Table 2. Water use efficiency

Treatments	Water use efficiency (kg/ha/mm)	
	1994	1995
I_1 0.80 and 1.00 IW/CPE ratio(GW)	19.98	16.62
I_2 0.80 and 1.00 IW/CPE ratio(NM)	15.51	14.41
I_3 1.00 and 1.00 IW/CPE ratio(GW)	21.95	17.95
I_4 1.00 and 1.00 IW/CPE ratio(NM)	16.52	14.90
I_5 1.00 and 1.20 IW/CPE ratio(GW)	21.60	19.16
I_6 1.00 and 1.20 IW/CPE ratio(GW)	17.03	14.71

GW = Gradual widening NM = Normal method

stress was reported by Ramadoss and Moosa Sherief (1993).

With regard to nitrogen application, application of nitrogen at 150 per cent of recommended level registered the higher yield of 44.4 t/ha which was higher by 18.7, 12.75, 5.0 per cent over 75 per cent , 100 per cent and 125 per cent of recommended level of N respectively. But 125 per cent of N was on par with 150 per cent of recommended N.

The number of fruits/bunch and number of hands/bunch were also higher in the above said treatments. The increased fruit yield was mainly due to increased number of fruit bunches. The reduction in yield was due to moisture stress (Holder and Gumes,1984).

With regard to consumptive use of water, the treatment of irrigating the crop 1.00 and 1.20 IW/CPW ratio consumed higher quantity of water (2605.6 mm in 1994 and 2814.2 mm in 1995) compared to other irrigation levels. Regarding gradual widening of channels and basins, there was a saving of 20-25 per cent of water over check basin method (Farmer's practice). The highest water use efficiency was obtained under gradual widening method of irrigation.

From the results, it is evident that irrigating the crop once in 6-7 days upto 7 months and once in 5-6 days later till harvest with 125 per cent of recommended level of N recorded the increased yield of 18.7 per cent over other treatments.

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STIGMA RECEPTIVITY AND POLLEN VIABILITY STUDIES IN HYBRID PEARLMILLET KM2

A.ANANTHAKALAISELVI, V.KRISHNASAMY and J.VIJAYA

Department of Seed Science and Techonology
Tamil Nadu Agricultural University
Coimbatore – 641 003.

ABSTRACT

The pollen viability of pearlmillet fertility restorer line (K560 D230) was tested during two consecutive summer seasons. The viability of pollen was judged in terms of seed setting on the male sterile line (MS 5141A). The pollination with fresh pollen and stored upto 2 hours resulted in good seed setting. Also the stigma receptivity of the male sterile line was tested by starvation and then by open pollination. Starvation upto two days resulted in better seed setting and after which the seed set declined.

KEY WORDS: Hybrid pearlmillet, Pollen viability, Stigma respectivity.

Table 1. Mean panicle weight (g), seed yield (g) and seed set (%) of male sterile line (ms 5141A) pollinated with fertility restorer (K 560-D 230) during summer 1996 and 1997

Pollen dusting after collection (h)	Panicle weight (g)		Seed weight (g)		Seed set (%)	
	1996	1997	1996	1997	1996	1997
0 (8 AM)	15.337	15.519	12.807	12.639	83.5	82.8
1 (9 AM)	15.290	15.290	12.974	12.739	84.9	83.4
2 (10 AM)	9.275	9.256	6.588	6.696	71.1	72.4
3 (11 AM)	4.357	4.605	1.016	1.007	23.4	23.1
4 (12 Noon)	3.579	3.599	0.140	1.179	3.9	5.0
CD (P=0.05)	0.536	0.522	0.541	0.735	5.237	6.859

The male sterile line of pearlmillet (*Pennisetum americanum* L.) is solely dependent on its facility restorer line for pollen supply during certified seed production. Therefore stigma receptivity coupled with adequate supply of viable pollen is essential for good amount of seed setting. The knowledge of period of pollen viability after anthesis and stigma receptivity after full stigma emergence in field conditions therefore assumes a great significance from seed production point of view. So the study relating to these aspects in parental lines of KM2 pearlmillet was undertaken.

MATERIALS AND METHODS

The male sterile line (MS 5141A) and the corresponding fertility restorer line (K560-D230) were grown during summer seasons of 1996 and 1997 at Coimbatore. A planting ratio of 2 : 8 (male to female) was followed with a spacing of 45 x 20 cm at six replications. Normal agronomic practices were followed. Fresh pollen was collected from R lines at 8 am from earheads bagged two to three days prior to the onset of anthesis. Five panicles of approximately equal size from seed parent were pollinated with pollen collected from the R line immediately (fresh pollen), and after one, two, three and four hours of collection. The pollination was accomplished by inserting the bagged earheads of the seed parent into the bag containing the poollen of the restorer line. A gentle shake was given so as to distribute the pollen grains uniformly over entire spike. The pollinated panicles were then rebagged and secured with pins. At maturity each pollinated earhead was harvested, weighed and threshed separately. The seed weight per earhead was recorded and used to determine the longevity of the pollen. Seed setting percent was caluculatd on weight basis (Seed weight divided by panicle weight x 100).

To study the stigma receptivity of the female seed parent, at the stage of full earhead emergence and one day before stigma receptivity the selected earheads (about 35-40 numbers) were covered with a paper cover. On the next day, 5 paper covers were removed and allowed for open pollination. Likewise on the subsequent days the covers were remvoed and allowed for pollination. The earheads were harvested, weilghed and threshed separately. The seed weight was recorded to know the receptivity of the stigma. Seed setting percent was calculated on weight basils (seed weight divided by panicle weight x 100). The analysis was carried out according to procedure described by Panse and Sukhatma (1967) for the data recorded separately.

RESULTS AND DISCUSSION

The analysis showed significant difference for the panicle weight, seed weight and seed set percentage. The data on mean panicel weight (g), seed weight (g) and seed set (%) obtained using fresh and stroed pollen for different periods during

Table 2. Mean panicle weight (g), seed yield (g) and seed set (%) of male sterile line (ms 5141A) after different starvation periods during summer 1996 and 1997.

Starvation after full stigma emergence (days)	Panicle weight (g)		Seed weight (g)		Seed set (%)	
	1996	1997	1996	1997	1996	1997
0	15.322	15.252	13.431	13.454	87.7	88.3
1	14.870	14.905	12.832	12.833	86.3	86.2
2	14.652	14.770	10.355	10.371	70.7	71.0
3	13.382	13.353	8.226	8.317	61.4	62.3
4	10.424	10.602	4.487	4.510	43.0	42.6
5	9.554	9.588	1.042	1.080	10.0	11.2
6	8.422	8.443	0.390	0.371	4.7	4.7
CD (P=0.05)	0.552	0.578	0.551	0.601	17.416	5.388

summer 1996 and 1997 are given in Table-1. Significant differences were found in seed yield due to period of pollen storage. The pollen from the resotrer line caused significantly higher seed yield when the pollination was made with fresh and stored pollen, indicating that fresh and 1 hour stored pollen were useful for good seed setting in pearlmillet. But upto two hours of storage the seed set was 71.1 per cent. The results are in agreement with those of Pokhriyal and Mangth (1979), Kharwal and Singh (1987) and Suryavanshi *et al.* (1994).

The data on mean panicle weight (g), seed weight (g) and seed set (%) obtained for different starvation periods of stigma are given in Table 2. The recorded data exhibtied significant differences with respect to different storage periods. The stigma was receptive upto two days of starvation by recording 70.7 percent seed set. More than 50 percent of seed set was observed upto three days starvation.

Use of fresh pollen and one hour stored pollen were found to be effective in getting good seed set and the stigma will be receptive upto three days of starvation

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