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A New Species and Synonym of Neosphyrotheca (Collembola).

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Neosphyrotheca fasciata (Salmon, 1951)

Plates 1, 2 and 4

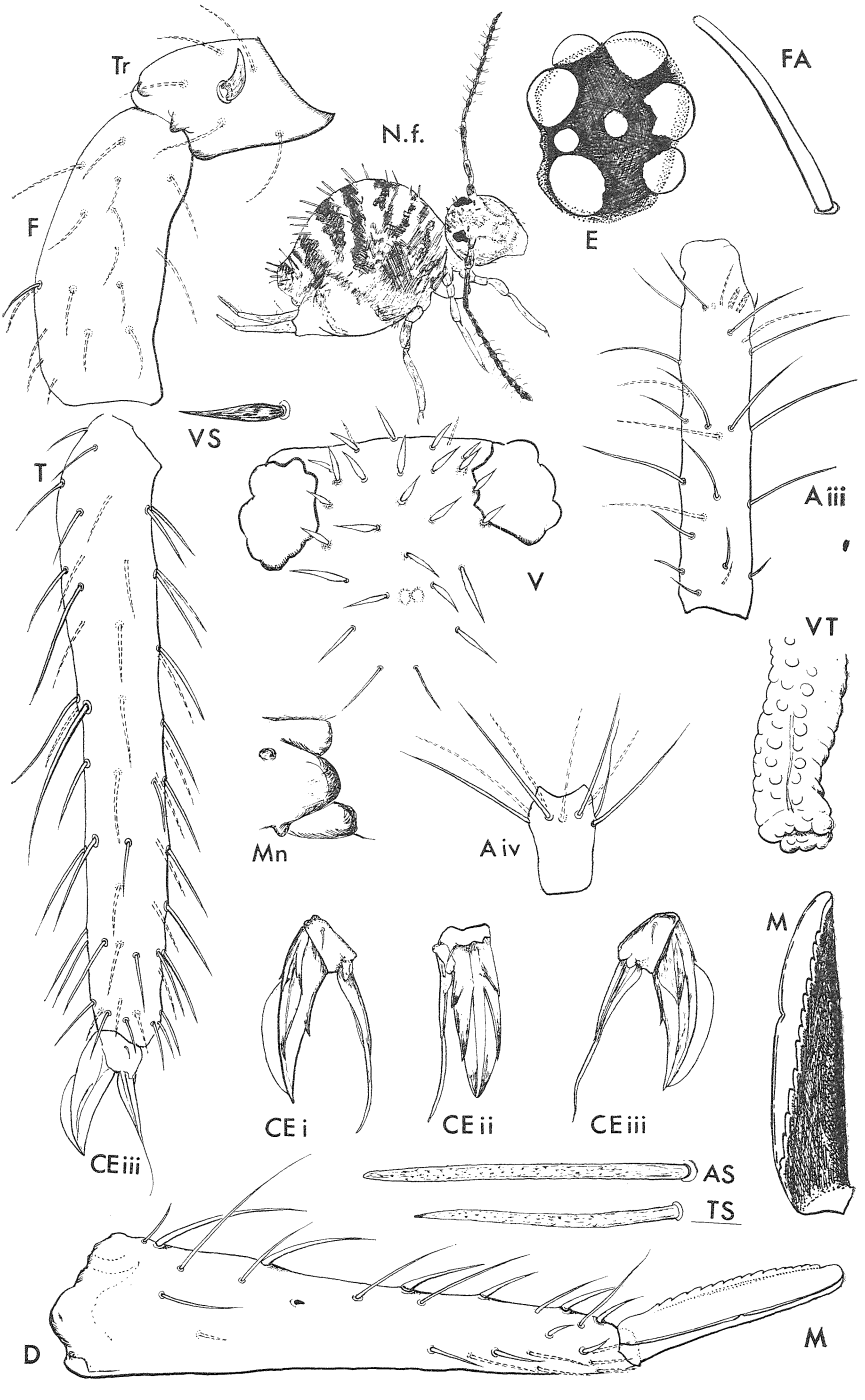
Parasphyrotheca fasciata Salmon, 1951
Sphyrotheca fasciata (Salmon, 1951)
Sphyrotheca hispida Yosii, 1959 s y n. n o v.
Neosphyrotheca (Sphyrotheca) fasciata (Salmon, 1964)

Length: Females 0.8—1.2 mm., males 0.55—0.8 mm.

Colour: Purple pigment distributed in irregular transverse bands of which the posterior three are the most distinct. The dark bands are separated by lines of dark-rimmed, clear, elliptical patches. Head with diffuse purple pigment, darker dorsally with pale lines, similar to those of the body, running down from the antennal bases. Antennae purple throughout, darkest apically. Legs and furcula diffusely pigmented with a trace of pigment in the claws and mucrones (plate 1 N.f.)

Cuticle: Vertex and dorsum similarly finely granulate. Anogenital segment more finely granulate, ventral surfaces and appendages relatively smooth.

Chaetotaxy: Vertex with about 27 variously modified, narrow-based, spear-head shaped, sharply pointed, straight or curved spines, covered with tapering, scale-like bracts (plates 1, 2, VS) which are sometimes scarcely visible, particularly on the more slender spines of the juveniles. Dorsal setae of antenna I spine-like, those of antenna II stronger and shorter than the ventral setae. Antenna III with about 24 long, fine setae, arranged in about 4 whorls (plate 1 A iii). The longest seta in the apical whorl is more than twice the length of that in the basal whorl. Antenna IV with whorls of up to 8 outstanding setae and one shorter,


Tr
F
N.f.
E
FA
VS
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Aiii
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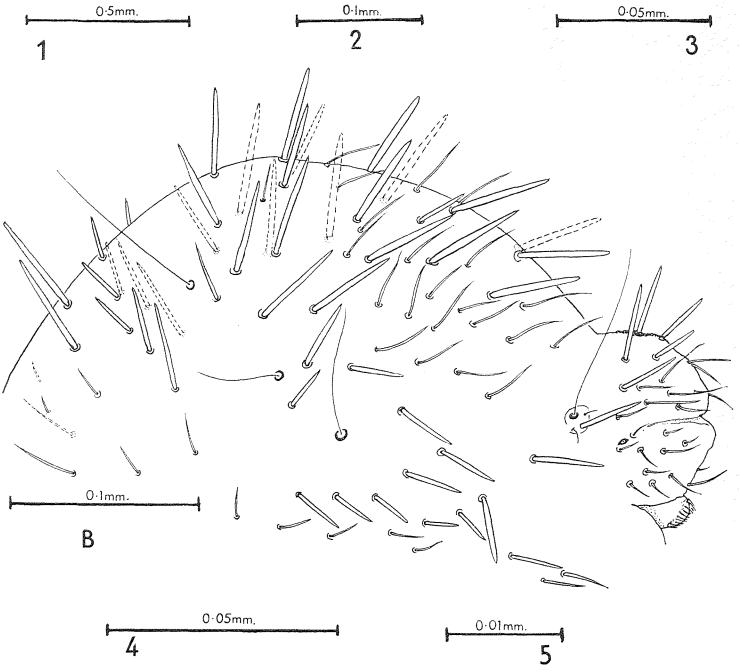


Plate 2. *Neosphyrotheca fasciata* (Salmon, 1951), body chaetotaxy. (B).

The scales (1—5) enable all illustrated characters on plates 2 and 3 to be measured (see the key to figures, p. 382).

sensory hair, the apical two thirds of which is lying parallel to the segment (plate 1 Aiv). Dorsum with about 50 stout, erect, apically rounded setae which are covered with numerous scale-like bracts. Shorter, slimmer, smoother setae, about 40 in number are distributed mainly towards the posterior part of the dorsum (plate 2 B). Great abdomen with 3 bothriotricha on each side, of which the median is the shortest and the dorsal the longest. Metathoracic trochanter with a well-developed hooked spine (plate 1 Tr) weaker on the other legs. Specialised setae of femora not well differentiated on metathoracic legs (plate 1 F). Sometimes 1—2 thickened, hooked setae are present on femora i-ii. Tenaculum with up to 4 apical setae. Dens with 18 posterior and 8 anterior setae. The setae of the inner and outer dorsal rows

Plate 1. *Neosphyrotheca fasciata* (Salmon, 1951). Key to figures on p. 382; scales on plate 2.

become more spinose distally. A minute thorn-like papilla is situated near the median-dorsal row of setae at a point a little short of half the length of the dens. This papilla is similar to that found on some *Pararrhopalites* species but undescribed for the *Sminthurini*. A pair of minute rods are sometimes visible in ventro-lateral pits on the anogenital segment. Anogenital segment of female with an anterior row of 2 pairs of stout, blunt setae, $M'M^2$ followed by a pair of similar, longer setae N. Setae a^0—a^3 progressively stouter, finely pointed. Seta G, longer than the fine H,H',T.

Mandibles asymmetric with 4—5 apical teeth. Maxilla with bulbous head, 3 distinct claws and well developed fringed lamellae. Eyes 8 on each side of the head of which 6 are larger with the corneas projecting beyond the extent of the eye-patch. The two smaller eyes are often entirely obscured by dense pigment and their presence is only revealed by clearing the specimen entirely (plate 1 E). In no case did any specimen so treated reveal less than 8 eyes on each side of the head. In this position, on the type material of *fasciata,* only 6 eyes can be seen but it is possible that the other 2 may be obscured by the pigment. Yosii describes this for *hispida* as being "intensely black", and his placing of the species in *Sphyrotheca* implies that he considered 8 eyes to be present. Antenna III sense organ with a pair of elongate lobes in narrow separate pits and a small accessory pin (plate 1 Aiii). Antenna IV with about 12 subsegments of which the apical one is constricted.

Claws of all feet usually with a tunica which may however be reduced or absent, particularly from the prothorax. A single tooth is often present on the inner edge of the claw, which, in outer view, exhibits two pairs of lateral teeth. These are formed by the narrow pseudonychia which are sometimes so poorly developed and so closely fused to the claw that their existence is doubtful. Empodium with apical needle, somewhat thickened in larger specimens, always over-reaching the claw (plate 1 CEi-iii). Ventral tube with sparse, low warts (plate 1 VT). Base of manubrium ventrally with a pair of conical papillae (plate 1 Mn). Mucro with median notch, invariably present, on rarely weakly toothed, usually smooth, outer edge. From 12—20 inner teeth are always present (plate 1 M).

D i s c u s s i o n. — If less material were at hand one might tend to interpret such differences as colour pattern, eye number, pre-

sence or absence of claw tooth and tunica, the number of mucronal teeth and small variations in the arrangement of setae as indicative of several, separate species or subspecies. Numerous specimens from the Noona Dan Expedition, Bishop Museum and Royal Society Expedition material were studied together with individuals from a single site, revisited regularly over 3 years by Dr. and Mrs. P. J. M. Greenslade. The presence of examples, showing various combinations of characters, in a single sample and of a range of intermediates, indicates that only one variable species is present.

In his original description of *fasciata,* based on Singapore specimens, Salmon describes the setal serrations as fine. In the original description of *hispida,* also from Singapore, Yosii indicates the fineness of these serrations by likening the setae to those of *Ptenothrix.* Judging by the illustrations however it seems improbable that Salmon's figure 45 represents the same type of seta as that illustrated in Yosii's figure 35F. Salmon has exaggerated the serrations while Yosii has omitted them. The comparison of a paratype of *fasciata,* presented to the British Museum by Professor Salmon, with the syntypes of *hispida* lent by Professor Yosii and fresh topotypes of both species collected by D. H. Murphy together with the Noona Dan, Bismarck and Solomon Island material, showed that there was no real difference in the nature of the setae. The apparent dissimilarity arises from the difficulty of reproducing drawings of fine structures. Some impression of the actual nature of the scale-like bracts on the setae in this species is given by the Stereoscan photographs (plate 4) kindly taken by the Electron Microscope Unit: British Museum (N.H.).

Originally *fasciata* was described in the genus *Parasphyrotheca,* characterised by the presence of "strong spine-like setae on the dorsum and stout spines on top of the head". Later Salmon, 1964 makes *fasciata* the type species of a new monotypic genus, *Neosphyrotheca,* which differs from *Parasphyrotheca* by having only 6+6 eyes and mucrones with dissimilar lamellae. The present material of *fasciata* is shown to include 8+8 eyed individuals. Salmon figures the mucronal lamellae of *P. subfusca* rather less dissimilar than those of *magnificata,* the type species of *Parasphyrotheca.* The difference between these lamellae in *fasciata* is variable while a related new species has both lamellae similarly toothed. Although there appears to be no described differences sufficient for separating *Neospyrotheca* from *Parasphyrotheca,* I

do not consider that the present state of our knowledge justifies either uniting these genera or synonymising them with *Sphyrotheca*. On the basis of only two previous collections, one of which was of two damaged females, *fasciata* and its synonym has already been included in three different genera allied to *Sminthurus*.

The genus *Sminthurus* contains about 130 species. Of 16 allied genera, 9 including *Neosphyrotheca* are monotypic while the remainder have an average of only 3—4 species. Many of the early types are lost while more recent species and genera have been described from such a paucity of material that their range of variation is unknown. Until the whole group is revised with the help of long series of fresh topotypes the classification is likely to be confused. Present evidence is insufficient to justify sweeping changes which are expected to be eventually inevitable. It is possible that *Neosphyrotheca* may be more closely related to *Pararrhopalites* which Salmon includes in the *Arrhopalitini* than to *Sphyrotheca* in the *Sminthurini*.

Noona Dan Expedition material:

Bismarck Is. — DYAUL: Sumuna, 2—11.iii.1962, Berleses 3,5,6,7; Kollepine, 12.iii.1962, Berlese 8,9. — LAVONGAI: Banatam, 19—26.iii.1962, Berleses 11,12,15,19,27. — MUSSAU: Boliu, 4.vi.1962, Berleses 52,53. NEW BRITAIN: Valoka, 13.vii.1962, Berleses 73,74.

Bishop Museum material:

Solomon Is. — BUKA: Gagan, 40m., 15.vi.1956 (J. L. Gressitt). — CHOISEUL: Malangona, sea level and 100m., 4.iii.1964 (P. Shanahan); Kitipi River, 80m., 20.iii.1964 (P. Shanahan). — GUADALCANAL: Gold Ridge, 500m., 24.vi.1956 (J. L. Gressitt). — KOLOMBANGARA: Gollifer's Camp. 700m., 23.i.1964 (P. Shanahan); Iriri, 5m., 4.vii.1964 (J. Sedlacek.); Sandfly Harbour, 2m., 9.vii.1964 (J. Sedlacek); Pepele, 30m., 11.—13.ii.1964 (P. Shanahan). — MALAITA: Dala, 30m., 14.vi.1964 (J. Sedlacek). — VELLA LAVELLA: Pusisoma, 29.xi.1963 (P. Shanahan).

British Museum material:

Solomon Is. — CHOISEUL, GUADALCANAL, MALAITA, NEW GEORGIA, VELLA LAVELLA, 1963—1966 (P. J. M. Greenslade Coll.) 50 records from 6 localities. — GUADALCANAL, KOLOMBANGARA, SAN CRISTOVAL, SANTA YSABEL, 1965 (P. N. Lawrence Coll., Royal Society Expedition) 15 localities.

The species occurs on 14 islands and is among the most frequently recorded *Symphypleona* in forest litter up to 1,500 feet. Detailed distributional data and ecological information is being published by Dr. and Mrs. P. J. M. Greenslade.

Neosphyrotheca noonae sp. n.

Plate 3

Length: females 0.6—0.8mm., males 0.55mm.

Colour: Diffuse, dark blue pigment dorsally, broken by irregular lines of pale oval areas. Head paler blue. Legs with dark pigment concentrated at the apices of the tibiotarsi. Dens and mucro, lightly, diffusely pigmented (plate 3 N.n.).

Cuticle: Head and body finely, fairly evenly granulate.

Chaetotaxy: Vertex of head with about 16 minutely serrate setae, variously modified as narrow-based, spearhead-shaped setae which are slightly curved and sharply pointed. The strongest of these setae are almost a quarter as broad as long and are situated on the dark inner margins of the eye patches (plate 3 V). Antenna I-II with spinose dorsal setae. Antenna III with about 16 setae of which the longest in the basal whorl is longer than that of the apical whorl (plate 3 Aiii). Antenna IV with whorls of up to 8 outstanding setae and a single fine sensory hair lying more parallel to the segment.

Body with about 40 erect, minutely serrate setae (plate 3 AS, TS) and longer, finer setae posteriorly. Three bothriotricha on each side of the great abdomen of which the longest is situated laterally and is from 2—3 times the length of an adjacent macroseta. Metathoracic trochanter with weakly developed spine (plate 3 Tr). Trochanters I-II with spine hardly distinguishable from common setae. Femoral hooks not differentiated on metathorax but weakly discernable on legs I-II as a pair of stouter setae. Dens with 22 posterior and 14 anterior setae. Those of the inner row are developed as 7 strong spines while the apical seta of the outer row is a stouter almost conical spine (plate 3 D). A minute, thorn-like papilla is situated near the dorsal row of setae at about one third of the distance from its base. Mucro with basal seta. The bothriotricha of the anogenital segment are about twice the length of the longest body setae. On the female abdomen V-VI there is an anterior row of 2 pairs of stout pointed setae M'M2 followed by

a pair of longer, stout, blunt setae N. Female anal appendage slender, curved, serrate (plate 3 FA) longer than the longest macroseta (plate 3 AS).

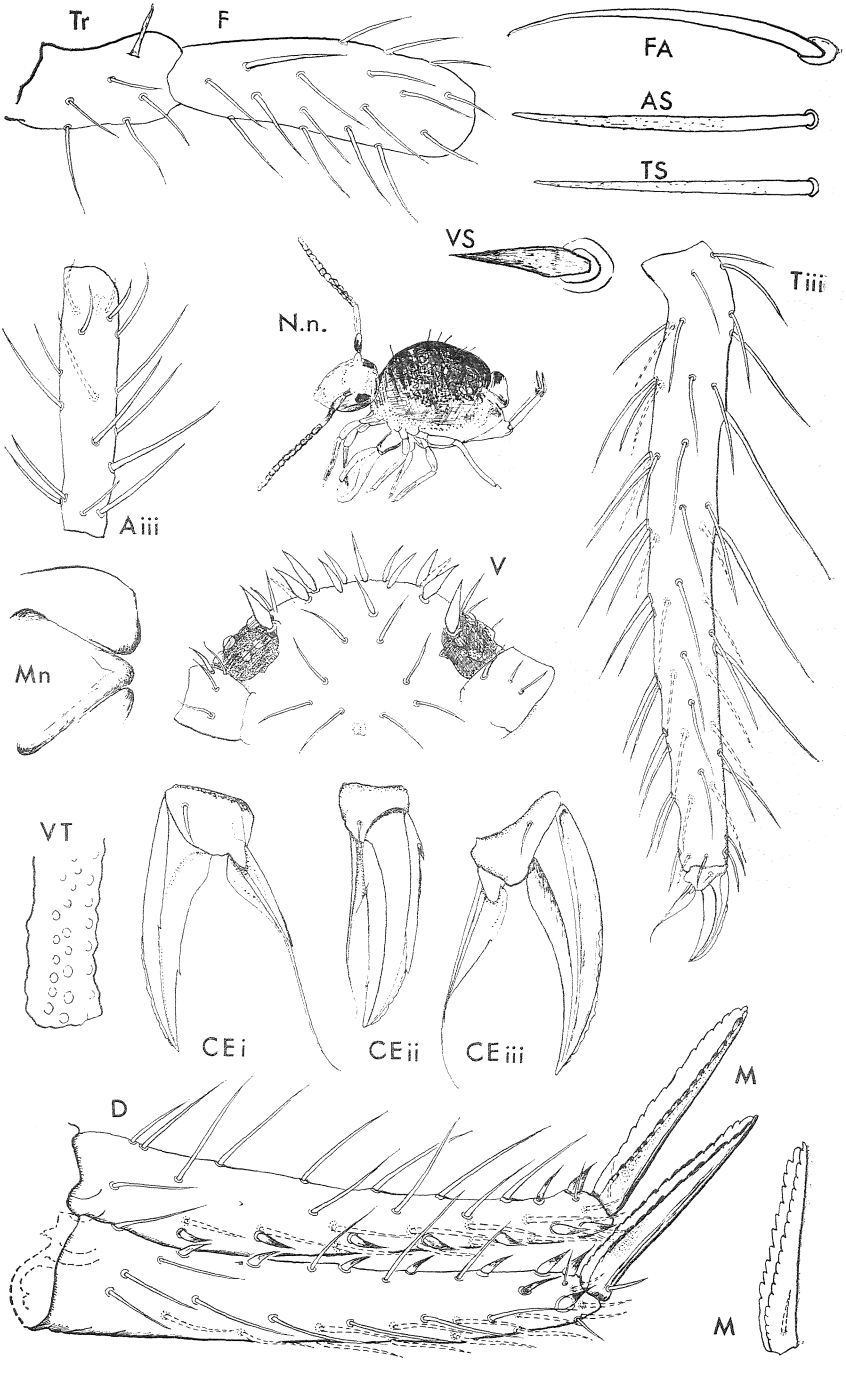
Mandibles asymmetric with 4—5 apical teeth. Eyes apparently 8+8 on intensely darkly pigmented patches. Antenna IV divided into about 13 subsegments of which the apical is constricted. A narrow tunica may be present on the claw but is sometimes reduced or not apparent. There is often a small inner tooth and 2 pairs of lateral teeth which may represent the rudiments of fused pseudonychia. Empodium with fine terminal filament usually over-reaching the claw (plate 3 CEi-iii). Ventral tube with spare, low, warts (plate 3 VT). Base of manubrium with thickened corners, scarcely developed into papillae (plate 3 MN). Mucro with up to 19 rounded inner teeth and 15 longer, flatter, outer teeth (plate 3 M).

Material examined:

Bismarck Is. — MANUS: Lorengau, 22.vi.1962, Noona Dan Expedition, Berleses Nos. 62, 63, 66, Holotype: ♀, Allotype: ♂ (Zoological Museum, Copenhagen), Paratypes: 1 ♂, 1 ♀, 5 ⊙. — NEW BRITAIN: Valoka, 13.vii.1962, Noona Dan Expedition, Berleses Nos. 75, 76, Paratypes: 1 ♀, 5 ⊙.

Discussion. — The species differs from *Neosphyrotheca fasciata* in the sparser chaetotaxy of antenna III, the greater development of dental and vertex spines, the more slender trochanteral spine, relatively longer female anal appendage, mucro with basal seta and both lamellae distinctly toothed. *Neosphyrotheca noonae* occupies an interesting systematic position, sharing the characters of several small genera and lacking one of those diagnostic of the genus in which I have provisionally placed it (dissimilar mucronal lamellae). The relatively long antenna IV and the chaetotaxy of antenna III are similar to those of *Sminthurus* Latreille, 1804. Until the significance of the characters separating the numerous small genera of the Sminthurini can be properly evaluated in the light of fresh material I have placed *noonae* in *Neosphyrotheca* so as not to lose sight of its similarity to the type species of this genus, *N. fasciata.*

Plate 3. *Neosphyrotheca noonae* sp. n. Key to figures on p. 382; scales on plate 2.


Tr
F
FA
AS
TS
VS
N.n.
Tiii
Aiii
V
Mn
VT
CE i
CE ii
CE iii
D
M
M

Key to figures.

A iii	3rd antennal segment (Scale 3)
A iv	4th antennal subsegment (Scale 3)
AS	Abdominal seta (Scale 4, plates 1 and 3)
CE	Claw and empodium (Scale 3, plate 1. Scale 5, plate 3)
D	Dens (Scale 3)
E	Eye patch (Scale 3)
F	Femur III (Scale 3)
FA	Female anal appendage (Scale 4)
M	Mucro (Scale 3)
Mn	Manubrium base (Scale 3)
N.f.	*Neosphyrotheca fasciata,* whole animal (Scale 1)
N.n.	*Neosphyrotheca noonae,* whole animal (Scale 1)
T	Tibiotarsus III (Scale 3)
TR	Trochanter III (Scale 3)
TS	Thoracic seta (Scale 4, plates 1 and 3)
V	Vertex of head (Scale 2)
VS	Vertex seta (Scale 4)
VT	Ventral tube vesicles (Scale 3)

The scales are found on plate 2 (p. 375).

Summary

A new species, *Neosphyrotheca noonae* described from the Noona Dan Expedition. A new synonym, *Sphyrotheca hispida* Yosii, is proposed of *Neosphyrotheca fasciata* Salmon, on the basis of material from the above Expedition and from other sources.

References

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Salmon, J. T., 1951: Proc. R. ent. Soc. Lond. (B) 20: 138—141

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Yosii, R., 1959: Cont. Biol. Lab. Kyoto Univ. 10: 60—62.

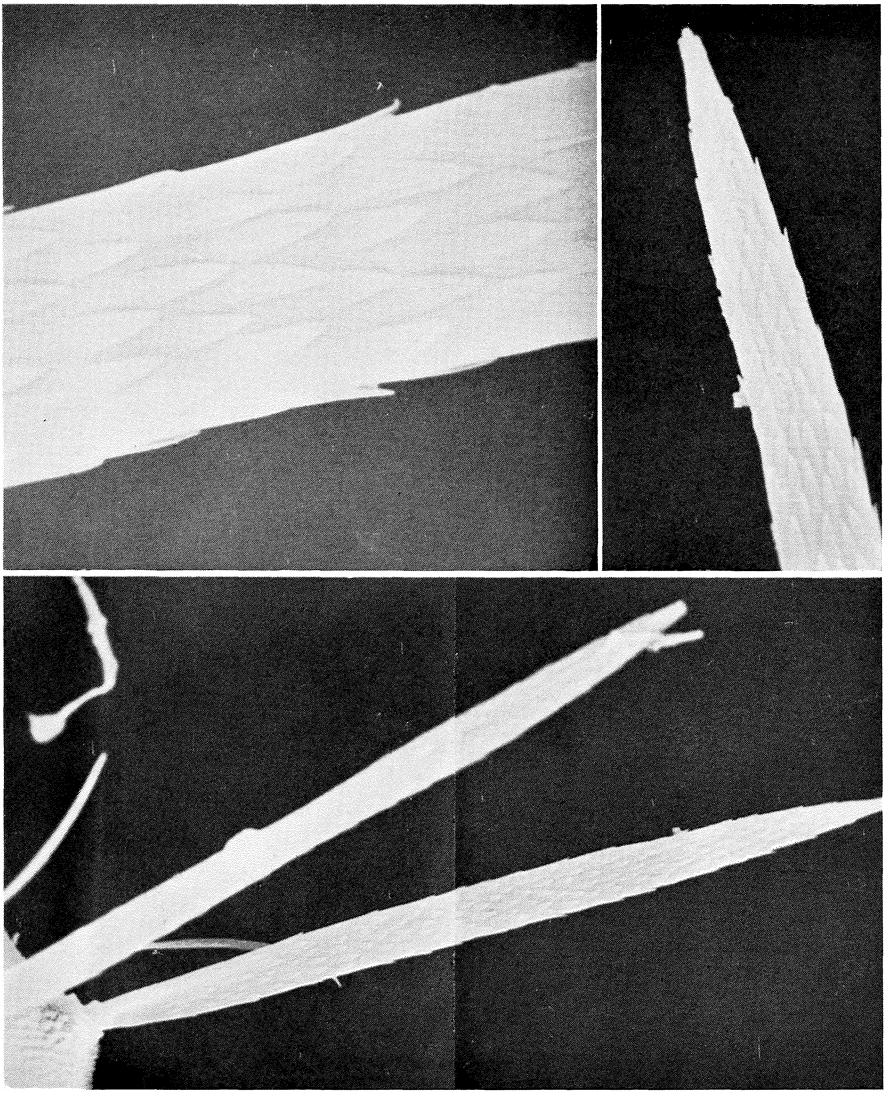

Plate 4. *Neosphyrotheca fasciata* (Salmon, 1951), setae; specimen from Solomons; upper figures × 3450, × 1402; lower figure × 1114. Stereoscan photographs.