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A NEW DISTRIBUTIONAL RECORD FOR *HAIDEOPORUS TEXANUS* (COLEOPTERA: DYTISCIDAE), A STYGOBIONTIC BEETLE FROM THE EDWARDS AQUIFER, TEXAS[1]

David E. Bowles[2], Ruth Stanford[3]

ABSTRACT: *Haideoporus texanus* recently was collected from the Edwards Aquifer at Comal Springs, New Braunfels, Texas. This is a significant new distributional record for this rare subterranean beetle formerly known only from an artesian well in San Marcos, Texas, suggesting the species may be more widely distributed in the Edwards Aquifer than previously thought.

The Edwards Aquifer located in south-central Texas has the highest known diversity of endemic subterranean aquatic species in the world (Longley 1981). Presently, there are 44 endemic, stygobiontic species reported from this aquifer (Bowles and Arsuffi 1993, Spangler and Barr 1995). Spangler (1996) defined stygobiontic species as those found almost exclusively in all their developmental stages in subterranean aquatic habitats and exhibiting various morphological adaptations associated with such habitats. Adaptations to subterranean habitats may include reduction or loss of eyes, loss of hindwings in some insects, greatly elongated sensory setae on the body and appendages, and decreased pigmentation and sclerotization of the integument (Young and Longley 1976). Represented among the primarily crustacean fauna of the Edwards Aquifer are three beetles (Coleoptera) including *Haideoporus texanus* Young and Longley (Dytiscidae: Hydroporinae), *Comaldessus stygius* Spangler and Barr (Dytiscidae: Bidessini), and *Stygoparnus comalensis* Barr and Spangler (Dryopidae). Stygobiontic beetles occurring in the United States have been reviewed by Barr and Spangler (1992), Larson and LaBonte (1994), Longley and Spangler (1977), Spangler and Barr (1995), and Young and Longley (1976).

Haideoporus texanus previously was known only from an artesian well located on the campus of Southwest Texas State University in San Marcos, Texas (Young and Longley 1976, Longley and Spangler 1977). The well was drilled into the San Marcos pool of the Edwards Aquifer in the late 1800's and has been the source for most of the collections of stygobiontic species from the aquifer. Recent collections from natural spring orifices at Comal Springs in New Braunfels, Texas, also yielded examples of *H. texanus*. Comal Springs,

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the largest spring system in Texas, issues from the San Antonio pool of the Edwards Aquifer approximately 24 km south of the artesian well in San Marcos. This new collection record shows that *H. texanus* is more widely distributed in the Edwards Aquifer than previously thought. However, the complete extent of this species' distribution in the aquifer remains unknown. The Edwards Aquifer extends for approximately 282 km from Brackettville in Kinney County northward to Georgetown in Williamson County and varies from eight to 48 km in width (Klemt et al. 1979, Barker et al. 1994). Numerous springs and wells occur in this broad area (Brune 1981) and *H. texanus* eventually may be found at other locations fed by the aquifer.

Several studies have shown that the Edwards Aquifer is being rapidly depleted due to excessive groundwater pumping (Longley 1992), and water quality is threatened by the encroachment of poor quality, saline water (Perez 1986, Barker et al. 1994) and contamination from the surface. Because of these threats, some of the unique and diverse aquatic fauna inhabiting the aquifer is at risk of extinction (Bowles and Arsuffi 1993). Recently, the United States Fish and Wildlife Service published proposed rules for listing some of these species as endangered though *H. texanus* was not among them (Stanford and Shull 1995).

Three adult specimens were collected by placing Wildco® stream drift-nets (363 µm mesh) at various orifices at Comal Springs for 24 hours on various sampling dates during 1993-1994. Samples were preserved in the field with 70% isopropyl alcohol and the beetles were later removed and pinned. Specimens are deposited in the National Museum of Natural History, Washington, DC (NMNH), the Essig Museum of Entomology, Berkeley, California (EME), and the Texas A&M University Entomological Collection, College Station, Texas (TAMU). Immature stages were not collected during this study.

SPECIMENS EXAMINED: United States, Texas, Comal County, New Braunfels, Landa Park, Comal Springs, spring-run 2, D. E. Bowles, and R. Stanford, 24-hour drift net, Oct 1993, 1 ♂ (NMNH); same data, but spring run 3, 26 Jan 1994, 1 ♀ (TAMU); same data, but Apr 1994, 1 ♀ (EME).

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LITERATURE CITED

Barker, R.A., P. W. Bush, and E. T. Baker, Jr. 1994. Geologic history and hydrogeologic setting of the Edwards-Trinity aquifer system, West-central Texas. U.S. Geol. Surv., Water-Res. Investig. Rep. 94-4039, Austin, Texas. 51 pp.

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Brune, G. 1981. Springs of Texas, vol. 1. Branch-Smith, Inc., Ft. Worth, Texas. 566 pp.

Klemt, W. B., T. R. Knowles, G. R. Elder, and T. W. Sich. 1979. Ground-water resources and model applications for the Edwards (Balcones Fault Zone) Aquifer in the San Antonio region, Texas. Texas Dept. Water Res. Rep. 239: 1-88.

Larson, D. J., and J. R. LaBonte. 1994. *Stygoporus oregonensis*, a new genus and species of subterranean water beetle (Coleoptera, Dytiscidae, Hydroporinae) from the United States. Coleopt. Bull. 48:371-379.

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Longley, G. 1992. The subterranean aquatic ecosystem of the Balcones Fault Zone Aquifer in Texas – threats from overpumping. pp. 291-300. In: J. A. Stanford and J. J. Simons [eds.], Proc. First Intern. Conf. on Groundwater, Am. Water Res. Assoc., Bethesda, Maryland.

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Perez, R. 1986. Potential for updip movement of saline water in the Edwards Aquifer, San Antonio, Texas. U.S. Geol. Surv., Water-Res. Investig. Rep. 86-4032, Austin, Texas. 21 pp.

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LITERATURE CITED

Milne, L. J. and M. J. 1944. Notes on the behavior of burying beetles (*Nicrophorus* spp.). J. N. Y. Entomol. Soc. 52:311-327.

Pukowski, E. 1933. Okologische untersuchungen an *Necrophorus* F. Z. Morph. Okol. Tiere. 27:518-586.

Shubeck, P. P. 1971. Diel periodicities of certain carrion beetles (Coleoptera: Silphidae). Coleopt. Bull. 25:41-46.

Shubeck, P. P., N. M. Downie, R. L. Wenzel, and S. B. Peck. 1981. Species composition and seasonal abundance of carrion beetles in an oak-beech forest in the Great Swamp National Wildlife Refuge (N.J.). Entomol. News. 92:7-16.

SYNAPTONECTA ISSA (HETEROPTERA: CORIXIDAE), FIRST NEW WORLD RECORD OF AN ASIAN WATER BUG IN FLORIDA[1]

J. T. Polhemus[2], R. P. Rutter[3]

ABSTRACT: The Asian corixid *Synaptonecta issa* was first discovered in south Florida in October 1993. A single male was taken in a dipnet sample from an herbaceous depressional wetland in St. Lucie County, Florida. Its presence in Florida may be the result of commercial trade in aquarium plants. Despite state regulation and federal inspection, there is ample opportunity for the importation and subsequent release of foreign aquatic insects.

Synaptonecta issa (Distant) was discovered in Florida when a single male was taken in a dipnet sample from an herbaceous depressional wetland in St. Lucie County, south Florida, in October 1993. The wetland was one of two, measuring 3.6 and 7.8 h, that had been constructed in the spring of 1990. Both wetlands were disked with donor mulch from nearby wetlands to help establish aquatic vegetation, and some shoreline was made contiguous with natural wetlands to promote water and propagule exchange. Both wetlands were qualitatively sampled again in April 1994, but no *S. issa* were found; the only corixid found was *Sigara bradleyi* (Abbott). Sampling was conducted again in October 1995, at which time several adults and immatures of *S. issa* were collected from two locations in the wetland where the species was first found. Water depth was 51 cm, and predominant vegetation was maidencane (*Panicum hemitomon*), umbrella grass (*Fuirena scirpoidea*), fragrant water lily (*Nymphaea odorata*), and the filamentous alga *Spirogyra* sp. No specimens were recorded from the other constructed wetland, although it was only 46 m distant and had periodically experienced exchange of surface water.

In September 1994, a single adult female was collected in a dipnet sample from the shoreline of oligotrophic Lake Viola in Highlands County, south central Florida. The predominant vegetation in the sample area was torpedograss (*Panicum repens*), spikerush (*Eleocharis* sp.), and associated filamentous algae. Values for selected physiochemical parameters measured at the time of sampling were: water temperature 30° C, specific conductance 227 µmhos/cm, pH 7.8 (8.2 in March 1994), and alkalinity 34 mg/l. No other corixids were collected in the sample.

A multitude of other habitats in south Florida, with varying water quality

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