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Research Note :

STANDARDIZATION OF PLANT MULTIPLICATION IN AONLA (*Emblica officinalis Garten.*) CV. NARENDRA AONLA-6

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ABSTRACT: Field experiment conducted to standardize the optimum stock thickness, budding height and method of budding in aonla cv. N.A. 6 concluded that Narendra Aonla-6 should be budded on 0.5 cm thickness or rootstock at 10 cm height above ground level with patch method of budding during the month of June for higher budding success and further growth of budding.

Keywords: *Aonla, rootstock, budding, bud take, survival.*

Aonla or Indian gooseberry (*Emblica officinalis* Gaertn) is one of the important indigenous minor fruit crops belonging to the family Euphorbiaceae and sub family Phyllanthoidae. It is native to tropical region of South-East Asia particularly Central & Southern India (Morton, 3).

There is lot of demand for aonla grafts particularly cv. NA-6 variety for value addition viz. fruit beverages, sauce, chutney, shreds, jam, *laddu*, toffee, preserves and candy etc. However, the success of budding in this particular cultivar is very poor. This may be because of meagre information available on impact of stock thickness, height and method of budding and growing condition of rootstock as well as season also. Hence, to generate more information about above parameter, a field trial was conducted to assess the positive response of same.

MATERIALS AND METHODS

The investigation was carried out at Main Experimental Station, Department of Horticulture, Narendra Dev University of Agriculture & Technology, Kumarganj, Faizabad (U.P.) during the year 2009. The experiment was laidout in randomized block design (Factorial), replicated thrice considering ten plants as unit with eight treatment combinations viz two thickness of rootstock (T_1= 0.5 cm and T_2 =1.0 cm) along with two different height of buding (H_1 =10 cm and H_2 =20 cm) and two budding method (patch = M_1 and modified ring = M_2) in cv. Narendra Aonla-6. One year old seedling plants of desirable thickness and height grown in nursery bed were taken for budding operation and vigrous pencil thick scion shoots were procured from 15-20 years old trees of aonla cv NA-6. Success of budding viz. per cent bud take, days taken to bud sprouting, per cent bud sprouting, per cent bud survival and growth parameter of budding viz. length of shoot, number of leaves per shoot, diameter of rootstock at union and scion shoot, average number of primary and secondary roots etc. were noted during experimentation.

RESULTS AND DISCUSSION

Observations with regard to success of budding viz. per cent bud take, bud sprouting, bud survival and days taken to bud sprouting were recorded 30 days after budding, however, observations on growth parameters were noted after 120 days of budding. Among the different treatment combinations, the maximum (94.33%) success in respect of budding were noted with patch method on lower girth (0.5 cm) and lower height (10 cm) of budding. Similar results were also reported by Singh *et al.* (8) who reported that on less girth and lower height of budding maximum success (94.74%) was obtained in ber. As for method is concern Saroj *et al.* (6) achieved more than 90% success through patch budding.

Study related to days taken to bud sprouting showed that patch budding took minimum days to

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Table 1: Impact of method, stock thickness and height of budding on budding success.

Treatment	Per cent bud take	Days taken to bud sprout	Per cent bud sprouting	Per cent bud survival
$M_1T_1H_1$	94.33 (76.27)	18.67	89.33 (79.95)	92.33 (73.95)
$M_1T_1H_2$	75.00 (60.36)	19.33	70.00 (57.30)	73.00 (59.00)
$M_1T_2H_1$	86.33 (68.34)	17.67	81.33 (64.42)	84.33 (66.71)
$M_1T_2H_2$	72.33 (58.99)	16.33	67.33 (55.16)	70.33 (52.02)
$M_2T_1H_1$	86.00 (68.34)	19.33	81.00 (64.34)	84.00 (66.67)
$M_2T_1H_2$	61.67 (51.75)	20.39	56.67 (48.83)	59.67 (50.58)
$M_2T_2H_1$	63.00 (52.54)	19.00	58.00 (49.61)	61.00 (51.36)
$M_2T_2H_2$	75.67 (60.46)	18.67	70.67 (57.22)	73.67 (59.14)
C.D. (P = 0.05)	6.57	N.S.	6.0	6.34

Table 2: Impact of method, stock thickness and height of budding on growth parameters of budlings.

Treatment	Length of shoot (cm)	Number of leaves per shoot	Diameter of root stock (cm)	Diameter of scion stock (cm)	Number of primary root	Number of secondary root	Fresh weight of shoot (g)	Dry weight of shoot (g)	Fresh weight of root (g)	Dry weight of root (g)
$M_1T_1H_1$	33.96	34.91	1.12	0.73	25.39	15.30	51.35	23.54	41.35	19.70
$M_1T_1H_2$	27.00	27.76	0.89	0.58	20.19	12.17	40.82	18.72	32.28	15.67
$M_1T_2H_1$	31.08	31.95	1.03	0.68	23.28	14.03	47.07	21.59	37.92	18.07
$M_1T_2H_2$	26.04	26.77	0.86	0.57	19.51	11.76	39.45	18.09	31.78	15.14
$M_2T_1H_1$	30.96	31.83	1.02	0.67	23.13	13.94	46.76	21.45	37.67	17.95
$M_2T_1H_2$	22.20	22.82	0.73	0.48	16.67	9.99	33.51	15.37	26.99	12.86
$M^2T_2H_1$	22.68	23.30	0.75	0.49	16.87	10.17	34.12	15.65	27.49	13.10
$M_2T_2H_2$	27.24	28.01	0.90	0.59	20.42	12.30	41.28	18.93	33.25	15.84
C.D. (P=0.05)	3.40	3.49	0.10	0.04	2.43	1.27	4.91	2.25	3.95	1.88

bud sprouting in comparision to modified ring budding. Per cent bud sprouting results enunciate that patch budding on less thickness and lower height have higher bud sprouting. Nosal and Gonkiewicz (4) reported that higher height reduced the length of sprout and per cent bud sprouting also decline. Saroj *et al.* (6) found that girth of rootstock matrix should not be less than 0.5 cm during budding for better success. Per cent bud survival also followed the same trend and patch budding on lower girth and lower height achieved highest success in final survival of bud. Similar results were also reported by Pathak *et al.* (5) who achieved more success and bud survival per cent by patch budding than modified ring budding. Scibisz (7) recommended that budding at lower height resulted in more growth than higher height and Singh *et al.* (8) advocated that less thickness (0.5cm) in comparison to more thickness (0.75 cm) gives maximum success.

The reason of maximum success with treatment combination of patch budding on lower thickness (0.5cm) and lower height (10 cm) might be due to the fact that mortality rate of bud was low because of better interlocking of cambium in patch budding particularly on lower thickness where easy and uniform union takes place and in addition to this lower height enhance the sprouting and survival of bud, being nearer to ground.

Perusal of Table 1 clearly indicated that maximum length of shoot was recorded in combination of patch budding on lower thickness and lower height. Former workers have also

reported that shoot length decreases with increasing the budding height.

The number of leaves per shoot was also maximum with patch budding on less girth and lower height. Diameter of rootstock at union and diameter of scion was also maximum with patch budding on less girth and lower diameter. This may be due to early sprouting and better union noticed in this combination which may enable more diameter of rootstock at union. Similar findings were also reported by Kviklys and Lanauskas (2) who reported that total shoot growth and stem diameter were reduced when budding performed at higher height in comparison to lower height. Average number of primary and secondary roots were more (25.39 and 15.30, respectively) with patch budding on lower thickness and less height. Fresh weight of shoot and root were recorded higher in patch budding on lower thickness and lower height in comparison to others. Singh (9) also reported that patch budding attains maximum fresh weight of shoot and root than other budding methods.

However, dry weight of shoot and root followed same trend as in case of fresh weight of shoot and root. The maximum dry weight of shoot and root were found with patch method of budding (20.48 g and 17.14g, respectively) Similar results were reported by Bhatnagar (1) who concluded that the dry matter production of both shoot and root portion showed direct correlation with height and growth of *Casurina* plant.

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