

## **Effect Of Age Of Seedlings On Incidence Of Brown Spot Of Finger Millet Incited By *Helminthosporium nodulosum* (Berk and Curt.) In Different Cultivars**

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### **Abstract**

*Brown spot or seedling blight or leaf blight incited by Helminthosporium nodulosum (Berk and Curt.) is next only to blast both in severity and distribution. Severity of brown spot is high in maturity stage as compared to pre-flowering stage. Among the 16 pre-release and released varieties evaluated for brown spot resistance, highest incidence was recorded among OEB-219, KMR-204, DPI-03-035 with grade-3 during pre-flowering and grade-4 during maturity stage and lowest among VR-708, GPU-48, PES-110, PR-202 with grade-1 both in pre-flowering and maturity stages during 2009-10 and also during 2010-11 sixteen other varieties were evaluated for brown spot resistance, among which highest incidence was recorded in RAU-8 with grade-1 during pre-flowering stage and grade-4 during maturity stage. Lowest incidence in GPU-28 with grade-0 during pre-flowering stage and grade-1 during maturity stage.*

*Key words: Finger millet, Brown spot, Helminthosporium nodulosum, Disease severity.*

### **Introduction**

Finger millet (*Eleusine coracana* (L.) Gaertn.) locally known as Ragi, Mandua, Nagli, Chodi, Taidalu is widely distributed extending from Tamil Nadu in south to Uttaranchal in north, Gujarat in west to Orissa in east and even extending to north-eastern regions including Sikkim.

Finger millet is the richest source of Calcium, Iron, Vit- B<sub>1</sub> and B<sub>2</sub> among all the cereals. It possesses hypoglycemic, hypocholesterolemic and anti-ulcerative activities. It contains 65-75% carbohydrates, 5-8% proteins, 15-20% dietary fibre and 2.5-3.5% minerals.

In India it has been grown over an area of 16.42 lakh ha with an average production of 19.35 lakh tonnes (Nagaraja *et al.*, 2007). It is known to be effected by several diseases viz., blast, Brown spot, banded blight, smut, rust, foot rot and viral diseases.

The brown spot disease incited by *Helminthosporium nodulosum* (Berk and Curt.) is known to occur in most of the finger millet growing parts of the world such as India (Coleman, 1920), Uganda (Sydow, 1927), East Africa (Castellani, 1938), USA and Philippines (Butler, 1918) etc. (Anilkumar *et al.*, 2003). All the parts of the plant are susceptible to attack and seedlings are most susceptible. The concentration of fungal spore was maximum on leaf surface at flowering stage. Brown spot infected seeds used for sowing may not germinate at all due to pre- emergence rot of the seeds. In case such seeds germinate, post emergence rot is common. Where seeds or seedlings do not die or when healthy seedlings are subjected to attack by the inoculum from outside, the characteristics symptoms on the leaf lamina is the appearance of brown or dark

brown spot. The pathogen infects leaves more readily from the upper surface or between the leaf and leaf sheath. Infection takes place through the stomata, the epidermal cells or more frequently through certain epidermal out growths.

The disease, however, does not result in appreciable losses, as most of the present day cultivars are less susceptible. The disease generally becomes severe during the advance stage of plant maturity, as it happens to be a low sugar disease. High humidity and intermittent rains during the period of emergence of ear and before grain formation causes heavy ear infection and reduction in yield.

In this investigation, an attempt was made to evaluate the effect of age of seedlings on incidence of brown spot on finger millet.

### Material and Methods

To evaluate pre-release and released varieties for brown spot resistance in finger millet, experiments were conducted during *Kharif* of 2009-10 and 2010-11 at experimental fields of Agricultural Research Station, Vizianagaram, Andhra Pradesh. Sixteen different varieties were sown in both the years in RBD with plot size of 2.8 x 1.8 m. Standard agronomic practices were followed at the time of crop growth period. Occurrence of brown spot was recorded by visual observation following 0-5 scale (Table-1) at the time of crop vegetative stage and maturity stages.

**Table 1 - Scale used for screening the varieties against Brown spot**

Grade	Percentage leaf area affected
0	No infection
1	Pinhead spots less than 1% leaf area affected
2	Pinhead spots 5-10% leaf area affected
3	Typical brown spots with grey centre 5-25% leaf area affected
4	25-50% leaf area affected
5	Large brown spots with grey centre more than 50% leaf area affected.

### Results and discussion

Data on the severity of brown spot from the sixteen genotypes/varieties during 2009-10 (table 2) revealed that OEB-219, KMR-204, DPI-03-035 were recorded as brown spot susceptible varieties and VR-708, GPU-48, PES-110, PR-202 as resistant varieties.

During 2010 and 2011, RAU-8 was recorded as brown spot susceptible variety and GPU-28 was recorded as resistant genotype (Table 3). The results indicated that at maturity stage the crop is more prone for the disease as it is devoid of proper nutrition due to exhaustion of nutrients by the crop for grain filling and hardening. Further high temperatures of above 33<sup>0</sup>C, dry weather also predisposes the crop for brown spot. The pathogen survives in infected plant debris for over 18

months and seed inoculum remains viable for a year. Hence the seed treatment with Mancozeb @ 2g per kg seed and spraying with the same chemical @ 0.2% can contain this disease.

**Table 2- Evaluation of Pre-release and Released Varieties for Brown Spot(2009-10)**

S. No.	Entry No.	Disease (grade) (Mean values)		Grain Yield (Kg/ha)
		Pre flowering	At maturity	
1	OEB-259	2	3	3075.0
2	VR-708	1	1	1816.0
3	GPU-48	1	1	2815.7
4	TNAU-1022	2	3	3174.3
5	OEB-219	3	4	2850.3
6	KMR-204	3	4	2954.7
7	RAU-8	2	3	2751.0
8	GPU-28	1	2	3078.0
9	TNAU-1018	2	3	3002.3
10	VR(W)-936	2	3	2925.7
11	VR-900	2	3	3333.7
12	DPI-03-035	3	4	2625.3
13	PES-110	1	1	2698.0
14	L-5	2	3	2856.7
15	PR-202	1	1	3286.3
16	VR-847	2	3	2711.3

**Table 3- Evaluation of pre-release and released varieties for brown spot resistance (2010-11)**

S. No.	Entry No.	Disease (grade) (Mean values)		Grain Yield (Kg/ha)
		Pre flowering	At maturity	
1	GPU-28	0	1	3248.7
2	TNAU-1039	1	3	3039.3
3	VR-958	0	2	3374.0
4	OEB-526	0	2	2782.3
5	PR-202	1	3	3441.0
6	VL-347	0	2	3035.3
7	VR-708	0	3	1995.3
8	VR-929	0	2	3243.3
9	RAU-8	1	4	3038.7
10	PRM-6107	0	3	2984.0
11	VL-149	0	3	3042.7
12	GPU-72	0	2	3238.0
13	GPU-67	0	2	3157.7
14	DEB-530	1	3	2806.7
15	KMR-107	0	2	2421.3
16	VR-847	1	3	3449.7

## References:

Anilkumar, T.B., Mantur, S.G. and Madhukeswara, S.S., 2003. Diseases of finger millet. Indian Council of Agricultural Research , UAS, Bangalore, India.

Butler, E.J., 1918. Fungi and Diseases in Plants, Thaker Spink and Co. Culcutta pp 547.

Castellani, E., 1938. *Helminthosporium nodulosum* Sacc Dagurrea in Eritrea. *Agricoltura Colan* 32: 447-51.

Coleman, L.C., 1920. The cultivation of ragi in Mysore. *Bull. Dep. Agric. Mysore, Gen. Ser. 11*

Kumar, A.C.K., Nagaraja, A., Raghavendra, B.T. and Ravikumara, B.M., 2013. *In-vitro* evaluation of fungicides against *Drechslera nodulosa* causing brown leaf spot of finger millet *Eleusine coracana* (L.) Gaertn. *Journal Environment and Ecology* , 31 (2): 626-628.

Nagaraja, A., Kumar, J., Jain, A.K., Narasimhudu, Y., Raghuchander, T., Kumar, B. and Gowda, B.H., 2007. Compendium of small millet diseases. All India coordinated small millets improvement project, UAS, Bangalore, India.

Sydow, H., 1937. Fungi in *intenera costaricensi* collects. *Ann. Mycol.*, 25 : 154.



**Fig: 1 Brown Spot symptoms on leaves of finger millet**

