Scientia Agraria Paranaensis – Sci. Agrar. Parana.
ISSN: 1983-1471 – Online

PHYTOSOCIOLOGY OF WEEDS IN COFFEE PLANTS WITH DIFFERENT SOIL MANAGEMENT TECHNIQUES

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SAP 24200 Received: 04/03/2020 Accepted: 08/07/2020
Sci. Agrar. Parana., Marechal Cândido Rondon, v. 19, n. 3, jul./sep., p. 270-279, 2020

ABSTRACT - The adoption of different soil management techniques in coffee plants can alter the phytosociology of the weed community and, therefore, identifying the technique that most contributes to an integrated weed management is fundamental. In this context, the objective of this study was to evaluate the phytosociology of weeds in coffee plants under different soil management techniques. The land was planted in January 2016 with coffee seedlings of the species *Coffea arabica* L., cultivar Mundo Novo IAC 379-19. The design used was in randomized blocks, arranged in a 2 x 6 factorial scheme, with 3 replications. Two evaluations were carried out: in the rainy season and in the dry season, in 2017. The management techniques applied inter-rows were: i) control (spontaneous vegetation in the area); ii) management with *Urochloa decumbens*. On the coffee in-rows, the treatments were: iii) coffee husk; iv) organic compound; v) plant residues of *U. decumbens*; vi) plant residues of *U. decumbens* with coffee husk; vii) plant residues of *U. decumbens* with organic compound; viii) control (without coverage). For the evaluations, a square (0.25 m²) was randomly launched and the phytosociological indices were subsequently calculated. The species of the families Poaceae and Asteraceae were the most frequent in the area. The management with *U. decumbens* inter-rows and the crop residues deposited in the row associated with the coffee husk, or organic compound, decreases the amount and the diversity of weed species.
Keywords: *Coffea arabica* L., integrated management, weed community.

FITOSSOCIOLOGIA DE PLANTAS DANINHAS EM CAFEEIROS COM DIFERENTES TÉCNICAS DE MANEJO DO SOLO

RESUMO - A adoção dessas diferentes técnicas de manejo do solo em cafeeiros pode alterar a fitossociologia da comunidade infestante e desta maneira identificar a que mais contribui no manejo integrado das plantas daninhas é fundamental. Nesse contexto, objetivou-se avaliar a fitossociologia de plantas daninhas em cafeeiros com diferentes técnicas de manejo do solo. A lavoura foi instalada em janeiro de 2016 com mudas de café da espécie *Coffea arabica* L., cultivar Mundo Novo IAC 379-19. O delineamento utilizado foi em blocos casualizados dispostos em esquema fatorial 2 x 6, contendo 3 repetições. Foram realizados dois levantamentos no período chuvoso e outro no período seco do ano de 2017. Os manejos aplicados na entrelinha foram: i) testemunha (vegetação espontânea da área); ii) manejo com capim-braquiária. Na linha do cafeeiro foram: iii) casca de café; iv) composto orgânico; v) restos vegetais de capim-braquiária; vi) restos vegetais de capim-braquiária com casca de café; vii) restos vegetais de capim-braquiária com composto orgânico; viii) testemunha (sem cobertura). Para o levantamento, foi lançado aleatoriamente um quadrado (0,25 m²) e posteriormente calculados os índices fitossociológicos. As espécies das famílias Poaceae e Asteraceae foram as de maior ocorrência na área. O manejo com capim-braquiária na entrelinha e os restos culturais depositados na linha associados à casca de café ou composto orgânico reduz a diversidade de espécies e a quantidade de plantas daninhas.
Palavras-chave: *Coffea arabica* L., manejo integrado, comunidade infestante.

INTRODUCTION

Weeds have plasticity and the ability to adapt to different types of environments, competing with crops of interest for water, light and nutrients. In coffee trees, there is a reduction in plant growth, yield and bean quality, in addition to hindering crop practices, such as: harvesting, fertilization and disease and pest control (RONCHI et al., 2003).

Among the different weed control methods used in coffee, chemical control, using herbicides, stands out due to its greater efficiency and ease of adoption. However, the success of this management depends directly on the use of correct techniques inherent in this technology. Nonetheless, the rise of herbicide-resistant weed biotypes is highlighted, as an obstacle in the adoption of this control method (BALBINOT JUNIOR and FLECK, 2005).

Crop weed control methods that favor soil cover, such as the use of cover plants, are increasingly important. In coffee trees, the use of intercropping grasses stands out,

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specifically with *Urochloa decumbens* Stapf. plants (brachiaria grass) (WUTKE et al., 2014). The planting of *U. decumbens* between coffee rows can contribute to weed suppression, due to the physical (crop residues), crop (PARTELLI et al., 2010) and allelopathic barrier (CARVALHO et al., 2016). In addition, brachiaria grass changes the physical and chemical properties of the soil, leading to changes in its quality, mainly increasing the stability of aggregates, resulting in increased soil macroporosity and infiltration capacity (ROCHA et al., 2014). These improvements occur due to the presence of straw and roots, which contribute to the increase in the carbon content of the soil (LOSS et al., 2011) and greater activity of the soil macrofauna (MARCHÃO et al., 2007).

The use of soil conditioners, such as coffee husk and organic compost, has physical, crop and biological effects in suppressing weeds, and can contribute to the sustainable management of coffee crops (SANTOS et al., 2008). According to Santos et al. (2001), the coffee husk protects the soil, has a high carbon/nitrogen ratio and the ability to return nutrients extracted by production to the crop, mainly potassium. In addition, it controls weeds by physically preventing germination, and can also inhibit the infestation level through its allelopathic effect.

As a way of assessing the success and stability of production systems that adopt sustainable management strategies, the dynamics of the weed community is monitored, in order to quantify and identify the weed population of weed species in different types of coffee tree management practices, to verify the variations in the weed population of the area as a function of the agronomic techniques used (OLIVEIRA and FREITAS, 2008). Currently, coffee growers use new concepts for grass management, such as the intercropping between coffee trees and brachiaria grass (RAGASSI et al., 2013). Furthermore, coffee husks and organic compounds are widely used in coffee growing. However, few studies are found in the literature detailing the adoption of this system in relation to weed phytosociology.

The adoption of these different soil management techniques in coffee trees can change the phytosociology of the weed community and, thus, identifying the one that most contributes to an integrated weed management is fundamental. In this context, the objective of this study was to evaluate the phytosociology of weeds in coffee plants with different soil management techniques.

MATERIAL AND METHODS

The phytosociological evaluation was carried out in an experimental area with coffee trees in Lavras (MG), with latitude 21°13’36.47” South, longitude 44°57’40.35” West and an average altitude of 975 m. According to the Köppen classification refined by (ALVARES et al., 2013), the climate in the region is classified as Cwa, mesothermal with mild summers and winter droughts.

The crop was set in January 2016 with coffee seedlings of the species *Coffea arabica* L., cultivar Mundo Novo IAC 379-19. The coffee trees were implanted with a spacing of 3.6 m between planting rows and 0.75 m between plants, with a total area of 0.40 ha, totaling 1320 plants. The land cover management practices used between the rows were: (i) brachiaria grass (*Urochloa decumbens*) and (ii) control (spontaneous vegetation in the area). The treatments used in the coffee row were: (iii) coffee husk, (iv) organic compound, (v) plant residues of brachiaria grass and coffee husk and (vi) plant residues of brachiaria grass and organic compound (vii) plant residues of brachiaria grass; (viii) control (without application of soil conditioners or crop residues of brachiaria grass).

Right after the demarcation of the planting furrows (December 2015), the brachiaria was sown, in a haul, in a 1.60 m range between the coffee rows, in order to maintain a distance of 1.00 m from the planting row. The amount of 10 kg ha^{-1} of *Urochloa decumbens* seeds was used (SOUZA et al., 2006). Brachiaria harvesting was always carried out before flowering, with a mechanical brush cutter, in order to avoid competition with the coffee tree. Subsequently, the brachiaria biomass was placed under the coffee canopy, with the aid of a rake, occupying 1.00 m of distance on each side of the planting row.

The coffee husk and the organic compound were applied, right after planting, in coverage, in the projection of the coffee canopy, at a dose of 10 liters per plant, distributed in a range of 0.50 m on each side of the plant (GUIMARÃES et al., 1999). The coffee husk applied came from the coconut coffee processing. The organic compound used was a commercial product containing residues from farms and food industries. The plant residues of the brachiaria grass obtained from the clearings carried out between coffee rows were deposited in the rows of the coffee trees. To quantify the biomass of the brachiaria placed on the soil in the planting row, the samples were collected in each experimental unit. Subsequently, the fresh weight was determined and it was estimated that, on average, 1.8 kg m^{-2} of poaceae plant material was deposited after each harvest.

The management with spontaneous vegetation in the coffee row (control) was carried out, keeping a range of 1.00 m on each side of the planting row always clean, through weeding and application of post- and pre-emergent herbicides (glyphosate and oxyfluorfen) in the commercial dose recommended by the manufacturers, applied in a directed jet. Between the rows, spontaneous vegetation management in the area (control) was carried out using a mechanical brush cutter.

The experimental design used was in randomized blocks, in a 2 x 6 factorial scheme, containing 3 replications, totaling 36 experimental plots. Two evaluations were carried out in 2017, one in the dry period and the other in the rainy period, randomly casting a square, with a known area of 0.25 m², and the weeds contained in the sampled area were identified and quantified by the square inventory method (BRAUN-BLANQUET, 1979). Each experimental plot between rows was 14.4 m² and, in the row, 9 m².

The square was launched between rows 10 times in each experimental plot, 5 times between rows. The square was launched on the line 5 times. Subsequently, the area of the squares was added to the plots that represented the same treatment. Thus, in each evaluation between rows, the sample area was 7.5 m² and 3.75 m² in the coffee row in each management practice. For phytosociological characterization, the weeds were identified according to family, genus and species, and the number of individuals of each species present at each sampling point was also determined.

The data obtained in both seasons were analyzed according to the methodology proposed by Mueller-Dombois and Ellenberg (1974), in which plant density, frequency and species abundance were calculated. From these calculations, the relative frequency, relative density, relative abundance and the importance value index (IVI) were determined. The sum of the relative values determines the IVI, which establishes a parameter for the integration of partial variables, in order to combine them in a single and simple expression, emphasizing the relative importance of each species better than any other phytosociological parameter (LAMPRECHT, 1964). The following Equations were used in the calculation of these parameters:

$$F = \frac{Pi}{P} \quad \text{(Equation 1)}$$

$$Fr = \frac{Fr * 100}{Ft} \quad \text{(Equation 2)}$$

$$D = \frac{Ni}{AA} \quad \text{(Equation 3)}$$

$$Dr = \frac{D * 100}{Dt} \quad \text{(Equation 4)}$$

$$A = \frac{Ni}{Pi} \quad \text{(Equation 5)}$$

$$AR = \frac{A * 100}{At} \quad \text{(Equation 6)}$$

$$IVI = Fr + Dr + Ar \quad \text{(Equation 7)}$$

Where:

F = frequency,
Pi = number of plots containing the species,
P = total number of plots used,
Fr = relative frequency,
Ft = total species frequency,
D = density,
Ni = number of individuals per species,
AA = total sampled area (m²),
Dr = relative density,
Dt = total species density,
A = abundance,
At = total species abundance and
IVI = importance value index.

Similarity (estimate of the degree of similarity in species composition) was also assessed between treatments and times of evaluations, using the similarity index (SI) described by Odum (1985), through Equation 8.

$$SI = \frac{2a}{b + c} * 100 \quad \text{(Equation 8)}$$

Where:
a = number of common species in both areas and
b and c = total number of species in the two areas compared.

The SI ranges from 0 to 100, being maximum when all species are common to both areas and minimum when there are no species in common.

RESULTS AND DISCUSSION

In the evaluation carried out in the dry period, 18 species were identified, grouped into 10 families. The main families present were Asteraceae (6 species), Poaceae (2 species), Euphorbiaceae (2 species) and Amaranthaceae (2 species) (Table 1). In the evaluation carried out in the rainy season, 22 species were identified, grouped into 9 families. The main families were Asteraceae, with 6 species; Poaceae, with 6 species, followed by Amaranthaceae, with 3 species (Table 2).

TABLE 1 - Weeds, distributed by family and species, present in coffee plantations under different management practices in the dry period.

Family	Scientific name	Common name
Amaranthaceae	*Alternathera tenella*	Apaga fogo
	Amaranthus viridis	Caruru de mancha
Asteraceae	*Bidens pilosa*	Picão preto
	Conyza bonariensis	Buva
	Emilia fosbergii	Falsa serralha
	Galinsoga parviflora	Fazendeiro
	Parthenium hysterophorus	Losna branca
	Sonchus oleraceus	Serralha
Brassicaceae	*Lepidium virginicum*	Mentruz
Commelinaceae	*Commelina benghalensis*	Trapoeraba

Continuation of Table 1 - Weeds, distributed by family and…

Euphorbiaceae	*Euphorbia heterophylla*	Leiteiro
	Euphorbia hirta	Erva de Santa Luzia
Fabaceae	*Neonotonia wightii*	Soja perene
Malvaceae	*Sida* sp.	Guanxuma
Poaceae	*Digitaria horizontalis*	Capim colchão
	Eleusine indica	Capim pé-de-galinha
Portulacaceae	*Portulaca oleraceae*	Beldroega
Rubiaceae	*Richardia brasiliensis*	Poaia branca

In relation to families with the largest number of species, Asteraceae and Poaceae are two of the main families of weeds in Brazil, as they are part of most agricultural production systems (OLIVEIRA and FREITAS, 2008). Corroborating these authors and the results of this study, Maciel et al. (2010) observed that, for coffee areas cultivated in organic systems, there was also a greater number of species belonging to the two families mentioned above.

TABLE 2 - Weeds, distributed by family and species, present in coffee plantations under different management practices in the rainy period.

Family	Scientific name	Common name
Amaranthaceae	*Alternathera tenella*	Apaga fogo
	Chenopodium ambrosioides	Erva-de-santa-maria
	Amaranthus viridis	Caruru-de-mancha
Asteraceae	*Bidens pilosa*	Picão-preto
	Conyza bonariensis	Buva
	Emilia fosbergii	Falsa serralha
	Galinsoga parviflora	Fazendeiro
	Parthenium hysterophorus	Losna branca
	Sonchus oleraceus	Serralha
Brassicaceae	*Lepidium virginicum*	Mentruz
Euphorbiaceae	*Euphorba hirta*	Erva-de-santa-luzia
Fabaceae	*Arachis pintoi*	Amendoim forrageiro
	Neonotonia wightii	Soja perene
Malvaceae	*Sida* sp.	Guanxuma
Poaceae	*Digitaria horizontalis*	Capim colchão
	Eleusine indica	Capim-pé-de-galinha
	Eragrostis pilosa	Barbicha de alemão
	Urochloa decumbens	Capim-braquiária
	Urochloa plantaginea	Capim marmelada
	Panicum maximum	Colonião
Portulacaceae	*Portulaca oleracea*	Beldroega
Rubiaceae	*Richardia brasiliensis*	Poaia branca

In the rainy season, the area had a higher total number of species compared to the dry period. However, the rain effect implied a greater weed infestation, which can be explained by the favorable climatic conditions. This fact was also observed by Oliveira and Freitas (2008) in sugarcane crops, both with plant cane and with cane, possibly due to species survival mechanisms, as in the case of seeds or tubers that may be dormant or quiescent in periods not favorable to germination and development (CARVALHO and NAKAGAWA, 2000).

In total, 24 different weed species were identified, distributed in 10 families. Species such as *Commelina benghalensis* and *Euphorbia heterophylla* were found only in the dry period, while *Arachis pintoi*, *Chenopodium ambrosioides*, *Eleusine indica*, *Euphorbia pilosa*, *Pannicum maximum*, *Urochloa decumbens* and *U. plantaginea* were observed only in the rainy season.

In the evaluation carried out in the dry period in coffee areas with spontaneous vegetation in the area between rows (control), 17 species were identified, especially *E. indica* (59.28), *Phartenium hysterophorus* (31.76*)*, *Digitaria horizontalis* (28.13) and *Richardia brasiliensis* (92.33), with the highest importance value index (Figure 1A). In the rainy season for the same management, 12 species were quantified, with emphasis on *E. indica* (60.32) and *P. hysterophorus* (91.08), with the highest relative importance index (Figure 1B).

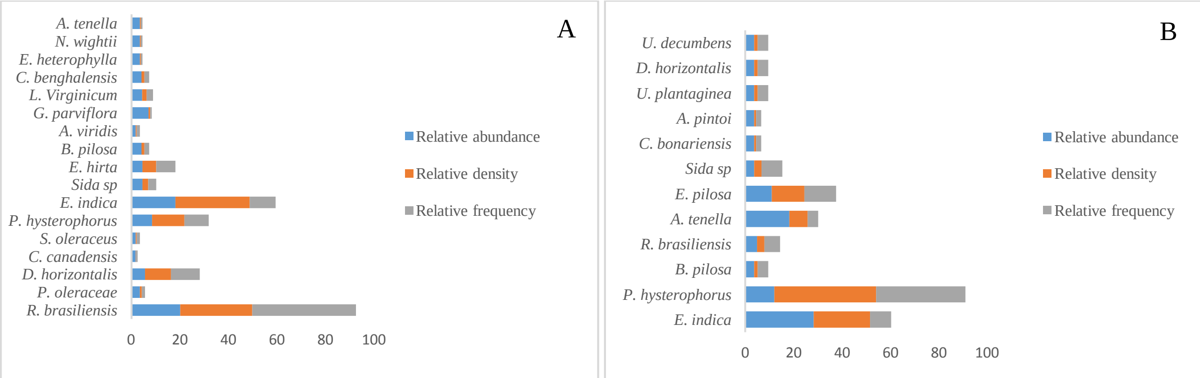

FIGURE 1 - Frequency, density and abundance of weed species present between coffee rows, under spontaneous vegetation management (control), in the dry (A) and rainy (B) periods.

These species of greater importance in the area were also mostly common according to Silva et al. (2013), regarding the treatment analysis on the occurrence of weeds in coffee plantations in monoculture, without intercropping. In addition, Ricci et al. (2008) described the increase in grasses for coffee plants in the conventional system, with high or medium consumption of fertilizers, pesticides and application of the herbicide glyphosate. In these two evaluations (dry and rainy season), there was also a high importance of plants of this family (grasses) and, among them, some were difficult to control, such as *E. indica*, which was recently reported as resistant to this herbicide in Brazil (TAKANO et al., 2017).

Following the same trend as the control, but with a smaller number of species, in the evaluation carried out in the dry period between the coffee rows planted with brachiaria grass, it implied a greater number of weed species, where 9 species were identified, with emphasis on *B. pilosa* (70.32) and *R. brasiliensis* (73.53) with the highest IVI (Figure 2A). In the rainy season, this management involved 4 weed species, with emphasis on *E. indica* (85.24), with the highest importance value index, thus being the weed with the greatest importance in the area (Figure 2B).

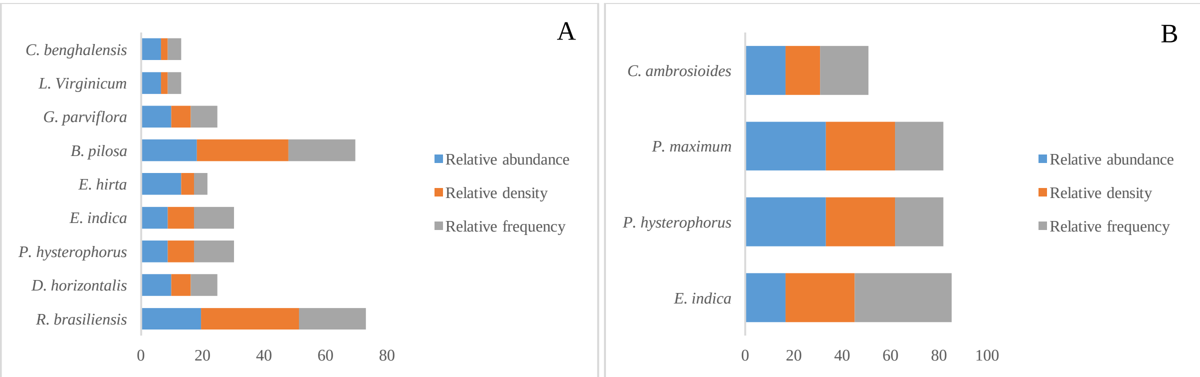

FIGURE 2 - Frequency, density and abundance of weed species present between coffee rows, using brachiaria grass, in the dry (A) and rainy (B) periods.

Comparing the two management practices carried out between coffee rows (control and management with the use of brachiaria grass) (Figures 1 A and B and 2A and B), it is observed that the presence of brachiaria grass drastically reduced the diversity of weed species, as well as the quantity, relative density, relative frequency and relative abundance in relation to the control. In addition, there was a reduction of 52.94% in the number of species when the management with brachiaria grass was adopted in comparison to the control in the dry period and 33.33% in the rainy period.

According to Pires et al. (2008), the plant cover over the soil limits the passage of light and forms an obstacle, which inhibits seed germination and hinders initial weed growth. Furthermore, the efficiency in suppressing weeds inherent to the use of brachiaria grass was also verified by Castro et al. (2011), referring to the rusticity characteristics of this species over the others.

In the coffee row under the management of spontaneous vegetation (control), the greatest number of weeds is noted, with 14 species in the evaluation carried out in the dry period and 12 species in the rainy period, especially *L. virginicum* (66.72) and *G. parviflora* (37.31), with the highest IVI in the dry period and *B. pilosa* (66.80) and *D. horizontalis* (70.90), with the highest IVI in the evaluation carried out in the rainy season (Figure 3A and B).

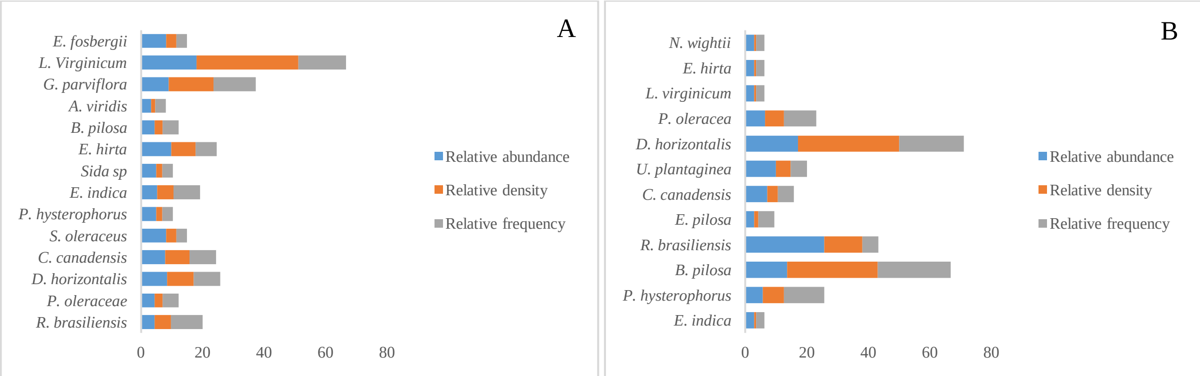

FIGURE 3 - Frequency, density and abundance of weed species present in coffee rows, under spontaneous vegetation management (control), in the dry (A) and rainy (B) periods.

Management with organic compound in the coffee row also had a high number of weed species, with 10 in total, where *E. hirta* (77.98) and *E. indica* (48.17) had the highest IVI in the dry period. In the rainy season, this management involved 13 weed species, with emphasis on the species *B. pilosa* (87.93) and *D. horizontalis* (59.43), with higher IVI (Figure 4A and 4B). In the management with the use of coffee husk on the row, 4 species were quantified in the evaluation carried out in the dry period, with the largest IVI for the species *A. tenella* (98.35) and *R. brasiliensis* (79.67). In the evaluation carried out in the rainy season, 7 species were counted, with emphasis on the weeds *D. horizontalis* (88.83) and *B. pilosa* (82.06) with the highest IVI (Figure 5A and 5B).

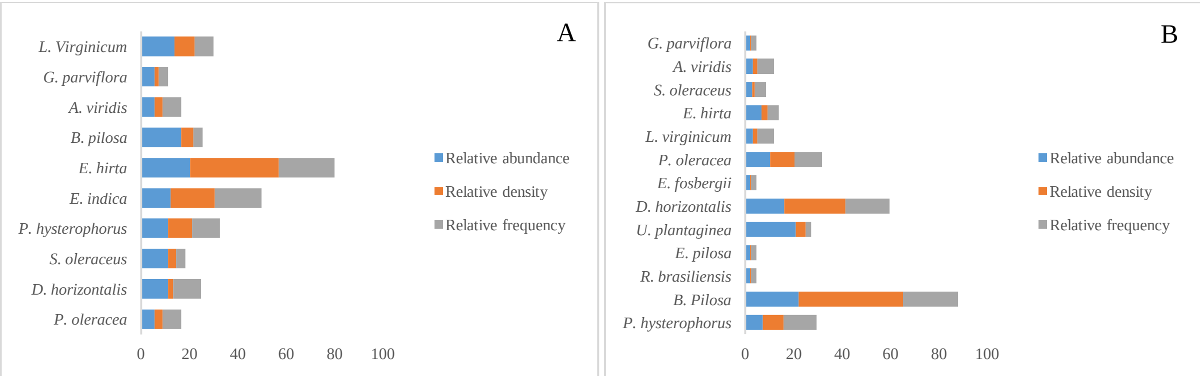

FIGURE 4 - Frequency, density and abundance of weed species present in coffee rows, using organic compound, in the dry (A) and rainy (B) periods.

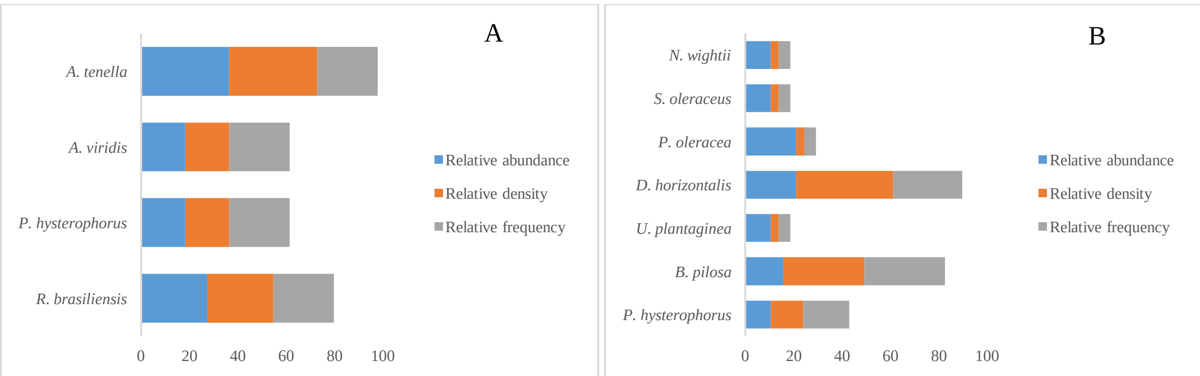

FIGURE 5 - Frequency, density and abundance of weed species present in coffee rows, using coffee husk, in the dry (A) and rainy (B) periods.

In the evaluation carried out in the dry period, in the coffee plants managed with plant residues of brachiaria grass in the row, 4 species were found, with emphasis on *B. pilosa* (101.47) with the highest IVI. In the evaluation carried out in the rainy season, 2 species were quantified, namely *B. pilosa* and *P. oleracea*, with IVI of 150 each (Figures 6A and 6B). It is noteworthy that in treatments with fewer species, the tendency is to increase the IVI, since the total IVI must add up to 300.

In the evaluation in the dry period in the coffee row in which the management with organic compound and brachiaria grass residues was used, only 2 weed species were found, namely *B. pilosa* and *D. horizontalis*, with the same IVI (150) (Figure 7A). In the evaluation carried out in the rainy season, 4 weed species were identified in this management, with emphasis on *P. oleracea*, with an IVI of 105 (Figure 7B).

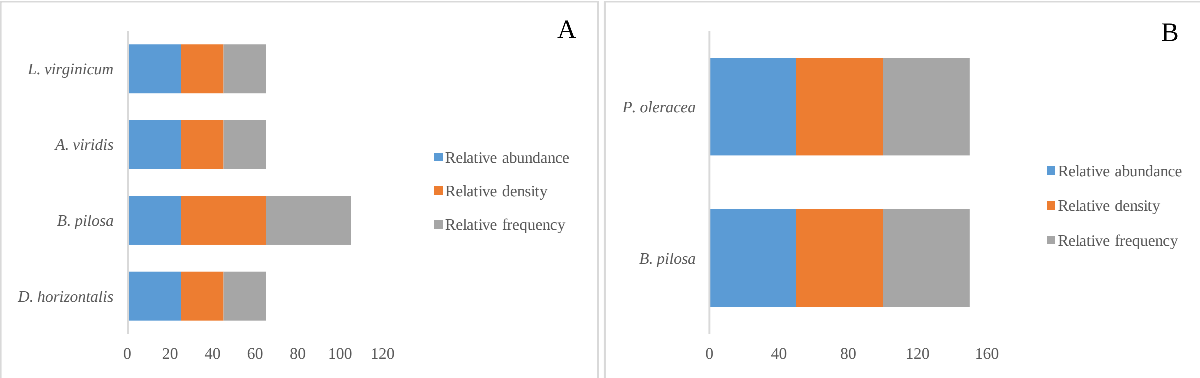

FIGURE 6 - Frequency, density and abundance of weed species present in coffee rows, using brachiaria grass residues, in the dry (A) and rainy (B) periods.

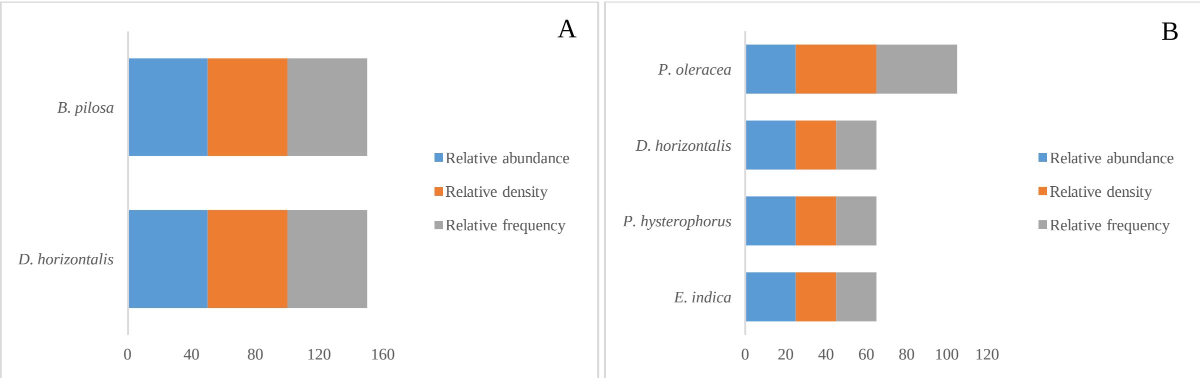

FIGURE 7 - Frequency, density and abundance of weed species present between coffee rows, using brachiaria grass residues and organic compound, in the dry (A) and rainy (B) periods.

In the management with the use of coffee husk and brachiaria grass residues deposited in the coffee planting row, no weed species was found in the evaluation carried out in the dry period. However, in the rainy season, 2 species (*S. oleraceus* and *B. pilosa*) were identified with the same IVI (150) (Figure 8). In general, there was not much differentiation of the flora in the area due to the treatments, only the reduction in the number of species and individuals due to management. In surveys carried out on the coffee row, both in the dry and rainy periods, it is noted that management with the use of brachiaria grass residues, in isolation or associated with organic compound or coffee husk, as well as use of coffee husk in isolation (Figures 5 to 8), reduced diversity, relative abundance, relative frequency, relative density and also resulted in fewer species, when compared to the others.

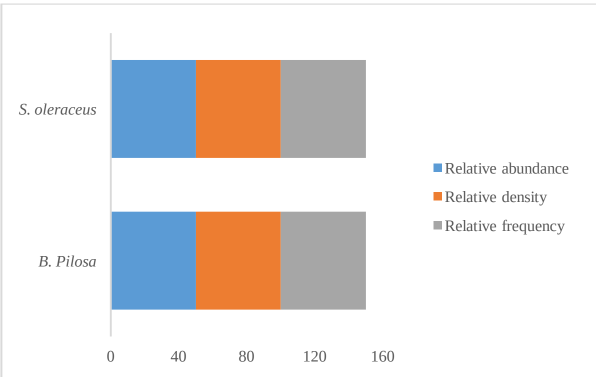

FIGURE 8 - Frequency, density and abundance of weed species present between coffee rows, using brachiaria grass residues and coffee husk, in the rainy period.

This reduction in the number of species occurs due to the deposition of straw on the soil, which influences weed germination, reducing its occurrence in agricultural areas. Therefore, the physical barrier formed by the soil cover leads to energetic depletion of the seedling before it exceeds the layer of straw imposed by the waste and, consequently, initiates the photosynthetic process. In addition, the reduction in weed germination and development can also occur due to the action of allelopathy and due to the release of secondary metabolites in the soil (MORAES et al., 2009).

According to the similarity index, among the managements carried out in the coffee row, in the evaluation carried out in the rainy season, there is a high similarity of species between the areas with the spontaneous vegetation of the area (control) and organic compound, with a value higher than 83% of the species common to both managements. Management with brachiaria grass also showed high similarity with management with organic compound (57%), as well as the management with organic compound and brachiaria grass residues, with a similarity of 66% when compared to the management in which only brachiaria grass residues were used. The other managements had low similarity (less than 50%), so that less than half of the species were common to the different managements (Table 3).

In the evaluation carried out in the rainy season, there is a high similarity of species between the areas with spontaneous management (control) and organic compound, with 64% of the species common to both managements, in addition to the management with coffee husk, with 63 % similarity with the management using spontaneous vegetation (control), and the management with coffee husk with 60% similarity with the organic compound management. It is also noted that in the two evaluations carried out, the management with coffee husk, together with brachiaria grass residues, yielded a low similarity index in relation to the control, organic compound and organic compound intercropped with brachiaria grass residues.

TABLE 3 - Weed similarity coefficient in the coffee row with different management methods.

Treatments	CO	CC	CB	COCB	CCCB
			Dry season		
CONT*	0.83	0.44	0.44	0.25	0
OC		0.28	0.57	0.33	0
CH		-	0.25	0	0
BG		-	-	0.66	0
OCBG		-	-	-	0
			Rainy season		
CONT	0.64	0.63	0.16	0.37	0.14
OC		0.60	0.26	0.35	0.26
CH		-	0.44	0.54	0.44
BG		-	-	0.26	0.50
OCBG		-	-	-	0

CONT = control, CH = coffee husk, BG = brachiaria grass, OC = organic compound, OCBG = organic compound and brachiaria grass, CCCB = coffee husk and brachiaria grass.

Between coffee rows, it is observed that in the evaluation carried out in the dry period, 69% of the species were common to both managements (control and brachiaria grass) and, in the rainy season, only 25% of the species were common to both adopted managements (Table 4). According to Felfili and Venturoli (2000), similarity index values above 50% are considered high, thus revealing that the managements consisting of brachiaria grass in isolation or intercropped with coffee husk and organic matter implied lower species homogeneity in relation to the other treatments. These results also indicate the possibilities of these treatments to select more adapted species, that is, resistant/tolerant in the management and that, in the same way as verified for the use of herbicides, several other strategies must be adopted in the integrated weed management in any crop system.

TABLE 4 - Weed similarity coefficient in the coffee row with two management methods.

Treatment	Dry season	Rainy season
	Brachiaria grass	Brachiaria grass
Control	0.69	0.25

Even for treatments with great proximity, with the same environmental conditions, there were differences in similarity; such differences can be attributed mainly to the management practices inherent to each area. In a weed evaluation in the dry and rainy seasons in pasture areas planted in the Southwest of Mato Grosso, Inoue et al. (2012) found the same behavior previously described, in the phytosociology of weeds.

In general, it is observed that the treatments where the management was integrated were the ones that stood out, reducing all phytosociological indices in the area, the number of individuals per area and also the number of species. In addition, these managements, when adopted, favor the soil and plants with various benefits, being great options for coffee growers to adopt on their properties. It is also ideal to continue to carry out evaluations and monitor the phytosociology dynamics in the area, in order to verify the long-term weed behavior according to the adopted managements.

CONCLUSIONS

The species of the families Poaceae and Asteraceae showed the highest importance value index in the evaluation.

The management with brachiaria grass between coffee rows reduces species diversity and the amount of weeds when compared to management with spontaneous vegetation in the area.

Management in the coffee planting row with the use of brachiaria grass residues in isolation or when combined with coffee husk or organic compound implies less diversity and quantity of weed species, being an efficient alternative for use in their integrated management in coffee trees.

ACKNOWLEDGEMENTS

The authors would like to thank Conselho Nacional de Desenvolvimento Científico e Tecnológico, Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES), Fundação de Amparo à Pesquisa do Estado de Minas (FAPEMIG), Agência de Inovação do Café and Consórcio Pesquisa Café, for the financial support to carry out the project.

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