

## WARMINGIA MARGARITACEA SP. NOV. (ORCHIDACEAE) FROM COSTA RICA AND A REVIEW OF THE GENUS<sup>1</sup>

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### ABSTRACT

The history of *Warmingia eugenii* Reichenb.f. is discussed and a new species, *Warmingia margaritacea*, is described from Costa Rica. A key to the species is provided and their distribution discussed. *Warmingia* Reichb.f. is newly recorded for Central America.

THE GENUS *Warmingia* (nom. cons.) was described by H. G. Reichenbach (1881) based on a flowering plant collected on 5 January 1865 in Lagoa Santa, Minas Geraes, Brazil by Eugen Warming<sup>2</sup>. Warming made careful notes during his stay at Lagoa Santa and he recorded that this plant (Orkide N° 62) was related to *Notylia* Lindl. After returning to Denmark in 1866, Warming sent most of his collections to specialists for determination. Reichenbach received the orchids, including "Orkide N° 62," and named both the genus and the species after Warming, *Warmingia eugenii* Reichb.f. Three other species of *Warmingia* have been described from Brazil and Ecuador: *W. loefgrenii* Cogniaux (1904) based on a plant from Franca in the province of Sao Paulo, Brazil; *W. holopetala* Kränzlin (1920) based on another of Warming's collections from Lagoa Santa; and *W. zamorana* Dodson (1989) based on a plant from Zamora-Chinchipe, Ecuador.

During a field trip to Central America in 1988 a new species of *Warmingia* was discovered at C.A.T.I.E. (Centro Agronómico Tropical de Investigación y Enseñanza), Turrialba, Costa Rica.

***Warmingia margaritacea*** B. Johansen sp. nov.  
TYPE: COSTA RICA, Turrialba, C.A.T.I.E. Epiphytic on *Hibiscus* sp. forming hedge, 600 m. 19

Nov. 1988, B. Johansen & M. Sørensen 138 (Holotype: C) (Fig. 1).

*Warmingiae zamorana* satis similis, foliis coriaceis, late lanceolatis, subfalcatis, inflorescentia pauciflora (2-4 floribus), petalis rhombicis, appendicibus columnae porro directis ab ea diversa. Flores ante anthesin semet ipsos pollinantes.

Epiphytic perennial herb to 7 cm high. **Roots** numerous, 1 mm in diameter, white, smooth. **Pseudobulbs** small, composed of one internode, conical to ovoidal, unifoliate, 7-8 mm tall, 3-4 mm wide, covered with 3-4 withering brown sheaths arising from the very short rhizomatous part of the shoot. **Leaves** coriaceous, lanceolate, somewhat falcate, 3.5-6.0 cm long including the 0.6-1.0 cm long petiole, 1.0-1.7 cm wide, dark green. **Inflorescence** 1-(2) racemose, pendent, emerging from the sheath at base of the pseudobulb, up to 3 cm long, with 2-3-(4) ivory-white, semi-opaque flowers. **Bracts** triangular, 6 mm long, 3 mm wide at the base. **Ovary** 8-9 mm long including the short pedicel. **Dorsal sepal** elliptic-lanceolate, slightly concave, with a carinate, acute apex, 8 mm long, 3 mm wide near the middle. With three prominent nerves. Margins entire. **Lateral sepals** similar to dorsal sepal, slightly falcate, 7 mm long, 3 mm wide. **Petals** rhomboid, 8 mm long, 5 mm wide, 5-nerved, slightly carinate at the apex, margins denticulate-erose to somewhat crispate. **Labellum** trilobed just above the base, 8 mm long, 9 mm wide across the sidelobes when spread out; sidelobes erect, transversely elliptic to reniform, 3 mm long, 5 mm wide, with erose-serrate margins; midlobe broadly ovate, acute 3 mm long, 3 mm wide, with erose-serrate margins, 3-nerved. **Callus** bilobed, deeply sulcate, appear to originate

<sup>1</sup>Thanks are due to Gitte Willumsen for her skillful line drawings. Dr. O. Seberg, Dr. R. L. Dressler and Dr. F. N. Rasmussen kindly commented on the manuscript. Dr. T. Christensen made the Latin diagnosis. Special thanks to Dr. M. Sørensen for inviting me to accompany him on the "Yam Bean collecting trip." The field trip was supported by the EEC under the STD2-program (Contract: TS2-0073-DK [AM]).

<sup>2</sup>Warming, E. *Orchidaceae brasiliensis* I. Unpublished manuscript. Central Botanical Library, University of Copenhagen, Denmark.

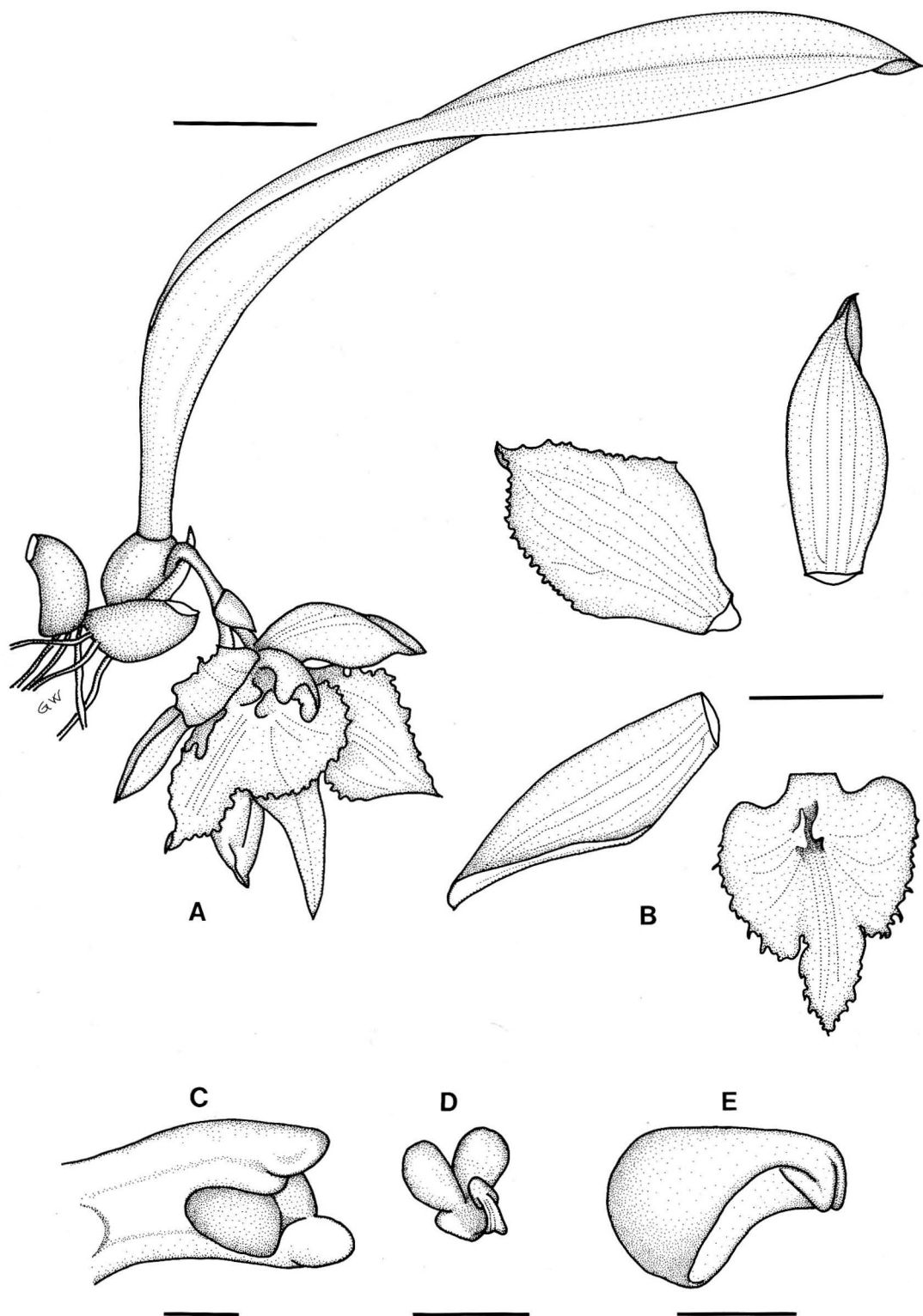


Fig. 1. *Warmingia margaritacea* B. Johansen, *sp. nov.* A. Plant. Bar = 5mm; B. Sepals, petal, and labellum (spread out). Bar = 3mm; C. Column. Bar = 1mm; D. Pollinarium, the stipe bent during self-pollination. Bar = 1mm; E. Anther cap. Bar = 1 mm.

from the base of the sidelobes. **Column** terete to semi-terete, 3 mm long, 1 mm wide, slightly expanded and with two appendages at the apex. Appendages erect, rounded. **Stigma** entire. **Anthercap** ovate, with a decurved truncate apex. **Pollinia** two, ovoid, yellow. **Stipes** obtriangular. **Viscidium** ovate, detachable. **Self-pollinating** by decurvature of the stipes before the flower opens. **Capsule** elliptic to obovate, 12 mm long, 8 mm wide. **Seed** with ivory-white testa.

**Etymology:** *margaritacea* (from Latin: *margarita* = pearl) describes the pearly appearance of the semi-translucent flowers.

### Taxonomy of *Warmingia*

*Warmingia* Reichb.f., Otia Bot. Hamb. 87, 1881.

Type species: *W. eugenii* Reichb.f.

Epiphytic, sympodial, perennial **herbs**. **Rhizome** short. **Pseudobulbs** small, consisting of one internode only. One single duplicate, pedicellate, articulate, more or less coriaceous **leaf** from the apex of the pseudobulb. **Inflorescence** lateral, few to many spirally arranged flowers. **Petals** with denticulate/erose margins. **Lip** trilobed, with denticulate/erose margins and a basal deeply sulcate callus. **Column** with two terminal, more or less decurving appendages. **Pollinia** two, yellow, on an obtriangular stipe.

The species of *Warmingia* are typical members of the Oncidiinae sensu Dressler (1981). Reichenbach (1881, 1900), Cribb (1976), and Bechtel et al. (1985) mention both *Macradenia* and *Notylia* as close relatives. However, *Notylia* only seems to share characters with *Warmingia* and *Macradenia* that are shared by most members of the Oncidiinae. *Macradenia* on the other hand shares the same type of lip (except for the callus) with *Warmingia*, an unusual lip shape in Oncidiinae, and both *Warmingia* and *Macradenia* show terminal column appendages. In *Macradenia*, however, the column appendage forms a denticulate cravat totally embracing the anther.

### Key to the species

1. Inflorescence many-flowered  
(up to 30) ..... *W. eugenii*
1. Inflorescence few (2-4)-flowered ..... 2
2. Petals ovate-elliptic, lip with yellow  
callus ..... *W. zamorana*
2. Petals rhombic, flowers pure ivory-  
white ..... *W. margaritacea*

*Warmingia eugenii* Reichb.f. Otia Bot. Hamb. 87, 1881. TYPE: BRAZIL. Minas Geraes, Lagoa Santa. *Warming* Orkide N° 62, pickled coll. 8697 (Holotype: C).

*W. loefgrenii* Cogn. Fl. Bras. 3(4):119, 1904. TYPE: Brazil, Sao Paulo, Franca *Comm. Geogr. et Geol. S. Paulo* 2044. (Holotype n.v.)

*W. holopetala* Kränzin, Vidensk. Medd. Nat. København 71:176, 1920. TYPE: Brazil, Minas Geraes, Lagoa Santa *Warming* s.n., (Holotype: C, pickled coll. 8625).

For a description of *W. eugenii*, see Cribb (1976).

Distribution: Brazil; Sao Paulo, Minas Geraes, Santa Catarina. Rio de Janeiro and Parana (*vide* Hoehne, 1949; Cribb 1976). Bolivia; Santa Cruz (*vide* Dodson & Vásquez, 1989).

Additional collections: Brazil, Lagoa Santa, *Warming* s.n., (C), pickled coll. 8622, 8623, 8624 (C).

**Nomenclatural notes:** Reichenbach received most of Warming's orchid material in 1870<sup>3</sup>, but only one of the collections of *W. eugenii*, "Orkide N° 62." Reichenbach also received the drawings of this plant made by Warming at Lagoa Santa, and these drawings were published along with the description of *W. eugenii* in 1881.

An examination of the pickled material of "Orkide N° 62" showed that several of the flowers in the inflorescence were missing when compared with the published drawing of the plant (Reichenbach 1900, fig. 226). Although it is possible that some flowers were removed by Reichenbach, there is no extant material in herb. Reichenbach (W) except the drawings and the Latin diagnosis (H. Riedl, pers. comm.), and only Warming's notes<sup>3</sup> makes it possible to justify "Orkide N° 62" as the holotype of *W. eugenii*.

A label marked "Orchidearum, Venezuela i/II-1864. Warming" was found in the jar containing the type of *W. eugenii*. It is not in Warming's handwriting and the text is confusing since Warming did not visit Venezuela until 1892. The label was probably placed in the jar by mistake.

Pabst (1954 a,b) considered *Warmingia loefgrenii* Cogn. to be synonymous with *W. eugenii*, which he claimed to be very variable. Studies of four collections of *W. eugenii* support Pabst's view on the variability of this species, which indeed appears to be variable with regard to size of the flower and form of the individual floral segments, and the serrate margins for the petals and lip.

I have not studied the type material of *W. loefgrenii*

<sup>3</sup>Warming, E. Notes on the Collections. Box 4, Central Botanical Library, University of Copenhagen, Denmark.

Cogn. but the drawings published by Cogniaux (1904: t.27,2) do not support its specific status. See Pabst (1954a:139-140) for a thorough discussion.

In his description of *W. holopetala*, Kränzlin claims that this species differs from *W. eugenii* by its entire petal margins, broader sidelobes of the lip, smaller flowers, and some minor differences in the structure of the column appendages. A study of the holotype of *W. holopetala* Kränzlin and comparison with four of Warming's other collections of *W. eugenii* proved, however, that *W. holopetala* did have sparsely denticulate-erose margins on the petals and that the column did not differ from the column of the holotype of *W. eugenii* Reichb.f. The size of the flowers and the form of the sidelobes of the lip seem to be within the limits of variation of *W. eugenii*. Thus, there seems to be no reason to maintain *W. holopetala* as a distinct species.

*Warmingia zamorana* Dodson, Ic. Pl. Trop., ser. II, t. 599, 1989. TYPE: ECUADOR. Zamora-Chinchi: Zamora, 1000 m., Dodson 3842 (Holotype: SEL, n.v.).

For description of *W. zamorana* see Dodson (1989).

Distribution: Ecuador, Zamora-Chinchi.

DISCUSSION—Self-pollination is much more frequent among the more primitive orchids than in the advanced groups (Dressler, 1981). Self-pollination is very unusual, especially among the predominantly insect pollinated (Dressler, 1981) and often self-incompatible (Clifford & Owens, 1988) members of the Oncidiinae. Self-pollination in *Warmingia margaritacea* takes place just before or while the flower opens. The stipe, still attached to the vicidium, bends forward and downward until the pollinia touches the stigma, much like the self-pollination in *Ophrys apifera* described by Darwin (1862). However, in *O. apifera* it is the caudicle that bends. Self-pollination by bending of the stipe can also be observed in plants of *Luisia zollingeri* Reichb.f. grown in the Botanic Garden, Copenhagen (pers. observation).

Nothing is known about how pollination is carried out in the two other species of *Warmingia*. However, when a keen observer like Warming did not mention self-pollination in *W. eugenii* there are reasons to believe that self-pollination does not take place in this species.

It seems remarkable that *W. zamorana* and *W. margaritacea* are found more than 3000 and 4000 km respectively from the nearest locality of *W. eugenii*

in Bolivia. However, such a disjunction is not unique, and several other taxa show a similar distribution pattern. *Corymborkis flava*, although more widely distributed in its northern range, Central America, the West Indies and northern South America, is found again in southern Brazil, northern Paraguay and Argentina (Rasmussen, 1977; fig. 14). Among other plant taxa showing the same disjunction are: (1) *Thismia* section *Ophiomeris* (Burmanniaceae) with four species in southern Brazil (Rio de Janeiro & Espirito Santo) and one species in Panama (Steenis & Balgooy, 1966; fig. 112), (2) the genus *Dicksonia* (Dicksoniaceae) in Central America and the Andes of Colombia, Ecuador and Venezuela in the north, and southern Brazil and northern Argentina in the south (van Steenis & van Balgooy, 1966; fig. 166), and (3) the *Acalypha cuspidata*-complex (Euphorbiaceae) (Seberg, 1984; fig. 7). Several animal taxa also show this distribution pattern, e.g., *Hydrachnellae* (Arachnidae) (Besch, 1969; fig. 11).

When, as above, several taxa show a similar disjunct distribution pattern, this is most parsimoniously explained as being caused by the same historical event, affecting all the involved taxa simultaneously, rather than by individual long-distance dispersal. The large geographic gap between the species of *Warmingia*, may thus reflect the true distribution pattern of the genus and need not be an artifact caused by undercollection of these easily overlooked small plants.

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