

# Trichocentrum pupulinianum (Orchidaceae)

A New Species from Costa Rica and Panama Honors Lankester Botanical Garden's Head of Research

By Diego Bogarín and Adam P. Karremans



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LANKESTER BOTANICAL GARDEN'S (JBL by its name in Spanish) scientific history dates to 1979 when Dora Emilia Mora (1940–2001) became the first director. During her tenure, leading figures of orchidology, including John T. Atwood, Calaway H. Dodson, Robert L. Dressler, Eric Hágsater, Carlyle A. Luer and Franco Pupulin, main-

tained a strong scientific cooperation with the garden. The momentum of Mora and the garden's current director, Jorge Warner, changed the direction of Lankester from an experimental farm to its modern vision of a botanical garden with the main focus being research on orchids.

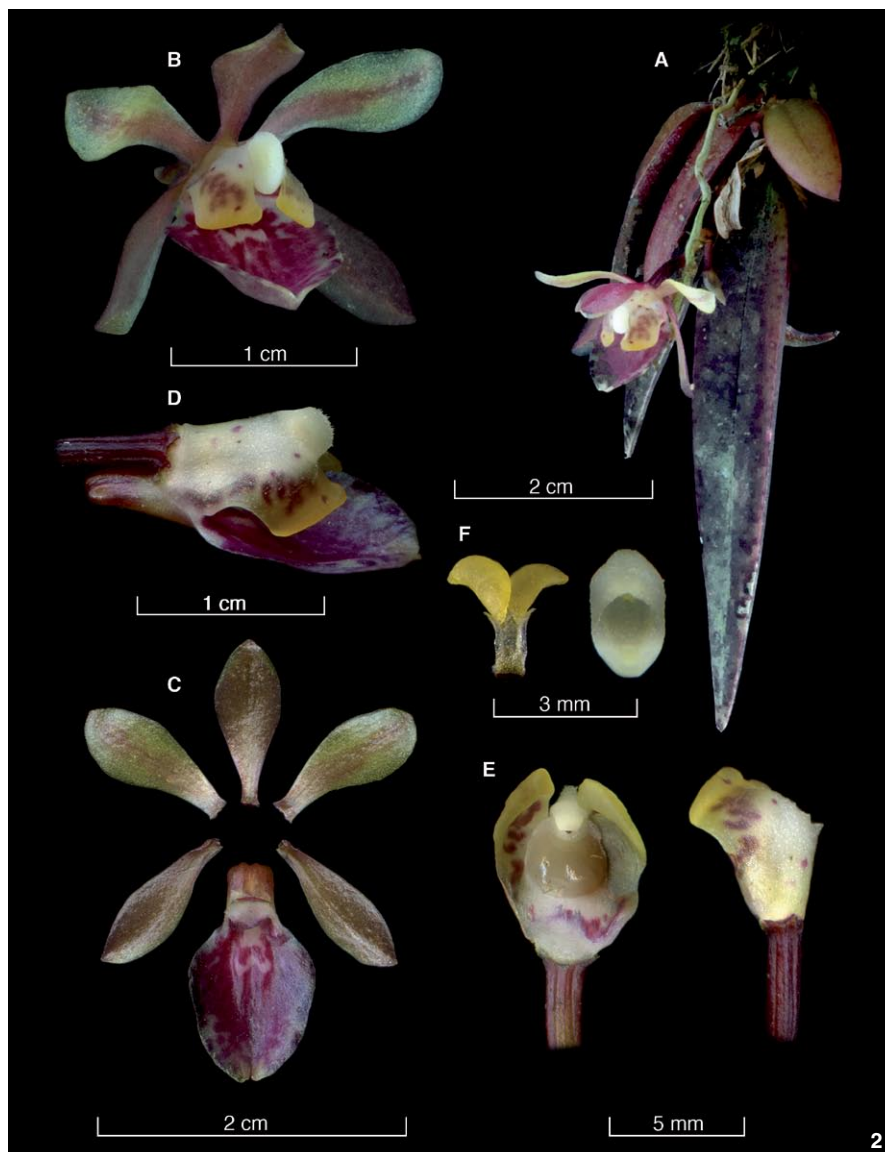


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Aside from the formal modifications in JBL's focus, and after the retirement and passing of Mora in 2001, the first person dedicated exclusively to studying orchids was employed. He was Franco Pupulin, a young eccentric Italian with great passion for Costa Rica, and even more for orchids. Pupulin, a journalist by profession, as well as an excellent photographer



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and illustrator, was looking to change his businesslike downtown-Milan lifestyle for a career in botany in the humid and seemingly lawless tropics (Fig. 1).

The combination of a willing director and an enthusiastic researcher was the formula for the slow but constant growth of the botanical garden. Ten years later, Pupulin is head of the research department at JBL. The department, made up of a handful of researchers and a dozen assistants, has organized two international conferences and is now the second most productive department at the University of Costa Rica, publishing almost 200 scientific articles in the last decade.

[1] Franco Pupulin's self-portrait.

[2] *Trichocentrum pupulinianum* Bogarín & Karremans. A. Habit. B. Flower. C. Perianth, flattened. D. Column and lip, lateral view. E. Column, ventral view. F. Anther cap and pollinarium. Plate from the holotype, A.P. Karremans et al. 3963 (JBL).

One of Pupulin's first interests (and passions) has been *Trichocentrum* Poepp. & Endl. His first articles treating Costa Rican orchids were published together with Mora. They published a monograph on *Trichocentrum* from Costa Rica (Pupulin and Mora-Retana 1994) and then a revision

of the whole genus a year later (Pupulin 1995), in all describing eight species and a subspecies as new to science.

When describing *Trichocentrum costaricense* Mora-Ret. & Pupulin, the authors compared it with *Trichocentrum caloceras* Endrés & Rchb.f. and *Trichocentrum capistratum* Linden & Rchb.f., both based on Costa Rican material without precise locality, collected by Augustus R. Endrés and Gustav Wallis, respectively. They concluded that populations of the two species found in the southern Pacific watershed of Cordillera de Talamanca (Pérez Zeledón and Buenos Aires) of Costa Rica could be referred to *T. caloceras* and *T. capistratum*, whereas *T. costaricense* is typical of the Caribbean watershed.

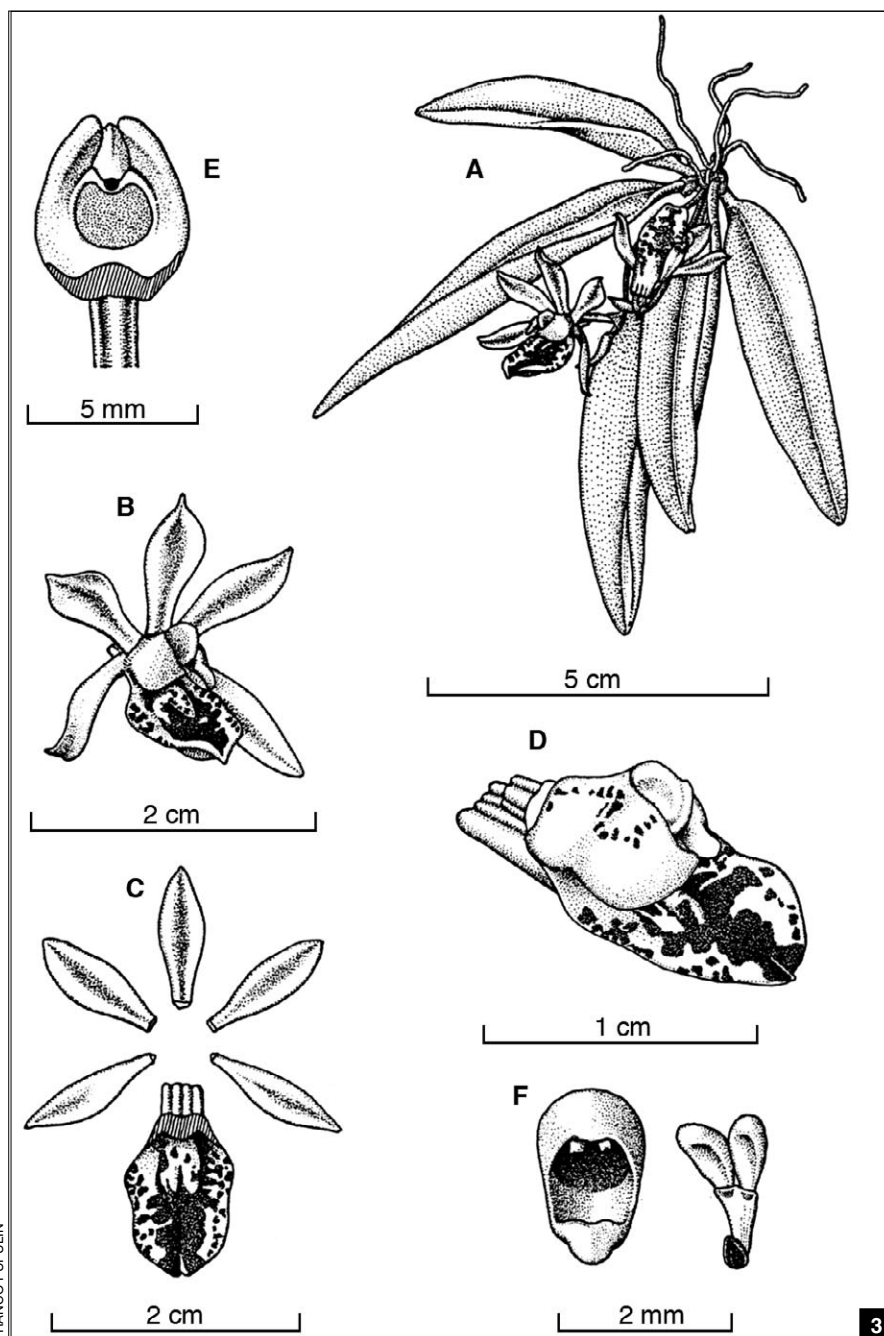
However, now that most of the relevant biogeographical data and a complete catalog of the localities based on the orchid collections of Augustus R. Endrés are known (Ossenbach et al. 2010), it has become obvious that *T. caloceras* probably refers to a species common in the Caribbean watershed rather than restricted to the Costa Rican southern Pacific, where that avid collector never went, because of the inaccessibility of the area — only partially surveyed during the last two decades of the 19th century (Ossenbach et al. 2010). It is more likely that the name *T. caloceras* actually refers to the same species as does *T. costaricense*, common in the Caribbean watershed around the San Carlos and San Ramón areas, frequented by Endrés.

In this article, we consider *T. costaricense* to be a synonym of *T. caloceras*. The misapplication of the name *T. caloceras* to the populations restricted to southern Costa Rica and western Panama leaves this species in need of a name; thus it is here described.

***Trichocentrum pupulinianum*** Bogarín & Karremans, sp. nov.

**TYPE** Costa Rica. Coto Brus, Sabalito, San Miguel, carretera entre Unión y Mellizas, 2.5 km después de Unión, orillas de la Quebrada Sereno, 8°51'17.0"N, 82°52'35.2"W, 994 m, bosque muy húmedo premontano transición a pluvial "supra truncos ad ripas silvarum prope San Miguel juxta flumen ad Quebrada Sereno," [translation: road between Unión and Mellizas, 2.5 km after the town of Unión, banks of Quebrada Sereno, 8° 51' 17 .0 "N, 82 ° 52' 35 .2" W, 994 m, premontane wet forest, rainforest transition.] April 18, 2011, A.P. Karremans 3963, D. Bogarín and D. Jiménez (JBL-Spirit; Fig. 2).

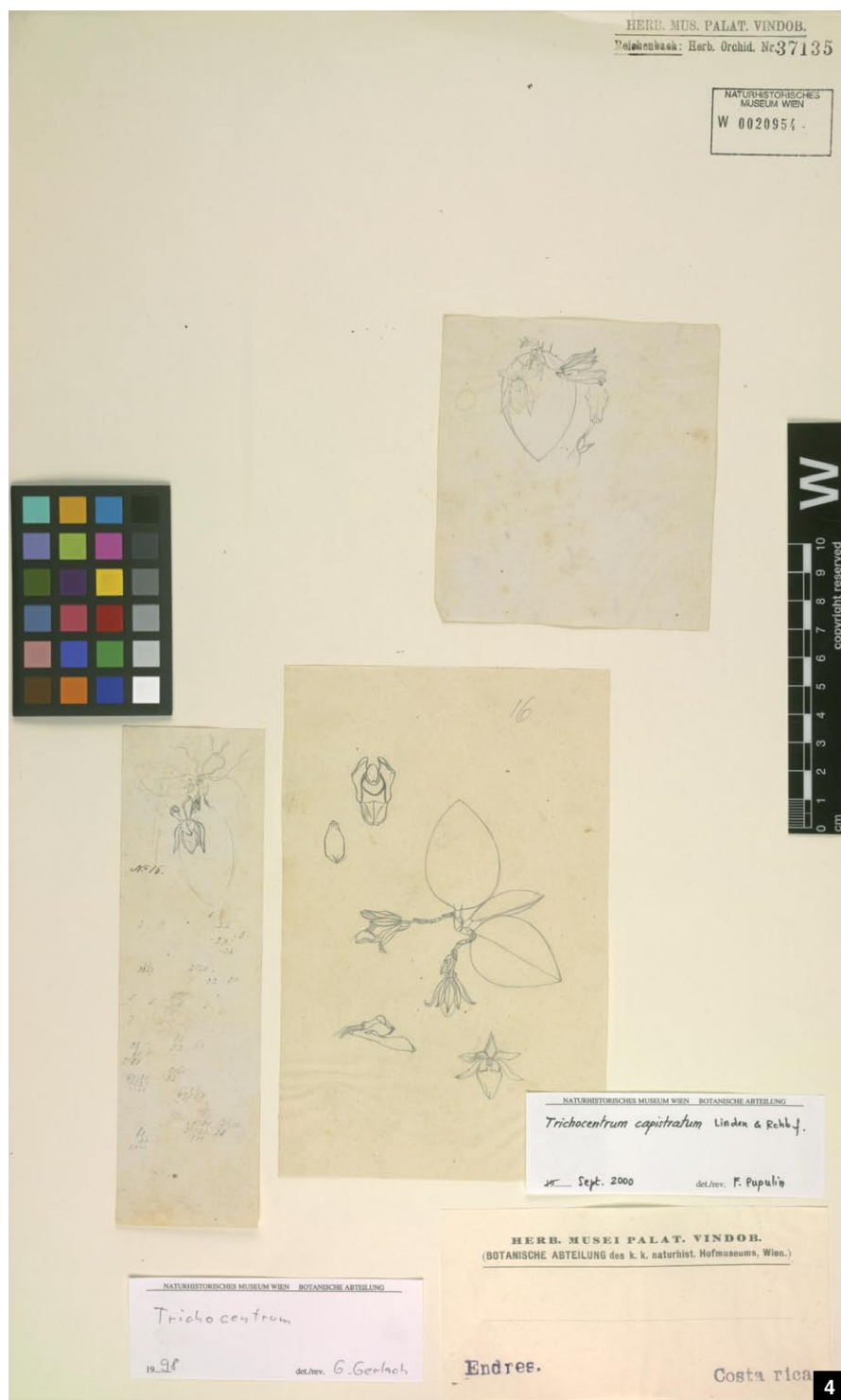
*Species Trichocentrum caloceras* Endrés & Rchb. f. affinis, sed foliis oblongis–ellipticis, alis columnae brevioribus, rhombicis, concavis marginibus revolutis, labello ovato–subpandurato purpureo maculato et anthera glabra differt.



Plant epiphytic, pendent, with abbreviated rhizome. Roots filiform, glabrous, with green apices. Pseudobulbs minute, cespitose, rounded, 2.0–2.5 mm long, unifoliate. Leaf green, more or less spotted with purple, fleshy, oblong to oblong–elliptic, subacute and somewhat minutely mucronate, sessile, to 7.0 × 1.4 cm. Inflorescences lateral, basal, racemose; peduncle terete, pendent, brownish, 3.0–3.5 cm long; rachis short, fractiflex, successively 5–6 flowered. Bracts conspicuous, imbricating, ovate, cucullate, acute, 4 mm long. Ovaries 8–10 mm long, including the pedicel. Flowers small, spreading, with sepals and petals brownish yellow and the lip white, marked with large purple blotches. Dorsal sepal erect, elliptic–lanceolate,

[3] *Trichocentrum pupulinianum* Bogarín & Karremans. A. Habit. B. Flower. C. Perianth, flattened. D. Column and lip, lateral view. E. Column, ventral view. F. Anther cap and pollinarium. Based on F. Pupulin and D. Castelfranco 1 (USJ).

subacute, slightly concave, to 11 × 4 mm. Lateral sepals obliquely elliptic–lanceolate, subacute, carinate at apex, 12 × 3 mm. Petals elliptic–oblong, obtuse, 12.4–5 mm. Lip ovate–subpandurate, adnate to the column, carinate, slightly constricted in middle, emarginate in front, cuneate at the base to produce a short, flattened, subquadrate,



four-lobed spur; disc with a pair of thick, glabrous, converging keels at the base; entire lip  $16 \times 8$  mm. Column short, without a foot, to 5 mm long, with a pair of fleshy, decurrent, short, rhombic, concave wings with revolute margins. Anther white, cucullate, carinate, glabrous. Pollinia 2, pyriform, complanate, on a triangular–elongate stipe; viscidium peltate, brown.

**PARATYPES** Costa Rica. Puntarenas: Coto Brus, Las Cruces, 1,300 m, epiphytic in cloud forest, prepared from cultivated

[4] Lectotype of *Trichocentrum caloceras* Endrés & Rchb.f. (Drawing N. 16 by A.R. Endrés, Rchb.f. Orch W-00220954). Reproduced with permission of the Herbarium, Naturhistorisches Museum, Vienna.

material, December 1989, F. Pupulin and D. Castelfranco 1 (USJ!; Fig. 3). Puntarenas: Coto Brus, San Vito de Java, Las Cruces, woods along the road to Wilson Botani-

cal Garden, ca. 500 m west of the Garden,  $8^{\circ}47'12.5''N$ ,  $82^{\circ}57'20.6''W$ , 1,227 m, premontane wet forest, October 25, 2005, F. Pupulin 5823, D. Bogarín, R.L. Dressler, R. Gómez, A.P. Karremans, A. and S. Rambelli (JBL-Spirit!). Same locality and date, F. Pupulin 5824, D. Bogarín, R.L. Dressler, R. Gómez, A.P. Karremans, A. and S. Rambelli (JBL-Spirit!). Same locality and date, F. Pupulin 5825, D. Bogarín, R.L. Dressler, R. Gómez, A.P. Karremans, A. and S. Rambelli (JBL-Spirit!). Coto Brus, San Vito de Java, Las Cruces, deviation point at right after at the southern end of Wilson Botanical Garden, ca. 1 km,  $8^{\circ}46'52.3''N$ ,  $82^{\circ}57'58.7''W$ , 1,980 m, premontane wet forest, mature secondary woods at the edge of a pasture, October 27, 2005, F. Pupulin 5865, D. Bogarín, R.L. Dressler, R. Gómez, A. and S. Rambelli (JBL-Spirit!). Fila Naranjo (about 800 m), epiphytic on trunks in primary forest, November 1989. Flowered in cultivation. May 1992, F. Pupulin and J. Cambronero s.n. (USJ!). Coto Brus, Las Cruces, Jardín Botánico Wilson, 1,250 m. Collected by M. Blanco and D.E. Mora, flowered in cultivation 16 Jan. 2001, F. Pupulin 2809 (USJ-Spirit!). San José: Pérez Zeledón, San Isidro, Alto de San Juan, road to Dominical, 1,090 m, epiphytic on *Citrus* sp. in pasture, August 28, 1991, F. Pupulin 186 (USJ). Pérez Zeledón, San Juan de San Isidro, 980 m, on *Citrus aurantium* trees, prepared from cultivated material 12/1986, F. Pupulin 10 (USJ). Pérez Zeledón, Fila Tinamaste, road between Dominical and San Isidro de Pérez Zeledón, near El Alto de San Juan, 900–1,050 m, epiphytic along the roadside, November 8, 2000, F. Pupulin 2485, D. Castelfranco and J. Prada (JBL-Spirit!). Same locality and date F. Pupulin 2506, D. Castelfranco and J. Prada (JBL-Spirit!). Road from San Isidro to Dominical, El Alto de San Juan,  $9^{\circ}19'42.4''N$   $83^{\circ}45'18.9''W$ , 1,150 m, premontane moist forest, October 22, 2005, F. Pupulin 5747, D. Bogarín, R.L. Dressler, R. Gómez, A.P. Karremans, A. and S. Rambelli (JBL-Spirit!). Pérez Zeledón, road from San Isidro to Dominical, deviation to Pacuarillo, Bijagual,  $9^{\circ}17'35.5''N$ ,  $83^{\circ}45'24.0''W$ , 1,000 m, premontane wet forest, October 23, 2005, F. Pupulin 5774, D. Bogarín, R.L. Dressler, R. Gómez, A.P. Karremans, A. and S. Rambelli (JBL-Spirit!). Same locality and date, F. Pupulin 5804, D. Bogarín, R.L. Dressler, R. Gómez, A.P. Karremans, A. and S. Rambelli (JBL-Spirit!). Same locality and date, F. Pupulin 5805, D. Bogarín, R.L. Dressler, R. Gómez, A.P. Karremans, A. and S. Rambelli (JBL-Spirit!). Alto de San Juan, R.L. Dressler 6682 (USJ!). San Juan de San Isidro, 1,100 m, October 29, 1989, F. Pupulin and M. Flores 6 (USJ!).

Pérez Zeledón, San Rafael de Platanar. Recolector desconocido, March 24, 1993. Floreció en cultivo en el Jardín Botánico Lankester, March 11, 2001, M. Blanco 1851 (USJ!). Panama. Chiriquí: side road between Volcán and Concepción, 500 m, December 17, 1976, Norris H. Williams 1352, Carl A. Luer and Robert L. Dressler (SEL). Volcán, February 4, 1961, H.P. Butcher 652 (SEL). Bugaba, between Concepción and Volcán, 900 m, December 7, 1983, C.A. Luer 9280, J. Luer and H.P. Butcher (SEL).

**DISTRIBUTION** Known from southern Costa Rica and western Panama.

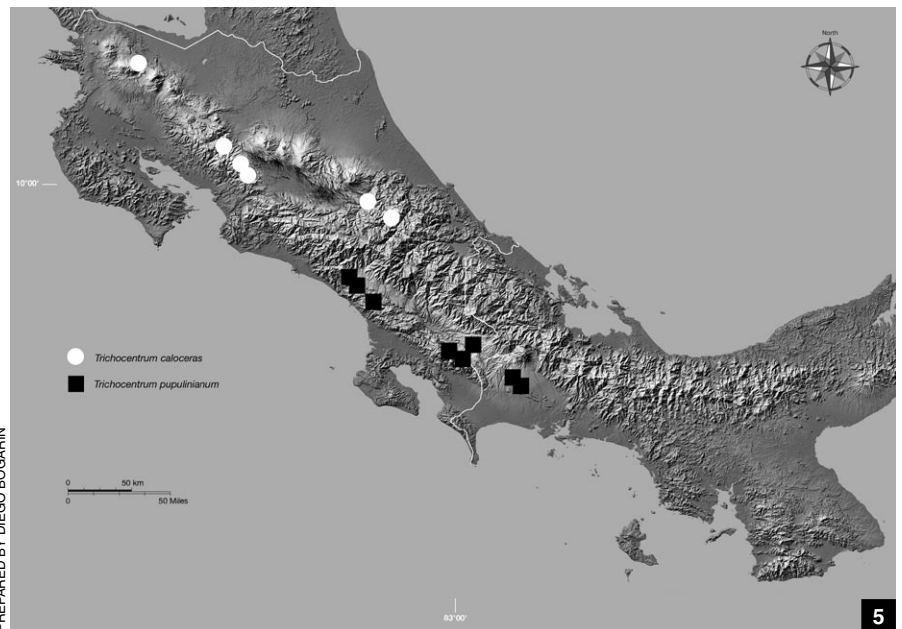
**HABITAT AND ECOLOGY** Plants grow in secondary and primary forest in premontane wet forest, rainforest transition and tropical wet and moist forest along the Pacific watershed of Cordillera de Talamanca at elevations from 500 to 1,300 m.

**EPONYMY** Honoring Franco Pupulin, Italo–Costa Rican botanist, current head of research at JBL, in recognition of his outstanding contributions to the knowledge of the orchid flora of the Neotropics and the development of the Lankester Botanical Garden Research Center.

**PHENOLOGY** Plants flower December–March.

**CULTIVATION** Plants inhabit moist to wet forests, where they grow on branches covered by mosses in relatively exposed sunny condition. Like most of *Trichocentrum* species, *T. pupulinianum* is easy to grow if moisture, warm temperature and good light and air movement are provided. It is advisable to cultivate plants on slabs so they can hang down freely, as in their natural habitat. The leaves tend to rot if water lodges near the axis with the pseudobulb, especially in plants grown in pots. To maintain plants in pots, they must be rather small and with perfect drainage so they can dry out quickly after watering.

**DISCUSSION** H.G. Reichenbach f. (1871) described *T. caloceras*, as compared with *T. capistratum*, “bearing the same most remarkable spurs, broad ovate acute leaves, brown sepals and petals, and a rhomboid white lip, with purplish numerous spots, a shorter column, with rhomboid wings.” This description also fits the description of *T. costaricense*. *Trichocentrum caloceras* (= *T. costaricense*) is recognized by the widely ovate leaves (rather than oblong–elliptic), the column wings decurrent, obtuse, introrse apically (rather than short, rhombic, concave with revolute margins) with a papillose or hirsute anther cap (rather than glabrous). The lip has bright red spots as described by Reichenbach (1871; rather than the purple blotches present in *T. pupulinianum*). The description written by Endrés (W-0021717),



which also refers to the drawing N. 16 (W-0020954, Fig. 4), describes a plant with the leaves “fleshy, ovate, acute” with the lip “white spotted with bright red.” The drawing N. 16 shows a plant with broad ovate leaves, characteristic of *T. caloceras*. Moreover, the localities given by Endrés in his descriptions are San Ramón de Alajuela, along Barranca river, Candelaria, a village about 3.2 km south of Palmares, near San Ramón and Guayabo, spelled “Guayavo,” a site north of Turrialba. The locality were *T. pupulinianum* can be found remained inaccessible for Endrés at that time (1867) because of the lack of access from San José toward San Isidro de El General and Buenos Aires. Endrés was able to visit Santa María de Dota over Copey and the Páramo de Vueltas on the way to the southern Pacific but still at too high an elevation for *T. pupulinianum*. Based on this evidence, we concluded that the concept of *T. caloceras* is best applied for the populations restricted to the Caribbean watershed in Costa Rica and the northern Pacific slopes of Cordillera de Tilarán. Populations restricted to the southern Pacific watershed of Cordillera de Talamanca, ranging from San Isidro del General, Buenos Aires, Coto Brus into western Panama close to the border with Costa Rica, are referred to another distinct entity, to which the name *T. caloceras* was erroneously applied in part by the lack of information about Endrés collections and itineraries now revealed (Fig. 5). The name proposed to those populations, *T. pupulinianum*, refers to plants with oblong–elliptic leaves (rather than widely ovate in *T. caloceras*), short, rhombic, concave column wings with revolute margins (rather than obtuse, subfalcate), the obovate–subpandurate lip marked with broad purple blotches (rather

[5] Distribution map of *T. caloceras* and *T. pupulinianum* in Costa Rica and Panama.

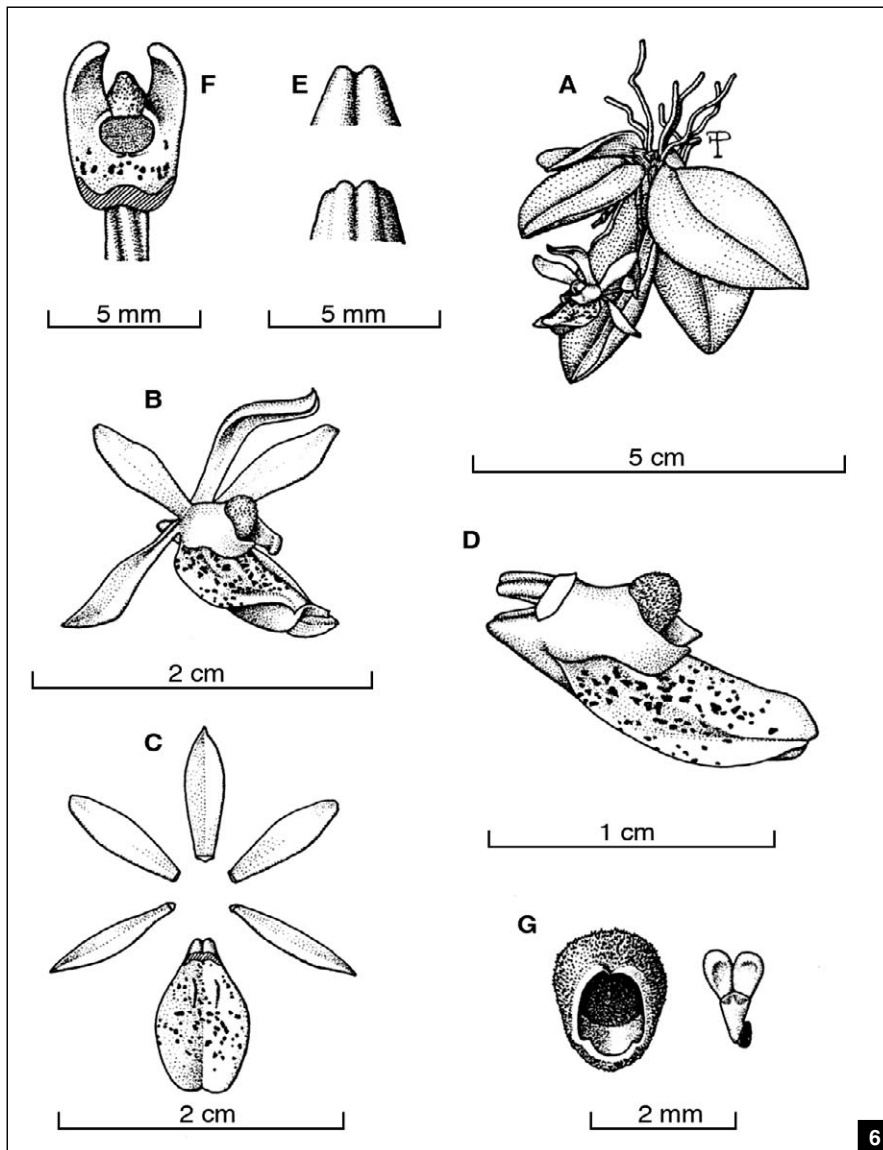
than elliptic, spotted) and the glabrous anther cap (rather than hirsute).

***Trichocentrum caloceras*** Endres & Rchb.f., *Gard. Chron.* 1257, 1871.

**TYPE** “Mr. Endres, the excellent Costa Rica traveller, has found since 1867, in Costa Rica, another *Trichocentrum*” (holotype presumed to be located at W, not located; lectotype, here designated: Costa Rica, without collecting data, A.R. Endres s.n., illustration kept at W, 0020954!; Figs. 4 and 6). The neotype designation by Pupulin (1995): Costa Rica. Puntarenas: Coto Brus, F. Pupulin and D. Castelfranco 1 (USJ) is here rejected, as the specimen selected is in conflict with the protologue and the natural distribution of this species. This conclusion is based on descriptive information in the protologue and geographic information provided by the itineraries of Augustus R. Endrés (Ossenbach et al. 2010, Pupulin et al. 2011).

***Trichocentrum costaricense*** Mora-Ret. & Pupulin, *Selbyana* 15:94, 1994, syn. nov.

**TYPE** Costa Rica. Alajuela: epiphytic in forest near Ciudad Quesada (about 700 m), 1988, flowered in cultivation 1989, C.K. Horich s.n. (USJ). Lectotype, here designated: Costa Rica. Alajuela: San Carlos, 600 m, Marzo 1989, C.K. Horich s.n. (USJ-Spirit, 57624). Rejected lectotype: Costa Rica. San José: Pérez Zeledón, San Isidro del General, “florece en mayo,” C.K. Horich s.n. (USJ-Spirit, 57468!) sensu Morales and Villalobos T. (2004). In their catalog of the types preserved at the Herbarium of the University of Costa Rica (USJ), Morales and



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Villalobos (2004) claimed that the original material of *T. costaricense* was not located at USJ. They designated a lectotype for this taxon, however, choosing a specimen from San Isidro de El General, C.K. Horich s.n. (USJ), which is not cited by the authors in the protologue (Pupulin and Mora Retana 1994), so far away from the type locality (actually the distribution range of *T. pupulinianum*) and which is in conflict with the protologue. For this reason we selected a new lectotype, choosing C.K. Horich s.n., a specimen cited by the authors from the type locality and which better conforms with the protologue.

**Additional Material Examined** Costa Rica. Alajuela: San Carlos, near Ciudad Quesada, C.K. Horich s.n. (USJ; Fig. 6). San Ramón, San Juan, 1,170 m, 1989; F. Pupulin and M. Flores 17 (USJ). San Ramón, Los Lagos, entrada a la Reserva Biológica Alberto Brenes, 800 m, 10°14'06"N, 84°31'56"W, January 23, 2001; M. Blanco 1813, R. Moran,

[6] *Trichocentrum caloceras* Endrés & Rchb.f. A. Habit. B. Flower. C. Perianth, flattened. D. Column and lip, lateral view. E. Spur apex. F. Column, ventral view. G. Anther cap and pollinarium. Based on C.K. Horich s.n. (USJ).

E. Watkins, E. Vargas (USJ!). San Juan de San Ramón, 1,100 m, in premontane moist forest, 11/1989; F. Pupulin and M. Flores 46 (USJ!). San Juan de San Ramón, 1,100 m, X-1989; F. Pupulin 103 and M. Flores (USJ-Spirit, 40394!). Upala, Bijagua, Zapote, desvió a la izquierda ca. 1 km después del puente sobre Río Zapote en sentido Bijagua-Pueblo Nuevo, Finca La Escondida, 10°45'21.0"N, 85°04'56.9"W, 650–700 m, bosque muy húmedo tropical, transición a premontano, epífitas en bordes de potreros y árboles aislados de *C. aurantium*, February 3, 2006; D. Bogarín 2517, J. Barrantes, R.L. Dressler, R. Gómez and A. Rojas (JBL-Spirit!). Cartago:

Turrialba, CATIE. Sobre *Citrus* sp. frente a la Casa del Café en el jardín de la casa 3-102 del CATIE. 9°53'22"N, 83°39'12"W, 600 m, January 11, 2006; A. P. Karremans 1249 (JBL-Spirit!). Turrialba, Tayutic, Jicotea, Fila Vereh, 100 m después del Río San Rafael, a orillas del camino hacia Pacuare, 9°47'12.7"N, 83°31'34.5"W, 1,180 m, bosque muy húmedo premontano, epífitas en árboles de *Citrus*, 17 enero 2006; D. Bogarín 2297, J. Carmona, A. Castillo and L. Madrigal (JBL-Spirit!). Turrialba, epiphytic on trees within CATIE installations, 9°54'N 83°40'W, 650 m, premontane wet forest, February 10, 2004; F. Pupulin 5107, D. Bogarín, A. Karremans and H. León-Páez (JBL-Spirit!).

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*Diego Bogarín is developing floristic projects for conservation in Costa Rica and Panama and has participated in research projects on DNA barcoding and orchid conservation with the Royal Botanic Gardens, Kew. He is an orchid taxonomist at Jardín Botánico Lankester, Universidad de Costa Rica, and research associate of the Herbario UCH of the Universidad Autónoma de Chiriquí, Panamá. (email diego.bogarín@ucr.ac.cr).*

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(This article was peer reviewed. — Editor.)