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ORIGINAL ARTICLE

Populations of phytophagous bugs influenced by crop background and wild plants

Populações de percevejos fitófagos influenciados pelo cultivo antecedente e plantas silvestres

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ABSTRACT: Plant-insect interaction governs the dynamics of insect populations with respect to their interrelation with the environment. The objective of the present study was to identify the influence of antecedent crops, species and diameters of wild plants on the quiescent population of phytophagous stink bugs. The experiment was conducted in the months of June and July in Parada Link, municipality of Santa Maria, Rio Grande do Sul state, Brazil in two fields under crops of rice and soybean. In the off season, alternative host wild plants such as *Andropogon bicornis*, *Andropogon lateralis*, and *Erianthus angustifolius* with 10, 20, 30 and 40 cm in diameter were selected. Six wild plants were sampled for each crop, species, and diameter, totaling 144 experimental units. The stink bug species were identified and quantified. Soybean and rice previous cultivation, as well as the species and diameter of the wild plant, influence the quiescent population of *Dichelops furcatus*, *Edessa meditabunda*, *E. rufomarginata*, *Euchistus heros*, *Piezodorus guildinii*, and *Tibraca limbativentris* phytophagous stink bugs. The host plants *A. bicornis*, *A. lateralis*, and *E. angustifolius* were utilized for the maintenance of the populations of phytophagous stink bugs in the off-season periods. Soybean cultivation in floodplain areas has a negative impact on the quiescent population of *T. limbativentris*.

KEYWORDS
Crop succession
Glycine max
Monitoring
Pentatomidae
Oryza sativa

RESUMO: *A interação inseto-planta é o que rege a dinâmica de populações de insetos em interrelação com o ambiente. O trabalho teve por objetivo identificar a influência de cultivos antecedentes, espécies e diâmetro de plantas silvestres sobre a população quiescente de percevejos fitófagos. O experimento foi conduzido nos meses de junho e julho na localidade de Parada Link, Santa Maria, RS, em duas lavouras cultivadas com arroz e soja. Na entressafra, plantas silvestres consideradas hospedeiras alternativas, como Andropogon bicornis, Andropogon lateralis e Erianthus angustifolius com diâmetro de 10, 20, 30 e 40 cm foram selecionadas. Para cada cultivo, espécie e diâmetro de planta silvestre foram amostrados seis plantas, totalizando 144 unidades experimentais. As espécies de percevejos foram identificadas e quantificadas. Cultivo antecedente de soja e de arroz irrigado, espécie e diâmetro da planta silvestre influenciam na população quiescente dos percevejos fitófagos Dichelops furcatus, Edessa meditabunda, E. rufomarginata, Euchistus heros, Piezodorus guildinii e Tibraca limbativentris. As plantas hospedeiras A. bicornis, A. lateralis e E. angustifolius são utilizadas para a manutenção das populações de percevejos fitófagos. O cultivo da soja em áreas de várzea influencia negativamente a população quiescente de T. limbativentris.*

PALAVRAS-CHAVE
Sucessão de culturas
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1 Introduction

Floodplain soils account for approximately 5.4 million hectares in the state of Rio Grande do Sul, and nearly one million hectares of these soils are cultivated with rice, corresponding to 61% of the total Brazilian production of this crop (SOSBAI, 2014). Soybean cultivation in floodplain areas has increased in recent years; according to the IRGA (2015), approximately 280,000 ha were planted in the 2014/15 season. Soybean is considered a viable and profitable alternative to rice production, allowing for the cycle breaking of insect pests, diseases, and weeds, improving the physical and chemical characteristics of the soil (Vernetti Junior et al., 2009).

In rice, three stink bugs species (Hemiptera: Pentatomidae) are characterized as economically important: *Oebalus poecilus* (Dallas, 1851), *Oebalus ypsilongriseus* (De Geer, 1773), and *Tibraca limbativentris* (Stal, 1860); they attack grains and culms. (SOSBAI, 2014). In soybean, there is a greater number of stink bug species of economic importance: *Dichelops furcatus* (Fabricius, 1775), *Edessa meditabunda* (Fabricius, 1974), *Euchistus heros* (Fabricius, 1794), *Nezara viridula* (Linneaus, 1758), and *Piezodorus guildinii* (Westwood, 1837), whose data are more expressive for grains (Corrêa-Ferreira & Panizzi, 1999). In these cultures, the attacks generate significant losses that vary according to the infestation level of each species, reaching 90% (Belorte et al., 2003; SOSBAI, 2014).

In off-season crops, the pest insects use the survival strategy of searching for host plants for shelter in the surrounding crop fields, where they remain in quiescence. According to Santos et al. (2004), understanding the survival strategies of insects is of great importance for integrated pest management systems. The knowledge about host plants is important for studies on ecology, population dynamics, host alternation, and monitoring and prediction of the emergence of harmful species in cultivated plants (Link & Grazia, 1987). According to Howe & Jander (2008), the host plant growth form imposes possibilities and restrictions, with influence of the plant species and their complexity level on the housed insect populations. Similarly, Smaniotto & Panizzi (2015) reported that the utilization of host plants depends on several factors: variable chemical profile of plants, plant architecture or plant design, and plant availability in time and space. According to Anderson & Anton (2014), the environment of herbivorous insects presents large spatial and temporal variability; for herbivores, the availability and density of important host plants can vary.

Surveys on stink bug host plants have been conducted by Quintanilla et al. (1976), McPherson & Mohlenbrock (1976), Link & Grazia (1987), Maes (1994), Panizzi & Grazia (2001), Tecic & McPherson (2004), Perez-Gelabert & Thomas (2005), Medeiros & Megier (2009), and Smaniotto & Panizzi (2015). However, these surveys did not consider the host plant morphological characteristics and off-season cultivation in which they were inserted. According to Panizzi (1997), the importance of wild host plants is related to bug population accumulation; the insects are able to feed and reproduce throughout most of the year, infesting agricultural crops.

Knowledge on the interactions between pentatomids and their native hosts is still limited (Medeiros & Megier, 2009). About 30% of the life of phytophagous bugs occurs in soybean, thus host plants are of paramount importance for the maintenance of these populations in the off-season periods (Panizzi, 1997). This importance extends to the rice crop, where host plants, mainly those located in the surroundings of crop fields, act as multipliers and disseminators of phytophagous bugs (Ferreira et al., 2001; Knolhoff & Heckel, 2014). Detailed knowledge about the native plants used by these stink bugs and their effects on the performance of insect pests can effectively contribute to integrated pest management (Panizzi & Slansky Junior, 1985; Medeiros & Megier, 2009). This study aimed to identify the influence of culture, species and clump diameter of wild plants on the population of phytophagous stink bugs.

2 Materials and Methods

This work was conducted in the 2011 off season, in the months of June and July, in Parada Link, municipality of Santa Maria, Rio Grande do Sul state, Brazil (Lat.: –29.650313º; Long.: –54.07167º; 114 m above sea level). Climate in the study area is Cfa according to the Köppen classification (Heldwein et al., 2009). The vegetation of the areas is characteristic of the southern grasslands.

Two lowland soil fields with 11.1 and 11.7 hectares under irrigated crops of rice and soybean, respectively, were selected. Surrounding these areas, during the off season of these crops - June and July, after cultivation of the respective cultures, the following wild plant species were selected: *Andropogon bicornis* L., *Andropogon lateralis* Nees, and *Erianthus angustifolius* Nees (Poaceae). The selected plants presented clump diameters of 10, 20, 30, and 40 cm and were located up to 15 m from the edge of the study areas. Six wild plants were sampled for each crop (off-season rice and soybean), species, and diameter, totaling 144 plants; each plant was considered an experimental unit. Screening of individuals and species of stink bugs occurring in each experimental unit was conducted for identification and quantification for statistical analysis.

The mean and standard deviation of the number of insects per plant, crop (rice and soybean), and bug species were estimated. To verify the data for normality and homogeneity of variance, the Anderson-Darling test and the Bartlett test were applied, respectively. Those which did not meet the assumptions were transformed using the following formula: $\sqrt{x+0.5}$. The *t*-test was used to compare the means between conditions and between bug species.

Within each off-season condition and bug species, the data representing the number of insects were analyzed considering a factorial of 3 host species × 4 clump plant diameters (Factor A = *Andropogon bicornis*, *Andropogon lateralis* and *Erianthus angustifolius* and Factor D = 10, 20, 30 and 40 cm), in a completely randomized design with six replications. To verify the data for normality and homogeneity of variance, the Anderson-Darling test and the Bartlett test were applied, respectively. Those which did not meet the assumptions were transformed using the following formula: $\sqrt{x+0.5}$, after that, Analysis of Variance was performed. The Tukey's test was used for comparison between the means of Factor A and the regression analysis for Factor D. 5% error probability was adopted for all statistical analyses.

3 Results and Discussion

In different rice and soybean off season conditions, host plant species and diameters, 5,908 individuals were quantified and divided into six stink bug species: *D. furcatus*, *E. meditabunda*, *E. rufomarginata*, *E. heros*, *P. guildinii*, and *T. limbativentris*, representing 5, 45, 3, 6, 4 and 37% of sampled individuals, respectively. This result confirms the use of the host plant species *A. bicornis*, *A. lateralis*, and *E. angustifolius* for the population maintenance of phytophagous stink bugs in off season periods, corroborating the results presented by Link & Grazia (1987) and Panizzi (1997). The absence of the phytophagous stink bug species *Oebalus* and *N. viridula* may be related to their preference for other host plants, such as bamboo foliage and tree bark, respectively (Link & Grazia, 1987; Panizzi, 1997; Ferreira et al., 2001; Santos et al., 2004; Klein et al., 2013).

No influence of antecedent crop on the sampled population of stink bugs in off season situations was observed. The *T. limbativentris* species presented the largest population in the rice off season situation (Table 1). In the soybean off season situation, this relationship was reversed, with other stink bug species presenting populations greater than that of the *T. limbativentris* species, with *E. meditabunda* species presenting the largest population (Table 1). According to Panizzi (1997), the maintenance of the populations of phytophagous stink bugs depends on the successive occurrence of host plants and the presence of a favorable hibernaculum; these characteristics are found in floodplain areas.

The breaking of host plant succession, such as the use of soybean crop in succession to rice crop, may have limited the population maintenance of *T. limbativentris,* even with the favorable presence of hothouses in the cultivation surrounding area (Table 1). The succession of soybean in rice area, in addition to fulfilling its primary function in reducing the levels of infestation of red rice population, as reported by Vernetti Junior et al. (2009), acts on reducing the quiescent population of *T. limbativentris*, which may result in lower infestation of this insect pest in the succession of soybean with rice. This is in agreement with the fact that the environment of herbivorous insects presents large spatial and temporal variability; for herbivores, the availability and density of important host plants can vary (Anderson & Anton, 2014).

For other species of phytophagous stink bugs, the results of the off season situation show that these populations naturally occur in alternative host plants in floodplain areas (Link & Grazia, 1987), where soybean seeding does not offer favorable conditions for a lower incidence of pest insects in this crop. Under these conditions, the successive occurrence of alternative host plants is strengthened by the presence of soybean, favoring an increased population of pest insects of the species *D. furcatus*, *E. meditabunda*, *E. rufomarginata*, *E. heros*, and *P. guildinii*.

For the rice off season situation, no significant interaction between the diameter and the host plant species was observed for *D. furcathus* and *P. guildinii*. These two stink bug species were significantly affected by host plant species (Table 2) and host plant clump diameter (Figure 1a). *D. furcatus* presented the largest sampled population at the host plant species *A. lateralis*, whereas *E. angustifolius* and *P. guildinii* presented the largest sampled population at the host plant *E. angustifolius* (Table 2). For these two stink bug species, the larger the host plant diameter, the greater their populations (Figure 1a). According to Howe & Jander (2008), each insect species has inherent characteristics that are related to survival and physiological needs, which in turn influence the choice of the host plant. However, the host plant morphological and physiological characteristics influence the sheltered insect population (Knolhoff & Heckel, 2014).

For the stink bug species *T. limbativentris*, *E. meditabunda*, *E. rufomarginata*, and *E. heros*, significant interaction was observed between the diameter and the host plant species (Table 3 and Figures 1b, c, d, e). No statistical difference in the sampled population of phytophagous stink bugs was found among plants with diameter of 10 cm. Differences occurred for diameters 20, 30, and 40 cm (Table 3). In plants with diameter of 20 cm, the largest populations of phytophagous bug species *T. limbativentris*, *E. rufomarginata*, *E. meditabunda*, and *E. heros* were found in the host plant species *E. angustifolius*, *A. bicornis*, *A. bicornis*, and *E. angustifolius*, respectively.

For diameters 30 and 40 cm, the average populations of stink bugs varied according to the host plant species, with no recurrence of host species with higher population (Table 3). When evaluating the results of these stink bug species in different diameters between host plant species, there is a direct relationship where plants with larger diameters showed higher numbers of insects similar to the relationship found for plant species *D. furcathus* and *P. guildinii*, confirming the previous report by Knolhoff & Heckel (2014) (Figure 1).

Table 1. Means and standard deviation of the occurrence of phytophagous stink bugs (Hemiptera: Pentatomidae) in host plants under rice and soybean offseason conditions.

Tabela 1. Média e desvio padrão da ocorrência de percevejos fitófagos (Hemiptera: Pentatomidae) em plantas hospedeiras localizadas no entorno da área de cultivo na entressafra de arroz e soja.

Species	Condition		$\bar{x}^1$
	Rice	Soybean	
Tibraca limbativentris	29.99±17.22Aa*	0.22±0.48Bd	15.10±12.14
Edessa meditabunda	10.67±6.61Bb	23.24±15.72Aa	16.95±13.99
Edessa rufomarginata	1.36±1.56Bd	2.32±2.71Ac	1.84±2.25
Dichelops furcathus	1.08±1.12Bd	4.40±4.56Ab	2.74±2.42
Euschistus heros	3.10±1.36Bc	4.08±1.11Ab	3.59±2.39
Piezodorus guildinii	1.04±1.68Bd	4.46±2.55Ab	2.75±2.82

*Mean followed by different letters within each species (line, lowercase letters) and between conditions (column, uppercase letters) differs statistically by t test ($p < 0.05$). [1]Average.

Table 2. Means and standard deviation of *Dichelops furcathus* (*Df*) and *Piezodorus guildinii* (*Pg*) (Hemiptera: Pentatomidae) in three host plant [*Andropogon bicornis* (*Ab*), *Andropogon lateralis* (*Al*), *Erianthus angustifolius* (*Ea*)] species in rice offseason.

Tabela 2. Média e desvio padrão de *Dichelops furcathus* (*Df*) e *Piezodorus guildinii* (*Pg*) (Hemiptera: Pentatomidae) em três espécies de plantas hospedeiras [*Andropogon bicornis* (*Ab*), *Andropogon lateralis* (*Al*), *Erianthus angustifolius* (*Ea*)] na entressafra de arroz.

Species	*Df*	*Pg*
Ab	0.46±0.42b*	0.17±0.10b
Al	1.25±0.82a	0.62±0.42b
Ea	1.54±0.85a	2.33±1.14a
$\bar{x}$[1]	1.08±1.10	1.04±0.95

*Mean followed by the same superscript letters are not significantly different by Tukey test ($p < 0.05$). [1]Mean.

In the rice off season condition, the sampled population of stink bugs is influenced primarily by the morphological characteristics of the host plant species (Knolhoff & Heckel, 2014). According to Howe & Jander (2008), the higher the degree of complexity of the host plant structure, the greater the amounts of food, shelter, and influence on the microclimate, providing cool conditions. The larger the host plant diameter, the greater the complexity, the better the conditions for the sheltering of stink bugs, and the greater the population sheltered.

For the host plants situated in the surroundings of the soybean crop, significant interaction between the diameter and the host plant species was observed for the pest insect species *E. meditabunda*, *E. rufomarginata*, *D. furcatus*, *E. heros*, and *P. guildinii* (Table 4, Figure 2). Because of the low population

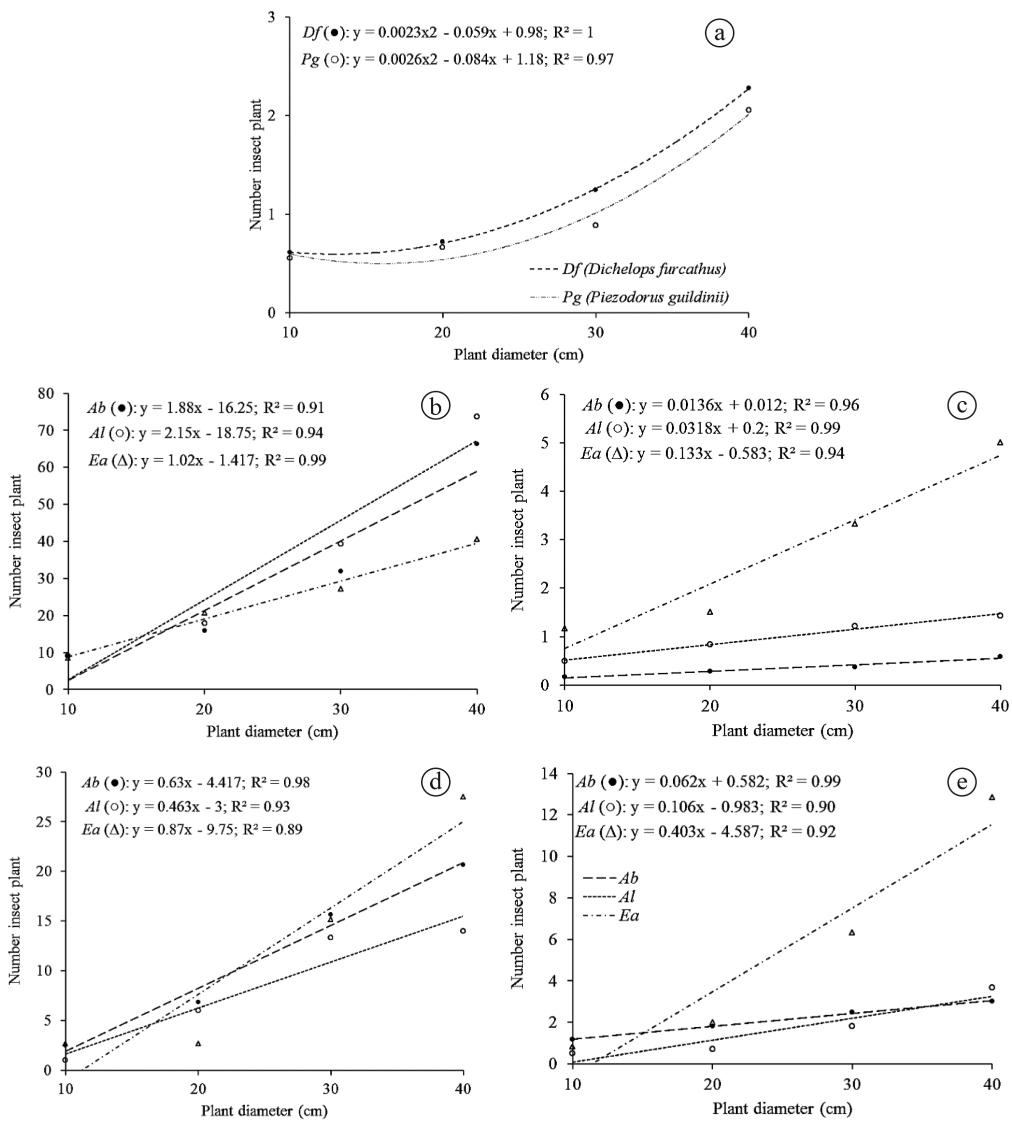

Figure 1. Means of the occurrence of *Dichelops furcathus* and *Piezodorus guildinii* (a); *Tibraca limbativentris* (b); *Edessa meditabunda* (c); *Edessa rufomarginata* (d); and *Euschistus heros* (e) (Hemiptera: Pentatomidae) in different host plant diameters in offseason rice. *Andropogon bicornis* (*Ab*); *Andropogon lateralis* (*Al*); and *Erianthus angustifolius* (*Ea*).

Figura 1. Média de *Dichelops furcathus* e *Piezodorus guildinii* (a); *Tibraca limbativentris* (b); *Edessa meditabunda* (c); *Edessa rufomarginata* (d); e *Euschistus heros* (e) (Hemiptera: Pentatomidae) ocorrentes em diferentes diâmetros de plantas hospedeiras na entressafra do arroz. *Andropogon bicornis* (*Ab*); *Andropogon lateralis* (*Al*); and *Erianthus angustifolius* (*Ea*).

sampled, *T. limbativentris* did not present significant interaction with the factors tested.

In plants with 10 cm in diameter, no difference in the population of sampled insects between host plants was observed for pest insect species *E. meditabunda*; the highest average was found for *E. angustifolius* plant species (Table 4). In other diameters of host plant species, *E. angustifolius* presented the highest means for *E. meditabunda*, except for diameters 20 and 40 cm, where the sampled population of *E. meditabunda* was equal to that found in the host plant *A. bicornis* (Table 4).

Table 3. Means and standard deviation of the occurrence of phytophagous stink bugs in three host plant species in rice offseason.

Tabela 3. Média e desvio padrão da ocorrência de percevejos fitófagos em três espécies de plantas hospedeiras na entressafra de arroz.

Species	*Tl*[1]	*Em*[2]	*Er*[3]	*Eh*[4]
	10 cm			
Andropogon bicornis	9.00±1.79ns	2.50±0.55ns	0.17±0.41ns	1.17±0.35ns
Andropogon lateralis	9.17±1.47	2.01±0.89	0.50±0.55	0.50±0.25
Erianthus angustifolius	8.50±1.84	2.67±0.82	1.17±0.41	0.83±0.21
$\bar{x}$[5]	8.89±1.67	2.40±1.06	0.61±0.70	0.83±0.32
	20 cm			
Andropogon bicornis	15.83±1.72c*	6.83±3.82a	0.28±0.25c	1.83±0.51a
Andropogon lateralis	17.83±2.14b	6.00±4.00b	0.83±0.32b	0.70±0.30b
Erianthus angustifolius	20.67±2.07a	2.67±1.75c	1.50±0.55a	2.00±0.84a
$\bar{x}$	18.11±2.76	5.17±3.65	0.87±0.46	1.51±0.98
	30 cm			
Andropogon bicornis	31.83±3.49b	15.67±2.54a	0.37±0.21c	2.50±1.32b
Andropogon lateralis	39.33±4.68a	13.33±2.34b	1.22±0.26b	1.83±0.85c
Erianthus angustifolius	27.17±1.72c	15.17±4.71a	3.33±0.89a	6.33±2.10a
$\bar{x}$	32.78±6.12	14.72±3.29	1.64±0.76	3.55±2.31
	40 cm			
Andropogon bicornis	66.33±7.03b	20.67±3.56b	0.59±0.41c	3.00±0.89b
Andropogon laterali	73.67±5.43a	14.00±4.24c	1.43±0.82b	3.67±1.97b
Erianthus angustifolius	40.50±3.15c	27.50±5.17a	5.00±2.28a	12.83±2.56a
$\bar{x}$	60.17±15.50	20.72±7.00	2.34±2.66	6.50±5.52

*Mean followed by the same superscript letters are not significantly different by Tukey test ($p < 0.05$). ns: not significant. [1]*Tibraca limbativentris*. [2]*Edessa meditabunda*. [3]*Edessa rufomarginata*. [4]*Euschistus heros*. [5]Mean.

Table 4. Means and standard deviation of the occurrence of phytophagous stink bugs in three host plant species in soybean offseason.

Tabela 4. Média e desvio padrão da ocorrência de percevejos fitófagos em três espécies de plantas hospedeiras na entressafra de soja.

Species	*Em*[1]	*Er*[2]	*Df*[3]	*Eh*[4]	*Pg*[5]
	10 cm				
Andropogon bicornis	6.00±2.04b*	0.00±0.00ns	0.33±0.52ns	0.67±0.84ns	0.33±0.32ns
Andropogon lateralis	5.17±0.98b	0.17±0.82	0.33±0.84	0.33±0.84	0.17±0.21
Erianthus angustifolius	8.50±0.89a	0.00±0.00	0.33±0.52	0.50±0.55	0.00±0.00
$\bar{x}$[6]	6.56±1.66	0.06±0.47	0.33±0.61	0.50±0.71	0.17±0.38
	20 cm				
Andropogon bicornis	14.67±2.01a	1.50±1.17a	1.50±0.84ns	1.50±0.84b	1.67±1.03b
Andropogon lateralis	10.33±1.58b	1.83±0.82a	1.67±0.75	3.17±1.17a	2.50±1.63a
Erianthus angustifolius	13.83±1.72a	0.00±0.00b	1.33±0.84	1.33±0.84b	1.17±0.62c
$\bar{x}$	12.94±4.87	1.11±0.92	1.50±0.83	2.00±1.45	1.78±1.19
	30 cm				
Andropogon bicornis	27.50±4.31b	2.33±1.63b	5.83±0.89a	4.33±1.03b	6.17±1.72b
Andropogon lateralis	19.67±4.67c	4.00±2.16a	5.00±1.05a	5.83±1.87a	7.50±1.52a
Erianthus angustifolius	30.50±8.82a	1.33±0.55c	2.67±1.55b	2.33±1.60c	1.83±0.63c
$\bar{x}$	25.89±7.38	2.56±1.92	4.50±1.89	4.17±2.27	5.17±3.18
	40 cm				
Andropogon bicornis	57.83±17.12a	3.50±1.87b	12.17±0.75b	13.00±1.79a	16.83±1.26a
Andropogon lateralis	31.67±2.42b	9.83±2.86a	16.67±1.63a	11.33±1.47b	11.50±2.14b
Erianthus angustifolius	53.17±12.84a	3.33±0.52b	5.00±2.17c	4.67±1.37c	3.83±1.60c
$\bar{x}$	47.56±19.18	5.56±4.06	11.28±3.72	9.67±3.81	10.72±3.88

*Mean followed by the same superscript letters are not significantly different by Tukey test ($p < 0.05$). ns: not significant. [1]*Edessa meditabunda*. [2]*Edessa rufomarginata*. [3]*Dichelops furcatus*. [4]*Euschistus heros*. [5]*Piezodorus guildinii*. [6]Mean.

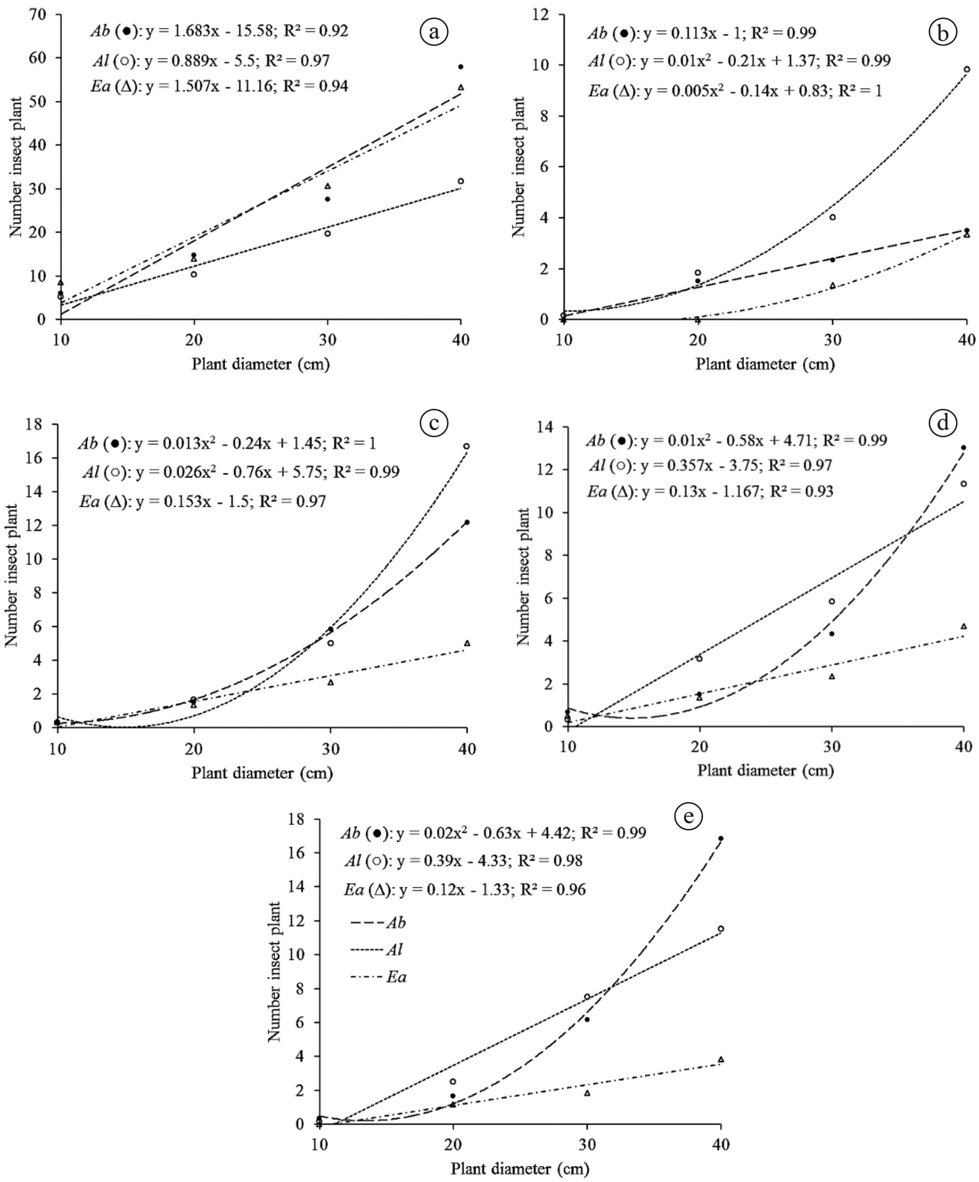

Figure 2. Means of the occurrence of *Edessa meditabunda* (a); *Edessa rufomarginata* (b); *Dichelops furcathus* (c); *Euschistus heros* (d); and *Piezodorus guildinii* (e) (Hemiptera: Pentatomidae) in different host plant diameters in offseason soybean. *Andropogon bicornis* (*Ab*); *Andropogon lateralis* (*Al*); and *Erianthus angustifolius* (*Ea*).

Figura 2. Média de *Edessa meditabunda* (a); *Edessa rufomarginata* (b); *Dichelops furcathus* (c); *Euschistus heros* (d); e *Piezodorus guildinii* (e) (Hemiptera: Pentatomidae) ocorrentes em diferentes diâmetros de plantas hospedeiras na entressafra da soja. *Andropogon bicornis* (*Ab*); *Andropogon lateralis* (*Al*); and *Erianthus angustifolius* (*Ea*).

As for the other species of stink bugs, in diameters 20, 30, and 40 cm, the largest populations were found in the host plant species *A. bicornis* and *A. lateralis*. The host plant *E. angustifolius* had the lowest populations for the pest insect species *E. rufomarginata*, *D. furcatus*, *E. heros*, and *P. guildinii.* This difference found between host plant species for pest insect species may be due to inherent characteristics related to survival and physiological needs, which in turn influence the host plant choice (Howe & Jander, 2008).

The stink bug species *E. meditabunda*, *E. rufomarginata, D. furcatus, E. heros*, and *P. guildinii* were directly related to the diameter of the host plant species *A. bicornis*, *A. lateralis*, and *E. angustifolius* located around the soybean area, where plants with larger diameters had the largest number of insects per plant; results similar to those found for host plants located around rice (Figure 2). Similarly to the off-season rice condition, under the soybean off-season condition, the sampled population of stink bugs is influenced primarily by the morphological characteristics of the host plant species (Knolhoff & Heckel, 2014).

The soybean crop appears as an alternative in floodplain areas not only for improving the income of producers, but also for reducing the population of rice insect pests. Host plants situated around the cultivated areas, in addition to serving as shelter for pest insect species, it can be used as an alternative to pest management, serving as a parameter for the monitoring and control of populations of herbivorous insects.

4 Conclusion

Rice and soybean crops, as well as wild plants and their diameters, influence the population of the phytophagous bug species *Dichelops furcatus*, *Edessa meditabunda*, *E. rufomarginata, Euchistus heros, Piezodorus guildinii*, and *Tibraca limbativentris*. The host plant species *A. bicornis*, *A. lateralis*, and *E. angustifolius* were utilized for the maintenance of the populations of phytophagous stink bugs in off-season periods. Soybean cultivation in floodplain areas has a negative impact on the quiescent population of *T. limbativentris*.

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