J. Phytol. Res. 9 (1): 75–76, 1996

SURVIVAL OF *MACROPHOMINA PHASEOLINA* ON SEEDS AND DISEASED STEM PIECES OF MAIZE

SAVITA PAREEK and B. L. JAIN*
Department of Botany, Banasthali Vidyapith, Banasthali- 304022, Rajasthan, India.
*Department of Botany, University of Rajasthan, Jaipur 302004, India.

Study with regard to the survival of *Macrophomina phaseolina* under different conditions was carried out under laboratory conditions. In seeds, it survived for 12 months and on stem pieces, for 31 months.

Keywords: *Macrophomina phaseolina*; Seeds; Stem pieces; Survival.

Seed borne infection plays an important role in the annual perpetuation of a number of plant pathogen. Charcoal rot disease of maize induced by *Macrophomina phaseolina* is reported to be seed and soil borne in nature[1-6].

Macrophomina phaseolina can survive as sclerotia or as mycelium in plant residue and in soil. Cook *et al*[7]., studied survival of sclerotia in corn and sorghum stalks residues and found that they were viable for 18 & 16 months, respectively. Sundaraman[8,9] and Bhargava[10] have found that sclerotia of this fungus had a greater survival than the pycnidiospores. It is well established that the fungus survives in soil in crop residues or as sclerotia. However, there is no relevant work with regard to the survival of *Macrophomina phaseolina* as maize pathogen in India or in Rajasthan. Therefore, in order to prove seed borne nature of this fungus the present study was under taken.

Survival of the pathogen on seed- Seeds of highly susceptible variety Arun check (12703) and resistant variety Vijay (12103) of maize collected during germplasm screening in kharif 1987-1988, were stored in paper bags at room temperature. Four hundred seeds of each variety were surface sterilized with 2 percent sodium hypochlorite solution and placed on salt malt agar (SMA) media, with four replications (100 seeds/replication). Ten seeds were placed in each Petriplate, incubated at 28°C for one week. Results were recorded on 8th day. The viability of seeds was tested at monthly interval on SMA medium plated in Petriplates.

Survival of pathogen on infected host plant parts- Stem pieces of infected maize were collected from the field at the time of harvesting during kharif 1987, and were kept in paper bags in the laboratory at room temperature. Monthly isolations were made by plating on PDA medium. The survival percentage was calculated after four days. This was continued till survival of the fungus.

Monthly isolations made from stored seeds plated on salt malt agar media revealed that *Macrophomina phaseolina* remained viable on susceptible (Arun check-12703) and resistant (Vijay 12103) varieties of maize for a period of 12 and 4 months, respectively. Percent survival was 4.14 and 0.37, respectively. The fungus retained its pathogenicity towards maize and when infected seeds were sown in pots the resultant plants showed symptoms of Charcoal rot infection (Table 1).

One month after inoculation diseased stem pieces of maize were collected during harvesting period. Monthly isolations made on PDA showed that the fungus survived on diseased stem pieces for a period of 31 months and the survival percentage was 76.75. The isolates were pathogenic to maize and showed typical Charcoal rot disease symptoms (Table1).

The disease in corn plants occur every year in india. The fungus has been found to survive on disease plant parts left over in the fields and in the soil. This fungus is definately a soil borne saprophyte but its exact nature has not been well understood. Smith[6], has classified it as both soil inhabiting as well as root inhabiting fungus.

According to Mayer *et al*[10]., this fungus is primarily a root inhabiting pathogen with sclerotia as the principal means of survival. Norton[12], had shown that this fungus had a

Table.1 Survival of *Macrophomina phaseolina* on seeds and diseased stem pieces collected during Kharif 1987 to 1990.

Monthly Isolations	Survival on Seeds				Survival on Stem Pieces	
	Resistant variety		Susceptible variety			
	Total Survival	Percent Survival	Total Survival	Percent Survival	Total Survival	Percent Survival
1st Dec. 1987					40	100
January, 1988					40	100
February					40	100
March					39	97.05
April					39	97.5
May					37	92.5
June					36	90
July					34	85
August					35	87.5
September					36	90
October					32	80
November					30	75
December 1988	1	0.25	10	2.5	34	85
January 1989	2	0.50	12	3.0	34	85
February	2	0.50	9	2.25	33	82.5
March	1	0.25	10	2.50	30	75
April	0	0.00	13	3.00	28	70
May	0	0.00	32	8.00	30	75
June	0	0.00	40	10.00	28	70
July	0	0.00	45	11.25	27	67.5
August			15	3.75	39	97.5
September			7	1.75	37	92.5
October			6	1.5	34	85
November			1	0.25	35	87.5
December, 1989			0	0.00	8	20
January, 1990			0	0.00	7	17.5
February			0	0.00	18	45
March			0	0.00	21	52.2
April			0	0.00	25	62.5
May					27	67.5
June					28	70.0

limited saprophytic ability because of the antagonism of other soil borne micro-organisms. Further, in comparison to the mycelium, the sclerotia were more dangerous in causing greater disease incidence[13] because they acted as primary soil borne inocula.

Cook *et al.*[7], had also studied survival of *Macrophomina phaseolina* in corn and sorghum stalk residue. They observed profuse production of sclerotia during sampling period. In our case also sclerotial production was profuse but the period of survival was much longer.

The auther (SP) is grateful to late Prof. B. S. Siradhana, Head of the Plant Pathology Department, Agricultural Research Station, Durgapura, Jaipur for his keen interest, valuable suggestions and encouragement and also for providing necessary facilities.

References

1. Butler E J 1918, *Fungi and diseases in Plants.* Thacker, Spinik and Co, Calcutta 547.
2. Briton - Jones H R 1925, *Min. of Agric. Exp. Tech. and Sci. Bull. 49* 129
3. Small W 1928, *Tropical Agriculturist 69* 9
4. Mackie W W 1931, *Phytopathology 21* 996 (Abst).
5. Reicher I and Hallinger 1947, *Palestine of Bot. 6* 107
6. Smith W H 1969, *Phytopathology 59* 379
7. Cook G E, Booslis M G, Dunkle L D and Odvody G N 1973, *Plant Disease Reporter 57* 873
8. Sundaraman S 1929, Administration report on the Government Mycologist Coimbatore for the year 1928-1929. Rep. Dept. Agric. 27 pp.
9. Sundaraman S 1931, Administration report of the Mycologist for the year 1929-1930, 30 pp.
10. Bhargava S N 1965, *Phytopathology Z.53* 35
11. Mayer W A, Sinclair J B and Khare M N 1973, *Phytopathology 62* 1108
12. Norton D S 1953, *Phytopathology 43* 633
13. Watanabe T, Smith R S and Synder W C 1970, *Phytopathology 60* 1717