

INCIDENCE OF RUST DISEASE OF GROUNDNUT (*P. arachidis*) IN WEST BENGAL II EPIDEMIOLOGICAL FACTORS AND AGE OF THE PLANT

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Rust caused by *Puccinia arachidis* Speg. is an important foliar disease of groundnut and becomes most serious in warm humid weather conditions. The disease perpetuates through uredospores on self sown plants. It is a serious disease particularly when the crop is attacked at an early stage when the weather condition is favourable for the pathogen.

A local variety of groundnut, spreading type was used to study the incidence of *Puccinia arachidis* under natural condition in the field. The experiments were under taken during March 1980 to April, 1981. Seeds were sown one month interval at a distance of 30 cm x 15 cm (plant to plant and row to row distance) in 10 sq meter plot. Fertilizers applied at the rate of 25 kg. N, 25 kg. P₂O₅, 50 kg. K₂O/ha. The disease was first seen on the ab-axial leaf surface of the lower most leaves, in the month of August 1980 when the weather conditions were most congenial for development of the disease. To study the manner of spread of the disease, 15 plants were selected at random in the field and symptoms were studied at 15 days interval. The symptom studied on a scale of 0-6 as follows :

- 0 — No visible symptom
- 1 — 1 Percent leaf area infected
- 2 — 1 — 5 do
- 3 — 5 — 25 do —
- 4 — 25-50 — do —
- 5 — 50-75 — do —
- 6 — 75-100 — do —

Disease symptom first appeared on lowest leaves, considered as the first leaf of the plant. The rating of disease incidence was recorded from first leaf and it continued upto the upper most leaves which were infected. Say for example, the first leaf was infected 25 percent of the total area, the value was 3 for 2nd leaf 4 (50 percent area got infected) similarly for 3rd leaf it was 5 (75 percent area got infected) and no infected on 4th leaf. Now the disease incidence per plant will be 3 + 4 + 5 + 0 = 12. To study the role of different elements of weather on the manner of spread of the disease. Maximum temperature (°C) minimum temperature (°C) maximum relative humidity (%) minimum relative humidity (%), rainfall (inch) were considered. Average of 15 days readings of maximum and minimum relative humidity were also taken.

Rust of groundnut was first noticed in the month of August because at that time, weather condition was most congenial for disease development and plants attained the maturity

of 90 days. The disease was most serious from August to October (Table 1). The disease incidence increased rapidly at a higher level upto October, From November to April the disease incidence increased at a lower rate, due to unfavourable weather conditions.

Age of the plant are also important factor for infection by the pathogen. In table-1, it was seen that after certain growth period, the plants were infected by the pathogen. Prasad *et al.* (1979) reported that the crop was infected by the 5th week in Karnataka in 1976.

Results for disease incidence and weather data are presented in Table 1.

Form table-1, it was observed that the main criterion of incidence of disease was the age of the plant which is highly correlated though weather factors such as temperature and relative humidity had a positive co-relation with the incidence of the disease. It was further observed that when a plant was allowed to grow for about 165 days, the incidence of rust disease was also increased in a linear fashion through there were most congenial weather conditions and then it came down as the plant was retarded its growth. The calculated 'r' value for age of the plant is +0.6545 which was highly significant while the 'r'

value for temperature, relative humidity and rainfall, +0.1945, +0.1857 and -0.2085 respectively were non-significant in terms of disease incidence.

Incidence of rust disease was more prevalent when temperature ranges from 22°C-32°C, relative humidity between 62-90 percent. Rainfall had no significant role on the incidence of rust disease on groundnut, through the plant attaining sufficient growth period in the month of January and February the disease incidence was low when temperature falls to 9.8°C (min) and relative humidity to 47% (minimum)

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Table 1. Incidence of rust disease of groundnut (*P. arachidis*) depending upon weather conditions and age of the plant

Date of observation	Age of the plant (in days)	Temperature (°C)*	Relative humidity (%)**	Rainfall (inch)	Disease incidence
1st May	0	31.5	63.5	0.09	0
15th May	15	31.5	66.5	0.27	0
1st June	30	30.6	79.4	0.34	0
15th June	45	29.7	80.9	0.31	0
1st July	60	30.0	81.7	0.21	0
15th July	75	29.9	82.1	0.32	0
1st August	90	29.7	80.2	0.59	17.5
15th August	105	30.4	80.1	0.42	49.9
1st September	120	30.3	78.7	0.16	94.8
15th September	135	30.7	78.1	0.09	181.6
1st October	150	29.3	76.1	0.02	221.4
15th October	165	27.3	76.3	0.11	245.5
1st November	45	24.8	73.3	0	4.0
15th November	60	23.5	67.7	0	16.7
1st December	75	21.3	64.3	0	29.6
15th December	90	20.3	68.6	0	43.6
1st January	75	18.3	70.4	0.02	3.9
15th January	90	20.3	67.6	0.12	7.2
1st February	105	22.9	77.6	0.09	12.7
15th February	120	24.5	70.0	0	18.8
1st March	135	25.7	70.5	0.08	24.9
15th March	150	26.5	67.8	0.17	34.2
1st April	165	28.6	63.2	0.03	50.1

*Average of 15 days readings of maximum and minimum temperature.

**Average of 15 days readings of maximum and minimum relative humidity.