

Damalinia cordillerai n.sp. (Mallophaga: Trichodectidae) and Two Other Previously Known Arthropod Parasites of the Luzon Sambar Deer, *Cervus (Rusa) philippinus* Smith, 1827 (Mammalia: Artiodactyla: Ruminantia)

Salcedo L. Eduardo*, DVM, MSc, PhD

ABSTRACT

Damalinia cordillerai, a new species of biting louse from a Luzon sambar deer, *Cervus (Rusa) philippinus* Smith, 1827 from the Cordillera mountains near Colayo, Kalinga, Cordillera Administrative Region (CAR), Philippines is described and illustrated. It was compared with the closely related species of the genus, *Damalinia maai* Emerson and Price, 1973. Two previously known species, *Haematopinus nigricantis* Weisser and Kim, 1972 (sucking louse) and *Lipoptena rusaecola* Bequaert, 1942 (a louse fly) were also reported from the same host. The former is herein reported for the first time from this host constituting a new host record for the species. A summary of the parasites so far recorded from the Luzon sambar deer is presented.

Key words: *Cervus (Rusa) philippinus*, *Damalinia cordillerai*, *Haematopinus nigricantis*, *Lipoptena rusaecola*, Luzon sambar deer

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INTRODUCTION

Very few species of parasites so far have been recorded from the Luzon sambar deer, *Cervus (Rusa) philippinus* Smith, 1827. These include six species of ticks (Kohls, 1950; Hoogstraal, Kohls and Parrish, 1967 and 1968; Hoogstraal and Parrish, 1968), a species of louse fly (Bequaert, 1942) and a species of a fluke (Eduardo, 1993). Arthropod parasites collected by Mr. Jose Coloma from a Luzon sambar deer, *Cervus (Rusa) philippinus* caught in the Cordillera mountains near Colayo, Kalinga, Cordillera Administrative Region (CAR) were made available for study to the author. Examination of the materials revealed a species of biting louse hitherto unknown and two previously known species, a sucking louse and a louse fly. This paper presents the result of this examination.

*FOR CORRESPONDENCE: Professor, Department of Veterinary Paraclinical Sciences, College of Veterinary Medicine, University of the Philippines Los Baños, Laguna 4031, Philippines.

MATERIALS AND METHODS

Specimens were received already preserved in isopropyl alcohol (rubbing alcohol). These were then transferred to 70% ethyl alcohol and kept until further study.

Specimens were soaked overnight in 1% sodium hydroxide solution and the softened internal parts were carefully pressed out. The specimens were then washed in water, dehydrated in increasing grades of ethyl alcohol, cleared in creosote and mounted in Canada balsam.

Drawings were made with the aid of an AO drawing apparatus. Photomicrographs were taken using a Nikon Labophot microscope. Measurements were taken with the aid of a calibrated eyepiece micrometer.

RESULTS

The collection consisted of three species, a biting louse, one sucking louse and a louse fly. The biting louse is described here as a new species, *Damalinia cordillerai*. The sucking

louse was identified as *Haematopinus nigricantis* Weisser and Kim, 1972 and the louse fly as *Lipoptena rusaecola* Bequaert, 1942. These are described and illustrated based on the present Philippine materials.

Description

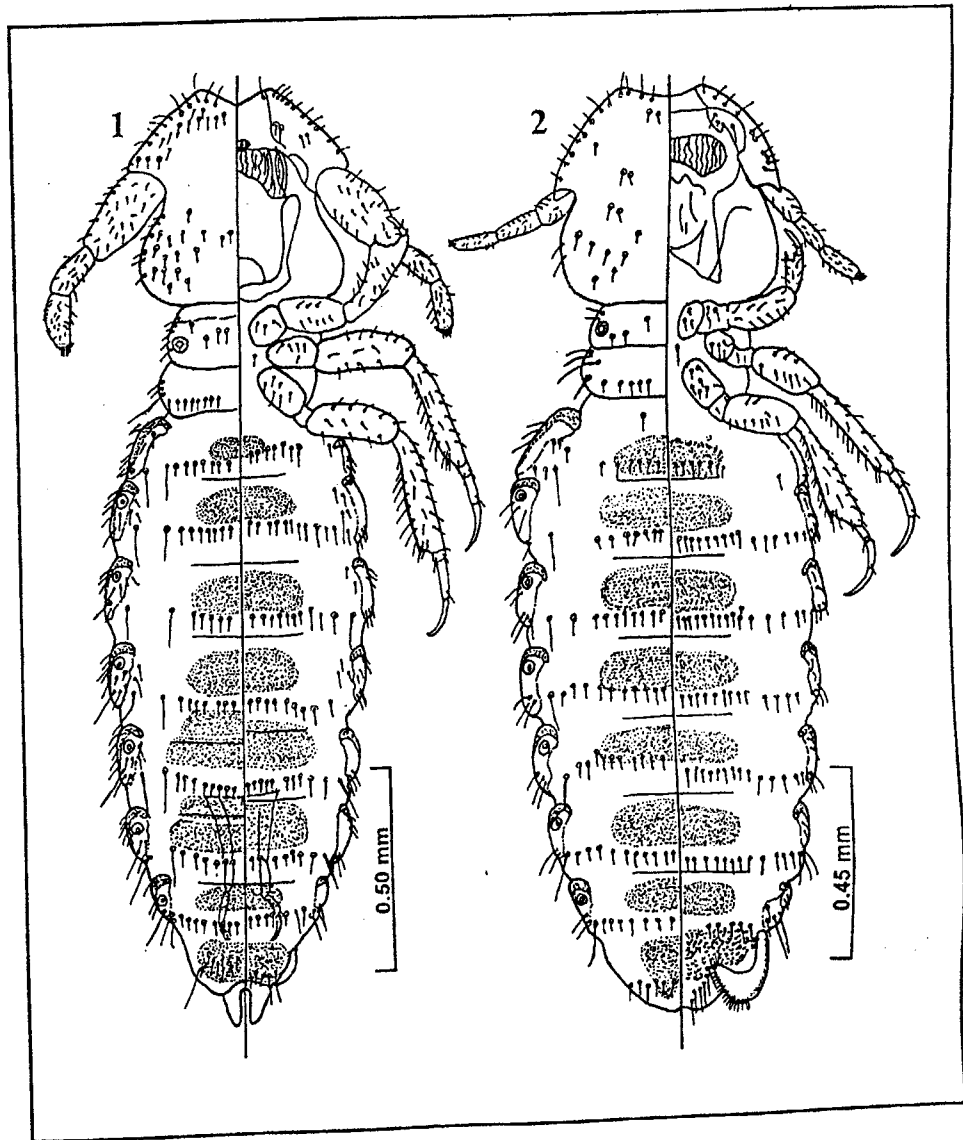
Damalinia cordillerai n. sp (Figs. 1-11)

Description and measurements were

based on nine males and eleven females.

Male (Figs. 1, 3, 5, 6, 9 and 11): External morphology and chaetotaxy as shown in figure 1. Total body length 2.27 - 2.32 mm.

Head: Length 0.48 - 0.53 mm; anterior margin deeply concave; preantennal portion slopes gradually, of similar length to post-antennal portion which is rounded laterally. First antennal segment greatly enlarged than the second and third segments and much thicker than the corresponding segment in



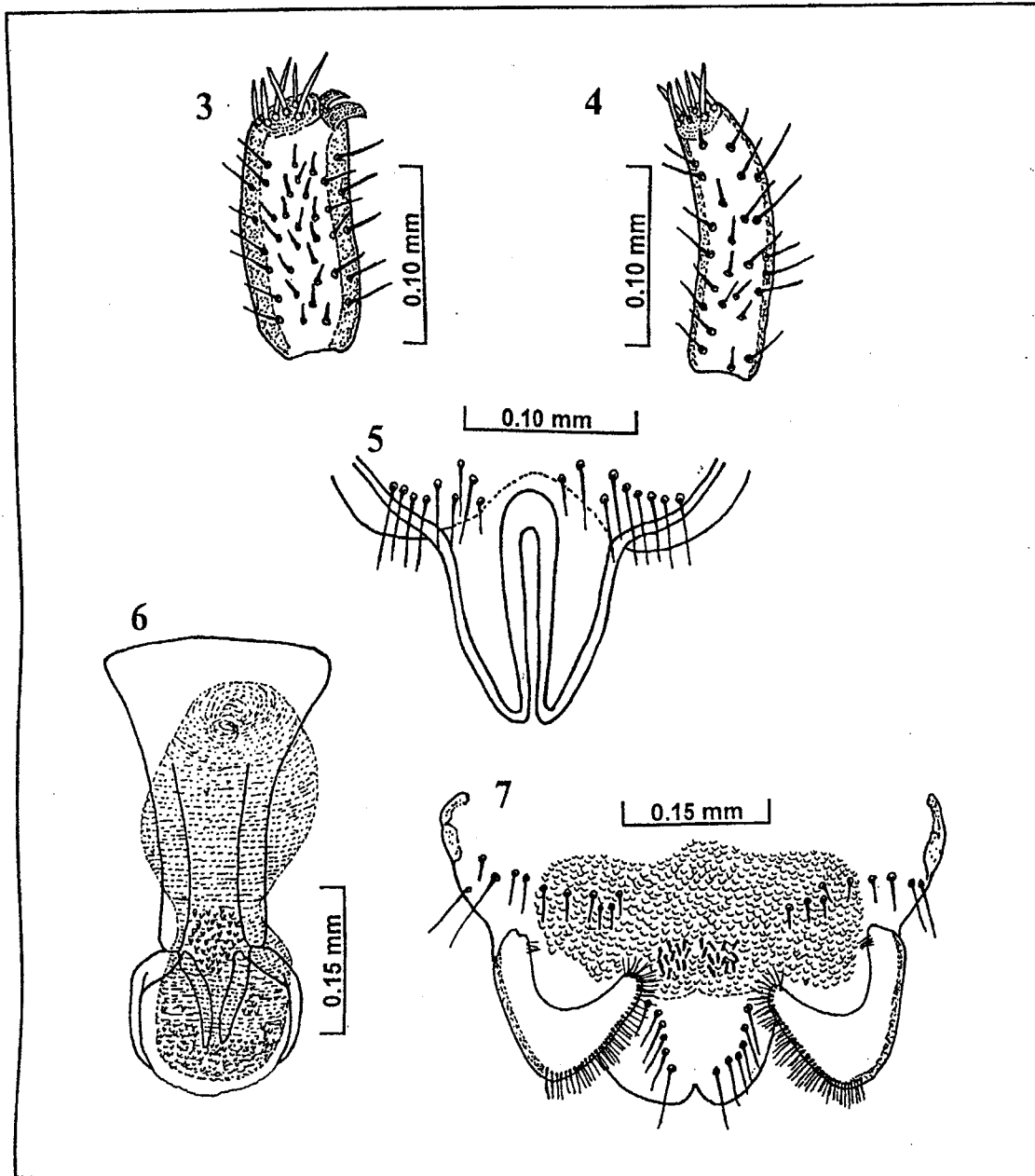
Figs. 1 - 2. *Damalinia cordillerai* n. sp. 1. Male (holotype), dorsal-ventral view. 2. Female (allotype), dorsal-ventral view.

the female, third segment bears two chitinous hook-like tubercles on the posterior side near the distal end and a cluster of about six spines on its distal tip (Fig. 3).

Thorax: Length 0.27 - 0.30 mm; bears a pair of spiracles. First pair of legs much

shorter than second and third pairs. Third pair of legs in normal position extends to the anterior border of the fourth abdominal segment.

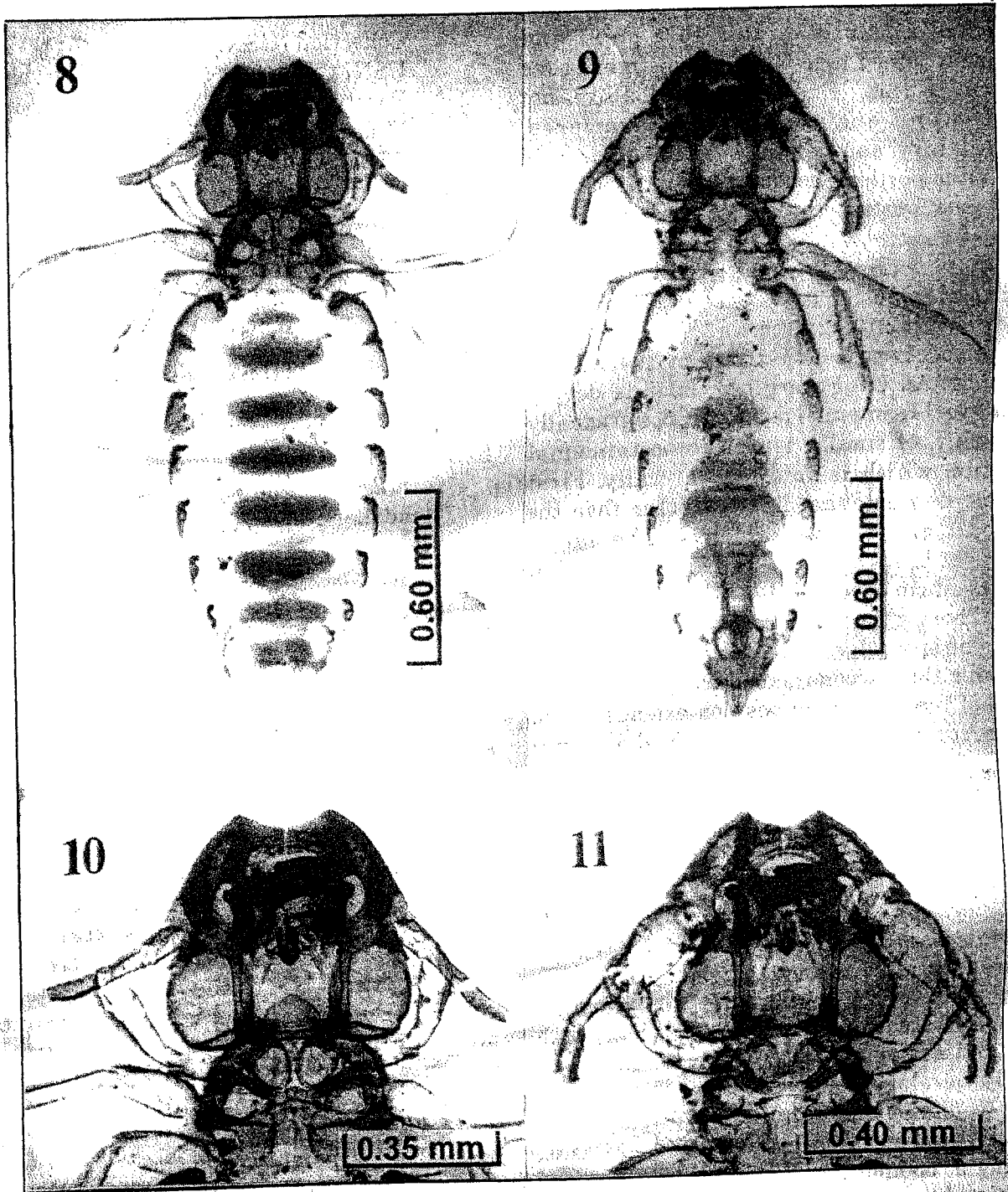
Abdomen: Length 1.42 - 1.63 mm and widest (0.65 - 0.67 mm) at the second and third



Figs. 3 - 7. *Damalinia cordillerai* n. sp. 3. Third segment of male antenna, note two hook-like tubercles near distal end. 4. Third segment of female antenna, 5. Posterior end of male, ventral view, showing chaetotaxy and the two protruberances. 6. Genitalia of male. 7. Posterior end of female, ventral view, showing chaetotaxy and genitalia.

segments. External morphology and chaetotaxy of the eighth or terminal abdominal segment as shown in Fig. 5. It ends in two protruberances whose medial sides are parallel to each other. Tergites and sternites bear one row of short setae each. Median

transverse plates very weak on tergite and sternite I, fairly developed on sternite and tergite II, III and IV, prominent and divided transversely on tergite V and VI, prominent and undivided on sternite V and VI, fairly developed on tergite and sternite VII, well



Figs. 8 - 11. *Damalinea cordillerae* n. sp. (photomicrographs). 8. Female, ventral view. 9. Male, ventral view. 10. Female, head and thorax regions, ventral view. 11. Male, head and thorax regions, ventral view.

developed on tergite and sternite VIII. Paratergal plates are fairly developed.

Genitalia is shown in Fig. 6. Basal apodeme broader proximally than distally and slightly constricted at the middle; extends forward to the posterior border of the fifth abdominal segment. Parameres are well developed, extend outward laterally, then directed medially ending to a point and probably joined together by a fine membrane forming a ring. Endomeres are rod-like, not united and enclosed by the parameres. Copulatory sac consists of anterior and posterior portions constricted at the middle, posterior portion covered with small hook-like structures.

Female (Figs. 2, 4, 7, 8 and 10): External morphology and chaetotaxy as in Fig. 2. Total body length 2.10 - 2.21 mm.

Head: Length 0.47 - 0.50 mm, as long as it is wide. Anterior margin of head is deeply concave. Preantennal portion slopes gradually laterally, of similar length to postantennal portion which is rounded laterally. First segment of antenna slightly thicker than the second and third segments. The latter segment bears a cluster of about six spines at its distal tip (Fig. 4).

Thorax: Length 0.28 - 0.32 mm bears a pair of spiracles. First pair of legs much shorter than second and third pairs. Third pair of legs in normal position extends to the anterior border of the fourth abdominal segment.

Abdomen: Length 1.33 - 1.44 mm and widest at the second and third segments (0.70 - 0.80 mm), posterior end bilobed. Segments II - VII, each has a pair of spiracles; tergites and sternites with a row of short setae each except the terminal segment. Median transverse plate present on each tergite and sternite. Median sternite marked by minute scale-like structures and armed medially with fine rod-like spines (Fig. 7). Paratergal plates fairly developed.

Genitalia is shown in Fig. 7. Gonophyses broad and bend forward at their distal ends, giving a "boomerang-shaped" appearance, the median borders of which bear setae.

Type host : *Cervus (Rusa) philippinus*

Smith, 1827 (Luzon sambar deer) (Ruminantia: Cervidae).

Type locality: Cordillera mountains, near Colayo, Kalinga, Cordillera Administrative Region, Philippines.

Type specimens: Holotype (male) and allotype (female), deposited in the United States National Parasite Collection (USNPC No. 090654.00 and USNPC No. 090655.00, respectively). Paratypes deposited in the Parasite Collection and Reference Center (No. 76-8a), College of Veterinary Medicine, University of the Philippines Los Baños (UPLB).

Etymology: Specific name is derived after the locality i.e. Cordillera mountains.

Haematopinus nigricantis Weisser and Kim, 1972 (Figs. 12 - 14)

Description and measurements were based on five female specimens.

Female: Total body length 3.72 - 3.77 mm.

Head: Length 0.90 - 0.93 mm, longer than it is wide; clypeus weakly sclerotized, ocular sinuses and occipital region strongly sclerotized. Preantennal portion shorter than post-antennal portion. Antennae five-segmented; last two distal segments each with a pit or sensorium. Head-index 18.1 - 21.1.

Thorax: Length 0.37 - 0.43 mm shorter than it is wide, with distinct sternal plate. Thorax-index 14.9 - 5.9. Legs typically haematopinoid; coxa with sclerotized margin; trochanter with ring-shaped sclerotization; femur with its condyle and lateral margins strongly chitinized, tibia with weak marginal sclerotization but strongly chitinized towards thumb; tarsus sclerotized on entire outer margin and bears on its inner margin a membranous pad, claw entirely strongly chitinous.

Abdomen: Length 2.00 - 2.65 mm, widest (1.50 - 1.55 mm) at the fourth segment, elliptical in shape, one row of setae on each segment dorsally and ventrally except two rows of setae on first dorsal segment.

Genitalia: Gonophyses as in Fig. 14, inner margins of which are slightly divergent and apically pointed; two well-developed apical lobes present, parallel to each other or their distal ends directed medially; median genital plate almost round; dorsal genital plate strongly sclerotized, constricted in its median part.

Chaetotaxy conforms to that described by Weisser and Kim (1972) for the species.

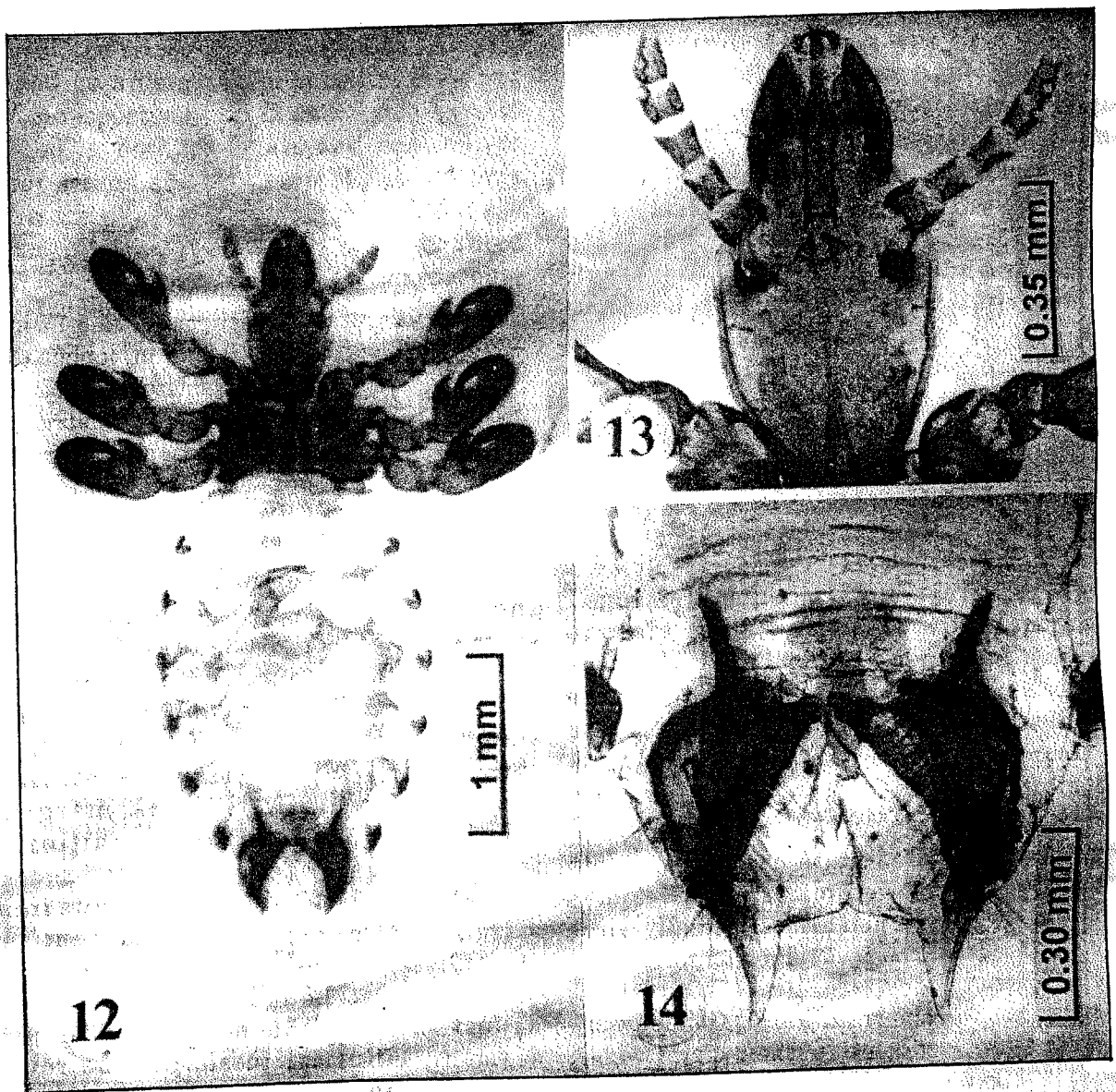
Voucher specimens: Deposited in the Parasite Collection and Reference Center (No. 76-8c), College of Veterinary Medicine, UPLB.

Lipoptena rusaecola Bequaert, 1942
(Figs. 15 - 18)

Female (single specimen, deadulted): Body length 3.60 mm.

Head: Length 0.75 mm, shorter than wide (1.37 mm); eyes moderately wide; mediovertex slightly longer than wide and about twice as long as postvertex; clypeus fused with frons; palpi nearly as long as fronto-clypeus.

Mesothorax: Median notal suture prominent; longitudinal intrascutal grooves



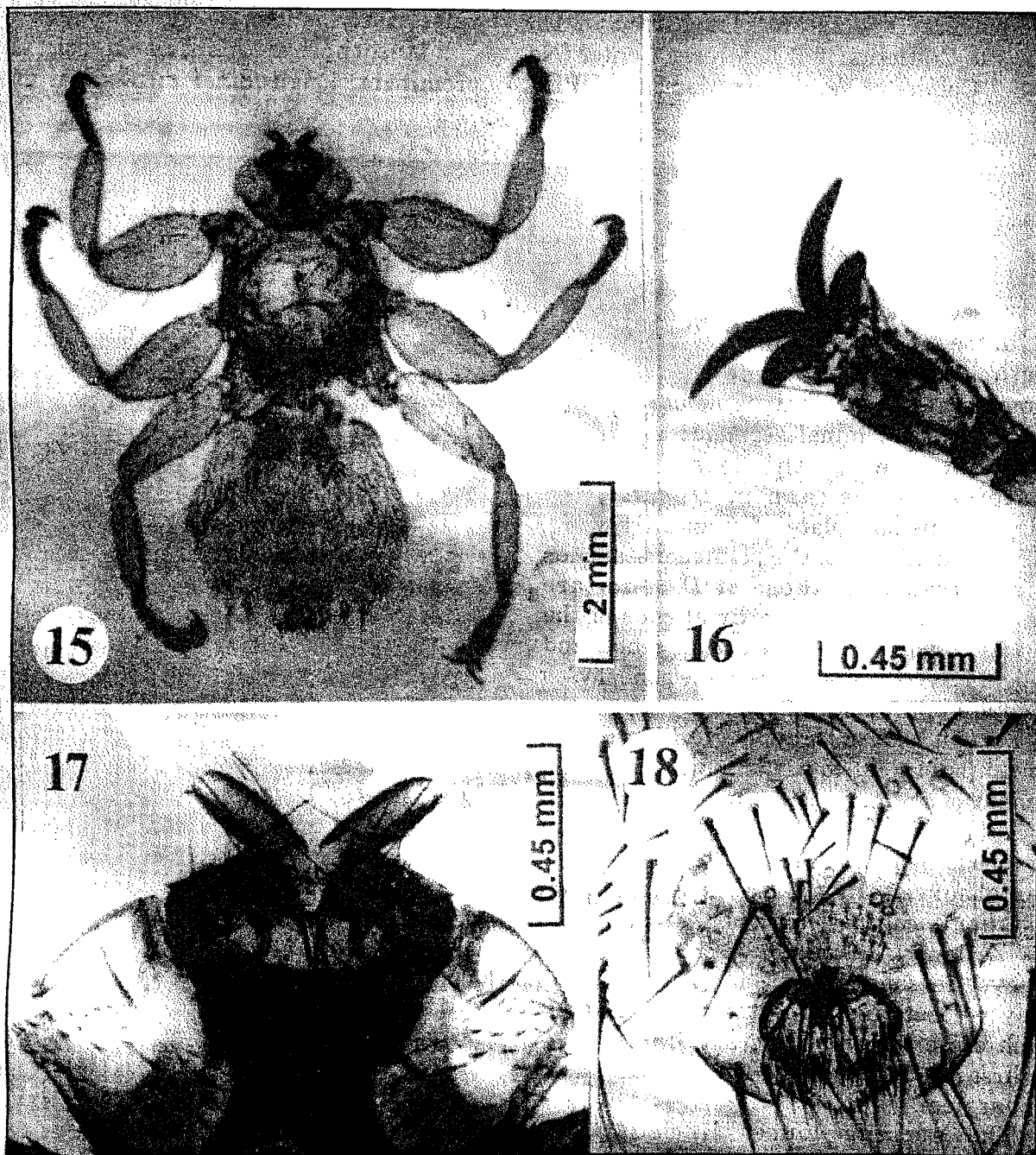
Figs. 12 - 14. *Haematopinus nigricantis* Weisser and Kim, 1972 (photomicrographs). 12. Female, ventral view. 13. Female head region, ventral view. 14. Female posterior end showing genitalia, ventral view.

well marked; mesonotal and posthumeral sutures weak; mesothoracic spiracles large. Legs strong and claws heavy.

Abdomen: Length 2.87 mm, width 2.52 mm. Basal dorsal pleurite large; pleurites II large and elongate, II to V fairly well set off and sclerotized, III and IV separate. Basal ventral sclerite has narrow lateral lobes.

Spiracles small but distinct. Supra-anal plate poorly defined with setae longer than those on infra-anal plate. Pregenital plate large, elongate and strongly invaginated; postgenital plate membranous.

Chaetotaxy similar to that given by Ferris (1930), Bequaert (1942) and Maa (1962) for the species.



Figs. 15 - 18. *Lipoptena rusaecola* Bequaert, 1942 (photomicrographs). 15. Female, dorsal view. 16. Claws of female leg III. 17. Female head region, dorsal view. 18. Female posterior region, dorsal view.

Voucher specimen: Deposited in the Parasite Collection and Reference Center (No. 76-8b), College of Veterinary Medicine, UPLB.

DISCUSSION

Damalinea cordillerai n. sp. stands closest to *Damalinea maai* described by Emerson and Price (1973) from the Formosan sika deer, *Cervus nippon taiouanus*.

The new species however differs from *D. maai* in the following characters: the presence in the male of two hook-like tubercles at the posterior border near the distal tip of the third antennal segment which are absent in *D. maai*; the triangularly shaped and broadly rounded preantennal region of the male and female, respectively, in *D. maai* it is broadly rounded in both the male and female; the shorter second and third pair of legs reaching only in the male to the anterior border of the fourth and in the female to the third abdominal segments, that of *D. maai* reaching to the sixth abdominal segment in both the male and female; the less developed paratergal plates than in *D. maai*; the undivided median plate of tergite III which is divided in *D. maai*; the pointed distal ends of the parameres, those of *D. maai* are enlarged; the unjoined proximal ends of the endomeres which are fused in *D. maai*; and the bent forward distal ends of the gonophyses which are not found in *D. maai*.

Sexual dimorphism in *D. cordillerai* as in *D. maai* is evident in the antennae. The first segment of the antenna in the male is much larger than the other segments, which is not so in the female. Two hook-like tubercles were also observed in the male antenna of *Damalinea hemitragi* specimens from tahr in New Zealand (Andrews, 1971). *D. cordillerai* however is separable from this species in many respects including the male genitalia which are entirely of different form. This is the first report of a biting louse in the Luzon sambar deer.

The sucking louse, *Haematopinus nigricantis* was first described and illustrated by Weisser and Kim (1972) from specimens of a Philippine deer, *Cervus nigricans* Brooke,

1877 from Bontoc, Mountain Province, Philippines. Durden and Musser (1994a and b) however listed the host for this louse species as *Cervus marianus* Desmarest in their taxonomic checklist and host-parasite list of Anoplura of the world. The present materials conform essentially to the description of Weisser and Kim (1972) for the species. Some of the present materials, however, are larger in size than those mentioned by the authors. This is the only report since the species was discovered in 1972 and is recorded for the first time in the Luzon sambar deer constituting a new host record for the species.

Lipoptena rusaecola was first described and illustrated by Bequaert (1942) based on specimens from *Cervus (Rusa) unicolor philippinus* from Mindanao (Mt. Apo) and Luzon (Mt. Makiling). Maa (1962) subsequently recorded it from *Cervus (Rusa) nigellus* in Mindanao (Mt. Katanglad, Bukidnon). The present material, which consisted only of a single deaLATED female specimen, agrees essentially with the description and illustration of Bequaert (1942) and Maa (1962), but the measurement is greater than those given by the former author. Ferris (1930) reported and illustrated a *Lipoptena* sp. without specific designation based on a single volant female probably from a deer of the genus *Rusa* from Mt. Makiling, Laguna. His material (4.0 mm in length) which appears to be co-specific with *Lipoptena rusaecola*, is as large as the present material of the species. *Lipoptena rusaecola* so far is restricted only to the Philippines, specifically distributed only in Luzon and Mindanao.

The parasites so far reported from the Luzon sambar deer are few and these are summarized in Table 1. All, except for one helminth species (trematode), are arthropod ectoparasites.

The Luzon sambar deer, locally known as "usa" in tagalog and "ugsa" in Ilocano, is one of eight deer species occurring in the Philippines (Rabor, 1986). It is found only in Luzon and the other species are found in other large islands of the country. It is endemic and becoming rare. Chances to obtain parasitic

Table 1. Parasites reported from the Luzon sambar deer, *Cervus (Rusa) philippinus*.

Species of parasite	Author
Trematoda (flukes): <i>Ogmocotyle indica</i>	Eduardo (1993)
Phthiraptera (lice) <i>Damalinia cordillerai</i>	present work
<i>Haematopinus nigricantis</i>	present work
Acarina (ticks) <i>Amblyomma</i> sp.	Hoogstraal & Parrish (1968)
<i>Boophilus microplus</i>	Hoogstraal & Parrish (1968)
<i>Haemaphysalis (Garnhamphysalis) rusae</i>	Hoogstraal & Parrish (1968)
<i>H. (Kaiseriana) luzonensis</i>	Hoogstraal & Parrish (1968)
<i>H. (Kaiseriana) psalistos</i>	Hoogstraal, Kohls & Parrish (1967)
<i>H. (Kaiseriana) susphilippensis</i>	Hoogstraal, Kohls & Parrish (1968)
Diptera Pupipara (pupiparous flies) <i>Lipoptena rusaecola</i>	Ferris (1930, as <i>Lipoptena</i> sp.); Bequaert (1942); present work

materials may become lesser and lesser. Efforts therefore must be made to collect and study materials for every opportunity presented. Conservation efforts for this species may require a captive breeding program as is now being done for the endangered Visayan spotted deer, *Cervus (Rusa) alfredi* (Philippines, DENR, 1997). Any information on the health aspects, including parasitic infections such as this report, will be useful in attaining success of such program.

ACKNOWLEDGMENT

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REFERENCES

- Andrews JRH. 1971. Description of the hitherto unknown males of *Damalinia longicornis* (Nitzsch, 1818) and *Damalinia hemitrangi* (Cummings, 1916) - Trichodectidae: Mallophaga. *Journal of Natural History* 6: 153-157.
- Bequaert J. 1942. A monograph of the Melophaginae, or kedflies, of sheep, goats, deer and antelopes (Diptera: Hippoboscidae). *Entomologica Americana* 22: 1-64; 65-124; 125-172; 173-220.
- Durden LA and Musser GG. 1994a. The sucking lice (Insecta, Anoplura) of the world: a taxonomic checklist with records of mammalian hosts and geographical distributions. *Bulletin of the American Museum of Natural History*, No. 218: pp. 90.
- Durden LA and Musser GG. 1994b. The mammalian hosts of the sucking lice (Anoplura) of the world: a host-parasite list. *Bulletin of the Society for Vector Ecology* 19: 130-168.
- Eduardo SL. 1993. *Ogmocotyle indica* (Bhalerao, 1942) (Trematoda: Notocotylidae), a parasite of the Luzon sambar deer, *Cervus (Rusa) philippinus*. *Philippine Journal of Veterinary Medicine* 30: 23-26.
- Emerson KC and Price RD. 1973. A new species of *Damalinia* (Mallophaga: Trichodectidae) from the Formosan sika deer (*Cervus nippon taiouanus*). *Proceedings of the Biological Society of Washington* 86: 329-332.
- Ferris GF. 1930. Sixth report upon Diptera Pupipara from the Philippine Islands. *Philippine Journal of Science* 43: 537-553.

- Hoogstraal H, Kohls GM and Parrish DW. 1967. Studies on Southeast Asian *Haemaphysalis* ticks (Ixodoidea, Ixodidae). *H. (Kaiseriana) psalistos* sp.n., a parasite of deer and boars in Luzon, Philippines. *Journal of Parasitology* 53: 1096-1102.
- Hoogstraal H, Kohls GM and Parrish DW. 1968. Studies on Southeast Asian *Haemaphysalis* ticks (Ixodoidea, Ixodidae). *H. (Kaiseriana) susphilippensis* sp.n., a parasite of Luzon and Mindanao boars. *Journal of Parasitology* 54: 616-621.
- Hoogstraal H and Parrish DW. 1968. Studies on Southeast Asian *Haemaphysalis* ticks (Ixodoidea, Ixodidae). *H. (Kaiseriana) luzonensis* sp.n. from Philippine deer and boars. *Journal of Parasitology* 54: 402-410.
- Kohls GM. 1950. Ticks (Ixodoidea) of the Philippines. *National Institutes of Health Bulletin*, No. 192: 1-19.
- Maa TC. 1962. Notes on the Hippoboscidae (Diptera), 1. *Pacific Insects* 4: 583-614.
- Philippines, Department of Environment and Natural Resources. 1997. *Philippine Biodiversity: an Assessment and Action Plan*. Makati City: Bookmark, Inc..
- Rabor DS. 1986. *Guide to the Philippine Flora and Fauna: Birds, Mammals*, Volume XI. Quezon City: Natural Resources Management Center, Ministry of Natural Resources and University of the Philippines.
- Weisser C and Kim KC. 1972. A new species of *Haematopinus* (Haematopinidae: Anoplura) from a Philippine deer, *Cervus nigricans* (Cervidae: Artiodactyla). *Pacific Insects* 14: 15-22.