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Short Comminucation

Relationship between weather parameters and pink canker (*Corticium salmonicolor* Berk. & Br.) of apple

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Apple (*Malus* x domestica Borkh.) is a highly remunerative deciduous fruit crop belonging to family Rosaceae, generally grown in temperate regions of the world. In India, it is cultivated in the North-western Himalayan region comprising the states of Jammu and Kashmir, Himachal Pradesh, Uttrakhand, Arunachal Pradesh and Meghalaya. Himachal Pradesh is well known as an "apple state" of the country as its cultivation has improved the socio-economic status of farmers. Among 16 different canker diseases of apple, pink canker caused by *Corticium salmonicolor,* is most prevalent and destructive, causing huge economic losses to the growers. The disease causes trunk girdling, limb blight, die-back or cankerous symptoms on twigs and branches leading to death of the entire tree (Sharma and Ram, 2010 ; Sharma and Bhardwaj, 2002). Disease severity in any crop is dependent upon the availability of primary inoculum, prevalent favourable environmental conditions and susceptible genotypes. In the present scenario, susceptible genotype of apple i.e. Royal Delicious occupies more than 90 per cent area in the state (Sharma and Bhardwaj, 1999) and primary inoculum is present on the host itself or in its vicinity. Therefore, the present investigations were carried out to ascertain the role of environmental factors particularly; temperature, relative humidity, cumulative rainfall and sunshine hours in disease development to further develop strong decision support system for application of management inputs.

The role of temperature, relative humidity, cumulative rainfall and sunshine on disease development was studied under field conditions for two crop years (2011 – 2012). Data on disease severity were recorded by adopting the disease rating scale (0-4 scale) devised by Verma (1991). Disease severity was recorded at 7 days intervals from June to September during both the seasons in Thanedhar which is a hot spot for disease in Shimla district and per cent disease index (PDI) was calculated by following the formula of Sharma *et. al.*, (1984).

Weekly temperature, average relative humidity, cumulative rainfall and sunshine hours were obtained from meteorological observatory located at SN Stokes' Harmony Hall Orchards at Thanedhar, Shimla. The data was analysed statistically to establish simple, partial and multiple correlations (Gomez and Gomez, 1986).

Disease first appeared in the third week of June with the prevalence of weekly mean temperature (19-21 ^{o}C), relative humidity (50-95%), cumulative rainfall (15-73mm) and weekly sunshine hours (6-13 hrs/day). The pink canker infection increased as the average monthly temperature remained below 18^{o}C coupled with high relative humidity (<80 %) during July, August & September. Therefore, moderate temperature, low relative humidity coupled with maximum sunshine hours reduced pathogen growth rate at Thanedhar of Shimla district (Fig. 1).

Simple correlation between per cent disease severity and relative humidity was positive and highly significant during both the years, exhibiting its effect on the disease development (Table 1). Simple correlation coefficient between disease severity and temperature was negative but highly significant in both crop seasons. Pooled data also showed similar results between meteorological factors and disease severity. Cumulative rainfall was found to be positively and highly significantly correlated with disease severity. However sunshine hours were found to be non-significant correlated. It also disclosed the fact that pink incrustation or salmon-coloured crustose phase, consisting of the sexual *Corticium* stage usually develops on shaded underside of infected branch or limbs of many plantation crops viz., cacao, coffee, tea, rubber and teak including apple (Hilton, 1958; Old *et al.,* 2000; Monahan, 2008).

Further the multiple coefficients of determination (R^2) between disease severity and group of independent variables were found to be highly significant.

The equation developed with pooled data is

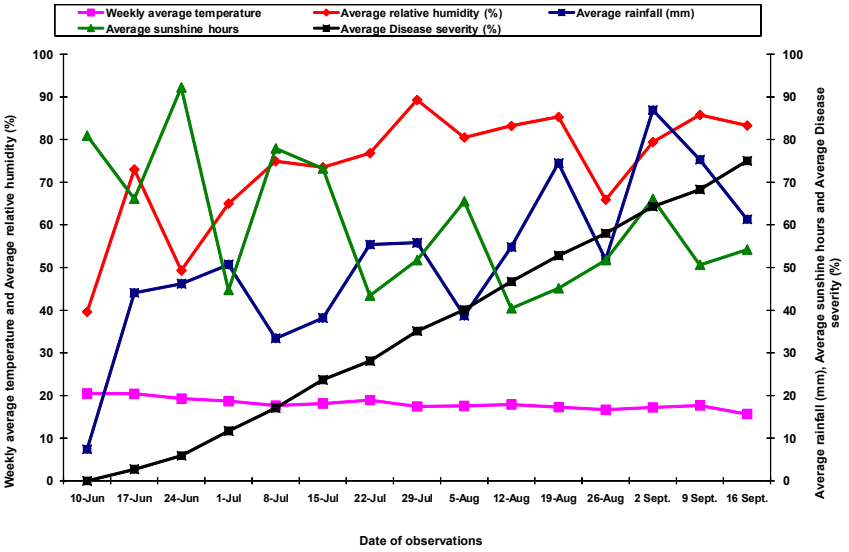

Fig. 1: Effect of meteorelogical factors on diseases development (Pooled data of 2011 and 2012)

Table 1: Correlation coefficients between disease index and environmental factors

Correlation pair	Simple Correlation
	Pooled
Temperature	-0.6944**
Relative Humidity	0.5866**
Cumulative rainfall	0.5877**
Sunshine hrs	-0.4102

** Significant at 5 % level of significance

$Y = 192.4 - 9.86\,X_1 - 10.192\,X_2 + 0.281\,X_3 - 0.131\,X_4$ $R^2 = 0.675$

Where Y is disease severity (%), X_1 = mean temperature (°C) weakly, X_2 is mean RH (%), X_3 = cumulative rainfall (mm), X_4 = weakly sunshine hours (hrs/day)

The results revealed that the meteorological factors viz., temperature, relative humidity, cumulative rainfall and sunshine hours could explain 67.5 per cent variation in disease severity of pink canker. The study will enable in developing disease management strategies by devising effective model system for predicting disease in advance and decision support system for adopting prophylactic measures to combat with this disease.

REFERENCES

Gomez, K. A., and Gomez, A. A. (1986). Statistical procedures for agricultural research. 2nd ed. John Willey and Sons, 680 p.

Hilton, R. N. (1958). Pink disease of *Hevea* caused by *Corticium salmonicolor*. *J. Rubber Res. Inst. Malaysia,* 15:275-292.

Mohanan, C. (2008). Outbreak of Pink Disease in Young Teak Plantations. Forest Protection Division, Kerala Forest Research Institute, Kerala, India. 1(1):8p.

Old, K. M. See L.S., Sharma J.K., and Yuan Z. Q. (2000). A manual of diseases of tropical acacias in Australia, South-East Asia and India. Center for International Forestry Research: Jakarata, Indonesia. 104 p.

Sharma, I. M., and Bhardwaj, S.S. (2002). Canker disease in apple: Present status and future strategies. In: *Horti-Vision 2020* (Eds. Dr(s). J.M., Singh, R.P., Sharma, V.K., Sharma). Published by State Department of Horticulture, Shimla, Himachal Pradesh, pp.323-329.

Sharma, I. M. and Ved Ram (2010). Occurrence and management of important cankers in apple. *J. Mycol. Pl. Pathol.* 40 (2) : 213 – 218.

Sharma, J. K., Mohanan, C., and Florence, E.J. (1984). Diseases survey in nurseries and plantations of forest tree species grown in Kerala For. Res. Inst. Peechi, p.36.

Verma, K. S.(1991). Factor affecting the development of pink canker of apple. *Plant Disease Res.,* 6: 40-45

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