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Authors: Ordaz-González, Edith Lorena, Equihua-Martínez, Armando, León-García, Imelda, Jones, Robert W., Aragón, Agustín, et al.

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

EDITH LORENA ORDAZ-GONZÁLEZ[1], ARMANDO EQUIHUA-MARTÍNEZ[1,*], IMELDA LEÓN-GARCÍA[2], ROBERT W. JONES[3], AGUSTÍN ARAGÓN[4], RACIEL HERNÁNDEZ HERNÁNDEZ[5] AND SANTIAGO VERGARA PINEDA[3]

[1]Colegio de Postgraduados, Entomología y Acarología Km. 36.5, Carretera México-Texcoco Montecillo, Edo. de México, C.P. 56230. México

[2]Consejo Nacional Consultivo Fitosanitario. Colegio de Postgraduados. Entomología y Acarología. Km. 36.5, Carretera México-Texcoco Montecillo, Edo. de México, C.P. 56230, México

[3]Facultad de Ciencias Naturales, Universidad Autónoma de Querétaro. Avenida de las Ciencias s/n, 76230 Juriquilla, Querétaro, México

[4]Departamento de Investigación en Ciencias Agrícolas, Instituto de Ciencias, Benemérita Universidad Autónoma de Puebla. Calle Araucarias, San Manuel, Puebla, Pue, 72570

[5]Universidad Autónoma Chapingo. Parasitología Agrícola. Km. 38.5, Carretera México-Texcoco, Texcoco, Edo.de México, C.P. 56230, México

*Corresponding author; E-mail: equihuaa@colpos.mx

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 cicatristriatus* 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 cicatristriatus* (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"

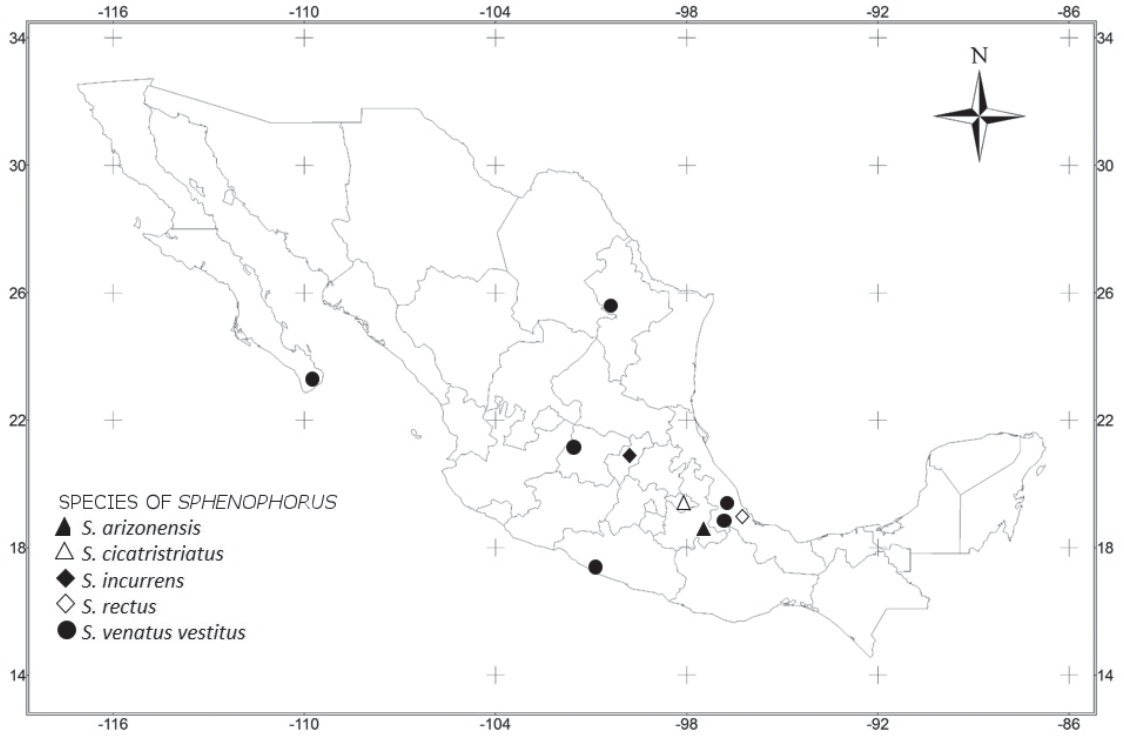

Fig. 1. Distribution of species of *Sphenophorus* collected from golf courses in Mexico.

-W 100° 20' 29.86") (Figs. 2I and 2J) representing a new state record for the insect.

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, *Lollium 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

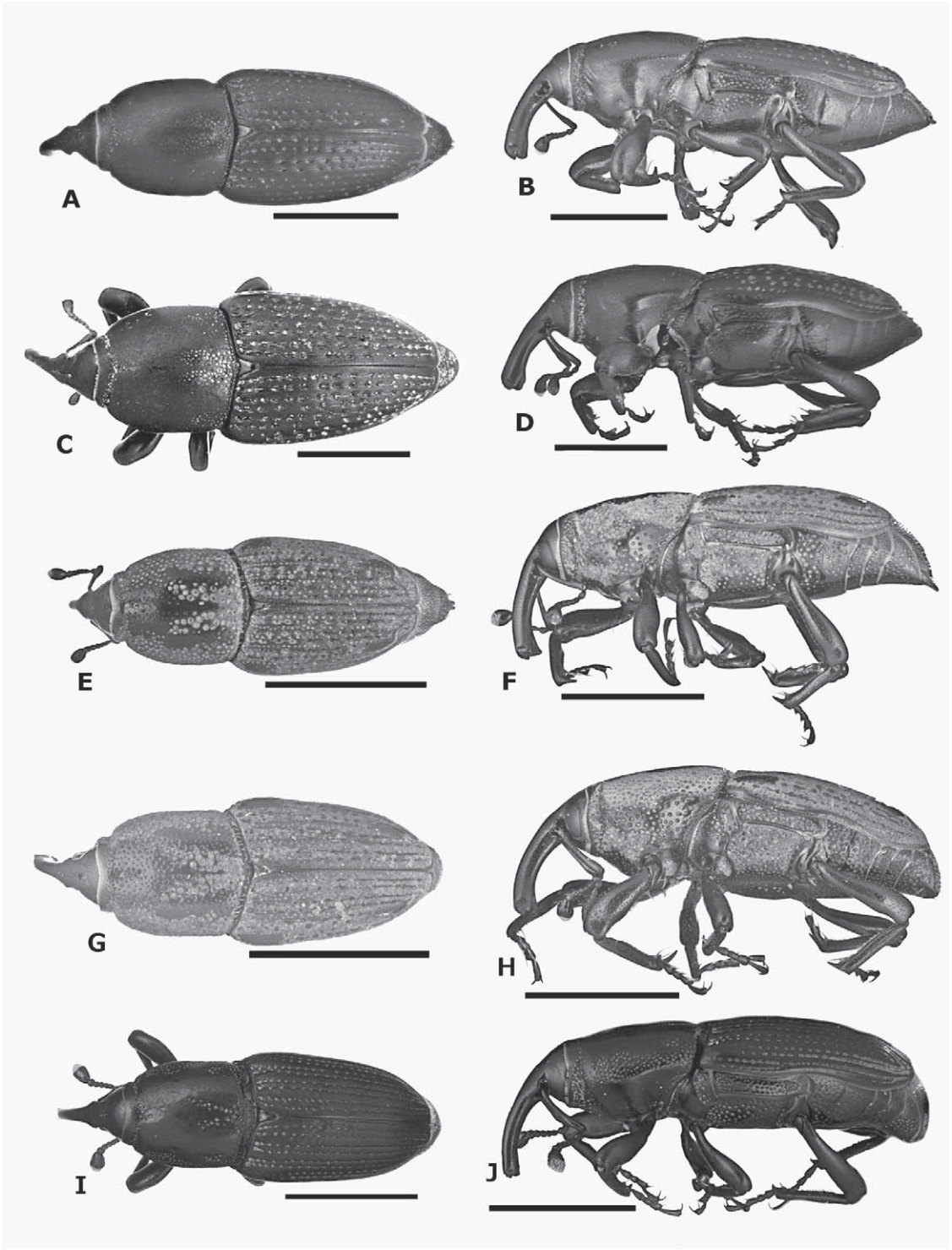

Fig. 2. A. dorsal, and B. lateral view of *Sphenophorus arizonensis*, (♀); C. Dorsal, and D. lateral view of *Sphenophorus cicatristriatus* (♀); E dorsal, and F, lateral view of *Sphenophorus rectus* (♀). G. dorsal, and H. lateral view of *Sphenophorus venatus vestitus* (♂); I. dorsal, and J. lateral view of *Sphenophorus incurrens* (♂). Scale indicates 3mm in all figures.

record); *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

RESUMEN

Se encontraron cinco especies de *Sphenophorus* asociadas a campos de golf en 7 estados de México en varias plantas hospederas; *Sphenophorus arizonensis* Horn en el estado de Puebla en *Paspalum vaginatum* Swartz (nuevo registro estatal y de hospedero); *Sphenophorus cicatristriatus* Fahraeus se colectó en Puebla en *Cynodon dactylon* (L.) Pers.; *Sphenophorus incurrens* Gyllenhal fue colectado en Querétaro en *Pennisetum clandestinum* Hochst. (nuevo registro estatal); *Sphenophorus rectus* (Say) se colectó en Veracruz en *P. clandestinum* (Nuevo hospedero); y *Sphenophorus venatus vestitus* Chittenden que fue colectado en Puebla, Veracruz, Guerrero, Baja California Sur y Nuevo León en *C. dactylon* y en Guanajuato en *Lolium perenne* L. (nuevo hospedero). Esta información generada contribuirá en el mejoramiento de las técnicas de manejo de especies de *Sphenophorus* que atacan pastos en los campos de golf en México.

Palabras Clave: *Sphenophorus*, pastos de campos de golf, plaga, distribución, México

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