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ROOTING AND PROPAGATION BY STEM CUTTINGS OF TECOMA FULVA SP AREQUIPENSIS AND OTHER NATIVE SPECIES OF AREQUIPA (PERU) USING GROWTH REGULATORS

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Abstract- This research work aims to assess the growth regulator effects on the propagation of native flora species from the Yarabamba and Polobaya districts of the Arequipa in the Republic of Peru for the ornamental purposes. The selected species were *Tecoma Fulva Sub Sp Arequipensis*, and *Calceolaria Pisacomensis Meyen*, the effect of Rapid Root and Root Hort as growth regulators have been evaluated under controlled conditions of the stem cuttings. The best rooting percentages were obtained for *Tecoma Fulva Sub Sp Arequipensis* with a yield of 86.67% with 20 g of Rapid Root, and *Calceolaria Pisacomensis Meyen* which obtained 60% with a dose of 5 mL of Root Hort, The propagation of native flora species is contributing to the preservation of threatened endemic species of Arequipa.

Keywords -rooting, plant growth regulator, stem cuttings, *Tecoma Fulva Sub Sp Arequipensis*, *Calceolaria Pisacomensis Meyen*, rapid root, root hort.

I. INTRODUCTION

The territory of the Republic of Peru is considered in South America as an area of high wealth in biodiversity with 19147 species of vascular plants [1,2] after Brazil and Colombia, this high wealth can be understood because in the environment of Peruvian territory there are 84 types of living areas of 117 recognized in the world [3] , its relief and topography create heterogeneous environments [4], Our country is not free from the climatological problem that is being lived nowadays and will come more strongly, if we add deforestation, overexploitation of natural resources, burning and population increase, this would influence onto soils degradation, and disappearance of native flora and fauna, as well as beneficial microorganisms.

Research studies should therefore be carried out in practice to establish conservation methods for these native species in the region. Despite this, there is little research to enable greater knowledge of propagation of these endemic species such are occupying the Mesoandine region [5-7]. The propagation of species using growth regulators for rooting has been widely evaluated yielding good results [8-17] also the using of stem cuttings has been widely evaluated giving high rooting percentages [18-24].

The Arequipa region has great floristic diversity among them are native flora species such as *Tecoma Fulva Sub Sp Arequipensis*, *Balbisia Verticillata Cav*, *Mutisia Acuminata*, *Calceolaria Pisacomensis Meyen* [7,25-26], these endemic species are being threatened.

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For this reason, was proposed to start this research in order to seek an efficient alternative to the propagation of native flora species with the ornamental potential to Arequipa, which could be used in green areas of municipalities and at the same time taking into account the advantage that these native flora species consume less water than the others exotic flora species introduced, which would generate a great saving of water resources, and would be preserving our species of native flora in addition to providing eco-efficient services to the population of Arequipa.

In this context, this research aims to improve the asexual propagation of typical native species from the Arequipa region, with the application of rooting hormones under controlled conditions, thus contributing to efficient water use, with consequent management and conservation of endemic and threatened species.

II. MATERIALS AND METHODS

2.1 Location of the investigation

The research was carried out at the greenhouse of faculty of agronomy of National University of San Agustín de Arequipa under the project "Native Flora of Arequipa: ornamental potential, management, efficiency in the use of water and cost analysis – benefit in the management of municipal green areas".

2.2 Material and Species understudy

The material used in the research was collected in the month of December from native ornamental mother plants of Yarabamba and Chiguata districts of Arequipa. The Yarabamba district and Chiguata District are located at 21.2Km and 23.4Km respectively from Arequipa city. The selected native flora species were: *Tecoma fulva sub sp arequipensis, Mutisia acuminata, Calceolaria pisacomensis meyen, and Balbisia verticillata cav,* and in the Fig. 1, Fig. 2, Fig. 3 and Fig. 4 are showing their taxonomic classification. In this research work, vegetative materials were collected, taking a sample size close to the basal middle third of native flora species. For material collection were used pruning scissors, water with bleach at 5%, paper bags, ziploc bags, water, and GPS. A mixture of sand, pumice stone, and compost was used as a substrate. Propagation beds with a mist irrigation system (Propagation beds are rectangular-shaped cement structures), identification cards, and 75% black raschel mesh were used for rooting of stem cuttings. Different concentrations of Rapid Root (RR) and Root Hort (RT) as growth regulators were used.

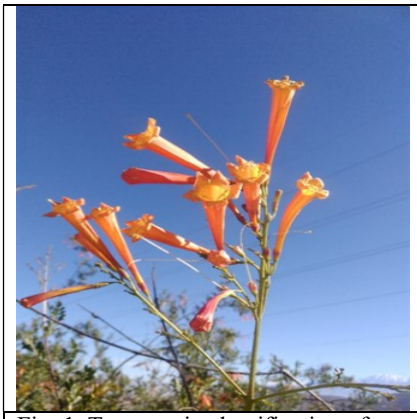

Fig. 1. Taxonomic classification of tecoma fulva sub sp arequipensis (T).
Kingdom: Plantae,
Subkingdom: Tracheobionta,
División: Magnoliophyta,
Clase: Magnoliopsida,
Orden: Lamiales,
Family: Bignoniaceae,
Tribu: Tecomeae,
Genus: Tecoma.

Fig. 2. Taxonomic classification of mutisia acuminate (M).
Kingdom: plantae,
Sub kingdom: tracheobeonta,
Clase: magnoliopsida,
Orden: asterales,
Family: asteraceae,
Tribu: mutisieae,
Genus: mutisia.

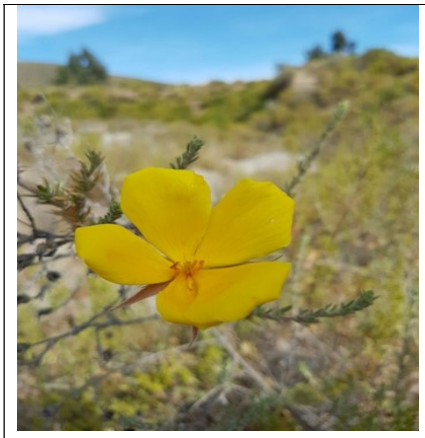	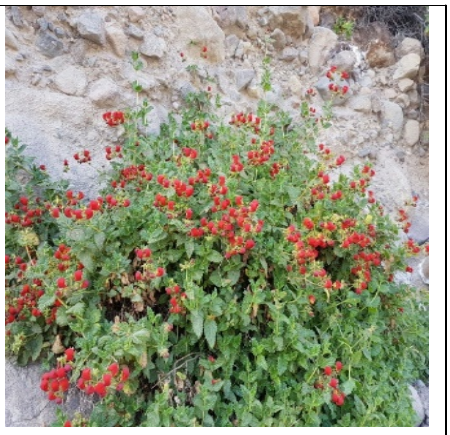
Fig. 3: Taxonomic classification of balbisia verticillata (B)**.** **Kingdom:** plantae, **Division:** traqeofita, **Class:** magnoliopsida, **Order:** geraniales, **Family**: vivianiaceae, **Gender:** balbisia	Fig. 4. Taxonomic classification of calceolaria pisacomensis (C). **Kingdom:** plantae, **Division:** magnoliophyte, **Class:** magnoliopsida, **Order:** lamiales, **Family:** calceolariaceae, **Gender:** calceolaria.

2.3 Methodology

The methodology used on the propagation of different native flora species is as follows:

2.3.1 Substrate preparation, The substrate used in the research was river sand, compost, and pumice stone, in proportion 1:1:1; a homogeneous mixture was made using lampas, once homogenized it was disinfected using vitamax, with active ingredient carboxin plus captan using a dose of 3 g/L, according to indications of product.

2.3.2 Selection of stem cuttings, The stem cuttings were selected from mother plants according to their physiological characteristics, the mother plants were the most vigorous in the area, these stem cuttings, have a length of 20cm and with at least three buds as a minimum and five buds as a maximum, it is worth mentioning that continuous disinfection of pruning scissors with sodium hypochlorite at 5% was made.

2.3.4 Preparation of stem cuttings, Once the plant material was collected, they were grouped, labeled and maintained in a cool environment, taking into account that if they are dehydrated they will be less viable, they were wrapped in damp paper and placed in a paper bag in such a way that dehydration was avoided as much as possible, and then they were transferred to plant nursery.

2.3.5 Preparation of Growth regulator. The regulators used were Rapid Root in proportions of 20g/L, 40g/L, 60g/L, these proportions were weighed with the help of a scale, and Root Hortin proportions of 5ml/L, 10ml/L, 20ml/L that were measured with the help of a pipette.

2.3.6 Installation of stem cuttings. A selection of stem cuttings was previously made. After preparing the containers with the above concentrations of growth regulators, the stem cuttings were immersed two-third parts into the mixture of water and growth regulator for a period of five minutes taking into account the direction of the buds, after five minutes according to the treatments under study the installation of stem cuttings was carried out in the bed of the greenhouse, introducing one-third of the vegetative material and lying down making an angle 45 degrees approximately.

2.3.7 Management of environmental conditions. All research was conducted under the same environmental propagation conditions. Temperature control such as relative humidity was performed by proper irrigation frequency management for the mist system, during the experimental stage when the temperature reached from 24°C to 27°C the irrigation was made with a frequency of 5 minutes every 3 hours, and when the temperature was less than 25°C the irrigation was made with a frequency of 2 to 3 minutes every 5 hours. The closing and opening of greenhouse doors were equally considered into the value of temperatures so that the average temperature in the investigation was 23°C. With regard to the luminosity, only the photoperiod was included in the development of this research.

2.3.8 Weeds control was done manually, as the time it was necessary to avoid the appearance of these.

2.3.9 Phytosanitary control aimed to avoid, prevent, economic losses caused by pests and/or diseases; only floury cochineal (pseudococcus sp) was presented in the species teconma fulva sub sp arequipensis its control was manually due to the low incidence.

2.3.10 Percentage rooting. This evaluation was done at the end of research work for which 5 stem cutting was taken at random for each experimental unit that would represent 100% for that following formula was used: % of rooted stakes = (Number of rooted stakes/ Total selected stakes) x 100.
2.3.11 Sprouting of stem cuttings: The evaluation was carried out every 15 days after installation, counting the total number of stakes that sprout for each experimental unit.
2.3.12 Experimental Design
In table 1 is showing the treatment descripctions for growth regulator by species, and Table 2 shows a complete experimental design sketch. A complete random experimental design was used, with 4x2x3 factorial with factors such as species, growth regulator and concentration; species factor working with 4 species *Calceolaria pisacomensis meyen (C), Tecoma fulva sub sp arequipensis (T), Balbisia verticillata cav (B), Mutisia acuminata (M)*; the growth regulator factor was rapid root (RR) and root hort (RT); while those concentration factors were for low doses R1 (5ml/L – 20g/L), for medium doses R2 (10ml/L – 40g/L) and for high doses R3 (20ml/L – 60g/L). Making a total of 24 treatments, each experimental unit considers 100 stakes with three replications making a total of 5400 stakes.

TABLE 1
TREATMENT DESCRIPTIONS FOR GROWTH REGULATORS BY SPECIES

Species	**Growth regulator**					
	Root hort (liquid)			**Rapid root (dust)**		
	5ml/L	**10ml/L**	**20ml/L**	**20g**	**40g**	**60g**
Tecoma fulva Sub sp Arequipensis (T)	**T1**	**T2**	**T3**	**T4**	**T5**	**T6**
Balbisia Verticillata cav (B)	**T7**	**T8**	**T9**	**T10**	**T11**	**T12**
Calceolaria pisacomensis meyen (C)	**T13**	**T14**	**T15**	**T16**	**T17**	**T18**
Mutisia acuminata (M)	**T19**	**T20**	**T21**	**T22**	**T23**	**T24**

TABLE 2
EXPERIMENTAL DESIGN SKETCH

CR2RR	TR2RR	BR3RR	BR1RR
TR1RR	TR2RT	MR3RT	MR2RT
CR1RR	MR1RR	TR3RT	CR3RR
BR3RT	TR3RR	MR1RT	BR1RT
TR1RT	BR2RT	CR3RT	CR2RT
MR3RR	BR2RR	CR1RT	MR2RR
MR1RT	TR1RT	CR1RT	TR1RR
CR2RR	BR2RR	TR2RT	CR3RT
BR2RT	CR3RR	TR3RT	BR3RT
BR1RT	MR2RR	TR2RR	MR1RR
TR3RR	BR1RR	MR3RR	CR2RR
MR3RT	CR2RT	MR2RT	BR3RR
BR2RT	CR3RT	CR2RR	BR2RR
CR2RT	CR3RR	TR2RR	MR1RT
MR1RR	MR3RR	TR2RT	TR1RR
MR2RT	BR3RR	MR2RR	TR3RT
TR3RR	MR3RT	BR3RT	BR1RR
TR1RT	CR1RT	BR1RT	CR1RR

T =Tecoma fulva sub sp arequipensis, **M** =Mutisia acuminata,
C =Calceolaria pisacomensis meyen, **B** =Balbisia verticillata cav.,
R1 = (5ml/l - 20gr/l), **R2=**(10ml/l – 40gr/l), **R3=**(20ml/l – 60gr/l),
RR =(Rapid Root), **RT** =(Root Hort).

III. RESULTS

3.1 Using of Root Hort to evaluated sprouting of stem cuttings

The results of the evaluation of sprouting of stem cuttings using different doses of Root Hort show that there are significant differences in the interaction of spices per dose, i.e. species as well as dosages, are determining factors for sprouting of cuttings. These results are observed in Table 3.

When conducting Duncan test by multiple comparisons for species, we observed that largest sprouting of stem cuttings was made by *Tecoma* (T) with a range between 17.11 and 59.89 sprouts; followed by *Mutisia* (M) with a range between 0.11 and 22.33 sprouts; *Calceolaria* (C) with a range between 0 and 13.44 sprouts and *Balbisia* (B) with the lowest sprouting of stem cuttings with a range between 0 and 5.67 sprouts; and when performing Duncan test by multiple comparisons for dose we observing that largest sprouting of stem cuttings were made by 5 mL dose with a range between 6.25 and 26.58 sprouts; followed by 20 mL dose with sprouts between 3.5 and 19.92; the slightest sprouting of stem cuttings was made by 10 mL dose with sprouts between 3.17 and 18.58.

In Table 3, we observed results of interaction of species by dose, for each of 10 evaluations as well as Duncan test by multiple comparisons; where we can observe that best interaction was presented by interaction of *Tecoma* (T) with doses of 5, 10 and 20mL; followed by *Mutisia* (M) with doses of 10, 20 and 5mL; The *Calceolaria* (C) with doses of 5, 20 and 10mL both *Muticia* (M) and *Calceolaria* (C) present intermediate values for the sprouting of stem cuttings. And finally *Balbisia* (B) interaction with doses of 20, 10, and 5 mL those are with the lowest sprouting of stem cuttings.

3.2 Using of Rapid Root to evaluated sprouting of stem cuttings

The corresponding results when evaluating sprouting of stem cuttings using Rapid Root, where we note that there are highly significant differences for species, for doses and for the interaction of species by dose (on 10 evaluations $p<0.01$), i.e. species, as well as, doses are determining factors for the sprouting of stakes. When conducting Duncan test by multiple comparison for species we note that largest sprouting of stem cuttings was made by *Tecoma* (T) with a range between 12 and 50.33 sprouts, followed by *Mutisia* (M) with a range between 0.11 and 29.44 sprouts, followed by *Calceolaria* (C) with a range between 0 and 11.33 sprouts and *Balbisia* (B) with the lowest sprouting with a range between 0 and 10.56 sprouts. And when performing Duncan test by multiple comparisons for dose we note that largest sprouting of stem cuttings was for 40 g by dose with a range of 3.83 and 26.42 sprouts, followed by 60 g by dose with sprouts between 3.33 and 23.67; the lowest sprouting of stem cuttings was for 20 g by dose with sprouts between 1.92 and 22.5.

In Table 4, we observed the results of the species by dose interaction, for each of 10 evaluations as well as Duncan test by multiple comparisons; where we can see that the best interaction for the first, second, third and fourth evaluation is presented by the interaction of *Tecoma* (T) with doses of 40, 60 and 20 g between the fifth to the tenth evaluation, followed by *Mutisia* (M) with a dose of 40, 60 and 20 g, *Balbisia* (B) and *Calceolaria* (C) with doses of 40, 60 and 20 g with lower values of sprouting of stem cuttings.

3.3 Using Root Hort to evaluate percentage rooting

Table 5 shows the results of the assessment of rooting percentage for stem cuttings with different doses of Root Hort, it is observed that there are highly significant differences for species, for doses and for the interaction of species by dose ($p<0.01$), i.e. species as well as dosages are determining factors for the rooting of stem cuttings, also in cases of interaction, may occur that a species is more recommended at a dose.

When performing Duncan test by multiple comparisons for species we note that the largest rooting was *Tecoma* (T), followed by *Calceolaria* (C), *Balbisia* (B), and *Mutisia* (M) as the lowest rooting percentage. And when performing Duncan test by multiple comparisons for dose effect on rooting, we observed that higher rooting was with a dose of 20 mL, followed by 5 mL and 10 mL as the lowest rooting percentage.

In Table 5, when performing Duncan test by multiple comparisons to assess the dose-effect interaction by Species, for rooting percentage we observed that higher rooting rate was for *Tecoma* (T) interaction at the 10 mL dose, followed by 5 mL and 20 mL dose; the interaction with the lowest rooting rate was the interaction of *Mutisia* (M) with doses of 10, 5 and 20 mL.

TABLE 3
SPROUTING OF STEM CUTTING ACCORDING TO DUNCAN TEST BY SPECIES AND DOSE FOR ROOT HORT

Plants	Doses	5-Jan		20-Jan		5-Feb		20-Feb		5-Mar		20-Mar		5-Apr		20-Apr		5-May		20-May	
		Median	Duncan	Median	Duncan	Median	Duncan	Median	Duncan	Median	Duncan	Median	Duncan	Median	Duncan	Median	Duncan	Median	Duncan	Median	Duncan
TECOMA	5 ml	25	A	57	A	75.33	A	87.67	A	85	A	80.67	A	85	A	86.33	A	71.67	A	47	A
TECOMA	20 ml	13.67	B	28.33	C	38.67	B	38.67	C	43.67	C	44.67	B	45	B	47	B	41.67	B	23	BC
TECOMA	10 ml	12.67	C	32.67	B	42.67	B	46	B	51	B	46	B	45.33	B	45	B	40.67	B	21	CD
MUTISIA	20 ml	0.33	D	3.33	D	15	C	16.67	D	20.67	D	19	D	19	D	18.67	D	15.33	D	3.67	FG
MUTISIA	5 ml	0	D	2.33	D	13.33	CD	18.33	D	20.33	D	16.33	D	15.33	D	15	DEF	13.67	D	4.33	FG
MUTISIA	10 ml	0	D	0.67	D	6.67	E	15.67	DE	20.33	D	25.67	C	32.67	C	35	C	21.67	C	25.67	B
BALBISIA	20 ml	0	D	0	D	2	FG	4.33	FG	6.33	FG	8	E	8	E	9	EFG	7.67	E	3.67	FG
BALBISIA	5 ml	0	D	0	D	0	G	1.33	G	1.67	G	3	F	3	E	3	G	4	E	1.33	G
BALBISIA	10 ml	0	D	0	D	1.67	FG	2.33	G	2.33	G	5.33	EF	5.33	E	5	G	4	E	0.33	G
CALCEOLARIA	20 ml	0	D	0	D	8.67	E	9.67	EF	11.33	EF	15	D	15.33	D	16	DEF	15	D	13	E
CALCEOLARIA	5 ml	0	D	0	D	9.67	DE	12.67	DE	14.67	DE	16.33	D	16.33	D	16.67	DE	17	D	18.33	D
CALCEOLARIA	10 ml	0	D	0	D	5.33	EF	6	FG	7.67	EFG	8	E	7.33	E	7.67	FG	8	E	6	D

THE SAME LETTERS INDICATE THAT THERE IS NO SIGNIFICANT STATISTICAL DIFFERENCE AT DUNCAN LEVEL A=0.05

TABLE 4
SPROUTING OF STEM CUTTINGS ACCORDING TO DUNCAN TEST BY SPECIES AND DOSE FOR RAPID ROOT.

Plants	Doses	5-Jan		20-Jan		5-Feb		20-Feb		5-Mar		20-Mar		5-Apr		20-Apr		5-May		20-May	
		Median	Duncan	Median	Duncan	Median	Duncan	Median	Duncan	Median	Duncan	Median	Duncan	Median	Duncan	Median	Duncan	Median	Duncan	Median	Duncan
TECOMA	40 g	15.33	A	33	A	40	A	48.33	A	42	B	36.67	C	42.67	B	44	B	37.67	B	19.33	B
TECOMA	60 g	13.33	B	27.33	B	37	AB	41	B	52	A	53.67	A	52.67	A	54	A	47.67	A	32.33	A
TECOMA	20 g	7.33	C	27.67	B	34.33	B	43	AB	47.33	AB	47.67	B	49.67	A	53	A	46.67	A	29.67	A
MUTISIA	20 g	0.33	D	6.33	C	19	C	19	CD	24.33	C	27.33	D	22.33	D	18.67	D	15.67	DE	7.33	EF
BALBISIA	20 g	0	D	0.67	D	1.67	E	4	E	5	D	8	F	8	F	7.33	FG	7	F	3.67	FG
MUTISIA	40 g	0	D	1.67	D	7.67	D	14.67	D	24	C	30.67	D	15.33	E	35.67	C	25	C	16.67	BC
MUTISIA	60 g	0	D	6.67	C	16.67	C	21	C	25	C	30.33	D	26	D	21.67	D	16.67	D	2.67	G
CALCEOLARIA	20 g	0	D	0.33	D	5.33	DE	4	E	5.33	D	7	F	7	F	6.67	G	7	F	6.67	EFG
BALBISIA	40 g	0	D	0.67	D	3	DE	5.33	E	9.67	D	15.33	E	15.33	E	13.67	E	13.67	DEF	8	E
BALBISIA	60 g	0	D	0	D	2	E	3.67	E	5	D	8.33	F	8.33	F	9	EFG	9.33	EF	4.67	EFG
CALCEOLARIA	40 g	0	D	0	D	5.33	DE	6.67	E	7	D	11.67	EF	11.67	EF	12.33	EF	12.67	DEF	15	CD
CALCEOLARIA	60 g	0	D	0	D	5	DE	5.67	E	5.67	D	7.67	F	7.67	F	8.67	EFG	10	DEF	12.33	D

THE SAME LETTERS INDICATE THAT THERE IS NO SIGNIFICANT STATISTICAL DIFFERENCE AT DUNCAN LEVEL A=0.05

TABLE 5
PERCENTAGE OF ROOTING ACCORDING TO DUNCAN TEST BY SPECIES AND DOSE FOR ROOT HORT

Species	Doses	Median	Duncan
TECOMA	10 ml	86.67	A
TECOMA	5 ml	80	AB
TECOMA	20 ml	73.33	ABC
CALCEOLARIA	20 ml	66.67	ABC
CALCEOLARIA	5 ml	60	BC
BALBISIA	20 ml	53.33	CD
BALBISIA	5 ml	33.33	DE
CALCEOLARIA	10 ml	26.67	EF
BALBISIA	10 ml	13.33	EF
MUTISIA	20 ml	6.67	F
MUTISIA	5 ml	6.67	F
MUTISIA	10 ml	6.67	F

THE SAME LETTERS INDICATE THAT THERE IS NO SIGNIFICANT STATISTICAL DIFFERENCE AT DUNCAN LEVEL A=0.05

3.4 Using Rapid Root to evaluate percentage rooting

The results of the assessment of the rooting percentage using Rapid Root showing that there are highly significant differences for species, for doses and for the interaction species by dose ($p<0.01$), i.e. species, as well as doses, are determining factors for the rooting of stakes, also in cases of interaction, it may occur that a species is more recommended at a dose.

When performing Duncan test by multiple comparisons for species we note that the largest rooting was *Tecoma* (T), followed by *Calceolaria* (C), *Balbisia* (B), and *Mutisia* (M) as the lowest rooting percentage. And when performing Duncan test by multiple comparisons to rooting effect by doses we observed that higher rooting was with a dose of 40 g followed by 60 g and as the lowest amount percentage of rooting was for a dose of 20 g.

In Table 6, when performing Duncan test by multiple comparisons to assess interaction effect of species by dose for rooting percentage we observed that increased rooting was for the interaction of *Tecoma* (T) with a dose of 60, 20, and 40 g, and the interaction with the lowest rooting percentage was the interaction of *Mutisia* (M) with doses of 20, 60 and 40 g.

The highest percentage of rooting was obtained for the species *Tecoma Fulva Sp Arequipensis* (T) which reached 86.67% using 20 g of Rapid Root, and 87.67 sprouts were also obtained using a dose of 5 mL of Root Hort which was the highest number of sprouts obtained.

A second place with a 60% of rooting percentage was obtained for the species *Calceolarea Pisacomensis Meyen* (C) with a dose of 5 mL of Root Hort, and thus 18.33 sprouts were obtained with a dose of 5 mL Root Hort.

In third place was obtained to a 53.33% of rooting percentage for the species *Balbisia Verticillata Cav* (B) with a dose of 20 mL of Root Hort , as well as 15.33 sprouts with 40 g of Rapid Root.

Finally, the fourth place with 6.67% of rooting percentage was obtained for the species *Mutisia Acuminata* (M) with 5 mL Root Hort, as well as obtained 35.67 sprouts with 40 gr of Rapid Root. The methodologies evaluated were appropriate for the spread of native flora species on Arequipa.

TABLE 6
PERCENTAGE OF ROOTING ACCORDING TO DUNCAN TEST BY SPECIES AND DOSE FOR RAPID ROOT

Species	Doses	Median	Duncan
TECOMA	60 g	86.67	A
TECOMA	20 g	86.67	A
TECOMA	40 g	80	A
BALBISIA	40 g	53.33	B
CALCEOLARIA	40 g	53.33	B
CALCEOLARIA	60 g	26.67	C
CALCEOLARIA	20 g	20	CD
BALBISIA	20 g	13.33	CDE
BALBISIA	60 g	6.67	DE
MUTISIA	40 g	0	E
MUTISIA	60 g	0	E
MUTISIA	20 g	0	E

THE SAME LETTERS INDICATE THAT THERE IS NO SIGNIFICANT STATISTICAL DIFFERENCE AT DUNCAN LEVEL A=0.05

IV. CONCLUSIONS

In this study, we succeeded in showing that those species *Tecoma Fulva Sp Arequipensis*, and *Calceolarea Pisacoemsis Meyen* have been propagated on plant nursery under controlled conditions. The best performance of percentage of rooting were for *Tecoma Fulva Sp Arequipensis* reaching an 86.67%. The use of Rapid root had the best performance in comparison to Root Hort as growth regulator. Hence, the treated cuttings could be used for massive propagation of flora native species of Arequipa (Perú) in order to preserving the endemic and threatened species**.**

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