Epidemiology of tikka disease of groundnut

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SUMMARY

Aerobiological investigations were carried out for one season over Groundnut (*Arachis hypogea* L.) field to assess the dispersal of the pathogen *Cercospora* sp. causing Tikka disease.Highest spore concentration was found in 9th week while onset of first symptom of disease was found in 12th week of the sampling. The period between the first incidence of pathogen and first incidence of disease was affected by the meteorological factors like temperature and humidity. The age of the plant also determines the susceptibility of the plant.

Groundnut (*Arachis hypogea* L.) is world's most popular oilseed crop cultivated in more than 100 countries in all six continents (Nwokolo, 1996).

India is largest grower among all the countries while rank second if production of groundnut is concerned. During life span groundnut become victim for about 73 bacterial, fungal, viral and nematodal diseases. Among these tikka disease caused by *Cercospora* sp. along with rust disease is responsible for heavy losses in groundnut yield, hence, they are economically very important.

These investigations were carried out to asses levels of airborne spores of *Cercospora* in relation to disease incidence and meteorological factors, which will be helpful for disease forecasting in future.

MATERIALS AND METHODS

Air-borne spores of *Cercospora* were collected by volumetric Tilak Air Sampler (Tilak and Kulkarni, 1970). The sampler was placed at center of the groundnut field at Mirkhel Dist. Parbhani (M.S.). The intake orifice was located at constant height of 1 meter above ground level. Spore trap was operated for two summer seasons from 21st January to 6th may 2007 and 22nd January to 6th May 2008. Plants in a sampling area were examined daily for disease incidence. Daily meteorological data was obtained from the department of meteorology, Marathwada Agriculture University, Parbhani. Scanning and detailed calculations were done by method described by Tilak and Bhalke (1978).

Weekly concentration and total number of

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Cercospora spores obtained during two years were listed in Table 1(a) and (b) while epidemiology of tikka disease of groundnut is shown in Table 2(a) and (b)

RESULTS AND DISCUSSION

Tikka disease of Groundnut is one of the important diseases of groundnut.

Conidia were recorded first time in forth week of sampling during both the seasons.

In first season it's higher concentration was recorded in 13th week of sampling and it's higher concentration in second season was recorded in 7th week of sampling.

First incidence of conidia, higher concentration of conidia and meteorological conditions are important for development of disease. All these things were recorded for both the seasons (Fig. 1 a, b and c).

In the first season first incidence of conidia were recorded in forth week of sampling and it's higher concentration (322 spores/m³ of air) was recorded in 13th week. Incidence of disease symptoms was recorded in 13th week of sampling.

Such a long delay in record of high concentration of conidia and appearance of disease from the first incidence of conidia in first season reveals that there were some factors, which were not favourable for the development of disease and that, were meteorological factors *i.e.* temperature and humidity.

In second season first incidence of conidia was recorded in forth week and it's higher concentration was recorded in 7th week of sampling. Incidence of disease symptoms was recorded in 9th week.

Difference between meteorological conditions in first and second season was noteworthy. In first season since 18th March maximum temperature was above 37.5℃ and such condition prevaeled up to 13th Week. Due to rainfall during 13th week temperature was decreased by 3C and

Table 1(a) : Weekly total spore count of *Cercospora* spores in 2007																
Spore types	Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Cercospora spores		0	0	0	84	238	294	294	238	280	210	294	238	322	266	308

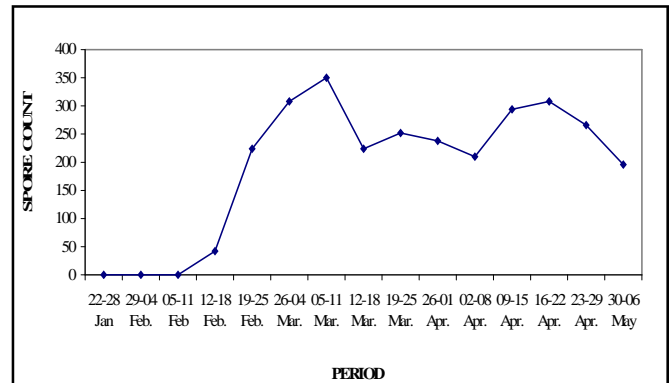| Table 1(b) : Weekly total spore count of *Cercospora* spores in 2008																
Spore types	Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Cercospora spores		0	0	0	42	224	308	350	224	252	238	210	294	308	299	196
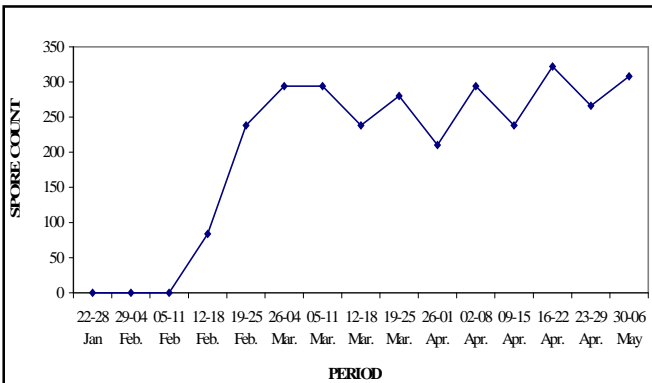
(a) Cercospora spore count in 2007
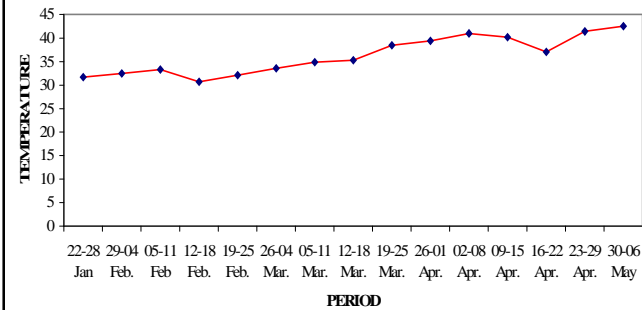
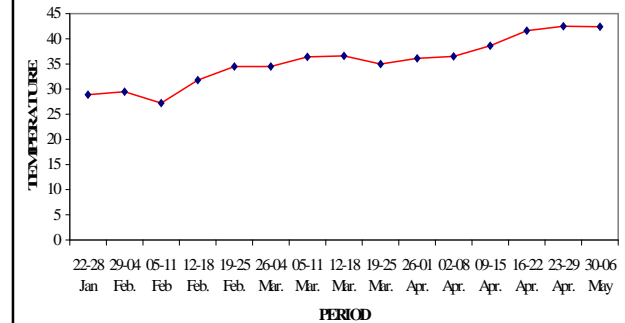**(b) Maximum temperature in 2007**
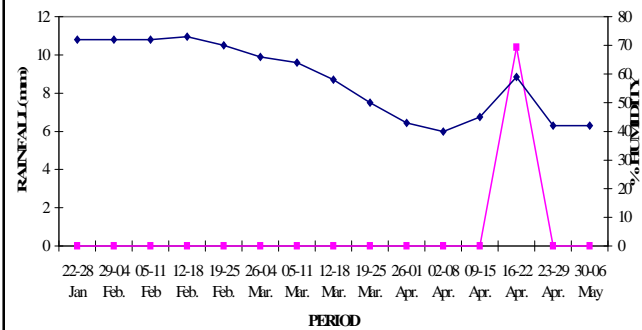
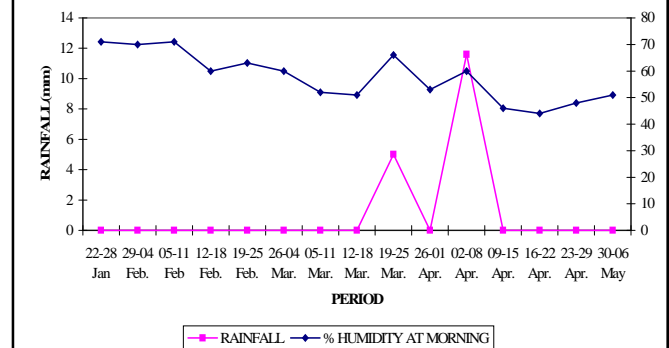**(c) Rainfall and % humidity in 2007**

Fig. 1 : (a) Spore count (b) Maximum temperature (c) Rainfall and perput humidity in 2007

(a) Cercospora spore count in 2008

(b) Maximum temperature in 2008

(c) Rainfall and % humidity in 2008

Fig. 2 : (a) Spore count (b) Maximum temperature (c) Rainfall and perput humidity in 2008

[*Internat. J. Plant Sci.,* **July, 2010, 5 (2)**]

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Table 2 (a) : Epidemiology of tikka disease of groundnut in 2007

Disease	Causal Organism	Period of first incidence of Conidia	Period of first of disease	Period of high concentration of conidia	Weather condition on day of high concentration of conidia			Period of max. incidence of disease	Susceptible age of crop
					Temp °C (Ave)	Humidity % (Max.)	Rainfall		
Tikka Disease	*Cercospora* sp.	4th week (12-18 Feb)	13th week (16-22 Apr)	13th week (16-22 Apr)	29.7	59	10.4	15th week (30-06 May)	13th – 15th week

Table 2 (b) : Epidemiology of tikka disease of groundnut in 2008

Disease	Causal Organism	Period of first incidence of Conidia	Period of first inset of disease	Period of high concentration of conidia	Weather condition on day of high concentration of conidia			Period of max. incidence of disease	Susceptible age of crop
					Temp °C (Ave)	Humidity % (Max.)	Rainfall		
Tikka Disease	*Cercospora* sp.	4th week (12-18 Feb)	9th week (19-25 Mar)	7th week (05-11 Mar)	26.2	52	--	15th week (30-06 May)	9th – onwards

humidity was increased by 13%. Therefore, disease could occur in late days of 13th week of sampling reaching maximum incidence of disease in 15th week of sampling *i.e.* at the time of harvesting.

In second season meteorological conditions were quite different in middle stage of (9th week of sampling) development of crop (Fig. 2 a, b and c). After first incidence of conidia in 4th week of sampling, maximum spore count was recorded in 7th week of sampling and incidence of disease symptoms in 9th week and disease became severe in 13th week because temperature was always below 37.5^{0}C and percentage humidity was always greater than 50 except some exceptions. This might be due to rainfall on 9th and 11th week of sampling.

Such meteorological conditions were favourable for development of disease, which occurred in 9th week rather than 13th week of sampling in the first season.

In the first season maximum spore count was recorded in 13th week of sampling and appearance of disease was also found in same week but in second season maximum spore count was recorded in 7th week but first incidence of disease was seen in 9th week of sampling, though the environmental conditions were suitable for disease development. Thus it can be concluded that age of the crop plant is also important in the development of disease. Plants in 7th week were more resistant to the disease than 13th week of development.

REFERENCES

Tilak, S.T. and Kulkarni, R.L. (1970). A new air sampler. *Experientia*, **26** : 443-444.

Tilak, S.T. and Bhalke, S.P. (1978). Aeromycology at Aurangabad I. Deuteromycetes. *Indian J. Bot.,* **1**:113-115.

Nwokolo, E. (1996). Peanut (*Arachis hypogea*) in : *Food and feed from legumes and oilseeds*. E. Nwokolo and J. Smartt, eds. New York: Chapman and Hall. pp. 49-63.

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