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A NEW SPECIES OF *IXODES* (*LEPIDIXODES*) FROM BATS IN MALAYA, NORTH BORNEO, AND THE CONGO (ACARINA-IXODIDAE)

BY

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The new species here described was discovered among numerous lots of ticks collected in Malaya by Lt. Colonel Robert Traub, USA, U. S. Army Medical Research Unit, Kuala Lumpur, and in North Borneo by Mr. Tsing-chao Maa of the Bernice P. Bishop Museum 1, Honolulu, and sent to the senior author for identification. Additional specimens were found in extensive collections from the Republic of the Congo which have been submitted to the junior author by Dr. V. Van Straelen of the Institute of National Parks of the Belgian Congo for a study supported by the U. S. Department of the Army. We are grateful to these individuals and agencies for placing these collections at our disposal.

*IXODES* (*LEPIDIXODES*) *PARADOXUS* n. sp.


1. Mr. Maa conducted field research in North Borneo under the Bishop Museum project "South Pacific insects of public health importance" with financial support from the National Institutes of Health, Bethesda, Md.

Description of female (Figs. 1-9): The heavily engorged holotype female is heart-shaped, widest in the anterior third; length exclusive of capitulum, 2.25, width, 1.95. The North Borneo female and four of the Congo specimens are not as heavily engorged and show little tendency to be heart shaped. One Congo specimen is 3.58 long by 2.66 wide and is widest at mid-length. Color of body, scutum, and capitulum dark brown. Surface of scutum, capitulum and legs covered with a

Ixodes (Lepidixodes) paradoxus n. sp.

Figs 1-9. Female. 1, dorsal view. 2, spiracular plate. 3, hypostome. 4, ventral view. 5, leg. I. 6, leg. IV. 7, coxae. 8, capitulum, ventral view. 9, capitulum and scutum.

Measurements are in millimeters.
reticulate pattern suggestive of scales. The body of all specimens covered with numerous short white hairs.

**Capitulum**: Length from tips of palpi to posterior margin of basis of holotype, 0.31; width of basis 0.28; for paratype, 0.31 and 0.30, respectively. Dorsum of basis broadly hexagonal, and with prominent carinae extending from posterior margin of basis to anterior edge; carinae less prominent in North Borneo and Congo specimens. *Porose areas not discernible*, cornua absent. Outer margins of palpi straight and nearly parallel. Length of segments 2 and 3 about 0.14 and 0.08, respectively. In ventral view basis broadly rounded posteriorly, lateral margins divergent. Auriculae absent.

**Hypostome**: Present only on two Congo specimens. Dentition 3/3 in anterior third, 2/2 to base, lateral files largest. Length 0.25.

**Scutum**: Length and width, holotype, 0.61 by 0.48; largest Congo specimen 0.75 by 0.54. Shape as figured. Lateral carinae distinct, slightly divergent and extend to posterolateral margins. Punctations lacking. Several short white hairs present.

**Legs**: All coxae without spurs. Tarsi tapering gradually subterminally. Length of tarsus I, 0.33; metatarsus, 0.18. Length of tarsus IV, 0.37; metatarsus, 0.16.

**Spiracular plate**: Shape as figured; size about 0.10 by 0.09.

**Genital aperture**: Situated between coxae II.

**Anal grooves**: Not visible.

**Description of nymph**: General appearance similar to female, however, shape and proportionate length of palpi more as in larva. Length of partly engorged specimen, 1.06; width, 0.76. Length of scutum, 0.26; width, 0.17.

**Description of larva**: (Figs. 10-14) (Paratype, partly engorged): Body oval, widest near midlength; 0.740 long by 0.570 wide, exclusive of capitulum. Sensilla sagittiformia absent. Two pairs central dorsals, Cd1 0.014; sixpa irs marginal dorsals, Md1 0.014, Md6 0.021; two to three pairs supplementaries; three pairs sternals, St1 0.021; two pairs preanals, Pa1 0.023; four pairs premarginals; three pairs marginal ventrals, Mv3 0.016 and one pair anal setae. Anal groove not visible. Festoons absent.

**Scutum**: Shape as figured; length, 0.165; width, 0.120, widest in anterior third. Surface scale-like in appearance. Cervical grooves long and straight, reaching beyond midlength. Three pairs setae, Sc3 0.009.

**Legs**: Surface of all appendages has fine reticulate pattern, scalelike in appearance. Coxae I-III without spurs. Coxa I and II with three setae and coxae III two: Tarsus I tapering sharply distally; length, 0.120; width, 0.058; dorsally with 2 pairs prehalleral and 3 pairs posthalleral setae; ventrally and laterally

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1. Terminology for larval morphology and setae follows that of Clifford and Anastos (1960).
with 3 groups of 4 setae each. Capsule and anterior pit of Haller's organ occupy common depression.

Capitulum: Shape as figured; length, 0.025; width, 0.095. Dorsally, posterior margin of basis slightly concave; cornua absent. Ventrally, basis broadly rounded;
three denticles in file three. One pair posthypostomal setae; distance between setae, 0.041.

The apparent absence of porose areas in the females of the new species described above distinguishes it at once from all known species in the family Ixodidae. In addition it is readily distinguished from the few known bat-infesting species of *Ixodes* (ARTHUR, 1956; KOHLS, 1957) by the following combination of characters — its extremely small size, characteristic shape of the basis capituli and scutum, lack of spurs on all coxae, and absence of auriculae.

Because of the extremely small size, the scale-like appearance of the integument and the host upon which this species was collected we are placing *Ixodes paradoxus* n. sp. in the subgenus *Lepidixodes* Schulze, 1935. This subgenus is represented by a single species, *I. (Lepidixodes) kopsteini*, which was described on the basis of a single male specimen. Because of the confusion that has existed regarding *I. kopsteini* a brief historical review is desirable.

Oudemans (1925) briefly described a single male off a bat from Amboina, Moluccas, as *Eschatocephalus ropsteini*. In 1926 he corrected the name to *E. kopsteini*, and in 1927 he redescribed this male and provided excellent figures. Schulze (1935) recognized that Oudemans' species had no relationship to *Eschatocephalus* and created a new subgenus *Lepidixodes* for it in the genus *Ixodes*.

Anastos (1950) in discussing this species states: "All these characters are primitive and unlike those of the ticks; this form probably represents a special type of mite, and I see no reason for regarding it as a tick, let alone an *Ixodes*." Apparently he was unaware of the 1927 paper by Oudemans where the figures, including that of tarsus I showing Haller's organ, clearly show that this specimen is a tick. Oudemans' figure of tarsus I showing Haller's organ was reproduced by Schulze (1935). Further, Anastos ascribes the correction of the name *ropsteini* to *kopsteini* to Schulze (1935) though this was actually done by Oudemans (1926) as noted above.

Available evidence suggests that *I. paradoxus* n. sp. eventually may prove to be a synonym of *I. kopsteini*. Whether or not this is true cannot be determined until the sexes of one or the other of the two species can be definitely associated.

The occurrence of the new species in such widely separated parts of the world as Malaya and the Congo is of considerable interest though at least two other bat-infesting species of *Ixodes*, i.e. *vespertilionis* Koch and *simplex* Neumann are also very widely distributed.

**Summary.**

*Ixodes* (*Lepidixodes*) *paradoxus* n. sp. is described from females and immature specimens off bats in Malaya, North Borneo, and the Republic of the Congo. The females are exceptional in that porose areas, present in females of all other species of *Ixodidae*, are apparently lacking. It is suggested that *I. paradoxus* may eventually prove to be a synonym of *I. (L.) kopsteini* (Oudemans), 1925 known from a
single male off bat, Amboina, but determination of this must await the definite association of the sexes of one or the other of the two species.

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