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A New Species of *Scelotes* from near Cape Town, Western Cape Province, South Africa

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A large new species of the scincine genus *Scelotes* is described from Bloubergstrand near Cape Town, Western Cape Province, South Africa. It lacks forelimbs, has didactyl hindlimbs, and is most similar morphologically and genetically to *S. kasneri*, a species of conservation concern occurring further north in the same province. The new species, known only from the holotype, occurs in beach dune habitat in a major metropolitan area and is probably at risk from beachfront development and human recreational activities.

The genus *Scelotes* is a monophyletic group (Whiting et al., in press) of reduced-limbed "scincine" skinks endemic to sub-Saharan Africa. Broadley (1994), in the last revision of the group, recognized 20 species, one restricted to Tanzania, and the remainder occurring in southern Africa. Twelve of the southern African taxa are restricted to eastern parts of the subcontinent (Mozambique, Swaziland, and KwaZulu-Natal, Mpumalanga, and Limpopo Provinces of the Republic of South Africa). Broadley (1994) grouped these taxa into five species groups on the basis of degree of limb reduction. Two species, *S. anguineus* and *S. cafer*, have chiefly southern distributions, the former in the region of Algoa Bay, the latter with scattered populations in both the southern and western Cape. The remaining five species are western in distribution: *S. capensis* occurs from the Richtersveld north into south central Namibia (Bauer and Branch 2003), and the Western and Northern Cape coastal regions are occupied by *S. bipes* (Mossel Bay to Saldanha Bay), *S. gronovii* (Doringbaai to Graafwater), *S. kasneri* (Vredenberg to Lambert's Bay), and *S. sexlineatus* (Stompneus Bay to Port Nolloth) (Cordes and Mouton 1996; Branch 1998).

Only *Scelotes bipes* has been recorded from the South African mainland in the immediate vicinity of Cape Town, with populations extending into the Cape Peninsula and on Robben Island (Branch 1981, 1991). *Scelotes gronovii* occurs as far south as Robben Island (Baard 1988b; Branch 1998) and Dassen Island (Branch 1981, 1991), but has mainland populations reaching only the Saldanha-Langebaan area (McLachlan 1978; Mouton et al. 1987). *Scelotes kasneri* was originally described from a single type from near Lambert's Bay by FitzSimons (1939), who later (FitzSimons 1950) signaled the presence of three additional specimens from Elands Bay. McLachlan (1978) and Mouton et al. (1987) likewise considered the range restricted to these areas, although more recently the species has been found as far south as Vredenburg (Baard 1988a;

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Cordes and Mouton 1996). We here report the discovery of a new species of *Scelotes,* allied to *S. kasneri,* from Bloubergstrand, approximately 14 km north of Cape Town.

Material and Methods

Morphology.— The following measurements were taken with Brown and Sharpe Digit-cal Plus digital calipers (to the nearest 0.01 mm): snout-vent length (SVL; from tip of snout to vent); width at midbody (BW); depth at midbody (BD); total leg length (LL); length of digits (DL); tail length (TL); head length (HL; distance between ear and snout-tip), head width (HW; measured at angle of jaws), head depth (HD; maximum height of head, from occiput to throat); eye diameter (ED; greatest diameter of orbit); eye to snout distance (E-S; distance between anteriormost point of eye and tip of snout); and eye to ear distance (E-E; distance from ear opening to posterior corner of eye).

Scale counts and external observations of morphology were made using a Nikon SMZ-10 dissecting microscope. Scale terminology follows FitzSimons (1943). Radiographic observations were made using a Faxitron closed-cabinet x-ray system. Comparisons were made with museum material in the collection of the California Academy of Science (CAS), as well as original published descriptions and descriptions provided in broader faunal and taxonomic treatments (e.g., Broadley 1994; Branch 1998).

Molecular Analysis.— We examined DNA sequence variation among *Scelotes* using the mitochondrial cytochrome b (700 bp), 12S ribosomal DNA (840 bp), and 16S ribosomal DNA (555 bp) gene regions. Tissue samples from representative species of *Scelotes* were processed at field collection sites and preserved in 95% ethanol. DNA was extracted following a standard phenol/chloroform protocol, and purified using Centricon-100 purification columns (Whiting 2001). DNA templates and controls were amplified using standard PCR techniques in 50 ml reactions and products were visualized via 2% agarose gel electrophoresis. The target products were purified using the Gene Clean III kit (Bio101 Co.) and sequenced using the Perkin Elmer Big Dye cycle sequencing kit. Purified sequencing reactions were analyzed on either an ABI 377, or ABI 3100 automated sequencer. All sequences have been deposited on the GenBank database as accession numbers AY217824–26, 217830, 217833–35 (cyt b), AY218027–29, 218033, 218036–38 (12S rDNA), and AY 217978–80, 217983, 217986–88 (16S rDNA).

Sequence data were used to compute uncorrected pairwise sequence divergences in PAUP*4.0 (Swofford 2002) between multiple species of *Scelotes*. Two specimens of *Scelotes sexlineatus* were used to establish intraspecific divergence levels for this genus and the molecular markers used. Four species from the western clade (Whiting et al., in press) of *Scelotes* (*kasneri, gronovii, sexlineatus,* and *bipes*), as well as one species from the eastern clade (*arenicola*), were included in pairwise comparisons to establish interspecific levels of divergence.

Phylogenetic inference was based on maximum parsimony analysis implemented in PAUP* 4.0 (Swofford 2002). Details of the phylogenetic analysis of *Scelotes* are presented elsewhere (Whiting et al., in press).

Systematics

Reptilia: Squamata: Scincidae

***Scelotes montispectus* Bauer, Whiting and Sadlier, sp. nov.**
Figure 1.

Holotype.— California Academy of Sciences (CAS) 223934 (field number AMB 7074).

Approximately 4.6 km north of Grootbaai, Bloubergstrand on Melkbos Rd, 33°45′02″S, 18°26′34″E. Collected by R. A. Sadlier, A. M. Bauer and A. S. Whiting, September 29 2001.

Etymology.— The specific epithet is derived from the Latin, *montis*, meaning mountain, and *spectus*, behold, in reference to the type locality, which offers some of the finest views of Table Mountain.

Diagnosis.— A very large *Scelotes* (134 mm SVL) with a robust body, wedge-shaped snout, no forelimbs, and reduced, didactyl hindlimbs. Scales in 22 rows around midbody. Dorsal color buff with faint dark markings on dorsal 7 scale rows; a dark mask from nostril through eye to nuchal scales. The combination of no external forelimbs and didactyl hindlimbs otherwise characterizes only *S. bidigittatus*, *S. kasneri*, *S. bipes*, *S. sexlineatus*, *S. guentheri*, and *S. brevipes*. The number of midbody scale rows further distinguishes the new species from all of these congeners except *S. bidigittatus* (20–22 scale rows) and *S. kasneri* (22 rows). It differs from the former in its much larger size (134 mm vs 83 mm max SVL), higher number of subdigital lamellae (5 beneath the longest digit in *S. montispectus* vs 2–3 in *S. bidigittatus*), and non-scaly lower eyelid. The new species is nearly identical in scalation to *S. kasneri* but differs from it in the absence of dark stripes on the body, chin shields in contact behind the postmental, shorter limbs (7.7% SVL vs 9.1% SVL), and in having a lower number of subdigital lamellae (5 vs 7).

Description (based on holotype).— Adult female, body elongate (SVL 134.00 mm), robust (BW 8.04 mm, 6% SVL; BD 6.19 mm, 4.6% SVL); regenerated tail short (TL 47.40 mm, of which 22.27 mm regenerated), strongly tapered. No forelimbs, hindlimbs small (LL 10.28 mm, 7.7% SVL), bearing two digits (3.29 and 1.52 mm), each bearing a well developed claw. Twenty-two midbody scale rows, 116 ventral scales rows from postmental to cloaca.

Head large (HL 11.31 mm; HW 6.46 mm; HD 4.90), not offset from neck and trunk; snout wedge-shaped, lower jaw countersunk; head flattened above, lateral aspect of head nearly vertical. Nostril with valvular flap, bordered by rostral and a crescentic nasal, narrowly separated by nasal from supranasal and first supralabial; no postnasal scale present; supranasals in contact behind rostral. Lower eyelid opaque, but not scaly. Frontonasal 7-sided, 1.6 times wider than long, posterior border straight; frontal trapezoidal, narrower anteriorly than posteriorly, 1.5 times wider than long, posterior border slightly convex; interparietal very large, wider than long, anterior border slightly concave; parietals narrow, separated posteriorly by interparietal, contacting third supraocular anteriorly; three supraoculars, first larger than second and third together, first and second contacting frontal, second and third contacting interparietal; four supraciliary scales, second twice as large as others; five supralabials, fourth beneath eye; four infralabials; loreal much larger than preocular; mental hemispherical, with slightly convex posterior margin; postmental roughly pentagonal; three enlarged chin shields on each side, posterior to postmental and medial to infralabials; anterormost pair of chin shields in narrow contact behind postmental. Ear opening small, but clearly visible; eye large (ED 1.73 mm) and well-formed; E-S (5.40 mm) greater than E-E (4.47 mm); parietal eye spot present.

Coloration (in life; Fig. 1).— Dorsum buff; darker straw to yellowish-brown on dorsum of head from rostrum onto neck; two straw colored stripes on tail base; vertebral and three paravertebral rows on each side with diffuse darker spots, forming very weakly defined rows, somewhat more pronounced on forebody and from sacrum onto tail base (Fig. 1), markings on more lateral scale rows less conspicuous and more irregular. Regenerated portion of tail pinkish-brown; venter white. Blackish mask from nostril, through eye to the nuchal scales. Color in preservative similar but straw to yellow-brown pigmentation faded, regenerated tail whitish.

Osteology.— Palatine bones in contact; atlantal arches not fused. Three cervical vertebrae, 50 trunk vertebrae with ribs, one lumbar vertebra, two sacral vertebrae, 12.5 caudal vertebrae prior

FIGURE 1. Holotype of *Scelotes montispectus* (CAS 223934) from 4.6 km north of Grootbaai, Bloubergstrand, Western Cape Province, Republic of South Africa, 33°45′02″S, 18°26′34″E. Note the lack of distinct dark bands on the body dorsum and flanks. Photo by R.A. Sadlier.

to regenerated tail. Minute pectoral remnants at level of 9th (6th trunk) vertebrae. Phalangeal formula of pes: 0.0.2.4.0.

DISTRIBUTION.— The new species is known only from the holotype collected at Bloubergstrand. Branch (1998) reported that the southernmost locality for *Scelotes kasneri,* the apparent sister taxon of *S. montispectus*, was near Vredenburg, approximately 110 km north of Bloubergstrand. The only congener with which the new species is strictly sympatric is *S. bipes.*

NATURAL HISTORY.— The specimen was collected by raking under vegetation in a narrow strip of beach dunes near Bloubergstrand, approximately 14 km north of Cape Town. *Scelotes bipes* was collected in the same habitat and *Mabuya homolacephala* and *Meroles knoxi* were collected on around the bases of strand vegetation. The habitat is similar to that noted for *S. kasneri* (Baard 1988b) and its biology is probably similar as well.

MOLECULAR COMPARISONS.— Genetic distance data cannot, in themselves, be used to establish that particular populations represent different species (Ferguson 2002). However, we considered the sequence divergence among and between species of *Scelotes* that are well accepted on morphological grounds as supplemental evidence to support the recognition of *Scelotes montispectus* as a new species. The sequence divergence between *S. montispectus* and its sister taxon *S. kasneri* (sampled localities 160 km apart) is approximately 3–8 times greater than the intraspecific divergence between the two specimens of *S. sexlineatus* (sampled localities 80 km apart) and is equivalent to the levels of divergence between other closely related species pairs (Tables 1–2).

TABLE 1: Uncorrected pairwise distance matrix for cytochrome *b* (above the diagonal) and 12S ribosomal DNA (below the diagonal). Tissues sampled from *Scelotes montispectus*, n. sp. (CAS 223934; holotype, ~4.6 km N of Grootbaai, Bloubergstrand on Melkbos Rd, Western Cape Province); *S. kasneri* (CAS 206991; 18.5 km N of jct. R365 (Leipoldtville Rd) on R27 towards Lamberts Bay, Western Cape Province); *S. gronovii* (CAS 206990; 18.5 km N of jct rd R365 on R27 towards Lambertsbaai, Western Cape Province); *S. bipes* (CAS 224005; ~4.6 km N of Grootbaai, Bloubergstrand on Melkbos Rd, Western Cape Province); *S. sexlineatus* (1, CAS 206813; Port Nolloth, Northern Cape Province; 2, CAS 206854; Brandberg, Farms Kourootje and Kap Vley, Northern Cape Province); *S. arenicola* (CAS 209635; Kosi Bay Nature Reserve, NW corner of Lake Nhlange, KwaZulu Natal Province).

	montispectus	*kasneri*	*gronovii*	*bipes*	*sexlineatus* 1	*sexlineatus* 2	*arenicola*
montispectus	–	0.08562	0.09401	0.12537	0.09292	0.10053	0.17248
kasneri	0.04686	–	0.11917	0.13798	0.12883	0.13237	0.18904
gronovii	0.07445	0.06757	–	0.14759	0.11172	0.11728	0.18660
bipes	0.10123	0.08406	0.09212	–	0.13710	0.14735	0.21459
sexlineatus 1	0.06508	0.06033	0.06756	0.09312	–	0.01189	0.17673
sexlineatus 2	0.06137	0.05660	0.06748	0.08665	0.00602	–	0.18169
arenicola	0.15731	0.14109	0.15567	0.14877	0.14993	0.14607	–

TABLE 2: Uncorrected pairwise distance matrix for 16S ribosomal DNA (specimens sampled as for Table 1).

	montispectus	*kasneri*	*gronovii*	*bipes*	*sexlineatus* 1	*sexlineatus* 2	*arenicola*
montispectus	–	–	–	–	–	–	–
kasneri	0.03846	–	–	–	–	–	–
gronovii	0.02565	0.03111		–	–	–	–
bipes	0.04419	0.05523	0.04779	–	–	–	–
sexlineatus 1	0.03479	0.04209	0.03291	0.05154	–	–	–
sexlineatus 2	0.04029	0.04210	0.04022	0.04969	0.01280	–	–
arenicola	0.07564	0.08313	0.08492	0.09185	0.08297	0.08667	–

DISCUSSION

Scelotes montispectus is clearly most similar in morphology to *S. kasneri*. It is also most similar to this form genetically, and a phylogenetic analysis of *Scelotes* (Whiting et al., in press) confirms that these two species are sister taxa. Despite obvious similarities, which are to be expected in a highly conservative group such as *Scelotes*, differences in scalation, proportion, and coloration distinguish *S. montispectus* from *S. kasneri*. Of these features, the last is the most obvious. All *S. kasneri* reported to date possess the obvious dark dorsolateral stripes initially described by FitzSimons (1939). That this pattern is ontogenetically and geographically stable is evidenced by the fact that it occurs not only in typical adult specimens (Visser 1984), but also in very large adults

(FitzSimons 1939, 1943) and in juveniles (FitzSimons 1950; CAS 206991) from near the type locality at Lamberts Bay as well as in specimens from elsewhere in the range of the species (Branch 1998).

In recent years there have been numerous descriptions of new taxa from South Africa, including some within a few km of major population centers. The discovery of *Pseudocordylus nebulosus* from Landdroskop, only 15 km from Somerset West (Mouton 1995), and *Afroedura hawequensis* from the Hawekwa Mountains, 10 km from Paarl (Mouton and Mostert 1985), are two such examples. This species, discovered only 14 km from Cape Town in a public beach area in Blouberg-strand is another such example. It highlights the inadequacy with which the herpetofauna of even suburban parts of South Africa has been surveyed and underscores the need for further research on the cryptic fauna of the Western Cape.

Both *Scelotes gronovii* and *S. kasneri* were listed in the first *South African Red Data Book* (McLachlan 1978); the former as rare due to restricted distribution and the latter simply as rare. In the more recent *Red Data Book* (Branch 1988), both species were listed as restricted. Subsequent research has expanded the known range of these two species (e.g., Cordes and Mouton 1996), but because of their fossorial habits, the true status of these and other *Scelotes* is difficult to assess. Partly because of this, Mouton et al. (1987) suggested that *Scelotes gronovii* and *S. kasneri* should be research priorities among the southwestern Cape red data lizards. Baard (1988a) regarded degradation of sand dune habitat, including conversion to parking lots and off-road vehicle use, as the major threat to *S. kasneri.* This is certainly also the case for *S. montispectus*. Indeed, the only known locality for this species lies within the Cape Town metropolitan area in a narrow sand dune strip between a busy road and a heavily used public beach.

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