INSECT PESTS OF OYSTER MUSHROOM, *PLEUROTUS OSTREATUS* (Jacq.:Fr) IN THE CENTRAL PROVINCE OF SRI LANKA AND THE BIOLOGY AND CONTROL OF *CYLLODES BIFACIES* (WALKER)

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ABSTRACT

Mushroom cultivation in Sri Lanka was established as a small industry only after 1986. The continuous growing of mushrooms on a large scale in localized areas has led to various pest infestations. The present study was conducted to investigate the pest spectrum of oyster mushroom [*Pleurotus ostreatus* (Jacq.:fr.)] , with the aim of recognizing the key pest and suggest appropriate management practices, in commercial mushroom cultivation in Sri Lanka. Twenty two mushroom houses from mid-country and up-country areas of Sri Lanka were selected for the study.

Eleven species of insects were associated with mushroom cultures. Only three species *Drosophila funebris* F., *Bradysia paupera* Tuomikoski and *Cyllodes bifacies* (Walker) were found to cause damage. *Cyllodes bifacies* was distributed in about 96 per cent of the farms visited and caused serious damage up to 82 per cent, to the farms infested. It was identified as the most notable key pest of mushrooms grown in the mid and up country districts. This is the first instance that *C. bifacies* has been found on cultivated mushrooms. Biology of this pest was not documented in literature.

There was a clear relationship between the incidence of *C. bifacies* and the cleanliness and type of construction of mushroom cropping houses. About 68 per cent of the beetles collected were found in farms with unclean surroundings. Infestation of *C. bifacies* were higher in farm houses in which the roofs were constructed with cadjan, or straw and the floor with sand or clay.

External morphological features of larvae, prepupae, pupae and adults of *C. bifacies* were studied and described in detail. Such information led to the modification of the existing key used for the identification of species under the Genus *Cyllodes*, to distinguish this species from other species. A detailed study of bionomics of *C. bifacies* was carried out under laboratory conditions (24± 2^{0}C and 80± 2 RH) at the University of Peradeniya . The adult longevity was 122-128 days. The newly emerged females started to lay eggs on the 8th - 9th day after emergence and continued oviposition through out its life. Oviposition was interrupted for about four hours when the beetle was disturbed. Eggs were oval -shaped with 0.94 mm length and 0.24 mm width and laid in clusters of 4 or 8 eggs. The mean hatchability and the incubation period of eggs were 93% and 21 ±2h respectively.

When single fertile female was allowed to lay eggs on fruiting bodies for a period of 48 hours, those eggs produced a progeny of 100 adults. Fecundity was not estimated in this study. Minimum of 30 g of fruiting bodies was required to complete the life cycle of 100 larvae.

There were three larval instars followed by a prepupal stage. The total larval period was 3.28 ±0.2 days. Prepupal and pupal periods were 5.7 ±0.81, 4.4 ±1.3 days respectively. Pupation took place mainly in compost and cracks in the mushroom house.

The adult beetles feed on both mushroom mycelium and fruiting bodies. Larvae fed only on the fruiting bodies . Greater damage was caused by larval feeding. All affected fruiting bodies collapsed, turned yellow and finally perished 3-5 days after infestation. The beetle completed its life cycle within 11-15 days, perfectly synchronizing with the phenology of the mushroom .

Acorus calamus (Sweet flag) rhizomes had a very effective repellent property against the adults of *C. bifacies*. Aqueous extract of *A. calamus* was evaluated for the control of the pest. The spraying of 10 g/l extract on the early stage of fruiting bodies showed about 99 % reduction of adult population over the control. There was no antagonistic effect of this extract on the development of the oyster mushroom.

Possible management practices were developed based on the study of the biology and the observations made at commercial farms. Designing an appropriate insect-proof cropping house, guidelines to maintain strict farm hygiene and the adoption of proper cultural practices for the prevention of the pest damage are proposed.