MITES OF THE FAMILY SPINTURNICIDAE FROM THE PHILIPPINES (Acarina)¹

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Abstract: Four genera in Spinturnicidae are recognized from bats collected in the Philippines. Among the 7 species treated in this paper, 1 belongs to Spinturnix von Heyden, 3 to Meristaspis Kolenati, 2 to Ancystropus Kolenati, and 1 to Oncoscelus, n. gen. The species described and illustrated are Spinturnix verutus, n. sp., Meristapis calcaratus (Hirst), Meristaspis mindanaoensis, n. sp., Meristaspis lateralis (Kolenati), Ancystropus eonycteris, n. sp., Ancystropus palawanensis, n. sp., and Oncoscelus kanheri (Hiregaudar and Bal) n. comb.

Bat mites, although known for many years, have not been reported from the Philippines until now. Four genera are represented: *Spinturnix* von Heyden, *Ancystropus* Kolenati, *Meristaspis* Kolenati, and *Oncoscelus* new genus. Seven species are described, 4 of which are new. This study is based mainly upon material collected by Bishop Museum from Palawan and Mindanao, and upon a few specimens collected by the Chicago Natural History Museum—Philippine Zoological Expedition of 1946–47. The types and paratypes of the new species described, unless otherwise stated, are to be deposited in the collection of Bishop Museum, Honolulu. Paratypes will also be distributed among the collections of the United States National Museum, Washington, D. C., the Institute of Acarology, Wooster, Ohio, and the Chicago Natural History Museum.

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Family SPINTURNICIDAE Oudemans

Spinturnicidae Oudemans, 1902, Tijdschr. Nederl. Dierk. Vereen, ser. 2, 7: 69. (Type genus: Spinturnix von Heyden, 1826).

These mites, parasitic exclusively on bats, are characterized as follows: Dorsal shield entire or divided; area surrounding shield may be lightly sclerotized as in some species of

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Meristaspis. Peritreme dorsal, lying over coxa III. Tritosternum large, reduced, or lacking, being atypical for Mesostigmata, consisting of only a sclerotized platelet. Three pairs of sternal setae in \mathcal{P} , but number variable in \mathcal{J} . Epigynial shield present, possessing a single pair of setae. Anal shield small, terminal, with a pair of adanal setae and with postanal seta usually lacking. Legs stout, usually with large caruncles and claws, sometimes caruncles I reduced in \mathcal{P} . Opisthosoma expansile.

Key to Phillippine genera of Spinturnicidae

- 3. Two pairs of setae surrounding anterior margin of dorsal shield; epigynial shield located far below coxa IV; tarsus I and coxa I each with a large lateral hook... Oncoscelus Three pairs of setae surrounding anterior margin of dorsal shield; epigynial shield located at level of coxa IV; without lateral hooks on tarsus I and coxa I... Ancystropus

Genus Spinturnix von Heyden

Spinturnix von Heyden, 1826, Isis von Oken 1826 6: 612.—Rudnick, 1960, Univ. Calif.
Publ. Ent. 17 (2): 200. (Type of genus: *Pteroptus myoti* Kolenati, 1856; Design.
by Opinion 128, International Commission on Zoological Nomenclature 1936).

Members of this genus have long, dorsal peritreme; anterior end bending ventrad and reaching ventral surface of body between coxae II & III. Four or more pairs of setae surrounding anterior margin of dorsal shield; few to several pairs of marginal setae posterior to stigmata. Tritosternum small. Sternal plate usually reticulate. Postanal seta present. Legs more or less equal in size, claws of leg I not enlarged, and caruncles of leg I well developed. Striae of body either possess lobes, or have a strongly shingled appearance, or form an interweaving design.

This genus is represented in the Philippines by a single species from Mindanao and Negros Oriental.

Spinturnix verutus Delfinado & Baker, n. sp. Figs. 1-7.

Characterized by having a broad lanceolate seta on dorsal tip of tarsi II-IV, and in having 5 pairs of setae surrounding anterior margin of dorsal shield.

Female: Idiosoma subspherical with very small opisthosoma, 720 μ long by 600 μ

wide; dorsal shield elongate oval, with 8 pairs of pores; 5 pairs of setae surrounding margin of shield; a row of setae posterior to stigmata. Striations on integument characteristic, as figured. Peritreme dorsal, long, bending ventrad between coxae II & III. All dorsal setae long and slender. Chelicerae long, slender, with small toothed chelae; hyposto-



Figs. 1–7. Spinturnix verutus, n. sp., \mathcal{P} . 1, venter; 2, dorsum; 3, gnathosoma; 4, leg I; 5, leg II; 6, leg III; 7, leg IV.

mal processes short, with harpoon-shaped tips. Tectum short, rounded. Tritosternum small. Sternal shield subspherical with short narrow neck, coarsely reticulate, with 3 pairs of very short setae, and 2 pairs of large pores. Short epigynial and metasternal setae; 5 pairs of longer setae on striated integument between epigynial and anal shields; several pairs of stout marginal setae on opisthosoma. Anal shield subterminal with large opening; paired adanal setae subequal in length to postanal seta. Legs stout, subequal in size; dorsal and lateral setae mostly long and barbed; tarsi II-IV each with a broad lanceolate seta on dorsal tip; corresponding seta on tarsus I not as broad.

Male: Similar to \mathcal{P} in most characters. Idiosoma 640 μ long, 400 μ wide. Spermatophorentrager stout, curved toward apex. Tritosternum not visible, or lacking. Sternal shield large, flask-shaped, with long, narrow neck, surface coarsely reticulate with 3 pairs of very short setae outside shield, and 2 pairs of large pores. Five pairs of setae on striated integument between sternal and anal shields. Anal shield elongate, widest at insertion of adanal setae, opening terminal, postanal seta short. Legs as in \mathcal{P} , with broad lanceolate seta on tarsi II–IV, that on tarsi I not as broad.

Holotype \mathcal{Q} (BISHOP 3551) Bayawan Basay, Negros Oriental, on bats, 15. XII. 1959, L. W. Quate. Paratypes: $2\mathcal{J}\mathcal{J}$, Surigao, Lake Mainit, Mindanao, B 52107-M-60-Q, on bats, 28. XI. 1959, Quate, Yoshimoto & Phang. Additional $3\mathcal{J}\mathcal{J}$ on the same host and locality are badly damaged.

Genus Meristaspis Kolenati

Meristaspis Kolenati, 1857, Wien. Ent. Monatschr. 1 (2): 60.—Rudnick, 1960, Univ. Calif. Publ. Ent. 17 (2): 178. (Type of genus: *Pteroptus lateralis* Kolenati, 1856; by subsequent design., Vitzthum, 1932).

Members of this genus are distinctive in having 4 pairs of setae surrounding anterior margin of dorsal shield. Tarsus I possesses a pair of large, flattened, distal setae; claws not enlarged; caruncles well developed. Tritosternum large, usually wider than long. Epi-gynial shield at level of coxae III-IV. Anal shield lacks postanal seta. Leg I enlarged, and has strong, spinose setae.

Key to Philippine species of Meristaspis

- Hypostomal processes with large, recurved teeth at apex; long, stout setae on sternal shield.......mindanaoensis
 Hypostomal processes harpoon-shaped, pointed apically; short, slender setae on sternal shield......lateralis

Meristaspis calcaratus (Hirst) Figs. 8–15.

Ancystropus (Meristaspis) calcaratus Hirst, 1923, Proc. Zool. Soc. Lond. 1923: 983. Meristaspis calcaratus: Rudnick, 1960, Univ. Calif. Publ. Ent. 17 (2): 183. The φ is very similar to *Meristaspis lateralis* (Kolenati). It can be separated by the strong, hook-like projection on the posterior margin of coxa I; also, the dorsal opisthosomal integument lacks the transverse line found in *lateralis*, and the 1st 3 pairs of setae surrounding the anterior margin of the dorsal shield are short, the pair above the peritreme being the longest. The tectum is rounded, lacking projections. The tritosternum has point-



Figs. 8-15. Meristaspis calcaratus (Hirst), φ . 8, dorsum; 9, venter; 10, gnathosoma; 11, distal seta of tarsus I; 12, leg I; 13, leg II; 14, leg III; 15, leg IV.

ed posterolateral corners, lacking the transverse line. The legs are stout; leg I is largest, with strong spinose setae; the flattened distal setae on tarsus I are rounded apically.

HOSTS & DISTRIBUTION: This species has been reported from several species of *Pteropus* from Rook Island, Pulau Berhala (Strait of Malacca), Madagascar, New Hebrides, Guam, Saipan, Peleliu, and from a flying fox from Manus I. The Philippine records are: Five $\varphi \varphi$, B 2309, on *Pteropus vampyrus*; Puerto Princesa, Palawan, 12. V. 1962; $2\varphi \varphi$, B 61, on *Pteropus vampyrus*; $4\varphi \varphi$, B56, on *Pteropus tablensis*; φ B 54, on *Pteropus speciosus*, Camp Lookout, 450 m, Cuernos de Negros, 21. I. 1962. All collected by D. S. Rabor.

Meristaspis mindanaoensis Delfinado and Baker, n. sp. Figs. 16-23, 53-54.

The \mathcal{Q} distinctive in having long, stout, sternal, metasternal, and epigynial setae, and stout hypostomal processes with large, recurved teeth. Furthermore, it has a dorsal transverse line visible even in undistended specimens. Shape of tritosternum in \mathcal{J} distinctive.

Female: Idiosoma broadly ovate, with dorsal transverse line separating podosoma from opisthosoma; opisthosoma 733 μ long, 546 μ wide. Dorsal shield small, reaching posteriorly to level of coxa IV, with 11 pairs of pores; 4 pairs of long, barbed setae surrounding shield anterior to peritreme. Opisthosomal setae as follows: a small pair posterior to shield; a tiny pair of submarginal setae, and 2 pairs of long, barbed setae along posterior margin. Peritreme dorsal, lying over coxa III. Chelicerae slender, chelae toothed; hypostomal processes stout, with large, recurved teeth at apex; tectum large, broadly rounded with small recurved projection at center. Tritosternum heavily sclerotized, about $2.5 \times$ as wide as long, with transverse line at anterior 1/3. Sternal plate well sclerotized, narrow anteriorly, expanded at level of seta II, sides and posterior margin straight, with 3 pairs of long, stout setae, and 2 pairs of pores. Epigynial shield small, bearing stout setae. Metasternal setae stout, subequal in length to sternal and epigynial setae. Integument between epigynial and anal shields with 4 pairs of short setae. Anal plate small, terminal, with moderately long adanal setae; postanal seta lacking. Legs stout, with many long, barbed dorsal setae and short, strong ventral setae. Leg I greatly enlarged, with spinelike lateral and ventral setae on distal 4 segments; short spine-like setae on venter of trochanter; large, flattened distal setae on tarsus with drawn out tip. Legs II & III short, subequal; leg IV longest. Coxa III with small lobe on posterior margin.

Male: Idiosoma small; dorsal shield covering most of dorsum; 4 pairs of barbed setae surrounding anterior margin of shield. Hypostomal processes slender, pointed distally; spermatophorentrager stout, curved distally. Tectum as in \mathcal{P} . Tritosternum bean-shaped. Sternal shield large, flask-shaped, with long, narrow neck; 5 pairs of long setae, posterior 2 pairs longer and stouter. Integument between sternal and anal shields with 3 pairs of slender setae; anal shield large, with short adanal setae inserted at posterior corners; 2 pairs of setae laterad of anal shield, anterior pair very short, posterior pair longer, barbed. Legs with few long dorsal setae, ventral setae short; long, slender distal setae on tarsus I.

Holotype \mathcal{Q} (BISHOP 3552), Mt. Malindang, 1666 m, Masawan, Mutya, Mindanao, B 125, on *Prioniturus malindangensis*, 29. XII. 1961, D. S. Rabor & R. B. Gonzales. Paratypes : $5\mathcal{Q}\mathcal{Q}$, 13, same data as holotype; $3\mathcal{Q}\mathcal{Q}$, Mt. Malindang, 1433 m, Masawan, Mutya, B 131, on *Cynopterus brachyotis*, 28. XII. 1961, Rabor & Gonzales; $6\mathcal{Q}\mathcal{Q}$, Davao, Tagum, Mindanao, CNHM-61075-789, on *Cynopterus brachyotis*, 12. X. 1946, H. Hoogstraal; 13, Surigao,



Figs. 16-23. Meristaspis mindanaoensis, n. sp., \mathcal{Q} . 16, dorsum; 17, venter; 18, gnathosoma; 19, distal seta of tarsus I; 20, leg I; 21, leg II; 22, leg III; 23, leg IV.

Lake Mainit, Mindanao, B-52-109-M59-Q, on bat, 28. XI. 1959, Quate, Yoshimoto & Phang.

Meristaspis lateralis (Kolenati) Figs. 24-30, 51-52.

Pteroptus lateralis Kol., 1856, Die Parasiten der Chiropteren, p. 29. Meristaspis lateralis: Kol., 1857, Wien. Ent. Monatschr. 1 (2): 60. Meristaspis lateralis: Rudnick, 1960, Univ. Calif. Publ. Ent. 17 (2): 180.

Characterized as follows: φ opisthosoma broadly expanded, with a distinct transverse line separating podosoma from opisthosoma. Four pairs of long, stout barbed setae surrounding dorsal shield anterior to peritreme.



Figs. 24-30. *Meristaspis lateralis* (Kolenati), φ . 24, dorsum; 25, venter; 26, gnathosoma; 27, leg I; 28, leg II; 29, leg III; 30, leg IV,

Chelae with large teeth; hypostomal processes harpoon-shaped, pointed apically. Tectum rounded, or roughly conical with a large, recurved projection. Tritosternum rectangular, with a transverse line at anterior 1/3, with pointed posterolateral corners. Sternal shield broadly pyriform, with 3 pairs of short setae. Epigynial shield with a fan-like anterior expansion. The small anal shield lacks postanal seta. Legs stout, dorsal setae mostly long and barbed. Leg I strongest, with strong, spine-like setae on most segments, and with flattened distal setae on tarsus I. Coxae II & III each with a large lobe.

The \Im opisthosoma small. Sternal shield large, flask-shaped, bearing 3 pairs of marginal setae, and with 2 additional pairs of setae just off the shield. Tritosternum broad, with a shallow indentation at middle of posterior margin, and with a straight anterior margin. Spermatophorentrager stout, bent towards tips. Leg setae as in \Im , except distal setae of tarsus I are flattened and have pointed, drawn out tips.

Genus Oncoscelus Delfinado & Baker, n. gen.

Type of genus: Ancystropus kanheri Hiregaudar and Bal, 1956. By present designation.

This genus closely resembles *Ancystropus*, from which it can be differentiated by the greatly modified leg I with large lateral hooks on tarsus I and coxa I. There are 2 pairs of setae surrounding anterior margin of dorsal shield. Epigynial shield located far behind coxa IV. Tritosternum large; 3 pairs of sternal setae; anal shield without postanal seta; leg setae mostly very short; claws on tarsus I very large, and caruncles on tarsus I reduced.

The name is derived from the Greek (onkos-hook; scelo-leg), referring to the large hook on tarsus I.

HOSTS & DISTRIBUTION: This species was originally described from a φ collected on *Rousettus leschenaulti* from India. The Philippine record is as follows: Two $\varphi \varphi$, 6 km NE San Nicolas, Busuanga I., Palawan, B 3011, on *Rousettus amplexicaudatus*, 24. V. 1962, M. Thompson. Other new records are: φ , Vogelkop, Kebar Valley, 500 m, West New Guinea, BM-NG 806-808, on *Rousettus*, 20. I. 1962, L. & S. Quate, φ , Praijawang Mata Wai Kenor, O-Sumba, B 102-107, on *Rousettus amplexicaudatus*, 13. VI. 1949, Dr. Buhler & Dr. Sutter; $5\varphi \varphi$, on bats, Luangban Cave, Kuala Lumpur, Malaya (no date or col-

lector).

Oncoscelus kanheri (Hiregaudar and Bal), n. comb. Figs. 31-36.



Figs. 31-36. Oncoscelus kanheri (Hiregaudar and Bal), \bigcirc . 31, dorsum; 32, venter; 33, leg I; 34, leg II; 35, leg III; 36, leg IV,

Ancytropus [sic] kanheri Hir. & Bal, 1956, Agra Univ. Jour. Res (Sci.) 5 (pt. 1): 95. Ancystropus kanheri: Rudnick, 1960, Univ. Calif. Publ. Ent. 17 (2): 177.

The \mathcal{P} of this species differs from other known members of the family in having characteristically modified leg: with small gnathosoma and elongate tritosternum both tightly wedged between legs I, and internal sclerotic thickening on venter of podosoma. Idiosoma with a narrow podosomal region, pointed anteriorly, and greatly expanded towards opisthosoma. Dorsal shield small, pointed anteriorly, and with characteristic sculpturing; there are 10 pairs of pores, only 2 pairs of setae along body margin anterior to peritremes. Tritosternum longer than wide; epigynial shield has an elongate, anterior expansion (not always visible), and is located far behind coxa IV; sternal shield small, with 3 pairs of short setae; anal shield terminal and lacks postanal seta. Tarsus I & coxa I each with a large lateral hook; there are smaller, ventral hooks or spurs on femur I & genu I, coxae II & III. All leg setae short to very short.

HOSTS & DISTRIBUTION: Originally described from a \mathcal{Q} collected on *Rousettus* leschenaulti from India. Philippine specimens were collected from *Rousettus amplexicauda*tus, Palawan. Other new records are for Malaya, New Guinea, the Solomons, and O-Sumba.

Genus Ancystropus Kolenati

Ancystropus Kolenati, 1856, Die Parasiten der Chiropteren, p. 25.—Rudnick, 1960, Univ. Calif. Publ. Ent. 17 (2): 171. (Type of genus: Ancystropus zeleborii Kolenati, 1856; monotypy).

Distinctive in that leg I enlarged, with strong ventral hooks; claws I large, and caruncles I are rudimentary. There are 3 pairs of setae surrounding anterior margin of dorsal shield; peritreme short; epigynial shield located at level of coxa IV; and anal shield lacks postanal seta. Legs have short to very short setae; distal setae on tarsus I slender. Tritosternum characteristic in that anterior corners project toward gnathosoma.

KEY TO PHILIPPINE SPECIES OF ANCYSTROPUS

Leg I lacking lateral hooks; femur I and genu I each with a single, large ventral projection eonycteris

Ancystropus palawanensis Delfinado and Baker, n. sp. Figs. 37-43.

The presence of sharp lateral hooks on femur, genu, tibia and tarsus of leg I, and 2 large recurved projections on venter of genu I and tibia I readily separate *Ancystropus palawanensis* from other known members of the genus.

Female: Idiosoma broadly ovate, with large expanded opisthosoma, 813μ long, 586μ wide. Dorsal shield small reaching posteriorly to below level of coxae IV, anterior margin not well delineated, with 10 pairs of pores, some with minute setae; integument finely striated; 2 pairs of long, and a pair of short setae along body margin anterior to peritreme; a pair of marginal opisthosomal setae, Peritreme dorsal, lying over coxa III. Chelicerae



Figs. 37-43. Ancystropus palawanensis, n. sp., \ominus . 37, dorsum; 38, venter; 39, dorsal view of leg I; 40, ventral view of leg I; 41, leg II; 42, leg III; 43, leg IV.

slender, with small, toothed chelae; hypostomal processes slender; tectum conical, almost indistinct. Tritosternum heavily sclerotized, with anterior corners strongly projecting towards posterior margin of gnathosoma. Sternal shield small, about $2 \times$ as wide as long; 3 pairs

of short, strong setae and 2 pairs of pores on shield; a pair of long metasternal setae subequal to sternal setae; small epigynial shield with short setae, circular anterior expansion; 4 pairs of ventral opisthosomal setae; anal shield small, terminal, with rounded posterior margin, short adanal setae, postanal seta lacking; short marginal and submarginal setae on opisthosoma. Leg I greatly enlarged, heavily sclerotized with sharp lateral hooks on femur, genu, tibia and tarsus; femur, genu and tibia each with 1 or 2 large, recurved ventral projections; large lobe on femur, small thumb-like seta on inner side of tarsus; claws enlarged, caruncles reduced. Legs II & III small, subequal; leg IV longer than II & III, but not enlarged. All dorsal and ventral leg setae short to very short.

Male: Unknown.

Holotype \mathcal{P} (BISHOP 3553), Busuanga I., 6 km NE San Nicolas, Palawan, B 2484, on *Cynopterus brachyotis*, 21. V. 1962, M. Thompson. Paratypes: $2\mathcal{P}\mathcal{P}$, same data as holotype; $4\mathcal{P}\mathcal{P}$, B 3011, 24. V. 1962, $3\mathcal{P}\mathcal{P}$, B 3182, 27. V. 1962, all on *Rousettus amplexicaudatus*, same locality as holotype; $2\mathcal{P}\mathcal{P}$, Puerto Princessa, Tarabanan, Concepcion, Palawan, B 1992, on *Cynopterus brachyotis*, 12. V. 1962; $2\mathcal{P}\mathcal{P}$, B 2003, 6. V. 1962, $1\mathcal{P}$, B 1064, $1\mathcal{P}$ B 1052, $3\mathcal{P}\mathcal{P}$ B 1047, 3. V. 1962, Brooke's Point, Macagua, Palawan, all on *C. brachyotis*, $1\mathcal{P}$ Minagas Point, Balabac I., Palawan, B 2673, on *Rousettus amplexicaudatus*, 25. V. 1962; all collected by M. Thompson.

Ancystropus eonycteris Delfinado and Baker, n. sp. Figs. 44–50.

Very similar to *Ancystropus palawanensis*, but lacks lateral hooks on distal 4 segments of leg I; femur I and genu I each with only 1 large ventral projection; and ventral setae on region above anal shield strong and stout.

Female: Idiosoma of non-distended φ ovate, narrowing to small opisthosoma, 546 μ long, 400 μ wide. Dorsal shield covering entire dorsum, with anterior margin not well delineated; 10 pairs of pores on shield; 3 pairs of short setae on integument surrounding dorsal shield, the pair above peritreme subequal in size to pair below stigmata; 2 pairs of long, stout setae along posterior margin. Peritreme short, dorsal, lying over coxa III. Chelicerae long, slender, with small toothed chelae; hypostomal processes long, slender, pointed apically; tectum rounded. Tritosternum about $2.5 \times$ as wide as long, with concave anterior margin and with corners projecting anteriorly. Epigynial shield with anterior bulbous expansion; epigynial setae subequal to metasternal setae; 3 pairs of stout setae on integument between epigynial and anal shields; another pair of stout setae laterad of anal Anal shield terminal, slightly longer than wide, with stout adanal setae inserted shield. at posterior corners; postanal seta absent. Leg I greatly enlarged, with large recurved projections on venter of femur and genu, larger on femur; small thumb-like seta on inner side of tarsus; claws greatly enlarged, caruncles reduced. Legs II-IV slender, subequal in length. Few long dorsal setae on trochanters, femora and genua; other leg setae short to very short.

Holotype \mathcal{Q} (CNHM), Central Cave, Cotabato, Mindanao, CNHM 56556-1674, on *Eonycteris robusta*, 27. XII, 1946, F. Werner,



Figs. 44-50. Ancystropus eonycteris, n. sp., \bigcirc . 44, dorsum; 45, venter; 46, dorsal view of leg I; 47, ventral view of leg I; 48, leg II; 49, leg III; 50, leg IV.



Figs. 51-54. Meristaspis spp. 51, M. lateralis (Kolenati), \mathcal{J} , venter; 52, same, leg I; 53, M. mindanaoensis, n. sp., \mathcal{J} , venter; 54, same, leg I.

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