**Study on mango crop disease detection using IOT**

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**Abstract:**

This paper gives the information on list of diseases to the mango tree and their symptoms. the growth and yield of the crop and their productivity is directly affected by the disease to the crop. By detecting them in earlier and preventing the loss caused by disease the farmer can get the high yield and quality product. Using IOT these diseases can be detected by the sensors like temperature sensor, humidity sensor and color sensor.

**1.Introduction:**

Agriculture is the most important sector of the Indian economy, two third of the population relies upon the agriculture [1].it is the basic foundation for Indian economy development. It also provides a large number of employment opportunity to the Indian population.

Disease to the crop causes the major impact on the crop yield and quality of product. In India yearly 30-70% loss in agriculture productivity was caused by the disease of the crop, in order to prevent this, farmer or an agriculture expert needs to monitor the crop status regularly which is time consuming and also expensive.

To automat disease detection and continues crop monitoring we can use the IOT sensors and detect the following diseases to trees and give them the pesticides to control diseases.

**2.Powdery mildew:**

Powdery mildew is one of the most serious disease of the mango affecting almost all verities. The characteristic symptoms of the disease are white superficial powder fungal growth on the leaves stalk of panicles, flowers and young fruits. The affected flowers0and fruits drop pre-maturely reducing the crop load considerably or might even prevent the fruit set. Rains or mists accompanied by cooler nights during flowering are congenial for disease spread.

**Control:**

Alternate spraying of tridemorph 0.1%, wettable Sulphur 0.2% and Bavistin 0.1% at 15 days interval are recommended for effective control of the disease. The first spray0is to be given at panicle emergence stage.

**2.Anthracnose:**

It is a widespread occurrence in0the field and in storage. Under the favorable climate condition this disease causes serious loss to young shoots, flowers and fruits, that is high humidity continues rain and the temperature range of 24-32o C. The disease produces leaf spots, blossom blight, withered tip, twig blight and fruit rot symptoms. Black spot develops on panicles. Severe infection destroys0the entire inflorescence resulting in failure of fruit setting.

**Control:**

The disease twigs should0be pruned and burnt along0with the fallen leaves. Spraying twice with carbendazim (Bavistin 0.1%) at 15 days intervals during flowering controls blossom infection. Spraying of copper fungicides (0.3%) is0recommended for the control of0foliar infection. Postharvest disease of mango caused by anthracnose could be0controlled by dip treatment of fruits in carbendazim (0.1%) in hot water at 520C for 15 min.

**3.Die back:**

It is one of the seriousproblems to the mango trees. This disease can occur at any time of the year but most conspicuous during October-November. This disease causes drying of twigs and branches followed by complete defoliation, which gives the tree an appearance of scorching by fire. The affected leaf turns brown and its margins roll upwards and at this stage twig or branch dies.

**Control:**

Pruning of the diseased twigs 2-3 inches below the affected portion and spraying copper oxychloride (0.3%) on infected trees controls disease. The cut ends of the pruned twigs are pasted with copper oxychloride (0.3%).

**4.Phoma blight:**

This disease can be detected by observing only the old leaves. Affected leaves display angular, yellow to brown irregular lesions scattered over the entire lamina. At the final stage the leaves start to wither and defoliation follows.

**Control:**

It can be controlled by spraying Benomyl (0.2%) just after the appearance of disease followed by (0.3%) Miltox at 20-day interval.

**5.Bacterial canker:**

It is one of the serious diseases in India. This disease causes yield loss, fruit drop and storage rot. This disease is found on leaves twigs, petioles, branches and fruits. The disease first appears as minute water soaked irregular lesions on any part of leaf or leaf lamina. The infection can turn leaf into yellow and drop off. The water-soaked lesions also develop on fruits which letter turn dark brow to black.

**Control:**

Three sprays of streptocycline (0.1%) or Agrimycin-100 (0.1%) after first visual symptoms at 10-days intervals and monthly sprays of carbendazim (0.1%) or copper oxychloride (0.3%) are effective in controlling the disease.

**6.Red rust:**

This disease causes reduction in photosynthetic activity of the plant and also defoliation of leaves thereby reducing the vitality of the host plant. The disease is evident by the rusty red spot mainly on leaves and sometimes on petioles and bark of young twigs. The spot is greenish grey in color and velvety in texture. Later they turn reddish brown. The affected portion of stem cracks. In case of sever infection, the bark becomes thick, twigs get enlarged but remains stunted and the foliage finally drips up.

**Control:**

Two or three sprays of Copper oxychloride (0.3%) is effective in controlling the disease.

**7.Sooty mould:**

This disease is common in the orchards where mealy bug, scale insect’s hopper is not controlled efficiently. This disease can be identified by presence of black sooty mould on the leaf surface. In some case the tree turn completely turns black due to the presence of mould over the entire surface of twigs and leaves. The severity of the infection depends on the honey dew secretion of the above insect. Honey dew secretions from insects stick to the leaf surface and provide necessary medium for fungal0growth. Although0the fungal causes no direct damage to, the photosynthetic activity of the leaf is adversely affected by it.

**Control:**

Pruning of affected branches and their prompt destruction followed0by spraying of wettasulf (0.2%) + Metacide (0.1%) + gum acacia (0.3%) helps to control the disease.

**8.Diplodia stem-end Rot:**

The fungus enters0through the0 mechanically injured areas on the stem or skin. The fungus growth from the pedicel into0a circular black lesion0around the pedicel.

**Control:**

Carefully0handling the mechanical0injuries. Postharvest dip of fruits in Carbendazim (0.1%) in hot water at 50-53oC for 15 minutes controls the disease in storage and transit.

**Conclusion:**

In the agriculture field yearly 70-80% of loss is caused by the disease to the plants. To reduce this continues monitoring of the plant is needed. Continues monitoring of plant and disease detection is bit expensive. By recognizing the symptoms of disease using IOT sensors, the disease can be identified and serious action can be taken against it, this will increase the crop yield and quality of the product in agriculture.

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