-like. Propodonal shield with 3-4 pairs of median setae. Median hysteronotal shield well developed, with 4 pairs of lateral and 1 pair of median setae. Dorsal shields well punctated. Dorsal interscutal areas striate-granulate. Setae *II* situated off the hysteronotal shield. Tibia I with 4 setae.

**27. *Cheletomimus (H.) athenae* (CORPUZ-RAROS, 1988)  
comb. nov.**

*Hemicheyletia athenae* CORPUZ-RAROS, 1988: 418-419.

MATERIAL EXAMINED: **Types:** Female holotype (UPLB), from leaf litter, Mt. Banahaw at Kinabuhayan, Dolores, Quezon, Luzon Is., the Philippines, 9. IX. 1978. (Coll. A.A. CAUYAN).

DISTRIBUTION: This species is known only from the Philippines (CORPUZ-RAROS, 1988).

DIAGNOSIS: Peritremes with 5 pairs of links. Palpal claw with 5 teeth. All setae of the palpal tibia smooth, hair-like. Dorsal lateral setae of the idiosoma lanceolate. Median setae of the idiosoma small, dendrite-like. Propodonal shield with 1 pair of median setae. Median hysteronotal shield bearing only 1 pair of median setae. Dorsal shields well punctated. Dorsal interscutal areas striate. Tibia I with 4 setae.

**28. *Cheletomimus (H.) bregetovae* (VOLGIN, 1969)  
comb. nov.  
(Fig. 17)**

*Dendrocheylea bregetovae* VOLGIN, 1969: 207-210

*Hemicheyletia bregetovae*, SUMMERS and PRICE, 1970: 18.

*Hemicheyletia scitula* CORPUZ-RAROS, 1972: 256-257; CORPUZ-RAROS and SOTTO, 1977: 169-170. **syn. nov.**

MATERIAL EXAMINED: **Types:** Female holotype (T-Ch-38, ZIN) and 14 female paratypes, on mushroom, Khosta-Sochi, Krasnodarskij Terr., Russia, 31. X. 1958. (Coll. N.G. BREGETOVA). Holotype of *H. scitula* **syn. nov.** (UPLB), from decomposing bark of a fallen log, Mt. Makling, Laguna, Mud Spring Area, the Philippines, 8. IV. 1972. (Coll. L.A. CORPUZ-RAROS).

**Other specimens:** 4 females, on *Astronia cumingiana*,

Davao city, Mt. Apo, the Philippines, 18. V. 1977. (Coll. R.C. GARCIA). 1 female, on *Premna odorata*, with same data as previous. 1 female, from decomposing *Araucaria*, Forestry campus, UPLB College, Laguna, the Philippines, 5.III.1977. (Coll. L.A. CORPUZ-RAROS). 1 female from litter of *Anthocephalus chinensis*, same locality as above, 14.IV.1976. (Coll. R.C. GARCIA). 1 female, from rice litter and topsoil, IRRRI Experiment Station, Laguna, the Philippines, VIII.1973. (Coll. R.S. RAROS). 1 female, on *Grewia multiflora*, Mt. Makiling, Calamba, Laguna, the Philippines, 12.I.1978. (Coll. L.A. CORPUZ-RAROS). 1 female, on *Casuarina equisetifolia*, BSU campus, La Trinidad, Benguet, the Philippines, 23.II.2002. (Coll. R.C. GARCIA).

DISTRIBUTION: This species was described from numerous specimens from Russia (holotype and paratypes), Bulgaria, Ukraine and Armenia (VOLGIN, 1969). It was recorded also from the Philippines (as *H. scitula* CORPUZ-RAROS, 1972, see Remarks) (CORPUZ-RAROS, 1972).

DIAGNOSIS: Peritremes with 6 pairs of links. Palpal claw with 6-8 teeth. Palpal tibia: Dorsal and outer ventral setae thickened and plume-like. Dorsal lateral setae of the idiosoma fan-like. Median setae of the idiosoma aberrant, staghorn-like. Propodonal shield with 3-4 pairs of median setae. Median hysteronotal shield well developed, with 4 pairs of lateral and 1-2 pairs of median setae. Dorsal shields well punctated. Dorsal interscutal areas striate-granulate. Setae *II* situated off the hysteronotal shield. Tibia I with 5 setae.

REMARKS. According to the original description (CORPUZ-RAROS, 1972), *H. scitula* CORPUZ-RAROS, 1972 differs from *C. bregetovae* only by the presence of two pairs of median setae on the hysteronotal shield (one pair in the holotype of *C. bregetovae*). However, this character is variable within the type series of *C. bregetovae*. We re-examined the holotypes of these species and conclude that *H. scitula* **syn. nov.** is a junior synonym of the latter species.

**29. *Cheletomimus (H.) greenwoodi* spec. nov.  
(Fig. 18)**

MATERIAL EXAMINED: **Type:** Female holotype (IRSNB), from nest of *Anthus spinoleta*, Barstey, Wales, England, 28. VII. 1991 (Coll. GREENWOOD).

DISTRIBUTION: This species is known only from England. It is named for Mr. M.T. GREENWOOD who collected this mite.

DIAGNOSIS: Peritremes with 6 pairs of links. Palpal claw with 8 teeth. Palpal tibia: Dorsal seta smooth, thickened and outer ventral setae thickened and plume-like. Dorsal lateral setae of the idiosoma fan-like. Median setae of the idiosoma aberrant, staghorn-like. Propodonal shield with 3 pairs of median setae. Median hysteronotal shield well developed, with 4 pairs of lateral and 1 pair of



Fig. 17 — *Cheletomimus (H.) bregetovae* (VOLGIN, 1969), female in dorsal view. Scale line 100  $\mu$ m.

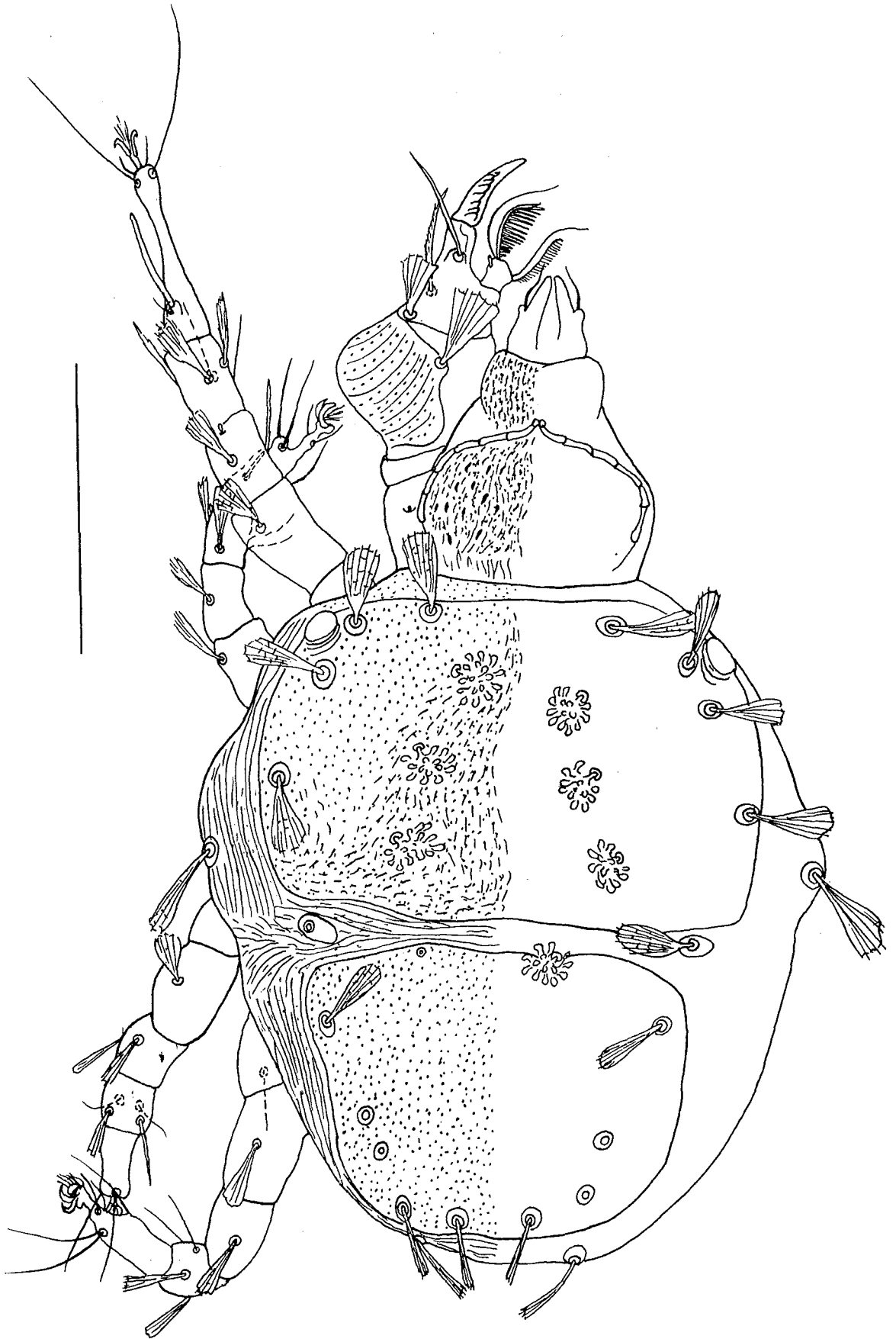


Fig. 18 — *Cheletomimus (H.) greenwoodi* **spec. nov.**, holotype female in dorsal view. Scale line 100  $\mu$ m.

median setae. Setae *d5* and *l5* more than 2 times narrower than propodonal ones. Dorsal shields well punctated. Dorsal interscutal areas striate-granulate. Setae *l1* situated off the hysteronotal shield. Tibia I with 5 setae. Holotype: Idiosoma 250 long; gnathosoma 125 long; propodonal shield 120 long and 175 wide; hysteronotal shield 105 long and 140 wide; setae *vi*, *ve*, *sci*, *sce* and *l1* about 25 long and 13 wide; setae *l2* 25 long and 8 wide; setae *l3* and *l4* broken; setae *l5* 27 long and 5 wide; setae *d5* 19 long and 5 wide.

REMARKS. This new species is closest to *C. bregetovae* but differs from it by the following characters: In *C. greenwoodi*, setae *d5* and *l5* are more than 2 times narrower than the propodonal setae *vi*, *ve*, *sci* and *sce*; the dorsal seta of the palpal tibia is smooth. In *C. bregetovae*, setae *d5* and *l5* are not narrower than the propodonal setae *vi*, *ve*, *sci* and *sce*; the dorsal seta of the palpal tibia is plume-like.

**30. *Cheletomimus (H.) gracilis* spec. nov.**  
(Fig. 19)

*Hemicheyletia scitula* CORPUZ-RAROS: MALABANAN and RORPUZ-RAROS, 1998: 127 (misidentification).

MATERIAL EXAMINED: **Types:** Female holotype (USNM) and 1 female paratype (IRSNB), on *Allium cepa*, Japan: at Hawaii, 26. VII. 1961. (Coll. H.A. WOOLFORD).

**Other specimens:** 1 female, on *Sorgo almacenado*, Palmira/Valle, U.S.A., 25. IX. 1974. (Coll. GARCIA). 2 females, on potato, C.E.S. Insectary, Riverside Cal., U.S.A., 26. X. 1954. (Coll. F. HALL). 1 female, on *Dendrobium* sp., U.S.A. (Coll. GIVERS). 1 female, under floral pieces of coconuts, Dahomey/Krake, 10. IX. 1974. (Coll. ELLSBURY). 1 female, on fig, Peru, 2. II. 1980 (Coll. C.W. SMITH). 9 females, from old comb of *Apis mellifera*, Pleasant Village, Los Banos, Laguna, Luzon Isl., the Philippines, 3. II. 1994. (Coll. GARCIA). 1 female, from secondary forest litter, Makiling Botanic Gardens, College, Laguna, the Philippines, 27.IV.1975. (Coll. R.C. GARCIA). 1 female from secondary forest litter, same locality as previous, 1.VI.1975. (Coll. J.M. SOTTO).

DISTRIBUTION: This species is known from the U.S.A, Hawaii, Peru and the Philippines.

DIAGNOSIS: Peritremes with 5 pairs of links. Palpal claw with 4-5 teeth. Palpal tibia: Dorsal and outer ventral setae thickened and plume-like. Dorsal lateral setae of the idiosoma fan-like. Median setae of the idiosoma aberrant, staghorn-like. Dorsal shields well punctated. Dorsal interscutal areas striate-granulate. Propodonal shield with 4 pairs of median setae. Median hysteronotal shield well developed, with 3 pairs of lateral and 2 pairs of median setae. Setae *l4* situated on the posterior margin of the hysteronotal shield or off this shield. Setae *l1* situated off the hysteronotal shield. Setae *a3* fan-like. Tibia I with 5

setae of which 3 fan-like (rarely 2 at one side) and 2 piliiform. Holotype: Idiosoma 265 long; gnathosoma 115 long; propodonal shield 100 long and 145 wide; hysteronotal shield 105 long and 100 wide; dorsal lateral setae of idiosoma about 18 long and 15 wide.

REMARKS. This new species is closest to *C. bregetovae* but differs from it by the following characters: In *C. gracilis*, setae *a3* are fan-like and the propodonal shield bears 4 pairs of median setae. In *C. bregetovae*, setae *a3* are serrate hair-like and propodonal shield bears 3 pairs of median setae.

**31. *Cheletomimus (H.) uichancoi* (CORPUZ-RAROS, 1972) comb. nov.**  
(Fig. 20)

*Hemicheyletia uichancoi* CORPUZ-RAROS, 1972: 258-261

MATERIAL EXAMINED: **Types:** Female holotype (UPLB) and 8 female paratypes, on decomposing bark of *Leucaena leucocephala*, College, Laguna, the Philippines, 3. II. 1972. (Coll. L.A. CORPUZ-RAROS). Two female, on decomposing bark of an unidentified log, from same locality as holotype, 29. I. 1972. (Coll. L.A. CORPUZ-RAROS). **Other specimens:** One female, from Cocoa podforest floor, Espiritu Santo, Second Channel, Vanuatu (Coll. K.C. KNIGHT).

DISTRIBUTION: This species is known from the Philippines (CORPUZ-RAROS, 1972). We add a new record for this species from Vanuatu.

DIAGNOSIS: Peritremes with 6 pairs of links. Palpal claw with 6-8 teeth. Palpal tibia: Dorsal and outer ventral setae thickened and plume-like. Dorsal lateral setae of the idiosoma fan-like. Median setae of the idiosoma aberrant, staghorn-like. Propodonal shield with 2-3 pairs of median setae. Posterior margin of the median hysteronotal shield situated at the level of setae *l3*. This shield ill defined, with 2 pairs of lateral and 1 pair of median setae. Dorsal shields well punctated. Setae *l1* situated off the hysteronotal shield. Tibia I with 5 setae.

REMARKS. In addition to the typical series of *H. uichancoi*, CORPUZ-RAROS (1972) also mentioned a series of "Other specimens examined" which, actually belongs to *C. (H.) wellsina*.

**32. *Cheletomimus (H.) lindquisti* (THEWKE et ENNS, 1979) comb. nov.**

*Hemicheyletia lindquisti* THEWKE and ENNS, 1979: 221-223.

Diagnosis of this species based on the original description of THEWKE and ENNS (1979).



Fig. 19 — *Cheletomimus* (H.) *gracilis* **spec. nov.**, female in dorsal view (A). Dorso-median seta (B). Vulva (C). Tibia I in dorsal view (D). Scale lines 100  $\mu$ m (A), 50  $\mu$ m (C-D).



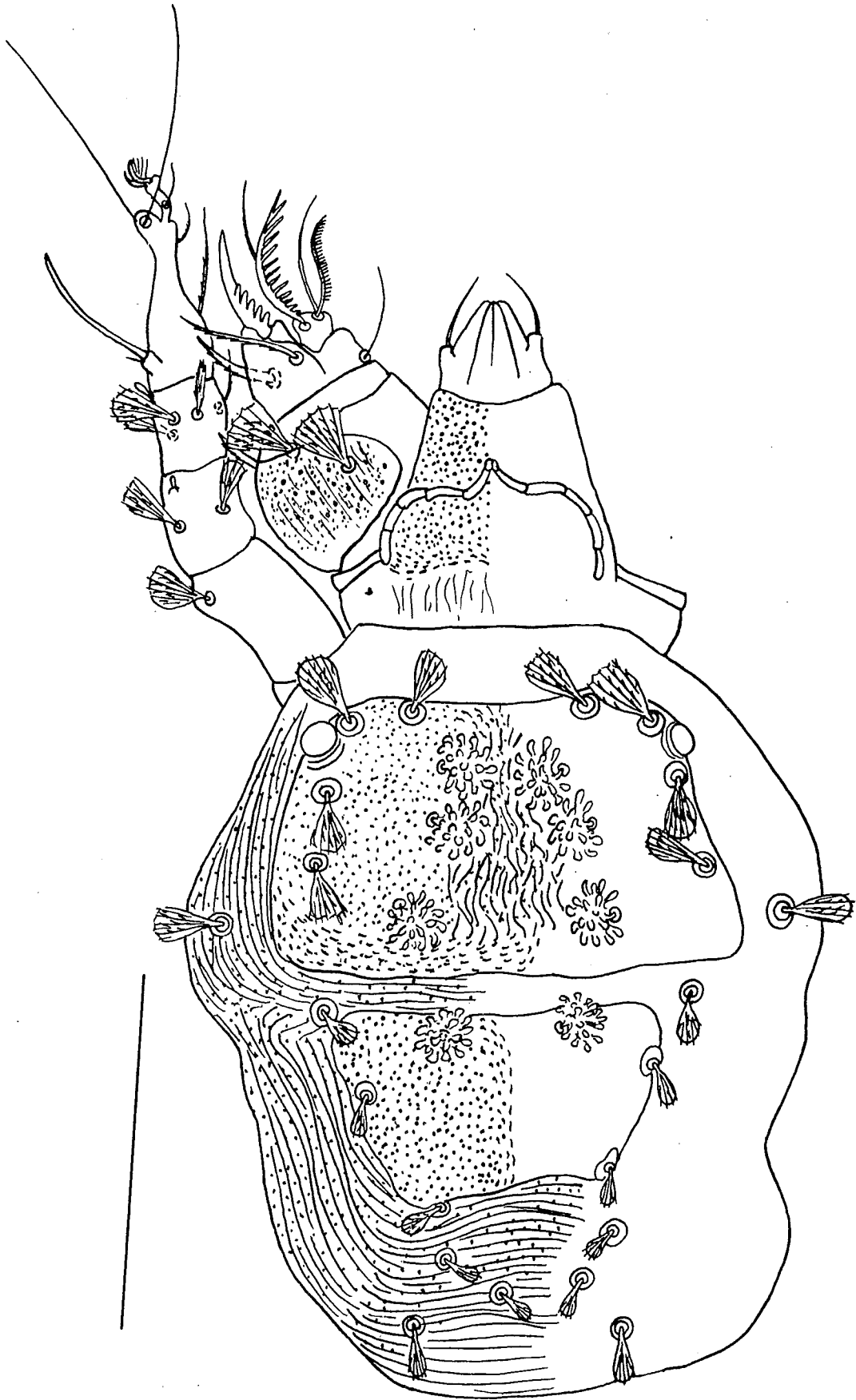


Fig. 20 — *Cheletomimus (H.) uichancoi* (CORPUZ-RAROS, 1972), female in dorsal view. Scale line 100  $\mu$ m

DISTRIBUTION: This species is known only from Canada (THEWKE and ENNS, 1979).

DIAGNOSIS: Peritremes with 6 pairs of links. Palpal claw with 4 teeth. All setae of palpal tibia smooth, hair-like. Dorsal lateral setae of the idiosoma fan-like. Median setae of the idiosoma aberrant, dendrite-like. Propodonal shield with 2 pairs of median setae. Median hysteronotal shield well developed, with 5 pairs of lateral and 2 pairs of median setae. Dorsal shields well punctated. Dorsal interscutal areas striate-granulate. Setae *II* situated on the hysteronotal shield. Tibia I with 5 setae.

REMARKS. According to the original description (THEWKE and ENNS, 1979), the holotype of *C. lindquisti* lacks setae *II* and the first pair of the median setae of the hysteronotal shield is fan-like. We think, however, that setae *II* were displaced from their bases, the latter being situated in the normal position (THEWKE and ENNS, 1979: fig. 2, p. 220). Furthermore, these setae are almost always present in the Cheyletidae.

#### Group *omissa*

Median setae of the idiosomal dorsum lacking.

### 33. *Cheletomimus (H.) omissa* (TSENG, 1977) comb. nov.

*Hemicheyletia omissa* TSENG, 1977: 222-225.

The holotype of this species, the single known specimen, was not available for our study. The diagnosis of this species is therefore based on the original description (TSENG, 1977).

DISTRIBUTION: This species is known only from Taiwan (TSENG, 1977).

DIAGNOSIS: Peritremes with 6 pairs of links. Palpal claw with 7 teeth. Palpal tibia: Dorsal and outer ventral setae thickened and plume-like. Dorsal lateral setae of the idiosoma fan-like. Median setae of the idiosoma lacking. Hysteronotal shield well developed, with 4 pairs of lateral setae. Dorsal shields well punctated. Dorsal interscutal areas striate-granulate. Setae *II* situated off the hysteronotal shield. Tibia I with 4 setae.

REMARKS. It is possible that the holotype of this species is an aberrant specimen of another species or that its median setae were broken.

#### Subgenus *Philippicheyla* CORPUZ-RAROS, 1972

*Philippicheyla* CORPUZ-RAROS, 1972: 265-266; 1998: 287; GERSON, 1994: 437; GERSON *et al.*, 1999: 78-79. *Hemicheyletia (Philippicheyla)*, FAIN and BOCHKOV, 2001: 299-300.

**Type species:** *Philippicheyla filipina* CORPUZ-RAROS, 1972

DIAGNOSIS: Hysteronotum without shields. Dorsal lateral setae of idiosoma narrowly lanceolate, similar to median setae. Dorsal interscutal areas striate. Tibia I with 4 setae. Tibia II-IV with 3-4 setae. Genu IV with 1-2 setae.

### 34. *Cheletomimus (P.) filipina* (CORPUZ-RAROS, 1972) comb. nov. (Fig. 21)

*Philippicheyla filipina* CORPUZ-RAROS, 1972: 265-266.

MATERIAL EXAMINED: **Types:** Female holotype (UPLB) and 5 female paratypes, on decomposing bark of a fallen log, Mt. Makiling, Laguna, the Philippines, 8. IV. 1972. (Coll. L.A. CORPUZ-RAROS).

DISTRIBUTION: This species is known only from the Philippines (CORPUZ-RAROS, 1972).

DIAGNOSIS: Peritremes with 5-6 pairs of links. Palpal claw with 4-5 teeth. Palpal tibia: All setae of palpal tibia smooth, hair-like. Propodonal shield well punctated, with 2 pairs of median setae. Hysteronotum with one pair of median setae (*d2*). Tibiae I-IV with 4 setae, genu IV with 2 setae.

### 35. *Cheletomimus (P.) notelaeae* (GERSON, 1994) comb. nov.

*Philippicheyla notelaeae* GERSON, 1994: 437-439.

The diagnosis is based on the very complete original description (GERSON, 1994).

DISTRIBUTION: Australia (Queensland).

DIAGNOSIS: Peritremes with 7 pairs of links. Palpal claw with 3-4 teeth. Palpal tibia: All setae of palpal tibia smooth, hair-like. Propodonal shield well punctated, with 1 pair of median setae. Hysteronotum with one pair of median setae (*d2*). Tibia I with 4 setae, tibiae II-IV with 3 setae, genu IV with 1 seta.

### 36. *Cheletomimus (P.) ascutatus* spec. nov. (Fig. 22)

MATERIAL EXAMINED: **Types:** Female holotype and 1 male paratype (USNM) from inner tree bark, Elizabeth La, California, U.S.A., 14. V. 1965. One female and 1 male paratype with the same data, in IRSNB.

DISTRIBUTION: This species is known only from U.S.A. (Elizabeth La).

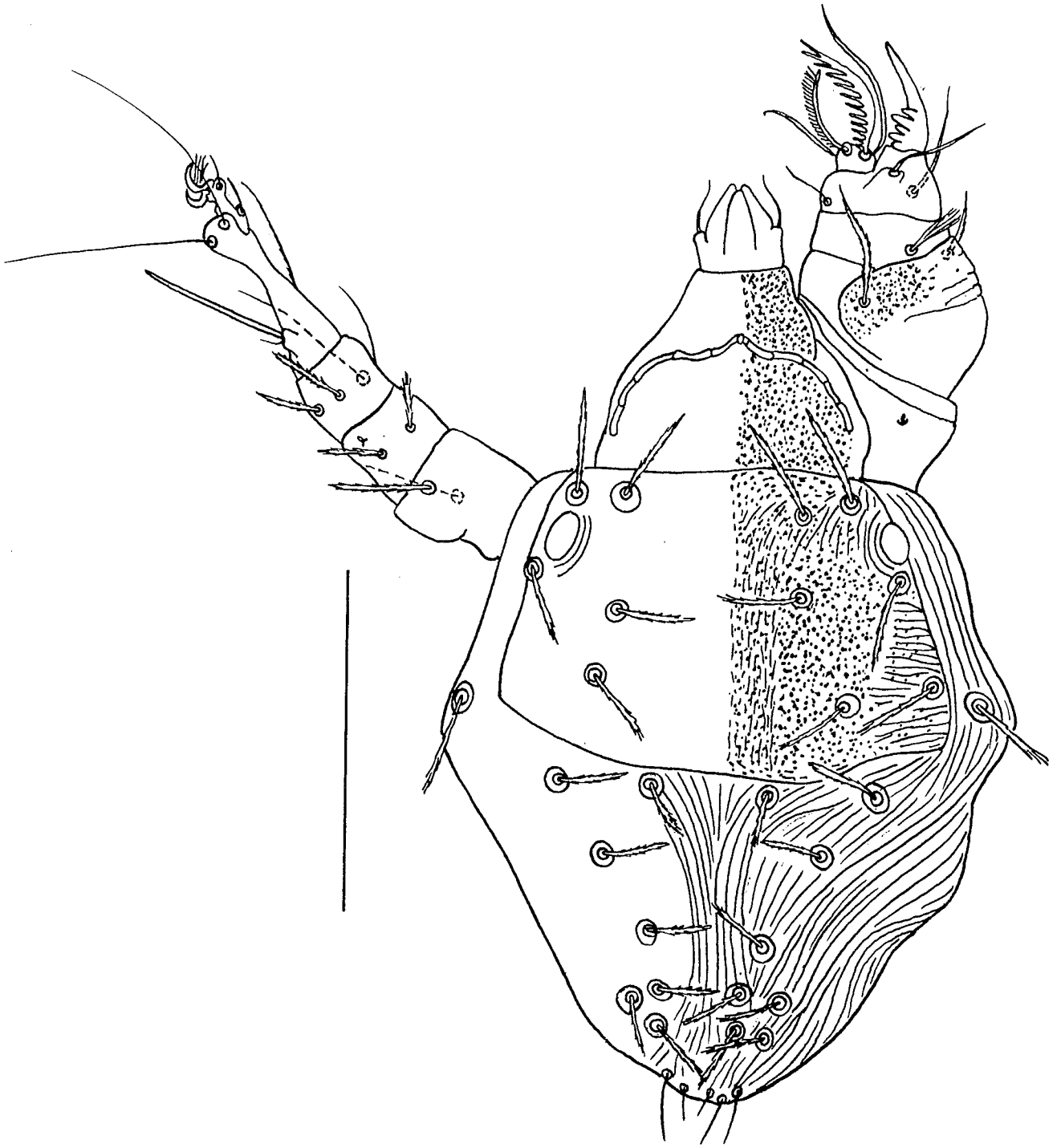


Fig. 21 — *Cheletomimus (P.) filipina* (CORPUZ-RAROS, 1972), female in dorsal view. Scale line 100  $\mu$ m.



Fig. 22 — *Cheletomimus (P.) ascutatus* **spec. nov.**, holotype female in dorsal view. Scale line 100  $\mu$ m.

**DIAGNOSIS:** Peritremes with 5 pairs of links. Palpal claw with 5-7 teeth. Palpal tibia: Dorsal seta slightly thickened, hair-like, ventral seta hair-like. Dorsal lateral setae of the idiosoma fan-like. Median setae of the idiosoma aberrant, staghorn-like. Propodonal shield with 2 pairs of median setae. Hysteronotum without shields, bearing one pair of median staghorn-like setae. Propodonal shield well ornamented. Dorsal interscutal areas striate. Setae *a3* fan-like. Tibia I with 4 setae. Holotype: Idiosoma 265 long; gnathosoma 125 long; propodonal shield 115 long and 140 wide; dorsal lateral setae of idiosoma about 30 long and 15 wide.

**REMARKS.** This new species differs from all the other species of the subgenus *Philippicheyla* by the fan-like shape of setae *a3*.

### Key to the subgenera of the genus *Cheletomimus* (females)

1. Hysteronotum either with one median shield or without shield(s) . . . . . 2
  - Hysteronotum with a pair of lateral shields (4 species) . . . . . Subgenus *Cheletomimus* s.str.
2. Hysteronotum without shield(s) (3 species) . . . . . Subgenus *Philippicheyla*
  - Hysteronotum with a single median shield . . . . . Subgenus *Hemicheyletia* (3)
3. Dorsum without median setae (1 species) . . . . . Group *omissa*
  - Dorsum with median setae . . . . . 4
4. Median setae of dorsum lanceolate or fan-like, similar in shape to the lateral setae (13 species) . . . . . Group *bakeri*
  - Median setae of dorsum aberrant in shape and markedly different from the lateral setae (15 species) . . . . . Group *wellsi*

### Key to the females of the genus *Cheletomimus*

1. Dorsum with median setae . . . . . 2
  - Dorsum without median setae . . . . . *C. omissa* (TSENG, 1977)
2. Dorsum with median setae normal in shape and similar to the lateral setae . . . . . 19
  - Dorsum with median setae aberrant in shape and very different from the lateral setae . . . . . 3
3. Hysteronotum with a median shield . . . . . 5
  - Hysteronotum either with 2 lateral shields or completely devoid of shield(s) . . . . . 4
4. Hysteronotum with 2 lateral shields . . . . . *C. ochoai* **spec. nov.**
  - Hysteronotum without shield(s) . . . . . *C. ascutatus* **spec. nov.**
5. Tibia I with 5 setae, excluding solenidion . . . . . 14
  - Tibia I with 4 setae, excluding solenidion . . . . . 6
6. Hysteronotal shield well developed, bearing lateral setae . . . . . 7

- Hysteronotal shield small, without lateral setae . . . . . *C. athenae* (CORPUZ-RAROS)
7. Hysteronotal shield with median setae . . . . . 8
    - Hysteronotal shield without median setae . . . . . *C. tropica* (SHIBA)
  8. Outer ventral seta of palpal tibia smooth . . . . . 11
    - Outer ventral seta of palpal tibia serrate . . . . . 9
  9. Propodonal shield with 2-4 pairs of median staghorn-like setae . . . . . 10
    - Propodonal shield with one pair of very small median bulb-like setae . . . . . *C. anarborae* (DE LEON, 1967)
  10. Setae *l3*, *l4* and *d5* subequal in length. Dorsal median setae rosette-like . . . . . *C. darwinia* (SUMMERS et PRICE)
    - Setae *l3* and *l4* 1.3 times longer than *d5*. Dorsal median setae staghorn-like . . . . . *C. wellsina* (DE LEON, 1964)
  11. Dorsal lateral setae of idiosoma lanceolate . . . . . 13
    - Dorsal lateral setae of idiosoma fan-like . . . . . 12
  12. Hysteronotal shield with 2 pairs of median setae and 4 pairs of lateral setae . . . . . *C. wellsii* (BAKER)
    - Hysteronotal shield with one pair of median setae and 2 pairs of lateral setae . . . . . *C. serrula* (SUMMERS et PRICE)
  13. Propodonal shield with 3-4 pairs of median setae. Setae *l4* situated on hysteronotal shield . . . . . *C. mexicana* (THEWKE et ENNS, 1979)
    - Propodonal shield with 1-2 pairs of median setae. Setae *l4* situated off hysteronotal shield . . . . . *C. chui* (TSENG, 1977)
  14. Hysteronotal shield well developed, bearing lateral setae . . . . . 15
    - Hysteronotal shield small, devoid of setae . . . . . *C. volgini* (SUMMERS et PRICE)
  15. Dorsal median setae of idiosoma staghorn-like. Setae *l1* situated off hysteronotal shield . . . . . 16
    - Dorsal median setae of idiosoma dendriform. Setae *l1* situated on hysteronotal shield . . . . . *C. lindquisti* (THEWKE et ENNS)
  16. Setae *a3* serrate, hair-like . . . . . 17
    - Setae *a3* fan-like . . . . . *C. gracilis* **spec. nov.**
  17. Hysteronotal shield with 4 pairs of lateral setae . . . . . 18
    - Hysteronotal shield with 2 pairs of lateral setae . . . . . *C. uichancoi* (CORPUZ-RAROS)
  18. Setae *d5* and *l5* more than 2 times narrower than propodonal setae *vi*, *ve*, *sci* and *sce*. Dorsal seta of palpal tibia smooth . . . . . *C. greenwoodi* **spec. nov.**
    - Setae *d5* and *l5* not narrower than propodonal setae *vi*, *ve*, *sci* and *sce*. Dorsal seta of palpal tibia plume-like . . . . . *C. bregetovae* (VOLGIN)
  19. Hysteronotum with 2 lateral shields . . . . . 34
    - Hysteronotum either with a median shield or without shield (s) . . . . . 20
  20. Hysteronotum with a median shield . . . . . 22
    - Hysteronotum without shield(s) . . . . . 21
  21. Tibiae II-IV with 3 setae. Propodonal shield with one pair of median setae. Dorsal seta of palpal femur fan-like . . . . . *C. notelaeae* (GERSON)
    - Tibiae II-IV with 4 setae. Propodonal shield with 2 pairs of median setae. Dorsal seta of palpal femur lanceolate . . . . . *C. filipina* (CORPUZ-RAROS)

22. Outer ventral seta of palpal femur and outer seta of coxa III hair-like . . . . . 23  
 – Outer ventral seta of palpal femur fan-like. Outer seta of coxa III fan-like ... *C. leytensis* (CORPUZ-RAROS)
23. Hysteronotal shield well developed, with 4-5 pairs of lateral setae . . . . . 25  
 – Hysteronotal shield small, devoid of lateral setae or only with one pair lateral setae . . . . . 24
24. Dorsal setae of idiosoma fan-like. Hysteronotal shield devoid of setae. Dorsal seta of palpal tibia narrowly fan-like . . . . . *C. kysenyiensis* (THEWKE et ENNS)  
 – Dorsal setae of idiosoma lanceolate. Hysteronotal shield with one pair of lateral setae. Dorsal seta of palpal tibia flattened, hair-like . . . . . *C. scutellata* (DE LEON)
25. Tibia I with 4 setae, excluding solenidion . . . . . 26  
 – Tibia I with 5 setae, excluding solenidion . . . . . *C. vescus* (QAYYUM et CHAUDHRI)
26. Setae II situated on hysteronotal shield . . . . . 30  
 – Setae II situated off hysteronotal shield . . . . . 27
27. Length and width of rostrum subequal. Hysteronotal shield with one pair of median setae. Tibia I with 2 hair-like and 2 lanceolate setae . . . . . 28  
 – Rostrum 1.4 times longer than wide. Hysteronotal shield with 3 pairs of median setae. Tibia I with 3 hair-like setae and 1 lanceolate seta . . . . . *C. rostella* (SUMMERS et PRICE)
28. Propodonotal shield with 2-3 pairs of median setae . . . . . 29  
 – Propodonotal shield with one pair of median setae . . . . . *C. asiatica* (VOLGIN)
29. Dorsal shields poorly punctate. Propodonotal shield with 3 pairs of median setae. Median setae of hysteronotum always situated on hysteronotal shield. Ratio of length/width of hysteronotal shield 1.4/1 . . . . . *C. congensis* (CUNLIFFE)  
 – Dorsal shields strongly punctate. Propodonotal shield with 2 pairs of median setae. Median setae of hysteronotum situated off or on anterior margin of hysteronotal shield. Ratio of length/width of hysteronotal shield 1/1.2 . . . . . *C. bakeri* (EHARA)
30. Dorsal shields punctate, without reticulate ornamentation . . . . . 31  
 – Dorsal shields with reticulate ornamentation . . . . . *C. reticulata* (JEFFREY et CAMPBELL)
31. Propodonotal and hysteronotal shields each with one pair of median setae . . . . . 33  
 – Propodonotal and hysteronotal shields each with 2-3 pairs of median setae . . . . . 32
32. Propodonotal and hysteronotal shields each with 2 pairs of median setae. Guard seta of tarsus I serrate, as long as 1/3 of tarsus I . . . . . *C. granula* (SUMMERS et PRICE)  
 – Propodonotal and hysteronotal shields each with 3 pairs of median setae. Guard seta of tarsus I very small and smooth . . . . . *C. makilingensis* (CORPUZ-RAROS)
33. Rostral shield and dorsal shields of idiosoma strongly granulate. Anterior margin of rostral shield with a median concavity . . . . . *C. cordovensis* (DE LEON)  
 – Rostral shield and dorsal shields of idiosoma weakly granulate. Anterior margin of rostral shield without median concavity . . . . . *C. transversa* (CORPUZ-RAROS)
34. Dorsal idiosomal setae lanceolate. Genu IV with one seta . . . . . 35  
 – Dorsal idiosomal setae narrow fan-like. Genu IV with 2 setae . . . . . *C. duosetosus* MUMA
35. Propodonotal shield with one pair of median setae. Dorsal seta of palpal femur lanceolate . . . . . *C. daltoniensis* CORPUZ-RAROS  
 – Propodonotal shield with 2 pairs of median setae. Dorsal seta of palpal femur fan-like . . . . . *C. berleseii* (OUDEMANS)

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### References

- AHEER, G.M., AKBAR, S. & CHAUDHRI, W.M., 1994. The genus *Cheletomimus* (Acarina: Cheyletidae). I. Descriptions of three new species. *Acarologia*, 35:345-351.
- AHEER, G.M., AKBAR, S. & CHAUDHRI, W.M., 1998. New species of the genus *Cheletomimus* OUDEMANS (Cheyletidae: Acarina) and a Study of Phenetic Affinities of the Species from Pakistan. *Pakistan Journal of Zoology*, 30: 125-132.
- BAKER, E.W., 1949. A review of the mites of the family Cheyletidae in the United States National Museum. *Proceedings of the United States National Museum*, 99: 267-320.
- BOCHKOV, A.V. & FAIN, A., 2001. Phylogeny and system of the Cheyletidae (Acari: Prostigmata) with special reference to their host-parasite associations *Bulletin de l'Institut royal des Sciences naturelles Belgique (Entomology)*, 71:5-36.

- CORPUZ-RAROS, L.A., 1972. Systematic studies of Philippine cheyletid mites. I. Preliminary report of species mainly from Laguna. *The Philippine Entomologist*, 72: 247-271.
- CORPUZ-RAROS, L.A., 1988. Systematic studies of Philippine cheyletid mites (Acarina). V. New species and new records, with a note on the synonymy of *Tutacheyla* CORPUZ-RAROS. *Philippine Journal of Science*, 117: 413-427.
- CORPUZ-RAROS, L.A., 1998. Twelve new species and one new record of Cheyletidae (Acari) from the Philippines. *International Journal of Acarology*, 24: 259-290.
- CORPUZ-RAROS, L.A. & SOTTO, J.M. 1977., Systematic studies of Philippine cheyletid mites (Acarina, Cheyletidae). II. New species and new records. *Philippine Journal of Biology*, 6: 143-170.
- CUNLIFFE, F., 1962. New species of Cheyletidae (Acarina). *Proceedings of the Entomological Society of Washington*, 64: 209-218.
- DE LEON, D., 1962. Three new genera and seven new species of cheyletids (Acarina: Cheyletidae). *The Florida Entomologist*, 45: 129-137.
- DELFINADO, M.D. & KHANG-FIELDS, A.A., 1976. Terrestrial mites of New York (Acarina). IV. Cheyletidae and Cheyletiellidae. *Journal of New York Entomological Society*, 84: 189-196.
- EHARA, S & ABDUL GHANI, I., 1988. Cheyletid mites associated with plants in the Malay Peninsula, with description of a new species (Acarina: Cheyletidae). *Proceedings of the Japan Academy*, 64: 237-240.
- FAIN, A., 1979. Idiosomal and leg chaetotaxy in the Cheyletidae. *International Journal of Acarology*, 5: 305-310.
- FAIN, A. & BOCHKOV, A.V., 2001a. Observations on the taxonomic status of some cheyletid genera (Acari Cheyletidae). *Belgian Journal of Entomology*, 3: 291-301.
- FAIN, A. & BOCHKOV, A.V., 2001b. A taxonomical review of the genus *Cheyletus* LATREILLE, 1776 (Acari: Cheyletidae). *Bulletin de l'Institut royal des Sciences naturelles Belgique (Entomology)*, 3: 291-301.
- FAIN, A. & BOCHKOV, A.V., 2001c. A review of some cheyletid genera (Acari: Prostigmata) with descriptions of new species. *Acarina*, 9: 47-95.
- FAIN, A. & BOCHKOV, A.V., 2002. A new genus and species of cheyletid mite (Acari: Cheyletidae) from a cave in Western Australia. *International Journal of Acarology*, 28: 37-40.
- FAIN, A., SMILEY, R.L. & GERSON, U., 1997. New observations on the chaetotaxy and the solenidiotaxy in the Cheyletidae (Acari: Prostigmata). *Bulletin de l'Institut royal des Sciences naturelles Belgique (Entomology)*, 67: 65-87.
- FAITH, D.P. & CRANSTON, P.S., 1991. Could a cladogram this short have arisen by chance alone? On permutation tests for cladistic structure. *Cladistics*, 7: 1-28.
- GERSON, U., 1967. Some cheyletid and pseudocheyletid mites from Israel. *Acarologia*, 10: 359-369.
- GERSON, U., 1994. The Australian Cheyletidae (Acari: Prostigmata). *Invertebrate Taxonomy*, 8: 435-437.
- GERSON, U., FAIN, A. & SMILEY, R.L., 1999. Further observations on the Cheyletidae (Acari), with a key to the genera of the Cheyletinae and a list of all known species in the family. *Bulletin de l'Institut royal des Sciences naturelles Belgique (Entomology)*, 69: 35-68.
- GOFF, L.M., 1982. A new species of *Hemicheyletia* (Acari: Cheyletidae) from Kure Atoll, northwestern Hawaiian Islands. *Proceedings of the Hawaiian Entomological Society*, 24: 83-86.
- GRANDJEAN, F., 1944. Observations sur les acariens de la famille des Stigmaeidae. *Archives des Sciences physiques et naturelles*, 26: 103-131.
- GUPTA, S.K., 1991. Studies on predatory prostigmatid mites of Northeast India with descriptions of new species and new records from India. *Records of the Zoological Survey of India*, 88: 207-239.
- JEFFREY, I.G. & CAMPBELL, J.B., 1975. A new species of *Hemicheyletia* (Acarina: Cheyletidae). *Journal of Stored Product research*, 11: 103-105.
- LIN, J., PEN, W. & CHEN, Y., 1994. A new species of the genus *Hemicheyletia* VOLGIN from Fujian (Acari: Cheyletidae). *Wuyi Science Journal*, 11: 141-143.
- MALABAN, J.M. & CORPUZ-RAROS, L.A. 1998. Mites associated with *Apis mellifera* Linnaeus and *Apis cerana* Fabricius in the Southern Tagalog Region, Philippines. *Philippine Entomologist*, 12: 123-135.
- MATHUR, S. & MATHUR, R.B., 1981. *Hemicheyletia hissarientis*, a new species of cheyletid mite from India. *International Journal of Acarology*, 7: 69-70.
- MUMA, M., 1964. Cheyletidae (Acarina: Trombidiformes) associated with citrus in Florida. *The Florida Entomologist*, 47: 239-253.
- OUDEMANS, A.S., 1904a. Acarologische Aanteekeningen. XI. *Entomologische Berichten Nederlands Entomologie*, 1: 153-155.
- OUDEMANS, A.S., 1904b. Acarologische Aanteekeningen. XII. *Entomologische Berichten Nederlands Entomologie*, 1: 160-164.
- OUDEMANS, A.C., 1906. Revision des Cheletines. *Memoires de la Société Zoologique de France*, 19: 36-144.
- PATXOT, D. J. & GOFF, M.L., 1985. Two new species and new records of Cheyletidae (Acari) in Hawaii and a key to the species. *International Journal of Acarology*, 11: 157-162.
- PRENDINI, L., 2001. Species or Supraspecific Taxa as Terminals in Cladistic Analysis? Groundplans Versus Exemplars Revisited. *Systematic biology*, 50: 290-300.
- QAYYUM, H.A. & CHAUDHRI, W.M., 1979a. Description of *Cheletomimus heredis*, new species (Acarina: Cheyletidae) from Pakistan. *Pakistan Entomologist*, 1: 9-12.
- QAYYUM, H.A. & CHAUDHRI, W.M., 1979b. Mites of the genus *Hemicheyletia* (Acarina: Cheyletidae) described from Pakistan. *Pakistan Journal of Zoology*, 11: 167-172.
- RASOOL, A. & CHAUDHRI, W.M., 1979. Two new species of the genus *Hemicheyletia* VOLGIN (Acarina: Cheyletidae) from Pakistan. *Pakistan Entomologist*, 1: 1-6.
- RASOOL, A., CHAUDHRI, W.M. & AKBAR, S., 1980. Studies on the mites of the family Cheyletidae from Pakistan. *Pakistan Entomologist*, 2: 27-36.
- SHIBA, M., 1976. Taxonomic investigations on free living Prostigmata from the Malay Peninsula. *Nature Life in South East Asia*, 7: 83-229.
- SOLIMAN, Z.R., 1975. Three new species of cheyletid mites from Egypt (Acari: Prostigmata) with a key to genera. *Acarologia*, 17: 95-102.
- SUMMERS, F.M. & PRICE, D.W., 1970. Review of the mite family Cheyletidae. University of California Press, Berkeley, Los Angeles, London, 153 pp.
- THEWKE, S.E. & ENNS, W.B., 1979. Three new species of *Hemicheyletia* VOLGIN (Acari: Cheyletidae) with a key to the

- known world species. *Journal of the Kansas Entomological Society*, 52: 218-225.
- TSENG, Y.H., (=TJYING) 1972. A new cheyletid mite *Hemichyletia arecana* n. sp. from Taiwan (Acarina: Prostigmata). *Plant Protection Bulletin*, 14: 8-10.
- TSENG, Y.H., 1977. A contribution to the knowledge of Formosan cheyletid mites. *Proceedings of the National Science Council*, 10: 213-264.
- VOLGIN, V.I., 1955. The family Cheyletidae Leach – predator mites. In: The mites of the rodents of the USSR fauna. *Akademia Nauk S.S.S.R., Zoologicicheskij Institut, Opredelitel po faune S.S.S.R.* 59: 150-174.
- VOLGIN, V.I., 1969. Acarina of the family Cheyletidae of the World. Akademia Nauk, Leningrad, USSR, in Russian, pp. 432.
- VOLGIN, V.I., 1978. New species of predatory mites of the family Cheyletidae (Acariformes, Trombidiformes). *Entomological Review*, 57: 149-152.
- YEATES, D.K., 1995. Groundplans and exemplars: Paths to the tree of life. *Cladistics*, 11: 343-357.
- YUNKER, C.E., 1961. The genera *Bak*, new genus, and *Cheleto-*  
*tomimus* OUDEMANS, with descriptions of three new species. *Canadian Entomologist*. 93: 1023-1053.

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