

# A new species of the *Acanthodactylus pardalis* group (Reptilia: Lacertidae) from Jordan

by Yehudah L. Werner

**Abstract.** A new species of the *Acanthodactylus pardalis* group, *A. ahmaddisii* sp.n., is described from Jordan, from a single specimen which differs from *A. pardalis* (Lichtenstein, 1823) of eastern Libya and Egypt, and *A. beershebensis* Moravec et al., 1999 from Israel. Compared to the latter two populations, *A. ahmaddisii* is larger with smaller head and shorter appendages and fewer (larger) dorsals. It also differs in qualitative pholidotic characters, especially by having tricarinate subdigitals, and in colour pattern.

**Kurzfassung.** Eine neue Art der *Acanthodactylus pardalis* Gruppe, *A. ahmaddisii* sp.n., wird aus Jordanien beschrieben, auf Grund eines einzigen Exemplares, das sich von *A. pardalis* (Lichtenstein, 1823) aus Ost-Libyen und Ägypten, und von *A. beershebensis* Moravec et al., 1999, aus Israel, unterscheidet. Im Vergleich zu diesen beiden Populationen ist *A. ahmaddisii* größer, mit kleinerem Kopf, kürzeren Gliedern und weniger (größeren) Dorsalschuppen. Die neue Art unterscheidet sich auch durch qualitative Pholidosis-Merkmale, besonders durch die dreikieligen (anstatt einkieligen) Subdigitalschuppen und durch das Farbmuster.

**Key words.** *Acanthodactylus ahmaddisii*, *A. beershebensis*, *A. pardalis*, Lacertidae, Middle East, Jordan, new species.

## Introduction

The population of the *Acanthodactylus pardalis* (Sauria: Lacertidae) group in the Negev of Israel was described by MORAVEC et al. (1999) as a new species, *A. beershebensis*, differing in many characters from the topotypical Egyptian population. Other than that, in southwestern Asia the taxonomy of this mainly North-African group (BOULENGER 1921) has remained neglected. From Jordan HAAS (1943) reported one individual collected in March 1936 by himself, H. MENDELSSOHN and O. THEODOR, 30 or 36 km S of Amman; he noted its differing from Negev specimens, and commented that it may represent a distinct taxon. To date, this has remained the sole find of this group from Jordan (WERNER 1998, DISI et al. 2001). DISI et al. (2001) pointed out that this former report of *A. pardalis* from Jordan probably represents a separate species. Elsewhere the lizards of the *Acanthodactylus pardalis* group are confined to narrowly defined types of soils, that both in Egypt and in Israel have nearly disappeared as natural habitats, leading to a decimation of the lizard populations (MORAVEC et al. 1999, BOUSKILA 2002). By extrapolation, and from partial information, the fate of their population in Jordan appears to be dubious. Therefore it seems urgent to define the Jordanian taxon and to name it, and I do so hereinafter, hoping both to support the efforts to conserve it and, especially, to encourage and guide the efforts to locate it in nature.

## Material and methods

The holotype is compared to the samples of *Acanthodactylus pardalis* and *A. beershebensis* that were used and described by MORAVEC et al. (1999), employing mainly the same characters as defined by MORAVEC et al. (1999). Because on the one hand the type series comprises a single specimen, and on the other hand this specimen shows clear qualitative differences from its obvious relatives, statistical testing is avoided.

**Abbreviations.** RA = Rostrum-anus length (WERNER 1971); PERCRA= Percents of ra (WERNER 1971).

## Results and discussion

### *Acanthodactylus ahmaddisii* sp. n.

#### Material

Holotype: HUIJ-R 1296 ♂ (Fig. 1); 27.iii.1936; coll. G. HAAS, O. THEODOR & H. MENDELSSOHN. Type locality: Transjordan (now the Hashemite Kingdom of Jordan): "36 km S of Amman" ("from Amman ... following the Hedjaz railway via Sisah, Katrane and Hissa, to Ma'an") – according to HAAS (1943). The Hebrew University's collection catalogue reads "30 km S of Amman"; this could be a translation to aerial distance, or either figure could represent a typo.

#### Differential diagnosis

An *Acanthodactylus* with three complete supraoculars; subocular broadly bordering the mouth; upper temporals smooth; dorsal scales small, flat, 52 across midbody; ventral plates in (presumably) 12 straight longitudinal series; three series of scales around the fingers and toes, which are not pectinate; subdigital lamellae clearly tricarinate; tail not spiny laterally; presacral vertebrae 24. Differing from *A. pardalis* and *A. beershebensis* especially in its lower number of dorsals and tricarinate subdigital lamellae.

#### Description of the holotype

Male; moderately robust, neck as wide as shoulders, barely narrower than head; tail base swollen for a stretch at least equaling head length, almost as wide as the inter-femoral distance (viewed dorsally).

Measurements: RA 78.5 mm; head length 17.5 mm (22.3 PERCRA); head width 11.8 mm (15 PERCRA); head depth 8.55 mm (10.9 PERCRA); head index 148.3; forelimb length 26.6 mm (33.9 PERCRA); hindlimb length 40.6 mm (51.7 PERCRA); fourth toe length 18.0 mm (22.9 PERCRA); tail length (complete) 115 mm (146.5 PERCRA). These proportions are compared with those of *A. pardalis* and *A. beershebensis* in Tab. 1.

Pholidosis: Key head shields symmetrical: first, second and third supraoculars entire, the fourth fragmented; supralabials anterior to the centre of eye, 4; subocular broadly entering lip (by >1/3 of its length); infralabials 6, the 5<sup>th</sup> and 6<sup>th</sup> separated by the last large (the 5<sup>th</sup>) chinshield that enters the lip (on the left, and almost so, on the right); gulars, 28; plates in collar, 11. Dorsals across midbody, 52; ventrals across belly, 11; transverse rows of ventrals, 30; no scales separating the two series of femoral pores; femoral pores, R, 19 & L, 20; pre-anals in straight median series, 7, the last of these (= anal plate) is significantly wider than a third of the ventral aspect of the tail base; tail ventrally behind the cloaca with 7 irregular



Fig. 1. Photograph (dorsal) of the holotype of *Acanthodactylus ahmaddisii* sp.n. HUI-R 1296 male (Scale bar: 1 cm).

rows of small scales, followed by scales that are twice as wide than long, posteriorly, where the tail narrows, gradually becoming triangular; subdigital lamellae, R, 21 & L, 21, not pectinate, the spines being equally short on the anterior and posterior aspects of the 4th toe, distinctly tricarinate, especially the long toes (Fig. 2). Most of these character states are compared with those of *A. pardalis* and *A. beershebensis* in Tab. 1 (bottom).

Colouration (in alcohol): head grey-beige, dorsally nearly plain, laterally speckled grey and whitish, one of the grey spots being under the eye. Dorsal ground color light grey, on the sides tending to beige. Four longitudinal series of bold, irregularly-shaped blackish markings (the lateral rows less developed), many of the markings approximate an irregular and broken ring enclosing a whitish center. Along the central rows, there are about 9 such complex markings from shoulder to pelvis. Craniad, towards the occiput, this system gradually merges to become a blackish net with whitish specks. Limbs spotted whitish; tail almost plain beige (skin of the base damaged). Ventral parts unmarked whitish, the chin-shield and tail tending to beige.

Vertebral count (on X-ray): presacral 24 (precaudal 26); the terminal caudals could not be counted.

### Etymology

The species is named for Prof Ahmad M. DSI of the University of Jordan, Amman, in recognition of his pioneering, continual and prolific contribution to the herpetology of the Hashemite Kingdom of Jordan and of the Levant in general.



Tab. 1. Mensural characters of males of of the *Acanthodactylus pardalis* group from Egypt, Israel and Jordan. Values in PERCRA, Except: RA and head index. Head index is head length as % of head width. For Jordan N = 1. Under the dividing line, meristic characters.

Character	Egypt		Israel		Jordan
	N	Mean±SD Range	N	Mean±SD Range	Measure/ Count
RA (mm)	67	56.38±4.97 45.0-66.5	130	66.26±5.86 55.0-87.0	78.5
Head length	63	25.54±1.03 23.7-28.21	130	24.52±1.20 17.5-27.1	22.3
Head width	60	17.74±0.98 14.9-20.2	129	17.80±0.96 14.4-20.6	15
Head depth	59	13.59±0.99 11.1-15.7	129	13.79±0.87 11.2-16.1	10.9
Forelimb length	61	34.95±2.21 30.3-41.5	127	33.97±1.65 30.2-38.3	33.9
Hindlimb length	57	61.87±3.89 53.0-75.0	128	57.26±3.03 49.4-64.9	51.7
Fourth toe length	63	27.05±2.46 22.0-34.5	129	24.32±1.53 20.0-29.9	22.9
Tail length	22	175.30±13.60 152.6-214.9	57	151.00±8.50 125.9-172.1	146.5
Head index	59	144.24±8.33 126.3-177.8	129	137.83±7.84 98.6-157.9	148.3
Supralabials	67	4.12±0.29 4-5	120	4.02±0.28 3-5	4
Gulars	67	28.85±2.09 25-34	120	30.63±2.55 24-37	28
Plates in collar	67	11.88±1.34 9-16	120	12.18±1.32 10-16	11
Dorsals	65	60.29±4.04 52-71	120	64.03±3.80 56-76	52
Ventrals across belly	66	11.83±0.71 10-14	120	12.47±0.81 10-14	11
Transverse rows of ventrals	66	30.55±1.35 28-34.5	119	33.06±1.41 29-37	30
Femoral pores	66	21.64±1.45 19-25	119	20.29±1.59 16-24.5	19.5
Scales between the rows of femoral pores	65	0.66±0.81 0-4	120	1.12±0.77 0-3	0
Preanals	66	7.38±1.14 5-10	120	7.52±0.83 6-10	7
Subdigital lamellae	66	20.64±1.56 17.5-27	119	20.17±1.17 17-23	21
Transverse rows of ventrals / femoral pores	65	1.42±0.11 1.22-1.71	118	1.64±0.13 1.31-2.09	1.54
Dorsals / femoral pores	64	2.80±0.25 2.31-3.58	119	3.17±0.25 2.5-4.13	2.72
Scales between rows of femoral pores / femoral pores	66	0.03±0.04 0-0.19	119	0.06±0.04 0-0.16	0

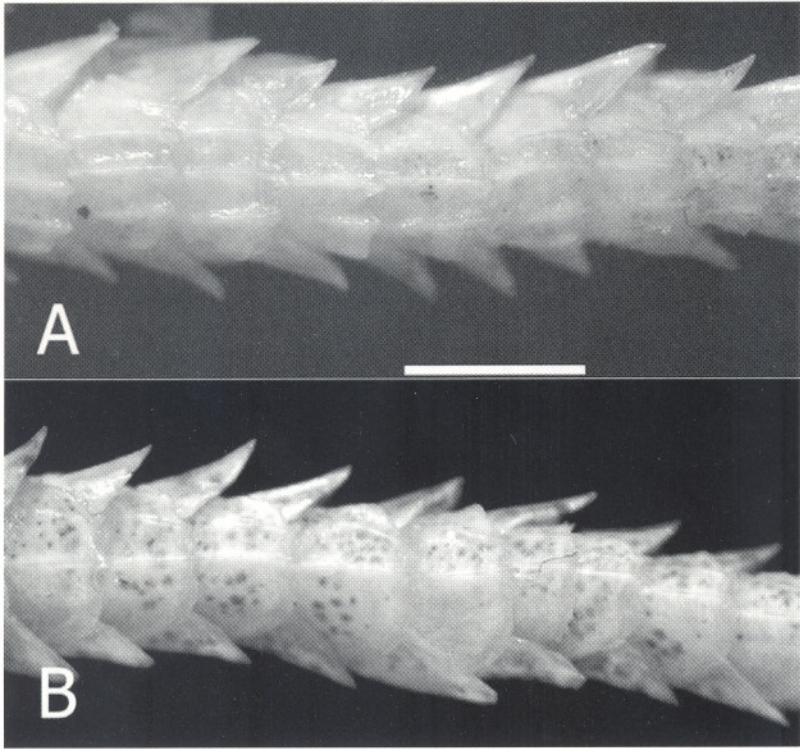


Fig. 2. Photographs (ventral) of portions of the fourth toe, of (A) *Acanthodactylus ahmaddisii* sp.n., subdigitals tricarinate (holotype, HUI-R 1296 from Jordan, male, 78.5 mm RA); and (B) *Acanthodactylus beershebensis*, subdigitals unicarinate (HUI-R 7331 from 3 km S Be'er Sheva, male, 72 mm RA) (Same scale bar: 1 mm).

### Comparisons

In the *Acanthodactylus pardalis* group, the mensural characters of males, summarized in Tab. 1 (assuming that the Jordanian specimen is fairly typical), seem to show a gradient from Egypt through Israel to Jordan, with the Jordanian population having the largest trunk and (relatively) smallest head and shortest limbs and tail. The head seems to be flatter in Jordan, as noted by HAAS (1943).

In pholidosis, the only meristic character showing a geographical variation in Tab. 1 is the dorsal count, 52 in the Jordan specimen, compared with 56-76 in Israel ( $N = 120$ ). But there are qualitative differences from the (neighboring but disjunct) Israeli population. Compared with the neighboring *A. beershebensis*. In the Jordan specimen the subocular enters the mouth broadly (rather than narrowly); the anal plate is  $>0.33$  tail-base width (rather than  $<<0.33$ ); the subcaudal scales following the anterior small ones are twice as wide as long (rather than rhomboid or triangular); and, especially, the subdigital lamellae are tricarinate with three equal keels (rather than prominently unicarinate with at most a faint indication of a lateral keel or two).



The hemipenial armature was not examined in this single specimen because this important character (ARNOLD 1983) shows some variation in related species (MORAVEC et al. 1999).

The colour pattern promptly distinguishes the Jordanian specimen (Fig. 1) from both the Egyptian and Israeli populations (MORAVEC et al. 1999: figs. 3–6). Nevertheless there seems to be a gradient Egypt-Israel-Jordan with the black blotches boldest in the last.

In view of all these differences, together with the disjunct distribution, the Jordanian population seems to be sufficiently separate to raise an expectation of future separate evolution, so that according to the “phylogenetic species concept” (FROST & KLUGE 1994) it merits recognition as a species, *Acanthodactylus ahmaddisii*.

### Distribution

So far the species is known only from the type locality, which lies in the Irano-Turanian biogeographic zone. The Jordanian population is presumably separated by soil discontinuity from the different Negev population, *A. beershebensis* (WERNER 1991, MORAVEC et al. 1999). Another locality, Ara'ir in Jordan (east of the Dead Sea, within the Mediterranean zone) listed by SALVADOR (1982) and WERNER (1991), based on LACM 74540, was erroneous. In actuality that specimen was an *A. beershebensis* from a locality of identical name in Israel, Ara'ir, now Be'erot Aro'er (west of the Dead Sea, within the Irano-Turanian zone).

### Ecological comments

In the circumstances nothing precise can be said. However, in Egypt *Acanthodactylus pardalis* is found in open semi-desert under Mediterranean influence, receiving 50–150 mm of rain annually, where it is confined exclusively to fairly hard substrates with vegetation (SALEH 1997, MORAVEC et al. 1999). In the Israeli Negev *A. beershebensis* lives in steppe with loess soil where the mean annual temperatures are 19–21°C and August temperatures 26–28°C; annual rainfall ranges 0–150 mm in a dry year but 150–400 mm in a wet year (AMIRAN et al. 1970). The vegetation of the area has been described by ZOHARY (1962, 1973) as of the Irano-Turanian Territory and by DANIN & PLITMANN (1987) as mixed Sahara-Arabian & Irano-Turanian with some Mediterranean and other chorotypes. Where the natural vegetation survived, the dominant shrub is *Artemisia herba-alba*. The type locality of *A. ahmaddisii* likewise seems to be in the Irano-Turanian vegetation territory (ZOHARY 1962, 1973).

### Conservation

In Egypt, land reclamation for agriculture and urban expansion has but completely destroyed the habitats of *Acanthodactylus pardalis* in the vicinity of Alexandria, and south towards Wadi el Natrun, Giza and El Faiyum. Coastal tourism development, overgrazing and large-scale ploughing for growing winter cereals are rapidly devouring valuable habitats between Alexandria and Salum (BAHA EL DIN in: MORAVEC et al. 1999). Similarly in Israel most of the original area of *A. beershebensis* is now in agricultural use or built up, as described above (MORAVEC, SELIGMANN & WERNER in: MORAVEC et al. 1999, BOUSKILA 2002). In Jordan, too, the habitat of *A. ahmaddisii* around the type locality has already largely been taken over by urbanization, industrial development, and agriculture (DISI et al. 2001). Hence exploration of the range of *A. ahmaddisii*, followed by appropriate measures, is urgent; doubly so, since probably the species is endemic to Jordan (DISI et al. 2001).

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