Studies on rooting response and survival of different morphotypes of Som plant (*Persea bombycina*, King ex Hook. F., Kost)

S. K. DUTTA, S. ROY CHOWDHURI, D. PANDIT, P.C.BOSE AND A. K. BAJPAI

Central Sericultural Research and Training Institute, Berhampore-742101, West Bengal

Muga sericulture, as one of the non-mulberry sericulture, is prevalent in North-Eastern India. The age old practice forms an important component of cottage industry and plays an important role in rural economic development in North-Eastern India specially inAssam. Unique golden yellow muga silk is produced mainly in Assam besides, small quantity in Meghalaya, Nagaland, Arunachal Pradesh, and Uttarkhand.

Som, *Persea bombycina* (=*Machilus bombycina*), is the primary food plant of muga silkworm,(*Antheraea assamensis*, Helfer) is a tree (family Lauraceae) and mainly cultivated in the North Eastern region and Utarakhand in India,. For success of muga sericulture, maintenance of muga food plant is important because of quality and quantity of muga cocoon production.

Som, being open pollinated and heterozygous tree plant, propagation through seeds is not ideal for maintaining the desired characteristics of the taxon in it's progenies, thus, needs multiplication through clonal propagation i.e., shoot cuttings. Eight morphotypes of Som plant as dominated in different areas of Assam and Meghalaya states showed wide variations in morphology i.e., protective covering of the vegetative buds, leaf length, stomatal frequency etc. and nutrient contents in leaf. Among eight morphotypes, S-3 and S6 were found superior in leaf productivity and quality for muga silkworm rearing. Moreover, propagation of Som plant through stem cuttings is difficult due to it's poor rootability (10-13%) and survival (13-15%). Hermann *et al.* (1976) suggested that rooting response of stem cuttings is determined to a considerable extent by the level of endogenous growth substances and their balance with nutrition and exogenous application of growth regulators and as a combined effect greatly modifies rooting potential of stem cuttings. Use of growth regulators for propagation of Som is effective (Chowdhury, 1965), but unlike other crop plants extensive work on use of synthetic growth regulator for rooting response in Som is meager (Kumar *et al*., 2002). Hence, in order to study the rooting behaviour of Som plant with increased propagation efficiency, application of growth regulators was tried so as to multiply the morphotypes maintaining it's desirable characters and quality for muga silkworm rearing.

S6 morphotype of som plant (Plate-II) was studied for propagation efficiency. Uniform cuttings of 15-17 cm length, 1.5 ± 1 cm diameter with 2-3 leaf nodes having prominent axillary bud free from diseases were selected and detached from the mother plant through a knife. Immediately after detachment from the mother plant, only one leaf with the prominent axillary bud was kept while other leaves were removed (if not mononodal). Tip of the single leaf was cut with the knife at a length of 2-3 cm from the petiole to prevent dryness of the leaf (Plate- IV). Cuttings were then dipped in fresh water so that the cut ends should not dry. Twenty centimeter long perforated polytubes filled upto $3/4^{th}$ with sand media were prepared for plantation of cuttings. The lower ends of the cutting were treated with IAA (T2) and IBA (T3) solutions (300 ppm each) separately following quick dip method *i.e.*, 2-4 minutes. Arodix a powder growth regulator, was applied (T4)on the basal end of the cuttings and excess growth regulator was removed. One thousand five hundred polythene tubes were used for 5 treatments with 100 each per treatment in three replications of RBD design. Three hundred polythene tubes of three replications were treated as control without using any growth regulator. Cuttings were planted in polytubes during October and November, ideal for vegetative propagation and placed in shade and nurtured. After 15 days of plantation, 300 cuttings (T-5) in polythene tubes were treated with shoot growth regulator, N-Triacontanol @ 100 ppm as spray followed by second spray on 30^{th} day of plantation. Regeneration starts after elongation of vegetative bud and the cuttings survive (Plate-V). Polythene tubes (Plate-VI) were ensured irrigation at eight hours interval. Rooting and survival data of 300 polytubes (Average) of each treatment is recorded in Table-I

Data recorded on survival of cuttings after 55 days and 90 days of plantation revealed that regeneration efficiency was 13% in cuttings without use of growth regulator,while survival was 50.6% in IAA (300 ppm), 60.3% in IBA (300 ppm) and 61.6% in Arodix (Table-1). Survival of cuttings was recorded

Email:csrtiber@rediffmail.com

Short Communication

higher than that in control, but difference of rooting and survivality is 7.3% in IBA, 4% in IAA and 9.7% in Arodix showing disintegration of cuttings after formation of roots. Use of growth regulators i.e., Arodix as root promoter and N-Triacontanol for shoot elongation, show 78.6 % survival of cuttings with the gain of 1.7% in rooting and survivability. In mass multiplication, the method showed 77.06% and 81.06% cuttings survival during 2004-05 and 2005-06 (Table-2) respectively.

During experimentation some negative impacts related to survivability of the cuttings were also observed. Non availability of prominent axillary bud in the mother morphotype of som plant was noticed. Sometimes single leaf of the cuttings becomes yellow after a few days of plantation. If excess quantity of Arodix remains in the cut ends of the cuttings, it causes gradual blackening and drying of the cuttings. Sudden elongation of shoot (axillary bud) without formation of root results gradual decay of the cuttings and sometimes after rooting, drying of the axillary bud also caused decay of the cuttings. Effect of different concentrations of growth regulators (synthetic auxins) on Som plant was studied by Bora *et al.* (1972). Propagation through air layering in the food plant of Tasar silkworm using growth regulators was studied by Singh *et al*. (1969) Auxin as growth promoter and Abscisic acid as growth inhibitor was studied by Chin *et al*. (1969). It was reported in FAO manual (Vol-II , Non mulberry sericulture) that Seradix-Gr-II (Herbal rooting growth regulator) could be used as root promoter in vegetative propagation of som plant, though chemical growth regulators, IAA and IBA were also mentioned for enhancement of rooting. It is evident from the result of multiplication technique by using Arodix (Gr-II) as root growth regulator and N-Triacontanol (100 ppm) as shoot growth regulator showed 77 to 81% survivability of cuttings may be used for increasing propagation efficiency of the high yielding morphotype (S6) of som plant for faster expansion in the farmers' field.

REFERENCES

Bora, N. B. and Nath, P. 1972. Effect of higher concentration plant growth hormones on *Machilus bombycina* stem cuttings. *Indian J. Seric.*, **11** : 6-10.

Chin,Ting-yun, Meyer, M. M. Jr. and Beevers, L. 1969. Abscisic acid stimulated rooting of stem cutting. *Planta*., **68**:192-96.

Chowdhury, S. N. 1965. Studies of propagation of Som (*Machilus bombycina*) by stem cuttings with the aid of growth regulators: *Indian Agric.*, **19** (1): 82-83.

FAO, manual. 1979.Non-mulberry sericulture.

Hermann, H.T. and Kester, D.E. 1976. *Plant Propagation –Principle and Practices, Prentice –Hall of India Pvt. Ltd. New Delhi*.

Kumar, A., Bhattacharyya, A., Das, P. K. and Suryanayana, N. 2002. Status paper on muga host plant germplasm. *Proc. Nat. Workshop on Sericultural Germplasm Management and Utilization*, pp. 53 – 59.

Singh, K. N. and Jolly, M. S. 1969. Air Layering in *Terminalia arjuna(Roxb*.) *W & AIn. For*., **95** (8):559-940.

Table- 1. Root proliferation and survival of cuttings of som morphotype (S6)

Treatment	Rooting(%)	Survival(%)
T-1 (Control)	13.3	13.0
T-2 (IAA 300ppm)	54.6	50.6
T-3 (IBA 300ppm)	67.6	60.3
T-4 (Arodix Gr-II)*	71.3	61.6
T-5 (Arodix Gr-II)* + N-Triacontanol (100 ppm)	80.3	78.6
LSD (P=0.05)	**5.06**	**6.37**

Table- 2. Mass multiplication of Som plant (Morphotype ,S6)

Treatment	Year of multiplication	No. of polythene tubes	Cuttings survived	Survival (%)
Arodix (Gr-II) + N-Triacontanol (100ppm)	2004-05 (Phase-I)	1500	1156	77.06
	2005-06 (Phase-II)	2000	1632	81.06

Plate-I

Plate-II

Plate-III

Plate-IV

Plate-V

Plate-VI

Plate I to VI. I – Som plant, II – Som plant (S-6 morphotype), III & IV – leaf bud cuttings, V – rooted cuttings, VI – Som saplings in polythene tubes