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ROOTING AND SURVIVAL PERCENTAGE IN GUAVA (*PSIDIUMGUAJAVA* L.) CUTTINGS AND ITS RESPONSE TO DIFFERENT IBA CONCENTRATIONS

Yasir Ali

Department of Horticulture, Faculty of Agriculture, Abdul Wali Khan University Mardan, Pakistan. Email: Yasirkareem@aup.edu.pk

ABSTRACT

Guava mainly propagates asexually through cuttings. IBA concentration at different levels (ppm) play a vital role in the survival and rooting in guava cutting. To investigate the response of guava cuttings to various concentrations of IBA for further research work, the findings of previously published literature are summarised in this paper for observing the response of different IBA concentration to rooting and survival percentage of guava. The summarised result suggests IBA at 2000 ppm for the better survival and at 4000 ppm for the better rooting of guava cuttings.

KEY WORDS: Guava, Rooting, Survival and IBA Concentrations.

INTRODUCTION

Guava (*Psidiumguajava* L.) belongs to family Myrtaceae and had attained commercial importance because of its wide adaptability to varied soil and climatic conditions. It is a shallow rooted shrub or small tree. It grows 3m-10m in height. It produces branches near to ground and often produces suckers from roots near the base of trunk. It is a long-living and hardy plant. The bark is smooth, grayish or reddish brown, peeling of the flakes. Leaves are simple, opposite in pairs, elliptical to oblong.Sexual propagation is the major source of genetic variation essential for producing new cultivars with high yield and good quality. However, once improvements are achieved they must be secured for future generations by using asexual means mainly cuttings in guava but cuttings are difficult to root; therefore this study was initiated to evaluate the effect of various concentrations of IBA on rooting of guava cuttings.

SUMMARIZED FINDINGS OF THE PREVIOUS LITERATURE

Luqman*et al*. (2004) studied the Effect of different concentrations of indole-butyric acid (IBA) on semi hardwood guava cuttings. The basal portions of semi hardwood guava cuttings were immersed for solutions containing 100, 200, 300, 400, 600, 700, 800, 900 or 1000 ppm IBA. The treated cuttings were planted in bags on 14 July and evaluated for growth parameters on 25 November. IBA had no significant effect on the number of days to bud sprouting and sprouting percentage. Survival (35.71%), number of leaves per cutting (13.93), number of branches per cutting (3.80), branch length (7.2 cm), and number of roots per cutting (21.15), root length (6.089 cm), root weight (4.57 g) and rooting percentage (39.28%) were greatest at 1000 ppm.

Tehsin*et al.* (2005) conducted an experiment in Peshawar to investigate the effect of plant growth regulators on the rooting of guava cv. Allaabadi cuttings. IBA, NAA and

paclobutrazol at 1000 ppm were applied on hardwood, semi-hardwood and softwood type cuttings by immersing the basal ends of cuttings in the solutions for 5 minutes. Maximum sprouting (71.22%), number of branches (3.44), root weight (1.46 g) and survival percentage (57.22%) were observed in softwood cuttings treated with paclobutrazol. The maximum root number (59.66) and the longest shoots (8.24 cm) were obtained from softwood cuttings treated with IBA. Semi-hardwood and softwood cuttings showed early sprouting (17 days) and maximum root length (12.81 cm), respectively, under the NAA treatment.

Yamamoto *et al.* (2010) conducted a research on guava treated with indolebutyric acid and alcohol, The aim of this research was to evaluate the cutting rooting of Psidiumguajava L. 'Século XXI' treated with different concentrations of indolebutyric acid (IBA) with talc and alcohol as a vehicle. Herbaceous cuttings with 10-12 cm were submitted to two forms of applications (alcoholic talc and alcoholic solution) and three doses (0; 2000 and 4000 mg L^{-1}) of IBA. The cuttings were placed in plastic boxes. After 95 days, the following variables were evaluated: cutting survival rate (%); foliar retention (%); rooted cuttings (%); root number per cutting; root length per cutting and dry root matter per cutting (g). The best results for the percentage of rooting (28.5%), number of roots per cutting (12.10) and root length (6.79) were obtained with the highest concentration of IBA. The results showed that the application of 2000 mg L^{-1} of IBA is the most appropriate to provide the best rooting characteristics of guava and the use of talc as an vehicle is more efficient than alcohol.

Colombo *et al.* (2008) conducted a research to evaluate the influence of different concentrations of IBA on the rooting potential of 10-12 cm-long herbaceous cuttings of guava selection 8501, submitted or not to basal lesions. The cuttings were prepared in 2 ways (with or without basal lesions) and submitted to 4 concentrations of IBA (0, 1000, 2000 and 3000 mg/litre). After 85 days, the following variables were evaluated: foliar retention; rooted cuttings; cutting survival rate; cuttings with callus, but without roots; root number per cutting; root length per cutting and wet and dry root matter per cutting. There was no significant contrast among the different IBA concentrations related to the percentage of rooted cuttings, but there was a significant difference related to the root number per cutting and wet and dry root matter per cutting where the 2000 and 3000 mg/litre showed the highest averages. The basal lesions did not bring improvements on the rooting potential of the cuttings. The 3000 mg IBA/litre concentrations resulted in the largest number of roots per cutting.

Prabkhar*et al*. (2007) studied about the Effect on rooting in guava cv. Lucknow-49 through PGR and organic media, One-year-old shoots of guava cv. 'Lucknow-49' were treated on ringed surface of shoots with IBA concentration (3000, 4000, 5000 and 6000 ppm) along with organic media, i.e. poultry manure, vermicomposting and farmyard manure. Air layering of guava with IBA concentration of 6000 ppm with soil sand poultry manure rooting media produced maximum percentage (76.75%) of survival of 60-days-old-plants grown in poly bags. This combination of IBA with rooting media helped in producing maximum number of primary roots (18.57), secondary roots (23.91), leaves on 60 days (14.36) and length of shoots on 60 days (5.31 cm). IBA at 5000 ppm and poultry manure combination was found to be second best for survival of air layering (73.25%)

Zietemans*et al.* (2007) studied the Effect of different substrates and collection seasons on the herbaceous cuttings rooting of guava cultivars Paluma and Século XXI. The herbaceous cuttings, 10 cm in length, with 2 nodes and a pair of leaves in the superior node, were collected in spring and summer seasons, and treated with 5 levels of IBA (0, 500, 1000, 1500 and 2000 mg/l) for each season, and disposed into plastic boxes containing rice hull coal and vermiculite as substrates. After 70 days, the rooting percentage, root length, number, fresh and dry matter, survival percentage, foliar retention and percentage of cuttings with callus

were evaluated. A better rooting percentage occurred in the cuttings collected in summer; the 1500 and 2000 mg IBA/l were the most appropriate to provide the best rooting characteristics of 'Paluma' and 'Século XXI' herbaceous cuttings, respectively.

Abo-El-Ez*et al.* (2004) conducted a research in Egypt during 2002 and 2003 on vegetative propagation of guava cv. Banaty under intermittent mist cutting were treated with IBA at 2000, 3500 or 5000 ppm. Cuttings prepared in April gave the highest average percentage of rooting as well as rooting plus shooting. December cuttings gave the lowest average percentage of rooting, while August ones came in between. The control guava cuttings significantly gave the lowest average rooting percentage. Treatment of IBA stimulated rooting as well as rooting plus shooting percentages compared to the untreated cuttings (control). IBA at 3500 ppm was the most efficient for stimulating rooting percentage. A similar trend was observed regarding cuttings that developed shoots plus roots. Extracts of basal portions of guava cuttings just before root initiation revealed the highest values of indoles and phenols. The highest percentage (52.71) of rooting was recorded for guava cuttings treated with IBA at 3500 ppm in April.

Ayaz*et al.* (2004) studdied about the Effect of paclobutrazol concentrations and dipping period on rooting of soft wood cuttings of Guava (Psidiumguajava).Fresh softwood cuttings of Guava having 3-4 leaves were dipped in 0, 10, 20, 30, 40, 50 and 60 ppm solution of paclobutrazol for 1, 2, 3, 4 and 5 h and the plants were grown in plastic tubes and covered with polythene sheet for maintaining humidity.. In various dipping period five hours dipping resulted in maximum cutting success (34.9%), rooting (30.1%), shoot length (10.6 cm) and number of roots (47.2) while four hours dipping resulted in the maximum number of branches (2.6) and root volume per plant (1.05 cm^3). In interaction, the maximum cutting success (81.7%), shoot length (28.8 cm) and number of branches (5.3) was observed in 60 ppm paclobutrazol concentration and 2 h dipping. Paclobutrazol at 60 ppm concentration and 3 h dipping period gave the maximum rooting (80%), number of roots (102.7) and root volume per plant (1.76 cm^3)

Costa *et al*. (2003) studied Stock plant shading and use of indolebutyric acid for rooting guava cuttings. Semi hardwood cuttings were dipped in 0 or 2000 mg IBA/litre for 5 seconds placed in vermiculite and held under greenhouse conditions with intermittent mist for 60 days. Percentage rooting of cv. Rica cuttings was highest (95.35-97.27%) in cuttings treated with 2000 mg IBA/litre (from either shaded or unshed trees) and in cuttings from trees grown under 30% shade without IBA treatment (89.71% rooting). Percentage rooting of cv. Kumara cuttings was highest in cuttings from trees grown under 30% shade either treated with 2000 mg IBA/liter (85.35%) or without IBA treatment (71.09%), or cuttings from trees grown under 50% shade without IBA treatment (56.73%). IBA increased the number of roots/cutting in all treatments and both cultivars resulted in 65-70% rooting, with 75-95% survival percentage in the nursery bed, provided all other conditions were favorable.

Al-Obeed*et al.* (2000) studied the effect of growth regulators, and time of propagation on the rooting of guava stem cuttings. Semi-hardwood 15-cm-long cuttings of guava (Psidiumguajava) cv. Balady were subjected to 15 treatments including IBA at 3000 ppm and NAA at 1000 ppm both alone or in different combinations with catechol at 500 or 1000 ppm and acid at 500 or 1000 ppm treating the cuttings with IBA or NAA The maximum rooting percentage (62.9%) was obtained in guava cuttings treated with IBA 1000 ppm, followed by cuttings treated with NAA at 1000 ppm (59.6%) and the lowest rooting percentage (19.8%) was in the untreated cutting. Generally, cuttings treated with IBA 1000 ppm gave the maximum number of roots (82.4) and the control produced 8.3 cm average root length per cutting.

Sandal *et al*. (2003) studied the Effect of pre-conditioning, maturity of shoot and auxins cutting, they studied the effects of preconditioning treatments (control, girdling, 200 ppm Ethrel [ethephon] and 200 ppm Cystocele [chlormequat]), maturity of shoots (softwood and semi hardwood) and auxins (IBA at 2500 and 5000 ppm and NAA at 250 and 500 ppm) on the rooting of guava (cv. Lucknow-49) stem cuttings. The results led to an inference that Lucknow-49 may be propagated by stem cuttings. Root regeneration and number of primary roots per cutting were higher in semi hardwood than softwood cuttings. Preconditioning the stock plants with 200 ppm Ethereal, followed by the treatment of the semi hardwood cuttings with 2500 ppm IBA

CONCLUSION

From the previous literature it was concluded for the cuttings of guava that the IBA concentration of 2000 ppm is recommended for better results in survival and IBA 4000ppm for the better results in rooting.

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