The endophallus of *Timarcha kiesenwetteri* ssp. *sagrensis* Kuntzen 1911 (Coleoptera: Chrysomelidae: Chrysomelinae)

José Miguel Vela[1]*, Mauro Daccordi[2]

Abstract - The endophallus of *Timarcha kiesenwetteri* ssp. *sagrensis* is herein described for the first time. Its morphology is simple. It has a long basal lobe and a large medial lobe which narrows progressively to a small apical diverticulum. *Timarcha kiesenwetteri* is an extremely rare species from Southern Spain. It is so rare it has been found very infrequently in the last century.

Keywords: leaf beetles, aedeagus, sclerite, Spain, Andalusia.

Riassunto - L'endofallo di *Timarcha kiesenwetteri* ssp. *sagrensis* Kuntzen 1911 (Coleoptera: Chrysomelidae: Chrysomelinae).

L'endofallo di *T. kiesenweteri* ssp. *sagrensis* è qui raffigurato per la prima volta. La sua morfologia è piuttosto semplice, con un lobo basale allungato, un ampio lobo mediano che si restringe progressivamente fino ad un piccolo diverticolo apicale. *Timarcha kiesenwetteri* è una specie molto rara che vive nel Sud della Spagna, raccolta raramente nell'ultimo secolo.

Parole chiave: Crisomeline, edeago, sclerite, Spagna, Andalusia.

INTRODUCTION

In the genus *Timarcha*, the study of the everted endophallus and its sclerite have proven to be particularly important for species diagnoses as well as for taxonomical statements. More than a half century has passed since Stockmann (1966) used the everted endophallus in a pioneering article. Petitpierre & Anichtchenko (2018, 2022), Daccordi *et al*. (2020) and Vela *et al*. (2020) have recently reinforced the significance of this structure in species distinction.

[1] Instituto Andaluz de Investigación y Formación Agraria y Pesquera, Agriculture Entomology, Cortijo de la Cruz, E-29004 Málaga, Spain.
[2] c/o Museo Civico di Storia Naturale, Lungadige Porta Vittoria 9, 37129 Verona, Italia.
E-mail: daccordimauro@gmail.com

* Corresponding author: josem.vela@juntadeandalucia.es

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Vela & Daccordi (2022) studied *Timarcha* species in the Southern part of the Iberian Peninsula. They produced illustrations of the endophallus of seven of the eight species found in that area. Although there are a few males of *Timarcha kiesenwetteri* ssp. *kiesenwetteri* Kraatz 1879 or *T. kiesenwetteri* ssp. *sagrensis* Kuntzen 1911, preserved in Museums, they are too old to be studied because the endophallus membranes are too fragile and they easily break during eversion. On the other hand, in the last fifteen years unsuccessful efforts to collect males of this species have been made by the entomologists Eduard Petitpierre (Palma de Mallorca), José Luis Lencina (Murcia), Gloria Bastazo (Málaga), and the authors of the present contribution. Recently, José Luis Lencina found a *T. kiesenwetteri* ssp. *sagrensis* male that he had overlooked in his large Coleoptera collection. The eversion of the endophallus of this specimen was therefore performed, and here described and illustrated.

It is with great pleasure that we dedicate this publication to the excellent entomologist from Milano, Carlo Leonardi. Carlo is a rigorous Chrysomelidae researcher as well as a generous and dear colleague and friend, from whom we have learned a great deal; not only from the entomology realm.

MATERIAL AND METHODS

The specimen of *Timarcha kiesenwetteri* ssp. *sagrensis* illustrated herein came from the Albacete province of Spain, Nerpio, Arroyo de Santiago de la Espada, 20/VI/2008, 1 ♂, F. Lencina & F. Albert leg. This specimen, together with the aedeagus and everted endophallus, is kept in the personal collection of José Luis Lencina (Jumilla, Murcia).

The endophallus (internal sac) was extracted following the method described in Daccordi *et al*. (2020). Photographs of the structure were taken with a Canon EOS 550D attached to a bellows with a Schneider Componon-S 50mm f/2.8 lens. Images were then processed through the focus stacking technique using the software Zerene Stacker®.

For terminology of the endophallus and sclerite, see Petitpierre & Anichtchenko (2018) and Daccordi *et al*. (2020).

RESULTS

The *T. kiesenwetteri* ssp. *sagrensis* (Fig. 1 A-B) inflated endophallus consists of a narrow, elongate basal lobe, nearly parallel, appearing as a neck which abruptly enlarges into a wider medial lobe. This part progressively narrows ending in a conical distal lobe in dorsal view (Fig. 1 A). In the lateral view it is curved upwards towards a small apical diverticulum (Fig. 1 B).

The sclerite shows a single, well developed, slightly enlarged at the middle manubrium, not divided into wings. The flagellum is longer than the manubrium.

Fig. 1 - Everted endophallus of *Timarcha kiesenwetteri sagrensis*. Dorsal view (A); lateral view (B). Scale: 2 mm. / Endofallo estroflesso di *Timarcha kiesenwetteri sagrensis*. Vista dorsale (A); vista laterale (B). Scala: 2 mm.

DISCUSSION

By its sclerite with single manubrium and type I spermatheca (Vela & Daccordi, 2022), *T. kiesenwetteri* is more closely related to other Southern Iberian species, such as *T. apricaria* Waltl 1835, *T. intermedia* Herrich-Schäffer 1838 and *T. strophium* Weise 1888 (Vela & Daccordi, 2022). The endophallus, due to the long basal lobe, is similar to that of *T. apricaria* and *T. intermedia*, although its architecture is simpler.

Timarcha kiesenwetteri is probably the rarest species in the genus worldwide. The nominotypical subspecies, of which only four specimens are known, has been found only in sites of Ciudad Real, Granada and Jaén. *Timarcha kiesenwetteri sagrensis* is distributed over the confluent areas of Southwestern Albacete, Western Murcia and Northeastern Granada. The presence of the beetle in these areas is also extremely limited at present. However, there are a few specimens of *T. kiesenwetteri sagrensis* in the Museo Nacional de Ciencias Naturales, Madrid (MNCN). They were collected by Manuel Martínez de la Escalera at the beginning of the 20th century; which suggests the species has suffered an extremely severe decline in its populations. Altogether, this made it very difficult to obtain the everted endophallus described here.

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