

## Pests and Diseases of Muga Food Plants

Often several pests and diseases inflict a heavy damage to the muga food plants and render them unsuitable for the silkworm rearing. The most important pests and diseases of *som* and *soalu* are listed below along with the nature of injury to the plants and their control measures.

### **Insect Pests of Som and Soalu**

**(1) Sucking Pests:** - Pests like thrips, aphids and jassids cause damage to leaves of *som* and *soalu* by sucking the plant sap and cause wilting of leaves. The initial symptoms are leaf margin rolling, followed by curling and wilting of leaves. Among these sucking pests, infestation due to thrips and jassids is less and does not reach economic level warranting any plant protection measures in *som* and *soalu*. However, less frequently aphids cause extensive damage to the developing leaf buds in the terminal branches. The honey-dew secretion due to aphid infestation attracts ants on the plants and makes it unsuitable for muga silkworm rearing. The honey-dew secretion of aphids also attracts saprophytic fungi which subsequently cause stem rotting due to extensive infestation of fungi.

The sucking pests can be effectively controlled by application of systemic insecticides like Rogar, Ekalaux, Anthio *etc.* Five percent solution of anyone of these insecticides may be sprayed with low volume sprayer on the foliages. The insecticide applied plantation should not be used for muga culture for at least forty to forty five days from the date of application of the insecticide.

**(2) Stem Borer:** - The carpenter worm, *Zeuzera multistrigata* Moore (Cossidae: Lepidoptera) cause extensive damage to *som* and *soalu* plantations. The female moth after mating lays eggs on the tree trunk, preferably in the trunk base between one to two feet above the soil level. The larvae emerging from the eggs bore through the bark and make a tunnel and commence intensive feeding of the middle portion of the tree trunk. The larva completes its growth and pupates inside the tunnel, Due to intensive feeding of the larva, the tunnel becomes wider and the entry hole becomes distinctly visible through which the larva excretes around the tree trunk in the soil. Large sized holes measuring up to 0.5 cm diameter is the symptoms of stem borer damage. The moth emerges through the hole made by the larva. A single female moth lays more than one thousand eggs scattered on the tree trunk. The stem borer is the major pest of *som* and *soalu*. The *som* and *soalu* trees infested by stem borer with extensive tunneling appear like normal trees but they break off if there is heavy wind or cyclone.

Various insecticides were tested for the control of stem borer but none of the chemicals is found to be effective against the carpenter worm which moves in the tunnel and the insecticide does

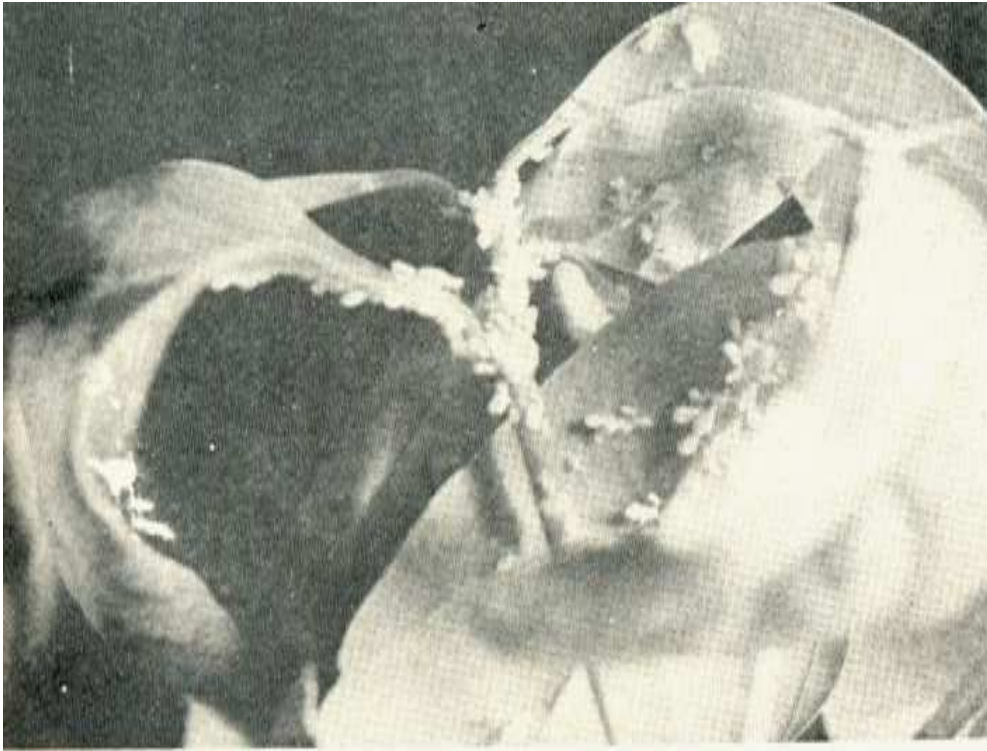
not reach the feeding site of the carpenter worm. Only fumigants are found to be effective. Chloroform, Benzene etc. are found to be effective. Cotton wool soaked in any one of these fumigant chemicals is used for plugging the larval entry hole and then the site of infection is plastered with mud. This method is found to be very effective. Fumigant insecticides like Nuvan also control this pest.

**(3) Leaf Miner:** - Caterpillars like semiloopers cause extensive damage to the leaves of *som* and *soalu*. The semiloopers feed voraciously and leave large holes on the leaf surface. The semiloopers are nocturnal in feeding habits and at times cause very serious damage. Spray of 10% Thiodan or 10% Endosulfan is found to be very effective for the control of semiloopers, after insecticide application the plantation should not be used for muga culture for forty five days.

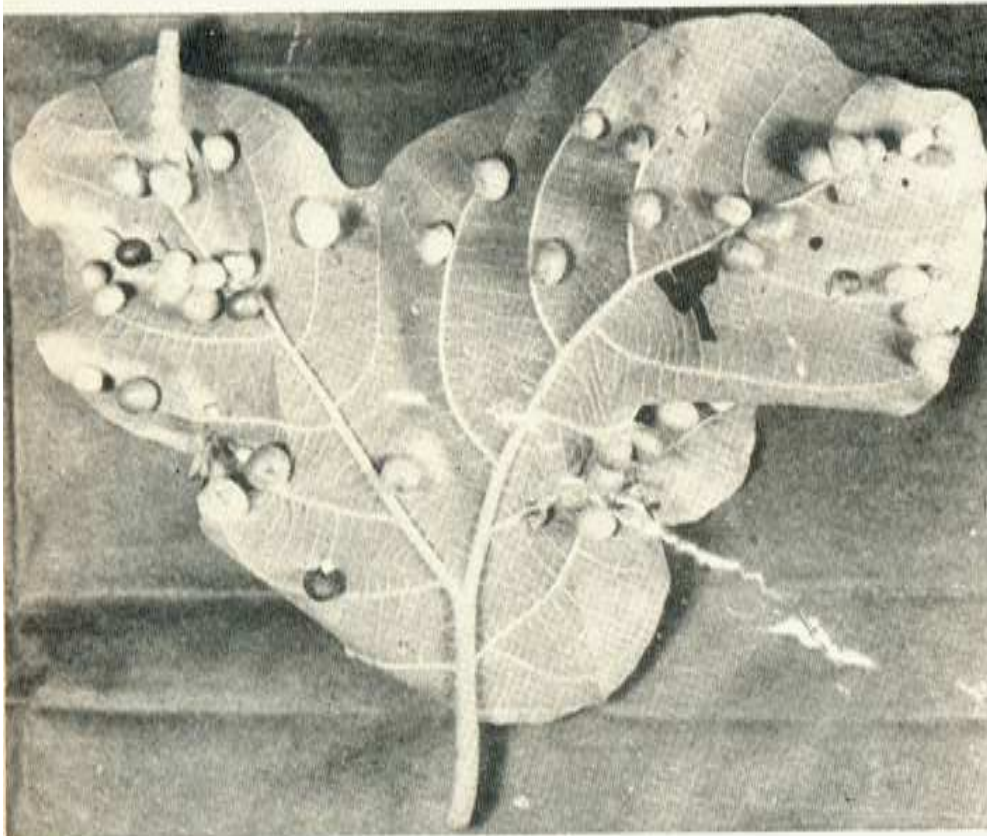
**(4) Leaf Galls:** - *Paropsylla besooni*: (Psyllidae:Hemoptera) induces galls in *soalu* leaves. *Apanteles* sp. induces gall in *som* leaves. Thus different gall insects cause damage to *som* and *soalu*. The adult bugs of *P. bersoni* lay eggs on the dorsal surface of the *soalu* leaves close to the veins. The galls are seen on the ventral surface in case of *som*. The *soalu* galls are oval, globular and spherical in shape. The galls of *som* are spherical in the lower surface and tapering in the terminal region. The gall is induced by the toxic saliva secreted by the gall insect larva. Gall is a malignant tumour like growth. The leaves with galls become unsuitable for muga silkworm feeding. Galls are seen throughout the year; however, more prevalent during June to November. The control measures are yet to be determined. Field sanitation and cultural practices like removal of gall infested leaves and destroying them in fire are found to reduce the incidence of galls. Severely gall infested trees may be pollarded at a height of four to five feet from the ground level and all the gall infested leaves and branches should be destroyed in fire at the same time.

**(5) Leaf Roller:** - This is a serious pest of *soalu*. The female moth lays clusters of eggs on the ventral surface of the leaves. The eggs are agglutinated to the leaf surface, the developing larvae secrete gummy substance and roll the adjacent leaves forming roll of leaves as if stitched to each other. The larvae develop inside the leaf rolls where the faecal materials also accumulate. This pest attacks *soalu* seedlings and also full grown trees, rendering the leaves unsuitable for muga culture. Mechanical control is found to be very effective in reducing the incidence of leaf roller. Spraying of 10% Thiodan reduces the incidence of leaf roller.

**(6) Hairy Caterpillar:** - Hairy caterpillars at times cause damage to *soalu* plantations. These caterpillars feed on the chlorophyll portion of the leaves leaving the veins and midrib. The caterpillars can be collected and destroyed. However, this is not a very serious pest.



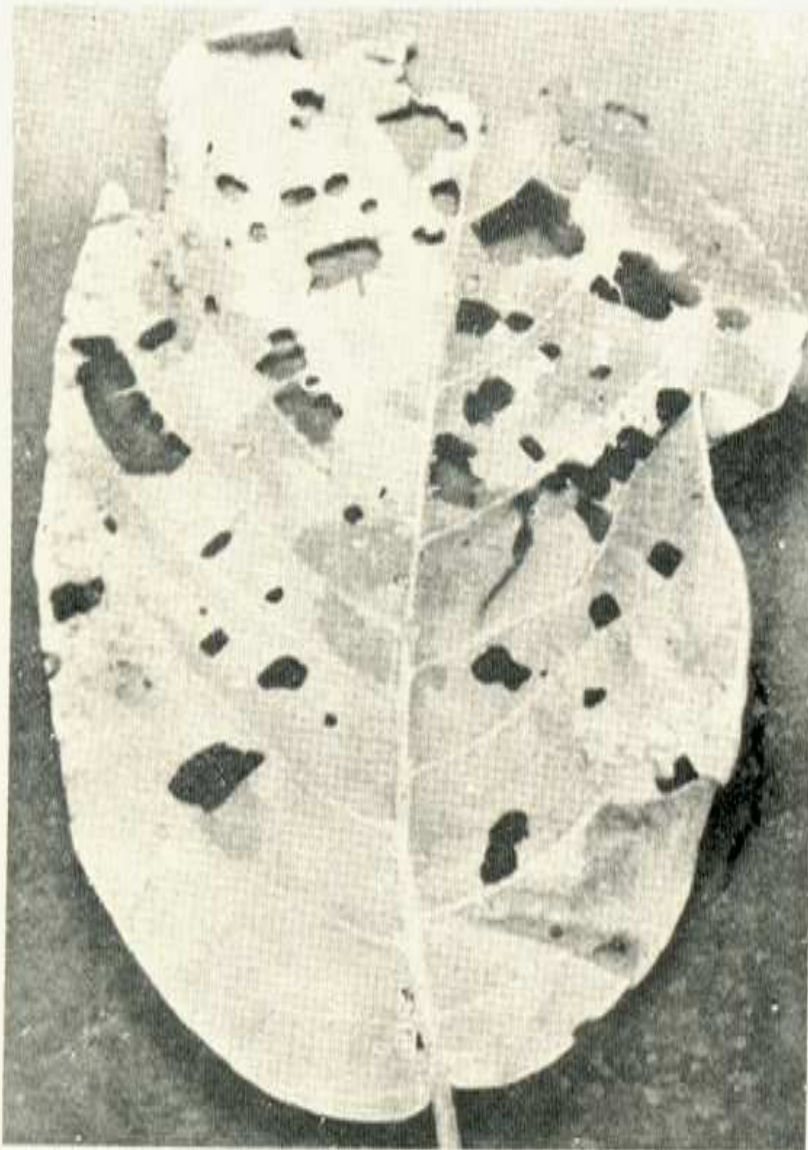
Aphid infestation in *Soalu*



Gall infestation in *Soalu* leaves

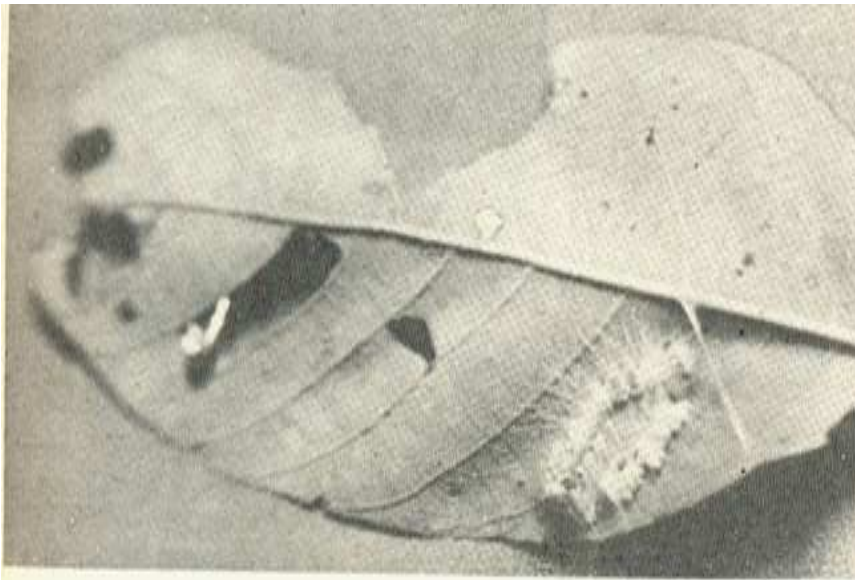


Gall infestation in *Som* leaves

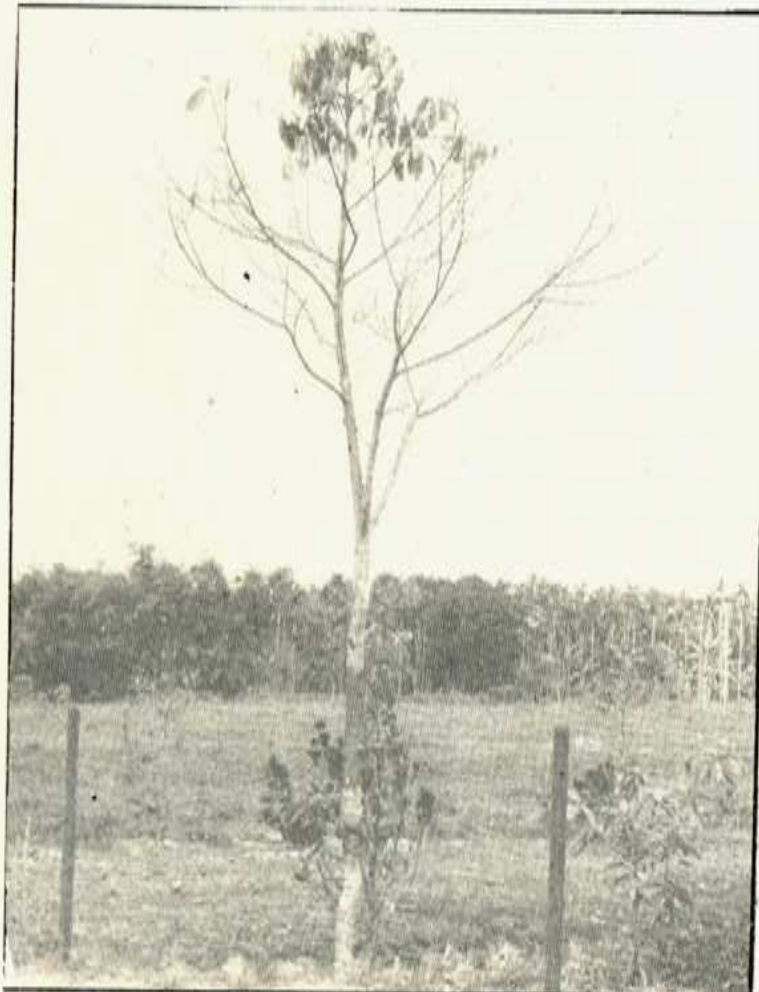


Hairy caterpillar damage in *Soalu* leaf





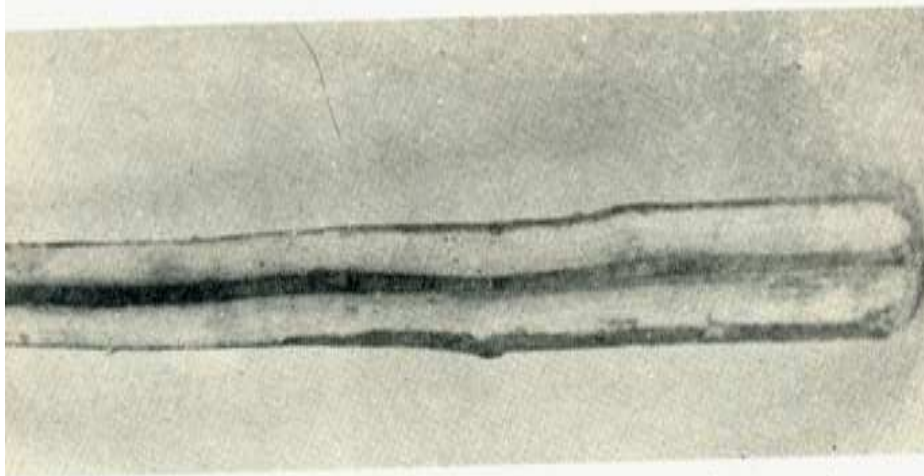
Hairy caterpillar attack *Soalu* leaf



Defoliation of *Som* tree by caterpillar



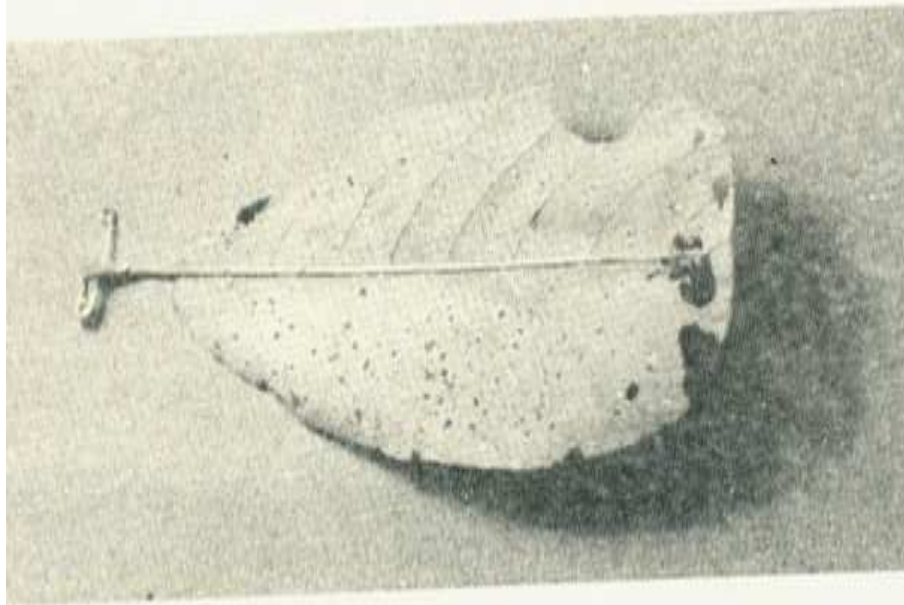
Stem borer damage *Soalu* tree trunk



Stem damage (inside view) by stem borer in *Som*

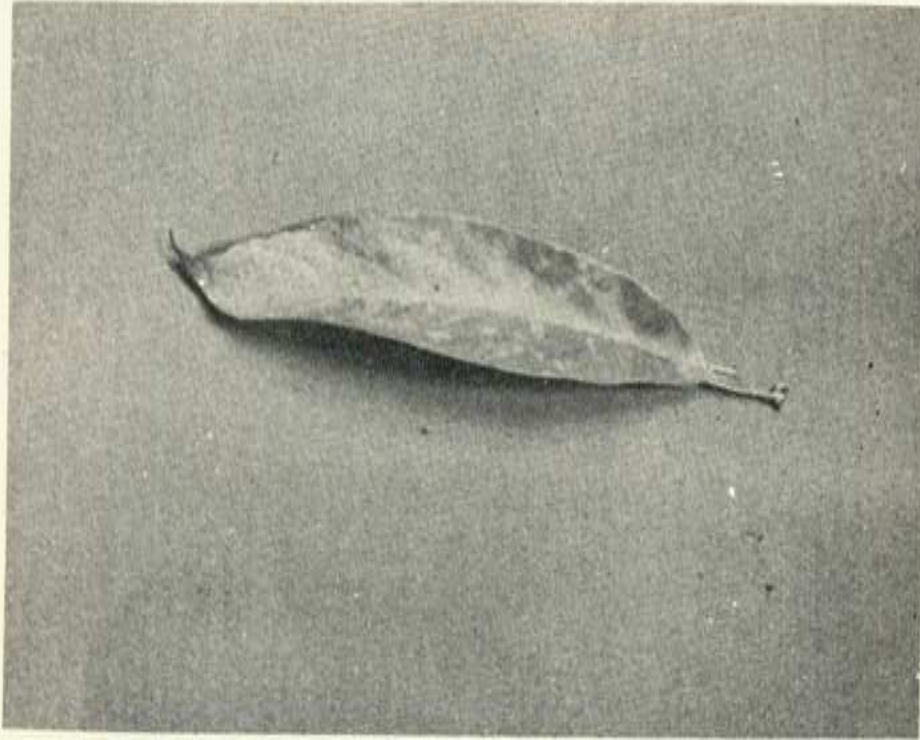


Stem borer attack in *Som* tree

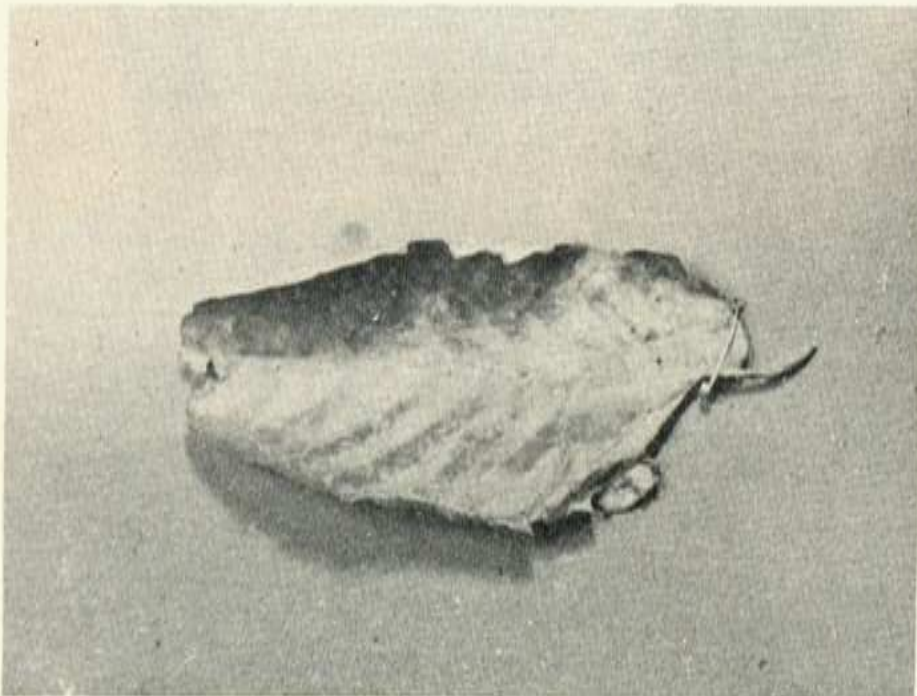


Leaf rust in *Soalu*





Leaf curling disease in *Som*



Leaf spot disease in *Soalu*



## Diseases of Som and Soalu

Som and soalu plants are susceptible to a number of diseases which affect normal growth of the plant and render the leaves unsuitable for muga silkworm rearing.

### Diseases of Som:

**Grey blight:** - Grey blight of leaf is common in *som* which is caused by a fungus known as *Pestatiopsis dessiminate*. Minute brownish patches appear on the leaves which soon turn grey. The disease starts from the tender leaves which die out from the top. Affected leaves become dry with dark grayish colour on the soft tender leaves.

**Control measures:** - Spray 1% Bordeaux mixture. But care should be taken not to feed these leaves to the muga worms for one month from the date of spraying. Picking and burning of diseased leaves in the early stage is recommended; this will reduce further spreading of the grey blight.

**2. Leaf spot:** - The affected leaves develop a number of circular or irregular dark brown spots with pale yellow margin. The leaf spot disease in *som* is caused by *Cercospora* sp. which belongs to the class *fungi imperfectii*.

**Control measures:-** Spray 0.2% Difolatan. The sprayed leaves should not be fed to muga silkworm for atleast 20 days from the date 'of spraying.

**3. Red Rust:** - The disease is algal in origin and is caused by *Cephaleurus* sp. (class: Chlorophyceal), it is an intercellular parasite. It is restricted to older leaves only and appears as orange yellow patches on the upper surface of the leaf. The patches may be numerous or few, crowded or scattered. Their maximum diameter is about one centimeter. At fruiting stage they are covered with a dense mass of orange coloured delicate and erect filament which is the stalk of sporangia. The thallus of the alga appears as a disk of radially elongated cells under the microscope. The disease has been observed throughout the year. In case of severe attack, most of the leaves become yellow and unhealthy and are not suitable for feeding to the muga silkworm.

**Control measures:** (i) Clean pruning or removal of the affected twigs and burning them is advisable (ii) Apply Bordeaux mixture of the 6-6-50 formula at the rate of 1500 liters per hectare after pruning.

**4. Leaf curling:** Mosaic symptoms, occasional curling of leaves and stunted growth of the plant are indicative of leaf curl diseases. Causative organism may be virus.

**Control measures:** Plant may be removed and burnt.

**5. Wilt:** Progressive drying of leaves and young shoots result in plant wilting. This is more common during February and March. Causative organism may be virus.

**Control measures:** Prune all dead and affected shoots and spray 1% Bordeaux mixture. The pruned plant materials should be burnt separately.

### **Diseases of Soalu**

**1. Red Rust:** The disease is caused by the same algal species (*Cephaleurus sp.*) which causes red rust diseases of *som*. It is restricted to older leaves and common during winter when the leaves become mature. The symptoms and control measures are same as those for *som*.

**2. Leaf spot:** Minute dot like irregular black or brown spots with light yellow margin appear on both surfaces of the leaves. The centre of the spots later falls off leaving a hole on the leaves.

**Control measures:** Spray Bordeaux mixture of 0.3% concentration at weekly intervals. Field sanitation is very much essential and this will reduce considerably the incidence of pests and diseases on *som* and *soalu* and thereby ensure successful muga crop.

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## **PESTS AND DISEASES OF FOOD PLANTS OF ERI SILKWORM**

### **PESTS OF CASTER FOOD PLANTS**

A good number of insects attack castor leaves. They include

1. Castor semi looper - *Achoea janta* L.
2. Capsule borer (red hairy caterpillar) - *Dichochrois punctiferalis* Geren
3. Caterpillar (hairy caterpillar) - *Euproctis lunata*
4. Mealy wing - *Trialeurodes ricini* Misra.
5. Castor jassid - *Empoasca flavescens* Pb.,

These insects attack foliage, shoot and capsules.

### **CONTROL OF PESTS**

Many of these pests are effectively checked by dusting with 10 % DDT or BHC or spraying 0.03 % Endrin, with calcium arsenate, 0.1 % Malathion and 0.05 % parathion insecticides. In the early stages of infection, the egg masses and caterpillars should be collected and destroyed. When the insecticides are used, leaves should not be fed to the worms immediately after spraying. Before use, leaves should be cleaned by washing them thoroughly. Other control measures include ploughing the soil to expose and kill the pupae, hand-picking and destroying the moths which appear after the monsoon showers in July-August and, trapping and destroying the caterpillars by digging trenches around and across the infected fields.

## DISEASES

Some of the important diseases of castor caused by fungi and bacteria as also the methods of their control are as follows:

- a) Seedling blight** - It is caused by a fungus *Phytophthora colocasiae* Racib. It attacks the leaves of seedlings and older plants. This disease can be effectively prevented by avoiding damp and low lying localities for plantation and by providing good drainage. Spraying with Bordeaux mixture also controls the disease- effectively. However; leaves should not be fed to silkworms immediately at least for a period of 10-12 days from the date of spraying. The symptom of disease is a roundish patch of dull green colour, changing to yellow and brown spots at later stage.
- b) Rust** - It is caused by a fungus called *Melampsora ricini* (Bv) Pass., which attacks the leaves causing them to wither and dry up prematurely. It is controlled by spraying the crop with sulphur.
- c) Alternaria blight** - As the name suggests, this disease is caused by *Alternaria ricini* which attacks all the aerial parts of the plant like stem, leaves, inflorescence and capsules. The affected parts are covered with a bluish green or sooty growth. It becomes extensive during rainy season, and is transmitted through seed-both externally and internally. Seed treatment may be useful.
- d) Cercospora leaf spot** - It is caused by *Cercospora ricinella* Sacc and Berl, which attack leaves. They are covered by a large number of roundish or irregular diseased spots which wither and dry up. The disease destroys quite a great bulk of leaves. Bordeaux mixture or other copper fungicides may be used to arrest the disease.

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## PESTS AND DISEASES OF FOOD PLANTS OF TASAR SILKWORM

Control of some of the important pests and diseases are given in the table.

<b>COMMON PESTS AND DISEASES OF TASAR FOOD PLANTS AND THEIR CONTROL</b>		
<b>PEST/DISEASE</b>	<b>DAMAGE</b>	<b>CONTROL</b>
<b>STEM BORER</b>	<b>LARVAE BORE IN TO THE T. ARJUNA &amp; T. TOMENTOSA SHOOTS KILLING THE BRANCHES</b>	<b>PLUGGING WITH COTTON SOAKED IN PETROL/KEROSENE OIL AND PASTING WITH MUD.  LIGHT TRAPS FOR ADULTS</b>
<b>GALL FLY</b>	<b>YOUNG FLIES PRODUCE UGLY GALLS ON T. ARJUNA &amp; T. TOMENTOSA FOLIAGE</b>	<b>DIMECRON @ 0.03% OR ROGOR 0,5% IS EFFECTIVE</b>
<b>TERMITES</b>	<b>ATTACK THE FOOD PLANTS AT ALL STAGES OF GROWTH</b>	<b>TERMITE SHOULD BE UNEARTHED AND DESTROYED BY POURING CRUDE OIL EMULSION/ALDRIN (30% E.C.) EMULSION. ALDRIN DUST (5%) SHOULD BE MIXED WITH SOIL @ 20KG/HA</b>
<b>MAY/JUNE BEETLE</b>	<b>FEEDS ON THE LEAVES OF FOOD PLANTS</b>	<b>OPTIMUM TILLAGE OPERATIONS AND SOIL APPLICATION OF ALDRIN DUST @ 5% / 20KG/HA</b>
<b>STEM CANKER</b>	<b>TUMOUR LIKE GROWTH ON T. TOMENTOSA TWIGS INCREASES IN SIZE AND BURSTS INTO UGLY ULCERS</b>	<b>PRUNING AND BURNING OF INFECTED TWIGS, DRESSING OF CUT ENDS WITH BORDEAUX PASTE AFTER PRUNING. SPRAYING WITH ZINCOP (0.3%)</b>
<b>LEAF CURL</b>	<b>CRINKLING OF LEAF SURFACE</b>	<b>SAME AS STEM CANKER</b>
<b>ROOT ROT</b>	<b>AFFECTED ROOTS DECOMPOSE &amp; DIE. POOR;Y DEVELOPED LATERAL ROOTS BECOME LONG SPREADING WITH AGE AND SPREAD INFECTION</b>	<b>BURNING OF DEAD PLANTS. DIGGING OF ISOLATION TRENCHES (1.5X0.7X0.3M) TO ISOLATE HEALTHY FROM INFECTED TRACTS</b>