

OBSERVING DECLINES IN THE ORCHARDS AND STUDY THEIR CAUSES

Exercise

Observing declines in the orchards and study their causes.

Objectives

- To learn about symptoms of orchard decline
- To know about causes of orchard decline
- To know about important measures to control decline in orchards

Delivery schedule: 01 periods

Student expectations/learning objectives

- To know about decline syndrome in fruit orchards.
- To know about important measures to control decline in orchards.

Handouts/material/equipment's & tools required: Practical note book, pen, and pencil to note down the important points on orchards decline, secateurs, magnifying lens, gloves, Petri plates, forceps and pruning saw.

Pre-learning required: Pre-requisite knowledge about plant health and cultivation practices of important fruit trees.

Introduction

Orchard decline is common in fruit orchards which results in loss to the productivity of orchards. You might have visited orchards of fruit crops like apple, citrus, guava, peach, pear, plum, mango, sapota etc. in your locality. In some orchards trees are having green foliage, vigorous growth with no sign of sickness. These types of fruit trees in orchards are healthy and able to produce good quantity and quality of fruits. In contrast, fruit trees in some orchards are showing sickness, chlorosis, die back, sparse foliage, gum exudation, bark splitting, twig and branch decay etc. All these symptoms are indication of decline of fruit trees and such conditions of fruit trees make them unproductive and consequently death of trees may occur.

Decline of fruit trees is a syndrome i.e., a group of symptoms that collectively indicate or characterize the abnormal condition of the plant. Causes of decline syndrome may be varying with the plant species. Edaphic factors like disturbed soil structure, soil pH, defective drainage, excessive salts, excessive free lime, low soil

For teachers...

- Make students to understand the difference between symptom and syndrome
- Practically, show the students, the different symptoms of decline of fruit trees
- Ask the students to observe declining trees and to note down the causes evident

organic matter, soil erosion may be responsible for decline of fruit trees. Similarly, varietal factors, rootstocks, faulty irrigation practices, indiscriminate use of fertilizers and chemicals and intensive intercropping may also be equally responsible for decline of fruit trees as well as orchards. Furthermore, incidence of insects and pests in the orchards and diseases caused by fungus, bacteria, viruses and nematodes contribute significantly to the decline conditions of trees.

Identification of affected trees in different fruit crops

Citrus

- In early stage, symptoms are restricted to a few limbs but eventually the whole plant is involved.
- Tree shows sparse mottling leaves, stunted growth, sickly appearance
- Midrib and lateral veins of old, mature leaves turn yellow with internal areas along the veins, showing diffuse yellowing.
- Leaves may turn yellow and are shed with the onset of summer or autumn and the die back of twigs started.

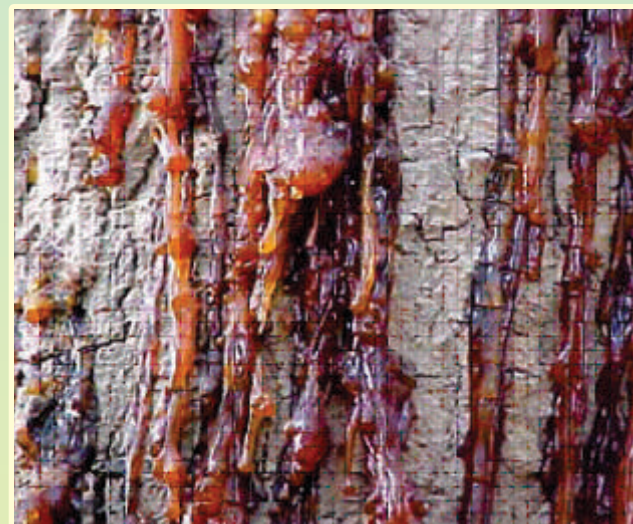


Citrus plant showing decline

- The entire outside of the tree bears short twigs carrying narrow small leaves on their lower portion.
- There is excessive flowering but the fruits are not carried to maturity. Either only few trees or entire orchard may be affected.

Mango

- Decline complex is manifested in the form of twig blight, tip die back, gummosis and bark splitting.
- As a preliminary symptom, drying of the tip, discoloration and darkening of the bark some distance from the tip becomes visible. It progresses downward involving bigger branches, as a result the leaves are shed.
- Sometimes gum exudates from the diseased portions. Bark splitting or cracking may also be noticed in severe cases.



Gummosis in mango

- Dieback, twig blight, defoliation, gummosis, vascular discoloration, marginal chlorosis, necrosis of leaves, nutritional deficiencies and root degeneration. These symptoms are found alone or in combination with each other in different mango orchards.
- In addition to decline complex, a new disease named as quick decline or collar rot has become the most destructive hazard in mango orchards.

Factors responsible for decline

Citrus

The citrus decline is a syndrome of various symptoms and caused by number of biotic and abiotic factors. Unfavourable soil condition, the presence of impregnated layers of the CaCO_3 , bad drainage cause poor aeration, salt concentration exceeds 1000 ppm, leaching of nutrients due to low pH and heavy rainfall, lack of adequate plant nutrition, incompatibility between stock and scion, excessive intercropping, inadequate tree spacing, inadequate manuring and attack of pests (leaf minor, citrus trunk borer, twig borer), diseases, citrus Tristeza virus, citrus nematode and nutrition disorders are responsible for citrus decline. Furthermore, negligence in management of orchards is prime cause of decline.

Mango

Mango decline syndromes are recognized in virtually all mango-production regions. Although fungi are the implicated incidents at many locations, abiotic stresses, nutritional deficiencies, are thought to play roles in other situations. On combination of these symptoms with root degeneration caused by soil borne pathogens, plants are ultimately destined to complete drying. Plant once predisposed to preliminary decline symptoms due to weak vigour and presence of inoculum becomes prone to even weak or secondary colonizers.

Management of orchard decline

Good cultural practices, improvement of soil fertility, drainage, control of diseases, pests and nematodes may be useful to minimize the incidence of this melody. The grower should adopt suitable orchard management practices and this would lead to the control of citrus and mango decline problem to a great extent. Tips for management of orchard decline in citrus orchard are as follows:

Citrus decline

- Make half moon terraces/tree basin for placement of manure and fertilizers to reduce nutrient loss.
- Water sprouts, rootstock scion, diseased and dried/dead branches/twigs should be removed and cut end should be pasted with bordeaux paste.
- Keep the basin free from weeds and mulch with dry grass during dry month.
- Manure and fertilizer should be applied as per recommended doses @ 50-60 kg well rotten FYM, 2000 g urea, 3000 g SSP and 1500 g muriate of potash/ tree/year in three equal split doses. The 1st split dose of fertilizer should be applied in the month of March-April and subsequent doses in June-July and September-October.

- Slaked lime @4-5 kg /tree should be applied in February in alternate year.
- Spraying should be given with zinc sulphate (0.5%) + magnesium sulphate (0.2%) + copper sulphate (0.4%) + magnese sulphate (0.4%) during flushing period.
- Flower and fruits should be reduced by hand thinning or chemical spraying.
- Pasting of tree trunk up to 60 cm ground level with Bordeaux paste in March-April and August-September.
- Collection and destruction of trunk borer adults by shaking the branches in May.
- Pasting of trunk up to 1.5 m height with 1% carbaryl along with sticker during IInd week of May to check adults of trunk borer from oviposition on the trunk.
- Control of trunk borer grubs by injecting petrol insedicide soaked cotton inserted in hole and plug it with wet mud in August-September.
- Spraying of bavistin (1g/l) + monocrotophos (1ml/l) on new flushes in March-April and July-August for controlling the insect-pest and disease.
- Spray malathion (2 ml/l) in September - October. over fruit to prevent fruit fly egg laying.
- Spray 1% bordeaux mixture or 0.3% blitox-50 during March-September to control dieback, scab and sooty mould diseases.

Students Activities

1. Visit fruit orchards in your locality and try to identify the fruit trees showing sign of decline.
2. Visit fruit orchards and try to find out decline symptom(s) on different fruit tree in an orchard.
3. Enquire from the orchardist about remedial measures taken for control of decline in orchard.

Study Material

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