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Lyctocoris campestris (F.) (Heteroptera Anthocoridae) in stores of *Triticum spelta* L. in Central Italy

Abstract - Some observations on activity and behaviour of *Lyctocoris campestris* (F.) (Heteroptera Anthocoridae), a predator of stored product insects, are reported.
The anthocorid was found in association with insects infesting stores of *Triticum spelta* L. in Central Italy.

Riassunto - Lyctocoris campestris *(F.)* (*Heteroptera Anthocoridae*) *in magazzini di* Triticum spelta *L. del centro Italia.*

Si riportano brevi annotazioni sui comportamenti e sulla biologia di *Lyctocoris campestris* (F.) (Heteroptera Anthocoridae) rinvenuto in centro Italia, in alcuni magazzini di stoccaggio di *Triticum spelta* L.
Oltre che dal predatore, il cereale è risultato infestato da vari Coleotteri e da diversi Lepidotteri, tra i quali predominavano *Oryzaephilus surinamensis* L. e *Sitotroga cerealella* (Olivier).
L. campestris svolge la sua attività entomofaga nei mesi piú caldi dell'anno, manifesta comportamento bivoltino, con adulti presenti in massima parte in aprile-maggio e luglio-agosto. Dalle osservazioni preliminari di laboratorio, questi ultimi sono risultati predatori di larve mature di *Oryzaephilus surinamensis, Tribolium castaneum* (Herbst), *Ephestia elutella* (Hübner), *Plodia interpunctella* (Hübner) e *Sitotroga cerealella.*
La continua e abbondante presenza di *L. campestris* nei magazzini visitati, l'adattabilità alle condizioni di allevamento, la capacità di predare specie appartenenti a ordini differenti, ne suggeriscono un possibile impiego in programmi di controllo biologico, indirizzati al contenimento degli insetti infestanti le derrate immagazzinate.

Key words: *Lyctocoris campestris*, Heteroptera Anthocoridae, stored products.

INTRODUCTION

Predaceous beetles of several families including Carabidae, Histeridae and Staphylinidae enter the storage habitat and may prey upon stored-product insects. True bugs of the family Anthocoridae are among the predaceous insects most commonly encountered in storage situations.

The bugs *Dufouriellus ater* (Dufour), *Lyctocoris beneficus* (Hiura), *Xylocoris flavipes* (Reuter), *X. galactinus* (Fieber) and *X. sordidus* (Reuter) have been recovered from stored-product ecosystems and their biologies have been studied (Chu, 1969; Arbogast, 1979, 1984; Arbogast et al., 1971, 1983; Tawfik & el-Husseini, 1971; Awadallah & Tawfik, 1972; Péricart, 1972; LeCato, 1976; Keever et al., 1986).

Despite of this *Lyctocoris campestris* (F.) according to our records is the least studied (figure 1). It is present in North America and in some European countries, also recently reported from Chile (Prado, 1988). Its distribution throughout the world is connected with man's trading activities.

Recently we have found together with other insects infesting in some stores of *Triticum spelta* L. situated in Central Italy.

Stored-products Anthocoridae are general predators, but their predatory activity depends upon the habitats that they occupy.

The present report describes our observations in field and the results of a preliminar study on this bug.

ACTIVITY OF *L. CAMPESTRIS*

L. campestris has been found in Russia, in cereal stores infested by Coleoptera and Lepidoptera (Zvierezomb-Zubkovsky, 1917) and in Uzbekistan where it was observed as a predator of many species of cereal pests (Asanov, 1980).

It was observed in England in a mill infested by larvae of *Ptinus tectus* Boield and *Tenebrio molitor* L. and by adults of *Ephestia kuehniella* Zeller and *Oryzaephilus surinamensis* L. (Ewer, 1943).

This bug has occasionally been reported as a associated stored-product in U.S.A. (Anderson, 1962; Arbogast, 1979). It was also reported in Virginia as a predator of Potato Tuber Moth *Phthorimaea operculella* (Zeller) larvae (Underhill, 1926), in Southern California as a predator, not a common species, observed feeding on pupae of the Western Tussock Moth *Hemerocampa vetusta* (Bdv.) on Citrus (Atkins, 1958), and in Italy on larvae and pupae of *Bombyx mori* L. (Corti, 1921).

Corti (1921) described the behaviour of the adults feeding on Silkworms *Bombyx mori* L.: «rostrum has driven into the lateral-inferior region of the body of larvae, *L. campestris* seldom stings the inferior region of the head. Larva of *B. mori* is pervades by strong contorsions: it stops feeding on leaves of Mulberry and its body curves up. Then it repeats contortions and *L. campestris* stings alternatively the head and the caudal region of the Silkworm. The attack to a 3th instar larva persists during 40 minutes; sometimes the bug does not kill larvae of Silkworm, however these are unable to make the cocoon».

Parajulee and Phillips (1992) suspect that adult *L. campestris* utilize a powerful venom to overcome their prey.

L. campestris has also been reported from poultry houses, primarily on manure surfaces and litter (Stafford et al., 1988). Its habitat also include compost piles, old haystacks, thatch, bird and mammalian nests, animal burrow, and it has occasionally been found under the bark of decaying trees (Anderson 1962; Kelton, 1978; Vasarhelyi, 1979; Krall, 1981).

This species has been recorded as a facultative ectoparasite of humans (Stys & Daniel, 1957). Büttiker & Ruther (1979) reported the species as a nuisance pest in Switzer-

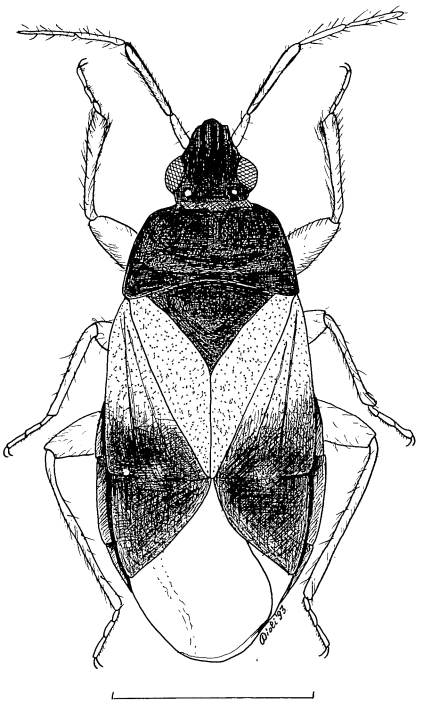

Fig. 1 - *Lyctocoris campestris* (F.), adult.

land because of the reports that they bite humans. Woodward (1951) also has reported a case of persistent attacks on one person in New Zealand, he observed a number of *L. campestris* in clothes hanging in a wardrobe, on undergarments worn on the body, and in the bed.

In England (Southwood & Leston, 1959) larvae and adults have been found together throughout the year but, there are probably at least two annual generations, most of the second generation becoming adult in August and September. Adult flies readily in summer and are often found stuck to freshly-painted surfaces.

The daily fly period was studied in the «aeroplancton» of the Delta of the Po river (Italy) and, samples of Heteroptera were taken from June to October: adults of *L. campestris* were recorded at sunsets in July and in August (Dioli, 1992).

The biology of this bug and its role in regulating populations of stored-product pests have recently described by Parajulee & Phillips (1992). They report that adults of *L. campestris* killed and ate mature larvae of *Tribolium castaneum* (Herbst), *Amyelois transitella* (Walker), *Cadra cautella* (Walker), *E. kuehniella, Galleria mellonella* L., and *Plodia interpunctella* (Hübner).

BIOLOGICAL OBSERVATIONS

We have collected larvae, nymphs and adults of *L. campestris* in a flat storage of *Triticum spelta* in Central Italy, from May to September. The cereal was augered into the building during cold weather, and no mechanical aeration system was used for the duration of the storage. The mass of cereal had a hill-and-valley topography with elevations ranging 3 meters from ground level.

Several other species of stored-product insects besides *L. campestris*, mostly beetles, were encountered during our study, mainly *Oryzaephilus surinamensis*, also Lepidoptera were present and the predominant species was the Angoumois Grain Moth, *Sitotroga cerealella* (Olivier).

The highest numbers of *L. campestris* were caught in few centimeters from the top layers of stored *T. spelta*, on the surface, or on the walls of the store, where many other mature larvae of stored-insects were in activity. The bugs are more frequent in moldy areas of the cereal stores (figure 2).

Fig. 2 - Flat storage with *Triticum spelta* L.

The entire storages were emptied and refilled each season with new cereal, and no insecticides were used on the cereal. Thus, the insect populations present represented descendents from residual populations or local immigrants from other sources of older stored-products.

Mating behavioural of *L. campestris* occurred normally, in contrast to the traumatic insemination in some other anthocorids.

The eggs are almost hyaline, the oviposition period is about two weeks, during this time the eggs laid per female is variable from 10 to 300. The incubation period of the eggs is of a week. Newly emerged nymphs presents a pale brown color. *L. campestris* passes through five nymphal stadia in about four weeks. Adults of both sexes have wings and their longevity is about two months. In the field the sex ratio is female-based. According to the preliminar observations, in Central Italy this insect have two generations per year, with adults in April-May and July -August.

In field study we observed the adults of *L. campestris* fed on a variety of beetle and moth larvae, the mature larvae of *Oryzaephilus surinamensis, Tribolium castaneum* and the moths *Ephestia elutella* (Hübner), *Plodia interpunctella* and *Sitotroga cerealella* were killed.

The small nymphs how we observed, can not kill and feed on fifth instar prey, but on eggs only; cannibalism of small nymphs occurres in mixed cultures.

CONCLUSIONS

The status of biological control of stored commodities from dangerous insects was reviewed by Arbogast (1984).

The life-history parameters of *L. campestris* observed in the laboratory are similar to those reported for *X. flavipes* (Arbogast, 1979; Parajulee & Phillips, 1992), a predator that is currently being used for biological control of pests insects in stored-product systems (Arbogast, 1983).

L. campestris displays the ability to kill fairly large prey, whereas *X. flavipes* is able to kill small preys like eggs and young larvae of moths and beetles.

The occurrence of *L. campestris* in storage areas, its adaptability to mass-rearing conditions, and its broad range in prey species, suggests the possibility of using it as a biological control agent and this motivates the studies that will be on the subject.

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