

A three-way division of the African Centipede Eating Snakes, *Aparallactus* Smith, 1849 (Serpentes: Lamprophiidae: Aparallactinae) and a new subgenus of Wolf Snakes *Lycophidion* Fitzinger, 1843 (Serpentes: Lamprophiidae, Lamprophiinae).

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ABSTRACT

A review of the Centipede Eating Snakes, *Aparallactus* Smith, 1849 shows that the genus as understood at present comprises three well-defined species groups. On this basis the genus *Aparallactus* Smith, 1849 is divided three ways.

Most species remain within *Aparallactus*. The species *modestus* is placed on its own in the genus *Elapops* Günther, 1859.

Two species, *Aparallactus wernerii* Boulenger, 1895 and *Aparallactus nigriceps* (Peters, 1854), are placed in a new genus *Plumridgeus* gen. nov. which is named and diagnosed according to the Zoological Code.

Within the African Wolf Snake genus *Lycophidion* Fitzinger, 1843 one species is divergent from the rest and is placed within its own subgenus, namely *Jacobclarkus* subgen. nov..

Keywords: Taxonomic revision; new genus; new subgenus; *Aparallactus*; *Plumridgeus*; *Lycophidion*; *Jacobclarkus*; *Elapops*; *Metoporphina*; *Cryptolycus*; *capensis*; *modestus*; *wernerii*; *nigriceps*; *laterale*.

INTRODUCTION

The Centipede Eating Snakes, genus *Aparallactus* Smith, 1849 as currently recognized consists of a genus of rear-fanged snakes found in Africa.

The taxonomic history of the group is similar to that of many other snake genera.

In the 1800's when species were named, many were placed in new genera at the time of first description.

In the 1900's these genera have been merged with the senior name taking priority.

In the post 2000 period a number of snake genera have been revisited to see if it is in fact appropriate to have morphologically conservative species within a single genus.

When it has been deemed appropriate to split a genus up, a search for pre-existing "available" names is done and if such are available, then these are used. If not, then one is assigned.

Aparallactus has also been the subject of molecular studies that have shown phylogenetic divisions within the genus as currently understood worthy of recognition at the genus level.

Pyron et. al. (2011) published results for three species showing at least two species groups within *Aparallactus* worthy of generic recognition.

A review of the entire 11 species currently placed within *Aparallactus* has found three distinct groups worthy of generic recognition.

These are easily characterized as follows:

The first group consists of most species, including the type species *capensis*. These snakes typically have seven supralabials and a high subcaudal count and in line with their common name, typically feed on centipedes.

The second group is that of the divergent species, *modestus* which while physically similar to the snakes in the first group,

appears to lack the back fangs seen in the other species and also appears to have a preference for earthworms as opposed to centipedes. When he first described this taxon, Günther assigned it to a new genus he erected, namely *Elapops* and so this species is re-assigned to this currently monotypic genus.

The third group of species includes two species, namely *Aparallactus wernerii* Boulenger, 1895 and *Aparallactus nigriceps* (Peters, 1854). These are separated from the rest of the genus by a suite of characters, most notably including a lower subcaudal count and six, as opposed to seven supralabials.

The results of Pyron et al. 2011, show clearly that *Aparallactus wernerii* is sufficiently divergent from the type species of *Aparallactus* to warrant being placed in a separate genus (obviously with the similar species *nigriceps*). As no genus name is available for these snakes, a new genus is erected to accommodate these species, namely *Plumridgeus* gen. nov. which is named and defined according to the Zoological Code (Ride et al. 1999).

The genus name *Uriechis* Peters, 1854, is referable to *A. lunulatus* and is therefore not available for the species referred to *Plumridgeus* gen. nov..

There have been numerous published studies that clearly diagnose and separate the various species-level taxa within *Aparallactus* sensu lato, in terms of the 11 species formerly placed within the genus. These include: Auerbach (1987), Barbour and Loveridge (1928), Bauer et al. (1995), Böhme (1975), Böhme et al. (2011), Boulenger (1893a, 1895, 1897a, 1897b, 1907, 1910), Boycott (1992), Branch (1993), Branch et al. (2005), Briscoe (1949), Broadley (1959, 1962, 1998), Broadley and Cotterill (2004), Broadley and Howell (1991), Broadley et al. (2003), Chabanaud (1916), Chifundera (1990), Chirio and Ineich (2006), Chirio and Lebreton (2007), Cole and Kok (2006), Cope (1860, 1861), de Witte (1927), de Witte and Laurent (1943, 1947), Fischer (1884), Günther (1859, 1888), Hughes (1983), Hughes and Barry (1969), Jackson and Blackburn (2007), Jacobsen et al. (2010), Jan (1862, 1865, 1866), Lanza (1983, 1990), Largen and Spawls (2010), Lawson (1993), LeBreton (1999), Loveridge (1929, 1935, 1936, 1938, 1944, 1956, 1957), Mertens (1938), Parker (1949), Pauwels and Vande weghe (2008), Pauwels et al. (2006, 2008), Peters (1854, 1870), Rasmussen (1981), Rödel and Mahsberg (2000), Rödel et al. (1999), Smith (1849), Spawls et al. (2001), Sternfeld (1909, 1910), Taylor and Weyer (1958), Trape and Roux-estève (1990, 1995), Trape and Mane (2006), Wallach (1994) and Werner (1897, 1899, 1902).

Within the African Wolf Snake genus *Lycophidion* Fitzinger, 1843 there have been various attempts in the past to break the genus up into smaller groups.

Besides the pre-existing genus name *Lycophidion*, the name *Metoporphina* Günther, 1858 is available for the species *irrorata* Günther, 1858 and others within this defined species group. The genus name *Cryptolyclus* Broadley, 1958 is available for the species *nanus* Broadley, 1958 for this taxon and others in this species group.

The genus name *Alopecion* Peters, 1863 is available for the species *nigromaculatus* Peters, 1863, but because it is within the same species group as *irrorata*, it would in effect be a junior synonym for the former.

Recent molecular studies and data published by Pyron et al. (2011) and others have shown there to be at least three distinct species groups within the genus *Lycophidion* as presently recognized. However Broadley 1996 identified no fewer than four major species groups.

Combining these and other studies, it is clear that *Lycophidion* should be divided. However due to the obvious morphological similarities between all species, my view is that these divisions should be at the subspecies level only.

I therefore recognise the subgenera *Metoporphina* Günther, 1858, *Cryptolyclus* Broadley, 1958, the nominate subgenus

(*Lycophidion*) and a fourth group as yet unnamed as a subgenus consisting of the divergent taxon, *Lycophidion laterale* Hallowell, 1857.

Therefore following the division of the genus *Aparallactus* below I name and diagnose a new subgenus within *Lycophidion*, namely *Jacobclarkus* subgen. nov. according to the Zoological Code (Ride et al. 1999).

Important publications in relation to the relevant species of *Lycophidion* sensu lato include, Auerbach (1997), Boulenger (1893b), Branch (1976, 1993), Broadley (1958, 1969, 1991, 1992, 1996), Broadley and Hughes (1993), Broadley et al. (2003) Chirio and Ineich (2006), Hallowell (1857), Largen and Spawls (2010), Parker (1949), Spawls et al. (2001) and Werner (1899).

GENUS APARALLACTUS SMITH, 1849

Type species: *Aparallactus capensis* Smith, 1849

Diagnosis: A genus of usually rear-fanged snakes found in sub-Saharan Africa. They are known as centipede eaters in reflection of what is thought to be their main diet.

The following traits diagnose these very thin snakes. Maxillary is short, with 6-9 small teeth followed by a large grooved fang situated below the eye. Anterior mandibular teeth longest. Head small, not distinct from neck. Eye is small, with a round pupil. Nasal entire or divided; no loreal. Body cylindrical; tail moderate or short. Dorsal scales smooth, without pits, arranged in 15 dorsal mid-body rows. Ventrals are rounded; subcaudals are single.

Not included in the genus *Aparallactus* as defined herein are three species formerly placed within this genus.

Specimens that would previously have been defined as being within this genus with six supralabials are placed in a new genus *Plumridgeus* gen. nov.. Those species are the species originally described as *Aparallactus wernerii* Boulenger, 1895 and *Uriechis nigriceps* Peters, 1854. These two species are separated from *Aparallactus* (and *Elapops*) by having 6 supralabials, as opposed to seven in all other species within *Aparallactus* (and *Elapops*).

Plumridgeus gen. nov. is further separated from *Aparallactus* by their lower subcaudal count (below 41, versus above 41), being a reflection of the considerably shorter tail seen in snakes of that genus.

The species originally described as *Elapops modestus* Günther, 1859 is returned to that genus as the type and sole species. It is separated from all other *Aparallactus* by an apparent lack of visible back fangs as seen in the other species.

Elapops modestus Günther, 1859 apparently feeds on worms as a preferred diet as opposed to centipedes.

Distribution: Sub-Saharan Africa.

Content of Genus *Aparallactus* Smith, 1849

Aparallactus capensis Smith, 1849 (Type species).

Aparallactus guentheri Boulenger, 1895.

Aparallactus jacksonii (Günther, 1888).

Aparallactus lineatus (Peters, 1870).

Aparallactus lunulatus (Peters, 1854).

Aparallactus niger Boulenger, 1897.

Aparallactus moeruensis de Witte and Laurent, 1943.

Aparallactus turneri Loveridge, 1935.

GENUS ELAPOPS GÜNTHER, 1859

Type species: *Elapops modestus* Günther, 1859

Diagnosis: This genus is monotypic for the type species.

It is separated from all snakes within genera *Aparallactus* and *Plumridgeus* gen. nov. by a lack of defined back fangs at the rear of the mouth. *Elapops modestus* Günther, 1859 apparently feeds on worms as a preferred diet as opposed to centipedes.

This genus (type species) is diagnosed by the following suite of characters: Dorsally *Elapops modestus* is a dark olive-gray, the

scales more or less distinctly edged with black. The ventrals and subcaudals are yellowish, olive-gray, or yellowish dotted or spotted with gray, the spots sometimes forming a median series. Adults may attain a total length of 54 cm, with a tail 7.5 cm long.

There are 11 or 12, maxillary teeth the last two enlarged and feebly grooved on the inner side. Anterior mandibular teeth are longest. Head small, not distinct from neck. Eye small, with round pupil. Nostril between two nasals; no loreal; parietal in contact with upper labials. Body cylindrical; tail moderate. Dorsal scales smooth, without pits, in 15 dorsal mid-body rows. Ventrals rounded, subcaudals single.

Portion of rostral visible from above is half as long as its distance from the frontal. Internasals shorter than prefrontals. Frontal one and a third to one and a half times as long as broad, as long as or longer than its distance from the end of the snout, shorter than the parietals. One preocular, in contact with the posterior nasal. One or two postoculars. A single temporal. Seven upper labials, third and fourth entering the eye, sixth or fifth and sixth in contact with the parietal. Four lower labials in contact with the anterior chin shield. Anterior chin shields slightly longer than posterior chin shields.

Ventrals 138-158; anal plate single; subcaudals 42-45, also single.

Distribution: West Africa in the countries stretching in a line from Uganda to Sierra Leone. This includes, Central African Republic, Uganda, Democratic Republic of the Congo (Zaire), Congo (Brazzaville), Cameroon, Nigeria, Togo, Benin, Ghana, Ivory Coast, Liberia, Sierra Leone, Cameroon and Gabon.

GENUS *PLUMRIDGEUS* GEN. NOV.

Type species: *Aparallactus wernerii* Boulenger, 1895

Diagnosis: Physically species within this genus are similar in most respects to *Aparallactus* as defined within this paper.

Plumridgeus gen. nov. is most easily separated from genera *Aparallactus* and *Elapops* by having six as opposed to seven supralabials.

Plumridgeus gen. nov. is also separated from genera *Aparallactus* and *Elapops* by their consistently lower subcaudal count (below 41, versus above 41), being a reflection of the considerably shorter tail seen in snakes of this genus.

Traits otherwise common to all three genera are as follows: very thin snakes. Maxillary is short, with 6-9 small teeth followed by a large grooved fang situated below the eye. Anterior mandibular teeth longest. Head small, not distinct from neck. Eye is small, with a round pupil. Nasal entire or divided; no loreal. Body cylindrical; tail moderate or short. Dorsal scales smooth, without pits, arranged in 15 dorsal mid-body rows. Ventrals are rounded; subcaudals are single.

In terms of the type species *Plumridgeus wernerii*, it is a blackish colored snake with a deep black, light-edged nuchal collar. The upper lip is blackish below the eye, and yellowish in front of and behind the eye. Ventrally it is uniformly yellowish.

It may attain 39 cm in total length, with a tail 6.5 cm long.

The dorsal scales are smooth, without pits, and are arranged in 15 dorsal mid-body rows. Ventrals 147-160; anal plate single; subcaudals 32-40, all single.

Portion of rostral visible from above nearly half as long as its distance from the frontal. Internasals much shorter than the prefrontals. Frontal one and a half times as long as broad, longer than its distance from the end of the snout, as long as the parietals. Nasal entire, in contact with the preocular. Two postoculars, in contact with the anterior temporal. Temporals 1+1. Six upper labials, second and third entering the eye. First lower labial in contact with its fellow behind the mental. Three lower labials in contact with the anterior chin shield. Two pairs of chin shields, the anterior pair broader and slightly longer than the posterior pair.

For the species *Plumridgeus nigriceps* it is reddish brown dorsally, and whitish ventrally. The top of the head and the nape

of the neck are black, the black on the nape edged with yellowish. A pair of yellowish spots may be present behind the parietal shields. The sides of the head are yellowish, with the shields bordering the eye black.

Adults may attain a total length of 25.5 cm. A juvenile 103 mm in total length has a tail 17 mm long.

Smooth dorsal scales in 15 mid-body rows. Ventrals 110-149; anal plate single; subcaudals 21-40, all single.

Portion of rostral visible from above about one third as long as its distance from the frontal. Internasals much shorter than the prefrontals. Frontal is one and a third times as long as broad, much longer than its distance from the end of the snout, a little shorter than the parietals. Nasal entire, in contact with the preocular. One postocular. Temporals 1+1 (the first sometimes absent). Six upper labials, second and third entering the eye, fourth (or fourth and fifth) in contact with the parietal. Three lower labials in contact with the anterior chin shield. Anterior chin shields in contact with the mental, slightly larger than the posterior chin shields.

Distribution: *Plumridgeus wernerii* is found in south-east Mozambique.

Plumridgeus nigriceps is only known from the Uluguru and Usambara Mountains, East Tanzania.

Etymology: Named after Gordon Plumridge of Kangaroo Flat, Bendigo, Victoria, Australia for services to reptile education in Australia.

Content of *Plumridgeus* gen. nov.

Plumridgeus wernerii (Boulenger, 1895) (Type species).

Plumridgeus nigriceps (Peters, 1854).

GENUS *LYCOPHIDIUM* FITZINGER, 1843

Type species: *Lycodon horstokii* Schlegel, 1837

(Known in most contemporary texts as *Lycophidion capense* (Smith, 1831)).

Diagnosis: The genus *Lycophidion* is a genus distributed across most parts of Africa and commonly known as Wolf Snakes. Consisting roughly 19 described and recognized species, they are smooth-scaled, moderate to small sized snakes with needle sharp and strongly recurved teeth, which are longest in the front of the upper jaw. These consist of 6-10 maxillary teeth increasing in size, and then after a small gap 15-17 very small teeth. Mandible anteriorly with 5-6 small teeth, increasing in size and then one or two large fang-like teeth, followed by very small teeth. The head is barely distinct from the neck, distinctively flattened and the snout is broadly rounded; the rostral is small; nostril pierced in a single nasal shield, followed by a small post-nasal; the eye is small with a vertically elliptical pupil; praecocular is much developed on the upper surface of the head taking the place of the supraocular anteriorly. The body is cylindrical and scales are smooth, with apical pits in 15-17 (rarely 19) dorsal mid body rows, rounded ventrals, single anal and all subcaudals paired, with the tail being short to moderate. All are oviparous.

Distribution: Africa, with most species south of the Sahara.

SUBGENUS *JACOBCLARKUS* SUBGEN. NOV.

Type species: *Lycophidion laterale* Hallowell, 1857

Diagnosis: This subgenus is monotypic for this species. It is separated from all other species within *Lycophidion* by having four or more apical pits. There are 2 or 3 in *Lycophidion irroratum* and *Lycophidion nigromaculatum* (subgenus *Metoporphina*) while all other species have a single pit.

The species *Lycophidion (Jacobclarkus) laterale* is also separated from others in the genus by having 17 dorsal mid-body rows, 8 supralabials, the rostral is nearly twice as broad as deep, two labials enter the eye, the diameter of the eye is not greater than the distance from the mouth and there are 176-188 ventrals.

In common with the rest of the genus, this species is a smooth-

scaled, moderate to small sized snake with needle sharp and strongly recurved teeth, which are longest in the front of the upper jaw. These consist of 6-10 maxillary teeth increasing in size, and then after a small gap 15-17 very small teeth. Mandible anteriorly with 5-6 small teeth, increasing in size and then one or two large fang-like teeth, followed by very small teeth. The head is barely distinct from the neck, distinctively flattened and the snout is broadly rounded; the rostral is small; nostril pierced in a single nasal shield, followed by a small post-nasal; the eye is small with a vertically elliptical pupil; praecocular is much developed on the upper surface of the head taking the place of the supraocular anteriorly. The body is cylindrical and scales are smooth, with apical pits in 15-17 (rarely 19) dorsal mid body rows, rounded ventrals, single anal and all subcaudals paired, with the tail being short to moderate. Oviparous.

Distribution: From the Central African Republic west to Senegal and including Senegal, Gambia, Guinea, Ivory Coast, Ghana, Togo, Benin, Nigeria, Cameroon, Democratic Republic of the Congo (Zaire), Congo (Brazzaville), Gabon, Central African Republic and North Angola.

Etymology: Named in honour of Jacob Clark of Ballarat, Victoria, Australia in recognition for his services to reptile education.

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