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Short Communication

Naphthalene acetic acid holds promise in hybrid rice seed production

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Hybrid rice technology exploits the phenomenon of hybrid vigour and involves raising the commercial crop from F_1 seeds. Adoption and success of hybrid rice technology will depend largely on practical seed production technology, economical grian yield from hybrid rice seed plots and efficient national seed production.

Application of GA_3 to hybrid rice seed production is one of the important phenomena because it a) enhances percent panicle exertion from the flag leaf, b) increases the duration of floret opening, c) increases the rate of stigma exertion and d) lengthens the duration of stigma receptivity, etc. [1].

One of the major drawbacks of the CMS lines of rice is the incomplete panicle exertion, which reduces the number of spikelets available for out-crossing. GA_3 application has proved to be an effective means to overcome this problem. However, GA_3 is one of the costly inputs in hybrid seed production. Therefore, it is necessary to identify alternate chemical as a substitute to economize the use of GA_3 in hybrid rice seed production.

An experiment was conducted in randomized block design with three replications and 15 treatments at Regional Agricultural Resarch Station, Karjat, Dist. Raigad (MS) during *Rabi*-1999-2000, *Kharif*-2000, *Kharif*-2001 with 15 treatments comprising of five chemicals *viz.*, Gibberellic acid (GA_3), urea, naphthalens acetic acid (NAA), boric acid, potassium dihydrogen orthophosphate with one control. The treatments were as follows :

T_1 - Control, T_2 - 50g GA_3/ha, T_3 - 100g GA_3/ha, T_4 - 50g NAA/ha, T_5 - 100g NAA/ha, T_6 - 150g NAA/ha, T_7 - 200g NAA/ha, T_8 30g GA_3 + Urea 0.1% + Boric acid 0.1%, T_9 - Boric acid - KH_2PO_4/ha, T_{10} - 50g GA_3 + 50g NAA/ha, T_{11} - 15g GA_3 + 100g NAA/ha, T_{12} - 15g GA_3 + 150g NAA/ha, T_{13} - 30g GA_3 + 50g NAA/ha, T_{14} - 30g GA_3 + 100g NAA/ha, T_{15} - 30g GA_3 + 150g NAA/ha.

Each treatment was applied on an area 20 m^2. The first spray of 1/4 portion of each treatment was applied by dissolving respective chemicals in 500 lit. water/ha with the help of knapsack sprayer at 5% heading over female parent of 'Sahyadri' rice hybrid. Remained 3/4th portion of each treatment was applied by same way at 30 to 40% heading over female parent. The observations were recorded on net plot basis for yield and yield contributing characters *viz.* % seed set, % panicle exertion and seed yield (kg/ha). The data was subjected to statistical analysis, the analysis of variance were calculated by R.B.D. design [2].

Analysis of variance (Table 1), showed that all the treatments differe significantly from each other for all the characters. It is also revealed from Table 2 that the % panicle exertion was the highest for 200g NAA/ha (88%) application for hybrid rice seed production plot, followed by 85.60%, 84.87%, 83.27% and 81.28% for T_{10} (50g GA_3 + 50g NAA/ha), T_3 (100g GA_3/ha), T_{15} (30g GA_3 + 150g NAA/ha), and T_{12} (15g GA_3 + 150g NAA/ha) treatments respectively. The treatments T_7, (200g NAA/ha) has given highest % seed set (27.39%) followed by T_{10} (25.66%) and T_3 (23.52%). The treatment T_7, T_{10} and T_3 exhibited significant results for per cent seed set. The treatment T_7 (200g NAA/ha), T_{10} (50g GA_3 + 50g NAA) and T_3 (100g GA_3/ha) showed significant performance with seed yield 1795 kg/ha, 1740 kg/ha and 1660 kg/ha respectively. The treatments T_7, T_{10} and T_3 performed signficantly superior over

Table 1. Analysis of variance table

Sr. No.	Source	df	Panicle exertion (%)	Seed set (%)	Seed yield (kg/ha)
1.	Replications	2	3.93	1.67	9.47*
2.	Treatments	14	159.04*	13.06*	10.48*
3.	Error	28	-	-	-

*Significant at 5% level.

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Table 2. Response of different chemicals treatments for hybrid rice seed production of Sahyadri (Averages of three seasons *vis.*, *Rabi*-1999-00, *Kharif*-2000 and *Kharif*-2001)

Sr. No.	Treatments	(%) panicle exertion	(%) seed set	Yield (kg/ha)
1.	T_1	66.37	15.24	948
2.	T_2	71.66	17.50	1031
3.	T_3	84.87	23.52	1660
4.	T_4	77.54	18.53	1260
5.	T_5	74.54	20.80	1215
6.	T_6	81.26	22.09	1464
7.	T_7	88.00	27.39	1795
8.	T_8	70.89	15.83	1081
9.	T_9	80.31	21.08	1485
10.	T_{10}	85.60	25.66	1740
11.	T_{11}	78.94	20.99	1316
12.	T_{12}	81.28	22.67	1500
13.	T_{13}	71.61	18.01	1114
14.	T_{14}	71.54	19.40	1200
15.	T_{15}	83.27	22.35	1543
Mean		77.85	20.73	1358.51
S.E. ±		0.511	0.948	81.13
C.D.		1.48	2.75	235.13
C.V. (%)		1.14	7.92	10.34

Table 3. Price analysis of statistically significant treatments

Sr. No.	Treat-ments	Required quantity/ha	Rate	Total cost (Rs.)
1.	T_7	200g NAA	NAA@ 4.45/g	890.00
2.	T_{10}	50g GA_3 + 50g NAA	GA_3 @ 117.00/g + NAA @ 4.45/g	6072.50
3.	T_3	100g GA_3	GA_3 @ 117.00/g	11,700.00

control for seed yield character. The trend of the performance of the treatments *viz.*, T_7, T_{10} and T_3 was same for all the characters under study. It is revealed from above results that the character, % panicle exertion was mainly responsible for seed yield, more the percent panicle exertion highest the seed yield was observed. The % seed set was also highest with highest seed yield by application of same treatment [3].

It is revealed from Table 3 that the significant treatment T_7 (200g NAA) required only 890.00 Rs./ha while that of treatment T_{10} (50g GA_3 + 50g NAA/ha) and T_3 (100 g GA_3/ha) required Rs. 6072.50 and 11,700.00 respectively [4]. Considering the requirement of chemicals responding to the significant results, the treatment 200g NAA may be applied economically for the hybrid rice seed production efficiently.

References

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