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SPECIES OF SPHENOPHORUS (COLEOPTERA: DRYOPHTHORIDAE) ASSOCIATED WITH GOLF COURSES IN MEXICO

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The construction of golf courses in Mexico has increased dramatically within the past 2 decades. This has led to a corresponding increase in pest problems associated with turfgrass, especially billbugs, Sphenophorus (Coleoptera: Dryophthoridae) which are considered one of the most damaging of turfgrass pests (Buss & Huang 2009; Johnson-Cicalese et al. 1990). The genus is diverse and widely distributed with 66 species reported from the United States and 29 from Mexico (Vaurie 1951, 1954; O’Brien & Wibmer 1986). However, there is little information concerning the species and distribution of Sphenophorus attacking turfgrass in Mexico. This situation has been further complicated by the importation of billbug infested turfgrass from the U.S., usually shipped as turf rolls from the states of Alabama, California, Georgia and Florida. Turf rolls from the U.S. infested with larvae of the eastern U.S. subspecies, Sphenophorus venatus vestitus Chittenden, have been intercepted by Mexican quarantine officials which prompted the need for information regarding the identification of the species involved (Vergara-Pineda & Muñiz-Vélez 2003). Evidence that populations of this species have become established in Mexico is presented by León-García et al. (2012) who reported S. venatus vestitus from golf courses in the state Quintana Roo. Other than this report, little information exists concerning the present distribution and possible new introductions of Sphenophorus in golf courses of Mexico. The objective of the present study was to determine the species and incidence of Sphenophorus associated with golf courses in Mexico from several geographic regions of the country.

Twelve golf courses were visited in 7 states from distinct geographic regions of Mexico from July of 2012 to March of 2013 (Fig. 1). Sampling of Sphenophorus was accomplished by flooding a defined area for a period of 3 to 5 min or until adult weevils were observed on the grass surface. These individuals were collected in labeled vials in 70% alcohol. Specimens were determined using the key in Vaurie (1951) and through comparison with specimens deposited in Entomology Collection of the Universidad de Querétaro (UAQE). Photographs of specimens were taken by a stereoscope Carl Zeiss III with a PaxCam III digital camara.

Five species of Sphenophorus were found in golf courses from 7 states of Mexico; Sphenophorus arizonensis Horn, Sphenophorus cicatristratus Fahraeus, Sphenophorus incurrens Gyllenhal, Sphenophorus rectus (Say), and Sphenophorus venatus vestitus Chittenden.

Sphenophorus arizonensis (Horn) was found from Paspalum vaginatum Swartz in the state of Puebla (N 18° 28' 58.83" -W 97° 24' 34.99") representing a new state and new host plant record for Mexico (Figs. 2A and 2B). Sphenophorus cicatristratus (Fahraeus) was collected from C. dactylon in golf courses in Puebla, Puebla (N 19° 00' 46.05" -W 98° 14' 54.44") (Figs. 2C and 2D). Sphenophorus rectus (Say) (Fig. 2E and 2F) was collected in turfgrass of Paspalum vaginatum on the coast of Veracruz (N 19° 03' 56.91" -W 96° 05' 32.80"), which represents a new host plant record for the species. Specimens of Sphenophorus incurrens (Gyllenhal) were collected on Pennisetum clandestinum in Querétaro, Querétaro (N 20° 37' 09.03"
The *Sphenophorus venatus* (Say) individuals collected were all identified as the subspecies *Sphenophorus venatus vestitus* Chittenden (Figs. 2G and 2H). This subspecies was the most abundant species and subspecies on the golf courses visited, and was found on 10 of the 12 golf courses that were sampled. This subspecies was found infesting *P. vaginatum* in Tehuacán, Puebla (N 18° 28’ 58.83” -W 97° 24’ 34.99”); from Boca del Río, Veracruz (N 19° 03’ 56.91” -W 96° 05’ 32.80”); Acapulco, Guerrero (N 16° 47’ 43.67” -W 99° 49’ 12.69”); and San José del Cabo, Baja California Sur (N 23° 02’ 30.54” -W 109° 42’ 54.49” and N 23° 04’ 21.75” -W 109° 39’ 11.15”). This subspecies was also collected from the turfgrass, *Cynodon dactylon*, in Acapulco, Guerrero (N 16° 46’ 26.41” -W 99° 47’ 28.67” and N 16° 47’ 43.43” -W 99° 48’ 44.86”), San José del Cabo, B.C. S. (N 23° 02’ 50.60” -W 109° 41’ 52.02”) and San Pedro Garza García, Nuevo León (N 25° 38’ 46.19” -W 100° 20’ 46.22”). Individuals were also collected on the turfgrass, *Lolium perenne* in León, Guanajuato (N 21° 11’ 57.38” -W 101° 41’ 43.46”). These collection data considerably expand the known distribution of this species and subspecies within Mexico, as well as, providing new host plant records.

Species of *Sphenophorus* were often found together in the same golf course. For example, *S. arizonensis* and *S. rectus* were associated together in turf grass, *Paspalum vaginatum*, in the states of Puebla and Veracruz but always in the presence of *S. venatus vestitus*. Whether the presence of *S. arizonensis* and *S. rectus* at these sites was the result of invasion from local populations or from recent foreign introductions, as suggested for *S. venatus vestitus*, is unknown. In contrast, *S. incurrens* from Queretaro associated with *Pennisetum clandestinum* and *S. cicatristriatus* from the turfgrass *Cynodon dactylon* in Puebla were not found associated with other *Sphenophorus* species suggesting these may be local invading populations, especially in the case of *S. incurrens* which does not occur in the United States.

**SUMMARY**

Five species of *Sphenophorus* were found in golf courses from 7 states of Mexico on various host plants; *Sphenophorus arizonensis* Horn from the state of Puebla on *Paspalum vaginatum* Swartz (new state and host record); *Sphenophorus cicatristriatus* Fahraeus was collected in Puebla on *Cynodon dactylon* (L.) Pers.; *Sphenophorus incurrens* Gyllenhal was collected in Querétaro on *Pennisetum clandestinum* Hochst. (new state

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**Fig. 1. Distribution of species of Sphenophorus collected from golf courses in Mexico.**
Fig. 2. A. dorsal, and B. lateral view of *Sphenophorus arizonensis*, (♀); C. Dorsal, and D. lateral view of *Sphenophorus cicatristriatus* (♀); E dorsal, and F, lateral view of *Sphenophorus rectus* (♀). G. dorsal, and H. lateral view of *Sphenophorus venatus vestitus* (♂); I. dorsal, and J. lateral view of *Sphenophorus incurrens* (♂). Scale indicates 3mm in all figures.
Sphenophorus rectus (Say) was collected in Veracruz on P. clandestinum (new host plant record); and Sphenophorus venatus vestitus Chittenden was collected in Puebla, Veracruz, Guerrero, Baja California Sur and Nuevo León on C. dactylon and in Guanajuato on Lolium perenne L. (new host record). This information will aid in the development of improved management tactics for Sphenophorus species attacking turfgrass in México.

Key Words: Sphenophorus, turfgrass, pest, distribution, Mexico

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