

A new subspecies of the Mediterranean Gecko, *Hemidactylus turcicus* from the Syrian lava desert (Squamata: Sauria: Gekkonidae)

Eine neue Unterart des Europäischen Halbfingergeckos *Hemidactylus turcicus*
aus der Syrischen Lavawüste
(Squamata: Sauria: Gekkonidae)

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KURZFASSUNG

Aus dem Gebiet der schwarzen basaltischen Lavawüste Syriens wird eine neue Unterart von *Hemidactylus turcicus* beschrieben. Sie unterscheidet sich von der nominotypischen Unterart durch (1) die mit den 2. Sublabialia in Kontakt stehenden vorderen Postmentalia, (2) höhere Mittelwerte der Anzahl der Lamellen sowohl unter der 1. als auch der 4. Zehe, (3) Lamellen in mehr oder weniger horizontaler Anordnung, (4) schwächer gekielte Rückentuberkel, (5) die Beschränkung von Wirteln mit sechs Tuberkeln auf den proximalen Schwanzabschnitt, (6) die geringere Anzahl von Präanalporen, (7) kleinere Körpermaße und (8) Färbung und Zeichnung.

ABSTRACT

A new subspecies of the Mediterranean Gecko *Hemidactylus turcicus* is described from the black Syrian basalt desert. The new taxon differs from the nominotypic subspecies in having (1) anterior postmentals in contact with 2nd lower labials, (2) higher average number of lamellae under 1st and 4th toe, (3) lamellae arranged more or less horizontally, (4) smaller and more weakly keeled dorsal tubercles, (5) the number of 6 longitudinal rows of tail tubercles restricted to the proximal part of tail, (6) lower number of preanal pores, (7) smaller body size, and (8) different colour pattern.

KEY WORDS

Reptilia, Squamata, Sauria, Gekkonidae, *Hemidactylus turcicus*, Syria

Six specimens of *Hemidactylus turcicus* (LINNAEUS, 1758) were collected during the herpetological investigations in the Syrian volcanic desert in 1994 and 1996. These specimens are referred to a new sub-

species the name of which is derived from the name of the black, volcanic lava desert, which seems to be the habitat of the new taxon.

Hemidactylus turcicus lavadeserticus ssp. n.

H o l o t y p e: [National Museum (Nat. Hist.), Prague] NMP6V 35540/1, adult female, Syria, muhafazat of Sweida, Ar'Raqiyeh (32°48' N, 37°05' E), leg. J. MORAVEC, 7 May 1996.

P a r a t y p e s: NMP6V 34831/1, adult female, 1 June 1994, same data as holotype. NMP6V 35340/2, adult female; NMP6V 35540/3, adult male; NMP6V 35540/4, subadult male; same data as holotype; [Zoologisches Forschungsinstitut und Museum Alexander Koenig] ZFMK 64409, subadult male, same data as holotype.

D i a g n o s i s a n d d e s c r i p t i o n: A subspecies of *Hemidactylus turcicus* (LINNAEUS, 1758) with: max. SVL: 48.0 mm (male), 48.5 mm (female); 14 more or less regular longitudinal rows of rather flat, feebly keeled, subtriangular to conical tubercles on the dorsum; 6-2 rather flat feebly keeled tubercles on individual segments of anterior half of tail (6 tubercles developed on 2-5 basal segments only); nostril bordered by rostral, 3 nasals and 1st upper labial; uppermost nasals separated by one smaller scale; anterior postmentals nearly as wide as long, shorter than mental,

in broad contact behind the symphysial and in contact with 1st and 2nd lower labials; digits moderately dilated, 7-8 lamellae and pairs of lamellae under the 1st toe, 10-12 under the 4th toe; adults with 9-11 ventrals on a longitudinal stretch 5 mm long; 6 preanal pores in males; head and body depressed (head depth: 35.8 - 44.6 % of head length, head width: 66.4 - 72.7 % of head length) [head length measured from snout to anterior edge of ear opening].

Adults yellowish-orange to yellowish-brown (juveniles and subadults orange with a dorsal pattern of 6 whitish crossbars (1st crossbar on the nape, 6th above the area of cloaca). In juveniles and subadults a trace of an additional narrow bar just in front of the 1st crossbar. Dark longitudinal streak in loreal and postocular area. Adults with small dark dots and irregular shadings bordering the light crossbars. Tail with a conspicuous pattern of 8-9 dark brown or black transverse bands on white or whitish background (in immature specimens the entire tail is brightly black and white, in adults the bands on basal part of the tail become less distinct). Tips of digits dark. Under-side whitish. In alcohol orange and yellow colours fade.

The new subspecies differs from *H. turcicus turcicus* (LINNAEUS, 1758) in the following characters (see table 1 and published data of BOULENGER 1885; ANDERSON 1898; WERNER 1971; LANZA 1978; SALVADOR 1981): in having (1) anterior postmentals in contact with 2nd lower labials, (2) higher average number of lamellae under 1st toe and under 4th toe, (3) lamellae arranged more or less horizontally (usually oblique in *H. t. turcicus*; figs. 1a, 1e), (4) smaller and weakly keeled tubercles, (5) the number of 6 longitudinal rows of tail tubercles restricted to the proximal part of tail, (6) lower number of preanal pores, (7) smaller body size, and (8) a dif-

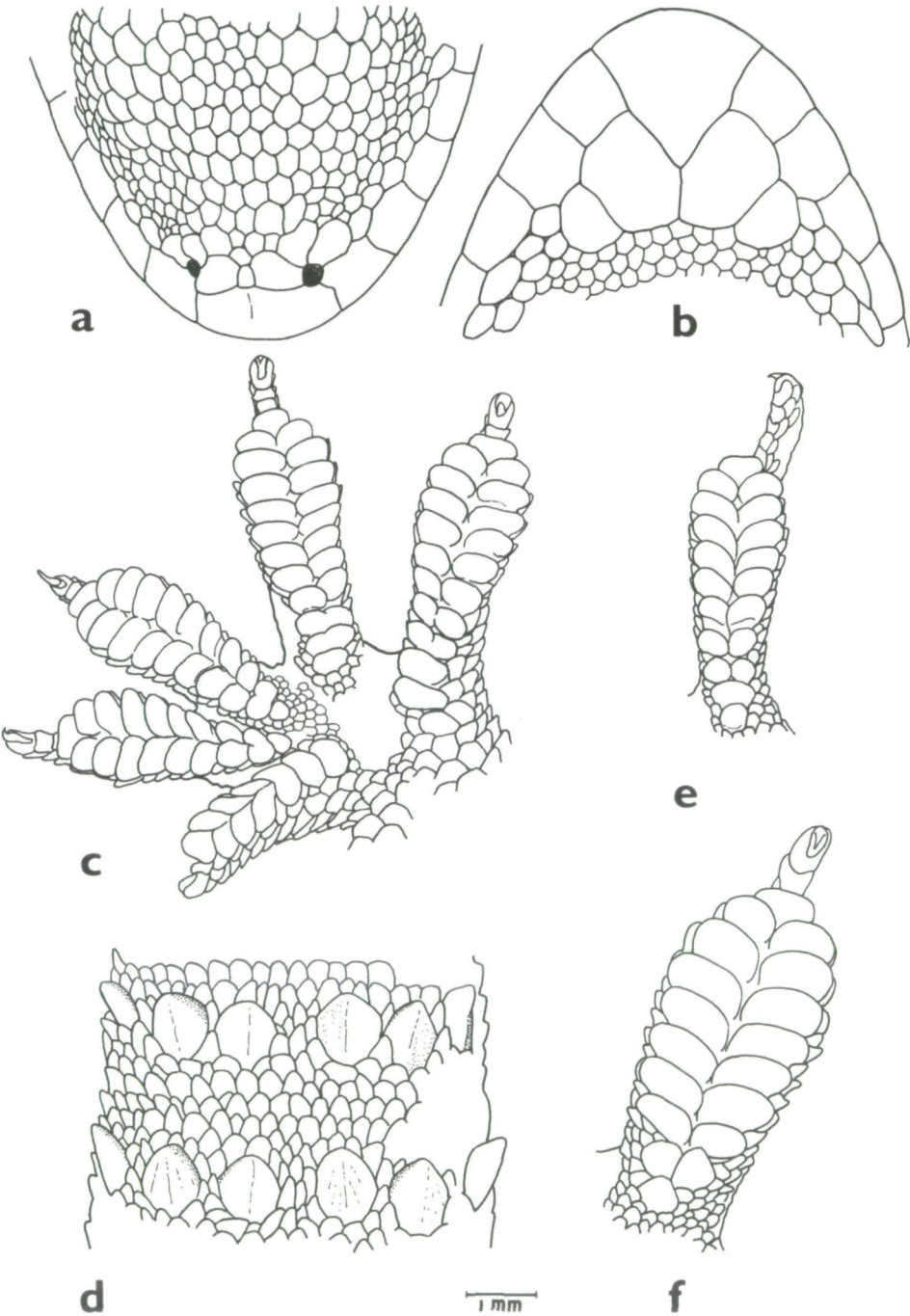
ferent colour pattern [Syrian and Jordan material of *H. t. turcicus* used for a first-hand comparison: NMP6V 34830/1-2, 34747, 34748/1-3, 34749, 35542/1-5].

Description of holotype: Snout-vent length: 47.0 mm. Tail length: 56.0 mm. Head length: 12.8 mm. Head depth: 5.4 mm. Head width: 9.1 mm. Upper labials (left/right): 9/10. Lower labials: 8/7. Rows of dorsal tubercles: 14. Ventrals on a longitudinal stretch 5 mm long: 11. Lamellae under 1st toe: 7/7. Lamellae under 4th toe: 12/12. Nostril surrounded by rostral, 3 subequal nasals, and 1st upper labial. Uppermost nasals separated by 1 smaller scale (fig. 1a). Mental large, subtriangular. Anterior postmentals nearly as wide as long, shorter than mental, in contact with 1st and 2nd lower labials. Posterior postmentals smaller, in contact with 2nd lower labials (fig. 1b). Digits moderately dilated, with lamellae arranged in horizontal position (fig. 1c). Dorsal tubercles rather flat, feebly keeled, arranged in 14 longitudinal rows. Largest paravertebral tubercles 0.8-0.9 mm long. Tail tubercles rather flat, weakly keeled (fig. 1d), developed on anterior half of tail only (on 13 segments), arranged in 6-2 longitudinal rows (6 rows reach 3rd tail segment, 4 rows reach 9th one). Scales on underside of tail enlarged and imbricate. Colour pattern is shown in fig. 2a and corresponds to the description given above.

Description of paratypes: In general, their morphological characters correspond well to those of the holotype. Measurements and counts for five paratypes are given as follows: NMP6V 34831/1, 35540/2-4, ZFMK 64409. Snout-vent length (mm): 48.5, 47.5, 48.0, 35.0, 31.0. Tail length (mm): -, -, 55.0, 44.0, 38.0. Head length (mm): 12.4, 13.4, 13.0, 9.9, 9.8. Head depth (mm): 5.0, 4.8, 5.8, 4.3, 4.0. Head width (mm): 9.0, 9.0, 9.4, 7.2,

Fig. 1 (opposite page): a-d - *Hemidactylus turcicus lavadeserticus* ssp.n. (holotype, NMP6V 35540/1).

- a, b - dorsal and ventral views of head; c - ventral view of left foot; d - dorsal view of tail (2nd and 3rd segments).
 e - *H. turcicus turcicus* (NMP6V 34749, Salkhad, Syria, female, SVL=43.0 mm), ventral view of 4th toe (left foot).
 f - *H. yerburii yerburii* (ZFMK 43360, Yemen, female, SVL=61.0 mm), ventral view of 4th toe (left foot).
 Abb. 1 (gegenüberliegende Seite): a-d - *Hemidactylus turcicus lavadeserticus* ssp.n. (Holotypus, NMP6V 35540/1).
 a, b - Dorsal- und Ventralansicht des Kopfes; c - Ventralansicht des linken Fußes;
 d - Dorsalansicht des Schwanzes (2. und 3. Segment).
 e - *H. turcicus turcicus* (NMP6V 34749, Salkhad, Syrien, Weibchen, KRL = 43,0 mm),
 Ventralansicht der vierten Zehe (linker Fuß).
 f - *H. yerburii yerburii* (ZFMK 43360, Jemen, Weibchen, KRL 61,0 mm), Ventralansicht der 4. Zehe (linker Fuß).



6.8. Upper labials: 10/10, 10/8, 10/10, 9/10, 10/8. Lower labials: 7/7, 7/7, 8/8, 7/8, 7/7. Ventrals on a longitudinal stretch 5 mm long: 9, 10, 10, -, -. Lamellae under 1st toe: 8/8, 8/8, 8/8, 8/7, 7/7. Lamellae under 4th toe: 11/11, 12/11, 11/11, 12/12, 11/10. Pre-anal pores: 0, 0, 6, 6, 6. Tail segments bearing 6 tubercles: 2, 3, 3, 5, 3. Colour pattern is shown in figs. 2b, 2d (juvenile specimen NMP6V 34831 /2, fig. 2c, was not included in the type series because of artificial incubation).

Habitat and notes on biology: The type locality lies in a typical black basalt desert region. All specimens were collected in a flat open wadi (continuation of Wadi Sham). The wadi was completely dried out and the habitat character was that of a desert. The slopes of the wadi were covered by large basalt rocks and layers of basalt stones of different size. The bottom was formed by a mosaic of flats of clay/sandy soil covered by sparse more or less dry herbaceous vegetation, stony fields and piles of stones accumulated usually around old desert wells. In 1994, the wadi was grazed by flocks of sheep and goats belonging to local bedouins. Owing to the lack of grass caused by the unusually dry period of 1995/96 bedouins left the area. In the same locality and its close vicinity *Bufo viridis* ssp., *Ptyodactylus puiseuxi*, *Acanthodactylus boskianus asper*, *Mesalina guttulata*, *Ophisops elegans blanfordi*, *Laudakia stellio picea*, *Pseudotrapelus sinaitus*, *Trapeus pallidus haasi*, *Uromastix aegyptia microlepis*, *Psammophis schokari*, and *Pseudocerastes persicus fieldi* were observed. The geckos were strictly nocturnal. During one night in 1994 and two nights in 1996 spent in the locality, two and eight specimens respectively (altogether 4 adults and 6 subadults) were observed. All animals were found on the clay/sand ground. They used to sit motionless at individual small tufts of herbs. The geckos were never seen on stones and they avoided places exposed to the wind. During both visits gravid females were collected. Two eggs obtained measured 11.4 x 8.3 and 11.2 x 8.1 mm.

Remarks: The new subspecies is known only from the type locality. It seems to be restricted to the area of black basalt to the specific conditions of which this form appears to be adapted. Since the lava desert

extends south into N Jordan and N Saudi Arabia we expect *H. t. lavadeserticus* to occur also in these two countries. Until now, only *H. t. turcicus* is known as a native representative of the genus *Hemidactylus* in the Levant states (e. g., WERNER 1988; DISI 1996; DISI & BÖHME 1996). Here, it is widespread along the Mediterranean coast and the Gulf of Aqaba. In the eastern dry parts of the Levant the scattered populations are more or less isolated, and there are no records from the area of the lava desert proper (eastwards, in Iraq, *H. turcicus* is replaced by the bigger *H. persicus* J. ANDERSON, 1872). During the herpetological investigation carried out in the Levant by J. M. in 1993-96, the nearest *H. t. turcicus* was found at the western and southern border of the volcanic area (Syria: Salkhad [ca. 50 km W of the type locality of *H. t. lavadeserticus*], Bosra ash Sham; Jordan: Azraq). Northeast of the lava desert, *H. t. turcicus* was collected in Palmyra (Syria). No intermediate colour forms were found between *H. t. turcicus* and *H. t. lavadeserticus* at the localities mentioned (see also WERNER 1971). The taxonomy and nomenclature of the Arabian geckos usually referred to *H. turcicus* is not yet resolved. LANZA (1978) used the name *H. parkeri* LOVERIDGE, 1936, for this population. ARNOLD (1980) and FRITZ & SCHÜTTE (1987) discussed the status of Arabian populations and used the trinomial *H. turcicus parkeri*. Later, ARNOLD (1986), SCHÄTTI (1989) and SCHÄTTI & GASPERETTI (1994) preferred to use the specific name *H. turcicus* in its broad sense until clarification of the problem. Contrary to this, SALVADOR (1981) treated these Arabian geckos as a full species and emphasized that *H. robustus* HEYDEN, 1827, appears to be an available name for them. On the other hand, KLUGE (1993) considered *H. parkeri* as a valid name and placed *H. robustus* in the synonymy of *H. turcicus*. The examination of the ZFMK material of *H. robustus* from Yemen led us to the conclusion that this population represents a species distinct from both *H. t. turcicus* and *H. t. lavadeserticus*. It differs markedly from both of these subspecies inter alia in its robust head, body and tail, in very small weakly keeled tail tubercles and in an inconspicuous colour pattern (table 1, fig. 3)

Table 1: Comparison of biometry of *Hemidactylus turcicus lavadeserticus* ssp.n., *H. t. turcicus*, *H. persicus*, *H. robustus* and *H. y. yerburii*. * - Data according to LANZA (1978); n - sample size; SD - standard deviation; Max. SVL - maximum snout vent-length.

Tab. 1: Biometrischer Vergleich von *Hemidactylus turcicus lavadeserticus* ssp.n., *H. persicus*, *H. robustus* und *H. y. yerburii*. * - Werte nach LANZA (1978); n - Stichprobenumfang; mean - Mittelwert; range - Spannweite; SD - Standardabweichung; Max. KRL - maximale Kopf-Rumpflänge.

Character Merkmal	Hemidactylus													
	<i>t. lavadesert.</i> Syria		<i>t. turcicus</i> Syria-Jordan		<i>t. turcicus</i> * Mediterr.		<i>persicus</i> Iraq-Iran		<i>robustus</i> Yemen		<i>cf. robustus</i> Iran		<i>yerburii</i> Yemen	
	n	mean range SD	n	mean range SD	n	mean range SD	n	mean range SD	n	mean range SD	n	mean range SD	n	mean range SD
Upper labials	6	9.5	13	8.9	74	8.4	4	11.6	6	9.3	3	9.7	6	11.0
Supralabialia		8-10 0.80		8-10 0.63		7-10 -		11-12 0.52		8-10 0.62		9-10 0.52		10-11 0.60
Rows of dorsal tubercles	6	14.0	13	14.1	-	-	4	15.5	6	16.0	3	14.7	6	15.7
Reihen von Rücken- tuberkeln		14 0.00		13-16 0.64		-		14-18 1.00		16 0.00		14-16 1.16		14-18 1.51
Lamellae under 1st toe	6	7.6	13	6.8	142	6.2	4	9.5	6	6.0	3	6.2	6	7.0
Lamellen an der Un- terseite der 1. Zehe		7-8 0.52		6-7 0.43		5-7 -		8-10 0.93		6 0.00		5-7 0.75		6-8 0.45
Lamellae under 4th toe	6	11.3	13	10.3	144	9.6	4	13.3	6	9.8	3	10.0	6	10.8
Lamellen an der Un- terseite der 1. Zehe		10-12 0.65		9-11 0.65		8-11 -		12-14 0.89		9-10 0.39		9-11 0.89		10-11 0.39
Tail segments bearing 6 tubercles	6	3.2	8	7.6	-	-	2	7.0	4	2.5	2	5.0	5	9.6
Schwanzsegmente mit 6 Tuberkeln		2-5 0.98		6-9 1.30		-		7 -		1-4 1.29		5 -		8-13 2.00
Preanal pores	3	6.0	7	8.1	58	6.8	3	8.0	3	6.0	1	6.0	4	12.5
Präanalporen		6 -		6-10 1.22		5-9 -		8 -		6 -		6 -		11-14 1.29
Head depth x 100 / head length	6	41.2	13	44.8	-	-	3	45.6	6	51.9	-	-	6	46.5
Kopfhöhe x 100 / Kopflänge		35.8-44.6 3.08		37.8-47.8 2.95		-		45.1-45.9 0.42		49.6-57.6 2.95		-		39.8-50.3 4.04
Head width x 100 / Head length	6	70.8	13	74.2	-	-	3	76.7	6	79.9	-	-	6	82.5
Kopfbreite x 100 / Kopflänge		66.4-72.7 2.47		69.0-78.8 3.25		-		73.5-80.0 3.25		77.5-84.8 2.87		-		75.0-88.9 4.54
Both postmentals in contact with 2nd lower labials (%)	100		15.4		35.0		0.0		33.3		100		100	
Beide Postmentalia in Kon- takt mit den 2. Unterlippen- schildern (%)														
Max. SVL males (mm)	48.0		49.0		57.5		55.5		48.0		-		72.0	
Max. KRL Männchen (mm)														
Max. SVL females (mm)	48.5		56.0		59.0		65.0		48.0		-		70.0	
Max. KRL Weibchen (mm)														

[Yemen material examined: ZFMK 43401, 43415, 43417, 43431, 43438, 43444]. Thus, we follow SALVADOR (1981) and LANZA (1990) and use the name *H. robu-*



2a 2b
2c 2d



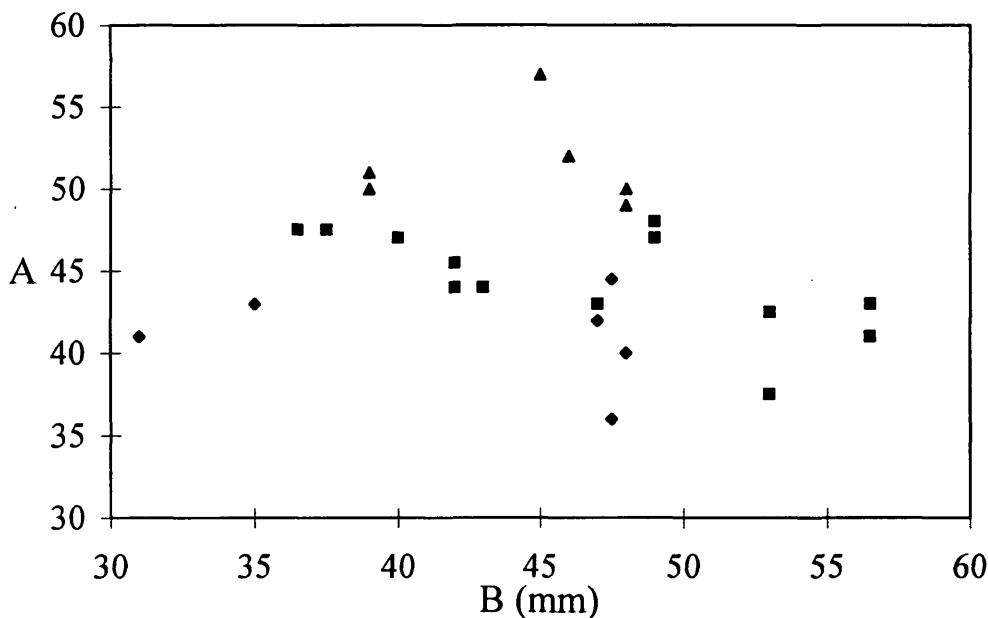


Fig. 3: Comparison of (Head depth $\times$ 100 / Head length) [=A] versus snout-vent length [=B] in *H. t. turcicus* (squares), *H. t. lavadeserticus* ssp.n. (rhomboids) and *H. robustus* (triangles).

Abb. 3: Vergleich von (Kopfhöhe $\times$ 100 / Kopflänge) [=A] gegenüber der Kopf-Rumpflänge [=B] bei *H. t. turcicus* (Vierecke), *H. t. lavadeserticus* ssp.n. (Rhomben) und *H. robustus* (Dreiecke).

stus for the Arabian population. According to SALVADOR (1981) the Arabian population of *H. robustus* is conspecific with the Pakistan geckos referred formerly to *H. turcicus karachiensis* MURRAY, 1884. We examined three subadult specimens (NMP6V 35543/1-3) from the Iranian island Larak (Strait of Hormuz) (see table 1) but it appears that a further more detailed comparative study is necessary to confirm this point of view. Nevertheless, *karachiensis* is markedly different from *H. t. lavadeserticus* both in scalation and colour pattern. For information, we include also a brief comparison of *H. t. lavadeserticus* with Arabian species of *Hemidactylus* which possess enlarged dorsal tubercles. *H. t. lavadeserticus* differs from them in the following character combination: From

H. persicus J. ANDERSON, 1872 in lower number of upper labials, lower number of lamellae under 1st toe, lower number of lamellae under 4th toe, lower number of preanal pores, more frequent occurrence of anterior postmentals in contact with 2nd lower labials, smaller body size, smaller head depth / head length ratio, smaller head width / head length ratio, less dilated digits and in colour pattern (see NADER & JAWDAT 1976 and table 1) [material examined: NMP6V 33082/1-3, 35545]; from *H. sinaitus* BOULENGER, 1885 in higher number of lamellae under 1st toe, higher number of lamellae under 4th toe, in having smaller and weakly keeled tubercles, having uppermost nasals separated by smaller scales, having enlarged scales on underside of tail, more dilated digits, and

Fig. 2 (opposite page): a - Holotype of *Hemidactylus turcicus lavadeserticus* ssp.n. (upper individual) compared with *H. t. turcicus* (NMP6V 35542/2, female, Bosra as Sham, Syria); b - *H. t. lavadeserticus* ssp.n. (male NMP6V 35540/3); c - *H. t. lavadeserticus* ssp.n. (juvenile NMP6V 34831/2, SVL=26.0 mm); d - *H. t. lavadeserticus* ssp.n. (subadult male ZFMK 64409) (lower individual) compared with *H. t. turcicus* (subadult male NMP6V 35541, Azraq, Jordan).

Abb. 2 (gegenüberliegende Seite): a - Holotypus von *Hemidactylus turcicus lavadeserticus* ssp.n. (oberes Tier) im Vergleich zu *H. t. turcicus* (NMP6V 35542/2, Weibchen, Bosra as Sham, Syrien); b - *H. t. lavadeserticus* ssp.n. (Männchen NMP6V 35540/3); c - *H. t. lavadeserticus* ssp.n. (Jungtier NMP6V 34831/2, KRL = 26,0 mm); d - *H. t. lavadeserticus* ssp.n. (halbwüchsiges Männchen ZFMK 64409) (unteres Tier) im Vergleich zu *H. t. turcicus* (halbwüchsiges Männchen NMP6V 35541, Azraq, Jordanien).

in colour pattern (see BOULENGER 1885; LOVERIDGE 1947; LANZA 1972; ARNOLD 1986); from *H. yerburii yerburii* J. ANDERSON, 1895 in lower number of upper labials, lower number of preanal pores, in having flat and weakly keeled tubercles, much smaller body size, smaller head width / head length ratio, less dilated digits (fig. 1f), and in colour pattern (see table 1 and FRITZ & SCHÜTTE 1987) [material examined: ZFMK 34456, 43354, 43356-8, 43385]. ARNOLD (1980, 1986), however, considers *H. yerburii* as extremely variable species. This author reports on Oman populations of *H. yerburii* with small snout-vent length (up to 54 mm) and low number of preanal pores (5-6) and on a

population which inhabits Yemen highlands having very small often unkeeled tubercles. In some features, these insufficiently known forms could perhaps resemble the subspecies of *H. turcicus* described. Considering the close relationship of the new Syrian form to *H. turcicus*, its parapatric character of distribution with *H. t. turcicus* and its probably endemic occurrence in the black volcanic desert, we - for the present - prefer to assign a subspecific status to this new form and describe it as a subspecies of *H. turcicus*. We consider it a parallel to *Laudakia stellio picea* PARKER, 1935 which seems to be a good example of an endemic reptile subspecies adapted to Syrian and Jordan lava desert.

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