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## GPU 28 : A Finger millet variety with durable blast resistance

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Finger millet variety GPU 28 developed at the Project Coordination cell, All India Coordinated Small Millets Improvement Project during 1990 and released for cultivation in the states of Karnataka and Tamil Nadu has remained highly resistant to neck and finger blast during the last 15 years. With <2% incidence of both neck and finger blasts, it has occupied vast area of almost 75% under ragi in Karnataka owing to durable resistance and superior yield performance over the national checks VL 149 and PR 202.

**Key words :** Finger millet, durable resistance, blast, GPU 28

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### INTRODUCTION

Finger millet [*Eleusine coracana*(L) Gaertn.] ranks third in importance in area and production after sorghum and pearl millet. Karnataka has almost half of the area (around 1 million ha.) with a productivity of around 1436 kg/ha. Crop utilization is mostly as food grain and straw as a valuable fodder (Seetharam, 1997).

Of the several diseases affecting ragi, blast caused by *Pyricularia grisea* (Cke.) Sacc. is the most serious one causing considerable grain loss in many ragi-growing regions of Karnataka. According to Mc Rae (1922) the grain loss due to blast could be over 56 per cent. The pathogen can infect the crop at all stages from seedling to post-flowering phase. But neck infection causes significant loss in grain number, grain weight and significant increase in spike-let sterility (Rath and Mishra, 1975).

Evolution of varieties with inbuilt genetic resistance is the best means of combating disease problem in any crop. Such an approach is more relevant in a crop like, finger millet which is predominantly grown by poor and marginal farmers who have little means of controlling diseases through chemicals. Obviously, breeding for blast resistance assumes greater importance in ragi (Viswanath and Seetharam, 1989).

Breeding was initiated at the Project Coordination

cell of the AICSMIP, Bangalore by utilizing IE 1012 as the resistant parent and PES 176, HPB 7-6, PR 202 and Indaf 8 as high yielding adopted parents. Subsequently Indaf 5 is also used as an agronomically superior variety to which resistant genes from IE 1012 are incorporated through hybridisation followed by pedigree selection. As a result, the variety GPU 28 has been developed. GPU 28 is a medium duration (110 to 115 days) ragi variety which has been released for cultivation in rainy season both under rained/irrigated conditions in the states of Karnataka and Tamil Nadu during 1998. It is a highly blast resistant variety with a yield potential of 35-45 q/ha. (Seetharam and Halaswamy, 2003). Ever since its development and subsequent release, the variety GPU 28 has been evaluated in different varietal testing trials including IVT, AVT and MLT etc. for its blast resistance and yield performance by the All India Coordinated Small Millets Improvement Project.

### MATERIALS AND METHODS

GPU 28 as an entry/variety was tested at the project coordination cell, AICSMIP under rained situations in red laterite soils at the Zonal Agricultural Research Station, GKVK, Bangalore. The crop was raised following the recommended agronomic practices (Anonymous, 1990) in 3 m long rows comprising 10 rows per plot. The experiment was laid in randomised complete block design with each plot surrounded by a row of K7 a highly blast suscepti-

ble variety as infector row for evaluation under high disease pressure. Varieties PR 202 and VL 149 served as national checks. The seeds were line sown and thinning was done after 15-20 days maintaining a spacing of 22.5 cm × 6.25 cm. At dough stage of the crop, neck blast as the percentage of ears showing infection on the peduncle and finger blast as the percentage of fingers affected was recorded. After maturity, ears were harvested, dried, thrashed and seeds were cleaned to record seed yield per plot from which yield per ha was computed.

## RESULTS AND DISCUSSION

The neck and finger blast incidence recorded during the years of study are presented in Table 1. It is evident that the variety GPU 28 had <2% of both neck and finger blast as against 0.5-13 and 0-4% of neck and 0.5-22 and 1-7% finger blasts in the checks PR 202 and VL 149 respectively, thus indicating the high blast resistance of GPU 28 (Seetharam and Halaswamy, 2003). However, the yield performance of GPU 28 during different years of study ranged from 2716-6266 kg/ha in comparison to 3134-6296 and 2785-5037 kg/ha recorded in PR 202 and VL 149 respectively. These variations in yield are mainly attributed to the amount and distribution of rainfall, as the crop was rained.

**Table 1 :** Performance of GPU 28 against blast over national checks VL 149 and PR 202

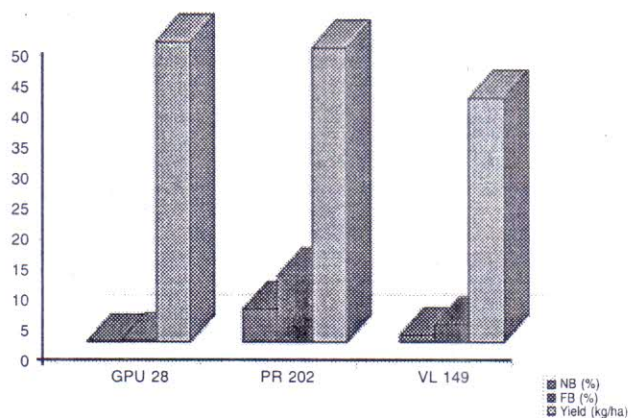
Variety	GPU 28			PR 202			VL 149		
	NB (%)	FB (%)	Yield (kg/ha)	NB (%)	FB (%)	Yield (kg/ha)	NB (%)	FB (%)	Yield (kg/ha)
1991	0.8	0.1	4541	0.5	0.5	4048	-	-	-
1992	0.7	1.8	4578	2.5	6.6	5980	-	-	-
1993	0.2	0.4	5348	6.7	11.5	5406	0.0	1.1	3949
1994	0.0	0.5	5727	3.8	6.8	5604	1.2	1.4	4158
1995	0.0	0.1	6148	1.8	6.6	5827	1.3	1.8	3530
1996	0.0	1.3	4595	12.8	17.3	4165	4.3	7.4	3854
1997	0.0	0.2	4370	1.7	3.6	4074	0.6	1.1	2785
1998	0.0	0.2	6266	6.7	14.0	5599	0.7	5.7	4517
1999	0.0	0.1	4888	9.1	14.7	6296	2.0	5.1	4296
2000	0.0	0.4	6103	1.4	15.1	5281	0.3	1.1	5037
2001	0.0	0.2	4815	7.8	15.9	4755	0.5	1.3	3777
2002	0.3	0.3	4446	4.9	3.0	3749	-	-	-
2003	0.0	0.0	2716	3.1	12.7	3134	-	-	-
2004	0.0	0.5	5007	9.4	22.3	4385	-	-	-
2005	0.0	0.2	3826	9.2	13.3	3652	-	-	-
Mean	0.1	0.4	4892	5.4	10.9	4797	1.2	2.9	3989

NB = Neck blast, FB = Finger blast

Looking at Fig. 1 can be very well concluded that the inbuilt resistance of GPU 28 has continued for

15 years thus exhibiting durability in resistance to blast which according to Johnson (1984) is the resistance that remains effective during prolonged and widespread use in an environment favourable for disease development. Further, the basis for durability is diverse and the methods to achieve the same are varied. This of course is evident even during surveys in different south Karnataka districts that mainly contribute to finger millet production. The variety has occupied almost 60-75% of the finger millet area in the state and is showing <2% neck and finger blasts.

Thus, since the variety has <2% neck and finger balsts for one and a half decade and has occupied very large area (almost 75 per cent) under finger millet crop in the state of Karnataka, it is concluded that GPU 28 has durable resistance against blast.



**Fig. 1 :** Mean performance of GPU 28 against blast and yield over checks

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