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RESPONSE OF KERNEL DIMENSIONS OF FINE RICE TO DIFFERENT LEVELS AND METHODS OF NITROGEN APPLICATION

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A field study was conducted in Kharif seasons of 1996 and 1997 to see the effect of different levels of nitrogen and methods of its application on kernel dimensions of fine rice, Basmati-385. In 1996, more kernel length was recorded with nitrogen application using point placement method compared with broadcast method. Nitrogen used @ 80 kg ha! resulted in longer kernels than rest of the nitrogen levels in both the years of study. Maximum kernel width was noted again with 80 kg N ha' in 1996 as well as 1997. Higher length-width ratio was observed in control followed by nitrogen levels 80 and 120 kg ha-t, both being statistically equal.

Key words: fine rice, kernel dimensions

INTRODUCTION

Increasing importance of rice quality is apparent from recent shifts in research emphasis. Of course, the importance of quality varies across countries. Among various quality parameters, grain size and shape should be considered in quality improvement along with milling because these determine the market acceptability of milled rice (Santha *et al.,* 1997). Long slender rice grain fetches a high price in the international market., Although under normal conditions, the kernel dimensions are genetically controlled but under stress conditions, appropriate cultural and management practices do contribute to increased kernel length, width and thickness (Khan, 1991). The present work was carried out to ascertain the response of kernel dimensions to different nitrogen levels and methods of its application.

MATERIALS AND METHODS

Most of the detials pertaining to this section have been given in Khalid *et al.* (1999 a,b), Kernel dimensions (length and width) of milled rice were taken on 100 normal kernels from each treatment with the help of a dial caliper. Length-witdh ratio was calculated from these values.

RESULTS AND DISCUSSION

Kernel Length: The data on kernel length given in Table 1 indicated that in 1996 nitrogen application methods had significant impact on kernel length. Application method M2 was found statistically better than Ml., During the same year nitrogen level N2 produced the maximum kernel length (9.63 mm) with minimum in control (9.18 mm). NI and N3 values did not differ statistically from each other. Again in 1997, N2 resulted in maximum kernel length (9.60 mm) with minimum in control (9.05 mm). Less losses, higher uptake and accumulation of N in application method M2 might have caused more favourable nitrogen metabolism and higher translocation of assimilates into kernels resulting in increased kernel length. Increased kernel length with medium nitrogen level could be due to an optimum vegetative growth achieved at this level providing the sink an opportunity to receive higher amount of soluble carbohydrates resulting in increased kernel length.

Table 1. Effect of application methods and levels of nitrogen on kernel length (mm)

Treatment	1996	1997
A. Application methods		
M1 = Broadcast	9,43b	9.30
M2 = Point placement	9,46a	9.33
LSD (5%)	0.02	NS
B. Nitrogen levels (kg N ha-t)		
NO= 0	9.18c	9.05d
NI = 40	9.50b	9.25c
N2 = 80	9.63a	9.60a
N3 = 120	9,48b	9.36b
LSD (5%)	0.03	0.05

NS= Non-significant; means followed by different letters in a column are significantly different at 0.05 P.

Kernel Width: The data presented in Table 2 showed that various nitrogen levels exhibited a significant influence on kernel width in 1996. On average nitrogen level N2 produced kernels having more width (2.18 mm) than control (2.07 mm). Average kernel width with N3 was found to be statistically equal to that with NI but less than that obtained with N2. In 1997, treatment N2, again

produced kernels of greater width followed by NI and N3 which were statistically equal but better than control.

Table 2. Effect of application methods' and levels of nitrogen on kernel width (mm)

Treatment	1996	1997
Nitrogen levels (kg ha-')		
NO= 0	2.07c	1.94c
NI = 40	2.16ab	2.14b
N2 = 80	2.18a	2.19a
N3 = 120	2.15b	2.15b
LSD (5%)	0.02	0.02

Means followed by different letters in a column are significantly different at 0.05 P.

* Effect of application methods on kernel width was non-significant.

Table 3. Effect of application methods' and nitrogen levels on kernel length-width ratio

Treatment	1996	1997
B. Nitrogen levels (kg - ha-I)		
NO= 0	4.44	4.67a
NI = 40	4.39	4.31c
N2 = 80	4.16	4.38b
N3 = 120	4.40	4.35bc
LSD (5%)	NS	0.043

NS= Non-significant; means followed by different letters in a column are significantly different at 0.05 P.

* Effect of application methods on kernel length-width ratio was non-significant.

Length-Width Ratio: As evident from Table 3, various nitrogen levels showed significant differences in respect of length-width ratio only in 1997. Maximum length-width ratio was observed in control (4.67), followed by N2 (4.38) and N3 (4.35) in a descending order. However, they were statistically similar to each other. Lower length-width ratio (4.31) was obtained with NI treatment. These results are in line with the findings of Rao *et al.* (1993).

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