New Record of The Billbug Genus *Sphenophorus* Schoenherr, 1838 (Coleoptera: Curculionidae: Dryophthorinae) From Egypt

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**ABSTRACT**

*Sphenophorus* weevils live on the ground, beneath the grass, and are known as primary pests because they lay eggs within the tissue of the stems of plants causing extensive damage to the stem, crown, and roots, leading to plant death. The adult is typically weevil-like in appearance with a short, broad, recurved snout. In the field of sugarcane crop located in Qena, Southern Egypt Individuals of billbugs appeared to look different morphologically from the most relative coexisted specimens. Specimens have been collected and sent to some world experts, they commonly suggested that the specimen is billbug species of the genus *Sphenophorus* but they cannot confirm the species. During the present work, the specimens were described, photographed, and identified using the available taxonomic keys and previous descriptions. The taxonomic work confirmed that the specimens belong to *Sphenophorus venatus* Chittenden (hunting billbug) and were reported for the first time from Egypt. This finding with data about damage, distribution, and host plants contributes to enriching lists of Egypt’s insect fauna and conservation of biodiversity.

**INTRODUCTION**

Curculionidae is a cosmopolitan family and among the largest in the order Coleoptera (about 48,000 species) (Name et al. 2007). Hunting billbug (*Sphenophorus venatus* Chittenden) was described by Chittenden (1904) as *S. vestitus* and was later placed under *S. venatus*. It is an important pest of many host species including most species of grasses and sedges (Huang and Buss, 2013). In Egypt, Curculionidae is represented by 301 species within 81 genera of 20 subfamilies. The Dryophthorinae were not recorded in Egypt in any of the available published sources, e.g., Alfieri (1976) in his valuable catalog "The Coleoptera of Egypt" didn’t record any member of this subfamily within Curculionidae, also, ministerial decree (Egypt), No 3007 (2018) concerning the quarantine pest list for Egypt, recorded *Sphenophorus venatus* under title "Unrecorded pests to be declined entry into Egypt". There are no valid publications mentioned and studied such groups in Egypt, therefore, the current work announced the genus *Sphenophorus* and *S. venatus* as recorded from Egypt for the first time. The genus *Sphenophorus* is the cosmopolitan genus (Alonso-Zarazaga and Lyal, 1999), with nine species recorded in the Palearctic Region (Alonso-Zarazaga, et al., 2017).

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MATERIALS AND METHODS

Insect Specimens’ Collection and Preserving:
The field survey was conducted on a sugarcane field in Qena governorate, southern Egypt in 2019. The specimens were collected by hand from the mud, roots, and stem of the plants (Figs. 1-4), killed and preserved in ethyl acetate, mounted on a paper card, and photographed.

Identification:
As the collected specimens differ from that of the Egyptian fauna, specimens were sent to some experts, namely, Dr. Lee Miller, University of Missouri, Division of plant sciences, Colombia, USA, Dr. Michael L. Ferro, Clemson University, South Carolina, Arthropod collection, department of plant and environmental sciences, USA and Dr. Nico Franz and Johnson, M. Andrew, Arizona State University, USA. They suggested that the specimens are billbug species of the genus *Sphenophorus* but couldn’t determine the species if they belong to *S. venatus* (as it is characterized by raised Y-shaped marking on the thorax) or *S. parvulus*. Identification is carried out depending on description and using taxonomic keys and any available images.

RESULTS AND DISCUSSION

Dryophthorinae:
The weevil of subfamily Dryophthorinae is one of the most economically important insect groups (Rugman-Jones et al., 2013; van Huis et al., 2013). Dryophthorinae includes about 1,200 species in 152 genera and five tribes (Anderson & Marvaldi, 2014; Oberprieler et al., 2007).

Diagnosis (After Vaurie, 1951):
Antennal club truncated cone, with a spongy distal part; funiculus with four to six articles; scrobe short. Prementum hidden. The apex of tarsal segment 5 with dorsal and ventral lobes extended between claws.

Genus *Sphenophorus* Schoenherr, 1838, (After Vaurie, 1951):
*Calendra* Clairville and Schellenberg, 1798, New York Ent. Soc., vol. 26, p. 210.
Pierce, 1919, Proc. Ent. Soc. Washington, vol. 21, p. 26.
*Calandra*, Latreille, 1810, Consideration’s generals, insects, pp. 223, 431 [genotype].
CSIKI, 1936, in Junk, Coleopterorum catalogues, pt. 149, p. 49.
*Sphenophorus* Schoenherr, 1838, Genera et species curculionidum, vol. 4, p. 874.
Genotype: *Calendra abbreviata* Fabricius, 1798, Halle, Saxony.

Nomenclatorial Notes:
This genus was formerly called *Calendra* Clairville and Shellenberg, (in some publications. International Commission of Zoological Nomenclature (ICZN), consulting experts, finally rejected the names *Calendra* and they recommended the *Sphenophorus* as the valid name (ICZN 1958, 1959).

*Sphenophorus venatus* (Figs. 5&6):
*Rhynchophorus venatus* Say, 1831, Description of new species of Curculionites of North America, p. 22.
*Sphenophorus venatus*, Horn, 1873, Proc. Amer. Phil. Soc., vol. 13, p. 426. Chittenden, 1904, Proc. Ent. Soc. Washington, vol. 6, p. 133.
*Calendra venatus*, Satterthwait, 1931, Ann. Ent. Soc. Amer., vol. 24, p. 162; 1932, U. S. Dept. Agr., Farmers’ Bull., no. 1003, pp. 16, 17, figs. 9, 25. Satterthwait, 1942, Ent. News, vol. 53, p. 42.
*Rhynchophorus immrninis* Say, 1831, Description of new species of Curculionites of...
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North America, p. 23.
*Rhynchophorus placidus* Say, 1831, loc. cit.
*Sphenophorus placidus*, Gyllenhal, 1838, in Schoenherr, *Genera et species curculionidum*, vol. 4, p. 947.
*Sphenophorus confusus* Gyllenhal, 1838, in Schoenherr, *op. cit.*, vol. 4, p. 944.
*Sphenophorus fallax* Boheman, 1845, in Schoenherr, *op. cit.*, vol. 8, pt. 2, p. 256.
*Type locality:* "The United States." Type destroyed.
*Neotype locality:* Watch Hill, Rhode Island, July 11, 1909 (W. Robinson). Neotype, male, new designation, in the American Museum of Natural History.

Figs. (1-3) Sugarcane crop infested with adult billbugs, (4) Larva infested sugarcane, (5&6) *Sphenophorus venatus*, (5) Dorsal view, (6) Lateral view.

**Description:**

Body, small to medium; black or dark red, bare, or coated; pronotum with three bare vittae, the median enclosing an apical depression, the laterals not reaching the apex; elytra variable, but strial punctures much larger than interval punctures.

Rostrum (from the side) curved, compressed, broader at apex, base with
puncture between eyes and depression of concentrated punctures. Eye reaching below the 
insertion of the rostrum.

Thoracic lobe present. Pronotum with three feebly or strongly raised, not well-
defined, bare strips, the median Y shaped, often disappearing towards the base, enclosing 
an ill- or well-defined, round subapical depression of dense or merging punctures, the 
lateral vittae narrow or broad, straight, or oblique, raised in basal one-half or two-thirds 
only. Scutellum narrower than long, sometimes grooved.

Elytra variable, bare or coated, in all or part, smooth or rugose, third and fifth 
intervals usually somewhat raised and somewhat wider than other intervals; striae with a 
large round or oval punctures six to eight times larger than interval punctures and cutting 
into intervals, making their sides sinuous. Under surface finely or coarsely punctured. 
Legs, front tibiae with an outer apical angle not prolonged, all tarsi with third segment 
narrow, longer than wide, below mostly smooth, with sparse hair at sides. Pygidium with 
tufts of hair at apex at sides.

Comparison:

The closest species to Sphenophorus venatus (hunting billbug) is S. parvulus 
(bluegrass billbug) (Huang and Buss, 2013). The hunting billbug is slightly larger than 
the bluegrass billbug, the pronotum of the adult has uneven punctures and tubercles, 
marked with a bare Y-like shape enclosed in parentheses (Kuhn, et al. 2013). The 
Sphenophorus venatus also has grooves on its elytra, more distinct in the S. parvulus. In 
addition, the life history of the Sphenophorus venatus appears to be similar to that of the 
S. parvulus, but hunting billbug adults are nocturnal, and eggs are deposited in or around 
feeding scratches made by the female on plant stems (Huang and Buss, 2009).

During the field survey, some specimens (belonging to the genus Sphenophorus) 
were found very similar to the S. venatus but differ in that the marks on the pronotum are 
not as distinct as S. venatus, they need critical examination (They may be S. 
cicatristriatus or S. phoeniciensis).

Geographical Distribution:

Sphenophorus venatus is geographically distributed across the Atlantic and 
Pacific coasts and the southern US, additionally, it has been reported in Hawaii, Puerto 
Rico, Mexico, the Bahamas, the Dominican Republic, Martinique, and Japan (Marsden 
1979, O’Brien and Wibmer 1982, Hatsukade 1997).

Hosts of Hunting Billbugs:

Timothy hay (Phleum pratense L.), Bermuda grass (Cynodon dactylon (L.)), wheat 
(Triticum aestivum L.), yellow nutsedge (Cyperus esculentus L.), corn (Zea mays L.), 
sugarcane (Saccharum officinarum L.) (Satterthwait 1931, Woodruff 1966, Oliver 1984). 
Sphenophorus venatus was reported as a pest on orchard grass (Dactylis glomerata L.) 
(Kamm, 1969).

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REFERENCES

Alfieri, A. (1976). The Coleoptera of Egypt. Memoires de la Societe entomologique 
d’Egypte, (5): 80-244.
Alonso-Zarazaga M.A. and Lyal, C.H.C. (1999): A world catalog of families and genera
of Curculionoidea (Insecta: Coleoptera) (excepting Scolytidae and Platypodidae). *Entomopraxis, S. C. P.*, Barcelona, Vol. 2258: 315 pp.

Alonso-Zarazaga, M. A.; Barrios H.; Borovec R.; Bouchard P.; Caldara R. *et al.* (2017). Cooperative Catalogue of Palaeartic Coleoptera Curculinoidea., Monografías electrónicas SEA 8 Sociedad Entomológica Aragonesa S.E.A.www.sea-entomologia.org, Zaragoza (Spain), (2):7pp.

Anderson, R.S. and Marvaldi, A. E. (2014). Dryophthorinae Schoenherr, 1825. In: Leschen R.A.B., Beutel R.G. (Eds). Handbook of Zoology, Coleoptera, Beetles, *De Gruyter, Göttingen*, (3): pp. 477–483.

Chittenden, F. H. (1904). On the species of *Sphenophorus* hitherto considered as *simplex* Le Conte. Proc. *Entomological Society. Washington*, 6: 127-130.

Hatsukade, M. (1997). Biology and control of the hunting billbug, *Sphenophorus venatus vestitus* Chittenden, on golf courses in Japan. *International Turfgrass Society Research Journal*, 8: 987-996.

Huang, T. I. and Buss, E. A. (2009). Billbug (Coleoptera: Curculionidae) species composition, abundance, seasonal activity, and developmental time in Florida. *Journal of Economic. Entomology*, 102: 309–314.

Huang, T. I. and Buss, E. A. (2013). "*Sphenophorus venatus vestitus* (Coleoptera: *Curculionidae*) preference for bermudagrass cultivars and endophytic perennial ryegrass overseed." *Florida Entomologist*, 96(4), 1628–1630.

ICZN (International Commission on Zoological Nomenclature). (1958). Report on the question of the application of the generic name “*Calandra*” Clairville & Schellenberg, 1798 (Class Insecta, Order Coleoptera) and matters incidental thereto. *The Bulletin of Zoological Nomenclature*, 16: 5–47.

ICZN (International Commission on Zoological Nomenclature). (1959). Opinion 572. *The Bulletin of Zoological Nomenclature*, 17: 112–116.

Kamm, J. A. (1969). Biology of the billbug *Sphenophorus venatus confluens*, a new pest of orchardgrass (*Dactylus glomeratus*). *Journal of economic entomology*, 62: 808-812.

Marsden, D. A. (1979). How to control the hunting billbug. *Entomology Notes*, vol. 2. Hawaii Cooperative Extension Service, Manoa, HI.4 pp.

Ministerial Decree (Egypt), No 3007. (2018). Unrecorded pests to be declined entry into Egypt. Egypt, Ministerial Decree No 3007/ 2001, pp. 1-74. https://silo.tips/queue/ministry-of-agriculture-land-reclamation-ministerial-decreeno-of-2001concernin/?queueid=1&v=1655210466&u=MTh3LjU3LjQwLjIxMg

Name, K. P. O.; Giuliano, P. F. D. R. and Sônia, N. B. (2007). An ultrastructural study of spermio genesis in two species of *Sitophilus* (Coleoptera: *Curculionidae*). *Biocell*, 31(2): 229-236.

Oberprieler, R. G.; Marvaldi, A. E. and Anderson, R. S. (2007). Weevils, weevils, weevils everywhere. *Zootaxa*, 1668: 491–520.

O’Brien, C. W. and Wibmer, G. J. (1982). Annotated Checklist of the Weevils (*Curculionidae sensu lato*) of North America, Central America, & the West Indies (Coleoptera: *Curculionidae*). *Memoirs of the American Entomological Society*, (34): 1-382.

Oliver, A. D. (1984). The hunting billbug - one among the complex of turfgrass insect and pathogen problems. *American Lawn Applicator*, 5: 24- 27.

Rugman-Jones, P. F.; Hoddle, C. D.; Hoddle, M. S., and Stouthamer, R. (2013). The lesser of two weevils: molecular genetics of pest palm weevil populations confirm *Rhyynchophorus vulneratus* (Panzer 1798) as a valid species distinct from *R. ferrugineus* (Olivier 1790) and reveal the global extent of both. *PLOS
One, 8(10) e78379. https://doi.org/10.1371/journal.pone.0078379.

Satterthwait, A. F. (1931). Key to known pupae of the genus Calendra, with host-plant and distribution notes. *Annals of the Entomological Society of America*, 24: 143-172.

Van Huis, A.; Itterbeek, J. V.; Klunder, H.; Mertens, E.; Halloran, A.; Muir, G., and Vantomme, P. (2013). Edible insects: Future prospects for food and feed security. *Food and Agriculture Organization of the United Nations*, 171: 213 pp.

Vaurie, P. (1951). Revision of the genus Calendra (formerly sphenophorus) in the United States and Mexico (Coleoptera, Curculionidae). *Bulletin of the American Museum of Natural History*, 98 (2): 9-186.

Kuhn, R. W.; Youngman, R.R.; Wu S. and Laub, A.C. (2013). Ecology, Taxonomy, and Pest Management of Billbugs (Coleoptera: Curculionidae) in Orchard grass of Virginia. *Journal of Integrated Pest Management*, 4(3) 5pp.

Woodruff, R. E. (1966). The hunting billbug, *Sphenophorus venatus vestitus* Chittenden, in Florida (Coleoptera: Curculionidae). *Florida Department of Agriculture Entomology Circular 45*, University of Florida, Gainesville, FL. 4 pp. doi.org/10.32473/edis-IN364-2001

ARABIC SUMMARY

تسجيل جديد لجنس

*(SPHENOPHORUS SCHOENHERR, 1838 (COLEOPTERA: CURCULIONIDAE: DRYOPHTHORINAE))

للمرة الأولى من مصر

وقد طلعت قناع حسين المغربي، هالة محي الديرت، و منال السيد عبد العزيز الشاعر 

1- قسم وقاية النبات - مركز بحوث الصحراء – القاهرة

2- كلية العلوم جامعة الأزهر، قسم حيوانات و الحشرات

تعتبر الأنواع المختلفة من السوس التابع لجنس *Sphenophorus* من الآفات الاقتصادية الأساسية و هي أرضية المعيشة حيث تضع بيضها تحت أرضيات الساق والتابعة الممتقة و الجذور، مما يسبب في موت النبات. خلال الدراسة الحالية تم رصد أفراد من السوس في أحد حقول السوس في محافظة كفر الشيخ، مما يسبب بعض الخبراء في قلطة السوس، وقد أقترحوا إجماعًا أن العينات هي نوع ما ينتمي لجنس *(Curculionidae)* لكنهم لم يستطيعوا تأكيد النوع. في الدراسة الحالية تم إجراء دراسة تصنيفية لتعريف النوع و تأكيده حيث تم تحويل العينات ووصفها وتصنيفها وتصويرها مع أشخاص من الخبراء في فصيلة السوس واجناسه و انواعه. وبيانها وتسجيلها في أنواع السوس و تأكيد هوية السوس. كما تم استخدام مفاتيح التصنيف الخاصة بفصيلة السوس واجناسه و انواعه وحصلت على النتائج التي تحققها. النتائج التي تحققها هي أن العينات تتسمي إلى نوع *Sphenophorus venatus* Chittenden في مصر وهو ما يعتبر أول تسجيل له من مصر (كجنس و كنوع). تساهم هذه النتائج مع البيانات حول الأهمية الاقتصادية و الضرر والتوزيع والتبادلات العائلة في إثراء وتصحيح قوائم الحشرات في مصر والحفاظ على التنوع البيولوجي.