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Effect of Feeding *Glyphodes pyloalis* Walker (Pyralidae : Lepidoptra) Infested Leaves on Nutritional Parameters of Silkworm (*Bombyx mori* L.)

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Abstract

Insect pest *Glyphodes pyloalis* Walker takes a heavy toll of mulberry especially from July to October under temperate climatic conditions of Kashmir. Feeding of *Glyphodes* infested mulberry leaves to silkworms affects their growth and development,which in turn brings down the quality of cocoons and silk and thus reduce the economic returns. In the present investigation the nutritional parameters were studied by feeding silkworm hybrid $NB_4D_2 \times SH_6$ with *Glyphodes* infested and healthy mulberry leaves from two mulberry varieties namely Goshoerami and Kokuso-20, the experiment was confined to fifth instar only. The results indicated that leaf consumption by larvae fed with infested leaves increased due to elongation of larval period while the final larval weight decreased significantly.

Key words : Effect of feeding, *Glyphodes pyloalis*, Infested leaves, Nutritional parameters, Silkworm.

A major factor determining productivity and profitability in sericulture, is the yield and quality mulberry crop. The productivity of mulberry silk cocoons and superior quality of silk is dependent on healthiness of silkworm *B mori* L, which in turn is closely related to the quality feed (mulberry leaf) . The importance of quality of mulberry leaves on the growth, development and silk production in silkworm is well documented (1,2). During infestation, the insect pests damage physico-chemical processes of the mulberry foliage, which ultimately alter the bio-chemical constituents of the host. Feeding of pest-infested leaves affects the silkworm growth and development which in turn brings down the quality of silk produced (3), because of the degraded nutritive values due to insect pest damage, as mulberry foliage is vulnerable to several to pests (4). In Kashmir, *G pyloalis* assumed greater significance in recent years owing to its damage to mulberry plants both qualitatively and quantitatively. The reduction in leaf quality by this insect pest leads to inferior performance of silkworm breed ($NB_4D_2 \times SH_6$) especially in autumn season by adversely affecting the growth and development of silkworm. The silkworm B mori L being a highly specialized monophagous insect derives all the nutrients essential for its growth and development from the mulberry leaf (5). Therefore, leaf quality and quantity in silkworm rearing decides the prosperity of sericulture. The growth of the silkworms will not be uniform if the quality of leaf is not good (6). The life cycle of this insect pest synchronises with the life cycle of silkworm and hence poses a threat to the second commercial crop. The present study was, therefore undertaken to study the impact of feeding the pest infested mulberry leaves on the nutritional parameters of silkworm *B. mori* L.

Methods

The silkworm hybrid $NB_4D_2 \times SH_6$ was reared up to fourth moult on healthy mulberry leaves in recommended environmental conditions (7). The experiment was conducted during autumn season 2005-2006 (September-October) at the Division of Sericulture Mirgund, SKUAST-K. Freshly resumed fifth instar larvae were grouped into four batches, with seven replications of 100 worms under each treatment and reared (cellular) as per the package of practices as recommended by (8). The experiment was initiated on the first day of fifth instar, by feeding pest infested mulberry leaves of Goshoerami and Kokuso-20 to the silkworms, of batch 1 and 3 (experimental) while those of batch 2 and 4 (control) were fed with healthy leaves of above two varieties. In the beginning of the fifth

Table 1. Impact of *Glyphodes pyloalis* infested mulberry leaves of variety Goshoeramion nutritional parameters of silkworm hybrid $NB_4D_2 \times SH_6$ during autumn season of 2005 and 2006. ** Highly significant. NS Non-significant.

	Parameters	Treatments Infested leaves T_1 (mean ± SD)	Healthy leaves T_2 (mean ± SD)	*P* value	Remarks
1.	Leaf fed / rep (g)	5120 ± 57.15	4000 ± 67.15	0.0001	* *
2.	No. of feeds/rep	42.00 ± 0.31	34.00 ± 0.82	0.0001	* *
3.	Left over leaves/rep (g)	3391 ± 12.62	2418 ± 7.64	0.0001	* *
4.	Weight of leaf in control (g)	3658 ± 33.38	2890 ± 18.64	0.0001	* *
5	Moisture loss (%)	1462 ± 37.84	1102 ± 27.83	0.0001	* *
6.	Intial larval wt (g)	7.50 ± 0.23	7.30 ± 0.29	0.6891	NS
7.	Final larval wt (g)	28.10 ± 0.90	39.00 ± 0.74	0.0001	* *
8.	Weight gained during feeding/ harvesting	2.06 ± 0.45	3.17 ± 0.071	0.0001	* *

stage the weight of the worms was recorded for the calculation of average weight gained.

Results and Discussion

The observations recorded on the nutritional parameters of silkworm by feeding pest infested and healthy mulberry leaves has been presented in Tables 1 and 2. The quality of mulberry leaf has a great influence on the amount of food ingested by the silkworm B. mori L. The importance of quality of mulberry on the growth, development, health and silk production in silkworms was studied by Yokoyama (9). In the present study the nutritional parameters such as leaf fed (g), no. of feeds per replication, left over leaves per replication (g), initial larval weight per ten larvae (g) and weight gained per larvae (g) are discussed.

The final larval wt (g) and the average wt (g) gained by larvae (g) were reduced in both the batches of silkworms fed with pest infested mulberry leaves of Goshoerami and Kokuso-20 varieties, while as quantity of leaf fed per rep (g) and left over leaves per rep. (g) increased with the pest infested leaves due to the higher number feeds per rep (prolonged larval duration). The minimum (28.10) and (27.50) g mature larval wt. in gms. was recorded in T_1 and T_3 batches which was offered the pest infested leaves of Goshoerami and Kokuso-20 varieties. While as the maximum (39.00) and (35.00) larval wt. in gms. was recorded in T_2 and T_4 batches of Goshoerami and Kokuso-20 healthy leaves respectively. These findings coincide with those of Kumar et al. (10) who also reported decrease in the larval weight of silkworm race, PCN fed with mealy bug-infested leaves from K-2 variety. The wt. gained by larvae during feeding period was minimum (2.06) and (2.00) recorded in T_1 and T_3 batches fed with pest infested leaves of two mulberry varieties, while as the maximum weight was

Table 2. Impact of *Glyphodes pyloalis* infested mulberry leaves of variety Koksu-20 on nutritional parameters of silkworm hybrid $NB_4D_2 \times SH_6$ during autumn season of 2005 and 2006. ** Highly significant, NS, Non-significant.

	Parameters	Treatments Infested leaves T_1 (mean ± SD)	Healthy leaves T_2 (mean ± SD)	*P* value	Remarks
1.	Leaf fed / rep (g)	5260 ± 42.78	4560 ± 47.18	0.0001	* *
2.	No. of feeds / rep	43.00 ± 0.82	38.00 ± 0.81	0.0001	* *
3.	Left over leaves/rep (g)	3442 ± 21.16	2667 ± 40.70	0.0001	* *
4.	Weight of leaf in control (g)	3743 ± 36.78	3278 ± 36.06	0.0001	* *
5.	Moisture loss (%)	1516 ± 20.47	1281 ± 21.47	0.0001	* *
6.	Intial larval wt (g)	7.50 ± 0.23	7.20 ± 0.26	0.5611	NS
7.	Final larval wt (g)	27.50 ± 0.90	35.00 ± 1.11	0.0001	* *
8.	Weight gained during feeding/ harvesting	2.00 ± 0.040	2.76 ± 0.103	0.0001	* *

found in the T_2 and T_4 batches (3.17 and 2.76 g) which was offered the healthy leaves of Goshoerami and Kokuso-20 varieties.

The leaf fed per replication in gms. was recorded highest in T_1 and T_3 batches (5120 and 5260 g) which was fed with pest infested leaves of Goshoerami and Kokuso-20 varieties, while as it was found lowest in T_2 and T_4 (control) with 4000 and 4560 g of healthy leaves. Maximum left over leaf 3391 and 3442 g was recorded in T_3 and T_4 batches while as minimum left over leaf 2418 and 2667 g in T_2 and T_4 batches. The higher values of leaf fed and left over leaf in T_1 and T_3 batches fed with pest infested mulberry leaves was manly due to the prolongation of larval duration. These findings are in conformity with those of Aftab et al. (11) who also reported prolongation of larval duration of silworms fed with spiralling whitefly (*Aleurodicus disperses* Russel.) affected mulberry leaves. The total weight of leaf in control (g) and the moisture loss (%) was also highest in feeding infested leaves fed treatments (T_1 and T_3). This was also because of the maximum leaf fed / replication in treatment batches (T_1 and T_3).

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