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Epidemiological studies on mango powdery mildew (*Oidium mangiferae* Berthet) cv. Alphonso

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Abstract

The powdery mildew, *Oidium mangiferae* Berthet is a major disease of mango in Konkan region of Maharashtra. The epidemiological study was conducted at Regional Fruit Research Station, Vengurle, M. S. during 2013-14 and 2014-15. The ten Alphonso mango trees from unsprayed plot were selected and 15 panicles of each tree were tagged and observed seven days interval for disease incidence. During the year 2013-14 and 2014-15 first powdery mildew appearance was noticed in the 2nd fortnight of January and 1st fortnight of January respectively. However, maximum disease intensity was recorded in the 2nd fortnight of March (85.60% & 73.40% during 2013-14 and 2014-15, respectively). The incidence of powdery mildew was significant and positively correlated with minimum temperature. Whereas, there was positive and non-significant correlation with evening humidity, maximum temperature and rainfall. The morning humidity was negatively and non-significantly correlated with powdery mildew incidence.

Keywords: powdery mildew, epidemiology, *Oidium mangiferae*, mango

1. Introduction

Mango (*Mangifera indica*) the king of fruits is the most important fruit in the tropical as well as subtropical region of the world in which India contributes a major share in area and production. It is the third widely produced fruit crop of the tropics after banana and citrus occupying relatively the same position in the tropics as the apple in Europe and North America. In India the leading mango growing states are Uttar Pradesh, Andhra Pradesh, Bihar, Karnataka, Tamil Nadu and Maharashtra. These six states together constitute about 79.8% of the total area under mango. In India, the area under mango cultivation is 2163000 ha and production 18527000 Mt. Maharashtra is one of the major mango growing state in India, occupying area 157000 ha and production 759000 Mt. (Anonymous, 2015) [1]. Konkan is the major and famous mango producing belt on the west coast of Maharashtra where it occupies an area of 0.165 million ha in four districts viz., Thane (23,722 ha), Raigad (46,418 ha), Ratnagiri (66,651 ha) and Sindhudurg (29,809 ha). The productivity of mango in Konkan is about 2.5 tonnes ha⁻¹.

Powdery mildew of mango caused by *Oidium mangiferae* Berthet is a widespread and most important disease of mango in India. Foliar, blossom and fruit infections caused by the disease, but blossom infection is most serious and is responsible for yield loss up to go per cent. It affects fruit set and causes fruit drop, resulting heavy yield loss. The disease is having endemic nature under Konkan conditions however, attains an epiphytotic form due to climatic fluctuations. Considering the importance of disease its direct relationship with weather it was felt necessary to study the epidemiological study of powdery mildew of mango caused by *Oidium mangiferae* Berthet. Study was undertaken during 2013-14 and 2014-15 at Regional Fruit Research Station, Vengurle.

Materials and methods

Epidemiological studies

The epidemiological work has been done during period of 2013-2014 and 2014-2015. Ten trees were selected for the studies and on each tree fifteen inflorescences were randomly selected and were labeled for observation on the powdery mildew disease development. Observations were recorded by using 0-5 scale at weekly interval of standard meteorological week.

Weather parameters *viz.*, maximum temperature, minimum temperature, relative humidity I (morning), relative humidity II (evening) and rainfall were continuously recorded at adjacent meteorological observatory located at Regional Fruit Research Station, Vengurle. Correlation analysis for disease severity of powdery mildew of mango with weather parameters were done for two seasons separately.

Observations recorded

Per cent disease Index (PDI) was recorded by scoring all the individual ten inflorescences on each plant using 0–5 scale (0=No symptoms, 1=1–20%, 2=21–40%, 3=41–60%, 4=61–80% and 5=8% and above inflorescences area covered). Further the PDI was calculated with the above scales by using formula (Wheeler, BEJ 1969) [5].

$$\text{PDI} = \frac{\text{Sum of all numerical ratings}}{\text{No. of leaves examined} \times \text{Maximum Disease rating}} \times 100$$

Results and discussion

Epidemiological studies of powdery mildew of mango

During the year 2013-14, symptoms of powdery mildew initiated during 4th MW (22.01.2014 to 28.01.2014). The severity increased slowly and reached as high as 85.60% during 14th MW (02.04.2014 to 08.04.2014). Maximum temperature ranged between 31.93 °C to 34.79 °C while minimum temperature ranged between 15.76°C to 24.95 °C. Mean relative humidity ranged between 91.29% to 41.14% and rainfall (100 mm) was recorded during the experimental year. Whereas the incidence of powdery mildew was initiated from 2nd MW (08.01.2015 to 14.01.2015) during 2014-15. Weather conditions during this year were recorded being as 30.77 °C to 34.34 °C maximum temperature and 13.84 °C to 23.99 °C minimum temperature while mean relative humidity ranged between 92.29% to 51.00% with rainfall (24 mm).

Table 1: Correlation of mango powdery mildew with weather parameters. Table *r* value at 5% = 0.396. *Significant at *p* = 0.05.

S. No.	Weather parameters	Correlation coefficient (<i>r</i>)	
		2013-14	2014-15
1	X1–Maximum temperature	0.00109	0.0022
2	X2–Minimum temperature	0.4614*	0.4899*
3	X3–Relative humidity I (%)	-0.36394	-0.00015
4	X4–Relative humidity II (%)	0.16864	0.2055
5	X5–Rainfall	0.0235	0.0199

The relationship between PDI and weather parameters during 2013-14 and 2014-15 is presented in Table 1. Data revealed that there was significant positive correlation between minimum temperature ($r=0.461$). While maximum temperature ($r=0.001$), relative humidity II ($r=0.168$) and rainfall ($r=0.023$) had non-significant and positive effect on PDI, whereas relative humidity I ($r=-0.363$) was negative and non-significantly correlated with per cent disease incidence during 2013-14. Similarly, during 2014-15, PDI was positive and significantly corrected with minimum temp ($r=0.489$). While, maximum temp ($r=0.002$), relative humidity II ($r=0.205$) on PDI. However, relative humidity I ($r=-0.00015$) was negative and non-significantly corrected with per cent disease incidence. These finding are in conformity with those of Rajeev Raina (2010) [4], Gupta, J.H. (1989) [2] and Karande *et al*; (2016) [3] who concluded that the fungus could cause disease from 15 to 32 °C and 50 to 100% relative humidity.

Conclusion

Epidemiological study indicated that, there was significant positive correlation between minimum temperature. Whereas,

relative humidity I was negative and non-significantly correlated with per cent disease incidence during both of years. However, maximum temperature, relative humidity – II and rainfall was found non-significant and positive correlation with PDI during both years. On the basis of two years of experimentation it is concluded that contribution effects of weather parameters *viz.*, maximum temperature (34.79 °C), minimum temperature (13.84 °C to 24.95 °C) and mean relative humidity 41.14% to 92.29%) 13.84 °C to 34.95 °C were found to be congenial for the maximum development of the powdery mildew of mango under Vengurle condition.

Acknowledgement

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