New species of Xanthosoma and Chlorospatha (Araceae) from Colombia and a new combination in Chlorospatha

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New species of *Xanthosoma* and *Chlorospatha (Araceae)* from Colombia and a new combination in *Chlorospatha*

Abstract

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Xanthosoma narinoense and *Chlorospatha hastifolia* from Colombia are described as species new to science. The delimitation of the two genera *Xanthosoma* and *Chlorospatha* is discussed and the new combination *C. feuersteiniae* validated for a species originally described in *Xanthosoma.*

Key words: aroids, taxonomy, pollen tetrads, *Xanthosoma narinoense, Chlorospatha hastifolia, Chlorospatha feuersteiniae.*

Introduction

One new species of *Xanthosoma* Schott and one of *Chlorospatha* Engl., both from Colombia, which were found in a loan of specimens received from the Herbario Nacional Colombiano (COL), are described. Both species are known only from their type collections but are well distinguished from all known species.

It is shown that the recently described *Xanthosoma feuersteiniae* Croat & Bogner is better placed in the closely related genus *Chlorospatha.* The species is therefore transferred to this genus and the necessary new combination validated.

Xanthosoma narinoense Bogner & L. Hannon, **sp. nov.**
Holotypus: "Colombia, Departamento de Nariño, Municipio de La Florida. Margen derecha del Río Barrancos, alt. 2300 m; alrededor de los bosques de *Quercus;* terrestre; hojas discóloras, espata crema, amento crema", 5.8.1977, *Santiago Diaz P., Gustavo Lozano C. & Polidoro Pinto E. 1088* (COL 179 960] – Fig. 1-2.

Lamina foliorum ovata lobis basalibus subauriculatis; pars florum sterilium spadicis brevis, synandrodia angustissima (3-3.5 mm longa et c. 1 mm lata); flores feminei stylis crassis latis cohaerentibus; pollen in tetradibus, exine laevis.

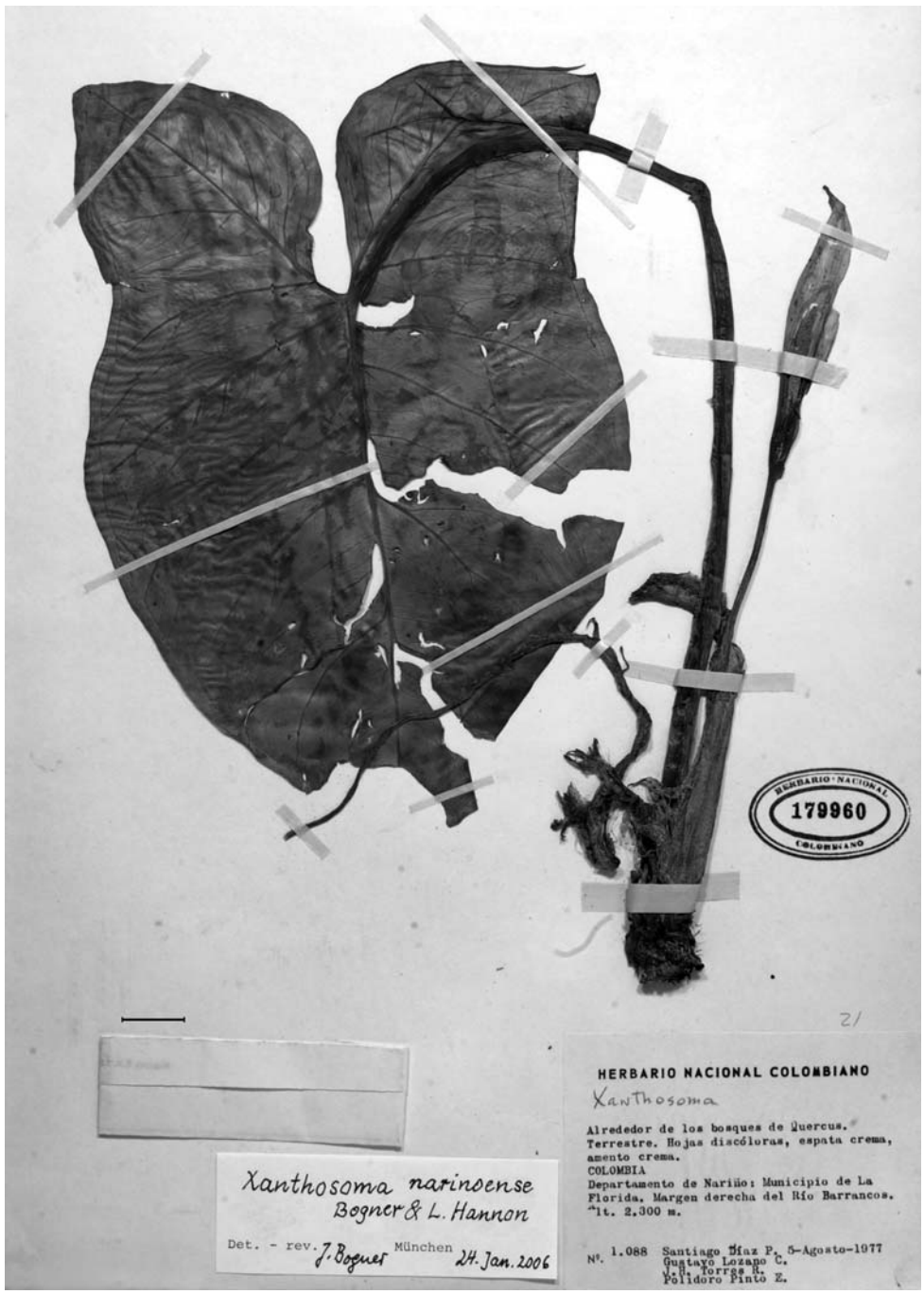

Fig. 1. *Xanthosoma narinoense* – holotype at COL. – Scale bar = 2 cm; photograph by F. Höck.

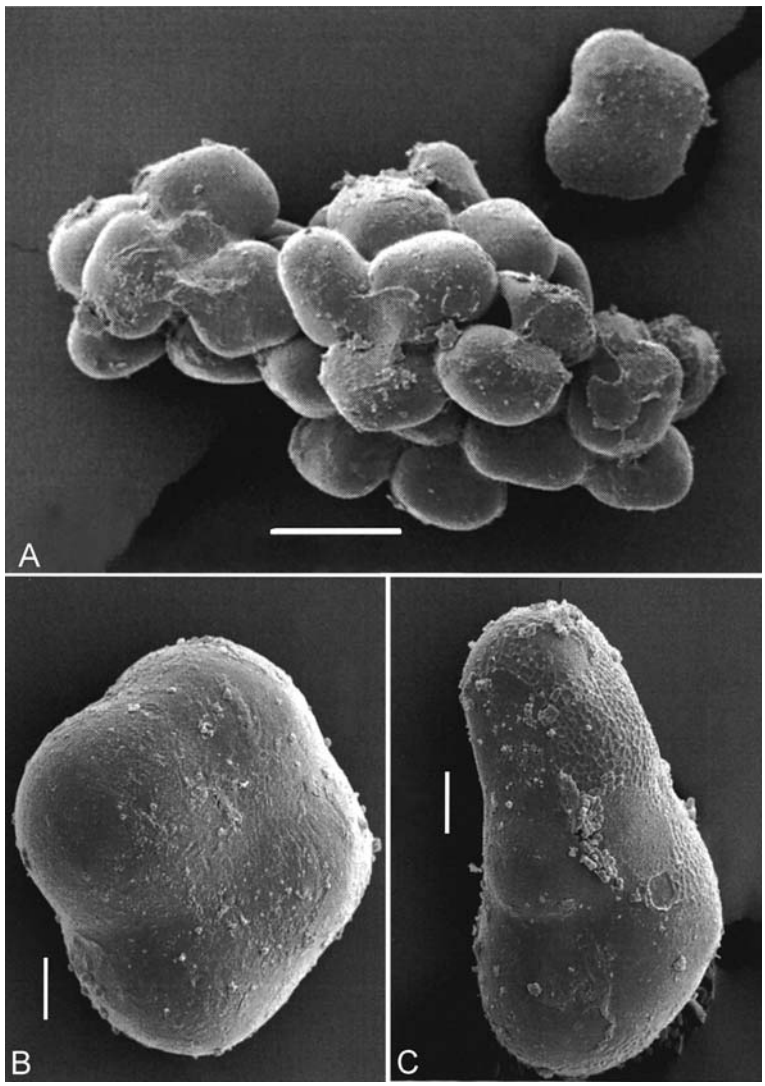

Fig. 2. Pollen tetrads of *Xanthosoma narinoense* – A: group of pollen tetrads; B: single tetrad; C: unusually formed tetrad. – SEM micrographs by M. Hesse; scale bars: A = 60 µm, B-C = 10 µm..

Plant glabrous (with one leaf and one inflorescence). *Stem* c. 2 cm in diam. *Petiole* c. 33 cm long, basally 0.8 cm and apically 0.4 cm in diam.; *sheath* c. 10 cm long. *Leaf blade* ovate, 23-24 × c. 16.5 cm (at middle and at basal lobes), between basal and anterior lobes 14 cm wide; basal lobes subauriculate and broader than long, c. 6 × 8 cm, close to each other but not overlapping, apex of them slightly rounded; apex of anterior lobe lacking; margin entire; venation reticulate; 5-6 primary lateral veins on each side of the strong midrib, one of the primary lateral veins running into the basal lobes, second order veins thinner and forming an interprimary collecting vein between the primary lateral veins and ending like the primary lateral veins in the inner collecting vein along the margin, third order veins much thinner and between the two; inner collecting vein 3-5 mm from the margin, a second one 1-1.8 mm from the margin, also a third, very thin collecting vein running along the margin. *Cataphyll* c. 12 cm long, membranous, older

cataphylls becoming fibrous. *Peduncle* c. 13 cm long and 0.2 cm in diam. *Spathe* 9 cm long, slightly constricted, lower part c. 3 cm long and c. 0.8 cm in diam., upper part c. 6 cm long and c. 1.5 cm in diam., cream coloured, apex cuspidate. *Spadix* shorter than spathe, 4.5-5 cm long, short-stipitate (a few mm), fertile to apex and narrowing towards apex; female part 1-1.2 cm long and c. 0.5 cm in diam.; male part c. 3 cm long and c. 0.4 cm in diam.; sterile part between female and male part c. 0.6 cm long and with only two rows of synandrodes. *Flowers* unisexual, naked. *Female flowers* densely arranged; ovary somewhat depressed globular, c. 1 mm in diam., styles 1-1.1 mm wide and coherent; stigma small, elongate, 0.2-0.3 mm long. *Synandria* densely arranged, truncate, c. 0.8 mm tall, 0.7-0.8 mm long and 0.4-0.5 mm wide (irregularly rectangular from above); thecae lateral, c. 0.8 mm long and thin, whitish, opening by an apical pore. *Pollen grains* in tetrads, rhomboidal, 50-55 µm in diam., exine smooth (psilate). *Synandrodes* truncate, elongate, 3-3.5 mm long and c. 1 mm wide. *Fruit* unknown.

Distribution and ecology. – The species is only known from the type locality in the Colombian Departamento de Nariño, where it grows terrestrial in a *Quercus* forest at an altitude of c. 2300 m.

Relationship. – *Xanthosoma narinoense* is characterized by the ovate leaf blades with subauriculate basal lobes and the short zone of sterile flowers with elongate and very narrow synandrodes. The thick coherent styles of the female flowers are typical for the genus *Xanthosoma.* The new species belongs to *X.* sect. *Xanthosoma.*

Remarks. – The female flowers of *Xanthosoma narinoense* are partly eaten by a small beetle. The leaves are discoloured according to the collector's notes.

Chlorospatha hastifolia Bogner & L. Hannon, **sp. nov.**
Holotypus: "Colombia: Comísaria del Amazonas, confluencia de los ríos Amazonas y Loretoyacu. En penumbra; hojas coriáceas; espata púrpura y espádice crema; los peciolos son púrpura. Topografia ondulada; suelos arcillosus pessados de color rojo (latericos)", 12.4.1975, *Isidoro Cabrera 3353* (COL 184576) – Fig. 3.

Lamina foliorum hastata; pars florum sterilium spadicis brevis, synandrodia longissima angustissima (2-3 mm longa et 0.3-0.4 mm lata); flores feminei stigmatibus discoideis; stylis tenuibus leviter lobatis non cohaerentibus; synandria laxe disposita; pollen in tetradibus, exine laevis.

Plant glabrous, with short stem and 3 leaves; stem c. 2.5 cm long and c. 0.8 cm in diam., covered with branched roots, those of first order c. 0.5 mm in diam. *Petiole* 25-27 cm long and c. 0.3 cm in diam., purple; *sheath* 11.5-12.5 cm long. *Leaf blade* hastate, coriaceous, 25-27 × 7-7.5 cm in the middle; anterior lobe c. 20 × 7-7.5 cm, apex of anterior lobe cuspidate; basal lobes 7-7.5 × c. 2 cm, apex ± obtuse; venation reticulate; 4-5 primary lateral veins on each side of a strong midrib, one of the primary lateral vein running into each basal lobe, second order veins forming an interprimary collecting vein, third and fourth order veins forming an irregular network (well visible underneath); inner collecting vein 4-5 mm from the margin, second outer collecting vein thinner and 0.9-1.5 mm from the margin, also a very thin third collecting vein running along the margin. *Peduncle* c. 7 cm long and placed within the leaf sheath. *Spathe* incomplete, but clearly constricted (purple teste collector's notes); lower part ellipsoid, c. 1.5 cm long and c. 0.8 cm in diam., at the constriction c. 0.3 cm in diam., upper part of spathe lacking. *Spadix* c. 6 cm long (cream coloured teste collector's notes), fertile to apex and narrowing towards apex; female part c. 1.2 cm long and 0.4 cm in diam.; male part 4-4.2 cm long and 0.5 cm in diam.; sterile part between female and male flowers c. 1.5 cm long, at most of its length 1.8-2 mm in diam., at base 3 mm in diam. *Flowers* unisexual, naked. *Female flowers* somewhat laxly arranged; ovary 0.9-1-(-1.1) mm in diam.; stigma button-like, yellow, c. 0.4 mm in diam.; style broader, 0.9-1 mm in diam., somewhat lobed (usually 4-lobed), thin, dark-coloured, not coherent. *Synandria* somewhat laxly arranged; synandrium truncate, c. 1 mm tall, from above irregularly rectangular to ± elliptic, 1.2-1.5 × 0.8-1 mm, with incisions of the thecae (as seen from above), thecae lateral,

Fig. 3. *Chlorospatha hastifolia* – holotype at COL. – Scale bar = 2 cm; photograph by F. Höck.

c. 1 mm long (thecae still closed in the specimen); pollen grains in tetrads, 55-60 µm in diam., exine smooth (psilate). *Synandrodes* between female and male flowers very long and narrow, truncate, ± linear and narrowed at both ends, very slightly sunken in the centre, from above 2.5-3 × 0.3-0.4 mm, the lowermost up to 1 mm wide and narrowly lanceolate in shape. *Fruit* unknown.

Distribution and ecology. – *Chlorospatha hastifolia* is only known from the type locality. It was collected at the junction of the rivers Amazonas and Loretoyacu, where it grows on red heavy sandy soil (laterite) in a half shaded place.

Relationship. – *Chlorospatha hastifolia* has very narrow synandrodes and the styles of the female flowers are thin, somewhat lobed and not coherent, the latter character being typical for the genus. Also the lower part of the spathe is ellipsoid and the peduncle included deep within the sheath of the petiole.

Remarks. – Most of the female flowers were eaten by insect larvae. The thecae are still immature and closed; the pollen is in tetrads with a smooth (psilate) exine.

Chlorospatha feuersteiniae (Croat & Bogner) Bogner & L. Hannon, **comb. nov.**
≡ *Xanthosoma feuersteiniae* Croat & Bogner in Willdenowia 35: 327. 2005 – Fig. 4.

Croat & Bogner (2005) described *Xanthosoma feuersteiniae* before the "Revision of the genus *Chlorospatha*" by L. Hannon & T. Croat (available as a manuscript in early 2006) was completed. In February 2006 Lynn Hannon visited the Munich Botanical Garden, just a few months before she passed away, and the first author showed her the material of this species. It became clear that it represents a *Chlorospatha* species and we agreed to publish the necessary new combination.

As Bogner & Gonçalves (2005) pointed out, the delimitation of the genera *Caladium*, *Xanthosoma* and *Chlorospatha* becomes more and more difficult in the light of the new material collected in the recent decades. Two of the most distinguishing characters of pollen and gynoecium turned out not to be constant. According to Madison (1981) *Caladium* species release the pollen in monads and *Xanthosoma* in tetrads, but *Xanthosoma mariae* Bogner & Gonçalves and *X. latestigmatum* Bogner & Gonçalves (2005) of *X.* sect. *Acontias* shed the pollen in monads (see also Bogner & Gonçalves 2005). On the other hand, *Chlorospatha feuersteiniae* also has the pollen in tetrads as all species of this genus have, but furthermore its tetrads are very similar to those of *C. pubescens* Croat & L. Hannon, *C. ceronii* Croat & L. Hannon and *C. hannoniae* Croat, all of which have a reticulate exine.

Concerning the gynoecium, *Xanthosoma* has usually been distinguished by the disk-like, broadened and coherent styles with a centrally smaller stigma. *Caladium* was distinguished by stigmas as broad as the ovary, often said to be sessile, but in fact there is a broad, unmodified style or stylar region present. Now we know at least five different types of styles in *Xanthosoma* (Gonçalves 2004) and they are not coherent in all cases. As it turned out, *C. feuersteiniae* has sessile stigmas, also known in the genus *Chlorospatha* (e.g., *C. longipoda* (K. Krause) Madison) and representing Hannon's type 1, but sessile stigmas are unknown in *Xanthosoma.* The unconstricted and apically hooked spathe of *C. feuersteiniae* is not like in any species of *Xanthosoma* or *Chlorospatha.*

The synandrodes of *Chlorospatha* are usually free to partly or completely connate into irregular, fungiform or lobed synandrodes and also truncate (prismatic) (e.g., *C. longipoda*) as is also the case in *C. feuersteiniae.* The latter also has truncate synandrodes with a length of c. 2.5 mm, which are densely arranged in only two rows and sometimes have an incomplete third row. As far as we have observed, *C. feuersteiniae* only has a solitary inflorescence with a robust peduncle, while *Chlorospatha* usually have several inflorescences with slender peduncles in a sympodium supported by the leaf sheath (very young plants have one inflorescence at first flowering, but also some species are known with only one inflorescence).

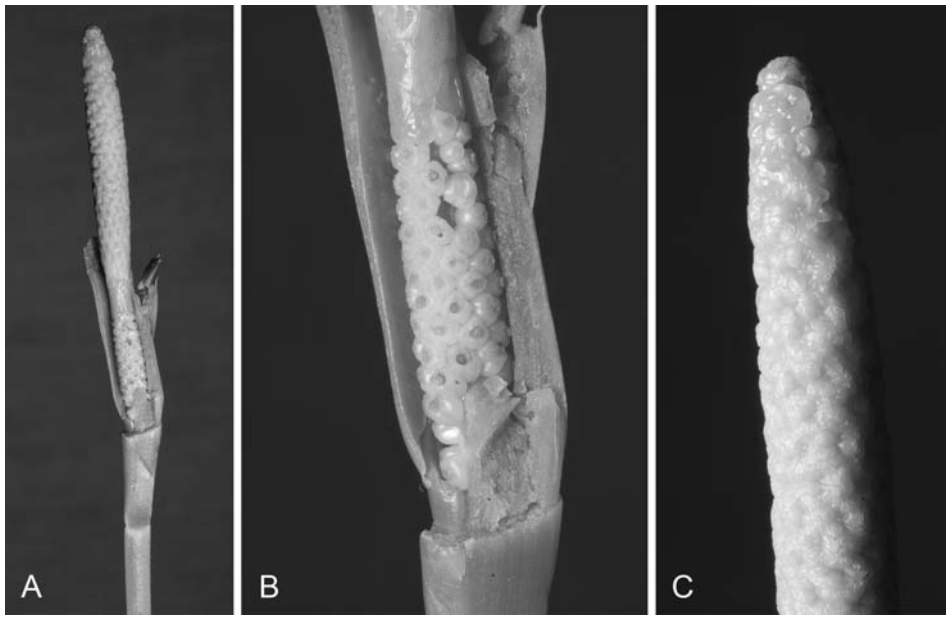

Fig. 4A-C. *Chlorospatha feuersteiniae* – spadix from a cultivated plant of the type collection; entire spadix (A), pistillate portion (B), staminate portion (C). – Photographs by G. Gerlach.

Chlorospatha feuersteiniae is the only species from the eastern slopes of the Andes where the lower side of the leaf blade is purple. Some species in this area have purple veins and purple petioles but none is completely purple below. *C. feuersteiniae* in general appearance looks like *Xanthosoma weeksii* Madison and *X. viviparum* Madison with also solitary inflorescences, but the spathes are always constricted and never hooked, and *X. viviparum* produces additionally conspicuous, small bulbils in the leaf axils.

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