IOSR JournalofAgricultureandVeterinary Science (IOSR-JAVS)
e-ISSN: 2319-2380, p-ISSN: 2319-2372. Volume 11, Issue 5 Ver. II (May 2018), PP 39-42
www.iosrjournals.org

Use of growth regulator and number of applications in growth of grumixameira seedlings

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***Abstract**: This work was developed with the objective of evaluating growth of grumixama seedlings, treated in different concentrations of growth regulator and times of application. The experimental design was a randomized complete block design in a 6 x 2 factorial scheme with three replications and one plant per plot. The doses consisted of the growth regulator concentrations of 0.0, 5.0, 10.0, 15.0, 20.0 and 25.0 ml L-1 of the product in one liter of water. The application times were 10 and 20 days after the transplanting of the grumixameira seedlings to plastic bags of 3 dm3. The evaluations of height, stem diameter and number of leaves were performed every 30 days. At 100 days after transplanting of the seedlings, root volume, root dry matter and shoot dry matter were evaluated. It was concluded that for both variables there was no significant difference in the analyzed variables.*

***Keywords**:Time; Giberellin; Hormone.*

Date ofSubmission: 12-05-2018 Dateofacceptance: 30-05-2018

I. Introduction

The grumixama (*Eugenia brasiliensis*) is a plant of the family Myrtaceae, which is also native forest species from Brazil, occurring from Santa Catarina to Bahia state [1]. Thisplantadaptswelltoanytypeofclimateandsoil, with management offertilizationhasgood response in lowfertilitysoils, hasresistancetofrostandcanreach 20 meters in height. Its fruits are ofthesmall globular drupetype, upto 5 cm in diameter. The fruitpulpissweetacidulated, composedofatleasttwodarkseeds [2]. Flowering takes place from September to December and ripening occurs in November to December [3] in Brazil condictions.

Seedsofthisspecieshave a short periodoflongevity, however it isrecommendedthatsowingofthesebedonesoonaftertheircollection [4]. It isnecessarytoobtainseed in quantityandqualitytoproduceseedlingswithgreatproductivepotential, fruitproductionorrecoveryofdegradedareas [5]. Takingtotheinterestandimportanceoftheproductionof Grumixama seedlings. Qualitysaplingspotentiatethegrowthandphysiologicaldevelopmentofplants. In additionhealthyseedlingsexertbettercompetitionwithinvasiveplants, betterqualityandgrowthpotential, being fundamental tothe use ofgood stands withnativeforestspecies [6]

Growthregulators are substancesthathaveaneffectonplantmetabolismand cause physiological responses toplants. Regulators play a role in triggering cellular changes and may influence tissue development [7]. According to [8], auxin (50mg L^{-1}), cytokinins (90mg L^{-1}), and gibberellin (50mg L^{-1}) form part of its composition, which have the function of acting on the physiological development of the plant. The objectiveofthisworkwastoevaluatethedevelopmentof grumixameira seedlingsat doses ofgrowthregulator in twoapplicationperiods.

II. Materials And Methods

The experimentwascarried out in Campo Grande - MS, Brazil, undergeographiccoordinates 20 23 '14 "south latitude and 54 36' 29" west latitude, at 532 meters altitude.

The experimentwasconducted in a randomized complete block design in factorialscheme 2 (application times) x 6 (growthregulator doses). Twoseasonswereused for theapplicationof a growthregulatorat 10 daysaftertransplanting, andanotherat 20 daysaftertransplanting. The doses ofgrowthregulatorconsistedofconcentrations: 0ml L^{-1}; 5ml l^{-1}; 10ml L^{-1}; 15ml L^{-1}; 20ml $L^{-1}$and 25ml L^{-1}. The

treatmentsconsistedofthecombinationofthefactorsof age x doses ofgrowthregulatortotaling 18 treatments. Eachtreatmenthadthreereplicates.

The seeds of grumixameira were collected from seedlings located on the School Farm of the Dom Bosco Catholic University and sown on December 5, 2016. Germination occurred on December 21, 2016 with 90% germination. At 63 days after germination (DAG) were transplanted into plastic sachets for 12cm x 25cm seedlings filled with the substrate base of pine bark plus additions of minerals super phosphate, limestone and potassium chloride.

The daily irrigation was of the micro sprinkler type with daily irrigation shift with irrigation schedules 7h, 9h, 13h and 16h with average flow of 900L h^{-1}. The application of the increasing doses of the growth regulator consisted of all the two seasons was by means of sprayer in the aerial part of the plants done at dusk, aiming to use greater efficiency of the product and its degradation with the solar rays.

The evaluationsconsistedofplantheight: measuredfromtheneckregiontotheapexoftheseedlingsbymeansof a millimeterruler. Diameterofthestem: measuredat 5 cm abovethelapoftheseedlingsby Universal Digital 150mm Zaas 1,0004 caliper. Twomeasurementsweremade in oppositedirectionsofthe cardinal points and later themeanwasrealized for correctionsofstemdistortions. Numberofleaves: obtainedbymeansofdirectcountingoftheemergedleavesonthestemoftheseedlings. Root drymass: the roots wereplacedtodry in a greenhousewithforcedaircirculationat 70 ºC for 62 hours, toobtainthedrymass. Drymassofthearea: theleaveswereDried in a greenhousewithforcedaircirculationat 70 ºC for 62 hours, toobtainthedrymass.

The data weresubmittedtoanalysisofvarianceandthemeansofthetreatmentscomparedbytheTukeytestatthe 5% levelusingthe SISVAR® program [9].

III. ResultsAndDiscussions

At 60 days after the installation of the experiment, it was observed that the height of the grumixameira seedlings remained partially equal in all treatments. When performing the analysis of variance, it was observed that the interaction between the factors of growth regulator and application time was not significant for the plant height parameters (figure 1).

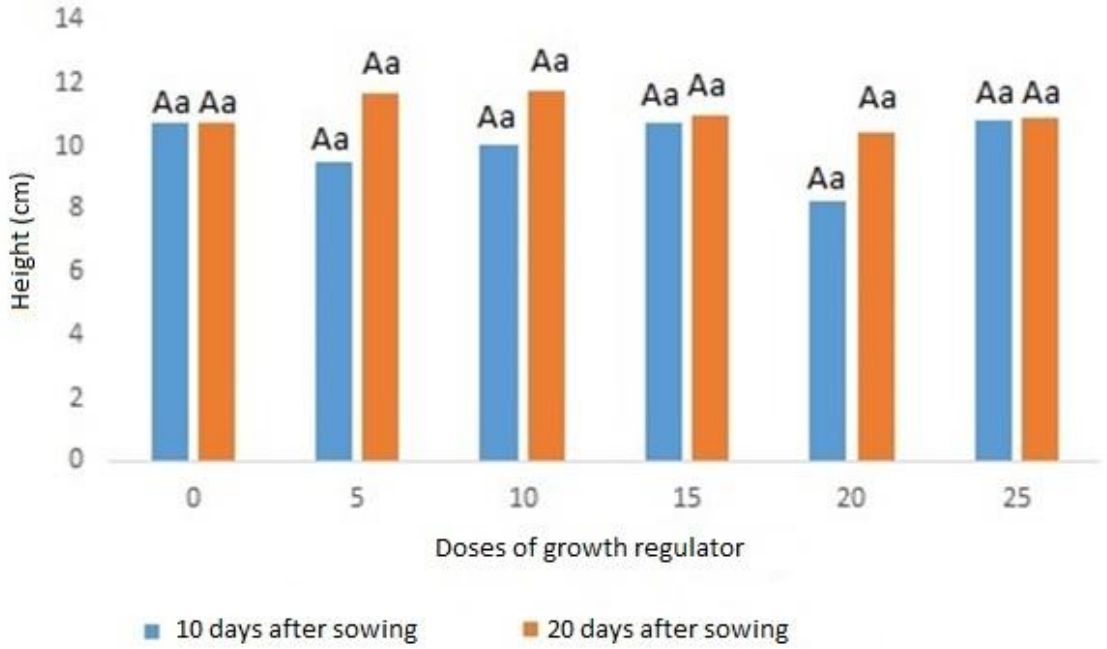

Figure 1: Height of grumixameira seedlings as a function of growth regulator dosages and different times of application

When working with a growth regulator effect on *Passifloraalata* CURTIS, [10] observed that gibberellin was less effective in increasing height using 64mgL-1 of GA4. The cytokinins and gibberellins according to the work of [10] may have acted synergistically, in cell division and stretching, respectively, which resulted in greater growth.

After the transplanting of the seedlings, when evaluating the grumixameira seedlings, it was observed that for the different dosages of growth regulator did not have significant difference in height.

According to [10] the analysis of gibberellic acid in the initial growth of peach tree seedlings had a positive effect on the growth of the same, using the dose of 200 mg L -1, but spraying GA3 had no effect on the diameter of the peach tree.

The dosages of 10 and 15 ml per liter of growth regulator in the first application already had a difference in the diameter of the seedlings, compared to the others, the second application the diameters remained partially equal, however, the control that received no dosage of regulator of growth and had greater thickening of the stem in relation to the other dosages, the dosage of 20ml of growth regulator had a reduction in the stem in the second application (Figure 2).

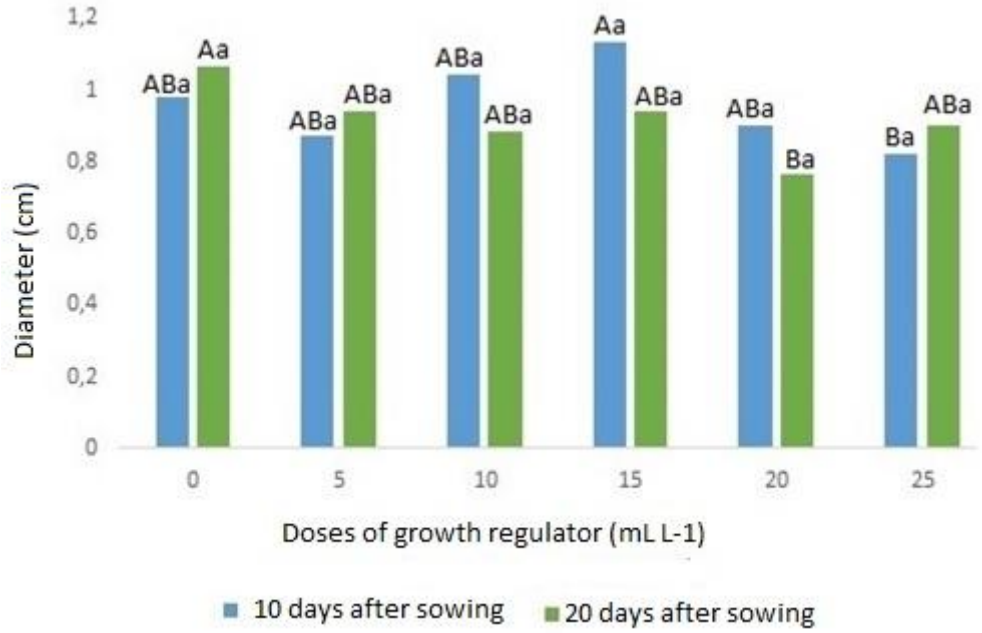

Figure 2: Diameter at different doses of growth regulator at two application times.

It wasobservedthataftertheapplicationofgrowthregulatorthe dose of 15 ml wasmaintainedatthehighestmeandiameter. In analyzingtheworkdoneby [10], the use ofplantregulatorsallowedanincrease in thevalues ofthediameters, which, in practicalterms, canleavetheseedlings in a point ofgrafting.

A greaternumberofleaveswereobserved for the 10 and 15 ml dosagescomparedtotheothertreatmentsafterapplicationat 10 days. In theapplicationat 20 daystherewas a uniformity in thenumberofleavesatbothdosages (Figure 3).

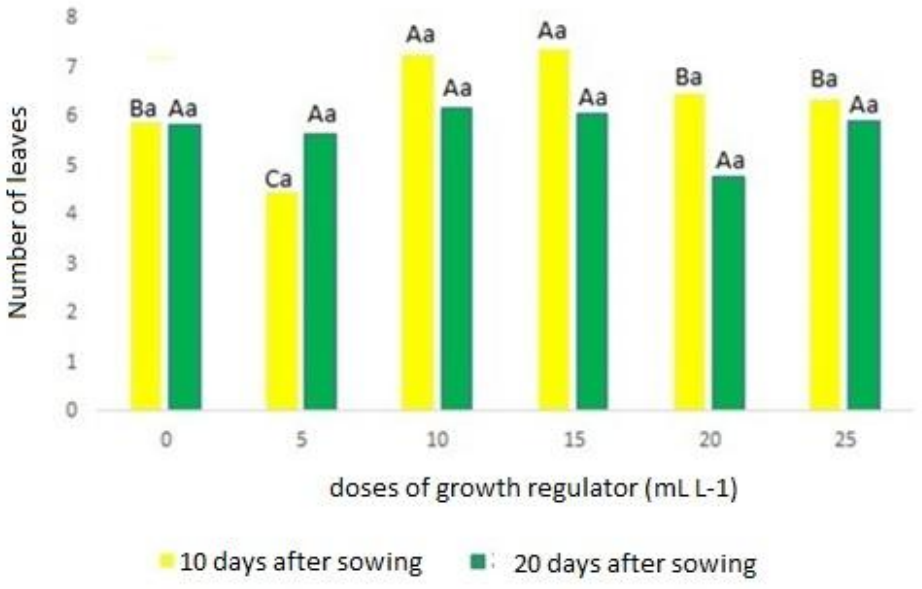

Figure 3: Numberofleaves, relativetothedifferent times ofapplication in differentdosagesofgrowthregulator.

Works usingeffectsofplantregulatorsonthedevelopmentof*Passiflora alata* CURTIS seedlings, theeffectsofregulatorswerenotsignificant for meannumberofleaves [10]. Treatmentscontainingcytokininsalonedemonstratetheeffectofcytokininsoncelldivision, inductionofsproutingon lateral buds, andalsoontheaccumulationofchlorophyll in theleaf. [11].

IV. Conclusion

In view of the presented results it was observed that:

Growth regulator doses did not present significant results for seedling size, root dry matter, root volume, and shoot dry matter. However, it was observed that in the 10 and 15ml L-1 doses the seedlings had higher growth.

The application times of the growth regulator did not have significant results for seedling size, diameter, number of leaves, root dry matter, root volume, and shoot dry matter;

At 60 days after transplanting, widespread chlorosis was observed in the seedlings culminating with the death of the plants.

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