

A new form of the genus *Tarentola* from north-western Africa (Squamata: Sauria: Gekkonidae)

Eine neue Form der Gattung *Tarentola* aus Nordwestafrika

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KURZFASSUNG

Eine neue Form der Gattung *Tarentola* wird aus dem Nordwesten Afrikas beschrieben: *Tarentola mauritanica pallida* subsp. nov. Sie unterscheidet sich von *T. mauritanica mauritanica* (LINNAEUS, 1758) und *T. mauritanica juliae* JOGER, 1984, die ebenfalls in diesem Gebiet vorkommen, durch die fähle, rosafarbene oder gelbliche Allgemeinfärbung; die durchscheinende Haut; das glattere, weniger warzige Erscheinungsbild, das z. T. durch die flacheren Tuberkel der Rückenmitte bedingt ist; das gelbe, manchmal purpurn marmorierte Schwanzregenerat; die isoliert stehenden Rückentuberkel, denen große, sekundäre Tuberkel fehlen und die nicht von einer Reihe kleinerer Tuberkel umstanden sind; und die leicht verminderte Zahl von Subdigitallamellen. Das neue Taxon ist von *T. boehmei* JOGER, 1984 durch seinen weniger eindeutig rosafarbenen Allgemeinaspekt, die Kopfform und die diagnostisch verwertbare niedrigere Anzahl von Subdigitallamellen (17 bis 18 gegenüber 21 bis 23) verschieden. Auch ist die Zahl der Gularia mit 33 bis 45 (gegenüber 42 bis 53) geringer. Die Verbreitung scheint auf den atlantischen Randbereich von Südmorokko und West Sahara von der Mündung des Oued Drâa bis Dchira beschränkt zu sein.

ABSTRACT

A new form of the genus *Tarentola* is described from north-western Africa: *Tarentola mauritanica pallida* subsp. nov. It differs from *T. mauritanica mauritanica* (LINNAEUS, 1758) and *T. mauritanica juliae* JOGER, 1984, which also occur in this region, by its pale, pinkish or yellowish general coloration; its translucent skin; its smoother, less warty, general appearance, partly due to the flat mid-dorsal tubercles; its yellow regenerated tail, sometimes with purplish marbling; its isolated dorsal tubercles lacking large secondary tubercles and not being encircled by a row of smaller tubercles; and the slightly lower number of subdigital lamellae. The new taxon differs from *T. boehmei* JOGER, 1984 by its general coloration which is less strictly pinkish, the slightly different head shape and the diagnostically lower numbers of subdigital lamellae (17 or 18 versus 21 to 23) and gular scales (33 to 45 versus 42 to 53). Its geographical range seems to be limited to the Atlantic fringe of southern Morocco and Western Sahara, between the mouth of Oued Drâa and Dchira.

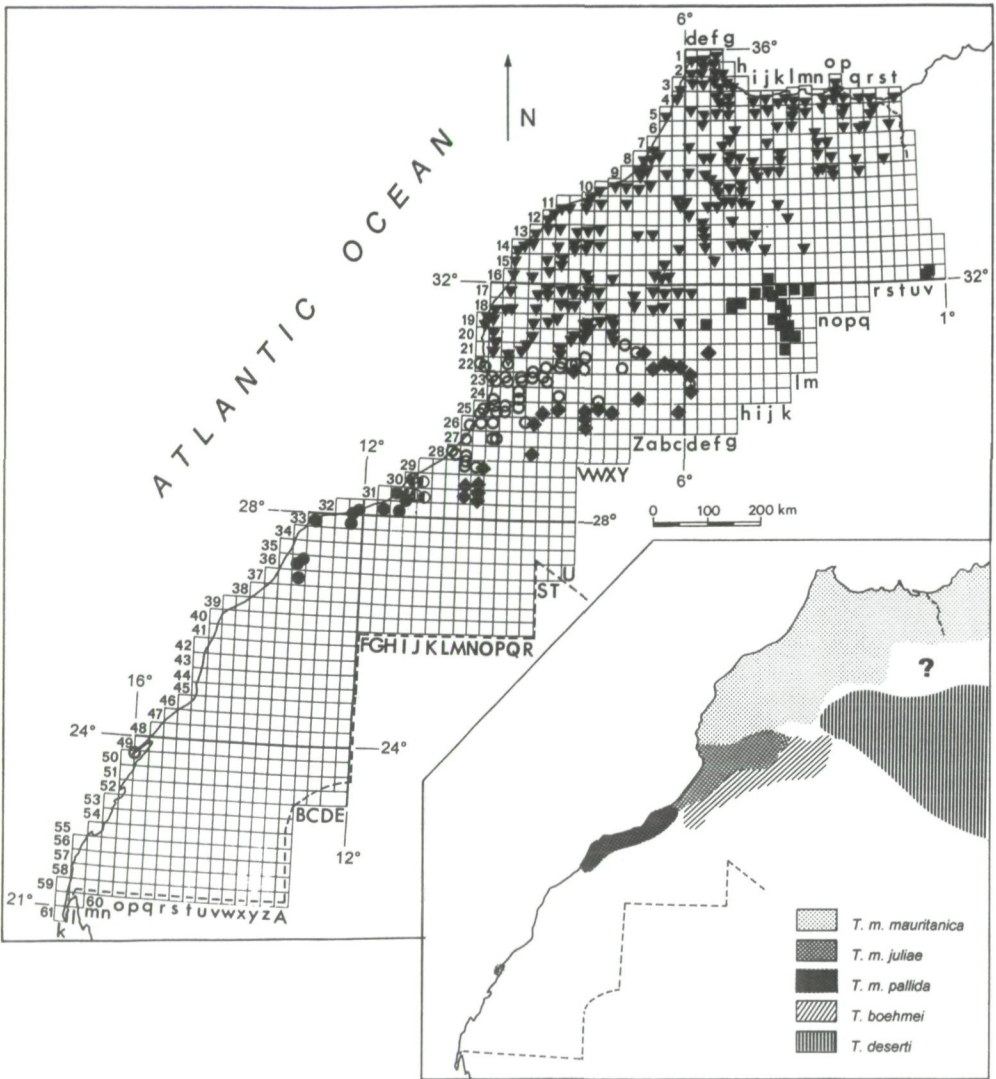
KEY WORDS

Sauria: Squamata, Gekkonidae; *Tarentola mauritanica pallida* nov. subsp., Morocco, Western Sahara, north-western Africa; new subspecies; systematics

Three species of the subgenus *Tarentola* (sensu JOGER 1984 a, 1984 b) are known to occur in Morocco: *Tarentola mauritanica* (LINNAEUS, 1758) (with a wide Circum-mediterranean distribution), *T. deserti* BOULENGER, 1891 (restricted to the north of the Sahara of Algeria and Morocco) and *T. boehmei* JOGER, 1984 (endemic to south-western Morocco) (cf. JOGER 1984 a, 1984 b; BONIS & GENIEZ 1996; SCHLEICH & al. 1996).

GENIEZ & al. (1991) and GENIEZ & GENIEZ (1993) have erroneously mentioned the presence of *T. boehmei* in the north of Western Sahara, from around the Khnifiss lagoon, at Laâyoune and at Dchira in pe-

culiar. When we re-examined these animals recently, we realized that, although their general habitus was extremely similar to that of *T. boehmei* (general coloration translucent pink or yellowish, weak dorsal tubercles), the scale counts were typical for *T. mauritanica juliae* JOGER, 1984 (see JOGER 1984 a) in that they show reduced numbers of subdigital lamellae underneath the fifth toe (17 to 19) and gular scales (32 to 45). All these characters agree with the diagnosis of *T. mauritanica* (see JOGER 1984 a, 1984 b), especially that of *T. mauritanica juliae*. On the other hand, both the dorsal tubercles which are flat and not encircled by secondary tubercles, and the pale,



- ▼ *Tarentola mauritanica mauritanica*
- *Tarentola mauritanica juliae*
- ◐ intermediate specimens between *T. m. juliae* and *T. m. pallida*
- *Tarentola mauritanica pallida*
- ◆ *Tarentola boehmei*
- *Tarentola deserti*

Fig. 1: Distribution of the forms of the subgenus *Tarentola* in Morocco and Western Sahara (modified from BONIS and GENIEZ 1996).

Abb. 1: Verbreitung der Formen der Untergattung *Tarentola* in Marokko und West-Sahara. (verändert nach BONIS und GENIEZ 1996).

translucent general coloration distinguishes these animals from other populations of *T. mauritanica*. Some populations (e. g., mouth of Oued Draâ) are morphologically intermediates between *T. mauritanica juliae* and the above mentioned new Western Sahara form. These intermediates are characterized by brown general coloration, variable transparence of the skin and rather low dorsal tubercles encircled by a row of secondary tubercles of variable distinctive-

ness. The homogeneity of the morphological features and the well defined geographical distribution of these Western Sahara *Tarentola* populations support our opinion to recognize them as a taxon of its own. The existence of morphologically intermediate populations probably indicates intergradation with *T. mauritanica juliae* and leads us to describe these animals as a new subspecies of *T. mauritanica*.

Tarentola (Tarentola) mauritanica pallida nov. subsp.

H o l o t y p e: MNHNP.1998-390 (Museum National d'Histoire Naturelle, Paris), J. SCHOUTEN rec., PH. GENIEZ leg., 20. 11. 1985.

T e r r a t y p i c a: Sidi Lemsid, Khnifiss lagoon (between Tantan and Tarfaya, south-western Morocco).

P a r a t y p e s: MNHNP.1998-391, Khnifiss lagoon (south-west Morocco), J. SCHOUTEN rec., 20. 11. 1985; MNHNP. 1998-392, Dchira, south of Laâyoune (Western Sahara), M. GENIEZ rec., 28.05. 1992.

D e r i v a t i o n o m i n i s: "*pallida*" is proposed because of the pale and translucent general coloration of all studied specimens.

D i a g n o s i s: A middle-sized *Tarentola* with a pinkish, yellowish or purplish-grey general coloration, more or less translucent, often with a narrow pale vertebral line. Low numbers of subdigital lamellae (17 to 19 underneath the fifth toe) and gular scales (32 to 45). Vertebral tubercles small and keeled; dorsal tubercles middle-sized, nearly flat, keeled, not encircled by a row of secondary tubercles; flank tubercles high, relatively large, keeled, each one with two small tubercles on either side and encircled by a row of secondary tubercles. Tubercles with one large central keel and several small secondary keels derived from the central keel. Rostral scale reaching nostril. Iris pinkish grey. Regenerated tail pale yellow, sometimes mottled pinkish.

D e s c r i p t i o n o f h o l o t y p e: adult animal, snout-vent length 61 mm, tail length 46 mm (regenerated tip). 35 gular scales from mental scale to gular fold; 17 lamellae underneath the fifth toe; small

and keeled vertebral tubercles; comparatively small, pyramidal, keeled dorsal tubercles, low, not encircled by a row of secondary tubercles; tubercles of the flanks comparatively large, keeled and pyramidal, each one with two smaller, pyramidal, keeled tubercles and a row of secondary tubercles; tubercles with one large central keel and several small secondary keels derived from the central keel; rostral scale reaching nostril; general coloration (animal in alcohol) purplish-grey, more or less translucent; a narrow dark band runs from the eye to the neck, then breaks up into elongated spots forming indistinct crosses on the back.

C o m p a r i s o n with other members of the subgenus *Tarentola* (sensu JOGER 1984) (cf. also table 1).

From *T. mauritanica juliae* (cf. JOGER 1984 a, 1984 b), *T. mauritanica pallida* is distinguished by its pale, pinkish or yellowish general coloration, its translucent skin which is smoother and less warty, by the colour pattern of its regenerated tail, which is yellow sometimes with purplish marbling, (grey, sometimes with blackish spots in *T. mauritanica juliae*), and its isolated dorsal tubercles, lacking secondary tubercles. From *T. mauritanica mauritanica*, in addition to the above mentioned features, it differs by the nostril not reaching the rostral scale, the multiple keels on the tubercles and the lower number of subdigital lamellae underneath the fifth toe (17 to 19 versus 19 to 21). From *T. mauritanica fascicularis* (DAUDIN, 1802), it differs by the lack of enlarged scales between the ventral and dorsal scales, the smooth general appearance and the different color-



Fig. 2: *Tarentola mauritanica pallida* nov. subsp., Khnifiss lagoon, south-western Morocco (terra typica).
(Photograph by M. GENIEZ)

Abb. 2: *Tarentola mauritanica pallida* nov. subsp., Khnifiss- Lagune, südwestliches Marokko (Terra typica)
(Photo: M. GENIEZ)



Fig. 3: *Tarentola mauritanica pallida* nov. subsp., paratype (MNHN 1998-392), Dchira, Western Sahara.
(Photograph by M. GENIEZ)

Abb. 3: *Tarentola mauritanica pallida* nov. subsp., Paratypus (MNHN 1998-392), Dchira, West-Sahara.
(Photo: M. GENIEZ)



Fig. 4: Specimen intermediate between *Tarentola mauritanica juliae* and *T. mauritanica pallida*, nine km beyond Tilemsoun toward Tantan, south-western Morocco. (Photograph by PH. GENIEZ)

Abb. 4: Intermediäres Exemplar zwischen *Tarentola mauritanica juliae* und *T. mauritanica pallida*, neun km von Tilemsoun in Richtung Tantan, südwestliches Marokko. (Photo: PH. GENIEZ)



Fig. 5: *Tarentola mauritanica juliae*, Ademine forest, south western Morocco. (Photograph by M. GENIEZ)

Abb. 5: *Tarentola mauritanica juliae*, Wald von Ademine, südwestliches Marokko. (Photo: M. GENIEZ)

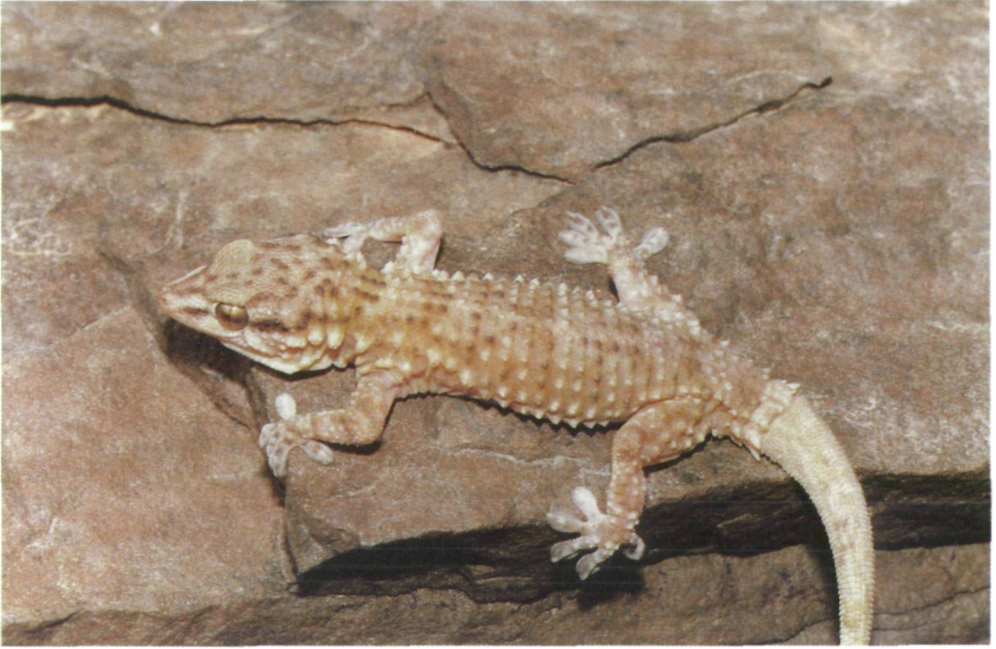


Fig 6: *Tarentola boehmei*, Oued El Mahasser, track 6961 from Mhamid to Zaouia Sidi Abd-en-Nebi, south Morocco. (Photograph by PH. GENIEZ)

Abb. 6: *Tarentola boehmei*, Oued El Mahasser, Route 6961 von Mhamid nach Zaouia Sidi Abd-en-Nebi, S-Marokko. (Photo: PH. GENIEZ)

ation. The new taxon is different from *T. boehmei* by its general coloration which is less intensively pink, its multi-carinated tubercles, the lower number of subdigital lamellae underneath the fifth toe (17 to 19 versus 21 to 23), and the lower number of gular scales (32 to 45 versus 38 to 54) between the post-mental scale and a hypothetical line between the ear openings. It differs from the allopatric *T. deserti* by a lower number of subdigital lamellae underneath the fifth toe (17 to 19 versus 22 to 25), a lower number of gular scales (32 to 45 versus 45 to 59), smoother general appearance, smaller size, different coloration of the upper side (less yellowish and more contrasting in *T. deserti*), and iris colour (uniformly ochre in *T. deserti*). Lack of an orange iris (but see remarks at the end), general coloration and smoother appearance distinguish this new form from the Canarian species *T. angustimentalis* STEINDACHNER, 1891 (in which the coloration is

grey or tawny, never translucent). Finally, it is distinguished from the recently described *T. mindiae* BAHÁ EL DIN, 1997 by the different head scalation (typical *T. m. mauritanica* type), the nostril not reaching the rostral scale, pointed tail tubercles, paler coloration and a slightly higher number of subdigital lamellae underneath the fifth toe (17 to 19 versus 15 to 17).

Ecology, distribution: *Tarentola mauritanica pallida* nov. subsp. has been found in buildings, under bridges and on ruins and walls, inside the "Saharan with warm winters" bioclimatic zone (sensu BRIGNON & SAUVAGE 1962), always relatively close to the sea (up to 54 km beyond Tantan toward Abatteh). The new taxon is distributed from the mouth of Oued Draâ to Dchira, south of Laâyoune, which constitutes the southern limit of the known autochthonous distribution of *T. mauritanica* (cf. fig. 2). Some specimens morphologically intermediate between *T.*

Table 1: Comparison between *Tarentola mauritanica mauritanica*, *T. mauritanica juliae*, *T. mauritanica pallida* nov. subsp., and *T. boehmei*. Expression of five morphological features as found in specimens of the collection of the E.P.H.E., Montpellier. SD - Standard Deviation.

Tab. 1: Vergleich von *Tarentola mauritanica mauritanica*, *T. mauritanica juliae*, *T. mauritanica pallida* nov. subsp. und *T. boehmei*. Die Ausbildung von fünf morphologischen Merkmalen an Exemplaren der Sammlung des E.P.H.E., Montpellier. SD - Standardabweichung.

Taxon	Number of subdigital lamellae underneath the fifth toe [arithm. mean, (range), SD, n] / Anzahl Subdigitallamellen an der Unterseite der fünften Zehe [arithm. Mittel, (Spannweite), SD, n]	Number of gular scales between the post-mental scale and a hypothetical line between the ear openings [arithm. mean, (range), SD, n] / Anzahl Gularia zwischen Postmentale und einer gedachten Verbindungslinie der Ohröffnungen [arithm. Mittel, (Spannweite), SD, n]	Dorsal tubercles / Rückentuberkel	Regenerated tail / Schwanzregenerat	Aspect of skin / Aspekt der Haut
<i>T. m. mauritanica</i>	20.00, (19-21), 0.72, 31	37.60, (30-45), 3.40, 30	strongly prominent, encircled by a row of secondary tubercles / stark hervorstehtend, von einem Kreis sekundärer Tuberkel umgeben	grey with blackish longitudinal marblings / grau, mit schwärzlicher längsgerichteter Marmorierung	opaque / opak
<i>T. m. juliae</i>	18.71, (18-19), 0.45, 7	36.14, (31-39), 2.47, 7	strongly prominent, encircled by a row of secondary tubercles / stark hervorstehtend, von einem Kreis sekundärer Tuberkel umgeben	grey with blackish longitudinal marblings / grau, mit schwärzlicher längsgerichteter Marmorierung	opaque / opak
<i>T. m. pallida</i> nov. subsp.	18.00, (17-19), 0.76, 7	37.57, (32-45), 4.24, 7	low, nearly flat, without secondary tubercles / niedrig, fast flach, ohne sekundäre Tuberkel	yellow, sometimes with vinous marblings / gelb, manchmal mit rankenförmiger Marmorierung	translucent / durchscheinend
<i>T. boehmei</i>	22.23, (21-23), 0.80, 26	45.83, (38-54), 3.68, 24	low, nearly flat, without secondary tubercles / niedrig, fast flach, ohne sekundäre Tuberkel	pinkish with vinous marblings / rosafarben, mit rankenförmiger Marmorierung	translucent / durchscheinend

mauritanica pallida and *T. mauritanica juliae* have been found in an area ranging from the mouth of Oued Draâ to the Youssef Ben Tachfine dam on the Oued Massa. Some of these intermediate animals have an orange iris, like the Canarian *T. angustimentalis*.

Concluding remarks: *Tarentola mauritanica pallida* nov. subsp. is extremely similar to *T. boehmei* in general habitus and body scalation, which explains some of the past confusions between these two taxa in the coastal area of south-

western Morocco (cf. supra). Nevertheless, this new form is clearly conspecific with *T. mauritanica*, as evidenced by its intergradation with *T. mauritanica juliae* in south-western Morocco. *T. boehmei* is largely sympatric with *T. mauritanica juliae* but not with *T. mauritanica pallida* nov. subsp. Wherever *T. boehmei* and *T. mauritanica* are sympatric they are thus easy to separate owing to the distinct general appearance of *T. mauritanica juliae* (nearly identical to *T. mauritanica mauritanica*), compared to *T. boehmei*.

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RÉSUMÉ

Une nouvelle forme du genre *Tarentola* est décrite du nord-ouest de l'Afrique: *Tarentola mauritanica pallida* subsp. nov. Par rapport à *T. mauritanica mauritanica* et *T. mauritanica juliae*, présentes également dans cette région, cette forme se différencie par sa coloration rosée ou jaunâtre pâle, par sa peau translucide, plus fine et moins verruqueuse, par la queue régénérée jaunâtre rehaussée ou non de marbrures violacées, par des tubercules dorsaux simples et peu élevés, non entourés de tubercules secondaires, et par un nombre de lamelles sous-digitales légèrement inférieur. Sa coloration rappelle celle de *T. boehmei* de laquelle elle se distingue par sa teinte générale moins franchement rosée, par un nombre de lamelles sous-digitales sous le cinquième orteil diagnostiquement inférieur (17 ou 18 contre 21 à 23) et par un nombre d'écaillies gulaires inférieur (33 à 45 contre 42 à 53). Sa répartition géographique semble limitée à la frange atlantique du Maroc et du Sahara Occidental comprise entre l'embouchure de l'oued Draâ et l'agglomération de Dchira.

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