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SHORT COMMUNICATION

Responses of IBA to induce rooting in stem cuttings of cucurbits

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The main role of vegetative propagation of cucurbits through stem cuttings is to maintain gynoecious and male sterile line (Pandey and Rai, 2006). Seed propagation of cucurbits requires new planting materials every year due to the loss of hybrid vigour and delayed flowering and fruiting. The availability of true to true type hybrid seed in local market is also difficult. However, rapid multiplication of cucurbits by stem cuttings has been the answer to such problem in cucurbits. Some perennial cucurbits like pointed gourd and kundru etc. as well as pumpkin (Singh, 1997), bottle gourd and bitter gourd (Singh, 2004) has been successfully propagated by stem cuttings.

The application of plant growth regulators increased the rooting and fruiting in tomato, pumpkin, bottle gourd and bitter gourd (Singh, 1999, Singh, 1997 and Singh, 2004). The present experiment was taken to examine the efficacy of different doses of IBA on vegetative propagation of different cucurbits commonly grown in Baran district of Rajasthan.

The investigation was carried out on cucurbits stem cuttings at Krishi Vigyan Kendra, Anta during the year 2008-2009.The site experiences subtropical climate having three distinct seasons, i.e. rainy (mid-June to September), winter (October to February) and summer (March to mid-June).Average annual rainfall during the study period was 1552 mm, of which 85% was received during monsoon months within 56 hours. The mean maximum temperature was 38°C (April to June) and minimum was about 8°C (January).The soil of the experimental site is a black cotton-alluvial in reaction pH 8.5, EC 0.854 dSm^{-1}, high in free CaCO3(35%), highly deficient in organic carbon (0.32%), poor in available N (166.3 kg ha^{-1}), P_2O_5 (28.5 kg ha^{-1}) and K_2O (148.2 kg ha^{-1}) with the soil texture sandy clay (sand, silt and clay: 54, 35 and 9% respectively).

The experimental material which consisted of 15-20 cm long cuttings (1.0 to 1.25 cm thick with 4-5 nodes) were harvested with the help of sharp knife from the tip portion of two month old available mother plants of cucumber (*Cucumis sativus* L.), sponge gourd (*Luffa cylindrica* Roem) and *tinda* (*Praecitrullus fistulosus* Pang.) varieties (Pusa Sanyog F1 hybrid), Pusa Chikni, Arka Tinda respectively on 10 August, 2008 and 10 March 2009. The 4 to 5 cm basal portions of 25 cuttings were treated with the solution of either 250 or 500 ppm indole butyric acid for 10 minutes and these cutting were compared with control constituted water treatment only. The treated cuttings were subsequently planted in 30X30X30 cm pits filled with 1/3 part of sand, 1/3 part of FYM and 1/3 part of upper soil at a distance of 2.5m X1.0 m on the eastern side of ridges. These treatments were replicated thrice in factorial randomized block design. Uniform cultural operations were adopted during the course of investigation. The observations on survival of cuttings were recorded after one month of planting and presented as per cent of total cutting planted. Subsequently, 5 cuttings were randomly tagged in each treated plots. All shoots emerging from these cuttings were counted and these cuttings were then uprooted after 35 days after transplanting for the counting of number of roots and its length. The number of days taken to flowering was counted at the time of first female flower emergence. Yield was recorded at the time of harvesting which was done at green tender stage. The data were statistically analysed as per procedure laid down by Panse and Shukhatme (1985).

Data revealed a profuse rooting and survival of cutting treated with IBA (Table 1). The total number of roots and its length was higher in 500 ppm IBA treated stem cuttings than 250 ppm IBA in all the cucurbits and required 2 to 3 day lesser time to induce rooting. Maximum rooting was recorded in rainy season sponge gourd followed by cucumber and *tinda*. The survival percentage of 500 ppm IBA treated stem cuttings was higher in sponge gourd (78.73- 94.15), cucumber (78.22-93.75) and *tinda* (35.93-49.87) in both the season than 250 ppm IBA. Probably maximum survival percentage was recorded due to increase of roots in plant growth regulator treated cutting (Singh, 2004). Maximum survival of cuttings was also due to the presence of differential level of endogenous rooting cofactors (Pandey *et.al.*, 1983) and carbohydrates and C: N ratio implicated in rooting of plant species.

The number of branches and yield were better (Table 2) in IBA treated stem cuttings of cucurbits. The cuttings treated with highest dose of IBA (500 ppm) produced maximum branching and takes one week lesser time to induce flowering. Flower induction was slightly earlier in summer season than rainy season in all cucurbits. The mature vines of cucumber, sponge gourd and *tinda* take minimum time to induce flowering. The response of 500 ppm IBA was more effective to significantly increase the

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yield of cucumber, sponge gourd and *tinda* i,e. 252.45-254.01, 227.48-228.35 and 219.51-220.14 q/ha respectively and harvested one week earlier than other treatment. The response of IBA and cucurbits are significantly increased the number of branch, number of days required for flowering, fruiting and yield but its interaction was non-significant. The increase in yield was due to the induction of early flowering, fruiting and number of branch per plant. Similar increase in yield was reported in pumpkin, bottle gourd, bitter gourd and tomato (Singh, 1997; Singh, 1999) stem cuttings.

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Table 1. Effect of IBA on rooting and survival of stem cuttings of different cucurbits.

Treatment IBA (ppm)	No. of root/plant		Length of root (cm)		Days required for rooting		Survival %	
	Rainy	Summer	Rainy	Summer	Rainy	Summer	Rainy	Summer
Cucumber								
Control	31.24	23.28	08.82	08.14	13.44	15.72	85.32 (21.33)	72.35 (18.08)
250	37.88	32.49	10.41	09.22	10.32	14.23	91.81 (22.95)	76.82 (19.20)
500	42.98	36.38	11.84	11.23	10.12	13.74	93.75 (23.43)	78.22 (19.55)
Sponge gourd								
Control	31.51	23.53	08.93	08.97	12.93	15.48	89.22 (22.30)	72.47 (18.11)
250	38.34	32.77	10.35	09.34	10.32	14.05	92.25 (23.06)	76.48 (19.12)
500	43.8	36.13	11.89	11.35	10.05	13.35	94.15 (23.56)	78.73 (19.68)
Tinda								
Control	22.35	15.74	06.37	05.87	16.12	18.39	41.18 (10.29)	33.47 (08.36)
250	28.25	21.01	07.94	06.14	14.37	16.47	46.52 (11.63)	35.54 (08.88)
500	29.41	22.49	08.01	06.58	13.68	15.89	49.87 (12.46)	35.93 (08.98)
CD(0.05)								
Treatment	2.14	2.16	0.98	0.88	1.22	NS	3.47	3.10
Cucurbits	2.46	2.21	0.99	0.94	NS	NS	NS	NS
Interaction	NS	NS	NS	NS	NS	NS	NS	NS
C.V.	30.48	30.12	28.47	28.23	47.99	58.57	35.34	33.26

Table 2. Growth and yield traits of cucurbits raised through stem cuttings treated with IBA.

Treatment IBA (ppm)	No. branch/plants		Days required for female flowering		No. of days taken to harvest		Yield (Q/ha)	
	Rainy	Summer	Rainy	Summer	Rainy	Summer	Rainy	Summer
Cucumber								
Control	9.53	6.31	44.46	44.21	54.19	52.16	201.41	200.12
250	11.14	8.53	39.27	38.71	49.01	47.58	244.85	244.11
500	11.90	9.32	37.12	35.12	47.59	45.13	254.01	252.45
Sponge gourd								
Control	9.59	6.55	44.54	42.31	50.84	48.47	208.52	207.15
250	11.54	8.63	39.48	37.11	44.12	41.68	214.28	214.07
500	11.95	9.38	37.58	36.26	42.15	41.18	228.35	227.48
Tinda								
Control	6.05	4.33	44.31	43.41	50.09	48.47	191.48	190.98
250	7.53	4.99	40.12	38.98	44.75	43.08	201.47	200.96
500	7.97	5.64	39.10	38. 09	42.07	41.86	220.14	219.51
C.D(0.05)								
Treatment	0.48	0.69	2.15	2.14	2.04	2.18	1.01	0.98
Cucurbits	0.61	0.71	2.34	2.87	2.27	2.68	2.41	1.86
Interaction	NS	NS	2.14	2.21	NS	NS	NS	NS
C.V.	27.25	27.46	11.13	11.11	21.12	22.61	68.32	62.01