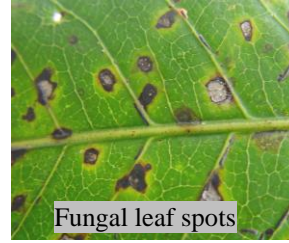


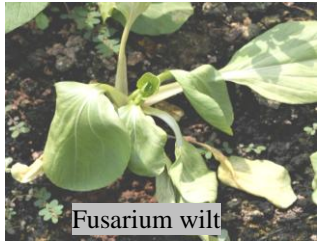
Leaf spots may be caused by bacterial or fungal infections. Bacterial spots appear as water-soaked with yellow halos or turn into V-shaped lesions. Fungal spots are drier, small spots of dead cells or joined to form larger dead patches.



Fungal leaf spots



Bacterial leaf spots



Fusarium wilt



Angsana wilt

Wilts refer to the loss of rigidity of the leaves or shoots resulting from infections and/or destruction of the plants' vascular systems by bacterial or fungal pathogens. Prolonged wilting will lead to the plant drying up and eventual death.

Damping-off refers to the death of seedlings before or just after their emergence from the ground. It is caused by a number of fungi and is often prevented by sowing seeds at the right density in clean media and not overwatering them.



Damping off



Sooty mould on leaves



Sooty moulds are fungi that grow on the surfaces of leaves, thus forming black, sooty coatings. Extensive coating will block off sunlight preventing leaves from efficiently making food for the plants.

Ganoderma rots usually attack the trunks and butts of trees and palms. The woody, semi-circular brackets or conks seen growing from the infections are fruiting bodies of the fungi and signify an advance stage of the infection.



Ganoderma brackets



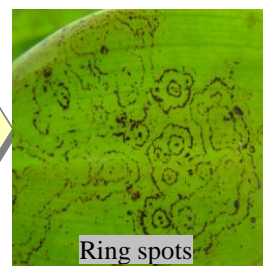
Twig Blight



Twig dieback

Twig dieback and blight refers to the death of all twigs and branches from fungal attacks that has girdled and killed the growing tips. Consequently, defoliation would be observed in twig-dieback, while death and browning of the leaves and needles would be the result of twig blight.

Viral diseases are caused by non-cellular virus particles. Symptoms of infection are chlorotic and yellow patterns of mosaics, mottles, blotches, ringspots, vein-banding on leaves and leaf-curls. It includes flower malformations, abnormal shoot branching, bunching and severe stunting of plant parts. Many of these symptoms are similar to those environmental effects and mineral deficiencies.

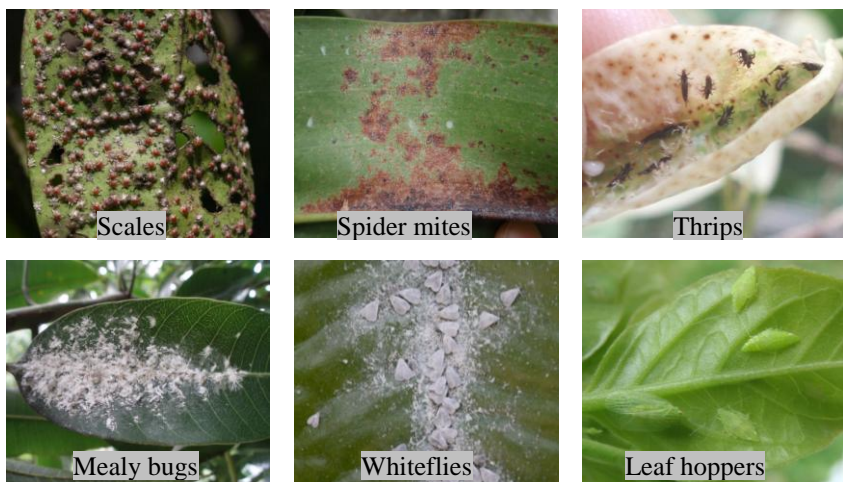


Ring spots



Mosaic

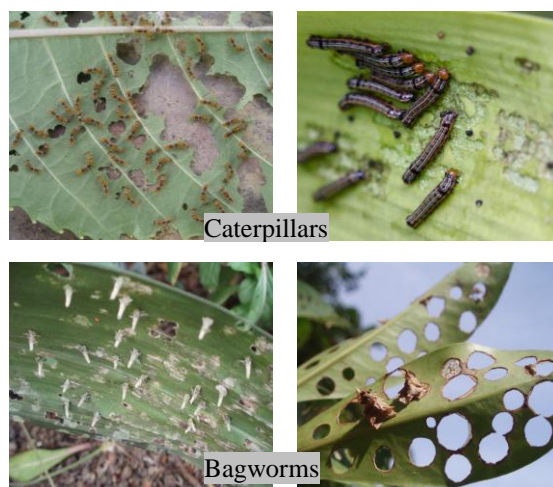
Sucking Insects



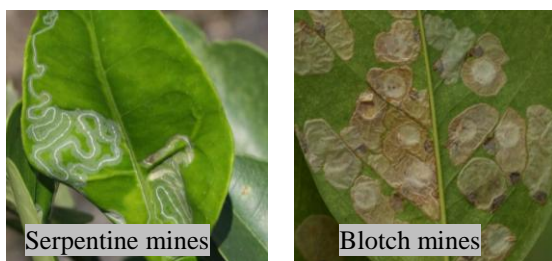
There are many types of sucking insects which feed on plant sap. Sucking insects such as aphids, mealy bugs, whiteflies, scale insects, mites, thrips and hoppers have piercing mouthparts. Their feeding results in symptoms exhibited as white or yellow leaf spots, silver or bronze stippling, brown patches and leaf curling. Severe infestations cause defoliation and plant stunting. Many of these are also vectors of plant viral diseases.

Chewing Insects

These insects attack plant leaves, twigs, branches and tree trunks. The most common chewing pests are caterpillars and bagworms. Caterpillars are the larval stage of moths and butterflies and are considered pests when they cause economic loss. Leaves with only veins left, shoot die-back and defoliation are results of caterpillar mass feeding. Bagworms are moth larvae which bind leaf and twig debris with silk to make a bag around themselves, in which the worm resides in and carries around with it. Circular holes on leaves are common bagworm symptoms.



Mining Insects



These insects create mine trails in leaf tissues by feeding between the upper and lower leaf surfaces. They are the larvae of moths, flies or beetles. Their tunneling patterns range from serpentine, winding trails to blotches. Severe attack causes defoliation and die-back.

Boring Insects

Insect borers attack tree trunks, branches, barks, stems, buds and roots. They are mainly larvae and/or adults of beetles, weevils and moths. Signs and symptoms include bored holes, insect frass, sap exudation, tunnels and die-back of plant parts attacked.



Plant Parasitic Nematodes



Plant parasitic nematodes are microscopic, worm-like organisms found in the soil around plant roots. They puncture the root tissues, to withdraw plant nutrients, physically injuring root tissues and injecting enzymes that affect plant growth. The infested plants often exhibit yellowing, stunting, wilting or root gall symptoms.