



Effect of Season and Planting Method on Seed Quality of Grain Amaranthus

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Abstract

The present investigation on season and planting method on seed quality of grain amaranthus (*Amaranthus hypochondriacus* L.) Cv. suvarna was carried out in the Department of Seed Science and Technology, TNAU, Coimbatore. The results revealed that seed production could be taken up both in kharif and summer. Among them kharif crop recorded 10.4 % increased yield than summer with transplanting of seedlings of 12 days old would be optimum for enhancing the productivity of the grain amaranthus seed crop.

Keywords: Grain amaranthus, seed, season, planting method, yield, quality characters.

Introduction

Grain amaranthus is one of the ancient groups of plants having huge potential for combating under and malnutrition of the population in many parts of the world. Amaranthus is the cheap, greatly nutritive and most popular leafy vegetable is being propagated by seeds¹. Leafy vegetables in addition to their very important role in health and nutritional security of human beings and its play a major role in improving the economy of people of the country. India is the second largest producer of vegetables only next to china in the world. India is mainly a vegetarian country, but could not attain self-sufficiency in vegetable production. One of the main reasons attributed is non-availability of adequate quantity of quality seeds to produce adequate vegetables. Therefore, there is an urgent need for augmenting the production of vegetables and vegetable seeds to meet out the minimum needs as well as ensuring the nutritional security of the fast growing population. The use of good quality seed is indispensable for the successful production of any crop. At present, the knowledge regarding the effect of environmental factors on seed production is meager. An understanding of the plant morphology and its relationship with seed yield as influenced by season and planting method for seed is an essential step towards identifying best season. Knowledge on this is warranted for selection of source seed for breeder or nucleus classes and at times for foundation seed, which are precious and are to be maintained at higher quality for future multiplication. Hence, present study; seeds were evaluated for their influence on season and sowing method on seed quality characters of grain amaranthus.

Material and Methods

Season: The seed crop of grain amaranthus was raised during July 2007 (Kharif) and January 2008 (Summer) adopting the fertilizers dose of NPK@ 40:20:20 kg ha⁻¹ and the spacing of 45 x 15 cm in plots of size 4 x 4 m² with 13 replications.

Planting method: In a field experiment, amaranthus seeds were sown in lines spaced at five centimeter in raised bed nursery, added with adequate organic manure and at two leaves stage (observed 12 days after sowing) the seedlings were transplanted to the main field (figure -1) adopting a spacing of 45 x 15 cm along with direct sowing (Sown by placing seeds directly a each hill) done with the crop geometry of 45 x 15 cm. The crops were raised by direct and transplanting techniques and grown over the common package of practices and at harvest.

Seed quality evaluation: The crops were evaluated the following observations were taken during 50 per cent flowering and after harvest viz., days for initiation of spike as days for 50 per cent spike formation, plant height (cm), number of leaves, number of spikelets spike, dry weight spike, seed yield plant, seed recovery, graded seed recovery, seed yield plot⁻¹ and seed yield ha⁻¹, The seed quality parameters such as 100 seed weight, seed germination², seedling length and drymatter production² and vigour index³ and protein content⁴.

Data analysis: The data pertaining to the experiment were subjected to statistical analysis by analysis of variance⁵.

Results and Discussion

Effect of Season: Crop growing season play a vital role in growth, development and yield of grain amaranthus. In the present investigation indicates that significant differences in seed yield were noticed among the season. During kharif the days for initiation of spike was two days earlier than summer and also single plant seed yield was the lowest when the crop was sown in summer and was higher with kharif crop. Similarly, the crop growth parameter was recorded maximum in kharif sown crop and minimum when the crop was shown on January 2008, the summer. The total yield as well as the graded seed was the highest with kharif crop than the summer crop by 10.4 and 2 per cent respectively. These findings are in conformity

with the studies of Srimathi⁶ and Reshma⁷. Among the seed quality characters, germination (93.0 %) and seedling vigour (930) was higher for the seeds obtained from the Kharif crop, which might be due to the prevalence of favorable temperature during the early and late stages of crop growth that prevailed during kharif season table-1. But summer sowing also found to be adoptable to grain amaranthus as the yield and quality characters were more or less equal to that of kharif season crop. These results were found in line with Thiagarajan⁸ and Selvaraj⁹. As information on suitable season of seed production will be highly useful to the seed growers of grain amaranthus.

Effect of plating method: It could be seen from table-2 transplanting method was found significantly superior compared to direct sowing. The results showed that crop raised with transplanted seedlings recorded the increased growth characters which was 3.4 per cent with plant height. This perfect environment enhanced the crop growth through sufficient photosynthetic activity, the causes for the better performance of transplanted crop compared to direct sown crop. In addition it also improved the seed yield hectare⁻¹ with 8.0 per cent, compared to direct sowing of seeds Table-2. The study also highlighted that the physiological seed quality characters were influenced by transplanted crop. The physiological potential of the seed in terms of germination (96 %), seedling dry weight (7.4 mg) and vigour index (930) were registered higher with the transplanted crop. The study was conformity with Agble¹⁰ and Jule Jankauskiene¹¹. The supremacy in transplanted crop sowing may be due to the advantages, the crop occurrence with selection of vigorous and better seedlings, accurate spacing and availability of the basal fertilizers perfectly to the seed crop for its growth and development of grain amaranthus.



Nursery



Transplanting



Crop

Figure-1

Nursery, transplanted and direct sown crop of grain amaranthus Cv. Suvarna

Table-1
Influence of season on seed yield quality characters of grain amaranthus

Yield attributes	Kharif (2007)	Summer (2008)	SEd	CD (P=0.05)
Days for Initiation of spikes	40	42	0.550	1.132
Days for 50 per cent spike formation	42	44	0.618	1.271
Plant height (cm)	145	120	1.553	3.193
Number of leaves	36	30	0.401	0.824
Number of spikelets spike ⁻¹	58	50	0.616	1.262
Dry weight Spike ⁻¹ (g)	77	65	1.515	3.115
Seed yield / plant (g)	39	28	0.651	1.339
Seed yield plot ¹ (kg)	4.8	4.3	0.067	0.169
Seed yield ha ¹ (kg)	3000	2687	19.973	43.519
Seed recovery (%)	50.6	43.0	0.450	0.925
Graded Seed Recovery (%)	95	93	0.295	0.632
100 seed weight (mg)	90	87	1.013	NS
Germination (%)	93	90	1.041	2.133
Root length (cm)	6.0	6.0	0.068	NS
Shoot length (cm)	4.0	4.0	0.045	NS
Drymatter production 10 seedling ⁻¹ (mg)	7.4	7.2	0.083	0.170
Vigour Index	930	900	10.414	21.334

Table-2
Effect of planting method on seed yield quality of grain amaranthus

Yield parameters	Transplanted crop	Direct sown crop	SEd	CD (P=0.05)
Plant height (cm)	145	140	1.926	4.131
Seed yield plant ⁻¹ (g)	36.0	33.3	0.811	1.741
Seed yield plot ⁻¹ (kg)	5.0	4.6	0.048	0.104
Seed yield ha ⁻¹ (kg)	3125	2875	21.984	47.157
Graded seed recovery (%)	95	93	1.068	2.327
100 seed weight (mg)	84	81	0.707	1.540
Germination (%)	96	93	1.480	3.055
Root length (cm)	5.2	5.0	0.065	0.141
Shoot length (cm)	4.0	4.0	0.063	NS
Dry matter production 10 seedling ⁻¹ (mg)	6.1	5.8	0.104	0.228
Vigour index	874	837	0.981	2.138
Protein content (%)	15.50	15.40	0.051	NS

Conclusion

From the present investigation, it could be concluded that seed production could be taken up both in kharif and summer and among them kharif crop performed better than summer and transplanting method (seedlings of 12 days old) would be optimum for enhancing the productivity of the grain amaranthus seed crop.

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