Varanus melinus sp/n., a New Monitor Lizard from _the V.indicus_ group from the Moluccas, Indonesia.

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Abstract - given in English

Introduction*.* *Varanus indicus* (Daudin 1802) is the first Pacific monitor to be described and so gave its name to the whole related group, although its type location "Ambione" being the small southern island of Ambon in the Moluccas. Of all its relatives, *V.indicus* has the widest distribution, stretching from the Celebes (Sulawesi) in the west, over the Moluccas, New Guinea and its associated islands, the Bismarck Archipelago, the Solomons as fat as the Carolines, the Maraianas and Marshall Islands to the northeast and southwards as fat as the northern tip of Australia (de Rooij 1915, Mertens 1942, Brandenberg 1983, see also Bennett 1996). Indeed, in the minds of these authors (with the exception of Bennett) the name "indicus" embraces various puzzling names, first cited as independent types in the works mentioned ([e.g.] *V.jobiensis*, *V.doreanus* and *V.spinulosus* - for a survey see Bohme 1997)); but most anomalies have been checked against the original documentation and thus freshly arranged (Bohme et al 1994).

But these sibling species of V.indicus, at last flushed into the open, are in no way the last surprises in the gripping saga of monitor lizard classification, nor are they the last examples of hitherto unknown large monitors! This was recently made abundantly clear by a number of photographs taken by Indonesian exporters in Jakarta and circulated among local monitor enthusiasts. They show, without doubt, more than one new kind, including conspicuous forms that have not so much been overlooked by science as simply not previously observed.

Four examples of one of these types, magnificently coloured, were imported into Germany and made available to us for examination. One of the animals was acquired by the vivarium of the Zoological Research Institute of the Koenig Museum in Bonn, which serves as the basis for the following description.

Varanus melinus Sp.n.
Diagnosis.

A representative of the V.indicus group (sensu Bohme et al. 1994) immediately distinguished from V.indicus, V.jobiensis, V.doreanus and V.spinulosus by the intense yellow ground colour of the head, body extremities and tail. It is further distinguished from V.indicus by the unpigmented, flesh-coloured tongue and by the absence of any pattern on the belly; from V.doreanus likewise by the totally unpatterned belly; and from V.doreanus and V.jobiensis by not having a turquoise coloured tail. Compared with V.doreanus and V.jobiensis. V.melinus has a clearly lower scale count around the base of the tail (Q), around the middle of the body (S), along the sides (X,Y) and round the throat (m) (Bohme et al 1994). V.melinus is different to V.spinulosus in not having a dark underside, a dark brown to black back and having no green or turquoise basic tinge. What is more, V.melinus has 124 to 130 scales around the middle of the body, vs. 210 in V.spinulosus, and lastly, far from having wide gaps, there are fine, thorn shaped scales running along the nuchal and dorsal areas (Mertens 1942, Sprackland 1994).

Holotype
ZPMK 65737, male, not yet adult (cover picture and illustrations 3-5), Obi Island, Moluccas, Indonesia, taken by a local hunter in 1997.

Description of the holotype.

Slim build. Total length (GL) 820 (body 300, tail 520)mm. Hindlegs 135mm. Nostrils closer to the snout (7mm) than to the eye (13mm). Distinct canthus rostralis in the pre-ocular area, otherwise rounded. Nasal area raised and showing a median ridge. Right supraocular region: the 3 foreparts a bit wider than they are long, with only one different, about equal in length and breadth. Left supraocular region; the four foreparts wider than they are long, the last a little smaller. Cap[?] scales between the foreparts of supraocular moderately [or in the centre line] enlarged. Scales over the pineal area scarcely enlarged, polygonal, scarcely different from neighbouring scales. Dorsal scales above the throat egg shaped, slightly keeled. Back scales like dorsal scales over throat but more keeled. . Back scales smooth, on the upper thorax hexagonal, the distal folds of the throat merging into elongated rectangles in the belly scales. Keeled scales on the upper side of the hind legs. Tail scales on two thirds of the tail distinctly keeled. The uppersurface of the first fifth of the tail has a continuous double ridge. On the underside, depressions at the apex can be discerned only on the first third. More measurements and details of scales are found in Table 1.

The left hemipene of the living animal could briefly (vide infra) be photographed in a spontaneous and almost complete state of erection. In that enlarged form it certainly serves as a hemipene (cf Ziegler & Bohme 1996, 1997). The following description (with terminology from Ziegler & Bohme 1997) is limited just to photos 4 & 5 and must be completed when alcohol preparations become available.

Hemipenis sturdy, divided at the end, in life dark red and only relieved by whitish hemibacula. The basal organ is not completely [?] visible, less than wholly engorged, the near end showing the arrangement of hemibacula only in Plate 4. The sperm duct is at an angle to begin with, and after the bend in the trunk continues to curve into the outer lobe, ending in the area of the outer. smaller hemibaculum. At the distal end of the short apical lobes the duct is rather taken up into the inner and larger hemibaculum. The outer edge of the channel is somewhat strongly marked, but the channel remains wide open. The flat area at the apex is elongated asymmetrically towards the outer lobe and lies bent under the channel. From both they irregular apical lobes distally stick out the two elastic and gristly-looking hemibacula (for the difficulty see Werner 1988). The inner bigger and stronger hemibaculum is arranged behind the apex, bending in a hollow curve towards the channel and looks deeply fluted, but bends outwards at the end, slightly wrinkled and does not yet conform to the substantially different adult form (cf Ziegler & Bohme loc.cit.); the end of the outer, smaller hemibaculum is only slightly differentiated and scarcely observable, though there is indication of further small continuation. The border [paryphasmen] is reduced, but clearly formed. From plates 4-5 the border rows [paryphasmenreiben] can be seen clearly running along the smooth[?-asulcalen] indentation of the apical platform towards the outer lobe. More observable is the relatively unembellished trunco-pedical area.

The basic colour in a live specimen of head, back limbs and tail is a strong yellow. The top of the head and eyelids are yellow, the tongue a uniform pink. The temporal stripe is not outstanding. Ear-drum to proximal edge bordered in lighter colour. Head uniform yellow. From a third of the way along the neck a black speckling begins to appear, first on the sides and then on the back, most apparent on the trunk and changing to black and yellow cross banding on the first third of the tail. The black speckling is generously scattered over the sides and back between the legs. The tail shows even more distinct areas, from these being more yellow scales only occasionally surrounding a black scale. Surrounded by the black speckling the yellow areas round the eyes are bounded by bands, and about 16 such bands occur between the limbs. The upper surface of the limbs shows some paler black speckling, which extends to the toes. There are no little black scales on the soles of the feet. Black bands are arranged in dark double stripes, fading out in the last third. The underside of the head, throat, trunk, limbs and tail are coloured a rather paler yellow; only on the throat is there dark speckling, continuing along the gular folds. And there is a slight darkening on the breast.

Paratypes.

Along with the holotype, three other live animals , nearly related (Pl 1-2, 6-8)were available for inclusion in the investigation after which they died and were donated to the ZFMK collection. After assessment of the swelling of the ventral tail root, the genital lumen and the size of the protrusion of the outer genitals by pressure on the ventral tail root is seems likely that they were males.

Description of paratypes
The paratypes generally correspond to the description of the holotype. For details (size, proportions and scalation) see Table 1.
[Legend to Table 1]

In the living state details of size, indices of proportions and scalation of the holotype and three paratypes of Varanus melinus in support [based on] the investigations of Brandenberg (1983) and Bohme et al. (1994). Because of the scantiness of the examples (n=4), calculation of standard deviation of mean values was abandoned. Abbreviations used as follows (cf. Bohme et al. loc.cit):

1. Size (in mm) KRL = snout-vent length SL = tail length GL = total length; A = head, from tip of snout to proximal edge of ear, ,B = width of head - greatest between the eyes and ears; C = height of head, measured across eyes; G = distance from orbit to nostril; H = distance from middle of nostril to snout. .

2. Proportions : 2 = position of nostril, between snout and eye (G:H); 10 = index of length against breadth of head (A:B); 11 = index of length against height of head (A:C).

3. Scalation. P = count of scales in a straight line over the head between the corners of the mouth; Q = count of scales at base of tail; R = count on scales on tail to [or after nach] the proximal third; S = scales on mid-body; T = ventral bands from gular fold to beginning of back legs; X = dorsal bands from ear to gular fold; WY = X plus the number of bands from gular fold to base of back legs; c = supralabials; m = scales round throat in front of gular fold; n = ventral scales from snout to gular fold.

Throat, belly and underside of tail are similarly coloured, pale yellow and the side of the throat shows a discreet speckling of spots (paratype 3 had fewer spots on the side of the throat). Paratype 3 had a faint black speckling or spotting on the lateral area of the throat as far as the head, where it reaches the eyes, but not on the temporal stripes. On the dorsal side, the top of the skull from the beginning of the throat to the eyes is covered with numerous small scales extensively speckled with black. Lastly, in paratype 2 the black speckling on trunk and tail shows more strongly and extends over the whole area of the throat as far as the skull, where on both front and back it peters out in front of the eyes.

Derivation of name.

The name melinus is a Latin adjective meaning pale yellow and well describes the characteristic yellow ground colour. For a German name we hit on the corresponding "Quittenwaran".

Distribution

According to U & H Dekker, Duisburg, the four specimens on which this work is based come from the Moluccan island Obi, in Indonesia (see Map 1); from conversation with Dr H.J.Jacobs, Padersborn, V.melinus occurs also on the Sula Islands (western Moluccas, Indonesia). So the precise distribution remains to be determined. Previous to some brief sightings, the distribution of this splendidly coloured lizard on Obi and the Sula Islands was based on the information of the Indonesian animal dealer B.Soctanto, Jakarta (told to U.Dekker), given in discussion of the devastating forest fires in Indonesia; the traditional hunting-areas were no longer sufficiently profitable as a result of the sudden and recent injection of new resources on some of the Moluccas { or because the traditional hunting areas were no longer sufficiently profitable, emergency action was just now undertaken on some of the Moluccas, following the acquisition of new resources.

Habitat and Habits

At the end of all this work, no descriptions are available of habitats and habits in the wild. Observing them in a terrarium in Germany, V & H Dekker found a marked tendency to be active in the twilight and at night. The four lizards, which were kept separately in quarantine conditions, proved to be good eaters. They preferred fish but would take catfood or hairless baby mice. When handled they were fairly placid and not inclined to bite. When the holotype specimen was taken out of quarantine at Duisburg and when it was taken out of the transportation box in Bonn it was observed that it has defecated, with a partial engorgement of the hemipenis. Such behaviour - defensive evacuation and penile arousal - is a very widespread reaction to danger (see Mertens 1946), but it was not established in observations of the three paratypes at Duisburg. In the case of the holotype, when both hemipenes were everted a sudden full erection of the left hemipene was brought on (see Plate 4-5).

In the big rain forest terrarium at Bonn, the holotype of V.melinus showed itself to be a definite water dweller, swimming and diving and blowing bubbles through its nostrils, and also a agile climber using its prehensile tail.

Relations

By the morphology of its genitals V.melinus is clearly a member of the subgenus Euprepiosaurus, based on the characteristic (for that subgenus) of asymmetrical sulcus spermaticus. An among those, on the grounds of its characteristically reduced paryphasmen (and clearly defined, compared with those of the V.prasinus group), it could be considered a representative of the V.indicus group (see Ziegler & Bohme 1997). Of course, it remains to confirm and expand in the future the information about genital morphology set out above, with more scholarly material. Nor must the comparison of genital morphology of V.melinus compared with other members of the V.indicus group remain a matter of speculation, since some essential characteristics are not yet known. Seeing that no information worth mentioning about the genital morphology of V.spinulosus or V.doreanus finschi have yet been forthcoming, it could be that V.melinus shows closer affinity with V.indicus, when the way the paraphasmen covers the hemipenis on only one side can be verified more precisely. According to Ziegler & Bohme, it is just that one side mantling of the paraphasmen of the external genitals in V.indicus which distinguishes it from the bilateral paraphasmen covering the reproductive organs of V.d.doreanus and V.jobiensis, reduced in size and [?] separated from it in layers.

Also, the scalation of the holotype and three paratypes of V.melinus, like the detailed measurements were taken from living specimens (and therefore subject to a certain degree of error), show clear characteristics of V.indicus. The currently available counts of scales of V.melinus hardly differ from those of V.indicus (cf Bohme et al 1994): simply the proportional indices of V.melinus are relatively higher, so that eventually surveys [?-lebendmessung] in the wild must be taken into consideration. Comparisons of scale counts with V.jobiensis and V.doreanus (see Bohme et al loc.cit) shows V.melinus has clearly lower scale counts (Q, S, XY, m, n). A clearer comparison is evident in the scale counts round the middle of the body, where V.jobiensis, V.d.doreanus, V.d.finschi and V.spinulosus have an average (183 +/-12, 168+/-7, 180+/-10 & 210 scales round the body, against 124-130 for V.melinus; an obviously higher [and different?] count. The value of S is confirmed by a comparison of the scalation of the V.prasinus group, which also shows lower scale counts round the body (what Sprackland (1991) calls "rows of midbody scale: V.p.prasinus 93-110, V.p.beccari 81-86, V.p.kordensis 85-88, according to Mertens loc. cit., V.bogerti 95-99, V.keithhorni 90-93, V.telenestes 100 according to Sprackland 1991. (For taxonomy and nomenclature of the members of the prasinus group see Ziegler & Bohme 1997).

Actually the fairly prehensile character of the tail irresistibly reminds one of the tree-dwellers of the V.prasinus group, though there is sometimes a similar tendency among members of the V.indicus complex (see pictures of V.indicus, V.jobiensis and V.doreanus finschi in Wilson & Knowles 1992, Bennett 1996 and Bohme et al. 1994). The light flesh coloured tongue of V.melinus, compared with the dark tongue of V.indicus, can be seen as more original [primitive], but the possibility of adaptation must be considered. It could be that future research into the V.indicus group, along with fuller morphology of the genitals and molecular analysis of samples currently being set up, will reveal precise details of family relationships. Already, in the context of research in progress by Bohme et al (loc.cit) the real V.indicus was able to be identified on Obi (RMNH 3184) but in their illustration 6 of site 28 where it was found viz. Obi, it was mistakenly attributed to the next island eastwards, Misool. According to the animal dealers in Indonesia (in conversation with V.Dekker), the Obi lizard should be known as V.kalabeck, hiding behind that unusable name a so-called "nomen dubium" (see Bohme et al loc.cit.) in so far as V.indicus itself is not referred to by it.

According to Bennett (loc.cit.) V.indicus may exist on Obi in broad sympatry with V.salvator, but he cites no reference for this. In this connection there should be noted also the clear yellow ground colour of V.salvator cumingi from the Philippines (Gaulke 1991) and here there are darker examples known for V.melinus, paratype 2 and [that colour] on a form of V.salvator from the east coast of Borneo (Bennett loc.cit.). V.dumerilii does not qualify for inclusion because of the clear orange-gold patch all over the front of its head. Horn & Schulz (1977) describe the conspicuous yellow colouring of young V.dumerilii like this "it is hard not to think that these bright colours makes them easy prey for predators. Without observing them in the wild we must suppose that they lead a furtive life in boggy parts. Bennett (loc.cit.) is much more inclined to suspect a warning or camouflage function, yet to be demonstrated). Being independent of each other the two types of monitors with their partly yellow patterns are more likely to have merged with the light and shade of their different habitats than to have been conspicuous, even if they were not adapted to activity at half light and at night.

In this connection, let it not go unmentioned that Mertens (1951) mentions yellow colouring on the underside, head and throat of the holotype and both paratypes of V.karlschmidti, an earlier synonym for V.jobiensis (Bohme 1991). Unless the type material of V.karlschmidti, from Marienberg, Sepik River, Papua New Guinea, harmonises with Mertens original description of the aforementioned high scale count (183-191) round the middle of the body, then it remains to demonstrate clearly a weakening of colour of V.jobiensis which certainly embraces still more obscure forms (Ziegler & Bohme loc. cit.). All the same, it must be said, when all is said and done, fair's fair, lets face it etc., Mertens original description of V.karlschmidti he presented slides from the Chicago Natural History Museum and as a consequence the (precise) colours are less than certain.

Protection and prospects

In common with all members of the genus Varanus, with the exception of V.bengalensis, V.flavescens, V.komodoensis, V.griseus and V.olivaceus, which are listed in Schedule A of the Washington Species Defence Programme (WA) V.melinus must be listed in Schedule B. Only further research can establish all the ecological needs of this kind of monitor in the wild. If its distribution really were very limited and restricted then the preservation of this previously unknown monitor, outstandingly attractive with its colouration and pattern, in its natural habitat must be a priority in future.

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Summary (in English)
Bibliography
Address of authors.