Damalinia (*Tricholipeurus*) *zaganseeri*, n. sp. (Phthiraptera: Trichodectidae), a Parasite from *Procapra gutturosa* (Artiodactyla: Bovidae) in Mongolia

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ABSTRACT During an expedition through the east Mongolian steppes, an undescribed chewing louse (Insecta: Phthiraptera) of the genus *Damalinia* was collected on Mongolian gazelles, *Procapra gutturosa*. This represents the 1st report of a chewing louse on this poorly known antelope. After a short review of the distribution of this genus and its subgenera among host groups, the new species *D.* (*Tricholipeurus*) *zaganseeri*, n. sp. is described and illustrated. Its distinct morphology is compared with that of similar species.

KEY WORDS *Procapra gutturosa*, *Damalinia* (*Tricholipeurus*) *zaganseeri*, Phthiraptera, Ischnocera

DURING A GERMAN-MONGOLIAN expedition to the eastern Mongolian steppes (Baga uul Plateau, Mardai Steppe, Kerulen Valley) in May 1995, extensive material was collected to examine the parasite fauna of the Mongolian gazelle, *Procapra gutturosa* (Pallas, 1777). Six of 31 animals were infested with a previously unknown species of chewing louse. These lice represent the 1st ischnoceran species found on this antelope, parasites of which have seldom been investigated. It represents a new species of the genus *Damalinia* Mjöberg, 1910.

According to Emerson and Price (1981), *Damalinia* spp. are known from 3 host families in the order Artiodactyla—1 species in the Tragulidae, 3 in the Cervidae, and 13 in the Bovidae. After a careful revision of the Trichodectidae, Lyal (1985) erected (in contrast to Werneck 1950) a separate genus *Tragulicola* for the species parasitic on Tragulidae and relegated the former genera *Cervicola* Kéler and *Tricholipeurus* Bedford to the status of subgenus of the genus *Damalinia*. Therefore, this genus is divided into 3 subgenera, representatives of which are parasitic on Cervidae and Bovidae. Whereas 16 *D.* (*Damalinia*) spp. seem to be restricted to Bovidae, *D.* (*Cervicola*) has 4 species parasitic on Cervidae and 9 on Bovidae. Furthermore, Lyal (1985) named 19 *D.* (*Tricholipeurus*) spp., 5 of them associated with Cervidae and 14 with Bovidae. *Damalinia* (*Tricholipeurus*), with 8 known species, is more frequently found on Antilopinae. The little-known Central Asian gazelles are assigned to this subfamily—1 genus, *Procapra* Hodgson, 1846; the 2 subgenera *Procapra* Hodgson, 1846 and *Prodorcas* Pocock, 1918; and the 3 species *P.* (*P.*) *picticaudata* Hodgson, 1846; *P.* (*P.*) *przewalskii* Büchner, 1891; and *P.* (*Prodorcas*) *gutturosa* Pallas 1777 inhabiting the steppes or semideserts of the highlands of inner Asia (Nowak 1991). To date, no chewing lice have been described from this group of hosts.

Materials and Methods

With permission of the Mongolian Ministry for Nature and Environment in Ulan Bator and with the support of the administrations of the aimags and sums, 21 male and 10 female gazelles were collected between 15 and 27 May 1995 (all shootings were carried out under license by the Mongolian Ministry for Nature and Environment, Ulan Bator). A complete parasitological autopsy yielded 650 chewing lice from the dorsal hide and neck of 6 freshly shot animals (2 adults and 1 subadult female and 2 adults and 1 subadult male) from the aimags Dornod and Khentie. Of these specimens, 325 were deposited in the collections of the German participants (204 males, 88 females, 33 larvae (2 larvae I, 31 larvae II)). The parasites were stored in 70% ethyl alcohol with 5% glycerin and examined microscopically in lactic acid. To clarify morphology of the integument and chaetotaxy, some specimens were prepared for examination by scanning electron microscopy. All drawings were made using a Zeiss drawing tube (Jena, Germany). All measurements are given in millimeters. In description of paratypes, the minimum and maximum as well as the corresponding mean sizes of 40 males and 40 females are given. Terminology of chaetotaxy follows that of Ischnocera of birds (Mey 1994) but is somewhat extended because of certain morphological features of the species examined. This does not infer that the named setae or groups of setae are homologous to

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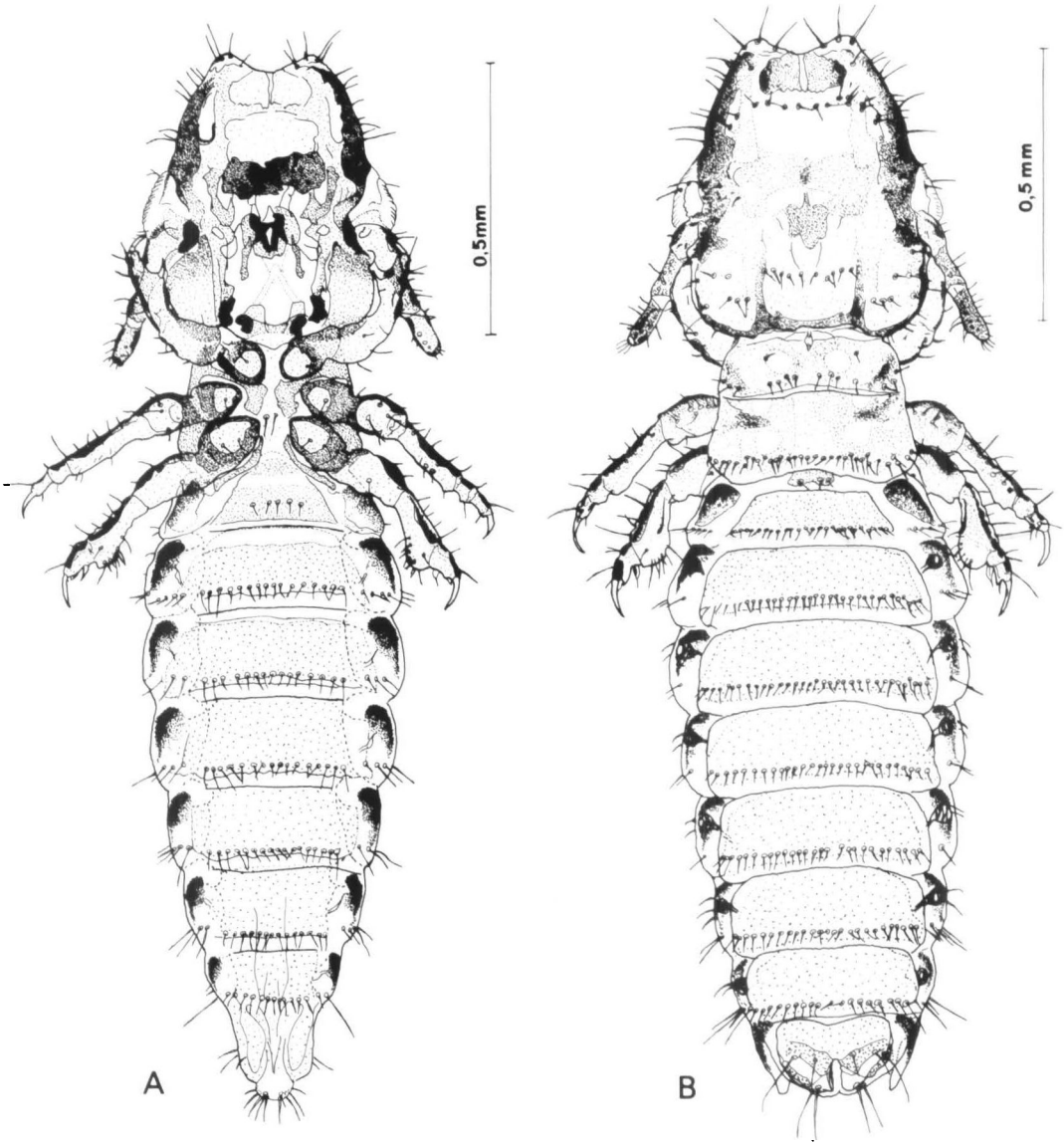

Fig. 1. *Damalinia (Tricholipeurus) zaganseeri.* (A) Male, ventral aspect. (B) Female, dorsal aspect.

the corresponding setae of the Ischnocera of birds. To standardize the nomenclature, it would be necessary to examine more species and genera of Ischnocera living on birds and mammals.

Damalinia (*Tricholipeurus*) *zaganseeri* Lux, Mix & Zedev, new species

Male. Ventral aspect shown in Fig. 1A. Shape of body narrow, with posteriorly pointed abdomen. Body measurements are shown in Table 1. Head longer than wide, conically shaped. Osculum well developed. Coni strong and scaled (Fig. 2D). Median broadening of clypeal marginal carina formed as medially divided plate behind osculum. In comparison with other *Damalinia* species, sexual dimorphism of antennae slight. Scapus not much enlarged, protruding only at caudal edge of eye. Tonguelike plates around both sensilla of flagellum (Fig. 2A) bearing 1 or 2 embossed coronalike symmetrical structures (Fig. 2B). Natural colours of well-sclerotized structures on head (marginal carina, nodi, mandibles, sitophore), thorax and legs (splints) as well as tergites, sternites, and pleurites reddishbrown, otherwise light yellowishbrown. Pleural ridges white, surface with distinct, smooth-edged scaley structure. Cuticle of tergites appearing smooth but on closer examination, segments III–V with barely recognizable scales, these becoming clearer on segments VI–VIII and ending posterio-marginally in a minute tooth. Sternite scales of same type but structured more clearly (Fig. 2C). Except terminalia, both sexes with same arrangement of dorsal and ventral setae.

Table 1. Measurements and head index of *D. (T.) zaganseeri* Lux, Mix & Zedev, n. sp.

Measurements	Males paratypes			Females paratypes		
	Holotype	Min.–Max	Mean	Allotype	Min.–Max	Mean
Total length	1.87	1.79–1.93	1.85	1.82	1.77–1.88	1.83
Length of head	0.54	0.47–0.54	0.52	0.52	0.52–0.56	0.53
Width of head	0.40	0.33–0.40	0.37	0.41	0.40–0.43	0.41
Head index[a]	1.35	1.33–1.47	1.38	1.27	1.26–1.35	1.29
Width of pronotum	0.30	0.26–0.31	0.28	0.31	0.29–0.33	0.31
Width of mesometanotum	0.34	0.30–0.35	0.32	0.35	0.34–0.37	0.36
Width of abdomen	0.48	0.44–0.50	0.47	0.50	0.48–0.54	0.51

All values are in millimeters. *n*, 40 males; 40 females.
[a] Ratio, length/width.

Chaetotaxy of Head (Fig. 4). Along marginal carina, 3 rows of irregular setae as follows: 6–7 dorsal submarginal setae (dsms), 2 of them frontal on hyaline margin; 5–6 marginal setae (ms), the last one extended, also on hyaline margin; and 5 ventral submarginal setae (vsms). From inside of marginal carina, one row of 11–13 anterior dorsal setae (ads), expanding anterio-dorsally over clypeus; between temple bands another row of 9–10 posttemporal setae (pts). On each of temples, 6–7 dorsal temporal

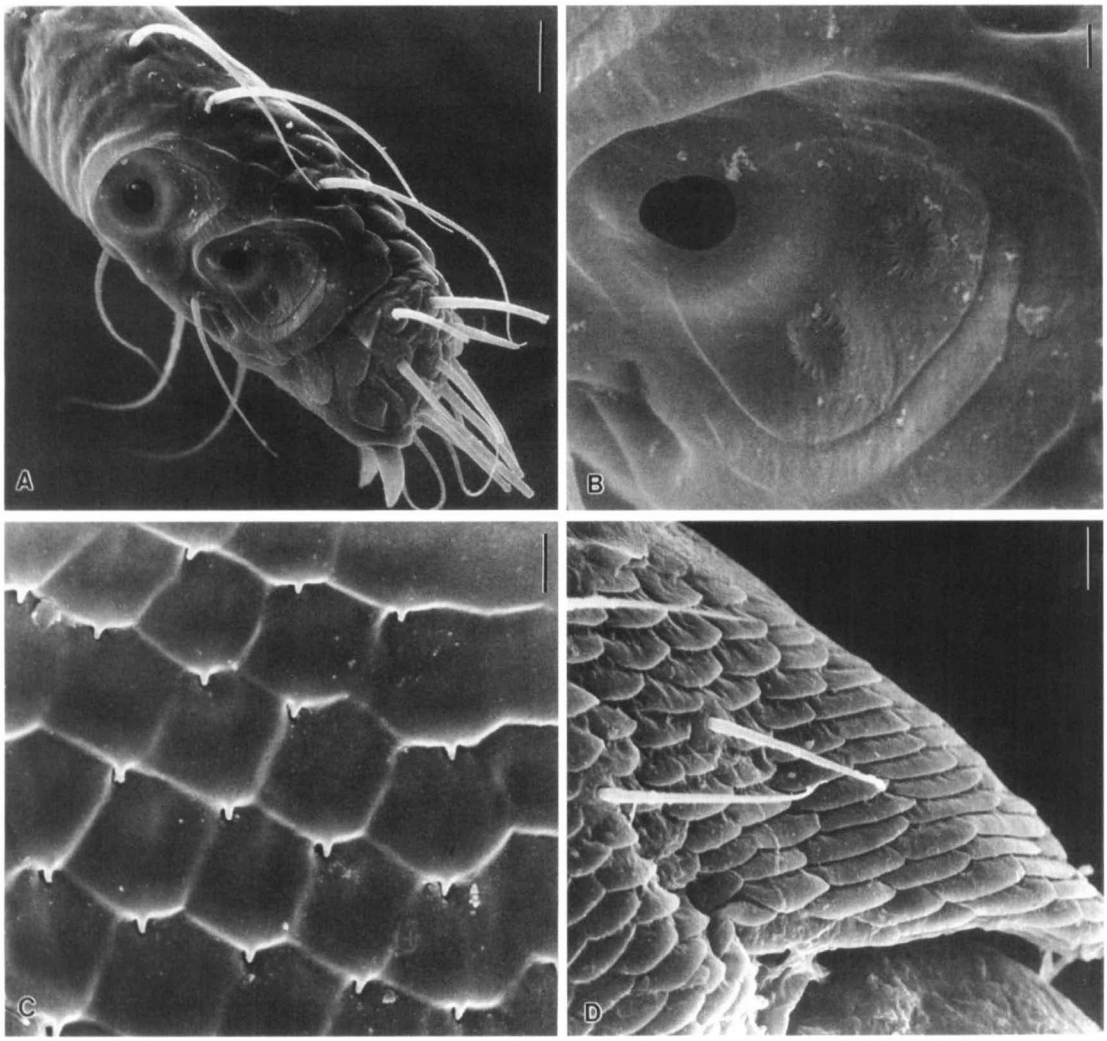

Fig. 2. Scanning electron micrographs of morphological details of *D. (T.) zaganseeri*. (A) Antennal flagellum (bar = 10 μm). (B) Tonguelike plate on flagellum with embossed coronalike structures (bar = 2 μm). (C) Sternite scales (bar = 5 μm). (D) Scaled conus with conal setae (bar = 10 μm).

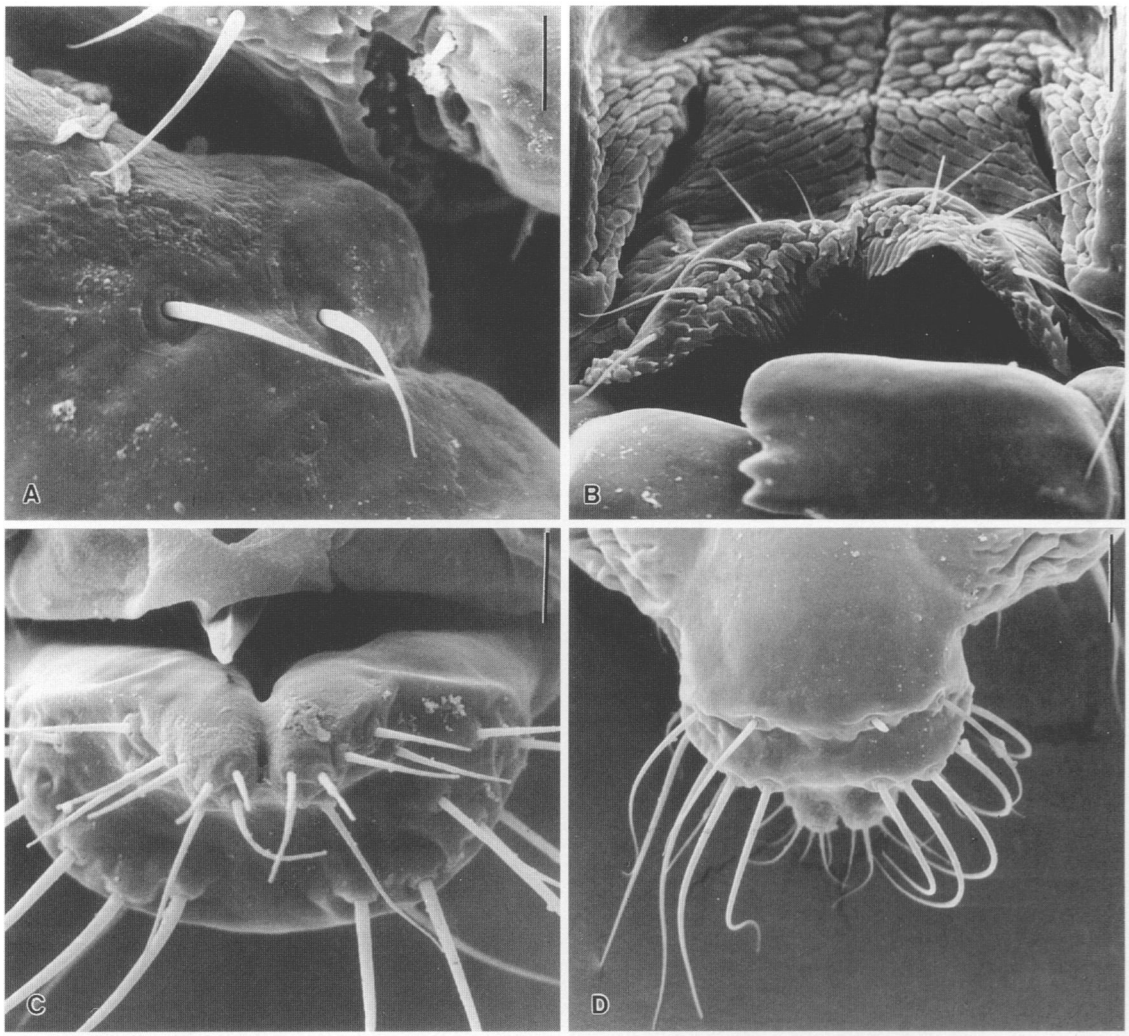

Fig. 3. Scanning electron micrographs of morphological details of *D. (T.) zaganseeri*. (A) Ocular seta and supraocular seta (bar = 10 μm). (B) Labrum (bar = 20 μm). (C) Caudal view of the terminalconus (bar = 10 μm). (D) Ventral aspect of the terminal conus (bar = 20 μm).

setae (dts) and 4 marginal temporal setae (mts). Occasionally 1 ocular seta above eye (Fig. 3A) but always 1 supra ocular seta (sos). On each side, 2 postnodal setae (pns) and 2 dorsal clypeal setae (dcs) forming 1 row expanding obliquely from posterior margin of clypeus to base of conus. Dorsally on coni, 2 conal setae (cs) (Fig. 2D) at ventral margin of base of each conus, 1 preconal seta (pcs) anteriorly and 1 preantennal seta (pas) posteriorly. Between caudal section of ventral carina and postmarginal carina, 4 anterior ventral setae (avs), 1 of them always lateral. At lateral margin of trichotheca, 4 trichothecal setae (tts), the anterior 2 shifted to its inside. Labrum with 8 fine setae, and anterio-medially another 2 (Fig. 3B).

Chaetotaxy of Thorax (Fig. 1). One irregular row with 9–14 setae, posterio-marginally on pronotum; outermost displaced farther anterio-laterally, 2 innermost displaced anteriorly. One gap laterally between middle and outer setae, 2 setae centrally behind anterior margin. Mesometanotum with 24–30 setae posterio-marginally. Again outermost displaced anterio-laterally. Mesometasternum with 1 pair of setae.

Chaetotaxy of Abdomen. Immediately behind mesometanotum, greatly reduced tergite of former abdominal segment I with 2 (rarely 3) setae. Setal counts posterio-marginally on tergites in regular rows are as follows: II, 14–19; III, 20–23; IV, 18–24; V, 17–20; VI, 14–19; VII, 13–16; VIII, 8–10; IX, 7–10, 2 of them more anterio-lateral. Additional 1–3 (usually 2) microchaetae on posterior margin (Fig. 5A). Setal counts on sternites are as follows: II, 4–8; III, 14–19; IV, 15–19; V, 14–18; VI, 14–16; VII, 12–15; VIII, 9–11. Pleurite II with 1 greatly reduced spiraculum on each side, with 1–2 possibly missing

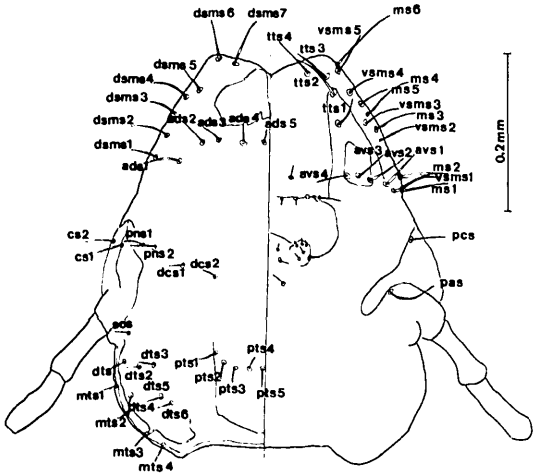

Fig. 4. *Damalinia* (*Tricholipeurus*) *zaganseeri*, dorsal and ventral chaetotaxy of head. dsms 1–7, dorsal submarginal setae; ms 1–6, marginal setae; vsms 1–5, ventral submarginal setae; ads 1–5, anterior dorsal setae; pts 1–5, post temporal setae; dts 1–6, dorsal temporal setae; mts 1–4, marginal temporal setae; sos, supra ocular seta; pns 1–2, post nodal setae; dcs 1–2, dorsal clypeal setae; cs 1–2, conal setae; pcs, preconal seta; pas, preantennal seta; avs 1–4, anterior ventral setae; tts 1–4, trichothecal setae.

spiracular setae. Spiracula of pleural ridges III–VIII well developed, 1–3 spiracular setae on III, 1–2 on IV, 1–3 on V, 2–3 on VI–VIII. Setal counts postspiracularly on posterior margin of pleuron II are 5–6, on III and IV 8–10, on V 6–8, on VI and VII 5–7, on VIII 5–6, inserting in short dorsoventral rows down to ventral surface of abdomen. On both sides of pleuron IX 2 setae. Shape and dorsal chaetotaxy of terminalia shown in Fig. 5A. Around lower margin of orifice of ductus ejaculatorius 18 small setae, 4 in pairs on top of each other on caudal papillae (Fig. 3C). On both sides of ventrocaudal margin are 4–5 long setae, on more ventrally situated transverse fold 2 pairs of setae (Fig. 3D).

Genitalia (Fig. 5C). Width at posterior third of basic plate 0.062–0.065, length of parameres 0.130–0.141.

Female. Dorsal aspect and terminalia (ventral) shown in Figs. 1B and 5B. Body measurements shown in Table 1. Colors and structures of head, thorax, and abdomen (except terminalia) similar to those of male. Setal counts much as for male (except genital region). Some specimens with 1–2 additional anterior dorsal and occipital setae. Greater number of mesometanotal setae (28–39) than in male. More tergal setae than in male (II, 21–28; III, 27–34; IV, 29–36; V, 27–32; VI, 25–33; VII, 24–31; VIII, 18–23) but only 6–7 relatively widely spaced setae on tergite IX. Sternites with following setal counts: II, 6–8; III, 18–23; IV, 19–24; V, 16–20; VI, 18–21; VII, 14–19). Arched, irregular row of 17–24 setae anterior to back margin of subgenital plate between bases of gonapophyses. On both sides of vagina, 3–4 terminal setae.

Type Material. HOLOTYPE: 1 ♂ (Prep. No. M 57 ELC), Baga uul Plateau, N 48°41′ E 113°44′, 18-V-1995. ALLOTYPE: 1 ♀ (Prep. No. M 58 ELC), Baga uul Plateau, N 48°41′ E 113°44′, 18-V-95. PARATYPES: 20 males and 20 females, Baga uul Plateau, N 48°41′ E 113°44′, 18-V-95; 10 males and 10 females, Mardai Steppe, N 48°56′ E 114°14′, 20-21-V-95, both localities Dornod Aimag; 10 males and 10 females, Kerulen Valley, N 47°48′ E 112°31′, 25-26-V-1995, Khentie Aimag.

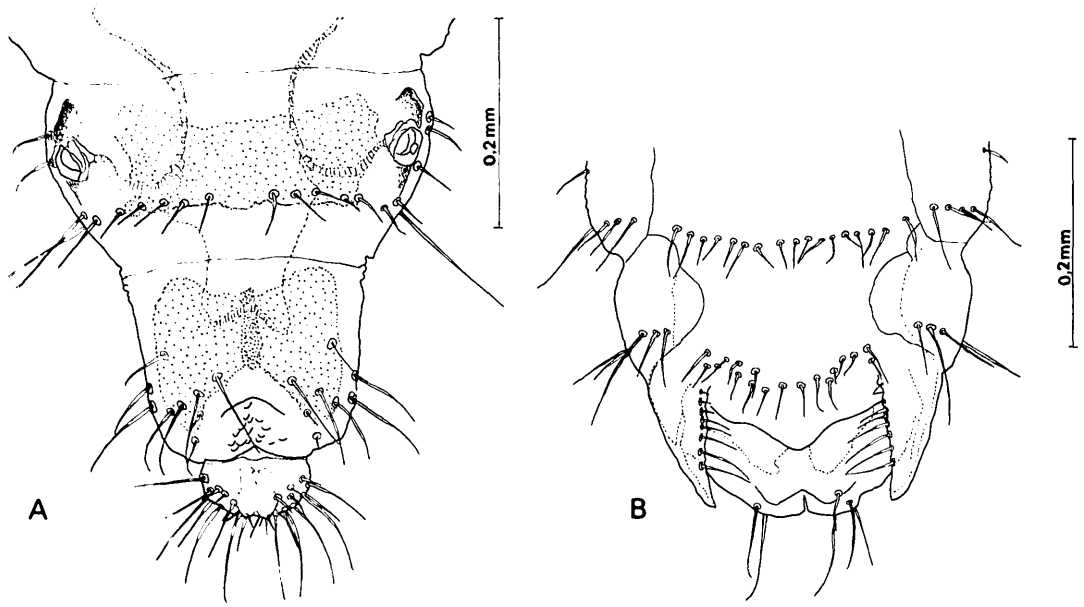

Fig. 5. Terminalia of *D.* (*T.*) *zaganseeri*. (A) Male, dorsal. (B) Female, ventral.

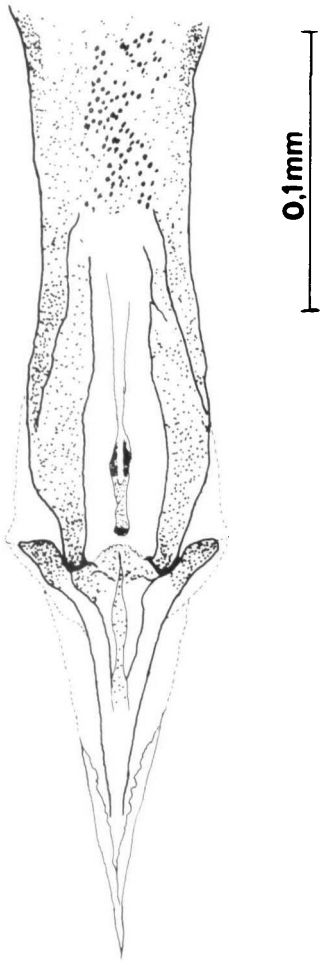

Fig. 6. Male genitalia of *D. (T.) zaganseeri*.

Type Host. Mongolian gazelle, *Procapra gutturosa* (Pallas).

Depositions. Holotype, allotype, and paratypes are deposited in the Institute for Zoo Biology and Wildlife Research Berlin, Germany. Additional paratypes are deposited in the Zoological Museum Berlin, the Museum of Natural History Rudolstadt, Thuringia, Germany, and The Natural History Museum, London.

Site of Infestation. Chewing lice were located in the back hide between and behind the shoulder blades and in the neck hide.

Etymology. The species is named after the traditional Mongolian term "zagaan zeer" (white antelope) for the type host species.

Remarks. In comparison with the description and the figures of *Damalinia* species published by Lyal (1985), the following differences in size and shape are apparent: *D. (T.) zaganseeri* is a medium-sized species in its genus. The shape of the head and osculum are similar to those of *D. (T.) spinifer* Hopkins from Grant's gazelle (*Gazella granti*). *D. (T.) zaganseeri* appears to have the least antennal sexual dimorphism among all known *Damalinia* spp. The female terminalia are very similar to those of *D. (C.) parallelus* Hopkins, but the subgenital lobe is elongated posteriorly. The pointed abdomen of the male resembles that of *D. (D.) theileri* Bedford, *D. (D.) harrisoni* (Cummings), and *D. (C.) hopkinsi* Bedford, but it differs in having an onion-shaped terminal conus. The male genitalia are unique in having an earlike projection on both sides of the parameres. All known *Damalinia* spp. are parasitic on very different host groups, and most of them are from very different geographical regions.

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