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Impact of Different Factors on the process of Leaf Spot Disease in Mulberry

Pudi Nageswarara Rao[1], B. Sujatha.[2]
[1]*MSc, Mphilin BOTANY, Andhra University*
[2]*M.Sc., PhD, Professor in Botany, Andhra University , Vishakapatnam, Andhra Pradesh.*

Abstract: ***The effect of temperature, relative mugginess, adjusted compost, and plant spacing on the improvement of Cercospora moricola leaf spot disease in mulberry was investigated. At the point when the external temperature and relative dampness were 25-30 oC and more than 80%, disease advancement was at its top in August and September. The impacts of adjusted manure and plant spacing on disease advancement were additionally investigated, and they uncovered a critical effect on disease seriousness. Disease seriousness was decreased by 6-8 percent when a reasonable dose of NPK compost was applied. As opposed to unequal manure application in the dirt, adjusted compost treatment brought about decreased leaf microorganism infection. Close plant spacing (60 cm) was additionally demonstrated to be more helpful for disease advancement than distance spacing (90 cm).***
Keywords: Cercospora moricola, Environment, Leaf Spot, Mulberry, Cercospora moricola.

I. INTRODUCTION

Since silk creation is reliant upon the wholesome nature of the leaves, which is hindered by disease attack, the mulberry (Morus sp.) plant is a significant financial plant. Leaf spot, bacterial scourge, leaf mosaic, fine mold, leaf rust, stem ulcer, violet rootrot, white rootrot, root hitch, and dwarfing are the most predominant mulberry diseases (Reddy et al., 2009; Shree and Nataraj, 1993). These microorganisms are the essential driver of a critical decrease in mulberry leaf creation and dietary benefit. Feeding the silkworm debilitated leaves adversely affects the silkworm's wellbeing and casing creation, both as far as quality and amount (Datta, 2010). The lessening in leaf yield is because of an absence of continuous and extensive examination on the leaf spot disease and flare-ups (Ghoes et al., 2010).

Temperature and stickiness of the air, amount of rainfall, soil temperature, wetness, and fruitfulness are the natural factors that greatestly affect the beginning and movement of infectious plant disease. These factors sway disease improvement by influencing the host's development and affectability, the microbe's increase and movement, or the host-microorganism interaction, which influences the intensity of manifestation advancement (Agrios, 2005). Mulberry is helpless to an assortment of diseases (Reddy et al., 2009; Sharma et al., 1993). During the long stretches of July to September in Bangladesh, the most serious disease is leaf spot disease brought about by Cercospora moricola Cooke (Ghoes et al., 2010). This disease causes serious defoliation, and most business cultivars are supposed to be powerless (Sikder and Krisnaswami, 1980). According to Siddaramaiah and Hegde (1990), the seriousness of infection brought about by C. In mulberry leaves, moricula drove in increased nitrogen and phosphorus levels yet diminished potash levels. Cercospora infection causes changes in biochemical parts like amino acids, phenols, and sugars, which may adjust the nature of mulberry leaves, according to the scientists. At the point when the temperature goes from 20 to 28oC and there is 36 to 72 hours of continuous encompassing soddenness, the most serious danger of infection exists (Nelson, 2008). Mugginess upgrades the deliciousness of host plants, making them more defenseless to microbes, affecting the expansiveness and seriousness of disease (Agrios, 2005). Cercospora leaf spot infections have infested mulberry manors because of the brutal climatic conditions. Thus, there is nothing more significant than establishing a solid ranch in request to deliver top notch leaves. The impacts of manure and plant spacing on the arrangement of mulberry leaf spot have not been investigated in Bangladesh. Considering the abovementioned, the momentum research examined the impacts of air temperature and relative moistness, adjusted manure and nitrogen compost application to the dirt, and plant spacing on the improvement of leaf spot disease in mulberry.

II. MATERIALS AND PROCEDURES

The level of leaf infection and disease index were examined at one month intervals from April to September of the years 2004 to 2006 in request to survey the effect of temperature and relative stickiness (RH) on the advancement of leaf spot disease in mulberry (Table 1). Three low profile mulberry plots in three distinct destinations of Bangladesh Sericulture Research and Training Institute, Rajshahi, were picked for the examination. A sum of 15 plants were looked over each plot to consider disease incidence. The plot was 20 by 20 meters in size, with a 120-centimeter plant-to-plant spacing.

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The improvement of disease under ordinary natural conditions was investigated. A three-year showcased low profile mulberry assortment plot, BM-1, BM-2, BM-3, and BM-4, was picked to investigate the effect of a fair dose of NPK manure on the improvement of leaf spot disease. Plant to plant and column spacing were 120 cm and 90 cm, individually, with a plot size of (20 15) m. The plot was parted into two areas, with the first receiving a decent NPK compost measurements of 300:150:100 kg/ha and 15000 kg/ha of natural manure. Just 15000 kg/ha of natural compost was utilized in the other region. Other social practices were given to the two areas depending on the situation. In a single day, the entirety of the plants were managed. Conidial suspension of C. elegans following 30 days of trimming Moricola was sprinkled equitably on the entirety of the plants, allowing them to develop appropriately. The level of leaf infection and disease index (DI) were estimated following 30 days after conidial spraying (Table 2). A high shrubbery mulberry plot was developed with three distinct spacings to investigate the effect of plant spacing on the advancement of leaf spot disease (Table 3); in one plot, the plant to plant and column to push distance was 60 cm.

The distances in the subsequent plot were 60 and 90 cm, individually. The distance in the third plot was 90 cm. The crown statures of the relative multitude of plants were kept at 75 cm at different spacings. This examination used high shrub plants that were two and three years of age. In a single day, every one of the three spacings of plants were managed. During the wet a very long time of June, July, and August, the plants were permitted to get naturally infected. Disease improvement was examined following 80 days of trimming. Leaf infection (%), plant stature, percent disease index (DI), and leaf yield of mulberry against leaf spot disease were investigated in this exploration. All out quantities of wiped out and solid leaves were recorded in three long brabranches of each plant in all instances to figure the disease index (DI) using Siddaramaiah et algrading .'s method (1978).

A. Technique for Grading

0 indicates there is no infection (Healthy)
I approaches 1–5%
6 to 25% of the aggregate
26-50 percent of the time
51-75 percent IV
V fluctuates somewhere in the range of 76 and 100%

As far as disease seriousness, the Disease Index (DI) was processed using the following equation: multiple times the amount of mathematical qualities Total number of evaluated leaves duplicated by most extreme grading in 5

The mathematical qualities were determined by multiplying the quantity of leaves by their grade. The entirety of the examinations were led in three replications, with the normal findings obtained. Using Microsoft Excel programming, the DI information were changed over to rakish qualities, and factual investigation was performed. At the point when LSD was processed, the resulting 'F' values were huge at the 5% level (Sendecor and Cochran, 1980).

III. FINDINGS AND DISCUSSION

Temperature and dampness were accepted to be the climatic factors that fundamentally affected the time and seriousness of disease infection. Table 1 shows the impacts of temperature and relative dampness on the improvement of the mulberry leaf spot disease.

Table 1. Effect of temperature and relative humidity on the development of leaf spot disease.

Month	Average temperature (°C)			Average relative humidity (%)			Infection (%)			Disease index (%)		
	Year											
	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006
April	29.41	30.11	28.39	50.11	46.63	59.03	19.20	17.10	18.70	7.33	6.54	7.00
May	29.71	29.48	28.68	77.48	66.62	73.90	18.90	24.20	24.40	7.10	8.70	9.11
June	29.46	30.44	29.26	83.94	73.79	81.01	29.80	31.70	29.60	8.24	12.60	10.60
July	29.21	28.75	29.36	84.40	85.93	83.54	30.00	36.70	34.50	9.52	15.22	12.73
Aug.	29.54	29.4	29.31	85.38	82.40	86.43	44.50	42.10	41.20	18.30	17.40	16.50
Sept.	28.61	28.78	25.46	89.26	88.26	87.23	50.62	52.70	51.79	21.60	23.50	20.80

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Temperatures between 25 to 30 degrees temperature and relative dampness of over 80% were displayed to support the disease's turn of events. During the long periods of June, July, August, and September, when the normal temperature and relative mugginess were somewhere in the range of 25 and 30 degrees Celsius and 80 percent and higher, disease spread rapidly. Albeit the disease was found in April, it didn't advance as fast as it did from June to September. When there was a great deal of dampness and normal showers, trailed by warm and muggy climate, leaf spot disease turned out to be very serious. Cercospora infection and ensuing injury arrangement in sugar beets were found to require air relative mugginess >95 percent or leaf wetness (Wolf and Verreet, 2005). The effect of temperature and dampness term on Cercospora arachidicola infection of three nut cultivars has been archived (Wu et al., 1999). Cercospora conidia, according to Alderman and Beute (Alderman and Beute, 1986), require aTemperatures of 16 to 25 oC are ideal for germinating in a soaked climate. At a general stickiness of 94.5 percent, germ tubes prolonged. The main factors for Cercospora infection on mulberry leaves, according to this examination, are temperature and relative stickiness.

Table 2. Effect of balanced fertilizer on the development of leaf spot disease.

Treatment	BM-1		BM-2		BM-3		BM-4	
	Leaf infection (%)	Disease index (%)	Leaf infection (%)	Disease index (%)	Leaf infection (%)	Disease index (%)	Leaf infection (%)	Disease index (%)
NPK Organic fertilizer	26.82 ± 0.537	7.69 ± 0.526	28.54 ± 0.687	7.77 ± 0.0366	29.82 ± 0.433	6.94 ± 0.397	25.36 ± 0.852	5.72 ± 0.473
Nil Organic fertilizer	37.12 ± 0.515	12.46 ± 0.325	32.6 ± 0.325	10.67 ± 0.32	36.57 ± 0.497	9.97 ± 0.412	33.12 ± 0.523	9.57 ± 0.08
C.D. at 5% level	2.982	1.903	3.031	2.376	3.886	2.316	3.886	1.952

Table 2 shows the impacts of a reasonable compost measurement of 300 kg/ha, 150 kg/ha, and 100 kg/ha of NPK with 15000 kg of natural manure/ha on the improvement of leaf spot disease in mulberry. As opposed to lopsided compost treatment, this exploration uncovered that decent manure application diminished disease infection and seriousness in each of the four sorts BM-1, BM-2, BM-3, and BM-4. The meaning of compost application for improved creation and top notch mulberry leaves is broadly perceived. It was shown that applying nitrogen and phosphate compost to the dirt increased ailment incidence and diminished disease advancement (Sharma, et al., 1993). The photosynthetic proficiency of chlorophyll atoms is more noteworthy than that of sound plants that are not given adjusted compost. For improved creation of excellent mulberry leaves, NPK is basic. It helps in the decrease of chlorophyll breakdown induced by ailment.

Table 3. Effect of plant spacing on the development of leaf spot disease due to *Cercospora moricola*

Plant spacing (cm)	Leaf infection (%)	Disease index (%)	Leaf yield/plant (g)
60 × 60	37.89 ± 0.242	11.03 ± 0.191	265.43 ± 0.654
0 × 90	33.9 ± 1.017	9.03 ± 0.22	290.3 ± 1.616
90 × 90	28.94 ± 0.691	7.99 ± 0.098	302.37 0.092
C.D. at 50% level	1.387	0.274	14.789

Table 3 portrays the movement of leaf spot disease at different plant spacings. In this exploration, more noteworthy plant spacing was displayed to lessen the advancement of leaf spot disease when contrasted with tight spacing. Tight plant spacing of 60 cm brought about disease advancement of 37.89 percent with lower leaf yield, while more extensive plant spacing of 60 90 cm and 90 cm brought about disease improvement of 33.90 and 28.98 percent with more prominent leaf yield, individually. Plants with tight spacing additionally had higher disease seriousness, which might be ascribed to diminished temperature, air development, and light in the middle of the thick plant populace.

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Plant spacing was diminished on the grounds that it increased moistness and decreased light, resulting in a reduction in air course. It was found that different agronomical strategies, like spacing, crown stature, and harvesting strategy, come about with more prominent disease incidence (Sharma et al., 1993). In the entirety of the sicknesses they took a gander at, more tight spacing (60 x 60 cm) brought about a significantly more prominent disease incidence (leaf spot, fine buildup and leaf rust). Disease incidence in various yields is influenced by agronomical patterns like spacing treatment and water system.

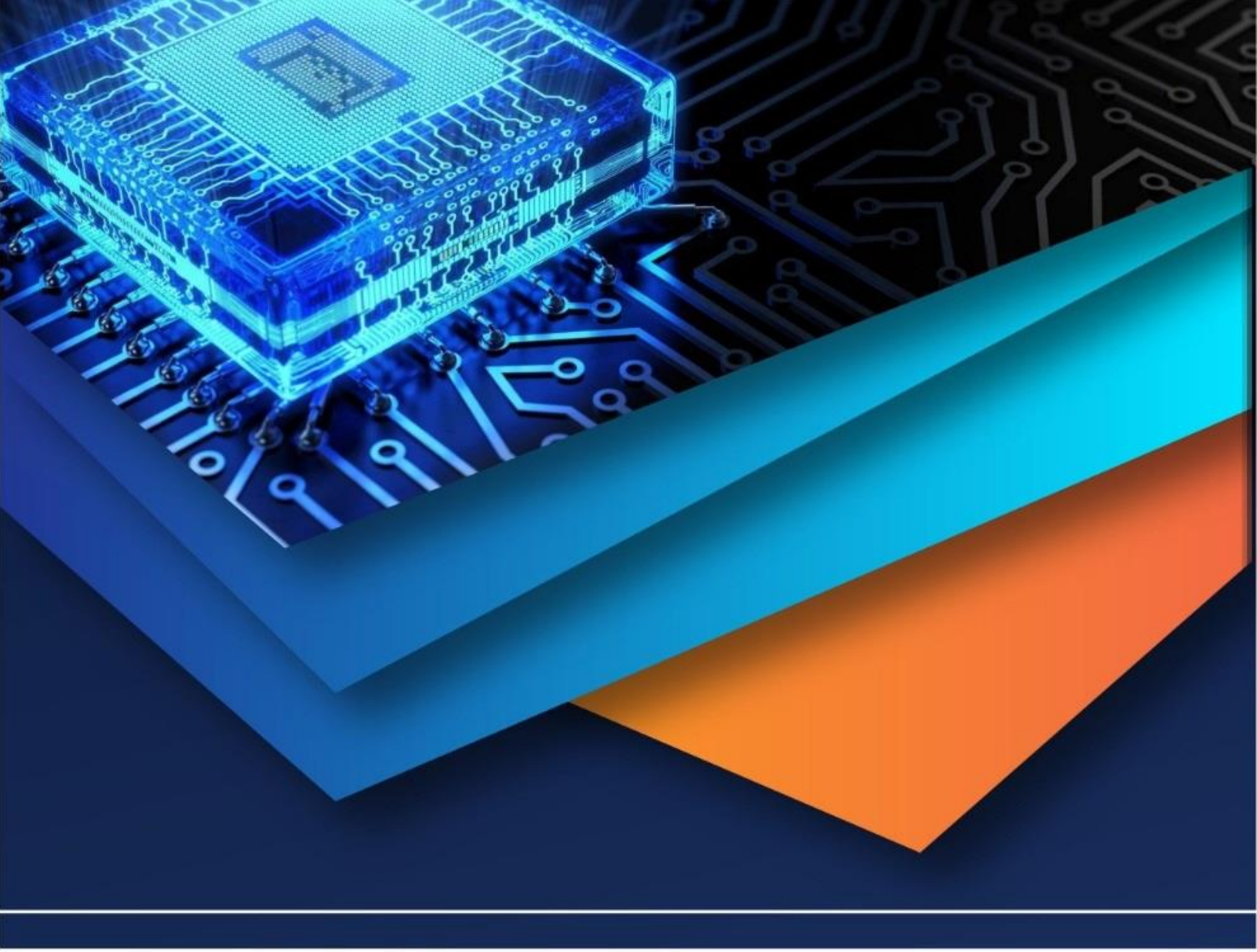
IV. CONCLUSION

According to the findings, ranchers might be informed about the possible development and spread of the mulberry leaf spot disease so that proper disease control can be carried out. To control the seriousness of the disease, information about the meaning of NPK and suitable portions of natural manure, just as ideal plant spacing, are likewise important to further develop silk creation.

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