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THE BURROWING GECKOS OF SOUTHERN AFRICA, 3 (REPTILIA: GEKKONIDAE)

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(With two Plates and one Text-figure)

ABSTRACT

This study deals with the entirely terrestrial genera of southern African gecko and is published in five parts in this journal. In this part the genus *Colopus* of the Kalahari is discussed and one new subspecies described.

ANNOTATED TAXONOMIC ACCOUNT (Cont.)

D. Genus *COLOPUS* Peters

Colopus Peters, 1869, *Mber. Akad. Wiss. Berlin* **1869**:57, plate, fig. 1.
Type species: *Colopus wahlbergii* Peters, 1869.

A small, slender, terrestrial, nocturnal gecko.

All fingers and toes with two undivided, terminal, transverse, adhesive lamellae. Toes clawed in females only, fingers without claws. Digits free and slender, with fingers slightly dilated near tip, but toes tapering. Hands and feet covered dorsally by imbricate scales and a terminal, nail-like scute on digits, ventrally with irregular, smooth granules on palms and blunt granules of similar shape to those of *Chondrodactylus* and *Kaokogecko* in digits. Granules under first interphalangeal joint of fingers enlarged. Soles of hands and feet slightly pad-like, with distinct swellings under interphalangeal joints of digits. Phalangeal formula: manus 3,3,4,4,3, pes 3,3,4,5,4. Body slender, subcylindrical; head oviform, not depressed; tail unsegmented, cylindrical, tapering; legs thin, average in length. Body covered with imbricate scales dorsally and ventrally. Pupil vertical with lobed sides, closing down to four pinholes (*Gekko*-type; Underwood,

1954); extrabrillar fringe well developed. Postanal sacs present, preanal and femoral pores absent.

A Kalahari endemic represented by a single species.

DISTRIBUTION: A Kalahari endemic, occurring from near the Orange River in the south through the central Kalahari north-westwards into southern Angola.

6a. *Colopus wahlbergii wahlbergii* Peters, text-fig. 1, plate 2 (top row).

Colopus wahlbergii Peters, 1869, *Mber. Akad. Wiss. Berlin* **1869**:57, pl., fig. 1; FitzSimons, 1943: 111, figs 31–34, pls 11:2, 17:5; Loveridge, 1947:335; Mertens, 1955:43; Wermuth, 1965:21; Mitchell and Steyn, 1967:25; Kluge, 1967:27; Mertens, 1971:35.

Colopus wahlbergi, Underwood, 1954:477; Pianka, 1971:1024.

Pachydactylus marshalli FitzSimons, 1959:406.

Type locality: Damaraland.

DIAGNOSIS: A small, slender, nocturnal, terrestrial gecko. In general appearance similar to some small ground-living species of *Pachydactylus,* but differing by having only two transverse, adhesive lamellae under each digit, tapering toes and only four phalanges in finger 4.

DESCRIPTION: Body elongate, slender, sylindrical with thin legs which carry body well off the ground. Limbs slender and average in length; adpressed hindlimbs reaching to between wrist and elbow. Tail unsegmented, cylindrical, tapering to a fine point, varying in length from 82,4 to 98,3 percra ($N = 34$, $\bar{x} = 91{,}2$).

Head oviform, convex, not depressed, about 1,2 times as long as broad, distinct from neck. Snout obtusely pointed to rounded, in length about 1,5 times to twice diameter of eye and 1,2 times distance from eye to ear opening. Ear opening minute, about one third of diameter of eye, oval and oblique. Eye average and slightly bulging, varying in diameter from 5,5 to 7,0 percra ($N = 41$, $\bar{x} = 6{,}1$); extrabrillar fringe well developed above and in front of eye, ending in a blob-like thickening in anterior corner of eye. Pupil a vertical, notched slit of *Gekko*-type (Underwood, 1954), which can close down to four pinholes, due to the overlapping of the marginal lobes. Nostril pierced between three nasal scales, of which anterior one is by far the largest and in contact with rostral and first upper labial, but separated from its fellow by an enlarged, elongate, internasal scale. Lateral nasal scale also in contact with first upper labial and a small semilunar projection from it partly obstructs nostril internally. Rostral six-sided, 1,5 times to twice as broad as deep; upper labials seven to ten (usually nine or ten); lower labials seven to eleven (usually eight to ten); mental variable, may be broader than long, but usually longer than broad, slightly tapering and rounded posteriorly; first lower labials broader than, and subequal in length to mental; no enlarged chinshields present. Granules on snout subhexagonal to rounded, elongate, subequal in size to those on back, becoming subimbricate mesially. Parietal and temporal area covered with small, juxtaposed, roundish granules, becoming subimbricate on neck and shoulder and imbricate and slightly convex on back. Tail covered above with large, squarish, imbricate scales, irregularly arranged near base, but in regular transverse rows over the greater part, while ventrally juxtaposed, imbricate, slightly pointed scales occur. Regenerated tails covered completely with juxtaposed, im-

bricate scales of irregular size and arrangement. Tail autotomy usually takes place at the base. Of 142 specimans 58,6% still had original tails while 27,5% had tails regenerated from the base and only two specimens (1,2%) had their tails regenerated from a point distally to the base. Of the remaining 12,7% the tail was broken at the base and missing.

Chin covered with minute juxtaposed granules, which change to flat imbricate scales on throat and belly, where many are irregularly notched. Ventrals largest in preanal area.

Front legs covered with flat imbricate scales dorsally and roundish to subimbricate granules ventrally. Hands covered dorsally with flat imbricate scales. Fingers subequal in length with serrated edges and slightly dilated tips. Tip of each finger covered with a large, flat, nail-like scute which overlies a smaller scale with a median notch and is bordered laterally by two enlarged, pointed scales. Ventrally each finger terminates in a pair of transverse, undivided adhesive lamellae, of which the distal one is larger. Palm covered with roundish, subconical granules, which, under fingers, have a more or less three-pointed base, made up of alternate convex and concave sides, similar in basic pattern to those of *Chondrodactylus* and *Kaokogecko*, but not as well developed. Palm of hand slightly pad-like with distinct swellings under first interphalangeal joints; each swelling bears enlarged, callous scales. Fingers bent upwards at first interphalangeal joints, thereby exposing these enlarged scales for digging and avoiding damage to terminally positioned scansors while digging or walking on ground.

Hindlegs covered with granular to flat imbricate scales. Feet and toes covered above with flat imbricate scales. Toes slender, tapering, increasing in length from 1 to 4, with toe 5 short, subequal to 3 and standing at about right angles to 4. Tip of each toe covered above by a flat nail-like scute, under which a minute retractile claw erupts in females. Palm and toes covered with granules and scales of similar shape to those on underside of hands and fingers, but of slightly smaller size.

Sexual dimorphism: On either side of base of tail, above vent, is a longitudinal, slightly curved row of three to six (usually four or five) enlarged scales. In males these are very prominent, pointed and curving upward, while in females flat and less conspicuous to absent. Posterior to vent males have two prominent, elongate, oviform swellings, into which hemipenes are retracted, while in females the postanal area may or may not be swollen. Toes of females bear minute claws, sometimes difficult to detect, occasionally retracted, but may be exposed by depressing tip of toe with a needle. Toes of males without claws, although in exceptional cases individual toes may be clawed. Females attain a greater average maximum length than males. In the large sample from Tshabong the snout-vent length of the ten largest females ranged from 56,3mm to 61,2mm ($\bar{x}$ = 57,9mm) while that of the ten largest males varied from 47,7mm to 51,4mm ($\bar{x}$ = 49,3mm). Further it appears that the eyes of males are slightly larger i.e. $\bar{x}$ = 6,3 percra. (N = 23, range 5,5 to 7,0) while those of females only reach 6,0 percra on average (N = 18, range 5,4 to 6,6). No sexual dischromatism was observed.

Colour: The dorsal pattern shows considerable individual variation, even amongst specimens from one locality. However, a basic similarity

exists and is as follows: A dark brown streak, starting behind the eye, extends, as a dorsolateral line, over the neck to the shoulders, where it may fade and merge into the dark colour on the sides of the body or may continue to anywhere up to the groin. Below this dark band is a light band which originates behind the nostrils, passes across the upper labials, the ear and neck onto the sides of the body, where it breaks up into a number of light blotches which may continue to the groin. A vertebral row of laterally elongate, bandlike, dark-edged light spots extends from the neck to the base of the tail. These spots may all merge into a broad, light-coloured, vertebral band with dark-edged, notched or lobed sides. The nostrils are dark; a light median line passes backwards from the rostral to between the eyes; the extrabrillar fringe is white; no definite pattern is visible on the head. Extremities are light brown, with isolated dark brown scales scattered over the dorsal surface. Unregenerated tails are brown with lighter spots and clusters of dark brown scales and a light underside. Regenerated tails are irregularly dark above with scattered isolated dark brown scales and a light underside.

In specimens from the Angola border adults have a dark brown mottled dorsum, while juveniles have a vertebral row of transverse elongate spots. A tendency for the vertebral spots to become confluent and to form a pale band with dark, irregularly wavy edges increases in intensity from north to south. Nevertheless, even in areas relatively close to the range of the new subspecies described below, the specimens available have a pattern which is clearly distinguishable from that of the new form.

Preserved specimens lose their delicate pastel colours. A colour slide of a specimen from Tierputs shows the sides of body and neck, dorsal side of snout, limbs and tail light brown; vertebral spots light pinkish-brown with interrupted dark brown border lines; light line on sides of head and neck and blotches on side of body pale lemon yellow; extrabrillar fringe light yellow; supra-orbital area bluish, due to the black eye-balls showing through skin; all dark dorsal markings chocolate-brown; all light areas dusted with minute brown specks; ventrum white, underside of limbs pinkish; iris silvery with chocolate brown to reddish reticulations, while area adjacent to pupil yellowish.

Size: Largest specimen and largest female P 17680 Snout/vent = 61,2 mm. Largest complete female P 17543 111,0 (56,5 + 54,5)mm. Both from 11km S. of Tshabong. Largest male TM 42513 97,8 (52,0 + 45,8)mm from Gangwe Pan.

Ecological and Field Notes: Until Pianka's field team came to South Africa in 1969, *Colopus* was the rarest of the burrowing geckos in scientific collections. At present very little is known about its biology. This shortcoming should be largely alleviated as soon as Pianka has analysed and published the wealth of information gathered by his team.

It is strictly nocturnal and emerges from its day retreats after sunset. However, after heavy rains in the central Kalahari, a female was observed basking in the afternoon sun at Khutse Pan in January 1972. Although, because of the presence of scansors theoretically able to climb, it appears to be exclusively terrestrial. No accurate information is available concerning its burrow. As the structure of the feet does not show the same

degree of adaptation to burrowing as found in the other genera under discussion, it indicates that this gecko might prefer existing available shelters. This deduction appears to be borne out by FitzSimons (1943 plus field-book notes), who found a specimen in a hole under a small bush at Matapha Pan. TM 26974 was found under an empty petrol drum at Dekar while TM 41477 was found sharing an occupied *Ptenopus* burrow at Khutse Pan. FitzSimons' observation that they appear to be particularly active after rains was also confirmed at Tierputs and Tuwhe Pan, where they were found walking about at night after showers, or while thunderstorms were in the vicinity. Rain is not usually dangerous to *Colopus* as Kalahari sand is very absorbent. However, strong downpours can be dangerous, as was observed by Broadley (1967) at Kangyane Pan, which was suddenly flooded during a thunderstorm. Specimens were found drowned or still swimming.

It is interesting to note that all six specimens collected at Tierputs in November 1961 were males. Although this could be accidental, it may have something to do with reproductive activities, about which nothing is yet known.

From the scanty records avaiable at present the distribution of *Colopus* cannot be as clearly associated with either physical or climatic conditions as those of the other genera under discussion. The Kalahari sand, which appears to be the preferred habitat of this gecko, covers a much wider area than its known distribution and it occurs from the below 250mm average annual rainfall zone to well into the 500mm to 750mm zone. The food consists of small insects, such as termites, grasshoppers, ant-lions and others, and a certain amount of sand is usually present in the stomach. *Colopus* has been recovered from the stomach of *Chondrodactylus* (Loveridge, 1947:338), the Brown House Snake, *Boaedon f. fuliginosus* (Broadley, 1967) and the Horned Adder, *Bitis caudalis* (Broadley, 1972). Other nocturnal snakes as well as small carnivores and owls must be considered natural enemies of this gecko. No external nor internal parasites have been observed.

REMARKS: Loveridge (1947:14) lists *Colopus* as one of five African gekkonid genera without postanal sacs. However, they were found to be present in all the specimens examined. Furthermore Loveridge (1947:336) discusses in great detail all previous discussions regarding the absence or presence of claws in this genus. Because of the presence of claws in specimens from the central Kalahari, a new species *C. kalaharicus* (FitzSimons, 1932:36) had been described, as no previous description mentioned these. The latest investigations have shown that claws are normally present in females only. (See sexual dimorphism above). As the holotype of *wahlbergii* in the Stockholm museum is said to be a male, Peters and subsequent investigators were probably correct in not finding any claws. The holotype of *C. kalaharicus* (V.L.K.E. 48, TM 14552) is a female with well developed claws, but was erroneously described as a male.

The type of *Pachydactylus marshalli* (TM 22589) is without a doubt a *Colopus wahlbergii* as already stated by Mitchell and Steyn (1967:25).

RANGE: The southern, central to north-western Kalahari, from the northern Cape Province through southern and central Botswana, north-eastern South West Africa into southern Angola (Fig. 1).

RECORDED LOCALITIES (Gazetteer in Part 1): Angola – S.W.A. Border 18° E. (TN); Damaraland (F, M, L,); Dekar, Gangwe Pan (TN); Gezelskap (P); Ghanzi (TN); Gomodimo Pan (L, TO); 22 km N.E. of Kalkfontein (UM); Kang (F, L); Kangyane Pan (UM); Kaotwe Pan (L, TO); Kokong (F, L); Khutse Pan (TN); Kuki (= Khutse) – Gomodimo Pans (L, TO); Lekuru Pan, 60 km N.W. of Lephepe, 60 km N. of Lephepe, 10 km W. of Letlhakeng, 22 km N. of Mabuasehubi (UM); Makambu (TN); Matapha Pan (L, TO); 15 km N.W. of Middelpits (P); 40 km N.W. of Mobutsane, Mothate Pan, Odila Dam, Rietfontein, Samangeigei (TN); 28 km N.W. of Serowe (UM); Shimanye (SW); Tierputs (TN, SW, UM); Topan Vley (F, L); 11 km S. of Tshabong (TN, P); 50 km N. of Tshabong, 55 km N.W. of Tsumkwe, Tuwhe Pan (TN); 5 km S.W. of Vanzylsrus; Voorloper (= Gemsbok) (P).

MATERIAL EXAMINED: One hundred and forty-nine specimens.

TRANSVAAL MUSEUM: TM 14552–5 Kaotwe Pan; TM 14556 nr Matapha Pan; TM 14557 btwn Kuke and Gomodimo Pans; TM 22589 Samangeigei; TM 24203 nr Ghanzi; TM 26974 Dekar; TM 27036–7, 27040–1 Tierputs; TM 27116 Tuwhe Pan; TM 38381–2 55 km N.W. of Tsumkwe; TM 38493–500 Makambu; TM 38526–8 Angola–S.W.A. Border 18° E.; TM 38553–5 Odila Dam; TM TM 39134 11 km S. of Tshabong; TM 39135 50 km N. of Tshabong; TM 39985 Mothate Pan; TM 41428–9 Rietfontein; TM 41477 Khutse Pan; TM 42505 40 km N.W. of Mobutsane; TM 42513 Gangwe Pan.

STATE MUSEUM: CR 2462 Tierputs; CR 3734–5 Shimanye.

UMTALI MUSEUM: UM 9927 Tierputs; UM 10229–30 60 km N.W. of Lephepe; UM 10267 10 km W. of Letlhakeng; UM 13814 22 km N.E. of Kalkfontein; UM 15094–5 Kangyane Pan; UM 18161 28 km N.W. of Serowe; UM 23994–5 Lekuru Pan; UM 23996, 24084 22 km N. of Mabuasehubi; no number 60 km N. of Lephepe.

PIANKA COLLECTION: 15876, 15898, 15923, 15931, 16335–6, 16391 Gezelskap; 15999, 16079, 16125 Voorloper; 15212–3 15 km N.W. of Middelpits; 15623–4 5 km S.W. of Vanzylsrus; 15615, 15618, 15949–50, 15957–9, 15961–2, 15982, 15985, 15992, 16021, 16091, 16141, 16150, 16155–6, 16158, 16174–7, 16192, 16205, 16256, 16263, 16286, 16297–8, 17423, 17477, 17542–3, 17658–60, 17678, 17680, 17698, 17702, 17705, 17725, 17729, 18893, 18899, 18934, 18978, 18980, 19009–14, 19753–4, 21154, 21194, 21196, 21200, 21202, 21246–7, 21251, 21254–7, 21260, 21432, 21435–6, 21440–1, 21461, 21465, 21467–70, 21472 11 km S. of Tshabong.

6b. ***Colopus wahlbergii furcifer*** ssp. nov., text-fig. 1, plates 2 (bottom row) and 3.

Colopus wahlbergii, FitzSimons and Brain, 1958:100 (Mata Mata); Mertens, 1971:35 (San Remo).
Colopus wahlbergi, Pianka, 1972 (Various localities).

Type locality: Twee Rivieren on Nossob River, Kalahari Gemsbok National Park, Gordonia district, Cape Province, South Africa (± 26° 22'S., 20°36'E., altitude 888m).

Type series: Eight specimens: 3 males, 4 females, 1 unsexed juvenile. The types are in the Transvaal Museum.

Holotype: TM 25727, adult female, from Twee Rivieren, 22.II.1959, C.K. Brain; paratypes: TM 24640, 24913, Mata Mata, February and October 1957, C. Koch; TM 25085 Twee Rivieren, January 1958, G. van Son; TM 25725–8, Twee Rivieren, 22.II.1959, C.K. Brain; TM 33370 Twee Rivieren, 3.XI.1966, C.G. Coetzee.

DIAGNOSIS: An arid-area form, occupying south-western parts of range of this monotypic genus, i.e. "dune area" of the western and south-western Kalahari. Differs from typical form in having a different colour pattern and a more pointed, subtriangular head.

DESCRIPTION: Holotype: TM 25727, adult female, 95,0 (50,5 + 44,5) mm. Head from tip of snout to right ear opening 11,5mm long, width 9,0mm over widest part of temporal area; snout 5,3mm from rostral to anterior border of right eye; diameter of right eye 3,2mm = 5,9 percra; distance from eye to ear on right side 4,3mm; length of right forelimb from armpit to palm of hand 12,1mm; length of right hindleg from groin to palm of foot 15,6mm.

Body elongate and slender; in general shape similar to typical form, but differing in more pointed snout resulting in more subtriangular shape of head; legs slender, adpressed hindlegs nearly reaching elbow; tail cylindrical, tapering to a fine point, equal to 88 percra. Scalation similar to that of typical form; rostral six-sided; mental elongate, with parallel sides and rounded posterior edge, extending beyond adjacent lower labials; upper labials 10; lower labials 9 and 8.

Colour: A light vertebral band, bordered by a thin dark line, extends from the root of the tail to the nape of the neck, where it forks into two. These prongs are of similar width to the main band and continue over the temporal areas to the postero-dorsal corner of the eyes. Another thin dark-brown line passes from the lower posterior border of the eye onto the side of the body, where it peters out. The area between this and the brown line bordering the dorsal band is dark brown in the postorbital region but becomes progressively lighter on the neck and continues as a general light-brown shading over the sides. The extrabrillar fringe is white. A white line starts on the rostral, covers the upper labials and from the suborbital area passes backwards as a white band over the sides of the neck but becomes fainter and breaks up into a row of pale blotches which continues to the groin. In the shoulder area a short, brown, longitudinal line marks the lower margin of this white lateral band. The snout and supra-orbital area are brown. A white band passes from the rostral across the snout to just behind the eyes, where it splits into two, each arm joining the light, temporal lines a short distance behind the eyes. The brown area on the dorsal side of the head, which is enclosed by the two opposing fork marks, is bisected into two triangles by a transverse white line. Of these the anterior one is in the parietal area and is obtuse, with the apex pointing forward. The posterior one behind the occiput is acute, elongate and points backwards. Dorsally the tail is light brown and has a row of light spots, of which some are more or less confluent. The lateral edges of these spots are marked with dark brown lines which form discontinuous, dorso-lateral, zig-zag lines. The extremities are dusted with light brown. The ventrum and extrabrillar fringes are white. Iris silvery with black infusions around edges, while area bordering pupil is white.

Paratypes: Scalation of paratypes similar to that of typical form. Snout more pointed, giving head a more subtriangular shape in comparison to typical oviform shape. This is less apparent in the juvenile. TM 25085 and 33370 are without internasal scale. Of total sample of this form 28% (i.e. 14 out of 50) have supra-nasals in contact behind rostral due to reduced size or absence of internasal. All specimens examined of typical form have well developed internasal separating supranasals. Upper labials 9–11; 2(9), 13(10), 1(11). Lower labials 8–11; 7(8), 5(9), 3(10), 1(11). Tail length varies from 82,6 to 90,0 percra in three adults while in juvenile TM 24640 it only equals 75,0 percra and remaining specimens have either lost or regenerated their tails. The four adult females have clawed toes while none were observed on the males and the unsexed juvenile.

Colour: Although the pattern of the holotype is particularly clear, the patterns of the paratypes are similar. On the paratypes the edge of the vertebral band varies from straight to lobed to wavy. However, on all the specimens, on the neck the band forks into two arms, which are of similar width to the main band. The fork-mark just behind the eyes is not clear in all specimens nor is the transverse line which bisects the dorsal dark mark on the head. Original tails are marked with a dorsal row of light blotches with irregular dark borders. These blotches may be more or less confluent. Regenerated tails have irregular, dorso-lateral dark brown lines on a light brown background. The ventrum is unmarked.

In life the vertebral band and the centres of the caudal spots are white. The sides of the body are light to pinkish-brown while the extremities are pinkish dusted with brown and the toes are whitish. The extrabrillar fringe is light yellow and the dorsal side of the head has a yellowish tinge. The lateral light bands and blotches are white or yellow in adults of this subspecies. The juvenile TM 24640 had a pinkish-yellow vertebral band and caudal spots with dark brown edges, while the sides and extremities were pinkish-brown. The extrabrillar fringes were lemon yellow, while the supra-orbital area had a light yellow tinge.

Other material: TM 24639 from Mata Mata was sent to Dr A.G. Kluge, University of California, Los Angeles in 1963 before recognition of this new subspecies.

Since the completion of my thesis another 42 specimens became available for study, mainly because of the remarkable Pianka field team. In general this additional material substantiates the existence of a distinct population, as diagnosed above, and according to present distribution records the range of this form coincides with the distribution of dunes in the south-western Kalahari. This is confirmed by descriptions of the collecting sites (Pianka & Huey, 1971:123): "The latter five sites (L = Leeudril, 14 km N.E. of Twee Rivieren; K = Kameelsleep; B = Bloukranz, which is part of Inkboschpan; A = Aarpan and X = Vrederus) all lie within the 'dune area' as delineated by Leistner (1967)". Site M (= Mahlzeit) also lies within this area (Pianka, 1971:1024). He also mentions that area G (= Gezelskap) which lies very close to area X is 'flatland shrub desert'. This ecological difference between these two sites is clearly reflected in the appearance of the *Colopus* specimens from the respective areas. The seven specimens from the dune area at Vrederus are rather light coloured individuals with only the fairly straight dark edge

of the pale vertebral band, the clear fork-mark on the neck and the dark marks on the head showing while the seven specimens from Gezelskap have typical *wahlbergii* patterns varying from a vertebral row of separate transverse spots to a condition where they form a confluent row with very irregular edges but without the fork-mark on the nape. The series from Aarpan has completely striped bodies. The edges of the lines are quite straight and in some cases an additional dark line, starting just anterior to the front legs and passing backwards to the groin, forms a lower border to the pale lateral line. The specimen from De Waal, the most northern record of this subspecies, had a pale yellow, straight edged vertebral line bordered by red-brown dorso-lateral bands. This is the only specimen of this group with a disrupted nuchal Y-mark, but the well defined bands confirm its relationship. Farm San Remo, the origin of SMF 52981 discussed by Mertens (1971:35), is known to me and consists of long, parallel dunes and the presence of a pale vertebral band mentioned in the discussion of this gecko leaves little doubt about its taxonomic position.

Of the 50 specimens studied only 44% had their original tails, while the tails of 20% were regenerated from the base; 12% had partially regenerated tails while the tails of 22% were broken at the base and lost and one specimen (2%) had the tip of its tail missing. A young male P15182 lost about a third of its tail but has a second tip growing out of the side about 4 mm from the vent. The incidence of total as well as partial autotomy appears to be higher in this subspecies than in the typical form. In the small sample of adults with tails, average tail length equals 83,4 percra (N = 12, range 75,5 – 88,2), which is lower than the ratio in the typical form for which $\bar{x}$ = 91,2 percra (N = 34, range 82,4 – 98,3). The average diamater of the eye is 6,5 percra (N = 39, range 5,9 – 7,2; males $\bar{x}$ = 6,8, females $\bar{x}$ = 6,3) which is higher than in typical *wahlbergii* where $\bar{x}$ = 6,1 percra (N = 41, range 5,5 – 7,0; males $\bar{x}$ = 6,3, females $\bar{x}$ = 6,0).

Size: Largest specimen and largest female P 17160 59,4 mm, tail regenerated, Mahlzeit. Largest complete female TM 37875 103,8 (56,8 + 47,0)mm, Kameelsleep. Largest male P 21031 47,5 mm, tail regenerated, Vrederus. Largest complete male P 16958 83,8 (44,4 + 39,4)mm, Kameelsleep.

Ecological and Field Notes: At present nothing is known about the biology of this subspecies and, at least until Pianka publishes the findings based on the work of his field team, it must be assumed that it is similar to that of the typical form.

Field notes at my disposal give a minimum of information. The four paratypes collected by Brain were taken between 23h30 and midnight, while feeding on alate termites amongst bushes on red sand above a low limestone ridge (Brain, 1959, unpublished field notes). The specimen collected by Coetzee at Twee Rivieren was found walking through the camp at night. In January 1967 four nights were spent at Twee Rivieren with the aim of obtaining additional specimens and biological information. Although various weather conditions were experienced, such as light showers, winds, cool and hot nights, not a single specimen was found. Other burrowing geckos reacted similarly to these conditions and *Ptenopus g. garrulus*, a species known to be very common there, was also

neither heard nor seen, while *Chondrodactylus* was encountered during only two nights.

It might be biologically significant that Brain's four specimens, which were collected during February 1959, were all adult females with small gonads, while the six specimens of the typical form collected by me at Tierputs were all males.

All the mentioned localities from where this subspecies has been recorded are known to me except for Vrederus and the site to the north-west of Bokspits. At each of these sites consolidated vegetated dunes consisting of red sand occur, which vary from parallel ridges several kilometres apart, as found on De Waal and Inkboschpan, to irregular dune "seas" as at the sites at Mahlzeit and Leeudril. This subspecies appears to be associated with this type of biotope or its immediate vicinity.

RANGE: The "dune area" of the western and south-western Kalahari as delineated by Leistner (1967), an area which in general has a lower average annual rainfall than the range of the typical form, and is below 200 mm per annum (Pianka & Huey, 1971: 123).

RECORDED LOCALITIES (Gazetteer in Part 1): Aarpan, Bluesky, 23km N.E. of Bokspits (P); De Waal (TN); Inkboschpan (P); Kameelsleep, (TN, P); Leeudril, Mahlzeit (P); Mata Mata (TN, Uni. of California L.A.); San Remo (M1); Swartmodder, Twee Rivieren (TN); Vrederus (P).

ADDITIONAL MATERIAL: Forty two specimens.

TRANSVAAL MUSEUM: TM 37825 Kameelsleep; TM 41391 De Waal; TM 42490 Swartmodder.

PIANKA COLLECTION: 15178, 15181–3, 16924, 16958, 17021, 18446 Kameelsleep; 15237 23km N.E. of Bokspits; 15343 Bluesky; 16423, 16493, 17297, 18573, 18613, 18615, 20007 Aarpan; 16768–9, 16827, 18301, 19307 Leeudril; 17160, 17200–1, 17234 Mahlzeit; 17115, 19581–2, 20234, 20489 Inkboschpan; 17334, 17384, 19676, 20569, 21031–2, 21034, 21365 Vrederus.

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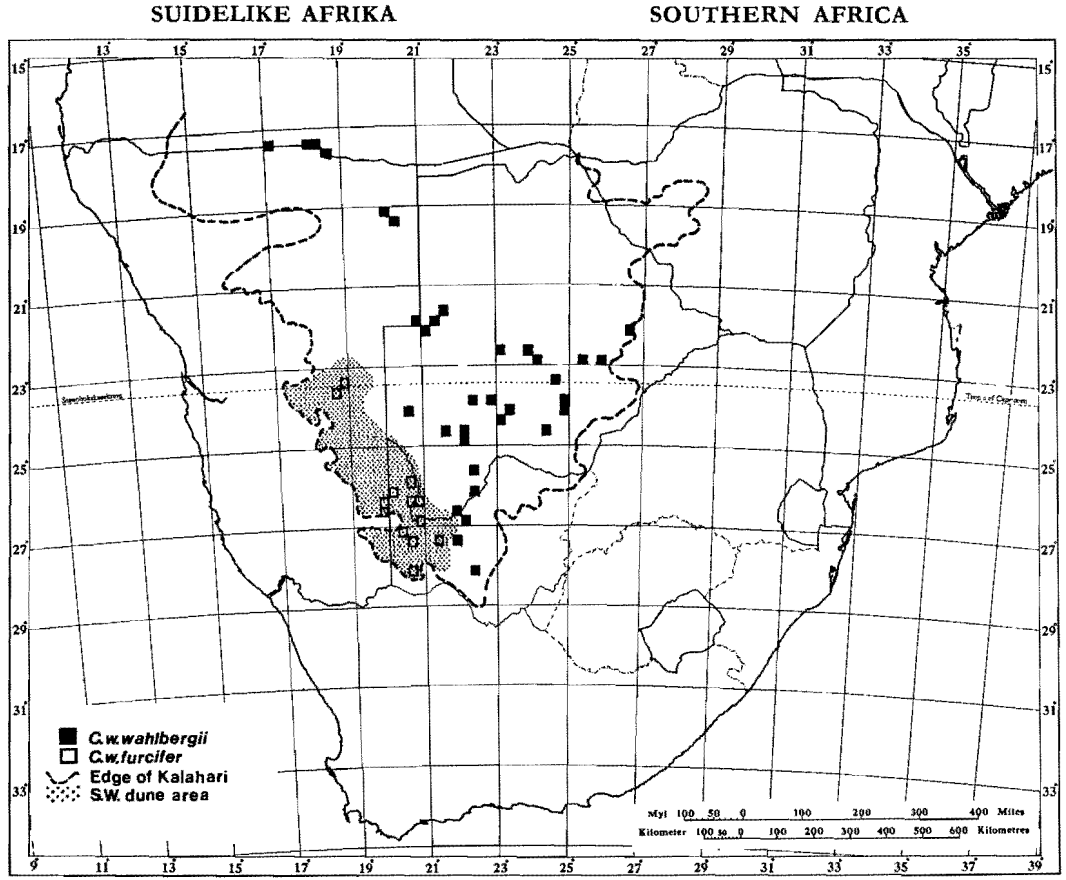

Fig. 1. Distribution of *Colopus wahlbergii*.

PLATE 2. Top row: *Colopus w. wahlbergii*, various localities central and north-western Kalahari.
Bottom row: *C. w. furcifer*, type series, Kalahari Gemsbok National Park. Holotype TM 25727.

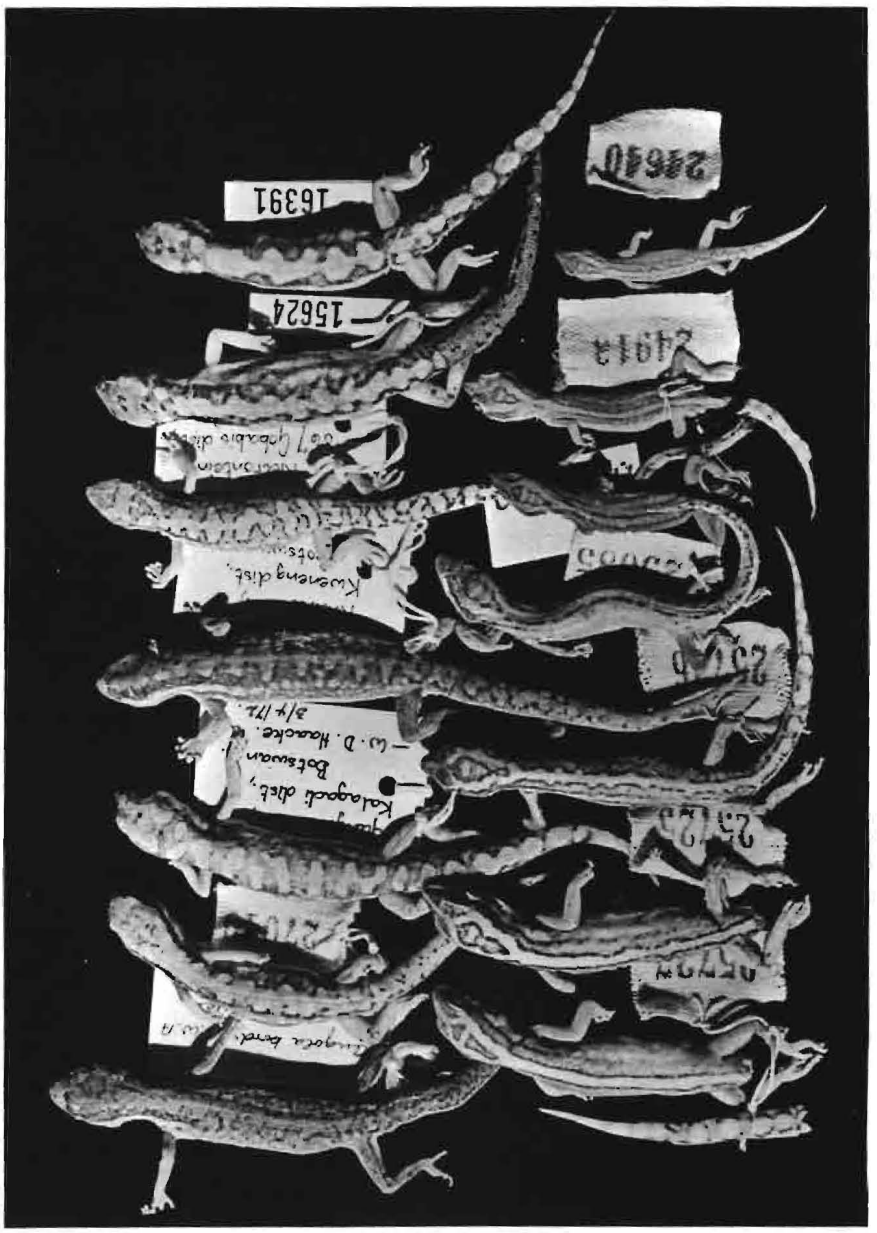
16391
15624
24913
24640

PLATE 3. *Colopus wahlbergii furcifer* female from Kameelsleep, Kalahari Gemsbok National Park.