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Factors Associated with Resistance to *Puccinia arachidis*

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ABSTRACT

Peanut rust infection frequency, uredial size, incubation period and latent period was studied on 47 genotypes. Seventeen genotypes namely NCAC 17133-RF, PI,259747, PI,393643, PI,381622, PI,390593, PI,390595, PI,393517, PI,405132, J-11, Jh-352, 39-2, Jl-24, 2704, US-74 and MK-374 showed a lower infection frequency and smaller uredosori, longer incubation and latent periods.

Key Words: Peanut rust, *Puccinia arachidis* Speg., detached leaf technique, rust resistance.

Peanut rust (*Puccinia arachidis* Speg.) was first reported in the Punjab state of India (1) and since then it has been obsrved in Tamil Nadu, Bihar, U.P., Rajasthan, Madhaya Pradesh, Karnatka, Andhra Pradesh, Gujrat and Haryana (6). During recent years it has become one of the limiting factors in peanut production in these states. Sources of rust resistance have been reported by various workers (3,4,7,8) but little is known about the nature of resistance. Therefore, development of *P. arachidis* on various peanut genotypes is discussed in this paper.

Materials and Methods

Genotypes (Table 1 Sr. No. 1-16) of peanut were collected from ICRISAT, Patancheru, 502324, Hyderabad, Andhra Pradesh; Gujrat Agricultural University, Junagadh 362001 (Sr. No. 18-21); P.A.U., Ludhiana (22-26); R.R.S., UAS, Raichur 584104 (27-33); A.P.A.U., Kadiri 515591 (38-43); R.A.R.S. (A.P.A.U.), Jagtial, A.P. (44) and Agriculture Research Station, Aliyarnagar 642101, Coimbatore, Tamil Nadu (45-47) and grown in pots in the laboratory. Three middle leaves of 60 day old plants grown in pots of each genotypes were detached and surface sterilized in 0.25% sodium hypochlorite solution for one minute followed by three washings in distilled water. Two lower leaflets from each leaf were removed and the terminal ones were inoculated with a 0.5 mL uredospore suspension in water (15 spores/400 x microscopic field). After inoculation the cut end of each leaf was immediately immersed in 7 mL tap water in a test tube of 30 mL capacity. The open end of each tube was covered by tying a polythene sheet (3"x3") having 3-4 pin holes and then leaves were incubated at 20 ± 2 C. Daily continuous light (78 foot candles) for 16 hrs was provided to the leaves. Data on number of uredosori, size of uredia, incubation period and latent period (time from inoculation to 50% uredia formation) were recorded on three replications of each variety.

Results and Discussion

Seventeen lines namely NCAC 17090, NCAC 17133-RF, PI. 259747, PI. 393643, PI. 381622, PI. 390593, PI. 390595, PI. 393517, PI. 405132, PI. 414332, J-11, JH-352, 39-2, JL-24, 2704, US-74 and MK-374 showed less frequency of sori (8-25) per leaflet than other varieties where high frequency of sori (90-120) was recorded. Less susceptible genotypes were characterized by small uredosori, a longer incubation and a latent period. On five genotypes (PI. 259747, PI. 405132, 39-2, JL-24 and MK-374) incubation and latent period were slightly less but higher than on heavily rusted varieties. Based on these criteria seventeen genotypes were considered as reliable

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Table 1. Development of rust on Peanut genotypes.

Genotypes	No. of uredia/ leaf let	Size of uredium (u) Length	Width	Incubation period (days)	Latent period (days)
1. NC AC 17090	8	581	498	24	29
2. NC AC 17133-RD	10	664	664	25	30
3. TMV-2	110	1743	1411	14	17
4. EC 76446(292)	100	1162	996	20	25
5. PI-259747	17	1743	581	17	21
6. PI-298115	120	1494	1328	14	17
7. PI-314817	100	996	498	20	24
8. PI-350580	105	980	415	20	24
9. PI-381622	17	630	664	24	29
10. PI-390593	20	581	498	25	30
11. PI-390595	12	664	498	26	30
12. PI-393517	9	664	581	25	28
13. PI-393531	105	1660	498	14	16
14. PI-393543	10	498	415	24	29
15. PI-405132	12	581	498	18	20
16. PI-414332	8	415	332	24	28
17. J-1	100	1530	580	12	14
18. J-2	106	1630	664	12	14
19. J-11	25	680	600	11	14
20. JH-352	25	581	498	24	27
21. 39-2	20	664	498	18	21
22. M-13	100	900	515	13	15
23. M-37	90	900	516	20	23
24. M-145	108	1494	1228	14	16
25. C-501	102	1320	680	14	17
26. JL-24	25	592	498	17	20
27. Sel-1	105	900	464	13	16
28. Sel-2	100	990	530	13	16
29. Sel-3	110	940	530	13	16
30. Sel-4	120	990	530	13	16
31. Sel-5	98	1100	464	13	16
32. Sel-6	97	860	464	13	16
33. Sel-7	105	990	330	14	16
34. RG-4	98	930	664	15	18
35. RG-6	102	1001	664	16	19
36. RS-7	112	1205	681	18	20
37. RS-138	104	930	664	16	19
38. X-1-21-B	108	1630	1300	11	14
39. Robot 33-1	115	1720	1402	16	19
40. 28-206	35	580	430	22	25
41. 2704	16	480	430	24	27
42. US-74	18	680	664	24	27
43. MK-374	20	830	664	19	22
44. 13-10	106	1200	430	18	21
45. TMV-10	98	1200	664	22	25
46. GBE-2	98	1330	780	13	16
47. AL-8465	115	1420	800	13	16

source of resistance. These components of resistance may be helpful in identifying slow-rusting peanut genotypes similar to some of the slow-rusting lines in cereals (2,5). Neither the size nor the frequency of stomata has been associated with resistance but difference in resistance due to rate and degree of development of the rust mycelium in the substomatal cavities and leaf tissues has been reported (8). Under field conditions some of these genotypes were previously identified as resistant or moderately resistant (4,7,8). Although TMV-2 was reported to be resistant (3), this is in contrast with our results and the results of Subramanyam *et al.* (7). In genotypes J-1, J-2, M-13, Sel-2, Sel-5, Sel-6, Sel-7, and X-1-21 B a high infection frequency was observed in our studies whereas moderate resistance was reported in these varieties elsewhere (3). Perhaps this intermediate infection frequency was not available due to more infection under artifical inoculations. Similar experience was also observed when tested under artificial inoculations (8). Therefore, this detached leaf method is useful in separating genotypes with larger difference in resistance.

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