

Lyctidae (Coleoptera) of Israel, Their Damage and Its Prevention

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Seven species of Lyctidae are recorded from Israel: *Lyctus linearis* (Goeze) and *L. planicollis* Le Conte for the first time; as well as *L. africanus* Lesne; *L. brunneus* (Stephens); *L. parallelocolis* Blackburn; *Minthea rugicollis* Walker; *Trogoxylon impressum* (Comolli); and *Acantholyctus cornifrons* Lesne for the first time from Sinai. The extent of damage and its reduction and prevention are described.

KEY WORDS: Lyctidae; Coleoptera; host plants; timber pests; economic importance; damage reduction and prevention; new records.

INTRODUCTION

The family of the Lyctidae (Coleoptera) comprises worldwide approximately 70 species of small, elongate, depressed, brownish beetles which exist on dry amylaceous (starch-containing) substrata, such as (sap-)wood, bamboo, stored grain, and a great variety of related products. Due to the fine, flour-like powder produced by the larvae, the Lyctidae are also known as powderpost beetles. However, the imagos of the lyctids themselves are not producers of powder; they are incapable of penetrating wood or other breeding substrata as external borers after initially having emerged from them. In contrast to the closely related Bostrichidae, which are usually cylindrical beetles with head deeply inserted in the prothorax (scolytoid form), representing the true boring type of xylobiontic insect life forms, the lyctids, with their depressed, cucujoid form (head horizontally erect) belong to the gnawing type. The imagos of most of the bostrichids are usually found boring galleries inside wood, etc., whereas adult lyctids have been observed gnawing on the surface of wood only occasionally, probably to test the infestability of breeding substrates before oviposition (6).

The taxonomical names of the family and of the genus *Lyctus* F. are derived from a Greek word meaning 'shadow' or 'twilight', which is probably an allusion to the obscure life-history of both larvae and imagos of the Lyctidae. The larvae are nourished in hiding, whereas the imagos simply take shelter in the dark underneath planks, boards, etc., in the shade of splits, cracks, holes and other refuges. Considering the neglected and unrevised taxonomies of the Lyctidae, and the largely unidentified institutional and private collections, one must admit of their 'shadowy' existence.

The objective of the present paper is to describe (a) the results of our endeavors to reduce the spread of damage caused by the newly introduced *Lyctus africanus* Lesne since

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its outbreak in the mid 1970s; and (b) the occurrence of Lyctidae in Israel and their host plants.¹ Identifications were made by the second author, who also added remarks on the zoogeography. Most of the specimens are deposited in the National Collection of Insects, Dept. of Zoology, Tel-Aviv University, Tel Aviv, Israel.

The first note on Lyctidae in our region was provided by Bodenheimer (2), who recorded the occurrence of *Lyctus brunneus* (Stephens) and *Trogoxylon impressum* (Comolli) causing damage to furniture and wooden crates. Bytinsky-Salz (3) wrote about *L. brunneus*: "I have not yet come across it; of no economic importance." Halperin (8) reported the occurrence of *L. africanus* and the considerable increase in populations of *Lyctus* species and losses to the timber industry, as a result of which surveys and investigations were conducted. Cymorek (5) reported the occurrence of *L. parallelocollis* Blackburn.

RESULTS

Reduction and Prevention of Damage

During the years 1974–79, the damage caused by *Lyctus* species to the wood industry in Israel increased constantly and significantly. In 1974 there were only a few reports of damage, but the number rose to 21 in 1975, 67 in 1976, 113 in 1977, 305 in 1978 and 470 in 1979. Research findings indicated that the main damage was to furniture made of plywood, to door-frames and to picture frames. Approximately 95% of the infestation was caused by *L. africanus* and the remaining 5% by three other *Lyctus* species. The affected wooden material consisted mainly of obeche (*Triplochiton scleroxylon*), ca 90%, with other timber species accounting for some 10%.

The results led to the conclusion that by stopping the use of obeche wood we might considerably reduce the damage to the timber industry. Therefore, efforts were made to convince the authorities to prohibit the introduction of obeche logs (used in the plywood industry) and sawn timber (used mostly for the production of linings). This was achieved in 1978 and implemented in 1979 thanks to the cooperation of the Ministries of Industry and Commerce and of Agriculture. Only limited introduction of obeche was permitted, that of preservative-impregnated boards.

Surveys of the occurrence of infestation were continued to check the impact of this prohibition against obeche importation on the number of damage reports. During the following 14 years the number of damage reports dropped to very low levels: 54 in 1987, 35 in 1989, 16 in 1991 and only three in 1993. Since 1994 a slight increase in *Lyctus* populations was noticed following the occasional introduction of non-impregnated obeche boards from E. Africa, and of ilomba (*Pycnathus angolensis*) and meranti (*Shorea* spp.) plywood from Spain in 1997 and later.

The recent liberalization of imports complicates administrative measures for prohibition of *Lyctus*-prone timber introduction. Therefore, other means are needed, including the use of mass media, to mobilize public opinion to prevent additional introduction of wood and wood products endangering the local industry and commerce, and causing trouble to thousands of consumers.

¹Until 1987 the surveys were conducted within the framework of the senior author's work at The Volcani Center, ARO, and after 1987 – at the Standards Institute of Israel.

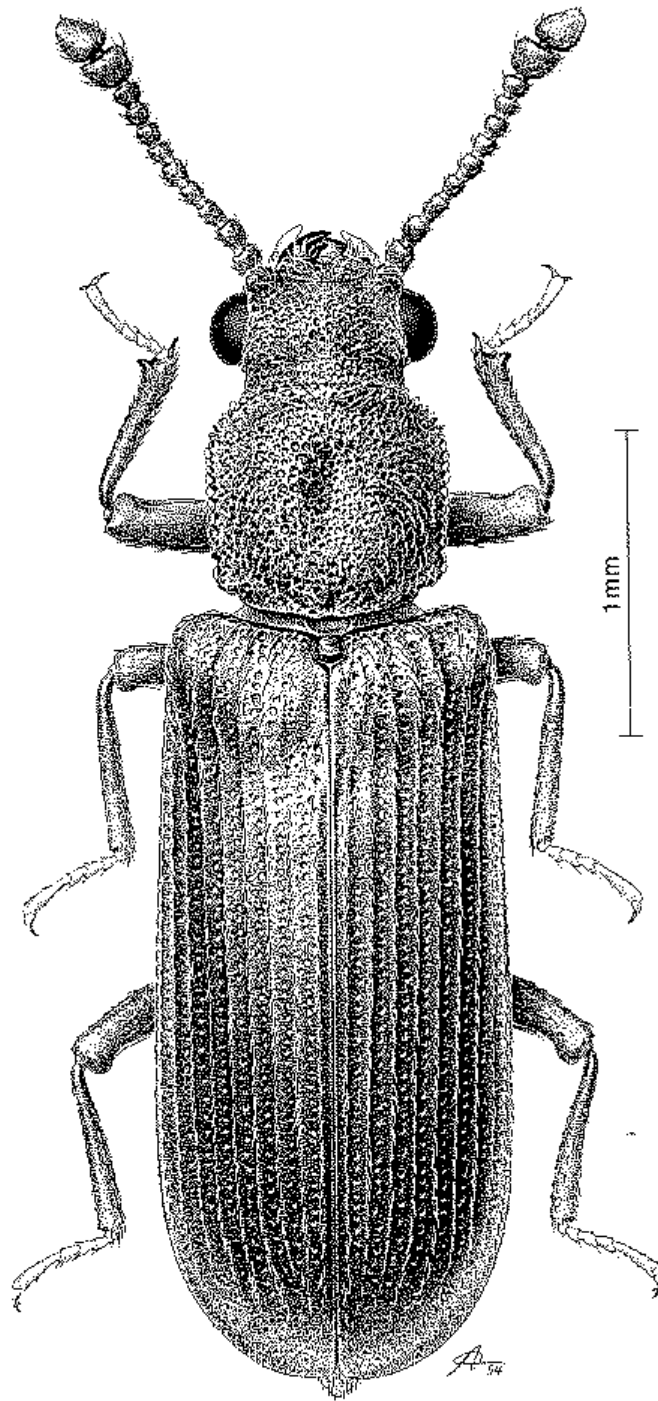


Fig. 1. *Lyctus linearis* Goeze. Natural size, 2.5–5.5 mm.

Species of Lyctidae

Lyctus (Xylotrogus) africanus Lesne, 1907

Introduced probably from W. Africa in the late 1960s or the early 1970s. In the mid 1970s it became the major pest of timber products in Israel, wrecking the local plywood industry. It breeds in obeche-origin plywood, and recently in ilomba, occasionally also in plywood made from aiélé (*Canarium schweinfurthii*), meranti, okoumé (*Aucoumea klaineana*) and some other tropical woods. It was also found breeding in local trees which were in poor condition, such as *Acacia albida* and *Moringa peregrina*, and in exotics such as *Prunus armeniaca*, *Bambusa vulgaris*, *Delonix regia*, *Eucalyptus gomphocephala* and *Grevillea robusta*, thus making the eradication of the pest close to impossible.

Zoogeographical Remarks: Long known from the Ethiopian and oriental regions and nowadays distributed throughout the pantropic regions. Today it remains uncertain whether *L. africanus* is of African or Southeast Asian origin. It was introduced into countries of the southern and eastern Mediterranean (Morocco, Egypt), probably also in earlier times. More recently, several occasional and temporary introductions of the species (without establishment) into modern industrial countries (North America, European countries, Japan) have been recorded.

Lyctus (Xylotrogus) brunneus (Stephens, 1829)

Zoogeographical Remarks: A most important timber pest of light-colored tropical timbers such as the above mentioned obeche, afara (*Terminalia superba*) and others. This species has truly become cosmopolitan. As in the case of the closely related *L. africanus*, it is nearly impossible to trace it to its area of origin.

In the second half of the 19th Century and the first decade of the 20th Century, *L. brunneus* was introduced sporadically into several European countries for the first time, but it became established only in England and Wales. In continental Europe it was introduced during the two decades after the Second World War, particularly in Germany and neighboring central European countries. Like elsewhere in western Europe, it was introduced with enormous amounts of (light) tropical timbers (such as obeche, afara, iroko) and their semi-products (plywood, veneer, doors and door-frames, etc.). There, it was able to establish itself within a few years, notably in biotopes exclusively in synanthropical environments (workshops, plywood industries, private houses). Observations of *L. brunneus* in natural biotopes of the southwest Mediterranean and of central Europe have been very rare and brief, being recorded in single, extraordinary cases only (1,4).

Lyctus (s. str.) linearis (Goeze, 1777)

Bred from oak boards imported from Yugoslavia in 1976.

Zoogeographical Remarks: Distributed throughout the western Palaearctic except for the extreme north, formerly being the most common of the endemic species in Europe. Introduced and established in North America (Canada, USA); occasionally introduced into other regions and therefore one of the cosmopolitan species of European origin. This was the most important of the endemic species of timber destroyers in Europe before the arrival and establishment of *L. brunneus*.

Lyctus (Xylotrogus) parallelocollis Blackburn, 1887

Found for the first time in 1963, bred (at Ilanot, near Netanya, Israel) from the handle of an agricultural tool. It was also bred from a dead stem of *Dalbergia sissoo* at Haifa in 1965, *Carya pecan* board in 1972, and dry branches of *Ligustrum ovalifolium* at Ilanot, in 1984.

Zoogeographical Remarks: Cymorek (5) identified it as *L. parallelocollis*, a species from Australia and an endemic element of that region, which is extremely far from Israel. No further reports of importations of this species into other countries or continents have been found.

Lyctus (s. str.) planicollis LeConte, 1858

First found in 1967, bred from *Juglans nigra* board introduced from California. In 1976 and 1977 it was found breeding in oak boards imported from Yugoslavia. Its last finding was in 1985, when it emerged in great numbers from bamboo stalks imported from the Far East for dining room decoration in a hotel. Intensive surveys are required to ascertain whether or not this species became a part of the Israeli fauna, as is the case with *L. linearis*.

Zoogeographical Remarks: A common and widespread species of the Nearctic subregion. In the United States *L. planicollis* is known as the southern lyctus beetle and is of considerable economic importance. Introduced frequently into the United Kingdom since 1918 and subsequently established. Recently introduced into Japan and recorded from Australia and India, where no information of probable establishments is at hand.

Acantholyctus cornifrons Lesne, 1898 (No records available from Israel)

Bred from a dry *Acacia tortilis* twig collected in Sharm (Sinai) 15.11.78.

Zoogeographical Remarks: Until now, the species had been known exclusively from the Sahara and the Sahel zone of the Ethiopian region and therefore was regarded as an Ethiopian element. Since its presence in the Arabian Peninsula, Jordan and moreover, southeast Iran,² was discovered recently, it may also be expected to appear in southern Israel. In regard to all the new records outside the Ethiopian region, the species seems to be a widespread element of the entire Saharo-Sahelian zone, from Senegal and southern Morocco to Somalia, from the Arabian Peninsula to Baluchistan, belonging to the Ethiopian and Palearctic fauna. Notably, this species was never observed in synanthropic biotopes; it is of no economic importance.

Minthea rugicollis Walker, 1858

Intercepted several times in Israel, its origin being the Far East.

Zoogeographical Remarks: A cosmopolitan species, which is distributed throughout the pantropic regions and has been introduced into all continents, not only together with timber and bamboo, but also with dry starch-containing foods (rice, maize, tapioca), and therefore is of considerable economic importance, particularly in tropical and subtropical areas.

²The findings in the Arabian Peninsula and Iran will be published separately.

Trogoxylon impressum (Comolli, 1837)

This species became a pest in the 1950s, when eucalypt posts were used for fencing or as supports in orchards (such as banana, avocado, citrus) or tomato. Impregnation of preservatives by a modified Boucherie process (9) solved the problem.

It has been bred from many declining local and exotic trees and shrubs such as *Acacia albida*, *Ceratonia siliqua*, *Cercis siliquastrum*, *Dalbergia sissoo*, *Ficus carica*, *F. retusa*, *F. sycomorus*, *Mangifera indica*, *Pistacia lentiscus*, *P. vera*, *Punica granatum*, *Quercus calliprinos*, *Schinus terebinthifolius*, *Vitis vinifera* and *Zizyphus* sp., in addition to *Eucalyptus* spp.

Zoogeographical Remarks: A distinct and common species of the Mediterranean subregion, and a notorious pest of several domestic and foreign timbers in all Mediterranean countries. Northwards, the area of distribution extends into central Europe (wine-growing areas in Switzerland, Germany and Austria). *T. impressum* has been introduced quite frequently into northern countries of Europe and into the U.S.A., where it became established (7).

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