

The herpetofauna of the Langjan Nature Reserve (Limpopo Province, Republic of South Africa) (Amphibia, Reptilia)

Die Herpetofauna des Langjan-Naturreservates
(Provinz Limpopo, Republik Südafrika)
(Amphibia, Reptilia)

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KURZFASSUNG

Das Langjan Naturreservat ist ein 4774 ha großes Schutzgebiet in der Limpopo Provinz Südafrikas, 130 km nördlich der Provinzhauptstadt Pietersburg gelegen. Während einer Feldstudie von Januar bis April 1998 und drei kürzeren Aufenthalten zwischen 1999 und 2001 konnten innerhalb des Schutzgebietes insgesamt 43 Reptilien- (3 Schildkröten, 23 Eidechsen, 17 Schlangen) und 7 Amphibienarten nachgewiesen werden. Die Anzahl der aus dem Gebiet bekannten Formen erhöht sich damit auf 47 bei den Reptilien und 10 bei den Amphibien. Die von der Autorin im Untersuchungsgebiet nachgewiesenen Arten werden hinsichtlich ihrer relativen Häufigkeit, ihrer allgemeinen Lebensraumsprüche und Verbreitung im Reservat charakterisiert. Neun weitere, bisher nur außerhalb der Reservatsgrenzen nachgewiesene Reptilienarten kommen wahrscheinlich auch im Reservat selbst vor. Die Fundortbeschreibungen ausgewählter Formen werden durch ökologische, zoogeographische oder taxonomische Hinweise ergänzt. Vier Arten (*Psammobates oculiferus*, *Typhlosaurus lineatus subtaeniatus*, *Scelotes limpopoensis albiventris*, *Colopus wahlbergii wahlbergii*) verdienen aufgrund ihrer eingeschränkten Gesamtverbreitungsgebiete bzw. Seltenheit besondere faunistische Beachtung.

ABSTRACT

The Langjan Nature Reserve, 4774 ha in size, is situated in South Africa's Limpopo Province, 130 km north of the Province's capital Pietersburg. During a field study from January to April 1998 and three shorter stays between 1999 and 2001, 43 reptilian (3 chelonians, 23 lizards, 17 snakes) and 7 amphibian species were recorded within the reserve. Thus, the known herpetofauna of the reserve now consists of 47 reptilian and 10 amphibian taxa. From the reptile and amphibian species recorded by the author, estimates of the abundance, the general habitat requirements and distributions in the reserve are presented. Nine more reptile species are specified which are likely to occur in the reserve but were observed only outside its boundaries so far. The description of the records of selected species in the reserve is complemented by considerations on ecological, taxonomic and distributional aspects. Because of their endemic status, their generally limited distribution or rarity, four species (*Psammobates oculiferus*, *Typhlosaurus lineatus subtaeniatus*, *Scelotes limpopoensis albiventris*, *Colopus wahlbergii wahlbergii*) are of specific faunistic interest.

KEY WORDS

Reptilia, Amphibia, *Colopus wahlbergii wahlbergii*, *Psammobates oculiferus*, *Scelotes limpopoensis albiventris*, *Typhlosaurus lineatus subtaeniatus*; check list, ecology, herpetofauna of Langjan Nature Reserve, Limpopo Province, South Africa

INTRODUCTION

In the Limpopo Province of South Africa there is a number of small nature reserves of special zoological interest. One of them is Langjan Nature Reserve, which was established in the year 1954 to protect the last autochthonous population of the South African Gemsbok (*Oryx gazella*) in former Transvaal. The geographical location of the reserve, its specific soil conditions and the

local climate account for the typical fauna and flora in the Reserve which are highly influenced by Kalahari elements. Unlike the situation in mammals and birds, a complete checklist of the herpetofauna is lacking up to now.

Within the short period of a few days JACOBSEN (1989) investigated the area during his reptile and amphibian survey of

the Transvaal and some occasional collecting was carried out over the years. Two field studies on species of the genera *Scelotes* and *Typhlosaurus* occurring in the reserve were published (JACOBSEN 1987a, 1987b). The rare subspecies *Scelotes limpopoensis albiventris* JACOBSEN, 1987 was described during these studies based on specimens from Langjan Nature Reserve (= locus typicus).

Due to the conservation status of the study area, the main goal of this field study was the investigation of aspects of reptile ecology and population biology. The present paper documents the reptiles and amphibians recorded during a 4 months research stay from January to the end of April 1998 and 3 additional stays in February 1999 (14 days), January 2000 (7 days) and January 2001 (8 days).

STUDY AREA AND METHODS

The Langjan Nature Reserve is situated 130 km north of Pietersburg (now Polokwane) between 22°47' - 22°52' S and 29°11' - 29°17' E. The topography of the reserve is plane at an altitude of approximately 800 m above sea level (STUART & STUART 1993). The present size of the reserve is 4774 ha. The Brak River flows through the south-eastern part of the reserve (fig. 1). In 1994 a dam was built at the foot of the Blouberg, 40 km south of the Langjan Nature Reserve, to provide water for citrus plantations. Since that time, the formerly seasonal Brak has become temporary downstream of the dam in the Langjan Reserve. The river conveys water only a few days a year when the waterlevel exceeds the crown of the dam after heavy rains. Throughout the rest of the year only pools can be found along the river bed.

Conglomerates, limestone and sandstone form the lithic substratum of the ground. The soil on the south-eastern side of the Brak River as well as in the centre of the reserve consists of deep red Kalahari sand (course sand - see fig. 2). Large areas of the reserve are covered by loam soil of different composition.

The vegetation is of the 'Arid Sweet Bushveld' type (Veld Type 14 - ACCOCKS 1988). The vegetation can be classified as short open woodland with patches of tall shrubland. On the harder soils (Hardveld, fig. 3) in the north-western area of the reserve, the dominant plants include a *Grewia flava* veld with dense growth of *Grewia flava* and *Acacia erubescens*, *Acacia mellifera* and *Dichrostachys cinerea* in varying proportions, some *Commiphora pyra-*

canthoides and scattered taller trees of *Boscia albitrunca* and *Acacia tortilis*. In sections where the soil is shallower, the veld becomes more scrubby and shrubs like *Commiphora* spp., *Terminalia prunoides*, *Catophractes alexandri*, *Boscia foetida rehmanniana* and *Sesamothamnus lugardii* are common. Patches of *Acacia* thickets with *A. mellifera*, *A. karroo*, *A. nebrownii* and *A. tortilis* are characteristic. South-east of the Brak River in the Sandveld (fig. 4), open woodland communities are dominant, represented by *Sclerocarya caffra*, *Acacia nigrescens*, *Terminalia sericea*, *Grewia bicolor*, *Combretum apiculatum*, *Commiphora pyracanthoides*, *Grewia flavescens* together with the common finger grass *Digitaria eriantha* and *Enneapogon scoparias*.

The average annual temperature is minimum in July (11 °C) and maximum in January (35 °C). The average annual precipitation is 300 - 400 mm (STUART & STUART 1993), rain falling mainly in the summer between November and March.

During an intensive field study which was predominantly focussed on the lacertid fauna of the Langjan Nature Reserve, data and records of other reptiles and amphibians were collected as well. Within three representative study areas, different in vegetation and soil types, the amphibians and reptiles were trapped by daily controlled live traps over a period of four months. During this period the traps were active altogether for 78 days. The size of these areas varied between 5 and 15 ha. They were situated south-east of the Brak River and in the northern and western parts of the reserve. Twenty one live

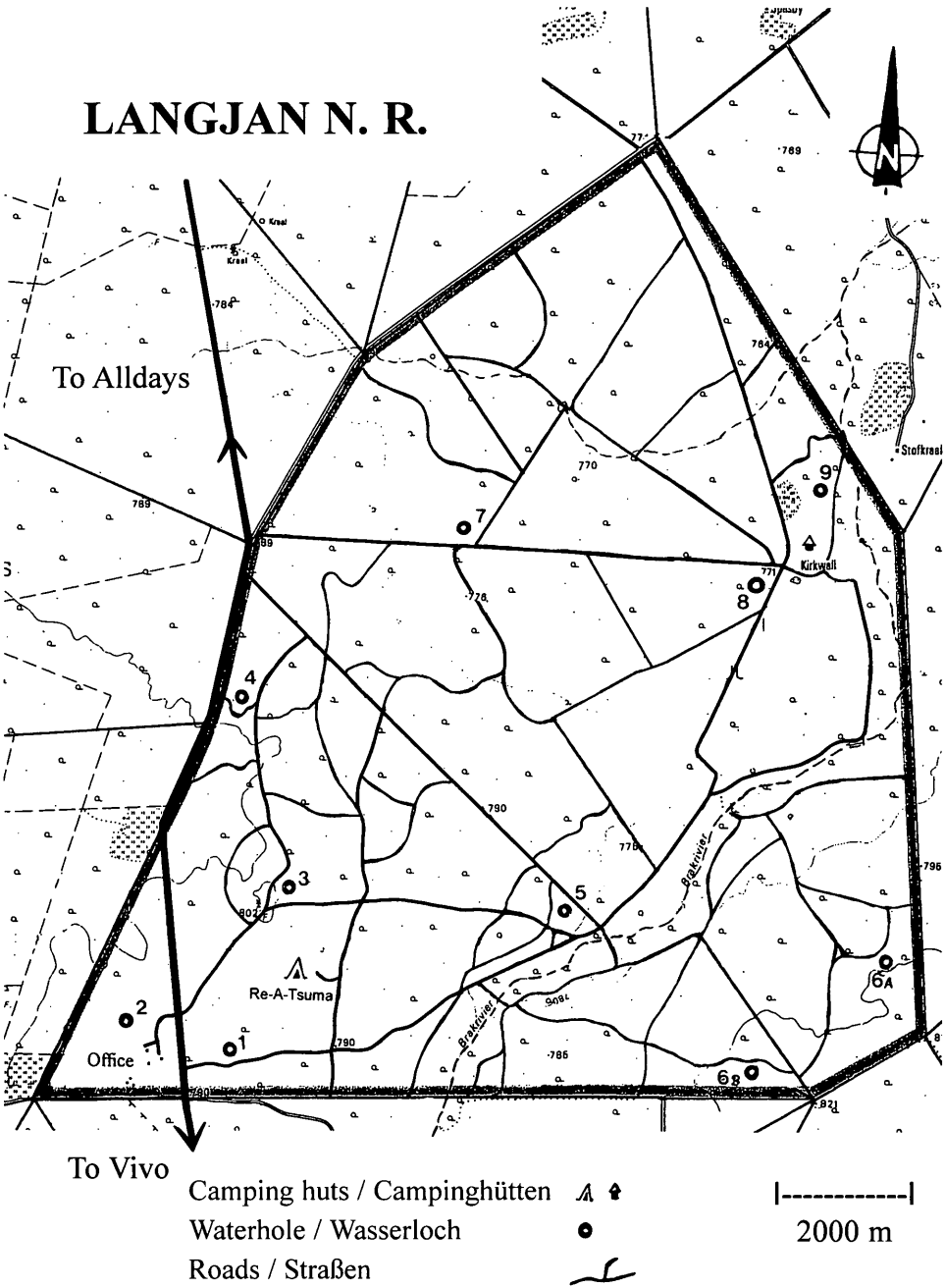


Fig. 1: Map of the Langjan Nature Reserve (Limpopo Province, Republic of South Africa). Modified from South Africa topographical maps 1:50.000 (sheets no. 2229CD and 2229CC), CTP Book Printers, Cape 1980.
Abb. 1: Karte des Langjan Naturreservates (Provinz Limpopo, Republik Südafrika). Verändert nach Topographische Karten Südafrikas 1:50.000 (Blätter Nr. 2229CD und 2229CC), CTP Book Printers, Cape 1980.

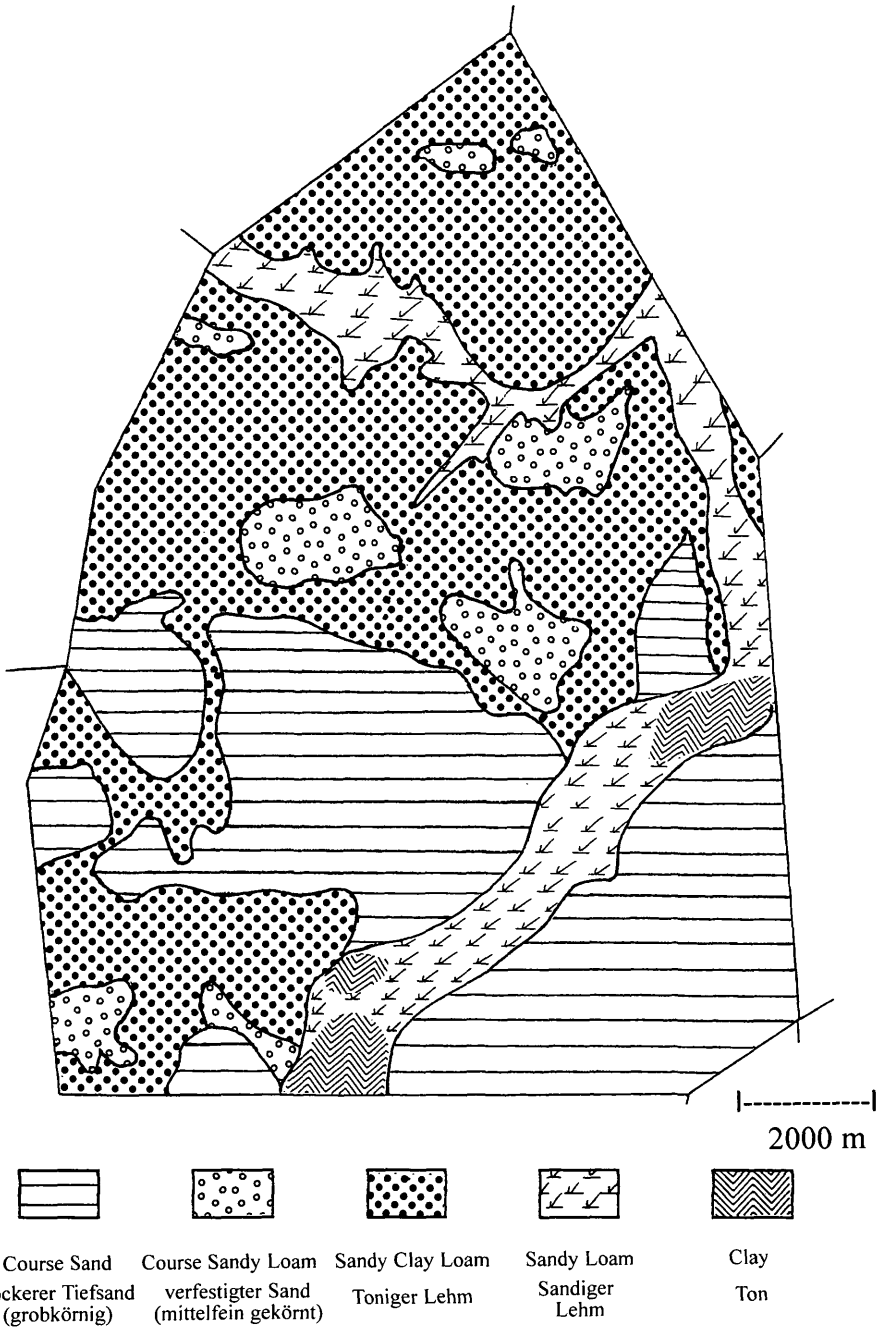


Fig. 2: Distribution of the soil types in the Langjan Nature Reserve (Limpopo Province, Republic of South Africa) based on a guidemap of the Langjan N. R. authorities and own investigations.

Abb.2: Verteilung der Bodentypen im Langjan Naturreservat (Provinz Limpopo, Republik Südafrika). Karte erstellt nach Unterlagen der Reservatsleitung des Langjan Naturreservates und eigenen Untersuchungen.

trap systems were distributed over the study areas. Each trap system was made of four 10 or 20 liter buckets, which were dug in the ground and connected through 10 meter long, strong plastic fences, similar to classic amphibian fences. Additionally, these study areas were monitored about twice a day in the morning (between 07:00 and 12:00) and afternoon (between 15:00 and 19:00) by three to four people. Altogether, nineteen spotlight surveys were made during nights, especially after rainfall, in order to record nocturnal species. Additional spots of herpetological interest, like waterholes, river beds, and roadsides were observed from time to time during all stays.

Specimens were captured alive, studied, determined and released after taking photographs. Details of locality, habitat, date, sex and reproductive state were recorded. The study was permitted by the Nature Conservation Department of the Limpopo

Province. Permits for collecting of voucher specimens were not generally granted, but issued under special circumstances only (e.g., for the new record of *Colopus wahlbergii wahlbergii* PETERS, 1869). All voucher specimens are stored at the Transvaal Museum (TM), Pretoria.

Scientific nomenclature and determination of species follows for the reptiles (except Chelonians) FITZSIMONS (1943, 1962) as modified by BALLETO (1968), BRANCH & BROADLEY (1985), BROADLEY (1968, 1972, 1977a,b,c, 1990), BROADLEY & WATSON (1976), HAACKE (1975, 1976), JACOBSEN (1987a) and LOVERIDGE (1957); for the Chelonians LOVERIDGE (1941) and LOVERIDGE & WILLIAMS (1957) as modified by BROADLEY (1981) and BOUR (1983) and for the amphibians POYNTON (1964), as modified by POYNTON & BROADLEY (1985a, b, 1987, 1988).

SPECIES ACCOUNT

In total, 50 reptile and amphibian species were recorded within the Reserve (3 chelonians, 23 lizards, 17 snakes, 7 amphibians).

The species lists (table 1 - Chelonia, Serpentes, Sauria; table 2 - Amphibia), were complemented by ecological aspects and data on the distribution and the frequency of observation in the reserve.

Seven reptile species were subject to additional observations or are of herpetofaunal interest and will be treated in more detail below.

Psammobates oculiferus (KUHL, 1820). All five tortoise records are localised in the sandveld area south-east of the Brak River. The specimens were observed between January and early March 1998, mostly after rainfall. The observation of five specimens of this rare and endemic species in one rain season suggests that the population in Langjan N. R. seems not to be seriously threatened when compared to other populations in the Limpopo Province or Botswana (W. HAACKE pers. com. 1999; P. SNYMAN pers. com. 2000; own data). The status of the species in the Limpopo Province is vulnera-

ble owing to low densities and limited available habitat (JACOBSEN 1989).

Pseudaspis cana (LINNAEUS, 1754). The Mole Snake appears to be abundant in the sandy parts of the reserve. It was exclusively found during the day. Juveniles (10 specimens) and subadults (3 specimens) were recorded between mid Februar and mid April; adults were never found. Juveniles of this viviparous snake are normally born during March and April, with an average of 30 to 50 young at a time (AUERBACH 1981; BROADLEY 1990). We observed the first juveniles earlier (on the 11th and 26th of February) in a sandy area south of the Brak River.

Nucras intertexta A. SMITH, 1838. In total, four specimens of the endemic Spotted Sandveld Lizard were recorded. During the rain season of 1998 they were observed in two localities characterized by sandy soil and more or less dense vegetation. Three lizards were adults, which emerged at the end of January and mid of March, one was a hatchling recorded on April 7. This species seems to be the rarest lacertid lizard in the reserve. However, its apparent „rarity“ could also be a result of the species' short



Fig. 3: A *Grewia flava* Veld (Hardveld) in the western part of the Langjan Nature Reserve (Limpopo Province, Republic of South Africa); in the background the Soutpansberg mountain range.

Abb. 3: *Grewia flava* Steppe (Hardveld) im westlichen Bereich des Langjan Naturreservats (Provinz Limpopo, Republik Südafrika); im Hintergrund ist ein Teil des Bergmassivs der Soutpansberge zu sehen.



Fig. 4: Sandveld open woodland communities, south-east of the Brak River (Limpopo Province, Republic of South Africa).

Abb. 4: Sandsteppe mit offenen Trockengehölzgemeinschaften, südöstlich des Flusses Brak (Provinz Limpopo, Republik Südafrika).

and irregular activity period and the solitary lifestyle. The Spotted Sandveld Lizard is a fast-moving terrestrial species with an unusual activity cycle. Based on own observations from other field studies in the Limpopo Province and long-term studies in captive specimens, the main activity period seems to be in the summertime, where it appears irregularly for some days to search for food, disappearing afterwards again for some weeks. During unsuitable conditions no specimen can be seen for several months. Because of this short and irregular „surface activity“ records of this species are generally rare.

Nucras holubi (STEINDACHER, 1882). Ten specimens were observed during the rain season of 1998. The records were restricted to four localities and to a four weeks period from mid January to mid February. An additional specimen was recorded on January 11, 2000. All specimens were adults except for one juvenile (February 16). *Nucras holubi* prefers harder substrates and is restricted to sandy clay loam or sandy loam soil in the reserve. Twice the species was observed in groups (six and two specimens, respectively) during the middle of the day feeding on alate termites which were swarming after rainfall. These *Nucras* specimens demonstrated the typical thermoregulatory behaviour of climbing into low bushes from time to time.

Typhlosaurus lineatus subtaeniatus BROADLEY, 1968. One specimen of the rare Striped Blind Legless Skink was recorded on January 11, 2000. The skink was found under rotten logs in a deep sand area south of the Brak River.

Typhlosaurus lineatus subtaeniatus is a localized form of the north-western part of the Limpopo Province, first described from the Great Saltpans north of the Soutpansberg (BROADLEY 1968). The typical form *T. l. lineatus* BOULENGER, 1887 is widespread in the Kalahari and has presumably extended its range eastwards during an interpluvial period. During the following pluvial period the ranges shrank leaving isolated populations in northern Venda (*T. l. richardi* JACOBSEN, 1987), north-western Transvaal (*T. l. subtaeniatus* BROADLEY, 1968) and in western Zambia (*T. l. jappi* BROADLEY, 1968) (BROADLEY 1968; JACOBSEN 1987b). The species is

listed in the South African Red Data Book as restricted (BRANCH 1988).

Scelotes limpopoensis albiventris JACOBSEN, 1987. Two specimens of the rare fossorial Limpopo Dwarf Burrowing Skink were recorded in a deep sand area south of the Brak River (fig. 5). One was caught in the middle of March 1998 in a pitfall trap, the other one was found under rotten leaves on January 11, 2000 in the same area. The rare and endemic subspecies *albiventris* has a very local distribution in just two adjacent 1/4° squares in the Limpopo Province and was first described from the Langjan N. R. (JACOBSEN 1987a).

The subspecies *S. l. albiventris* inhabits a small area within the middle of the distribution range of *S. l. limpopoensis* FITZ-SIMONS, 1930. So far, both forms were not found in sympatry although they occupy similar habitats (JACOBSEN 1987a) suggesting that *S. l. albiventris* is probably a full species (BROADLEY 1994). The species is listed in the South African Red Data Book as restricted (BRANCH 1988).

Colopus wahlbergii wahlbergii PETERS, 1869. Fourteen specimens of the endemic Kalahari Ground Gecko were recorded between February and March 1998 in the sandveld south of the Brak River. They were collected during night drives (between 19.30 and 22.00) in a deep sand area. Juveniles and adults co-occurred from February onwards. During a night drive in January 2001, two specimens were observed in the above area and three more specimens north of the Brak River in the central part of the reserve, also in a deep sand area.

The record of this species is remarkable with regard to aspects of zoogeography and taxonomy. The collected specimens show high individual variation of the dorsal pattern (figs. 6 a,b,c). Some specimens have a vertebral row of dark-edged spots (fig. 6a). In other specimens the vertebral spots tend to form a pale band with dark, irregularly wavy edges (fig. 6b) as mentioned by HAACKE (1976). In one juvenile specimen, the dorsal colour pattern is very similar to the pattern of the subspecies *C. w. furcifer* HAACKE, 1976 described from the dune area of the western and south-western Kalahari. This juvenile has a light vertebral band, extending from the root of the tail to the

Table 1: Reptiles detected by the author in the Langjan Nature Reserve (Limpopo Province, Republic of South Africa) with remarks on their abundance, habitat requirements and distribution in the reserve. D - daily in high numbers; R - regularly in camps and on buildings; S - Sandveld; H - Hardveld.

Tab. 1: Die im Langjan Naturreservat (Provinz Limpopo, Republik Südafrika) von der Autorin nachgewiesenen Reptilien mit Angaben zur relativen Häufigkeit, ihren Habitatsansprüchen und der Verbreitung im Reservat. D - täglich in hoher Anzahl; R - regelmäßig an Häusern und festen Campinghütten; S - "Sandsteppe" (gekennzeichnet durch Sandböden); H - "Hartsteppe" (gekennzeichnet durch relativ harte Lehm Böden); arboreal - baumbewohnend, arenicolous - sandbewohnend, (semi)fossorial - (mehr oder weniger) grabend, terrestrial - bodenbewohnend.

Taxon	Observation frequency Beobachtungs- häufigkeit	Habitat ¹⁾	Special require- ments / besond. Ansprüche ¹⁾	Distribution in the Reserve / Verbrei- tung im Reservat
<i>Geochelone pardalis</i> (BELL, 1828)	> 30	terrestrial		S / H
<i>Psammobates oculiferus</i> (KÜHL, 1820)	5	terrestrial	arenicolous	S
<i>Pelomedusa subrufa</i> (LACÉPÈDE, 1788)	> 350	terrestrial		H
<i>Rhinotyphlops lalandei</i> SCHLEGEL, 1844	1	fossorial		S
<i>Leptotyphlops longicaudus</i> (PETERS, 1854)	1	fossorial		S
<i>Leptotyphlops conjunctus incognitus</i> BROADLEY & WATSON, 1976	4	fossorial		S
<i>Python sebae natalensis</i> A. SMITH, 1840	4	terrestrial		H
<i>Pseudaspis cana</i> (LINNAEUS, 1754)	13	semifossorial		S
<i>Prosymna bivittata</i> WERNER, 1903	2	fossorial	arenicolous	S
<i>Psammophis subtaeniatus subtaeniatus</i> PETERS, 1882	23	terrestrial		S / H
<i>Psammophis brevirostris brevirostris</i> PETERS, 1881	2	terrestrial		S
<i>Philothamnus semivariatus</i> <i>semivariatus</i> (A. SMITH, 1840)	4	arboreal		S / H
<i>Dasypeltis scabra</i> (LINNAEUS, 1758)	1	terrestrial		H
<i>Dispholidus typus typus</i> (A. SMITH, 1829)	2	arboreal		S / H
<i>Elapsoidea sundevallii longicauda</i> BROADLEY, 1971	2	semifossorial	arenicolous	S
<i>Naja annulifera annulifera</i> PETERS, 1854	5	terrestrial		S / H
<i>Naja mossambica</i> PETERS, 1854	1	terrestrial		H
<i>Dendroaspis polylepis</i> (GÜNTHER, 1858)	2	terrestrial		H
<i>Bitis arietans arietans</i> (MERREM, 1820)	> 30	terrestrial		S / H
<i>Bitis caudalis</i> (A. SMITH, 1839)	11	terrestrial		S
<i>Typhlosaurus lineatus subtaeniatus</i> BROADLEY, 1968	1	fossorial	arenicolous	S
<i>Scelotes limpopensis albiventris</i> JACOBSEN, 1987	2	fossorial	arenicolous	S
<i>Lygosoma sundevallii sundevallii</i> (A. SMITH, 1849)	12	fossorial	arenicolous	S
<i>Mabuya striata striata</i> (PETERS, 1844)	D	arboreal		S / H
<i>Mabuya varia</i> (PETERS, 1867)	D	terrestrial		S / H
<i>Mabuya variegata punctulata</i> (BOCAGE, 1872)	4	terrestrial	(arenicolous)	S
<i>Heliobolus lugubris</i> (A. SMITH, 1838)	D	terrestrial		S / H
<i>Ichnotropis squamulosa</i> PETERS, 1854	D	terrestrial		S / H
<i>Nucras intertexta</i> A. SMITH, 1838	4	terrestrial		S
<i>Nucras holubi</i> STEINDACHER, 1882	10	terrestrial		H
<i>Pedioplanes lineocellata lineocellata</i> DUMÉRIE & BIBRON, 1839	8	terrestrial		S
<i>Gerrhosaurus flavigularis</i> WIEGMANN, 1828	2	terrestrial		S
<i>Varanus albigularis</i> (DAUDIN, 1802)	2	terrestrial		S / H
<i>Varanus niloticus</i> (LINNAEUS, 1766)	1	terrestrial		H
<i>Agama armata</i> PETERS, 1854	4	terrestrial		S
<i>Colopus wahlbergii wahlbergii</i> PETERS, 1869	19	terrestrial	arenicolous	S
<i>Hemidactylus mabouia</i> (MOREAU DE JONNES, 1818)	R	arboreal		S / H
<i>Homopholis wahlbergii</i> (A. SMITH, 1849)	R	arboreal		H
<i>Lygodactylus capensis</i> (A. SMITH, 1849)	R	arboreal		S / H
<i>Pachydactylus capensis capensis</i> A. SMITH, 1846	3	terrestrial		S
<i>Pachydactylus turneri</i> GRAY, 1864	R	arboreal		S / H
<i>Pachydactylus punctatus</i> PETERS, 1854	2	terrestrial		S
<i>Ptenopus garrulus garrulus</i> (A. SMITH, 1849)	11	terrestrial	arenicolous	S

¹⁾ Übersetzungen zu den Spalteneinträgen siehe Tabellenlegende.

Table 2: Amphibians detected by the author in the Langjan Nature Reserve (Limpopo Province, Republic of South Africa) with remarks on their abundance, habitat requirements and distribution in the reserve. S - Sandveld; H - Hardveld.

Tab. 2: Die im Langjan Naturreservat (Provinz Limpopo, Republik Südafrika) von der Autorin nachgewiesenen Amphibien mit Angaben zur relativen Häufigkeit, ihren Habitatansprüchen und der Verbreitung im Reservat. S - "Sandsteppe" (geennzeichnet durch Sandböden); H - "Hartsteppe" (geennzeichnet durch relativ harte Lehmböden); arboreal - baumbewohnend, arenicolous - sandbewohnend, fossorial - grabend, semiaquatic - mehr oder weniger aquatisch; terrestrial - bodenbewohnend.

Taxon	Observation frequency Beobachtungshäufigkeit	Habitat ¹⁾	Special requirements / besond. Ansprüche ¹⁾	Distribution in the Reserve / Vorkommen im Reservat
<i>Bufo garmani</i> (MEEK, 1897)	4	terrestrial		H
<i>Breviceps adpersus</i> PETERS, 1882	26	fossorial	arenicolous	S
<i>Phrynobatrachus natalensis</i> (SMITH, 1849)	1	semiaquatic		H
<i>Ptychadena anchietae</i> (BOCAGE, 1867)	2	semiaquatic		H
<i>Tomopterna marmorata</i> (PETERS, 1854)	2	fossorial	(arenicolous)	S
<i>Tomopterna cryptotis</i> (BOULENGER, 1907)	8	fossorial	(arenicolous)	S
<i>Chiromantis xerampelina</i> (PETERS, 1854)	6 foam nests / 6 Schaumnester	arboreal		H

¹⁾ Übersetzungen zu den Spalteneinträgen siehe Tabellenlegende.



Fig. 5: The rare endemic Limpopo Dwarf Burrowing Skink *Scelotes limpopoensis albiventris* JACOBSEN, 1987, has a very local distribution in the Limpopo Province and was described from specimens of the Langjan N. R. (specimen without actual collaction number, kept alive in the Transvaal Museum, Pretoria).

Abb. 5: Der seltene endemische Skink *Scelotes limpopoensis albiventris* JACOBSEN, 1987, besitzt eine sehr lokale Verbreitung in der Provinz Limpopo und wurde nach Exemplaren aus dem Langjan Naturreservat beschrieben (Exemplar derzeit ohne Sammlungsnummer, Lebendhaltung im Transvaal Museum, Pretoria).

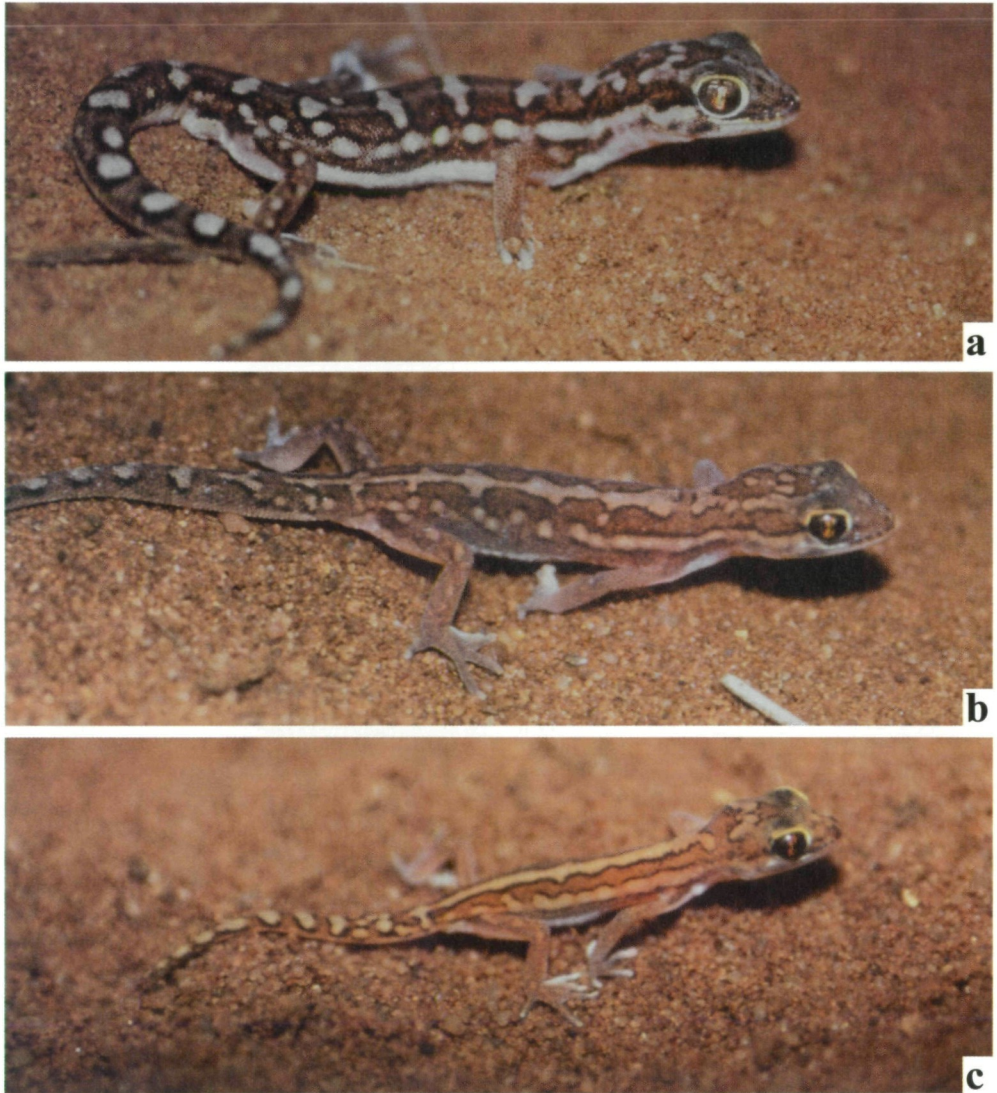


Fig. 6: The rare endemic Kalahari Ground Gecko *Colopus wahlbergii wahlbergii* PETERS, 1869 found in the Langjan Nature Reserve represents the second South African record of this species.

- a - Adult specimen with a vertebral row of dark-edged spots (TM 82185).
- b - Subadult specimen. The vertebral spots form a pale band with dark, irregularly wavy edges (TM 82187).
- c - Juvenile specimen. A light vertebral band extends from the root of the tail to the nape where it bifurcates (TM 82191).

Abb. 6: Die seltene endemische Geckoart *Colopus wahlbergii wahlbergii* PETERS, 1869 aus dem Langjan Naturreservat repräsentiert erst den zweiten Nachweis dieser Art für Südafrika.

- a - Adultes Individuum mit einer vertebralen Reihe von dunkel umrandeten Flecken (TM 82185).
- b - Subadultes Individuum. Die vertebralen Flecken sind zusammengefloßen und bilden ein wellenförmiges Band mit dunkler Umrandung (TM 82187).
- c - Juveniles Tier. Ein helles, dunkel gesäumtes Vertebralband verläuft von der Schwanzwurzel bis zum Nacken, wo es sich gabelt (TM 82191).

nape, where it bifurcates (fig. 6c). Further investigation of this highly isolated *C. wahlbergii* population is necessary to elucidate the systematic relationship. A series of ten specimens from this locality has been deposited in the Transvaal Museum, Pretoria (TM 82184 - 82193).

JACOBSEN (1989) simply gives an unconfirmed notice of *C. w. wahlbergii* in Limpopo Province based on a photo from „near Mopane“. HAACKE (2001 pers. comm.) substantiated the occurrence of this species in the Limpopo Province due to a collection of nine specimens from the Farm Pylkop, Messina district in 1991 (TM 7102-5, 81510). BRANCH's (1998) record of *C. w. wahlbergii* in the Limpopo Province goes back to these specimens deposited in the Transvaal Museum. The record from the Langjan Nature Reserve is the second observation of this species in the territory of South Africa.

Additional species recorded in the Langjan area

During the present study, a number of additional reptile species were recorded in the Langjan area, however, not in the reserve proper but in its neighbourhood. Most of these taxa can be expected to occur also inside the reserve, because of the presence of suitable habitats: *Leptotyphlops scutifrons scutifrons* (PETERS, 1854), *Atractaspis bibronii* A. SMITH, 1849, *Aparallactus capensis* A. SMITH, 1849, *Lamprophis fuliginosus* (BOIE, 1827), *Lycophidion capense capense* (A. SMITH, 1831), *Psammophylax tritaeniatius* (GÜNTHER, 1868), *Telescopus semiannulatus semiannulatus* A. SMITH, 1849, *Acanthocercus atricollis* (A. SMITH, 1849), *Panaspis wahlbergi* (A. SMITH, 1849).

DISCUSSION

During the field study in the Langjan Nature Reserve, 50 taxa of the herpetofauna (43 reptiles, 7 amphibians) were recorded. Seventeen of these (14 reptiles and 3 amphibians) were already listed by JACOBSEN (1989), who found 18 reptile and 6 amphibian species in the reserve during his reptile survey of the Transvaal. Four reptile species - *Pelusios sinuatus* (A. SMITH, 1838), *Mabuya capensis* (GRAY, 1830), *Cordylus tropidosternum jonesi* (BOULENGER, 1891), *Prosymna sundevallii lineata* (PETERS, 1871), and three amphibians - *Cacosternum boettgeri* (BOULENGER, 1882), *Kassina senegalensis* (DUMÉRIL & BIBRON, 1841), *Phrynomantis bifasciatus* (SMITH, 1847) recorded by JACOBSEN (1989) were not observed during the present investigation.

As a result of the current survey, the known herpetofauna of the area consists of 47 reptile and 10 amphibian species (table 3).

Lizard taxa dominate (25 species), followed by snakes (18), amphibians (10) and chelonians (4 species). The dominance of lizard species is a commonly observed feature of reptile species richness in arid regions, whereas in humid regions snakes are more diverse than lizards (JÖGER & LAMBERT 1997). For example, HAACKE

(1984) found in the area of the Southern Kalahari Domain a similar relationship of 27 lizards, 18 snakes, 3 chelonians, 5 amphisbaenia and 6 amphibians.

Among the lizard species, 16 are terrestrial, 3 fossorial and 6 arboreal. The high number of lizard species in the reserve can be attributed to the presence of large sandy areas. Seventeen lizard species occur in the Sandveld and are mainly terrestrial, except *Typhlosaurus lineatus subtaeniatius*, *Scelotes limpopensis albiventris*, *Lygosoma s. sundevallii* (A. SMITH, 1849) which are fossorial. Two terrestrial lizard species *Nucras holubi* and *Varanus niloticus* (LINNAEUS, 1766), were found only in the Hardveld.

Fourteen lizard species of the Sandveld areas are terrestrial and separated in their ecological niches by a number of parameters, especially space, time (daily and annually), diet and foraging strategies, reproduction and predator escape tactics. The nocturnal niche is occupied by four gecko species *Pachydactylus c. capensis* A. SMITH, 1846, *Pachydactylus punctatus* PETERS, 1854, *Ptenopus g. garrulus* (A. SMITH, 1849) and *Colopus w. wahlbergii*. They are separated among others in preferring different habitat conditions: *Ptenopus g. garrulus*

and *Colopus w. wahlbergii* are distributed in the reserve only in deep sand and mainly open areas. On the other hand *Pachydactylus c. capensis* and *P. punctatus* favour a firmer compact sand structure with a more dense vegetation, extending their range also to sandy loam soil.

Ten terrestrial lizard species are diurnal and separated by their different activity patterns, as well as foraging strategies, reproductive behaviour, and microhabitat selection. Four of them are lacertid lizards of the Sandveld areas, one of which being a typical sit and wait hunter [*Pedioplanis l. lineoocellata* (DUMÉRIL & BIBRON, 1839)], characterized by a long daily activity period of up to 10 hours (NAGY et al. 1984). The active hunter *Nucras intertexta* has short and irregular activity periods and a solitary lifestyle and, thus, is rarely seen. The other two active hunters *Heliobolus lugubris* (A. SMITH, 1838) and *Ichnotropis squamulosa* PETERS, 1854 are common and live syntopically in dense populations. These two species are segregated from each other by differences in their activities, reproductive and life cycles as well as anti-predator behaviour. *Heliobolus lugubris* is mainly active in the morning during the rain season, whereas *I. squamulosa* shows a longer daily activity including an afternoon peak (SCHMIDT 2001). *Heliobolus lugubris* produces up to three clutches of 4 to 6 eggs during one rain season and has a life period between 3 and 4 years (SCHMIDT unpubl.), whereas *I. squamulosa* is an annual species with one clutch of 9 to 12 eggs at the end of the rain season (BROADLEY 1979; JACOBSEN 1987c; SCHMIDT 2001). The juveniles of *H. lugubris* mimic noxious carabid beetles (HUEY & PIANKA 1977; SCHMIDT 1997a,b), and emerge between January and April. *Ichnotropis squamulosa* is a remarkably fast growing species, of which the juveniles appear in November, reaching adulthood in March and April (BROADLEY 1979; JACOBSEN 1987; SCHMIDT 2001). Thus, the juveniles of these two species do not co-occur.

Between the two *Mabuya* species of the Sandveld area, a spatial separation due to different preferences concerning the substrate and the degree of vegetation cover can be observed. *Mabuya varia* (PETERS, 1867) is widespread in the reserve and can be

found in nearly every habitat, except in the open and deep sand areas where the vegetation cover is mainly restricted to tufts of grasses. There, *Mabuya varia* is replaced by *Mabuya variegata punctulata* (BOCAGE, 1872), which is restricted to this habitat type in the reserve.

The snake fauna of the reserve comprises six fossorial species (*Rhinotyphlops lalandei* SCHLEGEL, 1844, *Leptotyphlops longicaudus* (PETERS, 1854), *L. conjunctus incognitus* BROADLEY & WATSON, 1976, *Prosymna bivittata* WERNER, 1903, *P. sundevallii lineata*, *Elapsoidea sundevallii longicauda* BROADLEY, 1971), which is clearly more than in the lizard fauna (3). Concerning the habitat selection, terrestrial species (11) dominate among the snakes. Only two arboreal snake species were recorded until now: *Dispholidus t. typus* (A. SMITH, 1829) and *Philothamnus semivariegatus* (A. SMITH, 1829).

As expected, amphibian diversity is comparatively low in this highly arid environment in that the amphibian fauna is restricted to species which are independent of open water for reproduction (*Breviceps adspersus* PETERS, 1882) or breed in temporary [*Tomopterna cryptotis* (BOULENGER, 1907), *T. marmoratus* (PETERS, 1854), *Bufo garmani* (MEEK, 1897), *Chiromantis xerampelina* (PETERS, 1854)] and shallow pools [*Phrynobatrachus natalensis* (SMITH, 1849), *Ptychadena anchietae* (BOCAGE, 1867)] and feature a fast larval development.

The highest species diversity in the reserve was observed in the Sandveld habitat with a total of 35 reptile species recorded. By contrast, the Hardveld holds fewer records (22 reptile species). The vegetation in the Sandveld is much more diverse than in the Hardveld, offering more ecological niches and leading to a more diverse herpetofauna. Generally, a higher species richness can be accommodated in structurally complex vegetation than in structurally simple vegetation (HEATWOLE & TAYLOR 1987).

Most of the savanna reptiles are continuously distributed within their range (POYNTON & BROADLEY 1978). Exceptions include, among others, the arenicolous reptiles, which are most abundant in the Kalahari sand areas and the coastal alluvium of the Mozambique plain (POYNTON &

Table 3: Preliminary numerical synopsis of reptile and amphibian taxa known from the Langjan Nature Reserve (Limpopo Province, Republic of South Africa) based on the author's observations and records of JACOBSEN (1989). The numbers of taxa exclusively recorded by JACOBSEN (1989) are indicated in parentheses.

Tab. 3: Vorläufige Anzahl der Reptilien- und Amphibien-Taxa des Langjan Naturreservates (Provinz Limpopo, Republik Südafrika), zusammengestellt nach eigenen Untersuchungen und den Nachweisen von JACOBSEN (1989). Die Anzahlen der Taxa, die nur von JACOBSEN (1989) nachgewiesen wurden, sind in Klammern angegeben.

Taxon	Number of forms	Anzahl Formen
Chelononia		4 (1)
Testudinidae	2	
Pelomedusidae	2 (1)	
Serpentes		18 (1)
Typhlopidae	1	
Leptotyphlopidae	2	
Boidae	1	
Colubridae	8 (1)	
Elapidae	4	
Viperidae	2	
Sauria		25 (2)
Scincidae	6 (1)	
Lacertidae	5	
Gerrhosauridae	1	
Cordylidae	1 (1)	
Varanidae	2	
Agamidae	1	
Gekkonidae	9	
Σ Reptilia		47 (4)
Bufonidae	1	
Hyperoliidae	1 (1)	
Microhylidae	2 (1)	
Ranidae	5 (1)	
Rhacophoridae	1	
Σ Amphibia		10 (3)

BROADLEY 1978). The Kalahari deep sand areas in the reserve facilitate the occurrence of arenicolous species. Some of these species (*Psammobates oculiferus*, *Prosymna bivittata*, *Typholosaurus lineatus subtaeniatus*, *Lygosoma s. sundevallii*, *Heliobolus lugubris*, *Pedioplanes l. lineocellata*, *Colopus w. wahlbergii*, *Ptenopus g. garrulus*) belong to the Kalahari group. Other

species are coastal arenicolous forms of the Mozambique plains (*Elapsoidea sundevallii longicauda*, *Scelotes limpopensis albiventris*, see POYNTON & BROADLEY 1978). Arenicolous species originated in the east extended their ranges westwards during the Pleistocene. At the same time, species originating from the west extended their ranges eastwards. The latter became possible during arid interpluvials when aeolic sands were deposited over large areas in the Transvaal (KING 1967; POYNTON & BROADLEY 1978).

The Langjan Nature Reserve and adjacent areas south to it is the type locality of two localised subspecies (*Typhlosaurus lineatus subtaeniatus*, *Scelotes limpopensis albiventris*) of otherwise widespread arenicolous lizard species (BROADLEY 1968; JACOBSEN 1987a,b, 1989). A further anomaly from this area includes an ovoviparous population of *Mabuya capensis* (recorded by JACOBSEN 1989 for the Langjan N. R.), while the species is oviparous in northern Transvaal (BROWN WESSELS 1989). The highly isolated record of the rare endemic gecko species *Colopus w. wahlbergii* in the reserve is of faunistic interest, as it represents the easternmost extension of its range and is only the second observation of this species for South Africa. The above facts support the opinion that the area was isolated for a longer period (JACOBSEN 1989).

There is no doubt that our knowledge of the reptile and amphibian fauna of the Langjan Nature Reserve is still incomplete. Common South African taxa such as *Lamprophis fuliginosus*, *Lycophidion capense capense*, *Telescopus semiannulatus*, *Psammophylax tritaeniatus*, *Atractaspis bibronii*, *Aparallactus capensis*, *Leptotyphlops scutifrons scutifrons*, *Panaspis wahlbergi*, *Acanthocercus atricollis* or *Pyxicephalus edulis* PETERS, 1854 can be expected to occur in the reserve. A potential number of about 70 species for the reserve seems possible.

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