

OBSERVATIONS ON THE AMPHIBIANS AND REPTILES OF SOUTHERN MOROCCO

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INTRODUCTION

The dry regions of North Africa support a large and particularly interesting number of amphibian and reptile species. Detailed accounts of these forms are to be found in several reports (e.g. St Girons 1956, St Girons and St Girons 1956, Pasteur and Bons 1957, Pasteur and Bons 1959, Gauthier 1967, Stemmler 1972, Werb 1979, Raxworthy et al., 1984). During May and June 1980 and September 1981, the author carried out a series of field studies on certain amphibians (Meek, 1983a) and reptiles (Meek, 1983b; Meek and Jayes, 1982) in southern Morocco. This paper reports on general observations on the herpetofauna located during the study periods, mainly concerning those species located on the study areas.

CLIMATE

Southern Morocco is situated in a geographical zone that is typically dry with hot summers and mild winters. An important geological feature is the presence of the Atlas mountains which buffer the coastal areas from the extreme aridity and temperature levels of the Saharan interior (-

buffer the coastal areas from the extreme aridity and temperature levels of the Saharan interior (Figure 1). Nevertheless temperatures on the coast are still high, for example during the hottest months (July and August) temperatures up to 47°C have been recorded. The coolest month is January when maximum daily temperatures average at 20°C although up to 30°C has been recorded, with the minimum daily temperature never falling below 0°C.

The region's arid nature is demonstrated by the rainfall figures. In July, the driest month, the maximum recorded monthly rainfall is 1mm but usually no rain falls at all during this time. January is the wettest month with a maximum recorded fall of 155mm and an average of 48mm. For a more detailed account of the climate of the region the work by Griffiths (1972) should be consulted.

HABITAT

Plates 1 and 2 show views of the main habitats investigated. Plate 1 shows an area of desert and part of a system of pools and irrigation channel that lay within it. This inland region had the highest temperatures and the lowest humidity levels recorded during the survey. Sand temperatures in May — June varied from a mid-morning level of 45°C in mid-afternoon; in September they approached 60°C. Air temperatures in May — June maximised around 35°C and in September reached 39°C. The temperatures of the water in the pools varied from 24 — 28°C depending on depth. In unshaded areas around the pools and water channel the relative humidity was approximately 45%. *Euphorbia* sp was the major plant species in the surrounding desert, although several trees (*Eucalyptus* sp) provided some shade near the water.

The locality shown in Plate 2 was an area of scrubland near the Atlantic coast investigated in 1980. Sand temperatures during the hotter times of the day here reached 35 — 40°C, whilst ambient air temperatures maximised around 33 — 35°C. The relative humidity during the hottest period of the day ranged from 45 — 50% but with frequent sea mists this could rapidly (within 15 minutes or so) increase to 96%. Air temperatures could also quickly decline to around 20°C. However, even with the absence of an evening mist, the relative humidity increased to approximately 80% during the hours following dusk. The vegetation here was mainly in the form of trees (*Argania* and *Eucalyptus* sp) with extensive areas of *Euphorbia*.

LIST OF SPECIES

Amphibia

Anura

Ranidae

Rana perezi (Seoane, 1885)

A large population located in an area with abundant pools and an irrigation system running through it (Plate 1). The frogs ranged in snout-vent length from 16 - 78mm in May — June (n = 108) and from 20 — 79mm in September (n = 24) but the relative size frequencies at the two periods in the year were different. Figure 2a shows that in May — June they were skewed towards smaller individuals probably as a result of recently metamorphosed individuals; the general absence of these size classes in September (Figure 2b) probably a result of growth and predation. The frogs were usually seen basking on the banks of the pools and on the slopes of the irrigation channel (see Meek, 1983a). There was some variation in dorsal pattern in the population, Plate 3 shows the most common of these.

Bufo

Bufo mauritanicus (Schlegel, 1841)

Located in the same general area as *R. perezi*. Only juvenile and subadults were found at the water channel but adults were found in the surrounding desert. The young toads were seen in open areas throughout the day although a few retired to shaded areas during the hotter periods. Limb abnormalities were observed in a large (79mm SV length) animal located in the desert.

Reptilia

Chelonia

Testudinidae

Testudo graeca graeca (Linnaeus, 1758)

Four tortoises were located at a site near the coast (Plate 2). Three of the animals showed extensive shell damage. The relationship between activity patterns and body temperatures in these tortoises has been described by Meek and Javes (1982).

Emydidae

Mauremys caspica leprosa (Schweigger, 1812)

Adults and juveniles of this species were found in the area shown in Plate 1, where they were observed basking on the banks of the water channel (Meek, 1983b) or moving along the channel bed. Additional animals were observed at a dam near this site.

Sauria

Gekkonidae

Saurodactylus mauritanicus brosetti (Bons and Pasteur, 1957)

A small gecko (Plate 4) located during the day under large rocks in scrubland (Plate 2) and around the old town of Agadir. This species was only observed abroad from dusk onwards. Several females were found to be gravid, usually with two eggs visible (May — June). Captive individuals (none of which exceeded 45mm in total length) have eaten small crickets, fruit flies and tiny mealworms. Only one other species *S. fasciatus* is known from this genus. Both occur in N. Africa (Gruber, 1975) and in common with certain other ground living forms of gecko they lack adhesive toe pads.

Geckonia chazaliae (Mocquard, 1895)

One individual found under a large stone during the day near the area shown in Plate 1.

Tarentola mauritanica mauritanica (Linnaeus, 1758)

Found in all areas investigated. At the irrigation channel they were located on the bridges, sometimes basking, but at the other sites they were usually found under rocks during the daylight hours. A juvenile was found under a large rock on the desert area shown in Plate 1.

Agamidae

Agama bibroni (Dumeril and Dumeril, 1851)



PLATE 1

Typical habitat features of the study area near Tiznit showing irrigation channel and surrounding desert. This view which faces southeast towards the Saharan interior, shows the rocky terrain and sparse vegetation, mainly *Eucalyptus* trees (top right) and *Euphorbia* dominated slopes (top left).



PLATE 2

Typical habitat features of the study area near Agadir. Vegetation growing on the rocky terrain was mainly *Euphorbia* (foreground) and *Argania*

Located at the site in Plate 2 and in the area around Agadir. All individuals observed were adults. The only lizard seen abroad during the hotter times of the day, its greyish colouring made it difficult to spot when it was motionless.

Scincidae

Eumeces schneideri algerensis (Peters, 1864)

Found in the dry areas shown in Plates 1 and 2. In the desert (Plate 1) they were always in association with dense growths of *Euphorbia* sp. During the day they were found in burrows, the entrance to which was normally under a large rock. One burrow excavated had a total length in excess of 2.5 metres and changed direction several times. Captive animals have accepted a wide range of food from mealworms, crickets and cockroaches to various types of commercial pet foods. It is of interest to note that these lizards have only rarely been observed to drink water from a bowl. In view of the fact that there were no pools of water in the desert areas where they were found presumably some other mechanism for water uptake is used.

Sphenops sphenopsiformis (Dumeril, 1856)

One individual found in an area of sand dunes near the region shown in Plate 1. This form which is adapted for living in areas of fine sand has both the front and hind legs much reduced (the front legs more so than the hind legs, see Plate 5a) with movement being mainly in a snake-like fashion. The head is flattened and pointed for burrowing (Plate 5b). The lizard was caught at mid-day below the sand and it seems likely that the period of activity on the surface is restricted to such times when the surface sand temperatures were much lower than 55 — 66°C levels which are achieved during midday.

Chalcides mionecton (Boettger, 1874)

One lizard found in a dune system in association with *Sphenops*. Similar to *Sphenops* this form appears adapted for burrowing in fine sand.

Serpentes

Colubridae

Natrix maura (Linnaeus, 1758)

Found to be abundant in May — June in the area shown in Plate 1 but less abundant during September. Perhaps because of the high daytime substrate temperatures, they were never seen at any great distance from the waters edge. Several animals were caught while swimming in the irrigation channel where they were observed hunting *R. perezi*.

Malpolon monspessulanus monspessulanus (Hermann, 1804)

Two specimens located in the area shown in Plate 2. Both snakes were adults and exceeded 1 metre in length. These snakes were also seen being used by the local snake charmers in Agadir.

DISCUSSION

A total of eleven reptile species and two species of amphibian were observed on these field trips. However, not all the species known from the areas investigated were located and for a more complete account of the herpetofauna of these regions, more extensive reports, in particular the excellent account by Stemmler (1972) should be consulted. Several detailed studies of the regions herpetofauna have been made. One of the most interesting being that of Gauthier (1967) who observed that certain species of reptile in North Africa adjust their periods of activity with season. Indeed, knowledge of a species activity period(s) in these regions is useful if they are to be observed abroad, as many of the lizard species in particular are bimodal, with activity periods in early morning and late afternoon. However, the desert agama (*A. bibroni*) appears to be active in unshaded areas even during the period of highest temperatures although these lizard are usually found where there are abundant shade plants. Raxworthy et al., (1984) recorded this species in undisturbed areas usually in association with *Euphorbia* succulents, which is in general agreement with the present observations, although some individuals were located amongst the ruins of the old town of Agadir destroyed by an earthquake.

FIGURE 1

Map of south west region of Morocco showing locations of the two main study sites (☆) and other areas where reptiles were found (○). The study area near Tiznit refers to plate 1; the study site near Agadir refers to plate 2.

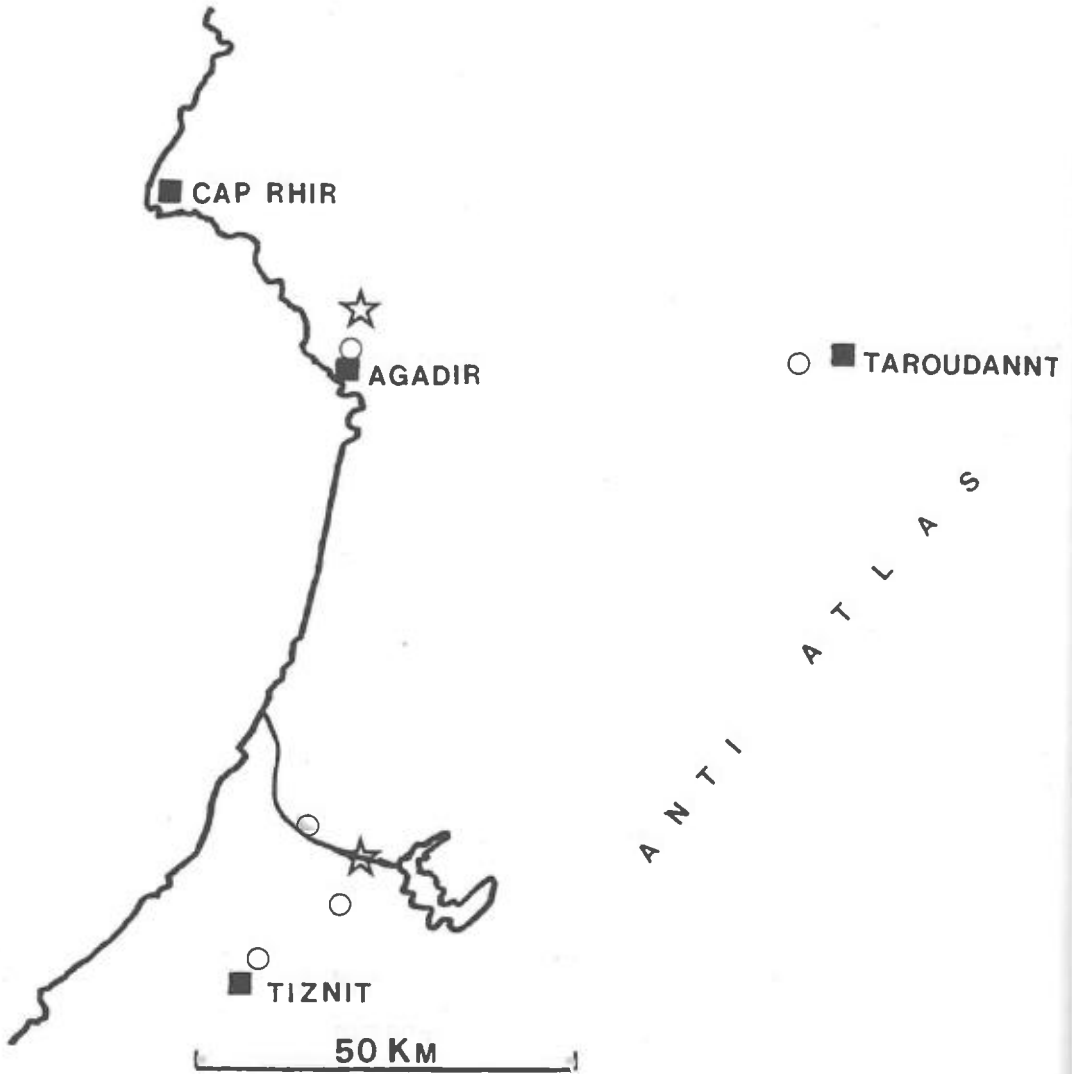
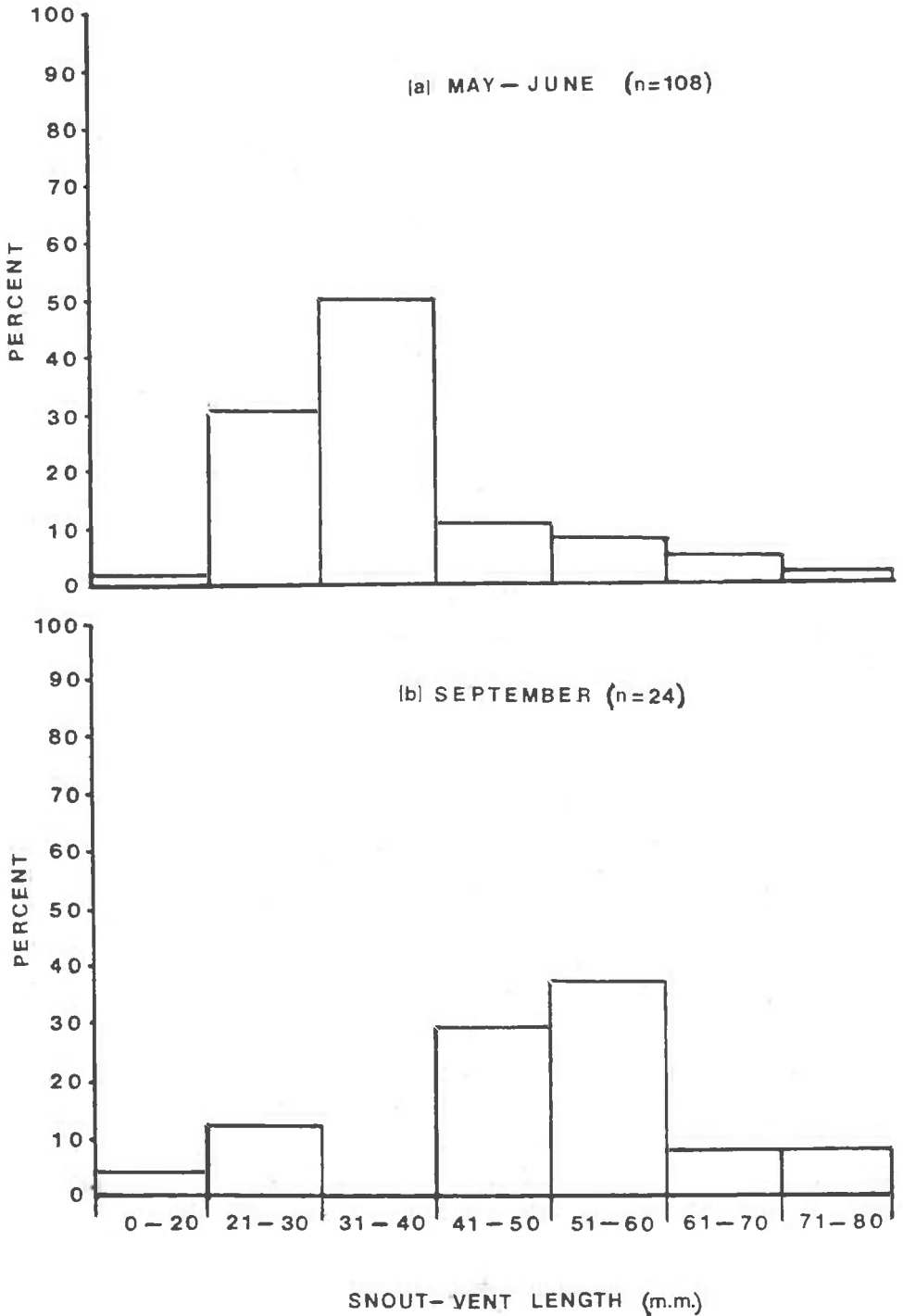


FIGURE 2

Histograms of size frequencies of *Rana perezi* sampled in May — June 1980 and September 1981.



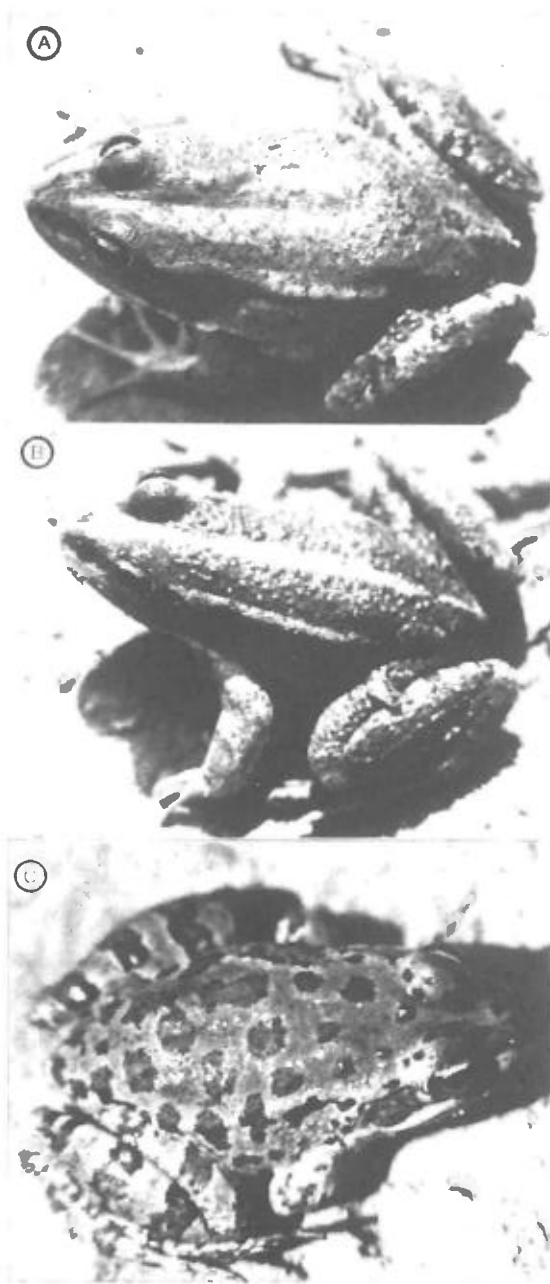


PLATE 3

Principal variations in dorsal patterns of *Rana perezi* based on 24 captured animals in September 1981. Plate 3a shows the most common (79.2%) followed by 12.5% with a dorsal stripe (Plate 3b). Only 8.3% had the pattern shown in Plate 3c.



PLATE 4

Adult *Saurodactylus mauritanicus* found 5km north of Agadir (Plate 2)

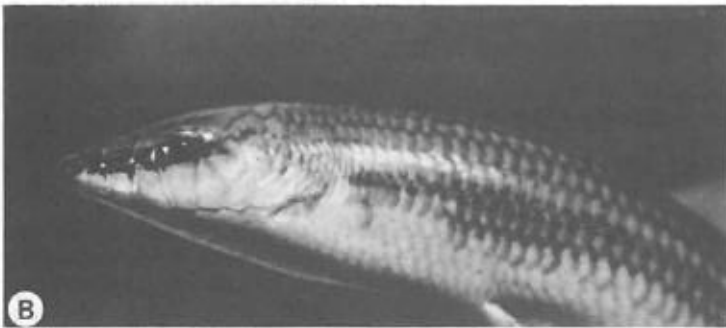


PLATE 5

Adult *Sphenops sphenopsiformis* found near the area shown in Plate 1. Plate 5a shows the elongate body and reduced limbs; Plate 5b the pointed head and specialised scales covering the ear openings. Apparently these and other features are adaptations for living on sand dunes.

From examination of the faeces of some of the lizard species (*Saurodactylus*, *Tarentola* and *Eumeces*) it would appear that ground living beetles (*Tenebrio*) are an important element in their diet. These beetles, which shelter in clusters under large rocks during the day, were found active in great numbers on the desert floor during the hours following dusk, where their slow movements probably make them an easy prey for the lizards. In addition to scorpions (probably two species one of which may have been a *Buthus* sp.) other invertebrates were also observed, mainly spiders, grasshoppers and locusts. The scorpions were found during the daytime under rocks but these other types were usually day active.

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