

A CONTRIBUTION TO THE SYSTEMATICS OF THE MITE FAMILY HARPIRHYNCHIDAE (ACARI: CHEYLETOIDEA)

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SYSTEMATICS
HARPIRHYNCHIDAE
ACARI
PARASITES
BIRDS

SUMMARY: Revised diagnoses are given for the subfamilies Harpirhynchinae and Harpypalpinae, and the genera *Harpirhynchus*, *Harpyrhynchoides*, *Harpypalpus* and *Harpypalpoides*. *Pseudoharpirhynchus* n. subg. is created for two species—*Harpirhynchus agapornis* Fain, 1972 (type species) and *Harpirhynchus cylindripalpus* Fritsch, 1954—within the genus *Harpirhynchus*. Six new species are described: *Harpirhynchus* (s. st.) *galeridae* n. sp., *Harpyrhynchoides kirgizorum* n. sp., *Harpyrhynchoides parazumpti* n. sp., *Harpypalpus tiarae* n. sp., *Harpypalpus spermestes* n. sp. and *Harpypalpoides namibiensis* n. sp. Three species are redescribed: *Harpypalpus dubinini* Fain, 1972, *Harpypalpus serini* Fain, 1972 and *Harpypalpoides hirundinis* (Fain, 1972). Males of *Harpyrhynchoides capellae* (Fritsch, 1954) and *Harpypalpus holopus* (Berlese & Trouessart, 1889) are described for the first time. A new host is recorded for *Harpyrhynchoides alectoris* (Fain, 1972). Keys to species of the genera *Harpypalpus* and *Harpypalpoides*, based on females, are proposed for the first time.

TAXINOMIE
HARPIRHYNCHIDAE
ACARI
PARASITES
OISEAUX

RÉSUMÉ : Des diagnoses étendues sont données pour les sous-familles Harpirhynchinae et Harpypalpinae et les genres *Harpirhynchus*, *Harpyrhynchoides*, *Harpypalpus* et *Harpypalpoides*. Un nouveau sous-genre, *Pseudoharpirhynchus* n. subg., composé de 2 espèces : *Harpirhynchus agapornis* Fain, 1972 (espèce type) et *Harpirhynchus cylindripalpus* Fritsch, 1954, est créé au sein du genre *Harpirhynchus*. Six nouvelles espèces sont décrites : *Harpirhynchus* (s. st.) *galeridae* n. sp., *Harpyrhynchoides kirgizorum* n. sp., *Harpyrhynchoides parazumpti* n. sp., *Harpypalpus tiarae* n. sp., *Harpypalpus spermestes* n. sp. et *Harpypalpoides namibiensis* n. sp. Trois espèces sont redécrites : *Harpypalpus dubinini* Fain, 1972, *Harpypalpus serini* Fain, 1972 et *Harpypalpoides hirundinis* (Fain, 1972). Les mâles de *Harpyrhynchoides capellae* (Fritsch, 1954) et de *Harpypalpus holopus* (Berlese & Trouessart, 1889) sont décrits pour la première fois. Des nouveaux hôtes sont signalés pour *Harpyrhynchoides alectoris* (Fain, 1972). Des clés sont proposées pour les femelles des genres *Harpypalpus* et *Harpypalpoides*.

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INTRODUCTION

The mites of the family Harpirhynchidae are permanent ectoparasites located in the skin or feather follicles of birds. According to recent general reviews of these mites (LOMBERT & MOSS, 1983; FAIN, 1972, 1976, 1994, 1995), this family includes 47–50 species, belonging to 11 genera and two subfamilies, Harpirhynchinae and Harpypalpinae. Despite the rather great difference in body and leg structure between these two subfamilies, the family Harpirhynchidae is undoubtedly monophyletic because of the similar structure of the gnathosoma (MOSS, 1979).

The present paper provides revised diagnoses of these two subfamilies, additions to diagnoses of the genera *Harpirhynchus*, *Harpyrhynchoides*, *Harpypalpus* and *Harpypalpoides*, descriptions of new taxa and corrections to descriptions of some previously described species. Within the genus *Harpirhynchus*, we establish a new subgenus, *Pseudoharpirhynchus* n. subg., with two species: *Harpirhynchus agapornis* Fain, 1972 (type species) and *Harpirhynchus cylindripalpus* Fritsch, 1954. Six new species are described: *Harpirhynchus* (s. st.) *galeridae* n. sp., *Harpyrhynchoides kirgizorum* n. sp., *Harpyrhynchoides parazumpti* n. sp., *Harpypalpus tiarae* n. sp., *Harpypalpus spermestes* n. sp. and *Harpypalpoides namibiensis* n. sp. Three species are redescribed: *Harpypalpus dubinini* Fain, 1972, *Harpypalpus serini* Fain, 1972 and *Harpypalpoides hirundinis* (Fain, 1972). Males of *Harpyrhynchoides capellae* (Fritsch, 1954) and *Harpypalpus holopus* (Berlese & Trouessart, 1889) are described from the first time. A new host is recorded for *Harpyrhynchoides alectoris* (Fain, 1972). Keys to species of the genera *Harpypalpus* and *Harpypalpoides* based on females are proposed for the first time.

MATERIAL AND METHODS

In the present study, we use the metric data and abbreviations proposed in recent papers on Harpirhynchidae (FAIN, 1994, 1995). Only two small modifications are made in the idiosomal chaetotaxy. As the subhumeral setae *sh* are absent in other families of cheyletoid mites (FAIN, 1979; FAIN *et al.*, 1997), it is

unlikely that they are present in Harpirhynchidae. Therefore, these setae are here regarded as the humeral setae *h*, instead of *sh* in previous papers (FAIN, 1994, 1995). From this point of view, the dorsal surface of propodosoma in the Harpirhynchidae has a complete set of dorsal setae (*scx*, *vi*, *ve*, *sci*, *sce*), typical of prostigmatic mites. The genital setae *g* (= *ga* in Harpypalpinae, see LOMBERT & MOSS, 1983) are herein referred to as paragenital, *pg*. The true genital setae are probably only present in females of the subfamily Harpypalpinae.

All the measurements are given in micrometers.

The materials used for the present study belong to the collections of the Institut royal des Sciences naturelles de Belgique (IRSNB), Musée royal de l'Afrique Centrale, Tervuren (MRAC) and the Zoological Institute of the Russian Academy of Science, Saint-Petersburg (ZIN).

SUBFAMILY HARPIRHYNCHINAE DUBININ, 1957

Type genus: *Harpirhynchus* Megnin, 1877.

Definition: The description of the palpi in the adults (male and female) of the Harpirhynchidae by FAIN (1994, p. 110, chapter on gnathosoma) should be corrected and replaced by the following text: "Palpal tarsus very small, palpal tibia relatively well developed and bearing at its inner side either a spine (= tibial claw) with a forked apex (Harpirhynchinae) or a spine carrying 3 blunt teeth (including apical tooth) (Harpypalpinae). Palpal genu and palpal femur fused, forming a very large segment bearing the three palpalae." Setae *pts* present. Propodosomal shield well developed or reduced. Anterior legs I and II either normal or reduced, pulvillus absent. Legs III and IV always reduced, with only one or two free segments, and lacking ambulacra. Tarsi I with a maximum of 9 setae; genu I, II with a maximum of 4 setae; coxal setae absent, except *cxII*; coxal field I without anteriorly-directed coxal lobe.

Female. Chaetotaxy of hysterosoma: only filiform setae *l5* always present; setae *ic3*, *pg* present or absent. Vulva with a pair of pocket-like structures.

Male. Setae *vi* and *ve* hair-like; chaetotaxy of hysterosoma: setae *ic3* present or absent, all other setae

absent (except *g1-g3*). Semicircular chitinous comb of ventral side of opisthosoma absent.

Immature instars. Setae PE and *pts* absent only in larva, these setae present in other immature instars. Propodosomal shield present. Chaetotaxy of idiosoma as in adults. Legs I–II with 4 free segments, legs III and IV with one or two free segments and lacking ambulacra.

The subfamily includes 10 genera: *Harpirhynchus* Megnin, 1877, *Harpyrhynchoides* Fain, 1972 n. stat., *Perharpyrhynchus* Fain, 1972, *Neharpyrhynchus* Fain, 1972, *Metharpyrhynchus* Fain, 1972, *Harpyrhynchiella* Fain, 1972, *Anharpyrhynchus* Fain, 1972, *Raliharpirhynchus* Fain, 1995, *Cypsharpirhynchus* Fain, 1995 and *Trichorhynchiella* Fain, 1995.

Genus *Harpirhynchus* Megnin, 1877

Type species: *Sarcoptes nidulans* Nitzsch, 1818.

Body circular or subcircular, covered with large shield. Legs I and II well developed, inserted marginally, with five free segments, and bearing pair of claws and ciliated empodium. Legs III and IV inserted marginally, legs III with two free segments, legs IV with one free segment. In both sexes, three palpalae (PA, PI, PE) are identical in shape. Setae *ve*, *sci*, *sce*, *h* long and serrate, setae *vi* long and serrate in female, very short and thin in male; setae *l5*, *ic1* filiform, setae *ic3* in both sexes and *pg* present or absent in female; setae *vi*, *ve*, *sci* well separated from each other. Sexual aperture of male situated in anterior half of dorsal shield, penis or sheath of penis originating in posterior part of the body. Number of ordinary setae on leg I: coxa 1, trochanter 1, femur 2, genu 3, tibia 5, tarsus 8; on leg II: 0, 1, 2, 3, 5, 7. Specialized setae: tarsi I and II each with 1 eupathidium and 1 solenidion ($\omega 1$ and $\omega 2$ respectively).

The genus includes two subgenera: the nominotypical subgenus and a new subgenus, *Pseudoharpirhynchus* n. subg.

Subgenus *Harpirhynchus* s. st.

Setae *ic3* absent. Female with idiosoma almost sacciform, setae *pg* absent. Includes two species: *Har-*

pirhynchus nidulans (Nitzsch, 1818) and *Harpirhynchus galeridae* n. sp.

Subgenus *Pseudoharpirhynchus* n. subg.

Type species: *Harpirhynchus agapornis* Fain, 1972.

Setae *ic3* present. Female with idiosoma rounded, setae *pg* present. Includes two species: *Harpirhynchus agapornis* Fain, 1972 and *Harpirhynchus cylindripalpus* Fritsch, 1954.

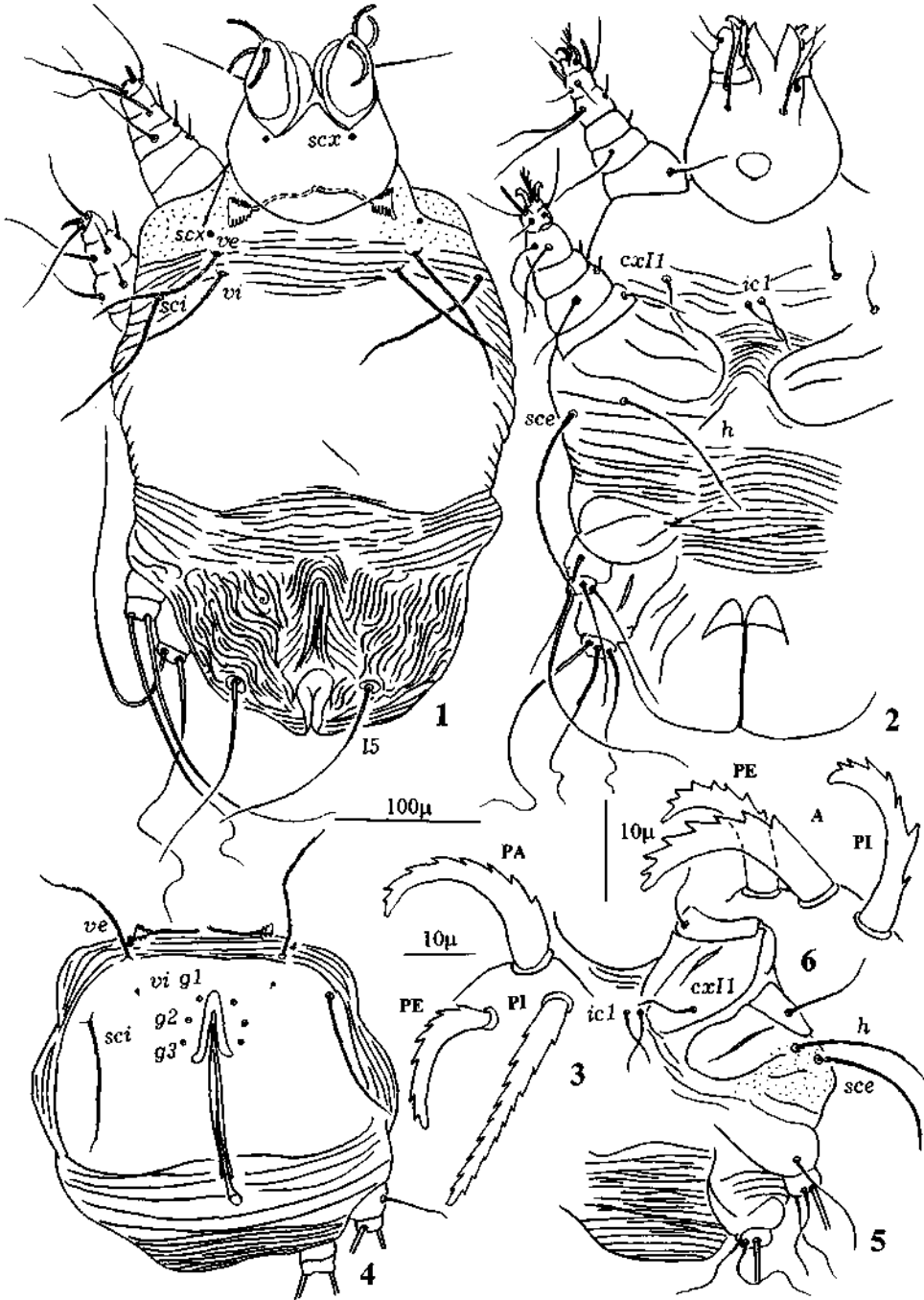
Harpirhynchus (s. st.) *galeridae* n. sp.

(Figs 1–6)

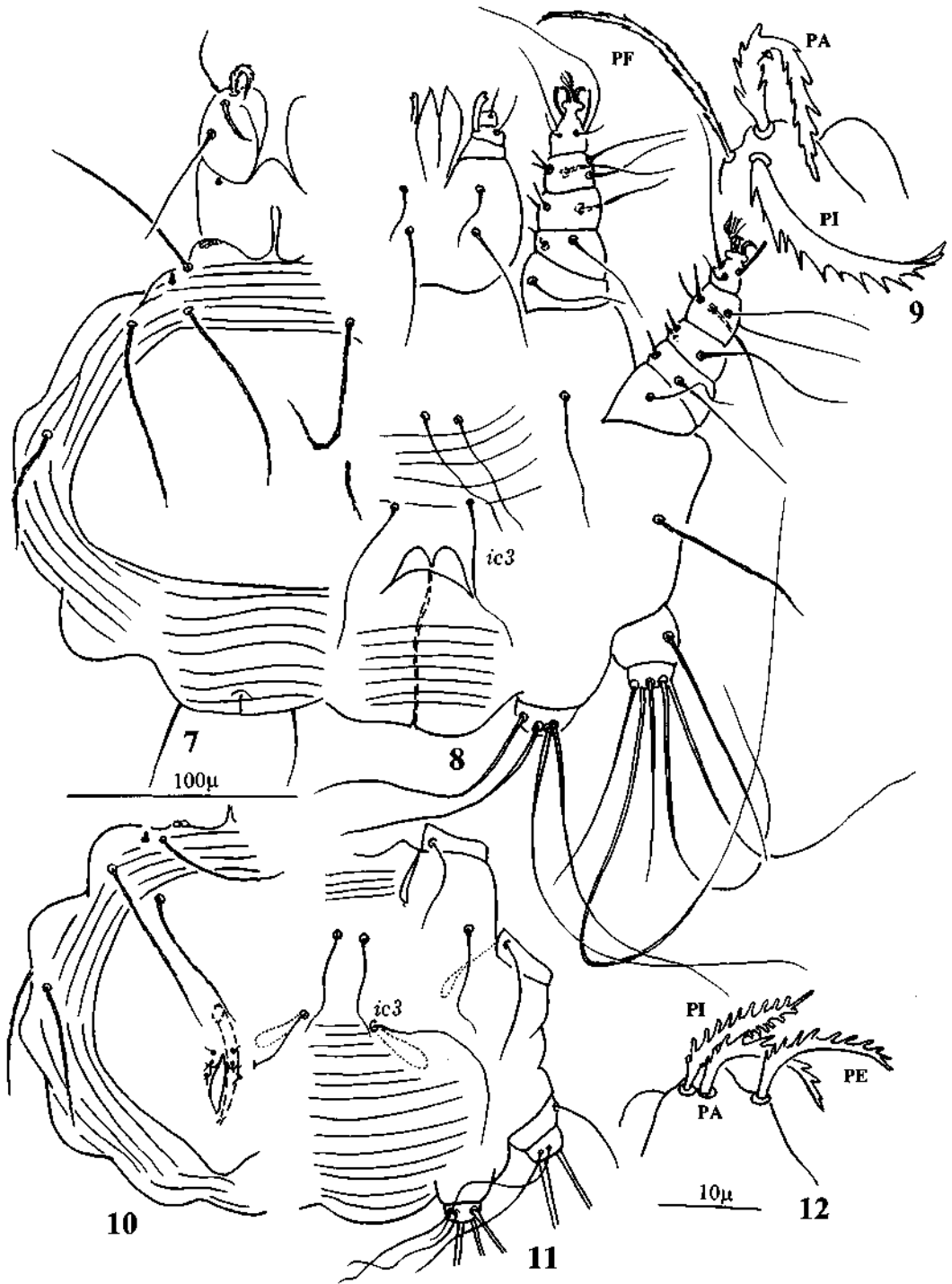
Female, holotype (Figs 1–3): L 440; W 180 (270 in paratype); LS 135; WS 252; LG 123; WG 101; setae *vi* 101 (92); *ve* 102 (83); *sci* 105 (90); *sce* 94 (92); *h* 85 (81); *l5* 179 (166); *ic1* 40 (37); *cxII* 36 (33); $\omega 1$ 13; $\omega 2$ 14; PA 33 about 33 long, with 8 teeth; PI about 33 long, with 9 teeth; PE about 29 long, with 7 teeth. Border of propodosomal shield indistinct; bases of setae *vi*, *ve*, *sci* situated off propodosomal shield; bases of setae *sce*, *h* inserted on ventral surface of idiosoma. Surface of idiosoma striated transversally, except on opisthosoma; dorsal cuticle of opisthosoma covered with small folds, ventral cuticle of opisthosoma smooth. Genital region at level of legs IV. Legs III with 2 free segments, legs IV with one free segment. Apical segment of legs III–IV with 5 (4 in paratype) long setae; preapical segment of legs III with seta 101 (83) long.

Male (Figs 4–6): L 310; W 225; LS 157; WS 184; LG 112; WG 95; *vi* 3; *ve* 83; *sci* 81; *sce* 87; *h* 94; *g1-g3* microsetae; sheath of penis about 112 long; *ic1* 45; *cxII* 45; PA, PI, PE about 22–23 long, with 7 teeth. Bases of setae *vi*, *ve*, *sci* situated on propodosomal shield; bases of setae *sce*, *h* inserted ventrally. Distances between bases of setae: *vi-ve* 13, *g1-g1* 11, *g2-g2* 22, *g3-g3* 22. Legs III with 2 free segments, legs IV with one free segment. Apical segment of legs III–IV with 5 long setae; preapical segment of leg III with 2 long setae, 123 and 74 in length, respectively.

Differential diagnosis. This species is closely related to *Harpirhynchus* (s. st.) *nidulans*. It differs from the latter by the presence of only one seta on preapical



FIGS. 1-6: *Harpirhynchus (s. st.) galeridae* n. sp. Female: dorsal view (1), ventral view (2), palpalae (3); male: dorsal view (4), ventral view (5), palpalae (6).



FIGS. 7-12: *Harpyrhynchoides kirgizorum* n. sp. Female: dorsal view (7), ventral view (8), palpalae (9); male: dorsal view (10), ventral view (11), palpalae (12).

segment of leg III in female; furthermore, both sexes of the new species bear 4–5 long setae on apical segments of legs III and IV. In *Harpirhynchus nidulans* the preapical segment of legs III has 2 setae in both sexes and the apical segment of legs III and IV bears 4–7 (generally 7) and 4–6 long setae, respectively.

Type material. Holotype female (T-Har-1), paratype female and male ex *Galerida cristata* (Passeriformes: Alaudidae) from Azerbaijan, 27 Oct. 1972, AMIRKHANOV coll. The holotype and paratype male are deposited in ZIN; paratype female in IRSNB.

Genus *Harpyrhynchoides* Fain, 1972 n. stat.

Type species: *Harpirhynchus (Harpyrhynchoides) squamosus* Fain, 1972.

Body circular, covered with large shield. Legs I and II well developed, inserted marginally, with five free segments, bearing pair of claws and ciliated empodium. Legs III and IV inserted marginally, legs III with two free segments, legs IV with two or one free segment. PA different in shape from other palpalae in both sexes. Setae *ve*, *sci*, *sce*, *h* long and serrate [in *Harpyrhynchoides anatum* (Fain, 1976), setae *sce* is filiform and setae *h* is absent]; setae *vi* normally developed in both sexes, serrate or filiform; setae *l5* and *ic1* filiform, setae *ic3* present in both sexes, setae *pg* present or absent in female; setae *vi*, *ve*, *sci* well separated from each other. Sexual aperture of male situated in posterior half of dorsal shield, penis or sheath of penis originating in front of sexual orifice and directed backwards. Number of ordinary setae on leg I: coxa 1, trochanter 2 (3), genu 2 (3, 4), tibia 5, tarsus 8; on leg II: 0, 1, 2 (3), 2 (3, 4), 5, 7. Specialized setae: Tarsi I and II each with 1 eupathidium and 1 solenidion ($\omega 1$ and $\omega 2$ respectively).

The genus includes 29 species, including the two new species described below.

Harpyrhynchoides kirgizorum n. sp.

(Figs 7–12)

Female (Figs 7–9): L 265–315 in 7 paratypes, W 211–234; LS 108–115; WS 164–177; LG 87–90; WG

78–85; setae *vi* 69–78; *ve* 83–94; *sci* 76–90; *sce* 78–101; *h* 74–82; *l5* 31–49; *ic1* 40–56; *ic3* 49–56; *pg* absent; $\omega 1$ 56–58; PA 22–29 long, with 10–15 teeth; PI 15–31 long, with 10–12 teeth; PE 25–33 long, with 10–15 teeth. PE about half as thick as PA and PI about 2 times, length ratio of these palpalae is 1:1:1. Bases of setae *vi*, *ve* and *sci* situated off propodosomal shield. Ventral surface of idiosoma striated transversally, without scales or verrucosities. Chaetotaxy of legs I, II (including eupathidial setae): coxa 1-0, trochanter 1-1, femur 2-2, genu 3-3, tibia 5-5, tarsus 9-8. Legs III with 2 free segments, legs IV with one free segment. Apical segment of legs III with 5 long setae, apical segment of legs IV with 4 setae; preapical segment of legs III with one long seta.

Male, holotype (Figs 10–12): L 229 (229, 234 in two paratypes); W 180 (175, 183); LS 105 (129, 135); WS 123 (121, 123); LG 67 (63, 70); WG 67 (56, 69); *vi* 67 (60, 72), serrate; *ve* 56 (54, 58); *sci* 67 (67, 84); *sce* 76 (76, 90); *h* 75 (78; 90); *gl*–*g3* microsetae; penis 45 long; *ic1* 45 (39, 40); *ic3* 56 (47, 55); PA, PI, PE about 16–22 long, with 9–11 teeth. Bases of setae *vi* only situated on propodosomal shield. Distances between bases of genital setae: *g1*–*g1* 13, *g2*–*g2* 9, *g3*–*g3* 13. Chaetotaxy of legs as in female. Ventral surface of idiosoma striated transversally.

Differential diagnosis. This new species is most closely related to *Harpyrhynchoides rubeculinus* (Cerny & Sixl, 1971). It differs from the latter by a different ratio of palpalae PA/PI/PE in female, which is 1:1:1 (ratio in *Harpyrhynchoides rubeculinus* 1:1:2). In females of the new species, the body measurements are smaller: L 265–315, LS 108–115, WS 164–177; in *Harpyrhynchoides rubeculinus* (3 specimens from the type host from France) L over 330, LS 132–135, WS 190–195.

Type material. Holotype male (T-Har-2); paratypes: 7 females and 2 males ex *Rhodospiza obsoleta* (Passeriformes: Fringillidae) from Kirgizia, near Sary-Kul Lake, 13 July 1978, P. CHIROV coll. Holotype and 6 paratypes (one male and 6 females) deposited in ZIN; 1 female and 1 male paratypes in IRSNB.

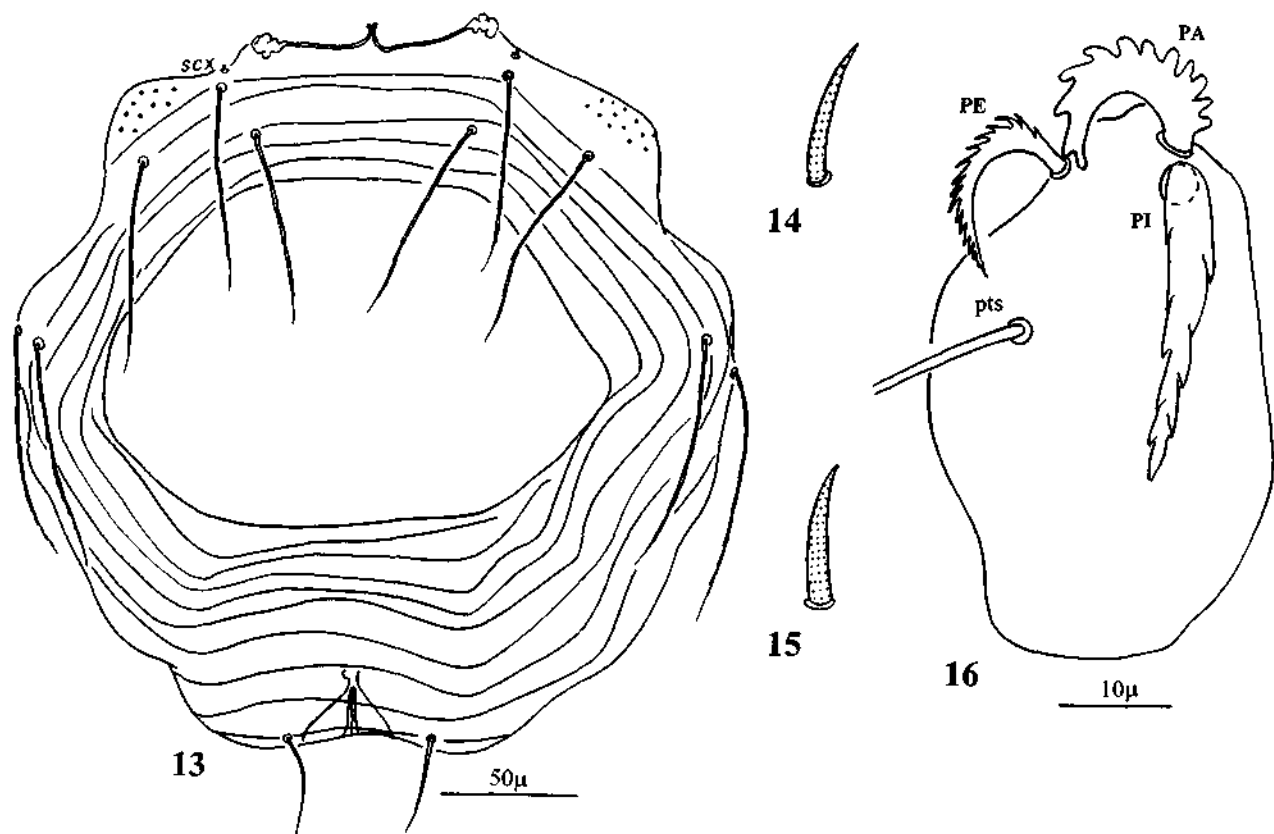
Additional material. One female and male ex *Passer domesticus* (Passeriformes: Ploceidae) from Kirgizia, Bishkek, 13 June 1973, P. CHIROV coll. 2 female ex *Emberiza calandra* (Passeriformes: Emberizidae) from Kirgizia, Tulek, 5 Nov. 1973, P. CHIROV coll.

Harpyrhynchoides parazumpti n. sp.

(Figs 13–16)

Female, holotype: L 320 (320–360 in 10 paratypes), W 270 (261–280); LS 135 (135–148); WS 202 (202–211); LG 99 (99–103); WG 96 (92–101); *vi* 81 (67–90); *ve* 90 (81–94); *sci* 90 (90–94); *sce* 108 (94–108); *h* 90 (85–99); *ls* 58 (50–67); *ic1* 54 (50–65); *ic3* 67 (65–70); *pg* absent; $\omega 1$ 12; $\omega 2$ 13; PA 22 (22–24) long, with 11–12 teeth; PI 30 (24–33) long, with 5–7 teeth; PE 15 (15–20) long, with 12–15 teeth. Ratio

of palpalae length PI/PA about 1.4:1; PE slightly thinner than PI. Bases of setae *vi*, *ve*, *sci* situated off propodosomal shield. Ventral surface of idiosoma striated transversally, except opisthosoma (posterior to level of setae *ic3*), without scales or verrucosities. Chaetotaxy of legs I, II (including eupathidial setae): coxa 1-0, trochanter 1-1, femur 2-2, genu 3-3, tibia 5-5, tarsus 9-8. Legs III with 2 free segments, legs IV with one free segment. Apical segment of legs III with 5 long setae, apical segment of legs IV with 4 setae; preapical segment of legs III with one long seta.

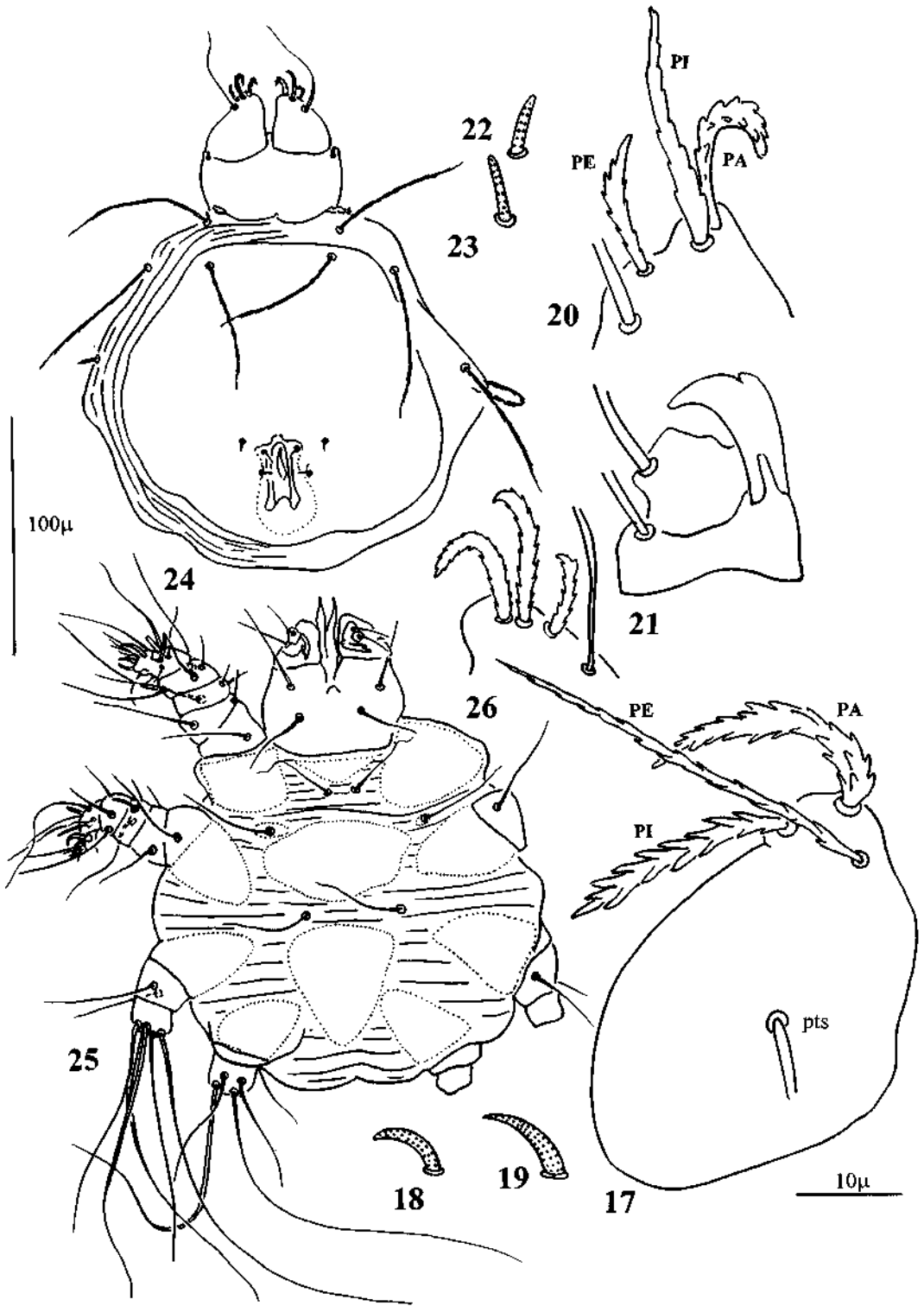


FIGS. 13–16: *Harpyrhynchoides parazumpti* n. sp. female. Dorsal view (13), $\omega 1$ (14), $\omega 2$ (15), palpalae (16).

Male unknown.

Differential diagnosis. The female of this new species is most similar to *Harpyrhynchoides zumpti* Fain, 1972. It differs from the latter species by the length

ratio PI/PA, which is about 1.4–1.5, and PE slightly thinner than PI; in *Harpyrhynchoides zumpti* the length ratio PI/PA is about 1:1 and PE is 2 times thinner than PI.



FIGS. 17-26: *Harpyrhynchoides rubeculinus* (Cerny & Sixl), female. Palpalae (17). ω 1 (18), ω 2 (19). *Harpyrhynchoides capellae* (Fritsch). Female: palpalae (20), palpal hook (21), ω 1 (22), ω 2 (23); male: dorsal view (24), ventral view (25), palpalae (26).

Type material. Holotype female (T-Har-3), paratypes (10 females) ex *Corvus monedula* (Passeriformes: Corvidae) from Moldavia, Kishinev, 11 April 1958, R. SHUMILO coll. Holotype and 7 paratypes deposited in ZIN; 3 paratypes in IRSNB.

Harpyrhynchoides rubeculinus (Cerny & Sixl, 1971)
(Figs 17–19)

This species was described from females ex *Erithacus rubecula* (Passeriformes: Muscicapidae) from Austria (CERNY & SIXL, 1954). The male of *Harpyrhynchoides rubeculinus* is unknown. In the original description of this species, the palpalae were incompletely described and not satisfactorily depicted.

Female: L 328–346 in 3 specimens; W 252–270; LS 132–135; WS 194–196; LG 83–90; WG 78–83; *vi* 94–101; *ve* 78–90; *sci* 101–110; *sce* 101–105; *h* 86–101; *ls* 78–90; *ic1* 49–51; *ic3* 56–67; *pg* absent; PA 19–23 long, with 12–13 teeth; PI 23–24 long, with 9–10 teeth; PE 42–45 long, filiform, barbed. Bases of setae *vi*, *ve*, *sci* situated off propodosomal shield. Ventral surface of idiosoma striated transversally, without scales or verrucosities. Chaetotaxy of legs I, II (including eupathidial setae): coxa 1-0, trochanter 1-1, femur 2-2, genu 4-4, tibia 5-5, tarsus 9-8. Legs III with 2 free segments, legs IV with one free segment. Apical segment of legs III with 5 long setae, apical segment of legs IV with 4 setae; preapical segment of legs III with one long seta.

Material. 3 females ex *Erithacus rubecula* from France, Nice, October 1993, J. GAUD coll. Specimens deposited in ZIN.

Harpyrhynchoides capellae (Fritsch, 1954)
(Figs 20–26)

The original description of this species was based only on females ex *Capella gallinago* (Charadriiformes: Scolopacidae) from Germany (FRITSCH, 1954). We give here the first description of the male, collected from the jacksnipe *Lymnocyptes minimus* (Charadriiformes: Scolopacidae).

Female (Figs 20–23): L 265, W 207; LS 139; WS 184; LG 96; WG 76; *vi* 83; *ve* 86; *sci* 82; *sce* 78; *h* 49; *ls*

72; *ic1* 38; *ic3* 42; $\omega 1$ 11; $\omega 2$ 9; PA about 22 long, with 7 teeth; PI about 22 long, with 8 teeth; PE about 13 long, with 6 teeth. Bases of setae *vi*, *ve*, *sci* situated off propodosomal shield. Ventral surface of idiosoma striated transversally, without scales or verrucosities; there is poorly sclerotized plate between coxae II. Chaetotaxy of legs I, II (including eupathidial setae): coxa 1-0, trochanter 1-1, femur 2-2, genu 3-3, tibia 5-5, tarsus 9-8. Legs III, IV with 2 free segments. Apical segment of legs III with 5 long setae, apical segment of legs IV with 4 setae; preapical segment of leg III with 2 setae, preapical segment of leg IV with one seta.

Male (Figs 24–26): L 195; W 168; LS 128; WS 141; LG 60; WG 58; *vi* 67, serrate; *ve* 73; *sci* 85; *sce* 72; *h* 48; *g1-g2* 6; *g3* 10; penis 29 long; PA and PI equal in length, PE 1.5 times shorter than PA; *ic1* 30; *ic3* 33; $\omega 1$ 13; $\omega 2$ 14; Bases of setae *vi* only situated on propodosomal shield. Distances between bases of *g* setae: *g1-g1* 31, *g2-g2* 13, *g3-g3* 20. Chaetotaxy of legs as in female. Ventral surface of idiosoma poorly striated.

Material. Female and male ex *Lymnocyptes minimus*, France, St Malo, Jan. 1974, J. GAUD coll. Specimens deposited in ZIN.

Harpyrhynchoides alectoris (Fain, 1972)

This species was known exclusively from *Alectoris graeca* (Galliformes: Phasianidae) from Antwerp Zoo (FAIN, 1972).

Material. 7 females and 1 male ex *Alectoris rufa* from Spain, Seville, Jan. 1990, H. DE ROJAS ALVAREZ coll. Specimens deposited in ZIN.

SUBFAMILY HARPYPALPINAЕ FAIN, 1972

Type genus: *Harpypalpus* Dubinin, 1957.

In adults of both sexes, the palpal tibial spine (tibia claw) has 3 teeth, setae *pts* absent. Propodosomal shield present. Anterior and posterior pairs of legs normal. Tarsi I with 8 setae; all tarsi terminating by pair of claws, empodium and well developed pulvillus; genu I–II with 5 setae; coxae I–IV with one seta; coxal field I with anteriorly directed coxal lobe.

Female. Chaetotaxy of hysterosoma: setae *d1–d5*, *ll*, *l5*, *ic3* and *pg* always present; setae *g1–g5* (microsetae) present or absent; setae *d3–d5* and *l5* all serrate. Pocket-like structures of vulva absent, but vulvar region with semicircular chitinous or circular comb around it.

Male. Setae *vi* and *ve* very short; chaetotaxy of hysterosoma: setae *d1*, *d2*, *d5*, *l5*, *g1–g3* and *ic3* present; setae *d5*, *l5* serrate. Semicircular chitinous comb present ventrally on opisthosoma.

Immature instars. Setae PE absent in all immature instars. Apodous, propodosomal shield absent. Setae of idiosoma situated mainly in posterior part of dorsal surface or moved to ventral surface of body.

The subfamily includes two genera: *Harpypalpus* Dubinin, 1957 and *Harpypalpoides* Lombert & Moss, 1983.

Genus *Harpypalpus* Dubinin, 1957

Type species: *Harpirhynchus longipes* Fritsch, 1954 (? syn. of *Harpirhynchus holopus* Berlese & Trouessart, 1889).

Setae *sce* present; paragenital (*pg*) and genital setae (*g1–g3*) of female present or absent; Vulvar region of female with semicircular chitinous comb. Chaetotaxy of legs I–IV: leg I: coxa 1, trochanter 1, femur 3, genu 5, tibia 5, tarsus 7; leg II: 1, 1, 2, 5, 5, 7; leg III: 1, 2, 0 (1), 0, 3, 6; leg IV: 1, 2, 0 (1), 0, 3, 6. Specialized setae of tarsi: tarsi I and II each with 1 eupathidium and 1 solenidion ($\omega 1$ and $\omega 2$).

This genus includes five or six species; the taxonomical status of *Harpypalpus longipes* is unclear.

KEY TO FEMALES OF THE GENUS *Harpypalpus* (female of *Harpypalpus serini* unknown)

1. Femur III, IV with one seta *H. holopus*
- Femur III, IV without setae 2
2. Setae *ic3* absent *H. dubinini*
- Setae *ic3* present 3
3. Setae *vi*, *ve*, *sci* and *ll* serrate *H. tiarae* n. sp.
- Setae *vi*, *ve*, *sci* and *ll* filiform *H. spermestes* n. sp.

Harpypalpus holopus (Berlese & Trouessart, 1889)

The female of this species was described ex *Passer domesticus* (Passeriformes: Ploceidae) from Italy (BERLESE & TROUESSART, 1889; BERLESE, 1894). One male of this species was found on same host from Belgium, but not described (FAIN, 1972).

Male. L 140; W 123; LS 96; WS 95; LG 41; WG 51; setae *vi*, *ve* 6; *sci*, *d1*, *d2*, *ll* - 9-10; *sce* 24; *h* 22; *d5*, *l5* 24; penis 42. Femur III, IV with one seta.

Remark. It is possible that *Harpypalpus longipes* (Fritsch, 1954), known from a single male from *Troglodytes troglodytes* (Passeriformes: Troglodytidae) from Germany, is conspecific with *Harpypalpus holopus*.

Material. One male ex *Passer domesticus* from Belgium, Tirlemont, Nov. 1964, A. FAIN coll. Specimen deposited in IRSNB.

Harpypalpus serini Fain, 1972

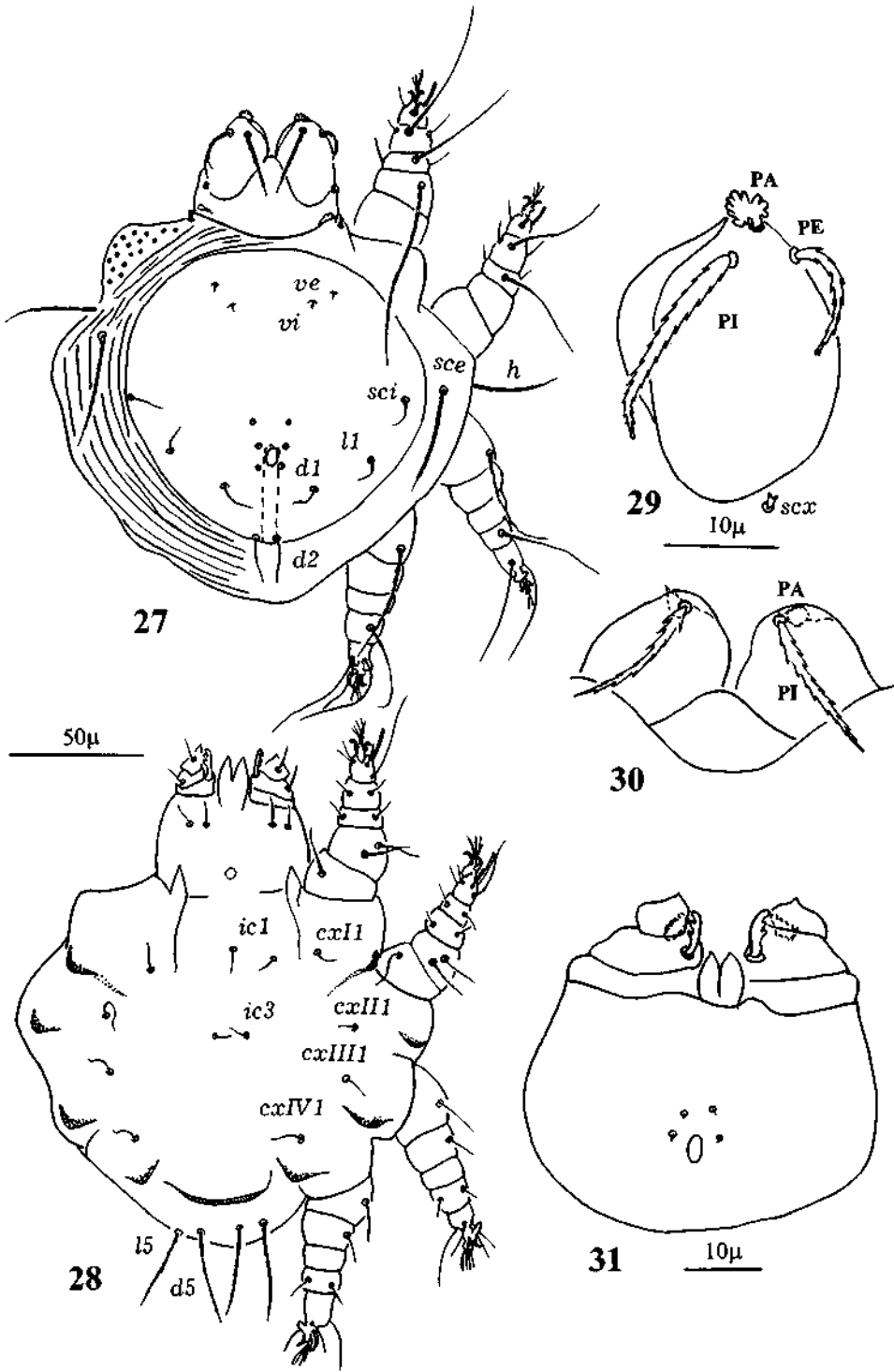
(Figs 27–31)

This species was briefly described, but not depicted, from *Serinus mosambicus* (Passeriformes: Fringillidae) from Antwerp Zoo (FAIN, 1972), originating from Central Africa.

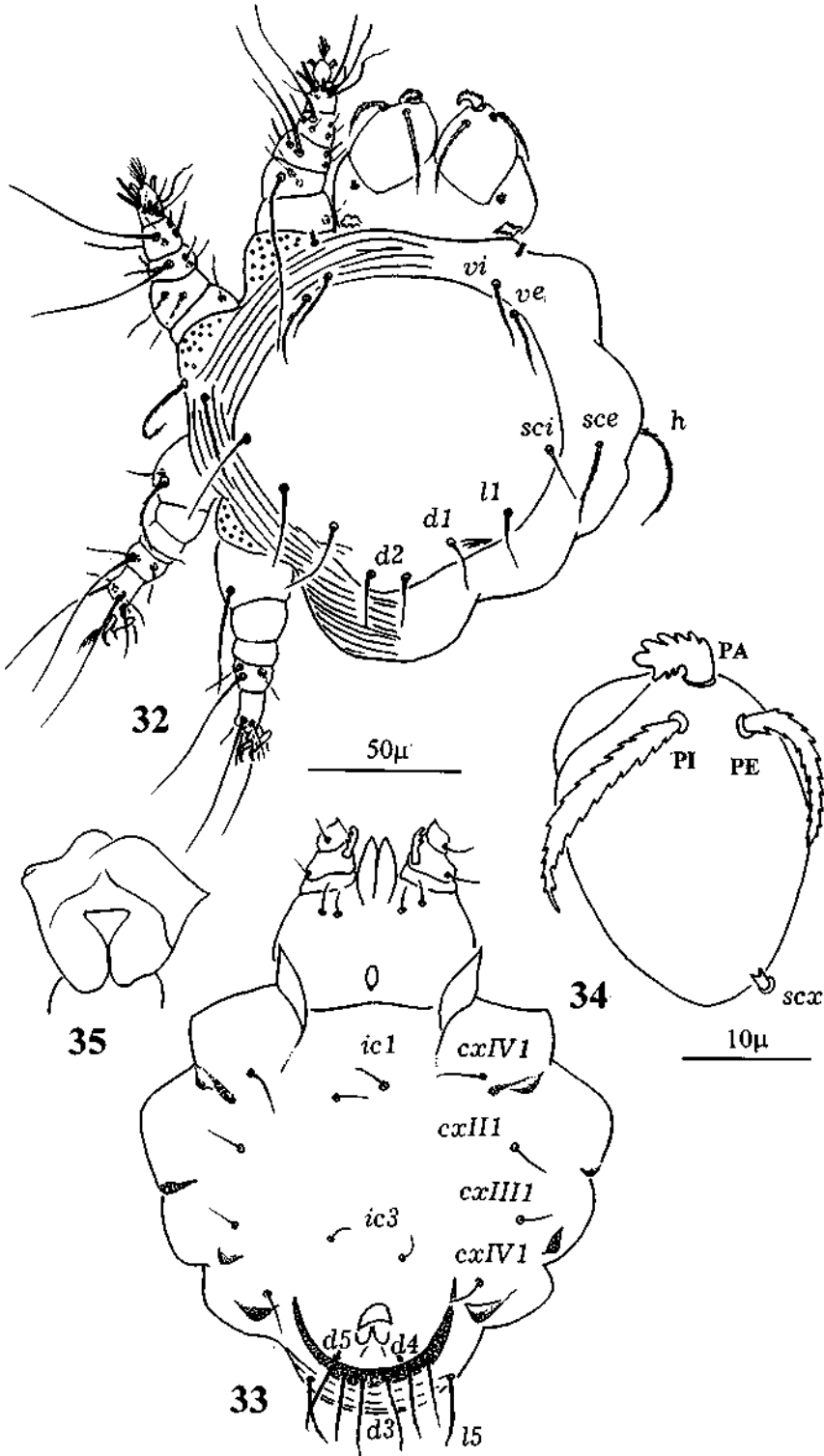
Male, holotype (Figs 27–29): L 152 (139, 140 in two paratypes); W 126 (114, 121); LS 94 (94, 92); WS 97 (90, 95); LG 42 (38, 42); WG 47 (49, 51); setae *vi*, *ve* 3 (3, 4); *sci* 12; *sce* 27 (25, 27); *h* 24 (23, 24); *d1* 12 (13, 15); *d2* 18 (22); *d5* 24 (24, 25); *ll* 12 (19); *l5* 27 (24, 27); *g1–g3* microsetae; penis 37 (56). Femur III, IV with one seta.

Differential diagnosis. This species is very closely related to *Harpypalpus holopus*, but differs from the latter species by lengths of setae *vi*, *ve* 3–4 and *d2* 18–22 (in *Harpypalpus holopus*, 6 and 9 respectively).

Type material. Holotype male ex *Serinus mosambicus* from Antwerp Zoo, 12 July 1963, A. FAIN coll. Paratypes (2 males and one tritonymph) from the same host and locality, 23 July 1963, A. FAIN coll. Holotype deposited in IRSNB; paratypes in MRAC.



FIGS. 27-31: *Harpypalpus serini* (Fain). Male: dorsal view (27), ventral view (28), palpalae (29); tritonymph, gnathosoma: dorsal view (30), ventral view (31).



FIGS. 32-35: *Harpyalpus dubinini* (Fain), female. Dorsal view (32), ventral view (33), palpalae (34), vulva (35).

Harpypalpus dubinini Fain, 1972

(Figs 32–35)

Originally, this species was briefly described ex *Sitagra* [*Sporophila*] *intermedia* (Passeriformes: ?Emberizidae) from Antwerp Zoo, but not depicted (FAIN, 1972).

Female, holotype: L 148; W 123; LS 90; WS 87; LG 40; WG 54; setae *vi* 18, *ve* 23, *sce* 25, *h* 23, all serrate; *sci* 22, *d1* 19, *d2* 17, *l1* 22, all filiform; *d3* 20; *d4* 19; *d5* 20; *l5* 18; setae *ic3* absent; setae *g* absent. Femur III, IV without setae.

Differential diagnosis. This species is most closely related to *Harpypalpus tiarae* n. sp., but differs from it and all other known species of the genus *Harpypalpus* by the absence of setae *ic3*. Furthermore, in female *Harpypalpus dubinini*, setae *sci* and *l1* are filiform,

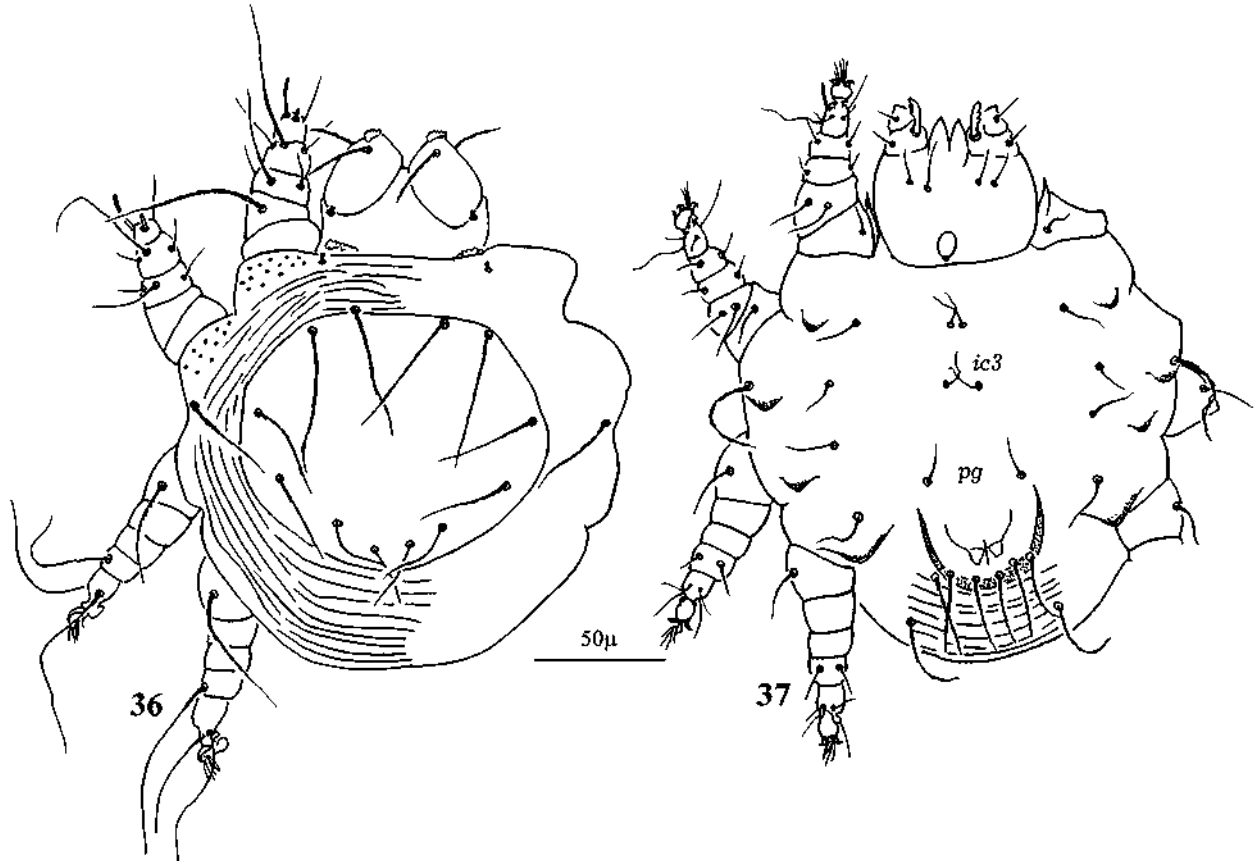
while in female *Harpypalpus tiarae* n. sp. these setae are serrate.

Type material. Holotype female ex *Sitagra intermedia* from Antwerp Zoo, 3 June 1968, originating from Central Africa. A. FAIN coll. Holotype deposited in MRAC.

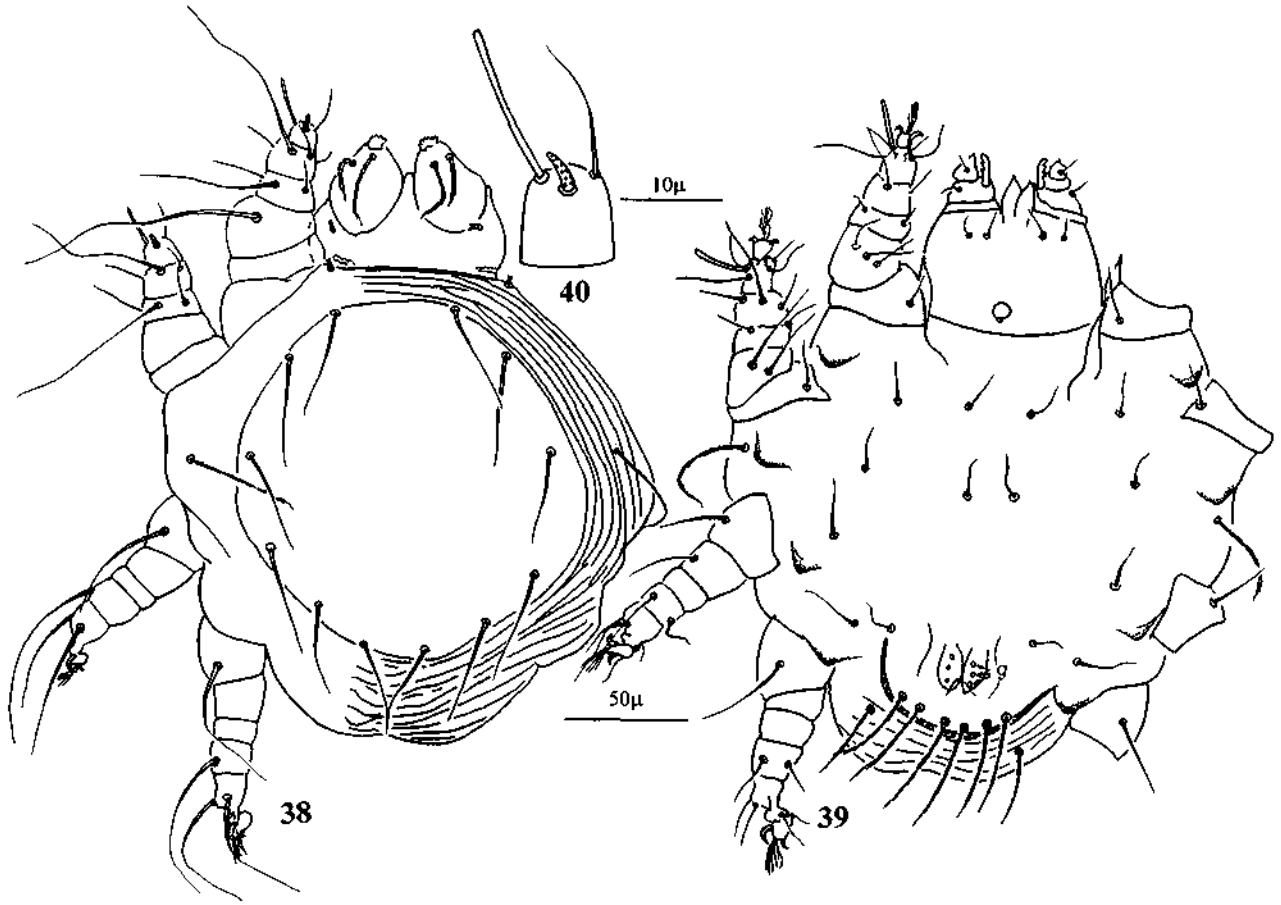
Harpypalpus tiarae n. sp.

(Figs 36–38)

Female, holotype: L 168 (166 in paratype); W 137 (135); LS 76 (81); WS 93 (94); LG 47 (48); WG 49 (50); setae *vi* 45 (44), *ve* 44 (45), *sci* 33 (32), *sce* 56 (45), *h* 34 (27), *l1* 29 (36) all serrate; *d1* 25 (24), *d2* 24 (22), all filiform; *d3* 26 (27); *d4* 24 (27); *d5* 24 (23); *l5* 31 (34); setae *g* absent. Femur III, IV without setae.



FIGS. 36–37: *Harpypalpus tiarae* n. sp., female. Dorsal view (36), ventral view (37).



FIGS. 38-40: *Harpypalpus spermestes* n. sp., female. Dorsal view (38), ventral view (39), tarsus I in dorsal view (40).

Differential diagnosis. The female of the new species is most similar to *Harpypalpus spermestes* n. sp., described below. It differs from the female of *Harpypalpus spermestes* n. sp. by the form of setae *vi*, *ve*, *sci*, which are serrate, and by absence of setae *g*; in *Harpypalpus spermestes* n. sp. setae *vi*, *ve*, *sci* are filiform, setae *g* present.

Type material. Female holotype and female paratype ex *Tiaris canora* (Passeriformes: Emberizidae) from Antwerp Zoo, 10 May 1965. Origin: Central Africa. A. FAIN coll. All material deposited in IRSNB.

Harpypalpus spermestes n. sp.

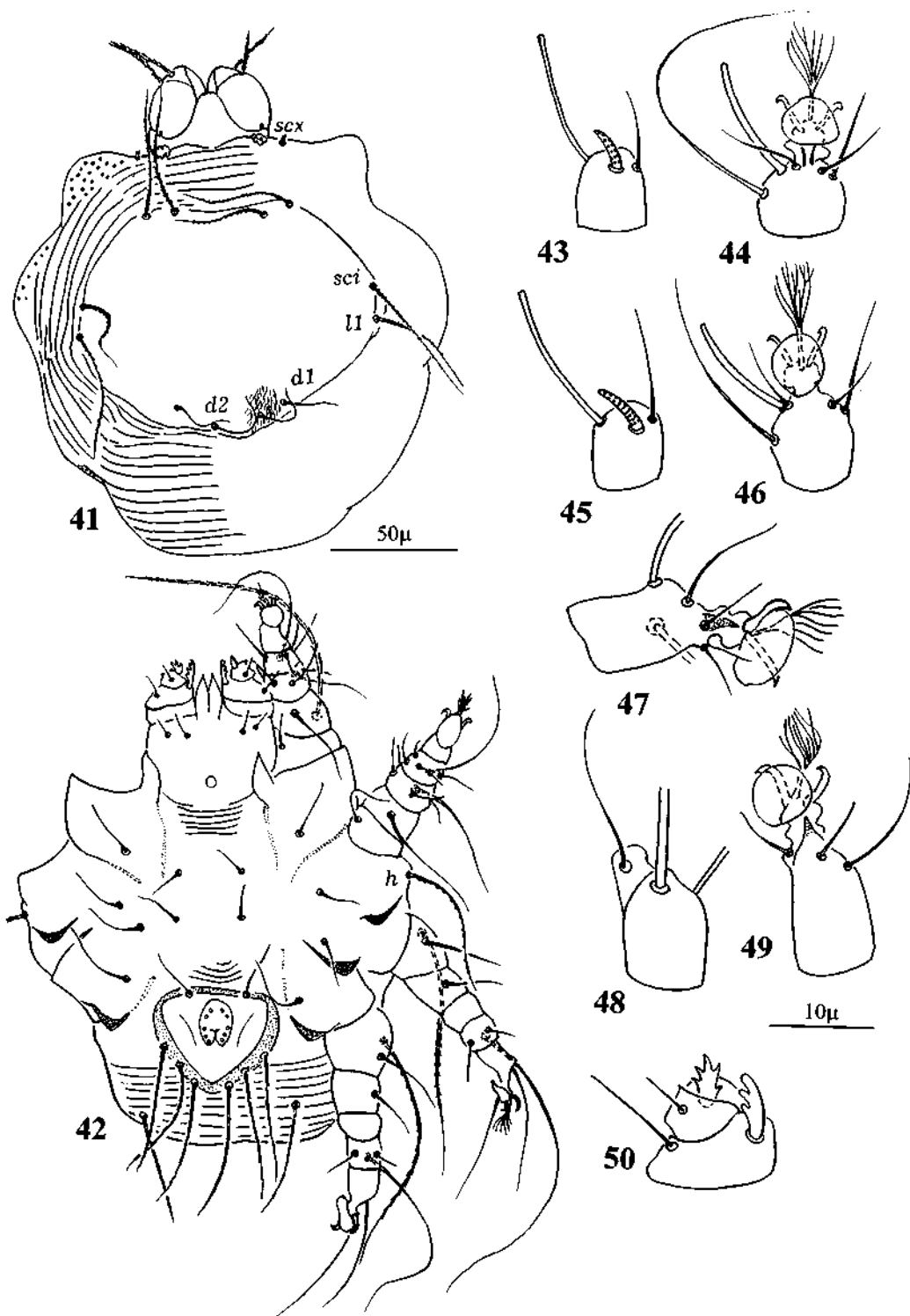
(Figs 38-39)

Female, holotype: L 193; W 164; LS 117; WS 121; LG 56; WG 63; setae *vi* 45, *ve* 45, *sci* 49, *d1* 33, *d2* 33,

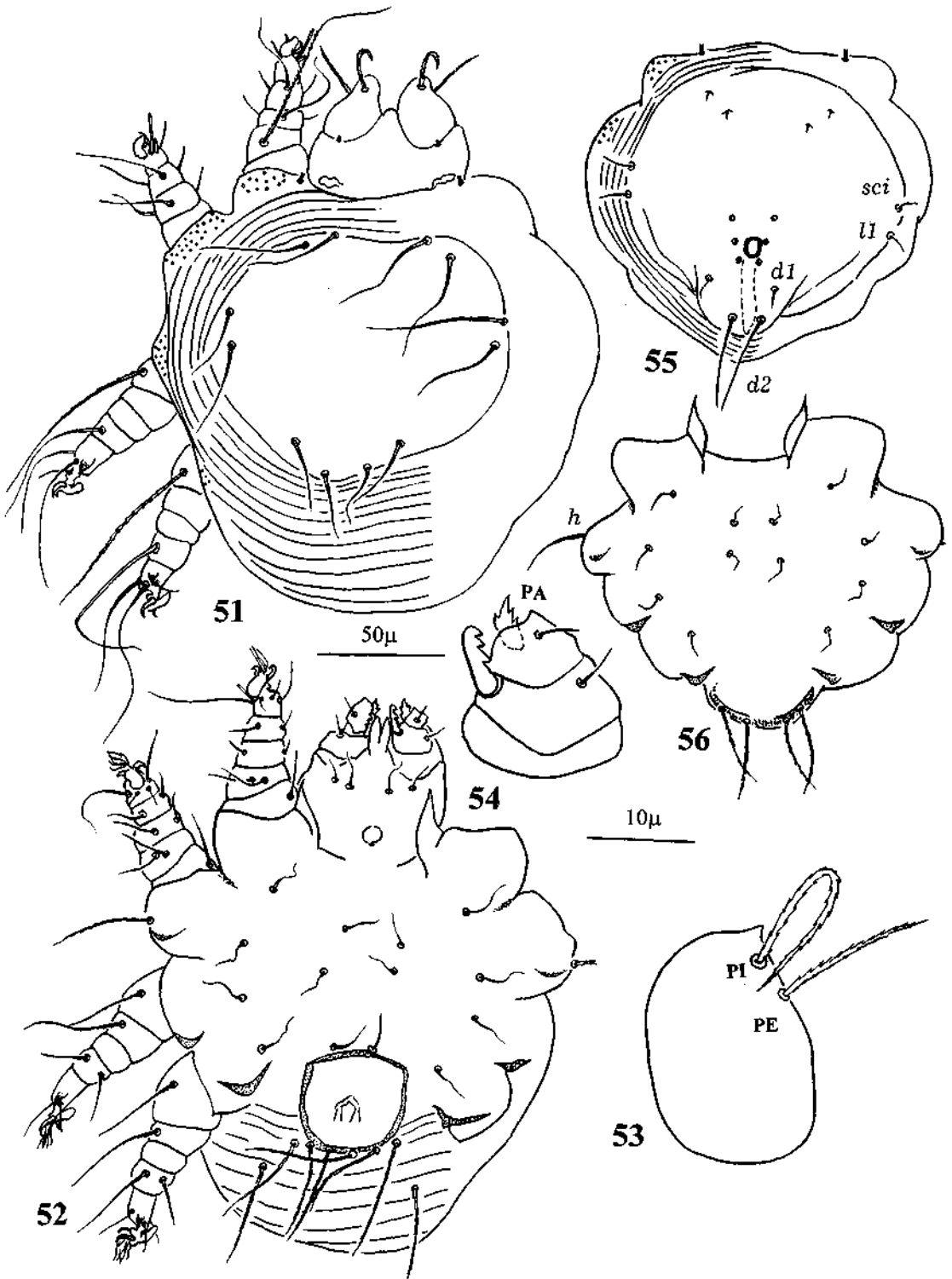
ll 42, all filiform; *sce* 47, *h* 36, all serrate; *d3* 40; *d4* 36; *d5* 36; *l5* 31; setae *g1-g3* present (microsetae). Distance between bases of setae *pg* and *cxII* 4 times longer than *pg-pg*. Femur III, IV without setae.

Differential diagnosis. The female of the new species is most similar to *Harpypalpus tiarae* n. sp. (see above). It differs from female of latter and all other species of the genus *Harpypalpus* by the ratio *pg-pg/pg-cxIV* 4:1. In other known species of the genus, this ratio is about 1:1.5.

Type material. Holotype female ex *Spermestes* [*Ploceus*] *cucullatus* (Passeriformes: ?Ploceidae) from Democratic Republic of Congo, Luluabourg, June 1965, DE ROO coll. Holotype deposited in IRSNB.



Figs. 41-50: *Harpyalpoides hirundinis* (Fain), female. Dorsal view (41), ventral view (42); tarsus I in dorsal view (43), ventral view (44); tarsus II in dorsal view (45), ventral view (46); tarsus III in lateral view (47); tarsus IV in dorsal view (48), ventral view (49); tibiotarsus of palp in ventral view (50).



FIGS. 51-56: *Harpypulpoidea namibiensis* n. sp. Female: dorsal view (51), ventral view (52); palp in dorsal view (53), ventral view (54); male: dorsal view (55), ventral view (56).

Genus *Harpypalpoides* Lombert & Moss, 1983

Type species: *Harpypalpoides lukoschusi* Lombert & Moss, 1983.

Setae *sce* absent; genital setae (*g1-g4, g5*) present or absent in female; vulvar region of female completely surrounded by a chitinous comb. Chaetotaxy of legs I-IV; leg I: coxa 1, trochanter 1, femur 3 (2), genu 5, tibia 5, tarsus 7; leg II: 1, 1, 2 (1), 5, 5, 7; leg III: 1, 2, 1, 0, 3, 6; leg IV: 1, 2, 1, 0, 3, 6. Specialized setae: tarsi I and II with each 1 eupathidium and 1 ω ($\omega 1$ and $\omega 2$ respectively).

This genus includes 3 species.

KEY TO FEMALES OF THE GENUS *Harpypalpoides*

- 1. Setae *vi, ve, sci* and *II* serrate; femur I with 2 setae, femur II with one seta *H. hirundinis*
- Setae *vi, ve, sci* and *II* filiform; femur I with 3 setae, femur II with 2 setae 2
- 2. Dorsal setae of trochanter III, IV filiform; setae *d1* 50 long, *d2* 47 long *H. lukoschusi*
- Dorsal setae of trochanter III, IV serrate; setae *d1* 22-24 long, *d2* 18-19 long *H. namibiensis* n. sp.

Harpypalpoides hirundinis (Fain, 1972)

(Figs 41-50)

Originally, this species was briefly described, but not figured. Host: *Psalidoprocne* sp. (Passeriformes: Hirundinidae) from Congo (FAIN, 1972).

Female, holotype: L 164; W 135; LS 81; WS 78; LG 47; WG 46; setae *vi* 42, *ve* 40, *sci* 45, *h* 40, *II* 42, all serrate; *d1* 18, *d2* 20, all filiform, *d3* 45; *d4* 44; *d5* 45; *l5* 36; setae *g1-g5* present. Femur II with 2 setae, femur III with one seta; dorsal seta of trochanter III, IV serrate, ventral seta of trochanter III, IV and seta of femur III, IV filiform.

Note. The holotype of this species has a remarkable aberration: the leg II on one side is absent, but the coxal seta and the lobe are present (Fig 41).

Differential diagnosis. This species differs from the two other known species of *Harpypalpoides* by the chaetotaxy of femur I, II (with 2 and 1 setae, respectively) and serrate setae *vi, ve, sci* and *II*.

Type material. Holotype female ex *Psalidoprocne* sp., Democratic Republic of Congo, Kinshasa, 14 Feb. 1965, coll. A. FAIN. Holotype deposited in MRAC.

Harpypalpoides namibiensis n. sp.

(Figs 51-55)

Female, holotype (Figs 51-56): L 179 (157-177 in 3 paratypes); W 146 (135-153); LS 81 (90-92); WS 101 (99-101); LG 47 (49-50); WG 49 (47-49); setae *vi* 36 (29-33), *ve* 34 (27-33), *sci* 27 (27-30), *d1* 24 (22-23), *d2* 19 (18), *II* 36 (30-33), all filiform; *h* 34 (36), serrate; *d3-d5* 33-34; *l5* 33 (27); setae *g* absent. Femur II with 3 setae, femur III with 2 setae; setae of trochanter and femur III, IV serrate.

Male (Figs 54-55): L 135, 139 (two paratypes); W 121, 126; LS 83, 87; WS 94; LG 45, 42; WG 42, 45; *vi, ve* 2-3; *sci* 9, 11; *h* 22, 23; *d1* 6, 9; *d2* 29, 27; *d5* 22; *II* 11, 13; *l5* 27, 20; penis 33, 34 long. Chaetotaxy as in female.

Differential diagnosis. This new species is closely related to *Harpypalpoides lukoschusi*. However, it differs from the latter species by serrate dorsal setae on trochanters III, IV, short setae *d1, d2* in females (18-19) and males (6-9, 29); in *Harpypalpoides lukoschusi* these setae measured 50, 47 in females and 19, 43 in males, respectively.

Type material. Holotype female, paratypes (3 females and 2 males) ex *Emberiza impetuani* (Passeriformes: Emberiziidae), Namibia, Aroab, 19 Oct. 1980, F. LUKOSCHUS coll. Holotype and three paratypes (2 females and 1 male) deposited in IRSBN; other paratypes (1 female and 1 male) in ZIN.

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