

Short Communication

Incidence of Citrus Canker (*Xanthomonas compestris* pv. *Citri*) on Orange Cultivars in Nursery

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ABSTRACT

Incidence of citrus canker on fifteen cultivars of sweet orange was studied. All cultivars were observed as more or less infected with citrus canker. The trend in intensity of disease leaves and lesions/leaf was partially similar in cultivars. Maximum (56.62%) diseased leaves/plant, were found in Marrs Early, immediately followed by Olinda Valencia and Pineapple i.e., 49.28 and 43.28%, respectively. Minimum (7.96%) infected leaves were observed in Jaffa, followed by Navelate (21.26%) and Salustiana (21.94%). In case of number of lesions/leaf, Olinda Valencia showed maximum (1.170) lesions/leaf, closely followed by Hamlin, Pineapple, Marrs Early, Succari, Blood red and Tarocco. Minimum (0.072) lesions/leaf was observed in Jaffa, closely followed by Navelate and Salustiana i.e., 0.302 and 0.42 respectively.

Key Words: Citrus canker; Orange cultivars; Diseased leaves; Lesions

INTRODUCTION

In Pakistan, citrus is the largest group of fruits grown in the country covering an area of 185 thousands hectares with annual production of 1.67 metric tons. The citrus plant faces many disorders/factors, which impede the fruit yield and quality. Diseases are one of the major factors. Among diseases, citrus canker (*Xanthomonas compestris* pv. *citri*) has its own importance, which adversely affects the plant health and fruit quality. Canker is rampant through out the citrus growing countries of the world (Koizumi, 1985). The bacteria form lesions commonly on all parts of plant (Hussain *et al.*, 1988), while fairly on young and tender parts above the ground (McGuire *et al.*, 1986). Intensity of infection varies with the species and cultivars (Falico-De-Alcaraz, 1986). Some varieties of citrus are more prone to the diseases as compared to others. Most affected varieties are considered to be the rough lemon and Kahhzi lime (Arif *et al.*, 1962 - 64), similarly it increases more rapidly in Marsh grapefruit than in Valencia late orange (Gottwala *et al.*, 1999). Different cultivars of sweet orange, sweet lime, grape fruit and other citrus species are infected with canker (Kuhara, 1978; Garnsey *et al.*, 1979; Wang & Chung, 1991). Similarly Fair child Tangerine has been reported to be least affected cultivar, closely followed by Pearl Tangelo and Valencia late Orange (Awan *et al.*, 1995). Canker affects Washington Navel severely Jaffa, Salustiana and Valencia were less susceptible to the disease (Chaudhary, 1951) and Graham (2001). Agro-climatic conditions have a crucial role in the multiplication of bacteria. Mild temperatures ranging from 20 to 30 °C with wet weather are conducive to infection and disease development (Reedy, 1984).

The above scenario suggests planning strategies to control disease. Previously little work has been done as far as the incidence of disease on various orange varieties is concerned with special reference to Pakistan. This study was initiated as a preliminary effort to know the severity of disease and also for the screening of cultivars against citrus canker.

MATERIALS AND METHODS

Incidence of citrus canker on 15 cultivars i.e., Marrs Early, Olinda Valencia, Pineapple, Valencia Navel, Succari, Blood red, Local blood, Musambi, Tarocco, Hamlin, Valencia late, Parson Brown, Salustiana, Navelate and Jaffa of sweet orange was studied in nursery of Orange Research Institute, Sargodha to observe disease intensity on 10 months old budding plants in nursery of Orange Research Institute, Sargodha, Pakistan. There were five replications, consisting of two plants per cultivar in each replication. Experimental design was Randomized Complete Block Design (RCBD). Disease incidence on leaves was recorded during July, 2006. Five leaves from lower, middle and upper part of each plant were randomly taken and observed for infection and lesions. The data were statistically analyzed and means were compared. The data were statistically analyzed and means were compared using Least Significant Difference (LSD) test.

RESULTS AND DISCUSSION

Results revealed that all cultivars were infected with citrus canker (Table I), nevertheless analysis of data

Table I. Mean incidence of citrus canker on different orange cultivars

Sr. No.	Cultivars	Diseased leaves (% age)	Lesions / leaf
1.	Marrs Early	56.62 a	1.048 abc
2.	Olinda Valencia	49.28 ab	1.170 a
3.	Pineapple	43.28 abc	1.112 ab
4.	Valencia Navel	39.92 bc	0.718 bcd
5.	Succari	35.96 bcd	1.022 abc
6.	Blood red	35.16 bcd	0.812 abcd
7.	Local Blood	31.94 cd	0.594 de
8.	Musambi	30.60 cd	0.748 bcd
9.	Tarocco	30.02 cd	0.792 abcd
10.	Hamlin	29.92 cd	1.128 ab
11.	Valencia late	28.60 cd	0.536 de
12.	Parson Brown	24.60 d	0.642 cde
13.	Salustiana	21.94 de	0.460 def
14.	Navelate	21.26 de	0.302 ef
15.	Jaffa	7.96 e	0.072 f
LSD		14.94	0.4105

Any two means not sharing a common letter differ significantly at 0.05 level of significance.

indicated significant differences in disease intensity among the cultivars. The intensity of diseased leaves and lesions per leaf were found partially similar in cultivars. Marrs Early displayed the highest (56.62%) disease incidence, as compared to Olinda Valencia (49.28%) and Pineapple (43.28%), although the differences were non-significant among these three cultivars. The lowest disease percentage was observed in Jaffa (7.96%), closely followed by Navelate (21.26%) and Salustiana (21.94%). Parson Brown, Valencia late, Hamlin, Tarocco, Musambi, Local Blood, Blood red and Succari showed higher disease intensity as compared to Navelate and Salustiana. However these were statistically at par with one another.

The data also showed some differences in number of lesions per leaf although these differences were insignificant among the cultivars. Olinda Valencia showed maximum (1.17) number of lesions followed by Hamlin, Pineapple, Marrs Early, Succari, Blood red and Tarocco with 1.12, 1.11, 1.04, 1.02, 0.82 and 0.79 lesions per leaf, respectively. Jaffa exhibited minimum (0.072) number of lesions per leaf, followed by Navelate (0.302) and Salustiana (0.46).

Although Valencia-late, Local-blood and Parson-brown had more number of lesions per leaf, they exhibited no prominent differences from Salustiana and Navelate. This is in line with the findings of Falico-de-Alcaraz (1986) who reported that infection varies with the species and varieties, Marrs-early, Pineapple and Valencia-navel were infected severely with Citrus-canker.

CONCLUSION

Three cultivars of sweet orange viz. Marrs Early, Olinda Valencia and pineapple were found the most affected with citrus canker. Cultivation of these cultivars requires special strategies against citrus canker from nursery to orchard. Least affected cultivars are recommended for commercial cultivation.

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REFERENCES

- Arif, A.G., C.M. Akhtar and M. Ibrahim, 1962 - 64. Citrus diseases and their control. *Punjab Fr. J.*, (Citrus Number), 27: 369-73
- Awan, M.Z., M. Ishfaq, I.A. Hafiz, M. Ijaz and G.A. Chaudhary, 1995. Incidence of citrus canker in rain-fed area of Chakwal. *J. Agric. Res.*, 33: 129-33
- Chaudhary, S., 1951. Citrus canker in Assam. *Pl. Prot. Bull.*, 3: 78-9
- Falico-de-Alcaraz, L., 1986. Multiplication of *Xanthomonas compestris* pv. *citri* in leaf tissue of different citrus species. *Phytopathologia*, 21: 52-60
- Gottwald, T.R., R. G. Mc Guire and S. Garran. 1988. Asiatic citrus canker. Spatial and temporal spread in simulated new planting situations in Argentina. *Phytopathology*, 78: 639-745
- Garnsey, S.M., E.P. Clicharme, J.W. Light field, C.P. Seymour and J.T. Griffiths, 1978. Citrus canker. *Citrus Indus*, 60: 8-13
- Graham, J.H., 2001. Varietal susceptibility to citrus canker: observation from Southern Brazil. *Citrus Indus*, 82: 15-7
- Hussain, M., A.S. Akhtar and M.Z. Iqbal, 1988. *Survey of Citrus Diseases in Selected Orchards of the Punjab*, Pp: 1-11. AARI, Faisalabad
- Koizumi, M., 1985. Citrus canker: The world situation. In: Timer, L.W. (ed.), *Citrus Canker: An International Perspective*, Pp: 2-7. Proc. Symptoms Institute of Food Agriculture Sciences University of Florida, P: 28
- Kuhara, S., 1978. Present epidemic status and control of the citrus canker disease (*xanthomonas citri*. (Hasse Dowson) in Japan Rev). *Pl. Prot. Res.*, 11: 132-42
- McGuire, R.G., J.B. Jones and M. Sesser, 1986. Tween media for semi selective isolations of (*X. Compestris* pv. *vesicatoria*) from soil and plant material. *Pl. Dis.*, 70: 887-91
- Reeddy, B.C., 1984. Incidence of bacterial canker of citrus in relation to weather. *Geobios New Rep.*, 3: 39-41
- Wang, L.Y. and K.C. Chung, 1991. A Supplements list of *Xanthomonas compestris* pv. *citri*. Strains isolated in Taiwan. *Pl. Prot. Bull. Taiwan*, 33: 301-4

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