

Genetic Variability in the Wild Rise *Zizania aquatica* L.

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Abstract—Study of genetic variability in 10 collections of wild Rise of diverse geographic regions shows significant variability in grain yield per plant, fodder yield per plant, plant height, numbers of tillers per plant, number of ears bearing tiller per plant, number of leaves on the main tiller, average length of leaf and seed sheltering percentage. Non-significant variability as observed in average width of leaf and grain /husk ratios. This study shows that the variability observed in ten diverse collections may be exploited for breeding of high yielding and non-sheltering plant.

1. INTRODUCTION

Wild rise (*Zizania aquatica* L.) is found abundantly throughout India as wild crop. It has also been reported in America and is now being cultivated in the upper- mid-western USA and Southern Canada and so becoming a more common food. (Varshney, 2000, Zhai, *et. al.*, 1994, 1996, Murakami, 1988). In India poor people use it as a substitute of food and some upper class people use it during the fast. As this plant grows on the waste bare land where sufficient water is available and no cultural practices are required. Its genetic transformation as a cultivated crop is essential. India has already entered the age of algeny (Genetic alchemy) and genetic transformation of the crop plants in a big way. (Swaminathan, 1970). Genetic variability has been pointed out by, Elliot and perhinget (1977), Elliot and Oelke (1977), Elliot and Goldman (1980). Keeping this in view a number of collection collected from diverse geographical regions have been studied for their genetic variability.

2. MATERIAL AND METHODS:

Present study based on the 10 collections of wild rise of diverse geographical regions have been presented in the following table -1.

The collection were maintained and studied for following quantitative characters such as, plant height, number of tillers per plant, number of ear bearing tiller per plant, number of leaves on the main tiller, average length of leaves, average width of the leaves, seed weight per plant, dry fodder weight per plant, percent shattering habit and grain husk ratio in the

experimental department of Botany, S. V. college, Aligarh and Department of Botany, D. S. college, Aligarh observations were recorded on individual plant basis for each treatment.

Table 1

Sr. No.	Name of strains	Symbol	Source
1	Collection I	J1	Jalesar
2	Collection II	Ba2	Bareilly
3	Collection III	P3	Pikhalauni
4	Collection IV	Un4	Unnao
5	Collection V	Ga5	Gava
6	Collection VI	A6	Aurangabad
7	Collection VII	C7	Cuttaek
8	Collection VIII	Bh8	Bhuvaneshwar
9	Collection IX	H8	Hosbangabad
10	Collection X	Gu10	Guna

3. RESULT AND DISCUSSIONS:

The yield of the grain and fodder yield per plant and the factor contributing to them were studied for all the ten collections of wild rise. The results obtained from this study are summarized in Table 2.

Table 2 shows that Gu10 (25.00 gms) yielded maximum grain per plant and Bh8 (23.00 gms minimum).

So far a fodder yield is concerned Guna yielded maximum fodder and J1 yielded minimum fodder. For seed yield only Gu10 was the significantly high yielder, while in the case of fodder H9 was also significantly high yielder.

As it is well known the yield of grain and fodder per plant is a combined function of a number of factors (Kaul and Singh, 1964), hence plant height, no. of tillers per plant, seed weight per plant, percent shattering and grain husk ratio are considered here for further analysis in the table 3.

Table 2: Yield of grains and fodder per plant (In Gms.)in various collections of wild rice.

Sr. No.	Collections	Grain yield	Fodder yield
1	Collection I	24.20	98.27
2	Collection II	23.20	82.26
3	Collection III	24.50	78.16
4	Collection IV	24.50	77.25
5	Collection V	23.10	70.88
6	Collection VI	23.50	68.63
7	Collection VII	23.50	67.16
8	Collection VIII	23.00	66.50
9	Collection IX	24.00	66.63
10	Collection X	25.00	64.00
	C.D. at 1%	1.70	15.10

Plant height showed maximum height of 66.00 Cms. By H9 and J1. The minimum (54.00 cms.) G5 , Pi3 and U4 stood 2nd, 3rd and 4th in order of performance and differing significantly.

The maximum number of tillers was shown by Ba2 (6.50) differing significantly from rest of the collections. J1 stood second in order of performance which was having 4.73 tillers. The minimum number of tiller was found in Gu10 (0.80). The two better performing collections differed significantly from rest of the collections had also significant difference among themselves.

The maximum number of ear bearing tillers, was shown by P3 (3.63) and minimum by Gu10 (0.70).

Table 3: Table showing Plant height, No.of tillers, No.of ear bearing tiller and no. of leaves.

S. No	Collections	Plant height	No.of tillers	No.of ear bearing tiller	No. of leaves
1	J1	54	4.73	3.25	10.95
2	Ba2	65	6.50	3.50	10.63
3	P3	60	3.03	3.63	10.63
4	Un4	61	3.00	2.00	10.60
5	Ga5	59	2.46	1.51	10.53
6	A6	63	2.33	2.30	11.00
7	C7	64	2.26	2.01	10.46
8	Bh8	65	2.20	2.01	10.30
9	H8	66	0.93	0.90	7.13
10	Gu10	60	0.80	2.70	6.40
	C.D.	21.10	3.951	2.10	9.01

The maximum number of leaves was found in A6 (11.00) and minimum in Gu10 (6.4), J1 was second in order performance differing insignificantly.

Table 4: Table showing Average length of leaves, Average width of leaves, Seed shattering and Grain husk ratio.

Sr. no.	collections	Av. Length of leaves	Av. Width of leaves	Seed shattering	Grain husk ratio
1	J1	9.9	0.5	99	80/20
2	Ba2	11.1	0.6	96	75/25
3	P3	11.6	0.5	64	80/20
4	Un4	11.2	0.5	96	65/35
5	Ga5	10.9	0.5	91	70/30
6	A6	11.0	0.5	86	70/30
7	C7	11.1	0.4	84	70/30
8	Bh8	11.7	0.4	70	75/25
9	H8	11.0	0.5	90	75/25
10	Gu10	10.0	0.5	94	75/25
	C.D.	1.52	N.S.	18.24	N.S.

The maximum length of the leaves was shown by P3 (11.6) and minimum length of leaves was shown by J1 (9.9).

Ba2 is the maximum width of leaf (0.6) differing insignificantly from rest of the collections. The minimum width of the leaves was shown by C7 and Bh8 (0.4).

The maximum shattering was found in J1 (99) and maximum was in Bh8 (70).

The maximum grain husk ratio was observed in J1 and P3 (80/20) and minimum in U4 (65/35).

The observation in the present study shows that there is great genetic variability in the yield and yield contributing characters. So far as percentage seed shattering is concerned source collections retained seeds in higher percentage up to maturity. The collections can be used in the hybridization to obtain better yielding, no shattering types.

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