

NITRATE REDUCTASE ACTIVITY AND ITS RELATIONSHIP WITH YIELD CHARACTERS IN JUTE

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Nitrate reductase activity (NRA) in the leaves of 19 different cultivars of jute (*Corchorus capsularis* L. and *C. olitorius* L.) seedlings were studied in relation to yield characters. NRAs showed positive correlation with the yield characters. Fibers and wood weight per plant and yield potential in term of fibre weight could possibly be related with nitrate reductase activity at seedling stage. Based on correlation study and analysis of variance (ANOVA) between NRA and fibre weight it was also found that JRC 212, JRC 321, JRO 524 and JRO 632 were superior amongst other cultivars. However, on the basis of Duncan's multiple range test (DMRT) above cultivars were not significantly different to each other in fibre yield potential.

Jute is a bast fibre crop and the golden fibre of commerce is obtained from the two cultivated species of the genus *Corchorus* namely *C. capsularis* L. and *C. olitorius* L. This crop occupies an important position in the Indian economy earning sufficient amount of foreign exchange.

Nitrate Reductase (NR) is one of the most important regulatory enzyme associated with the process of nitrate assimilation and plant growth. Considerable work has been done on cereals and legumes to emphasize the role of NR in yield (Johnson *et al.*, 1976, Miguel, 1981, Singh, 1986). Eilrich and Hageman (1973) proposed to use NRA as a selection criterion in a breeding programme for screening of germplasm for higher productivity in cereals. Such a information in the fibre yielding plant in which the economic yield is fibre, is not available. Therefore, the present investigation was undertaken to examine the relationship between NRA at seedling stage and yield performance in term of fibre and wood weight in a wide range of jute cultivars.

Seed of 19 cultivars of jute (11 cultivars of *Corchorus capsularis* L. and 8 of *C. olitorius* L.) were sown in the earthen pots (30.5 cm diameter) containing 16 kg farm soil and grown under normal agricultural recommended practices (Saraswat and Mukherjee, 1984). After 5 days plants were thinned and only four plants maintained per pot. The fully expanded first primary leaf of the seedling (15 DAS) was used for the assay of nitrate reductase. NRA was assayed according to the procedure described previously (Srivastava, 1975). Plants were harvested at 120 DAS and the dry weight of the fibre and wood of each cultivars were measured after retting.

Data presented here are the mean of three replicates and were statistically analyzed. Repetition of the experiment in the three year gave similar trends, hence one year date (1991) are presented in this paper.

Nitrate reductase activity in the first vegetative leaf of 15 day old seedling of each cultivar of *C. capsularis* and *C. olitorius* are shown in table I (A & B). There was considerable difference between the NRA in cultivars of *Capsularis* spp. whereas, the cultivars of *Olitorius* spp showed difference of relatively less magnitude. In

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Table I : Nitrate reductase activity (NRA) at seedling stage and its correlation with fibre and wood weight in different cultivars of *Corchorus capsularis* L. and *C. olitorius* L.

Cultivar	NRA $\mu\text{mol NO}_2$ $\text{g}^{-1}\text{fwh}^{-1}$	Fibre weight g plant^{-1}	Wood weight g plant^{-1}	Correlation matrix	
				1x2	1x3
<i>Corchorus capsularis</i> L.					
Vidyasundar	0.068f	6.73de	12.17g	0.989	0.961
Deodholi	0.457h	16.13a	37.80b	0.075	0.049
Australia green	0.098f	8.17cde	21.84e	0.996	0.991
Chlorina-1	0.340bcdf	13.00ab	40.27a	0.989	0.998
Lizza-2	0.040f	6.10de	11.87g	0.816	0.569
IC-20290	0.142ef	10.40bcd	25.94d	-0.756	0.746
Fanduak	0.190def	10.57bcd	28.50c	0.942	-0.397
JRC 212	1.140a	15.60a	29.10c	0.704	0.766
JRC 321	0.415bc	15.07a	22.23e	0.982	0.859
IC 3075 C	0.277cde	12.00abc	40.50a	0.992	0.997
Red Swaim	0.056f	5.00a	15.44f	0.501	0.698
<i>Corchorus olitorius</i> L.					
Wild olitorius green	0.131bc	11.63b	20.67c	0.547	0.963
Aus via Brazil	0.285b	17.53a	49.43d	0.994	-0.999
JRO 524	0.730a	19.43a	43.50ab	0.991	0.999
EC 169816	0.137bc	12.50b	37.20b	0.446	0.731
Short Internode	0.130bc	11.07b	20.53c	0.997	0.954
JRO 632	0.582a	18.70a	42.50ab	0.999	-1.000
TJ 23	0.113bc	10.17bc	40.00b	0.648	0.654
Stiff Stem	0.083c	6.50c	10.33c	0.721	0.778

Note: Means within each row followed by the same letter are not significantly different at 1% level by Duncan's multiple range test.

Capsularis var JRC 212 and Deodholi having fibre content of 15.6 and 16.13 g plant^{-1} respectively were considered to be superior against Red swain (5.0 g plant^{-1}).

In *olitorius* var. JRO 524 has highest (19.5 g plant^{-1}) and Stiff stem has lowest (6.5 g plant^{-1}) fibre yield. Similar reports have also been made in wheat (Dalling and Loyn, 1977). On the basis of correlation study and ANOVA between NRA and fibre weight, JRC 212, JRC 321, JRO 524 and JRO 632 were found superior over other cultivars examined. But these cultivars were not significantly different with each other in their potentiality for fibre yield (Table I. A & B) on the basis of DMRT comparison (Gomez and Gomez, 1983). It is similar findings have been obtained by Palit and Bhattacharya

(1982) who established a direct relationship with dry fibre weight in JRC 212 and JRO 632.

The correlation matrix was worked out between NRA and yield parameters. The positive correlation was obtained in most of the cultivars. Those cultivars having higher level of NRA resulted in higher fibre yield. Thus a high yield of fibre would seem to be favoured by a high nitrate assimilation.

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