EFFECT OF NIPPING SIDE BRANCHES ON SEED SIZE, SEED WEIGHT, SEED RECOVERY AND MATURITY IN MULTIBRANCHED RESTORER SUNFLOWER (Helianthus annuus. L)

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ABSTRACT

Restorer parents have been mainly used as a pollen source to contribute desirable traits to the hybrid. Seed quality of parents plays an important role in production of quality hybrid seed. Majority of the restorer parents used in the sunflower hybrid seed production are small seeded multibranched plant types. As seedling vigour is mainly dependent on seed size, to improve seed size and seed yield a genotype RHA-274 (multi-branched restorer line of BSH-1 hybrid) was used for the studies. Nipping side branches was tried at ten stages from 30 DAS to 75 DAS with an interval of five days between each nipping stage. Nipping at 45 to 50 DAS was found to increase seed size and inturn seed yield by 133 per cent. Nipped plants showed increase in capitulum diameter, 100-seed weight, seed density, seed length and seed breadth. These plants matured four days early and seed recovery from the processing was 30-40 per cent more compared to no nipping. This technique has greater help in increasing seed yield of breeder and foundation seeds in a given area.

KEY WORDS : Nipping, Days after sowing (DAS).

INTRODUCTION

Sunflower is one of the important oil seed crops grown in India, the area under sunflower cultivation has increased to 3.0 m.ha. This rapid increase is due to spread of hybrids than varieties. Most of the restorer parents used in sunflower hybrid seed production are of multibranched plant types. The yield levels in these types are very low. The limited yield levels of restorer parents come in the way of production and supply of hybrid seed to the cultivators. In multibranched plant types, the flower heads size varies and do not mature simultaneously and there by seed size varies from head to head and from branch to branch. This leads to higher proportion of smaller seeds to which will be lost during processing. Some of the technological aspects encompassing seed production, processing loss and instability for seed yield are yet to be investigated in restorer lines of sunflower. A few investigations pertaining to seed size, seed yield and quality have been reported in monohead sunflower (Robinson 1974, Trehan et al 1977, Udayakumar et al 1976). A significant improvement in seed weight, capitulum diameter, seed yield, seed set per cent in the genotype 6D-1 (Restorer line of KBSH-1 hybrid) have been reported by Shanker goud .I and Patil S.A. 1994. The present study was made to know the effect of nipping side branches on seed length, seed breadth, seed weight, seed yield, seed recovery and maturity in multibranched restorer parents of sunflower.

MATERIALS AND METHODS

The multibranched genotype choosen for the study consists of RHA-274 (Restorer parent of BSH-1 hybrid) a highly branched plant type (22 to 26 branches per plant) with an average seed yield of 700 to 800 kgs per hectare and seed type was very small narrow and elongated. The experiment was conducted at Regional Research Station, Raichur for over three seasons over three years 1988 to 1990 in randomised block design with three replications. The plot size was 4.2 m x 3.0 m. Inter and intra-row spacing was 60 cm x 30 cm for each plot. Nipping of all side branches from every leaf axil (except the main head) was done at ten stages from 30 DAS (days after sowing) to 75 DAS with an interval of five days, ie., 30, 35, 40, 45, 50, 55, 60, 65, 70 and 75 DAS. Observations were recorded on ten random plants per plot for the traits capitulum diameter, 100-seed weight, seed density, seed length, seed breadth, seed yield per hectare and day to maturity. Seed size was measured by using screw gauge considering the average value of twenty randomly selected seeds. Seed density was measured based on weight by volume 10 gram seed sample. Seed yield per hectare was calculated on net plot basis and the processing loss was estimated by using recommended sieve size (1.8 mm) of the state seed certification agency.

RESULTS AND DISCUSSION

The pooled analysis of three years data on RHA-274 revealed that (Table 1) nipping side branches at 45 DAS to 50 DAS showed significant improvement in seed breadth, seed length,

100-seed weight, capitulum diameter and yield per hectare. Nipping at 45 DAS increased seed yield significantly by 133 per cent (1832 kg/ha) over the control (no nipping) (785 kg/ha). Capitulum diameter increased to 22.3 cm than 11.1 cm of the control. 100-seed weight was significantly higher (5.7 g) than that of control (3.4 g). Seed length was 11.7 mm compared to control (10.1 mm), similarly seed breadth was increased to 5.1 mm over the control (4.2 mm). As a result of increase in seed size there was improvement in 100-seed weight that lead to increase in seed density of 1.9 g/cc over control (1.4 g/cc). The days to maturity was four days earlier (87 days) significantly higher than control (91 days). Nipping at 50 DAS also increased seed length (12.0 mm), seed breadth (5.2 mm), 100-seed weight (5.1 g), seed density (1.6 g/cc), capitulum diamter (19.9 cm), seed yield per hectare (1681 kg/ha) and days to maturity (86 days) which was five days earlier than control. No significant differences was noticed for oil content and days to 50 per cent flowering. Based on the results obtained, nipping at 45 to 50 DAS may probably help in the translocation of nutrients synthesized at this stage to main head development. Nipping at earlier stages before 45 DAS could not contribute to the improvement in seed size, yield and other traits due to rejuvenation of buds perhaps due to the continous synthesis of various hormones at these stages.

The recovery of good seeds after processing was 95-100% over the control (60-70%) when the processing was done by using the recommended sieve size (1.8 mm) of the state seed certification agency. It showed that the seed processing loss was reduced to an extent of 30 to 40% which other wise the loss incurred in

Table 1. Effect of nipping side branches on seed yield and its component characters in multibranched sunflower RHA-274 (Restorer of BSH-1 hybrid).

Treatments	Pooled over years, 1988, 1989 & 1990						
	Capitulum diameter (cm)	100-seed weight (g)	Seed density (g/cc)	Seed length (mm)	Seed breadth (mm)	Seed yield (Kg/ha)	Days to maturity
Nipping at 30 DAS	15.4	3.41	1.41	10.32	4.01	920.1	93
" 35 DAS	14.6	3.62	1.43	10.31	4.31	995.6	93
" 40 DAS	13.6	3.74	1.42	10.11	4.23	1192.8	93
" 45 DAS	22.3	5.74	1.91	11.72	5.13	1832.1	87
" 50 DAS	19.9	5.12	1.64	12.01	5.24	1681.3	86
" 55 DAS	14.7	4.92	1.52	11.83	5.03	1150.8	94
" 60 DAS	14.5	4.41	1.43	11.42	4.92	1088.9	93
" 65 DAS	14.2	4.31	1.54	11.24	5.01	988.4	94
" 70 DAS	12.8	4.34	1.46	10.14	4.04	623.2	94
" 75 DAS	12.5	4.51	1.42	9.92	4.13	587.9	91
No nipping (Control)	11.1	3.43	1.44	10.11	4.22	785.5	91
S.Em±	0.38	0.07	0.01	0.15	0.03	35.2	0.39
C.D. 5%	1.13	0.19	0.03	0.44	0.09	103.9	1.16
C.D. 1%	1.54	0.26	0.04	0.60	0.13	141.7	1.58

DAS = Days after sowing.

the processing due to the addition of smaller seeds from the smaller flower heads of all the branches when nipping was not done. It implies that nipping at 45 to 50 DAS is the important stage advisible as a means of increasing seed size and seed yield. This technique is very much useful to obtain higher seed yield and quality seeds in the breeder and foundation seed production programmes.

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