

# Generic reassessment and validity of the recently described species *Cyrtopodion dehakroense*

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**Abstract.** The new arboreal gecko species from Pakistan, *Cyrtopodion dehakroense* Masroor, 2009, was recently described. Here we document that based on external morphology (meristic and measurable morphological characters), this form is a member of the genus *Mediodactylus*. Moreover, the newly described species is morphologically and ecologically very similar to *Mediodactylus sagittifer*, which suggests that both forms could be conspecific.

**Keywords.** Gecko, Middle East, Pakistan, taxonomy.

The taxonomy of the genus *Cyrtopodion sensu lato* Fitzinger, 1843 has been substantially revised in recent years (for a brief history of understanding of the species content of the genus see e.g., Krysko et al. 2007; Červenka et al. 2008). For example, Khan (2003) attempted to resolve the complex situation in circum-Indus species of the genus *Cyrtopodion* using morphological characters and separated some species into three newly established genera (*Altigecko*, *Indogekko*, *Siwaligecko*). Possible phylogenetic relationships of these genera were suggested by Khan (2009). The analyses of allozymic data (Macey et al. 2000) and of the sequences of mitochondrial markers (Červenka et al. 2008) supported monophyly and the full generic status of *Mediodactylus* Szczerbak et Golubev, 1977, which was previously treated as a subgenus of *Cyrtopodion* (e.g., Szczerbak and Golubev 1986). Inclusion of *Mediodactylus* into the genus *Cyrtopodion* would make the genus *Cyrtopodion* paraphyletic. Several new species of the genus *Cyrtopodion sensu lato* have been recently discovered (e.g., Krysko et al. 2007; Nazarov and Rajabizadeh 2007; Masroor 2008).

Masroor (2009) described the new arboreal species *Cyrtopodion dehakroense* from southern Pakistan based on several morphological characters. The description contains comparison of this form with species of the genus *Cyrtopodion sensu lato* known in Pakistan.

Nevertheless, morphology of the new species perfectly fits in Anderson's (1999) definition of the genus *Mediodactylus* (assigned by him as "the *kotschyi* group" of the genus *Cyrtopodion*): "caudal tubercles, six to each annulus, do not form terminal row, but are distributed around middle of each caudal segment; no subfemoral tubercles; dorsal tubercles strongly keeled, trihedral, larger than interspaces; peritoneum unpigmented; 13–23 lamellae under fourth toe; preanal pores only; adults usually less than 55 mm snout-vent length." The number and position of tubercles on each caudal segment could be taken as the main synapomorphy of the genus *Mediodactylus*. According to the photos in Masroor (2009), *C. dehakroense* also possesses this character.

The author differentiates the new species from geckos of the genus *Mediodactylus* by few characters: "dorsal tubercles (strongly keeled versus smooth), transverse rows of enlarged subcaudals (2 versus 1), precloacal pore counts (4 versus 4–6) and TL/SVL ratio (0.73–0.75 versus 0.69–0.80)" (Masroor 2009). However, keeled dorsal tubercles are typical for the genus *Mediodactylus* (e.g., Anderson 1999; Szczerbak and Golubev 1986). The nature of transverse rows of enlarged subcaudals is variable in the genus *Mediodactylus*. For example, *Mediodactylus kotschyi* (Steindachner, 1870) has only one row, *Mediodactylus sagittifer* (Nikolsky, 1900) has two rows, and there is no clear continual row of subcaudals in *Mediodactylus heterocercus* (Blanford, 1874). Neither of the other two mentioned characters have specific discriminative value, because the states given for *C. dehakroense* form subsets of those reported for the genus *Mediodactylus*. We can specify that

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**Figure 1.** *Mediodactylus sagittifer* from Iranian Baluchestan. Photo by Milan Kaftan.

**Table 1.** The comparison of the measurable and meristic characters of *Cyrtopodion dehakroense* and *Mediodactylus sagittifer*. All measurements are given in mm.

Source	<i>C. dehakroense</i>		<i>M. sagittifer</i>
	Masroor 2009	Szczerbak & Golubev 1986	own data
Number of examined males	7	3	2
Number of examined females	1	2	2
Head width	5.9–6.6	-	5.7–6.8
Snout-eye distance	3.8–4.3	-	2.7–3.0
Orbital diameter	2.0–2.2	-	2.6–3.2
Trunk length	13.9–15.1	-	12.7–14.1
Snout-vent length	32.6–36.0	24.1–31.9	30.2–32.8
Supralabials	10–13	9–10	10–11
Infralabials	7–9	7–8	7–8
Postmentals	3	-	3
Interorbital scales	16–18	14–15	15–19
Longitudinal rows of tubercles	10–12	-	11–12
Scales around dorsal tubercles	10–12	12–13	11–14
Paravertebral tubercle rows	22–24	-	23–25
Midventrals	92–102	83–88	89–100
Scales across belly	21–25	16–19	18–20
Precloacal pores	4	4	4
Lamellae under digit IV Manus	12–16	-	15–18
Lamellae under digit IV Pes	18–23	18–19	17–20

the counts of preloacal pores vary within the genus *Mediodactylus* from two to six (e.g., Szczerbak and Golubev 1986; Anderson 1999).

The new form fits well into the genus *Mediodactylus* also ecologically. Arboreality is not typical for members of the genus *Cyrtopodion*; however, it is not unusual for some members of the genus *Mediodactylus*. For example, Werner (1993) documented arboreality in Israeli populations of *Mediodactylus kotschyi orientalis* (Štěpánek, 1937) and *M. sagittifer* is a typical arboreal species (Anderson 1999; pers. obs.; Figure 1). The species *M. sagittifer*, known only from Iranian Baluchestan, inhabits an environment very similar to that described for *C. dehakroense*. Although the type localities of these two forms are about 800 km apart, the morphological similarity between them is striking. Anderson (1999) compiled the detailed diagnosis of *M. sagittifer*: “Dorsal tubercles oval, keeled; diameter of ear opening smaller than half longitudinal diameter of eye; anterior pair of enlarged postmentals in contact; no subfemoral tubercles; males with 2–4 preanal pores; subcaudal scales one head-width behind vent small, keeled, not forming large plates; 14–16 abdominal scales across middle of belly (9–12 scales in a distance across belly equal to length of snout).” This diagnosis seems to be consistent with the description of *C. dehakroense*. We find broad overlap in values of the majority of meristic and measurable morphological characters reported for *C. dehakroense* and *M. sagittifer* in published literature and in our own data (summarized in the Table 1). Out of the only three characters which do not overlap, two (snout-eye distance and orbital diameter) are plastic characters varying with age. Moreover, character variability is further enhanced by very small size and thus small measurement repeatability and accuracy, especially when taken by different persons. The third character, number of scales across belly, depends on personal choice from where to start counting ventrals, distinguishing them from laterals, and the differences observed between *C. dehakroense* and *M. sagittifer* are minimal.

Based on morphological and ecological similarities, we thus cannot exclude the possibility that *C. dehakroense*

is conspecific with *M. sagittifer*. The data accumulated to date do not support the validity of the newly described species. Nevertheless, more detailed studies preferably with molecular markers will be needed to make a final decision.

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