Scholars Bulletin *(Horticulture)*

An Official Publication of "Scholars Middle East Publishers" ISSN 2412-9771 (Print)
Dubai, United Arab Emirates ISSN 2412-897X (Online)
Website: http://scholarsbulletin.com/

Effect of Different Concentration of Indole Butyric Acid (IBA) on Rotting of Guava Cuttings

Yasir Ali[1], Muhammad Ali Khan[1], Abdul Jalal[2*], Abdul Haseeb[2]

[1]Department of Horticulture, Faculty of Agriculture, Abdul Wali Khan University Mardan, Pakistan
[2]Department of Horticulture, Faculty of Crop Production Sciences, the University of Agriculture Peshawar, Pakistan

***Corresponding author**
Abdul Jalal

Article History
Received: 08.03.2018
Accepted: 17.03.2018
Published: 30.03.2018

DOI:
10.21276/sb.2018.4.3.7

Abstract: The research was conducted to evaluate effect of different concentrations of IBA on rooting of guava in Fruit Crop Research Program, Horticultural Research Institute (HRI), NARC Islamabad. Semi hard wood cuttings, 5-6'' in length having 2 to 3 buds, of guava cultivar was taken from about 1 to 1/2 year old uniform guava branches. These cuttings were treated with IBA 4000, 3000, 2000 and 1000 ppm while untreated cuttings were used as control. The greenhouse was equipped with heater and air cooler keeping the temperature at 240C and relative humidity was maintained at 60-70 % during the experiment period. Cuttings were irrigated through mist and the cuttings were planted in experimental pots containing sandy soil. The data was recorded for rooting percentage, number of roots per cuttings, root length per cutting and survival percentage. It was concluded that the cuttings treated with IBA 2000 ppm produced maximum number of roots. While in survival the IBA 2000 ppm is at the top. In all treatment very small difference exist without control treatment in which variation were exist, while in IBA the difference between different parameter were existed.

Keywords: Guava, rooting, IBA, root length and Survival Percentage.

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 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.

Guava is one of the hardiest tropical fruit trees and exceeds many others in importance, productivity and adaptability. It is high in vitamin C, pectin and mineral content, making it a nutritious crop commonly referred to as the ``apple of the tropics" [1]. Guava is one of the most common fruits in Pakistan where it can produce fruit two times in a year. Production-wise, it ranks fourth after citrus, mango and banana, and covers a greater area than apple and peach. Guava is grown throughout the country because it is hardy, drought tolerant and with stands soil pH ranging from 4.5 to 8.5 [2]. The average yield, however, is much less than it's potential.

Guava is believed to be originated in tropical America (Mexico to Peru). Guava is successfully grown under tropical and subtropical climatic zones. In areas having distinct winter season, the yield increases and quality improves. Dry atmosphere at the time of flowering, the guava does equally well on heavy clay, to light sandy, gravel bars near streams, or on limestone and tolerates a pH range from 4.5 to 9.4.[3]. It is somewhat salt resistant. Good drainage is recommended however, guavas are seen growing on land with high water table at present; it is mainly grown in South Asian countries, Cuba, Brazil, Pakistan and India. In Pakistan, it is grown in all the provinces over an area of 58.5 thousand hectares with production of 468.3 thousand tonnes [4].

Worldwide Pakistan is the 2nd largest producer of guava after India. The other largest guava producing countries are Mexico, Brazil and Thailand. Venezuela, Cuba, and Colombia are important Latin-American countries cultivating guava. Major growing areas include Jhang, Kasur, Lahore, Gujranwala, Sheikhupura, Sahiwal and Faisalabad. In Sindh province, an excellent pear-shaped guava with a smaller seed core is grown mostly in the districts of Larkana, Dadu, Shikarpur and Hyderabad. In Khyber Pukhtunkhwa, the Mardan and Kohat districts and Hazara Valley are famous for production of good quality guava. More trade is carried on processed guava products like Juices and nectars, Jam and Jellies, fruit

paste, canned whole and halves in syrup. Some traders believe that there is a good international market potential for fresh guavas and that demand will grow as more consumers become acquainted with this fruit.

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.

MATERIALS AND METHODS

The effect of different concentrations of IBA on guava'' an experiment was conducted in Fruit Crop Research Program, Horticultural Research Institute (HRI), NARC Islamabad. Semi hard wood cuttings 5-6'' in length having 2 to 3 buds of guava cultivar was taken from about 1 to 1/2 year old uniform guava branches in the month of July 2015, these cuttings were treated with IBA 4000, 3000, 2000 and 1000 ppm while untreated cuttings were used as control, six cuttings were used per treatment. The greenhouse was equipped with heater and air cooler. Temperature was kept at 24°c and relative humidity was maintained at 60-70 % during the experiment period. Cuttings were irrigated through mist and the cuttings were planted in experimental pots containing sandy soil.

Data was recorded on the following parameters.

(a) Rooting Percentage

Rooted cuttings were counted and converted to percentage.

(b) Number of Roots per Cuttings

Numbers of root are counted on each side by pencil because roots were very small.

(c) Root Length per Cutting

Root length was determined by measuring scale.

(d) Survival Percentage

Survival percentage was determined by converting survived plants in field to percentage

RESULTS AND DISSCUSSION

It is evident from table-1 that significantly highest rooting percentage (78.21%) was recorded for IBA 4000 ppm followed by IBA 3000 ppm (65.500%) and IBA 2000 ppm (60.200%) respectively but the difference between these two is insignificant, while significantly lowest rotting percentage was recorded for control (31.533%) followed by IBA 1000 ppm (46.313%). Our results are in agreement with Costa *et al.* [5] who reported that maximum rooting occurs at IBA 4000.

Data shows that significantly highest average root length per cutting (18.233 cm) was recorded for IBA 4000 ppm followed by IBA 3000 ppm (15.633 cm) and IBA 2000 (14.400 cm) respectively the difference between IBA 4000 ppm and IBA 3000 ppm and IBA 2000 ppm is non-significant while the difference between IBA 4000 ppm and IBA 2000 ppm is significant. Lowest root per cutting was recorded for control (5.5667 cm) followed by IBA 1000 ppm (9.9667 cm) the difference between these two is significant. Our research results are matching with Yamamoto *et al.* [6] that maximum root length was recorded for IBA 4000 ppm.

Data regarding number of roots per cutting shows that rotting was significantly affected by IBA concentration. It is evident from the data that highest significant number of roots per cutting were noted for IBA 2000 ppm(71.473) followed by IBA 3000 ppm (62.250), IBA 4000 ppm (52.683) IBA 1000 ppm (43.000) and control (28.593) respectively. Colombo *et al.* [7] also recorded maximum number of root for IBA 2000 ppm.

Data regarding survival percentage shows that rotting was significantly affected by IBA concentration. It is evident from the mean table-4 that significantly highest survival percentage (57.300) was recorded for IBA 2000 ppm followed by IBA 3000 ppm (47.887) and IBA 4000 ppm (42.237) respectively but the difference between these two is insignificant, while lowest rotting percentage was recorded for control (19.543) followed by IBA 1000 ppm (28.527) but the difference between these two was in significant. These results are in agreement with Zieteman *et al.* [8] who observed that best survival occurs when cuttings are treated with IBA 2000 ppm.

Table-1: Means and significance level of the data differentiated by different letters keeping LSD at 5% level significance

Treatments	Rooting Percentage	No. of roots per cutting	Root length	Survival percentage
Control	31.533d	28.593e	5.5667d	19.543c
IBA 1000	46.313c	43.000d	9.9667c	28.527c
IBA 2000	60.200b	52.683c	14.400b	42.237b
IBA 3000	65.500b	62.250b	15.633ab	47.887b
IBA 4000	78.217a	71.473a	18.233a	57.300a
Significance Level	*	*	*	*

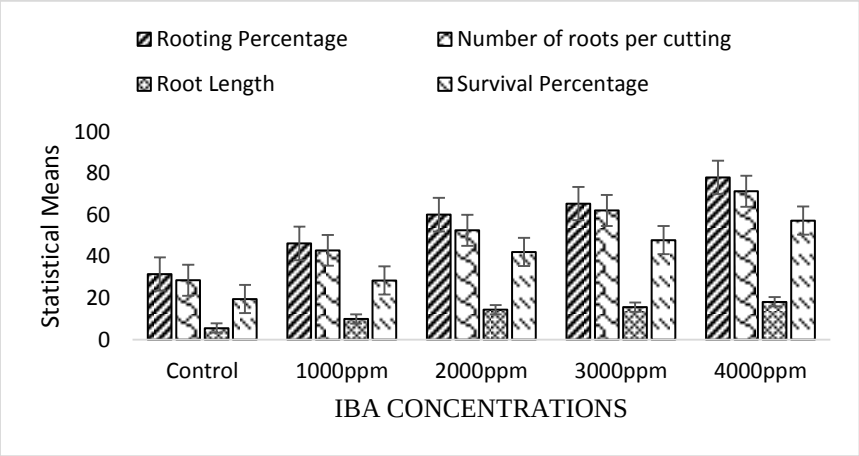

Fig-1: Graphical representations of the interaction among various parameters

CONCLUSION

It was concluded from the analysed data that cuttings treated with IBA 2000 ppm produced maximum number of roots. While in survival the IBA 2000 ppm is at the top. In all treatment very small difference exist without T_5 (control) treatment in which variation were exist, while in IBA the difference between different parameter were exist so that it could be stated that IBA play a great role in the growth of cuttings and rooting in guava.

RECOMMENDATIONS

Based on result of experiment it is recommended that:

- IBA 2000 ppm show the best result in survival.
- IBA 4000ppmshow best result in rooting.

More research work on planting of cuttings in various times at various locations should be done to reach the facts.

REFERENCES

1. Prakash, D. P., Narayanaswamy, P., & Sondur, S. N. (2002). Analysis of molecular diversity in guava using RAPD markers. *The Journal of Horticultural Science and Biotechnology*, *77*(3), 287-293.
2. Khattak, J. Z. K., Khan, S., Raza, S., Ullah, I., & Khattak, H. Z. K. (1999). Comparative study of physical and chemical characteristics of five guava cultivars. *Sarhad Journal of Agriculture (Pakistan)*.
3. Singh, P. R. A. B. K. H. A. R., Chandrakar, J., Singh, A. K., Jain, V., & Agrawal, S. (2005, December). Effect on rooting in guava cv. Lucknow-49 through PGR and organic media under Chhattisgarh condition. In *I International Guava Symposium 735* (pp. 197-200).
4. Padilla-Ramirez, J. S., & Gonzalez-Gaona, E. (2008, November). Collection and characterization of Mexican guava (Psidium guajava L.) germplasm. In *II International Symposium on Guava and other Myrtaceae 849* (pp. 49-54).
5. Da Costa Jr, W. H., Scarpare Filho, J. A., & Bastos, D. C. (2003). Estiolamento da planta matriz e uso de ácido indolbutírico no enraizamento de estacas de goiabeiras Stock plant shading and indolbutyric acid in the rooting of Psidium guajava L. *Revista Brasileira de Fruticultura*, *25*(2), 301-304.
6. Yamamoto, L. Y., Borges, R. D. S., Sorace, M., Rachid, B. F., Ruas, J. M. F., Sato, O., ... & Roberto, S. R. (2010). Cutting rooting of Psidium guajava L.'Século XXI'guava treated with indolebutyric acid with talc and alcohol as a vehicle. *Ciência Rural*, *40*(5), 1037-1042.
7. Colombo, L. A., Tazima, Z. H., Mazzini, R. B., Andrade, G. A., Kanayama, F. S., Baquero, J. E., ... & Roberto, S. R. (2008). Rooting of herbaceous cuttings of guava selection 8501-1 submitted to basal lesion and IBA concentrations. *Semina: Ciências Agrárias*, *29*(3), 539-546.
8. Zietemann, C., & Roberto, S. R. (2007). Effect of different substrates and collection seasons on the herbaceous cuttings rooting of guava, cvs. paluma and século XXI. *Revista Brasileira de Fruticultura*, *29*(1), 31-36.