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Short Communication

OCCURANCE OF INTERMEDIATE FORMS (SHIBRAS) IN CULTIVATED FIELDS OF PEARL MILLET

B.B. Singh*

ICRISAT-Niger Cooperative Programme
Republic of Niger, West Africa

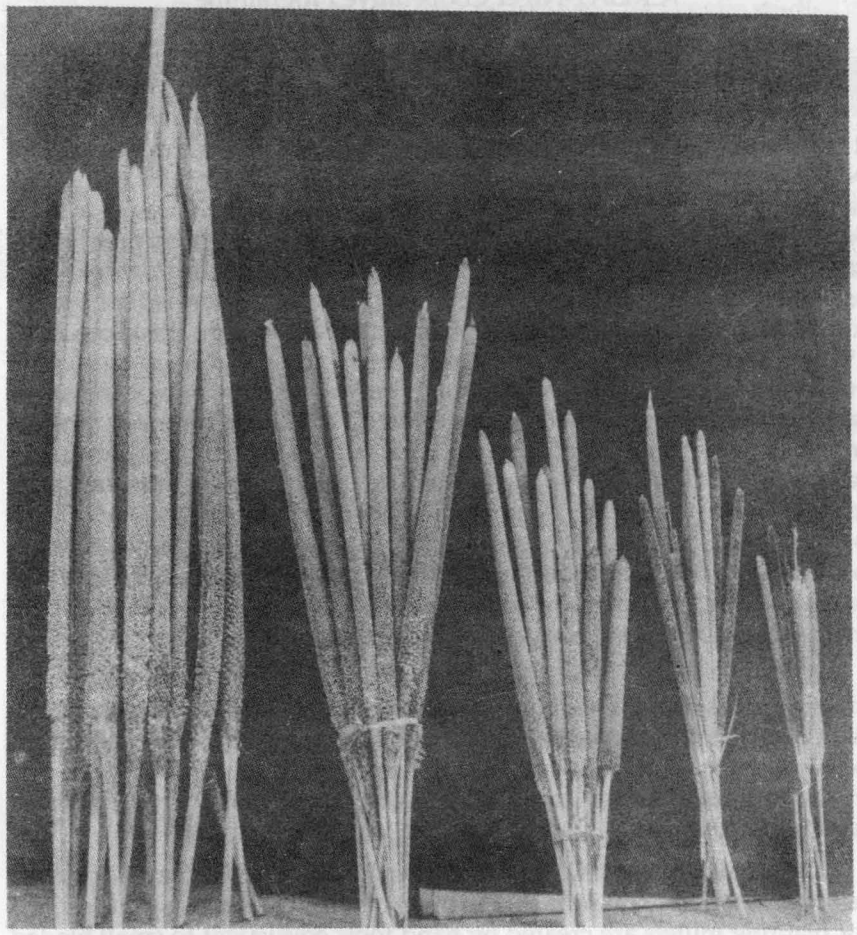
Pearl millet (*Pennisetum glaucum* (L.) R. Br.) cultivated over more than 2 m ha annually ranks 1st in the area and production in the Republic of Niger, West Africa (Singh and Ouendeba, 1977). Niger falls within the region of pearl millet domestication (Brunken *et al.* 1977), where wild, weedy and cultivated forms occur in aboundance. Cultivated pearl millet crosses with its wild relatives such as subspecies *monodi* (formarly known as *violaceum*) and *fallax* which result into creation of intermediate weedy forms which occur abundatly in many cultivated fields (Brunken *et al.* 1977). These intermediate forms continue to cross and back cross with cultivated types and inter cross among themselves appear to be the major factor land varieties in West Africa (Scholz, 1979). Though various farmers try to eliminate the weedy forms at various stages, the intermediate forms called shibras perpetuate in the farmers fields with varied morphologies, ranging from the forms close to cultivated pearl millet to their wild proginators. Since the crop is cross fertilizing, the genes for shattering persist in the non shattering forms. The weedy forms produce relatively smaller heads, smaller grains and are sometimes harvested for food as they mature early before the maturity of the main crop.

As the occurance of different cultivated, wild and intermediate forms in the farmers fields is common phenomenon in the Sahel region of West Africa, their careful consideration is essential is drawing samples during pearl millet exploration and collection in this region. The findings reported in the present paper is based on the data collected directly from the farmer's fields.

Pearl millet in West Africa is grown in hills spaced 1-1.5 m apart in the sandy and sandy-loam soils. At the onset of rainy season (May-June), hills for planting millets are created by hand tools equivalent to small bladed spade with a long handle. Thirty-fifty seeds are placed per hill manually and hills are covered with by foot. Twenty-five days after planting, thinning is carried out leaving 4-5 pearl millet seedlings in each hills.

*Present Address : National Bureau of Plant Genetic Resources, New Delhi-110 012

In order to examine the frequencies of various forms of ear heads in the farmer's field, ten (10) farmer's fields were sampled at random in typical pearl millet growing regions of the Republic of Niger (West Africa). A total of 100 hills selected randomly were observed in each farmer's field. Total number of tillers were counted for each hill and totalled for the 100 hills. The number of earhead bearing tillers were then counted and noted as productive tillers. When each earheads were examined carefully, five distint types of earheads were observed (Figure 1). The grouping of different forms of earheads for each farmer's field and their respective percentage in relation to total productive tillers have been summarised in table 1.



1 Cultivated 2 Close to cultivated 3 Intermediate 4 Close to wild type 5 Wild type

Fig. 1. Different forms of earheads observed in the farmer's fields in Niger, W.A.

Of the total tillers counted for various farmer's fields, only 48 to 63.8 per cent tillers were found having grain bearing earheads (productive earheads). This is a common phenomenon in the hill planting which is due

Table 1. Frequency of different forms of pearl millet earheads observed in the farmer's fiels in Niger, West Africa, rainy season 1985.

Field No.	No. of hills observed	Total No. tillers	No. of Productive tilers	Cultivated forms millet heads No. (%) Length (cm)	Earheads close to cultivated forms No. (%) Length (cm)	Earheds interme diate between cul tivated & wild type	Eartheads close wild type No. (%) Length (cm)	Earheads of wild type No. (%) Length (cm)
1.	100	1102	545 (49.5)	120 (21.6) 88.5	112 (20.6) 69.3	144 (26.5) 58.9	121 (22.2) 43.2	48 (8.1) 29.3
2.	100	1310	833 (63.5)	285 (34.2) 104.8	196 (23.5) 77.5	191 (22.9) 60.2	105 (12.6) 44.6	56 (6.7) 27.9
3.	100	862	478 (55.5)	128 (26.8 88.4	89 (18.6) 67.5	122 (25.5) 57.1	60 (12.6) 46.0	79 (16.5) 28.8
4.	100	1041	500 (48.0)	136 (27.2) 82.1	138 (27.6) 63.3	133 (26.6) 60.3	45 (9.0 33.4	48 (9.6) 24.7
5.	100	881	468 (53.1)	82 (17.5) 87.4	93 (19.9) 68.9	121 (25.9) 56.7	98 (20.9 37.7	74 15.8) 24.1
6.	100	1071	557 (52.0)	163 (29.3) 78.9)	120 (21.5) 58.3	185 (33.2) 47.8	61 (10.9) 36.2	28 (5.0) 23.8
7.	100	1093	629 (57.6)	178 (28.3) 81.5	184 (29.3) 65.0	138 (21.9) 51.7	88 (13.9) 35.7	41 (6.5) 21.4
8.	100	1074	656 (61.1)	187 (28.5) 87.6	153 (24.2) 69.2	155 (23.6) 57.2	113 (17.2) 40.7	51 (7.8) 23.5
9.	100	848	541 (63.8)	168 (31.1) 94.0	116 (21.4) 72.6	145 (26.8) 55.7	68 (12.6) 42.5	44 (8.13) 23.9
10.	100	936	550 (58.8)	171 (31.1) 71.8	120 (21.8) 58.6	143 (26.0) 47.0	61 (11.1) 36.5	56 (10.2) 21.6
Total	100	10218	5757 (56.3)	1618 (28.1) 865	1321 (22.9) 670.2	1477 (25.7) 522.6	820 (14.2) 396.5	5.25 (9.12) 249
Mean 100 hills		1022	575	162 86.5	132 67.0	147 55.3	82 39.7	52 24.9

Values under brackets indicate per cent of productive tillers

to excessive competition among seedlings which emerge and which are maintained in each hill after thinning. In hill planting over less fertile sandy soils, mostly main tiller bear the productive tillers and side tillers are generally unproductive tillers resulting into abundance of unproductive tillers.

About 50 per cent of the total productive heads were found to be typically farmers preferred types comprising of 28.1 per cent long headed earheads and 23 per cent the forms closed to farmers preferred types with an average ear length of 86 cm and 67.0 cm, respectively. The frequencies of cultivated forms of pearl millet heads in various fields varied from 17.5 per cent in the field number 5 to 34.2 per cent in the field number 2 with the mean head length of 87.4 cm and 104 cm, respectively. The frequencies of earheads intermediate between cultivated and wild type millets varied from 21.9 per cent in field NO. 7 to 33.2 per cent in the field number 6 with the mean head length of 60.2 cm and 47.8 cm, respectively. When the average was computed over all the fields 25.7 per cent earheads were found to be intermediate between cultivated and wild type millets with mean head length of 55.3 cm. The mean frequency of earheads close to wild type pearl millets was observed to be 14.2 per cent of the total productive earheads with mean head length of 39.4 cm. The frequencies of these types ranged from 9 per cent to 22.2 per cent with mean head length of 33.4 and 43.2 cm respectively. Of the total productive heads examined 9.12 per cent represented wild type heads with headlength of 24.9 per cent cm and very small grains. The frequency of wild type head ranged from 5 per cent to 16.5 per cent in various fields with earheads length of 21.4 cm to 29.3 cm.

It is apparant from the data recorded from different farmer's fields that the frequencies of various forms of earheads are variable, which might have been due to different degrees of elimination of intermediate forms practiced by the farmers in the previous cropping season and the frequencies of shattered wild type and intermediate forms of grains in the earlier cropping season (Brunken *et al.*, 1977, Appa Rao *et al.*, 1986).

These observations clearly demonstrate that adequate number of earheads representing various forms should be sampled in each field to represent existing variability represented by heterogenous plants present in the farmers fields, while collecting the pearl millet germplasm in the West African region.

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