

the cocoons at the right time, to obtain good quality of silk the pupae or chrysalis are not allowed to get transformed into adults and are killed inside the cocoon — stiffing.

**Stiffing:** For obtaining the commercial silk, the cocoons are treated with hot water or placed in a hot oven so that pupae are killed inside the cocoons. Killing of pupae is economically important to prevent the emergence of moth that cuts the cocoon and makes that unreelable.

**Reeling:** Removal of silk thread from cocoon is referred to as reeling. The cocoons are first heated in boiling water to soften them and dissolution of sericin or gum occurs. Its followed by brushing the outer surface of cocoons so that free end of the silk filament is obtained. In filature method of reeling the free ends of the silk filament of 5-10 cocoons are picked together, fixed on the reeling appliance and all are twisted into a single thick thread and wound on a reel. More importantly in this method cocoons are subjected to steam bath and not the boiling water. The thread is continuous and extremely long, the silk so obtained is called reeled silk. The raw silk is first reeled on small reels that allows the proper drying of fiber. Then its reeled on large reels referred to as rereeling. Only about 50% of the silk in each cocoon is releable, remainder is used as silk waste and formed into spun silk.

## Silkworm Diseases and Pests

Like many other insects, silk worms too are susceptible to pathogens causing them ill and eventually leading to their death. Some of the important among them are:

(i) **Pebrine.** It is the serious disease of silkworm caused by protozoan *Nosema bombycis*. The disease is transmitted through contaminated food and contact. It also spreads through the eggs of the diseased moths. The spores once ingested invade the gut tissue and are continuously discharged through the faecal matter. The infested moths show low fecundity, produce pepper like spots on body, wrinkled skin and sluggish behavior. Pebrine is of two types. One protozoan type already discussed and other is called viral pebrine caused by the

virus namely *Borrelina bombycis*, the larvae suffering from this disease get killed in 8-10 days of infection.

(ii) **Flacherie**. It's a bacterial disease caused by *Bacillus thuringiensis sotto*. The diseased larvae vomit green fluid through their mouth and are generally thin in body musculature. Due to high dysentric condition larvae appears flabby, feeble, weak, withered and loosely hanging. The body putrefies and becomes black or green. The caterpillars die and their bodies give an offensive smell. This disease is generally caused by indigestion, therefore over feeding should be avoided. Regular feeding of the larva and maintaining good hygenic condition to prevent spread of disease.

(iii) **Muscardine**. It's a fungal disease caused by Fungus, *Beauveria bassiana* and commonly found during rainy season. The fungal spores adhering to the larval body germinate under suitable conditions and penetrate the body. The suffered caterpillars loose appetite, become soft bodied turn stiff. White muscardine is due to *Beauveria bassiana*, green due to *Spicaria parsinna* and yellow muscardine via *Iscaria farinosa*.

(iv) **Glasseria**. It's caused by **Borrelina virus**, causing swelling of body segments that ultimately results in bursting of skin, care should be taken that the larvae should not be fed on mature leaves first and tender leaves after wards. Use of resistant strains, chemical disinfectants like bleaching powder, formalin, etc. should he periodically used to check the infestation.

Pests: Some of the important pests attacking the silkworm are:

(i) Uzi fly. *Tricholyga bombycis* (Diptera), young maggots of which bore into the body of silkworm and live in eating fat bodies for about a week leading to the death of the insect

(ii) Beetles. Dermestid beetles like *Dermestes cadaverinus* and other dermeslid beetles are attracted to the smell of cocoons in storage. They feed on cocoons, inside pupae and even eggs.

Other pests include ants, lizards, birds, rats, squirrels etc., all of these are capable of damaging eggs, pupae, cocoons and adults. Trapping should be carried out to catch rats and squirrels. Ant wells should be implied necessarily to counter ant attacks.