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Survey and weather factors for sesame (*Sesamum indicum* L.) diseases

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Abstract
Sesame is most important oilseed crops of Tamil Nadu, the biotic and abiotic stresses constitute the major yield destabilizing factors. The sesame Powdery mildew and phyllody was observed to be widely distributed the entire Cuddalore and Ariyalur district. A roving survey of sesame fields at 50 percent capsule forming stage in Cuddalore and Ariyalur district each in 7 locations were under taken during *Rabi-2023*. The maximum disease incidence was recorded at Rajendra Pattinum (36.80%) in severity of sesame phyllody Cuddalore district and Powdery mildew in Authukurichy (28.38%) in Ariyalur district, In fixed plot survey the maximum temperature positive correlate with powdery mildew, Alternaria and Phyllody diseases, in *Karif* 2022 the maximum temperature only positive correlation of all diseases but in Rabi 2023 there was positive correlation between disease severity and maximum temperature (r=0.63, r=0.54, r=0.58 and r=0.65), morning relative humidity (r=0.61, r=0.73 and r=0.41).

Keywords: Sesame, maximum temperature, powdery mildew, phyllody and correlations

Introduction
Sesame is the most ancient oilseed crop of the world. It is being cultivated in Asia since last 5000 years the quality of its oil being of high nutritional and therapeutic value Powdery mildew is a devastative important disease in all the sesame growing states of the country and Andhra Pradesh and Tamil Nadu in particular. Sesame is a major edible oilseed crop in India and Tamil Nadu ranked sixth in area and production among the states. The current research examines the area, production and productivity of sesame in the state of Tamil Nadu and the Kallakurichi district (Jeevamathi and G. Srinivasan, 2022) [1] Powdery mildew and phyllody among diseases contribute significantly to yield losses. The disease causes yield losses between 25 and 50% depending on the level of incidence It occurs on epidemic scale in areas of high rainfall and humidity coupled with low night temperature Now-a- days, phytoplasma are among the most serious plant pathogens that negatively affect economically valuable crops, like sesame, threatening worldwide food security (Hemmati *et al.*, 2021) [2].

Materials and Methods
Survey: The occurrence and distribution of, Powdery mildew, Alternaria and phyllody disease of sesame, a roving survey of sesame fields at 50 percent flowering and capsule forming stage in Cuddalore and Ariyalore district near in 7 locations were under taken during *Kharif*-2022 and Rabi 2023. The survey for sesame all disease was under taken in near the field was based on typical symptoms. The percent disease incidence were recorded at random on different locations in the field

Disease development Meteorological parameters in relation to disease incidence: Study the relationship of weather parameters on the natural occurrence of sesame powdery mildew, Alternaria and phyllody, observations were taken from 01.12.2022 to 31-03.2023 consisting of 9 meteorological weeks during *Kharif 2022* and *Rabi* 2023 under field condition at Experimental plot of Regional Research station Vriddhachalam. The weather parameters like maximum and minimum temperature (°C) maximum and minimum RH (%) and rainfall (mm) were co-related with all disease incidence of sesame. The PDI was recorded following a standard scale (0-5) based on the incidence of disease appearance on sesame plant through visual estimation. Percent disease incidence (PDI) was calculated by using the formula.

$$\text{Percent disease incidence (PDI)} = \frac{\text{Number of plants infected}}{\text{Number of plants observed}} \times 100$$

$$\text{Disease severity} = \frac{\text{Sum of all disease rating}}{\text{Total number of ratings x maximum Rade}} \times 100$$

Results and Discussion

The roving survey was conducted during Rabi 2023 at 14 village in two Districts *viz*., Cuddalore and Ariyalur, the results are presented in Fig1. That the sesame powdery mildew in maximum for Athukurichy colony of Ariyalur district ranging from (28.38PDI) in Phyllody disease incidence maximum at Rajendrapattinam (36.80%) at Cuddalore district, followed by Arasakuzhi (20.0%) respectively in Alternaria leaf spot Rangiyum village very less severity in two districts

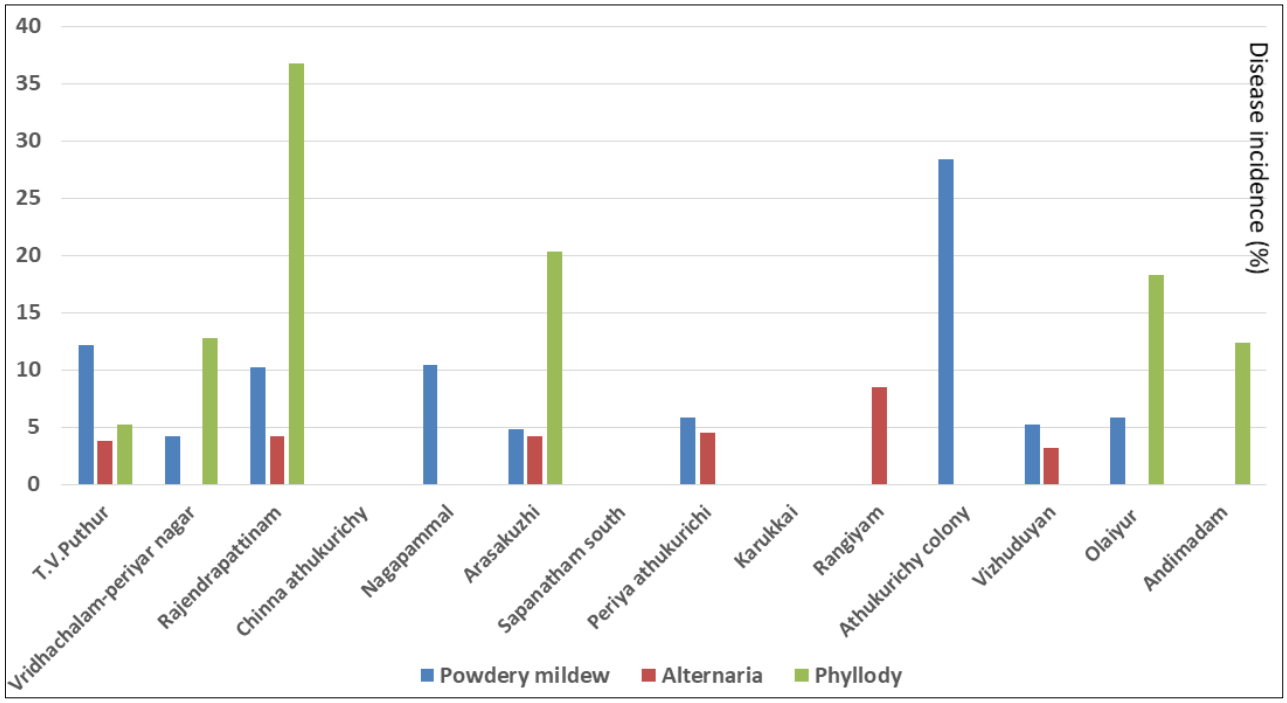

Fig 1: Roving survey for important disease of sesame Rabi 2023

Kharif 2022

From the Correlation table the estimated significance value is 0.004 for maximum temperature and phyllody, meaning the null hypothesis is rejected. Therefore there is significant relationship. Therefore, the strong positive relationship between maximum temperatures for phyllody.

From the Correlation table the estimated significance value is 0.016 for maximum temperature and Alternaria, meaning the null hypothesis is rejected. Therefore there is significant relationship. Therefore, the positive relationship between maximum temperatures Alternaria.

From the Correlation table the estimated significance value is 0.009 for maximum temperature and powdery, meaning the null hypothesis is rejected. Therefore there is significant relationship. Therefore, the positive relationship between maximum temperatures and powdery (Table 1).

Table 1: Weather factors and foliar disease of Kharif 2022 sesame

Correlations				
		Powdery	**Alternaria**	**Phyllody**
Maximum Temperature	Pearson Correlation	-.666**	-.629*	-.720**
	Sig. (2-tailed)	.009	.016	.004
	N	12	12	12
Minimum Temperature	Pearson Correlation	-.523	-.584*	-.652*
	Sig. (2-tailed)	.055	.028	.012
	N	12	12	12
Relative Humidity	Pearson Correlation	.462	.400	.473
	Sig. (2-tailed)	.096	.156	.088
	N	12	12	12
Rain Fall	Pearson Correlation	-.048	-.073	.030
	Sig. (2-tailed)	.870	.805	.919
	N	12	12	12
Wind Speed	Pearson Correlation	.561*	.523	.596*
	Sig. (2-tailed)	.037	.055	.024
	N	12	12	12

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Rabi 2022-23

Fixed plot survey was conducted at RRS, Vriddhachalam using the cultivar VRI 2. Powdery mildew disease initiated during 52th standard week with the disease intensity of 3.8 PDI and the disease intensity increased to the maximum of 30.52 PDI (9th standard week). Alternaria leaf spot disease initiated during 51nd standard week with the disease intensity of 2.4 PDI and the disease intensity increased to the maximum of 12.5 PDI (9th standard week). Phyllody disease initiated during 1st standard week with the disease of 1.32% and the disease intensity increased to the maximum of 58.1% (9th standard week) (Fig2.).

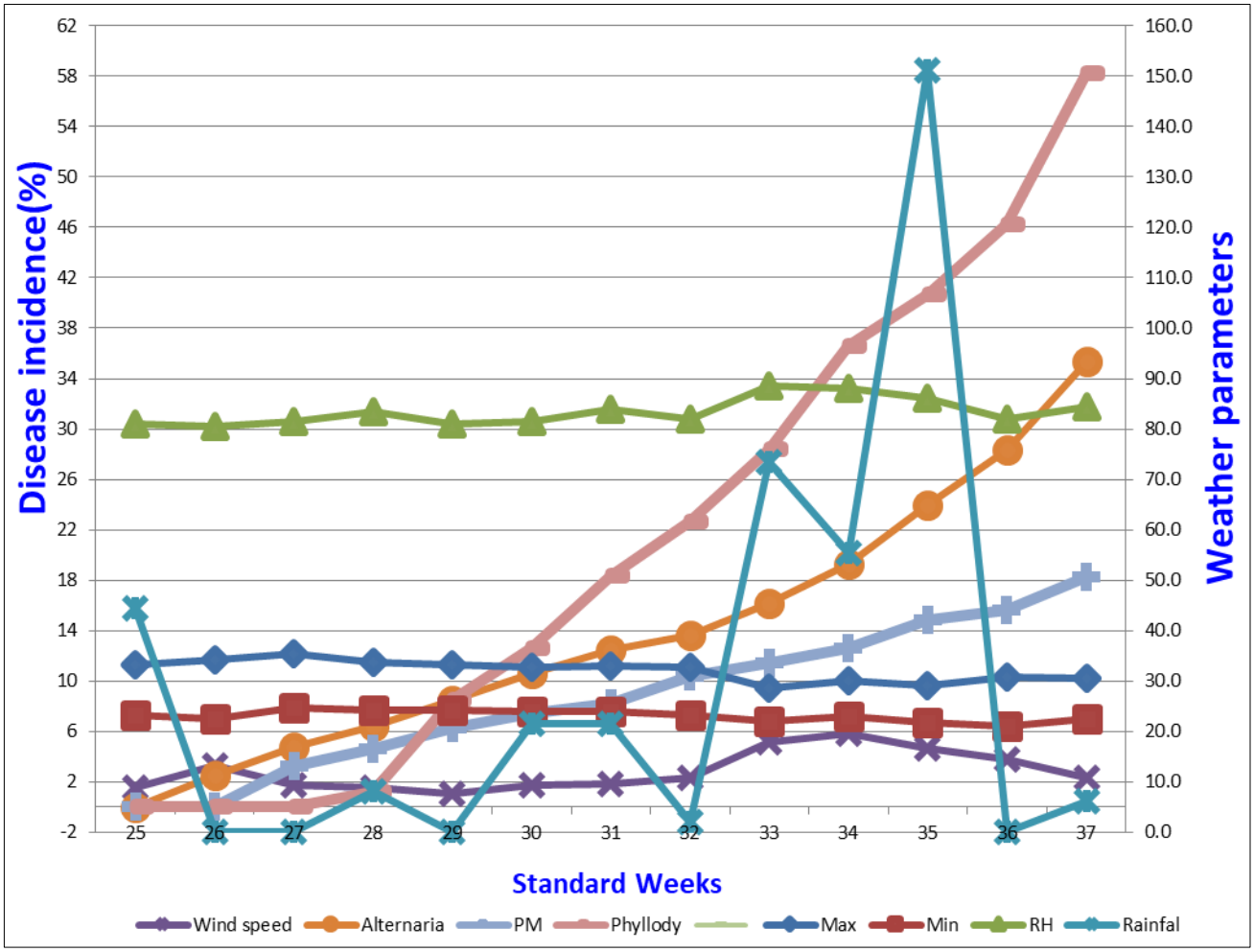

Fig 2: Weather factors for incidence of Sesame disease in Rabi 2023

Influence of weather parameters on the occurrence of Root rot, Powdery mildew, Alternaria, and Phyllody diseases: *Rabi* 2022 cropping period started from 49th (1rd week of December) to 10th (1 st week of March) standard week of 2022-23. The results revealed that in case of Root rot, powdery mildew, Alternaria and Phyllody diseases, there was positive correlation between disease severity and maximum temperature (0.63, 0.54,0.58 and 0.65), morning relative humidity (0.61, 0.73 and 0.41), whereas, Minimum temperature, Relative humidity, and rainfall showed negative correlation with disease intensity during Rabi season (Table 2).

Table 2: Correlation of root rot, powdery mildew, Alternaria and phyllody diseases of sesame with weather variables

Weather parameters		Correlation Co-efficient (r)		
	Root rot	Powdery mildew	Alternaria	Phyllody
Maximum temperature (°C)	0.636054	0.546803	0.581192	0.658423
Minimum temperature (°C)	-0.32976	-0.35247	-0.3798	-0.41345
Relative humidity (%)	-0.51546	-0.44882	-0.50822	-0.54736
Rainfall	-0.51417	-0.4461	-0.5379	-0.45415
Wind speed	0.111395	0.070512	0.038611	0.002673

Pinki Devi Yadav *et al.*, (2022) [3] the environmental factors Effecting sesame phyllody were minimum temperature, relative humidity and rainfall that increase both leaf hopper population and percent disease incidence except maximum temperature which show non-significant negative correlation with disease incidence and leaf hopper population.

Ahmed *et al.* (2022) [4] Ashri A (2006) [5] reported that dry environment, has shown epidemic infection with sesame phyto plasma, in addition to low fertility and soil salinity.

Conclusion

The sesame disease correlated with weather factor particularly to controlling of disease to using fungicides and insecticides for specific week and stage of the crop to prevent the yield Losse.

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