

A revision of the genus *Cheletopsis* (Acari Cheyletidae)

by Andre V. BOCHKOV, Alex FAIN & Jacek DABERT

Summary

The genus *Cheletopsis* OUDEMANS, 1904 (Cheyletidae) is revised. The species of this genus are predators living in the quills of birds of the order Charadriiformes. All the existing type material have been examined. Three new species, i.e. *Cheletopsis limnodromi* sp. n., *C. rynchops* sp. n. and *C. prosobonialis* sp. n. are described from the quills of *Limnodromus griseus* in U.S.A., *Rynchops flavirostris* in Mozambique and *Prosobonia cancellata* in French Polynesia, respectively. The species, *C. magnanima* OUDEMANS, 1904 is considered here as a species *inquirenda*. The distribution of the species of the genus *Cheletopsis* on their respective hosts is discussed.

Key words: Acari, Cheyletidae, *Cheletopsis*, quill mites, charadriiform birds

Résumé

Le genre *Cheletopsis* OUDEMANS, 1904 (Cheyletidae) est révisé. Toutes les espèces de ce genre vivent dans les tuyaux des plumes chez des oiseaux de l'Ordre des Charadriiformes où ils s'attaquent à des acariens occupant également ce biotope. Trois espèces nouvelles sont décrites ici, à savoir: *Cheletopsis limnodromi* sp. n. ex *Limnodromus griseus*, des U.S.A., *C. rynchops* sp. n. ex *Rynchops flavirostris*, de Mozambique et *C. prosobonialis* sp. n. ex *Prosobonia cancellata* de la Polynésie française. L'espèce *Cheletopsis magnanima* OUDEMANS, 1904 est considérée ici comme une espèce *inquirenda*. La distribution des espèces du genre *Cheletopsis* chez les oiseaux de l'Ordre des Charadriiformes est discutée.

Mots-clé: Acari, Cheyletidae, *Cheletopsis*, acariens des rémiges, Charadriiformes

Introduction

The genus *Cheletopsis* OUDEMANS, 1904 (Acari Cheyletidae) belongs to the tribe Cheletosomatini and it included until now nine species (KIVGANOV & BOCHKOV, 1994). All the mites of this genus, similar with the other representatives of the tribe Cheletosomatini, live in the quills of birds and they prey other mites inhabiting the quills, mostly representatives of the families Syringophilidae and Syringobiidae (VOLGIN, 1969; MIRONOV *et al.*, 1991; KIVGANOV & BOCHKOV, 1994). These mites are highly specialised predators and they have developed specific morphological adaptations for the life inside the quills i.e., most part of their body setae is abnormally

long, the setae *p'* and *p''* of legs II-IV are plume-like, the eyes are reduced etc Nevertheless, they resemble very much the nidicolous predators of the *Cheyletus* group. It is possible that these two groups (*Cheyletus* group and Cheletosomatini) derived from a common ancestor, probably a nidicolous predator living in the nest of birds.

Investigation on these cheyletid mites is very interesting because it could help us to understand the origin and the mechanism of evolution in parasitism and closely associated phenomena as, for example, preying on the host body. Such transition to parasitism via nest predation and predation on the host body is rather common for arthropods.

Most of the species of this genus were described in the beginning of the last century by OUDEMANS (1904, 1906) and they have not been redescribed or recollected until now. It is only recently that new species have been described in this genus (MIRONOV *et al.*, 1991; KIVGANOV & BOCHKOV, 1994).

The present paper is a revision of the genus *Cheletopsis*. It includes the descriptions of three new species and a key to the females and males of all valid species.

Material and methods

For this study we have re-examined the collections of *Cheletopsis* deposited in the following Institutions: NMNH - collection of OUDEMANS deposited in the National Museum of Natural History, Leiden, the Netherlands.

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

UAM - A. Mickiewicz University, Poznan, Poland.

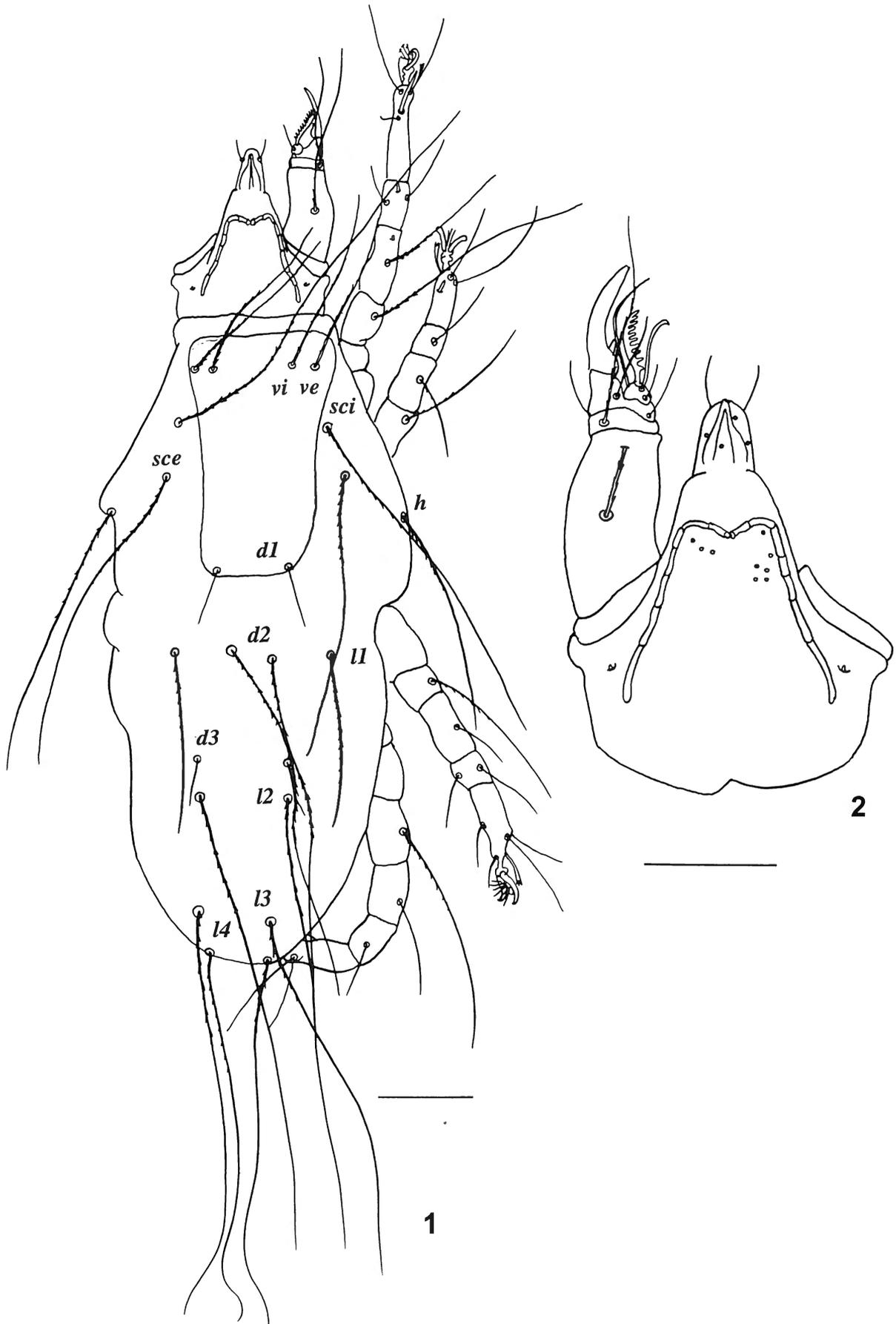
We also investigated material collected by JD from birds deposited in the four following Institutions:

UMMZ - Museum of Zoology, University of Michigan, Ann Arbor, U.S.A.

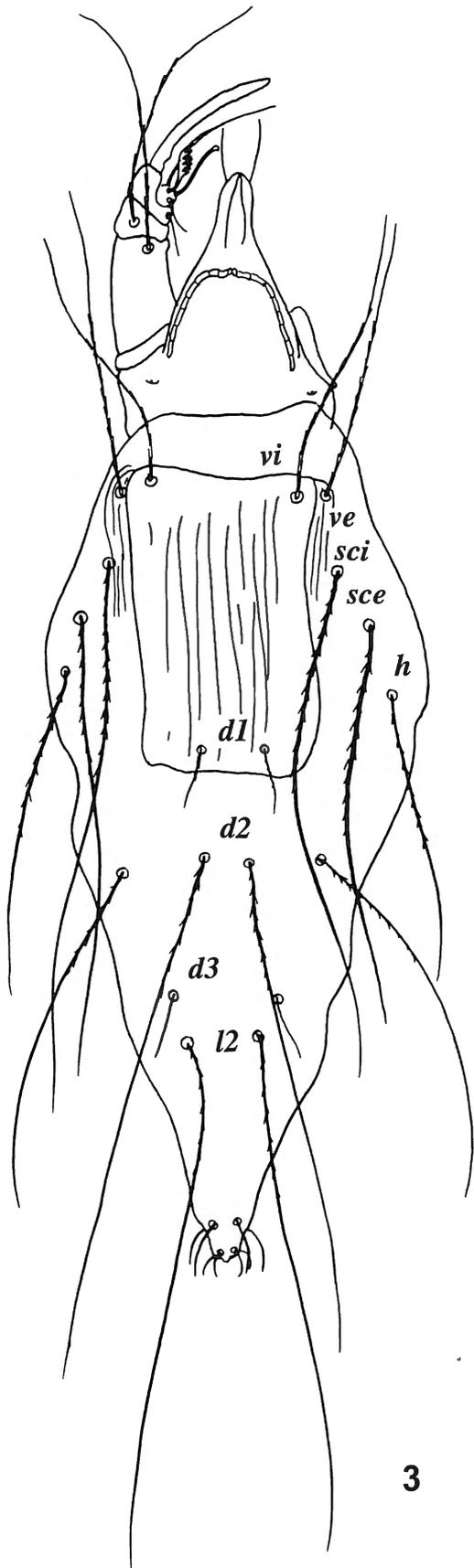
NU - University of Nebraska, Lincoln, U.S.A.

UGA - University of Georgia, Athens, U.S.A.

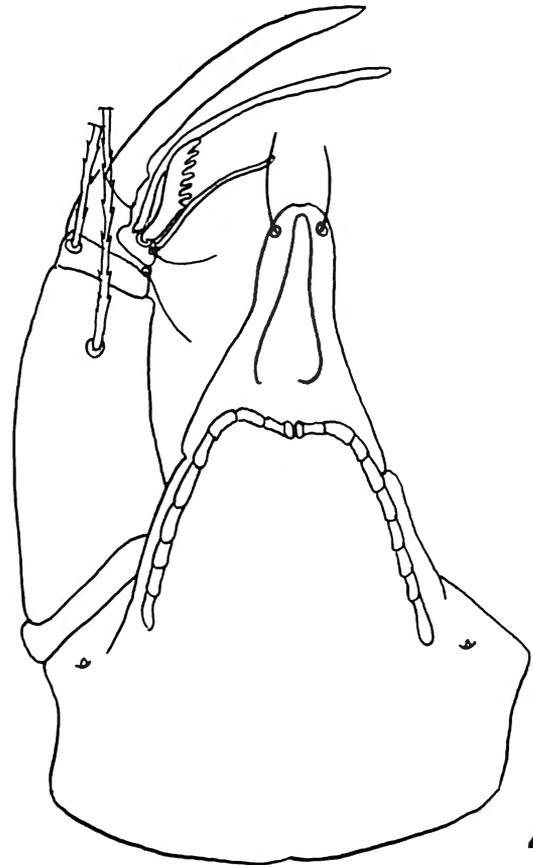
BOC - B.OConnor collection, University of Michigan, Ann Arbor, U.S.A.



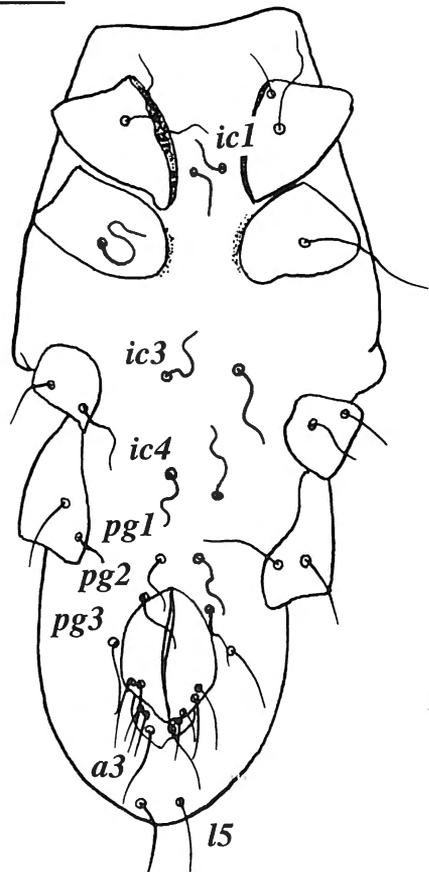
Figs. 1-2 — *Cheletopsis norneri* (POPPE, 1888), female. Dorsal view (1), gnathosoma in dorsal view (2). Scale line 100 μm (fig. 1) and 50 μm (fig. 2).



3



4



5

Figs. 3-5 — *Cheletopsis norneri* (POPPE, 1888), male: Dorsal view (3), gnathosoma in dorsal view (4). *Cheletopsis basilica* OUDEMANS, 1904, female: Ventral view 5. Scale line 100 μ m (figs 3, 5) and 50 μ m (fig. 5).

In the descriptions we have used the nomenclature of the idiosomal chaetotaxy proposed by FAIN (1979) and that of the leg chaetotaxy of GRANDJEAN (1944). All the measurements are given in micrometers (μm).

Systematics

Genus *Cheletopsis* OUDEMANS, 1904

DIAGNOSIS.

FEMALE. *Gnathosoma*: Palpal tarsi with 4 setae and a short solenidion: 1 dorsal comb-like seta, 1 dorsal hair-like seta and 2 sickle-like ventral setae. Palpal claw with few teeth in basal part. All setae of palps hair-like. Palpal tibia with 3 setae. Palpal genu with 1 dorsal seta. Palpal femur with 4 setae: 1 dorsal, 1 lateral and 2 ventral. Rostral shield without ornamentation. Peritremes arch-like. *Idiosoma*: Idiosoma elongate, about 2-4 times longer than gnathosoma. *Dorsum*: Eyes absent. Only propodosomal shield present. All setae hair-like, mostly ultralong. Neotrichial setae absent. Propodosoma bearing setae *vi*, *ve*, *sci*, *sce*, *h* and *d1*, hysterosoma bearing setae *l1-l5*, *d2* and *d3*, setae *l5* short and situated ventrally. *Venter*: Setae *ic1*, *ic3*, *ic4*, *pg1-pg3*, *g1*, *g2* and *a1*, *a2* and *a3* all hair-like. *Legs*: Legs slender. All tarsi with claws and empodium. Tarsus I-II, tibia I and genu I with solenidia. Guard seta of solenidion $\omega 1$ very short. Apical tarsal knobs and claw angles absent. Outer seta of coxae III hair-like. All leg setae are hair-like, excluding plume-like setae *p'* and *pt'*. Chaetotaxy (excluding solenidia): tarsi 9-7-7-7, tibiae 5-4-4-4, genua 2-2-2-2, femora 2-2-2-1, trochanters 1-1-2-1, coxae 2-1-2-2.

MALE. Similar to the female but the setae *l3-l5* are lacking.

TYPE SPECIES: *Cheyletus norneri* POPPE, 1888

This genus includes 12 species, that we divide here into two formal groups, “*norneri*” and “*impavida*”.

Species group “*norneri*”

Setae *vi* and *ve* subequal in length.

1. *Cheletopsis norneri* (POPPE, 1888)

Cheyletus norneri POPPE, 1888: 239, fig. 4
Cheletopsis norneri OUDEMANS, 1904: 170;
1906: 180-186, figs 52-54

This species was described from quills of *Sterna hirundo* in France (POPPE, 1888; OUDEMANS, 1904, 1906). Later on, it was found in quills of *St. hirundo*, *Gelochelidon nilotica* and *Tringa totanus* in Russia, Ukraine, Kazakhstan and Kirghizia (VOLGIN, 1969, MIRONOV *et al.*, 1991).

The type specimens of this species are lost. We redescribe here this species from specimens from *G. nilotica*

(Kazakhstan), because the material from the type host was not available for our study.

FEMALE (Figs. 1, 2): *Gnathosoma* 200 long and 165 wide. Peritremes with 7-8 pairs of links; the median part of peritremes slightly concave. Palpal claws with 1 tooth. Comb-like seta of palpal tarsus with 8-9 tines. *Idiosoma* 700 long and 250 wide. *Gnathosoma* about 3.5 time shorter than the idiosoma. Propodosomal shield 285 long and 135 wide. Setae *vi* and *ve* subequal and only slightly shorter than *sce*. Setae *d1* and *d3* short. Setae *sci* 2 times longer than *sce* and *l1*. Setae *l4* more than 2 times longer than *vi* and *ve*. Anal setae subequal. Length of setae: *vi* and *ve* about 200, *sci* 500, *sce* 250, *h* 380, *d1* 85, *d2* 400, *d3* 60, *l1* 230, *l2* 460, *l3* 450 and *l4* 470.

MALE (Figs. 3, 4): *Gnathosoma* 200 long and 150 wide. Peritremes with 8-9 pairs of links; the median part of peritremes slightly concave. Palpal claws without tooth. Comb-like seta of palpal tarsus with 6 tines. *Idiosoma* 515 long and 235 wide. Propodosomal shield 200 long and 115 wide. Setae *vi* and *ve* subequal. Setae *sci* and *sce* subequal and about 2 times longer than *vi* and *ve*. Setae *d1* and *d3* short. Posterior end of the body triangular. Length of setae: *vi* and *ve* about 185, *sci* 365, *sce* 350, *h* 300, *d1* and *d3* about 50, *d2* 450, *l1* 400 and *l2* 430.

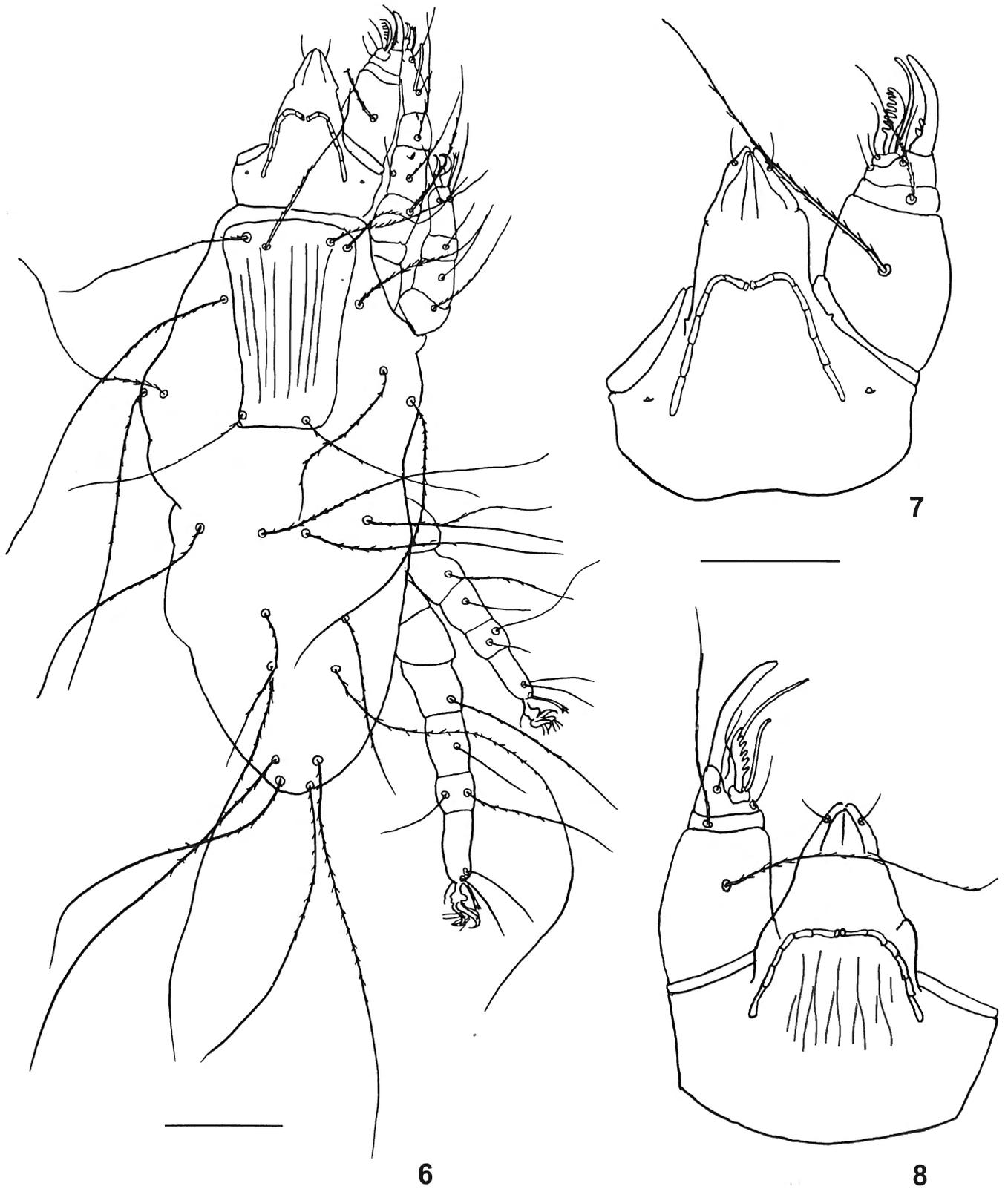
MATERIAL EXAMINED. Forty five females and 39 males from *Gelochelidon nilotica*, near of Sorbulak lake, Alma-Ata Prov., Kazakhstan, 23. VII. 1985. Coll. S. MIRONOV (ZIN). Two females and 4 males from the same host species, Beaufort, Cartel Co., N. Carolina, U.S.A., 08. VII. 1963. Coll. G. LEIDAHL (NU 4887). One female and 1 male from *Sterna repressa*, Gezira Abu Minquar, Red Sea Governate, Egypt, 16. V. 1984. Coll. S.M. GOODMAN (UMMZ 207034). One female from *Sterna simplex*, Departamento Presidente Hayes, 4 km NW Estancia Fonciere, west bank Rio Paraguay, Paraguay, 09. X. 1988. Coll. S.M. GOODMAN (UMMZ 227484). Three females from *Tringa totanus*, Aksai Valley, Kirghizia, 14. VII. 1990. Coll. S. MIRONOV (ZIN). Two females from the same host species, Slonsk Nature Reserve, Poland, 20. VII. 1987. Coll. J. DABERT (UAM 00990). Female and 1 male from the same host species, Kopojno, Poland, 08. V. 1988. Coll. J. DABERT (UAM 01102). Eight females and 4 males from *Chlidonias hybrida*, Birket El Brida, Wadi El Natrun, Boheira Governate, Egypt, 27. V. 1984. Coll. S.M. GOODMAN (UMMZ 207021).

REMARK. This species differs from all other species of the genus by the triangular shape of the posterior extremity of male.

2. *Cheletopsis basilica* OUDEMANS, 1904

Cheletopsis basilica OUDEMANS, 1904: 170;
1906: 186-189, fig. 55.

This species was described ex *Tringa totanus* from fe-



Figs. 6-8 — *Cheletopsis basilica* OUDEMANS, 1904. Female in dorsal view (6), gnathosoma of female in dorsal view (7), gnathosoma of male in dorsal view (8). Scale line 100 μ m (fig. 6) and 50 μ m (figs 7, 8).

male specimens in France (OUDEMANS, 1904). It had not been found again since the original description.

We have re-examined the type series of this species and designated a lectotype. The redescription of this species is based on specimens from *Charadrius hiaticula*, because the type specimens are seriously damaged. The male is described here for the first time.

FEMALE (Figs 5-7): *Gnathosoma* 145 long and 115 wide. Peritremes with 6 pairs of links; the median part of peritremes slightly concave. Palpal claws with 2 teeth. Comb-like seta of palpal tarsus with 7-8 tines. *Idiosoma* 480 long and 230 wide. *Gnathosoma* 1/3 the length of *idiosoma*. Propodosomal shield 115 long and 85 wide. Setae *vi* and *ve* subequal and only slightly shorter than *sce*. Setae *d1* and *d3* long. Setae *sci* about 1.5 time longer than *sce* and *l1*. Setae *l4* about 1.5 times longer than *vi* and *ve*. Anal setae *a3* about 2 times longer than *a2*. Length of setae: *vi* and *ve* and *d1* about 150, *sci* 300, *sce* 215, *h* 250, *d2* 230, *d3* 115, *l1* 165, *l2* and *l3* about 335 and *l4* 235.

MALE (Figs 8-9): *Gnathosoma* 135 long and 125 wide. Peritremes with 6 pairs of links; the median part of peritremes straight. Palpal claws without tooth. Comb-like seta of palpal tarsus with 6 tines. *Idiosoma* 400 long and 215 wide. Propodosomal shield 145 long and 90 wide. Setae *vi* and *ve* subequal. Setae *sci* about 1.7 longer than *vi*, *ve* and *sce*. Setae *d1* and *d3* long. Length of setae: *vi* and *ve* about 130, *sci* 230, *sce* 125, *h* 190, *d1* 95, *d2* 195, *d3* 110, *l1* 135 and *l2* 260.

MATERIAL EXAMINED. Female lectotype from *Tringa totanus*, France, 1882. Coll. TROUSSERT (NMNH). One female paralectotype from the same host species, France. Coll. M. MARTIN (NMNH). One female and 1 male from *Charadrius hiaticula*, Zagorow, Poland, 08. V. 1988. Coll. J. DABERT (UAM 01113). Two females and 2 males from *Calidris melanotos*, Tgiak Bay, Alaska, U.S.A., 09. VII. 1932. Coll. P.S. HUMPHREYS (UMMZ 225478). Two females from *Chlidonias niger*, Point Mouillée State Game Area, Monroe Co., Michigan, U.S.A., 07. V. 1982. Coll. S.M. GOODMAN (UMMZ 205022).

REMARK. This species differs from all other species by the great length of the setae *d1* (150) and *d3* (115) and by the ratio of anal setae *a2*: *a3* (1: 2) in the female.

3. *Cheletopsis animosa* OUDEMANS, 1904

Cheletopsis animosa OUDEMANS, 1904: 170;
1906: 189-193, figs 56, 57.

This species was described from? *Tringa totanus* in France (OUDEMANS, 1904). This species has not been recorded again since its original description.

We have re-examined the type specimens of this species and designated a lectotype male. However, all these

specimens are seriously damaged and we prefer redescrbe this species from specimens collected from *Sterna hirundo*.

FEMALE (Figs 10-11): *Gnathosoma* 115 long (100 long in paralectotype) and 85 wide. Palpal claws with 2 teeth. Comb-like seta of palpal tarsus with 6-7 tines. *Idiosoma* 450 long (370) and 165 wide (125). *Gnathosoma* almost 1/4 the length of *idiosoma*. Setae *h* 215 long (235). Setae *vi* and *ve* subequal and slightly longer than *sce*. Setae *d1* and *d3* short. Setae *sci* more 2 times longer than *sce* and *l1*. Setae *l1* 1.5 times shorter than *sce*. Setae *l4* 1.5 about 2 times longer than *vi* and *ve*. Anal setae subequal. Length of setae: *vi* and *ve* about 80, *sci* 215, *sce* 60, *h* 215, *d1* and *d3* about 50, *d2* 145, *l1* 40, *l2* 235, *l3* 300 and *l4* 165.

MALE (lectotype): *Gnathosoma* as in the female. *Idiosoma* 335 long and 125 wide. Setae *vi* and *ve* subequal and slightly longer than *sce*. Setae *sci* more than 2 times longer than *vi* and *ve*. Setae *d1*, *d3* and *l1* short. Length of setae: *vi* and *ve* about 100, *sce* 95, *h* 265 and *d1* 200.

MATERIAL EXAMINED. Male lectotype and 1 female paralectotype from *Tringa totanus*, France. Coll. TROUSSERT (NMNH). One female paralectotype from the same host species and the same localisation, 1882. Coll. MARTIN (NMNH). Three females from *Sterna hirundo*, Eastern North America, other data are lacking. Coll. B. OCONNOR (BMOC 81-1111-2).

REMARK. This species is closely related to *C. anax* and *C. mariae* but it differs from these species by the following characters: In the female of *C. animosa* the setae *l4* are 2 times longer than *vi* and *ve*. In the females of *C. anax* and *C. mariae* the setae *l4* 1.4-1.5 times shorter than *vi* and *ve*.

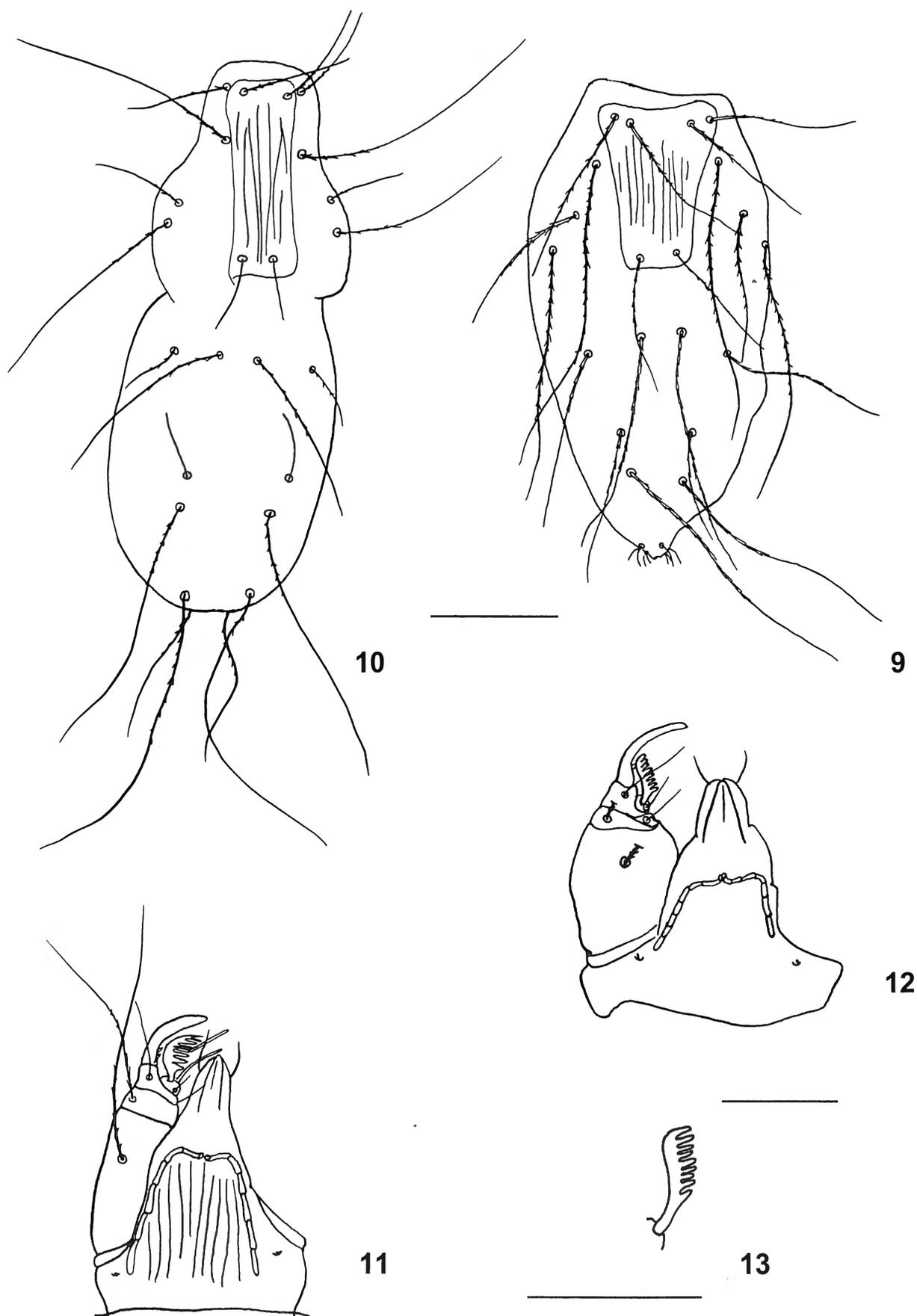
4. *Cheletopsis anax* OUDEMANS, 1904

Cheletopsis anax OUDEMANS, 1904: 170;
1906: 195-200, figs 59-61.

This species was described from ? *Tringa totanus* in France (OUDEMANS, 1904). This species has not been recorded again since its original description.

We have re-examined the type series of this species and designated a lectotype. Unfortunately the female type specimens are lost and the male specimens are seriously damaged. We can only depict here the gnathosoma and give some measurements of the setae. The rest of our description is based on the figures of OUDEMANS.

FEMALE: Body length about 300. Palpal claws with 2 teeth. Comb-like seta of palpal tarsus with 4 tines. *Gnathosoma* about 2.5 times shorter than the *idiosoma*. Setae *vi*, *ve* subequal and only slightly shorter than *sce*. Setae *d1* and *d3* short. Setae *sci* more 2 times longer than *sce* and *l1*. Setae *l4* about 1.5 time shorter than *vi* and *ve*. Anal setae subequal.



Figs. 9-13 — *Cheletopsis basilica* OUDEMANS, 1904, male: Dorsal view (9). *Cheletopsis animosa* OUDEMANS, 1904, female: Dorsal view (10), gnathosoma in dorsal view (11). *Cheletopsis anax* OUDEMANS, 1904, female: Gnathosoma in dorsal view (12), comb-like seta of palpal tarsus (13). Scale line 100 μ m (figs 9, 10), 50 μ m (figs 11, 12) and 25 μ m (fig. 13).

MALE (lectotype, Figs. 12-13): *Gnathosoma* 235 long and 215 wide. Peritremes with 8 pairs of links. The median part of peritremes straight. Palpal claws with 1 tooth. Comb-like seta of palpal tarsus with 8-9 tines. Setae *vi*, *ve* and *sce* subequal. Setae *sci* about 2 times longer than *vi*, *ve* and *sce*. Setae *d1* and *d3* short. Length of setae: *sci* 530, *h* 365, *d2* 230, *l1* 115 and *l2* 400.

MATERIAL EXAMINED. Male lectotype from *Tringa totanus*, France, 1882. Coll. TROUËSSART (NMNH). Two male paratypes from the same host species, France, 1882. Coll. TROUËSSART (NMNH).

REMARK. This species is very closely related to *C. mariae* but differs from it by the following characters: In the female of *C. anax* the palpal claw bears two basal teeth, the comb-like seta of palpal tarsus has 4 tines and the setae *sce* are longer than *vi* and *ve*. In the female of *C. mariae* the palpal claw bears one basal tooth, the comb-like seta of palpal tarsus bears 8-9 tines and the setae *sce* are slightly longer than *l1*.

5. *Cheletopsis mariae* MIRONOV, BOCHKOV et CHIROV, 1991

Cheletopsis mariae MIRONOV, BOCHKOV & CHIROV, 1991: 51-52, fig. 1.

FEMALE (holotype, Figs 14-15): *Gnathosoma* 150 long and 125 wide. Peritremes with 7-8 pairs of links; the median part of peritremes straight. Palpal claw with 1 tooth. Comb-like seta of palpal tarsus with 9-10 tines. *Idiosoma* 480 long and 200 wide. *Gnathosoma* about 1/3 the length of *idiosoma*. Propodosomal shield 170 long and 90 wide. Setae *vi* and *ve* subequal and slightly 1.1 time longer than *sce*. Setae *d1* and *d3* short. Setae *sci* about 3 times longer than *sce* and *l1*. Setae *l4* about 1.4 times shorter than *vi* and *ve*. Anal setae subequal. Length of setae: *vi* and *ve* about 100, *sci* 260, *sce* 90, *h* 250, *d1* 55, *d2* 225, *d3* 35, *l1* 80, *l2* 290, *l3* 315 and *l4* 70.

MALE. Unknown.

MATERIAL EXAMINED: Female holotype and 2 female paratypes from *Actitis hypoleucos*, Ottuk village, Issyk-Kul Lake, Kirghizia, 25. VI. 1990. Coll. S. MIRONOV (ZIN). One female from the same host species, Slonsk Nature Reserve, Poland, 22 VII. 1987. Coll. J. DABERT (UAM 01035). One female from the same host species and with the same localisation, 23. VII. 1987. Coll. D. RZEPKA (UAM 01066). One female from the same host species and with the same data. One female from the same host species and with the same localisation, 21. VII. 1987. Coll. J. DABERT (UAM 01003). One female from the same host species, Vistula River Mouth, Poland, 23. VII. 1999. Coll. M. ZAGALSKA (UAM 1716).

REMARK. This species is closely related to *C. anax* and *C. animosa* (see above).

Species group "impavida"

Setae *ve* about 2-4 times shorter than *vi*.

6. *Cheletopsis impavida* OUDEMANS, 1904

Cheletopsis impavida OUDEMANS, 1904: 170; 1906: 175-180, figs 48-51.

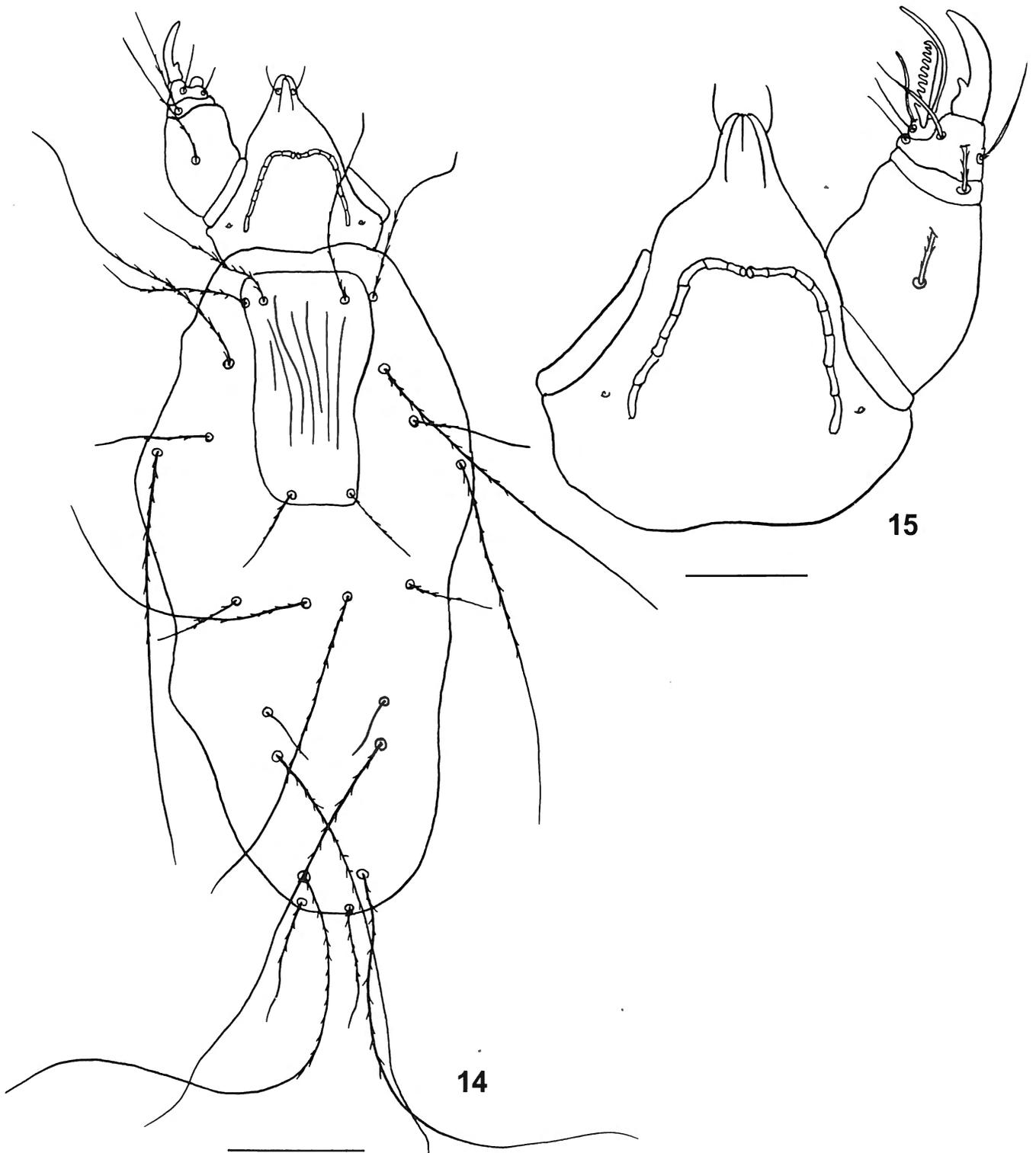
This species was described from *Tringa totanus* in France (OUDEMANS, 1904). Later on, it was collected from *Calidris minutus*, *C. temminckii* and *C. ruficollis* in Kazakhstan, Kirghizia and Russia (Far East) (MIRONOV *et al.*, 1991).

We re-examined the type specimens of this species and designated a lectotype. The type specimens of the females are seriously damaged and therefore we redescribe here this species from new female specimens collected from the typical host.

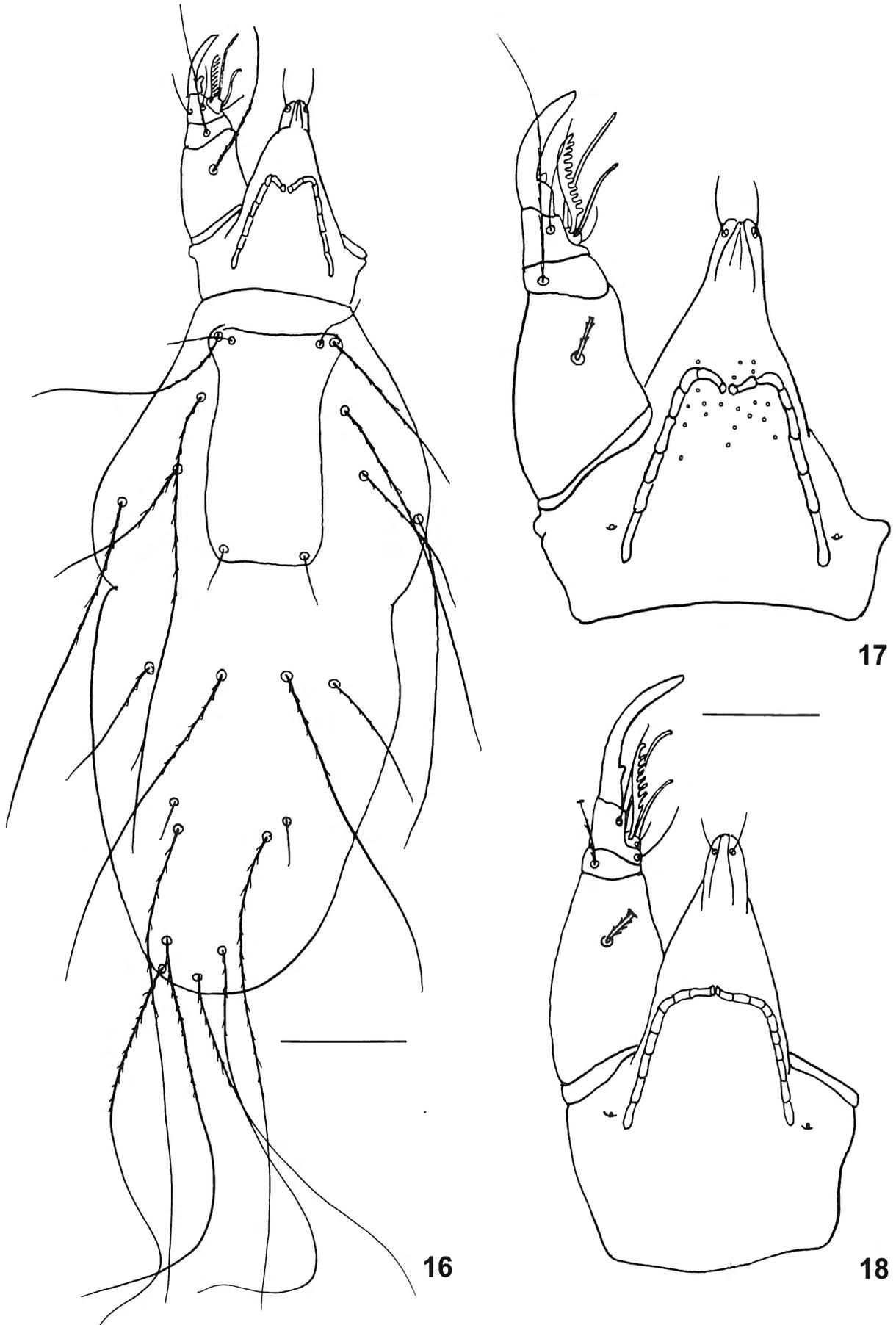
FEMALE (Figs. 16-17): *Gnathosoma* 200 long and 150 wide. Peritremes with 7-8 pairs of links; the median part of peritremes slightly concave. Palpal claws with 1 tooth. Comb-like seta of palpal tarsus with 9-11 tines. *Idiosoma* 600 long and 280 wide. *Gnathosoma* about 1/3 the length of the *idiosoma*. Propodosomal shield 190 long and 100 wide. Setae *ve* and *sce* about 4 times the length of *vi*. Setae *sci* more than 2 times longer than *ve* and *sce*. Setae *d1* and *d3* short. Setae *sce* 1.2-1.5 times longer than *l1*. Setae *l4* more than 3 times longer than *ve* and *sce*. Anal setae subequal. Length of setae: *vi* 50, *ve* and *sce* about 160, *sci* 365, *h* 265, *d1* 45, *d2* 350, *d3* 35, *l1* 125, *l2* 415, *l3* 420 and *l4* 350.

MALE (paralectotype, Fig. 18): *Gnathosoma* 235 long and 215 wide. Peritremes with 8 pairs of links, the median part of peritremes straight. Palpal claws with 1 tooth. Comb-like seta of palpal tarsus with 7 tines. Setae *ve* about 4 times longer than *vi*. Setae *sci* about 2 times longer than *ve* and *sce*. Setae *d1* and *d3* short. Length of setae: *vi* 40, *ve* 150, *sci* and *d2* about 335, *sce* 175, *h* 300, *d1* 35, *l1* 115 and *l2* 430.

MATERIAL EXAMINED. Female lectotype, 1 female paralectotype and 1 male paralectotype from *Tringa totanus*, France, 1882. Coll. TROUËSSART (NMNH). Three females from the same host species, Aksai Valley, Kirghizia, 14. VII. 1990. Coll. S. MIRONOV (ZIN). Three females from *Tringa stagnatilis*, Slonsk Nature Reserve, Poland, 21. VII. 1987. Coll. J. DABERT (UAM 00994). Seven females from *Calidris minutus*, Sary-Su river, Kysyl-Orda Prov., Kazakhstan, 20. VIII. 1986. Coll. S. MIRONOV (ZIN). Five females from *Calidris temminckii*, near Son-Kul Lake, Kirghizia, 23. 07. 1990. Coll. S. MIRONOV (ZIN). One female from *Calidris ruficollis*, Khasanskij Distr., Primor'e, Russia, 03. XI. 1987. Coll. T. VASUKOVA (ZIN). Three females from *Calidris pusilla*, Point Mouillee State Game Area, Monroe Co., Michigan, U.S.A., 13. VIII.



Figs. 14-15 — *Cheletopsis mariae* MIRONOV, BOCHKOV et CHIROV, 1991, female. Dorsal view (14), gnathosoma in dorsal view (15). Scale line 100 μm (fig. 14) and 50 μm (fig. 15).



Figs. 16-18 — *Cheletopsis impavida* OUDEMANS, 1904. Female in dorsal view (16), gnathosoma of female in dorsal view (17), gnathosoma of male in dorsal view (18). Scale line 100 μ m (fig. 16) and 50 μ m (figs 17, 18).

1982. Coll. S.M. GOODMAN (UMMZ 205339). Five females from the same host species and with the same data (UMMZ 205340). One female from *Calidris ferruginea*, Vistula River Mouth, Poland, 31. VII. 1999. Coll. M. ZAGALSKA (UAM 1718). One female from the same host species and with the same data, 23. VII. 1999 (UAM 1719). One male from *Micropalama himantopus*, Cheyenne Bottoms, Barton Co., Kansas, U.S.A., 05. V. 1974. Coll. J.G. STRAUCH (UMMZ 225502). Three females and 2 males from *Rostratula semicollaris*, Mardel Plata, Argentina, 1914. Coll. Unknown (UMMZ 63 186).

REMARKS. (i) This species is closest to *C. daberti* but it differs from it by the following characters: In the females of *C. impavida* the setae *d1* are 30-50 long. In the males the setae *d1* are 30-40 long, the peritremes not concave, the palpal claws have a basal tooth. In the females of *C. daberti* the setae *d1* are 70-90 long. In the males the setae *d1* are 70-80 long, the peritremes are slightly concave and the palpal claws have no tooth.

(ii) In the females of *C. impavida* from *Calidris ferruginea* the setae *l1* are 200-230 long, while in the females of this species from all other hosts these setae *l1* are 120-185 long. All another characters are similar in these mites.

7. *Cheletopsis daberti* KIVGANOV et BOCHKOV, 1994

Cheletopsis daberti KIVGANOV & BOCHKOV,
1994: 39-43, figs 1-3.

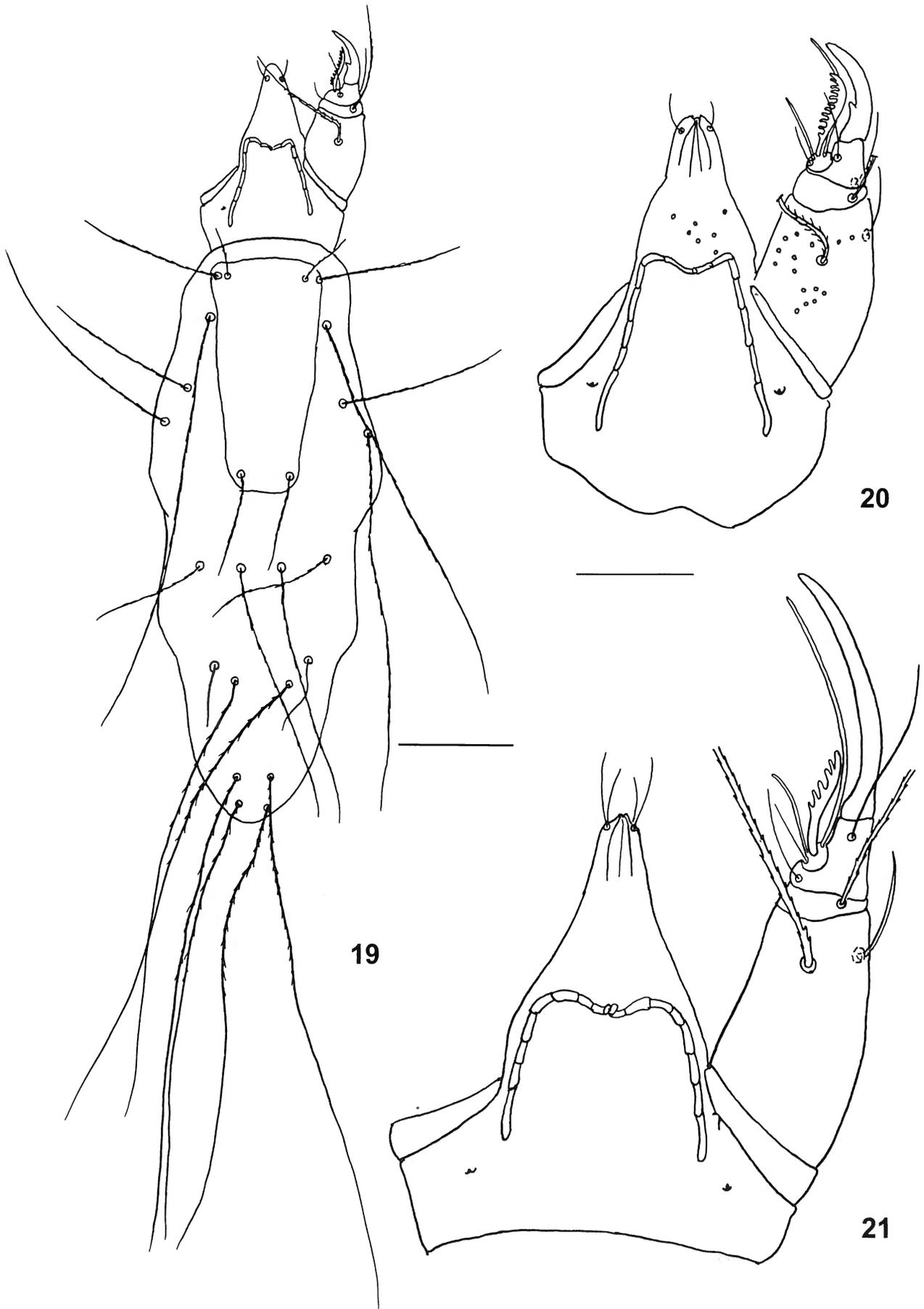
FEMALE (holotype, Figs 19-20): *Gnathosoma* 150 long and 150 wide. Peritremes with 7-8 pairs of links; the median part of peritremes slightly concave. Palpal claw with 1 tooth. Comb-like seta of palpal tarsus with 9-11 tines. *Idiosoma* 480 long and 230 wide. *Gnathosoma* about 1/3 the length of *idiosoma*. Propodosomal shield 180 long and 85 wide. Setae *vi* 1/4 the length of *ve* and *sce*. Setae *sci* more than 2.5 times longer than *ve* and *sce*. Setae *d1* and *d3* short. Setae *l1* slightly shorter than *sce*. Setae *l4* more than 3 times longer than *ve* and *sce*. Length of setae: *vi* 30, *ve* and *sce* about 120, *sci* 280, *h* 250, *d1* 70, *d2* 195, *d3* 25, *l1* 80, *l2* 365, *l3* 400 and *l4* 315.

MALE (paratype, Figs 21-22): *Gnathosoma* 220 long and 170 wide. Peritremes with 8 pairs of links; the median part of peritremes slightly concave. Palpal claw without teeth. Comb-like seta of palpal tarsus with 4-6 tines. *Idiosoma* 390 long and 210 wide. Propodosomal shield 170 long and 125 wide. Setae *vi* about 5 times shorter than *ve*. Setae *sci* about 2 times longer than *sce*. Setae *d1* and *d3* short. Length of setae: *vi* 40, *ve* 190, *sci* 350, *sce* 165, *h* 250, *d1* 65, *d2* 380, *d3* 30, *l1* 110 and *l2* 365.

MATERIAL EXAMINED. Female holotype from *Tringa glareola*, Tigulskij Reservation, Odessa Prov., Ukraine, 27. V. 1991, Coll. D. KIVGANOV (ZIN). Three female para-

types and 3 male paratypes from the same host species and with the same data, 16. VII. 1987 and 22. VII. 1987 (ZIN). Two female paratypes from the same host species, Slonsk Nature Reserve, Poland, 22. VII. 1987. Coll. J. DABERT (UAM 00997). One female and 3 male paratypes from the same host species and with the same data, 16. VII. 1987 (UAM 00956 M). One female and 1 male from the same host species and with the same data, 17. VII. 1987 (UAM 00770 C). Three females from the same host species and with the same data, 29. IV. 1987 (UAM 00886). One male from the same host species and with the same data, 18. VII. 1987 (UAM 00889). One female and two males from the same host species and with the same data, 21. VIII. 1986 (UAM 00918). One female from the same host species and with the same data, 18. VII. 1987 (UAM 00925). Four females from the same host species and with the same data, 17. VII. 1987 (UAM 00929). One female from the same host species and with the same data, 17. VII. 1987 (UAM 00951). One female from the same host species and with the same data, 19. VII. 1987 (UAM 00968). One female from the same host species and with the same data, 20. VII. 1987 (UAM 00974). Two females from the same host species and with the same data, 20. VII. 1987 (UAM 01034). Four females and 3 males from the same host species and with the same data, 20. VII. 1987 (UAM 01039). One female from the same host species and with the same data, 24. VII. 1987 (UAM 01051). One female from the same host species and with the same data, 21. VII. 1987 (UAM 01056). One female from the same host species and with the same data, 24. VII. 1987 (UAM 01063). Three females and 2 males from the same host species and with the same localisation, 16. VII. 1987, Coll. M. GIERTYCH (UAM 00935). Five females and 4 males from the same host species and with the same data, 27. VII. 1987 (UAM 01161). One female and 1 male from the same host species and with the same data, 27. VII. 1988 (UAM 01166). Eight females and 5 males from the same host species and with the same data, 26. VII. 1988 (UAM 01168). One female from the same host species and with the same data, 26. VII. 1987 (UAM 01206). Five females and 4 males from the same host species and with the same localisation, 02. VII. 1987. Coll. D. RZEPKA (UAM 01037). Two males from the same host species and with the same localisation, 05. VIII. 1988. Coll. G. LOREK (UAM 01197). One female from *Tringa nebularia*, Slonsk Nature Reserve, Poland, 19. VII. 1985. Coll. J. DABERT (UAM 00804). Three females and 2 males from *Calidris temminckii*, Poland, 19. VII. 1987. Coll. J. DABERT (UAM 00680). One female from *Micropalama himantopus*, Buttle, Mc. Henry Co., N. Dakota, U.S.A., 30. V. 1953. Coll. R.W. STORER (UMMZ 225498).

REMARK. This species is very similar to *C. impavida* (see above). Both species differ from *C. charadrii* by the short setae *l1* (80) and by the ratio of *sci*: *sce* 2.3: 1 in the female. In the female of *C. charadrii* the setae *l1* are 210-230 long and the ratio of *sci*: *sce* is 1: 1.1-1.2.



Figs. 19-21 — *Cheletopsis daberti* KIVGANOV et BOCHKOV, 1994. Female in dorsal view (19), gnathosoma of female in dorsal view (20), gnathosoma of male in dorsal view (21). Scale line 100 μ m (fig. 19) and 50 μ m (figs. 20, 21).



Figs. 22-23 — *Cheletopsis daberti* KIVGANOV et BOCHKOV, 1994, male: Dorsal view (22). *Cheletopsis charadrii* MIRONOV, BOCHKOV et CHIROV, 1991, female: Dorsal view (23). Scale line 100 μ m.

8. *Cheletopsis charadrii* MIRONOV, BOCHKOV
et CHIROV, 1991

Cheletopsis charadrii MIRONOV, BOCHKOV & CHIROV,
1991: 52-53, fig. 2.

FEMALE (holotype, Figs. 23-30): *Gnathosoma* 155 long and 125 wide. Peritremes with 8 pairs of links; the median part of the peritremes slightly concave. Palpal claws with 1 tooth. Comb-like seta of palpal tarsus with 8-9 tines. *Idiosoma* 510 long and 125 wide. *Gnathosoma* about 2.5 times shorter than the *idiosoma*. Propodosomal shield 145 long and 65 wide. Setae *ve* about 4 times longer than *vi*. Setae *sce* only 1.2 times shorter than *sci* and more than 2 times longer than *ve*. Setae *d1* and *d3* short. Setae *l1* slightly shorter (1.2 times) than *sce*. Setae *l4* more than 2.5 times longer than *ve*. Anal setae subequal. Length of setae: *vi* 45, *ve* 125, *sci* 315, *sce* 270, *h* 245, *d1* 45, *d2* and *l3* about 360, *d3* 45, *l1* 225, *l2* 370 and *l4* 340.

MALE. Unknown.

MATERIAL EXAMINED. Female holotype and 3 female paratypes from *Charadrius dubius*, Ottuk village, near Issyk-Kul Lake, Kirghizia, 25. V. 1989. Coll. P. CHIROV (ZIN). Four females from the same host species, Aksai Valley, Kirghizia, 11. VII. 1990. Coll. S. MIRONOV (ZIN).

REMARK. This species differs from all the other known species of the group "*impavida*" by the subequal lengths of setae *sci* and *sce*.

9. *Cheletopsis limnodromi* sp. n.

FEMALE (holotype, Figs 31-32): *Gnathosoma* 200 long and 165 wide. Peritremes with 10 pairs of links; the median part of the peritremes concave. Palpal claws with 1 tooth. Comb-like seta of palpal tarsus with 10-11 tines. *Idiosoma* 570 long and 215 wide. *Gnathosoma* about 3 times shorter than the *idiosoma*. Setae *vi* about 1/3 the length of *ve*. Setae *sce* about 1.7 times shorter than *sci* and almost 2 times longer than *ve*. Setae *d1* and *d3* short. Setae *sce* slightly longer (1.2 times) than *l1*. Setae *l4* 2.5 times or more longer than *ve*. Anal setae subequal. Length of setae: *vi* 50, *ve* 125, *sci* 380, *sce* 230, *h* 330, *d1* 90, *d2* 360, *d3* 45, *l1* 100, *l2* 460. Setae *l4* broken, more than 300 long.

MALE (paratype, Fig. 33): *Gnathosoma* 225 long and 200 wide. Peritremes with 8 pairs of links; the median part of peritremes slightly concave. Palpal claw without teeth. Comb-like seta of palpal tarsus with 9-10 tines. *Idiosoma* 530 long and 280 wide. Setae *ve* about 3-4 times longer than *vi*. Setae *sci* about 1.4 times longer than *sce*. Setae *d1* and *d3* short. Length of setae: *vi* 60, *ve* 230, *sci* 365, *sce* 315, *h* 300, *d1* and *d3* 45, *d2* 400, *l1* 280 and *l2* 480.

MATERIAL EXAMINED. Female holotype, 1 female paratype and 1 male paratype from *Limnodromus griseus*, Sapelo

Isl., McIntosh Co., Georgia, U.S.A., III. 1969. Coll. R. HEARD (UGA 1685).

Holotype and paratypes in UMMZ.

REMARK. This new species is close to *C. impavida* and *C. daberti* but it differs from them by the following characters: In the female of *C. limnodromi* sp. n. the setae *sce* are 230 long and the ratio *sce: l1* is 2.3: 1. In the male the setae *l1* are 280 long, subequal to *sce*. In the females of *C. impavida* and *C. daberti* the setae *sce* are 160 and 80 long, respectively and the ratio *sce: l1* is 1.3-1.5: 1. In males the setae *l1* are about 110 long and 1.5 times shorter than *sce*.

C. limnodromi sp. n. differs from *C. charadrii* by the following characters: In the female of *C. limnodromi* sp. n. the setae *l1* are 100 long and about 2.3 times shorter than *sce*; the setae *sci* are 1.7 times longer than *sce*; the peritremes have 10 links. In the female of *C. charadrii* the setae are *l1* 225 long and subequal to *sce*; the setae *sci* are only 1.2 times shorter than *sce*; the peritremes have 8 links.

10. *Cheletopsis rynchops* sp. n.

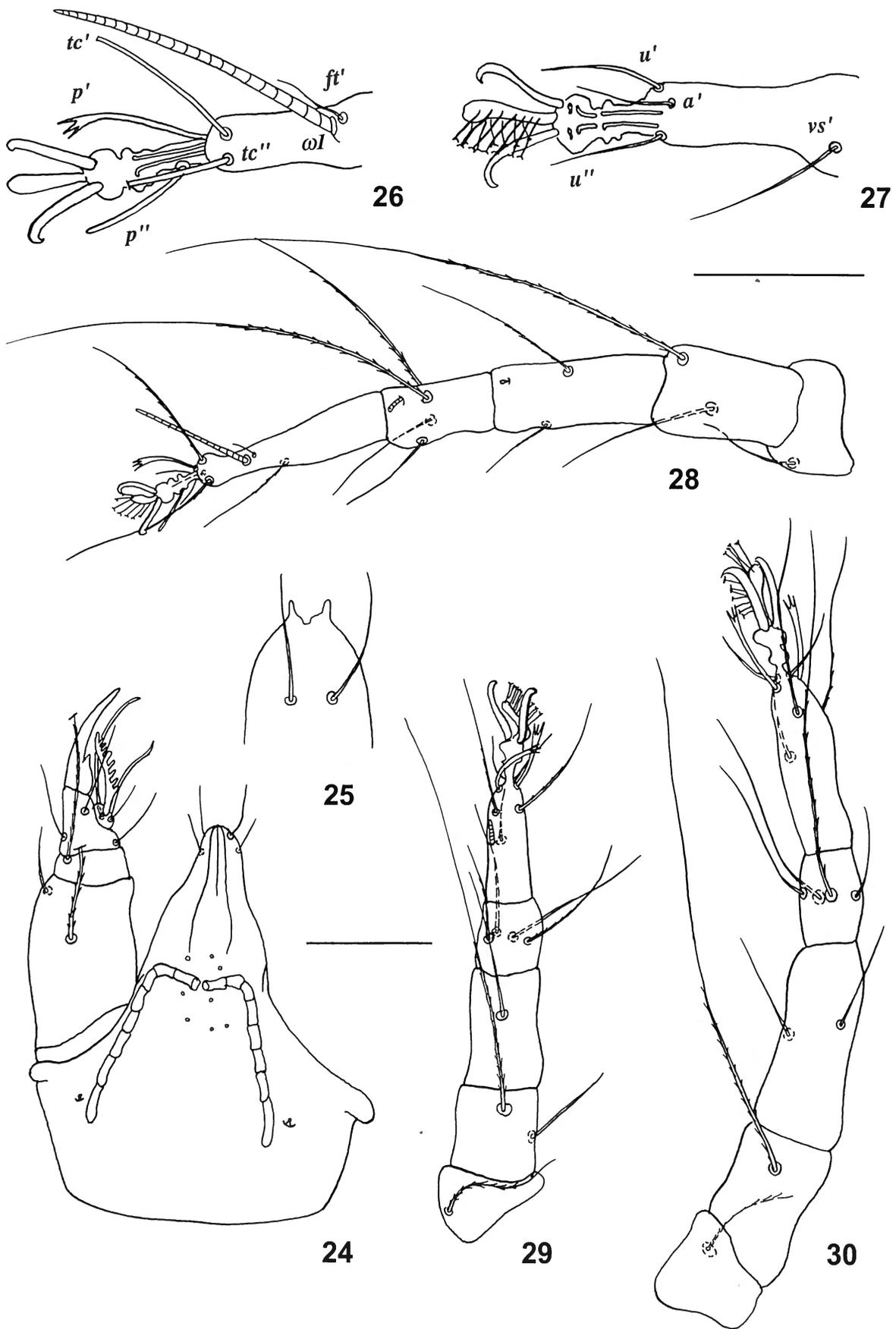
FEMALE (holotype, Fig. 34): *Gnathosoma* 365 long and 275 wide. Peritremes with 8-11 pairs of links; the median part of peritremes slightly concave. Palpal claws with 1 tooth. Comb-like seta of palpal tarsus with 15-17 tines. *Idiosoma* 580 long and 330 wide. *Idiosoma* 1.5-1.6 longer than the *gnathosoma*. Setae *ve* about 2.5 times longer than *vi*. Setae *ve* and *sce* 2.5 times shorter than *sci*. Setae *d1* and *d3* short. Setae *l1* and *sci* subequal. Setae *l4* more than 2.5 times longer than *ve*. Anal setae subequal. Length of setae: *vi* 85, *ve* 165, *sci* 480, *sce* 200, *h* 400, *d1* 60, *d2* 490, *d3* 50, *l1* 400, *l2* 530, *l3* 630 and *l4* 580.

MALE. Unknown.

MATERIAL EXAMINED. Female holotype and 4 female paratypes from *Rynchops flavirostris*, South Tica-Buzi River, Distr. Vila Machado, Mozambique, 15. VIII. 1968. Coll. M.V.E. BADDELY (UMMZ 214692). Two females from *Rynchops niger*, Beaufort, Cartel Co., N. Carolina, U.S.A., 09. VII. 1987. Coll. G. LEIDLAH (NU 4888).

Holotype and 3 paratypes in UMMZ, one paratype in UAM.

REMARK. This new species is clearly distinct from all the other species of the group "*impavida*" by the size of the *gnathosoma* and by the ultralong setae *l1*. In the female of *C. rynchops* the *idiosoma* is 1.5-1.6 times longer than the *gnathosoma* and setae *l1* are about 400 long. In the females of all other species of the genus *Cheletopsis* the *gnathosoma* is 2.5-4 times shorter than the *idiosoma* and the setae *l1* are not longer than 250. *C. rynchops* sp. n. is most closely related to *C. charadrii* and differs from it by the follows characters: In the female of *C. rynchops* sp. n. the setae *sce* are 2.5 times shorter than *sci* and subequal to *ve*. In the female of *C. charadrii* the setae *sce* are subequal to *sci* and they are more than 2 times longer than *ve*.



Figs. 24-30 — *Cheletopsis charadrii* MIRONOV, BOCHKOV et CHIROV, 1991, female. Gnathosoma in dorsal view (24), hypostosomal apex in ventral view (25), tarsus I in dorsal view (26) and ventral view (27), legs I-III in dorsal view (28-30). Scale line 50 μm (figs 24, 28-30) and 25 μm (figs 25-27).

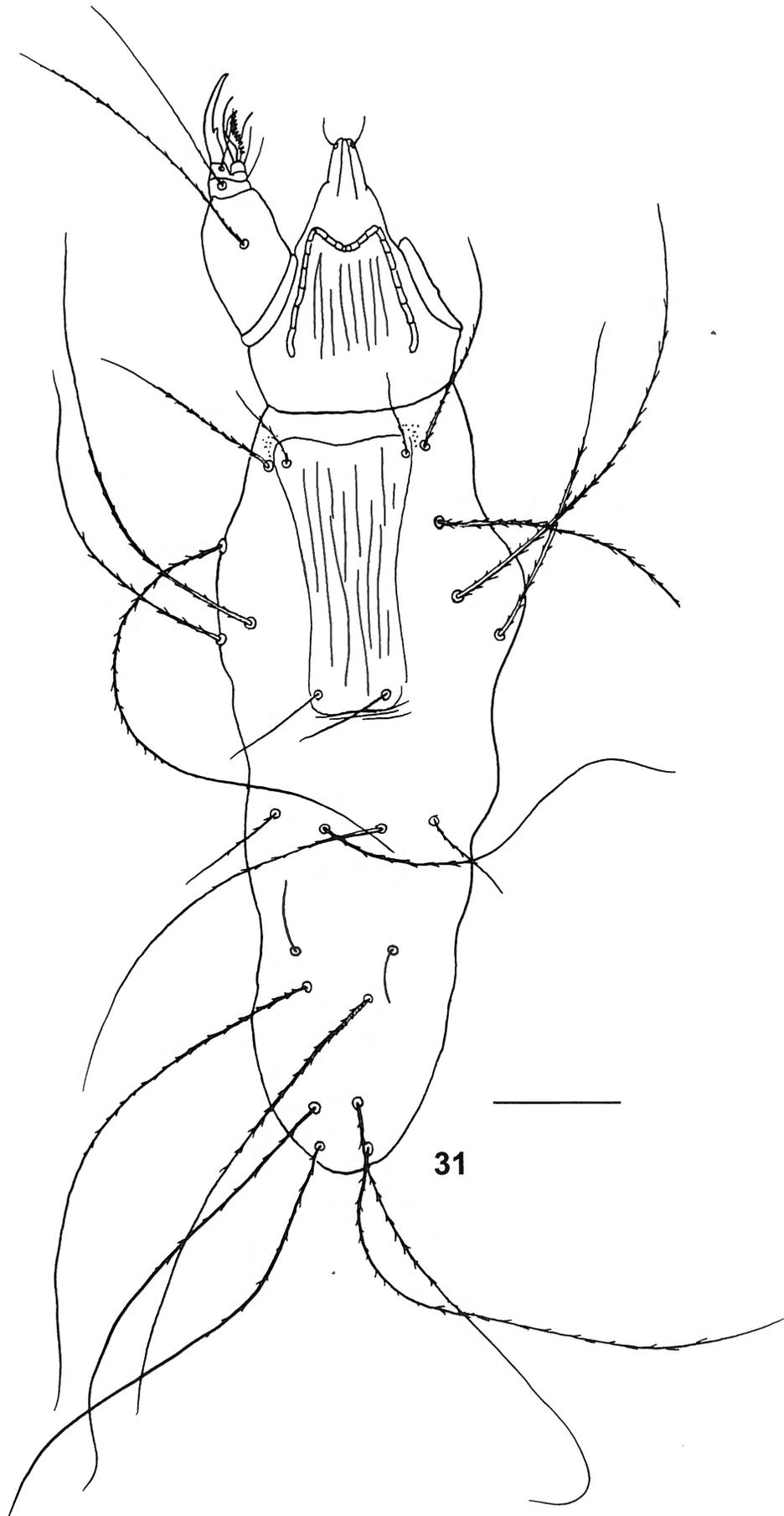
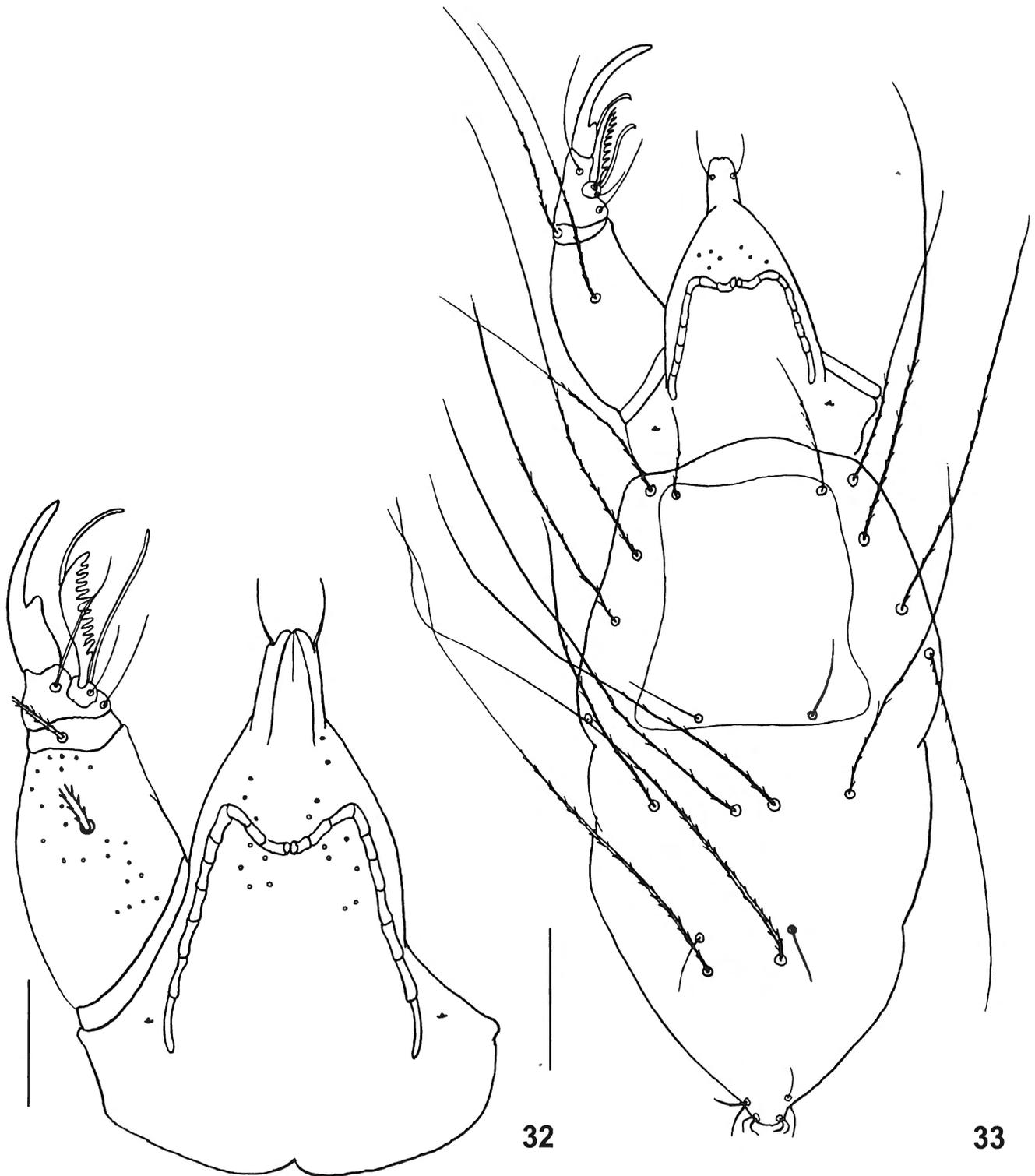


Fig. 31. *Cheletopsis limnodromi* sp. n. Female in dorsal view. Scale line 100 μ m.



Figs. 32-33 — *Cheletopsis limnodromi* sp. n. Gnathosoma of female in dorsal view (32), male in dorsal view (33). Scale line 100 μm (fig. 33) and 50 μm (fig. 32).

11. *Cheletopsis prosobonialis* sp. n.

MALE (holotype, Figs 35-36): *Gnathosoma* 250 long and 215 wide. Peritremes with 6-7 pairs of links; the median part of peritremes straight. Palpal claws with 1 small basal tooth. All the setae of palpal tarsus are nude. *Idiosoma* 500 long and 215 wide. Setae *vi* about 1/3 the length of *ve*. Setae *sci* about 1.4 times longer than *sce*. Setae *d1* and *d3* short. Length of setae: *vi* 80, *ve* 250, *sci* 380, *sce* 265, *h* 315, *d1* and *d3* 40, *d2* 480, *l1* 190 and *l2* 550.

MATERIAL EXAMINED. Male holotype and male paratype from *Prosobonia cancellata*, Tepoto Isl., Tuamotu Archipelago, French Polynesia, 02. V. 1923. Coll. R. BECK (UMMZ 63670).

Holotype and paratype in UMMZ.

REMARK. This new species differs from all the other known males of the genus *Cheletopsis* by the nude dorsal setae on the palpal tarsus.

Species inquirenda

Cheletopsis magnanima OUDEMANS, 1904

Cheletopsis magnanima OUDEMANS, 1904: 170;
1906: 193-195, fig. 58.

This species was described from *Tringa flavipes* based on a single female specimen in Chili (OUDEMANS, 1904). It has never been recorded again since its description.

REMARK. We have examined the type specimen of *C. magnanima* (NMNH). This specimen is seriously damaged. Furthermore, we could not see the small hysterosomal shield depicted in fig. 58 of OUDEMANS (1906) which is lacking in all the other species of the genus *Cheletopsis*. According to the original figure, the setae *d2* are set on this shield, however these setae are, actually, situated on the striated cuticle.

Therefore, we consider this species as a species *inquirenda* until new material from the type host will be examined.

Key to the females of *Cheletopsis*

The female of *C. prosobonialis* is unknown

1. Setae *vi* and *ve* subequal in length species group "norneri" 6
- Setae *ve* 2-3 times longer than *vi* species group "impavida" 2
2. Setae *ve* and *sce* subequal in length 5
- Setae *sce* 2 times or more longer than *ve* 3
3. Setae *sce* not longer than 160, ratio *sce: l1* 1.3-1.5: 1 4
- Setae *sce* 230 long, ratio *sce: l1* 2.3: 1 *C. limnodromi* sp. n.

4. *Idiosoma* 1.5-1.6 times longer than the gnathosoma. Setae *l1* are about 400 long; setae *sce* 2.5 times shorter than *sci* and almost subequal to *ve* *C. rynchops* sp. n.
- *Idiosoma* 2.5-4 times longer than the gnathosoma. Setae *l1* not longer than 250; setae *sce* almost subequal to *sci* and more than 2 times longer than *ve* *C. charadrii* MIRONOV, BOCHKOV et CHIROV, 1991
5. Setae *d1* 70-90 long *C. daberti* KIVGANOV et BOCHKOV, 1994
- Setae *d1* 30-35 long .. *C. impavida* OUDEMANS, 1904
6. Setae *l4* longer than *ve* 8
- Setae *l4* shorter or subequal to *ve* 7
7. Palpal claw with 2 teeth. Comb-like seta of palpal tarsus with 4 tines. Setae *sce* slightly longer than *vi* and *ve* *C. anax* OUDEMANS, 1904
- Palpal claw with one tooth. Comb-like seta of palpal tarsus with 10 tines. Setae *sce* slightly longer than *sce* .. *C. mariae* MIRONOV, BOCHKOV et CHIROV, 1991
8. Setae *d3* short, not longer than 60, 1.6-3 times shorter than *ve* 9
- Setae *d3* long, about 150, subequal to *ve* *C. basilica* OUDEMANS, 1904
9. Setae *l1* long, subequal to *ve*; setae *l3* and *l4* subequal in length *C. norneri* (POPPE, 1888)
- Setae *l1* very short, about 2 times shorter than *ve*; setae *l3* almost 2 times longer than *l4* *C. animosa* OUDEMANS, 1904

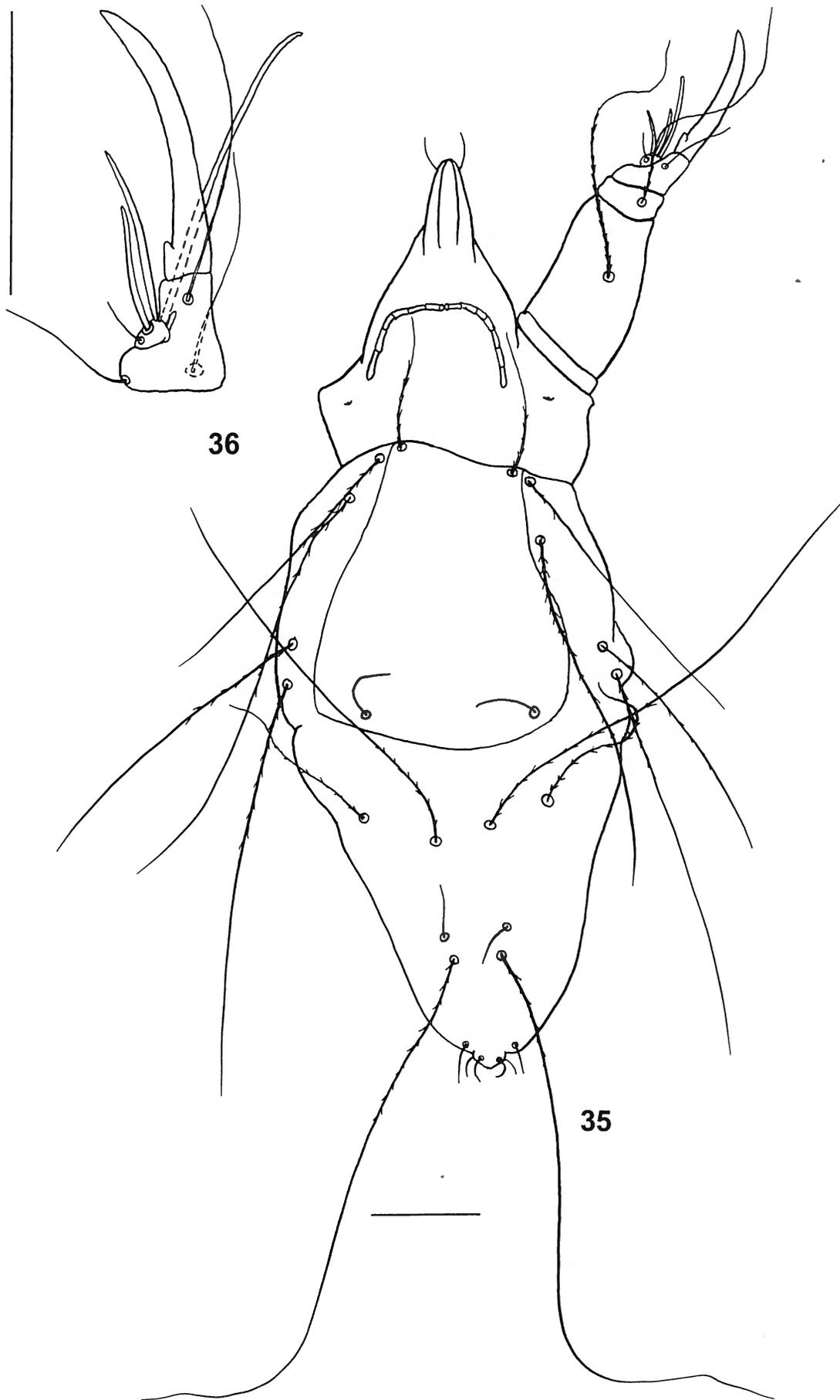
Key to the males of *Cheletopsis*

The males of *C. mariae*, *C. charadrii*, *C. limnodromi* and *C. rynchops* are unknown

1. Setae *vi* and *ve* subequal in length species group "norneri" 4
- Setae *ve* 2-3 times longer than *vi* species group "impavida" 2
2. Palpal tarsus with comb-like seta 3
- All setae of palpal tarsus nude *C. prosobonialis* sp. n.
3. Setae *d1* 30-40 long. Palpal claw with tooth. Peritremes not concave anteriorly *C. impavida* OUDEMANS, 1904
- Setae *d1* 70-90 long. Palpal claw without tooth. Peritremes slightly concave anteriorly *C. daberti* KIVGANOV et BOCHKOV, 1994
4. Posterior end of the body widely rounded 5
- Posterior end of the body triangular *C. norneri* (POPPE, 1888)
5. Setae *d3* short, not longer than 60, 1.6-3 times shorter than *ve* 6
- Setae *d3* long, about 150, subequal to *ve* *C. basilica* OUDEMANS, 1904
6. Setae *l1* long, subequal to *ve* *C. anax* OUDEMANS, 1904
- Setae *ve* about 2 times longer than *l1* *C. animosa* OUDEMANS, 1904



Fig. 34 — *Cheletopsis rynchops* sp. n. Female in dorsal view. Scale line 100 μ m.



Figs 35-36 — *Cheletopsis prosobonialis* sp. n., male. Dorsal view (35), palpal tibia and tarsus in dorsal view. Scale line 100 μ m (fig. 35) and 50 μ m (fig. 36).

Table — Distribution of species of the genus *Cheletopsis* on the host taxa from the order *Charadriiformes*.

* - type host species; £ - new host species

Mite species	Host species	Host family	Locality
<i>C. impavida</i>	* <i>Tringa totanus</i>	Scolopacidae	France, Kirghizia
''	<i>Tringa stagnatilis</i> £	Scolopacidae	Poland
''	<i>Calidris minutus</i>	Scolopacidae	Kazakhstan
''	<i>Calidris temminckii</i>	Scolopacidae	Kirghizia
''	<i>Calidris ruficollis</i>	Scolopacidae	Russia (Siberia)
''	<i>Calidris pusilla</i> £	Scolopacidae	U.S.A. (Michigan)
''	<i>Calidris ferruginea</i> £	Scolopacidae	Poland
''	<i>Micropalama himantopus</i> £	Scolopacidae	U.S.A. (Kansas)
''	<i>Rostratula semicollaris</i> £	Rostratulidae	Argentina
<i>C. daberti</i>	* <i>Tringa glareola</i>	Scolopacidae	Ukraine, Poland
''	<i>Tringa nebularia</i> £	Scolopacidae	Poland
''	<i>Calidris temminckii</i>	Scolopacidae	Poland
''	<i>Micropalama himantopus</i> £	Scolopacidae	U.S.A. (N. Dakota)
<i>C. rynchops</i> sp. n.	* <i>Rynchops flavirostris</i>	Laridae	Mozambique
''	<i>Rynchops niger</i>	Laridae	U.S.A. (N. Carolina)
<i>C. charadrii</i>	* <i>Charadrius dubius</i>	Scolopacidae	Kirghizia
<i>C. prosobonialis</i> sp. n.	* <i>Prosobonia cancellata</i>	Scolopacidae	French Polynesia
<i>C. limnodromi</i> sp. n.	* <i>Limnodromus griseus</i>	Scolopacidae	U.S.A. (Georgia)
<i>C. anax</i>	* <i>Tringa totanus</i> ?	Scolopacidae	France
<i>C. basilica</i>	* <i>Tringa totanus</i> ?	Scolopacidae	France
''	<i>Calidris melanotos</i> £	Scolopacidae	U.S.A. (Alaska)
''	<i>Charadrius hiaticula</i> £	Charadriidae	Poland
''	<i>Chlidonias niger</i> £	Laridae	U.S.A. (Michigan)
<i>C. animosa</i>	* <i>Tringa totanus</i> ?	Scolopacidae	France
''	<i>Sterna hirundo</i> £	Laridae	Eastern North America
<i>C. magnanima</i>	* <i>Tringa flavipes</i>	Scolopacidae	Chili
<i>C. mariae</i>	* <i>Actitis hypoleucos</i>	Scolopacidae	Kirghizia, Poland
<i>C. norneri</i>	* <i>Sterna hirundo</i>	Laridae	Europe, Russia (Astrakhan' Prov.), Kazakhstan, Kirghizia
''	<i>Sterna repressa</i> £	Laridae	Egypt
''	<i>Sterna simplex</i> £	Laridae	Paraguay
''	<i>Gelochelidon nilotica</i>	Laridae	Europe, Russia (Astrakhan' Prov.), Ukraine, Kazakhstan, U.S.A. (N. Carolina)
''	<i>Chlidonias hybrida</i> £	Laridae	Egypt
''	<i>Tringa totanus</i>	Scolopacidae	Poland, Kirghizia

Discussion

The mites of the genus *Cheletopsis* are associated exclusively with charadriiform birds (Table). These mites live in the quills of the larger feathers (remiges) and they prey upon the parasitic acariform mites inhabiting these quills. OUDEMANS (1904) reported the presence of four new species of the genus *Cheletopsis*, i.e. *C. basilica*, *C. impavida*, *C. anax* and *C. animosa* in the quills of *Tringa totanus* from France. Recent investigations have shown that only two species (*C. daberti* and *C. norneri*) are obligate inhabitants of this species and that, probably, the four previous species were actually collected from other species of charadriiform birds.

The host specificity of this group of mites varies from strict to very low. Several species are restricted each to a single genus in the same family of birds. This is the case for the following species: *C. charadrii* which has been found only from the quills of *Charadrius dubius*, *C. mariae* was found only from *Actitis hypoleucos*, *C. magnanima* only from *Tringa flavipes*, *C. prosobonia* sp. n. only from *Prosobonia cancellata*, *C. rynchops* sp. n. only from *Rynchops* spp. and *C. limnodromi* only from *Limnodromus griseus*. The other species are known from different families of charadriiform birds. This is the case for *C. impavida* which has been found in the genera *Tringa*, *Calidris* and *Micropalama* (Scolopacidae) and also in the genus *Rostratula* (Rostratulidae). In contrast with *C. impavida* there is another species, *C. daberti*, closely related to the former but, probably,

confined to the subfamily Tringinae. There are still three other species that display a low degree of host-specificity. The first is *C. basilica* which has been found in the genera *Charadrius*, *Calidris* and *Chlidonias* belonging to three different families (Charadriidae, Scolopacidae and Laridae, respectively). The other two species, *C. animosa* and *C. norneri*, have been found from birds of the families Scolopacidae and Laridae, but the second species is however much more common in the Laridae than in the Scolopacidae.

In conclusion, about half of the species of the genus *Cheletopsis* are not strictly associated with a well-defined charadriid taxon. The more strict specificity observed in the other species could perhaps be explained, at least in part, by our incomplete knowledge of the distribution of these mites in their host taxa.

Acknowledgements

The authors express their thanks to Dr. G. WAUTHY, Institut royal Science Naturelles Belgique (Bruxelles) for critically reviewing the manuscript. We also wish to thank Dr. E.J. NIEUKERKEN, National Museum of Natural History, (Leiden, The Netherlands) for the loan of type material of OUDEMANS.

We would like to thank Prof. W.T. ATYEO, University of Georgia, Athens, U.S.A. and Dr. B.M. OCONNOR, University of Michigan, Ann Arbor, U.S.A. for making their material available for our studies.

For this research Dr. A. V. BOCHKOV was beneficiary of a grant from the Belgian Federal Services for Scientific, Technical and Cultural Affairs.

References

- FAIN, A. 1979. Idiosomal and leg chaetotaxy in the Cheyletidae. *International Journal of Acarology*, 5: 305-310.
- GRANDJEAN, F. 1944. Observations sur les acariens de la famille des Stigmaeidae. *Archives des Sciences physiques et naturelles*, 26: 103-131.
- KIVGANOV, D.A. & BOCHKOV, A.V. 1994. A new mite species of the genus *Cheletopsis* (Acari, Cheyletidae). *Vestnik Zoologii*, 1994: 39-43. (In Russian with English summary)
- MIRONOV, S.V., BOCHKOV, A.V. & CHIROV, P.A. 1991. Mites of the genus *Cheletopsis* (Acariformes: Cheyletidae) from quills of charadriiform birds in the Middle Asia. *Izvestiya Akademii Nauk Respubliki Kirghizstan. Khimiko-Tekhnologicheskie i Biologicheskie nauki*. 4: 50-56 (In Russian)
- OUDEMANS, A.C. 1904. Acarologische Aanteekeningen. XIII. *Entomologische Berichten Netherlands Entomologie*, 1: 169-174.
- OUDEMANS, A.C. 1906. Revision des Cheletines. *Memoires de la Société Zoologique de France*, 19: 36-144.
- VOLGIN, V.I. 1969. Mites of the family Cheyletidae of the World. *Akademia Nauk, Leningrad, USSR*, in Russian, pp. 432 (In Russian).

Andre V. BOCHKOV
Zoological Institute,
Russian Academy of Sciences,
Universitetskaya emb. 1,
St. Petersburg 199034, Russia;

Institut royal des Sciences naturelles de Belgique,
Rue Vautier 29, B - 1000 Bruxelles, Belgique
(e-mail abochkov@kbinarsnb.be)

Alex FAIN

Institut royal des Sciences naturelles de Belgique,
Rue Vautier 29, B - 1000 Bruxelles, Belgique

Jacek DABERT

Department of Animal Morphology,
A. Mickiewicz University, 28 Czerwca 1956/198,
61-485 Poznan, Poland