

POWDERY MILDEW (*Oidium mangiferae* BERT.) INFECTION IN MANGO VARIETIES

INFECÇÃO DE OÍDIO (*Oidium mangiferae* BERT) EM VARIEDADES DE MANGA

Juliana Altafin GALLI¹; Luis Cláudio Patterno SILVEIRA²; Marcos Doniseti MICHELOTTO³; Antônio Lúcio Mello MARTINS³

1. Pesquisador Científico, Doutora, Agência Paulista de Tecnologia dos Agronegócios – APTA Regional Centro Oeste, Pindorama, SP, Brasil, julianagalli@apta regional.sp.gov.br; 2. Professor, Doutor, Universidade Federal de Lavras, Lavras, MG, Brasil; 3. Pesquisador Científico, APTA Regional Centro Oeste, Pindorama, SP, Brasil.

ABSTRACT: The objective of this work was to evaluate the incidence of powdery mildew in mango varieties. Twenty seven varieties, grafted on Manila (Carabao) mango variety, were evaluated. Powdery mildew was evaluated through the observation of symptoms on young inflorescences. A visual scale of notes was used for evaluation: 1 – visible symptoms in 0 to 25% of the inflorescence; 2 – 25-50%; 3 – 50-75%; and 4 – more than 75%. The varieties' yield was evaluated through the number of fruits per tree. The experimental design used was randomized blocks, with 27 treatments and three replications. The averages were compared by the Scott-Knott test, at 5% probability. The mango varieties presented different performance in relation to powdery mildew incidence, and could be separated into five groups. The most resistance variety was Rocha. The presence or absence of powdery mildew had no effect on yield.

KEYWORDS: Fungus. Disease. Orchard. Fruit.

INTRODUCTION

Mango (*Mangifera indica* L.) is an important fruit and is susceptible to a number of diseases at all stages of its development, i.e., from nursery to fruit bearing trees. All plant parts, namely, trunk, branch, twig, leaf, petiole, flower and fruit are attacked by different pathogens. Among the diseases, powdery mildew, caused by the fungus *Oidium mangiferae* Bert., was first reported from Brazil in 1914 by Berthet, and subsequently it was reported in several other countries. The losses caused by this pathogen vary from 5-20% depending on the weather conditions. The affected fruits do not grow and may drop before attaining pea size (RAWAL; SAXENA, 1992).

The fungus is a biotrophic parasite, developing on live and susceptible tissues of the host plant. The pathogen survives in old leaves at non-favorable conditions, where it produces conidia, which will infect other leaves, flowers and fruits. It is characterized by a white, powdery mycelium growth on the affected parts. It can cause injuries that, later, will favor infection by anthracnose (JUNQUEIRA et al., 2001).

Gupta (1989) in a study about the perpetuation and epidemiology of mango powdery mildew reported that maximum infection of the host occurred at 26°C and 100% relative humidity. However, the fungus could cause disease from 15 to 32°C and 15.5 to 100% relative humidity. It was observed that atmospheric temperature was the most important factor for disease onset and epidemic

development under field conditions. Temperatures ranging from 11–14°C (minimum) and 17–31°C (maximum) along with moderate relative humidity (64–72%) were most favorable for the development of mango powdery mildew. According to that author, rainfall did not play any significant role on appearance and disease development, but dry weather favored disease development.

Ribeiro (1997) classified the mango varieties Brasil, Carlota, Espada, Imperial, Oliveira Neto, Coquinho, Tommy Atkins and Keitt as resistant to powdery mildew. Despite of being more tolerant, these varieties presented thicker peduncles or fruits of smaller size, decreasing fruit drop, despite of the disease. In susceptible varieties, such as Bourbon, Mallika, Glenn, Dabina and Haden, this disease totally eliminates the fruits if not treated (ROSSETO, J.C., personal communication).

Carvalho et al. (2004) evaluated seven mango varieties in the region of Votuporanga-SP, Brazil, and reported that no variety was resistant to powdery mildew, anthracnose and mango malformation. “Haden 2H” was the variety with higher susceptibility to those diseases. The objective of this research was to evaluate the incidence of powdery mildew in mango varieties

MATERIAL AND METHODS

The experiment was conducted at Apta Regional Centro Norte, in Pindorama-SP-Brazil, with the collection of mango varieties. Twenty seven varieties were evaluated: Adams, Alda,

Brasil, Cacipura, Carrie, Castro, Edward, Família, Fascell, Foice, Gouveia, Haden, Haden 2H, Haden TR, Bourbon, Joe Welch, Lima Peru, Pele de Moça, Petacon, Pope, Regina, Rocha, Rosa, Rubi, Sensation, Torbet and White Langra.

The varieties were grafted on Manila (Carabao) variety, resistant to *Ceratocystis fimbriata* Ell. et Halst. The seedlings were planted in 1998, three trees per variety, at the spacing of 10 x 10m.

The orchard was managed following the conventional system for fertilization practices. From the second year on, no pulverizations with fungicides or insecticides were done.

Powdery mildew was evaluated in 16/09/2005, through the observation of symptoms in young inflorescences. Ten inflorescences were evaluated per plant, in all three plants per variety. A visual scale of notes was used for evaluation: 1 – visible symptoms in 0 to 25% of the inflorescence; 2 – 25-50%; 3 – 50-75%; and 4 – more than 75% (CARVALHO et al., 2004).

The varieties' yield was evaluated at 2005-2006 harvest, when the trees were seven years old. The number of fruits per tree was counted, for yield comparison among the varieties, being each tree one replication.

The experimental design used was randomized blocks, with 27 treatments and tree replications. The averages of notes of ten inflorescences per tree were one replication; yield was evaluated by the average of three plants; data were compared by Scott- Knot test, at 5% probability. The data was transformed in $(x + 0.5)^{1/2}$ for variance analysis.

RESULTS AND DISCUSSION

The results of powdery mildew in mango inflorescences and the average number of fruits per plant are presented in Table 1.

Table 1. Powdery mildew incidence and fruit yield in mango varieties. Pindorama, SP. 2005/06.

| Varieties | Powdery mildew incidence (average notes /3 plants) | | Yield (average fruits/ 3 plants) | |
|----------------|---|----------------|-------------------------------------|----------------|
| | | | | |
| Alda | 3,93 | a ¹ | 122 | a ¹ |
| Castro | 3,90 | a | 203 | a |
| Torbet | 3,80 | a | 60 | b |
| Adams | 3,77 | a | 150 | a |
| Joe Welch | 3,77 | a | 163 | a |
| Rubi | 3,73 | a | 215 | a |
| Petacon | 3,70 | a | 255 | a |
| Rosa | 3,67 | a | 178 | a |
| Fascell | 3,67 | a | 207 | a |
| Haden | 3,53 | a | 71 | b |
| Haden 2H | 3,43 | a | 183 | a |
| Pope | 3,43 | a | 173 | a |
| Bourbon | 3,40 | a | 79 | b |
| Sensation | 3,33 | a | 248 | a |
| Família | 3,30 | a | 174 | a |
| White Langra | 3,27 | a | 117 | b |
| Haden TR | 3,13 | a | 202 | a |
| Cacipura | 2,97 | b | 50 | b |
| Foice | 2,80 | b | 139 | a |
| Lima Peru | 2,77 | b | 41 | b |
| Gouveia | 2,70 | b | 104 | b |
| Edward | 2,33 | c | 160 | a |
| Pele de Moça | 2,27 | c | 224 | a |
| Carrie | 2,03 | c | 146 | a |
| Brasil | 2,03 | c | 45 | b |
| Regina | 0,93 | d | 175 | a |
| Rocha | 0,16 | e | 200 | a |
| F (Treatments) | 13,39 | ** | 2,55 | ** |
| F (Blocks) | 0,33 | NS | 0,20 | NS |
| C.V. | 14,33 | | 28,79 | |

¹ Averages followed by the same letter in column do not differ from each other, by the Scott-Knot test, at 5% probability; ** Significant, at 1% probability; NS Not Significant.

The varieties presented five different infection levels. The more susceptible ones, with higher infection notes, were Alda, Castro, Torbet, Joe Welch, Adams, Rubi, Petacon, Fascell, Rosa, Haden, Haden 2H, Pope, Bourbon, Sensation, Família, White Langra and Haden TR. There were no significant differences among these varieties. The lowest note was found for Rocha variety. Regina also presented low incidence value, and could be considered as very resistant to powdery mildew.

The average number of fruits per tree differed significantly among varieties, in two groups, ranged from 255 fruits (Petacon) to 41 fruits (Lima Peru). The daily temperatures before the evaluation of powdery mildew incidence remained around 28.6 to 31.2°C (maximum) and 10.2 to 19.0°C (minimum). Rainfall was scarce during the period before evaluation, with the last precipitation of 5.1 mm registered 15 days before evaluation. Thus, the weather conditions during the experiment were totally favorable for maximum infection by the fungus, as reported by Gupta (1989).

The Brasil variety, reported in the literature as resistant to powdery mildew (RIBEIRO, 1997), also presented resistance in the present study. But this variety presented one of the lower yields in the experiment, with an average of 45 fruits per plant.

Despite of being resistant, its low yield is not desirable for a commercial variety.

The varieties Pele de Moça and Rocha deserve prominence for presenting good yield (average of 224 and 200 fruits per tree, respectively) and low incidence of powdery mildew. These features are suitable for the formation of mango orchards in organic system.

Castro variety, which presented higher incidence of powdery mildew, and had a significant yield, could be considered tolerant, since, despite of disease incidence, fruit drop was low and, consequently, no decreases in yield were observed. The yield of this variety, despite of powdery mildew incidence, could be due to the medium size of fruits (350g), smaller than other varieties. Torbet variety, that also presented high infection, had little yield, but its fruits are higher (490 g).

CONCLUSIONS

The mango varieties presented different performance in relation to powdery mildew. The varieties Rocha and Regina could be considered resistant.

The presence or absence of powdery mildew symptoms had no effect on fruit yield of the mango varieties analyzed.

RESUMO: O objetivo do trabalho foi avaliar a incidência de oídio em variedades de manga. Foram avaliadas 27 variedades, enxertadas sobre porta-enxerto da variedade de manga Manila (Carabao). A doença oídio foi avaliada pela observação de sintomas em inflorescências jovens. Foi utilizada uma escala visual de notas: 1 – sintomas visíveis em 0 a 25% da inflorescência; 2 – 25-50%; 3 – 50-75%; e 4 – mais de 75%. A produção das variedades foi avaliada pelo número de frutos por árvore. O delineamento experimental utilizado foi em blocos ao acaso, com 27 tratamentos e três repetições. As médias foram comparadas pelo teste de Scott-Knott, a 5% de probabilidade. As variedades de manga apresentaram comportamento diferente com relação à infecção por oídio, podendo ser separadas em cinco grupos, sendo a variedade Rocha a mais resistente; a presença ou ausência de sintomas de oídio não interferiu na produção das variedades.

PALAVRAS-CHAVE: Fungo. Doença. Pomar. Fruto.

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