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EVALUATION OF THE INITIAL DEVELOPMENT OF CONILON COFFEE CLONES (*Coffea canephora*)

AVALIAÇÃO DO DESENVOLVIMENTO INICIAL DE CLONES DE CAFÉ CONILON (*Coffea canephora*)

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ABSTRACT

The 'Vitória Incaper 8142' variety of conilon coffee (*Coffea canephora*), presents superior productivity in relation to the others released so far. It consists of thirteen elite clones, whose cultivation is performed in lines. This work aimed to quantify the initial development of the clones which compose 'Vitória Incaper 8142' variety. The experiment was conducted in greenhouse, under a completely randomized design, with 13 treatments (clones) and seven repetitions. The plants were cultivated in vases and evaluated by 210 days after plantation. The 1V, 2V, 8V, 11V and 13V clones presented superior development in relation to the others concerning leaf number, plant height, plagiothropic branch emission, stem dry matter, root dry matter, air part dry matter and total dry matter. In general, this cultivar presents two groups of clones concerning the development by 210 days of plantation. The data indicates that the management can be different among the clones since the initial stage and that studies involving different environments are necessary in order to confirm these results.

Key-words: coffee tree clones; management; robust coffee; Vitória conilon.

RESUMO

A variedade 'Vitória Incaper 8142' de café conilon (*Coffea canephora*), apresenta produtividade superior a todas as demais até então lançadas. Esta é composta por treze clones elites, cujo plantio é realizado em linhas. O objetivo deste trabalho foi quantificar o desenvolvimento inicial dos clones que compõem a variedade 'Vitória Incaper 8142'. O experimento foi conduzido em casa de vegetação, sob o delineamento experimental inteiramente casualizado, com 13 tratamentos (clones) e sete repetições. As plantas foram cultivadas em vasos e avaliadas até os 210 dias após o plantio. Os clones 1V, 2V, 8V, 11V e 13V apresentaram desenvolvimento superior aos demais nas variáveis número de folhas, altura de planta, taxa de emissão de ramos plagiotrópicos, matéria seca de caule, matéria seca de raiz, matéria seca de parte aérea e matéria seca total. Em geral, essa cultivar apresenta, dois grupos de clones quanto ao desenvolvimento até os 210 dias do plantio. Os dados encontrados indicam que o manejo poderá ser diferenciado entre os clones desde a fase inicial e que são necessários estudos envolvendo diferentes ambientes para confirmação destes resultados.

Palavras-chave: clones de cafeeiro; manejo; café robusta; conilon Vitória.

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INTRODUCTION

The conilon coffee (*Coffea canephora*) production in the State of Espírito Santo from 1993 to 2007 increased about 215%, and for 2009 it has been foreseen the production of about 7.55 millions of processed bags (CONAB, 2009; Ferrão et al., 2008) in the State. This outstanding growth in the production is due mainly to the continuous increasing of productivity which took place between these years. The clonal variety 'Vitória Incaper 8142', whose productivity is superior to all the others released so far (Bragança et al., 2001), plays the main role to achieve these results. This variety consists of thirteen elite clones which present high productivity, stability of production, resistance to drought and rust disease, uniformity of maturation and big grains. These clones genetically distinguish so that there are no problems related to the gamete self-incompatibility, a proper feature of the *C. canephora* (Schifino-Wittmann & Dall'Agnol, 2002; Conagin & Mendes, 1961).

Due to the imposed crossed fertilization in the cultivation and the possibility of differentiate management among the genotypes, it is advisable to plant the clones in lines. One knows that these clones phenologically distinguish among them, mainly in the productive stage of the plants, at the time of the fruit maturation (Bragança et al., 2001). However, it is necessary to evaluate if the difference in the management among the lines are only restrict to the productive period of the cultivation. To make such questions clear it is necessary to perform researches about the initial growth pattern of each clone. Such information can lead the adoption or not of differentiate practices between the lines since their implementation, focusing a greater effectiveness in the culture dealings.

This work aimed to evaluate the initial development of the clones which compose the 'Vitória Incaper 8142' variety, and verify the possibility of a differentiate management of these clones right after plantation.

MATERIAL AND METHODS

The experiment was developed in greenhouse at Agrarian Science Center of Espírito Santo Federal University (CCA-UFES), in Alegre-ES. The scion employed were produced at Capixaba Institute of Research, Technical Assistance and Rural Extension (Incaper) and provided to CCA-UFES. The plants were cultivated in plastic vases with a 14 dm³ capacity. The substrate employed consisted of soil and bovine manure in the proportion of 3:1. The soil was collected in the city of Alegre- ES in a of 0-20 cm depth, after that it was fertilized, and put into plastic vases. The fertilization was performed according to the soil analysis interpretation and Lani et al. (2007) advice for the coffee tree cultivation in the State of Espírito Santo. The fertilization with phosphorus was performed, adding simple superphosphate to the substrate. The top-dressings were divided and performed every 30 days, by using potassium chloride and ammonium sulfate. Two applyings of Viçosa mixture (a mixing of bordeaux mixture-copper sulphate, hydrated lime - and micronutrients) were made via leaf according to Zambolim et al. (2007).

Before plantation health scion were selected and each one had from 3 to 4 pairs of definitive leaves. By using a knife, 1 cm was cut from the down part of the bag so that the coiled roots could be eliminated. In each one of the vases one scion was planted. The plants were conducted with only an orthotropic branch and cultivated for seven months. The irrigation was performed in accordance with the plants need.

The experimental outline used was a completely randomized design with 13 treatments (clones), 7 repetitions and plots consisted of a plant per vase. The variables analyzed in the work to determine the clone development were the growth rate, the final growth and the biomass production, based on the features described below.

Growth Rate

In order to obtain the data related to the growth rate of each clone, the following characteristics were evaluated: number of leaves (NL), number of plagiothropic branches (NPB), stem diameter (SD) and plant height (PH). The PH was obtained by using a millimeter graduated ruler and the SD was measured with a paquimeter (5 cm above ground). Four evaluations of each characteristic were made: the first one 120 days after plantation and the other ones every 30 days after the first evaluation. Through the data of these evaluations the growth rate was calculated from the regression coefficient of each characteristic according to the time. The calculated variables were the plant growth rate (PGR in cm month^{-1}), leaf emission rate (LER in leaf month^{-1}), plagiothropic branches emission rate (PBER in plagiothropics branches month^{-1}) and stem expansion rate (SER in mm month^{-1}).

Final Growth

In the last evaluation, besides the growth parameters previously considered, the root volume (RV) and the leaf area (LA) were also determined. The RV was obtained by submerging the roots into water in a graduated cylinder and the LA was obtained by using the Area meter measurer, 3100 model, LiCor, Nebraska, EUA. By this way, it was possible to obtain the final growth of each clone.

Biomass Production

Through the collection and drying of the vegetal tissues, the biomass production in leaf, stem and root of each clone was evaluated in the 210 days of cultivation. These materials were dried in a forced circulation greenhouse of 60 ºC for 72 h and weighed in electronic scale. The leaf dry matter (LDM), stem dry matter (SDM), root dry matter (RDM), air part dry matter (APDM) obtained by totalizing LDM and SDM, total dry matter (TDM) obtained by totalizing APDM and RDM, and relation between root dry matter/ air part (RRAP) obtained from the relation between RDM/ APDM.

The data were submitted to variance analysis and in the presence of significant differences, the averages were compared by Scott-Knott test at 5%. The analysis of the data was performed by using the resources of the computational program GENES (Cruz, 2006).

RESULTS AND DISCUSSION

Significant differences were noted among clones concerning final growth, growth rate and biomass production. By using Scott-Knott test (5%) the clones were placed in groups for each variable of development that was studied.

Final Growth

After 210-day plantation, significant differences (5%) among the clones were observed for all the evaluated characteristics. The mean obtained from each clone and the result of the Scott-Knott test (5%) can be observed in the Table 1. For all the characteristics there was a formation of two groups of means and variations in the composition of groups in according to the characteristic in study. In the following brackets are presented the means range to each characteristic evaluated and groups formed.

TABLE 1 – Means of number of leaves (NL), plagiothropic branch number (PBN), stem diameter (SD in cm), plant height (PH in cm), leaf area (LA in cm^2) and root volume (RV in cm^3) of 13 clones from the conilon coffee cultivar ‘Vitória Incaper 8142’.

Clones / Variables	NL	PBN	SD	PH	LA	RV
1V Clone	159.71 a	17.43 a	1.13 a	74.00 a	8614.11 a	60.00 b
2VClone	150.57 a	15.43 a	1.15 a	74.36 a	7614.14 a	66.00 a
3V Clone	124.29 b	13.14 b	1.09 a	55.29 b	7742.27 a	60.29 b
4V Clone	118.00 b	12.43 b	1.11 a	58.71 b	6453.96 b	53.57 b
5V Clone	123.29 b	15.43 a	1.05 b	66.43 a	7244.26 b	49.43 b
6V Clone	142.43 a	14.00 b	1.07 a	56.21 b	6751.47 b	47.57 b
7V Clone	122.43 b	15.57 a	1.08 a	66.43 a	6574.74 b	55.29 b
8V Clone	161.00 a	15.71 a	1.16 a	70.43 a	8353.81 a	92.29 a
9V Clone	114.57 b	14.00 b	1.00 b	60.79 b	6585.73 b	64.57 a
10V Clone	92.29 b	13.29 b	0.99 b	66.43 a	5548.06 b	47.14 b
11V Clone	128.29 b	15.00 a	1.10 a	71.50 a	6743.66 b	69.43 a
12V Clone	141.43 a	14.57 b	0.96 b	58.57 b	6501.04 b	44.00 b
13V Clone	168.57 a	16.57 a	1.03 b	64.07 a	8117.43 a	73.43 a
General Mean	134.37	14.81	1.07	64.86	7141.90	60.23
Var. Coef.(%)	18.42	14.97	9.92	13.91	20.00	38.70

Means followed by the same letter in a column do not differ significantly by the Scott & Knott test (5%).

In the NL characteristic, the superior group (141.43 to 168. 57 leaves) was formed by 1V, 2V, 6V, 8V, 12V and 13V clones. The inferior group (92.29 to 128.29 leaves) was consisted by 3V, 4V, 5V, 7V, 9V,10V and 11V clones. Concerning NPB, the 1V, 2V, 5V, 7V, 8V, 11V e 13V clones presented the highest values and formed the group of superior mean (15.00 to 17.43 branches). The inferior group (12.43 to 14.57 branches) was formed by 3V, 4V, 6V, 9V, 10V and 12V clones. In variable SD, the 1V, 2V, 3V, 4V, 6V, 7V, 8V and 11V clones formed the superior group (1.07 to 1.16 cm). The minor diameter (0.96 to 1.05 cm) was presented by 5V, 9V, 10V, 12V and 13V clones.

The SD and NPB highest values are interesting due to its known high and positive correlation with the future productivity of the coffee tree (Bustamante et al., 2004; Dhaliwal, 1968). Therefore, the cited vegetative characteristics have been used in coffee breeding improvement programs to select progenies (Silvarolla, 1997).

In the PH characteristic, the 1V, 2V, 5V, 7V, 8V, 10V, 11V and 13V clones formed the superior group (64.07 to 74.36 cm). The inferior group (55.29 to 60.79 cm) was formed by 3V, 4V, 6V, 9V and 12V clones. In the variable LA, the 1V, 2V, 3V, 8V and 13V clones showed the highest values (7614.14 to 8614.11 cm^2). The 4V, 5V, 6V, 9V, 10V, 11V and 12V clones presented the lowest values (5548.10 to 6751.47 cm^2). Concerning the RV, the superior group (64.57 to 92.29 cm^3) was formed by 2V, 8V, 9V, 11V and 13V clones. The inferior group (44.00 to 60.29 cm^3) was formed by 1V, 3V, 4V, 5V, 6V, 7V, 10V and 12V clones.

Although the 8V clone is not different from some clones, it presented RV highly superior to the others. With a great root system the plant is able to explore a greater volume of soil, reflecting in the water and nutrients absorption, making it possible a greater development of the air part. The variations in RV observed among the clones is in accordance with Pinheiro et al. (2005), who assert that the conilon coffee root volume changes according to the clone in study.

The 2V and 8V clones were located in all the characteristics in the group of superior mean, presenting a vigorous development in the air part and root. Despite the superior development in height, these clones remained superior in all the other characteristics, proving that such height growth was not harmful to characteristics such as SD. The 1V, 2V, 7V, 8V and 11V clones presented superiority in relation to PH and SD, indicating that this superiority is not due to etiolation in the plant stem.

Growth Rate

For all the characteristics related to this variable, it was possible to observe significant differences among the clones. In the Table 2 we can find the means evaluated by Scott-Knott test (5%). One could note the formation of two groups, except for the LER variable which had three groups formed. In the following brackets are presented the means range to each characteristic evaluated and groups formed.

TABLE 2 - Means of plant growth rate (PGR in cm month), leaf emission rate (LER inleaf month^{-1}), plagiothropic branch emission rate (PBER month^{-1}) and stem expansion rate (SER in mm month^{-1}) of 13 clones from the conilon coffee cultivar 'Vitória Incaper 8142'.

Clones / Variables	PGR	LER	PBER	SER
1V Clone	7.79 a	29.89 a	2.61 a	1.25 a
2V Clone	7.32 a	28.21 a	2.32 a	1.08 a
3V Clone	5.05 b	22.43 b	1.71 b	0.90 b
4V Clone	5.61 b	22.79 b	1.93 b	1.11 a
5V Clone	7.95 a	21.86 b	2.36 a	0.94 b
6V Clone	5.14 b	24.96 b	1.79 b	0.97 b
7V Clone	6.16 b	23.11 b	2.36 a	1.10 a
8V Clone	5.75 b	29.32 a	2.21 a	1.12 a
9V Clone	7.43 a	20.71 b	2.07 b	0.98 b
10V Clone	8.52 a	16.43 c	2.07 b	1.02 b
11V Clone	7.39 a	25.21 b	2.43 a	1.11 a
12V Clone	5.64 b	27.00 a	2.21 a	0.93 b
13V Clone	6.50 b	31.36 a	2.39 a	0.94 b
General Mean	6.63	24.87	2.19	1.03
Var. Coef.(%)	27.74	18.89	19.06	18.84

Means followed by the same letter in a column do not differ significantly by the Scott & Knott test (5%).

For the PGR variable, the clones 1V, 2V, 5V, 9V, 10V and 11V formed the superior group of means (7.32 to 8.52 cm month^{-1}). The inferior group (5.05 to 6.50 cm month^{-1}) was formed by 3V, 4V, 6V, 7V, 8V, 12V and 13V clones. In the LER characteristic, the 1V, 2V, 8V, 12V and 13V clones formed the superior group (27.00 to 31.36 leaves month^{-1}). The 3V, 4V, 5V, 6V, 7V, 9V and 11V clones formed an intermediate group of mean (20.71 to 25.21 leaves month^{-1}). The 10V clone formed isolated the inferior group and presented the lowest value (16.43 leaves month^{-1}).

The LER is an interesting feature, since a good production of leaf is favorable for a greater productivity of the plant due to a greater energy synthesis coming from the photosynthesis, considering it can also represent a greater vigor. Genetic materials with a greater vigor can show a superior recuperation for the shedding of leaves in comparison to the others.

In PBER, the 1V, 2V, 5V, 7V, 8V, 11V, 12V, 13V clones formed the superior group (2.21 to 2.61 plagiothropic branches month^{-1}). The inferior group (1.71 to 2.07 plagiothropic branches month^{-1}) was formed by 3V, 4V, 6V, 9V and 10V clones. For SER, the 1V, 2V, 4V, 7V, 8V and 11V clones formed the superior group (1.08 to 1.25 mm month^{-1}). The inferior group (0.90 to 1.02 mm month^{-1}) was formed by 3V, 5V, 6V, 9V, 10V, 12V, and 13V clones.

The growth differentiation was relatively low, because only two groups were formed concerning PGR, PBER and SER and three concerning LER. One can observe that 1V and 2V clones were found in the superior group of averages for all the characteristics. The 8V and 11V clones were not found in the superior group only concerning PGR and LER, respectively. Yet, the 3V and 6V clones were present into the inferior group of averages concerning all the variables, except for LER, whose inferior group consists only of 10V clone. Only for SER and PGR, respectively, the 4V and 9V clones were different from the inferior group of averages.

The 10V clone presented the highest PGR. However, upon evaluating the other variables, one can verify that this was inferior in relation to others, being found among the lowest averages and forming an isolated group of the lowest average in relation to LER. It indicates the height growth was not followed by a greater stem thickening and greater leaf and plagiothropic branch emission. This behavior can not be observed as a field level if the plant is under a high solar radiation which meets its needs. Although it is not different from some clones, the 3V markedly had a highly inferior behavior in comparison to the others, presenting the lowest value for all the rates, except for LER.

Biomass Production

For all the variables studied the clones were distinct concerning the biomass production. In the Table 3, the result of Scott & Knott (5%) test is shown and the biomass average obtained by each clone in study after 210 days of plantation. One could note the formation of two mean groups. In the following brackets are presented the means range to each characteristic evaluated and groups formed.

TABLE 3 – Means of leaf dry matter (LDM in g), stem dry matter (SDM in g), root dry matter (RDM in g), air part dry matter (APDM in g), total dry matter (TDM in g) and relation root dry matter/ air part (RRAP) of 13 clones from conilon coffee cultivar ‘Vitória Incaper 8142’

Clones / Variables	LDM	SDM	RDM	APDM	TDM	RRAP
1V Clone	62.18 a	29.44 a	21.02 a	91.62 a	112.64 a	0.23 b
2VClone	51.68 b	30.32 a	22.96 a	82.00 a	104.96 a	0.28 a
3V Clone	51.18 b	25.54 a	20.98 a	76.72 a	97.70 a	0.27 a
4V Clone	44.38 b	20.12 b	18.35 b	64.50 b	82.85 b	0.28 a
5V Clone	48.92 b	22.55 b	17.62 b	71.47 b	89.09 b	0.25 b
6V Clone	55.46 a	24.90 a	21.23 a	80.36 a	101.59 a	0.27 a
7V Clone	45.86 b	20.62 b	21.03 a	66.48 b	87.51 b	0.32 a
8V Clone	63.57 a	27.91 a	27.80 a	91.48 a	119.27 a	0.30 a
9V Clone	43.34 b	16.82 b	16.85 b	60.17 b	77.02 b	0.28 a
10V Clone	36.33 b	15.66 b	14.74 b	51.99 b	66.73 b	0.28 a
11V Clone	49.80 b	26.10 a	22.44 a	75.91 a	98.35 a	0.30 a
12V Clone	45.29 b	19.55 b	16.04 b	64.84 b	80.88 b	0.25 b
13V Clone	59.23 a	26.10 a	21.00 a	85.33 a	106.33 a	0.24 b
General Mean	50.56	23.51	20.16	74.06	94.22	0.27
Var. Coef.(%)	23.27	27.32	27.18	24.25	24.37	13.69

Means followed by the same letter in a column do not differ significantly by the Scott & Knott test (5%).

For LDM the 1V, 6V, 8V and 13V clones presented the superiors values (55.46 to 63.57 g), while the clones 2V, 3V, 4V, 5V, 7V, 9V, 10V, 11V and 12V formed the inferior group (36.33 to 51.68 g). Concerning SDM, the superior group (24.90 to 30.32 g) was formed by 1V, 2V, 3V, 6V, 8V, 11V and 13V clones. The 4V, 5V, 7V, 9V, 10V and 12V clones presented the minors values (15.66 to 22.55 g).

For RDM the 1V, 2V, 3V, 6V, 7V, 8V, 11V and 13V clones formed the superior group (20.98 to 27.80 g), while the inferior group (14.74 to 18.35 g) was formed by 4V, 5V, 9V, 10V and 12V clones. For APDM, the highest values (75.91 to 91.62 g) were presented by the 1V, 2V, 3V, 6V, 8V, 11V and 13V clones. The inferior group (51.99 to 71.47 g) was formed by 4V, 5V, 7V, 9V, 10V and 12V clones.

Concerning TDM the 1V, 2V, 3V, 6V, 8V, 11V and 13V clones had the highest values (97.70 to 119.27 g), forming the superior group. The lowest mean group (66.73 to 89.09 g) consisted of the 4V, 5V, 7V, 9V, 10V and 12V clones. Analyzing RRAP, the 2V, 3V, 4V, 6V, 7V, 8V, 9V, 10V and 11V clones showed the greatest relation (0.27 to 0.32), while the 1V, 5V, 12V and 13V formed the inferior group of means (0.23 to 0.25).

The 6V and 8V clones were in the group of the highest values for all the variables. The 2V, 3V and 11V clones were located in the group of the lowest averages only for the LDM variable, as well as the 1V and 13V clones for the RRAP variable. The 5V and 12V clones, showed inferior growth for all the variables in study. The 4V, 9V and 10V clones were not allocate in the inferiors groups only for RRAP variable, thus indicating an adequate balance in this relation.

The 10V clone presented inferior results in relation to the other ones in all the characteristics, except for RRAP, which made it be in the group of superior averages, demonstrating greater balance in the relation. But, it occurs due to the minor root system and air biomass presented by the plant, whose values are under the general average of the clones.

The balance between roots and air part is closely related to the coffee tree development and productivity, so the ideal clones are those which present high production of air biomass followed by great root system development, as we can see for the 8V clone. Although the plants might have other mechanisms of drought tolerance (Dias et al., 2007; DaMatta & Ramalho, 2006), a more developed root system should permit a better withstanding under drought conditions, as reported to Pinheiro et al. (2005).

The differences observed in quantity of root dry matter, corroborates with DaMatta et al. (2007), who assert that the root system of conilon coffee varies according to the clone in study, and also the extension, distribution, architecture, depth and efficiency either in water or nutrient absorption can be affected by several factors, such as the genetic one.

According to Bragança (2005), despite the irrigation in conilon tree, for years of high crop production there is an exhaustion of the plant, consequently with the root system part death. So, the importance of a root system well developed and in balance with the air part.

In general, the 8V clone presented superior values in comparison to the others, indicating superiority in the biomass production, which was not detected in this work. This clone presented the greatest biomass production noted in TDM, by showing the highest value for LDM and RDM variables, and being among the highest averages for SDM. Yet, this clone showed a superior behavior in comparison to the general average of the clones in the relation root/air part.

According to Rena & Maestri (1985), taking into consideration what occurs to arabica coffee (*C. arabica*), it can be that the conilon coffee leaf production is closely related to the stem growth, particularly the plagiothropic branches, since the leaf primordial come directly from the apical gem activity. Therefore, the conilon leaf production is directly related with the knot formation in the lateral branches (DaMatta et al., 2007).

The plagiothropic branches (productive) present in the leaf axil, in each knot, a set of buds, which produce flowers or productive branches of major order (Martinez et al., 2007). Thus, the emission of new plagiothropic branches and their development is fundamental in order to obtain a greater productivity.

In the whole analysis of data, it was possible to verify the non uniformity in the clone initial development, proved by general formation of two groups of clones for each variable and by changing in the composition of groups according to the characteristic in study. One knows that these clones are highly productive (Bragança et al., 2001), but information about their initial growth pattern was unknown.

This study shows that, in general, the ‘Vitória Incaper 8142’ variety presents two groups of clones concerning the initial development, in which there is a phenotypical similarity. The genotypes which are part of each group change according to the variable analysed.

To safely define the clone groups for each characteristic and the number of groups, new studies are necessary to evaluate the behavior repetition under the environmental variations, which, according to DaMatta et al. (2007), highly influence the coffee tree development. The inter-group uniformity is probably due to improvement process used, in which only those that have characteristics proper to development and production were selected and asexually propagated (Fonseca et al., 2004; Bragança et al., 2001).

Despite the similarity into the possible groups in the initial development, the plantation in line is always advisable, since they are 13 genetically distinct clones with different maturation time. The ‘Vitória Incaper 8142’ variety cultivation with 13 clones is necessary, since the *C. canephora* specie presents gametophitic self-incompatibility (Schifino-Wittmann & Dall’Agnol, 2002; Conagin & Mendes, 1961), besides, the cultivar formation with higher number of clones usually presents a greater genetic basis, which is a fundamental factor to diminish loss risk caused by biotic and abiotic stress, also diminishing possible breaking in the coffee production and activity sustainability.

The differentiate development among the clones corroborates for the previous works performed with the coffee tree culture, in which several authors noted variability concerning development among genotypes of the same species (Bergo et al., 2008; Partelli et al., 2006). Yet, in some cases it was noted variability concerning efficiency in the use of nutrients (Mattiello et al., 2008; Macedo et al., 2008, Reis Jr. & Martinez, 2002).

At last, taking the presented information into consideration, there is an indicative that cultural treatments such as fertilization must be different among clones since the initial stage. It is necessary more research to confirm the results. The differentiate management among clones is important in order to make the practices more efficient, diminishing the impact on the environment and reducing costs.

CONCLUSIONS

The 1V, 2V, 8V, 11V and 13V clones of 'Vitória Incaper 8142' cultivar present superior development in comparison to the others concerning most of variables. In general, this cultivar presents two groups of clones concerning the development until 210 days of cultivation. The data found indicates that management can be different among the clones since the initial stage and studies involving different environment are necessary to confirm these results.

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