

Compatibility Test and Agronomic Performance of Coffee Genotypes (*Coffea canephora* Pierre ex Froehner) in the State of Rondônia, Brazil

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Abstract

The objective of this work was to evaluate the degree of compatibility and agronomic performance in clonal genotypes of canephora coffee plants (*Coffea canephora* ex Froehner) for cultivation in the state of Rondônia, Brazil. The study was conducted with nine genotypes with three replications of *Coffea canephora* Arranged in the field: UFRO-60; UFRO-31; UFRO-61; UFRO-25; UFRO-03; UFRO-08; UFRO-21; UFRO-05 and UFRO-138 In adulthood and in two years of harvest (2013/2014 and 2014/2015). We evaluated: productivity, profitability, conversion index fruit cherry/grain benefited, mass of one hundred grains benefited, average diameter of the fruits, number of rosettes per branch, average distance between rosettes and number of fruits per rosette. Additionally, the degree of compatibility between the clones of clonal. The genotypes of *Coffea canephora* with the best agronomic performances evaluated for the edafoclimatic conditions of the State of Rondônia in this study were UFRO-08, UFRO-25, UFRO-03 and UFRO-138. According to the compatibility tests, the sequence of correct disposition in the field of *Coffea canephora* among the genotypes studied in this study are: UFRO-138; UFRO-31; UFRO-25; UFRO-08; UFRO-60; UFRO-21; UFRO-61; UFRO-03 and; UFRO-05. Close to 74% of the tests Were and self-pollination tests resulted in low fruiting, evidencing the characteristic of self-incompatibility.

Keywords: coffee growing in Rondônia, genetic materials, gametophytic auto incompatibility

1. Introduction

Worldwide, it is estimated that 500 million people are involved in the coffee production chain (Damatta et al., 2007; Ferrão et al., 2017). Brazil stands out as the world's largest producer of coffee and has one of the most efficient coffee growers in the world with a planted area of approximately 2.2 million hectares in 2018 (CONAB, 2018). The species *Coffea arabica* L. and *Coffea canephora* Pierre Ex Froehner are widely cultivated in the country due to the edaphoclimatic conditions favorable, mainly in areas of Southeastern and Northern Brazil (Ferrão et al., 2017). In areas of the Amazon Region, the species is mainly cultivated *Coffea canephora*, due to specific altitude and rainfall requirements (Partelli et al., 2014).

In the State of Rondônia, located in the southern part of Western Amazonia, coffee (*Coffea canephora*) is configured as the most planted perennial culture and contributes to the formation of family income in rural areas (CONAB, 2018). It is estimated, according to CONAB (2018), that the planted area is about 63.900 hectares and approximately 2 million of benefited sacks produced annually. Although the average productivity is still low, with about 31 sacks/ha, there is an annual increase in productivity influenced by the technological package that

involves fertilization, liming, irrigation and pest control in addition to the expressive use of new materials production for renewal of clonal crops (Dubberstein et al., 2017; CONAB, 2018).

Being fundamental for the increase of coffee productivity in the state of Rondônia, the genetic improvement, among other benefits, allows for uniformity of maturation, resistance to periods of drought, decrease of the effect of coffee bienniality and greater Yield of the benefited fruits (Ivoglo et al., 2008). However, as the *Coffea canephora* is an aloidic species, that is, dependent on other plants so that there is flowering and fruiting, the genetic compatibility among coffee genotypes becomes essential so that the crop can be productive (Marcolan & Espindula, 2015). The self-incompatibility between genotypes is the rejection of their own pollen or of clone plants that carry allelic characteristics that prevent self-fertilization (Nettancourt, 1997). According to Castric & Vekemas (2004), the capacity of the *Coffea canephora* in avoiding self-fertilisation is a vital characteristic of the species in order to avoid the deleterious effects caused by endogamy depression.

For this reason, it is indicated that there is a sufficient quantity of clones or genotypes in the planting area, in order to increase the chances of compatibility and production. Therefore, it is imperative that genetic materials undergo compatibility tests that ensure sufficient pollination, flowering and fruiting capacity, since clones not sufficiently compatible compromise these phenological phases, causing miscarriage and defective grains and consequently decreasing the productivity and quality of the final beverage (Lopes, 2015; Ferrão et al., 2017). Thus, the present study aimed to evaluate the degree of compatibility and agronomic performance in clonal genotypes of canephora coffee plants (*Coffea canephora*) for cultivation in the state of Rondônia, Brazil.

2. Material and Methods

2.1 Location and Experimental Design

The work was carried out in 'Ouro Verde', in the rural area of Novo Horizonte do Oeste, in the State of Rondônia, Brazilian Amazon, Brazil. The climate is predominantly the hot and humid tropical type Aw, according to Köppen, with a well-defined dry period, occurrence of water deficit from June to September, average annual temperature of 25 °C, average annual precipitation of 2,400 mm (Ageitec, 2019). A randomized block design was used, containing nine treatments, nine genotypes of Conilon coffee (*Coffea canephora*): UFRO-60; UFRO-31; UFRO-61; UFRO-25; UFRO-03; UFRO-08; UFRO-21; UFRO-05 and UFRO-138, arranged in lines, within the field of cultivation, as recommended by Ferrão et al. (2017a) and three repetitions. Except for the evaluation of the 2014/2015 crop, which did not count on the UFRO-61 clone, thus limiting itself to eight treatments. Adult plants were used, producing in the second and third commercial harvest, which were conducted with all the technical recommendations recommended by Ferrão et al. (2017). It was adopted a spacing of 3m x 1,3m, between lines and between plants, respectively, totaling approximately 2.560 plants ha⁻¹, conducted with 3 to 4 rods.

2.2 Experimental Conditions and Variables Analyzed

The harvest of coffee genotypes in the 2013/2014 and 2014/2015 was carried out in April and May when the plants had 80% of the cherry grain stage fruits, ideal harvest point as determined (Nunes et al., 2005). The experimental variables, except for productivity, were estimated from twelve plagiotropic branches taken from the median portion of the canopy of the useful area of the plot, being one branch for each cardinal point in each plant that composed the experimental plot. The evaluations that involved the obtaining of the grain mass were corrected to 13% of moisture, using the drying at full sun on the yard covered by canvas, and performed the periodic turning, according to the orientations of Pinheiro et al. (2012).

Plants were evaluated in open pollination: grain yield (Bags ha⁻¹) determined according to average production per plant, multiplying by the number of plants per hectare; beneficiation field, consisting of the conversion of fruits into 'coco' type in benefited grains; cherry/grain benefit ratio; mass of 100 grains; average diameter, measured using a caliper, determined from the arithmetic mean obtained from 50 fruits. The morphological characteristics were also evaluated: number of rosettes per plagiotropic branch; average distance between rosette, determined by the distance between the first and last rosette, and divided by the number of rosette and the average number of fruits per rosette for each genotype.

2.3 Genetic Compatibility Test

The compatibility test was installed in the main florade of the genotypes of *Coffea canephora*, a stage resulting from temporary water deficit, Following the procedures and steps proposed by Ferrão et al. (2017b) and Teixeira et al. (2011). The plants that would serve as pollen receptors were determined and constituted in an experimental plot. Each parcel received nine crosses, consisting of manual pollination with pollen from the other varieties and a self-pollination test. In each branch plagiotrópico selected himself four rosettes from the apex of the branch,

and in these, counted all the floral buds contained. Subsequently, the apical meristems were cut to avoid the emission of new floral buds, being protected with Kraft paper and the branches that would serve as receptors and pollen donors in order to avoid the fertilization of uncontrolled plants in opening of the flowers. The branches were protected from the sun's rays, being chosen those that were on the side of the shadow, seen the potentiality of the burning of the floral buds.

One day after these procedures, the flowers were opened, and artificial pollination was performed at the beginning of the day according to the recommendations of Ferrão et al. (2017b). The pollen donor branches were cut off and with the removal of protective sacks from the receptor branches, pollination was performed. After four days, after the period of receptibility of the flowers to pollen, he withdrew all the paper sacks and the normality of the flowers was verified, identifying the crosses performed in each branch. During the whole fruiting period, monitoring was performed weekly for the emission of new buttons. At the end of 21 weeks the initial date, when there were no greater manifestations of incompatibility and to prevent the environment from interfering in the final number of fruits, carried out the final count of the fruits that they averted, to determine the compatibility among the genotypes (Figure 1).



Figure 1. Protection of the branches of the genotypes of *Coffea canephora* (left) and monitoring of the floral buttons (right)

Source: Authors.

2.4 Analysis Statistics

The agronomic assessments and compatibility testing were submitted to determination of the confidence interval ($P < 0.05$), based on the difference between the upper confidence limit of the mean (95%) and the arithmetic mean, the coefficient of variation and the Scott-Knott test, at a 5% probability level.

3. Results and Discussion

The yield of the genotypes (Clones) of *Coffea canephora* studied did not differ statistically. However, the average productivity in 2013/2014 harvest of the clones was about 101 sacks ha^{-1} , around three times higher than the current average productivity of Rondônia, of 30.97 sacks ha^{-1} (CONAB, 2018). In The 2014/2015 harvest, the clones UFRO-25, UFRO-03, UFRO-08 and UFRO-138 presented the highest yields (76 sacks ha^{-1}), however, were 24.4% of the previous crop (2013/2014) (Table 1). Teixeira (2014) also verified the decrease in productivity and subsequent brothers and according to Ferrão et al. (2017) and Rocha et al. (2015) this fact correlates with the productive variation of each genotype or to non-measured climatic variations. The conversion rate of the cherry fruit to benefited grain was 4.44 in the Harvest 2013/2014, with the clones UFRO-60 and UFRO-61 with the highest indices and 4.36 in the Harvest 2014/2015 with the clones UFRO-60 and UFRO-61 with the highest indexes. Similar values were obtained by Ferrão et al. (2013abc) for varieties of *Coffea canephora* “Diamond Incaper 8112”, ‘Jequitibá Incaper 8122’ and ‘Centenary Incaper 8132’ of 4.27, 4.22 and 4.23, respectively.

The highest indices reflect proportionally the lowest profitability in coffee cultivation (Ferrão et al., 2013a). The clones UFRO-25, UFRO-08 and UFRO-138 showed the best profitability in the 2013/2014 crop, however, in the 2014/2015 crop, it did not present significant differences. The mean yield values are above those observed by Gaspari-Pezzopane et al. (2004), which ranged from 48.4% to 61.9% for *Coffea canephora*. According to these authors, the yield directly influences the final cost of coffee production, and when the lower these values, the

costlier is the production. Clonal crops, such as the ones in this study, present higher grain maturation uniformity, increasing the yield in relation to the seminiferous crops (Partelli et al., 2006).

The mass of 100 grains was significantly more in several clones, except in the genotype UFRO-61 (15.13 g). As can be seen in Table 1, the lower weight of the grains seems to be directly related to the Yield of this genotype, which was also the smallest. In general, the mean mass of 100 grains observed were higher than those observed by Kameyama et al. (2016) for several coffee genotypes in the state of São Paulo, Brazil, between 7.1 and 13.2 G. The genotypes studied by Ferrão et al. (2013a) obtained weights similar to the Obtained by the genotypes studied in this study. According to Medina Filho & Bordignon (2003) the mass of 100 grains is an excellent indicator of pollination and compatibility, because the emergence of 'Moca' grains indicates that only one of the grain compartments was fertilized, decreasing the weight of the grains and the productivity.

Table 1. Evaluation of the components: productivity, beneficiation yield (BY), cherry fruit/grain benefit ratio (CF/GB), mass of 100 grains benefited (M100) and fruit diameter (FD), in clonal genotypes of Canephora Coffee (*Coffea canephora* Pierre ex Froehner)

	Productivity (bags ha ⁻¹)		BY (%)		CF/GB		M100 (g)		FD (mm)	
	----- Harvests -----		---- Harvests ----		--- Harvests ---		---- Harvests ----		---- Harvests ----	
	1°	2°	1°	2°	1°	2°	1°	2°	1°	2°
UFRO-60	85.16a	73.76b	64.40b	59.45a	4.92a	5.04a	22.20a	16.70a	11.11b	10.96a
UFRO-31	87.74a	59.30b	63.95b	63.44a	4.40b	4.30b	19.37b	17.00a	11.98a	10.55a
UFRO-61	95.73a	-	59.64c	-	4.83a	-	15.13c	-	10.62b	-
UFRO-25	113.84a	86.78a	67.28a	64.22a	4.36b	4.05b	25.17a	18.27a	11.23b	9.96a
UFRO-03	107.54a	95.44a	63.33b	64.51a	4.50b	3.86b	23.30a	18.77a	10.47b	11.23a
UFRO-08	93.82a	81.99a	66.48a	62.57a	4.29b	4.17b	25.07a	18.97a	12.40a	11.33a
UFRO-21	109.17a	66.20b	64.79b	62.26a	4.48b	4.79a	19.20b	16.80a	11.21b	10.28a
UFRO-05	109.08a	69.21b	63.69b	58.41a	4.18b	4.39b	21.93a	16.27a	12.25a	11.04a
UFRO-138	104.97a	80.62a	67.18a	68.20a	4.04b	4.31b	22.83a	19.97a	10.40b	10.65a
Average	100.7	76.67	64.53	62.88	4.44	4.36	21.58	17.84	11.30	10.75
Standard Deviation	±6.71	±6.38	±1.06	±2.25	±0.14	±0.18	±1.41	±0.84	±0.43	±0.29
C.V.	13.79	12.09	2.54	8.32	6.02	5.47	9.45	9.96	7.01	5.30

Note. Averages followed by the same letter in the column do not differ from each other by the Scott-Knott test at a 5% probability level. C.V.: Coefficient of Variation. Harvests: 1st (2013/2014) and 2nd (2014/2015).

Regarding the fruit diameter, there were statistical differences only for the clones in the 2013/2014 harvest in which the clones UFRO-31, UFRO-08 and UFRO-0 were better (Table 2). According to Rocha et al. (2013), the largest grain size has a direct reflex in the final beneficiation of coffee with a positive correlation between this factor and the yield. Both the weight of the grains and the size are genetic characteristics controlled by several genes and may undergo variation among the genotypes and suffer with environmental factors such as water availability and fertilization management (Ferrão et al., 2017b). According to Silva et al. (2008), the decrease in the mass of 100 grains of the harvest of 2013/2014 for the harvest of 2014/2015 is due to the bienniality of coffee, characterized by the decrease of the plant reserves due to the high yield crop of the previous year.

The Clones UFRO-31, UFRO-25, UFRO-08 and UFRO-21 presented the highest number of rosettes per stem (NR) in the harvest of 2013/2014 and clones UFRO-03 and UFRO-31 in the Harvest 2014/2015 (Table 2). According to Rocha et al. (2013) the number of rosettes by branches favors the increase in the productivity of *Coffea canephora* and the selection of genotypes with superior characteristics. Verifying cultivars of *Coffea canephora* in the state of Rondônia, Rocha et al. (2013) observed a positive correlation between plant height and the number of rosettes per stem, allowing the selection of genotypes with lower heights, which facilitate treatment cultural, but with higher numbers of rosettes. The average number of rosettes obtained in this study are higher than those obtained by Ricci et al. (2013) in different shading conditions. According to the authors, the increase in luminosity influences the highest number of rosettes in the stem.

For the distance between the rosettes in the branches, the UFRO-05 clone showed the longest distance in the two harvests (2013/2014 and 2014/2015) (Table 2). The longest distances between the rosettes are unfavorable in a selection program of superior genotypes, considering that it is related to the decrease in the number of rosettes that a plagiotropic branch may contain, decreasing the overall productivity of the coffee (Marcolan & Espindula, 2015). According to Charrier and Eskes (2004), the distance between rosettes is correlated to smaller grains, but a larger number of grains per rosettes. Ricci et al. (2013) verified distances lower than this work. In this respect,

the number of grains per rosette (NFR) was higher for the clones UFRO-08, UFRO-21 and UFRO-25 in the Harvest 2013/2014 and UFRO-08 in the Harvest 2014/2015. Second Ferrão et al. (2017) both the spacing when the luminosity but limit the number of grains in the rosette, however, intrinsic characteristics of the plants can directly influence this item.

Table 2. Number of rosettes per plagiotropic branch (NR), distance between rosettes (DR), and average number of fruits per rosette (NFR) of twelve productive stems, in clonal genotypes of *Canephora* coffee trees (*Coffea canephora* Pierre ex Froehner)

Genotypes	NR		DR (cm)		NFR	
	----- Harvests -----		----- Harvests -----		----- Harvests -----	
	1°	2°	1°	2°	1°	2°
UFRO-60	12.36b	14.22b	5.01b	4.19c	12.28b	12.45c
UFRO-31	14.33a	15.94a	4.75b	4.06c	11.14b	9.35d
UFRO-61	12.89b	-	4.09c	-	13.57b	-
UFRO-25	15.94a	14.89b	4.87b	4.03c	17.59a	13.06c
UFRO-03	12.94b	16.22a	4.65b	4.45b	9.74b	14.64b
UFRO-08	14.69a	14.06b	4.62b	4.42b	16.67a	20.57a
UFRO-21	15.03a	13.75b	4.90b	4.23c	14.79a	14.31b
UFRO-05	12.75b	13.50b	5.35a	4.76a	13.07b	15.90b
UFRO-138	11.61b	13.92b	4.83b	4.56b	12.48b	12.37c
Average	13.61	14.56	4.78	4.34	13.48	14.08
Standard Deviation	±0.60	±0.52	±0.14	±0.12	±1.15	±1.42
C.V.	5.08	6.19	3.07	3.00	13.13	9.34

Note. Averages followed by the same letter in the column do not differ from each other by the Scott-Knott test at a 5% probability level. C.V.: Coefficient of Variation. Harvests: 1st (2013/2014) and 2nd (2014/2015).

The compatibility test between clonal genotypes differed statistically for receivers (lines) e for donors (columns). There is the presence of at least two compatibility groups, being reserved the lowest level of compatibility for self-pollinations, evidencing the self-incompatibility existing in the coffee plant. Analyzing the interactions between the receptors, it was statistically observed that the UFRO-03 genotype presented a low level of compatibility with the UFRO-21 genotype, which is similar to that observed in the self-pollination test. However, it cannot be affirmed that these genotypes share one or more alleles, characterizing them as "half siblings", as evidenced by these results, since the reciprocal among the clones presents high compatibility. Similarly, it occurs with the UFRO-08 clone, which for the UFRO-21 and UFRO-05 clone, presented the aforementioned occurrence (Table 3).

These facts are justified by the loss of pollen viability, which suffers oscillations and the germination of the germinative power due to artificial manipulation that can result in different forms in each genotype (Mendes, 1949). Nevertheless, it is important to emphasize that the donor and receptor branches in this study were covered with sacks at a time that coincides with the warmest period of the year in the state of Rondônia, which may be an additional factor for the reduction of the viability of the pollen, and consequently contributed to the low number of fruits.

As for the clone of *Coffea canephora* UFRO-08, three compatibility groups were presented: the first of lower level, restricted to self-pollination, a second group to which the clones are inserted UFRO-21, UFRO-05 and UFRO-138. With median compatibility and a third group with the other genotypes, composing the high compatibility group. For the clone UFRO-21, four compatibility groups were identified: one of the lowest compatibilities linked to self-pollination, one second of median compatibility, where is the UFRO-138 clone, a third of high compatibility with the UFRO-05 clone and a fourth group with excellent level of compatibility, where all other genotypes are inserted (Table 3; Figure 2).

Table 3. Fruiting percentage in manual pollinations between nine clonal genotypes of *Canephora* coffee plants (*Coffea canephora* Pierre ex Froehner)

Clone Receiver	Donor Clone									Average	Standard Deviation	C. V.
	UFRO-60	UFRO-31	UFRO-61	UFRO-25	UFRO-03	UFRO-08	UFRO-21	UFRO-05	UFRO-138			
	----- % -----											
UFRO-60	16cB	78bA	84aA	86aA	94aA	71aA	85aA	94aA	9aA	77.6	±10.4	16.78
UFRO-31	59bA	14cB	71bA	72bA	57bA	62aA	45bA	48cA	58bA	54.2	±8.1	23.66
UFRO-61	91aA	93aA	10cB	94aA	94aA	83aA	82aA	63bA	93aA	78.2	±11.8	20.07
UFRO-25	67bA	73bA	86aA	9dB	63bA	69aA	68aA	59bA	68bA	62.4	±9.6	15.10
UFRO-03	66bA	73bA	89aA	72bA	10cB	80aA	17cB	57bA	56bA	57.6	±11.3	20.86
UFRO-08	81aA	91aA	79aA	75bA	58bA	7cC	48bB	29cB	45bB	57.1	±11.6	22.78
UFRO-21	92aA	88aA	91aA	89aA	91aA	91aA	13cD	68bB	50bC	74.7	±11.0	12.86
UFRO-05	80aA	77bA	70bA	68bA	71bA	67aA	47bA	12cB	69bA	62.4	±9.3	21.07
UFRO-138	71bA	61bA	55bA	48cA	55bA	43bA	34bA	42cA	6cB	46.1	±8.3	26.83
Average	69.2	72.0	70.6	68.1	65.9	63.7	48.8	52.6	59.4			
Standard Deviation	±9.7	±9.6	±10.5	±10.7	±11.3	±11.0	±10.9	±10.4	±11.2			
C.V.	17.52	14.24	15.76	16.30	21.99	24.51	26.30	29.72	23.65			

Note. Averages followed by the same letter in the column do not differ from each other by the Scott-Knott test at a 5% probability level. C.V.: Coefficient of Variation. Harvests: 1st (2013/2014) and 2nd (2014/2015).

These results were not expected, considering that the literature predicted that the proportions expected for fruiting of the coffee plant, governed by three alleles of the S gene, are 0% for incompatibility, 50% for partially compatible and 100% for Fully compatible (Ferrão et al., 2017b). Other external and internal factors may explain the values outside the recommended margin that interfered in the fruiting percentages. The mechanisms of self-incompatibility usually present in the inhibition of pollen tube elongation as a consequence of protein interactions present in both pollen and stigma. Evidence shows that in the diploid species of the genus *Coffea* as *Coffea canephora*, there is the formation of RNases in the pistil cells in the gene locus “S” (Asquini et al., 2011; Nowak et al., 2011).



Figure 2. Manifestation of incompatibility in genotype of *Coffea canephora*

Source: Authors.

There is, observing the data in Table 3, a numerical discrepancy for the pollen donor genotypes, allowing the creation of three groups based at the compatibility level, with the exception of the clone UFRO-25. In the first group, interactions with a compatibility equal to or greater than 79% are inserted, except for five interactions, among the clones UFRO-08: Ufro-05, UFRO-08: UFRO-60, UFRO-08: UFRO-31, UFRO-08: UFRO-25, and UFRO-21: UFRO-25 that are inserted in this group and presented compatibility degree of 67%, 71%, 62%, 69% and 68% respectively.

In the second group are the interactions with compatibility between 18 and 78%, except the exceptions and the third group with compatibility between 6 and 17%, except for three interactions, all in the UFRO-05 genotype, between this and the genotypes UFRO-31, UFRO-08 and UFRO-138, which presented fruiting percentage of 48%, 29% and 42% respectively, and which are included in this group. There is an exception to the genotype

UFRO-25 That presented four groups, in which they were inserted in the first ones with a degree of compatibility equal to or above 86%, the second between 68 and 85%, the third between 10 and 67% and the fourth ones with 9% compatibility or less. In four occurrences, when the genotypes were pollens donors, there were statistically significant interactions between genotypes that manifested themselves as similar to the self-pollination test. The interactions between: Ufro-21: Ufro-03, UFRO-05: UFRO-31, UFRO-05: Ufro-08 and UFRO-05: UFRO-138 (Table 3).

Working with compatibility test between genotypes of *Coffea canephora* in the state of Rondônia, Brazil, Lopes (2015) verified compatibility between the tested plants and suggests the existence of more than one compatibility group, confirmed by this work. Some field observations indicated that in the *Coffea canephora*. There are three allelic forms of the “S” gene (S1, S2 and S3) controlling the gametophytic type self-incompatibility characteristic (Conagin & Mendes, 1961) (Figure 2). According to Omolaja and Falzun (2004), they have five allelic forms of the “S” gene can control compatibility and sustain the results of this work. According to the authors, the number of genotypic expressions would reach the ten case, confirming the existence of five alleles (S1S2, S1S3, S1S4, S1S5, S2S3, S2S4, S2S5, S3S4, S3S5, S4S5).

Through descriptive analysis, Monaco and Carvalho (1972) report that cross-matching between cultivars of *Coffea canephora* should present fruiting percentage equal to or greater than 50%, which was obtained in 74% of the tests performed in this study (Table 3). The literature reports the admission of 5 to 10% of self-fertilisation Schifino-Wittmann and Dall’agnol (2002), however, Monaco and Carvalho (1972) and Ferrão et al. (2017b) affirm that this percentage should be 0%, but this fact was not observed in this study. Further studies are needed to technically assess the compatibility between genotype of *Coffea canephora*, in order to identify the interaction of the materials for planting indication to farmers. Knowledge of compatibility or self-incompatibility between genotypes allows for increased productivity and final uniformity in Coffee cultivation (Ferrão et al., 2017; Schifino-Wittmann & Dall’agnol, 2002).

4. Conclusions

According to the compatibility tests, the correct disposition sequence in the field of *Coffea canephora* Among the genotypes studied in this work are: UFRO-138; UFRO-31; UFRO-25; UFRO-08; UFRO-60; UFRO-21; UFRO-61; UFRO-03 and; UFRO-05. The genotypes of *Coffea canephora* with the best agronomic performances evaluated for the edaphoclimatic conditions of the State of Rondônia in this study were UFRO-08, UFRO-25, UFRO-03 and UFRO-138. The results of the compatibility tests were not similar to those proposed for coffee-incompatibility in Brazil.

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