KRISHNENDU DAS

SEMESTER – II

SILKWORM REARING (UNIT 2)

Rearing Equipments:

Rearing House: The rearing house should meet certain specification, as the silk worms are very sensitive to weather conditions like humidity and temperature. The rearing room should have proper ventilation optimum temperature and proper humidity. It should be ensured that dampness, stagnation of air, exposure to bright sunlight and strong wind should be avoided.

Rearing Stand: Rearing stands are made up of wood or bamboo and are portable. These are the frames at which rearing trays are kept. A rearing stand should be 2.5 m high, 1.5 m long and 1.0 m wide and should have 10 shelves with a space of 20 cm between the shelves. The trays are arranged on the shelves, and each stand can accommodate 10 rearing trays.

Ant Well: Ant wells are provided to stop ants from crawling on to trays, as ants are serious menace to silk worms. They are made of concrete or stone blocks 20 cm square and 7.5 cm high with a deep groove of 2.5 cm running all round the top. The legs of the rearing stands rest on the centre of well filled with water.

Rearing Tray: These are made of bamboo or wood so that they are light and easy to handle. These are either round or rectangular.

Paraffin Paper: This is a thick craft paper coated with paraffin wax with a melting point of 55o C. It is used for rearing early stages of silk worms and prevents withering of the chopped leaves and also help to maintain proper humidity in the rearing bed.

Foam Rubber Strips: Long foam rubber strips 2.5 cm wide and 2.5 cm thick dipped in water are kept around the silkworm rearing bed during first two instar stages to maintain optimum humidity. Newspaper strips may also be used as a substitute.

Chopsticks: These are tapering bamboo rods (1cm in diameter) and meant for picking younger stages of larvae to ensure the hygienic handling. Feathers: Bird feathers preferably white and large are important items of silkworm rearing room. These are used for brushing newly hatched worms to prevent injuries. Chopping Board and Knife: The chopping board is made up of soft wood it is used as a base for cutting leaves with knife to the suitable size required for feeding the worms in different instar stages. Leaf Chambers: These are used for storing harvested leaves. The sidewalls and bottom are made of wooden strips. The chamber is covered on all sides with a wet gunny cloth.

Cleaning Net: These are cotton or nylon nets of different mesh size to suit the size variations of different instars of the silk worm. These are used forcleaning the rearing beds, and at least two nets are required for each rearing tray.

Mountages: These are used to support silkworm for spinning cocoons. These are made up of bamboo, usually 1.8 m long and 1.2 m wide. Over a mat base, tapes (woven out of bamboo and 5-6 cm wide) are fixed in the form of spirals leaving a gap of 5-6 cm. They are also called chandrikes. Other types of mountage such as centipede rope mountage, straw cocooning frames etc. are also used.

Hygrometers and Thermometers: These are used to record humidity and temperature of the rearing room.

Feeding Stands: These are small wooden stands (0.9 m height) used for holding the trays during feeding and bed cleaning. Other equipments like feeding basins, sprayer, and leaf baskets may also be required.

Disinfection :

Silkworm diseases are better prevented than cured. Disinfection and hygiene are the two important aspects in silkworm rearing to prevent the diseases. Suitable disinfectant is the primary need to disinfect the rearing house, its surroundings and appliances to eliminate the persistent pathogens from the rearing environment. In this direction, Serichlor, a new disinfectant in Indian Sericulture marketed as Serichlor-60 (contains 60,000 ppm of chlorine dioxide) and Serichlor-20 (contains 20,000 ppm of chlorine dioxide) has been evaluated for its germicidal effect against the pathogens of silkworm, viz., spores of Nosemabombycis, Bacillus thuringiensis, polyhedra of BmNPV and conidia of Beauveriabassiana both in vitro and in vivo. Results indicated that high concentration (2,500 ppm of chlorine dioxide) is required to kill all the pathogens at 100% level. The efficacy of the Serichlor was greatly enhanced by the addition of 0.5% slaked lime solution. 500 ppm of chlorine dioxide in 0.5% slaked lime solution was found effective against all the pathogens tested. This concentration of disinfectant was also found effective for disinfection of rearing house, rearing appliances and silkworm egg surface. The disinfectant is stable, non hazardous, least corrosive and most suitable for Indian Sericulture.

Fumigants:

A new fumigant-Shennong No. 1 which had strong killing action to virus polyhedra,fungousconidia,bacteria and its spores,Nosemabombycis spores etc. of main pathogens of the silkworm,Bombyxmori was developed. The fumigant was stable in disinfectant effect,easy and safe to use,low in corrosiveness and no effect to the growth and development of silkworm larva and the cocoon quality. Shennong No. 1 could beused in the disinfection of rearing room and instruments,rearing seat and larval surface of silkworm,environ-ment of silkworm reariIlg and leaf storaging,cocooning period etc.,and it had a good action for controlling thesilkworm diseases and increasing

the yield and income of cocoon in sericulture. So,Shennong No. 1 was a highdisinfectant according with the demands of disinfection and diseases prevention in silkworm rearing.

Disinfection Effect of DibromodimethvlHvdantoin on the Main Pathogens of Fungous and Viral Diseases in Silkworm,Bombyxmori

To popularize and use high effect and safe disinfectant is one of the important practices in disease prevention technological system for large scale silkworm rearing.In present study,different concentrations of a new disinfectant named dibromodimethvlhvdantoin were prepared and used to disinfect main pathogens of fungous and viral diseases in silkworm.The results indicated that,100% disinfection effect could be achieved against Beauveriabassiana and Aspergillusflavus with 0.5 g/L dibromodimethvlhvdantoin.TheBombyxmorinucleopolyhedrovirus (BmNPV) and cytoplasmic polyhedral virus (BmCPV) could not be perished if only dibromodimethvlhvdantoin was applied.However,after the dibromodimethvlhvdantoin solution with mass concentration of 0.5 g/L was added with 5.0 g/L sodium carbonate,100% disinfection effect could be achieved against BmNPV and BmCPV,while the addition of sodium carbonate had no adverse effect on the disinfection effect against B.bassiana and A.flavus.The results of safety test indicated that,growth and development of the 4th and 5th instar larvae feeding on mulberry leaves soaked with 1.0 g/L (or 0.5 g/L) dibromodimethvlhvdantoin and 5.0 g/L sodium carbonate once a day was not affected obviously,and the cocoon weight,cocoon shell rate and other economic indexes were about the same with those of the control.The above results suggest that the mixture disinfectant solution of dibromodimethvlhvdantoin and sodium carbonate can be used to disinfect main pathogens of fungous and viral diseases in silkworm rearing.

Silkworm bed cleaning:

Bed cleaning is an important silkworm rearing process to ensure the hygiene in the immediate vicinity of silkworms in order to protect from disease infection and to ensure them good feeding appetite. Hence, timely bed cleaning is essential to keep the worm treatments used for this study were one time bed cleaning frequency per instar, two times bed cleaning frequency per instar, three times bed cleaning frequency per instar, once bed cleaning frequency per day, twice bed cleaning frequency per day and no bed cleaning (control) to evaluate the effects of silkworm bed cleaning frequencies on silkworm races. Observations on larval mortality, larval period, single cocoon weight, shell weight, length of silk thread and silk ratio were carefully noted for each treatment and replications. Three replications were used for each treatment. Once bed cleaning frequency per day, twice bed cleaning frequency per day and three times bed cleaning frequency per instar significantly (period of Vietnamese eri-silkworm races (23.7, 25 and 24.3 days), Indian eri silkworm races (29.8, 28.6 and 29.6 days), Kenyan bivoltine silkworm races (27.5, 30.6 and 31.5 days), Korean bivoltine silkworm races (24.7, 25.3,

and 25.8 days) and Vietnamese multivoltine silkworm races (25.7, 25.8, and 25.8 days) respectively as compared to the untreated check which was 36.3 in Vietnamese eri, 55.4 days in Indian eri, 33.1 days in Kenyan bivoltine, 30.2 in Korean bivoltine and 30.3 in Vietnamese multivoltine silkworm races. Larval mortality was significantly higher for Vietnamese eri-silkworm races (8.25 and 15.58%), for Indian eri 11.66%), for Kenyan bivoltine silkworm races (12.2 (13.83 and 32.83%), for Vietnamese multivoltine silkworm races (0.33 mature larval stages of 4 and 5 larval instars respectively in the untreated silkworm rearing beds. Among the tested treatments, three times bed clea bed cleaning frequency per day and two times bed cleaning frequency per day significantly reduced larval mortality rate during the 4 and 5 ranged between 0 to 0.33% for Vietnamese eri silkworm races, 0.9 to 14.13% for Kenyan bivoltine silkworm races, 1 to 5.16 % for Korean silkworm races and 0.33 to 0.83% for Vietnamese multivoltine silkworm races. The young larval stages/instars (1 to 3 instars) showed low larval mortality rate than mature larval stages (4 and 5 instars) in all silkworm races. Bed cleaning frequencies had no significant effect for 1 instar for all silkworm races. All bed cleaning frequencies had no silkworm races and Vietnamese multivoltine silkworm races until the 3 cleaning is not necessary during these stages in silk worm rearing practices for such races. Bed cleaning has showed a positive effect to reduce larval mortality rate for Vietnamese eri races, Indian eri-silkworm races and Kenyan bivoltine silkworm races during 2 growth. Long spinning silk thread, robust silk cocoon and shell weight and higher percentage of silk ratio of silkworm races were registered from one time bed cleaning frequency per day and two times bed cleaning frequency per day.