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An Anomaly of Pecten in *Mesobuthus turcicus* Kovařík et al., 2022 (Scorpiones: Buthidae)

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Abstract: An anomaly was recorded in the pecten shape of the scorpion species *Mesobuthus turcicus* Kovařík et al., 2022 that was recently described from Türkiye. In this case, it is observed that marginal and median lamellae and fulcrae are fused in the right pecten. For this reason, the pecten is bent counter clockwise. Different from other pectinal anomalies, the size of teeth is developed normally but teeth number is fewer. This teratological anomaly on pecten is described and illustrated. This is the first report of pecten anomaly based on marginal and median lamellae.

Keywords: Teratology, Türkiye, first report, scorpion.

Mesobuthus turcicus Kovařík et al., 2022'ta bir pektin anomalisi (Scorpiones: Buthidae)

Öz: Yakın zamanda Türkiye'den tanımlanan *Mesobuthus turcicus* Kovařík et al., 2022 akrep türünün pekten şeklinde bir anomali kaydedilmiştir. Bu vakada sağ pektende marjinal ve medyan lameller ve fulkraların kaynaştığı gözlenmiştir. Bu sebeple pekten saat yönünün tersine bükülmüştür. Diğer pektin anomalilerinden farklı olarak diş boyutları normal gelişmiştir ancak diş sayısı daha azdır. Pekten üzerindeki bu teratolojik anomali tanımlanmış ve resimlendirilmiştir. Bu, marjinal ve medyan lamellerden kaynaklanan ilk pekten anomalisinin raporudur.

Anahtar kelimeler: Teratoloji, Türkiye, ilk rapor, akrep.

Anomalies on scorpion body occurring during embryonic development cause teratologic disorders (Yağmur et al., 2021). Anomalies may be deformations (malformations) on body parts of the scorpion body. Some parts may be absent; in addition, duplications, division or fusion may be seen on some scorpion parts. Duplications cases were reported by Berland (1913), Karataş & Kürtüllü (2006), and Teruel & Baldazo-Monsivaiz (2015) on prosoma, pedipalp, and pectinal organs, respectively. Metasoma, vesicle, and aculeus duplications are most common duplication types reported by many scholars (Alqahtani & Badry, 2021; Berland, 1913; Briseño, 1963; Campos, 1918; Galvis & Flórez-D., 2016; Lourenço & Hypolite, 2010; Sadine, 2021; Salabi et al., 2021; Seiter & Teruel, 2014; Sergent, 1946; Shulov & Amitai, 1955; Sissom & Shelley, 1995; Vachon, 1952, 1953, 1972; Williams, 1971). Pedipalp fusion was reported by Cao & Solórzano (1991) and pedipalp malformation cases were reported by Mattoni (2005), Graham (2006), and Jahanifard et al. (2008).

Fusion and division cases on carapace and tergites were reported by Armas (1976), Teruel (2003) and Mattoni (2005); pedipalp fusion by Cao & Solórzano (1991); leg malformation by Armas (1977); pectinal malformation by Ayrey (2011) and Šarić & Tomić (2020), and pedipalp malformation by Mattoni (2005), Graham (2006), and Jahanifard et al. (2008). In addition, Jahanifard et al. (2008) reported a vesicle malformation case and David (2012) reported a leg absence. Teruel (2003) compiled pedipalp, tergite, and cheliceral anomalies. Yağmur et al. (2021) reported a malformation on chelicera.

Only a few anomaly cases reported on scorpion pectins. Teruel & Baldazo-Monsivaiz (2015) reported a pectinal duplication based on gynandromorphism but pectins were well developed. Ayrey (2011) and Šarić & Tomić (2020) reported malformation on pectines. Ayrey (2011) reported that a pectinal anomaly on a female *Vaejovis lapidicola* on both two pectines. Pectins of the specimen are quite shriveled and shorter than the normal pectines. The abnormal pectines have significantly shorter anterior lamellae than the normal pectens. On the abnormal pectens the tooth area is abnormal, large majority of the teeth are fused into a single irregularly shaped sclerite but only the most distal tooth developed. Šarić & Tomić (2020) reported in the scorpion *Euscorpius* sp. that some pecten teeth are fused or malformed. They also reported that some of the fulcra are also malformed.

Mesobuthus turcicus was described by Kovařík et al. (2022) just recently from Konya (Karapınar District), Türkiye in two localities. This species is known in these two localities. The adult female of *M. turcicus* (Figs. 1A-B) was collected from Meke Salt Lake, Karapınar, Konya Province, Türkiye (37°41'39"N 33°38'33"E, 1033 m, 09.07.2021, leg. E. A. Yağmur & Ö. Sipahioğlu, AZMM/Sco-2021:18). This specimen was collected with type specimens of *M. turcicus*. It is preserved in 96% ethanol and deposited in AZMM (Alaşehir Zoological

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Museum, Manisa Celal Bayar University, Alaşehir, Manisa, Türkiye). Identification of the specimen was done according to Kovařík et al. (2022). Terminology for pectines follows Hjelle (1990).

The examined specimen has an abnormal right pectin whereas left pectin is normal (Figs. 2A-B). The pectines are comb-like sensory organs which are present only in scorpions. The pectines consist of three marginal lamellae and a variable number of median lamellae, fulcra, and pectinal teeth (Hjelle, 1990). An area called the peg sensilla is always located at the anteroventral edge of each pectinal tooth (Hjelle, 1990). Besides, the pectines generally are with various macrosetae and microsetae (Hjelle, 1990). The normal pecten has 3 marginal lamellae, 7 median lamellae, 21 fulcra and 21 pectinal teeth. Besides there are numerous macrosetae and microsetae on marginal lamellae and median lamellae. All marginal and median lamellae and fulcrae are fused (except one fulcrum exist on proximal of the pecten) but size of teeth is developed normally. Therefore, the pecten is bent counter clockwise; besides, the teeth number is fewer. The abnormal pecten has 11 teeth whereas normal pecten has 21 teeth. Numerous setae present on normal pecten. Only one seta was detected on fulcrum and six setae on the rest of the abnormal pecten (Figs. 3A-B).

A few cases of pectinal anomaly have been reported up to now. Teruel & Baldazo-Monsivaiz (2015) reported a pectinal duplication because of gynandromorphism. There are two couple pectens in this case that normally developed. The cases of Ayrey (2011) and Šarić & Tomić (2020) are simply about fusion of teeth. The teeth sizes and shapes are normal and they are not fused but fewer in number in this case. Pectens are not bent and some teeth are fused in the cases by Ayrey (2011) and Šarić & Tomić (2020) that is different from our case. This is the first report of the anomaly based on undeveloped marginal lamellae and median lamellae.

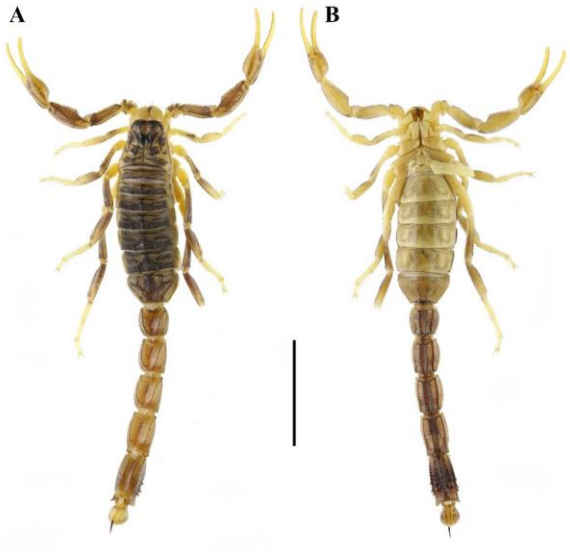

Figure 1. Female *Mesobuthus turcicus*. A. Dorsal view. B. Ventral view. Scale bar: 10 mm.

Ethics committee approval: Ethics committee approval is not required for this study.

Conflict of interest: The authors declare that there is no conflict of interest.

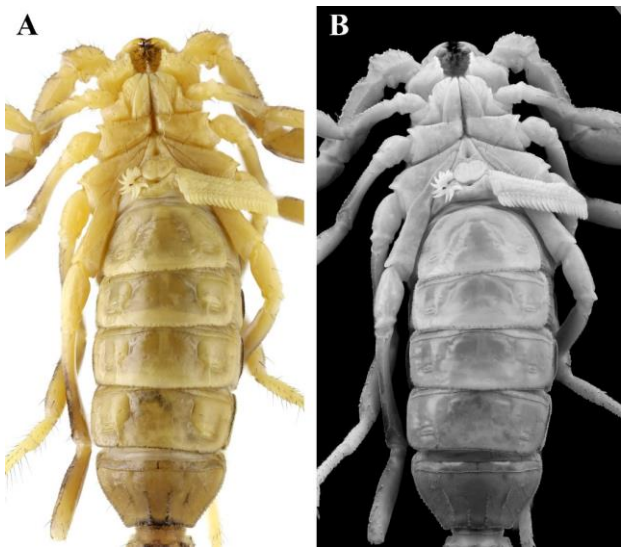

Figure 2. Carapace and mesosoma of ventral view of *Mesobuthus turcicus*. A. Under white light. B. Under UV light.

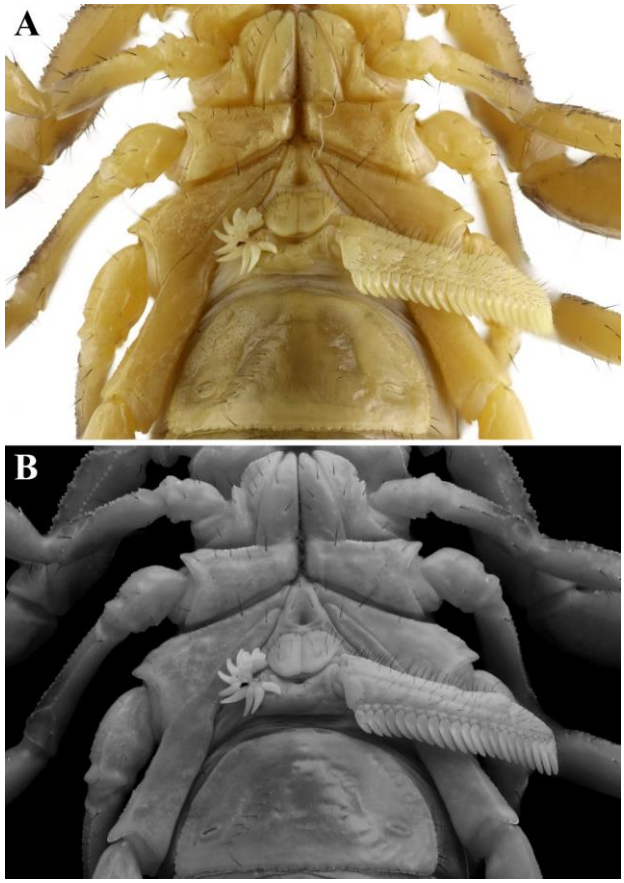

Figure 3. ventral view of coxosternal area of *Mesobuthus turcicus*. A. Under white light., B. Under UV light.

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