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Commentary

Apple Canker Disease: Symptoms, Cause and Managements

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Apple (Malus × domestica Borkh) is one of the most commonly consumed fruits in the world and commercially most important horticultural crops grown in temperate parts of the world. Apple is a predominant fruit crop of Jammu and Kashmir State; grown on an area of 1,60,900 ha and production of 1647.7mt tons. Apple is susceptible to more than seventy diseases caused by fungi, bacteria, viruses and phytoplasmas. The apple crop in J&K State is affected by many diseases, including scab, root rot, leaf blight and cankers These diseases have a significant economic impact, as diseased fruit are nonmarketable and even complete loss is possible, if steps are not taken in the orchard to reduce infection In recent years the apple trees have encountered new problems in the form of cankers. The canker disease has assumed epiphytotic proportions in most of the parts of world especially in Jammu and Kashmir. Canker is diseased area on woody portion of tree, results in death of affected bark through girdling of branches, die back of twigs, finally leading to death of either whole or part of the tree. The cankers inflict huge economic losses due to dying of branches, fruit rotting and pre-mature defoliation. Worldwide eighteen types of cankers have been reported on apple fruit caused by fungal and bacterial pathogens. Cankers initially appear as sunken areas of bark around buds, leaf scars, shoot bases or open wounds. As the canker develops the centre dies and bark flakes off, the old lesions show as flaky dark brown strips of bark surrounded by swollen wound tissue. Young cankers, particularly those on young shoots, tend to have white fruiting bodies, which tend to be present in the summer and early autumn, whereas red fruiting bodies or perithecia (sexual state) are present in autumn, winter and spring. Cankers on wood may result in wilting and/or browning of leaves and blossoms on the branch above the canker, which may occur even before the branch is girdled. Major types of cankers associated with apple are, Dieback and Bark canker (*Botryodiplodia theobromae*) which produces depressed lesions with longitudinal and transverse cracks. Stem bark canker (*Botryosphaeria dothidea*) produces cankered lesions on sun burnt or injured surface of main limbs of young apple trees, which turn black, becomes brittle and remain studded with numerous black fissures. Smoky or black rot canker (*Botryosphaeria obtusa*) develops cracks along the lesion margins which temporarily restricted canker elongation, in advanced stages however, the bark is loosened which gets separated from the wood and blister like fruiting bodies also appeared on the cankered surface. Valsa canker (*Valsa ceratosperma*) originated around the fruit scars, twig stubs, crotches and sites of winter or mechanical injuries as sunken water soaked areas with pinkish centre. Phomopsis canker (*Phomopsis mali*) initially produce small brownish lesions extending up and downward along the twig axis. With further advancement, the lesions became sunken and the bark of affected portions turned dark brown and papery which finally peeled-off, leading to the death of twigs. Control of fruit tree canker is difficult since the fungus produces spores throughout the year and there are always suitable entry sites on apple trees for infection. Canker diseases of horticultural crops, including apple cannot be controlled exclusively with a single management strategy, the efficiency of various strategies for integrated management of canker diseases of pome fruits. The effectiveness of most of the disease management strategies depends on genotype, age and heath of fruit tree besides environmental conditions. Cankers can be removed from orchards during winter pruning, larger cankers on the trunk or scaffold branches can be cut back to healthy tissue and covered with suitable wound protecting paint immediately after prunning. Canker girdled branches are removed along with 15 cm of healthy tissue in dormant season or 30cm in growing season. Un-macerated cankered pruning material left in the tree row can continue to produce spores for at least 1 - 2 years and therefore are a canker risk. In areas where conditions favour canker, remove pruned material from the orchard and burn and also avoid pruning in wet conditions, if it is too costly,

alternatively dump all pruning, including young shoots, in the grass alleyway and pulverise to ensure rapid decay. Avoid dumping young cankered shoots in the tree row as these can generate more inoculum. Mummified fruits on the trees and under the trees should be removed from the orchards. Trees should be pruned to encourage open canopies so that it encourages air circulation to improve tree drying, reduce surface moisture and the conditions for development of cankers.

Control of cankers in orchards presents a particular challenge. Entry points for infection are available round the year, inoculum is available all year round and the rain, essential for pathogen sporulation and infection, often makes timely spraying impossible. Therefore, the strategy for control, especially in orchards affected with cankers, must be to protect at key times to limit infection. Wounds provide entry points for canker pathogens and correctly used paints can provide enough protection. These paints contain chemicals active against canker pathogens which are applied to pruning wounds or pared back cankers to provide temporary protection against infection while the tree develops its own protective callus layer. The value of treating pruning wounds with paints like Chaubattia paint (copper carbonate, lead oxide and linseed oil in the ratio of 1:1:1.25) and Bordeaux paint (copper sulphate, lime and linseed oil in the ratio of 1:2:3) are important, as if they are treated rapidly the paint can act as a seal on fungal infection that has already occurred. Treat pruning wounds on trees, especially those in cankered orchards and in young orchards where it is essential that the scaffold branches remain canker free. Paints must be applied to the wound or pared back canker immediately as such time of application is not specified. In conclusion, cultivation of apple on large scale needs proper management both on production and protection front. A multipronged approach encompassing various strategies like cultural, chemical and resistance for integrated management of canker diseases needs to be established.

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