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Short Communication

Response of Ashwagandha to Different Sowing Dates and Spacings under Semi-arid Conditions of Rajasthan

Manish Agarwal, M.K. Agarwal and A.K. Gupta
SKN College of Agriculture, Jobner 303 329, India

Ashwagandha (*Withania somnifera* Dunal), an important plant of Solanaceae family, grows wild in arid and semi-arid regions. It is widely used for the treatment of several chronic diseases like arthritis, bronchitis, female sexual disorders, stomach and lung inflammations. It also improves potency and provides sound sleep due to its anti-stress properties. These medicinal values are attributed to the presence of several alkaloids, mainly withanin content that ranges from 0.13 to 0.31% (Nigam and Kandalkar, 1995). Crop diversification involving ashwagandha may increase income of the farmers. However, the package of practices for ashwagandha is yet to be standardized. Agronomic manipulations may play a vital role in its establishment, growth and performance through changing its morphological features, physiological functioning and the duration to complete its life cycle. The present investigation has, therefore, been undertaken on ashwagandha to generate information on correct time of sowing and optimum spacing.

A field experiment conducted at SKN College of Agriculture, Jobner (Rajasthan), during kharif season of 2002-03 comprized of three dates of sowing (20th July, 5th August and 20th August) and four spacings (20 cm x 5 cm, 20 cm x 7.5 cm, 25 cm x 5 cm and 25 cm x 7.5 cm). The treatment combinations were replicated thrice in randomized block design. The climate of the region is semi-arid with temperature ranging 25-46°C and 10-18°C during summer and winter, respectively. The annual rainfall of this tract varies between 400 and 500 mm. The pH of soil is 8.1 and ECe is 3.2 dS m^{-1}. The seeds were dibbled at spacings as per treatment. The crop required life-saving irrigation during intermittent dry spell. The crop was harvested by excavating soil blocks to a depth of 40 cm, 160-180 days after sowing maturity (reddening of berries and drying of leaves). The roots were dipped in clean water to remove soil. Above ground parts were cut to detach the roots. The bundle of roots so separated was weighed to record fresh weight and then air dried to note dry weight. Plot-wise yield was converted into yield in kg ha^{-1}. The data were analyzed statistically as described by Panse and Sukhatme (1985).

The data presented in Table 1 revealed that different sowing dates and spacings significantly influenced the growth and yield of ashwagandha. The growth attributes, viz.,

Table1. Effect of sowing date and spacing on growth and yield of ashwagandha

Treatment	Plant height (cm)	No. of branches plant^{-1}	Leaf area (cm^2 plant^{-1})	Fresh root yield (kg ha^{-1})	Dry root yield (kg ha^{-1})
Sowing date					
20th July	34.8	6.6	458	1647	676
5th August	31.3	5.7	400	1197	520
20th August	26.8	4.8	345	935	414
S Em±	1.1	0.2	14	53	21
C.D. 5%	3.3	0.5	42	157	63
Spacing (cm)					
20 x 5	34.7	5.1	344	1161	494
20 x 7.5	30.1	5.8	405	1504	669
25 x 5	31.9	5.5	377	1226	556
25 x 7.5	27.1	6.4	477	1148	436
S Em±	1.3	0.2	16	62	25
C.D. 5%	3.8	0.6	48	181	73

plant height, number of branches and leaf area were highest under 20th July sowing. Similarly highest root yield was also found under the same sowing. A critical analysis of data (Table 1) revealed that the fresh and dry root yield decreased by 76 and 63%, respectively, when the sowing of the crop was delayed by one month from July 20 to August 20. This might have been due to favorable environmental conditions, e.g., rainfall, sunshine, temperature, day length, etc. available to the plants sown on July 20 that might have led to better physiological functioning and higher accumulation of photosynthates.

Results also showed that closer spacing 20 cm x 5 cm produced the tallest plants perhaps due to severe competition for solar radiation while the number of branches and leaf area was highest under widest spacing, i.e., 25 cm x 7.5 cm (Table 1). The wider spacing appeared to cause less competition for nutrient and water among plants resulting in more branches and leaf area under 25 cm x 7.5 cm. The root yield of the crop was highest at 20 cm x 7.5 cm spacing indicating it to be optimum crop geometry. It was interesting to note that too dense (80-100 plants m^{-2}) or too sparse (53 plants m^{-2}) planting led to low yield of roots. The above results are in close conformity with those of Kahar *et al.* (1991) and Mohd. Abbas *et al.* (1994).

It can be summarized that earliest sowing, i.e., 20th July resulted in highest fresh (1647 kg ha^{-1}) and dry (676 kg ha^{-1}) root yield, respectively, and these decreased by 76 and 63%, respectively, when crop sowing of the crop was delayed by one month. The results further showed that the highest fresh (1504 kg ha^{-1}) and dry root (669 kg ha^{-1}) yield of ashwagandha was recorded at 20 cm x 7.5 cm spacing.

References

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