Pulse Pathology
Progress Report 38

SECOND ICAR-ICRISAT UNIFORM TRIAL FOR PIGEONPEA PHYTOPHTHORA BLIGHT RESISTANCE (IIUTPPBR)

REPORT
1983-84

ICRISAT

International Crops Research Institute for the Semi-Arid Tropics
ICRISAT Patancheru P.O.
Andhra Pradesh 502 324, India

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INTRODUCTION

The ICAR-ICRISAT Uniform Trial for Pigeonpea Phytophthora Blight Resistance (IIUTPPBR) was proposed and organised by the participants at the All India Kharif Pulses Workshop held under the auspices of the Indian Council of Agricultural Research (ICAR) at Jabalpur (M.P.) in April 1982. The second IIUTPPBR was conducted on the recommendation of pathologists who participated in the All India Kharif Pulses Workshop at Pune in April 1983.

OBJECTIVES

The objectives of the trial were to:

1. Identify cultivars, germplasm accessions and breeding lines resistant to pigeonpea phytophthora blight (Phytophthora drechsleri f. sp. cajani).

2. Determine the stability of different genotypes.

3. Detect new races of the blight pathogen.

NURSERY COMPOSITION

Eighty-four test entries and one blight susceptible cultivar (ICP-7119) were included in the trial.

NURSERY LOCATIONS

The nursery was sent to seven locations in India. The data were received from six locations listed below in Table 1.

Table 1. List of the locations and cooperators of 1982-83 IIUTPPBR

S.No	Location	Cooperator(s)
1.	Delhi	Drs. Mahendra Pal and Swaraj Kumar Division of Mycology and Plant Pathology I.A.R.I., New Delhi - 110 012
2.	ICRISAT	Drs. J. Kannaiyan and Y.L. Nene ICRISAT Center Patancheru P.O. - 502 324, Andhra Pradesh
3.	Kanpur	Drs. P. Shukla and R.R. Singh C.S. Azad University of Agriculture and Technology Kanpur, Uttar Pradesh
4.	Pantnagar	Drs. Y.P.S. Rathi and H.S. Tripathi Department of Plant Pathology G.B. Pant University of Agriculture and Technology Pantnagar - 263 145 Dist. Nainital, Uttar Pradesh
5.	Sehore	Dr. S.C. Agrawal and Ms. Sushma Nema R.A.K. Agricultural College Sehore, Madhya Pradesh
6.	Varanasi	Mr. V.B. Chauhan Department of Plant Pathology College of Agriculture Banaras Hindu University Varanasi - 221 005, Uttar Pradesh

NURSERY MANAGEMENT

Each entry was planted in one 4-meter row (50 seeds). After every four test entries, one row of the susceptible check ICP 7119 was planted to monitor the blight incidence across the plot and allow comparison of test entries with the susceptible cultivar. The date of planting, fertilizer applications and other cultural practices adapted were as per the local recommendations.

The major suggestion was to plant the nursery in a low-lying plot where phytophthora blight disease is most commonly seen every year.

Information on planting date, season's rainfall, temperature, irrigation, fertilizer application, insecticides used, etc. was requested from each cooperator.

SUMMARY OF THE RESULTS

Final observations on the number of plants blighted was recorded three months after planting. The summary of the results showing the blight percentage in each of the lines at six locations are presented in Table 2.

Delhi

The field was not irrigated artifically as the rainfall was high. The blight incidence in the susceptible check was 100 percent. Twenty-three lines showed less than 10 percent blight; and five lines showed 11 to 20 percent blight. The remaining lines showed 21 to 100 percent blight.

ICRISAT

The average blight incidence in the susceptible check was 98 (range 78 to 100) percent. High blight incidence was observed due to the presence of P3 isolate, a more aggressive strain than P2, in the field. Out of the eighty-four test entries, only eleven; ICP 113, 913, 1586, 2505, 7065, 7182, 7185, 8131, 8236, KPBR 80-2, and KPBR 80-3 showed less than 50 (range 27 to 50) percent blight.

Kanpur (C.S. Azad University)

The susceptible check showed 100 percent blight. Only four entries; KPBR 80-1-4, KPBR 80-3, KPBR 80-2, and ICP 7273 showed less than 50 percent blight (8, 10, 11, and 46 percent respectively). The remaining entries showed high blight incidence (range 68 to 100 percent).

Pantnagar

The average blight incidence in the susceptible check was 93 (range 42 to 100) percent. High blight incidence was observed in the test entries. Only seven entries; ICP 28, 113, 1529, 8214, KPBR 80-1-4, KPBR 80-2, and KPBR 80-3 showed less than 50 percent blight. KPBR 80-1-4 showed a minimum of 15 percent blight.

Sehore

Phytophthora blight incidence in the nursery was low and erratic. The average blight incidence in the susceptible check was 33 (range 0 to 77) percent. Seventeen entries showed 0 percent blight; twenty-three entries showed less than 10 percent; twenty-eight entries showed 11 to 20 percent, and fourteen entries showed 21 to 50 percent blight. The remaining two entries were found to be susceptible.

Varanasi

Five plants of each entry and in each row of the susceptible check were inoculated artificially with the local isolate of Phytophthora drechsleri f. sp. cajani. The susceptible check showed 100 percent blight. Fifteen entries showed 0 percent blight; thirty-three entries showed 20 to 40 percent, and the remaining entries showed 60 to 100 percent blight.

Performance across the locations

None of the entries was promising at all the six locations. ICP 7269 was the only entry that showed 0 to 10 percent blight at three locations; Delhi, Sehore and Varanasi. A total of twenty entries were promising and showed 0 to 10 percent blight at two locations. Twelve entries (ICP 1020, 1123, 1149, 1151, 1258, 1950, 2974, 3840, 3867, 7065, 7151, and 7173) were promising at Delhi and Sehore; one entry (ICP-3861) at Delhi and Varanasi; two entries (KPBR 80-1-4 and KPBR 80-3) at Kanpur and Sehore; and five entries (ICP 3753, 4752, 4882, 7910, and KPBR 80-2) at Sehore and Varanasi. Only at Varanasi, 15 lines showed 0% incidence in contrast to 100% in the susceptible check; whereas at other locations the susceptible checks themselves did not show 100% incidence.

Table 2 Performance of the second IIUTPPBR (1983-84) entries against phytophthora blight at different locations.

S. No.	Entry	Percent blight[a]					
		Delhi	ICRISAT	Kanpur (CSAU)	Pant-nagar	Sehore	Vara-nasib
1.	ICP-28	6	72	100	50	20	80
2.	-113	11	31	100	36	4	40
3.	-580	7	58	100	85	11	80
4.	-913	6	38	100	80	12	80
5.	-1020	7	88	100	97	0	80
6.	-1123	5	72	100	56	4	40
7.	-1149	7	79	100	92	3	100
8.	-1151	3	80	100	90	9	40
9.	-1258	4	100	100	91	0	60
10.	-1321	15	90	100	95	5	60
11.	-1529	7	87	100	50	11	0
12.	-1535	10	74	100	89	21	20
13.	-1586	18	44	100	89	0	20
14.	-1950	4	56	86	88	0	40
15.	-2153	91	63	100	100	14	60
16.	-2376	100	87	100	100	23	60
17.	-2505	100	46	100	100	0	60
18.	-2673	100	88	100	90	3	60
19.	-2682	50	100	100	100	19	40
20.	-2719	100	94	88	100	4	60

S. No.	Entry	Percent blight[a]					
		Delhi	ICRISAT	Kanpur (CSAU)	Pant-nagar	Sehore	Vara-nasi[b]
21.	-2736	100	100	100	100	25	60
22.	-2974	5	98	100	100	0	60
23.	-3259	21	100	100	100	8	80
24.	-3367	6	100	100	100	18	40
25.	-3741	21	100	100	100	10	60
26.	-3753	12	56	96	100	5	0
27.	-3840	5	95	96	100	0	20
28.	-3861	4	100	91	100	18	0
29.	-3867	7	100	100	100	7	40
30.	-3868	8	100	100	100	15	20
31.	-3891	38	100	77	93	5	40
32.	-3899	38	92	84	100	18	40
33.	-3937	19	67	68	84	20	20
34.	-4135	7	52	90	87	13	20
35.	-4168	97	97	83	94	21	60
36.	-4699	25	95	98	92	27	20
37.	-4752	63	100	98	100	6	0
38.	-4882	100	100	98	100	9	0
39.	-5450	100	100	100	100	9	100
40.	-5656	91	100	100	100	4	60

S. No.	Entry	Percent blight[a]					
		Delhi	ICRISAT	Kanpur (CSAU)	Pant-nagar	Sehore	Vara-nasib
41.	-5860	100	100	100	100	18	60
42.	-6865	100	100	100	100	17	20
43.	-6952	100	95	100	86	68	100
44.	-6953	100	95	100	100	25	40
45.	-6956	100	83	100	100	53	0
46.	-6974	100	57	100	90	19	40
47.	-7057	8	82	98	100	18	60
48.	-7065	6	27	91	92	0	20
49.	-7151	8	58	92	87	5	40
50.	-7182	61	42	87	68	18	40
51.	-7185	64	50	90	100	0	60
52.	-7200	29	65	86	98	10	80
53.	-7232	48	94	91	100	0	*
54.	-7269	8	100	87	100	0	0
55.	-7273	6	97	46	100	7	20
56.	-7533	79	97	100	90	17	40
57.	-7624	72	91	83	100	13	20
58.	-7657	94	100	98	100	29	0
59.	-7701	100	100	98	100	17	0
60.	-7754	100	100	100	100	17	60

S. No.	Entry	Percent blight[a]					
		Delhi	ICRISAT	Kanpur (CSAU)	Pant-nagar	Sehore	Vara-nasi[b]
61.	-7795	100	78	100	100	17	0
62.	-7798	100	77	100	100	23	0
63.	-7810	100	100	100	91	0	40
64.	-7837	100	80	100	92	0	40
65.	-7910	100	100	100	100	5	0
66.	-8087	100	76	100	88	25	40
67.	-8103	58	77	100	78	12	0
68.	-8104	95	68	100	88	0	40
69.	-8131	100	50	100	100	10	60
70.	-8132	41	70	100	64	18	100
71.	-8141	46	59	100	55	12	100
72.	-8214	50	64	100	50	29	20
73.	-8236	71	43	100	100	0	40
74.	-8248	36	57	100	90	6	60
75.	-8258	79	62	100	96	8	20
76.	-8287	100	52	100	83	21	0
77.	-8289	100	65	100	100	46	60
78.	-8328	100	100	100	100	46	20
79.	-8332	100	81	100	100	11	60

S. No.	Entry	Percent blight[a]					
		Delhi	ICRISAT	Kanpur (CSAU)	Pant-nagar	Sehore	Vara-nasib
80.	AN-1	-[c]	-	-	-	17	-
81.	RL-2	-	-	-	-	25	-
82.	KPBR-80-1-4	-	61	8	15	0	60
83.	KPBR-80-2	-	41	11	24	5	0
84.	KPBR-80-3	-	49	10	22	0	100
	ICP-7119[d]	100	98	100	93	33	100

* No germination
a Observations recorded three months after planting
b Plants were inoculated artificially
c Seed was not supplied by the contributor
d Phytophthora blight susceptible check

This report has been compiled by
Mrs. V.K. Sheila & Dr. Y.L. Nene