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SURVEY ON THE INCIDENCE OF SESAME LEAFHOPPER AND PHYLLODY IN MAJOR GROWING DISTRICTS OF SOUTHERN ZONE OF ANDHRA PRADESH, INDIA

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ABSTRACT

The present investigation was conducted to study the incidence of sesame phyllody disease in major sesame growing areas in Southern Zone of Andhra Pradesh (Y.S.R, Tirupati and Nellore districts) which revealed that the sesame phyllody incidence ranged from 19.18 to 25.47 per cent in Nellore and Y.S.R. districts. In Y.S.R district, the survey was conducted in 3 mandals. Among them, the highest average per cent disease incidence was observed in Kamalapuram mandal (27.35 per cent) and the lowest average per cent disease incidence (19.9 per cent) was recorded in Chapadu mandal. In Nellore district the survey was conducted in 3 mandals. Among them, the highest disease average per cent disease was observed in Kaligiri mandal (20.1%) and the lowest percentage in kaligiri mandal (16.25%) respectively. The infected plants shown different symptoms such as phyllody, floral virescence *etc.* In order to know the population dynamics of leafhopper transmitting sesame phyllody, a study was conducted at V.N. Palli mandal in Y.S.R districts during *rabi* 2023. Studies on the relative abundance of different leaf hoppers found in sesame ecosystem revealed that *Orosius albicinctus Distant* was the most abundant species found in sesame field with 6.94 per cent..

KEYWORDS: Incidence, leafhopper, phyllody.

INTRODUCTION

Sesame (*Sesame indicum* L.) is the oldest indigenous oilseed crop and popularly known as “Queen of oilseeds”. In India sesame is cultivated in an area of 19.47 lakh ha with a production of 8.66 lakh tones (FAOSTAT). India ranks third in sesame production and second in area. The crop of sesame mainly grown in arid and semi - arid regions such as Madhya Pradesh, Gujarat, Rajasthan and Uttar Pradesh. However highest sesame producing state is West Bengal. A well-managed crop of sesame can yield 1200-1500 kg/ha under irrigated conditions and 800-1000 kg/ha under rainfed conditions. Sesame is affected by several diseases bacterial, fungal and phytoplasma diseasesincluding powdery mildew, phyllody, Cercospora leaf spot, Alternaria leaf spot, root rot, and phytopthora blight. In most areas where sesame is grown, phyllody is the most important disease and the cause of a significant reduction in sesame production (Manjunatha *et al.,* 2012). Sesame phyllody has been linked to yield losses of up to 34.0 per cent, or 100.00 per cent in extreme cases (Sarwar and Haq, 2006). Initially, it was thought that the virus was the source of the disease, but a later study identified it as "mycoplasma like organisms" (MLOs), referred to as phytoplasmas (Das and Mitra, 1998). The term "Green flowering disease" was applied to sesame phyllody when it was initially discovered in Burma, or Myanmar (McGibbon, 1924). Subsequently, it emerged in India as a plant exhibiting symptoms resembling phyllody, which has been called sepaloidy and stenosis (Kashiram, 1930). Phyllody means transformation of flowers into green leaf like structures. It is mainly occurred by sap sucking insect vectors belonging to the families Ciccadellidae (Leafhoppers) and Fulgoridae (Planthoppers). In addition to the insect vectors, the disease can be transmitted by the parasitic dodder and grafting of infected material to healthy plant, but it is not transmitted through sap and seed (Gogoi *et al.,* 2017). In recent years, the production of sesame has faced significant constraints from Sesame phyllody in the southern regions of Andhra Pradesh. A research and a survey was conducted to determine the incidence of sesame phyllody and the population dynamics of leafhopper vector.

MATERIAL AND METHODS

Survey on the incidence of sesame phyllody

To know the occurrence and distribution of sesame phyllody, a roving survey was conducted in Y.S.R, Tirupati and Nellore districts of Southern zone of Andhra Pradesh during *rabi*2023. The mandals covered under roving survey in Y.SR districts were V.N. Palli, Kamalapuram and Chapadu mandals. In Tirupati district, K.V.B. Puram, Vadamalapeta, and Gollapalle mandals were surveyed and in Nellore Chegarla, Atmakur and

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Table 1. Incidence of sesame leafhopper recorded in major sesame growing districts of Andhra Pradesh

District	Mandals	Village	Variety	Age of the crop	Stage of the crop	Leafhopper population	Village mean	Per cent disease incidence
Y.S.R	V.N. Palli	Indukur	YLM-66	60 days	Flowering	6.87	5.71	29.16
		Lingala	YLM-66	55 days	Capsule maturity stage	6.94		
	Kamlapuram	Koduru	YLM-66	55 days	Flowering	5.41	7.04	27.35
		Thippaluru	YLM-66	50 days	Capsule maturity stage	6.27		
	Chapadu	Kethavaram	YLM-66	55 days	Flowering	5.98	5.84	19.92
		Alladaplle	YLM-66	60 days	Flowering	5.42		
Tirupati	K.V.B Puram	Anjuru	Til-6	55 days	Flowering	4.33	3.29	24.13
		Subramanyapuram	Til-6	50 days	Flowering and capsule	4.62		
	Vadamalapeta	Boyalagadda	Til-6	55 days	Flowering	5.42	2.65	22.73
		Gollakandriga	Til-6	50 days	Flowering	5.86		
	Gollapalle	Inagaluru	YLM-66	55 days	Flowering	4.18	3.51	22.73
		Kalavagunta	YLM-66	60 days	Flowering	4.56		
Nellore	Chegarla	Chittalur	YLM-66	50 days	Flowering	3.53	4.47	16.25
		Kandriga	YLM-66	55 days	Flowering	3.06		
	Kaligiri	Velagapadu	YLM-66	50 days	Flowering	2.89	5.64	21.24
		Masthanapuram	YLM-66	45 days	Flowering	2.34		
	Atmakur	Chittalur	YLM-66	60 days	Flowering	3.87	4.37	20.06
		Kandrika	YLM-66	55 days	Flowering	3.15		

Kaligiri mandals. The diagnosis of the disease in the field was based on the symptoms on the plant. The per cent disease incidence was recorded by selecting 10 rows in the field and by counting the total number of plants and number of plants showing phyllody disease symptoms using the formula given below

Per cent disease incidence =

$$\frac{\text{Number of diseased plants}}{\text{Total number of plants}} \times 100$$

RESULTS AND DISCUSSION

The mean population of sesame leafhopper was 5.71, 7.04, 5.84 leafhopper/plant in Chapadu, V.N.Palli , Kamalapuram mandals in Y.S.R. District respectively. However, in Nellore District the mean population of sesame leafhopper was 3.29, 2.65 and 3.51 leafhoppers per plant in Chegarla, Kaligiri, and Atmakur mandals respectively. In Tirupati District the mean population of sesame leafhopper was 4.47, 5.64 and 4.37 leafhoppers per plant in K.V.B puram, Vadamalapeta and Gollapalle mandals respectively. (Table 1)

Among the districts surveyed, the highest mean number of sesame leafhoppers of 6.2 per cent was recorded in Y.S.R District and lowest of 3.1 per plant was recorded in Nellore district.

A total of 18 villages were surveyed, 6 villages in Y.S.R district and 6 villages in Tirupati district and 6 villages in Nellore district were covered. In the field, the diagnosis was done based on the symptoms on plants. The disease incidence of sesame phyllody ranged from 0 to 29.16 per cent in Y.S.R, Tirupati and Nellore districts. Among the three districts, Y.S.R district, V.N. Palli mandal recorded highest mean disease incidence of (29.16%) followed by Kamlapuram mandal with 27.35 per cent of phyllody incidence. In Tirupati district the survey was conducted in 3 mandalas, among them K.V.B Puram recorded highest incidence of (24.13%) followed by Gollapalle mandal with 23.15 per cent incidence. In Nellore the survey was conducted in 3 mandals, among them Kaligiri mandal recorded highest per cent of phyllody incidence of 21.24 per cent followed by atmakur mandal with (20.21%) of phyllody disease incidence recorded in (Table 1 and 2).

Similar results have been reported by Kalita *et al*. (2018) the sesame phyllody incidence was varied from 2 per cent to 29 per cent in different location with incidence the highest in sonitpur in the variety ST-1683.

Variations in the climatic conditions that favors the migration and reproduction of the disease-carrying vectors may account for the variance in disease incidence observed in various regions. The transformation of floral parts into green leaf-like structure, stunted growth, decreased internodal length, reduced leaf size, and no seed production from parts that were damaged were the

Table 2. Incidence of sesame phyllody on sesame in major sesame growing districts of Southern Zone of Andhra Pradesh

Districts	Name of the mandal	per cent avg. incidence in mandals	per cent avg mean incidence in districts
Kadapa	V.N. Palli	29.16	**25.47**
	Kamalapuram	27.35	
	Chapadu	19.92	
Tirupati	K.V.B Puram	24.13	**23.36**
	Vadamalapeta	22.73	
	Gollapalle	23.15	
Nellore	Chegarla	16.25	**19.18**
	Kaligiri	21.24	
	Atmakur	20.06	

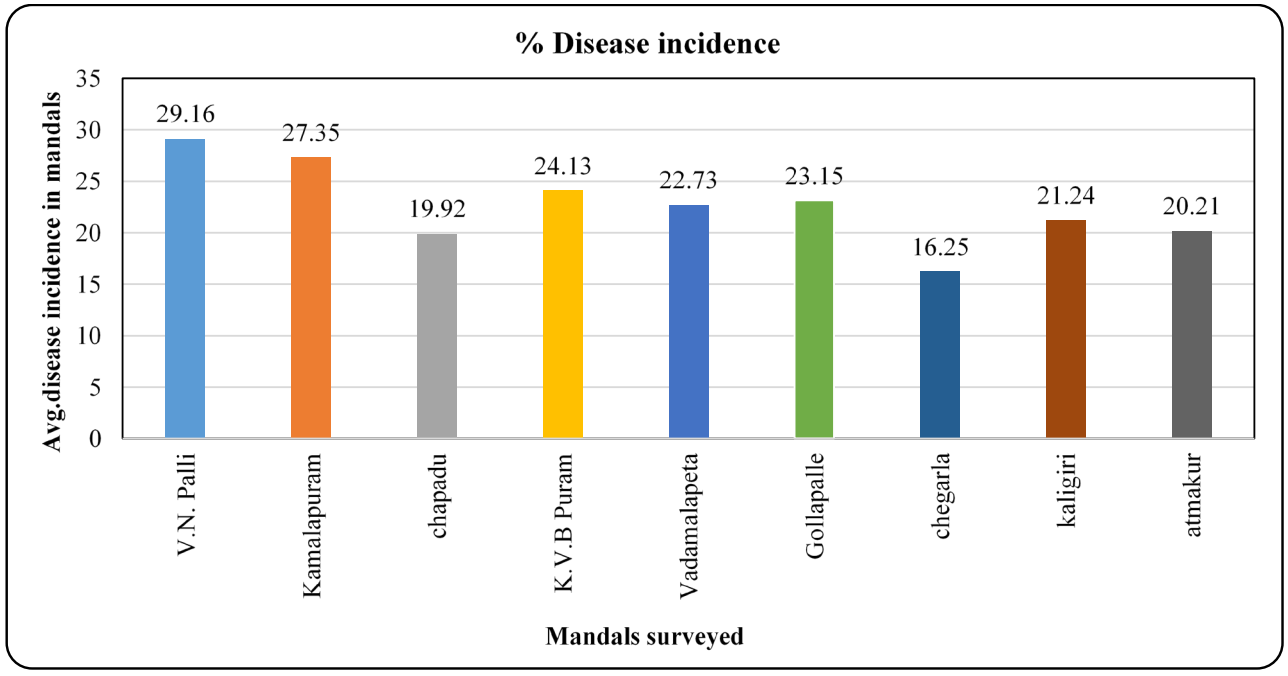

Fig. 1. Graphical representation of per cent phyllody disease in sesame growing districts of Southern Zone of Andhra Pradesh during *rabi* 2023.

distinctive symptoms seen in the field. The primary cause of the rising disease incidence in the districts of Y.S.R district, Nellore and Tirupati Districts may be attributed to the widespread and ongoing annual cultivation of the same well-known cultivars, such as YLM-66 and Til-6, as well as epidemiological parameters which aid the spread of leaf hoppers. Devanna *et al*. (2020) conducted a survey in the sesame fields of Karnataka during July-September 2010 in *kharif* and recorded an incidence of 32.14 per cent. The transformation of floral parts into green leaf-like structure, stunted growth, decreased internodal length, reduced leaf size, and no seed production from parts that were damaged were the distinctive symptoms seen in the field.

Two different types of leafhoppers were observed during research period viz., *Orosius albicinctus, Hishimonus phycitis.*

The disease incidence of sesame phyllody ranged from 0 to 29.16 per cent in Y.S.R and Nellore and Tirupati districts. Among the three districts, Y.S.R district V.N.Palli mandal recorded highest mean disease incidence of 29.16 per cent followed by Kamlapuram mandal with 27.35 per cent of phyllody incidence. In Tirupati district the survey was conducted in 3 mandalas, among them K.V.B Puram recorded highest incidence of 24.13 per cent followed by Gollapalle mandal with 23.15 per cent incidence *O. albicinctus* Distant was identified as the major leaf hopper species which was responsible for the transmission of sesame phyllody disease during the course of research.

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