

**PHYMATOCEROS STOTLER, W. T. DOYLE & CRAND.-STOTL., GEN. NOV. (ANTHOCEROTOPHYTA)****Raymond E. Stotler<sup>1</sup>, William T. Doyle<sup>2</sup> & Barbara J. Crandall-Stotler<sup>1</sup>**<sup>1</sup>Department of Plant Biology, Southern Illinois University, Carbondale, IL 62901-6509, U.S.A.<sup>2</sup>Department of Ecology and Evolutionary Biology, University of California, Santa Cruz, CA 95064, U.S.A.**ABSTRACT**

*Phymatoceros* Stotler, W. T. Doyle & Crand.-Stotl., **gen. nov.**, is described subsequent to study of the type specimen of *Anthoceros bulbiculosus* Brot. from Portugal and living material from both Portugal and California, U.S.A. This new genus is a segregate from *Phaeoceros* Prosk. but differs in several critical features, among them plastid structure, spore color, and the production of a single antheridium per antheridial chamber.

**KEY WORDS:** Anthocerotophyta, California, Hornworts, Mediterranean, *Phaeoceros*, *Phymatoceros*

During our study of the hornworts of California, a genus similar to, but distinct from, *Phaeoceros* Prosk. has been identified; the following Latin diagnosis is given here to make that name immediately available for use.

*Phymatoceros* Stotler, W. T. Doyle & Crand.-Stotl., **gen. nov.**

*Phymatoceros* differt a *Phaeoceros* chloroplastis sine pyrenoidibus, thallis fugacibus, ferentibus tubera plurima, locellis antheridorum continentibus unum tantum antheridium, et sporis fuscis ubi maturis.

Type Species: *Phymatoceros bulbiculosus* (Brot.) Stotler, W. T. Doyle & Crand.-Stotl., **comb. nov.**; Basionym: *Anthoceros bulbiculosus* Brot., Flora Lusitanica 2: 430. 1804[1805]. Neotypus: legit *Fernandes, Neves & Santos s.n.*, Coimbra, Portugal, 23.iv.1954, UC ! (acc. no. 985943).

The genus name is derived from the Greek *phyma*, -tos, n. tumor, growth and *keras*, -atos, n; *keros*, m [*ceros*- ] horn; in reference to the prolific tuber production of the thallus in this hornwort.

In contradistinction to all other hornworts, this monotypic genus possesses a suite of morphological traits that distinguish it from all other genera, but especially from *Phaeoceros* where the type species had previously been placed. As in most hornwort genera, it is characterized by the production of a single chloroplast per vegetative cell, but there are no pyrenoids in the plastids. Plants are dioicous rather than monoicous and are dimorphic. They are ephemeral, occurring in open, exposed sites during the rainy season with prolific tuber production. The gametophytes are narrow and do not form rosettes but rather grow as linear to lingulate thalli. Only a single antheridium develops in each antheridial chamber rather than 2 to 4 per chamber as in *Phaeoceros*. The spores are yellow as in *Phaeoceros*, only near the capsule base, above the intercalary meristem region where they are immature. In mature, field-dried capsules they become a fuscous brownish-black to black at the split capsule tips. The capsules split mostly on one side only rather than on two sides. Characteristics of secondary importance include the lack of schizogenous cavities in the thalli, smooth rhizoids, untiered antheridial jacket cells, sporophytes with an intercalary meristem, stomates, a columella, and thin-walled, multicellular pseudodelaters that lack spiral thickenings. We place *Phymatoceros* into Notothyladaceae (Milde) Müll. Frib. ex Prosk. subfamily Phaeoceroitoideae Hässel.

Proskauer (1957), in his detailed treatment of *Phaeoceros bulbiculosus* (Brot.) Prosk. ( $\equiv$  *Phymatoceros bulbiculosus*) reported this taxon as widespread in the Mediterranean region of Europe and Africa, and in North and South America. Although he referred to a

subspecies in California, he did not formally name one nor do we formally recognize the California populations as distinct (Stotler & Crandall-Stotler 2005).

#### SELECTED SPECIMENS EXAMINED

PORTUGAL. Cabris. Coimbra, nos taludes de uma vala, *Fernandes, Neves, & Santos s.n.* (UC, neotype of *Anthoceros bulbiculosus*); Baixo Alentejo, Parque Natural do Guadiana, Ribeira de Limas, 11.02.2004, *Sérgio s.n.* (LISU); Estremadura: Serra da Arrábida, Vila Nogueira de Azeitão, Casais de Porela, Piedade, Sito, 140m, 22.01.2005, *Sérgio s.n.* (ABSH, LISU). U.S.A. CALIFORNIA. Marin County, Mill Valley, Feb. 22, 1896, *Howe s.n.* (NY, holotype of *Anthoceros phymatodes*); Mill Valley, Mar. 19, 1892, *Howe s.n.* (NY (2), UC, paratypes of *Anthoceros phymatodes*); Santa Cruz County, Fuel Break Road nr. Junction with Red Hill Road, U. C. Santa Cruz, 6 May, 1996, *Doyle s.n.* (ABSH); San Luis Obispo County, El Chorro Regional Park, 550 ft., 26 April, 1998, *Doyle 9471* (ABSH); Mendocino County, North Coast Ranges, Little Lake Road, on soil in open areas, 540 ft., 14 May, 2003, *Doyle 10,421* (ABSH).

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#### LITERATURE CITED

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