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Record of the Long-horned Beetle, *Derobrachus hovorei* Santos-Silva, 2007: (Coleoptera: Cerambycidae), being Accidentally Transported to Ohio, USA

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Hovore's long-horned beetle, *Derobrachus hovorei* (Coleoptera: Cerambycidae), is a large species native to the southwestern United States and northern México. On 30 June 2017, one adult male *D. hovorei* was collected inside an office building in Dayton, Ohio, having been transported in baggage on a commercial aircraft from Scottsdale (Phoenix), Arizona to Ohio on the previous day (29 June). This is the first report of this species outside of its native range in the United States and México and demonstrates how insects can be transported accidentally over great distances via modern transportation.

El longicornio de Hovore, *Derobrachus hovorei* (Coleoptera: Cerambycidae), es una gran especie nativa del suroeste de los Estados Unidos y el norte México. En el 30 de juno 2017, un adulto masculino de *D. hovorei* fue recogido dentro de un edificio de oficinas en la ciudad de Dayton en el estado de Ohio. El longicornio fue transportado en el equipaje en un avión comercial de la ciudad Scottsdale (Phoenix) en el estado de Arizona al estado de Ohio en el día anterior (el 29 de juno). Este es el primero informe de esta especie de la región más allá de la extensión nativa en los Estados Unidos y México y tambien demuestra cómo los insectos pueden transportarse accidentalmente a distencias largas por los tranportes modernos.

KEYWORDS: long-horned beetle, geographic distribution, accidental transport.

Many terrestrial and aquatic invertebrates and vertebrates have been transported, both accidentally and purposefully, to areas outside of their natural distribution. Species of beetles, spiders, crustaceans, reptiles, and amphibians, among others, have been moved great distances for hundreds of years primarily on ships capable of crossing seas and oceans. More recently, because of increased and more rapid international trade of goods, human travel, and the pet trade, importations of nonnative species has increased dramatically (Allen 1928; Kauffeld 1932; Lanteri and Marvaldi 1995; McLaughlin et al. 2005; Lingafelter and Nearns 2006; Liebhold et al. 2006; McCullough et al. 2006; Beatty et al. 2008; Krysko et al. 2011; Rochford et al. 2015). The United States has approximately 50,000 introduced species of plants and animals (Pimentel et al. 2000; Pimentel et al. 2005), many of which require control measures to reduce their negative ecological and economic impacts. Nonnative species of plants and animals cause numerous problems, and the cost of damages and control measures was estimated to be about 120 billion dollars or more per year in the United States alone, which is likely an underestimate (Pimentel et al. 2000; Pimentel et al. 2005). Insects in particular can become serious pests of agricultural or ornamental plants and forest trees (Young et al. 1950; Herms and McCullough 2014; Haack et al. 2015). The white-

fringed beetle, *Naupactus leucoloma* Boheman, 1840 (Curculionidae), has both sexual and parthenogenetic populations and has been introduced to several continents, including North America, outside of its native range in South America (Lanteri and Marvaldi 1995; Voss and Poly 2002; Guzmán et al. 2012). The emerald ash borer, *Agrilus paniplennis* Fairmaire, 1888 (Buprestidae) is a far-eastern Asian beetle species introduced into North America; its infestations of ash trees have decimated populations of several ash tree species (Haack et al. 2002; Haack 2006; Herms and McCullough 2014; Haack et al. 2015; WJP, pers. obs.). Some introductions are interstate movements (the case herein), whereas others are intercontinental (Lanteri and Marvaldi 1995; Lingafelter and Nearns 2006; Guzmán et al. 2012). Nonnative species introduced into a new area sometimes exist in low numbers for years, then rapidly expand, whereas others experience rapid population expansion. In some cases however, established populations of nonnative species decline and even become extirpated (Simberloff and Gibbons 2004).

The taxonomy of the cerambycid genus *Derobrachus* has been revised and updated during the past decade, resulting in the recognition of 21 valid species in the genus (Santos-Silva 2007; Heffern and Santos-Silva 2016; Santos-Silva et al. 2018). Herein, the accidental transport of a large cerambycid beetle, *Derobrachus hovorei* Santos-Silva, 2007 from Arizona to Ohio is documented.

Materials and Methods

The beetle was collected alive inside an office building in Dayton, Ohio, Montgomery Co., Ohio (Lat./Long.: 39.759756°N / -84.180624°W) on 30 June 2017 by William J. Poly; it was photographed, kept alive for several days in captivity, then was frozen until 29 July 2018 when it was preserved in 95% EtOH. The beetle was identified using Santos-Silva (2007) and subsequent descriptions of new species of *Derobrachus* (Heffern and Santos-Silva, 2016; Santos-Silva et al., 2018). The specimen was deposited in the Entomology collection of the California Academy of Sciences, San Francisco, CA (CAS ENT 8277806 (n = 1 male, 52.4 mm TL)).

Results and Discussion

After returning on a roundtrip flight from Dayton, Ohio (origin) to Scottsdale (Phoenix), Arizona (26–29 June 2017), the traveler was startled to find a large insect inside her shoulderbag on the following day (30 June) and notified the author of its presence. Presumably it had entered the bag at the hotel or at some point in transit in Scottsdale, Arizona. The beetle was collected and identified on 30 June 2017 as a long-horned beetle, *Derobrachus* sp. Later it was identified further as a male *Derobrachus hovorei* based on possession of the following characters listed in the key of Santos-Silva (2007) (see Fig. 1): 1) scutellum glabrous, 2) internal lateral face of protibiae with longitudinal furrow, 3) antennomere III distinctly thickened and expanded apically; urosternite V equal to IV, apex broad and semicircularly emarginated; urosternite VI exposed, 4) antennomere III robust, thickened apically, apical width equal to or greater than one-third of segment length (W 2.2 / L 6.2 = 0.35), and 5) pronotal disc not rugose, glabrous, antennae not attaining elytral apex, and 6) antennomere III distinctly coarsely granulate on lateral and/or ventral face (in this specimen on about basal 2/3, not apically); pilosity of metasternum relatively long and very abundant; lobes of metatarsomere III with an apical spine (spine sometimes lacking, but the lobes are uniformly acuminate from apical third or fourth). Sutural apex of each elytra with a small, distinct spine (also possessed by other species of *Derobrachus*).

Until the recent revision of *Derobrachus*, *D. hovorei* had been included within *D. geminatus* LeConte, 1853, and *D. geminatus* and *D. leechi* Chemsak and Linsley, 1977 have overlapping distributions with *D. hovorei* (LeConte, 1853; Chemsak and Linsley 1977; Santos-Silva 2007).

The distribution of *D. hovorei* includes five states in the United States (Nevada, California, Arizona, New Mexico, Texas) and five states in México (Sonora, Chihuahua, Coahulia de Zaragoza, Durango, Nuevo Leon) (Santos-Silva 2007). Now there is one verified record of this species being transported to Ohio accidentally on a commercial aircraft. The closest record of a species of *Derobrachus* to Ohio is that in Klingeman et al. (2017), which included a single record of *D. brevicollis* Audinet-Serville, 1832 from Coffee Co., south-central Tennessee. There weren't any other collection data associated with that record; however, *D. brevicollis* is known from North Carolina, South Carolina, Alabama, Georgia, and Florida (Santos-Silva 2007) and Tennessee (Klingeman et al. 2017).

FIGURE 1. Dorsal view of *Derobrachus hovorei* Santos-Silva, 2007 (male, 52.4 mm TL) (CAS ENT 8277806).

Haack (2002) reported interceptions of insects by the United States Department of Agriculture, Animal and Plant Health Inspection Service (APHIS) on shipments entering the United States from 1985 to 2000; there were 1,649 interceptions of cerambycid beetles, including 81 genera. During the period 1985 to 2000, there were 422 interceptions of wood-associated insects in Ohio (Haack 2006). Eyre and Haack (2017) summarized information on the various pathways by which cerambycid beetles get transported to new locations. The numerous interception records for cerambycids associated with wood products or packaging brought into the United States from 1984 through 2008 (n = 3,483) and identified to species (n = 677) included one occurrence for *D. geminatus* originating from México (Eyre and Haack 2017). It is suggested here that the species identity *D. geminatus* might require confirmation considering recent updates to the taxonomy of *Derobrachus* spp. (Santos-Silva 2007; Heffern and Santos-Silva 2016; Santos-Silva et al. 2018). Another known case of a large cerambycid beetle having been transported a great distance was the collection of a then-new species, *Phoenicus sanguinipennis* Lacordaire, 1869, taken from a shipment of dyewood carried from the Caribbean to Poland on a ship (Lingafelter and Nearns 2006). The accidental transport of pest insects via passenger baggage and cargo has been treated in detail by other authors recently (Liebhold et al. 2006; McCullough et al. 2006; Meurisse et al. 2019) and typically involves live plants or fruits harboring the pest insects. There have been relatively high numbers of detections made by APHIS, but as only about 2% of cargo gets checked (Haack 2002; McCullough et al. 2006), the number of known detections must be much lower than actual occurrences (Haack, 2006), and cases such as the one documented herein must occur more frequently and go unnoticed or undocumented, with insects either being detected by the traveler and being killed or discarded, evading detection and escaping at its destination, or dying naturally (desiccation, starvation).

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References

Allen, W.R. 1928. Banana stowaways. *Copeia* No. 169:98–99.

Beatty, J.A., J.W. Berry, and B.A. Huber. 2008. The pholcid spiders of Micronesia and Polynesia (Araneae, Pholcidae). *The Journal of Arachnology* 36(1):1–25.

Chemsak, J.A., and E.G. Linsley. 1977. Review of the species of *Derobrachus* Audinet-Serville occurring in the United States (Coleoptera: Cerambycidae). *Journal of the Kansas Entomological Society* 50(4):508–514.

Eyre, D., and R.A. Haack. 2017. Invasive cerambycid pests and biosecurity measures. Ch. 13, Pages 563–618 *in* Q. Wang, ed., *Cerambycidae of the World: Biology and Pest Management*. CRC Press, Boca Raton, Florida, USA. i–xiii + 1–628 pp.

Guzmán, N.V., A.A. Lanteri, and V.A. Confalonieri. 2012. Colonization ability of two invasive weevils with different reproductive modes. *Evolutionary Ecology* 26(6):1371–1390.

Haack, R.A. 2002. Intercepted bark- and wood-boring insects in the United States: 1985–2000. *Michigan Entomological Society Newsletter* 47(3–4):14–15.

Haack, R.A. 2006. Exotic bark- and wood-boring Coleoptera in the United States: Recent establishments and interceptions. *Canadian Journal of Forest Research* 36(2):269–288.

Haack, R.A., E. Jendek, H. Liu, K.R. Marchant, T.R. Petrice, T.M. Poland, and H. Ye. 2002. The emerald ash borer: a new exotic pest in North America. *Michigan Entomological Society Newsletter* 47 (3–4):1–5.

Haack, R.A., Y. Baranchikov, L.S. Bauer, and T.M. Poland. 2015. Emerald Ash Borer biology and invasion history. Chapter 1, Pages 1–13 *in* R.G. Van Driesche and R.C. Reardon, eds., *Biology and Control of Emerald Ash Borer*. Technology transfer (United States. Forest Health Technology Enterprise Team); FHTET (Series), 2014-09. United States Department of Agriculture, Forest Service, Forest Health Technology Enterprise Team, 2015. Morgantown, West Virginia, USA.

Heffern, D., and A. Santos-Silva. 2016. New species and new record of Cerambycidae (Coleoptera) from Mexico, with updates to type depository for two species of Disteniinae. *Zootaxa* 4072(5):569–578.

Herms, D.A., and D.G. McCullough. 2014. Emerald Ash Borer invasion of North America: history, biology, ecology, impacts, and management. *Annual Review of Entomology* 59:13–30.

Kauffeld, C.F. 1931[1932]. *Lacerta melisellensis fiumana* at Philadelphia. *Copeia* 1931(4):163–164.

Klingeman, W.E., N.N. Youssef, J.B. Oliver, and J.P. Basham. 2017. The longhorned beetles (Coleoptera: Cerambycidae) of Tennessee: distribution of species, seasonal adult activity, and new state records. *The Florida Entomologist* 100(2):292–302. [+ supplemental material]

Lanteri, A.A., and A.E. Marvaldi. 1995. *Graphognathus* Buchanan a new synonym of *Naupactus* Dejean and systematics of the *N. leucoloma* species group (Coleoptera: Curculionidae). *The Coleopterists Bulletin* 49(3):206–228.

LeConte, J.L. 1853. Description of twenty new species of Coleoptera inhabiting the United States. *Proceedings of the Academy of Natural Sciences of Philadelphia* 6(6):226–235.

Liebhold, A.M., T.T. Work, D.G. McCullough, and J.F. Cavey. 2006. Airline baggage as a pathway for alien insect species entering the United States. *American Entomologist* 52(1):48–54.

Lingafelter, S.W., and E.H. Nearns. 2006. Rediscovery and redescription of the remarkable *Phoenicus sanguinipennis* Lacordaire (Coleoptera: Cerambycidae: Trachyderini) from the Dominican Republic. *The Coleopterists Bulletin* 60(3):199–206.

McCullough, D.G., T.T. Work, J.F. Cavey, A.M. Liebhold, and D. Marshall. 2006. Interceptions of nonindigenous plant pests at US ports of entry and border crossings over a 17-year period. *Biological Invasions* 8(4):611–630.

McLaughlin, P.A., D.K. Camp, M.V. Angel, E.L. Bousfield, P. Brunel, R.C. Brusca, D. Cadien, A.C. Cohen, K. Conlan, L.G. Eldredge, D.L. Felder, J.W. Goy, T. Haney, B. Hann, R.W. Heard, E.A. Hendrycks, H.H. Hobbs III, J.R. Holsinger, B. Kensley, D.R. Laubitz, S.E. LeCroy, R. Lemaitre, R.F. Maddocks, J.W. Martin, P. Mikkelsen, E. Nelson, W.A. Newman, R.M. Overstreet, W.J. Poly, W.W. Price, J.W. Reid, A. Robertson, D.C. Rogers, A. Ross, M. Schotte, F.R. Schram, C.-T. Shih, L. Watling, G.D.F. Wilson, and D.D. Turgeon. *Common and Scientific Names of Aquatic Invertebrates from the United States and Canada*: *Crustaceans*. American Fisheries Society, Special Publication 31, Bethesda, Maryland, USA. i–xiii + 1–545 pp.

Meurisse, N., D. Rassati, B.P. Hurley, E.G. Brockerhoff, and R.A. Haack. 2019. Common pathways by which non-native forest insects move internationally and domestically. *Journal of Pest Science* 92(1): 13–27.

Pimentel, D., L. Lach, R. Zuniga, and D. Morrison. 2000. Environmental and economic costs of non-indigenous species in the United States. *BioScience* 50(1):125–139.

Pimentel, D., R. Zuniga, and D. Morrison. 2005. Update on the environmental and economic costs associated with alien-invasive species in the United States. *Ecological Economics* 52(3):273–288.

Rochford, M.R., J.M. Lemm, K.L. Krysko, L.A. Somma, R.W. Hansen, and F.J. Mazzotti. 2015. Spreading holiday spirit and Northwestern Salamanders, *Ambystoma gracile* (Caudata: Ambystomatidae), across the USA. *IRCF Reptiles & Amphibians* 22(3):126–127.

Santos-Silva, A. 2007. Revisão do gênero *Derobrachus* Audinet-Serville, 1832 (Coleoptera, Cerambycidae, Prioninae). *Arquivos de Zoologia* 38(1):1–94.

Santos-Silva, A., N. Mal, M. van Roie, and M. Jocqué. 2018. A new species of *Derobrachu*s Audinet-Serville, 1832 (Coleoptera, Cerambycidae, Prioninae) from a cloud forest in Honduras. *Zootaxa* 4422(3):395–402.

Simberloff, D., and L. Gibbons. 2004. Now you see them, now you don't! – population crashes of established introduced species. *Biological Invasions* 6(2):161–172.

Voss, S.C., and W.J. Poly. 2002. First record of a whitefringed beetle, *Naupactus leucoloma* Boheman, 1840, in Illinois. *Transactions of the Illinois State Academy of Science* 95(2):141–142.

Young, H.C., B.A. App, J.B. Gill, and H.S. Hollingsworth. 1950. *White-Fringed Beetles and How to Combat Them*. U.S. Department of Agriculture Circular 850. 15 pp.