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On the presence of *Prostephanus truncatus* (Horn) (Coleoptera Bostrychidae) in Italy (*)

Abstract - The larger grain borer, *Prostephanus truncatus* (Horn), one of the main pests of stored grain in tropical and subtropical areas, widely diffused in Africa on maize cobs and dried cassava, is recorded for the first time in Italy, in a bakery of eastern Sicily. Some data on the biology, morphology and distribution are provided.

Riassunto - *Sulla presenza in Italia di* Prostephanus truncatus *(Horn) (Coleoptera Bostrychidae).*

Prostephanus truncatus (Horn) è uno tra i principali e più pericolosi insetti dei cereali immagazzinati nelle aree tropicali e subtropicali, ampiamente diffuso in Africa su mais e manioca; diversi esemplari adulti sono stati rinvenuti per la prima volta in Italia, nei locali di lavorazione di un panificio situato in Sicilia orientale. Si riportano sintetiche notizie sulla biologia, morfologia e distribuzione del coleottero.

Key words: Bostrychidae, Larger grain borer, stored products, geographical distribution.

INTRODUCTION

Prostephanus truncatus was originally described by Horn (1878) as *Dinoderus truncatus.* In 1897, it was taxonomically relocated by Lesne into the new genus *Prostephanus.* At present time, three other species are ascribed to this genus (*P. apax* Lesne 1930, *P. arizonicus* Fisher 1950 and *P. punctatus* Say 1827) that differ for the tubercle arrangement on the clypeus, their apical declivity and nature and their distribution of punctures and hairs on the body (Farrell & Haines, 2002), among those species, *P. truncatus* is the sole one, up to now reported, associated with stored products (Hodges, 1986). In Europe, it is commonly named Larger Grain Borer (LGB), whereas in the United States the same acronym is used for both *P. truncatus* and the closely related Lesser Grain Borer, *Rhyzopertha dominica* (F.) (Coleoptera: Bostrychidae).

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Similarly to the other members of the bostrychid family, *P. truncatus* is a wood boring insect that, as already known for other woody species, has more recently been recovered in newly created habitats such as those formed by stored maize and dried cassava (Fisher, 1950). It has been shown how LGB is able to damage economically important food crops such as wheat, paddy, pulses, groundnuts, cocoa beans, and coffee beans (Shires, 1977), dried tubers of yam (*Dioscorea rotunda* Poir.) and various confectionery nuts (Bangaly, 1993). During surveys carried out in Sicily (Italy) aiming at knowing which pests species are present in stored grain, several adults of the LGB were collected in flours of a local grain variety stored in a bakery. All the infested material has been immediately destroyed.

DISTRIBUTION

Starting from its area of origin in Central America, *P. truncatus* was introduced into Africa in the late 1970s, appearing first in East and then West Africa (Dunstan & Magazini 1981; Krall 1984). Now it is widely recognised as the most destructive pest of farm-stored maize and dried cassava in Africa (Hodges *et al.,* 1983; Markham *et al.,* 1991; Wright *et al.,* 1993) and it has also been recorded in Israel (Calderon & Donahaye, 1962), Iraq (Al-Sousi *et al.*, 1970) and, in Europe, in France (Lesne, 1897) and Germany (Zacher, 1926). In these countries *P. truncatus* has been only intercepted but probably it is not established (Shires, 1979).

NOTES ON MORPHOLOGY AND BIOLOGY

Adults of *P. truncatus* are small, brown-black, cylindrical beetles about 4 mm in length with distinctively square-cut ends and fulvous antennae. The larvae are c-shaped and scarabaeiform. Adults of *P. truncatus* have been described by Horn (1878) and Lesne (1897), while the description of the larvae and the pupae are reported in Spilman (1984). For adults identification the short keys provided by Kingsolver (1971) and Hodges (1982) or the extensive keys published by Fisher (1950) can be used. The deflexed head, strong mandibles, and cylindrical body shape of *P. truncatus* are typical features of xylophagous insects. The large pronotum protects the head during tunnelling and provides strong support for the mandibular muscles (Li, 1988). The presence on the pronotum of a basal row of teeth of the steeply inclined elytra with its apex presenting a strong carina (Gorham, 1987), are the most important features in distinguishing *P. truncatus* from *Dinoderus* spp. and *R. domestica* with which it, sometimes, occurs in stored grain. In addition, *P. truncatus* is slightly larger, and *Dinoderus* spp. usually has the pronotum with a pair of, more or less distinct, shallow depressions (Hodges, 1982; Gorham, 1987). In 90% of the cases, measuring the height of tubercles on the clypeus of adults is possible to distinguish the females, that present higher tubercles, compared with the male of *P. truncatus* (Shires & McCarthy, 1976).

P. truncatus has a potential adult life span of at least several months (Burkholder & Ma, 1985) that, on a soft substrate such as maize flour, is about 90-100 days (Meikle *et al.*, 1998) but in the case of whole grains the adult life span is only about 60 days (Shires, 1980). Under optimal conditions and on a good substrate, development from egg to adult can take as little as 24 days (Stewart-Jones, 2002). The female lay on average 7.4 eggs in little side tunnels bored at right angles from the main tunnel and each egg clutch is usually protected by tightly packed frass (Bell & Watters, 1982; Li, 1988). It has been demonstrated that there is a relationship

between *P. truncatus* lifetime fecundity and the nutritional quality of the substrate. The females, when reared on American yellow maize, lay a total of about 300 eggs, but this value decreases considerably when very hard maize varieties are used as a substrate (Li, 1988). *P. truncatus* undergoes three larval instar stages (Subramanyam *et al.*, 1985). Larvae are curved with the head sunk into a large pronotum, the body shape is well adapted for boring but concurs in a little mobility on a smooth surface. Li (1988) found that first instar *P. truncatus* larvae are not able to enter an undamaged maize kernel and then, they are dependent on the ovipositing female to provide a favourable environment for establishment. Vowotor *et al.* (1998) reported that the first instar larvae were predominantly found in the floury endosperm, while second and third instar larvae were mainly found in the germ tissue. The development time for different life stages could be summarized as follow: hatching of eggs takes 4-14 days, the three larval instars are completed in 16-129 days and the pupal stage can last 5-25 days (Bell & Watters, 1982; Subramanyam *et al.*, 1985; Demianyk & Sinha, 1988).

The presence of *P. truncatus* in a substrate could be associated to the large amount of 'frass', or fine, uneaten powder, produced by adults during their activity. Different important functions have been attributed to the frass: it may provide the developing larvae with some physical protection against predators and it may protect eggs and developing larvae from dehydration.

In relation to the role of *P. truncatus* as key pest for cereals, specific investigation will be developed using pheromone traps, already available in commerce, in order to evidence the diffusion of the bostrychid beetle in Sicilian cultivation areas and in grain storage silos.

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