Short Communication

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Standardization of propagation through patch budding in lasoda (*Cordia myxa* L.) under semi arid conditions of Rajasthan

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Lasoda or lehsua (*Cordia myxa* L) belongs to family Boraginaceae, found growing all over the country especially in arid and semi arid situations so far. Lasoda is not explored to full potential economically and hence immediate attention to explor the potential of its cultivation. It is a medium sized broad leaved deciduous tree. It has great capacity to tolerate drought and hence quite widespread in arid and semi arid regions of North India. Being a multipurpose tree species, it has long been associated with health, nutrition and other diversified uses. The Immature fruits are used as vegetable, pickled with raw mango and can be dehydrated for use in off season. The fruits and other plant parts are used in curing various ailments viz. skin diseases, dropsy, dysentery, cholera, headache etc. The fruits are astringent, diuretic, demulcent and expectorant. The fruit contains about 80% pulp, 8.32 g crude protein, 25.7 g crude fibre and 57.08 g of carbohydrates (Aberoumand, 2011). Pareek and Sharma (1993) also reported lasoda fruits are rich source of carbohydrates, phosphorus and ascorbic acid (40 mg/100 g). The nutritive value of forage per 100 g dry matter: crude protein 15 g, crude fibre 20 g, ash 14 g, crude fat 6 g, N free extract 47 g, Calcium 2.5 g, Phosphorus 0.3 g (Oudhia,2007).

The fruits are also rich source of phenolic compounds which have antioxidant properties. Aberoumand (2011) also reported ample amount of total phenolics (402 mg/100g) in the fruits of lasoda

Lasoda is commercially propagated by budding. However, several factors have restricted the expansion of area and production of Lasoda. Among these limiting factors, low quantity and non availability of quality planting material are some of the negative factors that hinder the increase of area and production of Lasoda. The percentage of successful budding in Lasoda is highly variable and often is low, probably due to failure of scion bud to sprout and budding at inappropriate physiological stage. Hence, the present investigation was carried out to explore the better success and suitable time of buding in Lasoda particularly under arid and semi arid conditions.

This study was carried out in the instructional Nursery, Department of Horticulture, SKN College of Agriculture, Jobner during the year 2013, 2014 and 2015. For raising root stocks, ripe fruits of lasoda were collected and the sowing of seeds was completed in 2nd week of June, 2012 in plastic bags filled with a mixture of soil, FYM and sand (1:1:1) and 200 g of single super phosphate per cubic meter of potting mixture. One year old generative root stocks of Lasoda were used for budding. Consisting six treatments, 20 plants per treatment and four replications, thus having 480 plants as experimental material were taken for the study. Seedlings were maintained in sand conditions by providing ample quantity of fertilizers, water and other requirements when required.. There were six treatments of budding dates comprising budding on 30th June, 15th July, 30th July, 16th August, 31st August and 15th September. Defoliation (removal of leaf blades with petioles intact on the shoot) was performed 2-3 days before the scion bud collected. Scion bud excised from twigs and defoliated just prior to budding. Budding was carried out as per the treatments during experimentation.

The data pertaining to patch budding performance of scion and stock were recorded. The bud take percentage was calculated by counting number of sprouted scions in every treatment. Budding success (%) was counted on the basis of continued survival of sprouted scion after four months of budding. Days required for first sprouting were recorded by watching the scion regularly in the nursery. Scion buds used were taken from vigorous flushes of terminal shoots with prominent auxiliary buds. A patch of 1.5 -2.0 cm long and 5-10 mm in width with one slightly swollen bud was selected.

The union point was wrapped with a plastic strip. The budded plants were maintained under natural shade net house conditions. Observations were recorded for days taken to bud sprout and sprout percentage of Lasoda buds. However, success per cent of Lasoda budding was recorded four month after budding. The experiment was setup under randomized block design with four replications which had 120 budding each. The different parameters under study were statistically analyzed for analysis of variance. Means were separated using Fisher's least significant difference at 5 per cent level of significance.

Days taken to bud sprout

The data mentioned in Table 1 indicated that budding done on different dates during the experimentation period had significant influence on days taken to bud sprout in Lasoda. The minimum number of days (11.44 and 11.98) required for bud

sprout recorded when budding was performed on 30th June during 2013 and 2015 respectively. This treatment was found significantly superior over rest of the treatments except when budding performed on 15th July which remained at par to it. However, budding performed on 15th July during 2014 took minimum of 12 10 days to bud sprout which was significantly better than other dates of budding but this treatment was found statistically at par with treatment of 30th June.

Further, the analysis of pooled data in same table clearly indicated that minimum days of 12.13 were taken when budding was done on 30th June which was found significantly superior over all the treatments except budding done on 15th July which was at par to it. This might be due to congenial atmospheric conditions as well as the physiological activities of rootstock and scion for better union and sprouting of scion buds during last week of June to first fortnight of July during experimentation. Similar results were also reported by Ganpathy *et al.*, 1985 in Coorg Mandarin.

Sprout percentage of bud

Data presented in Table 2 indicated that budding performed on 30th June recorded maximum sprout percentage (95.0 %) during 2013 and 94.46 per cent in 2015 However, in the year 2014, maximum sprout percentage (95.5 %) was recorded when budding was performed on 15th July which was noted at par with budding performed on 30th July during 2014 and budding performed on 30th June during 2013 and 2015. Further, the pooled data in the same table clearly indicated that maximum sprout percentage of 93.33 was observed when budding was performed on 15th July. This treatment was found significantly better than other treatments except budding performed on 30th June and 30th July which were remained at par to it.

Success per cent of Lasoda bud

The examination of data mentioned in Table 2 further revealed that budding performed on 30th June gave maximum success per cent followed by budding performed on 15th July and 30th July in the year 2013 and 2015. However, maximum success per cent of 92.50 % was recorded when budding was performed on 15th July (92.50%) followed by 30th July (91.50%) during 2014. Further, in pooled analysis of three years data (Table 2) clearly indicated that significantly maximum success percentage of lasoda buds were observed when budding was performed on 15th July among all the treatments except budding performed on 30th June and 30th July which were statistically at par to each other. It may be accounted to rapid complete union of xylem and cambium tissue and congenial physical state (Hartmann *et al* , 1997) of the scion and root stock favouring survival of the sprouts.

Table1. Effect of different budding dates on days taken to bud sprout in lasoda.

Treatments	Days taken to bud sprout			
	2013	2014	2015	Pooled
30th June	11.44	12.97	11.98	12.13
15th July	12.32	12.10	12.75	12.39
30th July	20.05	16.75	20.59	19.13
16th August	19.13	18.65	19.83	19.20
31st August	16.13	19.58	17.00	17.57
15th September	23.25	22.90	23.75	23.30
SEm±	1.12	0.72	0.32	0.75
CD at 5%	3.33	2.12	0.94	2.26

Table 2. Effect of different budding dates on sprouting and success per cent of lasoda bud.

Treatments	Sprout percentage of bud				Success per cent of bud			
	2013	2014	2015	Pooled	2013	2014	2015	Pooled
30th June	95.00	84.00	94.46	91.15	92.50	81.50	92.40	88.80
15th July	92.50	95.50	92.00	93.33	91.25	92.50	91.36	91.70
30th July	91.25	94.00	90.48	91.91	88.75	91.50	89.20	89.82
16th August	66.25	86.50	65.33	72.69	62.50	82.50	64.13	69.71
31st August	55.00	77.00	53.93	61.98	47.50	72.00	57.46	58.99
15th September	23.75	54.50	24.76	34.35	17.50	49.00	34.73	33.74
SEm ±	3.07	1.55	0.37	2.18	2.60	1.33	2.06	1.67
CD at 5%	9.13	4.60	1.11	2.57	7.73	1.96	6.12	5.04

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