SALAMANDRA	41	1/2	51-59	Rheinbach, 20 May 2005	ISSN 0036-3375

A new monitor lizard from Halmahera, Moluccas, Indonesia (Reptilia: Squamata: Varanidae)

WOLFGANG BÖHME & THOMAS ZIEGLER

Abstract. We describe a new varanid species from the Moluccan island of Halmahera, based on a preserved juvenile specimen collected 25 years ago. The new species is assignable to the subgenus *Euprepiosaurus* FITZINGER, by genital morphological characters. Within *Euprepiosaurus*, it forms part of the *V. indicus* group because of its compressed, dorsally crested tail. It has a peculiar, patternless, greyish to greenish-olive dorsal colouration, with sparsely intermixed bluish scales; underside whitish; tail tip with dark crossbands. Tongue dark bluish anteriorly, becoming distinctly lighter posteriorly (with broad whitish edges). Habitus slender, with a distinctly elongated neck. Dorsal neck scales rounded to oval, medially enlarged; 134 scales around mid-body. At least one differentiated supportive structure in the outer genital organ (hemibaculum or hemibaubellum, respectively) which is large and shovel-shaped, apically broadened and with at least eight tiny, terminal indentations. First notes about the taxonomy and natural history of this eleventh species of the *V. indicus* group are presented.

Key words. Reptilia: Squamata: Varanidae: new species; morphology; taxonomy; natural history; Indonesia: Moluccas: Halmahera.

Introduction

In the last decade nine – in part brightly coloured – species of monitor lizards were discovered and described: *Varanus finschi* BÖHME, HORN & ZIEGLER, 1994, *V. melinus* BÖHME & ZIEGLER, 1997, *V. yuwonoi* HARVEY & BARKER, 1998, *V. caerulivirens* ZIEGLER, BÖHME & PHILIPP, 1999, *V. cerambonensis* PHILIPP, ZIEGLER & BÖHME, 1999, *V. mabitang* GAULKE & CURIO, 2001, *V. macraei* BÖHME & JACOBS, 2001, *V. juxtindicus* BÖHME, PHILIPP & ZIEGLER, 2002, and *V. boehmei* JACOBS, 2003. Most of them (viz. eight) are members of the Indonesian-Australian subgenus *Euprepiosaurus* FITZINGER. Within this subgenus which is mainly characterized by derived genital morphological character states (ZIEGLER & BÖHME 1997), six of the newly discovered species belong to the *V. indicus* group and two to the *V. prasinus* group. Most of these species were discovered in the field or in the trade, respectively, but two species, viz. *V. finschi* and *V. juxtindicus*, were discovered while conducting morphological research with long-time preserved museum specimens.

During a visit of the senior author to the Division of Amphibians and Reptiles of the US National Museum of Natural History, Smithsonian Institution, Washington D.C. (USNM), in summer 2002, another obviously undescribed monitor lizard was recovered. The juvenile specimen was collected 25 years ago on the Moluccan island of Halmahera, Indonesia and was labelled as *Varanus indicus*. However, its body proportions and the uniform colouration pattern clearly separated it from *V. indicus* at first glance. In addition, this specimen differs distinctly not only from the other *Varanus* species known so far from Halmahera *(V. caerulivirens*, *V. salvator*, and *V. yuwonoi*; HARVEY & BARKER 1998, ZIEGLER et al. 1999) but also from other varanids known from the adjacent areas so that we describe it as a new species below.

Results and Discussion

Varanus zugorum sp. n.

Holotype: USNM 237439, juvenile (Figs. 1-2), Kampung Pasir Putih, Jailolo District, Halmahera Island, Moluccas, Indonesia, collected 29 December 1980 by ADAM C. MESSER.

Diagnosis: Due to its outer genital structures (see below) the new species which is currently known only from the juvenile holotype, can be assigned to the subgenus *Euprepiosaurus* FITZINGER of *Varanus*. From the representatives of both the *indicus* and *prasinus* groups (sensu ZIEGLER & BÖHME 1997) as well as from any other currently known *Varanus* species, *V. zugorum* sp. n. can be distinguished by the following combination of characters: (1) uniformly greyish to greenish-olive above without distinct pattern, but with single bluish scales interspersed on neck and body; (2) light (yellowish to beige) underside; (3) tail tip with twelve discernible dark crossbands; (4) tongue dark bluish pigmented anteriorly, becoming distinctly lighter posteriorly (with broad whitish edges); (5) very slender habitus, with a particularly elongated neck; (6) dorsal neck scales rounded to oval, medially enlarged; (7) 134 scales around mid-body; (8) existence of at least one supportive structure in the outer genital organ, which is large and shovel-shaped, broadened towards the tip with at least eight tiny, terminal indentations.

Comparisons: The existence of one distinctly enlarged hemibaculum-like structure (hemibaculum or hemibaubellum, respectively) that is shovel-shaped and distinctly broadened towards its tip and bears several tiny indentations, argues for allocating the new species to the subgenus *Euprepiosaurus* (sensu ZIEGLER & BÖHME 1997).

The outer genital organs of *V. olivaceus* from the Philippines also bear one large shovel-shaped hemibaculum or hemibaubellum each (see ZIEGLER & BÖHME 1997: their figs. 57-60), but they lack apical indentations. Moreover, *V. olivaceus* and its presumed sister species *V. mabitang* differ in scalation, for example by distinctly higher mid-body scale counts (AUFFENBERG 1988, GAULKE & CURIO 2001, GAULKE 2004).

The outer genitals of the SE Asian *Varanus rudicollis* show one large and apically broadened hemibaculum or hemibaubellum each, however, with one or two pointed bulges of different sizes at one edge of the hemibaculum's or hemibaubellum's tip only, instead of tiny terminal indentations (see ZIEGLER & BÖHME 1997: their figs. 25-28). Besides, differences in colour pattern and scalation make *V. rudicollis* easily distinguishable from the new species, e.g. by its large, compressed and strongly keeled neck scales and by the long, narrow snout with its slit-like nares that are closer to the eye than to the tip of snout (BENNETT 2004).

Within *Euprepiosaurus*, the members of both the *indicus* and *prasinus* groups have one large, shovel-shaped hemibaculum or hemibaubellum at each outer genital, and also a distinctly smaller one (which likely was overseen in the invertedly dissected genital organ of the juvenile holotype of *V. zugorum* sp. n., or it was destroyed during dissection). Thus, from the genital morphological point of view, the new species cannot be assigned to any of the two species groups within *Euprepiosaurus* at the time. However, as the arboreal *V. prasinus* group is characterized by, e.g., nares distinctly closer to the tip of snout than to the eye, and by a long (at least 1.75 times SVL) and prehensile tail which is rounded in cross-section (MERTENS 1942, SPRACKLAND 1991, JACOBS 2003), *V. zugorum* sp. n. cannot be assigned to the *V. prasinus* group and consequently must be considered a member of the *V. indicus* group. In addition, all taxa of the *V. prasinus* group have a distinctly lower mean mid-body scale count: *beccarii* 90, *boehmei* 87, *bogerti* 97, *keithhornei* 91, *kordensis* 89, *macraei* 95, *prasinus* 97, *telenesetes* 100 (data from BRANDENBURG 1983, SPRACKLAND 1991, JACOBS 2003). For the complicated taxonomy of the

V. prasinus group we refer to Böhme (1997, 2003).

Of the remaining representatives of the subgenus *Euprepiosaurus*, i.e. the ten species of the *V. indicus* group, *V. zugorum* sp. n. can be readily distinguished just by its greyish to olive greenish dorsal colouration, with some interspersed bluish scales but without discernible pattern, in combination with the light venter. In contrast, the other *indicus* group species are coloured as follows: *V. caerulivirens:* greyish-brown to black dorsum with light ocellation; light blue to turquoise tinge to the head, neck, body, dorsum, limb and tail colouration; *V. cerambonensis*: dorsum of adults deep brown to black, with numerous small light spots; dorsum of juveniles with black ocelli containing a yellow centre, whereas the dorsum of adults shows a crossbanded pattern; well defined yellow temporal band; *V. doreanus*: dorsum brownish or blackish with whitish to yellowish spots surrounded by black rings; bluish tail; dark, densely marbled throat; *V. finschi*: dark grey dorsum with black, light-centred ocelli; *V. indicus*: dorsal colour pattern consisting of irregularly scattered, small whitish to yellowish spots, mostly smaller than an area covered by five scales, on a dark-brownish or blackish background; lack of blue pigmentation; *V. jobiensis*: dorsum dark olive with numerous light spots; reddish throat; blue banded tail; *V. juxtindicus*: dorsum dark brownish, densely spotted with yellow; juveniles with reticulate to ocellate ventral pattern; tail unbanded; *V. melinus*: yellow ground colouration with more or less developed dark marbling; lack of any turquoise or blue colouration; *V. spinulosus*: dorsum dark brown with rows of yellow solid spots; *V. yuwonoi*: dorsum melanistic anteriorly, posteriorly yellow-brown; blue-banded tail (Böhme et al. 2004a, b, Philipp et al. 1999, 2004a, b, c, d, Ziegler et al. 1999, Ziegler & Böhme 2004). In addition, the new species can be distinguished from most of the other members of the *V. indicus* group by the following scalation and tongue pigmentation characters (comparative data from Mertens 1941, Böhme et al. 1994, Sprackland 1994, Harvey & Barker 1998, Philipp et al. 1999, Ziegler et al. 1999, Ziegler & Böhme 2004): (1) mid-body scale count (*caerulivirens*: 170-185; *doreanus*: 154-180, mean 168; *finschi*: 158-196, mean 180; *jobiensis*: 164-201, mean 183; *spinulosus*: 210; *yuwonoi*: 174-182); (2) tongue colouration (*caerulivirens*: pink-coloured, light tongue that may have dark pigment only on its tips and/or at its bifurcation point; *cerambonensis*: tongue completely pink only in juveniles, later the tips and an ill-defined area behind the bifurcation point become dark pigmented; *doreanus*: completely light, whitish to yellowish tongue; *finschi*: light tongue; *indicus*: entirely dark tongue; *jobiensis*: tongue pink; *melinus*: pink-coloured, light tongue; *spinulosus*: tongue pink; *yuwonoi*: tongue body dark violet, tines light).

Apart from this, *V. zugorum* sp. n. can be distinguished from *V. indicus* by its enlarged dorsal neck scales; besides, juveniles of *V. indicus* of about the same size as the holotype of *V. zugorum* sp. n. are much stouter with a distinctly shorter neck (e.g., Philipp et al. 1999). In addition, *V. jobiensis* differs from *V. zugorum* sp. n. by its conspicuously large eyes (Philipp et al. 2004b) and *V. juxtindicus* by its tail which is rounded in its first third and lacks a differentiated double keel on its dorsal ridge (Böhme et al. 2002).

Description of holotype: Habitus very slender, with a distinctly elongated neck. Length of left hindlimb 60 mm. Nostril somewhat closer to tip of snout than to eye. Nasal region swollen, with a median longitudinal concave, shallow groove. On the right side six supraoculars: the first and last ones oval, somewhat broader than long, the other four distinctly broader than long, the third being the largest, followed - in decreasing size - by the second, fourth, fifth, first and sixth supraocular. On the left side five supraoculars: all more or less broader than long, the first and last ones being more oval and the second one more square. The second supraocular is the largest, followed by the third and fourth, the

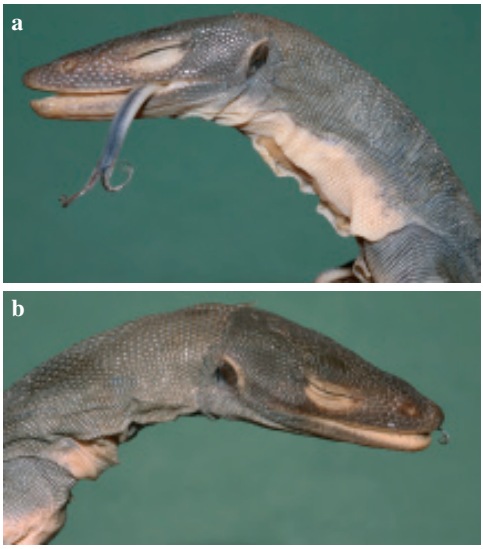

Fig. 1a, b. Portraits (left, right) of the holotype of *Varanus zugorum* sp. n. (USNM 237439).

first, and the fifth one being smallest. Pileus scales between the supraoculars medially enlarged. Scale covering the pineal organ likewise enlarged, darkened at the margins only, with a light greenish centre. Dorsal neck scales anteriorly more or less square, medially enlarged and more rounded to oval-shaped; in the posterior neck area the scales are longish, narrow and high-domed, with no distinct keel and feebly broadened behind, and surrounded by about ten granules of markedly diminished size. Dorsal neck scales at their hind part with (rarely) one to (more commonly) several distinct small grooves or pits. Dorsal scales similar to posterior neck scales, rounded to longish oval, but distinctly keeled in the second half of body and normally with fewer granules and usually only one darkened apical pit. Gular

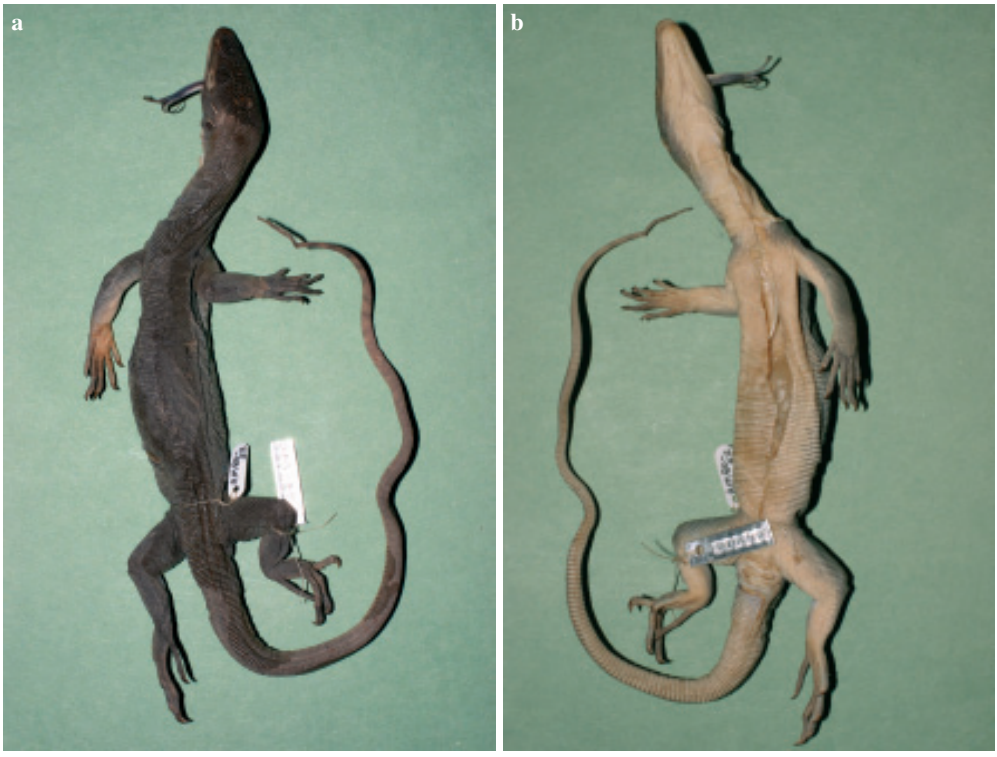

Fig. 2a, b. Dorsal and ventral view of the holotype of *Varanus zugorum* sp. n. (USNM 237439).

scales square, rounded or longish oval, bearing at the hind part one to several ill-defined pits and being surrounded, particularly in the posterior part, by a few smaller granules. Chest scales similar, more hexagonal, being largest in the medial part of chest region. Ventral scales longish oval to rectangular, slightly keeled, posteriorly mostly with one ill-defined pit and with few granules at their hind margins. Upper side of limbs covered with longish oval, high-domed and keeled scales, with granules occurring mostly at their hind part where normally also one pit is situated. Dorsal scales of tail weakly keeled, posteriorly surrounded by distinct granules only at the tail base. Here, the scales bear mostly several posterior pits, more distally only one pit. Ventral scales of tail similar to dorsal ones, but more strongly keeled, except at the basal part; the pits disappear towards the middle of tail. Tail laterally compressed, nearly from base onwards dorsally with a continuous longitudinal double keel. For further measurements, proportion indices and scale counts see Table 1.

Ground colour of the upper side of head, neck, dorsum, limbs and tail of the alcohol-preserved holotype greyish to olive greenish. Some scales in the lateral neck region and on dorsum and flanks reveal a light bluish colouration. Ground colour of the underside of the respective parts light (yellowish to beige). Median part of eyelids as well as (at least) lower part of supralabials and upper part of infralabials light (yellowish to beige); also light nostrils and tympanum with light anterior margin. Tongue dark bluish pigmented anteriorly, becoming distinctly lighter posteriorly (with broad whitish edges). The greyish greenish colour of the dorsum reaches the underside in part behind the gular fold, at the anterior thighs and behind the cloaca. Some scales beneath the fingers and toes are somewhat darker pigmented, too. Last 5 cm of tail with twelve dark crossbands, which are best discernible laterally.

Teeth slender, relatively pointed and slightly recurved.

Figs. 3 & 4. Removed and invertedly dissected left outer genital organ of the holotype of *Varanus zugorum* sp. n. (USNM 237439); note the diagnostically shovel-shaped hemibaculum-like structure below on the left. The latter is drawn in Fig. 4 (right).

Fig. 5. Stomach contents of the holotype of *Varanus zugorum* sp. n. (USNM 237439): gecko above, skink below.

Due to the tiny genital structures of the juvenile type specimen the right inverted genital organ failed to be everted after the method described by Pesantes (1994; and first applied also for female organs in moni-

Fig. 6. At present, *Varanus zugorum* sp. n. is only known from its type locality on the Moluccan island of Halmahera, Indonesia.

tor lizards by ZIEGLER & BÖHME 1997). However, a careful dissection of the left inverted genital organ, in total ca. 1 cm long, revealed a sperm groove which distinctly widens towards the end of the inverted organ and a large hemibaculum-like structure (that means a hemibaculum or hemibaubellum) on one side of the genital organ before turning out into the retractor muscle (Fig. 3). Due to the delicateness of the invertedly opened genital organ no other structures (i. e., second hemibaculum-like structure or paryphasmata) could be determined with certainty. The ca. 2.3 mm long, shovel-shaped hemibaculum-like structure that could be detected was distinctly broadened towards its tip which revealed at least eight tiny indentations (Fig. 4).

Etymology: The new species is named after GEORGE S. ZUG and his wife PATRICIA, in recognition of their help and great hospitality during WB's visit in Washington which made the recovery of this unique little monitor lizard from the USNM collection possible.

Systematic position: As stated above, *Varanus zugorum* sp. n. is clearly a member of the subgenus *Euprepiosaurus* FITZINGER, 1843 (sensu ZIEGLER & BÖHME 1997 and BÖHME 1997, 2003) and must be assigned, within this clade, to the *V. indicus* group. The relatively low scale counts and the anteriorly darkened tongue argue for an advanced position of *V. zugorum* sp. n. within the *V. indicus* group (e.g. BÖHME et al. 2002). However, the superficial resemblance of the flat, pointed head and the particularly long neck with tree monitors of the *V. prasinus* group could also argue for a basal position within the *indicus* group, i.e. close to the split off of the *prasinus* group from the common *Euprepiosaurus* clade. But this superficial resemblance could also be convergent if *V. zugorum* sp. n. is possibly more arboreal than the other members of the *V. indicus* group. It is clear that only additional specimens and future studies, in particular molecular genetic ones, will be able to resolve these questions.

It may be noted that uncoloured greyish monitor lizards with a general Pacific monitor habitus, but with doubtful and contradicting locality information exist in the international pet trade under the vernacular name „silver tree monitor" (see e.g. http://mampam.50megs.com/monitors/conservation2003.htm). We think that they might possibly represent adult specimens of *V. zu-*

		V. zugorum sp. n. USNM 237439 holotype	*V. caerulivirens* type series (n = 3)	*V.* cf *indicus** USNM 237438 juvenile	*V. indicus* ZFMK 68578 female	*V. yuwonoi* type series (n = 2) & [ZFMK 70594 juvenile]
I	D	59	65-141	64	120	[78]
	E	91	104-234	98	204	[130]
	SVL	150	169-375	162	324	345-532 [208]
	F	210	254-610	224	397+	463-845 [350]
	TL	360	423-985	386	721	1377 [558]
	A	30.4	32-65	31.4	54	[41]
	B	15.4	17-35	17.9	27	[20]
	C	11.3	13-23	12.8	22	[14]
	G	7.9	9-20	9.3	16.7	[11.8]
	H	6.8	7-14	7.7	11.7	[9.1]
	I	15.7	16-32	15.9	26.9	[21.9]
II	1	1.40	1.5-1.63	1.38		[1.68]
	2	1.16	1.29-1.5	1.21	1.43	[1.3]
	9	1.86	1.6-1.78	1.67	1.62	[1.62]
	10	1.97	1.85-1.88	1.75	2	[2.05]
	11	2.69	2.46-2.83	2.45	2.45	[2.93]
III	P	45	44-51	47	39	47-53 [55]
	Q	82	97-102	79	91	98-108 [105]
	R	56	53-56	53	69	[61]
	S	134	175-178	138	147	174-182 [188]
	T	97	91-97	94	94	100-101 [103]
	X	35	44-56	36	41	[45]
	XY	128	169-202	130	147	[184]
	C	25-26	24-26	26		26-28 [27]
	M	105	128-134	95	97	[137]
	N	101	91-94	92	92	103 [103]

Tab. 1. Measurements (I: in mm), proportion indices (II) and scale counts (III) of the holotype of *Varanus zugorum* sp. n. according to Brandenburg (1983) and Böhme et al. (1994). For direct comparisons with syntopically occurring representatives of the *V. indicus* group, the respective data of the type series of *V. caerulivirens* (after Ziegler et al. 1999) and *V. yuwonoi* (after Harvey & Barker 1998) are presented; these data are supplemented by measurements of a juvenile specimen of *V. yuwonoi* and each a juvenile and an adult specimen of *V. indicus* from Halmahera, deposited in USNM and ZFMK (Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn); abbreviations are as follows (see Böhme et al. l. c.): D: head neck length (from tip of snout to gular fold); E: body length (from gular fold to cloaca); SVL: snout vent length (D + E); F: tail length (from cloaca to tail tip); TL: total length (SVL + F); A: head length (from tip of snout to anterior margin of tympanum); B: head width (maximum width between eyes and ears); C: head height (above the eyes); G: distance from anterior margin of eye to centre of nostril; H: distance from centre of nostril to tip of snout; I: distance from anterior margin of tympanum to anterior margin of eye; 1: relative tail length (F : [D + E]); 2: position of nostril between tip of snout and eye (G : H); 9: position of nostril to snout tip ([A - I] : G); 10: relative head length in relation to head width (A : B); 11: relative head length in relation to head height (A : C); P: scales from rictus to rictus; Q: scales around tail base; R: scales around tail behind first proximal third; S: scales around mid-body; T: transverse rows of ventral scales from gular fold to beginning of hind legs; X: transverse rows of dorsal scales from hind margin of tympanum to gular fold; XY: X + transverse rows of dorsal scales from gular fold to beginning of hind legs; c: supralabials; m: scales around neck before gular fold; n: ventrals from tip of snout to gular fold. * the juvenile specimen USNM 237438 (also from Kampung Pasir Putih, Jailolo, Halmahera Island, collected 17 August 1981 by Paul M. Taylor) does not completely correspond to the diagnosis of *V. indicus* given in Philipp et al. (1999), as the tongue is not „entire dark“ (only tips, bifurcation point, and centre, the edges are light) and because a “light, dark-bordered postocular/supratemporal stripe” is not completely absent, thus in part discernible.

gorum sp. n. but were unable, despite several attempts, to secure a specimen for study.

Natural history: Nearly nothing is known about the ecology of *V. zugorum* sp. n. However, we know now that at least juveniles prey on small ground dwelling to arboreal lizards. The dissection of the stomach of the holotype revealed one juvenile gecko (*Hemidactylus frenatus*, SVL ca. 30 mm) and one juvenile skink (*Eutropis multifasciata*, SVL ca. 28 mm), both extremely common and widespread species and known from Halmahera since long (DE ROOIJ 1915). The relatively intact gecko had been ingested last and presumably tail first, because its head was directed towards the gullet; the skink was located in the hind part of the stomach, with its head directed towards the varanid cloaca. The skink's head was already in part digested and the body showed injuries on the left flank and right of the pelvic girdle. In addition, its right hand was absent and the right foot had been pulled out (Fig. 5).

Distribution: According to its label the single known specimen of *V. zugorum* sp. n. originates from Kampung Pasir Putih, Jailolo on Halmahera Island, Moluccan islands, Indonesia (Fig. 6). Much future work is necessary to evaluate not only the actual distribution of *V. zugorum* sp. n., but also its habitat requirements, life habits and population densities as well as of the sympatric and barely known varanid species *V. caerulivirens* and *V. yuwonoi*. It seems most likely that it is highly endangered since the very first moment of its emergence to science.

Acknowledgements

We thank GEORGE S. ZUG (USNM Washington) for the possibility to study the monitor lizards under his care. WB, in addition, thanks him and his wife PATRICIA ZUG for their great hospitality during his visit in Washington D.C. We also acknowledge the help of URSULA BOTT (ZFMK Bonn) with the preparation of the manuscript.

References

AUFFENBERG, W. (1988): Gray's monitor lizard. - Gainesville (Univ. Presses of Florida), 419 pp.

BENNETT, D. (2004): *Varanus rudicollis*. In: PIANKA, E. R., D. R. KING & R. A. KING (eds.): Varanoid lizards of the world. - Bloomington (Indiana University Press): 230-233.

BÖHME, W. (1997): ROBERT MERTENS' Systematik und Klassifikation der Warane: Aktualisierung seiner 1942er Monographie und eine revidierte Checkliste. Anhang zum Nachdruck von MERTENS, R., 1942, Die Familie der Warane (Varanidae). Erster bis dritter Teil. - Abh. senckenberg. naturf. Ges., Frankfurt/M. 462, 465, 466: 1-391. Frankfurt am Main (Edition Chimaira): I-XXIII.

BÖHME, W. (2003): Checklist of the living monitor lizards of the world (family Varanidae). – Zool. Verh. Leiden, **341**: 3-43.

BÖHME, W., H.-G. HORN & T. ZIEGLER (1994): Zur Taxonomie der Pazifikwarane (*Varanus indicus*-Komplex): Revalidierung von *Varanus doreanus* (A.B. MEYER, 1874) mit Beschreibung einer neuen Unterart. - Salamandra, Frankfurt am Main, **30** (2): 119-142.

BÖHME, W. & H.J. JACOBS (2001): *Varanus macraei* sp. n., eine neue Waranart der *V. prasinus*-Gruppe aus West Irian, Indonesien. - Herpetofauna, Weinstadt, **23** (133): 5-10.

BÖHME, W., K. PHILIPP & T. ZIEGLER (2002): Another new member of the *Varanus* (*Euprepiosaurus*) *indicus* group (Sauria, Varanidae): an undescribed species from Rennell Island, Solomon Islands. - Salamandra, Rheinbach, **38** (1): 15-26.

BÖHME, W., K. PHILIPP & T. ZIEGLER (2004a): *Varanus doreanus*. In: PIANKA, E. R., D. R. KING & R. A. KING (eds.): Varanoid lizards of the world. - Bloomington (Indiana University Press): 168-171.

BÖHME, W., K. PHILIPP & T. ZIEGLER (2004b): *Varanus juxtindius*. In: PIANKA, E. R., D. R. KING & R. A. KING (eds.): Varanoid lizards of the world. - Bloomington (Indiana University Press): 193-196.

BÖHME, W. & T. ZIEGLER (1997): *Varanus melinus* sp. n., ein neuer Waran aus der *V. indicus*-Gruppe von den Molukken, Indonesien. - Herpetofauna, Weinstadt, **19** (111): 26-34.

BRANDENBURG, T. (1983): Monitors in the Indo-Australian archipelago. - Univ. Leiden (Unpubl. thesis).

DE ROOIJ, N. (1915): The Reptiles of the Indo-

Australian archipelago. - Leiden (E.J. Brill Ltd.), 334 pp.

GAULKE, M. (2004): *Varanus mabitang*. In: PIANKA, E. R., D. R. KING & R. A. KING (eds.): Varanoid lizards of the world. - Bloomington (Indiana University Press): 208-211.

GAULKE, M. & E. CURIO (2001): A new monitor lizard from Panay Island, Philippines. - Spixiana, **24** (3): 275-286.

HARVEY, M.B. & D.G. BARKER (1998): A new species of blue-tailed monitor lizard (genus *Varanus*) from Halmahera island, Indonesia. - Herpetologica, **54** (1): 34-44.

JACOBS, H.J. (2003): A further new emerald tree monitor lizard of the *Varanus prasinus* species group from Waigeo, West Irian (Squamata: Sauria: Varanidae). – Salamandra, Rheinbach, **39** (2): 65-74.

MERTENS, R. (1941): Zwei neue Warane des australischen Faunengebietes. – Senckenbergiana, **23** (4/6): 266-272.

MERTENS, R. (1942): Die Familie der Warane (Varanidae); Dritter Teil: Taxonomie.- Abh. senckenberg. naturf. Ges., Frankfurt am Main, **466**: 235-391.

PESANTES, O.S. (1994): A method for preparing the hemipenis of preserved snakes. - J. Herpetol., **28** (1): 93-95.

PHILIPP, K.M., W. BÖHME & T. ZIEGLER (1999): The identity of *Varanus indicus*: Redefinition and description of a sibling species coexisting at the type locality (Sauria: Varanidae: *Varanus indicus* group). - Spixiana, München, **22** (3): 273-287.

PHILIPP, K., T. ZIEGLER & W. BÖHME (2004a): *Varanus cerambonensis*. In: PIANKA, E. R., D. R. KING & R. A. KING (eds.): Varanoid lizards of the world. - Bloomington (Indiana University Press): 165-167.

PHILIPP, K., T. ZIEGLER & W. BÖHME (2004b): *Varanus jobiensis*. In: PIANKA, E. R., D. R. KING & R. A. KING (eds.): Varanoid lizards of the world. - Bloomington (Indiana University Press): 189-192.

PHILIPP, K., T. ZIEGLER & W. BÖHME (2004c): *Varanus finschi*. In: PIANKA, E. R., D. R. KING & R. A. KING (eds.): Varanoid lizards of the world. - Bloomington (Indiana University Press): 176-178.

PHILIPP, K., T. ZIEGLER & W. BÖHME (2004d): *Varanus yuwonoi*. In: PIANKA, E. R., D. R. KING & R. A. KING (eds.): Varanoid lizards of the world. - Bloomington (Indiana University Press): 279-281.

SPRACKLAND, R.G. (1991): Taxonomic review of the *Varanus prasinus* group with description of two new species. - Mem. Qld. Mus., **30** (3): 561-576.

SPRACKLAND, R.G. (1994): Rediscovery and taxonomic review of *Varanus indicus spinulosus* MERTENS, 1941. – Herpetofauna, Weinstadt, **24** (2): 33-39.

ZIEGLER, T. & W. BÖHME (1997): Genitalstrukturen und Paarungsbiologie bei squamaten Reptilien, speziell den Platynota, mit Bemerkungen zur Systematik.- Mertensiella, Rheinbach, **8** : 1-207.

ZIEGLER, T. & W. BÖHME (2004): *Varanus melinus*. In: PIANKA, E. R., D. R. KING & R. A. KING (eds.): Varanoid lizards of the world. - Bloomington (Indiana University Press): 215-219.

ZIEGLER, T., W. BÖHME & K. M. PHILIPP (1999): *Varanus caerulivirens* sp. n., a new monitor lizard of the *V. indicus* group from Halmahera, Moluccas, Indonesia (Squamata: Sauria: Varanidae). - Herpetozoa, Wien, **12** (1/2): 45-56.

Manuscript received: 11 January 2005

Authors' addresses: WOLFGANG BÖHME, Zoologisches Forschungsinstitut und Museum Alexander Koenig, Adenauerallee 160, D-53113 Bonn, Germany, e-mail: w.boehme.zfmk@uni-bonn.de; THOMAS ZIEGLER, AG Zoologischer Garten Köln, Riehler Straße 173, D-50735 Köln, Germany, e-mail: tziegler@zoo-koeln.de.