Performance Of Pre-Winter Planted Rooted Cuttings Of Greater Yam (*Dioscorea alata* L.)

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Abstract : Nodal cuttings of *Dioscorea alata* from 45 day old plants were grown *in vivo* by treating them with different concentrations of IBA (100, 200, 500, 1,000 ppm), Rootex (a type of root promoting substance,the powdered contain 3gm IBA/Kg) and a control. For each treatment 2 node, 1 node and 0.5 node cuttings of 4 - 5 cm were used as explants. In the nursery there was a 100% survival of 1 node cuttings treated with 500 ppm of Indole 3-butyricacid (IBA) followed by Rootex 1 node, Rootex 0.5 node and control one node. From the results it was concluded that 2 node and 0.5 node cuttings were not suitable for *in vivo* rooting of yam with growth regulators. Single node cuttings with growth regulators are preferred for large scale production of propagules in an *in vivo* system for *D. alata*. [Nature and Science 2009; 7(12):44-47]. (ISSN: 1545-0740).

Key words: Rootex, IBA, Nodal cuttings Grater yam, Propagule

1. Introduction

Among tropical tuber crops the greater yam (*Dioscorea alata* L.) occupies an important position because of their food, nutritional, medicinal and industrial significance. *Dioscorea alata* is an old monocot from the family *Dioscoreaceae* (**Ayensu , 1972**). In India *D. alata* tubers are consumed mainly in the southern and northern states. They are also cultivated as a cash crop in some area where they are more important than potato. These crops have wide adaptability and are less stringent in input needs like fertilizer application, irrigation and plant protection. They are efficient converters of solar energy to dry matter.

In yams under ground tubers are seriously affected by pathogen accumulation (Gautt *et al*., **1969; Malauri *et al*, 1998**) which reduces the quality of planting material. Transportation of high volumes of planting material for field planting is difficult. About 2,500 to 3,000 kg of planting material is required to plant 1 ha. Thus the cost of planting material increases the cost of production. Under conventional propagation the rate of multiplication of tubers is very slow as a piece of tuber has only one or two sprouts. To counter the scarcity of planting material an attempt was made to standardize and develop an *in vivo* rapid multiplication method through the use of nodal cuttings treated with hormone. From the results it was clear that propagule production of yams through the use of nodal cuttings, for yam cultivation, is the best solution. It is cheaper, saves time and is resistant to pests and diseases.

2. MATERIALS AND METHODS

The experiment was conducted at the Botanical garden of the Post Graduate Botany Department, Utkal University, Vanivihar, Bhubaneswar. Nodal cuttings with different size node segments (2 node, 1 node and 0.5 nodes) were taken as explants from 45 days old vines of *D. alata* plants. Concentrations of IBA of 100, 200, 500 and 1,000 ppm and Rootex were used and an untreated control. In each chemical treatment a 2 node, 1 node and 0.5 node cuttings was used .The experiment had 18 treatments and 3 replicates in a randomized block design (**Panse and Sukhatme, 1978; Nanda *et al*, 1968**). Before starting the experiment the nursery bed was prepared (90cmX 90cm) by mixing with sun dried sand and cow dung and was sterilized with *Tricoderma viridae* followed by Steptocycline at 0.015%. Beds were watered twice daily depending on rainfall and the status of the environmental condition of the day. Nodal cuttings with different numbers of nodes were prepared from the vines and placed in different concentrations of IBA for 5 - 10 minutes. The nursery bed was wetted and the nodal segments were planted, one by one in the nursery bed at close spacings. For the Rootex treatment the nodal cut surface was dipped in to the solid mass. The cutting was then planted. Beds were watered every evening to maintain the humidity.

At 15 days data on nursery bed survival, root length, root number, microtuber weight and field survival was recorded and compared with the control (Table 1) using statistical analysis as proposed by **Panse and Sukhatme (1978)**.

3. RESULT AND DISCUSSION

From the results (Table 1) it was concluded that though greater yam is mainly propagated vegetatively through tubers it would be cost effective for farmers to use an alternative method of plantlet production from nodal cuttings. (**Bilderback, 1993**). There was a 100% survival of 1 node cuttings treated with 500 ppm of IBA, Rootex 1 node, Rootex 0.5 nodes and control 1 node. Two node and 0.5 node cuttings were not suitable for rooting. Half node cuttings treated with Rootex also had 100% survival in the nursery (**Waitt, 1960; Hartmann *et al*, 1997**)

In the field survival was highest in 1 node cuttings treated with Rootex (86.7%) followed by Rootex treated 0.5 node cuttings (81.7%). It was therefore decided to use Rootex 1 node cuttings for commercial production of propagules of *D. alata*. Root length was longest in 1 node cuttings treated with Rootex (14.0 cm). This was followed by 0.5 node cuttings treated with Rootex (13.3 cm). A similar result was obtained for root number (**Maharana and Singh, 1974; 1978**). The latter two treatments gave larger tubers than the other treatments. Tuber weights were 11.6 g in 1 node cuttings treated with Rootex followed by 0.5 node cuttings also treated with Rootex (9.7 gm). Tuber size was small, due to poor vegetative growth in all IBA and control treatments irrespective of 2 node, 1 node or 0.5 node cuttings pre-winter for off season cultivation of this important crop (Lamotta and Whigham, 1971; Whittle, 1978).

4. CONCLUSION

From the results it can be concluded that vine cutting with different growth regulator treatments can be used as an alternative method for propagule production of greater yam to sustain cost effective yam cultivation even in the off season. As field survival was highest with 1 node and 0.5 node cuttings treated with Rootex it is recommended that 1 node cuttings, treated with Rootex, be use for commercial production of *D. alata* propagules.

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Table 1. Performance of rooted cuttings of pre-winter planted *D. alata* in nursery bed and field evaluation

Treatments	Survival (%)		Root length (cm)	Number of roots	Tuber size (gm)
	Nursery	Field			
IBA 100 ppm, 0.5 node	83.3	56.7	8.0	6.67	2.33
IBA 200 ppm, 0.5 node	75.0	60.0	7.7	6.33	2.33
IBA 200 ppm, 1 node	95.0	60.0	8.7	7.33	3.33
IBA 100 ppm, 1 node	91.7	55.0	9.0	7.67	2.33
IBA 200 ppm, 2 node	61.7	16.7	7.0	2.00	2.33
IBA 500 ppm, 0.5 node	63.3	60.0	7.3	3.00	3.33
IBA 500 ppm, 2 node	65.0	20.0	7.0	2.33	2.33
IBA 500 ppm, 1 node	100.0	61.7	7.7	3.00	5.33
IBA 1,000 ppm, 2 node	58.3	18.3	7.0	1.33	3.33
IBA 1,000 ppm, 1 node	93.3	66.7	4.0	1.67	7.00
IBA 1,000 ppm, 0.5 node	58.3	50.0	4.0	1.67	6.33
Rootex 2 node	71.7	30.0	10.3	7.00	6.67
Rootex 1 node	100.0	86.7	14.0	14.00	11.67
Rootex 0.5 node	100.0	81.7	13.3	11.33	9.67
Control 2 node	63.3	16.7	7.0	5.33	2.00
Control 1 node	100.0	60.0	5.7	6.67	5.00
Control 0.5 node	71.7	55.0	6.0	6.00	3.33
S.E.M. ±	2.88	2.58	0.94	0.76	0.45
C.D. (0.05)	7.99	7.15	2.63	2.13	1.26

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