

## REPORTING A NEW LOCALITY FOR *Voyria aphylla* (GENTIANACEAE) ON ISLA DE UTILA, HONDURAS

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**RESUMEN:** La diversidad botánica y floral de las Islas de la Bahía, Honduras, ha recibido poca atención científica. Aquí se informa una localidad adicional para la especie micoheterotrófica *Voyria aphylla* (Jacq.) Pers. (Gentianaceae), desde el interior del bosque de pantanos mixtos y el hábitat de la sabana neotropical en la Isla de Utila.

**PALABRAS CLAVE:** Bosque de Pantano, Distribución, Flora, Honduras, Islas de la Bahía, Saprófito, Sabana Neotropical.

**ABSTRACT:** The botanical and floral diversity of Islas de la Bahía, Honduras; has received little scientific attention. Here we report an additional locality for the mycoheterotrophic species *Voyria aphylla* (Jacq.) Pers. (Gentianaceae), from within mixed swamp forest and neotropical savannah habitat on Isla de Utila.

**Key Words:** Distribution, Saprophytic, Swamp Forest, Neotropical Savannah, Flora, Islas de la Bahía, Honduras

**INTRODUCTION:** Utila is the smallest and western most of the three major Bay Islands (Utila, Roatan, and Guanaja) and part of the Cayos

Cochinos archipelago, situated off the Caribbean coast of Honduras. Of these major islands, Utila is positioned closest to the mainland, located approximately 32 km NNW from the city of La Ceiba in the Honduran Department of Atlántida. **Most** of its surface is covered by swamp forests, mangroves and neotropical savanna (Fickert and Gruninger, 2010; Fawcett *et al.* 2016). Swamp forests and mangroves are characteristic zonal ecosystems of the (sub) tropics. While mangroves occupy brackish and salty environments such as shorelines, lagoons and estuaries, further in-land, many different types of moist forests occur in freshwater environments (for Central American wetlands see Ellison, 2004). Neotropical savannas exhibit unique patterns of floral and faunal diversity that are poorly understood, and botanically, such habitats on Isla de Utila have not received much scientific attention. On Utila, these wetland habitats provide important ecosystem services and furthermore support much of the **island's** biodiversity, including populations of endemic reptiles (Pasachnik *et al.* 2012; Brown *et al.* 2017; D. Maryon. pers.comm.).

**METHODS:** The following floral records were opportunistically documented while performing standardized research and visual encounter surveys for reptiles in swamp forest and neotropical savannah habitats; Research Permit (Resolución DE-MP-054-2017

Dictamen técnico ICF-DVS-169-2017; Dictamen técnico DAP-068-2017); for the project “Conservación de los reptiles y anfibios de Utila, Honduras” issued in part to TWB of Kanahau (KURCF) by the Instituto Nacional de Conservación y Desarrollo Forestal, Áreas Protegidas y Vida Silvestre (ICF), Tegucigalpa, Honduras. During such biological surveys, we seek to opportunistically record all biodiversity present to better understand these ecosystems and their composition.

When new flora was encountered, GPS coordinates and photographic vouchers were taken to provide evidence of species occurrence at each location.

**RESULTS:** Here we present the first records of *Voyria aphylla* (Jacq.) Pers. (Gentianaceae), a mycoheterotrophic species on Isla de Utila, Isla de la Bahía, Honduras. On 15 March 2018, five separate clusters of *V. aphylla* were located within a patch of mature *Acoelorrhaphe wrightii* (Tique Palms), nearby to the Turtle Harbour Wildlife Refuge; the only protected terrestrial zone of habitats on Utila. The *V. aphylla* were encountered growing from the rotting bases of decaying *A. wrightii* palms and the surrounding leaf-litter, in low light closed canopy conditions (Figure 1).



Figura 1 The saprophytic *Voyria aphylla* growing from the rotting bases of decaying *Acoelorrhaphe wrightii* (Tique Palms) close to Turtle Harbour Wildlife Refuge (Photo credit: Tom Brown).

Notably, occurring sympatrically within 30 cm of *V. aphylla*, we also recorded numerous *Apteria aphylla* (Nutt.) Barnhart ex Small (Burmanniaceae) (Figure 2), also a mycoheterotroph; previously reported from Isla de Utila and importantly also only observed within such *Acoelorrhaphe* clones (Fawcett *et al.* 2016).



Figura 2. On Isla de Utila, the Mycoheterotroph *Apteria aphylla*, is only recorded occurring within *Acoelorrhaphe wrightii* leaf-litter (Photo credit: Tom Brown)

The habitat adjacent to either side of the locality was Swamp forest consisting of mature *Rhizophora mangle*, transitioning to neotropical savanna habitat composed predominantly of *Cladium jamaicense*, *Blechnum serrulatum*, and *Acrostichum danaeifolium*. To the best of our knowledge, *V. aphylla* has not previously been reported from Islas de la Bahía or formerly sympatrically alongside *A. aphylla* within *Acoelorrhaphe* clones.

**New Records:** Honduras; Isla de la Bahía; Isla de Utila (16°06.091'N, 086°55.068'W; 9m elev. (DDM). Tom W. Brown: 15 March 2018 (>10 individual specimens observed). Photographic vouchers taken and presented herein.

**Identification:** The genus *Voyria* Aubl. (Ghost-plants) contains 19 species distributed mostly in the rain forests of Central and South America, with one species in western tropical Africa

(Maas and Ruyters, 1986). In Honduras, *V. alba* (Standl.) L.O.Williams, *V. aphylla* (Jacq.) Pers., *V. parasitica* (Schltdl. et Cham.) Ruyters & Maas, *V. tenella* Hook. and *V. truncata* Standl. are currently registered (Nelson, 2008; Wilbur, 2015; Vegal *et al.* 2017). The *Voyria* genus is defined by its mycoheterotrophic and achlorophyllous nature, lacking chlorophyll for photosynthesis, but instead obtaining its energy by parasitizing mycorrhizal fungi on actively decomposing organic matter (Imhoff, 1999). Each species in this genus is identifiable by their reduced opposing scale like leaves and distinguished further by differences in formation of the flower and petal arrangement (e.g. Albert and Struwe, 1997). Notably, *Voyria* are often confused with other mycoheterotrophs of the Burmanniaceae family (e.g. *A. aphylla*), but they are differentiated by alternating leaves and 3 or 6 merous flowers and inferior ovary (Maas and Ruyters, 1986; Vega *et al.* 2017). Identification of *Voyria* to species level was achieved by comparison of other potentially occurring species, subsequently found to be *V. aphylla* (Jacq.) Pers. This species is characterized by having yellow, orange or white horizontally branching stems 15 – 30 cm tall, which form simple solitary trumpet-shaped flowers with 5-merous.

**DISCUSSION:** The seeds of the genus *Voyria* are amongst the smallest seeds known in the world. For example, filiform 'dust' seeds of *Voyria aphylla* are approximately 0.5-2 mm long and 0.003-0.1 mm in diameter (Maas and Ruyters, 1986). These seeds are provided with a rough, light-weight testa of air-filled cells with reticulate thickening and with two long projections which helps the seed to effectively disperse in wind. It is thus

not surprising to find that *V. aphylla* is widely distributed in tropical America (Figure 3), or indeed that its seeds are capable of dispersing to islands such as Utila. *Voyria aphylla* is the only species in that genus to occur at elevations of up to 1800 m (Maas and Ruyters, 1986).

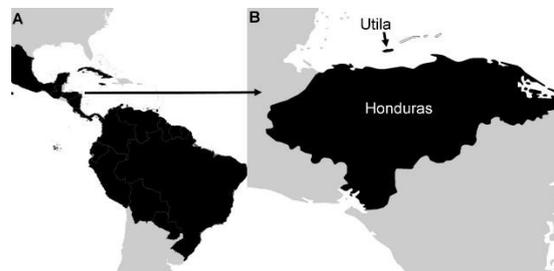


Figura 3. Distribution of *Voyria aphylla* (Jacq.) Pers. in South and Mesoamerica (A) and the new locality of *V. aphylla* on Utila Island, Honduras (B).

Until 1986 *V. aphylla* was mostly recorded from South America, with fewer collections from Mesoamerica (Maas and Ruyters 1986). Numerous Gentianacea and *Voyria* species (including *V. aphylla*) were recently reported from Honduras (Vegal *et al.* 2017); though in this part of their range they remain little studied. The additional locality we report expands the known distribution of *V. aphylla* in Honduras, seeking to highlight the floral diversity of Isla de Utila and the need for comprehensive botanical research.

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**AUTHORS' CONTRIBUTIONS:** All authors contributed equally to the writing and publication of this manuscript. Tom W. Brown conducted field work and made the initial observations. Cristina Arrivillaga assisted in the formatting/writing of this manuscript. Sven Batke identified the species and provided additional literature, information and reviews.

### BIBLIOGRAPHY

Albert, V. A. and Struwe, L. 1997. Phylogeny and classification of *Voyria* (saprophytic Gentianaceae). *Brittonia* 49: 466-479.

Brown, T. W. D. Maryon and Lonsdale, G. 2017. Habitat diversification and natural history observations in *Norops utilensis* (Squamata; Dactyloidae) on Isla de Utila, Honduras. *Mesoamerican Herpetology* 4(3): 974-979.

Ellison, A.M. 2004. Wetlands of Central America. *Wetlands Ecology and Management* 12: 3-55.

Fawcett, S, T. Phillips, M. Strand, and Rebertus, A. 2016. Flora and ecology of a neotropical savanna, Utila, Bay Islands, Honduras. *Folia Geobot.* DOI 10.1007/s12224-016-9245-0

Fickert, T. and Gruninger, F. 2010. Floristic zonation, vegetation structure, and plant diversity patterns within a Caribbean mangrove and swamp forest on the Bay Island of Utila (Honduras). *Ecotropica* 16: 73-92.

Imhoff, S. 1999. Root morphology, anatomy and mycotrophy of the achlorophyllous *Voyria aphylla* (Jacq.) Pers. (Gentianaceae). *Mycorrhiza* 9: 33-39.

Maas, P. J. M. and Ruyters, P. 1986. *Voyria* and *Voyriella* (Saprophytic Gentianaceae) [Monograph 41]. *Flora Neotropica* 40/42:1-93.

Pasachnik, S. A., C. E. Montgomery, A. Martínez, N. Belal, S.

Clayson and Faulkner, S. 2012. Body size, demography, and body condition in Utila Spiny Tailed Iguanas, *Ctenosaura bakeri*. *Herpetological Conservation and Biology* 7(3): 391-398.

Vega, H., Hernández, D. J., Cetzal, W., Romero-Soler, K., Solis, M., and Mó, E. 2017. Nuevos registros de Gentianaceae y Lentibulariaceae para Honduras. *Rodriguésia* 68(2): 771-778.