

New species of *Xanthosoma* (Araceae) from Western French Guiana

Thomas B. Croat
P.A. Schulze Curator of Botany
Missouri Botanical Garden
P.O. Box 299, St. Louis, MO 63166
Thomas.croat@mobot.org

Vincent Pelletier
Biotope Amazonie-Caraïbes
French Guiana

Ludovic Salomon
Biotope Amazonie-Caraïbes
French Guiana

Jean Weigel
Agroforesterie de la Comté
French Guiana

ABSTRACT

A new species of helophytic *Xanthosoma*, *X. nodosum* Croat & V. Pelletier, is reported for western French Guiana. The species is a member of section *Xanthosoma* and is allied with *X. sagittifolium* (L.) Schott and *X. jacquinii* Schott but differs from both of those species by its hydric habit and conspicuously arrayed short knobby root-like propagules on its stem. In addition, *Xanthosoma jacquinii* also differs by having a spathe tube which is dark purple on the inside.

KEY WORDS

Araceae, *Xanthosoma*, French Guiana, new species.

INTRODUCTION

The genus *Xanthosoma* remains one of most taxonomically difficult and poorly known genera of Araceae in the Neotropics. There are currently 67 published species with numerous known but unpublished new species. In addition to *Xanthosoma nodosum* Croat & V. Pelletier which is described here, the species



Figure 1



Figure 2

Figure 1. *Xanthosoma* cf. *nodosum* Croat & V. Pelletier (*Pelletier 301*). Habit of plant near Lezard River.

Figure 2. *Xanthosoma* cf. *nodosum* Croat & V. Pelletier (*Pelletier 301*). Stem showing closely arranged rows of root-like propagules, near Lezard River.

Note that images for Figures 1-3 were taken of plants from a different population in the vicinity of Elysée, near the Lezard River (04°45'14"N, 54°02'44"W).

currently reported for the Guianas include *Xanthosoma acutum* E. G. Gonç., *X. belophyllum* (Willd.) Kunth, *X. caracu* K. Koch & C. D. Bouché, *X. conspurcatum* Schott, *X. cordatum* N. E. Br., *X. granvillei* Croat & S. A. Thomps., *X. helleborifolium* (Jacq.) Schott, *X. sagittifolium* (L.) Schott, *X.*

striatipes (Kunth & C. D. Bouché) Madison, *X. striolatum* Mart. ex Schott, *X. undipes* (K. Koch & C. D. Bouché) K. Koch and *X. violaceum* Schott.



Figure 3



Figure 4

Figure 3. *Xanthosoma* cf. *nodosum* Croat & V. Pelletier (*Pelletier 301*). Stem showing close-up of the propagules which are easily dislodged from the stems near Lezard River.

Figure 4. *Xanthosoma nodosum* Croat & V. Pelletier (*Pelletier 301*). propagules after having been removed from stem; near vicinity of "Yaou".

Species with rhizomatous stems which form a prominent erect trunk include *Xanthosoma granvillei*, *X. sagittifolium* & *X. undipes*. Those with tuberous stems are *Xanthosoma acutum*, *X. belophyllum*, *X. caracu*, *X. conspurcatum* and *X. violaceum*. *Xanthosoma granvillei* differs from *X. nodosum* by having smooth stems, in having the interior of the spathe tube dark purple and the pistillate portion of the spadix bright orange; *X. undipes*, another large species, differs from *X. nodosum* by having the spathe tube purple within; *X. sagittifolium* shares the greenish spathe tube interior of *X. nodosum* but differs by typically having a thicker and smooth stem and leaf blades and petioles which are somewhat glaucous. The remaining species from the Guianas all

differ in having tuberous stems. *Xanthosoma acutum* also differs by its small size, usually blackish drying mottled sagittate-subhastate leaf blades; *X. belophyllum* possesses a spathe tube which is greenish inside but differs from *X. nodosum* by having a stem growing only weakly above the soil and in lacking the short root-like propagules; *X. violaceum* also differs by having the spathe tube purple on the interior surface and *X. conspurcatum* differs by having its tuberous stems as well as by its small stature and leaf blades with flaring subhastate lobes.

HISTORY OF DISCOVERY

Plants with short knobby offsets on their stem were first discovered by Vincent



Figure 5



Figure 6

Figure 5. *Xanthosoma nodosum* Croat & V. Pelletier (*Pelletier 301*). Inflorescence at anthesis with strings of pollen exuding from stamens; near vicinity of "Yaou".

Figure 6. *Xanthosoma nodosum* Croat & V. Pelletier (*Pelletier 301*). Inflorescence at anthesis showing fertile male flowers and sterile male flowers with the lowermost male flowers yellowish; near vicinity of "Yaou".

Pelletier & Ludovic Salomon while on a survey mission with their company in the region of Elysée, near the Lezard River in western French Guiana. Vincent brought this population to the attention of the senior author by sending photographs. It seemed apparent that the species was new to science but without herbarium material of fertile plants there was little interest in pursuing the matter further. Jean Weigel then returned to this locality and collected leaves and inflorescences of this species. This specimen is registered as *Sophie Gonzalez 3000*. Unfortunately the old inflorescence on the plant did not allow the senior collector to correctly describe this species. This collection continues not to be

identified with certainty in the absence of knowledge of the flower colors.

Later, Ludovic Salomon found a second population much further to the south but again in western French Guiana, in Yaou, near Maripasoula. That population had flowering individuals and again photographs were sent to the senior author. At this point it was possible to begin drafting a complete description of the plant and it was reported as a new species. Neither Pelletier nor Salomon had gathered the essential herbarium material even though living plants were collected and initially established with Joep Moonen at Emerald Jungle Village in Matoury. Later this



Figure 7



Figure 8

Figure 7. *Xanthosoma nodosum* Croat & V. Pelletier (*Pelletier 301*). Inflorescence at anthesis showing outer abaxial surface; near vicinity of "Yaou".

Figure 8. *Xanthosoma nodosum* Croat & V. Pelletier (*Pelletier 301*). Inflorescence at anthesis showing greenish interior (adaxial) spathe tube surface and whitish inner surface of spathe blade; near vicinity of "Yaou".

material was transferred to nursery in Cayenne as well as to Geneviève Ferry at the Conservatoire et Jardins Botaniques de Nancy in France. An attempt is being made to establish the species in a living collection where further studies can be made on the species.

We were fortunate that the company Biotope Amazonie-Caraïbes with which Pelletier and Salomon were employed had such sufficient interest in collecting this interesting new species that they agreed to launch a special expedition whereby Pelletier was able to return to western French Guiana to gather flowering individuals to prepare adequate herbarium material to describe the plant.

Xanthosoma nodosum Croat & V. Pelletier, **sp. nov.** Type: FRENCH GUIANA. Near the Commune of Maripasoula, adjacent to the Maroni River on the border with Suriname, vicinity of "Yaou" located within the SMYD mining concession (Mining Company Yaou Dorlin), 03°43'15.6" N, 53°57'04.3"W, 110 m, 23 June 2014, *Vincent Pelletier 301* (holotype, CAY; isotypes, K, MO, NCY, P, US. **Figures 4–10.**

The species is a member of section *Xanthosoma* characterized by its stout erect stems, conspicuously disposed short stout stubby propagules, semi-erect leaves, petioles sheathed to nearly the middle,



Figure 9

Figure 10

Figure 9. *Xanthosoma nodosum* Croat & V. Pelletier (*Pelletier 301*). Inflorescence at anthesis showing yellowish green pistillate spadix and the partially eaten sterile male section; near vicinity of "Yaou".

Figure 10. *Xanthosoma nodosum* Croat & V. Pelletier (*Pelletier 301*). Young infructescence showing pale yellowish green fruits nearing maturity; near vicinity of "Yaou".

ovate-sagittate blades which have the major veins on the upper surface sunken and have the posterior lobes directed toward the base or directed somewhat outward as well as by its pairs of inflorescences with a spathe tube dark green outside and pale green inside and a pale yellowish green pistillate portion of the spadix. The conspicuous and easily detachable propagules borne low down on the stem have unquestionably evolved as a means of aquatic vegetative dispersal for vegetative reproduction since the species is restricted to areas along water courses.

Xanthosoma nodosum is probably related to *X. caulotuberculatum* G. S. Bunting (Bunting, 1975) which was described as having similar propagules on the stem. That species is known for certain only from Venezuela in an area of sandy soils located in a *Premontane wet forest* life zone at 850–900 m elevation and has leaves with thicker leaf blades that dry dark brown not light green. In addition, *Xanthosoma caulotuberculatum* has a much broader petiole, more broadly curved posterior ribs with 5(6) pairs of acroscopic basal veins (versus 3(4) for *X. nodosum*), with a more gradually spatulate sinus and with the naked portion of the posterior rib ending before departure of the 2nd pair of basal veins (versus after the

departure of the 2nd pair of basal veins for *X. nodosum*) and more obscure and more widely spaced tertiary veins on the lower blade surface.

Xanthosoma nodosum keys to *X. jacquinii* Schott in the as yet unpublished treatment of the Araceae for the Flora of the Guianas (Croat, in prep.) which differs in lacking the short knobby propagules on its stem and by having a spathe tube which is dark purple on the inside. It might also be confused with *X. sagittifolium* Schott which differs in typically having much larger leaves with the posterior lobes held closely together and generally lacking any naked portion of the posterior rib as well as by having a smooth stem.

Growing in swampy areas and along stream banks; **stems** to 1.8 m tall with the lower portion reclining across the ground; **internodes** 6–12 cm diam., light brown with fragments of dark brown epidermis with shallow longitudinal furrows and with conspicuous rows of propagules appearing like new roots at a casual look, arranged in irregular rows, these densely arranged and multidirectional at soil line, easily removable, 1.4–2.3 cm long, 7–10 mm diam., light brown, rounded at the apex with purplish brown tip, covered with occasional thin removable scales with several weakly protruding buds, the surface scurfy; **petioles** to 62–95 cm long, sheathed 0.38 to 0.54 its length (sheath 28.5–44.5 cm long), 3.3–4.5 cm wide, 2.5–4 cm thick and obtusely flattened adaxially at base, nearly terete midway, 12–17 mm wide, 12–16 mm

thick, somewhat flattened near apex, 12 mm wide, 8 mm thick, the old petioles rotting and hanging on stem for a while, then deciduous; **blades** ovate-sagittate, 37.5–50 cm long, 22.5–34.5 cm wide, 1.3–1.7(7) times longer than wide, 0.45–0.62 times as long as petioles, rounded with a weakly down-turned acumen at apex, deeply lobed at base; thinly coriaceous, medium dark green and semiglossy above, moderately paler and semiglossy below, drying dark green and matte above, moderately paler grayish yellow-green and weakly glossy below; **anterior lobe** 23–24.5 long, broadly convex on margins; **posterior lobes** ca. 1/3 as long as anterior lobe, 16–20.5 cm long, 9–12.5 cm wide at constriction, 9.5–14.5 cm wide at broadest point, in living condition directed toward base but somewhat outward, elevated at an angle to the midrib with lobes not touching and forming a spatulate or narrowly V-shaped sinus, sometimes overlapping with a closed semicircular sinus on larger leaves, the apex bluntly pointed; inner margin of posterior lobe gradually tapered to posterior rib; **posterior rib** directed straight to tip of lobe with basal veins regularly branching off, 4–5 acroscopic, 3–4 basioscopic, naked 1.7–2.8 cm; **sinus** parabolic to spatulate, becoming broadly hippocrepiform when blade is flattened; **midrib** obtusely sunken and concolorous above, narrowly rounded and paler below, drying concolorous and sunken above, round-raised, brownish, darker than surface and matte below; **primary lateral veins** 5–7 pairs obtusely sunken and concolorous above, narrowly rounded or convex, paler below, drying

brownish, darker than surface, 5-ribbed, the ribs finely granular; **tertiary veins** flat, clearly visible but not at all raised. INFLORESCENCES 2–3 per axil, erect; **peduncle** 14–15 cm long in flower, 5 x 10 mm, (to 20 cm long in fruit); **spathe** 15.5 cm long; **tube** 4.5 cm long, 2 cm diam., dark green and semiglossy outside, pale green on inside; **spathe blade** 11.7 cm long, flattening to 5.1 cm wide, markedly arched otherwise stiffly erect at anthesis, weakly medium green outside medially, greenish white along margins; inner surface pale greenish white and semiglossy; constricted area 1.5 cm diam. (flattening to 3.5 cm wide); **spadix** 13.5 cm long, erect with staminate spadix 11.3 cm long, 9–10 mm diam., creamy white, stiffly erect, moderately narrowed to a narrow bluntly rounded point; sterile staminate spadix 2.3 cm long (the portion actually eaten 1 cm long), 1.2 cm diam. at base, 9 mm diam. at apex; **pistillate portion** 2.2 cm long in front, 1.3 cm long in rear, pale yellowish green; pistils ovoid, 3-locular; style thickened, ca. 2 mm thick; stigma 1.5–2 mm wide, depressed-globose with a prominent central funnel; ovules many, born on the lower portion of the central axis, 0.1 mm long, about twice as long as broad, funicle shorter than ovule width or about as long as ovule. INFRUCTESCENCES with spathe tube 6.5–9 cm long, 2.9–5.5 cm diam.; spadix 3.5–4 cm diam.; berries greenish, obovoid, 7–8 mm long, 5 x 4 mm wide, turning whitish in alcohol; seeds ca. 10 per locule, black, 1.2 mm long, 1 mm diam., shiny, smooth.

Xanthosoma nodosum is endemic to French Guiana, known only from the western fringe of the region in areas of what is probably *Tropical moist forest* (estimated because no Holdridge life zone map exists for the area (Holdridge et al., 1971)). Comparable areas of similar elevation in southern Venezuela are classified as *Tropical moist forest* life zones, for example. The new species occurs in semi-open swampy areas or on hydromorphic soils along small shady streams, growing in moderately dense stands. In addition to the type locality plants closely resembling the new species have been also seen elsewhere in central French Guiana in the vicinity of Elysée (**Figures 8–10**), near the Lezard River, 04°45'14" N, 54°02'44"W, as well as at Kotika on Maroni River, 03°57'15" N, 54°17'20"W. In light of the fact that there appears to be another species with very different inflorescence coloring associated with *Xanthosoma nodosum* these populations need to be revisited when they are in flower in order to be certain that they do represent *X. nodosum*. Thus, while the photographs of the habit (**Figure 8**), the stem (**Figure 9**) and the close-up of the root-like propagules appear to be exactly like those of the type plant in Yaou, we have labeled these photos *Xanthosoma* cf. *nodosum* because the plants were not in flower at the time and thus their exact identity could not be known.

At the time that the type specimens were collected near Maripasoula, a curious second species was found growing in close proximity to the new species. It was also collected but unfortunately without leaves.

At the time it was simply believed to represent another plant in the population but that species differed dramatically by having an inflorescence which had the inner spathe tube color dark purple, not pale green and a bright and dark orange pistillate spadix, not a pale yellowish green pistillate portion. That plant which is presently known only from its inflorescence which was vouchered as a spirit collection under the number *V. Pelletier 307* will be further studied before we can determine it after leaves are collected.

A collection from Guyana (*T. McDowell 4205*) from the Barima-Waini Region at 91 m elevation is also reported to have small tubers to 3 cm long and 1 cm diam. Unfortunately no notes were given about the color of the spathe tube or the pistillate spadix. Another collection from Suriname (*Wessels Boer 1217*) is described as having a stem 40 cm tall which is densely covered with short aerial roots. Unfortunately the collection mentions nothing else of importance. Both of these collections must be compared with *Xanthosoma nodosum* since it might be the same or another closely related species. The collection in Suriname is positioned perfectly to be in the same habit, in a marshy creek in a forest just as in French Guiana but the collection from Guyana was made from NW Guyana and made no mention of being collected in swampy conditions.

The species epithet comes from the Latin “*nodosus*” (meaning knotted or knobby) referring to the knobby short propagules born mostly in rows on the stem.

ACKNOWLEDGMENTS

The authors wish to thank Vincent Rufay, Biotope Amazonie-Caraïbes administrator, an environmental investigation firm for providing assistance to recollect this species and to Sophie Gonzalez, Curator of the CAY herbarium for drying and shipping specimens to St. Louis. We also thank the Mining Company Yaou Dorlin (groupe AUPLATA SA) for understanding the importance of this discovery and for providing assistance in allowing us to return to the area for essential herbarium specimens.

REFERENCES

- Bunting, G. S. 1975 (1977). Nuevas especies para la revisión de las Aráceas Venezolanas. *Acta Bot. Venez.* 10: 263–335.
- Holdridge, L. R., W. H. Hatheway, T. Liang & J. A. Tosi. 1971. *Forest Environments in Tropical Life Zones*. Pergamon Press, New York.