

Fig. 1. Denomination of head scales

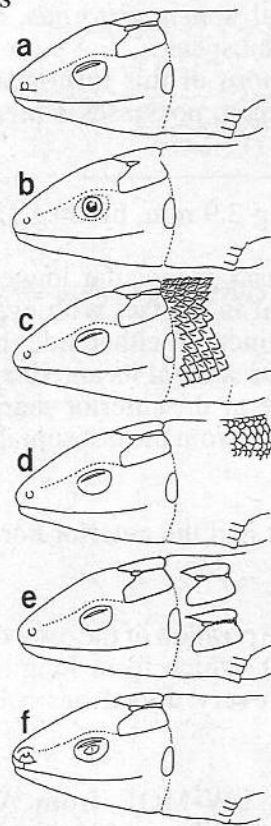


Fig. 2. Key characters in the genera of Lacertidae: a: *Lacerta*, *Podarcis*; b: *Ophisops*; c: *Psammodromus*; d: *Philochoortus*; e: *Acanthodactylus*; f: *Mesalina*

Family Lacertidae, "true lizards"

Morphology: Slender body of small to moderate size; tail often much longer than SVL, fragile. Pileus with large symmetrical scales; some genera with a collar of enlarged scales. Body scalation granular or imbricate. Limbs well developed.

collective a: Zerzoumia, Zermoumia; Thaba; Zalam, Ezelam (W-SAH)
b: Timkelkelt.

Head pholidosis of a lacertid:

ro	rostral	sn	supranasal
me	mental	pon	postnasal
in	internasal	sl	supralabials
pm	postmentals	lo	loreal
pf	prefrontal		
gu	gulars; with dotted row for scale count		
so	supraoculars	il	infralabials = sublabials
sc	supraciliaries	sbo	subocular
sg	supraciliary granules	te	temporals
ve	ventrals	PD	palpebral disk
fr	frontal	EO	ear opening
fp	frontoparietal	GF	gular fold
ip	interparietal	CO	collar
oc	occipital	CR	Canthus rostralis
pa	parietal		
st	supratemporals		

Key to the genera

- 1 Eyelids immobile (fig. 2b, 430/1): *Ophisops* (p. 430)
- 1' Eyelids mobile:2
- 2 Dorsal scales large, keeled, pointed and strongly imbricate (fig. 2c; 373/2 above): *Psammodromus* (p. 444)
- 2' Dorsals at least partially granular and small:3
- 3 A scute between nostril and supralabial (fig. 373/3 above), a subdivided palpebral disk (fig. 2f, 417/2,3); collar absent or very indistinct (fig. 373/1 above): *Mesalina* (p. 416)
- 3' Nostril in contact with or very close to supralabial (fig. 373/3 below), a palpebral disk, if present, undivided; collar distinct (fig. 373/1 below):4
- 4 Parietals in contact or (rarely) separated by one plate and several granules (fig. 2e): *Acanthodactylus* (p. 373) (Fringe-toed lizards)
- 4' Parietals not in contact, separated by the interparietal and the occipital (fig. 1d,f, 373/4):5
- 5 Middorsal longitudinal rows of conspicuously enlarged scales (fig. 1d; 373/2 below): *Philochoortus zolii* (p. 435) (an extreme rarity hitherto found only in Libya)
- 5' No enlarged middorsal scales: *Lacerta* and *Podarcis* (p. 403)

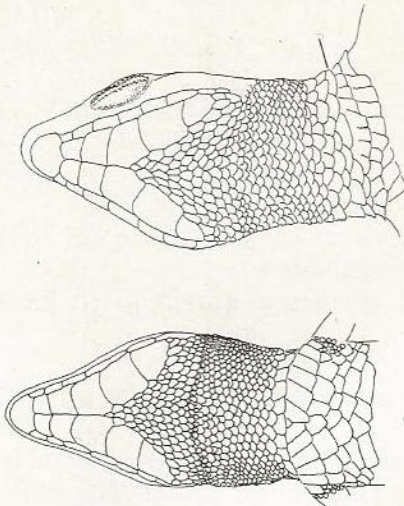


Fig. 1. Gular region with indistinct (*Mesalina guttulata*) and distinct (*Podarcis perspicillata*) collar.

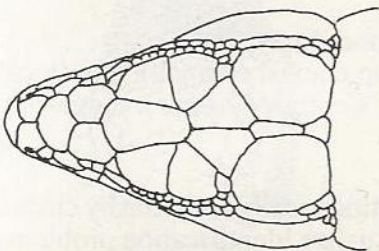


Fig. 4. Parietals not in contact

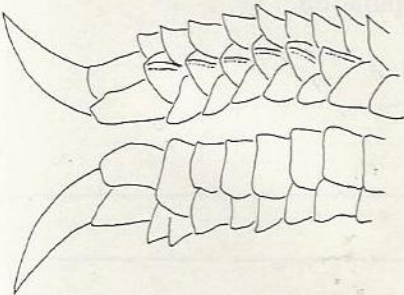


Fig. 5. Digit with 3/2 scale rows

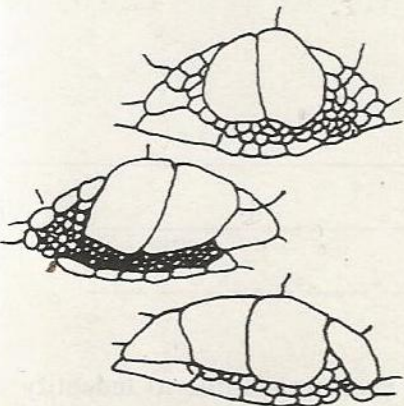


Fig. 6. two, three, four supraoculars

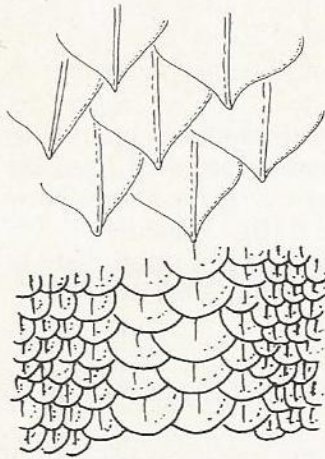


Fig. 2. Dorsal scales large and keeled; enlarged middorsal rows

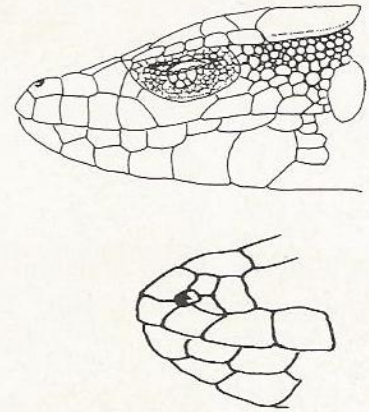


Fig. 3. Nostril separated from supralabials or in contact

Reproduction: According to BONS & SAINT GIRONS (1980) the genera *Lacerta*, *Podarcis* and *Psammodromus* have spermatogenesis of mixed type and produce multiple clutches. In *Mesalina* spermatogenesis is almost continuous, interrupted in winter and possibly in summer. IN DEN BOSCH (1994) discovered mating plugs in the genera *Lacerta*, *Ophisops*, *Podarcis* and *Psammodromus*.

Genus *Acanthodactylus*

Etymology: gr. akonthos: spine; daktylos: finger.
e: Fringe-toed lizards, Spiny-footed lizards
g: Fransenfinger.

Occipital usually absent, lower eyelid scaly, collar distinct, toes with a lateral fringe, best developed on the outer side of the 4th toe.

The description of the species is mostly based on SALVADOR (1982).
Keys (based on SALVADOR, 1982; BONS & GIROT, 1962; BLANC & INEICH, 1985). The discrimination of diagnostic characters is often difficult, especially in living specimens!

- 1 Fingers with 3 rows of scales (magnification needed, fig. 5); **two** rows of scales are visible from one side, **three** from the other:2
- 1' Fingers with 4 rows of scales, a complete lateral one between dorsal and ventral digit scale series; **three** rows of scales are visible from **each** side: *scutellatus* group (p. 376)
- 2 2 supraoculars (fig. 6 top): *erythrurus* group.....3
- 2' 3 supraoculars (fig. 6 center): *pardalis* group (p. 375)
- 2'' 4 supraoculars (fig. 6 bottom); rough scalation in rows on posterior dorsal region and tail base (fig. 374/1): *A. boskianus* (p. 378) (very wide range).
- 3 Ventrals in 12 rows (count several ones for control): *blanci* (p. 382)
- 3' Ventrals in 10 rows:4
- 4 Scales between prefrontals (fig. 374/2)5
- No scales between prefrontals: *erythrurus* part.....6

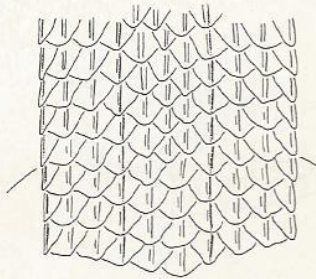


Fig. 1. Posterior dorsal scalation of *Acanthodactylus boskianus*



Fig. 2. Additional scales between prefrontals

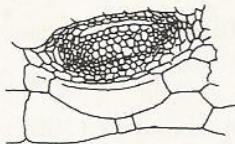
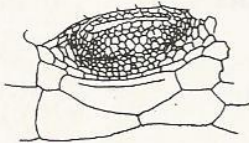
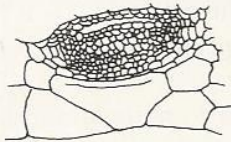


Fig. 3. *Acanthodactylus erythrurus* ssp.: Subocular touches lip (*belli*), it is separated from it (*lineomaculatus*), or by a small scale (*atlanticus*)

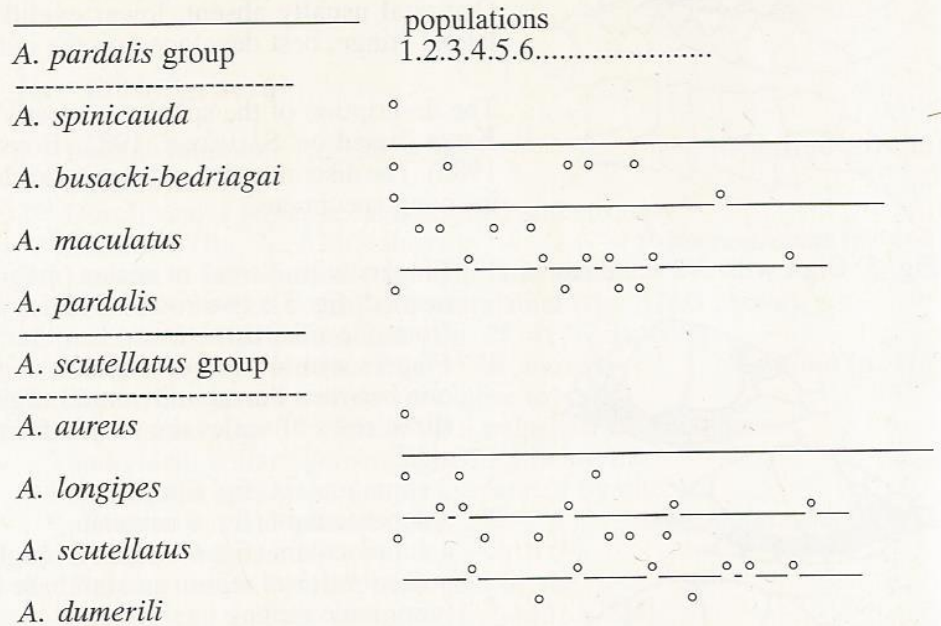
- 5 Tail of juveniles blue; range W-ALG (possibly E-MOR): *A. savignyi* (p. 386)
- 5' Tail of juveniles red; range W-MOR: *A. erythrurus lineomaculatus* (p. 384)
- 6 Subocular touches lip broadly (fig. 3 top): *A. erythrurus belli* (p. 384)
- 6' Subocular separated from lip7
- 7 Below eye is the suture between supralabials 5 and 6 (fig. 3 middle): *A. erythrurus lineomaculatus* (p. 384)
- 7' Below eye is a small plate between supralabials 5 and 6 (fig. 3 below): *A. erythrurus atlanticus* (p. 384)

Identification of species within the *pardalis* and *scutellatus* species-groups.

There is one species in each group which can be readily identified, namely *A. spinicauda* (*pardalis* group) and *aureus* (*scutellatus* group). The other forms may present great difficulties because of their complicated microevolution. The following peculiarities are a severe handicap to anyone who has to deal with their systematics:

1. There is a great intraspecific variability of morphological features.
2. This variability is nonclinal, i.e. key characters which might be useful for identification do not change gradually within the species' range, but may change abruptly between adjacent populations and appear in confusing combinations.
3. Many specimens cannot be classified beyond doubt.
4. In some places two forms of a species group coexist sympatrically (local populations of *A. scutellatus* and *A. dumerili* in Central Morocco), suggesting the presence of two true species.

The following simplistic model, where populations are symbolized by circles and isolation mechanisms by lines, tries to visualize identification problems in the two difficult species groups. The graph disregards all dimensions of geographic distribution, the phylogenetic relationship of species and the combinations of characters within each population.



In many cases it is extremely difficult or even impossible to identify a lizard by using a simple key. There are even specimens with an irregular head pholidosis which can be identified as two different species depending

on the side of the head which is taken into account. In some cases it will be useful to take into consideration a combination of characters as well as the species' range.

The taxonomic handicaps lead to a great instability in nomenclature, and it may be useful to present some of the major changes in temporal sequence.

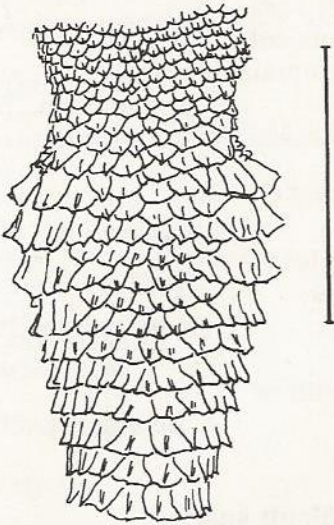


Fig. 1. Spiny tail base

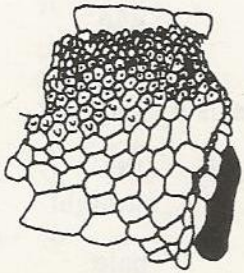


Fig. 2. Pointed supratemporals (ear opening at right)

Key to *Acanthodactylus pardalis* species group

- | | | |
|----|--|-------------------------------|
| 1 | Spiny scales on caudal base (fig. 1):
(very restricted in ALG: Sahara Atlas) | <i>A. spinicauda</i> (p. 394) |
| 1' | No spiny scales on caudal base: |2 |
| 2 | Dorsal scales flat (often very difficult to distinguish from 2'): |3 |
| 2' | Dorsal scales keeled (most distinctly on posterior back): (MOR to W-LIB) | <i>A. maculatus</i> (p. 392) |
| 3 | Ventrals in 12 rows (count several ones for control): |4 |
| 3' | Ventrals in 14 rows: | <i>A. bedriagai</i> (p. 390) |
| 4 | Supratemporals pointed (fig. 2):
(restricted areas in W-MOR) | <i>A. busacki</i> (p. 391) |
| 4' | Supratemporals flat: (in strict sense after SALVADOR; coastal regions of Cyrenaica and EGY.) | <i>A. pardalis</i> (p. 388) |

Combinations of key characters in the „difficult species“:

	<i>pardalis</i>	<i>maculatus</i>	<i>bedriagai</i>	<i>busacki</i>
dorsal scales	flat	keeled	flat	weakly keeled
ventralia rows	12	12	14	12
supratemporals	flat	granular	granular	pointed
subocular touches				
supralabial nr.	4+5	4+5	4+5+6	4-5
left and right				
femoral pore rows	separated	separated	in contact	in contact

Species according to different authors in temporal sequence (simplified and limited to NAF):

First description	evaluation of the forms		
	BOULENGER (1918)	SALVADOR (1982)	MELLADO & OLMEDO (1990)
<i>Lacerta pardalis</i> Lichtenstein, 1823	<i>A. pardalis</i>	<i>A. pardalis</i>	<i>A. pardalis</i>
<i>Scapteira maculata</i> Gray, 1838	<i>A. maculatus</i>	<i>A. maculatus</i>	<i>A. pardalis</i>
<i>A. bedriagai</i> Lataste, 1881	--	<i>A. bedriagai</i>	<i>A. pardalis</i>
<i>A. busacki</i> Salvador, 1982	--	--	<i>A. pardalis</i>

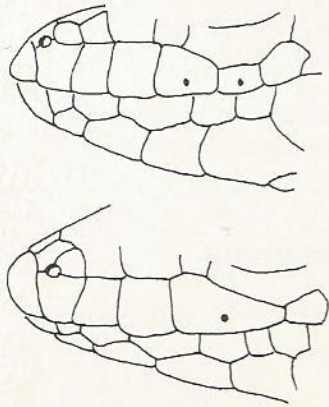


Fig. 1. Supralabials in *Acanthodactylus aureus* (bottom) and other forms.

Key to *Acanthodactylus scutellatus* species group

- 1 4th supralabial (in reality 4th & 5th fused) very long, reaching behind the middle of the subocular (fig. 1below). In some cases the long 4th supralabial can be fractioned, e.g. on one head side: *A. aureus* (p. 396)
(narrow Atlantic coastal strip from the Sous Valley southward)
- 1' 4th supralabial much shorter (fig. 1above):2
- 2 Dorsal scales large and strongly keeled, 38-55 in transverse row at midbody (S-Maghreb): *A. dumerili* (p. 400)
- 2' Dorsal scales very small, granular or weakly keeled, 57-88 in transverse row at midbody:3
- 3 Back and body sides reticulated with black: *A. scutellatus* (p. 397)
(large range in N Africa)
- 3' Back pale orange with white dots; sides with or without light brown reticulation: *A. longipes* (p. 402)
(locally in the Maghreb)

Combinations of key characters in the „difficult species“

	<i>scutellatus</i>	<i>longipes</i>	<i>dumerili</i>
dorsal scales around midbody	>56	>56	<56
dorsal scales	granular weakly keeled	flat or weakly keeled	sharply keeled
ventralia rows	(12-)14 oblique	(14-)16 (-18) oblique	14 straight
dorsal pattern	contrasting	pale	pale
reticulation	black dors.&lateral	light brown lateral or none	slight
sides with additional markings	none	white dots	light band in females

Species according to different authors in temporal sequence:

First description	Evaluation of the forms			
	BOULENGER (1918)	BONS & GIROT (1962a)	SALVADOR (1982)	MELLADO & OLMEDO (1990)
<i>A.s. aureus</i> Günther, 1903	<i>A. scutellatus</i> v. <i>aureus</i>	<i>A. inornatus</i> <i>aureus</i>	<i>A. aureus</i>	<i>A. aureus</i>
<i>Lacerta scutellata</i> Audouin, 1809	<i>A. scutellatus</i> v. <i>audoini</i>	<i>A. scutell.</i>	<i>A. scutell.</i>	<i>A. scutellatus</i>
<i>Scapteira inornata</i> Gray, 1838	<i>A. scutellatus</i> v. <i>inornata</i>	<i>A. inornatus</i> <i>inornatus</i>	<i>A. scutell.</i>	<i>A. scutellatus</i>
<i>Lacerta dumerili</i> Milne-Edwards, 1829	<i>A. scutellatus</i> v. <i>dumerili</i>	<i>A. dumerili</i>	<i>A. dumerili</i>	<i>A. scutellatus</i>
<i>A.s.v. exiguus</i> Lataste, 1885	<i>A. scutellatus</i> v. <i>exigua</i>	----	<i>A. dumerili</i> <i>exiguus</i>	<i>A. scutellatus</i>
<i>A.s.v. longipes</i> Boulenger, 1918	----	<i>A. longipes</i>	<i>A. longipes</i>	<i>A. scutellatus</i>

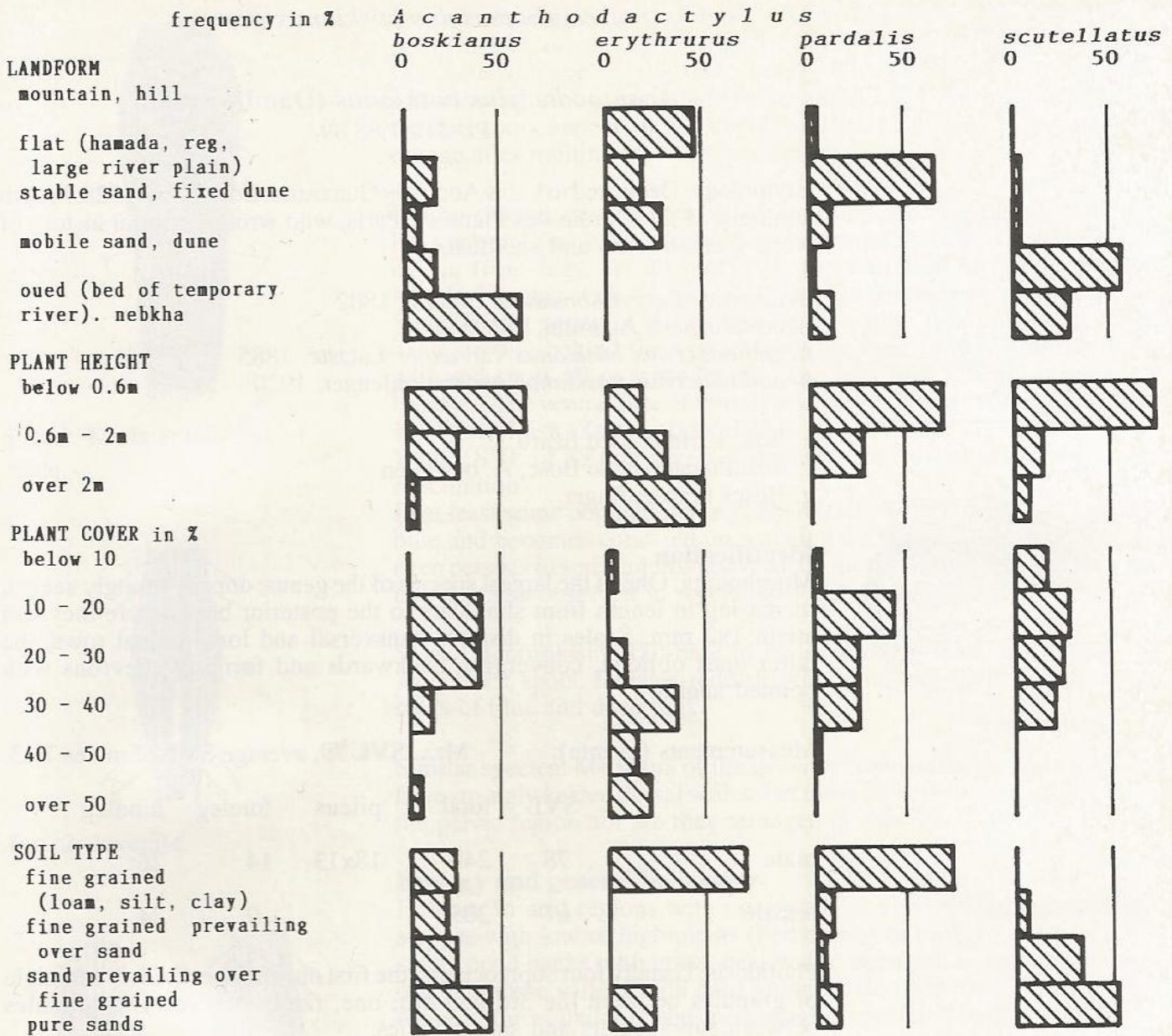
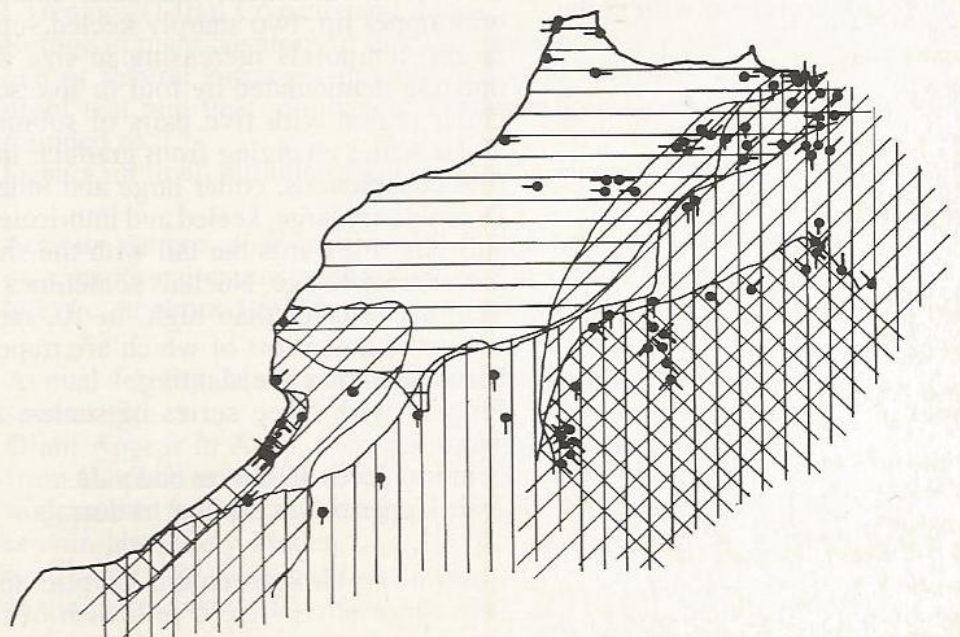


Fig. 1. Frequency of four *Acanthodactylus* species under different environmental conditions (Morocco)

Fig. 2. Distribution of four *Acanthodactylus* species in Morocco (dots: records):

- : *A. erythrurus*
- | : *A. boskianus*
- \ : *A. scutellatus & aureus*
- / : *A. pardalis* group



Acanthodactylus boskianus group*Acanthodactylus boskianus* (Daudin, 1802)

Pl. 31/87,88,89

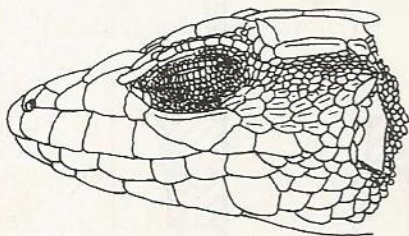
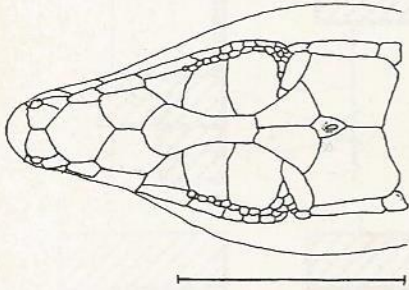
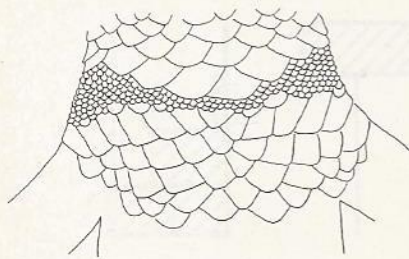
Fig. 1. *A. boskianus*

Fig. 2. Gular region with collar

Etymology: Dedicated to LOUIS AUGUSTIN GUILLAUME BOSC, 1759-1828, French zoologist at the „Jardin des Plantes“, Paris, who wrote a natural history of worms, crustaceans and shellfish.

Synonyms: *Lacerta boskiana* Daudin, 1802

Lacerta aspera Audouin, 1829

Acanthodactylus boskianus var. *asper* Lataste, 1885

Acanthodactylus boskianus asper Boulenger, 1920

e: Bosc's fringe-toed lizard

f: Acanthodactyle de Bosc, *A. boskien*

g: Boscs Fransenfinger

Identification

Morphology: One of the largest species of the genus; dorsals strongly keeled, increasing in length from shoulders to the posterior back where they can attain 1x2 mm. Scales in distinct transversal and longitudinal rows, the latter ones oblique, converging backwards and forming chevrons with pointed angles.

Measurements (in mm): Max. SVL 79, average SVL of males 71.3.

	SVL	total	pileus	foreleg	hindleg
male	78	245	18x13	14	26
female	67	205		9	24

Pholidosis: Usually four supraoculars, the first one may be divided; a triangle of granules between the 3rd and 4th; one, rarely two rows of granules between supraoculars and supraciliaries.

Nasal region raised; concave loreal region; four, sometimes five supralabials anterior to subocular; subocular sharply keeled, with or without contact with upper lip; two sharply keeled supratemporals, the anterior one much larger; temporals increasing in size downwards; anterior border of ear-opening denticulated by four or five scales; temporals keeled.

Gular region with five pairs of submaxillaries, the first three in contact. Gular scales changing from granular to imbricate towards the collar; gular fold conspicuous, collar large and indented.

Dorsals very large, keeled and imbricate, in 32-40 rows at midtrunk, growing still larger towards the tail with the sharp keel ending in a point. Keeling increases with age. Nuchals sometimes granular. Body sides with granules. Ventrals broader than high, in 10, rarely 12 or 14, straight longitudinal rows, the innermost of which are trapezoidal, the outer ones squarish; the horizontal rows are slanting.

Fingers with three series of scales, fourth toe moderately to strongly pectinate.

Femoral pores 19-26 on one side.

Tail: Upper scales similar to dorsals.

Coloration: Ground colour cryptic and depending on the surroundings: Darkish or silvery grey, yellowish or reddish brown with a contrasting or

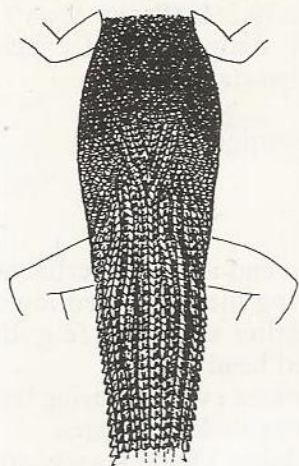


Fig. 1. Keels at tail base of male.



Fig. 2. Juvenile.

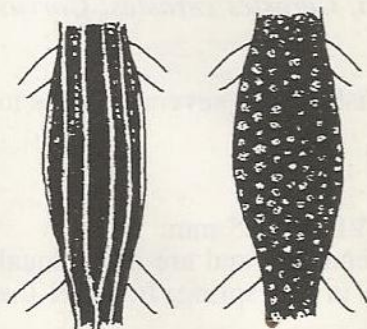
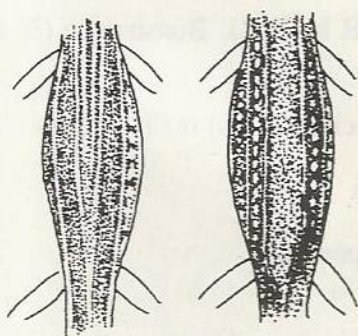


Fig. 3. Adult specimens

very reduced pattern of seven brownish longitudinal lines; the middorsal stripe may be broken up into dots; in many specimens the pattern becomes very pale with age and only traces of the dark longitudinal stripes remain in some specimens; many of them become dark grey. In the Beni Abbès region reddish spots appear in the dorsal and lateral pattern. Underside of tail orange after molting (see colour change).

Colour change, developmental: Juveniles with 7 black longitudinal stripes, the vertebral one bifurcate from its beginning backwards up to the height of the front legs. At 39 mm SVL the vertebral stripe begins to split lengthwise, and with 44 mm SVL the pattern consists of 8 black stripes. Some bear a series of red or pink spots within the bifurcation. The light band starting behind the eye and passing over the ear-drum is decorated with red spots all over its length. The legs bear sharply bordered white blotches. The ventral face of the tail is vivid vermilion to orange (DOUMERGUE, 1901) or bluish (ZIMMERMANN, 1983).

With a SVL of 55 mm the striped pattern may eventually transform into a reticulation.

In at least some populations (e.g. Djerba isl., TUN), the tail of hatchlings is blue and becomes coral-red on reaching a SVL of 33-35 mm. This colour even persists in some adults, above all on the underside, especially in females but was also observed in regenerated tail of males.

Sexual dimorphism: Tail-base of males strongly thickened; males: orange with black spots, females reddish grey with four light lines dorsally and spots of blue and deep pink.

Similar species: Members of the genera *Psammodromus* and *Ophisops* also have strongly keeled dorsal scales, but these do not increase in length towards the pelvic region nor are they arranged in chevrons.

Ecology and general behaviour

Habitat: In arid regions with open sand or clay ground (rarely stony); in steppes with low or high plants (herbaceous or bushes) or rocks for cover; sandy oued banks with grass, near water; open and overgrown sands of the erg, interdune valleys with hard ground (taiert); in the vicinity of oases; in oasis cultures; under bushes on sands accumulated by the wind (nebkhas); around refuse dumps.

Beni Abbès: Humid sands near waterholes in the oueds and cultures.

Cyrenaica (LIB): Coastal sand dunes.

Refuge in plant cushions or dug into the sand. They excavate burrows with one or several entrances in solidified sand. Burrows are used for refuge, night rest and heat avoidance. Entrance holes have a flat bottom and a rounded roof.

Occurs up to an altitude of 2400 m in the Hoggar Mts.

Activity pattern, diel: JOHANN (1981) and STEMLER & HOTZ (1972) report on exceptional crepuscular activities. On Djerba Isl. they appear relatively late, i.e. at about 10.00 h in the morning.

Annual activity: Many populations show winter activities, others hibernate several mth.

Oran: Appear in April, common in July-August. In SW-MOR hibernation from October to March. Beni Abbès: Strongly reduced winter regime with long pauses for basking, but it is only on cold or very moist days that they remain absolutely hidden.

SCHLEICH (1987) assumes late hatching and winter activity for the juveniles in the Cyrenaica (LIB) which thus are largely protected from predation by and competition for food with the adulti.

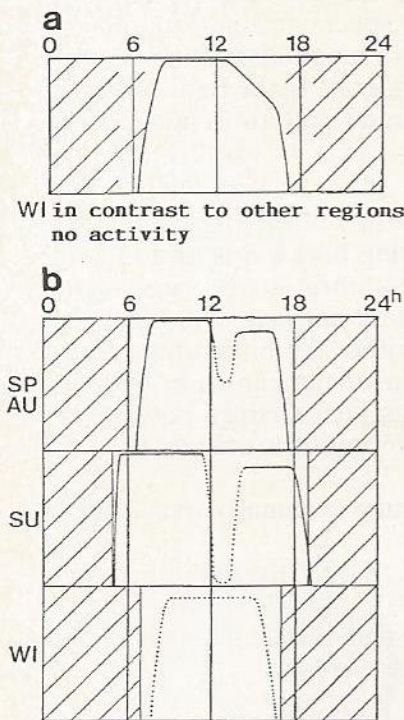


Fig. 1. Activity patterns, SW-MOR (a) and Beni Abbès

Thermal behaviour: Mean activity temperature 39.2°C (PERRY & al. 1990). In the Cyrenaica (LIB, June 5, 12.45 h) the body temperature of a specimen active in the sun was 32.8°C (air: 27.6°C; soil surface 62.6°C).

Locomotion: Runs with the tail elevated in a semicircle.

Population density: Locally very common.

Social behaviour: Territorial males (half-grown and adult) advertise with a slow tail wave after each locomotion, presenting the bright red lower tail surface. The tail wave is also released in conflict situations (e.g. during persecution by man). SCHLEICH (1987) observed head nods.

Captive males establish a hierarchy which becomes evident during basking behaviour, feeding and mating; only the superior male copulates.

During a rival attack the higher ranking male takes a high stance, spreads his gular region, nods and approaches his rival.

If the latter signals inferiority by tail wave and treteln, the dispute is settled. If not, he is licked at by the superior male and attacked with bites into the tail or neck region.

Herpetological community: In SW-MOR with *Acanthodactylus maculatus* and *Mesalina olivieri*. 5.4 Djebel trophic web; 5.5 lizard communities; profiles 7 (Presahara), 8 (Ougarta), 10 (reg), 11 (Erg oriental), 12 (Kouf).

Feeding strategy: Very voracious, eating every prey it can overwhelm; circulates near the waterholes. One was seen climbing up 6 inches into a bush to catch a big grasshopper.

Foraging specimens probe the ground frequently with the tongue and also eat dead organic particles.

Food spectrum: *Lepisma* (apterygote insect), grasshoppers, small coleoptera, ants, flies, tenebrionid larvae, butterflies and moths, spiders, a young *Tropicolotes tripolitanus* gecko.

Analysis of fecal pellet contents from S-MOR by E.-G. BURMEISTER (% of dry mass):

1 small pellet with plant fibers!

Insects: Hymenoptera - Formicinae + Myrmicinae (ants) 60%

Heteroptera - Tingidae (Lacebugs) 15 %

Heteroptera - Lygaeidae (Ground bugs) 20 %

Coleoptera (beetles) indet. 5 %

Coleoptera - Dermestidae (Hide beetles) 1 specim.

Coleoptera larvae.

Predators: Scorpions, *Galeodes* (Arachnoidea: Solifuga); *Chamaeleo chamaeleon* (MOSAUER, 1934), *Varanus griseus*, *Malpolon moilensis*, *Lytorhynchus diadema*, *Psammophis schokari*, *Cerastes cerastes*; *Corvus ruficollis*.

Antipredator behaviour: Each territory is furnished with several refuges to allow quick retreats.

Reproduction

Sexual maturity: In females attained with a SVL of 54.5 mm.

In S-ALG (Tademait) follicles start to grow end Jan. and are in an equal state to that attained by northern populations in late spring. In Israel the reproductive period lasts from April-June.

Courtship: The male approaches the female with a bent neck, probes her with his tongue, runs around her in a semicircle, and then probes her tail base, cloacal region and flank.

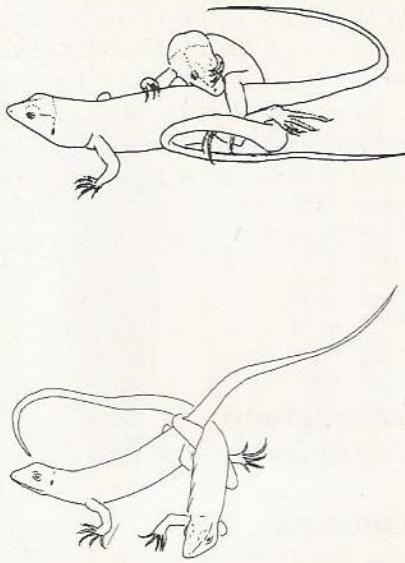


Fig. 1. Mating with and without flank bite hold

Male rejection by the female consists of high stance, head directed towards the male, gaping, lateral swaying of the forebody, head butts into the male's flank, but no biting.

A receptive female lies flat and lifts her tail base. The male butts into her flanks, takes a flank-bite hold, puts his forelegs on her forebody and after the cloacal twist, holds his hindlegs around the female's tail-base. The cloacal contact lasts 1-4 min. Approaching conspecifics are chased away.

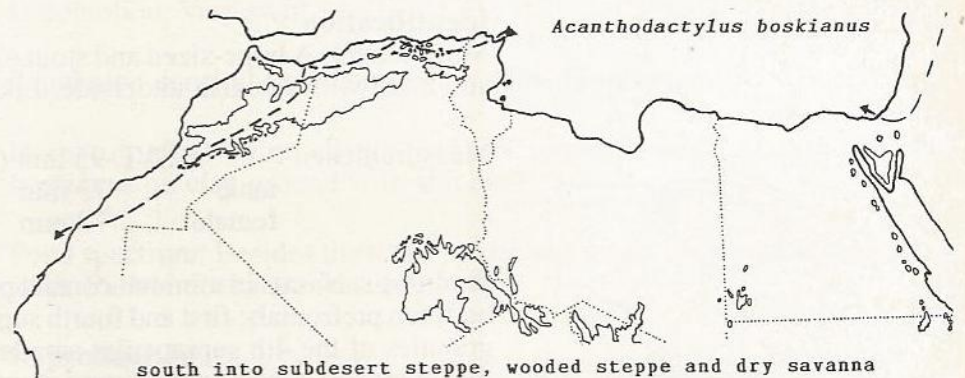
Oviposition: About 2 weeks after mating. The female circulates, probes the ground, puts her snout into it and digs a 8 cm deep hole into moist ground. Once the eggs are laid, the hole is refilled and the loose earth is fastened with snout and venter.

Clutches: Egg size increases with SVL of female. 2-7 eggs (mean 4.1) per clutch; egg volume 0.18-0.49 cm³.

On May 18th, oviposition was observed in SW-MOR. The relative clutch mass was 0.265 of the female's weight.

Incubation: 89-100 d at 28°C.

Hatchlings: Appearing in July in Oran : SVL 32 mm, total 92 mm. In subsequent April they measure SVL 45 mm, total 140 mm. Yearlings in SW-MOR measure SVL 33 mm, total 105 mm, foreleg 12 mm, hindleg 21 mm. For the Cyrenaica (LIB) SCHLEICH (1987) supposes hatching in late autumn.



Geographic range

Northern Africa: Extended range, in drier regions reaching the Mediterranean and Atlantic coast; south to Mali and N-Nigeria, Sudan and Abyssinia.

Other regions: Near East to Iraq and adjacent Turkey; Arabian Peninsula.

Zoogeography: Saharo-Sindian. The species is considered a recent immigrant as - except Egyptian specimens - there is little variability between specimens from different parts of N-AFR.

Subspecies: The fact that the subocular does or does not contact the upper lip has led to the description of the two subspecies *A.b. asper* Audouin, 1809, and *A.b. boskianus*. As this character occurs throughout the range, it cannot be considered of taxonomic value. Scale counts which were once thought typical for subspecies showed to be clinal and are therefore not apt to discriminate subspecies.

References: BLANC, C. (1960, 1980, 1986), BLANC, F. & al. (1981), BONS (1959, 1972, 1973), BOULENGER (1891), DOUMERGUE (1901), FRANKENBERG & WERNER (1992), GAUTHIER (1967), GRENOT (1976), JOGER (1981), JOHANN (1981), LAMBERT (1984), LE BERRE (1989), MELLADO (1985), MELLADO & OLMEDO (1987), 1991), MERTENS (1946), MOSAUER (1934), PAPPENFUSS (1969), PERRY & al. (1990), SALVADOR (1982), SCHLEICH (1987), SCORTECCI (1935a), SEURAT (1930), STEMLER & HOTZ (1972), VERNET & GRENOT (1972), WERNER, F. (1909, 1929, 1939a,b), WERNER, Y. (1982, 1983, 1985), ZAVATTARI (1930).

Acanthodactylus erythrurus group

(*A. blanci*, *A. erythrurus*, *A. savignyi*)

Acanthodactylus blanci Doumergue, 1901

Etymology: Dedicated to M. BLANC who sent the first Tunisian specimens to Doumergue, Oran.

Synonym: *Acanthodactylus savignyi blanci*, Doumergue, 1901

e: Blanc's fringe-toed lizard
f: Acanthodactyle de Blanc
g: Blancs Fransenfinger

Identification

Morphology: A large-sized and stout *Acanthodactylus* with a flattened body, and a tail with a bluish underside. Like *A. savignyi* it inhabits sandy areas.

Measurements:	SVL 95 mm (max.)	tail 165 mm
male	73 mm	208 mm
female	72 mm	211 mm

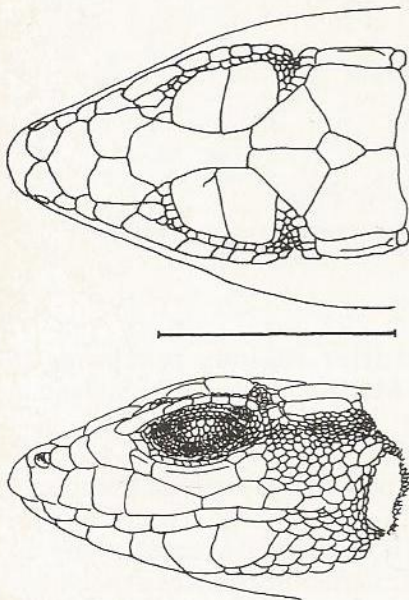


Fig. 1. *A. blanci*

Pholidosis: Nasals in minimal contact posteriorly; occasionally a small scute between prefrontals; first and fourth supraoculars disintegrated into granules; granules of the 4th supraocular smallest on the anterior edge and large on the posterior margin; one row of granules between supraoculars and supraciliaries.

Rostral protruding far over the lower mandible; four supralabials anterior to subocular; subocular keeled, not in contact with upper lip; one large supratemporal, sometimes followed by another very small one; no auricular denticulation.

5 pairs of submaxillaries, the first three of which in contact; anterior gular scales granular, becoming imbricate toward the collar; gular fold barely indicated; collar very large (2mm) and strongly indented.

Dorsals sharply keeled; neck with rounded granules, becoming larger and flatter towards the back; 53-61 longitudinal rows at midtrunk.

Supracaudal furrow with 4-8 supplementary scales;

Ventrals in 10-12 straight longitudinal rows.

Fingers with three series of scales; fourth toe weakly pectinate with 20 tricarinate subdigital lamellae.

17-25 femoral pores on each side.

Coloration: Basic colour blue-grey, greenish blue or reddish grey; three dorsal stripes, the middorsal one uniform, the lateral ones reticulated with black; longitudinal stripe on flanks with elongate yellowish spots; with age

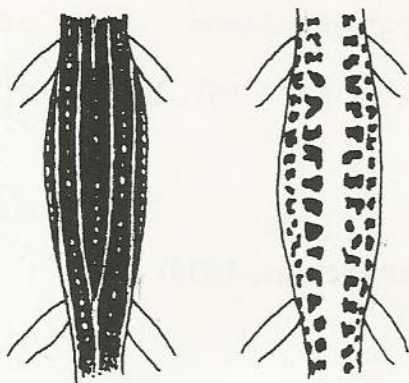


Fig. 1. Juvenile (left) and adult pattern

the striped pattern can become reticulated with progressing age. Lateral ventrals yellowish; underside of tail bluish.

Colour change, developmental: Juveniles with blue tail; back with three black stripes, the middorsal one darker; they are separated by whitish or yellow lines; each black stripe with a series of white dots. The middorsal series of light dots fuses into a yellow line anteriorly, causing a bifurcation of the black middorsal stripe. A broad dark stripe with marked light dots on the upper flanks; below them a yellow stripe followed by another dark one dotted with yellow. In larger juveniles the spots increase in size; limbs with many white ocelli; supraoculars black with a yellow margin and an elongate yellow spot in their center.

Sexual dimorphism: Males with thickened tail-base; in females the tail base is also relatively thick, but not constricted proximally like in the male.

Similar species: Other *Acanthodactylus*, possible sympatry with *boskianus* and *maculatus*; see key.

Ecology and general behaviour

Habitat: Semiarid regions with open vegetation; avoids rocky ground but occasionally hides under stones; sandy coastal areas and dunes with grass growth; clay ground with shrubs, e.g. *Rosmarinus officinalis*; very sparse *Eucalyptus* plantations.

Digs its own burrows.

Locomotion: Very swift.

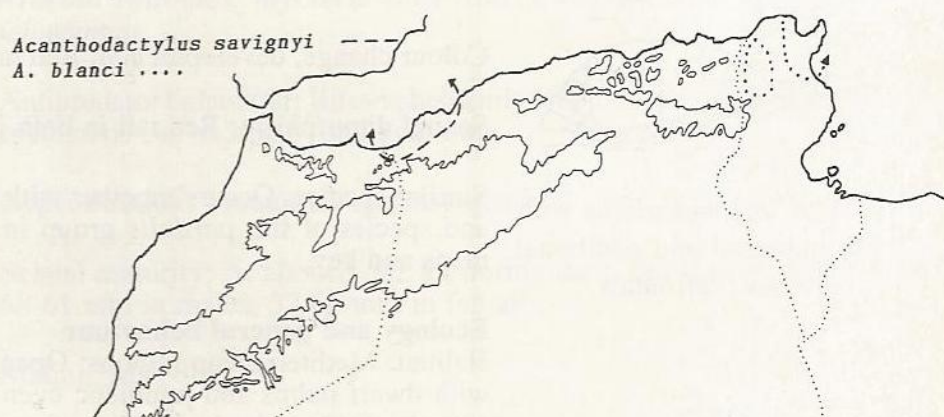
Population density: Very common in some litoral regions .

Herpetological community: In TUN together with *Acanthodactylus boskianus* on clay ground with shrubs.

Food spectrum: Besides the usual spider and insect prey even scorpions; an adult *Buthus occitanus* was swallowed.

Reproduction

Hatchlings: A light middorsal line, the dark margins of which have a tendency to fuse. Dark longitudinal lines with white dots. Head with contrasting dark dots.



Geographic range, Northern Africa: coastal and some inland regions of TUN, apparently with a distribution gap.

Zoogeography: Mediterranean, endemite.

Systematics: Closely related to *A. erythrurus* and *savignyi*.

References: BLANC, C. (1960, 1980), BLANC, F. & al. (1981), BONS (1967), DOUMERGUE (1901), SALVADOR (1982).

Acanthodactylus erythrurus (Schinz, 1838)

Pl. 32/90,91,92

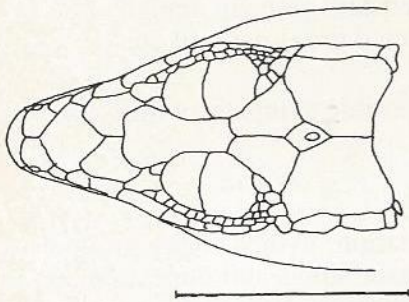


Fig. 1. *A. erythrurus belli*

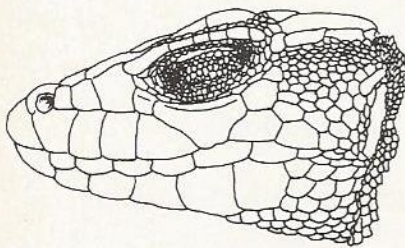


Fig. 2. *A. e. lineomaculatus* with divided internasal and additional scales between prefrontals

Etymology: gr. erythros: red, oura: tail.

Synonyms: *Lacerta erythrura* Schinz, 1833
Acanthodactylus vulgaris Duméril & Bibron, 1839
Acanthodactylus erythrurus Mertens, 1929

e: Common fringe-toed lizard
f: Acanthodactyle commun, A. à queue rouge
g: Europäischer Fransenfinger

Identification

Morphology: A medium-sized *Acanthodactylus* with red-tailed juveniles and females.

Measurements: Max. SVL 81 mm, tail 146 mm; max. weight 13 g.

Pholidosis: Two large (2nd and 3rd) supraoculars, 1st and 4th fragmented; one, rarely two rows of granules between supraoculars and supraciliaries. Four supralabials anterior to subocular; subocular in contact (*belli*) or not (*lineomaculatus*) with upper lip; ear-opening not pectinate. Dorsals small, smooth or weakly keeled; ventrals in 8-10 straight longitudinal rows.

Fingers with three rows of scales; 4th toe slightly pectinate.

Coloration: Brown with light grey stripes; series of green or blue ocelli on body sides (*lineomaculatus*) or lacking (*belli*).

Colour change, developmental: Red tail of juvenile males becomes brown.

Sexual dimorphism: Red tail in both juveniles and females.

Similar species: Occurs together with *A. boskianus*, *A. aureus*, *A. savignyi* and species of the *pardalis* group in parts of its range. See distribution maps and key.

Ecology and general behaviour

Habitat: Mediterranean regions: Open ground, stony, sandy, loam or clay, with dwarf palms and jujubiers; even in oak forests; shore with dunes or growth of *Carpobrotus* („*Mesembryanthemum*“); fields, where they take refuge under stones at their margins; gardens; in SW-MOR: *Euphorbia echinus* steppe.

In Spain they dig 10 cm deep holes for the night under shrubs.

Activity range: In Spain average values: 179-186 m² for juveniles, 544 m² for females, 834 m² for males.

Activity pattern, diel: Not interrupted at noon at higher elevations (1400m).

Annual activity: Fully active from February to November. They may leave their hibernation quarters around noon on dry winter days.

Thermal behaviour: Activity temperatures for Spanish specimens 13-40°C. Darkening of the pattern during thermoregulation was observed.

Locomotion: Drags the tail during slow locomotion, but flees very quickly with the tail lifted off the ground.

Population structure: In subadults the male/female was recorded with 1:1, in adults 1.4:1.

Population dynamics: 40% of the male population are juveniles.

Social behaviour: Nodding; very vehement rival combats. In captivity one of the fighting males may be killed.

Herpetological community: In SW-MOR associated with *Agama impalearis*; profiles 1 (Lixus), 3 (Moyen Atlas).

Food spectrum: Insects, even hard ones like small beetles; ext. (VALVERDE 1967, S-Spain) Chelonethi (Preudoscorphions; *Chernes*); Arachnida (Thomisidae); Isopoda; *Julus*; insect larvae (Lepidoptera - Bombycidae, Neuroptera, Diptera - Tabanidae, Coleoptera - Tenebrionidae); Orthoptera (Acrididae, Gryllidae, Blattidae), Hemiptera (Reduviidae, Pentatomidae), Homoptera (Jassidae), Hymenoptera (Formicidae, very many! Apidae, Sphecidae, Mutillidae), Coleoptera (Curculionidae, Tenebrionidae, Cerambycidae, Coccinellidae, Carabidae, Chrysomelidae, Dasytidae, Dermestidae, Alleculidae). A juvenile *Psammodromus algirus*.

49% of male and 82% of female specimens from the coastal regions of S-Spain contained plant matter (*Halmium halmifolium*, Yellow rock rose) in

Predators: Ext. *Coluber hippocrepis*, *Coronella girondica*, *Malpolon monspessulanus*, *Psammophis schokari*, *Vipera latastei*; *Bubulcus ibis*, *Ardeola ralloides*, *Mycteria ibis*, *Athene noctua*, *Tyto alba*; *Herpestes ichneumon*.

Antipredator behaviour: Bites vehemently when seized. 28% of the attacked specimens can escape by tail autotomy.

Reproduction: Prenuptial spermatogenesis.

Sexual maturity: At about 1 1/2 yr, during their 2nd spring with a SVL of 58-61 mm in males, 57-60 mm in females.

Mating: May-July.

Clutches: 1st in May/June; a 2nd clutch (July) in females larger than 62 mm SVL. 6-7 eggs measuring 15-16x8-9 mm.
Incubation: In 35-40 d at 30°.

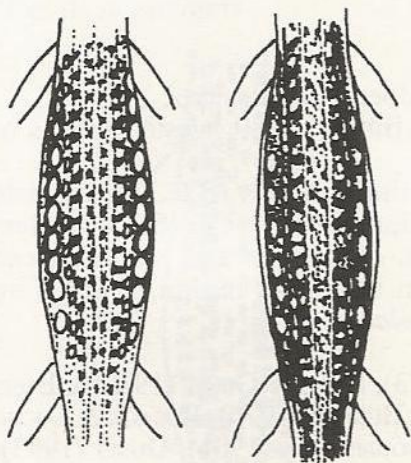


Fig. 1. *A. e. lineomaculatus* with blue or green ocelli

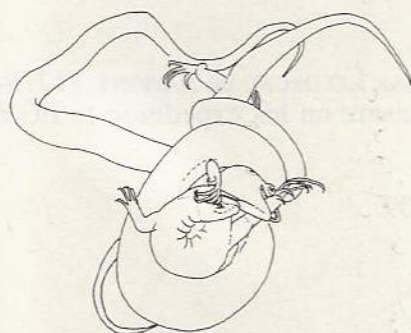
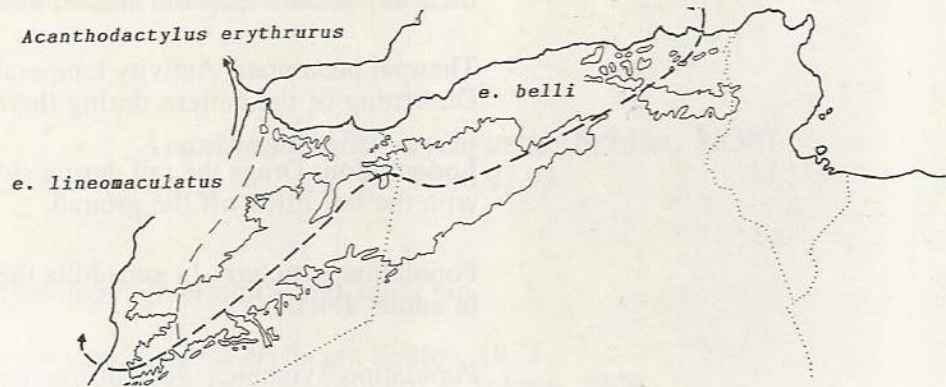


Fig. 2. *A. erythrurus* males in rival combat, and caught by a *Coronella girondica*

Hatchlings from early July (total 60 mm); measure 77 mm at beg. Aug. (SVL males 31 mm, females 24 mm).
The daily growth rate is 0.06 mm in males and 0.05 mm in females.

Geographic range, Northern Africa: Iberian peninsula and NW-AFR.



Zoogeography: W-Mediterranean.

Subspecies (fig. 374/3): *A.e. erythrurus*: Iberian Peninsula.

A. erythrurus lineomaculatus Duméril & Bibron, 1839: western plains of MOR.

A. erythrurus belli GRAY, 1845: eastern plains of MOR, ALG. Intermediate populations in the Atlas and Rif mountains. SALVADOR (1982) considers *tingitanus* pertaining to *lineomaculatus*, *ksourensis* and *mauritanicus* pertaining to *belli*, and *atlanticus* from the Atlas region, MOR, an intermediate between *belli* and *lineomaculatus*.

References: BONS (1959, 1967, 1972, 1973), BONS & GIROT (1962b), BONS & SAINT GIRONS (1980), BOULENGER (1891), BUSACK (1976), BUSACK & JAKSIC (1982), CARPENTER & FERGUSON (1977), DOUMERGUE (1901), DUSEJ (1993), LE BERRE (1989), MALKMUS (1982), MELLADO (1985), MELLADO & al. (1988), MELLADO & OLMEDO (1987, 1990, 1991), MERTENS (1946), PASTEUR & BONS (1960), SAINT GIRONS (1953), SALVADOR (1979, 1982), SCHÄTTI (1993), STEMMLER (1965b,e, 1966a,b), STEMMLER & HOTZ (1972), VALVERDE (1967), WERNER, F. (1929, 1931b).

Acanthodactylus savignyi (Audouin, 1809)

Etymology: Dedicated to MARIE JULES CÉSAR LELORGNE DE SAVIGNY, (1778-1851), who accompanied NAPOLEÓN BONAPARTE on his expedition to EGY and created a system of annelid worms.

Synonyms: *Lacerta savignyi* Audouin, 1809

Acanthodactylus Savignyi Vaillant, 1882

Acanthodactylus vaillanti Lataste, 1885

Acanthodactylus savignyi Boulenger, 1887

Identification

Morphology: A small and slender species with a pointed head; especially characteristic are two scales between the frontonasals; only two undivided supraoculars. Underside of tail bluish.

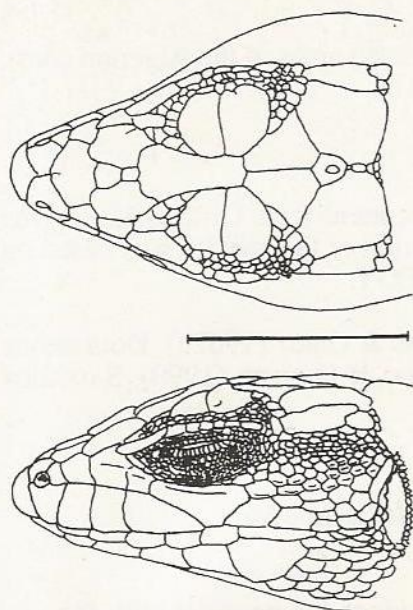
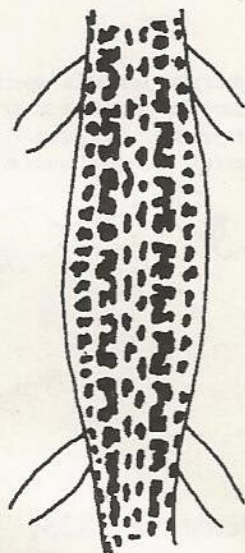
Fig. 1. *A. savignyi*

Fig. 2. Adult dorsal pattern

Measurements:	SVL	total	pileus
male	71 mm	199 mm	14x11 mm
female	52 mm	144 mm	

Pholidosis: Prefrontals separated by two small scales; first and fourth supraocular fractured into granules; two (sometimes three, rarely one) rows of granules between supraoculars and superciliaries; in some specimens occipital granules separate the parietals (fig. 1).

Four supralabials anterior to the keeled subocular, which contacts the upper lip; one very large supratemporal followed by granules; anterior edge of ear-opening weakly denticulated.

5 pairs of submaxillaries, the first three being in contact; distinct imbrication of gular scales; gular fold distinct; collar narrow and weakly indented.

Dorsal scales small, in 54-66 longitudinal rows, sharply keeled. Ventrals in straight transversal and longitudinal rows, the latter numbering 10 to 12. Fingers with three rows of scales; toes pectinated.

Femoral pores 23-28, in a female 19 on each side.

Tail: Anterior upper side with large, sharply keeled scales.

Coloration: Basic colour greenish blue with dark grey or brown narrow bands on each side of the back which become fragmented with age. In old specimens there is a strong tendency to change towards a spotted pattern with elliptical light spots, or they become uniformly sand-coloured with the light lines disappearing.

Underside of body and tail bluish, but much less bright than in juveniles.

Colour change, developmental: Juveniles with four pale stripes along the back and two on each side, the upper one fragmented into ocelli; one dark band on each side of the back, both joining on the tail; limbs abundantly covered with white ocelli; tail blue.

Sexual dimorphism: Males with a distinctly swollen tail-base. Their dorsal pattern appears spotted. Females retain a more or less striped pattern which is most evident after moulting but changes into a uniform grey later. In contrast to the males the females never bear yellow spots.

Similar species: *Acanthodactylus erythrurus lineomaculatus* which is partially sympatric. In the field the blue tails of *savignyi* juveniles and the sandy biotope help to avoid confusion. The *erythrurus* subspecies has a red tail and lives on stony ground.

Ecology and general behaviour

Habitat: Sandy habitats of the coastal region and its hinterland.

Activity pattern, annual: In Oran active from Feb. on; juveniles appear earlier. Very frequent sightings in spring and early summer, disappearing with the ardent summer heat but, reappearing in September, sometimes even end of August. Activity ceases with the onset of winter rains.

Locomotion: Runs very quickly with trailing tail

Food spectrum: Grasshoppers, small coleoptera, ants.

Reproduction

Mating: In Oran courtship begins at the end of March.

Clutches: Supposedly two, the first one end May to begin June; **Size:** 4-6 eggs measuring 14-15x9 mm.

Hatchlings: Appear in July.

Geographic range, Northern Africa: Restricted areas of the Algerian coast, possibly adjacent MOR. See map p. 383.

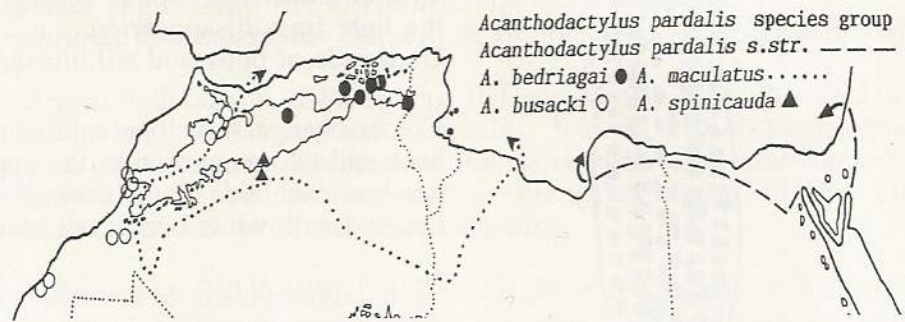
Zoogeography: Mediterranean, endemite.

Systematics: DOUMERGUE described the specimens from Oran as *A. savignyi* var. *oranensis* because the original description of the species was based on material erroneously assumed to be from EGY.

References: BONS (1967, 1972, 1973), BONS & GIROT (1962b), DOUMERGUE (1901), MELLADO & DAKKI (1988), MELLADO & OLMEDO (1990), SALVADOR (1982), WERNER, F. (1929).

Acanthodactylus pardalis group (see p. 375)

(*Acanthodactylus spinicauda*; *Acanthodactylus pardalis* with the semispecies *A. bedriagai*, *A. busacki* & *A. maculatus*.)



Acanthodactylus pardalis (Lichtenstein, 1823)

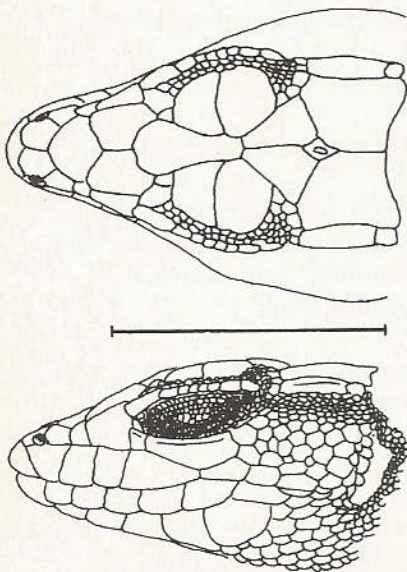


Fig. 1. *A. pardalis*

Etymology: lat. pardus, panther - referring to dorsal pattern.

Synonyms: *Lacerta pardalis* Lichtenstein, 1823

Lacerta deserti Milne-Edwards, 1829

Zootoca deserti Günther, 1859

Acanthodactylus pardalis Boulenger, 1887

e: Leopard fringe-toed lizard

f: Lézard léopard, Acanthodactyle panthère

g: Leoparden-Fransenfinger

Identification

Morphology: Robust, of moderate to large size, with 4 rows of white or orange spots.

Measurements: Average SVL 55.7 mm, max. SVL in females 74 mm. Males have an average weight of 7.4 g, max. 11.0 g; females 5.0 g resp. 6.5 g. Specimens from the Cyrenaica: Male SVL 62 mm, tail 104 mm; female SVL 65 mm, tail 90 mm.

Pholidosis: Snout slightly pointing upwards; a long suture between nasals; mostly three entire supraoculars, the fourth fragmented into granules; one or two rows of granules between supraoculars and supraciliaries.

Four supralabials anterior to the keeled subocular, which is not in contact with upper lip; one large supratemporal followed by a small one, both not keeled; anterior border of ear-opening denticulate with four or five scales. Three of the five pairs of submaxillaries meet; gular fold absent or hardly distinguishable.

Dorsals flat, medium-sized; neck scales granular and pointed. Ventrals in 12 straight longitudinal rows.

15-26 femoral pores on each side; both series are separated by 1-2 scales. Fingers with three rows of scales; fourth toe slightly pectinated.

Tail relatively short.

Coloration: 4 rows of white, blue or orange ocelli; with irregular traces of a darker background pattern which originally consists of 6 rows of spots but tends to fade and become reticulate in older males.

Sexual dimorphism: Males with an irregular reticulated pattern, larger femoral pores and broad tail-base; females with two light dorsal bands.

Similar species: Other forms of the *pardalis* group save *A. spinicauda*.

Osteology: Females with 25, males with 24 or 25 presacral vertebrae.

Ecology and general behaviour

Habitat: Mainly in arid, but also semiarid regions. Steppe, on hard clay or salty ground, e.g. near sebkhas with *Frankenia thymifolia* and *Zygophyllum album*.

Activity pattern, diel: In summer exceptionally dusk activities.

Thermal behaviour: Voluntary maximum 38.0°C.

Population density: In TUN (using SALVADOR's nomenclature the observed species was *A. maculatus*) with maximal values in the dunes of of Medenine (May 1972) 379/ha, max. biomass: 2154g/ha ; total estimate: 148 males and 231 females/ha.

Herpetological community: 5.5 lizard communities; profiles 6 (Massa), 7 (Presashara), 11 (Erg Oriental), 12 (Kouf).

On sebkha ground of the Kerkennah Islands (TUN) together with *Mesalina olivieri*.

Feeding strategy: An opportunistic feeder with a wide range of prey animals changing with location and season.

Food spectrum: Practically all groups of insects represented in the biotope; spiders and mites; snails.

Comparison of juvenile/adult diet for the most frequent prey animals in % of total number of prey items (Kerkennah Islands, NOUIRA 1983):

Beetles 1.5/13.9; aphids & cicadae 0.8/26.6; ants 92.4/38.0; grasshoppers 0.8/3.8; snails -/8.8.

Predators: *Psammophis schokari*, *Psammophis sibilans*, *Cerastes cerastes*.

Antipredator behaviour: Escapes into substrate.

Reproduction

Sexual maturity: In females attained with 59 mm SVL.

Reproductive period in Israel March-July.

Clutches: Egg number increases with body size: 3-7 (mean 4.8) eggs. Their volume is 0.20-0.53 cm³.

Hatchlings: Juveniles measure SVL 28 -32 mm, total 66 mm; in Oct. SVL 33 mm, total 79 mm in July.

Geographic range, Northern Africa (sensu SALVADOR; see map *A. pardalis* group): from Cyrenaica eastwards.

Other regions: Southern Israel.

Zoogeography: W-Saharan.

Systematics: Some modern authors prefer not to separate *maculatus* and *busacki* from *pardalis*.

SALVADOR (1982), considers *pardalis* the eastern sibling species to *maculatus*. The variability between populations can be considerable.

References: BLANC, C. (1960, 1980, 1986), BLANC, F. & al. (1981), BONS (1959, 1972, 1973), BONS & GIROT (1962b), BONS & SAINT GIRONS (1980), BOULENGER (1891), BUSACK (1973), DOUMERGUE (1901), FRANKENBERG & WERNER (1992), GAUTHIER (1967), GREENE (1988), GRENOT (1976), JOHANN (1981), LAMBERT (1984), LE BERRE (1989), MELLADO (1985), MELLADO & OLMEDO (1987, 1990, 1991), MOSAUER (1934), NOUIRA (1983), SALVADOR (1982), SCHLEICH (1987), STEMMLER & HOTZ (1972), WERNER, F. (1929, 1931a,b), ZAVATTARI (1930).

Acanthodactylus bedriagai Lataste, 1881

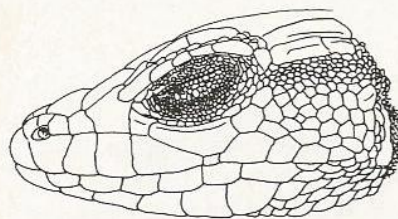
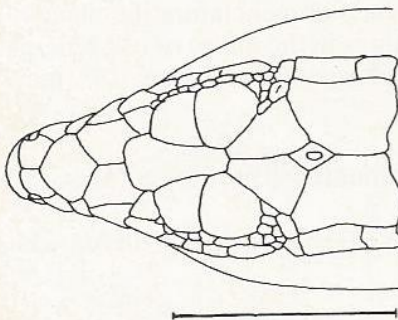


Fig. 1. *A. bedriagai*

Etymology: JOHANN VON (JEAN DE) BEDRIAGA published numerous articles on reptiles and amphibians during the last century. He also described the North African species of the Fire salamander.

Synonyms: *Acanthodactylus pardalis* variété *bedriagai* Doumergue, 1901
Acanthodactylus bedriagai Salvador, 1982

Identification

Morphology: Large and robust with a relatively short snout which is slightly turned upwards.

Measurements: Male SVL 64 mm (max. 67 mm); foreleg 21 mm, hindleg 37 mm.

Pholidosis: Nasal region slightly raised; fourth supraocular split into granules; one row of granules between supraoculars and supraciliaries. Four supralabials anterior to subocular; subocular keeled, separated from lip by a small scale; two supratemporals, the anterior one larger; temporals not keeled, the superior ones granular, distinctly smaller than the lower ones; anterior border of ear-opening denticulated with three or four scales.

5 pairs of submaxillaries, the first three in contact medially; an indistinct gular fold.

Dorsals flat and imbricate, not keeled, neck scales granular and pointed; scales between hindlegs sometimes obtusely keeled. Ventrals arranged in 14 longitudinal series.

Fingers with three series of scales; fourth toe slightly pectinate.

15-21 femoral pores on each side, arranged in one continuous row.

Tail with smooth scales on upper side.

Coloration: Overall colour brown, maroon or blue; four lines of white or bluish ocelli along the back with 6 series of dark spots, two series fusing in the lumbar region; traces of a reticulated pattern on the body sides; limbs with some light ocelli and a weak reticulation. In SW-MOR all colours are greyish.

Similar species: *A. maculatus* from which *bedriagai* can be distinguished by the 14 rows of ventrals. According to SALVADOR (1982) many reports of this species are based on misidentified *A. maculatus* specimens.

Osteology: Males and females with 26 presacral vertebrae.

Ecology and general behaviour

Habitat: Open and stony ground with scarce plant cover; usually avoiding sands.

Activity pattern, annual: In Oran all year round, if the weather is not too cold; very common in spring, rare in July and August, reappearing in September and active on fine winter days.

Herpetological community: In a sandy oued, SW-MOR, together with *Acanthodactylus boskianus* and *Mesalina guttulata* juveniles.

Reproduction

Hatchlings from July measure: SVL 28 mm, total 66 mm; in Oct. they attain: SVL 33 mm, total 79 mm.

Geographic range, Northern Africa: Very local in Algeria.

Zoogeography: Mediterranean, N-Algerian endemite.

References: DOMERGUE (1901), MELLADO & OLMEDO (1990), SALVADOR (1982).

Acanthodactylus busacki Salvador, 1982

Etymology: Dedicated to the contemporary American herpetologist STEPHEN D. BUSACK.

Identification

Morphology: Body large and stout, head short.

Pholidosis: One row of granules between supraoculars and supraciliaries. 4 supralabials anterior to subocular; the latter distinctly keeled and not in

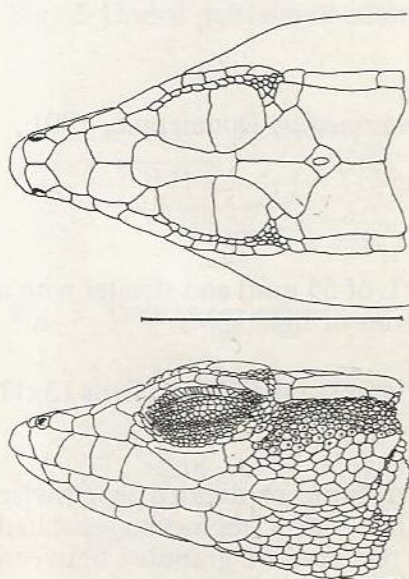


Fig. 1. *A. busacki*

contact with the upper lip; anterior border of ear-opening pectinate with 5 scales; anterior supratemporal larger than posterior one; upper temporal scales granular and pointed.

5 pairs of submaxillaries, the first three ones in contact medially; gular scales imbricate, the imbrication getting more pronounced towards the collar; gular fold poorly defined.

Dorsals irregular, imbricate, smooth or weakly keeled; neck with granular pointed scales.

Ventrals in 12 straight longitudinal rows.

Fingers with three rows of scales; toes with scant lateral pectination.

17-23 femoral pores on each side. They form a continuous row which is not interrupted in the anal region.

Tail with large keeled scales on the upper side.

Colour: Overall colour greyish brown with four dorsal lines of white ocelli in a dense net of black reticulation; limbs with a few light ocelli and weak reticulation.

Sexual dimorphism: Larger males with a dense irregular black reticulation.

Similar species: Difficult to distinguish from other forms of the *pardalis* group.

Osteology: Males and females with 26 presacral vertebrae.

Geographic range, Northern Africa: Isolated regions in MOR. (Map p. 388).

Zoogeography: Mediterranean and Atlantic Saharan.

Systematics: Closely related to *A. bedriagai* and *A. pardalis*.

References: LAMBERT (1984), MELLADO & OLMEDO (1990), SALVADOR (1982).

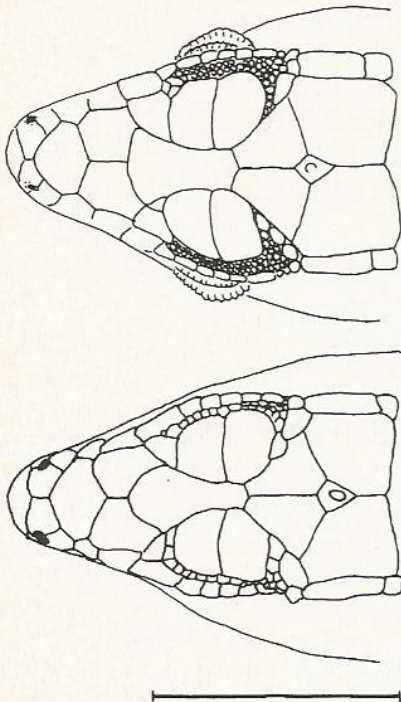


Fig. 1. *A. maculatus* from Tiznit (MOR) and Bou Saada (ALG)

Acanthodactylus maculatus (Gray, 1838)

Pl. 33/93

Etymology: lat. maculatus: spotted.

Synonyms: *Scapteira maculata* Gray, 1838

A. pardalis variété *pardalis* sous-variété *intermedius* Doumergue, 1901

A. pardalis latastei Boulenger, 1918

Acanthodactylus maculatus Salvador, 1982

Identification

Morphology: Small (rarely exceeding a SVL of 55 mm) and slender with a long and pointed snout, with or without series of light spots.

Measurements: SVL 56 mm (exceptionally large!), tail 90 mm, pileus 13x11 mm, adult male 7.5 g.

Pholidosis: Nasals raised; first supraocular entire or divided lengthwise into 2 or 3 scutes; 4th supraocular broken into 2 or 3 fragments, separated from the 3rd by a triangle of granules; one row of granules between supraoculars and supraciliaries.

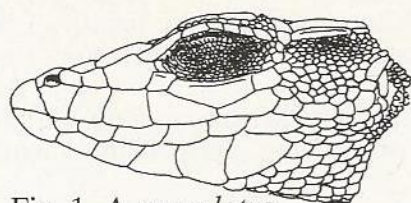
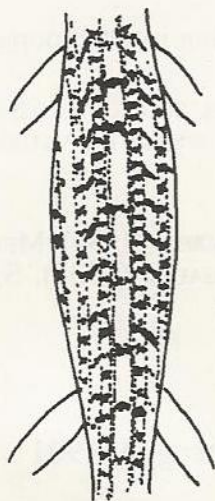
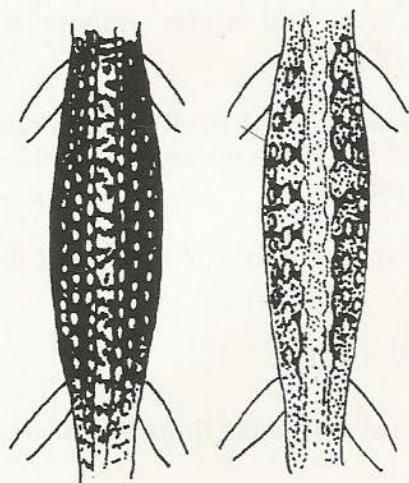
Fig. 1. *A. maculatus*

Fig. 2. Dorsal patterns of adults

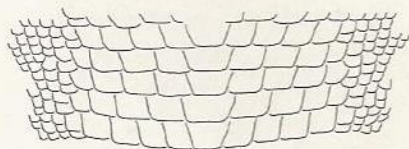


Fig. 3. Ventral scalation

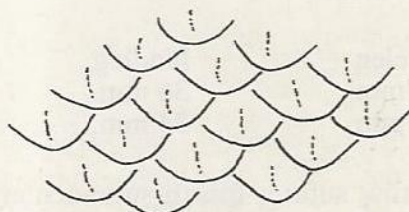


Fig. 4. Keeled posterior dorsals

Four, sometimes five supralabials in front of the subocular; the latter is keeled and only in rare cases in contact with upper lip; a large supratemporal followed by a small one; small granular temporal scales; anterior border of ear-opening slightly pectinate with 4 or 5 scales.

5 pairs of submaxillaries, the first three of which in contact; gular fold weak or absent, collar narrow.

Dorsals slightly keeled, particularly towards the posterior back and always between hindlegs; keeling increases with age. Ventrals in 12 straight longitudinal rows; sometimes 14 in a transversal row.

Three rows of scales on fingers; fourth toe weakly or moderately pectinate. 16-23 femoral pores on each side, interrupted by 1 or 2 scales in the anal region.

Coloration: Overall colour from pale grey to dark brown; basic dorsal pattern of 4 or 5 regularly arranged lines of oblong whitish, yellow, orange or grey spots which can fuse into longitudinal lines. Between the light lines series of dark spots which can be square or x-shaped. The latter can fuse and include a light spot of the basic colour; some specimens show a reduced pattern of two dark dorsal bands. Body sides with a few irregular black spots. Limbs slightly reticulated with a few white ocelli; ventral side bluish white.

Colour change, developmental: Juveniles with bluish brown basic colour; back with four regular series of light spots; another series on each body side. In the space between them irregular dark patches. Ventral side bluish, tail blue.

Similar species: Other forms of the *A. pardalis* group, see key.

Osteology: Males with 24 presacral vertebrae, females with 25.

Ecology and general behaviour

Habitat: On solid ground in arid or subarid (in TUN even occasionally subhumid) regions: Steppes with short herbs; plains with patches of vegetation; chotts, dayet within the hamada, even in very small depressions; reg.

Refuges are often dug in sand mounds at the foot of a *Zilla macroptera* shrub. Its thorny branch thicket protects the entrance.

Altitudinal distribution up to 1700 m.

Activity pattern, diel: Much dependent on temperature with a pause at noon in the hot season.

Annual activity: No hibernation, but reduced activity with extensive basking at the den entrance. Long pauses during cold, rainy or cloudy weather.

Thermal behaviour: The threshold ambient temperature for activity is 18°C.

Population density: In Beni Abbès low. See also *A. pardalis*.

Feeding strategy: Circulates from plant to plant and vehemently chases any prey detected. In spite of its relatively small size the lizard even catches Migratory locusts. Vigorously shaking them it detaches wings and legs one after the other and then engulps the complete body with great effort.

Food spectrum: Grasshoppers, small beetles, spiders, ants, flies, locusts. Predators: *Psammophis schokari*, *Psammophis sibilans*, *Cerastes cerastes*.

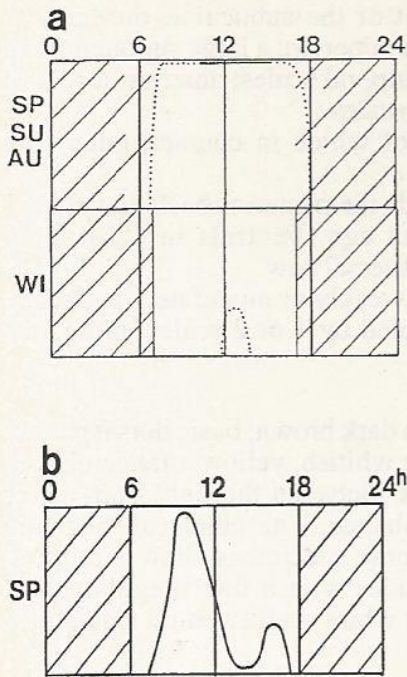


Fig. 1. Activity patterns SW-MOR and S-TUN

Antipredator behaviour: On ground with scant vegetation the lizard flees over vast distances to the nearest cover. Exceptionally it even hides in holes dug by large beetles (*Ateuchus*, *Blaps*).

Near the margin of a sebkha with thorn thicket it rushes into its *Zilla* shrub at the slightest alarm and stays there for some time. Only at imminent danger the lizard disappears in its hole.

Reproduction

Mating: Probably two main periods in spring and winter supposedly throughout the year except winter in Beni Abbès.

Clutches: In Oran two in spring (end of Jan. and mid April) and one in autumn (end of Sept.) with 4, 4, and 3 eggs; in TUN females contained 2-4, mostly 3 very large eggs at the end of April.

Geographic range, Northern Africa (see map *A. pardalis* group): MOR to Tripolitania (map p. 388).

Zoogeography: SW-Mediterranean and NW-Saharan.

Systematics: The separation of *A. busacki* and *maculatus* from *A. pardalis* is not accepted by all modern authors.

Comments: This species consists of greatly varying isolated populations.

Subspecies: *A.m. latastei* from the Algerian Sahara, according to SALVADOR, (1982), is not maintained, as its characteristic fall within the variation range of other populations of *A. maculatus*.

References: BUSACK (1975), GAUTHIER (1967), LAMBERT (1984), MELLADO & DAKKI (1988), MELLADO & OLMEDO (1990), MOSAUER (1934), SALVADOR (1982), WERNER, F. (1929).

Acanthodactylus spinicauda Doumergue, 1901

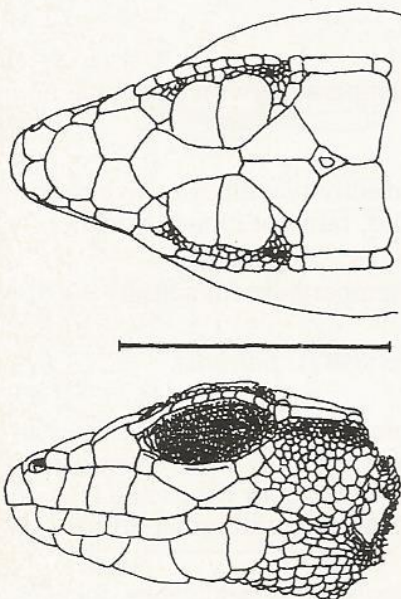


Fig. 2. *A. spinicauda*

Etymology: lat. spina: thorn, cauda: tail.

Synonyms: *Acanthodactylus pardalis* var. *spinicauda* Doumergue, 1901

Acanthodactylus spinicauda Salvador, 1982

e: Spiny-tailed fringe-toed lizard

Identification

Morphology: The projecting keels of the lateral scales of the tail base form triangular spines which are about 1mm high. They are especially conspicuous in adult males (fig. 375/1). Body small and slender.

Measurements:	SVL	foreleg	hindleg
males	55 mm	21 mm	36 mm
females	52 mm	19 mm	34 mm.

Pholidosis: Nasals contacting with a narrow suture; fourth supraocular fractured into granules, the posterior ones being the largest.

Four supralabials anterior to the keeled subocular which in rare cases may

contact the upper lip; temporal scales granular and unkeeled; anterior border of ear-opening denticulated with four to six scales.

The first three pairs of five submaxillaries are in contact; gular scales imbricate; no gular fold; collar narrow (1/2-1mm), arched.

Dorsals flat, scarcely keeled, keeling stronger middorsally.

Ventrals in 12, sometimes 14, longitudinal rows.

Limbs relatively long and slender; fingers with three series of scales; 21-23 femoral pores.

Toes long, slightly pectinated.

Lateral scales at tail-base much larger than dorsal ones and strongly keeled, are a unique character among all species of *Acanthodactylus*! The tail-base appears very large (up to 11mm) from above, while the pelvic region looks relatively narrow.

Coloration: Overall colour pale greenish and bluish grey; pattern of dorsal stripes like *pardalis*; dorsal stripes often greatly reduced; sides with orange ocelli and reticulation; limbs without pattern; tip of tail blue; venter bluish white

Colour change, developmental: Juveniles are sand-grey with longitudinal stripes.

Similar species: Easy to distinguish from other species of the genus.

Osteology: Males with 24 presacral vertebrae, females with 26.

Ecology and general behaviour

Habitat: Stony and sandy places.

Activity pattern, annual: Becomes abundant in May, rare in August and common again in Sept.-Oct.

Locomotion: A relatively slow moving species.

Herpetological community: May be associated with *Acanthodactylus scutellatus*.

Reproduction

Clutches: A total of ca. 8 eggs is laid in a first clutch at the beginning and a second one at the middle or end of May.

Eggs 12x7 mm.

Hatchlings observed on Aug. 8th, measuring 33 mm SVL. On Oct. 5th a juvenile measured SVL 40 mm, total 88 mm.

Geographic range, Northern Africa (see map *A. pardalis* group): Very restricted area in the Algerian Sahara Atlas in the oases Arba Tahtani and El Abiod-Sidi-Cheikh (map p. 388).

Zoogeography: N-Saharan, endemite.

References: BONS (1973), DOUMERGUE (1901), LAMBERT (1984), PASTEUR & BONS (1960), SALVADOR, 1982.

Acanthodactylus scutellatus group

With *A. aureus*; *A. scutellatus* with the semispecies *A. dumerili* and *A. longipes*. Key see p. 376

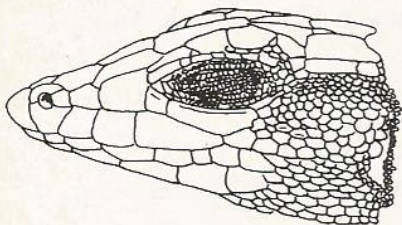
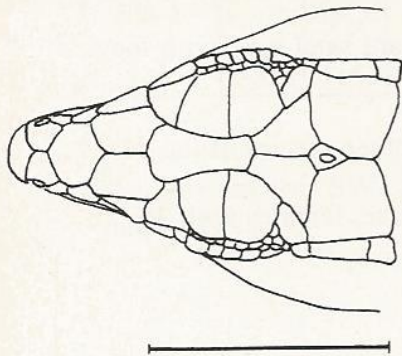
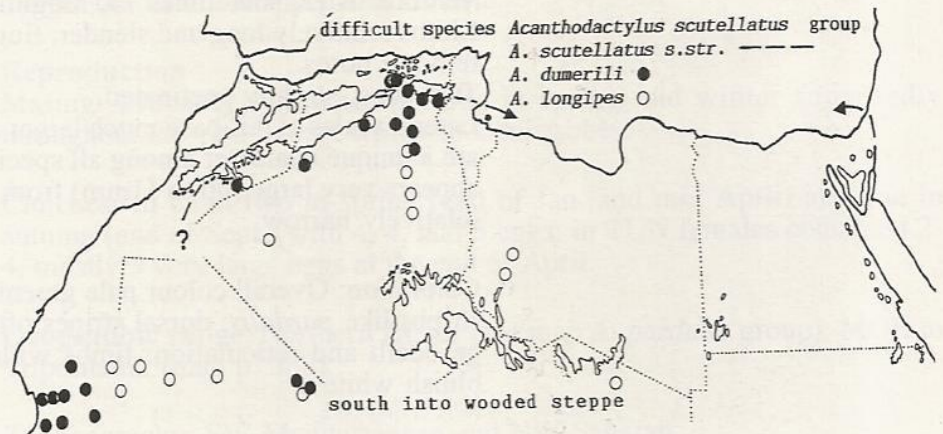


Fig. 1. *A. aureus*

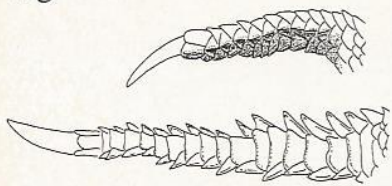


Fig. 2. Left hand, 4th finger, caudal; left foot, 4th toe, ventral

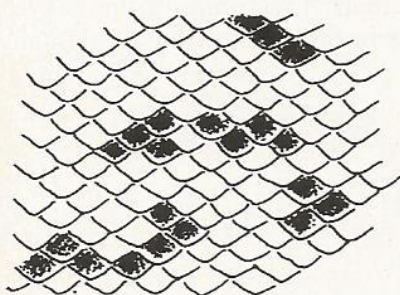


Fig. 3. Dorsal colour pattern.

Acanthodactylus aureus Günther, 1903 Pl. 33/94

Etymology: lat. aureus: golden.

Synonyms: *Acanthodactylus inornatus aureus* Günther, 1903
Acanthodactylus aureus Salvador, 1982

e: Western Sahara fringe-toed lizard

Identification

Morphology: Body slender, medium-sized; snout sharply pointed.

Measurements:	SVL	total	foreleg	hindleg
male	55 mm	168 mm	18 mm	32 mm
female	50 mm	128 mm	15 mm	29 mm

SVL increasing toward the south

Pholidosis: Mostly four entire supraoculars, fourth sometimes divided into two.

4 supralabials, the fourth one (4+5 fused) very long, anterior to subocular; subocular keeled and separated from upper lip; two keeled supratemporals; temporals small and keeled; upper anterior border of ear-opening pectinate with two or three scales.

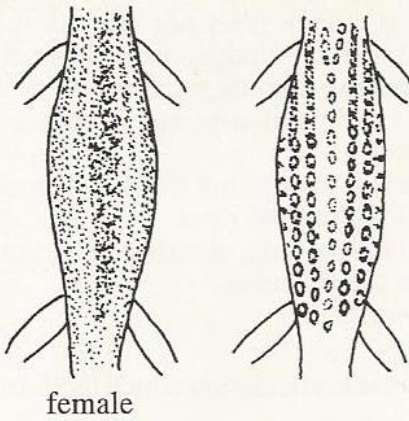
5 pairs of submaxillaries, mostly separated, but sometimes in contact up to the middle of the third pair; a slight gular fold.

Dorsals flat and keeled. Ventral in 14 oblique rows.

Fingers with four series of scales; fourth toe intensely pectinate (fig. 2).

Coloration: Beige, yellowish or greenish with 5 lines of white spots, the central one bifurcate towards the head at shoulder level. Rows of dark markings between the light lines. In old males the dark elements may fuse into a black reticulation; in some specimens the pattern is very reduced. Body sides are bluish grey; tail blue.

Sexual dimorphism: During the reproductive period males are yellow with blue markings, females are brown with four lines of white dots.



female

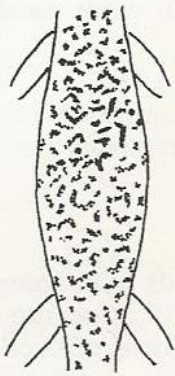


Fig. 1. adult male from Massa (MOR)

Similar species: Normally the species is easily identified due to the large 5th supralabial. Rarely this scute is fractioned on one side of the head.

Ecology and general behaviour

Habitat: Mainly on coastal sands near the Atlantic, but also far inland, e.g. near the mining center Boukraa about 80 km from the coast.

Refuge: Under single rocks in the sand or in plant cushions.

Thermal behaviour: Active even during overcast or cool weather.

Herpetological community: 5.5 profile 6 (Massa).

Predators: *Psammophis schokari*.

Antipredator behaviour: Fleeing distance of cool animals in the morning 10 m.

Reproduction: Unknown.

Geographic range, Northern Africa: Coastal regions of S-MOR, Mauritania and Senegal.

Zoogeography: Saharan, Atlantic.

References: BONS (1959, 1972, 1973), BONS & GIROT (1962a, b), LAMBERT (1984), MELLADO & OLMEDO (1990, 1991), PASTEUR & BONS (1960), SALVADOR (1982).

Acanthodactylus scutellatus (Audouin, 1809)

Pl. 33/95

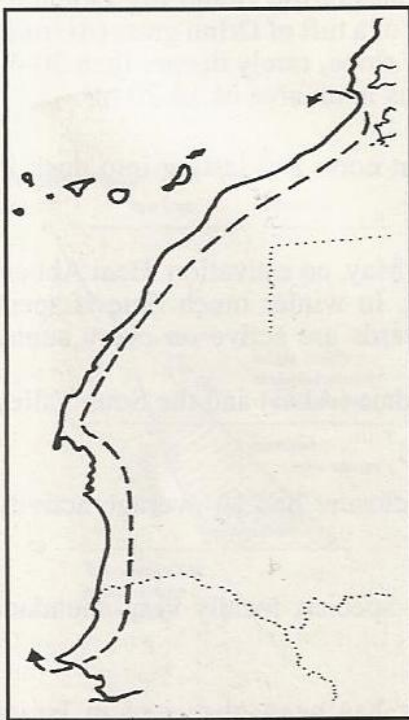


Fig. 2. Distribution of *Acanthodactylus aureus*

Etymology: lat. scutellum: small shield, alluding to small body scales.

Synonyms: *Lacerta scutellata* Audouin, 1809

Scapteira inornata Gray, 1838

Acanthodactylus scutellatus Boulenger, 1918

A. scutallatus var. *audouini* Boulenger, 1918

e: Nidua lizard

f: Acanthodactyle doré, *A. pommelé*

g: Gepunkteter Fransenfinger

Identification

Morphology: Medium-sized, slender; snout elongate; with a high number of small granular dorsal scales. Back and flanks reticulated with black. With relatively short hindlegs.

Measurements: SVL 63 mm (max. 66 mm), tail 110 mm, pileus 13x10 mm.

Pholidosis: Nasals protrude upwards and to the sides, with a short suture between them; the anterior part of the fourth supraocular is fractioned into granules; one row of granules between supraoculars and supraciliaries;

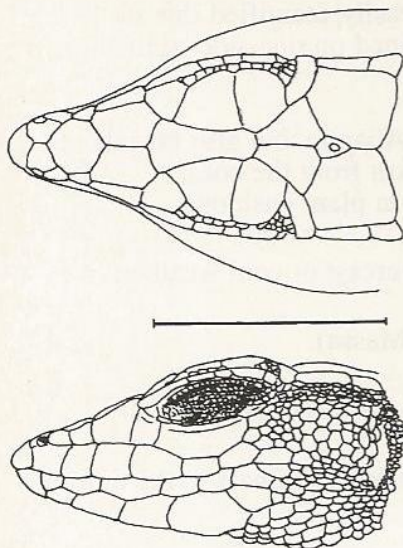


Fig. 1. *A. scutellatus*

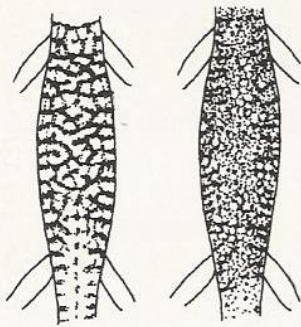
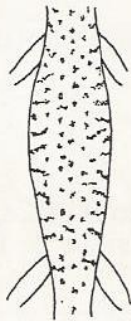


Fig. 2. Female (top) and two males

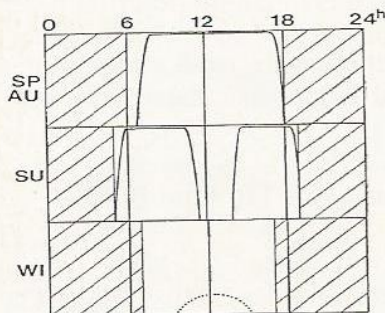


Fig. 3. Activity pattern, Beni Abbès

5th supralabial below the keeled subocular, which does not contact the upper lip; a long and a short supratemporal, both sharply keeled; small keeled temporals; anterior border of ear-opening slightly pectinate with 3 to 5 scales. The first three pairs of the five submaxillaries are in contact; gulars large and imbricate; gular fold present.

Dorsals small, flat, granular and weakly keeled, numbering 57 to 87 across midbody. Ventrals in 14 oblique v-shaped longitudinal rows.

Fingers with four rows of scales; hindlegs relatively long, intense pectination of the fourth toe with fringes as long as the toe diameter.

Scales on upper tail surface with diagonal keels.

Coloration: Inconspicuous, bluish grey with black reticulation which includes light spots dorsolaterally.

Colour change, developmental: Juveniles with two white bands on each side; blue tail.

Similar species: Not always clearly delimited from other forms of *the scutellatus* group. In contrast to *A. longipes* the hindlegs reach only the ear-opening when plied forward.

Ecology and general behaviour

Habitat: Relatively solid grounds; firm desert sands with some plants or more extended low thickets are the main condition of its occurrence: sands of coastal plains; erg dunes and sandy places, e.g. beds of oueds; in TUN nebkhas with *Retama raetam* (Papilionaceae), *Arthrophytum schmittianus* (Chenopodiaceae), *Thymelea microphylla* (Thymeleaceae).

GRENOT (1967) found them in the central SAH (Eglabs, N of Igli) in oueds which are rarely filled with water and show a rich vegetation on a ground of coarse sand. The surroundings were rocky and the beds contained boulders.

Normally not on dunes, but BLANC & INEICH (1985) found them in a region which had recently been covered by the dunes of the Grand Erg Oriental.

Refuge: A hole dug into the sand at the base of a tuft of Drinn grass (*Aristida pungens*) or another plant, preferably on a slope, rarely deeper than 30-40 cm; sometimes one lizard digs up to 3 holes in an area of 10-20 m².

Activity pattern, diel: Hardly interrupted at noon and lasting into dusk in summer.

Annual activity: In W-ALG they appear in May, no estivation. Beni Abbès: one of the few erg reptiles not hibernating. In winter much time is spent basking at the refuge entrance, but the lizards are active on every sunny day.

Winter activity is also recorded from Ghardaia (ALG) and the Sous Valley (MOR).

Thermal behaviour: Lizards kept in an enclosure had an average activity temperature of 39.3°C.

Population density: A relatively common species, locally very abundant (Beni Abbès).

Social behaviour: No strict territoriality has been observed in Israel (FRANKENBERG & WERNER, 1992).

Herpetological community: 5.4 Erg trophic web; 5.5 profiles 10 (reg), 11 (Erg Oriental).

Feeding strategy: Active foraging with attacks on any prey that can be overwhelmed. The lizard is quick enough to catch even flies landing on the sand.

Food spectrum: Small coleoptera, tenebrionid larvae, termites, chiefly ants.

Predators: Scorpions, *Galeodes* (Arachnoidea, Solifuga); *Scincus scincus*, *Varanus griseus*, *Lytorhynchus diadema*, *Malpolon moilensis*, *Psammophis schokari*, *Cerastes vipera*; *Corvus ruficollis*; *Fennecus zerda*.

Antipredator behaviour: Flees into a refuge. Disturbed there it eventually takes to another den. Ultimately it flees at chance, using any available cover, eventually choosing the hole of a conspecific or a rodent. Rodent burrows are not used as normal retreats.

Reproduction

Sexual maturity. In females attained with a SVL of 40 mm.

Reproductive period in Israel March-October.

Clutches: 2-4 (mean 2.7) eggs. Their volume is 0.23-0.43 cm³. Relative clutch mass: 0.265 of the female's weight.

Incubation: The problematics of *Acanthodactylus* eggs buried in sand was studied by PERRY & DMI'EL (1994) with emphasis on *A. scutellatus*. They found that incubation conditions were mainly dictated by temperature and moisture of soil as is shown in the graph (fig. 2) which schematically visualizes the spatiotemporal changes during the breeding season.

Some limiting conditions which influence the success of incubation are listed as follows:

1. Temperature oscillations which are too high near the surface, but become more levelled at depths of 30 cm and more (below 4°C).
2. In spring the substrate must be heated to a temperature of 28°C, and in the spatiotemporal diagram this temperature marks the begin of possible egg-laying.

3. With the advancing of the hot season the sand starts to dry up from the surface downwards, with moisture reserves stored in deeper layers.

Incubation was successful with a water content of 5% in the sand.

In *Acanthodactylus scutellatus* the end of the incubation period is marked by the drying-up of sand. Overheating of the substrate could have a similar effect

4. PERRY & DMI'EL did not state the conditions which limited the breeding substrate downwards. Theoretically the energy expenditure of the hatchlings to dig to the surface could be too high, the sand could be too wet or temperatures too low.

Favourable conditions in the senses 1-4 are indicated by simple hatching. For a pregnant female it is most economic to limit her digging work and save energy reserves for a possible second clutch.

In addition to all these restraints one must put into account that favourable conditions must last the whole incubation time, visualized in the graph by a dark bar. Favourable conditions are thereby limited to the crosshatched field.

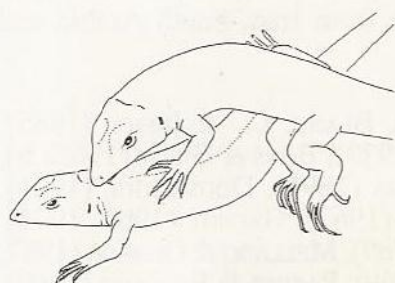


Fig. 1. Neck bite hold during courtship.

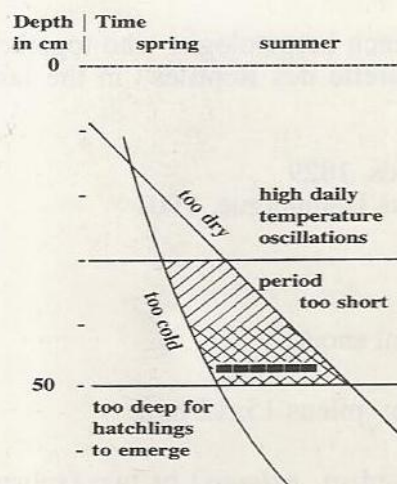


Fig. 2. Factors limiting incubation in moist sand.

All these restraints show that the choice of an appropriate egg-laying site is a very complex matter, especially for the involved gravid female, and bears heavily on the reproductive success.

Geographic range, Northern Africa: central and western NAF.
see map p. 396.

Other regions: Israel, Iraq, Saudi Arabia, Kuwait.

Zoogeography: Large parts of Saharo-Sindian province.

Systematics: *A. scutellatus* forms a species group with *A. aureus*, *dumerili* and *longipes*.

Comments: Populations from NAF show a great variation range.

Subspecies: SALVADOR (1982) includes the populations from NAF and Israel in the subspecies *A.s. scutellatus*, those from Iraq, Saudi Arabia and Kuwait are classified as *A.s. hardyi*.

References: BLANC, C. (1960, 1980, 1986), BLANC, C. & INEICH (1985), BLANC, F. & al. (1981), BONIS (1959, 1972, 1973), BONIS & GIROT (1962a,b), BOULENGER (1891), CONDORELLI-FRANCAVIGLIA (1895), DOUMERGUE (1901), FRANKENBERG & WERNER (1992), GAUTHIER (1967), GRENOT (1967, 1976), JOHANN (1981), LAMBERT (1984), LE BERRE (1989), MELLADO & OLMEDO (1987, 1990, 1991), MOSAUER (1934), PAPENFUSS (1969), PARKER & BELLAIRS (1969), PASTEUR & BONIS (1960), PERRY & al. (1990), PERRY & DMIEL (1994), SALVADOR (1982), SAUER (1989), SCORTECCI (1935a,b), SEURAT (1930), STEMMLER & HOTZ (1972), WERNER, F. (1909, 1929), WERNER, Y. (1982, 1983, 1985, 1987), ZAVATTARI (1930).

Acanthodactylus dumerili (Milne Edwards, 1829)

Etymology: Dedicated to A. DUMÉRIL, French herpetologist who together with BIBRON published the „Histoire naturelle des Reptiles“ in the last century.

Synonyms: *Lacerta dumerili* Milne Edwards, 1829
Acanthodactylus scutellatus variété *exiguus* Doumergue, 1901
Acanthodactylus dumerili Salvador, 1982

Identification

Morphology: small species with short, blunt snout.

Measurements: SVL 50 mm; total 135 mm; pileus 15x12 mm.

Pholidosis: 4th supraocular divided; one (subsp. *exiguus*) or two (subsp. *dumerili*) rows of granules between supraoculars and supraciliaries; five supralabials anterior to subocular; subocular distinctly keeled, not in contact with upper lip, touching 4th, 5th and 6th supralabial; one large supratemporal followed by a small one, both keeled; temporals keeled, too; anterior border of ear-opening slightly denticulate.

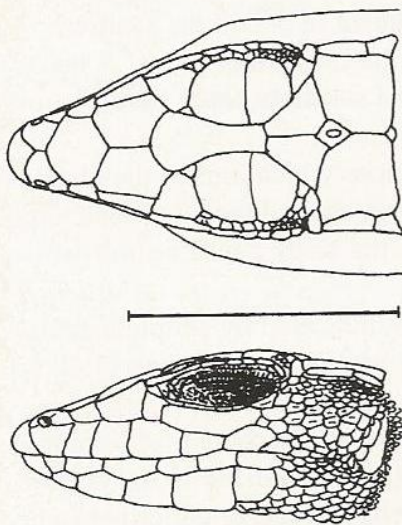


Fig. 1. *A. dumerili*

Five pairs of submaxillaries, the anterior three in contact; gular scales large and slightly imbricate.

Dorsals larger than laterals, flat and sharply keeled. Ventrals in 12 straight or 14 (12-16) oblique longitudinal rows in the subspecies *A.d. dumerili* and *A.d. exiguus* respectively.

Fourth toe moderately pectinated with fringes smaller than toe diameter.

Coloration: Overall colour grey, sand-colour, reddish or olive brown. **Dorsal pattern:** The light spots of the juvenile pattern may remain in adults all over the back or only on the body sides. They can fuse into a light stripe on each side. In other specimens the darker basic colour forms rows of dots or dark lines. Many adults are slightly reticulated, the pattern being very faint or reduced to small dots which eventually consist of single darker scales.

Colour change, developmental: In juveniles the ground colour is pink mixed with olive; with more or less distinct light spots.

Sexual dimorphism: Females with a pale band on each side of the body.

Similar species: Separation from other forms of the *A. scutellatus* group sometimes impossible.

Ecology and general behaviour

Habitat: Open ground of sandy deserts. Ext. very common on the coastal dunes of Senegal.

Thermal behaviour: Voluntary maximum: 46°C.

Feeding strategy: Desert ants of the genus *Cataglyphis* which forage for dead insects up to 200m from their burrows are heavily predated. They start running about at temperatures over 46.5°C when most *A. dumerili* have ceased hunting. A high-stanced gait and a silvery hair cover help ants to overcome the heat. They are able to return to their burrows on a direct route after their foraging tours and thus minimize exposure to heat and predation.

Geographic range, Northern Africa (see map *scutellatus* group, p. 396): from Senegal to TUN border.

Zoogeography: W-Saharan, isolates.

Subspecies: *A.d. dumerili*: Senegal and Mauretania; intermediate populations in former Rio de Oro;

A.d. exiguus Lataste, 1885: MOR north of Draa valley and ALG

In intermediate populations ventral scale rows may count 12 or 14, the dorsal pattern is banded or reticulated.

References: BONS (1973), BONS & GIROT (1962a), DOUMERGUE (1901), JOGER (1981), MELLADO & OLMEDO (1990), MELLADO & DAKKI (1988), SALVADOR (1982), WEHNER (1992).

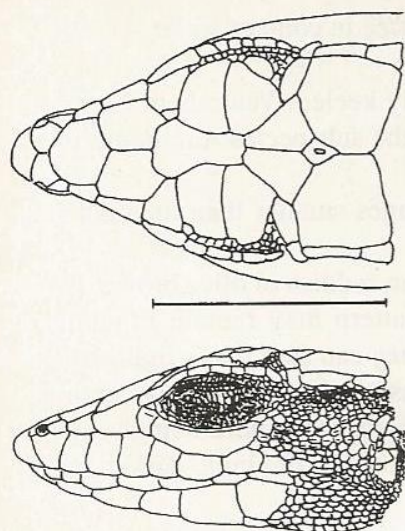


Fig. 1. *A. longipes*

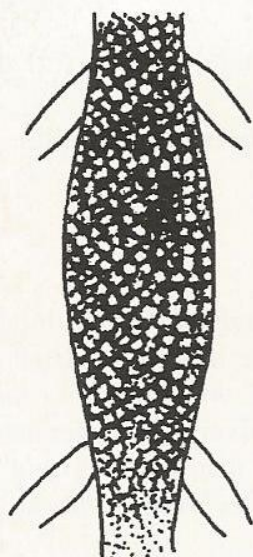


Fig. 2. Dorsal pattern

Acanthodactylus longipes Boulenger, 1918

Etymology: lat. longipes: long-legged.

Synonyms: *A. scutellatus* var. *longipes* Boulenger, 1918

A. longipes panousei Bons & Girot, 1964

e: Long-footed fringe-toed lizard

Identification

Morphology: Medium-sized with an elongated snout and relatively very long hindlegs; numerous small dorsals.

Pholidosis: Only a very small suture between the nasals; three entire supraoculars, the fourth divided; one to three rows of granules between supraoculars and supraciliaries,

Five supralabials anterior to the keeled subocular which is separated from the upper lip; supratemporals mostly two, keeled; temporals medium-sized and keeled. Anterior border of the ear-opening pectinated with four or five scales.

5 pairs of submaxillaries, the first three in contact; gulars small and granular; gular fold distinct.

Dorsals of same size as laterals. Ventrals very small and square, in 16 oblique longitudinal rows.

Hindlegs extremely long: plied forward they usually reach the centre of the eye.

Fingers with four series of scales; fourth toe intensely pectinated.

Colour: Overall colour whitish, yellowish or reddish; a weak reticular pattern on body sides; limbs reticulated, with white ocelli.

Similar species: *A. scutellatus*.

Ecology and general behaviour

Habitat: Erg with large dunes, especially in dune valleys with a lot of Drinn grass; less frequent on hard ground between dunes. Refuge between roots of Drinn grass (*Aristida pungens*).

Herpetological community: 5.5 profiles 9 (Erg Occidental), 11 (Erg Oriental).

Geographic range, Northern Africa (see map *scutellatus* group p. 396); Central and western Sahara.

Zoogeography: Saharan.

Systematics: Very closely related to *A. scutellatus*. The differences between the two species are most pronounced where they occur sympatrically.

Subspecies: According to SALVADOR (1982) the subspecies *panousei* falls into the variation range of the whole species.

References: BLANC (1986), BLANC & INEICH (1985), BONS (1972), BONS & GIROT (1962a), GAUTHIER (1967), GRENOT (1967, 1976), LAMBERT (1984), MELLADO & OLMEDO (1990), SALVADOR (1982).

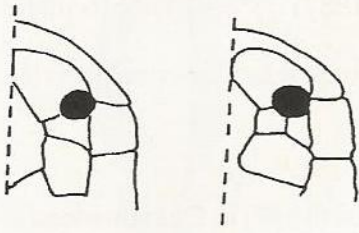
Genus *Lacerta*

Fig. 1. One or two postnasals, at right *Lacerta pater*

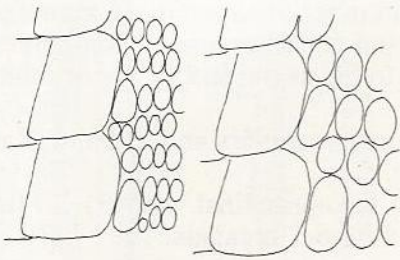


Fig. 2. Ventral and dorsal scale rows in *Podarcis hispanica* (left) and *Lacerta andreanskyi*

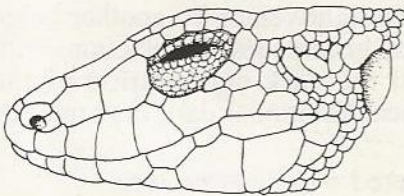


Fig. 3. *Lacerta andreanskyi*

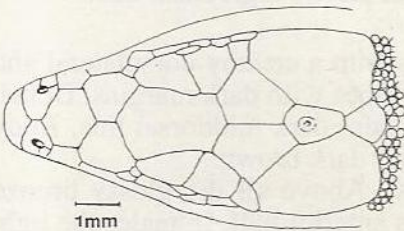


Fig. 4. *Lacerta andreanskyi*, Variability of supraciliary granules: 1 (top) to 4 resp. 5 (bottom)

A heterogeneous group with very different species of partially little affinities, which remained after the formerly large genus of same name has been split up.

Predator: Ext. *Coronella girondica*

Key to the species of *Lacerta* and *Podarcis*

- 1 Large size, SVL over 10 cm: *Lacerta pater* (p. 412)
- 1' Small size, SVL under 10 cm:2
- 2 Lower eyelid with transparent disk (fig. 441/1): *Podarcis perspicillata*
- 2' Lower eyelid without transparent disk: ...3
- 3 Two postnasals (fig. 1, right). 10 rows of ventrals: *Lacerta pater* (p. 412)
- (juvenile). Possibly a relative of this species still survives in the W-SAH, region of El Ayoun (Laayoun); see *Lacerta spec.* (p. 415/416)
- There are even hints that a *Lacerta spec.* of medium size occurs in N-LIB.
- 3' One postnasal (fig. 1, left), 6 rows of ventrals4
- Over most of the MAG the only lizard with these characters: *Podarcis hispanica* (p. 437)
- Only in parts of the Haut Atlas this species has to be distinguished from *Lacerta andreanskyi*:
- 4 Over 50 dorsalia rows at midtrunk; one row of ventrals equals 3 rows of dorsals (fig. 2, left); marginal ventrals with rounded black spots (fig. 439/2). Often transversal dorsal spots (fig. 439/1): *Podarcis hispanica* (p. 437)
- 4' Less than 45 dorsalia rows at midtrunk (starting at the middorsal line you can count halfway); one row of ventrals equals 2 rows of dorsals (fig. 2, right); marginal ventrals without rounded black spots; colour pattern without green or yellow; linear dorsal pattern (fig. 405/1). *Lacerta andreanskyi* (montane regions of the Haut Atlas above 2000 m, p. 403).

Lacerta andreanskyi Werner, 1929

Pl. 34/96,97,98; fig. 66/1

Etymology: Dedicated to GÁBOR ANDREÁNSZKY, a Viennese zoologist who accompanied FRANZ WERNER on several voyages to Morocco and caught the first specimens. Note that the specific name is written without sz in the original description! Nevertheless FRANZ WERNER used the denominations *L. andreanszkyi* as well as *andreanskyi* in later articles.

e: Atlas dwarf lizard
f: Lézard nain d'Atlas
g: Atlas-Zwerggeidechse, Atlas-Bergeidechse

Identification

Morphology: A small lizard strongly resembling a half-grown *Lacerta vivipara* in size and pattern. The tail is relatively thick and might serve for the storage of a limited amount of fat.

In the population examined by BUSACK (1987) 78% of tails in males and 56% in females were regenerated.

The number of specimens with mutilated toes was also considerable: 43% of females and 44% of males.

Measurements: Average SVL 50.6 mm.

In a population census undertaken by BUSACK (1987) in Oukaimedene during end May, SVL of males ranged from 24-51 mm, in females from 29-54 mm; in females: Pileus 8x5 mm, foreleg 12 mm, hindleg 17 mm.

Mass in males from 0.3-2.5 g, in females from 0.5-3.0 g.

Pholidosis: 1st and 4th supraocular small; number of supraciliary granules on each side ranging from zero to 5. Occipital and interparietal sometimes separated. Nostril between two nasals, close to the rostral and 1st supralabial. 5th supralabial touches eye.

19-22 gulars in the midventral line between inframaxillary and collar. Collar with 6-10 (usually 9) scales.

Dorsal smooth, in 36-42 rows; ventrals in 6 longitudinal and 31-32 (in females) transversal rows. Anal surrounded by 6-7 preanals.

Tail scales weakly keeled dorsally.

Coloration: Similar to the Common lizard (*Lacerta vivipara*) with a light brown middorsal region and dark brown flanks. The dorsal region presents a more or less pronounced dark vertebral streak and is limited by a light dorsolateral line on each side which in turn is bordered with dark (fig. 405/1).

The dark body sides are separated from the light venter by another beige line. Dorsolateral and ventrolateral lines may become less conspicuous with age: Their light colour may darken and the dark delimitation of the dorsolateral line may be dissolved into dots. Additional dark dots may be scattered over the back.

The dark flanks may be uniform or chequered with light brown.

Ventral side usually greenish white with small dark dots.

After molting the brown dorsal basic colour shows a greenish hue.

Colour change, developmental: Hatchlings with a creamy dorsolateral and ventrolateral stripe on each side. All four stripes with dark margins. Dorsal region between stripes light brown with a faint dark middorsal line. Body sides framed by light stripes or spotted with dark brown.

In females the light stripes tend to persist. Above all the glossy bronze coloured dorsolateral stripe is distinct in its anterior half. In males the light stripes fade and their dark margins dissolve into a series of dark spots. The dark brown body sides also become blotched or chequered.

The tail is vivid bluish green in hatchlings. This striking colour turns to blackish green during the following spring and to brown in adults.

Sexual dimorphism: The male's head is relatively larger, its body shorter. Its extended foreleg reaches the anterior border of the eye while in females only its posterior border is reached.

If forelegs and hindlegs are plied towards each other, the longest toe reaches the wrist or elbow in males, but rarely or not the fingers in females.

The venter may partially be yellowish red in some male specimens. In an adult male from Oukaimedene the anterior venter had a bronze hue.

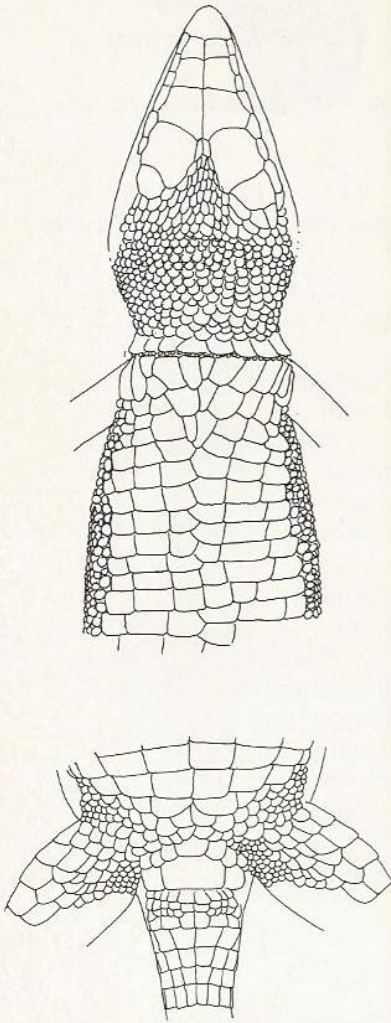
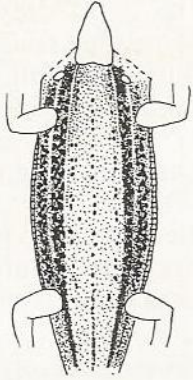


Fig. 1. Female, details of ventral scapulation

Males have 25-29 transversal rows of ventrals, in females there are 31-32.



Similar species: There may be some difficulty in distinguishing this species from juvenile *Podarcis hispanica*, but in the light and dark brown *L. andreanskyi* no yellowish or greenish pattern elements appear, and there is no tendency of a fractioning of the dark lateral bands. The number of superciliary granules is an unreliable differentiating character. Adult *P. hispanica* are much larger than *L. andreanskyi*.

Ecology and general behaviour (field data mainly from BUSACK, 1987, captivity data from KÄSTLE)

Habitat: Meadows, plant cushions, scree and boulders, especially at the border of small watercourses; on plains or in ravines, where a plant cover is lacking or very sparse; in the Haut Atlas above 2000 m altitude. A considerable portion of the species range falls into the vegetation-belt of thorn cushions which mainly grow on debris slopes. They belong to several plant families: Fabaceae (pea family): *Cytisus balansae*, *Astragalus ibrahimianus*; Brassicaceae (mustard family): *Ptilotrichum (Alyssum) spinosum*, *Vella spinosa*; Apiaceae (carrot family): *Bupleurum spinosum*. They have reduced leaves and much of their wooden parts is transformed into spines which form an interlaced thicket up to 50 cm high. This habitat offers ideal conditions for a small lizard:

1. a buffered microclimate with widely graded insolation, temperature and air humidity;
2. protection from large predators;
3. protection against the vehement winds of high altitudes;
4. rich food, e.g. plant lice on green parts and insects attracted by a mass of flowers;
5. condensation points for mist and dew.

FRANZ WERNER had to uproot plant cushions with a pick axe to catch the lizards hidden in them.

Activity pattern, diel: Strictly heliophilous, adults remaining inactive when the sky is overcast; hidden under cover during great heat. Field activity was observed from 10.00 to 17.00 h at the end of May; see also fig. 66/1.

Annual activity: The harsh climate of the mountain region imposes a long hibernation period from about October to March on its lower limit, from September to May at heights around 3000m. During favourable weather, hibernation can be interrupted for basking, drinking and defecation. At the end of hibernation the emergence is rapid (see paragraph on thermal behaviour).

A captive male basked much more than the female in August and September, perhaps due to the onset of spermiogenesis.

Well-fed captives hibernating around 5°C emerged in an excellent state of nutrition after 4 mth.

Thermal behaviour: Shuttling heliotherm, basking intensely. Three adaptations to its extreme biotope are typical:

1. Rapid emergence: With the onset of insolation, even after hibernation, the animals appear within a very short lapse of time and quickly shift from cold torpor to activity.
2. Low voluntary minimum: A captive male ran about at 6.7°C in a north-facing hibernation room. Singular observations on the duration of emergence

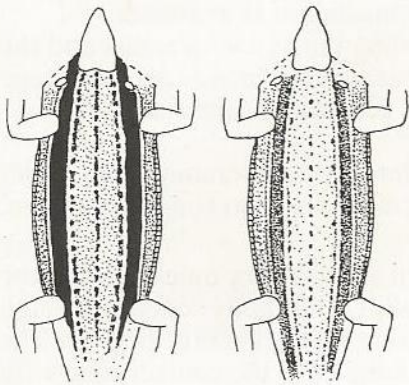


Fig. 1. Male (top), two females

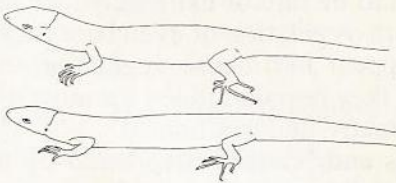


Fig. 2. Body proportions of male (top) and female

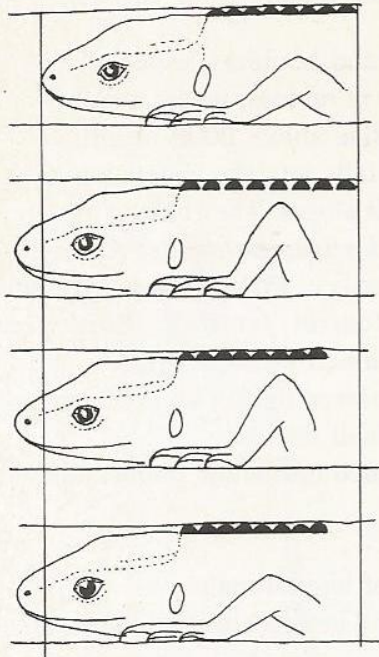


Fig. 1. Squeezing through a narrow passage with body mass and skin moving alternately. See text opposite

from the start of insolation at different temperatures were: 9°C - about one min; 6.8°C - 3 min ; 4.7°C - 20 min.

3. Short basking period: Due to their low body volume they reach activity temperature within about 10 min of intensive basking with full exposure on an appropriate surface. Thereafter they start foraging with interspersed short basking phases under light cover.

Field observations: Emerge from shelter at 7.30 h at an ambient temperature of 13.1°C, body temperatures 21.5 and 22°C respectively.

During the activity period ambient temperatures varied from 15.3 to 28.9°C, body temperatures from 25.0-36.0°; mean activity temperature (n=55) 31.4°C, mean difference between ambient and cloacal temperatures 9.2°C (range 3.3-15.8C).

Basking activities of juveniles (yearlings) differ from those of adults in two aspects:

1. They are much more prolonged during sunny weather and can extend over the whole insolation period if graded insolation is available.
2. Juveniles even bask in very weak sun when the sky is overcast and the adults remain in cover. During this kind of basking the lizards do not change their posture and site for many minutes, in contrast to „normal“ basking.

Resting animals choose retreats with preference temperature, e.g. under flat stones or bark, and captive juveniles were observed to congregate there.

Locomotion: The relatively short legs do not allow a very quick run and the lizards can be caught by hand without great skill. They aptly squeeze through holes and chinks, moving body mass and skin independently (fig. 1). The body is pushed forward first while the skin adheres to the contact zone with strongest friction. In front of it it is stretched. During the next phase the skin is drawn forward into its normal position. The next circle of motion is started with the forelegs advancing.

Population density: This species is assumed to be rare or extremely rare in most parts of its area, where cushions of thorn-vegetation or even bare rock predominate. However, as the lizards disappear into dense vegetation to forage or rest after a short period of basking they remain hidden for most of their activity period, and their number is greatly underestimated.

Under very favourable conditions (pebbles and boulders deposited by a nearby meandering brook) density rises up to 0.5 animals per m², e.g. in a selected census areal near Oukaimedene, Haut Atlas (MOR, 2650 m; BUSACK, 1987). This would result in a potential density of 2950 animals / ha, the highest recorded of a lacertid (other extreme values of Saurian densities are 4244/ha in *Anolis acutus* on Virgin Island (TURNER, 1977) and the dwarf chameleon *Brookesia minima* in Madagascar, roughly estimated at 10 000/ha (HENKEL & HEINECKE, 1993). The corresponding biomass of *L. andreanskyi* would be 6 kg/ha.

Locally, near watercourses, up to 5 animals can be seen on one square meter. Large populations inhabit a surface area of 0.5 km².

Population structure: The sample area examined by BUSACK (1987) counted 45 males for 30 females. It shows two distinct size groups: SVL 24-36 mm (17 males, 8 females) and, separated by a 6 mm gap, SVL 42-54 mm (28 males, 20 females, 2 females lacking in the total!). Compared with juveniles bred in captivity the first group (34%) consists of last year's juveniles which hatched in July or August, or even September. The smallest of them had scarcely increased in length since hatching. The other specimens were reproductive adults in their 3rd year or older with a SVL usually around 46 mm. The occurrence of single relatively large females with a SVL of 53 and 54 mm allows the conclusion that a part of the population is at least in its 4th year.

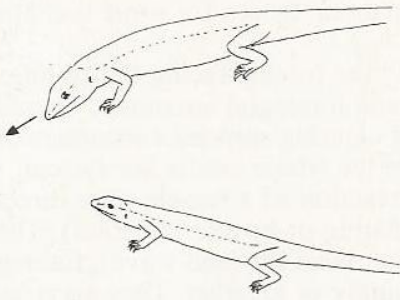


Fig. 1. Slight threat of a male passing by a juvenile

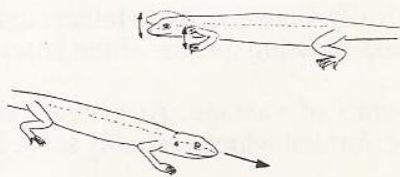


Fig. 2. Treteln released by a larger sibling passing by

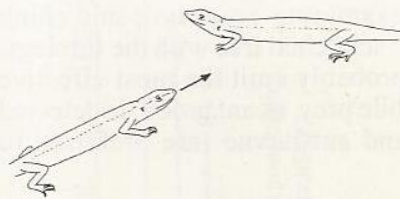


Fig. 3. Head lift released by an approaching conspecific

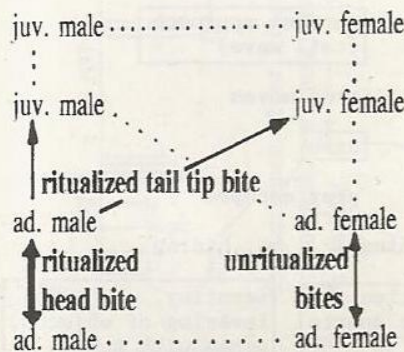


Fig. 4. Temporary hostile interactions between sexes and age groups: dotted lines: no hostilities

The fact that the number of adults is larger than that of juveniles may also be explained by the facts that the adult-size class recruits itself from several age-groups and that juveniles are more secretive.

Population dynamics: In a stable population the 20 reproductive females (cited above) produce a maximum of about 60 eggs per yr. Compared with other studies on population dynamics of lizards (BLAIR, 1960), the survival of 25 juveniles after losses by failing to hatch, predation and hibernation appears rather high.

Longevity: After observation in captives at least 5 years, probably more.

Social behaviour: Males and females do not interact at encounters during most of the year. In the warm season when females need a lot of food to develop their clutches, the lizards chase conspecifics with large food items in their mouths and try to tug them out. Females as well as males and juveniles behave like this.

Juveniles and couples bask with close body contact. Approaching conspecifics that e.g. place a leg on a lizard's head are fended off by a vehement lateral head motion.

The number of ritualized interactions increases abruptly in times of social reorganization, e.g. if captive juveniles (yearlings) are introduced into the cage of their parents. While the female was absolutely tolerant towards her offspring and allowed close body contact while basking, the male behaved aggressively against them, even after the juveniles had been staying with their parents for 4 weeks.

The intensity of these aggressions was subject to great changes: sometimes he tolerated them in a distance of 8 cm, often the juveniles fled when they saw him close by. In this case a head turn of the male in direction of the juvenile could trigger flight.

During aggressive behaviour against juveniles the following act systems were observed in a male:

1. **Patrolling behavior:** During phases of up to about 10 min the male made continuous tours through the cage, searching conspecifics. The same behaviour appeared during the mating period.
2. **Slight threat behaviour:** The male approaches a juvenile with stretched forelegs and lowered head (fig. 1).
3. **Tail-tip pinching:** The male pinches a juvenile's tail-tip (never its base!).

The juvenile invariably flees and is persecuted over 10 cm or somewhat more. In spite of the high number of this kind of interactions broken tails seem to be rare incidents. Even if autotomy occurs the loss in substance is minimal

This behaviour seems to favour the spacing of conspecifics and to reduce population density. It is regularly repeated several times a day during the male's activity period. Nevertheless the juveniles continue their normal activities and continue basking and feeding.

Chemical cues are essential for recognition: The male started pinching the tail of a juvenile hidden in a thicket after probing the tail tip with the tongue.

A newly introduced juvenile fled after licking its mother's tail.

Captive yearlings started hostile interactions as soon as they were associated with their parents. The inferior (smaller) yearlings showed the following fear reactions when they were approached by a larger sibling.

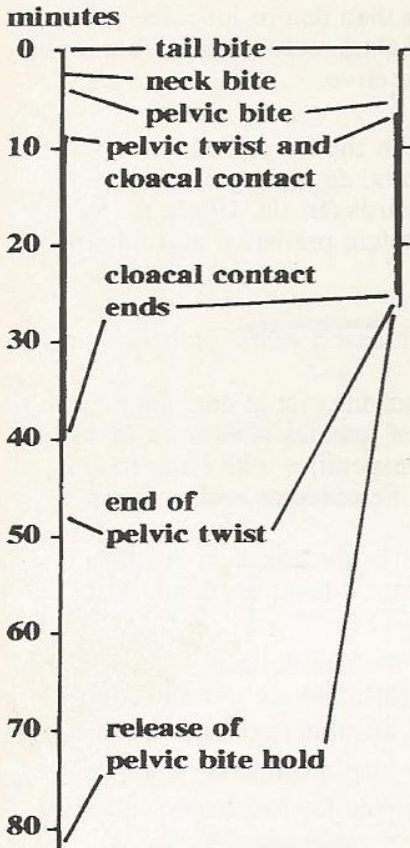


Fig. 1. Temporal mating sequence; left: first mating (after 2nd hibernation) with prolonged terminal phase. Right; older couple

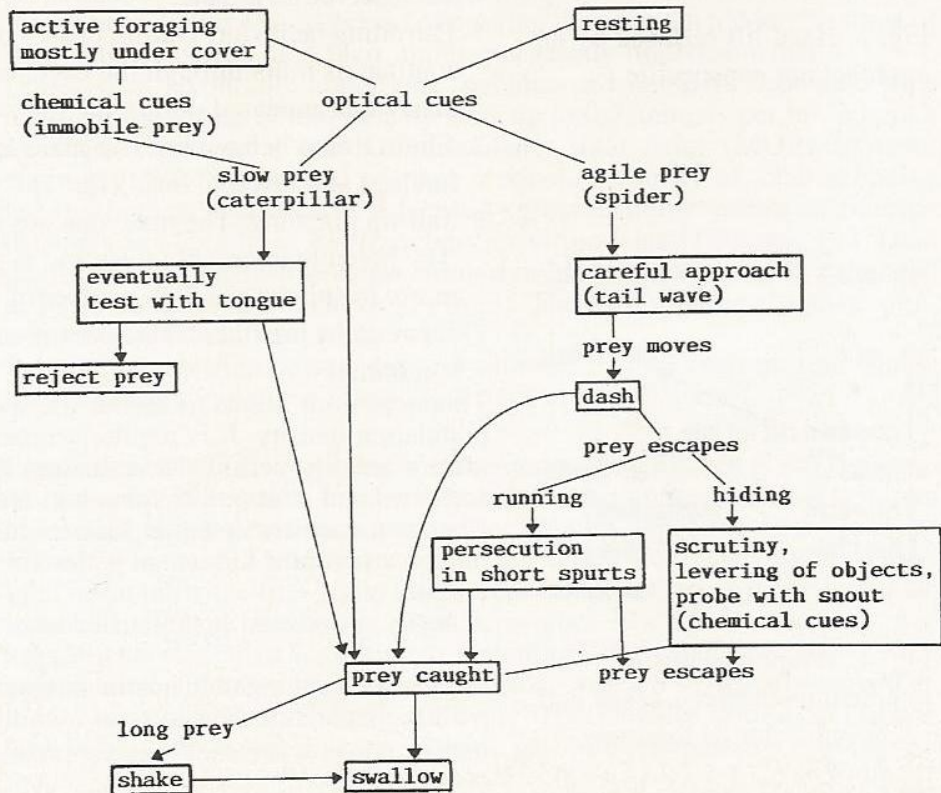
1. Tail wave.
 2. head lift with the chin pointing towards the conspecific (fig. 3).
 3. Head lift and foreleg raise with both remaining frozen for some seconds before fleeing.
 4. Treteln (fig. 407/2), preferably with only the foreleg facing the sibling: This behaviour starts like nr. 3 but head and foreleg(s) are moved up and down. It is normally followed by fleeing. During surprise encounters of two juveniles both of them may perform the whole treteln act system.
- A onesided foreleg waving was the only reaction of a female on a direct approach by an adult male (without any mating or hostile intention). The single elements of the „treteln“-complex are: head lift (and wave), foreleg lift (and wave) can evidently be released singly or together. They serve as appeasing actions and may be followed by fleeing.

If a juvenile is obliged to pass in front of a superior conspecific, it slows down its speed during its approach, but resumes speed the moment the larger specimen has been passed. The yearlings learned to differentiate optically between their father and mother within one day, fleeing the former and showing no fear of the latter.

The adult male liked to sit on elevated points of vantage. At his arrival there a single upward jerk of the head was performed which probably served as advertising function. Hostile interactions between males are very common (fig. 407/4).

Herpetological community: 5.5 profile 4 (Oukaimedene).

Feeding strategy: Basking lizards rush towards all tiny insects coming into sight. The lizards also forage intensively, examining every hole and chink on their feeding tours. Hidden food items are scratched free with the forelegs. Small spiders trigger intense hunting and probably emit the most effective key stimuli of all prey items. But also immobile prey, as ant brood, is detected and eaten. Ant pupae without a cocoon and ant larvae are preferred to pupae in cocoons.



Small aphids living in colonies are not collected one by one, but the lizard takes the infested plant stalk in its mouth and tears the whole congregation of insects off.

11% of males and 20% of females studied by BUSACK (1987) had empty stomachs.

Food spectrum: Tiny insects, even dead organic particles. The considerable amount of seeds found in the stomach contents suggests a purposive search for them.

Stomach content analysis of 45 males and 30 females from Oukaimedene after BUSACK (1987). In brackets percentage of total food items in males/females:

Seeds (6/3); Oligochaeta (less than 1/1); Isopoda (-/1); Acarina ((less than 1); Araneae (4/3); Collembola (9/3); Orthoptera (22/15); Plecoptera (1/1); Odonata ((less than 1/-); Hemiptera (-/3); Neuroptera (2/1); Coleoptera (30/14); Lepidoptera (3/4); Hymenoptera (17/42); Diptera (2/2); unidentified larvae (8/11); nymphs (below 1/-); empty stomachs (11/20).

Captives take much larger food items than specimens in nature: Small crickets and medium-sized waxmoth larvae.

The tail of well-fed specimens probably serves for fat storage and becomes rather thick in autumn, not decreasing in diameter in its first half.

Predators: *Vipera monticola* is assumed to be its main predator. In contrast to larger species of *Vipera*, this dwarf form cannot turn to larger prey, such as small mammals (which are lacking apparently in the biotopes of *L. andreanskyi*), even as an adult.

Antipredator behaviour: Flee from approaching humans at a distance of 0.5-2 m. In contrast to other lizards inhabiting the same locality (*Quedenfeldtia trachyblepharus*, *Podarcis perspicillata*) a shadow moving across the lizards does not obligatorily release flight.

Preferred refuges are thorn cushions (see habitat). The high percentage of regenerated tails and mutilated toes (see morphology) is due to factors other than intraspecific fights (predation?).

Excited juveniles (e.g. closely observed ones) wave their greenish tails for several seconds.

Reproduction:

Sexual maturity is reached at an estimated 1 1/2 yr (2nd spring) in well-fed specimens, but certainly later at high altitudes with long periods of cold torpor.

The smallest reproductive females registered by BUSACK (1987) had a SVL of 42 mm.

A captive male basked intensely in autumn and after emergence in spring, while the female remained hidden until the onset of warm weather on March 24th. The male began to persecute her at once, and they mated one hour later.

Mating (see also fig. 408/1; 409/1; 410/1; 411/1) schema on following side): During the first days after emerging from hibernation, a captive male always left his hiding-place earlier than the female and began to chase her the moment she appeared. In captivity mating activities are normally observed during sunny weather in the late forenoon or around noon. If the sun shines only in the afternoon courtship may set on much later.

The „carousel“ (scheme p. 410) is performed during flank bite hold when the female moves its forebody towards the male and the latter - without loosening his flank-bite hold follows the female, both animals thus forming an almost closed tight circle.

The female never copulated more than once a day and rejected the male's

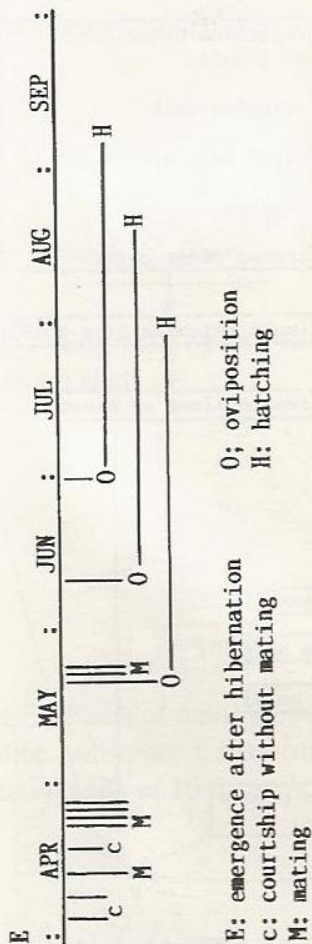


Fig. 1. Reproductive cycles in a female during one yr. Note the decrease in mating activities toward the 3rd clutch

attempts to copulate - chasing and tail-bite hold - by retreating into crevices. During their reproductive period from late March/April to June, females are extremely voracious and need many times as much food as males.

Clutches (fig. 409/1, 411/2,3): At least three per season are possible in well-fed captives, in intervals of three weeks beginning in April/May: Usually 2, rarely 1 or 3 eggs (BUSACK, 1987, found an average of 2.1); They measure: 12.5-13x6.5-8 mm and 8 x 13.5 mm, towards the end of incubation. Community oviposition is possible in cavities below solid objects.

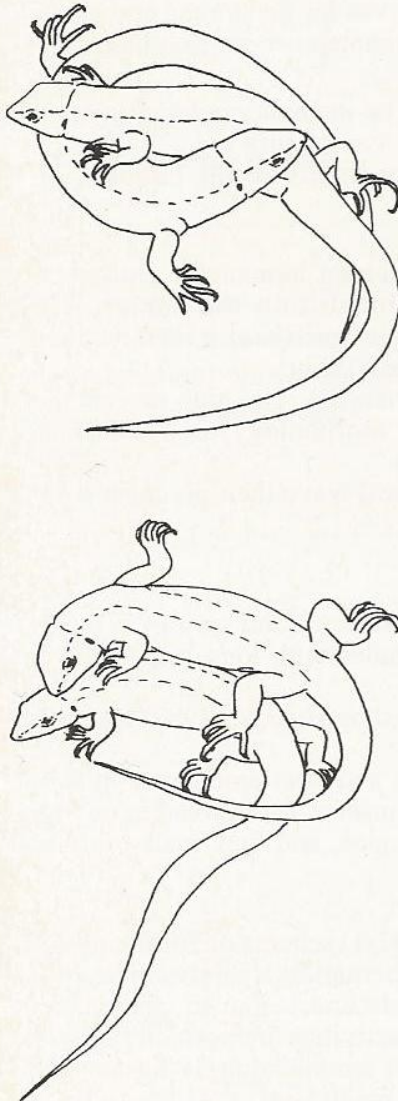
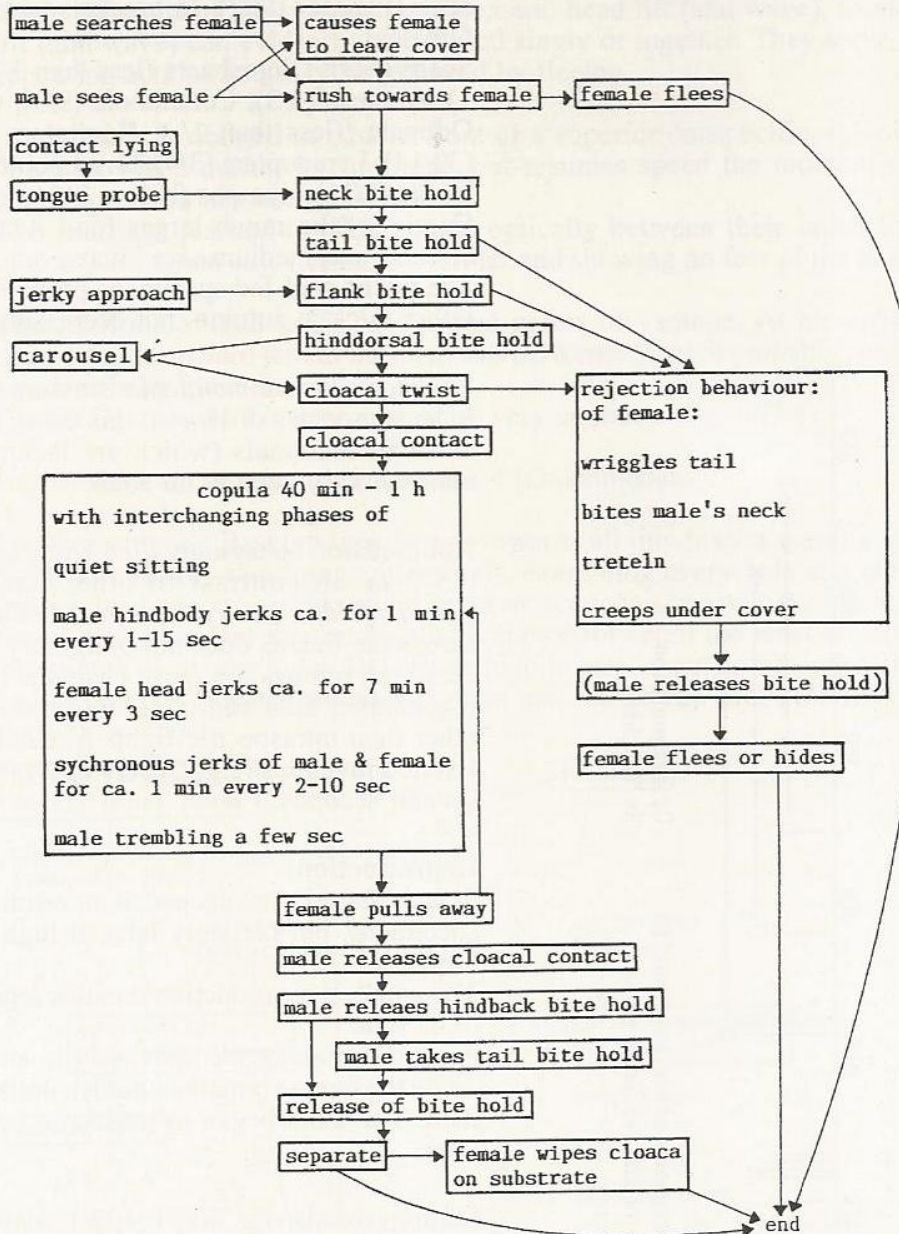


Fig. 1. Lying in contact during the mating period. Male in front (top) or on back (bottom) of female



Incubation: At 26-27°C in 70-73 d at 27°C in 63-65 d. Freshly laid eggs are cream white; they become pink after one week and greyish after 3 weeks.

Hatchlings: SVL 23 mm, tail 30 mm; colour pattern of body similar to adults, but more glossy bronze, light stripes brilliant, tail greenish blue. They are very agile and try to hide in crevices eventually creeping into loose soil under stones. During their first days they remain under cover most time and come into the open only for seconds. During rapid flight on

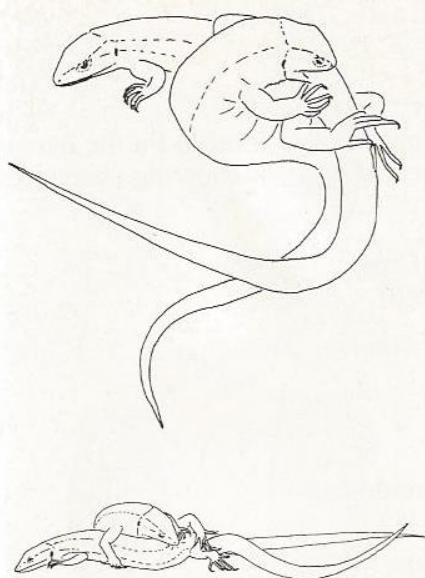


Fig. 1. Flank-bite hold and tail twist during copulation



Fig. 2. Egg with white concretions on shell

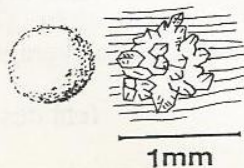


Fig. 3. Patch of amorphous white substance transforming into crystals in 10 d

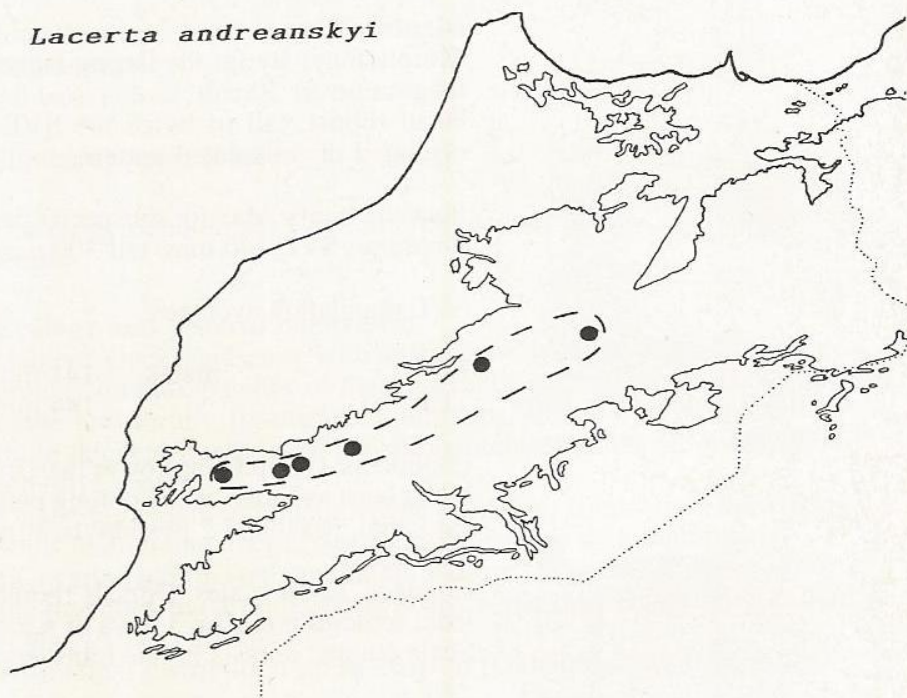
a smooth substrate they adpress their limbs and move by lateral undulation. Hiding under cover they assume an S-shape. They feed on aphids, small spiders, minute caterpillars and other small insect larvae.

Development: Largest juveniles measure 68 mm total length after one month. Towards autumn the striking greenish blue colour of the tail slowly fades, but persists into the following yr. It changes to dark brown during the following spring, but a greenish tinge remains. After moults in the second summer the back takes a greenish hue, and the contrast between body and tail colour fades.

In the first months they are rather cryptic, bask only for relatively short periods of 5-10 min and then forage or stay under cover.

The first molt takes place in their first spring. when they are about 6 months old. In contrast to the adults the skin is shed in small pieces, beginning at the snout and the tail. At this time they develop an astonishing appetite and should be fed with small food items several times a day.

Lacerta andreanskyi



Geographic range, Northern Africa: Haut Atlas, several mountain massives.

Most records are from localities which are readily accessible and frequented by hikers.

As the species has a low population density in many places and additionally is rather cryptic, our knowledge on its distribution has remained fragmentary. The recent discoveries (DESTRE & al. 1989) of this species on the Dj. Tinerguet (2500m, near Argana) in the west and Dj. Tilsgoulaft (2260 m) and Dj. el Ayachi (3350 m) in the east have shown that its range extends over much of the Haut Atlas chain.

Zoogeography: Mediterranean, endemite of the Haut Atlas.

References: BONS (1972, 1973), BONS & GIROT (1962b), BUSACK (1987), DESTRE & al. (1989), HERRMANN (1993), MALKMUS (1981), MELLADO (1985), PASTEUR & BONS (1960), SAINT GIRONS (1953), STEMMLER (1972a), WERNER, F. (1929, 1931a,b).

Lacerta pater Lataste, 1880

Pl. 35/99

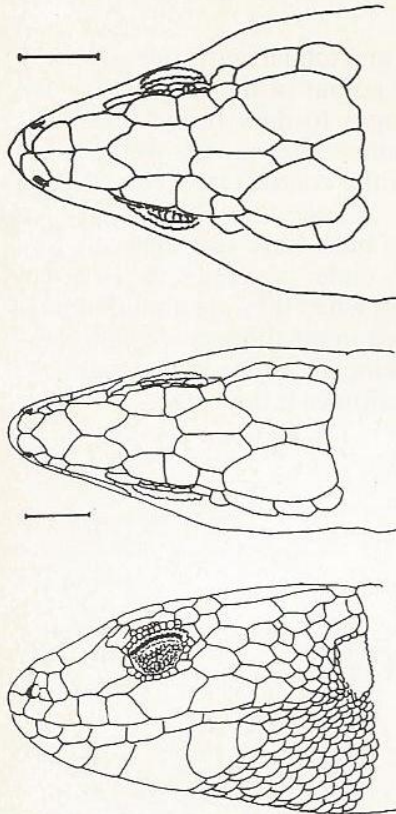


Fig. 1. Pileus: Tunis, *L. p. pater* (top); Tangiers, *L. p. tangitana*

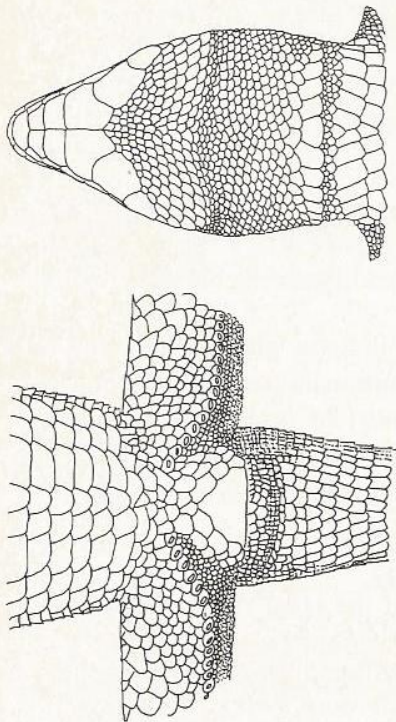


Fig. 2. Gular and anal region

Etymology: lat. pater: father. Lataste supposed this form to be the parent („father“) of both *Lacerta viridis* and *Lacerta ocellata* showing characters of both species.

Synonyms: *Lacerta ocellata* Daudin, 1802 part.
Lacerta ocellata var. *pater* Boulenger, 1920
Lacerta lepida pater Angel, 1946
Lacerta pater Bischoff, 1982

e: North African ocellated lizard
 f: Lézard ocellé de Barbarie
 g: Nordafrikanische Perleidechse, Berbereidechse
 a: Bou rioun; Ataya

Identification

Morphology: By far the largest lacertilian in N-AFR attaining a max. total length of over 50 cm.

Head robust, tail of twice the SVL. Basic colour green or brown with ocellated or reticulated pattern.

Measurements: Max for subspecies *pater*: SVL 170 mm, tail 365 mm; subsp. *tingitana*: SVL 140 mm, tail 300 mm.

SVL population averages:

Rif:	males	141 mm	females	137.7 mm
TUN		144 mm		144.4 mm

Pholidosis: Occipital narrower than frontal or of equal width, often broader, but at least as broad as the oblong pentagonal interparietal. Nostril between 1st labial, nasal and 2 postnasals. Rostral approaches the nostril closely or touches it.

Collar of 12-14 scales. Dorsals rhomboidal, feebly keeled. Anal separated from femoral pores by 3 rows of scales.

Scale counts: dorsals in one transversal row at midbody (on average):

Rif:	males	83	females	83.6
TUN:		65.3		75.1

Ventrals in 8, sometimes 6 longitudinal rows, median and marginal ones smaller.

Coloration: Unicoloured green, bronze, yellowish brown; dark reticulation heavy to none; with many, some or no ocelli at body sides, relicitary ones in axillae possible; ocelli with light, sometimes blue centers; see also sexual dimorphism.

Breeding in captivity produced several cases of nigrinos with weakly visible dorsal and distinct tail and leg pattern. Mating chances of nigrino females were remarkably reduced compared with normal ones. The rates of nigrinos among normal siblings were 1/25, 3/25, 4/28. The type of inheritance is unknown.

Colour change, developmental: Hatchlings from N-TUN are olive brown, usually with 4 longitudinal rows of ocelli on each flank. These are greenish white and bordered with dark brown. The ocelli may be reduced or lack entirely.

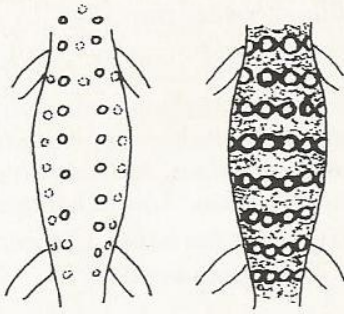
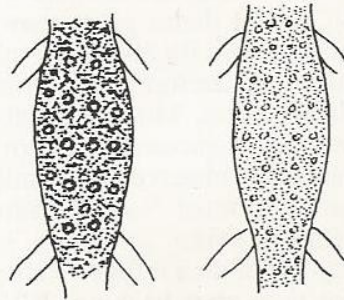
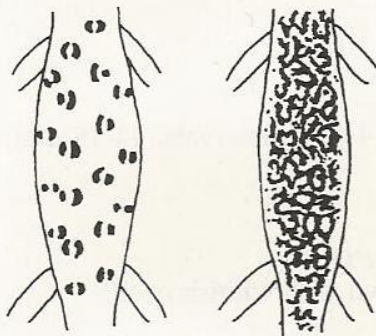
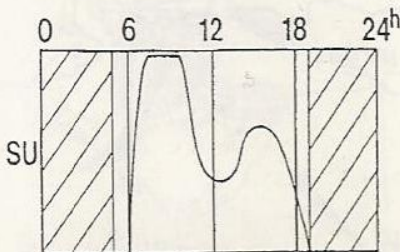
Fig. 1. *L. p. tangitana*, juvenilesFig. 2. *L. p. tangitana*, adultFig. 3. *L. p. pater* female + male (TUN), adulti

Fig. 4. Activity pattern, Dj. Toubkal, Haut Atlas

After moulting in early Oct. the ground colour changed to olive green and the lowest ocelli turned bluish.

After another moult end Oct. the dorsal ground colour turned light green, the ocelli became larger and their margins less contrasting.

Sexual dimorphism: As there are remarkable differences between the two subspecies they are treated separately in the following table:

subspecies

	West: <i>tangitana</i> weak sexual dimorphism		East: <i>pater</i> pronounced dimorphism	
character	males	females	males	females
throat	greenish		yellow	greenish
ocelli	weakly expressed and closed			distinct open
dorsal pattern	reticulate			plain
hind leg and tail base colour	dark brown		same colour as back	

Similar species: None.

Osteology/odontology: Caniniform teeth as in the closely related *Lacerta lepida*.

Ecology and general behaviour

Habitat: Open landscape with sufficient cover and often bushes: Macchia on clay ground, patches of macchia on coastal sands (N-TUN); meadows, dense low shrubs, fissured rock outcrops, slopes with debris and boulders, thorn thickets, bushes near irrigation ditches, borders of oueds, stone walls, old olive groves.

On the high plain of Oukaimedene (2 650 m, Haut Atlas) they live in stone walls and around crevices in rock plateaus or rock outcrops.

In a varied biotope on a mountain pasture (BISCHOFF & IN DEN BOSCH, 1991) the juveniles lived in the stone heaps while the adults preferred Holm oak (*Quercus ilex*) bushes.

Altitudinal distribution up to 2650 m (Oukaimedene, Haut Atlas).

Activity pattern, diel: At higher elevations (2 200 m, Moyen Atlas) full activity is attained at noon. In summer dusk activities were recorded.

Locomotion: They may climb up several meters on walls.

Population density: Individual distance at Oukaimedene (Haut Atlas) ca. 200 m. 8-10 animals along 2 km of street.

Population structure: Along a road near Oukaimedene (Haut Atlas) the number of females was three to four times that of males (June 1993).

Social behaviour: Threat includes high stance, throat spreading, head lowering, gaping. Bite during combat.

Herpetological community: 5.5 lizard communities; Profiles 2 (Zad), 3 (Ifrane), 4 (Oukaimedene), 5 (Rheraia).

Food spectrum: Worms, snails, strongly chitinized insects, esp. Coleoptera; grasshoppers, mantids; frogs, small snakes, young birds.



Fig. 1. On coastal sands the large tracks (at least 5 cm wide) are easily to distinguish from those left by *Acanthodactylus* and *Psammadromus*. Trailing the rigid tail-end wipes the sand aside at the turns of the undulating tail imprint

In captivity baby mice and, particularly in autumn, sweet fruit: figs, dates, cherries, plums, sweet pears, raisins.

Predators: *Coluber hippocrepis*, *Coronella girondica*, *Malpolon moilensis*. Ext. predation of *Lacerta lepida*: *Tyto alba*, *Bubo bubo*, *Geochelidon nilotica*, *Bubulcus ibis*, *Ciconia ciconia*, *Eleanus caeruleus*, *Milvus milvus*, *Milvus migrans*, *Hieraetus pennatus*, *Hieraetus fasciatus*, *Aquila heliacea*, *Aquila chrysaetos*, *Neophron percnopterus*, *Gypaetus barbatus*, *Circaetus gallicus*, *Circus pyrgargus*, *Falco naumanni*, *Falco tinnunculus*.

Antipredator behaviour: Flees into thicket or between stones. The fleeing distance largely depends on the lizards' exposure: If they are without any cover they flee at several meters while those amidst dense plant growth may allow an approach to under 1 m. Weak subthreshold flight-stimuli may evoke intention movements, e.g. a posture change with the forebody shifting in the direction of the refuge, but without locomotion. Moderate stable stimuli, e.g. if an approaching human does not further proceed and move, may cause the lizard to stop at the burrow entrance and observe the intruder. Captives stay shy even after months. In contrast to most N-AFR lizards they scarcely get habituated to the close presence of man. Before emerging in the morning the animals peep out of their refuges without moving, and they need many minutes before they start basking. When reappearing after taking refuge in their hole, the surroundings are carefully inspected with only the anterior part of the head showing.

Reproduction: Spermatogenesis of mixed type.

Sexual maturity: In captives already after 1 yr.

Mating: April.

Clutches: In captivity 2-3 per yr in about 4 week intervals, 14-18 d after mating. Clutch size 2-20 eggs.

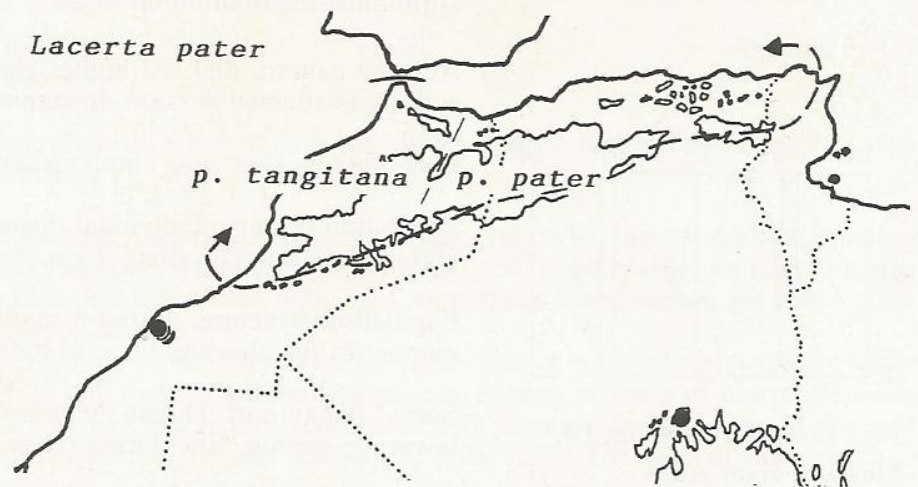
Eggs: 13x21 mm.

Incubation period At 29°C 88-89 d;

Hatching: In nature after 3 mth end Sept. & Oct.

Hatchlings: Total length 12 cm. Olive brown with whitish ocelli.

Development: Growth record of a juvenile from Tunis (SVL+tail): 2 mth: 42+79 mm; 4 mth: 64+131 mm; 8 mth (with interruption by 3 mth of hibernation): 72+134 mm; 9 mth: 81+157 mm; 11 mth: 85+160 mm.



Geographic range. Northern Africa: MAG, relatively humid Mediterranean and Atlantic regions near the coast, Atlantic Ziz and Draa river valleys (Tafilalt, MOR); mountain ranges and highlands (Tell, Moyen Atlas, Haut Atlas, Algerian plateau, Aurès, Kabylie, Khroumirie (N-TUN), Tunisian coastal mountains: Isolates in the Saharan Atlas.

The capture of a specimen near Amguid (N Tassili, SE ALG), more than 600 km south of the hitherto known range (JOGER, 1981), suggests that a relictary population may exist in this region. JOGER doubts that the animal was released there.

VALVERDE (1957) reports sightings of this or a similar large and green lizard in the lower Seguiet al Hamra near El Ayoun (Laayoun) on the Atlantic coast.

There are some hints on the occurrence of a *Lacerta* spec. in Libya. See *Lacerta* spec., following chapters.

Zoogeography: Mediterranean, MAG.

Systematics: Closely related to *Lacerta lepida* and considered a subspecies of it for a long time. The separation from *Lacerta lepida* is founded on the weak viability of hybrids (BISCHOFF, 1982) and morphological data (MATEO, 1990).

Subspecies: Western *Lacerta p. tangitana* and eastern *Lacerta p. pater* are separated by the Oued Moulouya valley. See sexual dimorphism.

References: BISCHOFF (1982), BONIS (1972, 1973), BONIS & GIROT (1962b), BOULENGER (1891), DESTRE et al. (1989), DOUMERGUE (1901), FISCHER (1888), JOGER, 1981, LAMBERT (1984), LANGERWERF (1981), LANZA & BRUZZONE (1959), LE BERRE (1989), MALKMUS (1983), MARTIN & LOPEZ (1990), MATEO (1990), MELLADO (1985), MELLADO & DAKKI (1988), MOSAUER (1934), PASTEUR & BONIS (1960), SAINT GIRONS (1953), SEURAT (1930), STEMLER (1965a,c,e, 1966b, 1972c), STEMLER & HOTZ (1972), VALVERDE (1957), WERNER, F. (1929, 1931a,b), ZIMMERMANN, 1983.

Lacerta spec.

from the Atlantic coast of the W-SAH.

Synonyms: *Lacerta lepida* Daudin VALVERDE, 1957

The existence of a large green lizard near the Atlantic coast of the W-SAH (see map *Lacerta pater*) was confirmed beyond any doubt by J.A. VALVERDE (1957) on several occasions during his expedition in 1955.

He observed them repeatedly, from close and over a length of time, stating they were light green and looked like those known to him from „Dar Chau“ (Taourirt?) in N-MOR. A verbal translation of his report (p. 348) follows: „El Aium, May: On several occasions observed between rocks of the northern margin of the Seguiat on the terrace bordering the valley. - El Meseied, 23.5.: One hides in *Rhus tripartitus* bushes, in a grara with soil of clay and stones. - Etchera, 27.5.: We noted them at two places in the rocks on the margin of the Seguiat.

In the graras SE of El Aium we noted them with doubt, considering the velocity of their course, on two or three occasions. It is rare at all noted spots. Generally it seems that it prefers rocks and places with dense vegetation of the richest biocenoses, being replaced by *Agama* in others.

If captures confirm the observations this is the southernmost locality from which this species is known and which we consider another one of the typical Berberian elements which reach the Seguiat or are encountered as relicts in it.“

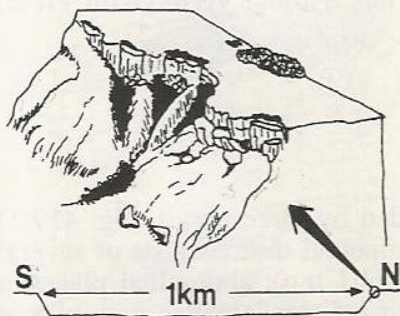


Fig. 1. Biotope of *Lacerta* spec. on the steep border of the Lower Seguiet el Hamra near El Aioun (VALVERDE, 1957)

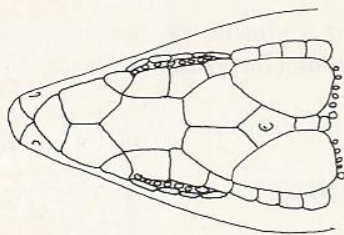


Fig. 1. *Lacerta* spec; Libya



Fig. 2. *Lacerta* spec., Libya

The term „Agama“ is used for *Agama impalearis* and *Trapelus mutabilis*. A sketch based on a drawing by VALVERDE shows a typical biotope of the lizard with a plant thicket at the head of a ravine (fig. 415/1).

An intense search for the species by SCHLEICH in June 1993 was in vain, and he even doubts that any biotopes for this species have remained. The very recent construction (observed 1993) of a water dam might improve climatic and habitat conditions in this habitat, and if still extant, survival might become facilitated of that species once mentioned by VALVERDE.

References: VALVERDE (1957).

Lacerta spec.

From Libya (figs. 1,2)

Synonyms: *Lacerta ocellata* (Dand) var. *Pater* (sic!) Umani, 1922.

There are some hints that a hitherto unknown *Lacerta* spec. exists in Libya.

1. SCHLEICH took fotos of large green lizards preserved at the University of Tripoli. They were in a bad state of conservation and not labelled.

2. UMANI (1923) states: „Ricordo infatti di aver veduto nella raccolta del Prof. Testi un grosso lacertide che riferii alla specie *Lacerta ocellata* (Dand) var. *Pater* (sic!).“

Prof. FR. TESTI, a „Generale Medico“, collected in the region of Bengasi and Marsa Susa.

References: UMANI (1923), ZAVATTARI (1922).

Genus *Mesalina*

see cladogram p. 26

The predominantly N-AFR genus differs from the asiatic *Eremias* in the following characters (in brackets characters of *Eremias*): Ventrals form right (oblique) angles with the ventral midline. Occipital well (scarcely) developed. Inferior nasal in contact with rostral and 1st (rostral, 1st and 2nd) supralabial. Inferior eyelid with distinct (without distinct) palpebral disc.

In juveniles ventral sides of thighs and tail without vivid (with vivid) colouration (Szczerbak, 1974).

e: Desert racer

f: Erémias

g: Wüstenrenner.

General characteristics: Nostril surrounded by three nasals (fig. 417/1) and widely separated from supralabials; palpebral disk consists of several transparent scales; collar indistinct (fig. 373/1 top); abdominal plates in parallel rows. Toes slightly depressed, their inferior lamellae with two or three keels (fig. 418/3).

Refuge: Captives require slightly moist places for hiding and oviposition.

Reproduction: Species of the genus *Mesalina* are relatively small. At least some of them attain sexual maturity within one year (SZCZERBAK, 1974) and therefore have perhaps the quickest sequence of generations among North

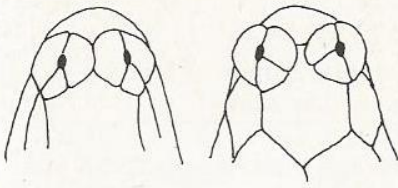


Fig. 1. Nasal regions of *M. rubropunctata* (right) and other species

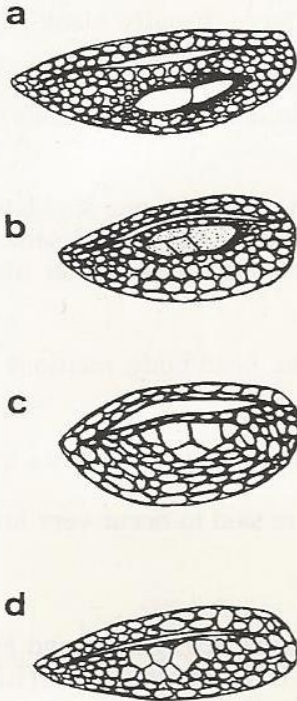


Fig. 2. Palpebral disk of a: *Mesalina guttulata*, b: *olivieri*, c: *pasteuri*, d: *simoni*

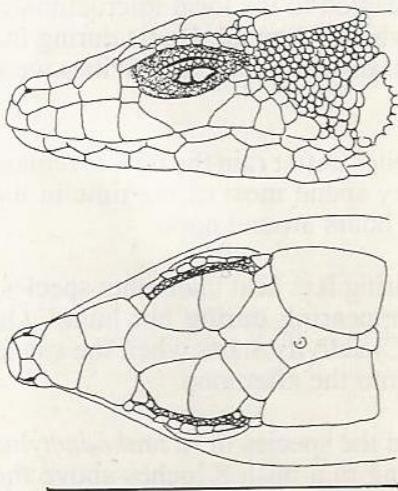


Fig. 3. *Mesalina guttulata*

African lizards. This way they represent an r-strategy (see appendix, 8,1) which is typical for short-lived species with high colonizing abilities.

Geographic distribution: As the three species *M. guttulata*, *M. olivieri* and *M. simoni* were confounded by earlier authors, all distribution records before 1980 have to be treated critically.

The lack of records for *Mesalina guttulata*, *olivieri* and *rubropunctata* from much of Libya suggests wide distribution gaps. This is probably a misapprehension, due to the rarity of reptile collections from that region and the low population density of the tiny and inconspicuous forms of *Mesalina*.

Key (after PASTEUR & BONS, 1960; SZCZERBAK, 1975)

A major role for identification of the species plays the structure of the palpebral disk.

- | | | |
|----|--|----------------------------------|
| 1 | Nasals in broad contact behind the rostral (fig. 1 left);
10 longitudinal series of ventrals: |2 |
| 1' | Nasals without or with minimal contact
behind the rostral (fig. 1 right); 12 longitudinal
series of ventrals: | <i>M. rubropunctata</i> (p. 425) |
| 2 | Palpebral disk consisting of two transparent scales,
mostly with dark borders (fig. 2a): | <i>M. guttulata</i> (p. 417) |
| 2' | Palpebral disk with 4-8 enlarged scales (fig. 2b,c,d): |3 |
| 3 | 4 supralabials anterior to subocular: |4 |
| 3' | 5 supralabials anterior to subocular (Sahara;
palpebral disk c): | <i>M. pasteuri</i> (p. 423) |
| 4 | Palpebral disk with 4-6 (rarely 3) scales of very
different size and often with a dark margin (fig. 2b).
Tail-base of male not very thick. Light dorsal lines
with black margins; gular and ventral regions
slightly greyish (N-AFR except the extreme W): | <i>M. olivieri</i> (p. 420) |
| 4' | Palpebral disk with numerous scales, mostly 6,
(rarely 7 or 8; fig. 2d), without dark margins.
Tail-base of male very thick. Light dorsal lines
without black margin; gular and ventral
regions intensely grey (W-MOR): | <i>M. simoni</i> (p. 428) |

Mesalina guttulata (Lichtenstein, 1823)

Pl. 35/100

Etymology: Lat. guttula: droplet; refers to dorsal pattern of light spots.

Synonyms: *Lacerta guttulata* Lichtenstein, 1823

Scapteira punctulata Gray, 1838

Eremias guttulata Duméril & Bibron, 1839

Eremias pardalis Duméril & Bibron, 1839

Mesalina guttulata Szczerbak, 1975

e: Small-spotted desert-racer

f: Érémiàs à gouttelettes. The French spelling alternates between Érémiàs (Doumergue, 1901), Érémiàs (LeBerre, 1989) and Eremias (Bons, 1959).

Identification

Morphology: A very small lizard with a laterally compressed body, a narrow head with pointed snout and a flattened frontal region. Ocelli with a white center flanked by usually two dark spots.

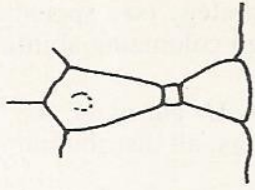


Fig. 1. Variability (Chott el Djerid): small scale between interparietal and occipital

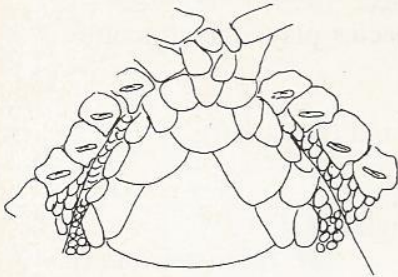


Fig. 2. Anal region with femoral pores

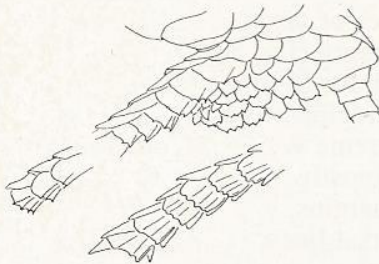


Fig. 3. Right foot from below, 1st, 2nd and 3rd toe

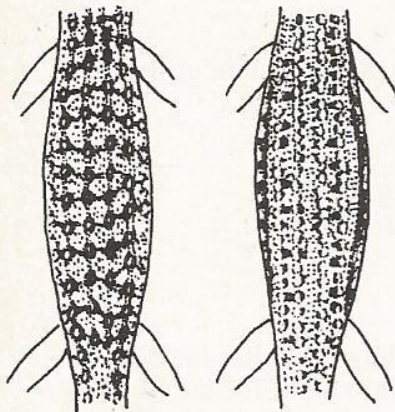


Fig. 4. Israel; el Kantara (ALG)

Measurements: Values from SW-MOR (BONS, 1959)

male	SVL 43 mm	tail 96 mm	foreleg 17.5 mm	hindleg 31 mm
female	42.5 mm	83.5 mm	15 mm	24 mm

males, average head length 16.93 mm average trunk length 25.58 mm
females, -" -" -" 14.83 mm -" -" -" 28.61 mm

Max. SVL of females from Israel 54.5 mm.

Pholidosis: 4 supraoculars, 1st and 4th very small and sometimes fractioned. The two large supraoculars are separated from the supraciliaries by 1 row of granules. Nostrils not prominent. Normally 5th supralabial is in contact with the eye.

Palpebral disk transparent, composed of two large, usually black-edged scales.

Transversal rows of ventrals, males 25-29, females 28-33.

Normally a large anal surrounded by two semicircles of small preanals (fig. 2). 9-13 femoral pores on each side.

Coloration: Ground colour adapted to surrounding rock, in some populations darkened to a glossy black. Mostly brown with two dorsolateral series of ocelli consisting of white spots bordered with black ones. Venter bluish grey.

Sexual dimorphism: Easy to distinguish, as the head/body relations are very different; see measurements.

Similar species: Frequently confounded with *M. olivieri* which has a more striped pattern and a different palpebral disk.

Hybrids between *M. guttulata* and *M. olivieri* are said to occur very rarely in Israel.

Ecology and general behaviour

Habitat: Rocky to gravel-covered ground: Hamada, reg, gorges and jebel slopes (Beni Abbès); grass and salt steppe (TUN); coastal plain (LIB); together with *M. olivieri* on sandy loess (Israel); rocky plains with sparse vegetation, coastal dunes (SW-MOR); stony slopes. In the Mediterranean region on places with a warm microclimate.

Refuge: A hole dug into loose substrate, often below a rock plate which forms a small cavity. A slightly moist retreat is preferred.

Activity pattern, diel: Very variable and adapted to the local microclimate, e.g. even on warm winter days in gorges which warm up. Hunts during the hot hours and rests in the shadow of stones. In summer dusk activities were recorded.

Annual activity: No hibernation in Beni Abbès. After rain the lizards remain hidden because of cold and moisture. They spend most of the time in the retreat, and are only active for one or two hours around noon.

Thermal behaviour: In desert regions requiring less heat than other species; active even during overcast sky and disappearing during hot hours. On days with moderate temperatures (25-30°C) activity starts when the sun is high above the horizon and continues up into the afternoon.

Mean activity temperature 34.9°C.

Locomotion: A fast runner, but slower than the species of *Acanthodactylus* and quickly fatiguing. One was seen resting in a bush 8 inches above the ground.

Population density: A common species in favourable biotopes, cited as the most common reptile of SW-MOR.

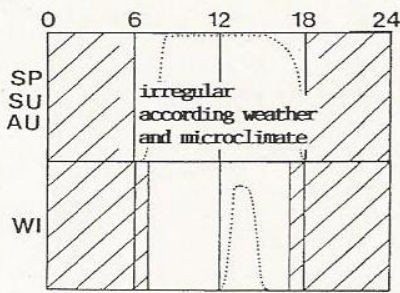


Fig. 1. Activity pattern, Beni Abbès

Apparently the numbers of specimens oscillate considerably with the years.
Social behaviour: Nodding during interactions.

Herpetological community: 5.4 Djebel trophic web; 5.5 profiles 8 (Ougarta), 11 (Erg Oriental), 12 (Kouf).

Feeding strategy: During hot hours the lizards sit at ambush in the shadow of rocks or plants, dart off to catch a prey item and then return immediately.

Food spectrum: Tiny arthropods: spiders, mites, isopodes, apterygotes, aphids, ants, small coleoptera, on rare occasions termites.

All specimens caught by BONS (1959) in the morning had an empty stomach, they contained little food during the forenoon and had a full stomach at noon.

Predators: Scorpions, *Galeodes*. (Arachnoidea, Solifuga); *Agama impalearis*, *Varanus griseus*, *Psammophis* spp., *Cerastes cerastes*, "*Echis carinata*"; *Falco biarmicus*, *Falco peregrinus*, *Oenanthe* spp., *Lanius* spp.

Antipredator behaviour: It often lives in habitats which offer little cover, but is often overlooked because of its cryptic colour, small size and rapid flight. Flees only a short distance to the next stone or tuft of grass and tries to dig into the substrate.

Reproduction

Sexual maturity: Attained in the spring subsequent to hatching with a SVL of 40 mm in females.

Reproductive season in Israel Feb. to April.

Mating: Observations from SW-MOR on Apr. 1st, 5th and 6th.

The male chases the female from stone to stone, circles around her while she proceeds slowly, the male's speed being three times that of the female's. The male seizes the female's flank and carries her around while she remains totally passive.

Flank-bite hold during copulation.

Clutches: Several per yr. Egg number increases with the SVL of a female; 2-7 (mean 4.4) eggs. Their volume is 0.09-0.20 cm³.

In TUN females contained 2 or 3 eggs end Apr. The relative clutch mass is 0,295 of the female.

Incubation: 4 mth at 25°C in; 2 mth at 30° .

Hatchlings: In the regions of Assa/Foum el Hassane and Akka (SW-MOR) on March 19/20. SVL 22 and 22.5 mm, tail 39 and 37 mm, foreleg 7 and 8 mm, hindleg 14 and 13 mm. They are ocellated like the adults and grow very fast.

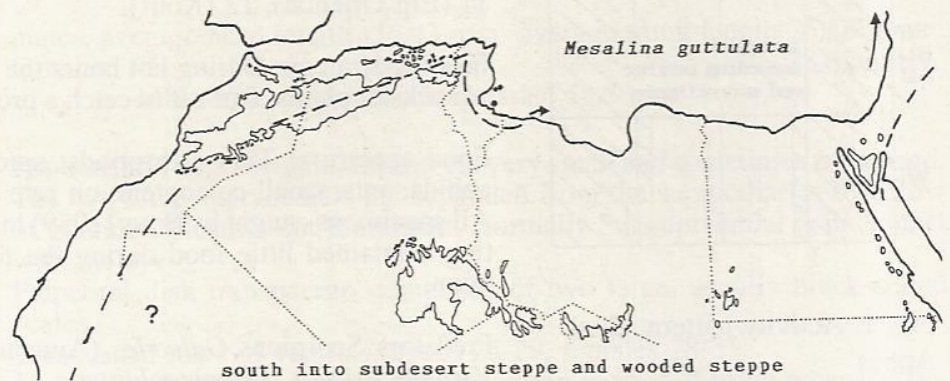
Geographic range, Northern Africa: All countries.

Other regions: Senegal, Niger, Sudan; Sinai, Israel, Syria. Aden, western Saudi Arabia.

Zoogeography: Saharo-Sindian.

Systematics: For a long time *M. olivieri* was considered a subspecies of *M. guttulata* until it was shown that the two widely sympatric forms are

morphologically strictly separated and differ with regard to their habitat preferences.



Subspecies: All records listed under „Geographic range“ refer to the subspecies *M.g. guttulata*.

M.g. susana Boulenger, 1918 from Sousse (TUN) has not been reconfirmed. ARNOLD (1986) argues that the former subspecies *M.g. watsonana* Stoliczka, 1872 should be given species rank. Range: Pakistan, Afghanistan, Iran, Turkmenia.

References: ARBEL (1984), ARNOLD (1986), BLANC (1986), BONIS (1959, 1972, 1973), BONIS & GIROT (1962b), FRANKENBERG & WERNER (1992), GAUTHIER (1967), GRENOT (1976), HAAS (1951), JOHANN (1981), LAMBERT (1984), LE BERRE (1989), MELLADO & OLMEDO (1987), MERTENS (1946), MOSAUER (1934), PAPPENFUSS (1969), PASTEUR & BONIS (1960), PERRY & al (1990), SCHLEICH (1987), SCORTECCI (1935a), SZCZERBAK (1975), STEMLER & HOTZ (1972), WERNER, F. (1909, 1929), WERNER, Y. (1982, 1983), ZAVATTARI (1930).

***Mesalina olivieri* (Audouin, 1829)**
Pl. 35/101

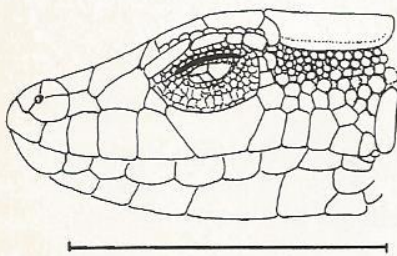


Fig. 1. *Mesalina olivieri*

Etymology: Dedicated to ERNEST OLIVIER, French herpetologist, who published a „Herpetologie Algérienne“ in 1894.

Synonyms: *Lacerta olivieri* Audouin, 1829
Eremias martini Boulenger, 1897
Eremias guichenoti Doumergue, 1901
Eremias guttulata olivieri Boulenger, 1921
Eremias olivieri Dekeyser & Villiers, 1956
Mesalina olivieri Szczerbak, 1975

e: Olivier's desert-racer
f: Érémiass d'Olivier
g: Oliviers Wüstenrenner

Identification

Morphology: A small lizard with a short head, a broad snout, a domed front and the nostrils situated on small protuberances. Body more or less cylindrical in cross section.

Measurements: Male: SVL 49 mm, tail 101 mm; female SVL 45 mm, tail 80 mm; average SVL 38-43.5 mm.

Pholidosis: Pileus with rugose plates; nostrils rounded, protruding, situated between three scales, one of which touches the rostral; frontal region somewhat bulging; 1st and 4th supraoculars small, more or less divided; interparietal and occipital of equal size.

Palpebral disk consisting of more or less translucent scales, in some specimens with a slightly dark border: 2 or 3 large plates rest on a row of 4-6 small ones (after DOUMERGUE, 1901, fewer scales in specimens from the S). In 90% of N-AFR specimens the 5th supralabial touches the eye, in 10% the 6th and very rarely the 7th;

Gular fold and collar generally distinct.

Dorsals granular. Ventrals in 8 longitudinal rows plus a marginal row of half-sized plates on each side. Anal small, triangular or subpentangular, surrounded by two rows of small preanals and a third one of granules. Toes with fine and short denticulation.

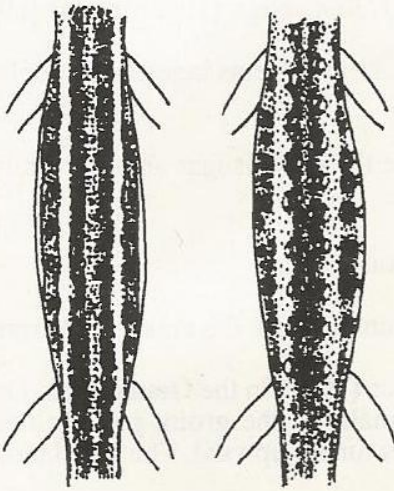


Fig. 1. Israel; Kerkennah Island (TUN)

Coloration: Ground colour very variable, from dark brown to light beige; head of same colour as body in juveniles and half-grown specimens, silvery grey in old ones. A longitudinal pattern of six greyish to yellowish lines, striated to ocellated. The ocelli are rather distant (3 mm) and irregularly bordered with black.

The black markings can be rectangular and form 2-4 separate lines. The lower flanks may be dotted with black. Striped and dotted forms can occur together, but are often separated; those of W-ALG are apparently exclusively dotted.

In specimens from SW-MOR the light lines remain contrasting.

The limbs are of same colour as the body and bear small spots.

Ventral side yellowish white (Oran), or greyish (SW-MOR), more intense below the tail.

Saharan specimens from S-ALG assume a reddish sand-colour in summer, and have a strong tendency towards a spotted pattern. Of the four persisting rows of brown spots the lateral ones are most pronounced. The ground colour is additionally spotted with white.

Colour change, developmental: Juveniles with light longitudinal stripes like *Ophisops elegans*.

Sexual dimorphism: Tail-base flattened below in males, rounded in females.

Similar species: *M. simoni* in the extreme west of its range. For differences see key and *M. simoni* „similar species“.

Ecology and general behaviour

Habitat: On flat terraces of open ground on soil with stones and shrubs; sandy or loamy sebkha soils with *Frankenia thymifolia* and *Zygophyllum album*; Halfa grass steppes; in the Saharan region sandy regions with rocks.

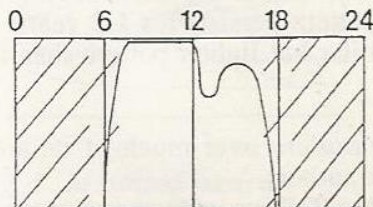
Activity pattern, diel: Diurnal but extending into dusk in summer.

Annual activity: Active throughout the year, in coastal regions above all in winter. They remain hidden during periods of bad weather, but become active with sunshine.

At the coast hatchlings appear in the beginning of July, yearlings emerge some days later and adults become common by September.

Locomotion: Distinctly less agile than the species of *Acanthodactylus*.

Population density: This species was very common at the beginning of the



WI active in coastal regions (Oued Souss)

Fig. 2. Activity pattern, SW-MOR

century „abonde partout, depuis le littoral jusque dans le Sahara“ (DOUMERGUE, 1901), but was subsequently substantially reduced in numbers by agricultural projects.

Herpetological community: 5.5 lizard communities; profiles 6 (Massa), 7 (Presahara).

On sebkha soils of Kerkennah Isl. (TUN) together with *Acanthodactylus pardalis* (*A. maculatus* sensu SALVADOR, 1982).

Feeding strategy: An opportunistic feeder which makes no big difference among its prey.

Food spectrum: All insect groups occurring in the biotope; spiders, mites (Acarina); snails; once a small lizard.

NOUIRA (1983) calculated the different percentages of the total number of prey items eaten by *Mesalina olivieri/Acanthodactylus pardalis* (*maculatus* sensu SALVADOR) living in the same biotope. Values for some important types of prey only:

Beetles 50.9/6.9; aphids and cicadae 19.1/30.4; bugs (Heteroptera) 0.9/10.9; ants 11.3/42.9.

In another Kerkennah population 22.5% of the prey items ingested by adults were mites (Acarina).

Antipredator behaviour: Flees into cover at the least danger and can easily be caught if it takes shelter under a stone.

Reproduction: Spermatogenesis almost continuous.

Mating: In the Oran region beginning in autumn with the emergence from estivation.

During a copulation observed by DOUMERGUE (1901) in the Oran region. On April 2nd at 10.30, the male held the female by the groin, passing one hindleg over her back. The female's tail was turned upward. The copulation took longer than 15 min.

Another mating was observed by the same author on Sept. 23rd also at 10.30 h.

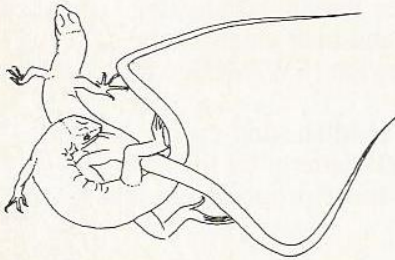


Fig. 1. Copulation

Clutches: Female with fully developed eggs were found in the Oran region from mid-Oct. to end of May. There are at least two clutches per year with 2-4 eggs measuring 10-13x6-8 mm. Oviposition is discontinued in mid-winter.

Hatchlings: In the Oran region and on Kerkennah Isl. at beg. July, in SW-MOR recently hatched ones were found on May 18th.

Measurements: SVL 23-25 mm, tail 33 mm. Colour pattern often striped and similar to juvenile *Ophisops*: Four very pronounced reddish white stripes and a fifth less distinct vertebral one; ground colour brown with rows of small white dots (W-ALG). The juvenile pattern persists for 1-2 years.

Juveniles from the SAH region have a similar but lighter pattern than the adults.

Geographic range: Sympatric with *M. guttulata* over much of its area. Both species were not separated by earlier authors.

Northern Africa: Arid region from W-SAH to TUN; a wide gap of records; east of the Nile.

Other regions: Mauritania, Senegal, Sudan, Ethiopia, Somalia, Socotra; Sinai, Israel, Jordan, S-Iraq.

Zoogeography: Saharo-Sindian, northwards into MAG.



southern limit uncertain due to the scarcity of records

Systematics: Formerly considered a subspecies of *M. guttulata*.

Subspecies: *M.o. olivieri*: most of the above listed range.

M.o. balfouri Blanford, 1881: Socotra Island.

M.o. latasti Boulenger, 1918: Aumale (SE Alger): not reconfirmed.

M.o. martini Boulenger, 1897: W shore of the Red Sea to Somalia, Aden. A form of uncertain status: Mauritanian Adrar, Senegal, W-SAH.

M.o. schmidtii Haas, 1951: Israel.

M.o. simoni Boettger, 1881: W-MOR, attributed specific rank as distinctly different from *olivieri* (s. p. 429).

References: ARBEL (1984), BONS (1972, 1973), BONS & GIROT (1962b), BONS & SAINT GIRONS (1980), DOUMERGUE (1901), HAAS (1951), LAMBERT (1984), LE BERRE (1989), MELLADO (1985, 1988), MELLADO & OLMEDO (1987), PAPENFUSS (1969), PASTEUR & BONS (1960), SALVADOR (1982), SZCZERBAK (1975), STEMLER & HOTZ (1972), WERNER, Y. (1982, 1983, 1985).

Mesalina pasteuri (Bons, 1960)

Etymology: Dedicated to GEORGES PASTEUR, a contemporary French herpetologist, who at the time of the description worked at the Institut Chérifien in Rabat.

Synonyms: *Eremias pasteuri* Bons, 1960

Mesalina pasteuri Szczerbak, 1975

e: Sahara desert-racer

f: Érémiass de Pasteur

g: Pasteurs Wüstenrenner

Identification (data from BONS, 1960)

Morphology: A small species distinguished from related forms by beige and white longitudinal stripes and the absence of ocelli.

Measurements: SVL 38 mm to max. 50 mm; tail 85-103 mm, 2.2-2.4x SVL.

Pholidosis: Pileus smooth, very similar to *M. guttulata*, but snout more pointed and nostrils more prominent. 5 (rarely 4) supralabials in front of the subocular.

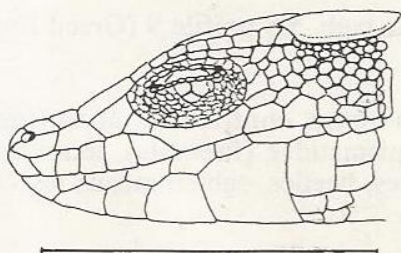


Fig. 1. *Mesalina pasteuri*

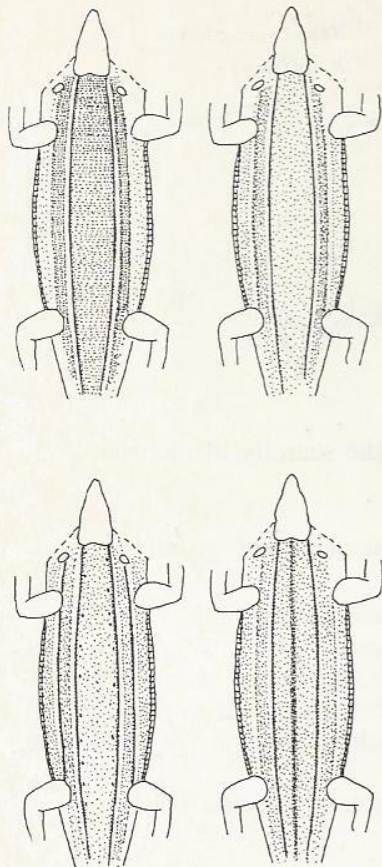


Fig. 1. Variability of dorsal pattern

Palpebral disk consisting of 2 (rarely there is an additional 3rd and smaller one) translucent scales, with two or three smaller ones on their lower anterior margins.

Dorsals granular or subimbricate, smooth or slightly keeled, in 34-41 rows at midtrunk.

Ventrals in 10 longitudinal and 28-33 transversal rows. A large anal plate surrounded by two series of preanals.

10-14 femoral pores on each side.

Coloration: Total beige with white longitudinal lines.

A middorsal and, on each side, two lateral beige bands which are separated by 1 mm wide white or yellowish lines; The broad middorsal stripe continues for some distance on the tail. Its borders are marked with one row of maroon scales. Additionally it may show a darker vertebral streak or black and white lateral granules.

The upper lateral beige stripe is about 2 mm wide and darkens towards its ventral margin. The lower one begins at the mouth angle and separates dorsal from ventral coloration. It can be pale beige, indistinct or show a maroon ventral border.

Similar species: In several regions occurring together with *M. olivieri* which prefers solid ground, though. The different contact points of the supralabials with the eye and the striped pattern of *M. pasteuri* exclude errors.

Ecology and general behaviour

Habitat: Mobile sands with solitary tufts of grass; border of the Grand Erg Occidental near Beni Abbès; small dunes near the Oued Draa near Tagounite; sandy oueds in the Eglabs, central SAH, W-border of the Erg Chèch, in a hyperdesertic region which has been without rain for several yr and showed only faint traces of plant and animal life.

Activity pattern, diel: In spring and autumn activity begins after the soil has sufficiently warmed up, in summer the animals appear with the first sun rays. A heat pause at noon is observed during the hot months.

Annual activity: Hibernates (in contrast to *Mesalina rubropunctata*), normally from Nov. into March, but the specimen of the Eglabs was caught in Februar during exceptionally mild weather.

Population density: Extremely low, records are rare.

Herpetological community: 5.4 Erg trophic web. 5.5 profile 9 (Grand Erg Occidental).

Food spectrum: Only small items (in sharp contrast to *Mesalina rubropunctata*): Aphids, ants, mites, Lepismatidae (firebrats), termites, flying insects including butterflies and flies, beetles, subterranean insect larvae.

Predators: Scorpions; *Galeodes* (Arachnoidea: Solifuga); *Varanus griseus*, *Lytorhynchus diadema*, *Malpolon moilensis*, *Psammophis schokari*, *Cerastes vipera*; *Corvus ruficollis*.

Reproduction (GAUTHIER, 1965)

Sexual maturity: Probably at one year.

Clutches: A captive female laid 3 eggs end of April and another three eggs at the end May. They measured: 10-10.5x5-6 mm; and weighed 0.195-0.2 g.

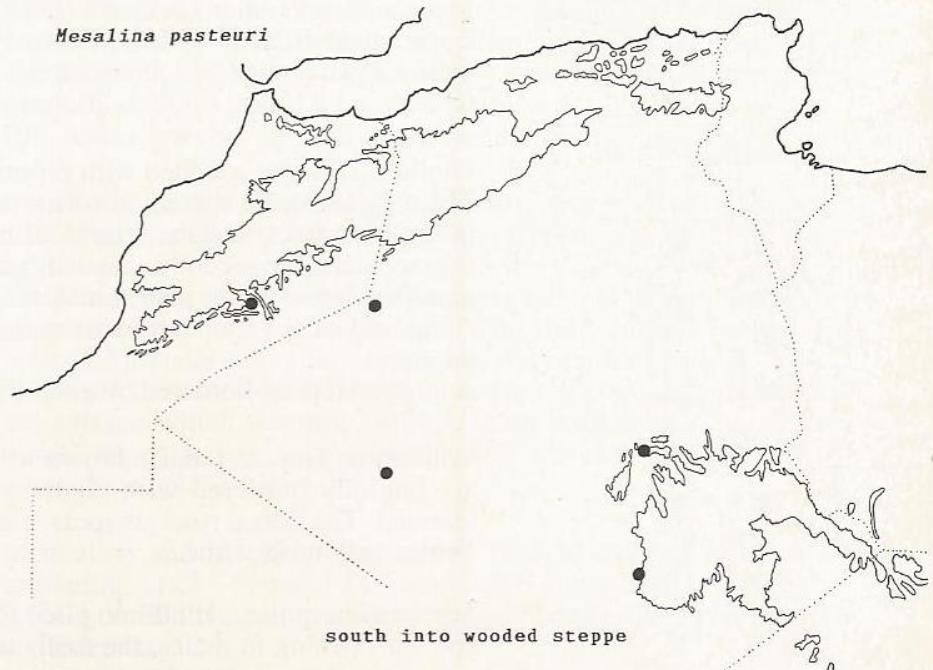
They are white, more oblong than in *Mesalina rubropunctata* and do not agglutinate sand when drying. The eggs were deposited at the end of a tunnel which began under a stone and ended in moist sand at a depth of 30 cm.

Incubation period in Beni Abbès under natural conditions: 45 d.

Hatchlings: SVL	21 mm	tail	38 mm	weight	0.225 g
	24 mm		46 mm		0.245 g

Pattern similar than in adults, but less distinct.

The dominant juvenile grew to an eightfold weight within four months while its lower ranking mate attained only half of it.



Geographic range, Northern Africa: Probably most parts of the SAH with mobile sands: MOR: Tagounite (Draa); ALG: Beni Abbès, Erg Chèch, Amguid, Hoggar.

Other regions: Niger: Agadez (Aïr), Bilma (Kaouar).

Zoogeography: Saharan.

References: BONS (1960b, 1972, 1973), BONS & GIROT (1962b), GAUTHIER (1965, 1967), GRENOT (1976), LAMBERT (1984), PAPENFUSS (1969), PASTEUR & BONS (1960), SZCZERBAK (1975), VERNET & GRENOT (1972).

Mesalina rubropunctata (Lichtenstein, 1823)
Pl. 36/102

Etymology: lat. rubropunctatus: red-dotted.

Synonyms: *Lacerta rubropunctata* Lichtenstein, 1823
Scapteira nebulosa Gray, 1838

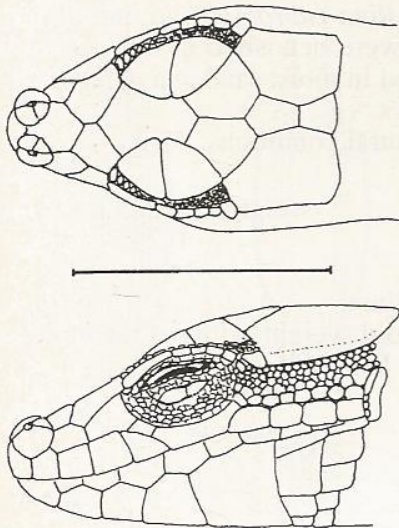
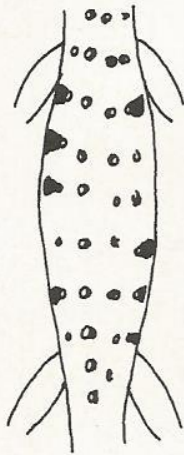
Fig. 1. *M. rubropunctata*

Fig. 2. Dorsal pattern

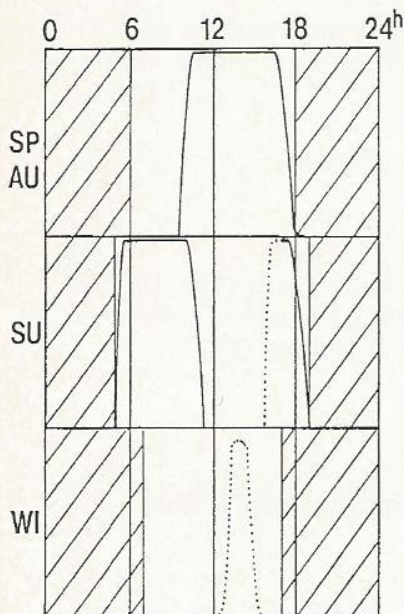


Fig. 3. Activity patterns, Beni Abbès.

Mesalina lichtensteinii Gray, 1838
Eremias rubropunctata Duméril & Bibron, 1839
Mesalina rubropunctata Gray, 1845

e: Red-spotted desert-racer
 f: Érémiás à points rouges, Érémiás à taches rouges
 g: Rotgepunkteter Wüstenrenner

Identification

Morphology: A small grey to brown lizard with striking rows of white spots bordered with dark red, maroon or black looking like „brands“.

Measurements: After LE BERRE (1989): SVL 50-63 mm, tail 87-110 mm.
 2 specimens from SW-MOR, BONS, 1965:
 male SVL 42 mm tail 82 mm foreleg 19 mm hindleg 31 mm
 female 41 mm 70 mm 18 mm 27 mm

Pholidosis: Snout rounded with prominent nostrils; frontal region bulging. The only *Mesalina* species in which the nasals of both sides are usually not in broad contact, and the internasal mostly reaches the rostral. Two large supraoculars, the second separated from the supraciliaries by 2 or 3 rows of granules; interparietal pentagonal, in contact with occipital. Palpebral disk composed of several translucent scales. 5th supralabial normally contacts the eye.

A large anal plate bordered by a semicircle of 2 or 3 rows of small preanals.

Coloration: Grey to reddish brown with mostly 4 rows of white dots which are laterally bordered with contrasting dark spots, often reddish, as if branded. The dorsal rows of spots continue on the anterior part of the tail. Venter yellowish white.

Sexual dimorphism: Hindlimb plied forward extends to between shoulder and ear-opening in males, the axilla or the shoulder in females.

Similar species: Not to be confounded with other species. Besides the very characteristic pattern another peculiarity of *M. rubropunctata* is the contact between rostral and internasal.

Ecology and general behaviour

Habitat: Reg and hamada; the typical lizard for arid stone and rock deserts; the only one in extreme hyperarid areas such as the Tanezrouft.

Refuge: In a natural or self-dug cavity under a rock.

Activity pattern, diel: The degree of activity depends on temperature, but particularly on the intensity of insolation.

Annual activity: No strict hibernation; the animals become active with mild weather and do not pause at noon.

Thermal behaviour: In summer the hottest hours are spent under a rock or in the shadow of a plant.

Population density: In Beni Abbès (MOR) and in LIB very low; a rarity in SW-MOR; in hyperarid deserts single specimens can only be found by intensive search over several days.

Social behaviour: Males kept together in captivity fight intensely until superiority rank is established. Inferiors flee at the slightest sign of an attack and even leave a food item if the superior male appears.

Herpetological community: 5.5 profile 10 (reg).

Food spectrum: Ants and small Coleoptera, especially tenebrionids. In captivity crickets. Attacks every prey it can overwhelm.

Reproduction (data for Beni Abbès from GAUTHIER, 1966)
Sexual maturity: Probably in its second year.

Mating: Beginning in March, latest in June. At this time food becomes very scarce in nature and diel activity is reduced because of the heat, but also captives which are well fed cease to lay eggs.

The male seizes the female at the neck and later changes to the flank, or takes a flank-hold at once. The receptive female arches her hindbody and remains passive when the male has taken hold. The grip is held for hours, and the male even drags the female around. Copulation begins with a tail twist, the female still in an arched posture.

Bite marks are very distinct and generally disappear with the next moult.

Clutches: 2 or 3, rarely 4; eggs 3-7, mostly 4 or 5; of very variable size: 9-12x5-9 mm, weight 0.205-0.330 g. The largest eggs occur in clutches of 4 eggs.

They are milky white, with a rather thin shell, not agglutinating sand. They shrink rapidly in dry surroundings. The first clutches are laid in April, most in May and June, the last ones in the first half of July.

Oviposition: A captive female deposited her eggs in a chamber 40 cm below the surface which was not entirely filled with sand. The female digs a tunnel which in one case opened under a stone. The entrance is closed when the eggs have been laid.

Incubation and hatching: During the first 20 days of incubation an egg measuring 11x7.5 mm and weighing 0.265 g increased to 14.5x9.5 mm and 0.650 g. A relatively high number of eggs, namely 1-2 in an average clutch, are infertile.

Under natural conditions clutches from April hatch after about 64 days, a later clutch needed 42 days.

Hatchlings:

average values:	SVL 26 mm	tail length 44 mm	weight 0.370 g
maxima:	28 mm	47 mm	0.410 g
minima:	24 mm	36 mm	0.260 g

In contrast to adults hatchlings are uniformly greyish beige, lacking the characteristic spots of the adults.

They avoid strong insolation much more than the adults and appear only in the early morning and the late afternoon.

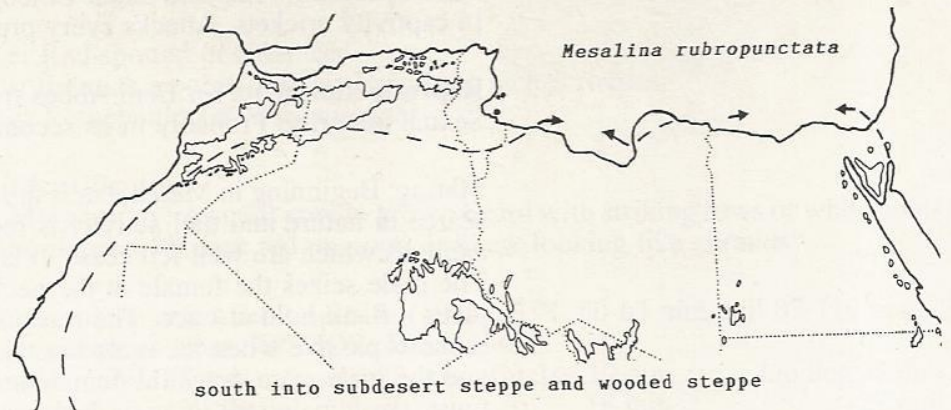
Captive hatchlings can be fed with termite and cricket larvae. Territorial rivalry is very pronounced from the first week on, and inferior specimens show a greatly reduced growth rate, even stopping to gain weight after 2 months.

Those growing rapidly added more than a half to their total length (longest: 116 mm) and quintupled their weight (heaviest 2.1 g) within 100 days. Continuing this growth rate they can attain the measures of reproductive specimens by next spring.

Juveniles are heavily preyed upon by the scorpion *Androctonus amoreuxi* which discovers them under stones at night.

Termite soldiers take such a tenacious hold with their mandibles, even after their death, that mutilated juvenile lizards can be found with hands or feet, even limbs, amputated and a dried termite head still clinging to the stump.

Geographic range, Northern Africa: Desert regions of all countries with exception of TUN.



Other regions: Mauritania, Mali, Niger, Sudan.

Zoogeography: Saharan.

References: BONS (1959, 1973), BONS & GIROT (1962b), LE BERRE (1989), GAUTHIER (1966, 1967), GRENOT (1976), JOHANN (1981), LAMBERT (1984), MELLADO & MATEO (1992), PAPPENFUSS (1969), PASTEUR & BONS (1960), SAUER (1989), SCORTECCI (1935 a,b), SEURAT (1930), SZCZERBAK (1975), WERNER, Y. (1982, 1983), ZAVATTARI (1930).

Mesalina simoni (Boettger, 1881)

Etymology: Dedicated to EUGÈNE SIMON, 1848-1924, French zoologist, who studied crustaceans and spiders of Algeria and Tunisia.

Synonyms: *Podarcis (Mesalina) simoni* Böttger, 1881
Eremias olivieri simoni Bons, 1959
Mesalina simoni Arnold, 1986

e: Simon's desert-racer
 f: Érémiás de Simon
 g: Simons Wüstenrenner

Identification

Morphology: A rare form which is very similar to *M. olivieri* and differs from this species only in some morphological details.

Measurements: Mean SVL of adults about 50 mm.

Pholidosis: Very similar to the closely related *M. olivieri*. Palpebral disk made up of 7-8 opaque or translucent plates which are never bordered with black (fig. 417/2d).

Coloration: Ground colour usually dark maroon with weakly marked light longitudinal stripes. Ventral side intensely grey, in contrast to Moroccan specimens of *M. olivieri* which have well-marked light dorsal lines and a pale grey ventral side.

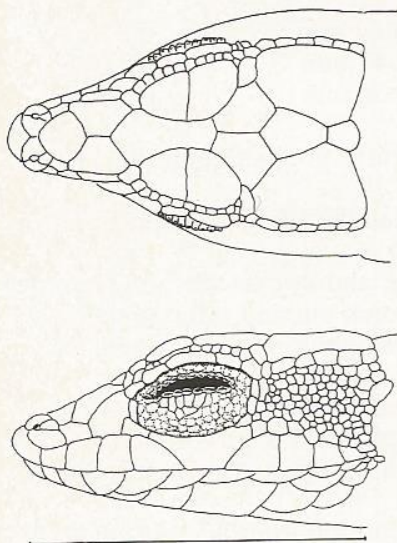


Fig. 1. *Mesalina simoni*

Sexual dimorphism: Tail-base of male very broad.

Similar species: Over its whole range there are no other species of *Mesalina*. From the closely related parapatric *Mesalina olivieri* it can be distinguished by the following characters (PASTEUR & BONS, 1960)

<i>Mesalina simoni</i>	<i>Mesalina olivieri</i>
Palpebral disc opaque or translucent	Palpebral disc more or less transparent
Scales of palpebral disc numerous and small, normally 8 (sometimes 7)	Palpebral disc of 4-6 (sometimes 3) scales of very different size.
Scales of disc not bordered with black	Scales of disc often with dark margins.
Tail-base of males strongly dilated	Tail-base of males feebly dilated
Mean SVL of adults about 50 mm	Mean SVL of adults between 40 and 45 mm
Gular and ventral regions strongly pigmented with dark grey	Gular and ventral regions weakly pigmented with dark grey
Light dorsal stripes bordered with black	Light dorsal stripes not contrasting
Back normally dark maroon	Back dark maroon or grey

Ecology and general behaviour, reproduction:

As this form was frequently confounded with *M. guttulata* or *M. olivieri* exact data on its biology are lacking.

Habitat: Rocky plateaus with scarce vegetation. Its altitudinal distribution exceeds 1000 m (La Chaouia).

Geographic range, Northern Africa (see map *Mesalina olivieri*): Atlantic region from the W Haut Atlas to the coastal plains; apparently allopatric with *Mesalina olivieri*.

Zoogeography: Mediterranean, endemite of NW-MOR.

Systematics: Was considered a subspecies of *M. olivieri*, recently given specific rank as no intermediary forms were found.

References: BOETTGER (1883), BONS (1972, 1973), BONS & GIROT (1962b), LAMBERT (1984), PASTEUR & BONS (1960), SZCZERBAK (1975).

Genus *Ophisops*

Etymology: gr. ophis: snake; ops: eye. The eyelids are fused and the lower one bears a transparent window. In contrast to snakes the eyelids have retained some mobility (fig. 431/2)

e: Snake-eyed lizard
g: Schlangenaug

Pholidosis: Dorsals large, imbricate and strongly keeled, similar to the scalation of Sand racers.

Systematics: The classic view was that two species - *O. occidentalis* in the west and *O. elegans* in the east - are separated by a distribution gap of about 400 km in the Gulf of Sirte (N-LIB).

This standpoint was already doubted by CALABRESI (1923) who argued that both are members of one species as there are what she called intermediary forms in LIB with a reduced series of superciliary granules. Up to our days the question of Libyan specimens remains unsettled.

New light was shed on this question by the discovery of an *O. elegans* isolate in the Djebel Aurès (E-ALG) with both species coexisting in adjoining areas without intergrades (CHIRIO & BLANC, 1993).

Key to the species after CHIRIO & BLANC (1993) applicable for the Aurès region where both species coexist. According to these authors both species may be expected in other mountain regions of E-ALG and TUN. *Ophisops occidentalis* has an extended range in the MAG.

- 1 0-16 supraciliary granules (left and right side together); usually 17 or fewer femoral pores (left and right thigh together); light lateral stripes become inconspicuous beyond the arm pit.: *O. occidentalis* (p. 433). (MOR-Tripolitania, perhaps even in the Cyrenaica)
- 1' 17 supraciliary granules or more on both sides together separate supraciliaries from supraoculars; usually 18 or more femoral pores; light dorsolateral and lateral stripes very conspicuous towards the tail base: (relictary in E-ALG; Cyrenaica, EGY). *O. elegans* (p. 430)

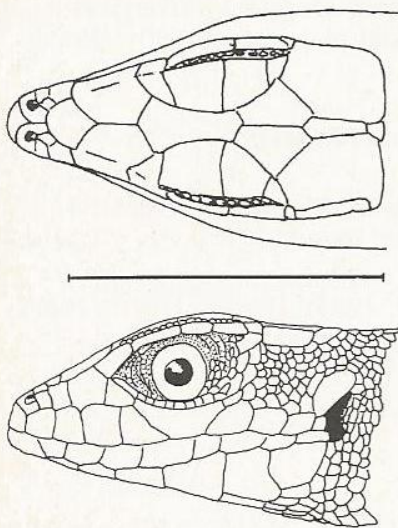


Fig. 1. *Ophisops elegans*

Ophisops elegans Ménétries, 1832 Pl. 36/103

Etymology: The specific name refers to its slender build.

e: Elegant snake-eyed lizard, Ménétries' lizard
f: Ophisops élégant
g: Europäisches Schlangenaug, Europäische Schlangenaugen-Echse

Identification

Morphology: A small and slender lizard with rather large, keeled scales and fused eyelids.

Measurements: Total 190 mm, SVL ca. 60 mm, in females from Israel max. 52 mm. Tail 2.06 (1.75-2.55) x SVL.

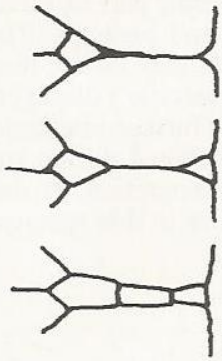


Fig. 1. Variability of occipital scalation

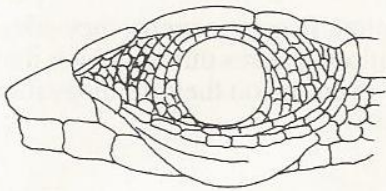


Fig. 2. Limited mobility of the lower eyelid

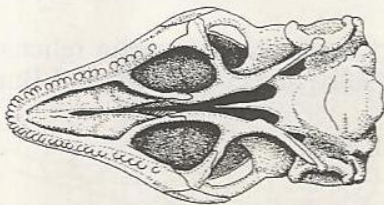
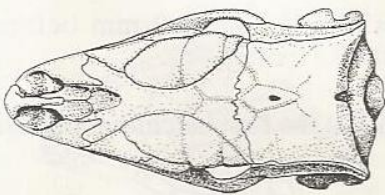


Fig. 3. Skull: dorsal (top) and palatal

Pholidosis (specimens from the Dj. Aurès, E-ALG):

Supraciliary granules of both sides 17 or more; less than 1/6 of the supraocular length is in contact with the supraciliaries.

Dorsals in 18-44 longitudinal rows, on each side 1-3 rows of marginal scales; ventrals in 6 rows. In the two extreme cases the scale total around midtrunk sums up from 6 ventrals, 3+3 marginals and 18 dorsals to 6 ventrals, 1+1 marginals and 44 dorsals.

18 or more femoral pores in 91.5% of the specimens examined by CHIRIO & BLANC (1993).

Ophisops from the Cyrenaica exhibit a remarkable variability of the head pholidosis. Among 42 specimens examined by CALABRESI (1923) the following individual variations were noted:

1. The 2 postnasals are fused
2. The normally rhomboidal frontonasal is divided lengthwise
3. The normally contacting frontonasals are separated by a few scales
4. The interparietal can be very long and in contact with the occipital or it can be divided in two (fig. 1 bottom)
5. The occipital lacks in a few specimens (fig. 1 top).
6. normally 7 supralabials, with the subocular between nr. 4 and 5, alternatively 8 or 9 supralabials, with the subocular between nr. 5 and 6.
7. Number of superciliary granules reduced to 3-4 on each side: specimens from Ghemines (Qaminis), perhaps relictary *Ophisops occidentalis*.

Coloration: Dark brown with striking yellow lines (2 dorsolateral and 2 lateral) from head to tail-base.

Sexual dimorphism: Males with larger heads. Their dark lateral stripes are fractioned into dark patches while females maintain the striped juvenile pattern.

Similar species: A clear separation of both N-AFR forms requires a very close inspection.

Ecology and general behaviour

Information almost exclusively based on material from SE-Europe or SW-Asia.

Habitat: In the Cyrenaica (NE-LIB) in all kinds of habitats - grassland, shrubs and woodland - with exception of the sandy coastal plain: It has few competitors on terra rossa soil and is very common in grassy areas, on bare ploughed fields and in scrub.

In the Dj. Aurès (E-ALG) in drier and more open habitats than *O. occidentalis*: banks of oueds, steppes with *Juniperus thurifera*, dry, short grassland up to 1850 m altitude.

Activity pattern, diel: In summer single specimens are active into dusk and were still observed at 20.00 h (June 10th, Kouf Nat. Park).

Thermal behaviour: Shows the widest temperature tolerance of all reptiles in the Cyrenaica. An active specimen had a body temperature of 29.5°C on June 10th at 11.15 h.

In other parts of its range this species appears earliest in spring, becomes active with the first sun rays in the morning and stays outside even during the hottest hours. They avoid heating by climbing on low plants and panting.

Locomotion: A very fast runner.

Social behaviour: Rival males react to one another at a distance of 1-1.5 m. They approach to a few centimeters, raise the anterior part of their bodies on the elevated forelegs and display with nods and pushups. The same display is directed at other small lacertilians, but as they do not respond in the typical way, the *Ophisops* flees instantly. A conspecific's display releases the high-legged stance, and both separate without further interaction. The white or yellow throat of males which is exhibited during ritualized display apparently acts as a key stimulus in species recognition. No damaging fights have been observed, and broken tails are rare in this species.

Herpetological community: 5.5 profile 12 (Kouf).

Feeding strategy: Active foraging.

Food spectrum: Spiders, Homoptera (Leaf hoppers), Hemiptera (bugs), Nematocera (midges), ants, butterflies.
Captive accept mealworms, small grasshoppers and flies.

Antipredator behaviour: Escape into vegetation. In open country they cover long distances and interrupt fleeing with outlook pauses during which they wave their forelegs alternately. They may even run on their hindlegs for a short distance and try to hide behind stones.

Reproduction

Sexual maturity: Attained in females on reaching a SVL of 45 mm.

Mating: During courtship the male displays in front of the female with elevated forebody (and nods?). The female flees, and the male tries to take hold at her tail-base.

Reproductive period in Israel: May-Aug.

Clutches: Egg numbers increase with SVL of female.

In other parts of its range up to 3 clutches/yr with 3-6 eggs each; Israel: mean 4.0.

Eggs measure 10.5x5.5 mm upon oviposition, 14-25x8-9 mm before hatching. Their volume at oviposition is 0.05-0.11 cm³.

Incubation and hatching: In the Cyrenaica (LIB) the first hatchlings appear towards the end of July.

Hatchlings: SVL 20-22 mm, tail 40-42 mm; dark with 4 white longitudinal stripes.

Geographic range, Northern Africa: Fractioned into three main relictary areas: Dj. Aurès (E-ALG), Cyrenaica (NE-LIB) and N-EGY west of Burg el Arab.

Subspecies: No studies concerning NAF to date.

According to CHIRIO & BLANC (1993) the distribution of this species was fractioned during the last 8000 - 9000 yr when the climate became warmer and drier. *Ophisops occidentalis* expanded eastwards and concurred with *O. elegans* which, in the Dj. Aurès, receded into drier and more open habitats, e.g. the valleys of Oued el Hai, Oued el Abdi, Oued el Abiod and Oued el Arab.

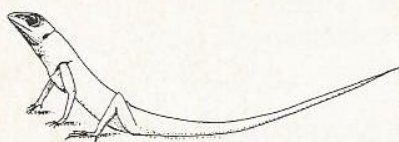


Fig. 1. Outlook posture

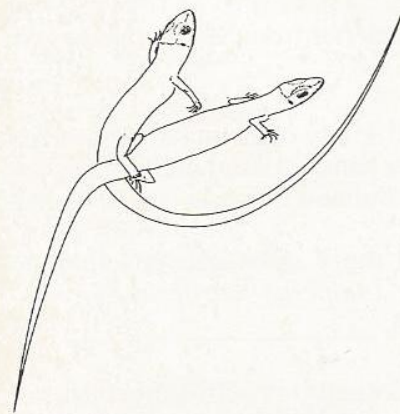
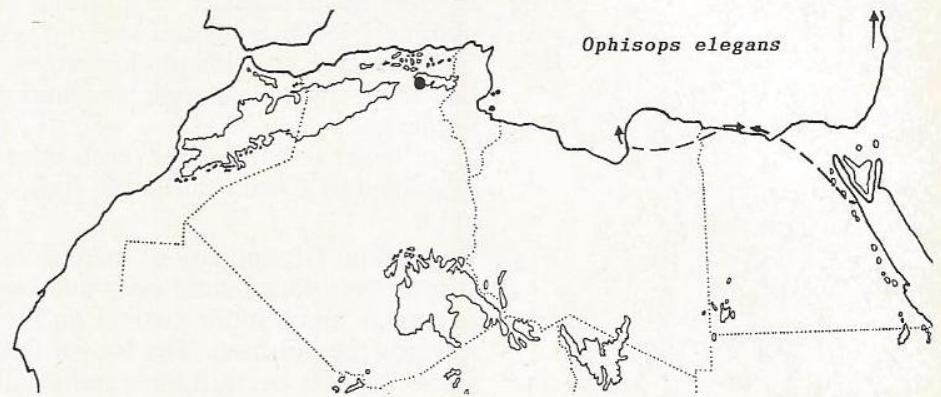


Fig. 2. Mating without bite-hold

Other relictary populations may occur in the Saharian Atlas of SE-ALG.



Other regions: From parts of Greece and the Bosphorus through SW-Asia to Iran and the Caucasus region: Bulgaria, Azerbaidjan, Turkey, Iraq, Jordan, Israel.

Zoogeography: E-Mediterranean.

References: ARBEL (1984), BISCHOFF (1974), DAREWSKI & BEUTLER (1979), EDMUND (1969), ESTERBAUER (1983), FRANKENBERG & WERNER (1992), LE BERRE (1989), SCHLEICH (1987), SEURAT (1930), ZAVATTARI (1930), WERNER, F. (1909).

Ophisops occidentalis (Boulenger, 1887)

Pl. 36/104

Etymology: Lat. occidentalis: Western (the closely related *O. elegans* occurs from E-ALG eastwards).

e: Western snake-eyed lizard
f: *Ophisops occidentalis*
g: Westliches Schlangenauge

Identification

Morphology: A small and slender lizard with rather large, keeled scales and immovable eyelids. Body sides with contrasting light streaks. The striped pattern and the keeled dorsal scalation cause great similarity to young *Psammodromus algirus*.

Measurements: SVL 48 mm, tail 85 mm; pileus 10x5 mm. Tail 1.8 (1.19-2.29) x SVL.

Pholidosis: Frontal with rounded contours, its anterior part much enlarged. 1st and 4th supraoculars very small, undivided; 16 to zero (valid for E-ALG, CHIRIO & BLANC, 1993) supraciliary granules (in contrast to *O. elegans*); More than 1/4 of the supraocular length in contact with superciliaries. Interparietal and occipital small; the latter may be absent. Parietals flat, in

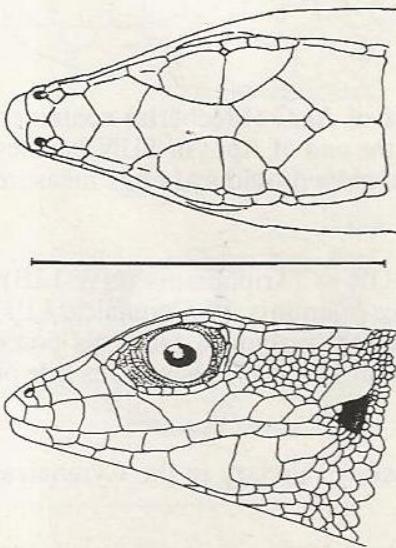


Fig. 1. *O. occidentalis*

contact. Nostril surrounded by 4 scales (sometimes reduced to 3, even 2); 5th (sometimes 6th) supralabial touches eye.

Gular fold and collar indistinct.

Dorsals quadrangular; their strong keels form continuous rows running obliquely towards the tail-base.

Ventrals large, in 6 longitudinal rows, the second ones from the midventral line being somewhat larger; an additional row of lesser size along the lateral borders.

17 or fewer femoral pores (both sides together) in 91.5% of the specimens examined by CHIRIO & BLANC. Toes weakly denticulated.

Coloration: Ground colour maroon or brown with four white longitudinal stripes, two dorsolateral ones and two beginning at the ear opening. The pattern is much more distinct on the anterior body and becomes diffuse towards the tail-base. The brown flanks become dotted in their posterior parts; the dots being lighter and smaller towards the venter. Venter white, sometimes bluish; the lateral ventrals are sometimes spotted. Ventral side of tail white or grey.

Similar species: *Psammodromus* (*algirus* and possibly *blanci*), which have movable eyelids.

Ophisops elegans (both *Ophisops* species occur in the Dj. Aurès, W-ALG); see key *Ophisops* p. 430.

Ecology and general behaviour

Habitat: Upper arid to subhumid zone, even into dense pine forest (CHIRIO & BLANC, 1993); solid open ground with sparse vegetation on the Hauts Plateaux: rocky, stony, pebbled or hard clay; steppe region, on firm grassy ground, Halfa grass plains, rosemary and associated plants; fields. Rock faces and mobile sands are avoided.

Altitudinal distribution up to 1500 m.

Activity pattern, diel: Diurnal.

Locomotion: Very agile.

Antipredator behaviour: Runs into dense vegetation, e.g. cover of high grass or herbs.

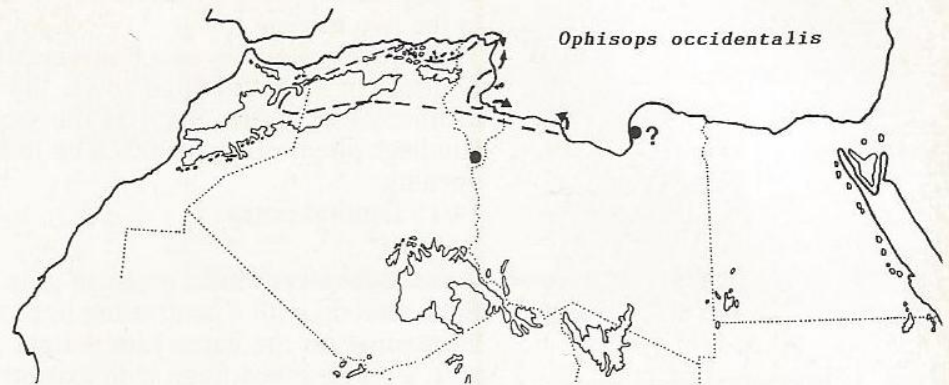
Reproduction: Data very incomplete.

Clutches: Females from the Hauts Plateaux of ALG (Méchéria) contained 2 resp. 4 eggs which are ready to be laid at the end of Apr.; in TUN females contained 3 large eggs end April. Fully developed oviducal eggs measure 10x5 mm.

Geographic range, Northern Africa: E-MOR to ?Tripolitania (NW-LIB); The record of two specimens from Ghemines (Qaminis, W-Cyrenaica, LIB) with only 3-4 supraciliary granules on each side and 16 femorals pores (CALABRESI, 1923) suggests the possibility that relicts of this species live or lived in this region.

Zoogeography: Mediterranean, MAG, possibly relictary in the Cyrenaica, N-LIB.

Systematics: Apparently specifically distinct from *Ophisops elegans*.



References: BLANC (1978), BONS (1972, 1973), BONS & GIROT (1962b), BOULENGER (1891), CALABRESI (1923), CHIRIO & BLANC (1993), DOUMERGUE (1901), LAMBERT (1984), MELLADO & MATEO (1992), MOSAUER (1934), PASTEUR & BONS (1960), WERNER, F. (1909).

Philochortus zolii Scortecci, 1934

Etymology: gr. philos: friend, chortos: grass; other species of this genus live in steppes.

This species was dedicated to signore ZOLIO, president of the Italian Geographic Society, which supported the expedition to Libya during which the first specimen was caught. In literature the name is often misspelled *P. „zolli“*.

Two specimens are known up to our days: (from Elbarkat near Ghat (SW-LIB) and Ajdabia (SW Cyrenaica)).

Identification

General characteristics: After the original description of the type specimen (SCORTECCI, 1934b) from Elbarkat S of Ghat, (LIB).

Morphology: A slender and long-tailed lacertilian with enlarged middorsal scales (fig. 436/1), a bold striated dorsal pattern and a coral-red tail.

Measurements: SVL 47 mm (probably a juvenile; related species up to 85 mm); tail incomplete (in related species about $2 \frac{1}{2} \times$ SVL); forelegs 17 mm; hindlegs 34 mm; head 10.5 mm long, 5 mm high, 6.5 mm wide.

Pholidosis: Supranasals contacting one another in a long suture; internasals much broader than long, larger than the distance between the nostrils; prefrontals widely separated by a subtriangular plate, the base of which is directed forward; parietals a little shorter than the frontal; interparietal in contact with occipital; 6 supraciliaries on each side, separated from the supraoculars by a series of granules. 4 supraoculars, the 1st and 4th fractioned, 2nd and 3rd of about equal size, in contact with the frontal at equal lengths 3 or 4 supratemporals, the 1st one being the largest.

Nostrils separated from 1st supralabial and postnasal by a small margin. 5 supralabials in front of the subocular. 2 loreals, the 2nd being much larger. 4 pairs of submaxillaries, the anterior 3 in contact medially. 25 gulars in the median row; collar of 6 scales.

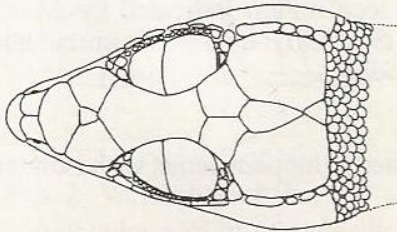
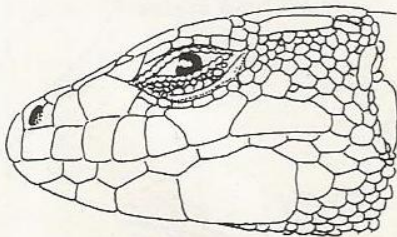


Fig. 1. *Philochortus zolii*

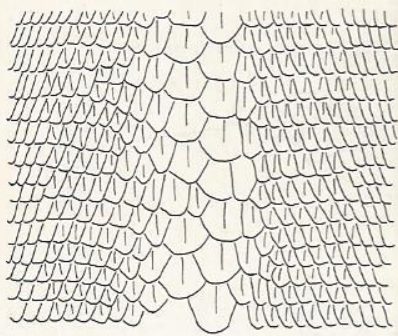


Fig. 1. Middorsal scale rows

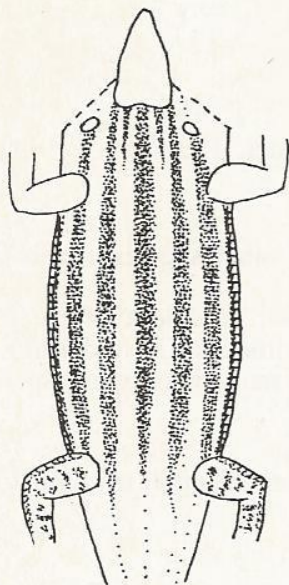


Fig. 2. Dorsal pattern

Dorsals slightly keeled; 4 series of enlarged scales, the 2 vertebral ones larger, those of the forebody smooth, the others distinctly keeled, especially in the two median rows.

35 or 36 dorsal scales in a transversal row at midbody.

Ventrals in 6 longitudinal rows, the 2 median ones smaller, the others distinctly longer than high; 31 transversal rows of ventrals.

Hindlegs plied forwards reach up to half distance between collar and ear-opening.

14/15 femoral pores.

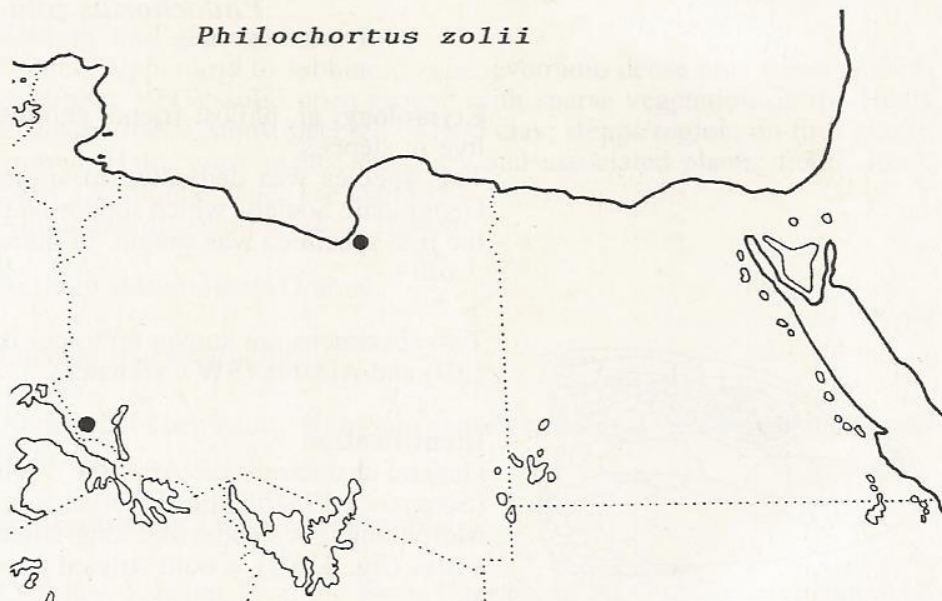
Coloration: Upper head greenish grey, sides of head bluish white.

Back maroon with 6 contrasting light yellowish lines, the two median ones bifurcating on the nape. Limbs light greenish yellow. Lower parts white with a bluish-green tinge with exception of the hindlegs which are yellow below. Tail-base yellowish above, whitish below; rest of the tail brilliant coral-red.

Similar species: Only one species in our region; the separation of the prefrontals seems to be an important specific character of *P. zolii*.

Ecology and general behaviour

Habitat: Oases



Geographic range, Northern Africa: 1. Oasis of Elbarkat (Al Barkat) 8 km S of Ghat, Fezzan, SW-LIB.

2. near Ajedabia, W-Cyrenaica, LIB; the localisation indicated by MARX (1968): "35 miles W of Ajedabia, 10 miles S of Libyan coast" is unrealistic as the Mediterranean lies 15 km W of Ajedabia.

Zoogeography: Relictary in LIB.

The genus *Philochortus* is a highly fragmented Ethiopian genus with isolated Saharan forms.

Systematics: The relationships to *Philochortus lhotzi* from Niger and *P. intermedius* from E-AFR are uncertain.

References: BONS (1973), BOULENGER (1917), LAMBERT (1984), LE BERRE (1989), MARX (1968), SCORTECCI (1934b).

Genus *Podarcis*

The validity and delimitation of this genus of „Wall lizards“ is still in discussion as morphological and biochemical characterizations are partially contradictory.

Podarcis hispanica (Boulenger, 1905)

Pl. 37/105,106

Etymology: lat hispanicus: Spanish.

Synonyms: *Lacerta muralis* var. *vaucheri* Boulenger, 1905
Lacerta (*Podarcis*) *bocagei vaucheri* Mertens & Müller, 1940
Lacerta hispanica vaucheri Klemmer, 1959
Podarcis hispanica „*vaucheri*“ Arnold, 1973

e: Moroccan rock-lizard, Iberian wall-lizard

f: Lézard hispanique

g: Spanische Mauereidechse

The Maghrebian „*Podarcis hispanica*“ is probably a species complex with forms which are very difficult to separate by morphological criteria.

The denomination of all N-AFR forms of this group as „*Podarcis hispanica vaucheri*“ goes back to BOULENGER (1905) who classified specimens from Tangiers as this „variety“. In the following decades this denomination was uncritically applied for the whole MAG.

According to BLASCO (1980) we should refrain from using subspecific denominations. The extreme variability between specimens and populations shown by this author for Spain, and by BLANC (1979) for TUN, supports the view that the taxonomic situation is very complicated.

Identification

Morphology: A relatively small Wall lizard with a flat and pointed head and without a palpebral disk.

Measurements: Very variable between populations; max. SVL in Tlemcen (W-ALG) 60 mm; tail of twice the SVL, pileus 12x5.5 mm.

Specimens from TUN are larger.

Pholidosis: Head sides: 4 (5) supralabials in front of subocular

In a series of 17 specimens from N-TUN, BLANC (1979) found the following variations (number of varying specimens in brackets):

a) Anterior end of the supraciliary granule row extending anteriorly (fig. 2) to the anterior end of the 1st supraciliary (2), to the center of the 1st supraciliary (1), to the posterior border of the 1st supraciliary (12), to the posterior end of the 2nd supraciliary (1), to the anterior border of the 3rd supraocular (1).

b) The interrelations between the interparietal and occipital may be as follows (fig. 438/1):

both scutes in contact (14),

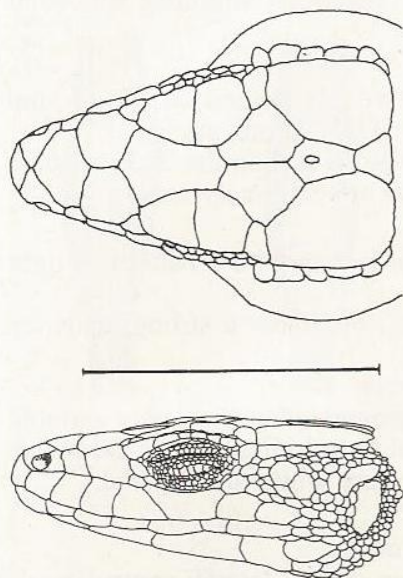


Fig. 1. *Podarcis hispanica*

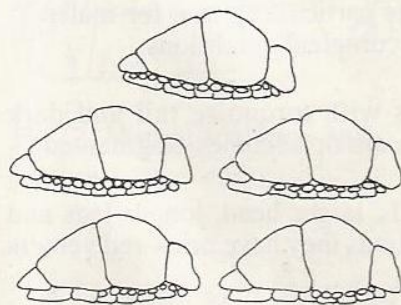


Fig. 2. Variability of the supraocular row of granules in TUN. See text opposite and next page

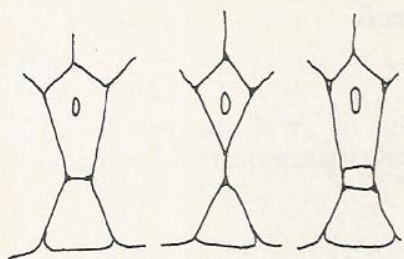


Fig. 1. Relations of interparietal and occipital

both separated by the suture between the parietals (1),
both separated by a small scute (2).

c) The relations between rostral and internasal vary as follows (fig. 2):
both are separated by the supranasals (16),
both are in contact (1).

d) Relations of internasal and frontal (fig. 3):
both are separated (15),
both are in contact in a point (1),
both are in contact with a suture (1).

e) The supralabial following the postocular (nr. 6) has a straight or convex upper margin (fig. 4). In the latter case the posteriorly adjoining subocular is relatively small.

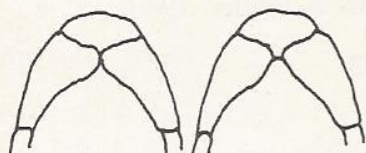


Fig. 2. Contacting and separated supranasals

Dorsals granular, very small, smooth or weakly keeled, 40-68 around midbody. In Oran the lowest value is 55, in TUN counts are lower. Ventrals in 6 rows, the 1st and 3rd being narrower than the 2nd. In some specimens from Tangiers the 2 median rows are extremely narrow.

Coloration: Ground colour green, yellow or brown with a pattern of light and dark lines.

These are distinct in juveniles and females, but show a strong tendency towards reticulation in males.

In the var. *unicolour* the pattern lacks entirely.

In specimens from N-TUN (BLANC, 1979) ground colours are very variable from green and black with vivid blue lateral lines to light beige and bluish grey with fine brownish lines. Venter from pure white to brick-red.

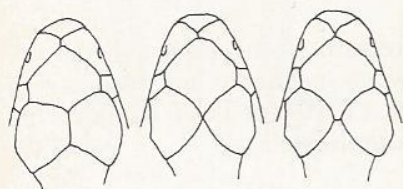


Fig. 3. Contacting and separated prefrontals

The basic pattern shows three types of elements:

1. 7 light longitudinal lines (middorsal, laterodorsal, lateral, ventrolateral)
2. 2 rows of ocelli on each side of the light lateral line
3. dark markings: 2 dark stripes bordering the light dorsolateral stripe; 3 rows of black dots on the (middle and) lateral ventrals (fig. 439/2); in rare cases there may be a middorsal line which is accompanied by some nuchal dots.

Stripes become reticulated with age. This is particularly true for males. Colours are evidently not correlated with ecological conditions.

Colour change, developmental: Juveniles with turquoise tail and dark vertebral stripe which subsequently disappears or becomes fragmented.

Sexual dimorphism: Males with larger SVL, larger head, longer legs and more distinct femoral pores. In some populations they have brick-red venters with striking blue marginal shields.

Similar species: Can possibly be confounded with the striped form of *P. perspicillata* (*pellegrini*) as both may live on rocks. The palpebral disk allows undoubted the identification of *P. perspicillata*, though.

In the Haut Atlas a confounding of juvenile *P. hispanica* and adult *Lacerta andreanskyi* is possible (see key p. 403).

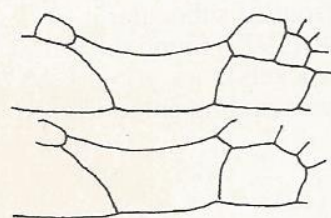


Fig. 4. Supralabial following subocular with straight/convex border

Ecology and general behaviour

Habitat: Less dependent from water and rocks than its relative *P. perspicillata*, but preferring the vicinity of watercourses.

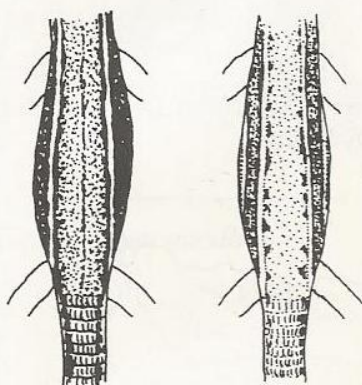
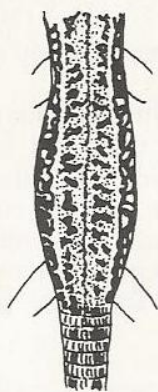


Fig. 1. Male (top) and two females

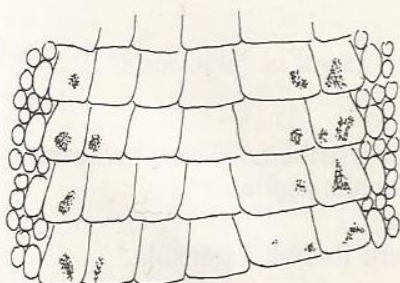


Fig. 2. Ventral sculation and pattern

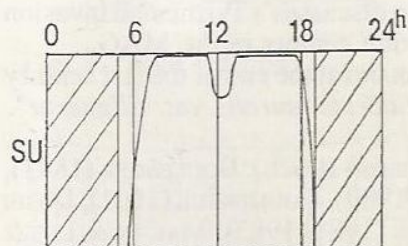


Fig. 3. Activity pattern, Dj. Toubkal (Haut Atlas)

On mountain slopes with debris and boulders, especially with accumulations of soil between them; rock outcrops on alpine meadows; tree trunks; in TUN in the humid zone with *Quercus faginea* (Zeen oak) woods: Open woods with large boulders, on clearings, in stone rain gutters (gaviones) near roads. In semiarid regions on rock faces.

One population at 1000 m altitude in the Moyen Atlas near Sefrou lived on a cereal field and the lizards hid and retired under small and even tiny stones on the ground.

Doumergue (1901) mentions the curious fact that a population from Oran „digs tunnels like *Chalcides ocellatus*“.

In the Haut Atlas observed at 3100m, common between 1700 and 2200 m; together with the gecko *Quedenfeldtia trachyblepharus* one of the N-AFR reptiles with the highest altitudinal distribution.

Activity pattern, diel: In summer some activity up into dusk.

Annual activity: At low elevations activities are mainly restricted to spring and autumn. During the summer only hatchlings and yearlings forage intensely.

Many, but not all populations are active in winter, e.g. in the Rif (Chechaouen) or the Atlas of Blida (ALG).

Thermal behaviour: Shuttling heliotherm. A population living on a northern slope in the Moyen Atlas started its activities around noon. In the Haut Atlas they are active close to snow fields.

In Spain they form winter aggregations in localities with especially favourable microclimates allowing intensive basking.

Locomotion: Climbing excellently, but less strictly adapted to a life on vertical rock faces than the following species. *P. hispanica* apparently spends more time among the vegetation.

Population density: Very high in favourable places .

Social behaviour: Not very aggressive towards conspecifics. Spanish males have small territories and do not defend them vigorously.

Individual distance is especially reduced in winter when the lizards can be seen basking in groups.

Herpetological community: 5.5 lizard communities; profiles 1 (Lixus), 2 (Zâd), 4 (Oukaimedene), 5 (Rheraia).

Food spectrum: In Spanish specimens (prey in order of commonness: spiders, dipters, aphids, beetles, especially weevils (*Curculionidae*), ants, grasshoppers.

Prey size ranges between 1 and 25 mm (mostly 2-5 mm).

Predators: *Coluber hippocrepis*, *Coronella girondica*, *Malpolon monspessulanus*, *Vipera latastei*; ext. *Athene noctua*, *Bubo bubo*, *Strix aluco*, *Tyto alba*, *Mycteria ibis*, *Ciconia ciconia*, *Milvus milvus*, *Falco naumanni*, *Falco tinnunculus*, *Lanius excubitor*, *Pica pica*.

Antipredator behaviour: Fleeing distance from humans only 1.5 m or less, even allowing a close-up photograph.

Specimens from El Hajeb (N-MOR) living along a small brook fled through the water when approached. Those living at high altitudes flee into thorn cushions (*Ptilotrichum spinosum*, *Bupleurum spinosum*, *Cytisus balansae*, *Ononis atlantica*, *Astragalus ibrahimianus*).

Reproduction: Spermatogenesis of mixed type

Mating: (observations in Spanish specimens) The female is only motivated to copulate for a few days.

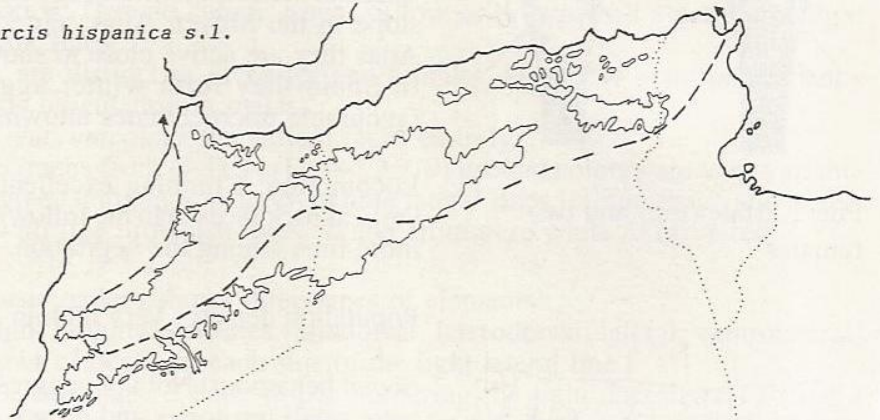
The male display preceding copulation may be omitted if both mates are familiar with each other. The female answers with nods and sometimes also with treteln. This appeasement behaviour is reduced at the peak of female receptivity. The male takes a bite-hold at the tail, sometimes also on the neck and then shifts to the flank. Genital contact was observed to last from 5.5 to 59 min. Male holds female with forelegs during copulation. Normally other attempts to copulate are rejected for some time after copulation.

Oviposition 13 days after mating. Eggs elongate, 11.7-12x 7 mm. 2-3 clutches per yr with up to 5 eggs each.

Incubation: In 63 d at 20-30°C.

Hatchlings: SVL 23-25 mm, tail 28-43 mm. In Oran the first hatchlings appear in July, in Tlemcen (W-ALG) in beg. August. Juveniles stay predominantly on the ground.

Podarcis hispanica s.l.



Geographic range, Northern Africa: Widely distributed in the Mediterranean part of the MAG, mainly in humid mountain regions.

Other regions: Southern France and southern Iberian Peninsula.

Zoogeography: W-Mediterranean.

Systematics: The traditional classification of this lizard as *Podarcis hispanica vaucheri* suggests a general close relationship with Iberian forms and a southward immigration across the Gibraltar passage. This view is considered one-sided by MATHON (1979) who discusses a Tyrrhenian invasion route as well, with perhaps several speciation centers in the MAG.

This view was already pronounced by CAMERANO at the end of the last century who identified specimens from Tunis as „*Lacerta muralis* var. *tiliguerta*“.

References: BONS (1972, 1973), BONS & GIROT (1962b), BOULENGER (1891), BONS & SAINT GIRONS (1980), DESTRE et al. (1989), DOUMERGUE (1901), DUSEJ (1993), JOGER & BISCHOFF (1989), MALKMUS (1981, 1983), MARTIN & LOPEZ (1990), MATEO (1990), MATHON (1979), MELLADO (1985), MELLADO & OLMEDO (1987), PASTEUR & BONS (1960), SAINT GIRONS (1953), SALVADOR (1985b), SCHÄTTI (1993), STEMMLER (1965a,b,c, 1966a,b, 1972a), STEMMLER & HOTZ (1972), VALVERDE (1967), VERBEEK (1972), WERNER, F. (1929, 1931a,b).

Podarcis perspicillata (Duméril & Bibron, 1839)

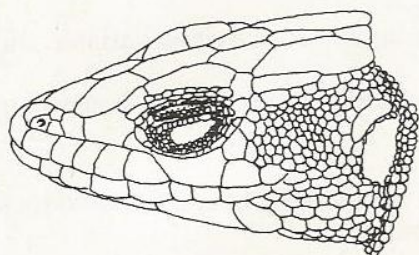
Pl. 37/107; fig. 66/1

Etymology: lat perspicillum: spectacles.Synonyms: *Lacerta perspicillata* Duméril & Bibron, 1839*Podarcis perspicillata* Arnold, 1973

e: Moroccan rock lizard

f: Lézard à lunettes

g: Brilleneidechse

Fig. 1. *P. perspicillata***Identification**

Morphology: A very small lizard with a SVL of about 6 cm. It appears extremely „nervous“ and climbs excellently on steep rocks. Its conical head is rather thick and high in the temporal region. The transparent palpebral disc in the mobile lower eyelid is a unique trait among lacertilians of the region.

Measurements: Average SVL 59.8 mm, tail about 1.5x SVL; total up to 170 mm; the subspecies markedly differ in length (see coloration).

Pholidosis: A series of granules between supraoculars and superciliaries; nostril not in contact with rostral; three nasals, two of them posterior to nostril; five supralabials in front of subocular.

Collar of 9-11 scales (fig. 373/1bottom).

Dorsals: 54-56 in one transversal row at midbody. **Ventrals** in 10-12 rows.

Coloration: Three main colour morphs (fig. 442/1), which occur in separate populations with almost no intergrades and different average sizes. The distribution pattern is influenced by elevation and aridity, but more complicated as suggested by the following chart (see also subspecies):

1. small light spots or uniformly bronze; average SVL 51mm: Arid regions of MOR, coast of ALG (*Podarcis perspicillata perspicillata*)
2. two light longitudinal stripes; average SVL 54mm: Moyen & Haut Atlas, MOR (*Podarcis perspicillata pellegrini*)
3. light spots on darker ground; average SVL 61 mm: Western Atlas slopes (*Podarcis perspicillata chabanaudi*).

In the Moyen Atlas the ocellated form lives below 1200 m, the striped one above.

In the Haut Atlas an intermediary form lives between 1200 und 2000 m. Below that region the lizards are (as a rule?) ocellated, above they are striped. But the ocellated form also lives on the plateau of Okaimeden at 2600 m altitude!

Sexual dimorphism: General differences as in most lacertilians: Males with longer and wider heads, thicker cloacal region, fewer transversal rows of ventrals (29-32 vs. 31-36 in females).

Similar species: The striped form (*pellegrini*) may have some resemblance with *Podarcis hispanica* at the first glance, but this species has a flatter head and of course no transparent palpebral disc.

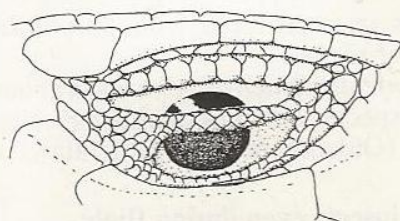


Fig. 2. "Spectacle" in lower eyelid

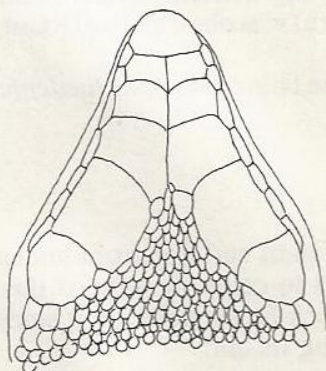


Fig. 3. Gular region

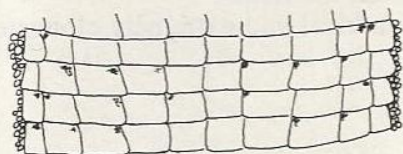


Fig. 4. Ventral scalation and pattern

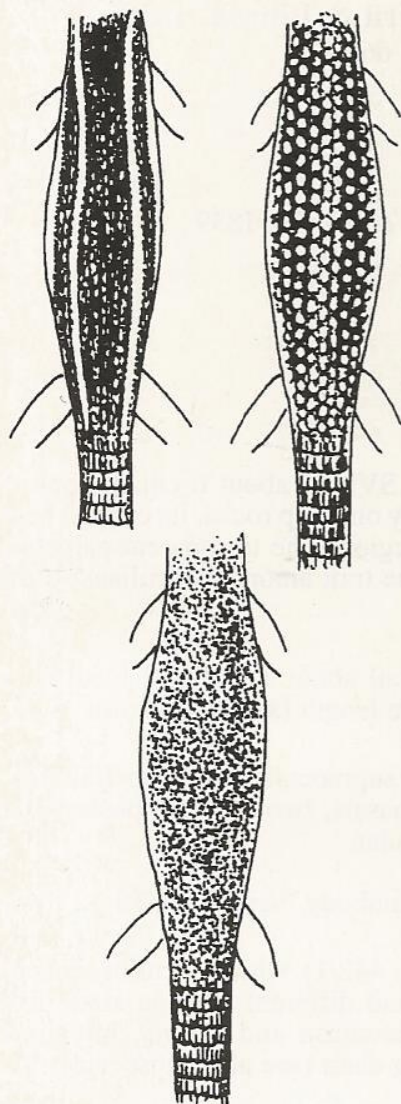


Fig. 1. Subspecies *pellegrini*, *chabanaudi*; *perspicillata* uniformly bronze

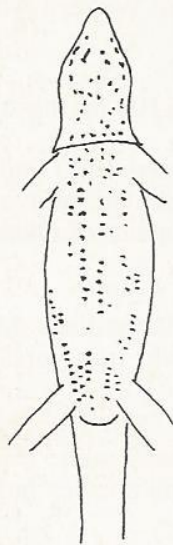


Fig. 2. Ventral pattern (Okaimeden, MOR).

Ecology and general behaviour

Habitat: Lacks in arid regions, needs a relatively high air-humidity and prefers the vicinity of water.

Vertical rock faces with scant vegetation; fissured rock outcrops, large boulders, slopes with debris, stone walls, quarries, exceptionally even on trees up to their tops (e.g. Olive trees) or among bushes, e.g. near a mountain brook.

Activity pattern, diel: diurnal. During the hot months activity is limited to the morning hours and ceases about 10.00 h. A second activity peak may last into dusk. see also fig. 66/1.

Annual activity: No obligatory hibernation; winter activities variable and influenced by weather conditions.

Some active specimens can be observed during December and January; in February they become more frequent.

Thermal behaviour: Extensive basking in the morning hours. Exposed rock faces warm up relatively quickly after sunrise,

Locomotion: An excellent climber; one of the lacertilians which are best adapted to running on vertical bare rocks.

Social behaviour: Severe hostile interactions are evidently rather rare and short.

Herpetological community: Moyen Atlas on rock faces with *Tarentola mauritanica*; *Chalcides ocellatus* on foot of rocks.

Haut Atlas in colonies together with *Quedenfeldtia trachyblepharus* in about equal numbers; in the same biotope single-species colonies of either species occur. 5.5 lizard communities; profiles 4 (Oukaïmedene), 5 (Rheraïa).

Feeding strategy: Very skilful in catching insects even during flight.

Food spectrum: Small insects: Ants, caterpillars, flies, small moths.

The need for water may be quenched by eating berries. A lizard carrying the black fruit of *Rhamnus lycioides* (buckthorn) was observed by DOUMERGUE (1901).

A captive is highly suspect of having eaten the tails of several *Quedenfeldtia* geckos.

Predators: *Malpolon monspessulanus*.

Antipredator behaviour: They are extremely alert and flee from humans at a distance of 1.5-5 m, but are very difficult to catch in spite of this low fleeing distance. They run out of reach on rock faces; defecate if seized. It is very difficult to catch one without breaking its tail.

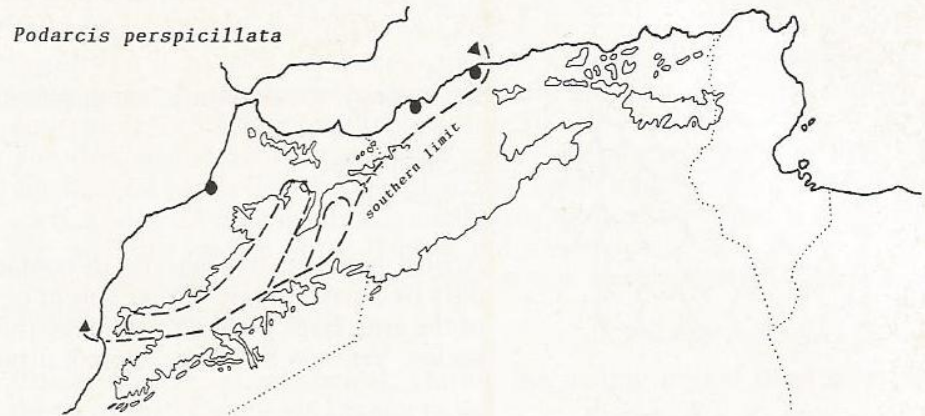
Reproduction: Spermatogenesis of mixed type.

Mating: Females show traces of bite-holds on the flanks.

Clutches: In Oran mostly in June: 2-3 cylindrical and extremely elongate eggs, 15x6 mm.

Hatching: In Oran in August.

Hatchlings: SVL 23 mm, tail 34 mm, turquoise blue.



Geographic range. Northern Africa: Humid mountain regions of MOR and on the coasts of MOR and W-ALG. Often occurs in isolates, e.g. on single rocks.

Other regions: Introduced to Menorca/Baleares where they occur only near Ciudadela. Records from Almería (S-Spain) need to be reaffirmed as it is unknown if they are from a viable population.

Zoogeography: SW-Mediterranean.

Systematics: Because of its unique morphological traits an own subgenus *Scelarcis* was proposed for this species. Closer related with the Madeiran *Podarcis dugesi*.

Subspecies: In contrast to the „classic“ subspecies concept the following forms can partially occur sympatrically or at different elevations in the same region (see colour pattern).

1. *Podarcis p. perspicillata* (Duméril & Bibron, 1839): Algerian Coast, high plateaus; introduced to Menorca.
2. *P. p. pellegrini* (Werner, 1929).
3. *P. p. chabanaudi* (Werner, 1931).

References: BONS (1968, 1972, 1973), BONS & GIROT (1962b), BOULENGER (1891), DOUMERGUE (1901), MALKMUS (1983), MELLADO (1985), MELLADO & MATEO (1992), PASTEUR & BONS (1960), RICHTER (1986), SAINT GIRONS (1953), SALVADOR (1985b), SEURAT (1930), STEMMLER (1966b), STEMMLER & HOTZ (1972), WERNER, F. (1929, 1931a,b).

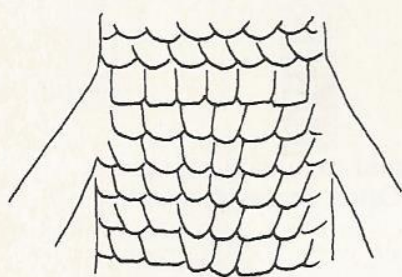
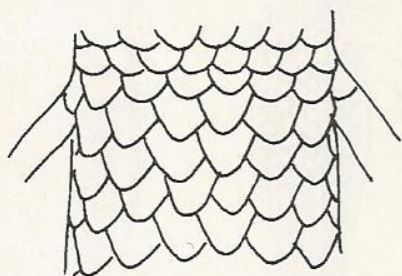
Genus *Psammodromus*

Fig. 1. Ventrals of *P. algirus* (top) and *blanci/microdactylus*

Etymology: gr: psammos: sand, dromos: course.

e: Sand racer
g: Sandläufer

Nostril between two nasals, in contact with the first labial or separated only by a narrow rim. Collar absent or feebly marked. A short fold in front of the arm. Back covered with large rhombic, strongly keeled and imbricate scales. Ventrals imbricate. Femoral pores present.

Key to the forms:

- 1 Ventrals equal, rounded and strongly imbricate (fig. 1 top): *P. algirus* (p. 444)
(common in the MAG)
- 1' Ventrals rounded polygonal, weakly imbricate, the 2 median rows smaller (fig. 1 bottom): *P. blanci-microdactylus* complex (p. 447)
(relictary areals).

***Psammodromus algirus* (Linnaeus, 1758)**

Pl. 38/108

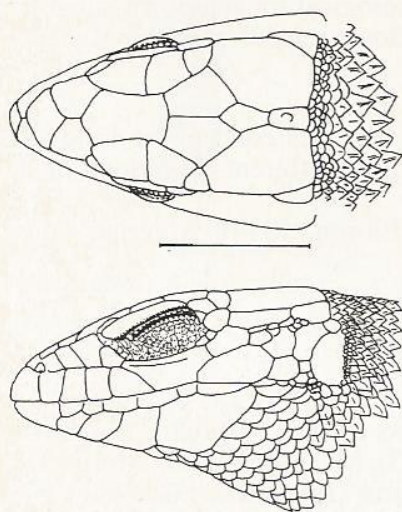


Fig. 2. *Psammodromus algirus*

Etymology: lat. algirus: Algerian.

Synonyms: *Lacerta algira* Linnaeus, 1758
Tropidosaura algira Boettger, 1874
Psammodromus algirus Boulenger, 1887

e: Algerian sand racer, Large psammodromus
f: Psammodrome algire, Lézard des sables
g: Algerischer Sandläufer

Identification

Morphology: A slender lizard of medium size, with large imbricate, keeled and pointed scales; head weakly set off from neck, tail extremely long.

Measurements: Max. SVL 80 mm, tail 230 mm, foreleg 24.7 mm, hindleg 39 mm. Tail 2.6-3x SVL.

Pholidosis: Frontal rather narrow and angular; parietals bent down towards the temporal region, separated by the occipital and interparietal.

5th (rarely 4th or 6th) supralabial in contact with eye.

Gular scales imbricate, continuously merging into ventrals; no gular fold, no trace of a collar (fig. 445/1), a short fold in front of the arm.

Dorsals large and long, their strong keels forming subparallel longitudinal lines (fig. 373/2 above). No sharp delimitation between dorsals and ventrals, which are rounded and unkeeled. 30-36 scales around midtrunk.

13-21 femoral pores on each side, reaching the knee (fig. 445/2).

Ventrals subequal, a little broader than long, roundish hexagonal, strongly imbricate (fig. 1 top).

Subdigital lamellae smooth, tubercular or feebly bicarinate. Upper caudal scales resembling the dorsals.

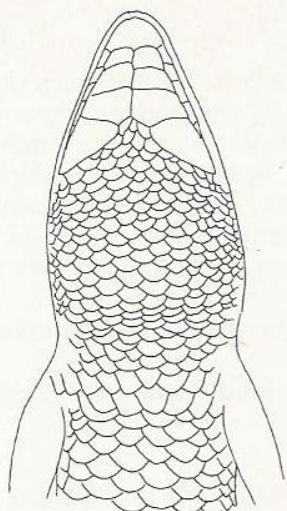


Fig. 1. Gular region

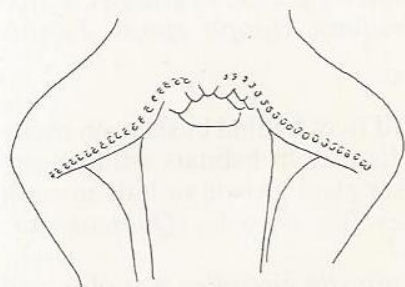


Fig. 2. Femoral pores

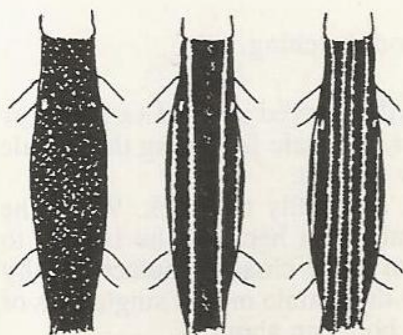


Fig. 3. Pattern types, not subspecies: "ketamensis", "normal", "nolli"

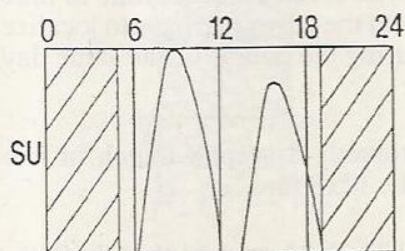


Fig. 4. Activity pattern, Dj. Toubkal, Haut Atlas (MOR)

Coloration: Light brown, bronze to olive above with two or four golden to bluish dark-edged dorsal streaks which can be missing. The latter two forms have been described as special „races“, namely „nolli“ (4 stripes) and „ketamensis“ (unicoloured). They represent different genotypes which are not typical for distinct populations (fig. 3).

The dark bands between the light stripes are not spotted with dark; the dorsolateral bands bear 1-3 bluish axillar ocelli which comprise 4-5 scales each. The number of ocelli augments with age, and they form a row which can reach the middle of the flank in old specimens.

Venter nacreous whitish; lower side of tail whitish in the Oran region, orange or reddish in TUN.

Colour change, physiological: During the mating period head sides and throat of males are vivid orange to red.

Sexual dimorphism: Male with a pale blue ocellus above the shoulder, sometimes followed by one or two more.

Similar species: Juveniles resemble *Psammodromus blanci* and *Ophisops occidentalis* which may live in the same biotope. *O. occidentalis* are identified by their transparent palpebral disk, *P. blanci* are shorter and lack the red ventral side of tails.

Osteology: The skull is heavily incrustated with osteoderms, which close the temporal region in old males.

Ecology and general behaviour

Habitat: Humid and semiarid regions.

An ubiquitous which lives in a great variety of biotops provided that there is enough insolation, even without any cover; on sand, but prefers hard soil and rock; pine forests with undergrowth, meadows, Halfa grass steppes, bushes and low plants, near small streams, rarer on open ground; *Opuntia* hedges (TUN); juveniles even on walls (together with *Podarcis hispanica* "vaucheri", *Tarentola mauritanica*). The only reptile species in degraded coastal macchia of N-TUN.

They do not avoid the vicinity of man, dwell around houses in villages, in gardens and fields.

Vertical distribution: In the Haut Atlas up to 2400 m.

Activity pattern, diel: Where *P. algirus* and *P. blanci* live together the former remains active around noon in early summer. Activity may last into dusk during the hot season.

Annual activity: Hibernates relatively long: Oran Nov. to Feb./March. In southern Spain juveniles remain active during winter.

Thermal behaviour: Shuttling heliotherm, basks on stones and shrubs; very tolerant to heat.

Locomotion: Very agile; dart over open ground, dig in the sand, climb on shrubs, tree trunks and lower branches.

Population density: One of the most common reptiles in N-AFR.

Social behaviour: During the reproductive period couples living together were observed in the Moyen Atlas. Fighting males squeak loudly.

Herpetological community: 5.5 lizard communities; profiles 1 (Lixus), 2 (Zâd), 4 (Ifrane), 5 (Rheraia).

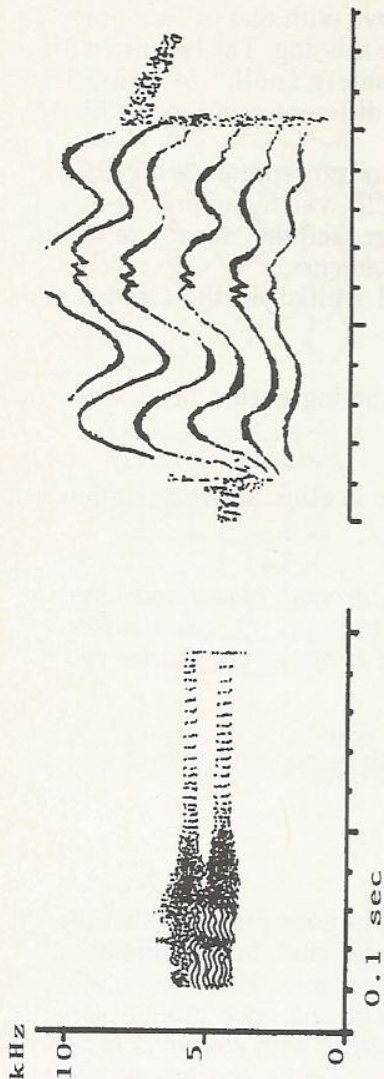


Fig. 1. Squeaking (top) functions as a distress call if seized, during rival combats, and mating. Croaking (bottom), which may end in a click, can precede or follow a squeak

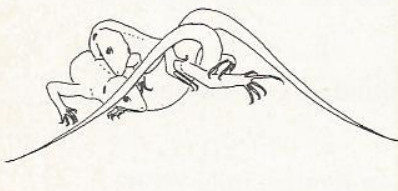


Fig. 2. Mating

Feeding strategy: Mainly active foraging on ground, rock or lower branches.

Food spectrum: (ext. VALVERDE, 1967) spiders (*Lycosa*, Thomisidae); insect larvae (Geometridae, other Lepidoptera, Diptera, Tenebrionidae); Thysanura (*Lepisma*), Hemiptera (Reduviidae), Orthoptera (Ephippigeridae, Acrididae, Gryllidae), Hymenoptera (Apidae, Formicidae, Sphegidae), Lepidoptera (Pyralidae, Noctuidae), Diptera (Tipula, Culicidae, Muscidae), Coleoptera (Curculionidae, Chrysomelidae, Nitidulidae, Tenebrionidae, Carabidae, Coccinellidae, Cerambycidae, Brucidae); prey size 3-10 mm, soft prey like caterpillars 15 mm.

In ALG *Ophisops occidentalis* living in the same herpetological community are eaten.

Conspecific juveniles are attacked. They squeak loudly and were released in 4 of 5 cases observed (MELLADO, 1985).

Predators: numerous birds of prey and snakes; ext. *Coluber hippocrepis*, *Coronella girondica*, *Malpolon monspessulanus*, *Vipera lebetina*; *Athene noctua*, *Bubo bubo*, *Otus scops*, *Tyto alba*, *Mycteria ibis*, *Burhinus oedicephalus*, *Ciconia ciconia*, *Circaetus gallicus*, *Circus pygargus*, *Falco naumanni*, *Falco tinnunculus*, *Milvus milvus*, *Upupa epops*, *Lanius excubitor*.

Antipredator behaviour: If possible the lizard flees behind bushes, on rocky ground directly into a hole, or hides in a fissure. In habitats without any cover they dart several 100 m towards denser plant growth or hide in earth fissures. In the Moyen Atlas (Sefrou) they flee on oaks (*Quercus ilex*; STEMMLER, 1966) hiding behind the trunk.

Seized lizards gape, bite, and squeak. A *Coronella girondica* was observed to let go a squeaking *Psammotriton algericus*. Spiny scales hinder snakes to eat them from behind

Reproduction

Sexual maturity: Probably in the 2nd yr from hatching.

Mating: During the mating period (end April observed in N-ALG, BISCHOFF & IN DEN BOSCH, 1991) pairs move together, the male following the female during foraging and basking, seeking body contact.

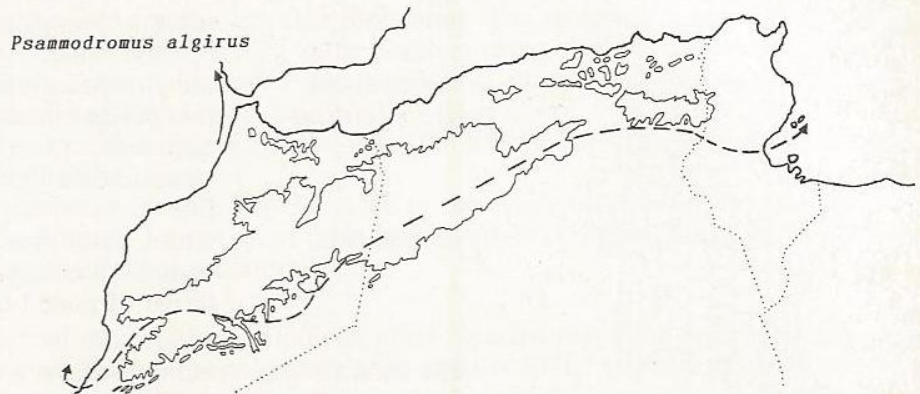
He tries to take hold on her tail or body, especially the neck. When the fleeing female is seized she drags the male with her until he is able to mount on her back. Mating with neck-bite hold; cloacal contact usually lasts 5-10 (sometimes 3-5) min. Eventually the female moves single toes or tretsels during copulation. After separation both run about.

Oviposition: 15-20 d after copulation. 1 d before egg-laying the female begins to dig at moist places. The laying site is covered with soil by the female turning her head off the site and scratching with fore- and hindlegs or turning towards the clutch and pushing with forelegs. From time to time the female puts her snout 1/2 to 1 cm deep into the cover (perhaps to localize the clutch). The laying site is monitored during the course of the same day and then left.

Clutches: Of 3-11 eggs; Oran in May, probably a second clutch in late summer. Eggs globular and relatively small: 12x8 mm.

Hatchlings: Appear not before July. Tail relatively short, less than 2x SVL, red on lower side or all over.

Geographic range, Northern Africa: MAG to the SAH.



Other regions: Iberian Peninsula save extreme N; Mediterranean margin of France.

Zoogeography: W-Mediterranean.

Subspecies: Several forms were described, but are now considered as mutants which can appear in different populations (see colour):

P.a. doriae Bedriaga, 1886, melanistic (Galitone, Galita Island).

P.a. nollii Fischer, 1887, with 6 light stripes Touggourt, W-ALG).

P.a. ketamensis Galan, 1931 (Ketama Valley, Rif Mts., MOR).

References: AL-SADOON & SPELLERBERG, 1985), BISCHOFF & BOSCH, IN DEN (1991), BLANC (1978), BÖHME (1979), BÖHME et al. (1985), BONIS (1972, 1973), BONIS & GIROT (1962B), BOSCH, IN DEN (1986), BOULENGER (1891), DESTRE et al. (1989), DOUMERGUE (1901), DUSEJ (1993), FISCHER (1887), LANZA & BRUZZONE (1959), LE BERRE (1989), MALKMUS (1982, 1983), MARTIN & LOPEZ (1990), MELLADO (1985), MELLADO & MATEO (1992), MOSAUER (1934), PASTEUR & BONIS (1960), PLEGUEZUELOS & MORENO (1990), SAINT GIRONS (1953), SALVADOR (1985), SEURAT (1930), STEMLER (1965a,b,d, 1966a,b 1972c), STEMLER & HOTZ (1972), VALVERDE (1967), WERNER, F. (1929, 1931a,b).

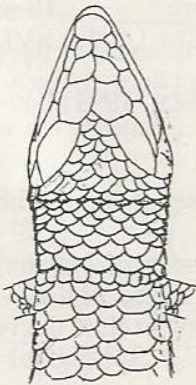


Fig. 1. *P. blanci* with gular fold and distinguishable collar

Psammodromus blanci-microdactylus group

The following two forms present some difficulties as the description of a specimen from Debdou, NW-MOR, showing key characters of both (PASTEUR & BONIS, 1960) suggests that *blanci* and *microdactylus* could be treated as subspecies. Evidently *microdactylus* has become extremely rare since the beginning of this century, and nowadays both forms only exist in small isolates. No more intergrades were found in the last decennia.

For practical reasons we treat both forms as sibling species here.

DOUMERGUE (1901), as well as PASTEUR & BONIS (1960), have emphasized the fact that the colour pattern is the most reliable discriminating feature.

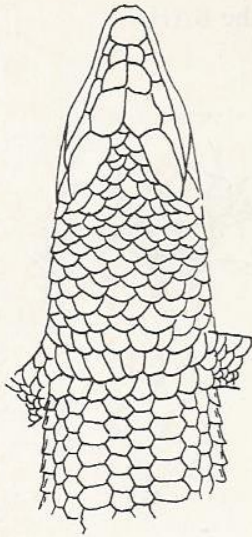


Fig. 1. *P. microdactylus* without gular fold and collar

The main morphological differences (fig. 1: 447/1) are as follows:

<i>Psammodromus</i>	<i>blanci</i>	<i>microdactylus</i> (p. 452)
gular fold	more or less distinct	absent
collar	distinguishable (fig. /1)	none (fig. /1)
colour above	olive or pea-green	olive or bronzy brown
lateral stripes	two yellowish streaks on each side sometimes a light vertebral line	one brown or reddish streak on each side
ventral side	white, outer row of ventrals lemon-yellow, throat of male bluish	uniformly yellowish, or whitish with bluish hue

The intermediate specimens have a moderately distinct collar, tubercular toe lamellae, a relatively high number of lamellae under the 4th toe, a well-marked gular fold, a massive neck and a relatively short body

Psammodromus blanci Lataste, 1880

Etymology

Synonyms: *Zerzumia Blanci* Lataste, 1880
Psammodromus blanci Boulenger, 1887

e: Blanc's sand racer
f: Psammodrome de Blanc
g: Blancs Sandläufer

Identification

Morphology: A tiny lizard with a narrow neck and an elongate body which is 2 - 2 1/2 times as long as the distance between snout and collar. Dorsals large, strongly keeled and imbricate; a striking light pattern of 4 longitudinal stripes on brown ground colour.

Measurements:

male: SVL 38 mm, tail 55 mm, foreleg 14 mm, hindleg 21 mm
female: 40 mm, 61 mm, 12 mm, 18 mm
Tail 1 1/2 to 1 3/4 x SVL.

Specimens from NE-ALG (BISCHOFF & IN DEN BOSCH, 1991) have SVLs of 37-45.8 mm in males, 37-47 mm in females.

Pholidosis: Frontal narrow and angular; parietals separated by the occipital and the interparietal.

Collar and gular fold distinct; collar scales twice as broad as long; Ventral scales obliquely elongate or straight rectangular in the first row. Ventrals broader than long, the median and outer rows narrower than the two others. 10-12 femoral pores on each side (fig. 449/3). Subdigital lamellae tuberculate; 17 or more under the 4th toe.

Coloration: Ground colour brown, in TUN greenish, with two pairs of very light, white, yellowish, golden or beige lateral stripes, the upper ones beginning on the exterior border of the parietals, the lower ones on the

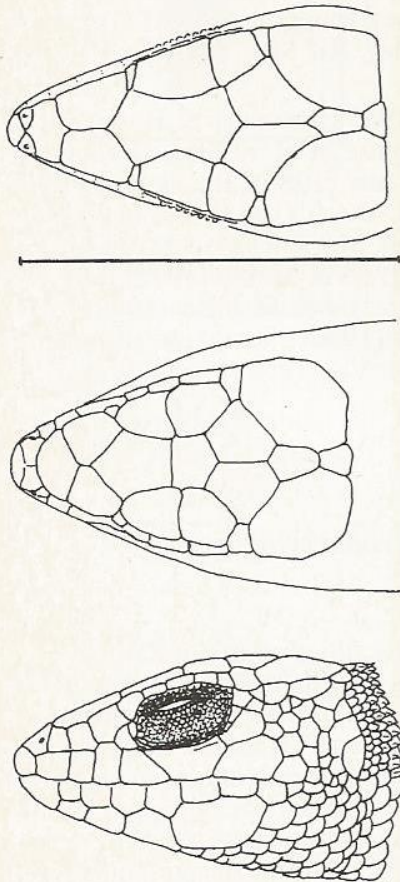


Fig. 2. Note abnormally divided frontal in 2nd pileus view

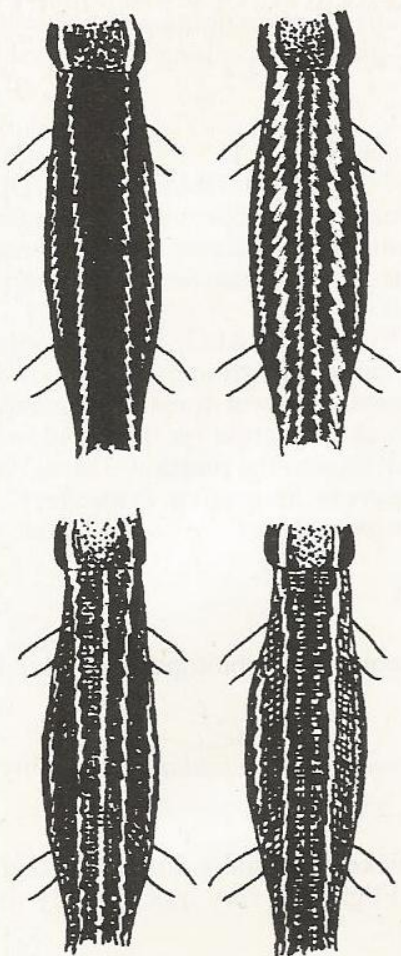


Fig. 1. Pattern variety

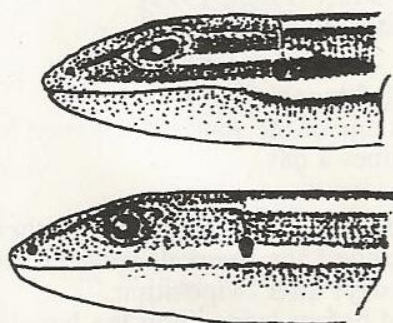


Fig. 2. Head patterns of *Psammodromus blanci* (top) and *Ophisops occidentalis*

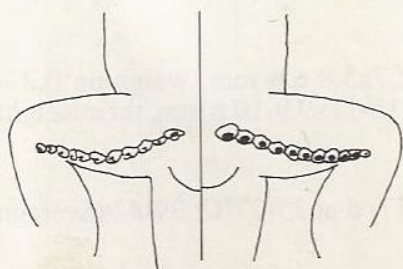


Fig. 3. Female/male femoral pores

mouth angles. Sometimes a light vertebral stripe, which can be double. The stripes continue for a short distance on the tail. The light ventrolateral line is bordered with brown dots.

The ground colour may be spotted with dark. Spots on the flanks become lighter and smaller towards the venter. The temporal regions bear a short light stripe from the eye to the posterior margin of the ear-opening (fig. 2). Ventral side nacreous or greenish white, often yellowish in the gular and lateral regions. Lower side of tail yellow.

One specimen from Lambesa near Batna (NE-ALG) had ventrolateral stripes in splendid orange.

Specimens from NE-MOR close to the range of *P. microdactylus* show 3 black dorsal lines, one of them in the vertebral region, the other two bordering the light dorsolateral lines.

Sexual dimorphism: Hindlegs plied forward reach the axilla in males but not as far in females. Males with smaller SVL, larger femoral pores (fig. 3), distinctly thickened tail-base and relatively longer tail.

Colour change, physiological: During the mating period the lower flanks of males become golden yellow, their tails blue-grey, while in females the lower side is yellowish and the tail brown.

Similar species: The colour pattern of *P. blanci* is similar to that of *Ophisops occidentalis* (fig. 2) and juveniles of *P. algirus* with which it occurs together in many localities. They can be easily distinguished by the presence of eyelids or the arrangement of ventral scales which resemble true lizards while in *P. algirus* they are rounded and similar to those of skinks. For further differences see *P. algirus*.

Ecology and general behaviour

Habitat: Humid to semiarid zone, region of *Quercus faginea* (Zeen oak), *Quercus suber* (Cork oak), *Cytisus triflorus* (broom), *Pinus halepensis* (Aleppo pine), *Quercus ilex* (Holm oak), *Retama sphaerocarpa*.

Open landscape, clearings, aisles, meadows, pastures with low vegetation of grass, thorn cushions, Euphorbias, Asphodel or shrubs; hills and plateaus with thyme, *Chamaerops humilis* (Dwarf fan palms), Halfa grass. Prefers stony clay soils; avoids open ground, rocks and stone heaps as well as higher growth.

Today's isolates mostly lie at elevations above 1000 m and may reach 2000 m in mountain regions.

Activity pattern, diel: Main activities in the morning and evening with a resting period around noon.

Annual activity: Almost without interruption, in the Oran region mainly active from Sept. to June.

Thermal behaviour: Bask on stones and shrubs, but generally avoid excessive heat.

Locomotion: Dart over open ground, dig in sand and climb on low plants.

Population density rather high in some biotopes, and many specimens can be observed within one hour.

Social behaviour: Hostile interactions during encounters in the field are uncommon during most of the year, and no territorial interactions are seen. From end of March to beginning of June, and again in Oct. captive males engaged in fights. They circled around one another with their heads directed

at the temporal region of the rival; they bit at each other holding on up to 20 sec. The bitten specimen flees, sometimes emitting a peeping sound. He is often persecuted and bitten again.

Herpetological communities: Lizard communities 5.5.1.

In E-ALG (BISCHOFF & IN DEN BOSCH, 1991): Col de Tibharine near Dj. Ichmoul, Aurès Mts., NE-ALG, 1510 m; steep rocky slope with a low grass cover, thorn cushions and Euphorbia shrubs, goat pasture: with *Lacerta pater*, *Ophisops occidentalis*, *Podarcis hispanica* "vaucheri", *Psammotromus algirus*, *Macroprotodon cucullatus*.

Below Col de Telmet, Belezma Mts. near Batna, NE-ALG, 1500m; cattle pasture with dense and low grass cover, numerous groups of asphodels (probably *Asphodelus ramosus*), stone heaps; adjacent forest of *Cedrus atlantica*, *Quercus ilex*, *Quercus suber* which also grow on the meadow: with *Lacerta pater*, *Psammotromus algirus*; around the meadow *Tarentola mauritanica*, *Chalcides ocellatus*, *Podarcis hispanica* "vaucheri", *Macroprotodon cucullatus*, *Malpolon monspessulanus*.

Feeding strategy: Circulate between plants.

Food spectrum: Grasshopper nymphs are common in biotopes mentioned under herpetological community.

Predators: *Macroprotodon cucullatus*, *Malpolon monspessulanus*, probably *Lacerta pater*.

Antipredator behaviour: Flees into plant thickets and hides among the leaf litter. Thorn cushions offer ideal refuges. Flight not very quick, easily to catch. It emits a peeping sound when seized.

Reproduction

(by far the most data are from BISCHOFF & IN DEN BOSCH, 1991)

Sexual maturity: In the first spring after hatching.

Mating: In captivity between 21st Feb. and June 9th.

The copulation, which lasts about 10 sec is one of the shortest observed in lacertids. A female may copulate up to 3 times a day.

Clutches: In captivity five between March 28th and June 28th; during another yr four clutches between March 22nd and June 15th; intervals between 18 and 34 days; most matings during the four days after oviposition.

Oviposition 19-25 d after mating. Up to 5 d before oviposition the female starts to dig holes and ceases feeding. Forelegs and snout help to cover the eggs. Every 5-10 min the female pauses for about the same length of time to run about, bask, drink or feed. The laying site is inspected for up to more 2 days, during which time it is covered with more soil that is pressed down with the head.

Clutch size is 2-4 eggs measuring 9.7-12.7x5.8-6.8 mm, weighing 0.21-0.32 g. Their final size after incubation was 15-17x9.9-10.6 mm, their weight 0.92-1.32 g.

Incubation and hatching: 54-59 (average 57) d at 25-27°C; 39-42 (average 41) d at 29-31°C.

Hatchlings: SVL 19-23 mm, tail 31-38 mm, weight 0.25-0.43 g. Colour pattern: Dark brown with light brown stripes, the middorsal one more contrasting than in adults.

Courtship and mating
(data from IN DEN BOSCH, 1991)

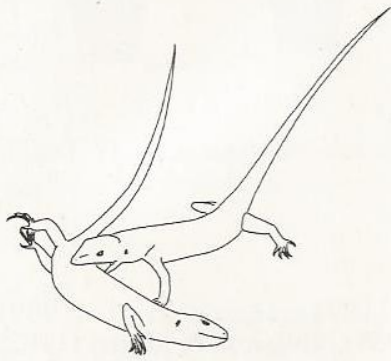


Fig. 1. Flank-bite hold during courtship

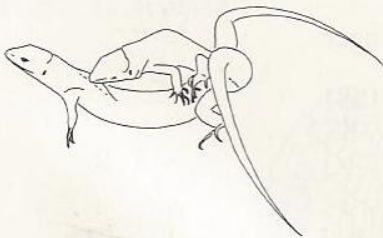
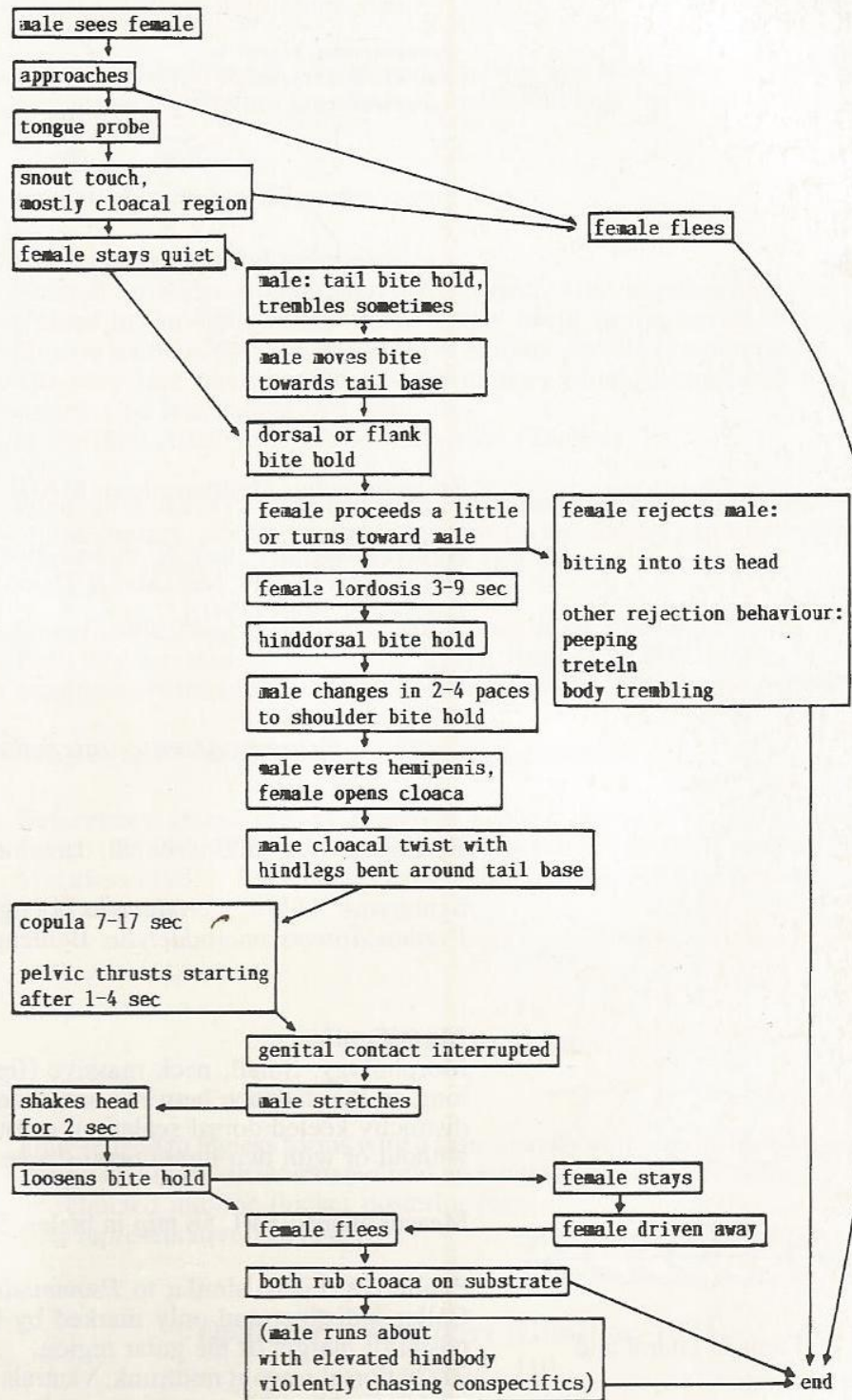
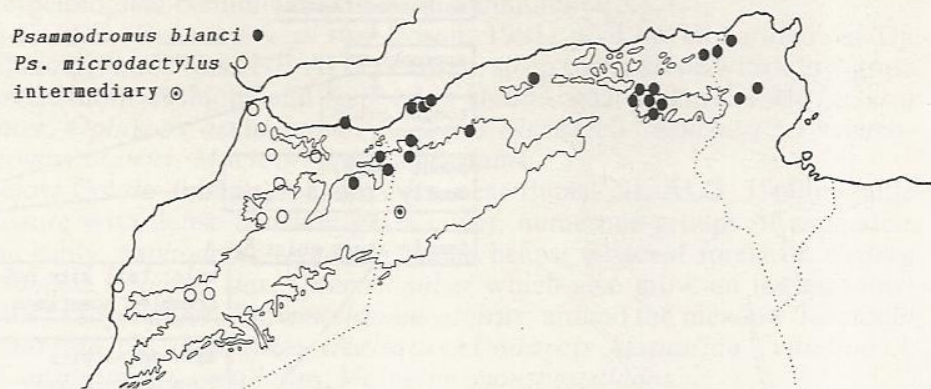


Fig. 2. Copulation with shoulder-bite hold



Development: In September juveniles measure 33+60 mm and weigh 1.14 g; at the end of next May, when they have already attained sexual maturity, they measure 40+72 mm and weigh 2.16 g.

Geographic range, Northern Africa: Numerous isolates in NE-MOR and N-ALG, mainly on the plateaus and in the mountains.



Zoogeography: Mediterranean, MAG.

References: BISCHOFF & IN DEN BOSCH (1991), DESTRE et al. (1989), DOUMERGUE (1901), MELLADO & DAKKI (1988), MELLADO & MATEO (1992), PASTEUR & BONS (1960).

Psammodromus microdactylus Boettger, 1881

Etymology: Gr. mikros: small, dactylon: finger.

Synonyms: *Algira microdactyla* Boettger, 1881
Psammodromus microdactylus Boulenger, 1887

Identification

Morphology: Small, neck massive (fig. 448/1); body short, not twice as long as the distance between snout and collar; with large imbricate and distinctly keeled dorsal scalation; colour dark olive with brown spots and without or with two light dorsal stripes.

Measurements: SVL 58 mm in males, 57 mm in females, tail $1 \frac{2}{3}$ x SVL.

Pholidosis: Pileus similar to *Psammodromus blanci*.

Collar indistinct and only marked by the irregular scale sequence at the posterior margin of the gular region.

21-24 dorsal rows at midtrunk. Ventrals imbricate, in 6 unequal rows: those of the two median rows are narrower than the adjoining ones; the lateral ventrals may be the narrowest ones.

9-13 femoral pores on each side. Subdigital lamellae keeled (fig. 1), 17 or less under the 4th toe.

Coloration: Ground colour green or dark olive with a bluish hue. An olive brown dorsolateral band which fades towards the hindlegs is typical for specimens from the region of the Moyen Atlas.

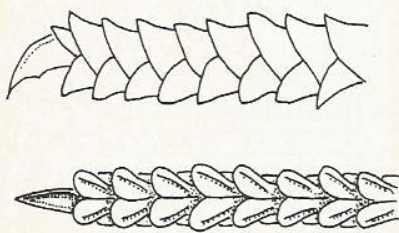


Fig. 1. Digit in lateral and ventral view.

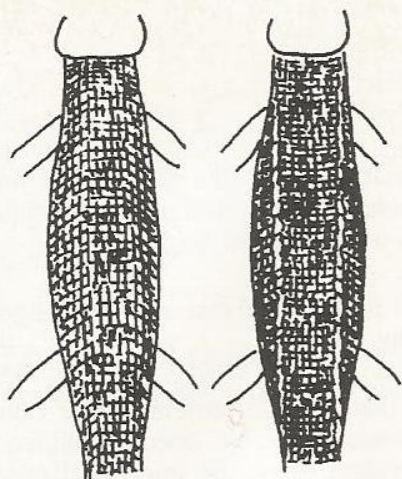


Fig. 1. *P. microdactylus*, dorsal pattern

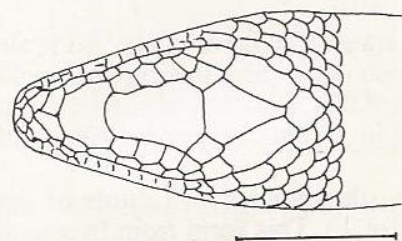


Fig. 2. *O. koellikeri*



Fig. 3. Note the strong lateral fold and scale annuli

In contrast to *P. blanci* no light longitudinal stripes, or only two dorsolateral ones (fig. 1) which are not distinctly marked but are of a lighter ground colour; dark brown dots in more or less irregular longitudinal rows. Tail light brown.

Venter whitish with a bluish hue.

Sexual dimorphism: If forelegs and hindlegs are plied towards each other, the longest toe reaches the elbow in males, but only the wrist or finger tips in females.

Similar species: See *Psammodromus blanci*.

Ecology and general behaviour

Habitat: From dense vegetation in the Moyen Atlas to rather bare mountain regions in the Haut Atlas, where it may occur in the lowest biotopes of *Lacerta andreanskyi* (Around 2000 m altitude, see distribution map p. 557). The very rare records report on specimens which disappeared between stones. One was caught in a field.

In the Haut Atlas up to 2250 m elevation (Tadlest).

Population density: This species has become a rarity already in the thirties of this century, and only single specimens were sighted or caught (WERNER 1931a,b). Today's situation is perhaps still worse.

Geographic range, Northern Africa (see map *Psammodromus blanci*): Relictary isolates which lie far apart, limited to NW-MOR, from the mountain chains of the Rif, the Moyen and Haut Atlas to the Atlantic.

Zoogeography: Mediterranean, Moroccan endemite.

References: BLANC (1978), BOETTGER (1883), BONS (1972, 1973), BONS & GIROT (1962b), BOULENGER (1891), DOUMERGUE (1901), FISCHER (1887), MALKMUS (1983), PASTEUR & BONS (1960), SEURAT (1930), WERNER (1929, 1931a,b).

Family Anguidae

Four-legged to legless forms with a skin heavily armoured with osteoderms. Tongue strikingly differentiated into an emarginated anterior part which can be retracted into the thicker posterior part.
One representative in N-AFR.

Ophisaurus koellikeri (Günther, 1873)

Pl. 38/109, 110

Etymology: gr. ophis: snake; saura: lizard.

This species is dedicated to the Swiss-born anatomist ALBERT VON KÖLLIKER (1817-1906) who discovered the cellular character of the egg and asserted that all body cells descend from it.

Synonyms: *Hyalosaurus koellikeri* Günther, 1873
Pseudopus apus forma *ornata* Boettger, 1881
Ophisaurus koellikeri Boulenger, 1885

plate 31

87

Lacertidae

Acanthodactylus boskianus

Distribution:

Morocco - Libya, Egypt



Male, elevated posture on heated soil,
Marada (Libya)

page 378

88

Lacertidae

Acanthodactylus boskianus

Distribution:

Morocco - Libya, Egypt



Male, Dakhla (W-Sahara)

page 378

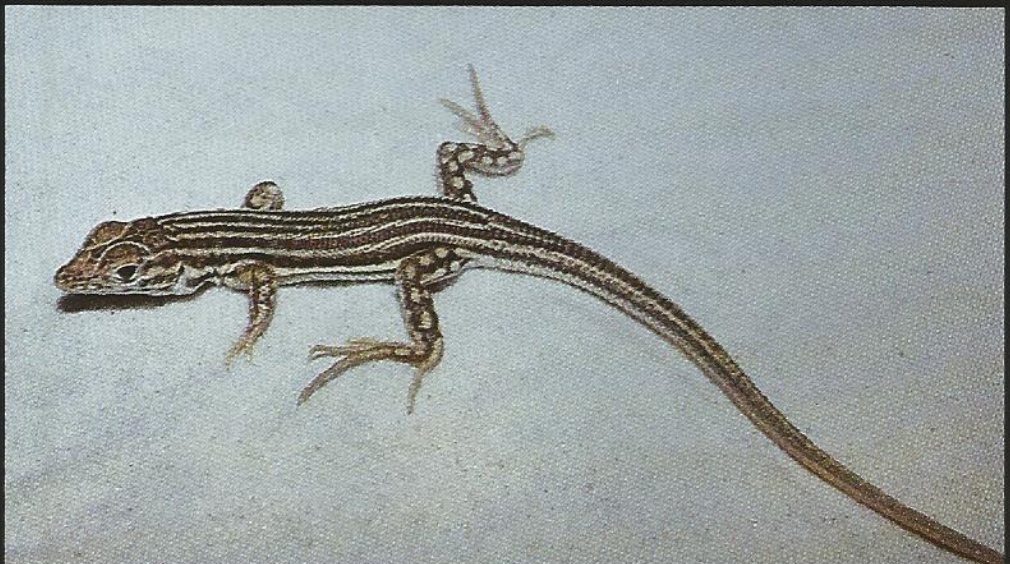
89

Lacertidae

Acanthodactylus boskianus

Distribution:

Morocco - Libya, Egypt



Juvenile, Tunisia

page 378

plate 32

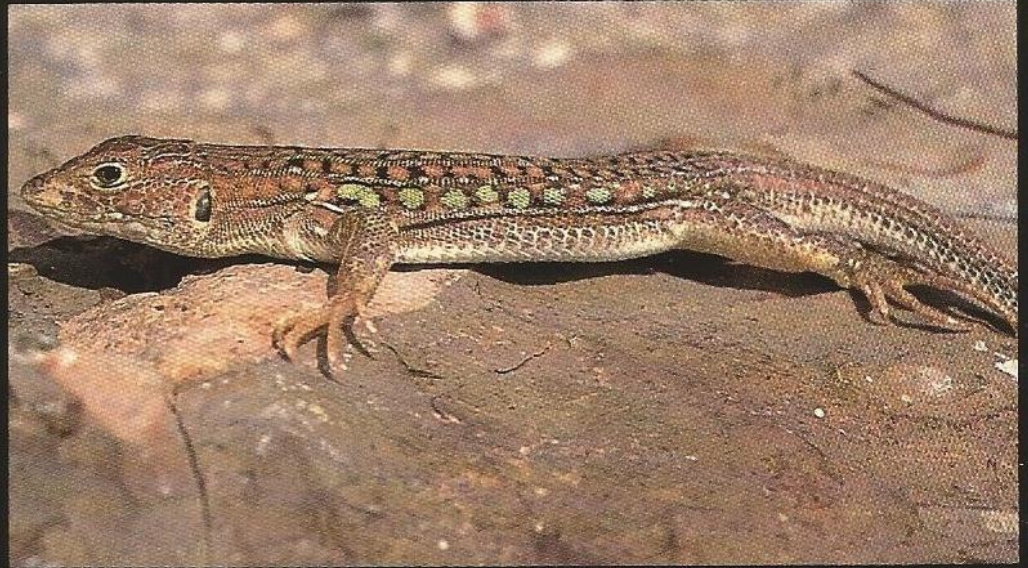
90

Lacertidae

Acanthodactylus erythrurus

Distribution:

Morocco - Algeria



A. erythrurus lineomaculatus (W-Morocco), male,
N Essouira (Morocco)

page 384

91

Lacertidae

Acanthodactylus erythrurus

Distribution:

Morocco - Algeria



A. erythrurus belli (Central Morocco-Algeria), male,
Mas el Ra, (Morocco)

page 384

92

Lacertidae

Acanthodactylus erythrurus

Distribution:

Morocco - Algeria



A. erythrurus belli, female, Azrou (Morocco)

page 384

plate 33

93

Lacertidae

Acanthodactylus maculatus

Distribution:

Morocco - Libya



Male, Tifnite (Morocco)

page 392

94

Lacertidae

Acanthodactylus aureus

Distribution:

Morocco



Male, Agadir (Morocco)

page 396

95

Lacertidae

Acanthodactylus scutellatus

Distribution:

Morocco - Libya, Egypt



Male, Tunisia

page 397

plate 34

96

Lacertidae

Lacerta andreanskyi

Distribution:

Morocco



Male, Okaimeden (Morocco)

page 403

97

Lacertidae

Lacerta andreanskyi

Distribution:

Morocco



Female, Okaimeden (Morocco)

page 403

98

Lacertidae

Lacerta andreanskyi

Distribution:

Morocco



Hatchling, Okaimeden (Morocco)

page 403

plate 35

99

Lacertidae

Lacerta pater

Distribution:

Morocco - Tunisia



Lacerta pater tangitana (W-Central Morocco), male, Okaimeden (Morocco)

page 412

100

Lacertidae

Mesalina guttulata

Distribution:

Morocco - Libya, Egypt



El Kantara (Algeria)

page 417

101

Lacertidae

Mesalina olivieri

Distribution:

Morocco - Libya, Egypt



Male, Morocco

page 420

plate 36

102

Lacertidae

Mesalina rubropunctata

Distribution:

Morocco - Libya, Egypt



Female, S Marsa Bregah (Libya)

page 425

103

Lacertidae

Ophisops elegans

Distribution:

Morocco - Libya, Egypt



Kouf National Park (Libya)

page 430

104

Lacertidae

Ophisops occidentalis

Distribution:

Morocco - Libya



Batna (Algeria)

page 433

plate 37

105

Lacertidae

Podarcis hispanica

Distribution:

Morocco - Tunisia



Podarcis hispanica "vaucheri" (NAF)
Male, Okaimeden (Morocco)

page 437

106

Lacertidae

Podarcis hispanica

Distribution:

Morocco - Tunisia



Female, Okaimeden (Morocco)

page 437

107

Lacertidae

Podarcis perspicillata

Distribution:

Morocco - Algeria



Podarcis perspicillata chabanaudi (humid Atlas region)
Okaimeden (Morocco)

page 441

plate 38

108

Lacertidae

Psammodromus algirus

Distribution:

Morocco - Tunisia



Male, Morocco

page 444

109

Anguidae

Ophisaurus koellikeri

Distribution:

Morocco



Adult, Ifrane (Morocco)

page 453

110

Anguidae

Ophisaurus koellikeri

Distribution:

Morocco



Juvenile, Ifrane (Morocco). Note dark flanks and lack of dorsal marks.

page 453