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IMPACT OF CLIMATE CHANGE ON CASHEW LEAF BLIGHT DISEASE

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Abstract

An experiment was conducted at Regional Fruit Research Station, Vengurle by using eight different treatments with three replications against cashew leaf blight disease, caused by *Phomopsis anacardii*. The disease was observed on young leaf tissues of cashew. Angular lesions, dark tan with a dark reddish brown margin were formed on leaves. Lesions subsequently enlarge and coalesce causing blighting and defoliation. Older lesions become papery, silver/grey in colour and develop shot-holes. The results showed that all the seven fungicides at their concentration when sprayed twice at 10 days interval effectively controlled natural incidence of leaf blight as compared to control. Among the eight treatments, the treatments *viz*., carbendazim + mancozeb (0.2%), copper oxychloride (0.3%), thiophanate methyle (0.1%), carbendazim (0.1%) and tricyclazole (0.1%) were found significantly superior over rest of the treatmnets and were at par with each other. These were followed by benomyl (0.2%) and mancozeb (0.2%), which were found to be at par with each other.

Key words : Climate change, leaf blight disease, cashew, konkan region.

Introduction

Cashew (*Anacardium occidentale* L.) is an important cash crop in Konkan region of Maharashtra and is native of Eastern Brazil. Basically, South Konkan region is the important area of cashew cultivation. It contributes significant share in cashew production and cashew processing. It is a fast growing, hardy and drought resistant multipurpose crop. The trees produce fruits when they are about 4 years old and maximum production is from 10 to 30 years. Trees are also suitable for use in the rehabilitation of degraded lands, afforestration of barren, slash-and burned farmland and coastal saline sandy lands. The trees are easily cultivated, vigorous and require little care. The prospects for cashew plantations are very good due to domestic and international demand for cashew tree products. The main producing countries are Brazil, India, Mozambique and Tanzania. Limiting factors for the species are the inability to tolerate frost and extreme cold for a long time, reduction of nut yields due to anthracnose fungal disease and the damaging effect of heavy rain during the flowering period. The highest productivity is observed in Kerala and Maharashtra with over one ton per ha. The higher yields in Maharashtra are primarily due to the fact that cashew production is of recent origin and the major part of the plantations have been established with high yielding clonal material. The major States in India in which cashew are cultivated are Kerala, Karnataka, Goa, Maharashtra, Tamil Nadu, Andhra Pradesh, Orissa and West Bengal. Economics and marketing of cashew production activities are important part in this region. The changing trend of agriculture from subsistence to commercial cultivation affects the agricultural land use and economic viability of cashew cultivation. It is a rich source of protein (21.2%), carbohydrates (22%), fat (47%) and minerals (Calcium, Phosphorous and Iron) (Sharma, 2004) and provides 575 kcal of energy per 100 g (Sathe, 1994). As a delicacy, cashew is used in confectioneries, breakfast cereals, health foods, baked goods and as adjuncts in chocolate manufacture. Besides being known as an edible nut, cashew is also known to possess therapeutic value, the potential to treat several common diseases including scurvy, anemia, cough, urinary complications, liver disorders and diabetes. Its role in treating cardiovascular diseases and obesity is due to the high content of unsaturated fatty acids (Yang *et al*., 2009).

However, due to change in climate and increasing plantation area in the Konkan region, the cashew crop was affected by several diseases. Among these, leaf blight disease is becoming a serious problem. It is caused by *Phomopsis anacardii*. The disease was observed on young leaf tissues of cashew. Angular lesions, dark tan

with a dark reddish brown margin were formed on leaves. Lesions subsequently enlarge and coalesce causing blighting and defoliation. Older lesions become papery, silver/grey in colour and develop shot-holes.

Hence, by keeping this view in mind, the present study was carried out at Regional Fruit Research Station, Vengurle by using different fungicidal treatments.

Materials and Methods

The experiment was conducted at Regional Fruit Research Station, Vengurle during 2014-15 on Vengurla-4 cultivar of cashew with eight treatment and three replications in Randomized Block Design. The young vegetative grown plants were selected and sprayed thrice with respective fungicide as per the treatments. The first spray was given before the onset of monsoon *i.e.* last week of May and subsequent sprays were given at one month interval. The sticker Sandevit was added during rainy season. Observations on leaf blight were recorded 10 days after last spray using 0-5 scale as follows.

0 - No incidence
1 - 1-20% incidence
2 - 21-40% incidence
3 - 41-60% incidence
4 - 61-80% incidence
5 - 81-100% incidence

Per cent Disease Index (PDI) was calculated by using the formula:

$$PDI = \frac{\text{Sum of all numerical ratings}}{\text{No. of panicles observed} \times \text{Maximum rating}} \times 100$$

The commercially available fungicides *viz*. copper oxychloride (0.3%), carbendazim + mancozeb (0.2%), benomyl (0.2%), tricyclazole (0.1%), thiophanate methyle (0.1%), mancozeb (0.2%) and carbendazim (0.1%) at various concentrations were used.

Results and Discussion

The data presented in table revealed that all the treatments were found significantly effective in controlling leaf blight disease of cashew. The fungicides *viz*. Tricyclazole (0.1%) and Carbendazim + Mancozeb (0.2%) were recorded 9.56 and 10.16 per cent disease index, respectively and found significantly superior over rest of the treatments and were equally effective. Next in the rank were Thiophanate methyl (0.1%), Carbendazim (0.1%) and Copper oxychloride (0.3) which were recorded 11.30, 12.58 and 12.89 per cent disease index, respectively and found at par with each other. These were followed by Benomyl (0.2%) and Mancozeb (0.2%) (table 1).

Kumar (2012) reported that spraying twice with Carbendazirn (Bavistin 0.1%) at 15 days interval during flowering controls blossom infection. Spraying of copper fungicides (0.3%) is recommended for the control of foliar infection. Postharvest disease of mango caused by anthracnose could be controlled by dip treatment of fruits in Carbendazim (0.1%) in hot water at 52^0C for 15 minutes. Suharban *et al*. (1985) reported that fungicidal treatments were the most suitable and ecofriendly for management of mango anthracnose on foliage as well as on blossom. According to the Sundravadana and his coworkers studied the efficacy of Azoxystrobin of *Colletotrichum gloeosporioides* Penz. on growth and sporulation of anthracnose on blossom and had reported that panicles were completely free from anthracnose or blossom blight of mango.

Table 1 : Efficacy of different fungicides against leaf blight of cashew.

Tr. no.	Treatment/Fungicide	Conc. (%)	Per cent disease index (PDI)
T_1	Copper oxychloride (Green coper)	0.3	12.89 (21.04)*
T_2	Carbendazim + Mancozeb (Saaf)	0.2	10.16 (18.58)
T_3	Benomyl (Benlate)	0.2	16.84 (24.21)
T_4	Tricyclazole (Beam)	0.1	9.56 (17.99)
T_5	Thiophanate methyle (Roko)	0.1	11.30 (19.63)
T_6	Mancozeb (Bilzeb)	0.2	18.19 (25.22)
T_7	Carbendazim (Bavistin)	0.1	12.58 (20.75)
T_8	Control	-	21.76 (27.76)
	SE ±	-	**1.126**
	CD at 5%	-	**2.417**

*Figures in parenthesis indicated arcsine transformed values.

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