Zoology. — *Lizards from the Island of Morotai (Moluccas).* By L. D. BRONGERSMA. (Communicated by Prof. P. J. GAILLARD.)

(Communicated at the meeting of March 20, 1948.)

The herpetological fauna of the island of Morotai is still very incompletely known. DE ROOIJ (1915, p. 359) and DE JONG (1928, pp. 148—149) mention ten species of lizards from this island. The study of two small collections in the Leiden Museum raises the number of species known from Morotai to nineteen.

The first collection was presented to the museum in 1862 by H. A. BERNSTEIN. Part of it served apparently as a base for the records by DE ROOIJ. Two species mentioned by this author (*Gymnodactylus marmoratus* (Kuhl) and *Lygosoma cyanurum* (Less.)) were recorded erroneously from Morotai. The second collection was made in June 1930 by Prof. H. BOSCHMA. As zoologist of the oceanographical expedition on board of H.M.S. Willebrord Snellius, R.N.N., Prof. BOSCHMA spent about ten days on Morotai.

In the following notes all species at present known from Morotai are mentioned; those not included in the lists by DE ROOIJ (1915, p. 359) and by DE JONG (1928, pp. 148—149) have been indicated by an asterisk.

***Gymnodactylus deveti** nov. spec. (Fig. 1)

Gymnodactylus marmoratus, DE ROOIJ, 1915, p. 13 (part.), p. 359.

1 ♂, holotype, Morotai, leg. H. A. BERNSTEIN, 1862, reg. no. 2775.
1 ♂, paratype, Morotai, leg. H. A. BERNSTEIN, 1862, reg. no. 8683.

Head large, oviform; forehead strongly concave. The length of the snout is 1.4—1.5 times the distance from the orbit to the ear-opening, and 1.1—1.2 times the diameter of the orbit. Ear-opening oval, vertical, its diameter one fourth to one third that of the orbit. Head covered with granules, those on the snout largest; occiput, temples and supraocular region with tubercles among the granules. Rostral 1.5—1.7 times as broad as high, with a median cleft above; bordered above by a row of four small shields, the outer of which are the supranasals. Upper and lower lip bordered by 12 or 13 shields, and posteriorly by 2 or 3 small scales. Nostril bordered by rostral, first upper labial, supranasal and three postnasals. Symphysial pentagonal, 1.6—1.8 times as broad as long. A median pair of large chinshields, with a smaller one on each side. Behind the median pair a shield of irregular shape in the holotype (fig. 1c); in the paratype this shield is divided into two by a longitudinal suture. Throat covered with small granules (no tubercles on the throat).

Body slightly depressed, covered above with small granules and numerous rather small tubercles. These tubercles are convex, some are slightly keeled to trihedral. About 21 to 24 tubercles across the back. Lateral fold strongly developed, with numerous enlarged convex to more or less conical tubercles.

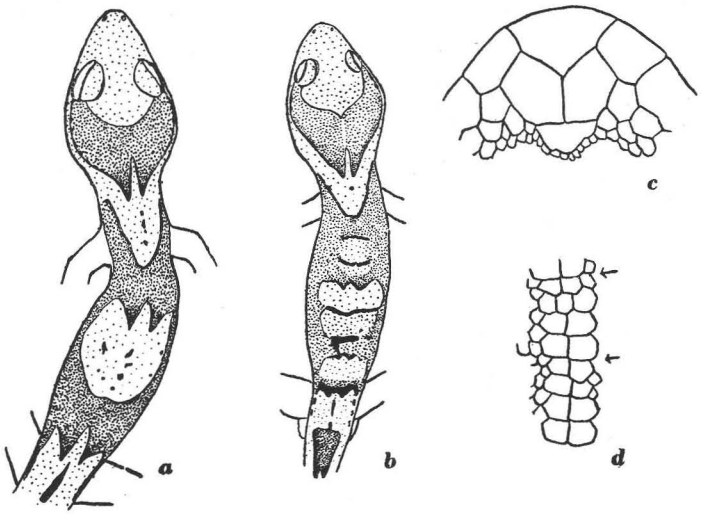

Fig. 1. *Gymnodactylus deveti* nov. spec.; a, sketch of the colour pattern of the paratype; b, idem of holotype; c, chin of holotype; d, lower surface of tail of holotype. Figs. a—b, × ½; figs. c—d, × 3¼.

Ventral scales very small (almost granular) at the sides, larger, cycloid and subimbricate on the middle of the belly; 38 to 40 scales across the belly from fold to fold. An angular series of 18 to 23 preanal and femoral pores, the outer very small. The series of scales with pores extends for a short distance below the thighs; at each end 2 to 4 scales without pores. From these scales towards the knee, the lower surface of the thigh is covered by very small scales (about 33 scales from the pore scales to the inside of the knee, i.e., a distance of about 10 mm). The pore scales are about as large as the row of scales in front of it. Between the pore scales and the vent the scales are very much smaller. No trace of a preanal groove.

Tail slightly vertically oval in cross section, annulate; covered above with small scales, 10 in an annulus; below with large scales, the two median rows strongly enlarged, four in an annulus (fig. 1*d*). Upper surface of tail with convex to slightly conical tubercles, arranged in transverse rows at the posterior border of each annulus; some other tubercles more or less irregularly disposed on the proximal part of each annulus. Three or four large tubercles on each side of the base of the tail. Postanal slits and ossicles present.

Digits depressed at the base, compressed distally; with transversely enlarged lamellae under the proximal phalanx. Fourth finger with 26

lamellae, the basal 13 transversely enlarged; fourth toe with 28 to 29 lamellae of which 15 under the basal phalanx. The adpressed hindlimb reaches to between the elbow and the shoulder.

Colour (in alcohol). The colours have somewhat faded, but the colour pattern is still distinct. In both specimens a broad purplish brown band starts behind the orbit and curves across the occiput to the orbit of the other side; this band extends posteriorly on to the nape, where it ends in two protracted points. The lower (posterior) border of this band is marked by an irregular line of very dark brown. The paratype has two broad crossbands across the back; their purplish brown colour is continued along the sides and connects the two bands (fig. 1*a*). The bands have dark borders of almost blackish brown. A few small, irregular dark spots are present in the pale areas. In the holotype the anterior crossband of the back is still distinct, but it tends to dissolve into two crossbands; these are separated by a paler area in the middle of the band, and by two dark crosslines in it. The posterior crossband also tends to dissolve into narrower crossbands; the subdivision of the posterior band is more irregular than that of the anterior (fig. 1*b*). On the sacral region a longitudinal blackish streak, interrupted in the type. Tail with three dark crossbands. Lower surface of head, body, and tail uniformly whitish.

Measurements (in mm)	Holotype	Paratype
Length of head and body	92	105
Length of tail	100	86 (regenerated)
Forelimb	39.5	42
Hindlimb	43	53

The two specimens described above are apparently those on which DE ROOIJ based her record of *Gymnodactylus marmoratus*. They certainly do not belong to *G. marmoratus* (Kuhl). From this species *G. deveti* nov. spec. differs inter alia in the absence of a preanal groove, and in the presence of large shields on the lower surface of the tail. From the neighbouring island of Halmaheira, MERTENS (1929, p. 237) described *G. fumosus halmahericus* Mrts. From this subspecies as well as from *G. fumosus fumosus* Müller, the new species differs in the absence of a preanal groove. From *G. f. halmahericus* the new species differs also in having a lower number of scales across the belly (38—40 as opposed to 50—55), in the lower number of pores (18—23 as opposed to 43). I am indebted to Mr. J. C. BATTERSBY for comparing the holotype of the new species to a *Gymnodactylus* from Halmaheira that like the types of *G. f. halmahericus* was collected by KÜKENTHAL, and that consequently may be considered to belong to the subspecies described by MERTENS (1929, p. 237). This specimen (British Museum (Natural History), reg. no. 95.10.26.1) is a male with a distinct preanal groove, and 44 pores; the series of pore scales extends much farther towards the knee (15 small scales from pore scales to inside of knee = 2.5 mm); the scales on the

lower surface of the tail are enlarged, but not regularly as in the holotype of the new species.

The new species has been named in honour of Dr. A. C. DE VET, neurosurgeon of the St. Ursula Clinic, Wassenaar, Holland.

***Hemidactylus frenatus** Dum. & Bibr.

1 ♂, 2 eggs, Morotai, 3—7. VI. 1930, leg. Prof. H. BOSCHMA, reg. no. 7955.

***Peropus mutilatus** (Wiegm.)

1 specimen, Morotai, leg. H. A. BERNSTEIN, 1862, reg. no. 2616.

Gehyra marginata Blgr.

Gehyra marginata, DE ROOIJ, 1915, pp. 44, 359.

1 specimen, Morotai, leg. H. A. BERNSTEIN, 1862, reg. no. 2769.

***Lepidodactylus lugubris** (Dum. & Bibr.)

1 specimen, Morotai, leg. H.A. BERNSTEIN, 1862, reg. no. 2620.

Gekko vittatus Houtt.

Gecko vittatus, DE ROOIJ, 1915, pp. 52, 359.

12 specimens, Morotai, leg. H. A. BERNSTEIN, 1862, reg. no. 2772.

Calotes cristatellus moluccanus (Less.)

Calotes cristatellus, DE JONG, 1928, p. 148.

7 specimens, Morotai, leg. H. A. BERNSTEIN, 1862, reg. no. 3029.

In all specimens the rostral is broader than the symphysial. The nasal is situated mainly above the second upper labial; in most specimens its anterior border is placed over, or just in front of the suture between the first and second upper labials. In four specimens the nasal is separated from the rostral by 2 scales, in two specimens by 1 scale, while in one specimen 2 scales are present on the left and 1 scale on the right. One row of scales between the nasal and the upper labials. Upper labials 7 to 9, generally 8 (7 times) or 9 (5 times); 8 to 10 lower labials, generally 9 (8 times) or 8 (4 times). Scales round the base of the tail in 15 to 17 rows (15 in two, 16 in three and 17 in two specimens). Scales round the body in 65 to 72 rows (67 and 71 in two specimens each; 65, 70 and 72 in one specimen each).

***Varanus (Varanus) indicus indicus** (Daud.)

1 juv., Morotai, leg. H. A. BERNSTEIN, 1862, reg. no. 3188.

Fifty scales across the head from the corner of the mouth to that of the other side; 148 scales round the middle of the body; 101 scales from the gular fold to the anterior level of the hindlimbs. Length of head and body 145 mm; tail 211 mm.

***Mabuya multifasciata** (Kuhl)

1 ♀, 1 juv., Morotai, 3—7. VI. 1930, leg. Prof. H. BOSCHMA, reg. no. 7944.

Otosaurus variegatus (Ptrs.)

Lygosoma variegatum, DE JONG, 1928, p. 149.

*Lygosoma (Sphenomorphus) brevipes Bttgr.

12 specimens, Morotai, 3—7. VI. 1930, leg. Prof. H. BOSCHMA, reg. no. 7946.

The scale counts for this series are given in Table I. As is clear from this table the number of nuchals is extremely variable. The length of the hindlimb very slightly exceeds the distance from the forelimb to the anterior corner of the eye in seven specimens, it is equal in two specimens, and in three specimens the hindlimb is very slightly shorter than this distance. The distance from the snout to the forelimb is contained 1.4 to 1.8 times in that from axilla to groin. Only three specimens have the tail complete; in these the length of the tail is 1.4 to 1.5 times the length of head and body.

The scales on the upper surface of the fourth toe are arranged as follows: 3 single scales at the tip, followed by 3 pairs of scales, and from there to the base of the toe 3 rows of scales.

TABLE I. *Lygosoma (Sphenomorphus) brevipes* Bttgr..

Scales round body	Lamellae under 4th toe	Supra-ciliaries	Labial below eye	Nuchals	Length of head + body (in mm)
26	18/18	7/8	4	3/3	56
28	16/17	8/8	5	2/2	54.5
28	15/16	7/7	5	1/1	53.5
28	16/16	8/8	5	4/4	52
28	17/17	9/8	5	6/6	50
28	17/17	7/8	5	4/4	48
28	16/17	8/8	5	r. 1, l. 4	47
28	16/—	8/8	5	r. 3, l. 4	46
28	19/18	8/8	r. 6, l. 5	r. 6, l. 3	39.5
28	17/17	8/8	5	r. 3+1*), l. 7	37.5
28	17/16	8/8	5	5/5	32
28	17/17	8/8	5	4/4	29

*) This last nuchal separated from the anterior three by a pair of scales.

Lygosoma (Leiolepisma) fuscum fuscum (Dum. & Bibr.)

5 specimens, Morotai, 3—7. VI. 1930, leg. Prof. H. BOSCHMA, reg. no. 7947.
1 specimen, Morotai, 3—7. VI. 1930, leg. Prof. H. BOSCHMA, reg. no. 8659.

TABLE II. *Lygosoma (Leiolepisma) f. fuscum* (Dum. & Bibr.)

Reg. no.	Scales		Lamellae under 4th toe
	Round body	From nuchals to base of tail	
7947	32	47	31/31
	34	48	30/28
	34	47	29/31
	32	46	31/33
8659	—	—	—
	32	49	27/27

Lygosoma (Leiolepisma) novae-guineae Meyer

Lygosoma novae-guineae, DE JONG, 1928, p. 149.

Dasia smaragdina moluccarum Barb.

Lygosoma smaragdinum, DE ROOIJ, 1915, p. 199 (part.), p. 359.

1 specimen, Morotai, leg. H. A. BERNSTEIN, 1862, reg. no. 2567.

Scales in 22 rows; 30 lamellae under the 4th toe.

Emoia sorex (Bttgr.)

Lygosoma sorex, DE JONG, 1928, p. 149.

4 specimens, Morotai, leg. H. A. BERNSTEIN, 1862, reg. no. 7272.

TABLE III. *Emoia sorex* (Bttgr.)

Scales		Lamellae under 4th toe
Round body	From nuchals to base of tail	
30	55	44/44
28	56	—/45
30	± 58	47/47
28	54	45/44

Emoia werneri (Vogt)

Lygosoma cyanurum, DE ROOIJ, 1915, p. 253 (part.), p. 359.
Lygosoma werneri, BRONGERSMA, 1933, p. 19.

16 specimens, Morotai, leg. H. A. BERNSTEIN, 1862, reg. no. 2553.
11 specimens, Morotai, leg. H. A. BERNSTEIN, 1862, reg. no. 2556.
3 specimens, Morotai, 3—7. VI. 1930, leg. Prof. H. BOSCHMA, reg. no. 8660.

*Emoia kuekenthali kuekenthali (Bttgr.)

3 specimens, Morotai, leg. H. A. BERNSTEIN, 1862, reg. no. 2571.
1 specimen, Morotai, 3—7. VI. 1930, leg. Prof. H. BOSCHMA, reg. no. 8658.

TABLE IV. *Emoia k. kuekenthali* (Bttgr.)

Reg. no.	Scales		Lamellae under 4th toe
	Round body	From nuchals to base of tail	
2571	42	65	—/56
	42	67	54/54
	40	62	55/55
8658	40	67	59/59

In one specimen the right supranasal is divided into two small shields.

*Riopa albofasciolata mentovaria (Bttgr.)

Lygosoma mentovarium BOETTGER, 1895, p. 119; BOETTGER, 1900, p. 345, pl. 14 fig. 4; DE ROOIJ, 1913, p. 18; DE ROOIJ, 1915, pp. 263, 265, 359.
Riopa mentovaria, MERTENS, 1934, p.70.
Riopa (Eugongylus) mentovaria, SMITH, 1937, p. 229.
Lygosoma (Riopa) [albofasciolatum] mentovarium, STERNFELD, 1918, p. 418.

5 specimens, Morotai, leg. H. A. BERNSTEIN, 1862, reg. no. 2583.
2 specimens, Morotai, leg. H. A. BERNSTEIN, 1862, reg. no. 8684.
2 specimens, Morotai, 3—7. VI. 1930, leg. Prof. H. BOSCHMA, reg. no. 8673.
4 eggs, Morotai, 3—7. VI. 1930, leg. Prof. H. BOSCHMA, reg. no. 8674.

STERNFELD (1919, p. 418) considers *mentovaria* to be a subspecies of *albofasciolata,* but MERTENS (1934, p. 70) mentions *mentovaria* as a separate species. When the descriptions of *mentovaria* and *albofasciolata* as given by DE ROOIJ (1915, pp. 263, 265: *Lygosoma mentovarium,* and pp. 263, 266: *Lygosoma albofasciolatum*) are compared, the differences between the two forms appear to be very slight. Although I had no specimens of *albofasciolata* for comparison to the specimens from Morotai, I feel justified in following STERNFELD in considering *mentovaria* as a subspecies of *albofasciolata.* It remains remarkable, however, that the two subspecies are widely separated from one another in geographical range. *Riopa a. albofasciolata* (Gthr.) has been recorded from the territory of New Guinea, the Bismarck Archipelago, Solomon Ids., Rossel Id., Caroline Ids., Sta. Cruz Ids., Fergusson Id., and Queensland; *R. a. mentovaria* (Bttgr.) is known only from Halmaheira and Morotai.

Exact data on the variation of *R. a. mentovaria* are scarce, and therefore I give an extensive description of the Morotai specimens examined by me.

Snout short, obtuse. Lower eyelid scaly. Ear-opening oval (in one specimen somewhat distended to roundish), its diameter about half that of the orbit; 4 or 5 small, rounded auricular lobules at its anterior border. Supranasals present, separated from each other by the frontonasal. Nostril in the nasal, bordered above by the supranasal. Frontonasal more broad than long, its length contained 1.4—1.7 times in its width. The frontonasal is in contact with the rostral and the frontal. The suture with the rostral is much shorter than that with the frontal, i.e., about $^1/_3$—$^2/_3$ of the latter. The suture with the frontal is from 0.4—0.5 times the width of the frontal. Prefrontals small, widely separated; their length is contained 2.4—3.4 times in the length of the frontal. The frontal is longer than broad, its breadth is contained 1.4—1.6 times in its length. The frontal is slightly longer (1.1—1.2 times) than the frontoparietals and interparietal together; the length of the frontal is about equal to its distance from the posterior border of the parietals; in two specimens the frontal is slightly shorter, in one specimen it is slightly longer than this distance; in all specimens the frontal is shorter than the combined length of the frontoparietals and parietals. The frontal is wider than the supraocular region (in 7 out of 9 specimens much broader). Five supraoculars, viz., four large shields, the fifth very small; the anterior two supraoculars in contact with the frontal. Eight or nine supraciliaries. Frontoparietals slightly longer than the interparietal in 5 specimens, equal in 1 specimen, and slightly shorter in 2 specimens. Parietals in contact behind the interparietal, followed by a pair of broad nuchals, and with a large temporal on each side. Generally 9 upper labials, the sixth largest and below the centre of the eye; three

specimens have 8 upper labials on one side, the 5th below the eye. A row of small subocular scales separates the labials from the orbit.

Scales in 34—36 rows; on the neck the vertebral two series much broader than the scales of the adjoining rows. On the body the vertebral scales are only very slightly broader than those of the adjoining rows. Towards the sides the scales gradually diminish in size. The middorsal scales are about as broad as 1½ rows of ventrals together. The preanal scales are not or hardly larger than the ventral scales in front of them.

The distance from the tip of the snout to the forelimb is contained 1.5—1.9 times in the distance from axilla to groin (1.1 times in a fullgrown embryo). The length of the tail is 1.4—1.5 times that of head and body in the only two adult specimens having a complete tail (1.3 times in a fullgrown embryo). The adpressed limbs are separated from each other, or they just meet (one specimen); in the embryo they overlap. Third and fourth finger of about equal length; fourth toe longer than third, with 20—23 infradigital lamellae. Upper surface of fourth toe with 10 single scales at the tip, followed towards the base by 3 pairs of scales, and at the base a few transverse rows of 4 scales each. The length of the forelimb is equal to its distance from the posterior corner of the orbit in 3 specimens; in the other specimens it is equal to the distance from the forelimb to between ear-opening and orbit. The length of the hindlimb is equal to the distance from the forelimb to the anterior corner of the orbit in one specimen, to between the orbit and the nostril in 5 specimens, and to the nostril in one specimen.

Colour (in alcohol). Brown above. The sides of the head with four to five blackish bars on the upper labials, three of which start from the orbit. These bars run downwards across the lower labials; they are continued obliquely backwards on the chin and throat, where they converge towards their fellows. These black lines are clearly marked in fully adult specimens. One black stripe from the posterior corner of the orbit to above the ear. In some specimens a blackish longitudinal stripe on the middle of the nape and neck. Two narrow transverse black bands, interrupted on the vertebral region; in one specimen the anterior pair of these bands is confined to the sides of the neck, while those of the posterior pair converge forwards towards the median stripe. A broader blackish brown transverse band across the back in front of the shoulders, a second band behind the shoulders. Some other transverse bands are indistinctly marked on the back. Between these dark transverse bands a number of scales have pale centres, and these together form more or less distinct pale crossbands, which are most conspicuous on the shoulder region; posteriorly they are distinct only on the sides. The dorsal scales have dark borders, and these form more or less distinct dark longitudinal lines on the back. Except for the blackish converging lines on chin and throat, the whole of the lower surface is uniformly whitish.

Prof. BOSCHMA collected four eggs, apparently two sets of two. Two of

these eggs measure 29½ × 15 mm; one of these was opened and contained a young embryo. The other two measure 26 × 16 mm, and contained fully developed young. These young agree in all characters with the adult specimens, except that the distance from axilla to groin is relatively shorter; the adpressed limbs distinctly overlap. The coloration is similar to that of the adults, although somewhat more clearly marked. On the anterior part of the back the dark crossbands are very distinct. On the posterior half they are replaced by more or less irregular narrow crossbands, which alternate and fuse with those of the other side; they are not very distinct, and the back appears to be more or less variegated.

The eggtooth is well developed in the two fullgrown young. It consists of a short vertical shaft with which the tooth is inserted on the premaxillary, and of a horizontal pear-shaped cutting blade. The surface of this cutting blade bears four strong ridges on its (lower) surface (fig. 2).

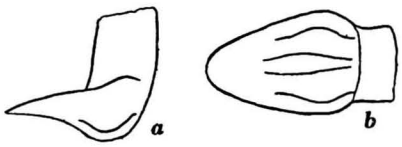

Fig. 2. *Riopa albofasciolata mentovaria* (Bttgr.), eggtooth, × 35; a, from the left side; b, from below.

TABLE V. *Riopa albofasciolata mentovaria* (Bttgr.)

Reg. no.	Scales: Round body	Scales: From nuchals to base of tail	Lamellae under 4th toe		Upper labial below eye	Frontal length/width	Frontonasal suture w. rostral / suture w. frontal	Axilla to groin / Snout to forelimb	Measurements in mm: Head + body	Tail (* regenerated)	Forelimb	Hindlimb
2583	34	74	—	22	6	1.6	0.5	1.5	165	179*	36½	51½
	34	72	23	23	6	1.6	0.4	1.6	150	171*	36½	48½
	34	73	23	23	r. 6, l. 5	1.6	0.6	1.7	141	146*	31	44
	34	74	21	21	6	1.5	0.3	1.6	139	190	30½	42
	34	74	22	22	6	1.6	0.4	1.7	118	153*	27	37
8684	34	74	23	22	6	1.4	0.4	1.9	141	112½*	32	42
	34	71	20	20	6	1.4	0.3	1.7	131	128*	29	40
8673	36	70	22	21	6	1.6	0.4	1.5	118	68*	27½	37
	36	70	21	21	r. 6, l. 5	1.6	0.5	1.5	112	163	28½	37½
8674	34	74	21	21	r. 5, l. 6	1.4	0.5	1.1	42½	55	12½	17
	36	75	22	22	6	1.6	0.5	1.1	42½	55	13	16½

Dibamus novae-guineae Dum. & Bibr.

Dibamus novae-guineae, DE JONG, 1928, p. 149.

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