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MULTIPLICATION OF *Cattley guava* BY DIFFERENT TECHNIQUES AND VARIABILITY AMONG GENOTYPES IN VIGOR AND ROOTING

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HIGHLIGHTS

Herbaceous cuttings of *Psidium. cattleyanum* from the field do not take root.

Cuttings of *Psidium. cattleyanum* resist at temperatures with averages around 39.3 °C.

There is genetic variability justifying the selection of cattley guava genotypes.

Mini-cuttings make better rooting, therefore with high variability between genotypes.

Keywords:
Psidium cattleyanum
Mini-cuttings
Herbaceous cuttings
Semi-hardwood cuttings

ABSTRACT

Cattley guava (*Psidium catteyanum* Sabine) is a widespread native plant species of South America and constitutes important genetic resources for the improvement of guava trees. Fruits of these species are consumed by wild animals and extracted by local human populations. However, the vegetative propagation of adult plants, which is necessary for fixing desired characteristics, has been inefficient. The objective of this work was to evaluate the rescue of adult plants of *P. cattleyanum* by herbaceous and semi-hardwood cuttings for the establishment of clonal mini-gardens and to evaluate the rooting potential of mini-cuttings of different genotypes. The experimental design was completely randomized in a factorial scheme with the treatments being different propagule or propagation techniques (herbaceous and semi-hardwood cuttings from mother plants cultivated in the field and by mini-cuttings), with five repetitions and six propagules per plot. The potential for multiplication by the mini-cutting technique and plant vigor were evaluated for 20 genotypes of cattley guava during three seasons of the year (autumn, winter and summer). The use of semi-hardwood cuttings is feasible for the rescue of adult plants and the establishment of clonal mini-gardens. The mini-cutting technique provided the highest rooting percentage, and was most efficient in summer. The genotypes evaluated varied in rooting percentage and plant vigor.

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INTRODUCTION

Brazilian guava and cattley guava (*Psidium* sp.) are native plant species of South America and are widespread throughout the main biomes of Brazil. Fruits of some species are consumed by wild animals and extracted by local human populations (Franzon et al., 2009). The confirmation that these fruits possess beneficial substances (Hister et al., 2017) has generated a demand for consumption and the establishment of orchards, which has stimulated interest in the propagation of these plants. Research has also found that some cattley guava genotypes show promise for improving rootstocks or commercial canopies of guavas, since some genotypes of *P. cattleyanum*, *P. friedrichsthalianun* and *P. guineense* were identified as resistant to the galling nematode *Meloidogyne enterolobii*, which causes a disease with serious impacts on guava culture (Almeida et al., 2009; Miranda et al., 2012; Costa et al., 2012; Bizatti et al., 2016).

According to Franzon et al. (2009), the most widely used propagation method for species of cattley guava is by seed, which results in great genetic variability. Therefore, vegetative propagation of these plants is desirable for the selection and fixation of characteristics. However, cloning adult plants has low rooting rate for cuttings (Schwengber et al., 2000), which makes it difficult to select and fix characteristics observed in the field.

In the juvenile stage, however, the mini-cutting technique has been shown to achieve high rooting percentages. This technique can be used to keep clonal mini-gardens of guava and cattley guava in protected nurseries. These plants can be maintained in containers and, after pruning the apices, emit sprouts that are collected at regular intervals and staked in a greenhouse, thus giving rise to new plants (Marinho et al., 2009; Altoé et al., 2011). The mini-cutting technique has advantages over conventional techniques of using herbaceous cuttings, including: dispensing with the clonal field garden; greater ease in pest and disease control; greater ease of rooting propagules (mini-cuttings); and reduced time for the formation of new plants (Wendling and Dutra, 2008).

The objectives of this work were to rescue adult plants of *Psidium cattleyanum* by herbaceous and semi-hardwood cuttings, establish clonal mini-gardens and select genotypes of cattley guava with greater rooting potential and vigor when multiplied by the mini-cutting technique.

MATERIAL AND METHODS

Three experiments were performed in a greenhouse under polypropylene screens in Campos dos Goytacazes, municipality of Rio de Janeiro State, Brazil (21° 48'S, 41° 20'W).

Rooting potential of herbaceous, semi-hardwood and mini-cuttings

Plants originated from seed propagation of two accessions of *P. cattleyanum* (115 and 117) determined to be resistant to *M. enterolobii* by Miranda et al. (2012) and Biazatti et al. (2016). Some plants were cultivated under field conditions (for supplying herbaceous and semi-hardwood cuttings), while the remainder were used to produce mini-stumps (for supplying mini-cuttings) and kept in greenhouse under 50% polypropylene screens (Sombrite®). Field plants and mini-stumps were both sown in March 2009 and transplanted in January 2011. At the time of the installation of the experiments, the plants in the field and in greenhouse were already producing flowers and were about 22 months old.

The experimental design was completely randomized in a factorial scheme with the treatments being different propagule or propagation techniques (herbaceous and semi-hardwood cuttings from mother plants cultivated in the field and by mini-cuttings), with five repetitions and six propagules per plot.

The mini-stumps were cultivated in 5L plastic pots filled with a commercial *Pinus* sp. bark-based substrate. The mini-stumps were fertilized with 7.6 g of urea, 24.7 g of simple superphosphate and 2.8 g of potassium chloride per pot, divided among three applications at 14-day intervals 14-day intervals. The mini-stumps also received leaf fertilization with zinc sulphate (1 $g{\cdot}L^{-1}$), manganese sulphate (1.5 $g{\cdot}L^{-1}$), boric acid (0.5 $g{\cdot}L^{-1}$) and urea (1.5 $g{\cdot}L^{-1}$) ten days after the last fertilization (Altoé et al., 2011). About ten days after this fertilization the plants were pruned, leaving each mini-stump with three to four pairs of leaves. The mini-cuttings used for rooting were prepared from new sprouts emitted 30 days after pruning. The plants cultivated in the field were approximately 1.5 m of high and sprouts were collected from the median region between the top of the crown and 50 cm above ground level. The plants had half their crowns pruned at about ten days after fertilization, leaving them with four to five pairs of leaves; the other half of the crown was left un-pruned so as to allow the removal of semi-hardwood and herbaceous cuttings from the same plant.

Trees were fertilized according to recommendations for planting 'Paluma' guava (Natale et al., 1996). Chemical analysis of soil samples from the experimental area showed the following characteristics between 0-20 cm deep: pH 5.5; 141 $mg{\cdot}dm^{-3}$ K; 11 $mg{\cdot}dm^{-3}$ P; 2 $cmol_c{\cdot}dm^{-3}$ Ca; 1.3 $cmol_c{\cdot}dm^{-3}$ Mg; 4.2 $cmol_c{\cdot}dm^{-3}$ H+Al; absence of Al; and 3.7 $cmol_c{\cdot}dm^{-3}$ SB. Each of the plants grown in this soil received 400 grams of nitrogen, 100 grams of phosphorus and 80 grams of potassium. Fertilization with N and K was divided among three applications during the rainy season. The fertilizers were applied in the projection of the canopy at 0.25 m, in a radius of 0.5 m from the plant trunk.

Thirty days after pruning, the herbaceous cuttings used for rooting were prepared from the new sprouts emitted. Semi-hardwood cuttings were removed from the sprouts of previous growth. The plants of the different forms of cultivation (protected or in the field), had their respective herbaceous, semi-hardwood and mini-cuttings prepared, staked and evaluated for survival, callus formation and rooting capacity.

The herbaceous, semi-hardwood and mini-cuttings were prepared with two pairs of leaves, from which the basal leaf pair was removed and the apical pair had their limb reduced by half.

The mini-cuttings had lengths ranging from 3.5 to 6.0 cm, and diameters of 1.3 to 2.5 mm. The semi-hardwood cuttings had lengths ranging from 4.5 to 7.5 cm and diameters of 2.5 to 3.5 mm. The herbaceous cuttings had lengths ranging from 3.5 to 5.5 cm and diameters of 1.5 to 3.5 mm, respectively.

Staking of the cattley guava was performed between 6 and 9h. The three types of cuttings were placed to be rooted in 50 cm^3 tubs filled with Basaplant® substrate in a chamber under 60% polypropylene screens (Sombrite®) with intermittent misting by Fogger® micro-nebulizers with a flow rate of 7 $L \cdot h^{-1}$ under pressure of 4.0 $kgf \cdot cm^{-2}$. Based on the procedures adopted by Altoé el at. (2011), the environment was controlled by scheduled sprays lasting 15 s at 10 min intervals for a period of 10 days. After this period, nocturnal nebulization was suspended between 23 and 04 h; the cuttings were then maintained in this regime for another 50 days. After this period the plantlets were acclimated with irrigation by a fine sieve irrigator. About 70 days after staking the percentages of survival, callus formation and rooting were evaluated.

The data obtained were submitted to analysis of variance with the means of treatments being compared by the Duncan test at $p<0.05$.

Survival, callus formation and rooting of mini-cuttings

Plants obtained by seminiferous propagation (22 months of age) were transplanted in January 2011 into 5-liter plastic pots filled with commercial *Pinus* sp. bark-based substrate, where they began to be grown in mini-stumps systems. Two experiments were carried out. In the first, eleven genotypes from accession 115 were evaluated during three seasons of staking (autumn, winter and summer), with four replicates with each plot composed of five mini-cuttings. In the second experiment, nine genotypes from accession 117 were evaluated during two seasons of staking (autumn and summer), with four replicates and each plot composed of five mini-cuttings per genotype. The experimental design was completely randomized with the treatments consisting of genotypes, four replicates and five mini-cuttings per plot. The data of each seasons of staking were submitted to joint experimental analysis, with each season being considered an environment.

The mini-stumps were fertilized and pruned according to the methodology previously described. The mini-cuttings from accession 115 had a length of 3.5 to 5.5 cm and diameters ranging from 1.3 to 2.0 mm. On the other hand, the mini-cuttings from accession 117 had lengths varying between 4.5 and 6.0 cm and diameters between 1.7 and 2.5 mm.

Staking of mini-cuttings was carried out in autumn, winter and summer of 2011, following the same procedures described previously.

The survival (characterized by the maintenance of green-colored leaves), percentage of callus formation and percentage of rooting of the mini-cuttings were evaluated. A mini-cutting was considered rooted if the size of the root was greater than one centimeter.

The data obtained were submitted to analysis of variance with the means of treatments being compared by the Scott Knott test at $p<0.05$.

Vigor of young plants from rooted mini-cuttings of different genotypes of *Psidium cattleyanum*

This experiment used mini-stumps formed from seeds from accessions 115 and 117, and grown in a greenhouse. The experimental design was completely randomized, with the treatments consisting of eleven genotypes (ten from accession 115 and one from accession 117), with six replicates and one plant per plot.

The plantlets from rooted mini-cuttings were transplanted in February 2012 into 500 mL plastic bags filled with Basaplant® substrate where they remained for 75 days. After this period they were transplanted into 3.8 L conical pots filled Basaplant® substrate. The treatments received fertilization at the dosage of 6 $g \cdot L^{-1}$ of simple superphosphate, 30 $g \cdot L^{-1}$ of lime and 6.6 $g \cdot L^{-1}$ of Osmocote® slow-release fertilizer with a 14-14-14 formulation and mean release time predicted for three months at the mean temperature of 24 ° C.

About 140 days after the last transplanting, the diameter of the stem (mm) at a height of 20 cm above the collar, plant height (cm) and number of leaf pairs were evaluated.

The data obtained were submitted to analysis of variance with the means of treatments being compared by the Scott Knott test at $p<0.05$.

RESULTS AND DISCUSSION

Rooting potential of herbaceous, semi-hardwood and mini-cuttings

Survival, callus formation and rooting were influenced by the cutting type and accession origin.

Herbaceous cuttings of the two accessions had low survival percentages and no callus formation or rooting (Table 1).

TABLE 1 Mean percentages for survival, callus formation and rooting of herbaceous, semi-hardwood and mini-cuttings of two accessions of *Psidium cattleyanum* cultivated in the field and in a greenhouse.

Type of propagule	Accessions	Survival	Callus	Rooting
			(%)	
Herbaceous	115	10 c	0.0 d	0.0 c
Herbaceous	117	3.3 c	0.0 d	0.0 c
Mini-cuttings	115	83.3 a	73.3 a	56.7 a
Mini-cuttings	117	20.0 b	16.7 c	13.3 b
Semi-hardwood	115	83.3 a	26.7 b	6.7 bc
Semi-hardwood	117	20.0 b	13.3 c	3.3 c
CV (%)		17.6	28.1	51.0

Means followed by the same lowercase letter in a column constitute a statistically homogenous group according to the Scott Knott test at $p<0.05$.

Mini-cuttings of accession 115 had higher survival, callus formation and rooting percentages than those of accession 117. Rooting of the two accessions was higher when they were propagated by mini-cuttings. The semi-hardwood cuttings of accession 115 also had higher survival and callus formation than those of accession 117, however, the rooting percentage was equally low for both accessions when propagated by this method.

There was no rooting of the herbaceous cuttings of the accessions of *Psidium cattleyanum* evaluated in the present work. Rodriguez et al. (2016) obtained 98% rooting for herbaceous cuttings of juvenile plants of *P. cattleyanum*, while Altoé et al. (2011) obtained above 90% rooting for mini-cuttings of the same.

The cattley guava plants of the present study had passed the juvenile period, since at 22 months of age plants grown both in the field and in the greenhouse had bloomed. Plants in the field had already produced flowers and fruits while the mini-stumps grown in the greenhouse, which experienced successive pruning, did not produce more flowers, which may explain the low rooting percentages obtained, mainly for the cuttings from the field.

Several factors may be related to the higher rooting percentage for mini-cuttings in relation to semi-hardwood cuttings. The age of sprouting and the degree of juvenility of the tissues differed between the two. The sprouts from the plants in the field were collected above 50 cm from the soil. On the other hand, the sprouts emitted by the mini-stumps were emitted between the collar of the plants and an average height of 15 cm, characterizing a greater degree of juvenility in relation to the propagules collected in the field.

Plants in the juvenile phase exhibited low flowering and greater rooting capacity. Andrejow et al. (2009) recommended the use of minicuttings from mini-stumps of seminiferous origin for the commercial propagation of *Pinus taeda*, since juvenility favored rooting in this species.

However, there are different degrees of juvenility within individual plant since the lower part of a tree trunk has physiologically younger tissues because they have experienced fewer cells divisions (Fachinello, 2005).

Other environmental conditions, such as greater shading by mother plants kept in nurseries (mini-stumps), may have contributed to the results obtained. According to Casagrande Junior et al. (1999), increased shade by cattley guava mother plants causes an increase in starch content and a reduction in the content of reducing carbohydrates, soluble carbohydrates and phenolic compounds, which are conditions that can positively influence rooting in this species.

The degree of lignification of the cuttings also interferes with their rooting. For vegetative propagation of *Vochysia bifalcata*, the use of epicormic shoots induced by stem coppicing provided better adventitious rooting than stem bending, which was associated with a lower degree of lignification (Rickly et al., 2015).

In the present work, low rooting percentages were obtained for semi-hardwood cuttings (between 3.3 and 6.7%), which were similar to the 5.2% rooting percentage reported by Schwengber et al. (2000) for semi-hardwood cuttings of *P. cattleyanum* in an intermittent nebulization system for a period of 80 days.

Mini-cuttings had a higher rooting percentage than semi-hardwood cuttings, with percentages varying from

13.3 to 57% for accessions 117 and 115, respectively, which can be attributed to differences in propagation techniques and types of propagules, such as greater exposure to light, higher lignification of tissues and less juvenility of cuttings from the field, among other factors.

According to the results of the present study, the use of semi-hardwood propagules is recommended for the rescue selections of *P. cattleyanum* that are under field conditions. Although this type of cutting does not produce results as satisfactory as mini-cuttings, its use is necessary when the establishment of clonal mini-gardens from materials selected under field conditions is desired. After establishment of clonal mini-gardens, mini-cuttings would be the most appropriate technique for *P. cattleyanum* multiplication.

Survival, callus formation and rooting of mini-cuttings

The performance of each of the 11 genotypes from accession 115 (U) was dependent on the season in which the rooting was performed. The interaction between genotype and season of rooting was significant in relation to the survival of mini-cuttings.

For the autumn season, the genotypes with the greatest mini-cutting survival were U6, U8 and U11. However, despite having a lower survival percentage than these genotypes, genotype U4 stood out with 39% rooting during this period. In winter, the genotypes with the highest survival rate were U2, U3 and U6, while those with the highest rooting were U4, U5, U6 and U11 (Table 2).

TABLE 2 Mean percentages for survival, callus formation and rooting of mini-cuttings of *Psidium cattleyanum* (accession 115) in autumn (Aut), winter (Win) and summer (Sum) staking seasons.

Genotypes	Survival (%)			Callus (%)			Rooting (%)		
	Aut.	Win.	Sum.	Aut.	Win.	Sum.	Aut.	Win.	Sum.
U1	80 bB	80 bB	100 aA	80 bB	80 bB	100 aA	5 dB	7 cB	60 cA
U2	78 bB	90 aA	90 aA	78 bB	90 aA	85 bA	13 cB	5 cB	60 cA
U3	78 bB	84 aB	100 aA	78 bB	84 aA	75 cB	11cB	0 cC	30 eA
U4	78 bB	76 bB	95 Ba	78 bB	76 bB	95 aA	39 aB	24 aC	55 cA
U5	67 cB	47 dC	100 aA	67 cB	47 dC	100 aA	4 dC	27 aB	60 cA
U6	87 aB	87 aB	95 Ba	87 aA	87 aA	70 cB	25 bB	28 aB	40 dA
U8	88 aB	70 bB	90 bA	88 aA	70 bB	85 bA	4 dC	15 bB	60 cA
U9	62 cB	43dC	100 aA	62 cB	43 dC	95 aA	10 cB	12 bB	45 dA
U11	83 aB	75 bC	100 aA	83 aB	75 bC	100 aA	17 cC	33 aB	90 aA
U14	78 bB	25 eC	100 aA	78 bB	25 eC	96 aA	11Cb	17 bB	75 bA
U15	42 dC	57 eC	90 bA	42 dC	57 cB	90 aA	26bB	19 aB	40 dA
CV (%)	6.66			6.78			23.15		

Means followed by the same lowercase letter in a column and the same upper case letter in a row constitute a statistically homogenous group according to the Scott-Knott test at $p<0.05$.

Staking in summer resulted in mini-cutting survival of between 90 and 100%. The worst index for callus formation during this season was 70% for U6. A rooting percentage of 90% was observed for U11 in summer, making this genotype stand out in relation to the others in terms of mini-cutting rooting. In general, the best season, among those evaluated, for survival of mini-cuttings was summer. Genotype U2 was the only one to have its highest mini-cutting survival in more than one season, with values of 90% for both winter and summer (Table 2).

In the experiment performed with the genotypes from accession 117 (C), winter could not be evaluated because the mini-stumps did not produce a sufficient number of mini-cuttings.

Survival and callus formation for mini-cuttings were higher for staking done in summer than autumn for all the evaluated genotypes. This period was also more favorable than autumn for rooting by the genotypes C5, C9 and C15 (Table 3).

Among the factors that may have contributed to the higher survival rates for mini-cuttings in summer are physiological conditions and appropriate temperature, humidity and management, as well as the genetic potential of the material.

Altoé et al. (2011) evaluated the rooting potential of *P. cattleyanum* mini-cuttings from mini-stumps formed by seminiferous propagation. At 226 days after sowing, stem coppicing was performed for the formation of mini-stumps. Mini-cuttings were collected from 49 to 229

TABLE 3 Mean percentages for survival, callus formation and rooting of mini-cuttings of *Psidium cattleyanum* (accession 115) in autumn (Aut), winter (Win) and summer (Sum) staking seasons.

Genotypes	Survival (%)		Callus (%)		Rooting (%)	
	May	Dec.	May	Dec.	May	Dec.
C2	42cB	83 aA	32dB	83 aA	0 bA	8 bA
C5	68 aB	100 aA	68 bB	100 aA	5 bB	33 aA
C6	79 aB	100 aA	79 aB	100 aA	25 aA	15 bA
C7	74 aB	92 aA	74 aB	92 aA	20 aA	25 aA
C8	62 bB	92 aA	62 bB	92 aA	16 aA	25 aA
C9	57 bB	92 aA	50 cB	92 aA	6 bB	25 aA
C11	79 aB	92 aA	79 aB	92 aA	15 aA	16 bA
C14	63 bB	92 aA	63 bB	92 aA	5 bA	8 bA
C15	79 aB	93 aA	79 aB	93 aA	10 bB	35 aA
CV (%)	10.06		10.18		51.42	

Means followed by the same lower case letter in a column and same upper case letter in a row constitute a statistically homogenous group according to the Scott-Knott test at $p<0.05$.

days after stem coppicing and were considered juveniles. These authors obtained survival rates of between 92% and 100% in summer. On the other hand, Brondani et al. (2010) found that mini-cuttings of *Eucalyptus* sp. experienced their lowest survival during the spring and summer, when the highest temperatures were recorded.

Air relative humidity always stayed above 80% in all three experimental periods, while temperature varied according to the time of the year, highlighting staking done in summer during which maximum temperatures reached 42 °C and minimum temperatures were always above 20 °C. Thus, mini-cuttings of *P. cattleyanum* can be considered able to survive high temperatures.

High survival rates in conditions of high temperature, as seen for mini-cuttings of *P. cattleyanum,* it is not very common, since special care must be taken with herbaceous and semi-hardwood cuttings due to increased transpiration rate, which can inducing wilting (Fachinello et al., 2005). However, our results indicate that the maintenance of moisture by nebulization was efficient and did not allow dehydration and death of cuttings.

High temperatures, however, may be beneficial for rooting for some species. Cuttings of guava plants, for example, have higher rooting in seasons of higher temperatures (Tavares et al., 1995). During the rooting process, high temperatures related to light exposure favor the metabolism of photoassimilates, which are required as carbohydrate reserves in root formation (Fachinello et al., 2005).

The staking performed in summer was, in general, the most beneficial for callus formation, which is a further indication that the environmental conditions of this period were favorable for rooting of *P. cattleyanum* by the mini-cutting technique. According Fachinello et al. (2005), callus formation usually occurs in conditions favorable to rooting, which is characterized as an irregular mass of parenchymal cells in varied states of lignification.

The fact that staking in summer had the highest mini-cutting rooting capacity may be associated with the higher temperatures, which averaged around 39.3 °C, 22.8 °C and 28.7 °C during the summer, autumn and winter, respectively. Zietemann and Roberto (2007) found that the best time to collect and prepare cuttings of Paluma and Século XXI cultivars was in the summer. Furthermore, Stuepp et al. (2017) also observed that summer was the best season for rooting by cuttings of *Melaleuca alternifolia*.

According to Fachinello et al. (2005), the optimal temperature for rooting by cuttings is quite variable, and is dependent on the peculiarities of the plants, the propagation period, the degree of lignification of the cuttings and the local climatic conditions. While warmer temperatures have been shown favorable for rooting by *Psidium* sp., this has not been necessarily verified for other plants. Brondani et al. (2010) observed that rooting of mini-cuttings of genotypes from *Eucalyptus* hybrid varied according to genotype and were very sensitive to seasonality and temperature oscillations. The best rooting rates were recorded in the colder seasons, when they ranged from 19.6% to 56.2%, and the lowest in the hottest seasons, when they ranged 4.62% to 8.50%. In the present work, the highest rooting indexes for genotypes from accession 115 were obtained in the summer and ranged from 30 to 90%, while in winter it ranged from 0 to 33%.

Some of the genotypes had their low rooting indexes in more than one season, which was the case for genotypes U9 and U3 from mini-cuttings of accession 115, and genotype C9 from mini-cuttings of accession 117. Some genotypes also had higher rooting in more than one season, such as U11 in winter and summer, U4 in autumn and winter, and C7 and C8 in autumn and summer. This shows the variability for rooting among the genotypes of accessions 115 and 117, and demonstrates the need to select individuals with greater rooting potential for clonal propagation. The present work also confirms that *P. cattleyanum* can have satisfactory rooting percentages when propagated by the mini-cutting technique.

Vigor of young plants from rooted mini-cuttings of different genotypes of *Psidium cattleyanum*

The genotypes U15, U14, U11, U12, and U7 of accession 115 and the entire set of genotypes of 117 (C) had the highest plant heights. Regarding the diameter of the stem at 20 cm from the collar, the plants coming from accession 117 stood out in relation to the genotypes of accession 115. The plants of accession 117 and the genotypes U5 and U7 of accession 115 had fewer pairs of leaves when compared to the other genotypes of accession 115 (Table 4).

Although they had fewer pairs of leaves in relation to the other genotypes, plants of accession 117 had larger leaves, which was a visually prominent characteristic of this accession.

Some genotypes stood out in more than one vigor characteristic, specifically the genotypes U15, U14, U11 and U12 in relation to height and the number of leaf pairs, and accession 117 in relation to the stem diameter at 20 cm from the collar, at 140 days after staking.

Altoé et al. (2011) reported differences among *P. guineense, P. cattleyanum* and *P. guajava*, with greater vigor

TABLE 4 Mean height, stem diameter an number of leaf pairs for the accessions of *Psidium cattleyanum* 140 days after transplanting of rooted and acclimated mini-cuttings.

Genotypes	Height (cm)	Diameter (mm)	Number of leaf pairs
U15	136.50 a	5.30 b	36.67 a
U4	124.33 b	4.82 b	35.33 a
U9	124.83 b	5.06 b	34.50 a
U6	127.00 b	4.95 b	34.33 a
U14	134.83 a	5.31 b	37.17 a
U11	131.17 a	5.43 b	35.83 a
U13	129.50 b	5.06 b	35.00 a
U12	136.33 a	5.11 b	36.67 a
U7	135.50 a	5.32 b	33.50 b
U5	117.50 b	4.91 b	31.00 b
Accession 117	139.17 a	6.98 a	31.33 b
CV (%)	6.89	7.34	8.37

Means followed by the same lower case letter in a column constitute a statistically homogenous group according to the Scott-Knott test at $p<0.05$.

of *P. guava* in relation to cattley guava for plants from mini-cuttings. For *P. guineense* and *P. cattleyanum*, the mean diameter of the stem reached 7 mm at 140 days after transplanting, performed after rooting and acclimation of mini-cutting sprouts, while for *P. guajava* the diameter of the stem reached 8 mm 110 days after transplanting.

The differences in height, diameter and number of leaf pairs found among the different genotypes demonstrate the genetic variability of *P. cattleyanum*, and thus justifying its use for the selection of superior genotypes.

CONCLUSIONS

Herbaceous cuttings of *Psidium. cattleyanum* from the field do not take root, making it necessary to use semi-hardwood cuttings for the rescue and initial establishment of clonal mini-gardens. Mini-cuttings root better, with high variability among genotypes in the rooting potential as well as plant vigor. The best season for collecting mini-cuttings is summer, when higher rooting potentials can be achieved.

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