INDIAN JOURNAL OF ARID HORTICULTURE
2017, Vol. 12 (1-2):56-57

Effect of size of polythene bags on seedling growth and budding success in jamun

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(Received: 31.01.2018, Accepted: 5.05.2018)

Abstract

Studies were conducted to determine the effects of poly container size on the seedling and root growth and their effect on budding success in jamun at experimental farm of CHES, Vejalpur, Godhra, Gujarat. Four size of polythene bags (25x15 cm, 25x10 cm, 30x8 cm and 20x8 cm) were used with a potting medium that consisted of sand soil and FYM in the ratio of 1:1:1. Overall growth of jamun seedlings after 8 months of seed sowing in terms of seedling height, collar diameter, number of leaves/plant, buddable root stock percentage, root length, root diameter, number of secondary and tertiary roots were best in 25x15 cm size of polythene bags which was followed by 25x10 cm polythene bags. Good quality seedling root stocks for budding purpose with seedling height above 80 cm and collar diameter above 2.0 cm along with higher number of secondary and tertiary and secondary roots in 8 months in 25x15 cm polythene bags. Most of the parameters of quality seedling root stocks were also produced by 25x10 cm polythene bags. Highest budding success percentage was recorded in 25x15 cm size followed by 25x10 cm polythene bags. These findings suggest use of 25x15 cm polythene bags for speedy seedling root stock growth and high budding success in jamun.

Key words: *Budding success, polythene bags, seedling growth, Syzygium cuminii*

Introduction

The Jamun (*Syzygium cuminii* Skeels) is one of the important minor fruit crops belonging to the family Myrtaceae which is widely distributed throughout the tropic and sub-tropics. Its ripened fruits are eaten fresh and can be processed into beverages like jelly, jam, squash and vinegar. Fruits are useful against various lifestyle ailments as diabetes, heart and liver troubles (Singh, 2001). A wide range of variability occurs with regard to fruit size and quality owing to its seed propagation, which needs to be conserved and exploited (Devi *et al.* 2002). For the conservation and exploitation, standardization of faster multiplication protocols is required in jamun. Traditionally seedlings of jamun are raised by direct sowing seed in the nursery beds which produce seedlings with poor root and shoot growth. As a consequence, it takes more time to produce a seedling plant for budding purpose and also poor survival under field condition. Owing to this containerized seedling production is now widely used for production of nursery stock (Saroj et al., 2000 and Lal et al., 2004). Polythene bags are conventionally used for large-scale production seedling root stocks of fruit plants as they are easy to handle and transport. Optimum container size depends on factors such as species, plant stocking in the nursery, size of the seedling desired type of growing medium and length of the growing season (Jinks, 1994). It is therefore important to select the best size of polythene bags which can contain sufficient quantity of growing medium to support optimum root and shoot growth of seedlings in lesser time so that buddable size root stocks are ready for grafting in minimum time with high success percentage. The systematic study is lacking with regard to size of polythene bags for raising seedling root stocks in jamun; therefore, present investigation was undertaken with an objective to determine the optimum container size for the rapid large-scale production of quality seedling root stocks of jamun.

Material and Methods

Seeds of jamun cv. Goma Priyanka were collected from freshly harvested fruits during the first week of June from experimental farm of CHES, Vejalpur, Godhra, Gujarat. Extracted seeds were collected in bucket filled with fresh water and after grading, healthy seeds were directly used for sowing in the different size of polythene bags. The sand, silt and FYM were used an potting medium in the ratio of 1:1:1. (The potting medium used was sand, soil and FYM in the ratio 1:1:1.) The different size of polythene bags *viz.*, 25x15 cm, 25x10 cm, 30x8 cm and 20x8 cm were used for testing. A total of 100 seedlings used in each treatment, arranged in four replicate each of 25 seedlings in a randomized block design (RBD). The experiment was conducted in an open condition and during the experimental period, normal management practices were adopted, but no fertilizer was applied. Various growth characters were taken after 8 months of seed sowing, however, for recording the data on root characters, three randomly-selected seedlings from each replicate were carefully uprooted without disturbing the root system and washed in running tap water and then data on root length, diameter and number of secondary and tertiary roots were recorded. After this, 8 months old seedling from each treatment were used for budding with scion shoots of Goma priyanka for recording the data on

budding success (%). The data were statistically analyzed as per method of Gomez and Gomez (1984).

Results and discussion

Effect of different size of polythene bags on seedling growth and percentage of buddable rootstocks were presented in table1. In general, seedling height, collar diameter, number of leaves per plant and percentage buddable rootstocks significantly increased with increase in polythene bag size. The maximum seedling height (85.50 cm), collar diameter (2.50 cm), number of leaves per plant (25.10) and buddable rootstocks (98.0 %) were recorded with 25x15 cm polythene bag followed by 25x10 cm polythene bag. The seedling height variation in different containers can probably be attributed to the size of containers. Similar relationships have been reported between container volume and seedling height and biomass in *Grevillea robusta* (Misra and Jaiswal, 1993) and in aonla (Saroj et al., 2000). The minimum seedling height (52.0 cm), collar diameter (1.50 cm), number of leaves (12.50) and buddable root stock percentage (10.50 %) were noted with 20x8 cm polythene bag. The poor growth in 20x8 cm polythene bag, compared to that in the 25x15 cm and 25x15 cm sizes, can be attributed to the poor root system development due to small volume area available for root development which ultimately affected the aerial growth of plant and photosynthetic activity too as growth rate of shoots and roots are interdependent (Tonutti and Giulivo, 1990).

Among various sizes of polythene bags, 25x15 cm size recorded the maximum root diameter (1.10 cm), number of secondary (34.10) and tertiary roots (83.10) followed by 25x10 cm polythene bag. However, the maximum root length was recorded with 30x8 cm polythene bag (60.10 cm) followed by 25x15 cm size (40.50 cm). Whereas the minimum root length (30.50 cm), root diameter (0.58 cm), number of secondary (19.50) and tertiary roots (41.10) were observed in 20x8 cm polythene bag. Seedlings with relatively large root system generally suffer less post plant shock after planting than the plants with small root system. Our results confirm the findings of Misra and Jaiswal (1993) who observed better root architecture in *Grevillea robusta* seedlings when raised in different size of polythene bags. Highest budding success was obtained with 25x15 cm polythene bag (80.50%) followed by 25x10 cm size (75.10 %) while 20x10 cm polythene bag recorded only 56.0% budding success which was having seedling girth of 1.50 cm. It is important to note that the girth of rootstock should be more than 2.0 cm during budding for better success. Similar kind of observations were made by Saroj *et al.* (2000) in aonla.

Table 1. Effect of size of polythene bags on seedling growth and budding success in jamun after 8 months of seed sowing

Size of polythene bags (cm)	Seedling height (cm)	Seedling girth (cm)	No. of leaves plant^{-1}	Buddable rootstocks (%)	Root length (cm)	Root diameter (cm)	No. of secondary roots	No. of tertiary roots	Budding success (%)
25x15	85.50	2.50	25.10	98.00	40.50	1.10	34.10	83.10	80.50
25x10	75.00	2.00	20.00	94.50	38.00	0.70	32.00	79.50	75.10
30x8	60.10	1.70	16.00	40.00	60.10	0.60	22.00	68.00	68.00
20x8	52.00	1.50	12.50	10.50	30.50	0.58	19.50	41.10	56.00
CD (P=0.05)	3.55	0.15	1.20	8.50	3.80	0.11	1.13	2.52	3.50

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