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New records of teratology in *Helichus suturalis* LeConte, 1852 (Coleoptera: Dryopidae) from the Baja California peninsula, Mexico

Nuevos registros de teratología en *Helichus suturalis* LeConte, 1852 (Coleoptera: Dryopidae) de la península de Baja California, México

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ABSTRACT

We present two cases of teratology in *Helichus suturalis* LeConte, 1852 and a compilation of teratological records for aquatic Coleoptera.

Keywords: Anomaly, malformation, ontogeny, aquatic beetles, Mexico.

RESUMEN

Presentamos dos casos de teratología en *Helichus suturalis* LeConte, 1852 y una recopilación de registros teratológicos en coleópteros acuáticos.

Palabras clave: Anomalía, malformación, ontogenia, escarabajos acuáticos, México.

The study of teratology in insects has a long history, supported by the works of leading researchers such as Jean Balazuc (1948), Ernesto Dallas (1936), and Vicente Ortuño (2000) who have dedicated continued efforts to the study of somatic anomalies. However most of these reports are only of a descriptive nature. A detailed taxonomic foundation for individuals bearing abnormalities or malformations offers a robust foundation that provides reliable information on endogenous and exogenous factors affecting an organism development (Savini and Furth 2004; Ortuño and Abuin 2008).

Among the numerous deformities documented, Balazuc (1948) classified them into four main categories: 1) general anomalies, 2) anomalies in the body, 3) anomalies in the appendages, and 4) anomalies in the elytra and wings. Of the several teratological cases that have been recorded in Coleoptera, most of them are from families such as Scarabaeidae, Cleridae, and Cerambycidae (Márquez and Sierra-Martínez 2008; Lür 2019; Barria et al. 2020; López and Baena 2023). In contrast, information about anomalies in aquatic Coleoptera is rather scarce. In his synthetic work “La Tératologie des Coléoptères et expériences de transplantation sur *Tenebrio molitor* L.,” Balazuc (1948) collects information on different cases observed in species of the family Dytiscidae. One of the few more recent records is that by Greñ and Lubecki (2019) in Iceland, who observed

deformities on antennae in several individuals of the families Dytiscidae and Haliplidae, as well as anomalies on elytral striation in a species of the family Hydrophilidae.

MATERIAL AND METHODS

During an expedition in October 2023 to the Baja California peninsula, Mexico, a total of 717 specimens of the family Dryopidae were collected at six different sites, and later inspected for body anomalies in the laboratory. Of these, 649 belonged to the genus *Postelichus*, while 68 belonged to *Helichus* with two of the latter presenting an anomaly. Identification to genus level was based on the key of White and Short (2019), with species identification based on Brown (1976). To identify what type of teratology an individual presented, we used the terminology and classification of Balazuc (1948). High resolution photography to record malformed individuals was obtained through a motorized Zeiss AxioZoom V16 stereomicroscope from Laboratorio de Microscopía y Fotografía de la Biodiversidad II, IBUNAM, and specimens examined are deposited in Colección Nacional de Insectos (CNIN), Instituto de Biología, Universidad Nacional Autónoma de México.

RESULTS

Two male specimens of *Helichus suturalis* LeConte were found to hold a malformation, both collected in

Ensenada, Myke's Sky Rancho, on the banks of the San Rafael River, 200 meters below the waterfall, with coordinates 31°05.848'N, 115°37.325'W, at 1,224 m.a.s.l. Both specimens presented teratology of the unilateral cystelity type.

Description (Fig. 1). In one individual, a conspicuous (ca. 1/5 length of elytron) vesicle with rounded appearance, reddish, paler than rest of elytron, with surface mostly smooth, was detected (Fig. 1A). This deformation is placed close to the sutural line on the lateral mid region of right elytron (Fig. 1B). The vesicle is located on the inner part of the elytron, displaying a semi-translucent and generally rough texture (Fig. 1C); in its interior it holds a black thread-like body that appears to be foreign, of unknown nature (Fig. 1C, zoom). This teratology resulted in a deformation of striae and shortening of the right elytra.

In a second specimen, cystelity is present in the left elytron, with vesicle having a semi-rectangular shape, being adjacent to the sutural line and, unlike the previous case, vesicle is narrow-elongate, smaller (Fig. 1D-E). The vesicle presents a smooth surface as well, however it is dark as rest of elytron (Fig. 1E-F). According to Balazuc (1948) this type of anomaly has not received in-depth attention, he adds that the content of these vesicles could be liquid. Another aspect he points out is that these teratologies are produced before hardening of the integument.

DISCUSSION

To date, no previous cases of malformation have been recorded in *Helichus suturalis*, neither in any other species of Dryopidae as far as we know, suggesting that this phenomenon may be infrequent, as this is a widespread and commonly sampled insect group in aquatic macroinvertebrate survey studies. In order to complement and facilitate information of formerly reported cases, and type of anomaly, we have included a list of teratologies in aquatic Coleoptera and their references (Table 1). The number of records, being for all countries, is noticeably small, possibly because of a combined low prevalence in nature, as well as the little attention paid to these phenomena. Of 13 species of aquatic beetles with records of teratology, all of them have an Old World distribution, except *Colymbetes dolabratus*, *Haliphus fulvus*, and *Cercyon littoralis*, which are also distributed in North America, plus the species herein treated (*H. suturalis*), which is distributed in North and Central America. Further research may shed light on whether teratology on aquatic beetles has received more attention in Old World countries, or whether this is an actual tendency of geographic prevalence.

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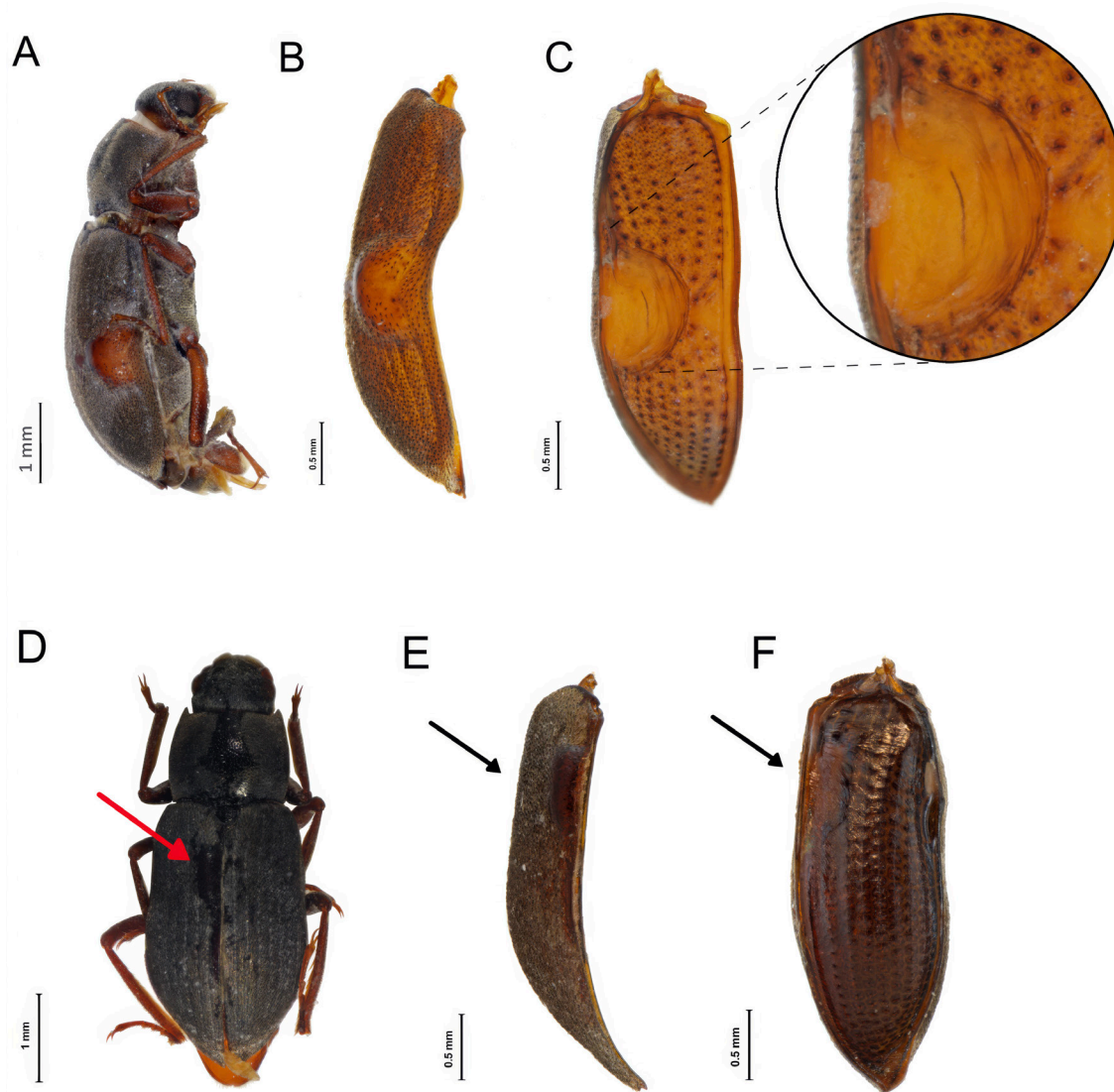


Figure 1. *Helichus suturalis*, A-C specimen 1, D-F specimen 2. A) habitus, right; B) right elytron, lateral; C) right elytron, inner, plus zoom; D) habitus, dorsal; E) left elytron, lateral (outer); F) left elytron, inner. Arrow points anomaly.

Table 1. Selected teratological cases reported for aquatic Coleoptera.

Family	Species	Type of anomaly or affected part and description	Reference
Dryopidae	<i>Helichus suturalis</i>	Cystelitry (characterized by the presence of single or multiple vesicles arranged symmetrically)	This study
	<i>Helichus suturalis</i>	Cystelitry	This study
Dytiscidae	<i>Agabus bipustulatus</i>	Anomaly in antenna	Greñ and Lubecki (2019)
	<i>Agabus didymus</i>	Ternary schistomelia (occurs when one appendage branches into three)	Schaefflein (1987)
	<i>Agabus guttatus</i>	Mesomelia (occurs when an additional limb is inserted between two normal limbs)	Schaefflein (1987)
	<i>Cybister limbatus</i>	Hysterotely (metamorphosis of a larva into a pupa, a pupa into an imago in which some organs or body parts remain in the larval stage)	Westwood (1879)*
	<i>Colymbetes dolabratus</i>	Anomaly in antenna	Greñ and Lubecki (2019)
	<i>Dytiscus marginalis</i>	Gynandromorphism (specimens showing characteristics of both sexes)	Dabbert (1923)*
	<i>Dysticus marginalis</i>	Gynandromorphism	Westwood (1843)*
	<i>Dysticus laticornis</i>	Gynandromorphism	Kolbe (1913)*
	<i>Graphoderus bilineatus</i>	Hysterotely	Havelka and Winkler (1953)*
	<i>Hydroporus nigrita</i>	Anomaly in antenna	Greñ and Lubecki (2019)
	<i>Nebrioporus elegans</i> (as <i>Deronectes</i>)	Abnormal aedeagus	Balfour-Browne (1931)*
Halplidae	<i>Halplus fulvus</i>	Anomaly in antenna	Greñ and Lubecki (2019)
	<i>Halplus obliquus</i>	Anomaly in antenna	Pearce (1932)*
Hydrophilidae	<i>Cercyon littoralis</i>	Anomaly in elytra	Greñ and Lubecki (2019)
	<i>Cercyon littoralis</i>	Anomaly in palpomere	Greñ and Lubecki (2019)

*Reference taken from Balazuc (1948).