PREFERENCES OF *Zulia entreriana* (BERG, 1879) AND *Deois flavopicta* (STAL, 1854) (HOMOPTERA: CERCOPIDAE) FOR THREE PASTURE GRASSES OF THE GENUS *Brachiaria* GRISEB.

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RESUMO

Preferência de *Zulia entreriana* (Berg, 1879) e *Deois flavopicta* (Stal, 1854) (Homoptera: Cercopidae) por três espécies de gramíneas forrageiras do gênero *Brachiaria* Griseb.

Amostragens de cigarrinhas-das-pastagens efetuadas em pastagens de *Brachiaria decumbens*, *B. humidicola* e *B. brizantha* mostraram que a maioria dos adultos foram coletados em *B. humidicola* e a minoria nas pastagens de *B. brizantha*. Em *B. humidicola* predominou a espécie *Deois flavopicta* (Stal, 1854) e em *B. decumbens*, *Zulia entreriana* (Berg, 1879). Houve maior densidade de ninfas (55/m²) nos pastos de *B. humidicola* em relação a *B. decumbens* (33/m²) e *B. brizantha* (<1/m²). No período em que predomina a oviposição dos ovos em diapausa (março-abril), registrou-se maior número de adultos em *B. decumbens*, e da mesma forma, maior número de ovos foram recuperados nesses pastos. Em geral, 32% dos ovos recuperados encontravam-se ressequidos e dos restantes, 72% eclodiram. *B. brizantha* mostrou-se não preferida para a alimentação, tanto para *Z. entreriana* como para *D. flavopicta*.

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INTRODUCTION

Two spittlebug species *Zulia entreriana* (Berg) and *Deois flavopicta* (Stal) have successfully adapted to some introduced grasses in central Brazil. This has resulted in much damage and forage loss in the state of Mato Grosso do Sul. The dominant grass species in this area of Brazil is *Brachiaria decumbens* Stapf. but other species such as *B. humidicola* and *B. brizantha* (Hochst ex A. Rich) Stapf. cv. Marandu (BRA-000019) are also used as pasture grasses (MENEZES *et al.*, 1983; EMPRESA BRASILEIRA DE PESQUISA AGROPECUÁRIA, 1984). Since spittlebug feeding causes substantial damage to pasture grasses it is important to know which species are preferred and which species are least preferred. Plants unfavorable for spittlebug development could be used to provide forage in areas where spittlebugs continue to be a problem.

This study reports on the results of sampling populations of *Z. entreriana* and *D. flavopicta* in pastures planted to *B. decumbens*, *B. humidicola*, and *B. brizantha*. Plant resistance is discussed in relation to the number of insects inhabitating the different grass pastures and to egg density in the dry season.

MATERIAL AND METHODS

All sampling of spittlebugs was carried out on a farm (Fazenda Bracinho) 120 km north of Campo Grande-MS from October 1984 to December 1985. The study site consisted of six large pastures which were seeded in December 1983 and January 1984; two pastures seeded to *B. decembuns*, two seeded to *B. humidicola*, and two seeded to *B. brizantha*. Each large pasture was divided into 5 smaller pastures which varied in size from 0.6 ha to 1.0 ha. All pastures were moderately grazed before the dry season began in 1985.

Adult spittlebug were collected once a month in all 30 pastures during an eight month period (October 1984-May 1985) and again in November and December 1985. First generation nymphs were counted in October and November 1984 and November and December 1985. Egg samples were obtained once a month from May throught August 1985 from one small pasture within each of the six large pastures. Thus eggs were collected from two small pastures of each grass species.

Adults were collected with a 40 cm diameter sweep net. Six samples (10 sweeps = 1 sample) were obtained from each small pasture on each date for a total of 60 samples per grass species. A square metal frame (0.0625 m^2) was thrown 20 times in each small pasture and the nymphs within the frame were counted. Thus, an area of 12.5 m^2 within each grass species was sampled for nymphs on each date. An egg sample consisted of the soil and debris in a circle 10 cm in diameter to a depth of 2 cm. Twelve plants were selected randomly in each of the six pastures and two samples taken near each plant but on opposite sides of the plant. So 24 egg samples were obtained from each pasture and 48 from each grass species on each date.

Eggs were separated form soil particles and debris using the method described by NILAKHE *et al.* (1984). The percentage of eggs hatching was determined form eggs collected in August 1985. Desiccated eggs were counted and discarted and eggs that appeared viable were placed on moistened filter paper in Petri dishes for a period of six weeks and the number hatching recorded daily.

RESULTS AND DISCUSSION

The number of nymphs and adults of *Z. entreriana* and *D. flavopicta* sampled on each date from each grass species is shown in Table 1. Most adults (both species included) were collected from *B. humidicola* pastures (7378). This compared to 4216 from *B. decumbens* pastures and 304 from *B. brizantha* pastures. *D. flavopicta* was the most abundant species in *B. humidicola* pastures on every collecting date except one, comprising 83% of the population. However, *Z. entreriana* was the most abundant species in *B. decumbens* pastures, comprising 67% of the population. The fewest number of adults (304) were collected in *B. brizantha* pastures and *D. flavopicta* was the most abundant species. Considering the total number of adults of *D. flavopicta* collected in all pastures, 79% were collected in pastures of *B. humidicola*; likewise 69% of *Z. entreriana* were collected in pastures of *B. decumbens*. Therefore, it appears that *D. flavopicta* has a stronger preference for *B. humidicola* than *Z. entreriana* does for *B. decumbens*. Nymphs were also more abundant in the *B. humidicola* pastures (52/m^2). This compared to (33/m^2) in *B. decumbens* pastures and (<1/m^2) in *B. brizantha* pastures.

TABLE 1 - Number of spittlebugs (*Zulia entreriana* and *Deois flavopicta*) collected in different grass pastures at Fazenda Bracinho-MS, during an eight month period, 1984-1985[1].

Collection Date	Total adult spittlebugs collected per grass species									Total collected per date	
	B. brizantha			*B. humidicola*			*B. decumbens*				
	Z. entreriana	*D. flavopicta*	Total	*Z. entreriana*	*D. flavopicta*	Total	*Z. entreriana*	*D. flavopicta*	Total	*Z. entreriana*	*D. flavopicta*
19/10/84	7	2	9	277	677	954	800	41	841	1084	720
08/11/84	8	19	27	52	801	853	133	246	379	193	1066
06/12/84	0	9	9	169	421	590	339	73	412	508	503
10/01/84	30	204	234	313	3628	3941	274	526	800	617	4358
07/02/85	1	6	7	118	232	350	141	42	183	260	280
07/03/85	0	5	5	46	157	203	142	250	392	188	412
03/04/85	6	7	13	242	204	446	869	191	1060	1117	402
15/05/85	0	0	0	6	35	41	116	33	149	122	68
TOTALS	52	252	304	1223	6155	7378	2814	1402	4216	4089	7809

	Nymphal density (Nymphs/m²) per grass species[2]		
19/10/84	<1	49	21
08/11/84	<1	3	12
TOTALS	<1	52	33

[1] Sixty sweep not samples were taken per grass species/date. A sample consisted of 10 sweeps with a sweep net.

[2] Nymphal counts were made only during the first generation following hatching. Two hundreds samples (0.0625 m²) were taken per grass species/date.

These results also agree with VALÉRIO & KOLLER (1982) who counted nymphs and adults in 20 x 30 cm plots of 10 grass species. They found more nymphs and adults on *B. humidicola* than on the other nine grasses. Likewise they found only one nymph on *B. brizantha* and 73 adults. In this study 304 adults were collected from *B. brizantha* during the eight month period and only 11 nymphs were counted in 400 samples (0.0625 m^2). Evidently some adults migrate into *B. brizantha* pastures but few eggs are laid and fewer nymphs survive. For example, only eight adults were collected from two pastures of *B. brizantha* (P-2, P-16) during March, April and May when adults were laying diapause eggs. During the five month period from May to August only 16 eggs were recovered from 240 samples obtained in *B. brizantha* pastures. After hatching started in October only two nymphs were counted in November and December and no adults were collected.

An attempt was made to show the relationship between the number of last generation adults laying diapausing eggs, egg density, resulting nymphal density, and finally the number of nymphs reaching the adult stage (Table 2). The total adults of both species counted during the eight month period was greater in the *B. humidicola* pastures (Table 1) but the total adults laying diapausing eggs counted in March, April, and May was greater in the *B. decumbens* pastures (Table 2). It is possible that *B. humidicola* pastures dry out more rapidly than *B. decumbens* pastures as the dry season approaches and ovipositing adults move to the more desirable *B. decumbens* pastures. Thus, it is not surprising that more eggs were recovered from the *B. decumbens* pastures. Therefore, adult population densities just prior to the dry season may be a good indicator of nymphal density at the beginning of the rainy season. Also more nymphs and first generation adults were counted in the *B. decumbens* pastures (Table 2). However, very dry conditions in September and October 1985 delayed spittlebug egg hatching and when some hatching did begin a prolonged period without rain caused a high mortality of both nymphs and adults. Thus, the full potential of the first generation nymphal population was not realized.

Egg samples were collected from six pastures in August but only samples from three of the pastures contained eggs, from two pastures of *B. decumbens* and one pasture of *B. humidicola*. Of the 11 eggs from the *B. humidicola* pasture, 36% were desiccated and 71% of the remaining eggs hatched. Of the 313 eggs from the *B. decumbens* pastures, 28% were desiccated and 72% of the remaining eggs hatched. In a previous unpublished study 34% of the eggs recovered during the dry season were desiccated and 65% of the remaining eggs hatched.

TABLE 2 - Spittlebug populations in pastures of 3 grass species from the time diapause eggs are laid until first generation adults appear. Fazenda Bracinho-MS. 1985[1].

	B. humidicola					*B. decumbens*					*B. brizantha*				
	Adults collected - ovipositing diapause eggs														
	P-9		P-21			P-12		P-29			P-2		P-16		
	Z. en- treriana	*D. fla- vopicta*	*Z. en- treriana*	*D. fla- vopicta*	Total	*Z. en- treriana*	*D. fla- vopicta*	*Z. en- treriana*	*D. fla- vopicta*	Total	*Z. en- treriana*	*D. fla- vopicta*	*Z. en- treriana*	*D. fla- vopicta*	Total
March April May	4	19	9	20	52	184	55	68	40	347	1	0	2	5	8
	Eggs recovered during dry season														
May	68		21		89	27		65		92	1		6		7
June	56		12		68	39		28		67	0		3		3
July	48		0		48	65		31		96	6		0		6
August	11		0		11	244		69		313	0		0		0
Total	183		33		216	375		193		568	7		9		16
	Nymphal density - Nov. Dec. 1985														
November	15		1		16	50		10		60	1		1		2
December	0		0		0	0		0		0	0		0		0
Total	15		1		16	50		10		60	1		1		2
	Adults collected Nov. Dec. 1985														
	Z. en- treriana	*D. fla- vopicta*	*Z. en- treriana*	*D. fla- vopicta*	Total	*Z. en- treriana*	*D. fla- vopicta*	*Z. en- treriana*	*D. fla- vopicta*	Total	*Z. en- treriana*	*D. fla- vopicta*	*Z. en- treriana*	*D. fla- vopicta*	Total
November	0	3	0	0	3	0	1	0	1	2	0	0	0	0	0
December	0	0	0	1	1	15	1	0	0	16	0	0	0	0	0
Total	0	3	0	1	4	15	2	0	1	18	0	0	0	0	0

[1] Numbers preceded by P identify 6 pastures.

The results obtained here generally agree with COSENZA *et al.* (1983ab), and MENEZES *et al.* (1983). They reported *B. decumbens* as susceptible, *B. humidicola* as having some tolerance, and *B. brizantha* as moderately resistant. NILAKHE (1985) also reported *B. brizantha* to have high levels of antibiosis. It appears that *B. brizantha* in this area of Brazil has excellent resistance and should be used in conjunction with other species where spittlebugs are a major problem. However, control methods, including the use of resistant plants, should be implemented at the farm or ranch level since most spittle bug problems are site specific.

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ABSTRACT

Spittlebugs sampled in pastures of *Brachiaria decumbens*, *B. humidicola*, and *B. brizantha* showed that most adults were collected from *B. humidicola* pastures and the fewest from *B. brizantha* pastures. *Deois flavopicta* (Stal, 1854) was the most abundant species in *B. humidicola* pastures and *Zulia entreriana* (Berg, 1879) in *B. decumbens* pastures. Nymphs were more dense in *B. humidicola* pastures (55/m²) compared to *B. decumbens* pastures (33/m²) and *B. brizantha* pastures (<1/m²). More adults were counted, when diapause eggs were being laid (March-April) in *B. decumbens* pastures and also more eggs were recovered from these pastures. In general, 32% of the eggs recovered were desiccated and 72% of the remaining eggs hatched. *B. brizantha* is not preferred as a food plant for either *Z. entreriana* or *D. flavopicta* in central Brazil.