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Effect of growth hormones IBA on clonal propagation of bamboo in nursery condition

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Abstract

An experiment was conducted at AICRP on Agroforestry, College of Agriculture (Dr PDKV), Nagpur to study the effect of different concentrations of IBA on two node culm cuttings of bamboo species for ease propagation and production of quality planting material.

Study revealed that among both the species in nursery condition *D. stockssi* (Chivar-mesh) produces significantly maximum 4.15 shoots and survival percentage 44.99. Whereas, *B. polymorpha* (Narangi) significantly attained maximum shoot height 47.31 cm and rooting percentage 49.97. Similarly, among different concentrations of growth regulator IBA, significantly produces maximum number of shoots 5.66, maximum height of shoot 69.04 cm, rooting percentage 68.40 and survival percentage 63.39 when two node culm cuttings were treated with IBA 2500 ppm. The interaction effect were noticed non significant.

Keywords: bamboo, growth regulator IBA, clonal propagation, culm

Introduction

Bamboo is world fastest and versatile woody plant capable of providing ecological, economical and livelihood security to the people. It is also known as 'Green Gold', wonder plant. India has the richest genetic resources with 136 species including 11 exotic. The total forest area under bamboo is estimated to 10 million ha. This is 14.70% of total forest area of our country. Bamboo species *D. stockssi* and *B. polymorpha* are commercially useful as the material is widely used in furniture industry and construction work. The bamboo species under study does not produce viable seeds and hence vegetative propagation is alternative for multiplication.

The conventional propagation method of bamboo was through seeds and rhizomes. The habit of unpredictable gregarious flowering and seeding followed by death makes bamboo propagation uncertain through seeds which have short viability. The improvement through hybridization is very difficult. In order to achieve these objectives large scale plantation and farming a vegetative propagation technique by use of PGRS will offer a great potential for production of quality planting material.

Material and Method

The field experiment was conducted during 2011 to 2013 at Agroforestry Research Farm, College of Agriculture (Dr PDKV) Nagpur during the period of 2011 to 2013. The two node culm cuttings of bamboo species- *B. polymorpha* and *D. stocksii* were cut into required numbers from the Bamboo germplasm and treated with the five different solutions of plant growth regulator IBA 500 ppm, 1000 ppm, 1500 ppm, 2000 ppm and 2500 ppm. Treated cutting were placed on ridges and furrow under open conditions in the month of September. Observations on number of shoots at 30, 60 and 90 days after treatments were recorded. Similarly rooting percent and survival at 90 days was recorded. Observations presented in Table below.

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Results and Discussion

Table 1: Effect of IBA concentrations (pooled mean) on No. of shoots, shoot, height, rooting % and survival of bamboo culm cuttings.

Treatments	No of Shoots @ 90 Days	Shoot Height cm 90 D	Rooting % 90 D	Survival % 90 D
A1	3.38	47.31	49.97	38.11
A2	4.15	42.67	46.55	44.99
F test	Sig	Sig	NS	Sig
SE	0.17	1.42	1.80	1.99
CD	0.52	4.76	.	5.91
B1	2.00	23.27	40.44	25.44
B2	2.77	27.86	59.22	29.00
B3	3.28	31.83	44.83	28.93
B4	5.11	63.00	35.07	61.00
B5	5.66	69.04	68.40	63.39
F test	Sig	Sig	Sig	Sig
SE	0.26	2.52	5.22	2.58
CD	0.77	7.49	15.49	7.65
A1B1	1.44	24.98	25.31	23.33
A1B2	2.33	30.04	64.11	30.22
A1B3	3.22	35.73	60.33	25.11
A1B4	4.55	57.53	30.65	52.00
A1B5	5.33	67.48	69.30	59.90
A2B1	2.75	21.57	55.44	27.55
A2B2	3.22	25.69	54.11	27.78
A2B3	3.33	27.93	22.67	32.75
A2B4	5.67	68.35	52.81	66.89
A2B5	6.00	70.61	67.51	70.00
F test	NS	NS	NS	NS
SE	1.07	15.73	8.51	11.02
CD at 5%	..	---	---	---

Table 1 revealed that application of different concentrations of IBA on culm cuttings of bamboo species recorded significantly maximum No of shoots, increased shoot height, rooting percentage and survival percentage.

No. of Shoots

Maximum numbers of shoots were observed after 90 days of treatment in both Bamboo species. However, in *D. stockssi* (Chivar-mesh) produces significantly maximum 4.15 shoots. Similarly, among different concentrations of plant growth regulators, IBA 2500 ppm recorded significantly maximum number of shoots (5.66) and at par with IBA 2000 ppm (5.11). Whereas, the Interactions effects were found non-significant.

Shoots Height at 90 days

Maximum height of shoot was observed after 90 days of treatment in both Bamboo species. In case of *B. polymorpha* maximum shoot height 42.67 cm was noticed. Whereas, among the different concentrations of IBA, 2500 ppm found significantly maximum shoot height (69.04 cm) and at par with IBA 2000 ppm (63.00). Interactions were found non-significant.

Rooting % at 90 days

Significantly, maximum rooting percentage was noticed after 90 days with application of different concentrations of IBA. The treatment IBA 2500 ppm recorded significantly maximum rooting 68.40% among all treatments. Bamboo species and Interactions were found non-significant.

Survival % at 90 days

Maximum survival of rooted cuttings was observed after 90 days of treatment in both Bamboo species. In bamboo species *D. stockssi* significantly maximum survival 44.99% was observed. Among different concentrations of growth regulator

application of 2500 ppm IBA observed significantly maximum survival (63.39%) followed by IBA 2000 ppm (38.11%). The interactions effect were found non-significant.

Conclusion

From the study it is concluded that under nursery conditions in *B. polymorpha* (*Narangi*) as well as *D. stockssi* (*Chivar-mesh*) bamboo produces maximum number of shoots, attains maximum height, produces maximum number of roots and maintain the maximum survival when bamboo cuttings are treated with rooting hormone IBA 2500 ppm. Hence for maximum rooting and survival percentage it is recommended that two node culm cuttings of *D. stockssi* and *B. polymorpha* bamboo should be treated with 2500 ppm concentration solution of IBA.

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