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Article

Weed Diversity in Corn with Different Plant Arrangement Patterns Grown Alone and Intercropped with Palisade Grass

Diversidade de Plantas Daninhas em Milho com Diferentes Arranjos de Plantas, Solteiro e Consorciado com Braquiária

MELO, T.S.[1*]
MAKINO, P.A.[1]
CECCON, G.[2]

ABSTRACT - Composition and level of weed infestation interfere with crop yield and increase production costs. This study aimed to identify weed composition and infestation in corn grown with different plant populations, single, and intercropped with palisade grass. The phytosociological method was used to evaluate density, frequency, dominance, and infestation level of weeds in single and intercropped corn, a with conventional (0.90 m) and reduced (0.45 m) spacing, and low and high plant population in Dourados, MS, Brazil. *Commelina benghalensis*, *Echinochloa* spp., and Euphorbia heterophylla were the species most found in the treatments. Single corn with higher plant population decreased weed occurrence. Treatments with palisade grass under a reduced spacing showed lower absolute weed infestation (about 75%) when compared to single corn. Weed infestation was lower in the intercropping of corn with palisade grass, with more pronounced effect under a reduced spacing.

Keywords: *Zea mays*, *Urochloa*, plant population, phytosociology, diversity.

*RESUMO - A composição e o nível de infestação de plantas daninhas interferem na produtividade das culturas e aumentam o custo de produção. Este trabalho foi realizado com o objetivo de identificar a composição e a infestação de plantas daninhas em milho cultivado com diferentes populações de plantas, solteiro e consorciado com braquiária. Utilizou-se o método fitossociológico para avaliar a densidade, frequência e dominância e o nível de infestação de plantas daninhas nos tratamentos com milho solteiro e consorciado, com espaçamento convencional (0,90 m) e reduzido (0,45 m) e com baixa e alta população de plantas, em Dourados, MS. **Commelina benghalensis**, **Echinochloa** spp. e **Euphorbia heterophylla** foram as espécies mais encontradas nos tratamentos. O milho solteiro com maior população de plantas diminuiu a ocorrência de plantas daninhas. Os tratamentos com braquiária, no espaçamento reduzido, apresentaram menor infestação absoluta de plantas daninhas (cerca de 75%) quando comparado ao milho solteiro. A infestação de plantas daninhas é menor no consórcio de milho com braquiária, e o efeito é mais pronunciado no espaçamento reduzido.*

Palavras-chave: *Zea mays*, *Urochloa*, população de plantas, fitossociologia, diversidade.

*** Corresponding author:**
<thais.stradioto1@gmail.com>

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[1] Universidade Federal de Grande Dourados, Dourados-MS, Brasil; [2] Embrapa Western Agriculture, Dourados-MS, Brasil.

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INTRODUCTION

The presence of weeds is among the biotic factors related to corn yield loss, and the degree of infestation may cause damage to crop productivity and quality mainly due to competition for water, light, and nutrients. Maintaining the minimum interference level possible favors crop and ensures productivity in weed management. Thus, establishing crop management strategies is necessary to favor the best use of natural resources by the cultivated plant (Pitelli, 2014).

The main management adopted for weed control is chemical due to its efficiency. However, this management is not always sufficient to control the interference of weed species when used alone (Dan et al., 2010).

Integration of management practices assists in weed control, and intercropping of corn with forages is an efficient practice due to their rapid mass production (Freitas et al., 2013), which hinders germination and establishment of other plants. In addition, the spatial distribution of crop plants provides favorable conditions for weed development and control (Marchão et al., 2005). Thus, larger plant populations can interfere with water and nutrient use efficiency, assisting in controlling undesirable species (Merotto Junior et al., 1997).

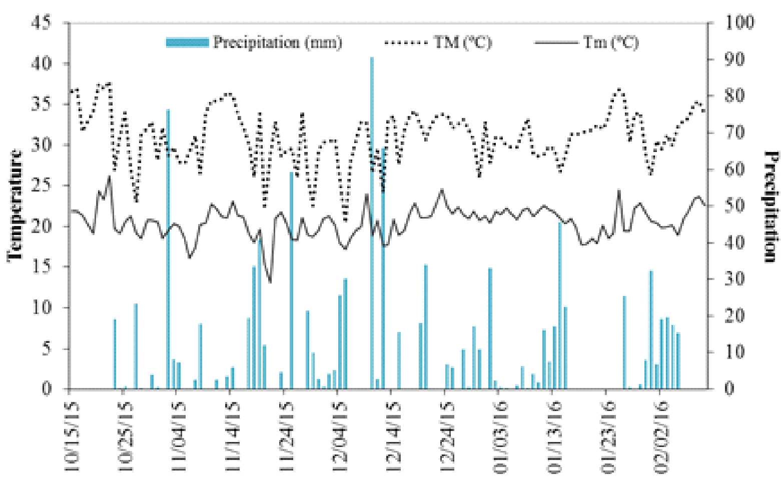
Knowing the level of infestation and the composition of the weed community provides information to determine efficient weed management (Silva and Silva, 2007). Among the methods of weed colonization surveys, phytosociology allows estimating the density, frequency, and dominance of each plant species in the weed community and determining the importance of certain weeds in agricultural areas (Barbour et al., 1998).

This study aimed to identify weed composition and infestation level in corn with different plant populations and interrow spacings under single and intercropping systems.

MATERIAL AND METHODS

This study was carried out in the 2015/16 summer crop season, in Dourados, MS, Brazil (22°132 S and 54°482 W, with 408 m of altitude). The soil is classified as a very clay textured dystroferric Red Latosol (Embrapa, 2013). The results of soil chemical analysis at the 0-20 cm layer were Al = 0.03 $cmol_c$ dm^{-3}, pH ($CaCl_2$) = 5.35, OM = 31.23 g kg^{-1}, P (Mehlich) = 34.48 mg dm^{-3}, K = 0.79 $cmol_c$ dm^{-3}, Ca = 5.74 $cmol_c$ dm^{-3}, Mg = 1.54 $cmol_c$ dm^{-3}; and V = 64.75%.

The regional climate is Cwa according to Köppen classification, that is, a humid mesothermal climate with hot summers and dry winters (Fietz et al., 2017). Precipitation data and maximum and minimum temperatures from the experiment period were obtained from the weather station belonging to Embrapa Western Agriculture (Figure 1).



Source: Embrapa Western Agriculture (2016).

Figure 1 - Precipitation and maximum (TM) and minimum (Tm) temperatures during the experimental period in Dourados, MS (2016).

The experimental design was a randomized block design with experimental units of 3.6 m wide and 6.0 m long and four replications. Treatments were as follows: T1 - intercropping, reduced spacing (0.45 m), and low corn population (45 thousand plants ha^{-1}); T2 - intercropping, reduced spacing (0.45 m), and high corn population (85 thousand plants ha^{-1}); T3 - intercropping, conventional spacing (0.90 m), and low corn population (45 thousand plants ha^{-1}); T4 - intercropping, conventional spacing (0.90 m), and high corn population (85 thousand plants ha^{-1}); T5 - single corn, reduced spacing (0.45 m), and low corn population (45 thousand plants ha^{-1}); T6 - single corn, reduced spacing (0.45 m), and high corn population (85 thousand plants ha^{-1}); T7 - single corn, conventional spacing (0.90 m), and low corn population (45 thousand plants ha^{-1}); and T8 - single corn, conventional spacing (0.90 m), and high corn population (85 thousand plants ha^{-1}).

Plants were desiccated with paraquat (0.4 kg i.a. ha^{-1}) before sowing the crops. No-till was performed on October 19, 2015, in succession to black oat. The single-cross corn hybrid DKB 390 PRO was used, and its seeds were treated with the insecticides Standak Top® (12.5 g ha^{-1}) and Cruiser® (60 g ha^{-1}) and sown at 5 cm depth. Thinning was carried out at 15 days after emergence (DAE) to adjust the number of plants of each treatment. Seeds of *Brachiaria brizantha* (Hochst. ex A. Rich.) Stapf. cv. Paiaguás (palisade grass) (80% germination and 60% purity) were broadcasted sown in the intercropping systems before corn, targeting a population of 20 plants m^{-2}. Fertilization consisted of 200 kg ha^{-1} NPK 8-20-20 applied at corn sowing and 45 kg ha^{-1} N as topdressing using coated urea at 17 days after corn emergence.

The phytosociological characterization of weeds was carried out at physiological maturation of corn through the random frame sampling method proposed by Barbour et al. (1998). Random samples were taken within each experimental unit using a metallic frame (0.5 x 0.5 m), in which all the plants present were identified, counted, and collected. Subsequently, the collected samples were oven-dried until constant weight to determine the dry matter. Sampling accuracy based on density (eq. 1) and dominance (eq. 2) was obtained as follows:

$$Acc.De = \frac{1}{s^2\,(De)} \qquad \text{(eq. 1)}$$

$$Acc.Do = \frac{1}{s^2\,(Do)} \qquad \text{(eq. 2)}$$

where *Acc.De* is the density-based sampling accuracy, s^2 (*De*) is the variance of sample density means, *Acc.Do* is the dominance-based sampling accuracy, and s^2 (*Do*) is the variance of sample dominance means.

The variables density (*DE*), frequency (*FR*), and dominance (*DO*) were estimated for each species. Density expresses the number of plants of each species occurring in a given area, i.e., it describes the species ability to generate offspring, and is determined by (eq. 3):

$$DE = \frac{I}{TI} * 100 \qquad \text{(eq. 3)}$$

where *DE* is the relative density (%), *I* is the number of individuals of the species *x* in the area, and *TI* is the total number of individuals in the area.

The frequency expresses the distribution of a species in the evaluated area, whether in localized spots or generalized and is determined by (eq. 4):

$$FR = \frac{Q}{TQ} * 100 \qquad \text{(eq. 4)}$$

where *FR* is the relative frequency (%), *Q* is the number of samples evaluated in the area where the species *x* is present, and *TQ* is the total number of samples in the area.

Dominance expresses the species ability to occupy the physical space and inhibit the growth of others, i.e., the most dominant plant is the one that covers the largest soil area and accumulates the highest weight, being determined by (eq. 5):

$$DO = \frac{Dm}{TDM} * 100 \qquad \text{(eq. 5)}$$

where *DO* is the relative dominance (%), *DM* is the dry matter of individuals of species *x* in the area, and *TDM* is the total dry matter of weeds in the area.

The importance value index (*IVI*) is the arithmetic mean of the parameters *DE*, *FR*, and *DO*. *IVI* of each species at each area was obtained according to Pandeya et al. (1968) and Barbour et al. (1998) by (eq. 6):

$$IVI = \frac{DO + FR + DO}{3} \quad \text{(eq. 6)}$$

Areas were also intra-analyzed for species diversity using the Simpson (*D*) and Shannon-Weiner (H') indices (Barbour et al., 1998), and the Shannon-Weiner evenness proportion (SEP) sustainability coefficient was determined according to McManus and Pauly (1990).

Simpson diversity coefficient (*D*) quantifies, in simple terms, the probability that two randomly collected individuals from the same area belong to the same species by the following equation (eq. 7):

$$D - 1 = \frac{\sum ni * (ni - 1)}{N * (N - 1)} \quad \text{(eq. 7)}$$

The Shannon-Weiner diversity coefficient (*H'*), on the other hand, is more affected by the appearance or disappearance of rare species and hence more effective in detecting small changes in the weed community, being calculated by (eq. 8):

$$H' = \sum (pi * in\ (pi)) \quad \text{(eq. 8)}$$

The SEP coefficient is an index can infer the sustainability of management applied to production systems from static data, being obtained by dividing the Shannon-Weiner diversity coefficient, calculated based on species dominance, by the coefficient obtained for the respective densities, by the following equation (eq. 9):

$$SEP = \frac{Hd'}{H} \quad \text{(eq. 9)}$$

in which *D* is the Simpson diversity coefficient, *H'* is the Shannon-Weiner diversity coefficient (based on density), *ni* is the number of individuals of species *i*, *N* is the total number of individuals in the sample, *pi* is the proportion of individuals in the sample belonging to species *i*, *SEP* is the Shannon-Weiner evenness proportion; and *Hd'* is the Shannon-Weiner diversity coefficient (based on dominance).

Subsequently, the areas were compared to each other by the Jaccard asymmetric binary similarity coefficient. The similarity matrix was prepared based on Jaccard coefficients (eq. 10) and, from it, the dissimilarity matrix (1-similarity - eq. 11), according to the following equation (Concenço et al., 2013a):

$$J = \frac{c}{a + b + c} \quad \text{(eq. 10)}$$

$$Di = 1 - J \quad \text{(eq. 11)}$$

where *J* is the Jaccard similarity coefficient, a is the number of species in area *a*, *b* is the number of species in area *b*, *c* is the number of species common to areas a and *b*, and *Di* is the dissimilarity.

The hierarchical clustering was obtained from the distance matrix (dissimilarities) (Barbour et al., 1998) by using the unweighted pair group method with arithmetic mean (UPGMA) (Sneath and Sokal, 1973). Cluster validation should be performed by the cophenetic correlation coefficient, obtained by Pearson's linear correlation between the cophenetic matrix and the original distance matrix (Sokal and Rohlf, 1962).

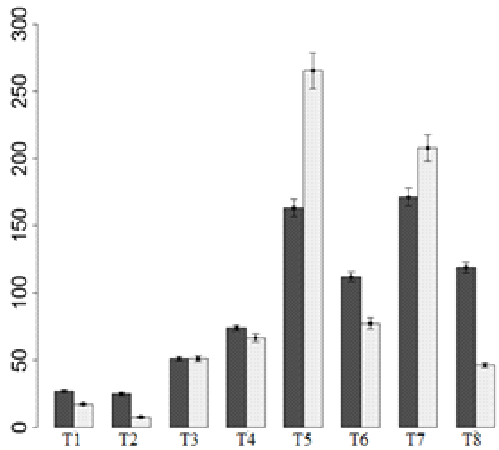
Analyses were performed in the R statistical environment (R Core Team, 2016) using commands provided by packages Plyr, Vegan, Hmisc, Cairo, and ExpDes. All the formulas and procedures described for area sampling, community description, and species grouping followed the recommendations of Barbour et al. (1998) for synecological analysis.

RESULTS AND DISCUSSION

A phytosociological difference was observed for the number and dry matter of weeds in the weed community among the studied treatments (Figure 2). In general, treatments with intercropping between corn and palisade grass showed a lower weed incidence when compared to those with single corn. Palisade grass provided higher soil cover, causing crop suppression by weeds. Corn intercropping was efficient in weed suppression, while single corn favored weed occurrence.

Treatments T1 and T2 presented lower weed infestation than the others. Moreover, the use of larger spacing (0.90 m) favored an increase in number and dry matter of weeds, even in intercropping areas. Crop interrow closure occurred more quickly when interrow spacing was reduced. It may have led to a lower incidence of light within the canopy, which limited weed development (Balbinot Junior and Fleck, 2005).

Treatments T5 (single corn with small spacing and low population) and T7 (single corn with large spacing and low population) showed a higher weed infestation. The low population of single corn plants favored the growth in number and accumulation of weed dry matter. Single corn with a higher corn population (T6 and T8) presented lower weed dry matter, being similar to treatments T3 and T4, in which corn was intercropped with palisade grass. Merotto Junior et al. (1997) also observed a reduction in weed dry matter as single corn population increased.



T1 - intercropping, reduced spacing (0.45 m), and low corn population (45 thousand plants ha^{-1}); T2 - intercropping, reduced spacing (0.45 m), and high corn population (85 thousand plants ha^{-1}); T3 - intercropping, conventional spacing (0.90 m), and low corn population (45 thousand plants ha^{-1}); T4 - intercropping, conventional spacing (0.90 m), and high corn population (85 thousand plants ha^{-1}); T5 - single corn, reduced spacing (0.45 m), and low corn population (45 thousand plants ha^{-1}); T6 - single corn, reduced spacing (0.45 m), and high corn population (85 thousand plants ha^{-1}); T7 - single corn, conventional spacing (0.90 m), and low corn population (45 thousand plants ha^{-1}); and T8 - single corn, conventional spacing (0.90 m), and high corn population (85 thousand plants ha^{-1}).

Figure 2 - Number of weeds (, m^{-2}) and dry matter of weed shoots (, g m^{-2}) under different management of summer corn in Dourados, MS, 2018.

No phytosociological difference was observed for number and dry matter of weeds when comparing areas of single corn in relation to spacings. Concenço et al. (2013b) carried out a study with single corn under two spacings (0.45 and 0.90 m) and observed that the interrow spacing of 0.45 m presented similarity regarding the number of weeds when compared to 0.90 m, but infestation severity was 30% lower in the reduced spacing. It was different from that observed in treatment T8, which showed a high number of weeds but low weed dry matter, while treatment T7 had a high number and dry matter of weeds. Thus, not only spacing but also plant population would be important factors for weed suppression. Both treatments (T7 and T8) have the same interrow spacing, but T8 has a higher plant population, which may explain the low value of weed dry matter.

Table 1 shows the phytosociological analysis within each treatment, with species found and their respective density, frequency, dominance, and importance value index. A phytosociological difference was observed in the presence of weeds among the evaluated treatments. *Commelina benghalensis* presented the highest IVI among treatments T1, T2, T4, T5, T6, T7, and T8, with values of 42.15, 46.32, 47.13, 36.89, 52.40, 40.94, and 22.51%, respectively. According to Blanco (2014), the permanence of *C. benghalensis* in agricultural areas may be related to the fact that this species produces both viable ground and underground seeds, which makes it even more difficult to control, besides presenting better adaptation to humid and shaded environments (Blanco, 2014).

Treatment T3 (intercropping with larger spacing and smaller corn population) had a different behavior from the others. *Euphorbia heterophylla* was the main weed, with the highest IVI (28.08%),

Table 1 **-** Density (DE), frequency (FR), dominance (DO), and importance value (IVI) indices of the weed community in areas under different summer corn treatments in Dourados, MS, 2018

Treat.	DE	FR	DO	IVI
Ipomoea sp.				
T2	4.0	11.1	2.1	5.7
T4	1.4	5.9	1.4	2.9
T8	0.8	4.8	0.0	1.9
Amaranthus sp.				
T1	11.1	27.3	5.2	14.5
T2	4.0	11.1	0.1	5.1
T3	9.8	13.3	1.8	8.3
T4	6.8	17.7	3.0	9.1
T5	1.2	11.1	0.0	4.1
T6	2.7	6.7	0.4	3.2
T7	3.5	6.3	0.6	3.5
T8	2.5	14.3	1.3	6.0
Bidens pilosa				
T2	4.0	11.1	0.3	5.1
T3	5.9	6.7	8.8	7.1
T4	4.1	11.8	2.0	5.9
T5	0.6	5.6	0.1	2.1
T6	2.7	6.7	0.0	3.1
T7	0.6	6.3	0.0	2.3
Chamaesyce hirta				
T1	3.7	9.1	2.6	5.1
T2	12.0	22.2	17.6	17.3
T3	7.8	6.7	1.9	5.5
T5	20.3	22.2	2.4	15.0
T6	29.5	20.0	2.1	17.2
T7	16.4	18.8	2.9	12.7
T8	17.7	14.3	17.4	16.4
Commelina benghalensis				
T1	40.7	27.3	58.4	42.2
T2	48.0	22.2	68.7	46.3
T3	9.8	13.3	33.0	18.7
T4	44.6	23.5	73.3	47.1
T5	23.9	16.7	70.1	36.9
T6	36.6	26.7	93.9	52.4
T7	26.9	25.0	70.9	40.9
T8	4.2	14.3	49.1	22.5

Treat.	DE	FR	DO	IVI
Digitaria horizontalis				
T3	13.7	6.7	4.8	8.4
T4	8.1	5.9	5.0	6.3
T5	0.6	5.6	0.6	2.2
T8	19.3	9.5	23.0	17.3
Digitaria insularis				
T6	1.8	6.7	0.5	3.0
T7	0.6	6.3	0.3	2.4
T8	30.3	9.5	0.3	13.3
Echinochloa sp.				
T1	29.6	18.2	19.1	22.3
T2	24.0	11.1	8.2	14.4
T3	23.5	6.7	10.1	13.4
T5	47.2	22.2	23.2	30.9
T6	9.8	13.3	2.1	8.4
T7	36.8	12.5	13.1	20.8
T8	0.8	4.8	7.9	4.5
Euphorbia heterophylla				
T1	11.1	9.1	7.5	9.2
T3	23.5	26.7	34.1	28.1
T4	23.0	17.7	11.0	17.2
T8	3.4	4.8	0.3	2.8
Leonotis nepetifolia				
T1	3.7	9.1	7.4	6.7
T2	4.0	11.1	3.0	6.0
T3	3.9	13.3	3.5	6.9
T4	12.2	17.7	4.4	11.4
T5	4.9	5.6	2.2	4.2
T6	0.9	6.7	0.2	2.6
T7	9.4	12.5	12.0	11.3
T8	1.7	4.8	0.2	2.2
Richardia brasiliensis				
T5	0.6	5.6	0.0	2.1
T6	16.1	13.3	0.8	10.1
T7	5.3	6.3	0.2	3.9
T8	16.0	14.3	0.6	10.3

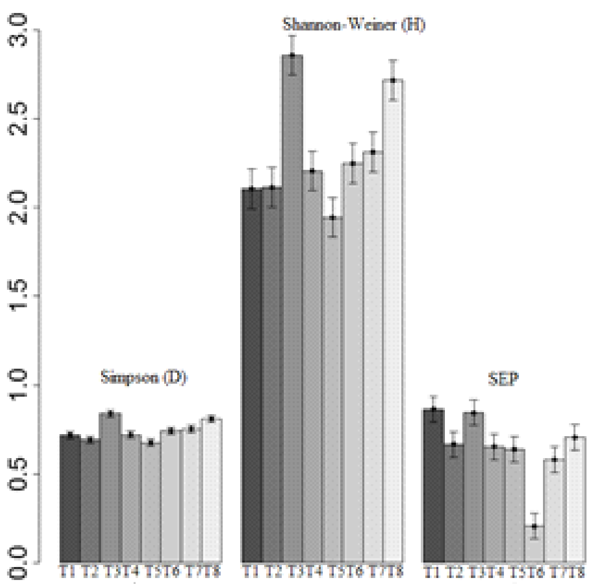
[1] T1 - intercropping, reduced spacing (0.45 m), and low corn population (45 thousand plants ha^{-1}); T2 - intercropping, reduced spacing (0.45 m), and high corn population (85 thousand plants ha^{-1}); T3 - intercropping, conventional spacing (0.90 m), and low corn population (45 thousand plants ha^{-1}); T4 - intercropping, conventional spacing (0.90 m), and high corn population (85 thousand plants ha^{-1}); T5 - single corn, reduced spacing (0.45 m), and low corn population (45 thousand plants ha^{-1}); T6 - single corn, reduced spacing (0.45 m), and high corn population (85 thousand plants ha^{-1}); T7 - single corn, conventional spacing (0.90 m), and low corn population (45 thousand plants ha^{-1}); and T8 - single corn, conventional spacing (0.90 m), and high corn population (85 thousand plants ha^{-1}).

followed by *C. benghalensis* (18.71%) and *Echinochloa* sp. (13.42%). *Echinochloa* sp. had the same percentage of density (DE) as *E. heterophylla*, with a value of 23.53%, and *Digitaria horizontalis*, which belongs to the same family as *Echinochloa* sp. (Poaceae), was the second species with the highest percentage of density (13.73%). Generally, species of Poaceae family produce high amounts of seeds (Blanco, 2014). Also, *D. horizontalis* and *Echinochloa* sp. are species with higher emergence flow in spring-summer (Blanco, 2014), the evaluation time of this study. *E. heterophylla* also prefers warmer seasons and has large seeds with a significant reserve, which allows the germination and breaking the layer of straw or vegetation cover (Blanco, 2014). Thus, the intercropping of palisade grass with corn was not very efficient to control *E. heterophylla*, which presented IVI of 9.22 and 17.2%, respectively, in the intercropping treatments T1 and T4.

Richardia brasiliensis was observed only in treatments with single corn (T5, T6, T7, and T8), with the highest IVI values in T6 and T8 (10.06 and 10.27%, respectively). According to Kissmann and Groth (1994), *R. brasiliensis* presents the development most stimulated by good lighting, with more aggressive characteristics in more open areas, which may explain its appearance in single corn areas.

Digitaria insularis was also present only in areas with single corn (T6, T7, and T8). This species had a higher relevance in T8, with an IVI of 13.34% and density of 30.25%. This high value of density may be due to the high seed and rhizome production capacity (Blanco, 2014). In T6 and T7, despite having a low IVI, with values of 2.99 and 2.37%, respectively, this species needs attention, as its control may be more difficult compared to other species with higher IVI due to its resistance to commonly used herbicides, such as glyphosate (Licorini et al., 2015). In addition, *Commelina benghalensis* had a higher density of individuals (DE) in the intercropped treatments T1 (40.74%), T2 (48.0%), and T4: *C* (44.59%).

Figure 3 shows the Simpson (D) and Shannon-Weiner (H') diversity coefficients, as well as the Shannon sustainability coefficients (SEP). The D coefficient quantifies the probability that two randomly collected individuals belong to the same species, i.e., it is mainly influenced by the occurrence of species with an abundant number of individuals (Concenço et al., 2016). On the other hand, Shannon-Weiner coefficient (H') is quantified by sporadically occurring individuals, i.e., it is influenced by the occurrence of rare species; treatments T3 and T8 presented changes in the weed community.

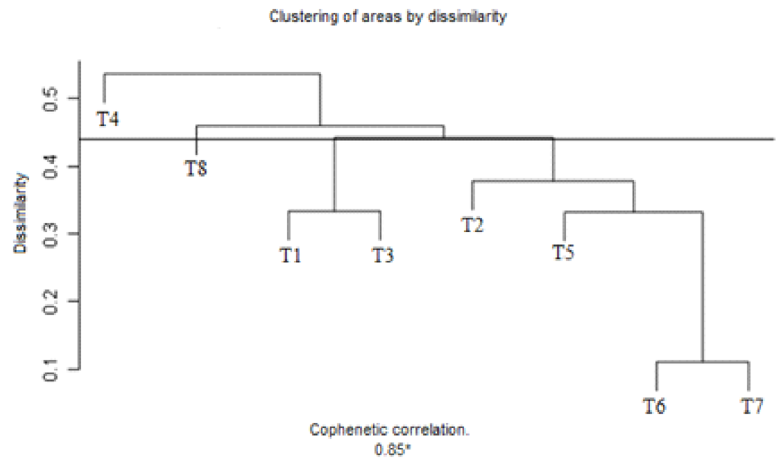


T1 - intercropping, reduced spacing (0.45 m), and low corn population (45 thousand plants ha^{-1}); T2 - intercropping, reduced spacing (0.45 m), and high corn population (85 thousand plants ha^{-1}); T3 - intercropping, conventional spacing (0.90 m), and low corn population (45 thousand plants ha^{-1}); T4 - intercropping, conventional spacing (0.90 m), and high corn population (85 thousand plants ha^{-1}); T5 - single corn, reduced spacing (0.45 m), and low corn population (45 thousand plants ha^{-1}); T6 - single corn, reduced spacing (0.45 m), and high corn population (85 thousand plants ha^{-1}); T7 - single corn, conventional spacing (0.90 m), and low corn population (45 thousand plants ha^{-1}); and T8 - single corn, conventional spacing (0.90 m), and high corn population (85 thousand plants ha^{-1}).

Figure 3 - Simpson (D) and Shannon-Weiner (H) diversity coefficients and SEP sustainability coefficient in areas under different summer corn treatments in Dourados, MS, 2018.

The behavior of the coefficient D was similar to that observed in the coefficient H', naturally considering the appropriate proportions. The Shannon sustainability coefficient (SEP) refers to the sustainability of agricultural areas in relation to applied management, i.e., whether the plant community is more or less prone to environmental stress and/or management (McManus and Pauly, 1990; Correia, 2017). Thus, treatment T6 had a lower value of SEP, and treatments T1 and T3 showed higher values, close to 1. According to Concorde et al. (2016), values close to zero indicate longevity for agricultural practice. However, according to Correia (2017), treatments with SEP values higher than 1 are more prone to management stress. However, lower SEP values may be considered positive for agricultural environments, as weed species of high importance or difficult to control in the system may be being eliminated, but longer-term studies would be needed to infer sustainability measurements.

The clustering obtained by the UPGMA method was validated with a cophenetic correlation coefficient of 85% (Figure 4). Cluster analysis showed only three threshold level area clusters based on the mean of Jaccard original similarity matrix as follows: (1) treatment T8, (2) treatments T1 and T3, and (3) treatments T2, T5, T6, and T7. In the first cluster, T8 is the treatment with the highest number of weed species than the others (Table 1). In the second cluster, treatments T1



The cutoff point for cluster formation was obtained by arithmetic mean method of the Jaccard dissimilarity matrix, disregarding the intersections between the same areas. Clustering was established based on the UPGMA method.

Figure 4 **-** Multivariate cluster analysis for eight summer corn treatments in the 2015/16 season.

and T3 have the same population of corn plants and presence in the intercropping with palisade grass, with approximately 77% similarity. The third grouping joins the other areas, which include T2, T5, T6, and T7.

Cluster analysis is not directly related to the level of absolute infestation presented in Figure 2, but a moderate relationship can be observed with Table 1 since it considers the presence or absence in the sampled points and not the number of individuals of weed species.

Sampling accuracy is obtained with a minimum value of 1 (Concenço et al., 2014). In the present study, all values were higher than 1, and they can be interpreted without restriction (Table 2).

Table 2 **-** Sampling accuracy under different summer corn management in Dourados, MS, 2018

Treatment[(1)]	Accuracy by density	Accuracy by dominance
T1	7.99	29.19
T2	145.5	5.24
T3	4.13	3.65
T4	7.59	7.45
T5	3.53	5.19
T6	3.88	12.68
T7	3.67	4.15
T8	3.11	4.61

The intercropping of corn with palisade grass reduced weed infestation, which was more pronounced in the reduced spacing. Regardless of the interrow spacing, single corn cultivation with low plant population favored weeds regarding the number of individuals and dry matter accumulation. *C. benghalensis* presented the highest important value index in most treatments. Intercropped corn may prevent the occurrence of *R. brasiliensis* and *D. insularis*. Thus, performing the phytosociological survey is essential to analyze weed community behavior.

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