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**DAMAGE TO STORED SILWORM COCOONS OF *BOMBYX MORI* BY
DERMESTES BEETLES AT PATHANKOT PUNJAB**

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ABSTRACT

Mulberry is the basic food source for *Bombyx mori* and silk production is directly affected by the quality of mulberry leaves. Though high yielding mulberry varieties and improved agronomical practice and encourage reaper quality sufficient leaf for rearing of silkworms, but at the same time almost all mulberry varieties are prone to the attack of insect pests and cause diseases, which result in reduction of leaf both qualitatively and quantitatively. Much infestation damage its yielding. Infestation of *Dermestes ater* was observed during first and second crop in the grainage house. Both the grubs (Larval stage of dermestid) and adults were found feeding on the pupa and moth of host. This paper deals with the damage caused by dermestid maculates and *Dermestes undulates* infected stored silkworm cocoons of *Bombyx mori* in Research centre Sujampur Punjab. The Experiment deals with simulated hessian cloth bags (3.25'x1.5) with upper welcro opening (1.0x1.5), middle welcro opening (8'x9') and lower welcro opening (6'x9') Experimentation is three different reeling units in each of these three places. Experimental period started with marketing of spring crop harvest till the exhaustion of these cocoons in respective reeling units. Onset of winter and low atmospheric temperature slow the activities in the bags even if reeling cocoons were still left. Damage was found to be more in middle portion of the simulated bags than lower portion.

Keywords: *Dermestes Maculates, Dermestes Undulates, Bombyx mori, Simulated Hessian Cloth Bags, Damage*

INTRODUCTION

Mulberry is the basic food source for *Bombyx mori* and cocoon production is directly affected by the quality of mulberry leaves. Though high yielding mulberry varieties and improved agronomical practices encourage quality and sufficient production of leaf for rearing of silkworms, but at the same time almost all mulberry varieties are prone to the attack of insect pests and cause diseases, which result in reduction of leaf both qualitatively and quantitatively. A large number of pests are reported to attack both the host plant as well as adult silkworm. Various pests are known to attack and cause severe damage to the stored mulberry cocoons make them unfit for reeling (Ansari and Basanlingappa, 1987). Almost 20 percent damage of the silk production is due to Dermestid beetles. *Dermestes ater* was observed in the grainage house of Research centre Sujampur during first and second crop grainage season (Arulmozhi, 1998). The infestation was observed in the pupae of open cocoons. Their grubs (Larva of Dermestid), in process of their entry in cocoon for feeding on pupa, damage cocoons 2.2 to 7.8 percentage infestation were reported. Destruction of silkworm cocoons, detailed account of damage by different species of dermestid, attagenus and anthrenus to sericulture industry cocoons and silk yarn. Majority of the work done on infestation of dermestid to sericulture commodities. They also reported Dermestid *ater* responsible for 20% loss in production in one of the grainage (Babu *et al.*, 1998). It made several holes in cocoons making them unfit for reeling. Estimated loss in weight of cocoons as 15 to 50% for different bivoltine and multivoltine races (Babu *et al.*, 1998). Percent infestation of *Attagenus fasciatus* with references on infestation to different textile material is more. They reported 12-15 days old larvae boring into cocoons. Thiagrajan and Govindaiah, (1987) studied *Dermestes ater* reported that grubs infested from forth to final larval instars could cut the hole in cocoons to feed on pupae. Smaller larvae feed on silk floss only. Maximum loss reported to pupae and minimum loss to moths in a grainages (Thiagrajan and Govindaiah, 1987). The total loss was more than twenty %. The reported infestation of *Dermestes ater* on live pupae and moths was more than in absence of dead and dried pupae (Chandra *et al.*, 1999). It was reported four

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species of *Dermestes*, two species of *Anthrenus* and one species of *Attangenus* damaging cocoons in grainages, storage yarn in their storages. Each experiment had two parts, one at reeling units and the other at laboratories of Experiment sites. The part of discussion in this paper is the work conducted in first part reeling units at all the three test sites (Gouda and Devaiah, 1986).

MATERIALS AND METHODS

In each Experiment site at Sujapur reeling unit were selected for the study population dynamic and extents of loss were also studied simultaneously. The study was also continued for these experiments in laboratories of RSRS and CSR&TI as stated (Kumar *et al.*, 1998). At each experimental site reeling unit, 4 simulated Hansen cloth bags were kept as replication. Each bag (3^{1/4} × 1^{1/2}), had

1. Upper full welcro opening (1' X 1 1/2')
2. Middle welcro opening of 8" X 9" and
3. Lower welcro opening of 6" X 9".

Numbers were mark by Marker pen on the bags. Each bag had approx. 3.5 kg cocoon weighed. Total number of cocoons were estimated by counting the number in 500 gm. Cocoons. Every month, data on number of cocoons damaged by grubs of the beetle were taken at upper, middle and lower levels. Population of grubs and adults was also taken into consideration simultaneously for each experiment (Tewari and Tayal, 2006). For experimental period, highest number of damaged cocoons noticed during monthly observation was taken into consideration. Average of highest value, during monthly observation, in bags for upper, middle and lower levels constitute Unit, data (Sahaf, 2007). Highest value of damaged cocoons during monthly observation was taken into considerations to avoid handling error as damage observed cocoons. Converted percent infestation of bag at upper, middle and lower levels served as treatment and average of reeling unit Experiment site as replication (Sahaf, 2007). Calculation was taken from the three Experiment sites. Thus, total loss in these sites in different levels is analyzed. Further two factors analysis was also done in complete block design by talking all three levels with all three Experiment sites (Virk *et al.*, 2011).

RESULTS AND DISCUSSION

In this paper, Observation and analysis of data reveals that damage is maximum in middle level. Less in upper level and least in lower level (Aruna *et al.*, 2014). Observed loss was highly significant in middle and upper level of bags at all the three Experiment sites. Population of grubs, as well as of adults, was more in upper level than middle level.

Table 1: Less in Reeling Units at Different Levels and Different Test Sites

| Experiment Sites | Levels | Average Damage | F Value |
|------------------|--------|----------------|----------|
| Sites 1 | Upper | 1.46 | 21.395** |
| | Middle | 2.67 | |
| | Lower | 0.66 | |
| Sites 2 | Upper | 2.27 | 27.806** |
| | Middle | 2.53 | |
| | Lower | 0.7 | |
| Sites 3 | Upper | 0.89 | 35.177** |
| | Middle | 1.02 | |
| | Lower | 0.21 | |

Loss is directly proportional to the population of grubs, but insect behavior tends to move them up, particularly in last in star for growing into adults. Probably the behavior is the cause of more population at upper level. After inflicting damage at middle level, beetle tends to move up for pupation (Aruna *et al.*, 2014). Adults, although not harmful to cocoons, were more in upper levels for mating purpose. Two factors (three test sites and three levels) Complete Block Design Confirms the earlier randomized

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Complete Block Design analysis (Siddaiah and Kujur, 2016). Except replication, all F values were highly significant which has shown that the loss was significant irrespective of Experiment sites. This observation shall be useful in planning of management of beetles.

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