T.R.I. ADVISORY CIRCULAR No.DM 1

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PROTECTION OF TEA FROM BLISTER BLIGHT

(This Advisory Circular supersedes the Advisory Circular DM 1, Serial No. 1/02 issued in October 2002 and related previous Advisory Circulars and links with Advisory Circular PU 2)

1. Introduction

Blister blight disease of tea is caused by a fungus (*Exobasidium vexans Massee.)* and is spread by wind- borne spores. A high relative humidity (85%) is required for spore production and their release. Most importantly high moisture on the leaf surface favors germination of spores and infection. Therefore, conditions of persistent mist and dew are particularly conducive to high levels of infection. The spores are killed when they are exposed to either direct sunlight or desiccation. The disease is of great economic importance during the rainy seasons at mid and high elevations (>600 m).

Blister blight fungus can infect only young succulent leaves and tender stems. As the leaves and stems mature, they become immune to infection.

2. Disease Management

Integrated disease management inclusive of plant resistance, cultural practices and chemical spraying is emphasized.

2.1 Resistant Cultivars

No cultivars have so far been found to be totally resistant to this disease. Only gradations of susceptibility have been found in the various cultivars of tea. Growing resistant cultivars is the best option. The amount of money spent on chemical control can be proportionately reduced with the increase in resistance of a selected cultivars. To select blister blight resistant cultivar/s for planting, please refer Advisory Circular PN 1.

2.2 Cultural Methods

Cultural practices are the measures undertaken to prevent and control the disease by manipulating plants and the environment. These practices include the following:

1. Shade management: Thinning and removal of excess shade to provide adequate sun light and ventilation.
2. Plucking manipulation: Shorter plucking rounds and hard plucking to remove infected leaves and reduce the amount of inoculum and the rate of spread.
3. Good Agricultural Practices: Timely and balanced fertilization avoiding unnecessary succulence of the foliage, and timely weed management in the pruned fields up to tipping to avoid stem blisters.

2.3 Chemical Methods

The following categories of fungicides, which have protective and curative mode of action, can be used to control the Blister Blight Disease in tea.

1. Protective - Copper Fungicides
2. Curative - Systemic Fungicides

2.3.1 Copper Fungicides

Copper fungicides, which are protective in their action, have been found to give adequate protection against blister blight in tea. When sprayed, copper deposited on the leaf surface prevents the germination of spores, thereby preventing infection. However, copper will have no effect if applied after the fungus has penetrated the leaf surface.

The main ingredient of these fungicides is metallic copper (Cu) and can be available in the forms of oxides, oxychlorides, hydroxides or sulphates. Their formulations could be either wettable powders (WP), dry-flowable powders (DF), wettable granules (WG) and suspension concentrate (SC). All recommendations are based on copper formulations having 50% copper (w/w) or lower. Different dosages are recommended for different formulations due to the differences in fineness of the commercial preparations and their resultant spreadability/miscibility in water.

Based on their solubility they have been categorized into two major groups. They are;

Group (a) - Copper oxides (insoluble in water)

Group (b) - Copper hydroxides, Tribasic copper sulphate (slightly soluble in water)

2.3.2 Systemic Fungicides

Systemic fungicides have both protective and curative properties. Unlike the protectant fungicides, they can cure an established infection at early stages.

The disadvantages of the fungicides are the high costs, potential residues in made tea and the likelihood of the fungus developing resistance to the fungicide and retain residues in made tea.

It is recommended to adopt the following strategies to overcome the disadvantages:

i. Use the lowest possible concentration of fungicide as recommended by the TRI based on the disease severity.

ii. Alternate use of systemic fungicides that belong to different groups, possessing different modes of action with protectant copper fungicides (except for plucking fields).

iii. Limit the total number of applications per season to a minimum possible, following sunshine hours (cumulative total of 20 hours sunshine over the previous five days is sufficient to prevent disease reaching an economic damage level).

iv. Avoid a fungicidal spray when there are a minimum of 4 hours of sunshine at a stretch for 5 consecutive days and during heavy rains.

2.4 Management of Blister Blight in Nurseries

Succulent stems and leaves of the nursery plants are attacked by blister blight, affecting the overall growth of the plants.

Select cultivars resistant to blister blight for establishing a nursery (please refer Advisory Circular PN1).

Avoid dense shade in nurseries during monsoonal weather.

Spray fungicides as recommended in Advisory Circular PU2. Apply copper fungicides and systemic fungicides, either individually or as alternative sprays using a knapsack sprayer.

2.5 Management of Blister Blight in Young Tea

Tender young plants are also prone to heavy attacks of blister blight. Repeated heavy infections could seriously damage newly establishing plants. Therefore, it is essential to pay more attention for the control of blister blight at this stage of growth.

Closer spraying rounds are recommended using a knapsack sprayer in order to wet all the young foliage and tender stems for maximum protection.

Use of both copper fungicides and systemic fungicides, either individually or as alternative spraying are recommended for controlling Blister Blight in young tea fields.

Please refer Advisory Circular PU2, for the details of the products, dosages and the methods of application.

2.6 Management of Blister Blight in Tea Recovering from Pruning

On account of blister blight, the most critical time for a tea bush is during the period it is recovering after pruning. During this time all its leaves and shoots are young and tender. The loss of newly emerging stems and leaves at this stage will cause a serious setback to growth. The regeneration growth to replace dead shoots is possible only at further expense of food reserves. Therefore, if the pruned bushes are not adequately protected, incidence of blister blight could cause very poor recovery, which may even lead to their death.

Schedule lopping of shade trees at the onset of the monsoon and weeding in post-pruned fields.

Blister blight disease could be effectively controlled in pruned fields by strictly following the fungicide spray schedules as recommended in Advisory Circular PU2. Both copper fungicides and systemic fungicides can be applied in tea fields recovering from pruning.

Application of fungicides should commence with the bud break (approximately three weeks from pruning) and be continued up to the time of tipping (approximately three months). For maximum protection, it is preferable to use knapsack sprayers in order to wet all the young foliage and tender stems. The last two applications prior to tipping should be carried out carefully, by making every effort to get the lance into the bush. This would ensure that the tender parts, that would be exposed, following tipping are also protected by the fungicides. The application of systemic fungicides should be terminated 2-3 weeks before tipping in order avoid fungicide residues in the final product.

2.7 Management of Blister Blight in Tea in Harvesting

2.7.1 Cultural Method

Reduce natural shade by lopping shade trees at the beginning of the monsoons;

i.e. April/May, in the Western sector

September/October, in the Eastern sector.

This allows maximum available sunshine falling on the plucking table, which in itself has fungicidal properties.

Shorter plucking rounds (5-7 days) and hard plucking (up to fish leaf) reduce subsequent blister blight infections. In order to improve the bush health, the fields may be rested or lightly plucked intermittently for a period of 6-8 weeks following these practices.

2.7.2 Chemical Method

Only copper fungicides, using knapsack sprayers or mist-blowers, are recommended for controlling Blister Blight in tea in harvesting. Spraying should be done on the day following harvesting or immediately thereafter. In the event of harvesting rounds being delayed or extended, the spraying rounds must be made sufficiently flexible, enabling a pre- harvest interval of 7 days with copper fungicides, prior to harvesting.

Both, High Volume Sprays (hand-operated knapsack sprayers) or Low Volume Sprays (mist-blowers) could be used to spray copper fungicides in tea fields in harvesting.

The following points are important for effective control of the disease:

i. Good protection depends on good supervision of spraying operation.

ii. It is important that the recommended amount of fungicides be sprayed on to the stipulated area for effective control.

iii. Spraying during continuous heavy rain is not warranted for two reasons. First, there is less likelihood of infection as the spores too could get washed off. Second, any fungicide applied during this time could also get washed off. Cool humid weather with overcast skies is very conducive for infection and spraying is best carried out during such periods. During light drizzles spraying could be undertaken when they are not likely to wash off the fungicides from leaves.

iv. Spray equipment should be periodically checked and maintained in good condition.

v. Wettable powders should be first made into a paste with a little water and then diluted to the required volume.

vi. Personnel safety should be ensured by wearing personal protective equipment coverall, gloves, mask, and shoes.

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