

Grapes

Diseases

Anthracnose (*Elsinoe ampelina*):



This disease is prevalent in all grape-growing regions of the country attacking mainly the leaves and young shoots. Small light brown or grayish black lesions develop on tender shoots, young leaves, flowers and young berries. It causes short holes in the leaves and thus reduces the effective leaf area. Affected blossoms fail to set fruits. The fungus also causes cankers on the petioles and veins, and leaves become twisted and deformed. On berries, the disease causes circular brown sunken spots with dark brown margins. If severely attacked, berries may crack exposing the seeds. Bunches with anthracnose affected berries lose their export value. Rain and dew are highly favourable for the spread of the disease.

Control : Prophylactic measures should be followed for effective control. All affected twigs or canes showing cankers should be removed while pruning. The pruned twigs and leaves should be burnt or buried deep in the soil. This disease is more problematic during October and November. The new shoots and young branches should be given protective sprays during this period. Spraying of the grapevines at 3-4 leaf stage with fungicides like Bordeaux mixture @ 0.8% or Copper Oxychloride @ 0.25% or Carbendazim @ 0.1% are effective against this disease.

Downy Mildew (*Plasmopara viticola*):



Light and continuous rains or heavy dew associated with high humidity and low temperatures favours the development of the disease. The disease attacks the leaves, flowers, cluster and young fruits. Initial symptom appear as light yellow spots on the upper surface of young mature leaves with corresponding white spots on the lower side. Affected portions of the leaves turn brown and can not support the bunch development due to reduced photosynthetic activity. The losses are very high when the clusters are attacked before fruit set. Entire clusters decay, dry and drop down. Infected small berries turn brown and become mummified. Once berries begin softening and change colour, they cease to get infected.

Control : Pruning of the vines after the second week of October helps to minimize the damage by this disease. All affected portions of the vine should be removed at the time of pruning and destroyed immediately.

Bordeaux mixture (1%), Copper Oxychloride (0.2%), Mancozeb (0.2%), Metalaxyl (0.2%) or Fosetyl Al (0.2%) are effective against this disease. Systemic fungicides are more effective than non-systemic ones. However, more than 2-3 sprays of systemic fungicides should be avoided. Continuous sprays with systemic fungicide encourage the disease to develop resistant to these fungicides and help in the resurgence of new diseases like *Alternaria*, *Botrydiplochia* and others.

Bacterial Leaf Spot (*Xanthomonas campestris*) :

The disease is more prevalent during June-August and again in February-March. Temperature range of 25-30°C and relative humidity of 80-90% is favourable for the development of the disease. The young growing shoots are affected first. Disease infects leaves, shoots and berries. The symptoms appear as minute water soaked spots on the lower surface of the leaves along the main and lateral veins. Later on these spots coalesce and form larger patches. Brownish black lesions are formed on the berries, which later become small and shriveled.

Control: Collecting and burning the infected plant parts minimizes the spread of the disease. Streptocycline (500 ppm) is very effective as a prophylactic spray. Weekly sprays of copper fungicide and Bordeaux mixture given from last week of October are effective to prevent the incidence and spread of the disease.

Powdery Mildew (*Uncinula necator*) :

It is the second most destructive disease after downy mildew but more important one in the viewpoint of export of fresh grapes, as it leaves blemishes on the affected berries and deforms them. The disease develops under warm and dry conditions. Shade or diffused light also helps in the development of this disease.



The disease is characterized by the presence of white powdery (ash like) coating in patches on both sides of the leaves, young shoots and immature berries. The affected leaves turn pale and curl up. Affected shoots remain weak and immature. The buds affected during growing season, fail to sprout after October pruning. Thus the productivity of the cane and the number of

productive canes are reduced. If blossoms are affected they fail to set fruit. When young berries are attacked they become corky. Berries attacked at 50% maturity turn dark and become distorted in shape. If severely attacked they are enveloped with a white powdery coating and crack eventually. Loss of yield results from both berry drop and reduced size of berries.

Control : Powdery mildew can be controlled easily by spraying Wettable Sulphur (1.5kg/200 litres of water). Care should be taken while spraying as they scorch the berry skin leaving minute black specks. Sulphur dusting (20kg/ha) in the morning hours controls the disease effectively. The affected plant parts should be thoroughly coated with the dust. Systemic fungicides like Bayleton (1g/litre of water) or Calaxin (3-4 ml/10 litres of water) or Benomyl (5g/10 litres of water) offer better and prolonged control of the disease. Fungicidal spray against this should be done from November to February. No single chemical should be sprayed more than twice. In between two successive systemic fungicides a spray of non-systemic fungicide as Wettable Sulphur is taken to avoid the development of disease resistance.

Leaf Blight and Bunch Necrosis (*Alternaria alternata*):

It appears in the month of June and December. The disease attacks both leaves and fruits. Small yellowish spots first appear along the leaf margins, which gradually enlarge and turn into brownish patches with concentric rings. Severe infection leads to drying and defoliation of leaves. Symptoms in the form of dark brown-purplish patches appear on the infected berries, rachis and bunch stalk just below its attachment with the shoots.

Control : If the disease on the berries is not controlled in the field, it can lead to berry rotting during transit and storage. Bordeaux mixture (1.0%), Mancozeb (0.2%), Topsin-M (0.1%), Ziram (0.35%) or Captan (0.2%) is to be sprayed alternatively at weekly intervals from Jun-August and again from December until harvest to keep this disease under check. Two to three sprays of systemic fungicides should be given per season.

Rust (*Phakopsora vitis*) :

The weather conditions in Bangalore present during July-December favours the development of the disease. The symptoms are in the form of numerous orange coloured pustules on the lower surface of the leaves. In case of severe infection such pustules cover the entire leaf surface leading to severe defoliation.

Control : Rust on Bangalore Blue is being successfully controlled in vineyards by applying 3-4 sprays of Baycor (0.1%) or Chlorothalonil (0.2%) at fortnightly intervals during July- August and January February gives effective control of rust under Bangalore conditions.

Bitter Rot (*Greenaria uvicola*) :

The disease causes considerable losses in field, storage and in transit. The disease infects the leaves, canes and berries. The disease is most serious on older leaves. Initially the infection starts as dark brown water soaked spots covering the entire leaf lamina on either side of the veins and veinlets. The infection on the cane is prominently visible which initially becomes white and later turns black. The infected cane shows reduced growth and wilts. The young infected green berries get shriveled, turn black and become mummified. The raisins made out of the infected berries taste sour and have a poor shelf life.

Control : IIHR, Bangalore recommends pruning of the canes followed by sprays of Rovral (0.2%), Baycor (0.1%) and Thiophanate Methyl (0.1%) for effective control in the field and the storage.

Black Rot (*Guignardia bidwelli*) :

Warm and moist climate with extended periods of rain and cloudy weather favours the development of the disease. The disease attacks the leaves, stem, flowers and berries. All the new growth on the vine is prone to attack during the growing season. The symptoms are in the form of irregularly shaped reddish brown spots on the leaves and a black scab on berries. Occasionally, small elliptical dark coloured canker lesions occur on the young stems and tendrils. Leaf, cane and tendril infection can occur only when the tissue is young, but berries can be infected until almost fully-grown if an active fungicide residue is not present. The affected berries shrivel and become hard black mummies.

Control : Mummified berries left on vines should be collected and destroyed. Cultivation practices should ensure free circulation of air. Spraying Bordeaux mixture (4:4:100) once or twice on young bunches prevents the infection. Copper fungicides are preferred for spraying on bunches, as they do not leave any visible deposits on the fruit surface.

Dead Arm (*Phomopsis viticola*) :

The disease is mostly prevalent in South India. The disease is first noticed as angular small spots on the leaves, stems, canes and flower clusters. Most of the spots have yellowish margins with dark centres. Frequently the spots grow together and form large brown areas on the canes. Later on the canes start to dry rapidly. In severe cases the fungus spreads on the woody part where it gradually attacks the water conducting tissues. In case of severe infection the drying extends to the roots and the whole plant wilts.

Control : The pruned canes should be collected and destroyed. The dead canes should be pruned to the region where healthy tissues are seen and it can still be further pruned so as to avoid any chance of mycelial growth left out in the canes. Such pruned cane should be pasted with Bordeaux paste immediately after the pruning. Later on the vines should be sprayed with Bordeaux mixture (5:5:50) followed by Difolatan (0.2%) or Daconil (0.2%) or Dithane Z-78 (0.2%) at fortnightly intervals till the canes become hard.

Botrytis Rot/Grey Mould (*Botrytis cinerea*) :

It is one of the most important diseases in storage and is capable of growing at low temperature. In the vineyards, the fungus attacks the shoots and clusters or destroys stalks leading to premature fruit drop. In the early stages of infection the skin of the affected berries just below the infection become loose. When rubbed with fingers the skin slips from the berry leaving the firm pulp exposed. The infected berries shrivel, rot and turn dark brown showing the presence of greyish growth of the fungus.



Control : Careful handling in the field, precooling and refrigeration helps in controlling the disease. Pruning and thinning of the vineyard reduces humidity around the clusters. Prophylactic sprays with Captan (0.2%) and Benomyl or Bavistin (Carbendazim) (0.1%) minimize the development of the fungus during transit and storage.

Black Rot (*Aspergillus niger*) :

It is a post harvest disease. High storage temperatures and humid conditions favour the development of the disease. The fungus enters the berries through the injuries caused due to poor post harvest handling operations. The pulp of infected berries is reduced to watery consistency.



Control : Careful handling and prompt refrigeration to 1-2° C or below prevents the disease in storage. Inclusion of SO₂ releasing pads in the boxes while packing helps to control the disease.

Rhizopus Rot (*Rhizopus sp.*) :

It is a post harvest disease. Under warm and moist conditions the fungus grows rapidly producing a coarse grey mat of mycelium. Injury caused to the berries by tight packing and storage temperature help the fungus grown during storage. If the infected berries are trimmed at harvest, it does not occur after harvest under ideal storage conditions.



Control : Pre-harvest fungicidal sprays of Captan or Benomyl reduce the disease inoculum on berries. Inclusion of SO₂ releasing pads in the boxes while packing, removing of diseased berries during grading, avoiding injury to the berries while packing and handling helps to restrict the growth of fungi. Maintaining cold storage temperature between 0-1° C prevents fungal growth.