The Pharma Innovation Journal 2021; 10(11): 1165-1167

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2021; 10(11): 1165-1167

www.thepharmajournal.com
Received: 11-08-2021
Accepted: 29-09-2021

Rajaswaminathan Vairavan
Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

Latha Paramanandham
Department of Cotton, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

Harish Sankarasubramanian
Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

Kalaiselvi Thangavel
Department of Agricultural Microbiology, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

Corresponding Author:
Rajaswaminathan Vairavan
Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

Survey on fungal leaf spot complex in cotton at different locations of Tamil Nadu

Rajaswaminathan Vairavan, Latha Paramanandham, Harish Sankarasubramanian and Kalaiselvi Thangavel

Abstract
Cotton leaf spots are caused by various fungal pathogens, which are ubiquitous. These fungal leaf spots lead to a 30% loss of cotton production. To assess the disease incidence in Tamil Nadu, a survey was conducted to calculate the per cent disease index (PDI) for the leaf spot disease present in different locations of Tamil Nadu. PDI was calculated for the fungal leaf spot disease present in the cotton crop at 18 different locations from Coimbatore, Tiruppur, Dindigul, Madurai, Virudhunagar, and Permabalur districts. The PDI of the leaf spot disease varied between a range of 8.5-19.8. The highest PDI of 19.8 was recorded at Arasaappapillaipatti village of Dindigul district. The least PDI recorded was 8.5 at K. Kallampatti village of Madurai district. The major fungal leaf spot disease observed were *Alternaria* leaf spot, *Myrothecium* leaf spot, and *Cercospora* leaf spot. The occurrence of leaf spot in different locations expressed the presence of disease prevalence in Tamil Nadu, and strategies need to be taken to manage further disease spread.

Keywords: Cotton, fungal leaf spot, Tamil Nadu, pre cent disease index (PDI)

1. Introduction
Cotton (*Gossypium* sp.) is the most ancient and essential commercial crop next to food grains. Sixty percentage of the clothing in India is made from cotton. India is ranked number one in the top 10 cotton-producing countries, followed by China (USDA, 2021). In India, the area of cotton is 37.5% of the global share. There are nine major cotton-growing states which come under three zones: North Zone (Haryana, Punjab, and Rajasthan), Central Zone (Madhya Pradesh, Maharashtra, and Gujarat), and the Southern Zone (Andhra Pradesh, Karnataka, and Tamil Nadu) (Blaise and Kranthi, 2019) [1].
The cotton-growing area in Tamil Nadu is 1.28 lakh hectares with a production of 6 lakh bales (2019-20). Virudhunagar district (0.194 lakh ha) leads the state in the area of cotton cultivation, followed by Perambalur (0.139 lakh ha) (Source: Department of Economics and Statistics, Government of Tamil Nadu, 2020). The full potential of cotton production has not been exploited due to several biotic and abiotic factors.
The crop is affected by many fungal diseases, among which foliar diseases cause severe loss of yield. Indian cotton fields are previously reported to be affected by different fungal leaf spot diseases, such as;

- *Alternaria* leaf spot (*Alternaria altenata, Alternaria macrospora*)
- *Cercospora* leaf spot (*Cercospora gossypina*)
- *Myrothecium* leaf spot (*Myrothecium roridum*)
- *Corynespora* leaf spot (*Corynespora cassicola*)
- *Helminthosporium* leaf spot *(Helminthospotium spiciferum*)

(Sandipan *et al.*, 2019) [6]. The major cotton growing areas in Tamil Nadu are to be surveyed for the incidence of fungal leaf spot diseases, which will give researchers and extension workers inputs to concentrate on areas where the incidence is predominant and unravel the factors responsible for the incidence. Hence, a survey of major cotton growing areas in Tamil Nadu was surveyed, and the observations are discussed in the paper.

2. Materials and Methods
Fungal leaf spots were observed in major cotton-growing areas of Tamil Nadu.

A survey was conducted in 6 central cotton-growing districts: Coimbatore, Tiruppur, Dindigul, Madurai, Virudhunagar, and Permabalur from December to March 2020-21. The cotton fields were selected randomly. The plants in the field were chosen randomly by selecting at least 50 plants, and the severity of the leaf spot complex was recorded. The per cent disease index was recorded for the general leaf spot disease present and not specific to the pathogen. Plant showing the leaf spot symptoms were scored as per the severity grade of 0-4;

Disease Grade	Description
0	No infection
1	Less than 5% of leaf area covered
2	6-20% of leaf area covered
3	21-40% of leaf area covered
4	More than 40% of leaf area covered

The per cent disease index was calculated as per the methodology suggested by Sheo Raj (Raj, 1988) [5] and Kaloo (1995) using the following formula,

$$\text{Per cent Disease Index (PDI)} = \frac{\text{Sum of all individual ratings}}{\text{Total number of leaves obtained}} \text{ X } \frac{100}{\text{Maximum grade obtained}}$$

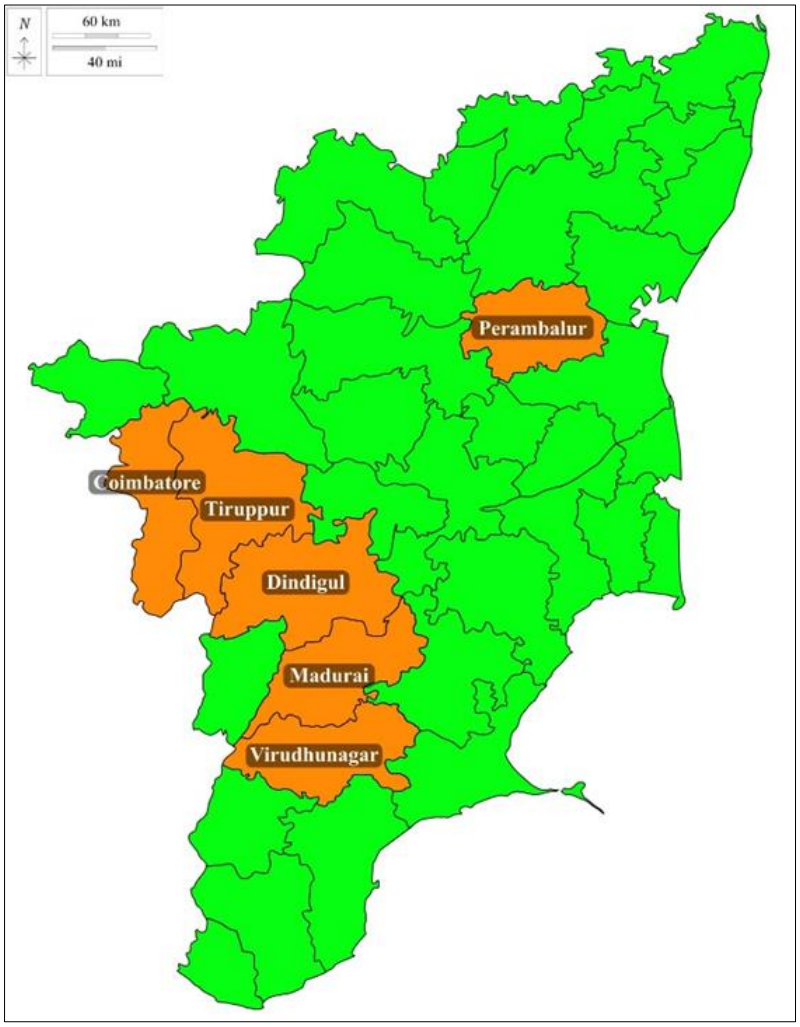

Fig 1: Districts of Tamil Nadu where the fungal leaf spot disease occurrence in cotton was surveyed

3. Results and Discussion

Srinivasan and Kannan were the first to report fungal leaf spot occurrences in South India (1974). The leaf spot pathogens may cause a reduction in seed germination, delayed emergence, and defoliation. In India, 30 percent of losses were caused by leaf spot diseases (Monga *et al.*, 2011) [4], and 60 percent in Brazil (Meyer *et al.*, 2006) [3].

The survey was conducted in different cotton-growing areas in Coimbatore, Tiruppur, Dindigul, Madurai, Virudhunagar, and Perambalur districts of Tamil Nadu. The severity was assessed by using a 0-4 disease score scale. The PDI ranged from 8.5-19.8. The maximum disease was observed at Arasappapillaipatti (19.8 PDI) of Dindigul district and was followed by Veppanthattai of Perambalur district (16.5 PDI). A minimum PDI of 8.5 was documented at K. Kallampatti of Madurai district. Major disease symptoms observed were *Cercospora*, *Alternaria*, and *Myrothecium.*

The percent disease incidence for *Alternaria* leaf spot in the Coimbatore district was 17.05 (avg.) (AICCIP, 2004-05), which is quite comparable to the PDI determined in this study (15.4). The *Alternaria* leaf spot disease index was 19.00 in the Dharwad district of Karnataka (Chattannavar *et al.*, 2010) [2]. In recent years, there have not been many surveys on the occurrence of *Myrothecium* leaf spot. In 2019, *Cercospora* leaf spot severity was 20.37% in the Raichur district in Karnataka, where the severity of *Alternaria* was found to be 6.96%.

Table 1: Survey for fungal leaf spot complex present in major cotton areas of Tamil Nadu

S. No.	Location	District	GPS Coordinates	Percent Disease Index (PDI)*
1	Thottipalayam	Coimbatore	11° 04’ 39.3” N, 76° 55’ 31.2” E	15.4[d]
2	Kondayampalayam		11° 14’ 22.5” N, 76° 55’ 12.2” E	13.2[f]
3	TNAU Farm		11° 01' 11.0" N, 76° 55' 38.4" E	17.5[b]
4	Varapalayam	Dharapuram	10° 46’ 51.7” N, 77° 30’ 2.6” E	10.8[h]
5	Vadaparuthiyur		10° 40’ 0.5” N, 77° 37’ 3.4” E	12.5[g]
6	Karisalpatti	Dindigul	10° 21' 13.5" N, 77° 51' 34.8" E	9.4[jk]
7	Tettupatti		10° 24' 50.5" N, 77° 48' 48.0" E	10.2[i]
8	Koonur Pirivu		10° 20' 51.5" N, 77° 52' 48.7"E	8.9[kl]
9	Reddiar Sathiram		10° 25' 23.2" N, 77° 52' 55.2" E	12.7[fg]
10	Arasaappapillaipatti		10° 28' 23.2" N, 77° 42' 53.2" E	19.8[a]
11	Virupatchi		10° 28' 04.2" N, 77° 42' 22.2" E	10.1[i]
12	Kallupatti	Madurai	09° 42' 08.7" N, 77° 49' 42.5" E	9.7[ij]
13	Kadaneri		09° 42' 14.8" N, 77° 49' 46.8" E	10.2[i]
14	Melavalasai		10° 00' 10.0" N, 78° 23' 14.5" E	11.3[h]
15	K. Kallampatti		10° 06' 28.9" N, 78° 20' 43.6" E	8.5[l]
16	Kalkurichi	Virudhunagar	09° 36' 00.8" N, 78° 05' 51.1" E	10.8[h]
17	Thiruvilliputhur		09° 30' 12.3" N, 77° 38' 40.4" E	13.8[e]
18	Veppanthattai	Perambalur	11° 21' 5.1" N, 78° 48' 15.7" E	16.5[c]

SE (d) = 0.256, C.D. = 0.521
*Mean of three replications
In a column, any two means having a common letter is not significantly different at the 5% level of DMRT

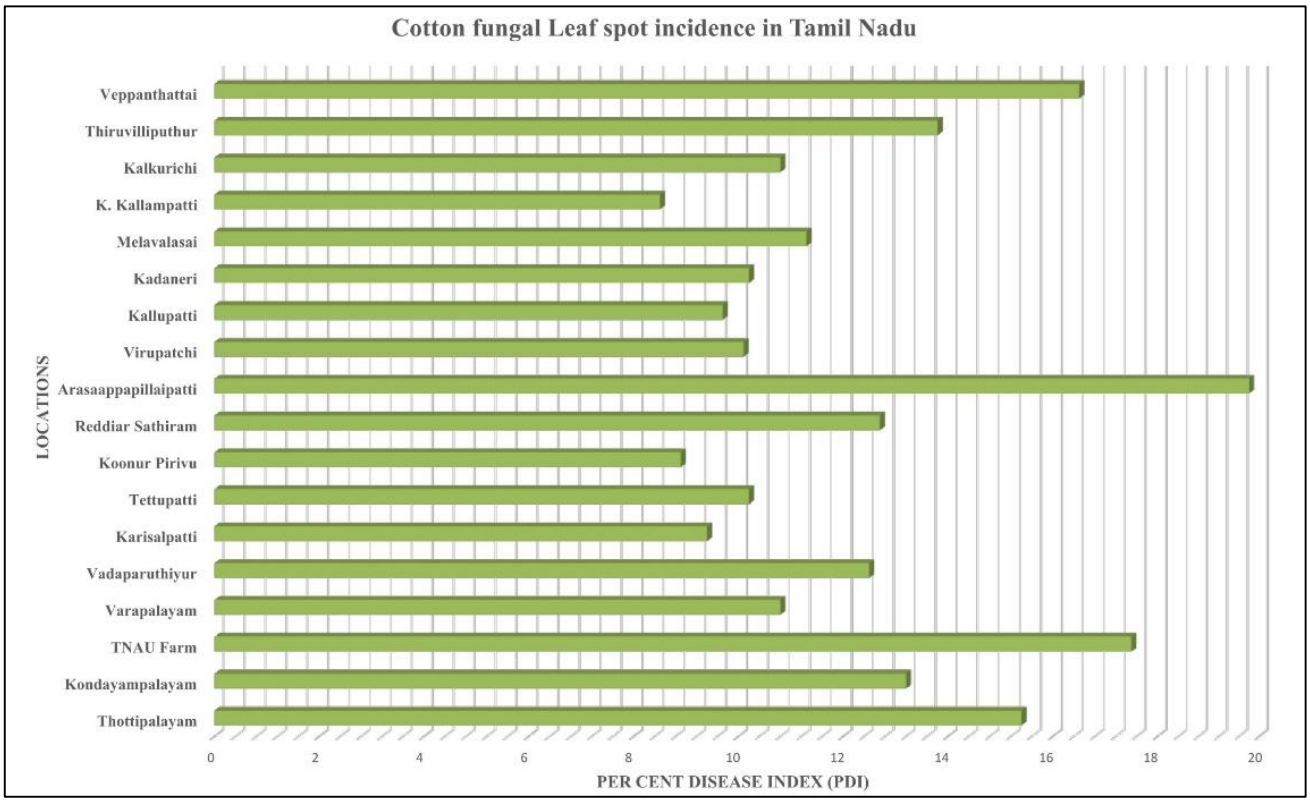

Fig 2: Fungal leaf spot disease PDI in different locations of Tamil Nadu

4. Acknowledgment
Supported by Department of Plant Pathology and Department of Cotton, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

5. References
1. Blaise D, Kranthi K. Cotton production in India. Cotton Production, Wiley 2019, 193-215.
2. Chattannavar S, Hosagoudar G, Ashtaputre S. Crop loss estimation due to foliar diseases in cotton. Karnataka J Agric. Sci 2010;23(4):602-605.
3. Meyer MC, JCD Silva, Maia GL, Bueno CJ, Souza NLD. "Myrothecium leaf spot of cotton caused by Myrothecium roridum. Summa Phytopathologica 2006;32(4):390-393.
4. Monga D, Kranthi K, Gopalakrishnan N, Mayee C. Changing scenario of cotton diseases in India-the challenge ahead. World Cotton Research Conference-5, Mumbai, India, 2011.
5. Raj S. "Grading for cotton disease, CICR, Nagpur. Bull: 1988, 1-7.
6. Sandipan PB, Patel R, Faldu G, Patel D. "Status of Different Diseases of Cotton under South Gujarat Region of India. Int. J Curr. Microbiol. App. Sci 2019;8(10):2651-2657.