
ABSTRACT

Burl is an unwanted out-growth or swelling on main stem and lower branches of mango tree seems like tumour. This disease is lesser known but widely spread throughout Indian and some other countries. Therefore, the study was done to carried out, disease incidence and several morphological characteristics viz., burl shape, colour, surface texture, position of burl formation from ground level on the stem, the total number of burls per plant, the height of the first burl from ground and presence of gummosis for the prevalence of burl disease in different germplasms. Nearly, 473 germplasm were screened among them 34 germplasm found susceptible with 7.18 % disease incidence. In Gujarat state, 167 germplasm were screened and 20 germplasm found infected with 12% disease incidence. Maximum disease incidence (100%) was recorded in approx. 14 germplasm while minimum incidence was found in Desi, Khodi and kesar germplasm. The shape of burl was recorded globose to elongated, globose to semi-elongated and irregular in many germplasm. The burl colour was also recorded during the investigation and colour noted as brownish-black, greyish-black, brownish-grey to brownish-black and blackish-brown. The surface structure of mango trunk was also noted and it was found rough in majority while smooth surface in some germplasm. The size of the burl was larger in *Langra* (36.00 cm³), followed by *Desi* (32.00 cm³), whereas it was minimal in *Mankurad* (10.0 cm³) in Gujarat state. The fruit yield loss was also observed and the maximum fruit yield loss was found in *Mahmood Vikarabad* (21.56 %) and *Langra* (20.22 %) followed by *Hybrid 10* (17.81 %), *Sukul* (14.30 %) *Sindhu* (15.40 %) and *Seedling* (12.30 %) whereas lowest fruit yield loss was recorded in *Olour* (2.30 %), *Alphanso* × *Baneshan* (0.83 %) and *Alphanso* × *Sabja* (0.47 %), respectively. Based on morphological (colony characters, gram staining and plate essay) and molecular characterization (phylogenetic analysis) the pathogen was identified as *Agrobacterium tumefaciens*. Pathogenicity test was also applied to confirm the pathogen and to prove Koch's postulate. Wood anatomy of healthy (normal) stem and burl was also investigated and when compared with healthy and affected wood tissue, drastic alterations were not only observed in the composition of wood of healthy and burl affected trees but also showed alterations in the structure of the individual xylem elements. The secondary xylem elements viz. vessel elements and ray cells of this portion were sealed with tyloses. Biochemical changes in fruit and wood of burl infected and non-infected plants were also analysed. Fruits of the burl affected plants of *Langra* and *Rajapuri* varieties showed maximum content of TSS (18.8 °brix), total soluble sugar, reducing sugar, non-reducing sugar and ascorbic acid while the acidity was found minimum. Total eleven parameters such as total contents of moisture, ash,

cellulose, fibre, lignin, total soluble sugar, reducing sugar, non-reducing sugar, total phenol, starch and ascorbic acid were examined and compared with normal and burl portions. Similarly, there is an increase in moisture content, cellulose, lignin and other parameters in the burl wood. In conclusion, burl disease is an important disease of mango because it causes great economic loss in mango production in India and throughout the world. In India, several varieties like *Arka Aruna*, *Mahmood Vikarabad*, *Langra* etc., are highly susceptible to it while other varieties like *Desi*, *Khodi* and *Kesar* are relatively resistant *Amrapali*, *Mallika*, *Totapuri* and *Vanraj* are found free from the burl disease. External injury during agricultural practices may be the major source of pathogen entry in the tree. Another possible reason is the source of stock used in the grafting source may be responsible for the incidence of the disease. This statement may be supported by the fact that trees growing naturally in forest areas and open area wild germplasms showed no disease incidence. For the management of disease, primary management methods can be established or applied to manage the disease including, proper tree management, avoiding wounding or pruning of trees from orchard may reduce impacts of the disease. Types of equipment used in the pruning of the trees should be disinfected frequently when in use because infected equipment can spread pathogen during pruning operations. The complete eradication of burl by chemical treatment is not known but farmers should remove burl from the tree trunk and apply copper oxychloride or Bordeaux paste mixed with compatible insecticide (methyl-demeton or monocrotophos) is a good way to control this disease. The fungicidal paste Chaubattia paste can also be applied to the wounds during the pruning operations in the first fortnight of October.