

Description of a new species of *Afroedura* (Loveridge) (Reptilia: Gekkonidae) from the south-western Cape

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A new gekkonid species, *Afroedura hawequensis*, is described from the south-western Cape (South Africa). The three species groups recognized in the genus are discussed.

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'n Nuwe geitjie-spesie, *Afroedura hawequensis*, vanuit die Suidwes-Kaap (Suid-Afrika), word beskryf. Die drie speslegroepe wat in die genus onderskei word, word bespreek.

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The genus *Afroedura* (Loveridge) is restricted to southern Africa where it is well represented by 18 taxa (Onderstall 1984). Its distribution is from Mozambique southwards through Zimbabwe, northern and eastern Transvaal, Swaziland, eastern Orange Free State and Natal to the south-eastern Karroo, and from the south-western Cape northwards through Little Namaqualand and South West Africa to Central Angola (Figure 1).

Afroedura differs from other gekkonid genera mainly in the anatomy of the digits, which are free, clawed, and with a large pair of adhesive pads distally slightly separated from one or two pairs of smaller adhesive pads proximally (Loveridge 1947). *Afroedura* is so close in appearance to the Australian *Oedura* that the African form for a long time was considered to belong to the latter genus. The initial separation of *Afroedura* from *Oedura* was based on the smaller number of digital adhesive pads and the verticillate tail of most of the African species (Loveridge 1947; Haacke 1965). Since then evidence has been produced that in spite of superficial similarity they actually belong to separate subfamilies, namely Gekkoninae and Diplodactylinae (Kluge 1967).

With the exception of one taxon these geckos are rupicolous, occurring from sea level to mountain top (Fitz-Simons 1943; Onderstall 1984). It is believed that its rupicolous nature with accompanying limited vagility is possibly the cause of the discontinuous and often restricted distribution of the different taxa (Onderstall 1984). All the species are mainly nocturnal.

A new form of the genus *Afroedura* was discovered in the south-western Cape and this study was undertaken to determine its taxonomic status.

Systematics

Afroedura hawequensis sp. nov.

TYPE MATERIAL. 15 specimens, all collected at the type locality. *Holotype*: TM 58437, adult male. *Allotype*: TM 58438, adult female. *Paratypes*: TM 58439 – 58443, two adult males and three adult females; TM 58444 – 58446, subadults and TM 58447 – 58451, juveniles. TM 58438, 58444, 58445 and 58447 collected 11 November 1984. All other specimens collected 24 November 1984. The type specimens were deposited in the collection of the Transvaal Museum, Pretoria.

TYPE LOCALITY. The Hawekwa Mountains near Paarl, 33°41'05"S/19°05'42"E, Cape Province, South Africa, at an altitude of 1 140 m.

ETYMOLOGY. Named after the type locality, the Hawekwa Mountains.

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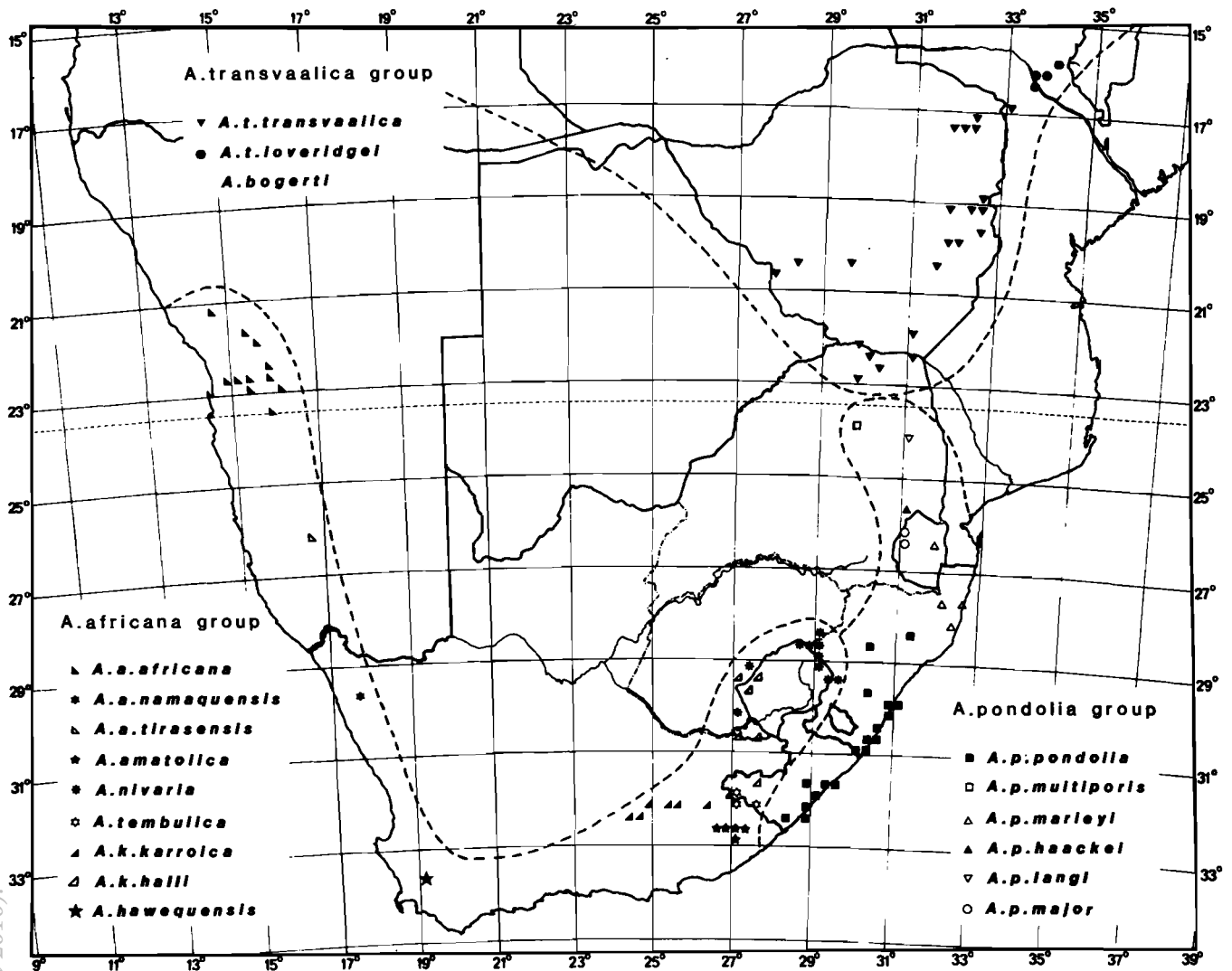


Figure 1 Distribution of the genus *Afroedura* in southern Africa. The distributional boundaries of the species groups are indicated by broken lines. *A. bogerti* occurs in Central Angola and its distribution is not indicated on the map. (Partly redrawn from Onderstall (1984).)

DIAGNOSIS. Three pairs of adhesive pads on all digits but the first of each hand and foot where the second and third pairs are markedly undeveloped (Figure 2 a,b). Males have an exceptionally large number of preano-femoral pores, 30–32, which extend across the entire femoral region (Figure 3). Pore-bearing scales distinctly enlarged forming a curving series from knee to knee (Figure 3). Tail much depressed and regenerated tails broadened into a leaflike shape (Figure 4).

DESCRIPTION.

Holotype. TM 58437, adult male (Figure 4). Snout-vent length 76 mm. Tail 56 mm long, regenerated, extremely flattened dorso-ventrally, 21 mm broad at base and leaflike in shape. Head and body greatly depressed. Head oviform. Nostril pierced between rostral, first upper labial, two nasal scales and nasorostral. Nasorostrals separated by two granular scales, one behind the other, larger than granules on snout immediately behind nasorostrals. Rostral twice as broad as deep. 12 (R) and 13 (L) upper and 10 lower labials on both sides. Labials decrease in size towards gape. Pupil above ninth and tenth upper labials, respectively.

Mental scale subhexagonal, much wider at lip than adjacent lower labials, but narrows to half its width at posterior end and is slightly longer than adjacent labials (Figure 5). Mental and adjacent pair of lower labials followed by enlarged, hexagonal and pentagonal chin scales which grade

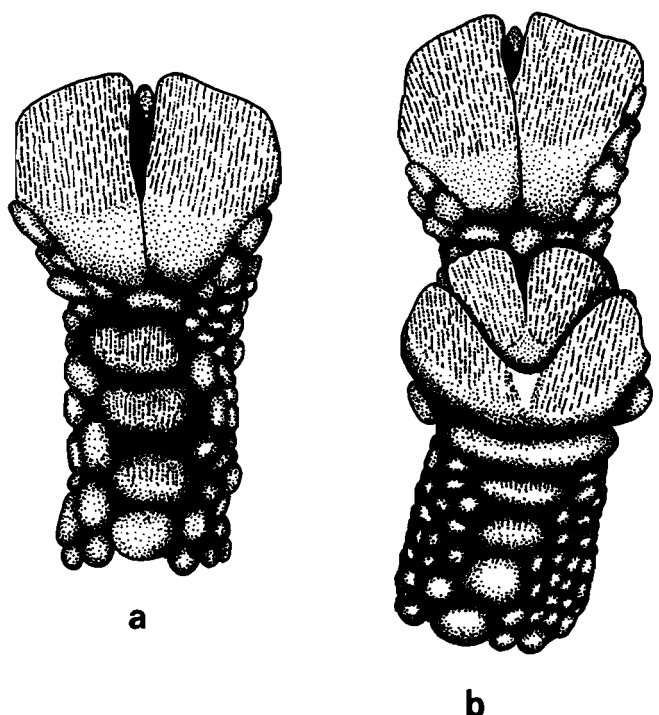


Figure 2 The ventral terminal part of (a) the first finger and (b) the third finger of the left hand of the holotype, TM 58437.

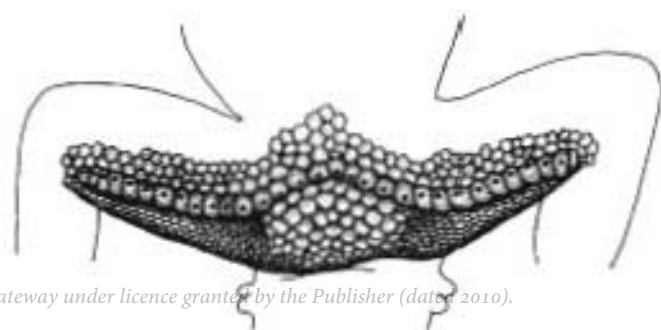


Figure 3 The preano-femoral pores and associated scales of the holotype, TM 58437. In reality the shape of the pores is not as regular as indicated.

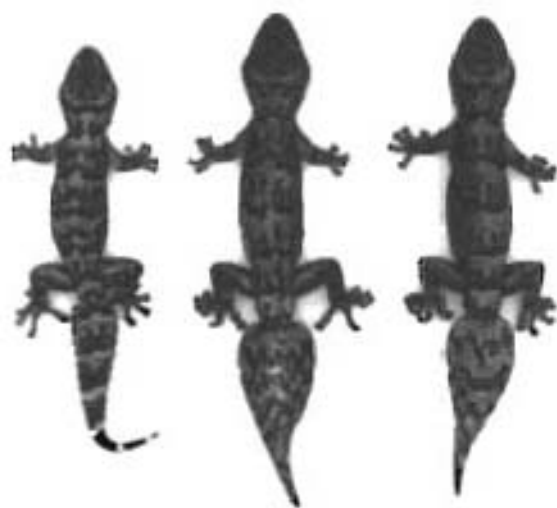


Figure 4 *Afroedura harwequensis* sp. nov. Dorsal views of the holotype (centre) and paratypes TM 58444 (left) and TM 58443 (right).

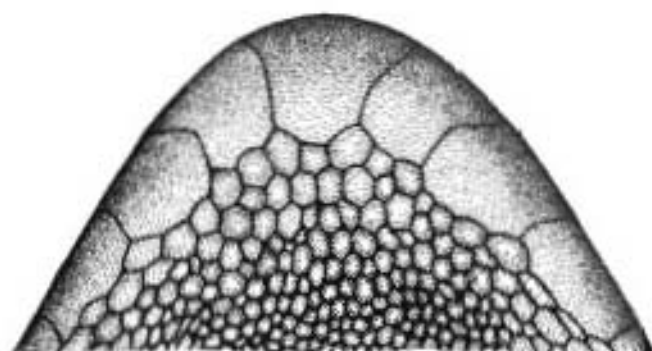


Figure 5 Arrangement of the chin scales of the holotype, TM 58437.

into very small gular scales. 62 gulars across throat below the eyes. Mental bordered posteriorly by three chin scales (Figure 5).

Scales on snout rounded, granular and juxtaposed, much larger than scales on back of head, smaller than scales on back. Dorsal scales variable in size, rounded, flattened, juxtaposed and subimbricate. Ventral scales hexagonal, flat, imbricate, elongated and some are slightly serrated posteriorly along the body midline. Preano-femoral pores 30, each situated anteriorly in a distinctly enlarged scale over the femoral region and posteriorly in a slightly enlarged scale over the preanal region (Figure 3). Pore-bearing scales form a

curving series from knee to knee. On either side of base of tail two strongly enlarged subconical tubercles occur.

Three pairs of adhesive pads on each digit other than the first digit of each hand and foot on which the second and third pairs of pads are undeveloped (Figure 2a). All the other digits have large adhesive distal pad pairs followed by a gap and then by two pairs of smaller adhesive pads (Figure 2b). The last pair is followed by a large transversely elongated scale and a median row of 1–5 smaller transversely elongated, flattened scales.

Dorsal side of head, body, limbs and tail covered with irregular or broken-up transverse bands of dark brown over a light greyish brown background (Figure 4). Six bands occur from back of head to base of tail. The bands are continued on the ventral side of the tail, distally. Yellow spots occur at the edges of the transverse bands and along the sides of the body. The underparts of the body are creamy white.

Allotype. TM 58438, adult female. Snout-vent length 75 mm. Tail incomplete but remaining part verticillate. Each verticil formed by six rows of scales dorsally and four rows of slightly larger scales ventrally. Tail stub distinctly flattened, 15 mm at broadest point. Three enlarged, projecting scales occur on either side of tail base. Nasorostrals separated by one large scale. Ventral scales variable from hexagonal to rounded, imbricate, slightly serrated on posterior border. A curving series of 34 enlarged scales stretches from knee to knee ventrally, similar to the pore-bearing scales in the holotype. Although most of these scales bear indentations no actual pores occur.

Paratypes. TM 58444, subadult male. Snout-vent length 64 mm. Tail much depressed, 12 mm at broadest point and verticillate. Each verticil with 6–7 rows of scales dorsally and five rows ventrally. Projecting scales at tail base two on one side and three on the other. Ventral scales subimbricate, hexagonal to rounded, not serrated medianly. Dorsal scales spherical to slightly flattened. Preano-femoral pores poorly developed and only few discernible. About 85 gulars across throat counted below the eyes.

TM 58440, adult female. Snout-vent length 75 mm. Tail regenerated, 51 mm long, distinctly flattened dorso-ventrally, 20 mm at broadest point. Nasorostrals not separated by granules.

TM 58441, adult female. Snout-vent length 75 mm; tail lost. Mental bordered posteriorly by only two chin scales, thus pentagonal in form.

TM 58442, adult female. Snout-vent length 83 mm. Tail regenerated, 45 mm long, flattened dorso-ventrally, 21 mm at broadest point. Nasorostrals partially separated by small granule.

The rest of the paratypes are similar to the other types but for slight individual variations.

VARIATIONS. In all 15 individuals investigated the second and third pairs of adhesive pads of the first digit of each hand and foot are undeveloped. Tails are distinctly flattened in all individuals with intact tails but more so the regenerated tails. In adults the dorsal scales are flattened while in subadults and juveniles they are more spherical. In adults the ventrals are hexagonal, imbricate, elongated antero-posteriorly and slightly serrated along the midline, while in subadults and juveniles the ventrals are rounded, subimbricate, not elongated, nor serrated.

The variations occurring could be summarized as follows:
Internasal granule (a) Absent and nasorostrals in close contact in two individuals.

- (b) Nasorostrals in partial contact enclosing a minute internasal behind the rostral in three individuals.
- (c) One present in three individuals.
- (d) Two, one behind the other, present in seven individuals.

Upper labials	10–13
Lower labials	8–11
Chin scales bordering	
mental posteriorly	two in one individual three in 14 individuals
Rows of scales in	
caudal verticil	above 5–7 below 4–5
Gulars	62–85
Preanal pores	30–32
Maximum snout-vent	
length	83 mm

FIELD NOTES. All the geckos were found in narrow cracks in sandstone boulders, preferring shady conditions. Up to five individuals were found to share the same fissure, while they were also sometimes found in association with *Phyllodactylus porphyreus*. Other rupicolous lizards found in the area were *Agama atra* and *Pseudocordylus microlepidotus*. Some of the adult female geckos had fully developed eggs when caught during middle November and one female laid two eggs in the laboratory. These eggs with hard calcareous shells had a long axis of 17 mm.

Discussion

In the genus *Afroedura* three distinct species groups can be recognized by using the number and arrangement of adhesive digital pads and the nature of the tail as distinguishing characters (Onderstall 1984). One group, the Transvaalica group, is characterized by two pairs of adhesive pads per digit and a strongly verticillate, flattened tail. Another group, the Pondolia group, also has two pairs of adhesive pads per digit, but a 'non-verticillate' tail. The third group, the Africana group, is distinguished by three pairs of adhesive pads per digit and, as in the Transvaalica group, a verticillate flattened tail. The areal extent of each group's distribution is indicated in Figure 5. Large distributional interruptions exist between *A. bogerti* and the rest of the Transvaalica group and between the western and south-western forms of the Africana group.

A. hawequensis sp. nov. should be considered as belonging to the Africana group because it has a verticillate, flattened tail and three pairs of adhesive pads on four of the five digits of each hand and foot. The discovery of this new form partly fills in the distributional gap which existed between the western and south-eastern forms of the Africana group (Figure 5). Except for its large size, high number of 'preanal' pores and only one pair of adhesive pads on the first digits, *A. hawe-*

quensis more or less resembles the other forms of the Africana group morphologically. Interestingly, a form of similar body size, *A. pondolia major*, occurs in the Pondolia group, while an equal number of preanal pores occur in another Pondolian form, *A. pondolia haackei*.

By arranging the different forms of *Afroedura* into groups (Onderstall 1984) it is implied that taxa within a group share phyletic routes. This in turn implies that certain chronological sequences of processes were responsible for the formation of the different groups. Onderstall (1984) used only two characters to separate the different species of *Afroedura* into three groups, with three implications: Firstly, because one character is shared in each case, the Africana and Transvaalica groups and the Pondolia and Transvaalica groups are sister groups respectively; secondly, because no characters are shared, the Africana and Pondolia groups are not sister groups, and therefore not closely related, although these two groups are geographically in broad contact in the south-eastern Cape (Figure 5); thirdly the species of *Afroedura* form a ring complex with the ring closing in the south-eastern part of the country. To recognize vectorial trends in the complex, and thus to determine the most plesiomorphic group, outgroup comparison is called for.

The occurrence of *A. hawequensis* sp. nov. in sandstone situations proves that the distribution of *Afroedura*, at least in the south-western Cape, is not restricted to the occurrence of dolerite sills as was suggested by Onderstall (1984) for the whole southern Cape.

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