



SURVEY ON LEAF SPOT DISEASES IN ACID LIME IN NELLORE REGION OF ANDHRA PRADESH

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Abstract

A roving survey was conducted in the year 2017-18 during August- November months, in acid lime grown orchards of three different mandals viz., Balaya palli, Dakkili and Venkatagiri mandals of Nellore district of Andhra Pradesh to assess the percent disease index of leaf spot diseases in acid lime. The percent disease index was recorded by using 0-5 point scale. Among the different locations surveyed, leaf spot caused by *Colletotrichum* spp. and greasy spot was more prevalent. The maximum mean percent disease index of leaf spot caused by *Colletotrichum* was recorded from Dakkili mandal (26.08%) followed by Balayapalli mandal (20.97%), while lowest mean was recorded in Venkatagiri mandal (17.3%). The maximum mean percent disease index of greasy spot was observed from Balayapalli mandal (22.58%) followed by Dakkili mandal (18.23), whereas lowest percent disease index was recorded in Venkatagiri mandal (14.44 %).

Key words: Percent disease index, *Colletotrichum* spp. greasy spot

Introduction

India is the largest producer of acid lime in the world. Acid lime is one of the commercially important citrus species grown in India. India ranks fifth among major lime and lemon-producing countries in the world. India is perhaps the largest producer of acid lime in the world. It is cultivated in almost all the states, Andhra Pradesh, Maharashtra, Tamil Nadu, Karnataka, Gujarat, Bihar, and Himachal Pradesh are the major producing states. Sweet orange and acid lime are the two chief commercial citrus fruits grown in Andhra Pradesh. Lemons, Pummelo, and Mandarins are cultivated in limited areas. Common variety under cultivation in India is Kagzi lime. In Andhra Pradesh majority cultivated varieties are Balaji, Petlur selection 1. In India, the total area under cultivation is 259.3 thousand hectares with a production of 2789.0 thousand tonnes, respectively. Andhra Pradesh is leading lime/lemon producing State in the country with an area of 52.53 m ha with production of 840.55 MT. (Horticultural statistics at a glance 2017).

Acid lime was majorly grown in Nellore, Y.S.R.

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Kadapa, Prakasham, Guntur, West Godavari and East Godavari and Anathapur districts of Andhra Pradesh. In Nellore district acid lime become quite popular and more remunerative crop. Nearly 50 per cent area and production come from Nellore district alone as compared to rest of all districts in Andhra Pradesh. Nellore district has become the major area (21,128 ha.) of acid lime contributing 50 per cent of total production (3,16,920 MT). Gudur town of Nellore district is having the largest market for acid lime in the country. (Mukunda Lakshmi *et al.*, 2016). In recent years declining of acid lime is seen in most acid lime growing areas of Andhra Pradesh. Wide spread occurrence of bacterial canker, greasy spot, bark and wood splitting, tristeza virus and dry root rot alone or in combination are the primary causes for acid lime declining. (Mukunda Lakshmi *et al.*, 2016). Keeping in view, the present investigation was aimed to record the incidence of leaf spot diseases in major acid lime growing area *i.e.* Nellore district.

Materials and methods

Roving survey was conducted during 2017-18 in the months of August, September, November, and December

in acid lime growing areas of Nellore district A.P to assess the intensity of leaf spot diseases in acid lime. A total of 9 different locations was surveyed in 3 mandals *viz.*, Balaya palli, Dakkili and Venkatagiri of Nellore district of A.P. were covered. A proforma for survey was prepared to collect and record the information on planting time, previous crop, fertilizer and fungicide application, crop rotation, inter crops and other diseases in acid lime. Leaf spot samples showing symptoms from the farmer's field in three mandals were collected.

At each village randomly three acid lime orchards were surveyed. At each farmer field randomly 10 plants were selected, then Randomly 10 twigs were selected from the each plant. The occurrence of leaf spot disease were recorded, and Percent Disease Index (PDI) was calculated. The symptomology of leaf spots surveyed were recorded.

Percent Disease Index (PDI) recorded by using formula given below and rated by 0-5 scale. (Timmer and Zitko, (1995).

$$PDI = \frac{\text{Sum of all rating}}{\text{Total No. of leaves} \times \text{maximum rating value}} \times 100$$

- 0 = none (leaf area not covered by leaf spot lesions.
 1 = negligible to 5% of the leaf area covered by leaf spot lesions.
 2 = 6-10% of the leaf area covered by leaf spot lesions.
 3 = 11-15 % of the leaf area covered by leaf spot lesions.
 4 = 16-20 % of the leaf area covered by leaf spot lesions.
 5 = >20 % of the leaf area covered by leaf spot lesions.

Results and discussion

Percent disease index of leaf spots

The results indicated that, in Nellore district majorly observed leaf spot was caused by *Colletotrichum gloeosporioides* and *Colletotrichum acutatum*. The results indicated that the percent disease index was noticed in all the locations surveyed with a range of 15.4 to 28.80 per cent. The maximum mean percent disease index was recorded in Dakkili mandal (26.08%) followed by Balayapalli mandal (20.97%), while lowest mean was recorded in Venkatagiri mandal (17.3%). (table 1).

In Balayapalli mandal, three villages *viz.*, Kayyuru, Kamakuru, Pigilam were surveyed. Among the different locations surveyed, highest percent disease index was noticed at farmer field in Kamakuru (22.25 %) village. Whereas lowest percent disease index was recorded at farmer field in Kayyuru (20.12%). In Pigilam, (20.54%) PDI was recorded. In Venkatagiri mandal, highest percent disease index was

Table 1: Survey on the occurrence of leaf spot diseases of Acid lime in Nellore district of Andhra Pradesh during 2017-18.

S. No	Location		Percent Disease Index (PDI)*		Longitude & Latitude
	Mandal	Village	Colletotrichum leaf spot	Greasy spot	
1.	Balayapalli	Kayyuru	20.12 (26.71)	21.2 (27.42)	17.655007 & 82.218257
		Kamakuru	22.25 (28.11)	20.56 (26.92)	35.319225 & 139.546687
		Pigilam	20.54 (26.92)	25.98 (30.59)	13.998857 & 79.692305
		Mandal mean	20.97 (27.20)	22.58 (28.32)	
2.	Dakkili	Lingasamudram	25.54 (30.33)	17.21 (24.50)	15.083475 & 79.700721
		Mopuru	28.50 (32.27)	17.95 (25.03)	14.065051 & 79.565963
		Matamadugu	24.21 (29.47)	19.54 (26.21)	16.311716 & 79.138625
		Mandal mean	26.08 (30.66)	18.23 (25.25)	-
3.	Venkatagiri	Mannegunta	16.25 (23.73)	13.4 (21.47)	13.925316 & 79.555076
		Kurgagunta	18.12 (25.18)	15.8 (15.82)	41.45164 & -74.359188
		Chilakampaadu	17.53 (24.65)	14.12 (22.06)	15.475763 & 17.903877
		C.R.S. Petluru	15.4	17.42	15.4447 & 79.7799
		Mandal mean	17.3 (24.58)	14.44 (22.30)	-
		Overall mean	21.45 (27.56)	18.41 (25.40)	-

*Mean of three replications

recorded from kurgagunta (18.12 %) and lowest percent disease index was recorded at farmer field in Mannegunta (16.25%). At Citrus Research Station, Petluru (17.25%) Percent Disease Index was recorded. In Dakkili mandal highest percent disease index was recorded at farmer field in Mopuru (28.50%) village. Whereas lowest incidence was noticed at farmer field in Matamadugu (24.21%) village.

Figures in parenthesis are arc sin transformed values

Greasy spot was also observed in acid lime orchards during the survey. The maximum mean percent disease index was recorded in Balayapalli mandal (22.58%) followed by Dakkili mandal (18.23), whereas lowest percent disease index was recorded in Venkatagiri mandal (14.44%). Among the locations surveyed, highest percent disease index was noticed at farmer field in Pigilim (25.98%) village of Balayapalli mandal. Whereas lowest percent disease index was noticed at farmer field in Mannegunta (13.4%) village of Venkatagiri mandal. Symptoms of leaf spot caused by *Colletotrichum* spp. includes, initially necrotic lesions on leaves with light greyish center surrounded by brown margin, with semi-circular or angular shaped spots, surrounded by yellow halo. In later stages the presence of fruiting bodies (acervuli) on necrotic lesion of leaf. Greasy spot produces brown to dark brownish oily lesions on under side of the leaf and chlorotic spots on upper surface initially. Later stages defoliation of leaves occur, on which pseudothecia was formed.

Discussion

The from the data pertaining to the survey indicated that in Nellore district, leaf spot caused by *Colletotrichum* sp. severity was high followed by greasy spot.

Leaf spot caused by *Colletotrichum gloeosporioides* and *Colletotrichum acutatum* severity was high during August-November. The disease favoured by rains and high humidity. Similar findings were reported by Jamadar and Patil (2011) in anthracnose of pomegranate. Who revealed that disease was most serious during the period of July-October. Rains, high humidity and temperature (20.67) favoured the disease. Key limes were not grown commercially in humid areas of the America due to the devastating effects of this disease.

Greasy spot severity was high in September-October months. These results were also in conformity with Dr.YSRHU Annual Report, 2011-12. Where reported that greasy spot was appeared throughout the year but the peak intensity was recorded during the months of September-October.

Leaf spots caused by *Colletotrichum* spp. and *Mycosphaerella citri*, causes defoliation and yield loses of acid lime cultivation. Shathraghya Singh (2005) reported that wither tip, anthracnose and leaf spot diseases were major limiting factors for decline of nimbu/lime (*Citrus aurantifolia* Swingle) cultivation in north India,

mainly more prevalent in Kanpur (U.P.). An average of 10-15% losses were sustained due to *Colletotrichum gloeosporioides*. Due to greasy spot yield loss in Florida can be up to 45% on grapefruit and 25% on sweet orange (Whiteside 1977). The symptoms of *Colletotrichum* sp. was agreement with those reported in past by Cai *et al.* (2009) in citrus. Greasy spot symptoms were also in conformity with (Timmer and Gottwald, 2000; Mondal and Timmer, 2006).

Conclusion

From this study revealed that, leaf spot caused by *Colletotrichum* spp. was more prevalent, followed by greasy spot. The occurrence of *Colletotrichum* leaf spot was influenced by environmental conditions. Greasy spot occurrence was more in September- October months. In severe cases defoliation of leaves were observed due to the leaf spot.

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