

# THE SNAKES OF THE GENUS

# PSITHIUS

Illustration of *Psithius  
albans*  
Original photo: E. Coll



# PART 1: BIOLOGY AND SYSTEMATICS

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The snakes of the genus *Psammophis* are commonly called sand racers. The scientific name is derived from the Greek *psamme*, meaning sand, or the similar *psammos* (which some Greek writers, such as the historian Herodotus, use to mean desert, especially in reference to the deserts of Egypt and Libya), plus the Greek *ophis*, meaning snake.

The genus *Psammophis* belongs to the subfamily Psammophiinae of the family Colubridae. Because of its very wide distribution and considerable morphological variability, the genus is the subject of several taxonomic studies — the classification of *Psammophis sibilans* and *Psammophis sudanensis* is especially confusing.

In this article we use the most widely accepted systematics for the genus, taking into account recent contributions made by BROADLY (2002), HUGHES and WADE (2004), and KELLY (2005). According to this classification, there are currently 29 recognized species — 25 African

species and 4 Asian species. Two of the African species, *Psammophis aegyptius* and *Psammophis schokari*, are also found in Asia.

The distribution range of the genus *Psammophis* covers the entire continent of Africa from Morocco to South Africa, and also extends into the Middle East and western Asia.

Contrary to what might be supposed from its common name, the sand racer is not found in true deserts, but rather in savanna (TRAPE and MANE, 2000), rain-forest, woodland (AKANI et al., 1999), and mangrove swamp (LUISELLI and AKANI, 2002).

## Description

Sand racers are slender and cylindrical, varying greatly in length — *Psammophis angolensis* grows to only 30–40 centimeters, whereas *Psammophis mossambicus* grows to nearly 2 meters. The tail can make up as much as a third of the total length. The head is elongate and not well differentiated from the body, with a typically rather pointed snout. The eyes are

large and somewhat sunken, but always bright and alert; the pupils are round.

The snakes of this genus always have smooth dorsal scales, and almost always have more or less distinct longitudinal stripes along the entire body. The belly is also striped, and aids in identification. With very little sexual dimorphism, identification of sex is difficult, especially in living specimens. Even tail length and number of ventral scales, which in most snake taxa tend to differ between the sexes (KING, 1989; SHINE, 2000), are not appreciably different between male and female sand racers (MARX, 1988; AKANI et al., 2002). In any case, the males do tend to grow a little larger than the females. Unlike in most snakes, the hemipenes of the males of this genus (and of the entire subfamily Psammophiinae) are vestigial tubelike structures (DOWLING and SAVAGE, 1960; BROADLEY, 1977, 2000).

Coloration is quite variable, consisting of combinations of colors that range from light brown to





*Psammophis rukwae*. Photo: C. Coll



*Psammophis schokari*. Photo: C. Coll

dark grayish brown or gray. Coloration can also be uniform, such as in *Psammophis mossambicus*. The underside tends to be lemon yellow, and in some species has two dark more or less distinct longitudinal bands bordered with white.

#### Diet and venom

Like many snakes, sand racers feed mainly on lizards, rodents, amphibians, and nestling birds. Nonetheless, the diets of the different species naturally vary depending on the environmental conditions in which they live.

Prey size depends on the size of the snake, but small meals are preferred. Lizards of the family Agamidae, Gekkonidae, Lacertidae, and Scincidae are favorite prey of sand racers in general. Only the larger species also feed on rodents and nestling birds. The species that live in wetter areas more frequently eat amphibians.

*Psammophis mossambicus* is also known for its tendency to eat other snakes.

Hunting strategy is about the same for all species of *Psammophis*. Prey is located visually, then pursued, and finally grabbed. The prey is held with the front teeth and "chewed" until the snake's venom takes effect. These snakes are opisthoglyphs, having fixed teeth at the back of the mouth that are relatively thick and grooved, helping to work the venom into the prey. The venom of these species is not considered dangerous to humans, but symptoms of pain, swelling, itching, bleeding, and nausea have been described in bite victims.

#### Biological curiosities

One unusual characteristic of sand racers is that if they are held by the tail they can wriggle with such force that the tail breaks off. In some cases the tail will grow back, at least

in part, and this makes determining reliable lengths and weights for the species difficult.

All species of *Psammophis* are oviparous, usually laying clutches of fewer than 10 eggs.

The snakes of this genus, and others of the subfamily Psammophiinae, exhibit an unusual behavior known as self-rubbing (DE HAAN, 2003a, 2003b), in which they spread their undersides with a colorless, viscous fluid secreted by specialized nasal glands. This fluid contains proteins and fatty acids, and may be rubbed onto the body when the snake is on the ground or when it is up in a shrub. It was once thought that this substance served to limit excessive evaporative water loss, but more detailed studies (especially DE HAAN, 2003a) suggest an even more interesting purpose. It seems that the fluid dries quickly to form a film, which then cracks into flakes that are spread as the snake moves — thereby marking its territory for hunting and mating, and leaving other messages for members of the same species. The fluid is also secreted by glands in the parietal and infralabial regions of the mouth.

#### African species

##### *Psammophis aegyptius*

**Distribution.** Algeria, Egypt, Libya, and Israel.

**Size.** Maximum 150 centimeters, normally 120 centimeters.

**Habitat.** At elevations up to about 2,000 meters above sea level. Found in sandy or rocky areas such as dry streambeds with sparse vegetation. Also found in oases palm groves and agricultural fields.

**Habits.** Diurnal, ground dwelling (although also seen in shrubs and small trees), agile, and timid. If approached, it prefers to flee, but if pursued or cornered it will puff out its throat and attack.

**Diet.** Feeds mostly on lizards and small mammals, but if prey is scarce, also nestling birds.

##### *Psammophis angolensis*

**Distribution.** Congo, Zaire, Tanzania, Ethiopia, Angola, Zambia,



Malawi, Mozambique, Zimbabwe, Botswana, Namibia, and South Africa.

**Size.** Maximum 50 centimeters.

**Habitat.** Wooded areas and dry and wet savanna to elevations of up to 1,500 meters.

**Habits.** Diurnal, secretive; commonly active among the shrub vegetation. Does not usually bite.

**Diet.** Feeds mainly on lizards and amphibians.

***Psammophis ansorgii***

**Distribution.** Angola.

**Size.** Maximum 75 centimeters; normally 50–60 centimeters.

**Habitat.** Montane grassland and wet savanna at elevations up to 1,800 meters.

**Habits.** Diurnal, ground dwelling.

**Diet.** Feeds mostly on lizards and very small mammals.

***Psammophis biseriatus***

**Distribution.** Libya, Sudan, Ethiopia, Somalia, Kenya, Uganda, and Tanzania.

**Size.** Maximum 110 centimeters.

**Habitat.** Savanna and montane grassland up to 1,500 meters.

**Habits.** Diurnal and quite active. Ground dwelling and also arboreal. If captured this snake struggles wildly and can drop its tail in order to get away. The tail apparently grows back partly.

**Diet.** Feeds mainly on lizards and very small mammals.

***Psammophis brevirostris***

**Distribution.** Namibia, Botswana, Zimbabwe, Swaziland, and South Africa.

**Size.** Maximum 110 centimeters.

**Habitat.** Savanna up to elevations of 2,000 meters.

**Habits.** Diurnal, ground dwelling.

**Diet.** Feeds mainly on lizards and small mammals, but also eats nestling birds.

***Psammophis crucifer***

**Distribution.** Zimbabwe, Swaziland, and South Africa.

**Size.** Maximum 65 centimeters; usually 40–50 centimeters.

**Habitat.** Wet grassland in high

plateaus and montane plains at elevations up to 2,300 meters.

**Habits.** Diurnal, ground dwelling. Bites if not handled with care.

**Diet.** Feeds on lizards and frogs.

***Psammophis elegans***

**Distribution.** Gambia, Senegal, Mali, Ivory Coast, Burkina Faso, Ghana, Togo, Benin, Nigeria, Cameroon, Central African Republic.

**Size.** Maximum 170 centimeters.

**Habitat.** Rainforest, but also hills and grassy savanna.

**Habits.** Diurnal, ground dwelling.

**Diet.** Feeds mainly on lizards and small mammals.

***Psammophis jallae***

**Distribution.** Angola, Zambia, Namibia, Botswana, Zimbabwe, and South Africa.

**Size.** Maximum 105 centimeters.

**Habitat.** Hills and grassy savanna, especially from 700 to 1,500 meters.

**Habits.** Diurnal, ground dwelling.

**Diet.** Prefers skinks and other lizards.

***Psammophis leightoni***

**Distribution.** South Africa.

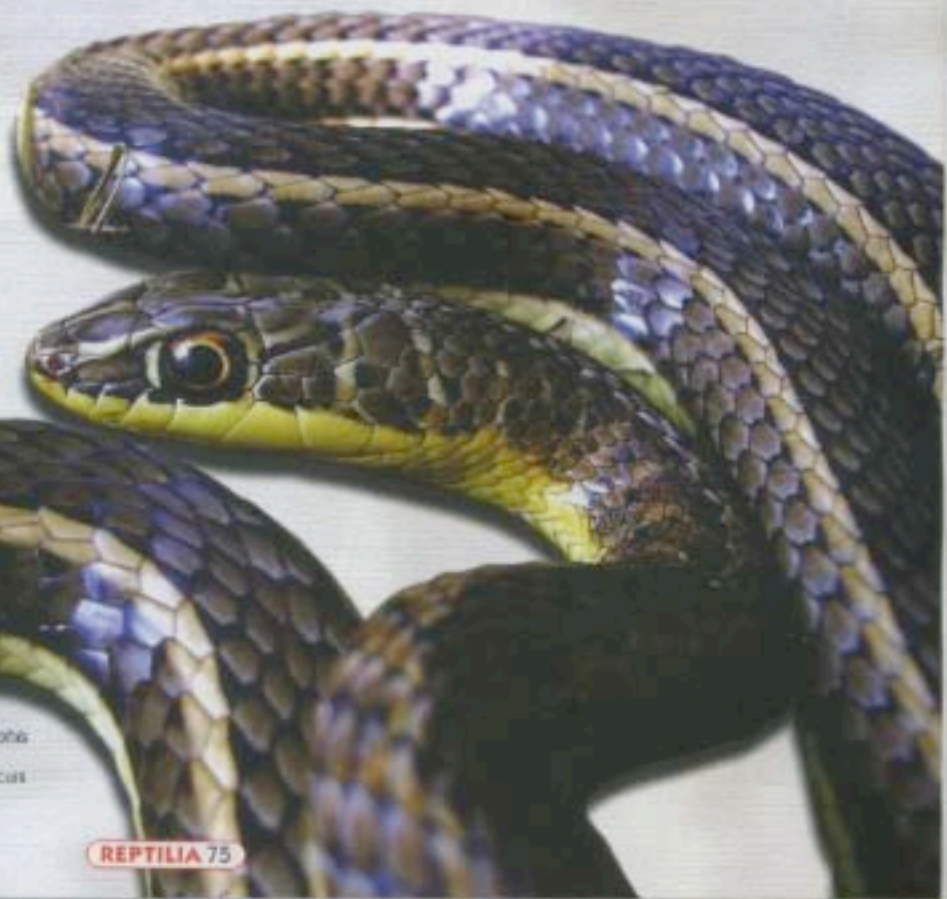
**Size.** Maximum 105 centimeters.

**Habitat.** Desert and semidesert coastal areas and savanna.

**Habits.** Diurnal, ground-dwelling.

**Diet.** Feeds on lizards and small mammals, and also on other snakes.

*Psammophis rukwae*  
Photo: C. Curt







Juvenile *Psammophis mossambicus*. Photo: W. Steen

***Psammophis leopardinus***

**Distribution.** Angola and Namibia.

**Size.** Maximum 140 centimeters, but normally less.

**Habitat.** Areas of semidesert and arid savanna.

**Habits.** Diurnal, ground dwelling.

**Diet.** Feeds on lizards, small mammals, and young birds.

***Psammophis mossambicus***

**Distribution.** Sudan, Zaire, Angola, Zambia, Malawi, Mozambique, Zimbabwe, Botswana, Namibia, and South Africa.

**Size.** Maximum 176 centimeters.

**Habitat.** Wet forest and grassland, especially near marshland and agricultural fields, at elevations of up to 1,500 meters.

**Habits.** Diurnal, ground dwelling.

**Diet.** Feeds on lizards, frogs, rodents, birds, and occasionally other snakes.

***Psammophis namibensis***

**Distribution.** Angola, Namibia, and South Africa.

**Size.** Maximum 137 centimeters; normally 80 centimeters.

**Habitat.** Desert (Namibia) and semidesert of the Karoo region (South Africa), at elevations of up to 1,500 meters.

**Habits.** Diurnal, ground dwelling.

**Diet.** Feeds mostly on lizards and rodents.

***Psammophis notostictus***

**Distribution.** Angola, Namibia, Botswana, and South Africa.

**Size.** Maximum 98 centimeters; normally 65 centimeters.

**Habitat.** Arid steppe, very common in clay soil areas of the Karoo and in the fynbos shrubland of South Africa.

**Habits.** Diurnal, ground dwelling. Very agile.

**Diet.** Feeds mainly on skinks and other lizards.

***Psammophis orientalis***

**Distribution.** Kenya, Malawi, Mozambique, and Zimbabwe.

**Size.** Maximum 122 centimeters; normally 75 centimeters.

**Habitat.** Arid savanna at elevations up to 1,300 meters.

**Habits.** Diurnal, ground dwelling. Very agile, and likes to climb in search of prey.

**Diet.** Feeds on lizards, rodents, small mammals, and occasionally other snakes.

***Psammophis phillipsi***

**Distribution.** Senegal, Gambia, Guinea-Bissau, Guinea, Sierra Leone, Liberia, Ivory Coast, Burkina Faso, Ghana, Togo, Benin, Nigeria, Cameroon, Central African Republic, Sudan, Equatorial Guinea, Gabon, Congo, Zaire, Uganda, Kenya, Ruanda, Burundi, Tanzania, Malawi, Mozambique, Zambia, Angola, Namibia, Botswana, Swaziland, and South Africa.

**Size.** Maximum 178 centimeters; normally 110 centimeters.

**Habitat.** Wet savanna, especially near marshland and low grassland.

**Habits.** Diurnal, ground dwelling. Fast and very active. If caught by the tail, this snake whips back violently causing the tail to break off.

**Diet.** Feeds on small vertebrates. Juveniles eat mainly frogs and lizards, whereas adults feed mainly on rodents and occasionally other snakes (including baby mambas).

***Psammophis pulcher***

**Distribution.** Sub-Saharan Africa.

**Size.** Maximum 50 centimeters; normally 35 centimeters.

**Habitat.** Arid savanna and plains at elevations of up to 500 meters.



**Habits.** Diurnal, ground dwelling.

**Diet.** Probably feeds mainly on lizards.

***Psammophis punctulatus***

**Distribution.** Subsaharan Africa.

**Size.** Maximum 187 centimeters; normally 100 centimeters.

**Habitat.** Arid savanna at elevations up to 1,300 meters.

**Habits.** Diurnal, ground dwelling. Likes to climb in search of prey.

**Diet.** Feeds mainly on lizards and other snakes.

***Psammophis rukwae***

**Distribution.** Algeria, Mali, Senegal, Ghana, Cameroon, Sudan, Uganda, Kenya, and Tanzania.

**Size.** Maximum 168 centimeters; normally 90 centimeters.

**Habitat.** Open deciduous woodland, and floodplains.

**Habits.** Diurnal, ground dwelling. Agile, and likes to climb in search of prey.

**Diet.** Feeds mainly on lizards and frogs.

***Psammophis schokari***

**Distribution.** Morocco, Western Sahara, Mauritania,

Mali, Algeria, Niger, Nigeria, Tunisia, Libya, Sudan, Ethiopia, Somalia, Djibouti, Eritrea, Egypt, Saudi Arabia, Yemen, Israel, Jordan, Syria, Iraq, Iran, Turkmenistan, Pakistan, and India.

**Size.** Maximum 150 centimeters; normally 90 centimeters.

**Habitat.** At elevations up to 1,800 meters in arid and semiarid regions, including deserts and plains with sparse vegetation, foothills of mountains, high plains, steppes, and oases.

**Habits.** Diurnal, ground dwelling. Hunts at night during the hottest months. Normally harmless, and quick to flee if it perceives a threat. Often hides under rocks and rubble, or in abandoned rodent burrows or other holes in the ground or among the roots of trees.

**Diet.** Feeds mainly on lizards, but also eats frogs, rodents, and small birds.

***Psammophis sibilans***

**Distribution.** Morocco, Western Sahara, Mauritania, Senegal, Mali, Algeria, Niger, Nigeria, Tunisia, Libya, Chad, Egypt, Sudan, Eritrea, Djibouti, Ethiopia, Somalia, Kenya, Uganda, Tanzania, Rwanda, Burundi, Zaire, Angola, Zambia, Malawi, Mozambique, Zimbabwe, Swaziland, Botswana, Namibia, and South Africa.



*Psammophis orientalis*. Photo: C. Coll





Looking at the teeth of *Psammophis orientalis*. Photo: C. Coll



Bite marks left by *Psammophis rukwae*. Photo: C. Coll



*Psammophis rukwae*. Photo: C. Coll

**Size.** Maximum 183 centimeters; normally 100 centimeters.

**Habitat.** Found at elevations of up to 2,500 meters, this species occupies a wide variety of habitats including high plains and montane fields, arid and rocky savanna, dry hills, grassland, and tropical rainforest.

**Habits.** Diurnal, ground dwelling. Fast and active, but timid. Flees to holes in the ground or to water when disturbed. Docile in nature. If caught by the tail, this snake lunges back such that the tail breaks off. If provoked, this snake does attack, but without much effort.

**Diet.** Feeds on small vertebrates. Juveniles feed mainly on lizards and frogs, whereas adults feed mainly on small mammals and sometimes birds.

#### *Psammophis subtaeniatus*

**Distribution.** Central African Republic, Sudan, Ethiopia, Kenya, Tanzania, Angola, Zambia, Malawi, Mozambique, Zimbabwe, Botswana, Namibia, and South Africa.

**Size.** Maximum 137 centimeters; normally 90 centimeters.

**Habitat.** At elevations up to 1,500 meters in dry open savanna.

**Habits.** Diurnal, ground dwelling. Agile.

**Diet.** Feeds mainly on lizards, rodents, small mammals, and sometimes birds.

#### *Psammophis tanganicus*

**Distribution.** Libya, Sudan, Ethiopia, Eritrea, Somalia, Kenya, Uganda, and Tanzania.

**Size.** Maximum 141 centimeters; normally 70 centimeters.

**Habitat.** Usually at elevations up to 1,300 meters, in dry grassy savanna, hill country, and low grassland.

**Habits.** Ground dwelling. Fast and very active.

**Diet.** Feeds mainly on lizards and small mammals.

#### *Psammophis trigrammus*

**Distribution.** Angola, Namibia, and South Africa.

**Size.** Maximum 138 centimeters; normally 70 centimeters.

**Habitat.** Arid savanna and semidesert.

**Habits.** Diurnal, ground dwelling. Very fast.

**Diet.** Feeds mainly on skinks and other lizards.

#### *Psammophis trinasalis*

**Distribution.** Angola, Namibia, Botswana, and South Africa.

**Size.** Maximum 106 centimeters; normally 65 centimeters.

**Habitat.** Mainly at elevations of about 700 meters, in wooded areas of the Kalahari Desert and mixed savanna.

**Habits.** Diurnal, ground dwelling.

**Diet.** Feeds mainly on lizards and rodents.

#### *Psammophis zambiensis*

**Distribution.** Zambia.

**Size.** Maximum 101 centimeters; normally less.

**Habitat.** Wet miombo woodland.

**Habits.** Diurnal, ground dwelling.

**Diet.** Feeds mainly on lizards and amphibians.

#### Asian species

The Asian species of *Psammophis* are distributed as follows: *Psammophis condanarus* in India, Pakistan, Nepal, Myanmar, and Thailand; *Psammophis leithii* in Afghanistan, Pakistan, and India; *Psammophis lineolatus* in Iraq, Iran, Azerbaijan, Turkmenistan, Uzbekistan, Kazakhstan, Kyrgyzstan, Tajikistan, Afghanistan, Pakistan, China, and Mongolia; and *Psammophis longifrons* in India.





Juvenile *Psammophis mossambicus*. Photo: W. Klein

These species range in size from 60–70 centimeters (*Psammophis leithii*) to 140 centimeters (*Psammophis longifrons*). They live in habitats ranging from dry areas with sparse vegetation to wet and marshy areas. They are ground dwellers or semi-arboreal, and usually shy and harmless. ■

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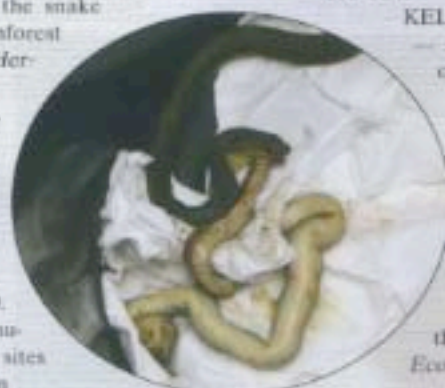
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*Psammophis mossambicus* regurgitating a specimen of *Lamprophis* sp. Photo: W. Klein