STUDIES ON CROSS INFECTIVITY OF PEBRINE DISEASE FROM MUGA TO ERI SILKWORM

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[Das, K., Das, R., Bora, A. & Rajan, R. K. 2014. Studies on cross infectivity of pebrine disease from Muga to Eri silkworm. Munis Entomology & Zoology, 9 (1): 518-520**]**

ABSTRACT: The causal organism of Pebrine disease *Nosema antheraea* was inoculated in second instar healthy eri silkwom larvae in ambient temperature and relative humidity. The data showed that pebrine disease caused significantly highest larval mortality in September-October (13.7%) followed by May-June (7.5%) and July-August (5.3%). Highest pupal mortality was recorded in July-August (13.2%) followed by May-June (9.6%). Significantly highest infection in adult moths was recorded in May-June (63.72%) followed by September-October (60.25%) and July-August (56.80%) which confirmed the cross infectivity of pebrine disease from muga to eri silkworm.

KEY WORDS: Eri silkworm, microsporidian, mugasilkworm, nosema, pebrin.

Pebrine is an insidious and chronic disease in muga silkworm, *Antheraea assamensis*, Helfer, caused by highly virulent microsporidian parasite *Nosema antheraea*. Most of the entomopathogenic microsporidia occur in the genus *Nosema* and more than 150 described species have been reported in 12 orders of insects (Becnel & Andreadis, 1999). Canning, (1977) reported that microsporidian are the most important protozoan pathogens of insects and fishes and over seven hundred species of them were recorded from these hosts. In mulberry silkworm, *Nosema bombycis, Nosema* sp. *Pleistophora* sp. *Thelohania* sp. and *Leptomonus* sp. causes microsporidiosis, commonly known as pebrine disease (Jolly, 1986: Abe, 1978). Different mulberry pests and lepidopterans were known to harbour microsporidian (Sharma et al., 1987). Ishihara & Iwano, (1991) reported that the perpetual incidence of microsporidian infection in silkworm may be due to various sources of secondary contamination or crossed infection from the alternate hosts. The periodic occurrence of pebrine disease in the rearing field indicates the possibility of cross infection of pebrine spore from the other alternate host. It was observed that most of the farmers raised their plantations such as, som, soalu castor, kesseru in the same farm and conducted muga silkworm rearing in the som and soalu plants and at the same time harvest castor, kesseru leaves for eri silkworm rearing which have a possibility for chances of transmit of pebrine pathogen from muga to eri silkworm.

In view of this, the present investigation was carried out to ascertain the cross infectivity of pathogen of pebrine disease from muga to eri silkworm.

MATERIALS AND METHODS

Purification of pebrine pathogen from muga silkworm:

Pebrine infected muga silkworm larvae were collected from the farmer's field of Jorhat district and killed by anesthetic (chloroform) and homogenized in 0.5% K_2CO_3 containing 0.85% NaCl solution. The homogegenate was allowed to settle for 3min and filter through muslin cloth. The filtrate was centrifuged at 3000rpm for 5mim and the pellet was suspended in water. The smear was observed under microscope (40x 15) for pebrine spores. The shape, size, luster and Brownian movement were used as a indices for the identification of pebrine spore.

Infectivity test in Eri silkworm:

The stock of purified pebrine spores was diluted to 1x106 spores/ml smeared on castor leaves. The smeared leaves were fed to second instar healthy eri silkworms during may-June, 2004, July-August.2004 and September-October, 2004. Ten replications of each treatment containing 100 larvae in each were maintained under CRD design. The rearing was conducted in ambient temperature and humidity in the rearing house. The larvae were reared up to spinning stage and the mortality occurred in larval and pupal stage due to pebrine as well as others was recorded. All the adult moths were microscopically examined individually in each crops and percentage of infection of pebrine were calculated and analyzed the data statistically.

RESULTS AND DISCUSSIONS

The analysis data on mortality of larvae due to pebrine, others and infection in adult moths were recorded and present in the table 1.

The morphological character of pebrine spores which was observed in inoculated eri silkworm larvae was identical in size, luster and Brownian movement and designated as *Nosema antheraea*. The data showed that pebrine disease caused significantly highest larval mortality in September-October (13.7%) followed by May-June (7.5%) and July-August (5.3%). Highest pupal mortality was recorded in July-August (13.2%) followed by May-June (9.6%). Significantly highest infection in adult moths was recorded in May-June (63.72%) followed by September-October (60.25%) and July-August (56.80%) which confirmed the cross infectivity of pebrine disease from muga to eri silkworm.

The present study revealed that the causal organism pebrine disease of muga silkworm infect eri silkworm and alarmingly higher percentage of infection 56.8 to 63.72 was recorded in adult moth. Similar results obtained in *Nosema mensili* isolated from *Pieris rapae* Crucivora (Abe & Kawarbata, 1988) and *Nosema* sp. isolated from *Tribolium* sp. (Fisher & Sanborn, 1962) reported to be cross infective to the silkworm. Ishihara and Iwano (1991) isolated *Nosema bombycis* from *Spodoptera depravata* which was infected to *Bonbyx morie* and confirmed the cross infection.

From the present study it is concluded that it was first time study on cross infectivity of pebrine disease from muga to eri silkworm and more than 60% cross infection was recorded in eri silkworm in adult moths which confirmed the cross infection.

As the pathogen is same it is advisable to take utmost care during rearing and grainage period of muga and eri silkworms.

Leaves of castor and kesseru grown near by muga silkworm rearing field should be avoided for feeding to eri silkworm rearing.

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Table 1. Cross infectivity of pebrine disease inoculated from muga to eri silkworm.

Treatment	Mortality (%)						Live moth		
	Pebrine Disease								
	May-June		July-Aug		Sept-Oct		May-June	July-Aug	Sept-Oct
	L	P	L	P	L	P	Adult Moth (%)		
Inoculated	7.5 (15.89)	9.6 (18.05)	5.3 (13.31)	13.2 (21.30)	13.7 (21.72)	0.00 (4.05)	63.72 (52.96)	56.80 (48.91)	60.25 (50.91)
Control	-	-	-	-	-	-	-	-	-
SD (p= 0.05)	L= 1.48 P= 3.20								

Data in parentheses are arcsine transformed value
L: Larvae, P: Pupae