A NEW SCINCID LIZARD OF THE GENUS *TRIBOLONOTUS* FROM MANUS ISLAND, NEW GUINEA

by

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With one text-figure and one plate

Introduction

The scincid lizards of the genus *Tribolonotus* are generally dull-coloured, armoured, thigmothermic, cryptozoic lizards with several unique features in their morphology and biology. These features include the possession of abdominal glands and volar pores, a vestigial left oviduct, the production of a single egg or young (in all species so far investigated) and an ability to vocalize (in at least one species) otherwise unknown within the family Scincidae.

As a result of two recent papers (Zweifel, 1966; Greer & Parker, 1968) the taxonomy of the genus is firmly based, while many aspects of the biology and ecology of various species have been documented.

In the course of field work in New Guinea in 1969, as part of Program B of the 1969 "Alpha Helix" Expedition to New Guinea, I was able to continue earlier observations of *Tribolonotus gracilis* on Karkar Island. Moreover on Manus Island three specimens of a new species of *Tribolonotus* were found under piles of rotting coconut husks, a habitat in which *Tribolonotus* often abound in other parts of New Guinea. I take much pleasure in naming this new species in honour of Dr. L. D. Brongersma for his many valuable contributions to the herpetology of this region.

The abbreviations AM and AMNH refer to the Australian Museum and the American Museum of Natural History respectively.

Tribolonotus brongersmai spec. nov.

Holotype. — AM R30000, an adult male collected by H. G. Cogger, H. C. Dessauer and T. Gobble, circa 9 miles east of Lorengau, Manus Island, Admiralty Group, on August 25th, 1969. Plate 1 is a photograph of the holotype in life.

Paratypes. — AMNH 105873, an adult male and AM R29999, an unsexed hatchling. Data as for holotype.

Diagnosis. — *Tribolonotus brongersmai* is distinguished from all other members of the genus by the following combination of characters: only two rows of enlarged vertebral scales, commencing on the nape immediately behind two rows of enlarged nuchals; the latter extend laterally to separate the granular scales on the side of the neck from the parietal and upper secondary temporal scales (scute terminology of Zweifel, 1966).

From its individual congeners *brongersmai* may be distinguished as follows (see also key on p. 208):

gracilis and *novaeguineae* of New Guinea possess four rows of enlarged vertebral scales (two in *brongersmai*), the outer rows of which possess greatly enlarged spines; the first labial is small, rarely extending back beyond the nasal, whereas that of *brongersmai* is extremely attenuated and extends back to the level of the eye.

blanchardi of the Solomon Islands possesses a single row of enlarged vertebrals, whereas there are two such rows in *brongersmai.*

ponceleti and *pseudoponceleti* of the Solomon Islands, and *annectens* of New Britain are each readily distinguished from *brongersmai* in that their paired series of enlarged vertebral scales commence well back on the nape, and are separated from the enlarged scales of the parietal region by an area of small granular and spiny scales; in *brongersmai* the latter are entirely excluded from the top of the neck by a series of enlarged nuchal scales between the parietal and the anterior enlarged vertebral scales.

schmidti of the Solomon Islands is the species most similar to *brongersmai* in squamation, the principal difference between the two being the disposition of scales on the nape; in *schmidti* the enlarged vertebral scale rows extend almost as far forward as the large parietal scale or may indeed contact it. However, the small granular and spiny scales on the side of the neck extend dorsally to contact the parietal or secondary temporal scales, whereas in *brongersmai* the smaller scales on the side of the neck are broadly separated from the parietal and secondary temporal scales by a series of enlarged nuchals. *T. schmidti* is apparently a much smaller species than *brongersmai*; Zweifel (1966) cites the six largest specimens (all males) of a series of 35 *schmidti* as having a snout-vent length of 41 mm whereas the two adult males of *brongersmai* have snout-vent lengths of 63.5 mm and 55 mm.

Description of holotype

An adult male with a snout-vent length of 63.5 mm and an intact and complete tail measuring 89 mm. The head measures 16.5 mm from tip of

snout to the anterior edge of the tympanum, and has a maximum width of 12.5 mm (on a line more or less level with the hind edge of the parietal). The forelimb measures 18 mm (from axilla to tip of extended third finger) while the hindlimb measures 26.5 mm (from groin to tip of extended fourth toe). The distance from axilla to groin is 28.5 mm, while the adpressed limbs overlap by almost the length of the hind foot.

The head is markedly triangular in shape when viewed from above, while the body is relatively slender. The head shields are markedly sculptured, with longitudinal ridges predominating. The rostral is nearly 2½ times broader than deep and is broadly in contact with the large frontonasal; it also contacts the nasal and first labial on each side. The nostril lies in an undivided nasal, the latter in contact with the rostral, frontonasal, preocular and first supralabial. There is a large preocular on each side (fig. 1c) which is almost as deep as long (this scale has been referred to as a loreal by Zweifel (1966) and Greer & Parker (1968), and as a frénale by Roux (1931)). Supranasals and prefrontals absent, the elongate, somewhat hour-glass-shaped frontal (the latter nearly twice as long as broad) being in broad contact with the large frontonasal. The latter is about 1½ times longer than broad. Four supraoculars on each side, the first in contact with the frontonasal, the first and second in contact with the frontal, the third (and a fraction of the fourth on the right side only) in contact with the frontoparietal, and the fourth in contact with the enlarged median parietal and the smaller adjacent anterior parietal scale. The disposition of scales in the temporal region is shown in fig. 1c; I have not attempted to name these scales as it is clear from previous work (Roux, 1931; Zweifel, 1966; Greer & Parker, 1968) that names (parietals, temporals, postoculars) have been applied without any clear understanding of homologues in other scincid lizards. Ear-opening vertically elliptic, without auricular lobules; tympanum sunk only slightly below the surface; ear 3.7 mm high by 1.9 mm in length. Behind the median parietal shield are two rows of enlarged nuchal shields, the shields in the posterior row being 2-3 times as large as those in the anterior row; the first row of these enlarged nuchals extends laterally to the upper margin of the tympanum while the second row almost reaches the tympanum. The presence of these enlarged nuchals totally excludes the small granular scales on the sides of the neck from the occipital and nuchal regions. The first supralabial is long and splint-like (fig. 1c), extending back to a point beneath the centre of the eye, and almost excluding the second supralabial from the lip margin. Five supralabials. Mental a narrow strip, 4-5 times as broad as deep. First infralabial similar in shape to the first supralabial and extending back to the same point as the latter; the second infralabial is only

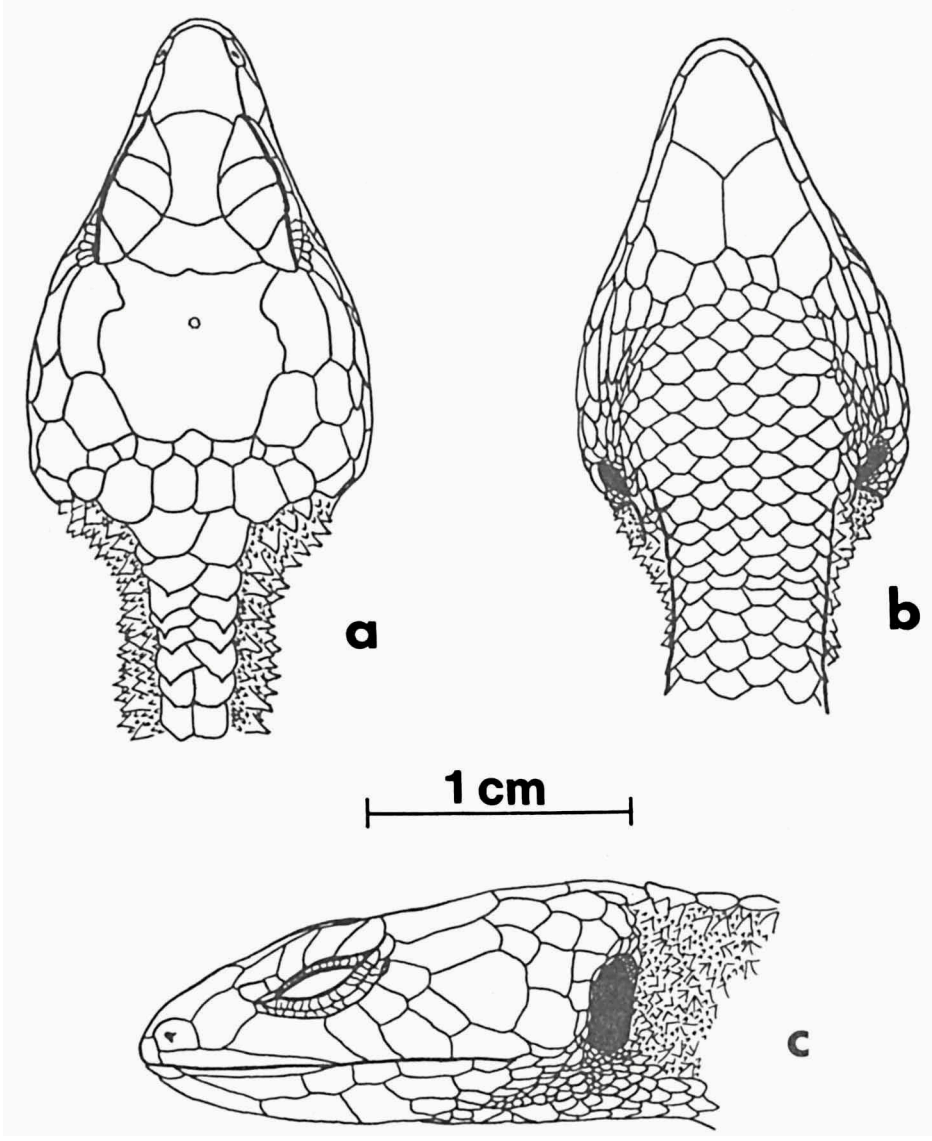

Fig. 1. Dorsal aspect of head (a), ventral aspect of head (b) and left lateral aspect of head (c) of holotype of *Tribolonotus brongersmai* spec. nov.

narrowly in contact with the lip margin, and is more or less continuous with a large sublabial lying below the first infralabial. Five infralabials. A large postmental is bordered behind by a large pair of chin chields. The disposition of the remaining scales of the throat is shown in fig. 1b. The gular scales are only slightly keeled, each with a low median longitudinal ridge.

A vertebral series of enlarged scales consisting of two rows of adjacent scales, each with a strong median keel. These scales commence immediately behind the enlarged nuchal scales and continue as a distinct series along the basal sixth of the tail; however the series is divided into two distinct groups; the anterior six pairs of scales are more distinctly imbricate and different in shape from the remainder of the series (fig. 1a). There are 32 enlarged scales along the vertebral line between the hind edge of the parietal and the posterior edge of the hindlimbs (level of vent). The area between the enlarged vertebrals and the enlarged ventral scales consists of small, irregular, granular, tuberculate and spinose scales through which are scattered numerous larger, high-keeled, somewhat tetrahedron-shaped scales in which an apex points anteriorly while the posterior face is concave. The largest of these scales lie in an irregular series roughly parallel to the vertebrals, and they decrease in size as they become more lateral and inferior (plate 1). The ventral scales are broader than long, each with a very low, indistinct median longitudinal keel; there are four rows of ventral scales between the forelimbs and eight rows at the level of the abdominal glands. The latter lie beneath four median pairs of ventrals and end eight scales (including the preanals) in front of the vent. There are 43 rows of enlarged ventrals between (but not including) the anterior pair of enlarged chin shields and the pair of enlarged preanals.

The tail is covered by regular rings of mostly rectangular-shaped scales, each with a sharp, backwards-directed median keel.

The forelimbs are covered by strongly keeled scales; the scales of the hindlimb are strongly keeled, except that the hind side of the femoral region consists of small granular scales among which are scattered irregular spinose scales similar to those on the sides of the body. The palms are covered by low tubercular scales, while there is a single palmar pore on each hand, each at the base of the fourth finger. The sole is similarly tubercular. There are three groups of plantar pores on each sole; these consist of a continuous series of eight (left) or seven (right) pores along the base of the fourth toe. These pores are separated by one or two small tubercular scales from a pair of pores on the heel. In addition, there are two (left) and three (right) pores at the base of the third toe. There are 24 lamellae under the fourth (longest) toe (immediately distal to the plantar pores).

Colour. — More or less uniform dark brown above except for some alternating irregular groups of small blackish and cream-coloured scales along a dorso-lateral line on each side of the body. Sides lighter in colour, becoming even lighter inferiorly, with some individual scales even lighter still. Several narrow, light brown bands across the top of the basal third of the tail, the most conspicuous of which is a V-shaped band at about the level of the vent. Terminal two-thirds of tail a lighter brown than the rest of the dorsum. Venter white to cream. Lips lightly barred with a few narrow, cream-coloured vertical bars. The colour pattern is similar to that found in many *T. pseudoponceleti* (Greer & Parker, 1968, fig. 2).

Variation. — Adult male paratype AMNH 105873 varies little in scalation or colour from the holotype. This specimen was decapitated and otherwise mutilated when tissue samples were taken; its dimensions and principal scale counts, together with those of the juvenile paratype, are compared with those of the holotype in Table 1. However, an important difference is that, despite well-developed plantar pores, palmar pores are lacking. As in the holotype, the plantar pores are disposed in three groups: a continuous series of seven (left) or eight (right) pores at the base of the fourth toe, two pores on the heel, and three (left) and two (right) pores at the base of the third toe. Abdominal glands as in holotype.

The hatchling paratype, AM R29999, has a distinctive colour pattern consisting of a broad lighter brown vertebral band extending from the nape to

TABLE 1

Dimensions (mm) and principal scale counts for type specimens of *Tribolonotus brongersmai* spec. nov.

	AM R30000	AM R29999	AMNH105873
Snout-vent length	63.5	26.5	55
Tail length	89	52	30+
Head length	16.5	6.5	12
Head width	12.5	4.8	8.8
Forelimb length	18	8	14
Hindlimb length	26.5	13	22
Axilla-groin	28.5	11	21
Occiput-rump scale count *	32	32	33
Gular + ventral scale count *	43	41	c32
Lamellae under 4th toe	24	23	23

* vide Zweifel, 1966.

about half way along the tail; there are a few scattered darker flecks within the lighter band, while the light V-shaped pelvic band of the holotype is much more distinct in the juvenile. The body scales of the juvenile are more strongly rugose or keeled than in the adults, especially on the throat and venter. There are no volar pores or abdominal glands.

Distribution. — Known only from the type locality on the eastern end of Manus Island, Admiralty Group, Territory of New Guinea.

Habitat and habitat associates. — All three specimens were collected under piles of decaying coconut husks in a copra plantation. The plantation was situated in hilly country, and as is typical of plantations in the area the plant growth on the ground between the coconut palms is periodically cleared by work parties with machetes. As a result of this clearing the piles of husks are found among thick but low, rank grass and ground creepers. The microhabitat beneath each pile is dark and moist, and each pile typically harbours numerous individuals of several reptile and frog species; on Manus Island the dominant species found in this habitat were the ranid frog *Platymantis papuensis*, the gecko *Cyrtodactylus pelagicus*, skinks of the genera *Emoia* and *Carlia*, as well as *Sphenomorphus solomonis*, a boid snake of the genus *Candoia* and a colubrid snake of the genus *Stegonotus*.

Key to the species of *Tribolonotus* (modified from Zweifel, 1966)

1. Enlarged dorsal scales in four rows, projecting spines present on posterior dorsal margin of head (New Guinea) . . . . . *gracilis* and *novaeguineae*
— Enlarged dorsal scales in one vertebral row or in two rows juxtaposed along the midline; posterior margin of head without projecting spines (Solomon Islands, New Britain and Manus Island) 2
2. Enlarged dorsal scales in two rows 3
— Enlarged dorsal scales in a single row . . . . . *blanchardi*
3. Juxtaposed rows of enlarged dorsal scales commence on nape immediately posterior to the enlarged scales on head 4
— Juxtaposed rows of enlarged dorsal scales commence on posterior part of nape, most of neck being covered with granular or spiny scales 5
4. Two rows of enlarged vertebral scales separated from parietal and temporal scales by two rows of enlarged nuchals; maximum recorded snout-vent length 63.5 mm . . . . . *brongersmai*
— Two rows of enlarged vertebral scales in contact with parietal scales or separated by small granular and spiny scales; maximum recorded snout-vent length 41 mm . . . . . *schmidti*
5. Spiny, enlarged scales in rows closest to enlarged vertebral rows numerous, approximately one scale for each enlarged middorsal scale; two primary temporal scales 6
— Spiny, enlarged scales in rows closest to enlarged vertebral rows less numerous, approximately one scale for every two enlarged middorsal scales; three primary temporal scales . . . . . ***annectens***

6. Nasal in contact with second supralabial; maximum recorded snout-vent length 125 mm . . . . . *ponceleti*
— First infralabial separating nasal and second supralabial; maximum recorded snout-vent length 73 mm . . . . . *pseudoponceleti*

Notes on Tribolonotus gracilis

Zweifel (1966) discussed at some length the status of the New Guinean species *Tribolonotus gracilis* and *T. novaeguineae*. He showed that the only quantifiable character previously used to distinguish the two species, viz., the relative lengths of the large postmental scale and the adjacent anterior enlarged gular scales, was subject to considerable variation in a sample of 33 specimens from localities throughout New Guinea. De Rooij (1915) used this character in differentiating *T. novaeguineae* from *T. gracilis*. Whereas in the former the postmental was said to be as long as the paired anterior gulars ("first pair of chin shields"), the postmental in *T. gracilis* was stated to be much shorter than the anterior gulars (although in the original description of *gracilis* (De Rooij, 1909) the postmental is shown to be almost as long as the anterior gulars).

In 1965 and 1969 the author obtained two large series of *Tribolonotus gracilis* from Karkar Island, a volcano lying a few miles off the north-eastern coast of New Guinea. Measurements were made of the lengths of the postmental and enlarged anterior gular scales of 50 individuals from Karkar Island in an attempt to ascertain the degree of intrapopulation variability in the relative dimensions of these scales.

The length of the postmental ranged from 50% to 77% of the length of the longest anterior gular, with a mean of 63.1% and standard deviation of 5.8%. This mean is far below that obtained by Zweifel (1966) who obtained a range of 62-90% and a mean of 77% in his sample, and suggests that discrete populations may vary considerably in this character throughout the range of the species.

In respect of other cited differences between *T. novaeguineae* and *T. gracilis*, all specimens from Karkar Island possess a red or orange circle, disrupted above, around the eye.

The spines of the upper caudal scales generally point backwards, a feature which De Rooij (1915) regarded as characteristic of *T. gracilis*. She stated that the caudal spines of *T. novaeguineae* point upwards (although Zweifel, 1966, inadvertently reversed these characteristics for the two species).

In the Karkar Island series the spines of the first one or two rows of enlarged upper caudals are directed very nearly vertically, but with each successive distal row the spines become lower and point more posteriorly.

Unfortunately the above data fail to resolve the taxonomic status of

T. novaeguineae and *T. gracilis*, but they do provide some measure of the variability of purported specific diagnostic features in an isolated local population.

As ecological data on species of *Tribolonotus* are generally lacking it is of interest to record the body temperatures of several specimens of *T. gracilis* taken from large piles of coconut husks in a copra plantation on Karkar Island on 8 August, 1969. A sunny morning, the ambient temperature (shade) was 26.7°C, while the substrate temperature below all three piles of coconut husks was 25.0°C. The rectal temperatures of five adult *T. gracilis* were 24.7°C, 24.9°C, 24.4°C, 24.3°C and 23.9°C, while that of a single juvenile was 25.3C.

Although most specimens when exposed would lie dormant and rely on their cryptic coloration to avoid detection, some individuals were immediately active and aggressive, attacking with open mouths.

Finally, specimens of *T. gracilis* were found to be very vocal when alarmed, producing a loud gecko-like cry which could be heard for some distance. Whether this vocalization is produced only under stress is not known.

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Holotype of *Tribolonotus brongersmai*, spec. nov. in life, Manus Island, Admiralty Group, New Guinea.