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EFFECT OF DUSTING LIME-BLEACHING POWDER ON SILKWORM ON THE CONTROL OF MUSCARDINE AND VIRAL DISEASES

BY

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INTRODUCTION: The mulberry silkworm Bombyx mori L. is a domesticated insect and hence highly susceptible to diseases and attach by pests and parasites. The decrease in cocoon crop at present, due to silkworm diseases is estimated at 5 % of the annual production. Of all the damages, 'Flacherie' takes the largest share, above 70 %, followed by 'nuclear polyhedrosis' and 'muscardine' about 10 % each.

The diseases are caused by protozoa, fungi, bacteria, virus, mycoplasma and other pathogens. The infection way of these pathogens are divergent. 'Muscardine' caused by fungi is infected only through the skin of the silkworm. The so called 'Flacherie' due to bacteria and virus is carried mostly through the mouth, though partly through the skin. 'Pebrine' is transmitted, besides through the mouth, through the ovary.

Any disease, once it breaks out, spreads quickly. The silkworm, therefore, are reared with utmost care and adopting all possible preventive measures. If there is no pathogen, the disease does not occur. The disease occurance possibility may, thus, be minimized by eliminating the source of infection. It can be done by removal of pathogens through disinfection both before of start of rearing by fore-hand disinfection of rearing room and tools as well as during the rearing by disinfecting the rearing bed and larval body.

As reported by Krishnaswami S. et. al. 1973, the application of disinfectants has been recommended for controlling the diseases. Disinfection of silkworm body with formaline is practised. In Japan, recently, ceresan lime has been used which is spread evenly on the rearing tray with the silkworms.

Chihiro A., 1972 has reported that the disease controlling method includes the disinfection of rearing room and instruments and disinfection of body of silkworm to destroy pathogens (fungi) on the body. The disinfectants are sprinkled over the rearing bed for killing the pathogens introduced to the bed or larval body during rearing operation or at least for checking their budding and secondary infection. Formaline solution or high test bleaching powder may be sprinkled over the bed. At present, however, the sprinkling of 'pafusol' and other powders are widely practised.

The method employed for the control of fungus diseases of silkworm are disinfection of the rearing room and tools before rearing and disinfection of the body surface of larvae on the rearing bed. Since young larvae and newly moulted larvae are less resistant to fungus pathogens, powdery fungicides such as 'pafusol (3.3 % para-formaldehyde), 'Kabinoran' (2 % TPN and 2 % Manele), (Kinubon' (5 % 8-hydroxquinoline strontium salt) and others are dusted on larvae in the rearing bed immediately after each larval moulting as stated by Tazima Y. et. al. 1978.

Omura S., 1967 stated that despite the rearing rooms, tools and eggs were disinfected, the larvae are often attached by the spores that came from the corpses of diseased wild insects. The rearing seats and silkworms are, therefore, to be necessarily disinfected. Such chemicals as powder of 'Pafusol' and 'Ceresan' are convenient. The chemical are scattered evenly over the

rearing seat and silkworms at the rate of 5 g. per 0.1^{2m}.

This experiment was undertaken to study the effect of lime-bleaching powder against the muscardine (fungus)disease.

MATERIAL AND METHOD: The silkworm eggs of the variety PAK 4 laid in spring, cold stored at $5^{o}C$ - 1 and treated for artificial hatching were incubated and reared at Sericulture Research Laboratory, Lahore, The brushing of larvae was carried out on September 29, 1992 and feeding started the same day. During incubation of eggs and rearing of Ist and 2nd instar larvae, the temperature and R.H. was maintained within the ranges of 27-$30^{o}C$ and 60-70 % respectively by using air cooler. The rearing of larvae of the rest of the instars was carried out under natural conditions of temperature (26-$31^{o}C$) and R.H. (60-65 %). The larvae were administered 5 feeds daily. The larval duration and moulting data was recorded and is given at annexure 1.

For studying the effect of lime bleaching powder for controlling the muscardine disease, the larvae were grouped in six batches of 272 each. The larvae of three groups were treated with lime bleaching powder and the larvae of other three groups were not treated and maintained as control. The treatment of lime bleaching powder was applied by dusting the powder on the rearing bed with larvae immediately after each moult and during active feeding stage. The powder was prepared by well mixing the bleaching powder and lime powder in the ratio of 1 : 10. The mixed powder was dusted over when mulberry leaves were eaten up and new feed was given 10-15 minutes after casting the separating material husk so as to prevent the silkworms from ingesting the chemical. The larvae, as soon matured, were mounted on semi dried eucalyptus shoots for spinning cocoons. The cocoons

were harvested after seven days of moulting of larvae and following characters were studied in respect of each group.

(a) Cocooning Ratio: The viability of the larvae was expressed on the basis of cocooning ratio determined by the following formula:

$$\text{Cocooning Ratio} = \frac{\text{Number of cocoon spun}}{\text{Number of sampled larvae}} \times 100$$

(b) Grades of Cocoon: The cocoons of each group of each hybrid race were sorted out and graded as ; (1) good cocoons (2) low cocoons, (3) defective cocoons and (4) double cocoons. The number of cocoons of each grade were counted, averaged and their respective percentage was determined.

(c) Cocoon weight: Female and male cocoons, 10 each, were taken at random from good cocoons of each group of each race on the harvest day and their weight (gm) determined and averaged.

(d) Cocoon shell weight: The shell weight (gm) of the cocoons (c) was determined after removing the pupae from the cocoons and averaged.

(e) Cocoon shell ratio: The cocoon shell ratio, expressed in percentage, was calculated by the following formula:-

$$\text{Cocoon shell ratio} = \frac{\text{Cocoon shell weight}}{\text{Cocoon weight}} \times 100$$

(f) Sound pupae ratio: 25 cocoons from amongst the normal cocoons were taken at random from each group, cut and number of sound pupae was counted and expressed in percentage.

RESULTS AND DISCUSSION: The detailed data recorded during the course of experiment is given at annexure II and the characters derived therefrom are given below in table 1.

TABLE 1

CHARACTERS AND RESULTS OF THE EFFECT OF THE DUSTING OF LIME BLEACHING POWDER ON THE RACE PAK 4 DURING AUTUMN, 1992.

Sl. No.	CHARACTERS	LARVAE TREATED WITH LIME BLEACHING POWDER		CONTROL	
		Average	Percentage	Average	%age
1.	No. of sampled larvae	272	100	272	100
2.	No. of cocoon spun	235.33	86.52	210.00	77.20
3.	Cocooning ratio (%)	86.52	86.52	77.20	77.20
4.	Mortality at larval stage(%)	13.48	13.48	22.80	22.80
5.	No. of normal cocoons	200.00	84.99	172.67	82.22
6.	No. of low cocoons	18.00	7.65	16.67	7.94
7.	No. of defective cocoons	12.00	5.10	15.33	7.30
8.	No. of double cocoons	5.33	2.26	5.33	2.54
9.	Single cocoon weight (g)	1.117	-	1.032	-
10.	Cocoon shell weight (g)	0.217	-	0.210	-
11.	Cocoon shell ratio (%)	19.43	19.43	20.36	20.36
12.	Sound pupae ratio (%)	96.00	96.00	72.00	72.00

The above result reveals that the application of lime-bleaching powder has a positive effect on the control of silkworm disease. The cocooning ratio (86.52 %) in respect of the treated larvae is much higher (plus 9.32%) when compared with that of (77.20%) in respect of non-treated larvae and thus the mortality rate at larval stage was reduced from 22.80 % in non treated larvae to 13.48% in treated larvae. Similarly the sound pupae ratio (96 %) of the treated larvae was much higher (plus 24 %)

as compared to (72 %) in respect of larvae of control group. As such the pupal mortality was far more significantly reduced by 24 %. There was, however, no effect either on qualitative or quantitative characters of silk cocoons.