

THE GENUS *BRASSIA* IN COSTA RICA: A SURVEY OF FOUR SPECIES AND A NEW SPECIES¹

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ABSTRACT: The genus *Brassia* is discussed in general; its pollination syndrome, molecular phylogeny and taxonomic position. The four previously recognized Costa Rican species are discussed and a new species, *Brassia suavissima* Pupulin & Bogarín, is described.

THE BRITISH BOTANIST Robert Brown described the genus *Brassia* in 1813 to accommodate a group of species related to *Oncidium* that were characterized by long, almost caudate sepals and petals. The genus was dedicated to William Brass, botanical illustrator, who collected plants in West and South Africa under the employment of Sir Joseph Banks. The type species for the genus, *Brassia maculata*, was described in the second edition of *Hortus Kewensis* on the basis of a plant imported from Jamaica by J. Banks. In 1824, John Lindley transferred to Brown's genus *Epidendrum caudatum*, which was published by Linnaeus in 1763 on the basis of a name proposed by Plumier for a plant from the West Indies.

THE GENUS *BRASSIA*

The common name for *Brassia* species — spider orchids — refers to the characteristic shape of the flowers, which resemble large spiders. Apparently, this similarity is also the base of the pollination syndrome for *Brassia*. As noted by Dodson (van der Pijl and Dodson, 1966), species of *Brassia* are pollinated by female spider-hunter wasps of the genera *Pepsis* and *Campsomeris*. The wasps sting and paralyze the spider to drag it to the nest, where they lay an egg in the anesthetized body, which then serves as living food for the developing larva. Due to the mimicry of the flowers, the wasp stings the lip and repeatedly tries to drag its prey; during this unsuccessful effort, the pollinarium adheres to the insect's head. This observation was recently confirmed in southern Costa Rica, where large Pompilid wasps were observed trying to sting the flowers of *Brassia* cf. *caudata*.

¹We thank Marta Herra, Adolfo Quesada-Chanto, Rafael Ángel Valverde and Esteban Víquez Jiménez, of the Fundación Orquídeas de Costa Rica, for calling our attention to the distinctiveness of *Brassia* plants in their collections and for making material available for study. We also thank Gustavo A. Romero, Harvard University Herbaria, for providing documentation on *Brassia* species, and Norris H. Williams, Florida Natural History Museum, University of Florida, for his suggestions and observations that greatly improved this manuscript.

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Norris H. Williams segregated *Brassia* section *Glumaceae*, which includes the species with enlarged floral bracts and mostly reduced pseudobulbs, into the genus *Ada* (Williams, 1972). Species of the genus *Brassia* in the strictest sense can be easily recognized by the rather large plants with conspicuous, one- to two-leaved pseudobulbs, lateral inflorescences with small floral bracts, spider-shaped flowers with spreading, elongate sepals and the lip free from the column and a pollinarium provided with a narrow stipe.



Fig. 1. In some clones of *Brassia arcuigera*, individual flowers may be longer than 50 cm (20 inches). Photographs by Franco Pupulin.



Fig. 2. *Brassia arcuigera* is one of the most common species in Costa Rica, where it occurs at elevations ranging from 500–1,500 m (1,640–4,920 feet).



Fig. 3. *Brassia caudata* is a species from the lowlands that requires warm conditions and high humidity year round.

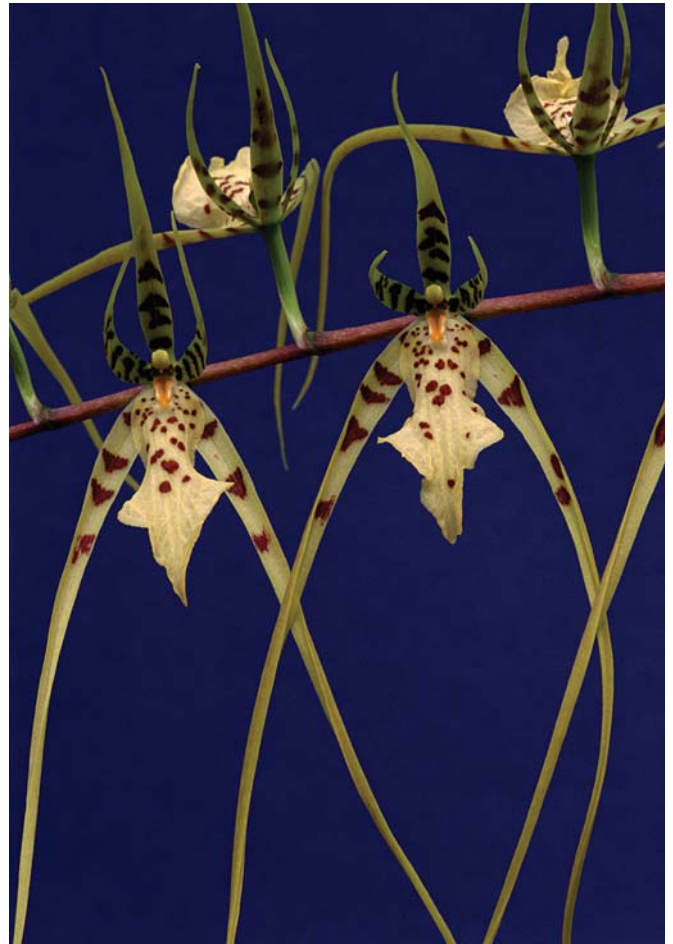


Fig. 4. *Brassia caudata* is the most widespread species in the genus. The flowers of Costa Rican populations are highly variable in size and color.

As understood today, the genus *Brassia* includes some 30 species distributed all around the American tropics from Florida and the West Indies to Brazil and Bolivia. The center of distribution of the genus is likely in the South American Andes, with Peru, with 15 species, hosting the highest diversity. A second center is in eastern Brazil and the Guyanas, with 11 and nine species respectively. Species diversity decreases toward the north, with five species recorded from Panama, four species from Costa Rica and Mexico and a single taxon from South Florida. The West Indies host three species of *Brassia*, but only *Brassia caudata* and *Brassia maculata* are truly Antillean (the former from Cuba, Hispaniola, Jamaica and Trinidad, the latter from Jamaica), the eminently South American *Brassia lanceana* having been recorded only from Trinidad. Some of the species present an unusually wide distribution, such as *B. caudata*, which has been recorded throughout the entire geographic range of the genus, or the variable *Brassia arcuigera*, reported from Costa Rica to Venezuela and Peru, but more than 50 percent of the species are endemic to a single country.

Molecular analyses carried out by Williams and coworkers (2001) assign *Brassia* to a mainly South American clade

including *Ada* (probably encompassing *Mesospinidium*), *Aspasia*, *Cischweinfia*, the Brazilian species of *Miltonia* and *Systemoglossum*.

Although the genus is morphologically well characterized among members of the Oncidiinae, the taxonomy of *Brassia* at the specific and subspecific levels has been controversial. Since its establishment, more than 60 names belonging to *Brassia* have been published, and recent views have been expressed about the taxonomic status of presumably well-understood taxa (Mora-Retana, 1999; Christenson, 2003; Dressler and Williams, 2003). As noted by Dodson (1999), the genus is obviously in urgent need of systematic revision.

THE GENUS *BRASSIA* IN COSTA RICA

In Costa Rica, four species of *Brassia* are recorded. *Brassia arcuigera* (Fig. 1, 2; pages 202, 203) was described by Reichenbach *f.* from a plant imported from Peru. The type in Reichenbach's Herbarium in Vienna shows a small flower compared with Costa Rican specimens, but flower size is variable also within single populations. The flowers of *B.*



Fig. 5. Probably the showiest of Costa Rican species, *Brassia gireoudiana* grows on the Pacific slopes of the Continental Divide in Costa Rica, where rainy and dry seasons are well defined.



Fig. 6. Some authors suggest that the correct name for the “warty-lipped” *Brassia verrucosa* from Costa Rica should be *Brassia brachiata*; others consider it just a subspecies of *Brassia gireoudiana*.

arcuigera in one population in Panama vary from about 10 cm (4 inches)—45 cm (18 inches) (N.H. Williams, pers. comm.). *Brassia arcuigera* is the only *Brassia* in Costa Rica with monophyllous (single-leaved) pseudobulbs, and the largest flowered species. It grows in premontane rainforest (mid-elevation rainforest with a rather warm climate), usually above 800 m (2,600 feet).

Brassia caudata (Fig. 3, 4) is probably the species with the widest distribution, ranging from Florida to Bolivia. It has flowers solidly marked with brown in the lower thirds of sepals and petals, and it grows in tropical lowland forest at lower elevations, from sea level to about 200 m (650 feet). Based on comparison of floral segments measurements, Dora Emilia Mora-Retana (1999) suggested that large-flowered populations of Costa Rican *B. caudata* from the Pacific drainage might perhaps represent an undescribed species.

Brassia gireoudiana (Fig. 5), from the semideciduous premontane forests (forest at mid-elevations where some tree species partially lose their leaves during the dry season) on the Pacific slope of southern Costa Rica (at elevations of 500–1,000 m [1,600–3,300 feet]), is one of the showiest species of the genus, with long inflorescences

and spectacular flowers to 25 cm (10 inches) high, green spotted with brown and with a whitish lip. Reichenbach and Warszewicz described the species in 1854 on the basis of a plant collected in Chiriquí. It is endemic (found only in) to southern Costa Rica and the adjacent Chiriquí region in western Panama.

The warty-lipped *Brassia* (Fig. 6) from Costa Rica has been generally treated as the *B. verrucosa* described by Lindley in 1840 based on a Mexican specimen cultivated by Messrs. Rollisson and illustrated in Bateman’s monumental *The Orchidaceae of Guatemala and Mexico*. However, Mora-Retana (1999) noted that plants from northern Nicaragua have smaller flowers and a rather unpleasant odor compared with their Costa Rican relatives. Recently, Eric A. Christenson (2003) suggested that Central American *Brassia* with verrucose lips belong to two different species. According to Christenson, the true *B. verrucosa*, with densely flowered racemes bearing 10 to 20 flowers decreasing in size toward the apex of the rachis, would be restricted to northern Mesoamerica from Mexico to Nicaragua, whereas populations ranging to Costa Rica and Panama would better correspond to *Brassia brachiata*, described by Lindley in 1842 from a Guatemalan collection

by Hartweg. Norris Williams (pers. comm.) noted that, in Central Costa Rica, specimens are found that mostly resemble the large-flowered *B. gireoudiana*, but also present on the lip are several small warts, typical of *B. verrucosa*, and he interpreted them as the possible result of past hybridization between the two species. Although a definite trend seems to exist toward an increase in flower size in specimens from Nicaragua and Costa Rica compared with more northern specimens, a more comprehensive field study of variation is required to verify Christenson's conclusions. On the other hand, Robert L. Dressler and N.H. Williams (2003) suggested that no clear distinction is evident between *B. gireoudiana* and *B. verrucosa*, reducing the latter to subspecific rank under a broad concept of *B. gireoudiana*.

A NEW SPECIES OF *BRASSIA*

A large sampling of *Brassia* flowers from different populations is actually on the way at Lankester Botanical Gardens, University of Costa Rica, to assess natural variation and specific limits among Costa Rican taxa (Pupulin and Quesada-Chanto, in prep.). During the collecting activities aimed at broadening our knowledge about distribution of *Brassia* species in less explored areas, a distinctive taxon was discovered along the Pacific slopes of the Talamanca range, and it is hereafter described as new to science:

Brassia suavissima Pupulin & Bogarín, *sp. nov.*

TYPE: Costa Rica. San José: Pérez Zeledón, Páramo, San Ramón Sur, toward Río Berlín, ca. 09°25'N 83°44'W, 1,420–1,640 m, collected by Esteban Viquez Jiménez, June 2003, flowered in cultivation in the collection of Marta Herra, 29 May 2004, *F. Pupulin 5236* (Holotype: USJ; Isotypes: CR, USJ-Spirit) (Fig. 7, 8).

Species Brassiae signatae Rchb.f. *similis, inflorescentiae dense multiflorae, labello niveo immaculato dentibus apicalibus conspicuis erectis rotundatis ornato, sepalis chloro-luteis immaculatis recedit.*

Plant epiphytic, caespitose to shortly creeping. **Rhizome** stout, the secondary stems produced 2.5–4.0 cm apart. **Roots** fleshy, flexuous, ca. 2 mm in diameter. **Pseudobulbs** narrowly elliptic-oblong, strongly complanate-ancipitous, 9.5–14 × 1.8–2.6 cm, apically 2- (rarely 1-) foliate, subtended at the base by 5–7 sheaths, the lower one triangular, acute, scarious, the upper one foliaceous. **Leaves** narrowly ligulate-elliptic, acute, subcoriaceous, 14.5–28 × 2.4–3.4 cm, constricted at the base into a conduplicate petiole ca. 1 cm long. **Inflorescence** a lateral raceme, emerging from the upper foliaceous sheath, many- (18–30) flowered, the flowers distichously arranged, to 35 cm long; peduncle terete, to 18 cm long, provided with 3–5 imbricating, triangular, acute bracts, to 8 × 5 mm. **Flower bracts** small, triangular, acute, 5 × 2.5 mm. **Ovary** pedicellate, terete to subclavate, 15 mm long including the pedicel. **Flowers** small for the genus, spreading, very scented (vanillalike), progressively smaller toward the inflorescence apex, the sepals and petals greenish yellow, the petals with pale brown blotches in the basal quarter, the lip white, with the callus basally bright yellow, the column greenish white. **Dorsal sepal** narrowly lanceolate, attenuate, 20–26 × 3.5–4.5 mm. **Lateral sepals**

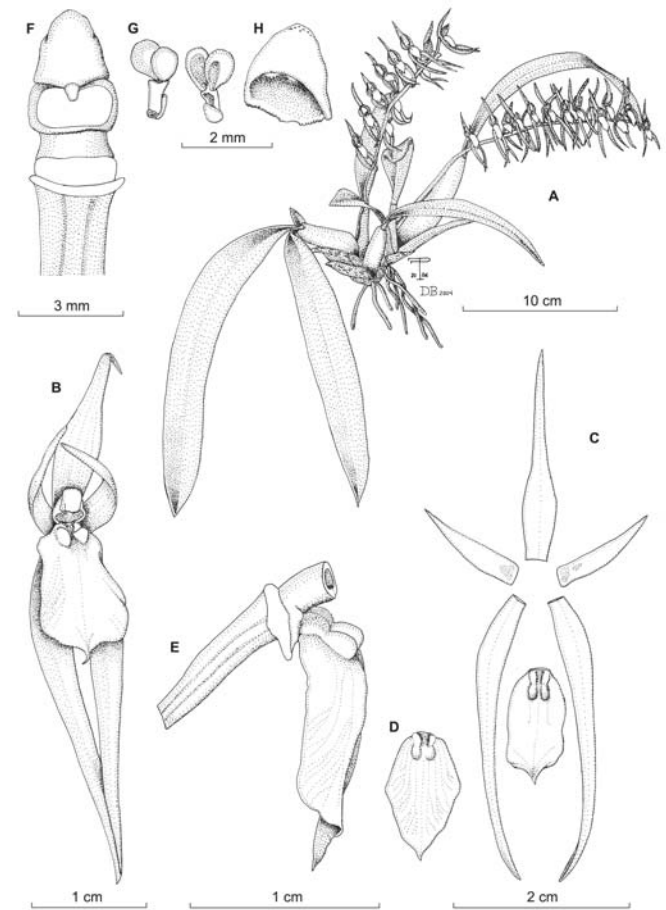


Fig. 7. *Brassia suavissima*. **A.** Habit. **B.** Flower. **C.** Dissected perianth. **D.** Lip. **E.** Column and lip, lateral view. **F.** Column, ventral view. **G.** Pollinarium, two views. **H.** Anther cap. A–C, E–H, from the holotype; D, from Viquez Jiménez 2. Drawing by the authors.

obliquely narrowly lanceolate, attenuate, 22–38 × 3–3.5. **Petals** porrect, the apices converging in natural position, elliptic-lanceolate, acuminate, 10–12 × 2–2.5 mm. **Lip** elliptic-subpandurate to ovate-rhombic, acute, shortly apiculate, 11–15 × 6–8.5 mm; disc with two parallel, erect keels, densely long-pubescent on interfaces, and two apical, distinct, rounded teeth. **Column** short, stout, terete, truncate, 3 mm long, the stigma transverse. **Anther cap** cucullate, ovate, papillose. **Pollinia** 2, obovate, on a small elliptic stipe, the margins infolded, abaxially provided with a narrow triangular keel; viscidium ovate-triangular, brown.

ADDITIONAL MATERIAL EXAMINED: Same locality of the type, *E. Viquez Jiménez 2* (USJ-Spirit; USJ-drawings).

DERIVATION OF NAME: From the Latin *suavissimus*, meaning very scented, in reference to the strong vanilla scent of the flowers.

DISTRIBUTION: Known only from the type locality in Costa Rica.

ECOLOGY: Epiphytic in lower montane moist forests (upland forest with intermediate temperatures) along the Pacific watershed of the Talamanca range, at 1,500 m (4,900 feet).



Fig. 8. The flowers of *Brassia suavissima* are small — less than 6 cm ($2\frac{3}{8}$ inches) long — and strongly scented.

Brassia suavissima differs from the Central American *B. signata* by the dense, many-flowered (18 to 30 flowers) inflorescence (lax, four- to 10-flowered, in *B. signata*), the presence of two conspicuous teeth in front of the linear keels at the base of the lip (absent in *B. signata*), and the unspotted floral segments (spotted with reddish-brown in *B. signata*). The new species is also somewhat reminiscent of the South American *B. lanceana*, from which it mainly differs by the calli at the apex of the basal keels of the lip, which are prominent, erect and rounded in *B. suavissima*, and inconspicuous in *B. lanceana*.

Brassias are easily grown, both on slabs and in pots, and they often produce large and showy specimens. *Brassia caudata* should be kept warmer than the other species, and high moisture should be retained year round.

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