



## Taxonomic review of the stem-inhabiting trehala-constructing *Larinus* Dejean, 1821 (Coleoptera: Curculionidae): New species, systematics and ecology

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### Abstract

Trehala are unusual insect pupal chambers that are sweet and have been used as human food. They are formed by only four *Larinus* Dejean species which develop in plant stems. This group is revised taxonomically, and a new key is provided. A new synonymy is proposed: *Larinus nidificans* Guibourt, 1858 [= *Larinus multiguttatus* Reitter, 1901, **syn. n.**]. Lectotypes for *Larinus maculatus* Gyllenhal, 1836, *Larinus hedenborgi* Boheman, 1845, and *Larinus rudicollis* Petri, 1907 are designated. *Larinus capsulatus* **sp. n.** from northeastern Turkey is described, and a differentiating redescription of *L. rudicollis* is provided. Ecological information on the trehala-building *L. capsulatus* and *L. rudicollis* is presented. *Larinus hedenborgi* is a new record for Turkey, Iran and Egypt.

**Key words:** Curculionidae, ecology, *Larinus*, new species, taxonomic revision, trehala constructing

### Introduction

Trehala are unusual insect pupal chambers that are sweet and have been used as human food. Trehala are constructed on the outside of stems by larvae in the genus *Larinus* Dejean (Coleoptera: Curculionidae: Lixinae according to Alonso-Zarazaga & Lyal 1999), but little is known about this phenomenon. The first reference properly classifying the originator of this substance is a note by Guibourt (1858), and the subsequent literature on this topic was reviewed by Pierce (1915). Guibourt (1858) states that in the Orient the cocoon is used for food as commonly as salep and tapioca are used in France. His specimen was received from “Roumelia” and probably originated in Syria. Guibourt (1858) named the producer of these cocoons *Larinus nidificans* Guibourt, and this constitutes, according to art. 72.5.1 of the Code (ICZN 1999), a valid description. Pierce (1915) following Berthelot (1858), reported that the substance in trehala is analogous to sugar cane. According to his investigations, it appeared that the cocoons are composed of a large proportion of starch, identical with that found in the stem of *Echinops* L. (Asteraceae) upon which the insect forms its nest. They also contained gum, a peculiar saccharine matter, and a bitter substance, besides earthy and alkaline salts. Subsequently, Hanbury (1859) reviewed the earlier literature on trehala, which was also called “tricala”, citing the early Persian names for it (Shakar-elma-ascher) and stating that the first reference to the substance was made by Father Ange in his “Pharmacopoea Persica” in 1681. The same author describes the cocoons as ovoid or globular, nearly 2 cm long; with their inner surface composed of a smooth, hard, dusky layer, external to which is a thick, rough, tuberculated coating of a grayish-white color and earthy appearance. They are constructed on the stems of *Echinops* and sometimes contain spiny portions of leaves.

Hanbury (1859) reports, based on M. Bourlier, that trehala was abundant in the shops of Jewish drug-dealers of Constantinople and was frequently used by the Arab and Turkish physicians in the form of a decoction, which was regarded by them as effective treatment for diseases of the respiratory organs.