Short Communication

Pest insects in natural and sown pastures of Paraguay

Insectos plagas en pasturas naturales y cultivadas de Paraguay

HUMBERTO J. SARUBBI AND MARÍA B. RAMÍREZ

Facultad de Ciencias Agrarias, Universidad Nacional de Asunción, San Lorenzo, Paraguay. agr.una.py

Abstract

Paraguayan livestock production is based mainly on the use of natural and sown pastures as basic cattle feed. Several genera of harmful insects reported in forage grasses can cause damage to both yield and quality of forage. A review of the insect collection of the Plant Protection Area of the Faculty of Agrarian Sciences, National University of Asunción was carried out, in order to prepare a list of insects with incidence in grasses. Then random sampling of different species of Poaceae showing insect damage in open areas of paddocks grazed by cattle was carried out during 2014–2017 in all Regions of Paraguay. Thirteen different genera and species of pastures were collected and 20 species of insects were identified in the following orders: Hymenoptera (Formicidae family: 5 species); Isoptera (Termitidae: 3 species); Hemiptera (Lygaeidae: 1 species; Cercopidae: 6 species); Lepidoptera (Noctuidae: 2 species); and Orthoptera (Acrididae: 3 species). The most common forms of damage observed in pastures were: leaf consumption (25%), leaf cutting (25%) and leaf yellowing-drying (35%).

Keywords: Families, identification, predation, sampling.

Resumen

En Paraguay la producción pecuaria se basa principalmente en el uso de pasturas naturales y cultivadas como alimento base para ganado vacuno. En el país se han identificado varios géneros de insectos dañinos que pueden ocasionar daños tanto en la cantidad como la calidad de las gramíneas forrajeras. Inicialmente se realizó una revisión de la colección de insectos del Área de Protección Vegetal de la Facultad de Ciencias Agrarias, Universidad Nacional de Asunción, con el objeto de elaborar un listado de insectos con incidencia en pasturas. Posteriormente, durante los años 2014–2017, se realizaron muestreos al azar en diferentes especies de gramíneas que presentaban daños por insectos en áreas abiertas destinadas al pastoreo de vacunos en los diferentes departamentos de Paraguay. En total fueron colectados 13 diferentes géneros y especies de pastos y se identificaron 20 especies de insectos, de los órdenes Hymenoptera (familia Formicidae, 5 especies); Isoptera (Termitidae, 3 especies); Hemiptera (Lygaeidae y Cercopidae, 1 y 6 especies, respectivamente); Lepidoptera (Noctuidae, 2 especies); y Orthoptera (Acrididae, 3 especies). Los daños más comunes observados en las pasturas fueron daños por consumo de follaje (25%), corte de láminas foliares (25%) y amarillamiento y secado de hojas (35%).

Palabras clave: Familias, identificación, muestreo.

Introduction

Paraguayan cattle ranching has experienced a significant improvement in number and quality in the last 20 years, and Paraguay is the seventh largest beef exporter in the world (ARP 2017). The country currently has 15 million hectares being used for livestock, and sown (5.6 million ha) and natural pastures (10 million ha) are the primary feed source for cattle, since it is the most economic and practical approach to meat production (Glatzle and Stosiek 2001; ARP 2017). This has created an ideal environment for the proliferation of different genera of insects, which can be harmful to forage crops (Fowler 1979; Glatzle 1999; Benítez 2002; Sarubbi 2016). Many
of these insects are widely distributed over the American continent and cause a range of symptoms from defoliation to death of plants (Gallo et al. 2002; Brandão et al. 2011). Knowing the distribution and potential hosts of insects and damage caused is an important step in the development of adequate management strategies (Picanço et al. 1999; Nakano 2011).

The objective of this work was to identify harmful insects and determine their distribution throughout Paraguay, plant hosts infested and description of damage caused.

Materials and Methods

First, a review of the insect collection of the Plant Protection Area of the Faculty of Agricultural Sciences, National University of Asunción was carried out, in order to produce a list of registered pests causing damage to pastures. Subsequently, insect collections were carried out at random, during the years 2014–2017, in the 4 seasons of the year (1 collection per season, 16 in total), on different species of Poaceae showing insect damage. The work was carried out in open areas of paddocks destined for cattle grazing in the following Regions: Western Region or Chaco: Alto Paraguay (APY), Boquerón (BOQ), Villa Hayes (VHA); and Eastern Region: Amambay (AMA), Concepción (CON), San Pedro (SPE), Canindeyú (CAN), Caaguazú (CAG), Alto Paraná (APA), Central (CEN), Cordillera (COR), Paraguari (PAR), Guairá (GUA), Caazapá (CAZ), Itapúa (ITA), Misiones (MIS) and Ñeembucú (NEE). Pasture samples were collected from the following species: Cenchrus ciliaris (CC), Cenchrus purpureus (CP), Chloris gayana (CG), Cynodon nlemfuensis (CN), Digitaria eriantha (DE), Megathyrsus maximus (MM, a range of cultivars), Paspalum notatum (PN), Urochloa brizantha (UB, a range of cultivars), Urochloa decumbens (UD), Urochloa mosambicensis (UM), Urochloa ruziizensis (UR) and Urochloa arrecta × Urochloa mutica (UA × UM; tangola grass).

Insect pests were collected, recording date, location, host and type and extent of damage, were photographed and immediately deposited in plastic containers for identification. The collection was manual using an entomological sweep net (50 cm ring diameter and 1 m bag length). The samples were transported to the Entomology Laboratory and examined with a stereoscope for identification. Insects were identified using the following reference sources: Fowler (1979), Kidono (1982), Glatzle (1999), Valério et al. (1999), Gallo et al. (2002), Sarubbi (2016) and Tolotti et al. (2018).

Results and Discussion

Twenty (20) species of insects in the orders Hymenoptera, Isoptera, Hemiptera, Lepidoptera and Orthoptera were found on 12 pasture hosts (Table 1). In Hymenoptera, 6 were in Formicidae family; in Isoptera, 3 were in Termitidae; in Hemiptera, 1 was in Lygaeidae and 6 in Cercopidae; in Lepidoptera, 2 were in Noctuidae; and in Orthoptera, 3 were in Acrididae.

The Urochloa and Megathyrsus genera represent the most important pasture grasses in the country, and consequently the greatest variety of insects was found on them. A unique case was observed in Urochloa arrecta × U. mutica (tangola grass), which was the exclusive host of Blissus antillus (grass bug). In relation to the occurrence of insects across Regions, some species, such as defoliating ants and cicadas, cover the whole country, while other species are confined to certain regions or places, such as the locust (Staurorhuctus longicornis) and the cutter ant (Atta vollenweideri) in Chaco. The types of damage to pastures most commonly observed were: leaf consumption 25% [caterpillars (Mocis latipes, Spodoptera frugiperda) and locusts], cutting 25% (cutter ants) and leaf yellowing and drying 35% [grass bug and spittlebug (Notozulia enterriana and Mahanarva fimbriolata)] (Table 1).

Insects with the highest number of species (12) and distribution were cutter ants and spittlebug as mentioned by Fowler (1979), Kidono (1982), Glatzle (1999), Benítez (2002) and Sarubbi (2016). Valério (2006) and Tolloti et al. (2018) consider that spittlebugs are among the most important harmful insects of tropical pastures, attacking several genera, species and varieties, as observed in this research, as they were present in the whole territory of Paraguay and with a wide host range.

Incidence of Blissus antillus in tangola pasture agrees with reports of Valério et al. (1999) and Fazolin et al. (2012), who found that tangola grass (a natural Urochloa hybrid) and Urochloa arrecta were the only hosts of Blissus antillus in Brazil.

The damage caused by termites is considered indirect since this species develops mounds that are obstacles for agricultural machinery, causing loss of useful area in the paddocks.

Occurrence of most of these insects is seasonal and some appear in large numbers at specific times. Some which can cause serious damage are: caterpillars (Mocis latipes), bug (Blissus antillus) and cicadas (Notozulia enterriana and Mahanarva fimbriolata), as was mentioned by Gallo et al. (2002) and Tolotti et al. (2018).
Table 1. Insect pests (common name in parenthesis) identified in different pasture species of Paraguay.

| Insect order, family and species | Host | Occurrence (Region and collection site) |
|---------------------------------|------|-----------------------------------------|
| Hemiptera: Cercopidae           |      |                                         |
| Deois flavopicta (Salivazo)     | CN, MM, UB | SPE 23°44'11.4" S 56°29'38.4" W |
| Deois mourei (Salivazo)         | CN, MM, UB, UD | CEN 25°19'41.1" S 57°31'11.0" W |
| Deois rubropicta (Salivazo)     | CN   | AM 22°40'15.7" S 56°02'41.8" W |
| Deois schach (Salivazo)         | PN, MM, UB | CAG 25°24'37.4" S 55°34'16.6" W |
| Mahanarva fimbriolata (Salivazo) | CP, UB | COR 25°14'51.4" S 57°08'32.7" W |
| Notozulia entrecaria (Salivazo) | CC, CN, CG, DE, MM, UB, UD, UR | DE 26°59'38.1" S 56°47'25.5" W |
| Hymenoptera: Formicidae         |      |                                         |
| Acromyrnex heyeri (Akeké)       | PN   | MIS 27°07'35.6" S 56°41'57.3" W |
| Acromyrnex landolti fracticornis | CC, CN, CG, DE, MM, PN, UB, UD, UM, UR | APY 20°10'59.8" S 59°32'18.0" W |
| Atta capigua (Ysaú kapí i)     | CN, MM, PN, UB, UD, UR, MM | CEN 25°12'22.4" S 57°24'31.7" W |
| Atta laevigata (Ysaú akã vidrio) | CN, MM, PN, UB, UD, UR | COR 25°15'45.6" S 57°08'51.6" W |
| Attaollenweideri (Ysaú chaco)   | CC, CN, CG, DE, MM, UM | GUA 25°43'08.3" S 56°11'09.1" W |
| Isoperta: Termitidae            |      |                                         |
| Cornitermes bequaerti (Kupí i takuru chimena) | CN, MM, PN, UB, UR | APY 20°10'32.2" S 59°32'42.7" W |
| Cornitermes cumulans (Kupí i takuru) | CN, MM, PN, UB, UD, UR | APY 20°15'55.1" S 59°32'42.7" W |
| Procornitermes striatus (Yvy kupí i) | CN, MM, PN, UB | VHA 23°31'00.0" S 58°36'58.2" W |
| Leptoptera: Noctuidae           |      |                                         |
| Mocis latipes (Falsa medidora)  | CC, CN, DE, MM, UB | APY 22°00'01.0" S 59°53'14.3" W |
| Spodoptera fragiperda (Cogolero del maíz) | CC, CN, DE, MM, UB, UD, UM, UR | APY 20°15'53.6" S 59°43'53.8" W |
| Orthoptera: Acrididae          |      |                                         |
| Rammatocerus pictus (Langosta)  | CC, CN, MM | CEN 25°19'43.5" S 57°31'10.0" W |
| Schistocerca cancellata (Langosta migratoria) | CC, CN, CG, MM | APY 20°11'31.4" S 59°31'48.1" W |
| Staurhorhctus longicornis (Langosta de pastura) | CC, CN, CG, MM | APY 20°11'31.4" S 59°31'48.1" W |

1Hosts: CC (Cenchrus ciliaris), CP (Cenchrus purpureus), CG (Chloris gayana), CN (Cynodon nlemfuensis), DE (Digitaria eriantha), MM (Megalotis maximus), PN (Paspalum notatum), UD (Urochloa brizantha), PP, UM (Urochloa decumbens), UAXM (Urochloa arrecta × Urochloa mutica), UC (Urochloa mosambicensis) and UR (Urochloa ruziei).  
2Occurrence according to the records of the entomological collection of the Plant Protection Area of the Facultad de Ciencias Agrarias, Universidad Nacional de Asunción and collections made by the authors.  
Regions: AM = Amambay; AP = Alto Paraná; APY = Alto Paraguay; BO = Boquerón; CAG = Caaguazú; CA = Canindeyú; CED = Caazapá; CEN = Central; CON = Concepción; COR = Cordillera; GUA = Guairá; ITA = Itapúa; M = Misiones; NEE = Neembucú; PAR = Paraguari; SPE = San Pedro; and VHA = Villa Hayes.

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Conclusions

This study has provided an overview of the range of insects which occur in pastures in Paraguay. Whether or not active measures to control them should be undertaken would depend on the extent of damage they cause and the impact on both pasture production and resultant animal performance. Observations on degree of damage to pastures under a range of conditions should supply some information on which to base decisions.

References

(Note of the editors: All hyperlinks were verified 5 May 2020.)

ARP (Asociación Rural del Paraguay). 2017. Introducción a Paraguay y su sector cárnico. ARP, Asunción, Paraguay. bit.ly/35wlZ9h

Benítez E. 2002. Listado de nombres científicos y vulgares de plagas agrícolas y forestales del Paraguay. Universidad Nacional de Asunción, San Lorenzo, Paraguay.

Brandão CRF; Maye-Nunes A; Sanhudo CED. 2011. Taxonomia e filogenia das formigas cortadeiras. In: De la Lucia TMC, ed. Formigas cortadeiras: Da biologia ao manejo. Editora UFV, Viçosa, MG, Brazil. p. 27‒48.

Fazolin M; Tomazini MJ; Estrela JLV. 2012. Pragas das culturas de importância econômica para o Estado do Acre. Documentos 127. Embrapa Acre, Rio Branco, AC, Brazil. bit.ly/3fp26Fp

Fowler H. 1979. Las hormigas cortadoras del Paraguay de los géneros Atta Fabricius y Acromyrmex Mayr: Bionómico, distribución y sistemática. Informes científicos ICB-UNA 2:30‒57.

Gallo D; Nakano O; Silveira Neto S; Carvalho RPL; Baptista GC; Berti Filho E; Parra JRP; Zucchi RA; Alves SB; Vendramim JD; Marchini LC; Lopes JRS; Omoto C. 2002. Entomologia agrícola. p. 484–493. FEALQ, Piracicaba, SP, Brazil.

Glatzle A. 1999. Compendio para el manejo de pasturas en el Chaco. Editorial El Lector, Asunción, Paraguay.

Glatzle A; Stosiek L. 2001. Perfiles por país del recurso pastura/forrajé Paraguay. Food and Agriculture Organization of the United Nations (FAO), Rome, Italy. bit.ly/2sG6zTo

Kidono H. 1982. Algunas observaciones sobre las cigarritas de las pasturas, salivazo en el Paraguay. Universidad Nacional de Asunción, San Lorenzo, Paraguay.

Nakano O. 2011. Entomologia econômica. p. 280‒293. ESALQ, Piracicaba, SP, Brazil.

Picanço M; Leite GLD; Mendes MC; Borges VE. 1999. Attack of Atarsocoris brachiariae Becker, a new pest of pastures in Mato Grosso, Brazil. Pesquisa Agropecuária Brasileira 34:885‒890. (In Portuguese). doi: 10.1590/S0100-204X1999000500022

Sarubbi H. 2016. Plagas de pasturas en Paraguay. Universidad Nacional de Asunción, San Lorenzo, Paraguay.

Tolotti A; Azevedo WS; Valiati VH; Carvalho GS. 2018. Cigarrinhas das pastagens en gramíneas forrageiras no Brasil. Editora Evangraff, Porto Alegre, RS, Brazil.

Valério J. 2006. Considerações sobre a morte de pastagens de Brachiaria brizantha cv. Marandu em alguns estados do Centro e Norte do Brasil: Enfoque entomológico. Comunicado Técnico 98. Embrapa Gado de Corte, Campo Grande, MS, Brazil. bit.ly/3fmm2sx

Valério JR; Vieira JM; Valle LCS. 1999. The occurrence of Blissus antillus Leonard (Hemiptera: Lygaeidae: Blissinae) in Tangola pasture in Mato Grosso do Sul State, Brazil. Anais da Sociedade Entomológica do Brasil 28:527‒529. (In Portuguese). doi: 10.1590/S0301-8059199900300020

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