Ulearum donburnsii, a New Species of Araceae from Ecuador

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ABSTRACT

Ulearum donburnsii, a new species of Araceae, is described from the Amazon lowlands of Ecuador along the Río Morona in the Province of Morona-Santiago. The species is only the second species in the genus *Ulearum*. The species differs from the only other species, *Ulearum sagittatum* Engl., by having filiform staminodes on the spadix on either side of the staminate portion of the spadix, in contrast to the depressed globose or short, cylindric staminodes present in *Ulearum sagittatum*.

INTRODUCTION

A recent discovery of a plant in the Amazon lowlands in the Province of Morona-Santiago has proven to be a new species. The new species is known from a single locality and was introduced into horticulture by a nursery in southern Ecuador. The species was first brought to the attention of the senior author by naturalist, Betsy Feuerstein, who subsequently revisited the site to acquire much needed habit and growth information. It is unusual to discover new species in the Amazon lowlands, though the Río Morona lies near the Cordillera del Cutucú, an isolated range of low mountains at the edge of the Amazon basin which has many endemic species. Most of the new species in the region of Cordillera del Cutucú occur further up on the slopes of the massif so it is unusual to find an endemic in this region at only about 243 m elevation.

The new species is a member of the tribe Zomicarpeae in the subfamily Aroideae in the Araceae. The tribe comprises the genera, *Zomicarpa, Zomicarpella, Ulearum,* and *Filarum* (Bogner, 1997; Boyce, 1995; Mayo *et al.,* 1997). All of these genera are relatively restricted in geographic terms. Most of the genera, with the exception of *Zomicarpa,* are restricted to the upper Amazon basin along the margin of the Andes. *Zomicarpa* is found at about the same latitudes but it is restricted to eastern Brazil. The genus *Ulearum* is also found in the upper Amazon basin, but this is the first species of the genus in Ecuador.

Ulearum donburnsii has blades similar to *Ulearum sagittatum* but differs in having a much longer and thinner appendix and in having long filiform staminodes rather than depressed, globose, or short cylindric staminodes. *Ulearum donburnsii* with its attenuated staminodia somewhat resembles the attenuated filaments of *Filarum manserichense* Nicolson. Both species also share similar leaves and short-creeping rhizomes. The resemblance is however superficial since in the case of *Filarum* most of the elongate structures are actually attenuated filament-like connectives of the fertile stamens whereas in *Ulearum* the elongated structures are filiform staminodia not directly associated with fertile stamens and instead arise directly from the axis of the spadix. In *Filarum* the prolonged filament-like connectives are present on a broad and continuous band above the pistillate portion of the spadix whereas in *Ulearum donburnsii* the filiform staminodes occur mostly in two narrow bands on either side of the staminate portion of the spadix.

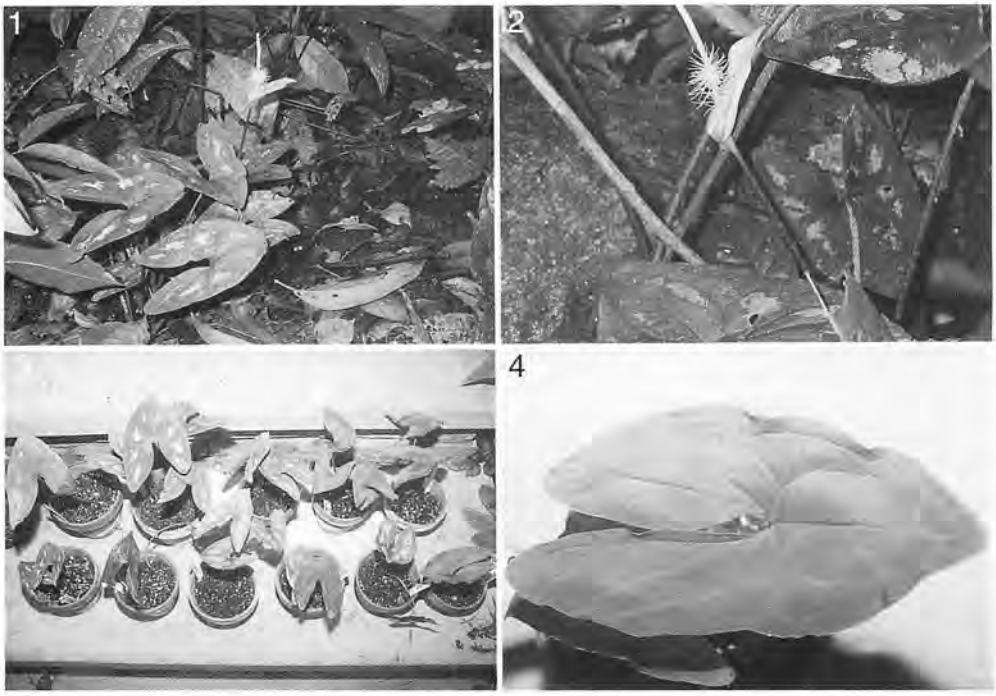
KEY TO SPECIES OF *ULEARUM*

1. Spadix with depressed globose or short, cylindric staminodes below and above the male flowers; appendix short and thick, less than 5 times longer than wide . . . . . *Ulearum sagittatum* Engler.
1. Spadix with long filiform staminodes below and above the male flowers; appendix elongate and slender, more than 15 times longer than wide . . . *Ulearum donburnsii* Croat & Feuerstein

Ulearum donburnsii Croat & Feuerstein, sp. nov.

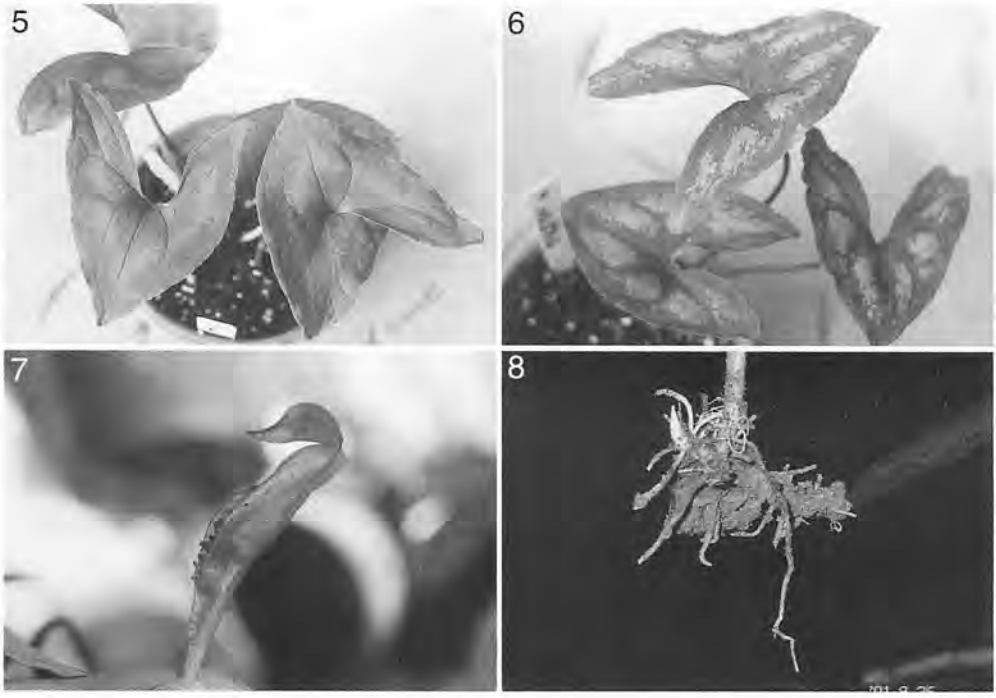
Rhizoma gracilis, nivius, 6–9 mm diam.; petiolus (9)14.5–23.5(31) cm longus, 3–4 mm diam., teres, infirme multi-costatus; lamina sagittato-hastata, 8.0–14 cm longa, 6–13 cm lata; lobulas posteriorus, aequans vel longior quam lobula anterior; sinus anguste V-formatus vel anguste spathulatus; venas basales 4–6 utroque; nervis primariis lateralibus 1–2 utroque; pedunculus 14.2–27(42) cm longus, 3–4 mm diam.; spatha anguste ovata, apertus, viridis; spadix 6–7.2 cm longus, palide viridis; spadix pistilata 1.2–1.3 cm longa, 2–3 mm diam.; pistilas 20–27; appendix 3.0–3.7 cm longus, palide viride; stamens cum filamenta ca. 1 mm longa; bacca 6.7–7.5 mm longa, 3.0–3.3 mm diam., elliptica; semina 4.9–5.3 mm long, 2.3–2.5 mm diam. Typus: ECUADOR. Morona-Santiago: Along Río Morona, along road E. of Santiago and E. of Río Santiago, Amazon lowlands, flood plain of Río Morona, vicinity of Puerto de Morona on E. side of River, 200 ft E. of ferry which crosses to San José Morona, along margin of flood plain forest and adjacent to the road, 02°55.341'S, 77°43.272'W, 183 m, *Croat 84834* (holotypus MO-5564275; isotypus AAU, B, CAS, COL, F, GB, GH, K, L, M, NY, Q, QCNE, QCA, S, U, UB, US).

Terrestrial rhizomatous herb; rhizomes slender whitish, 6–9 mm diam., sometimes branched; petioles (9)14–23(31) cm long, 3–4 mm diam, terete to subterete, multiribbed circumferentially, usually obtusely sulcate above the middle or at least toward the apex, sometimes narrowly and deeply sulcate near apex (sometimes with the margins moderately acute) medium green with minute dark green speckles (these speckles sometimes becoming purplish), matte, spongy; lacking any sign of a sheath, but instead the petiole bases are surrounded by a cataphyll 4–6 cm long, the cataphyll apex acute to rounded and weakly apiculate; blades sagittate-hastate, 8.0–14 cm long, 6.0–13 cm wide, 7.5–14.2 cm long from tip of blade to tip of posterior lobe, matte-subvelvety, variable in color, ranging from nearly solid dark green or mottled with light green or white above (those with the most solid dark green blades usually with a continuous, solid pale green V-shaped band paralleling the margins), moderately paler and matte below; margins straight to undulate and often crisped and hyaline; anterior lobes 5.0–7.2 cm long, decurrent onto petiole at base; posterior lobes 5.5–9.7 cm long, 3.1–3.5 cm wide, equaling or up to 1.2 times longer than the anterior lobe, and directed toward the base or directed somewhat outward at 40–50° angle, bluntly pointed at tip; basal veins 4–6 per side, 1st pair free to the base, 2nd pair coalesced 4–8 mm, somewhat retrorse then prominently arched toward the apex, 3rd and 4th coalesced 1.5–2.2 cm, the 3rd pair usually directed straight to apex; sinus deeper than broad to about as broad as deep, narrowly V-shaped to narrowly spathulate, usually 0.5–2 cm wide in life, 1–3 cm on flattening, sometimes closed with the lobes overlapping; major veins etched to etched-sunken and concolorous above, darker, moderately raised and obtusely angular below; midrib somewhat thicker than broad toward base, faintly and sparsely pale-lineate; primary lateral veins 1–2 pair, arising at 45–55° angle; higher order veins (2nd and 3rd) clearly distinct on lower surface. Inflorescence solitary, erect; peduncle 14.2–27(42) cm long, 3–4 mm diam., matte, spongy, deeply sheathed and sulcate almost to the base, with one margin folded over the other, only the apical portions



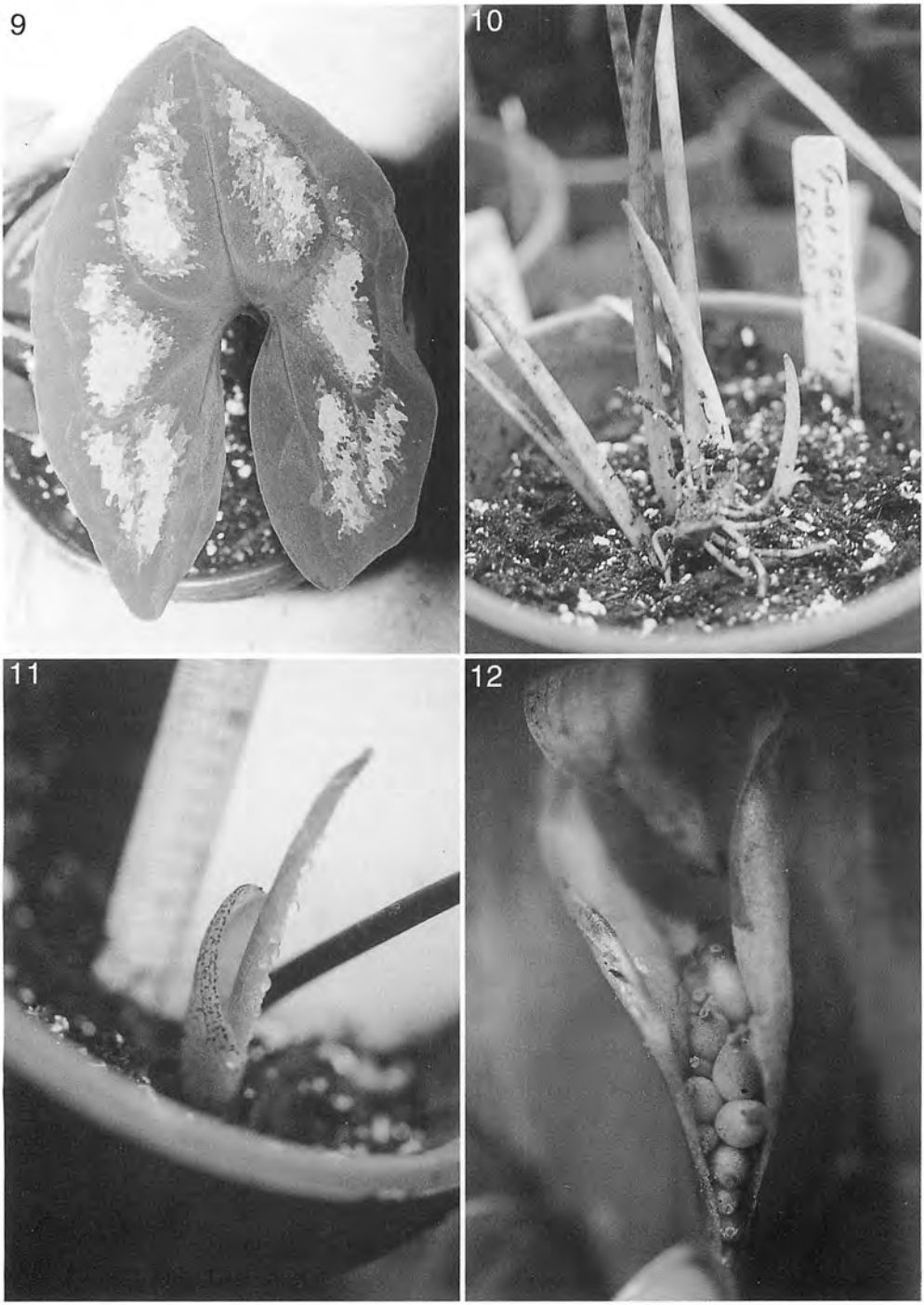
Figs. 1–4. *Ulearum donburnsii* Croat & Feuerstein 1 (upper left). Habitat with flowering plant. 2 (upper right). Inflorescence. 3 (lower left). Eleven plants from a single population demonstrating the degree of variation in leaf shape and coloration. 4 (lower right). Leaf blade showing sagittate solid green blade with unequal, more or less parallel posterior lobes exceeding the length of the anterior lobe.

open and sulcate, sparsely blotched with darker transverse lines; spathe narrowly ovate, 5.8–7.0 cm long, 2.0–2.7 cm wide, erect-spreading, medium green to pale green or white to green tinged pinkish gray, sometimes mottled with pinkish gray, acuminate at apex, decurrent at base onto peduncle, tightly folded toward the base, the main veins 13, the margins in the lower ½ of the spathe rolled under, those of the upper ½ rolled inward, inner surface smooth and glossy, outer surface matte, on magnification with a minute alveolate pattern of irregular ridges and deep depressions; spadix 6–7.2 cm long, overtopping spathe by ca. 1 cm, with the pistillate portion interrupted by a segment with long filiform staminodes surrounding a short staminate portion, sometimes with a naked portion of the axis just above the pistilate portion; pistilate portion 1.1–1.8 cm long, 2–3 mm diam., fused obliquely to the spathe in the lower ½ or fused throughout (sometimes even with a small portion of the sterile staminate section, along with the filiform staminodia, fused to the spathe), the lowermost pistils in a single row consisting of 3–5 flowers borne in the middle of the axis (sometimes with a small gap several flowers above the base), succeeding portions with more flowers per row, up to 5 flowers per row; with a section of filiform staminodia 2.7–3.0 cm long, to ca. 1.5 cm wide, this enveloping the staminate section, occurring both above and below the staminate section, mostly in the first 2–4 mm above and below the staminate section but also extending up to 6 mm above the staminate section and sparsely so all the way to the pistillate section; the filiform staminodia ca. 20–25 in all, greenish, (1.6)6.2–7.0 mm

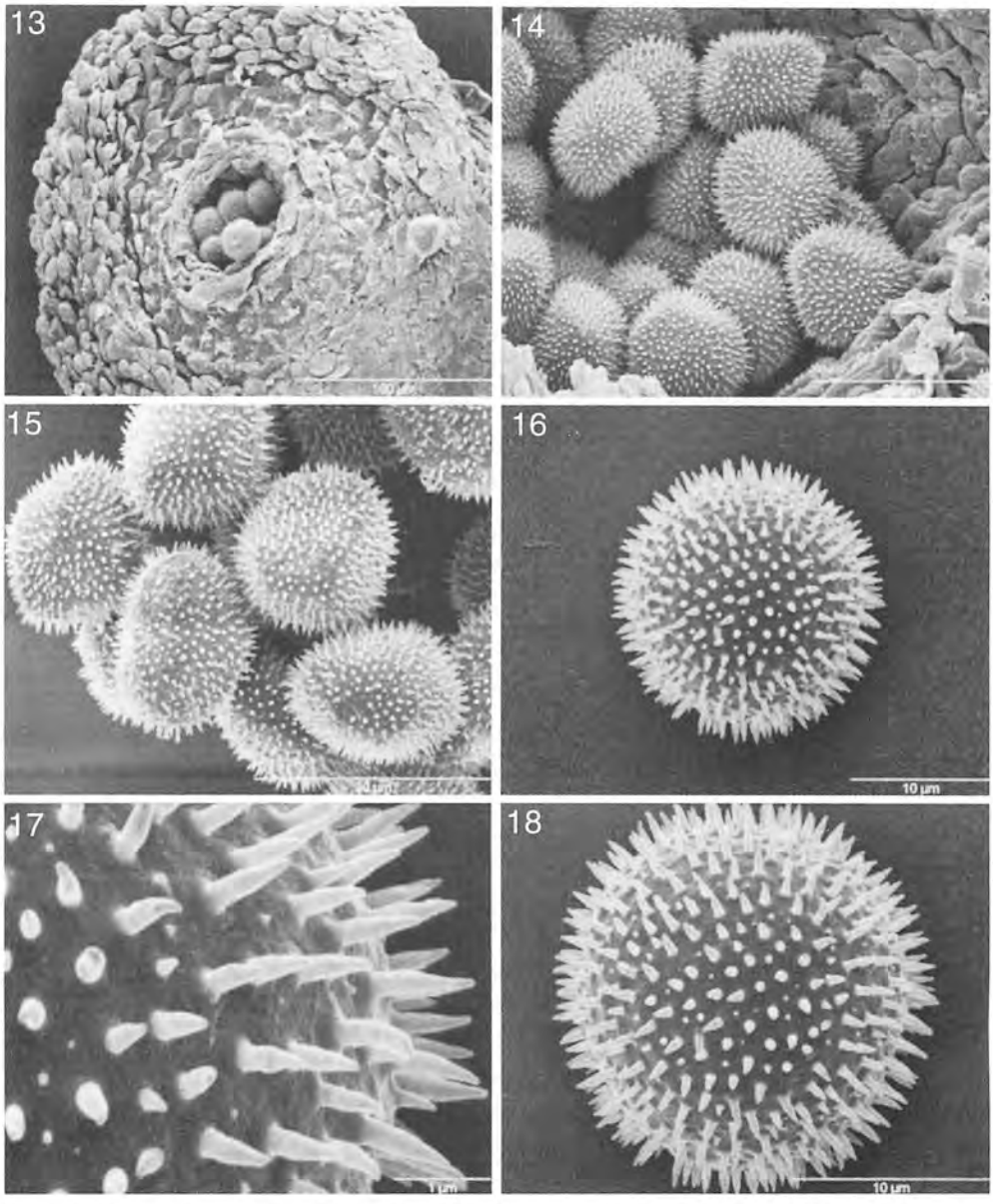


Figs. 5–8. *Ulearum donburnsii* Croat & Feuerstein 5 (upper left). Leaves with subhastate blades with a paler green band extending along the entire border. 6 (upper right) Leaves with subhastate bicolorous blades with pale green areas between the major veins. 7 (lower left). Infructescence with the persistent spathe flexed forward. 8 (lower right). Short-creeping rhizome with sparse roots.

long, 1–2 mm diam., terete to somewhat flattened, minutely puberulent, drying with weak ribs, these finely and minutely warty/papillose; the axis of the staminate spadix as well as the filamentous processes with whitish-drying, elongate cellular inclusions 0.1–0.4 mm long; staminate spadix (including appendix) (5)6.6–7.5 cm long, usually falling off (or eaten off) after anthesis; staminate flowers arranged in 4–5 weak spirals or rows; pistils 20–27, 1.0–2.8 mm long, 0.8–1.0 mm diam, cylindrical to somewhat swollen, somewhat oblique at the base, the surface weakly short pale-striate; stigma 2 mm wide round, funnel-shaped with a deep central depression, sometimes somewhat oblique; ovary 1-locular with a short style; stigma discoid and sunken in the center; ovule 1, anatropous, subcylindric ovules 0.9–1.1 mm long, 0.5–0.7 mm wide, 0.2 mm thick, and somewhat thicker in the distal half, with basal placentation; funicles 0.6–0.7 mm long; both the funicle and ovary moderately flattened; stamens usually with the filaments ca. 1 mm long, rarely with the stamens borne on branched filaments; anthers with a pair of thecae 0.8–1.0 mm wide, yellowish green, truncate and irregularly rounded at apex but weakly connected to appear like the figure 8, each theca with a medial pore (this 0.1 mm diam.), drying with a paler, narrowly raised edge (also on drying appear to be discrete and separate anthers with medial pore rather than individual thecae); pollen ovoid, 20–22 μ, echinate, is of medium size and is presented in monads, the spines 1.5 μ long; appendix 3.0–3.7 cm long, more or less flattened, 1 × 2 mm diam., pale green, ca. 1.5 cm longer than the spathe. Berries 6.7–7.5 mm long, 3.0–



Figs. 9–12. *Ulearum donburnsii* Croat & Feuerstein 9 (upper left). Leaf blade showing pattern of venation and variegations in mottling with three shades of green. 10 (upper right). Base of uprooted plant showing roots, stem, petioles with mottled bands and unopened leaf contained in leaf sheaths. 11 (lower left). Leaf in bud enveloped by mottled leaf sheath. 12 (lower right). Infructescence with reflexed spathe and exposed berries.



Figs. 13–18. *Ulearum donburnsii* Croat & Feuerstein 13 (upper left). Anther with central pore and emerging pollen grains. 14 (upper right). Cluster of pollen grains. 15–18. (Middle and lower right). Pollen grains in various states of magnification indicated by bar.

3.3 mm diam., ellipsoid to ellipsoid-ovoid, whitish in lower ⅓, pale yellow-green in upper ⅔; pericarp thin, mottled irregularly with pale purple (mottling with jagged edges); seed solitary, 4.9–5.3 mm long, 2.3–2.5 mm diam., appearing essentially sessile and borne at the base of the ovary, testa thin, faintly brownish white; raphe inconspicuous; embryo large, pale yellow green, straight, attached basally by a thickened whitish funicle less than 1 mm long, endosperm lacking.

Ulearum donburnsii is known only from the type locality in tropical moist forest in Morona-Santiago Province of eastern Ecuador at 283 m. Although there is a possibility that *Zomicarpella* occurs in Colombia, this occurrence of a member of the Zomicarpeae in Ecuador is the northernmost collection for any member of tribe Zomicarpeae from the Andean region of western South America. The genus *Zomicarpa* is restricted to eastern Brazil while *Zomicarpella* is known for certain only from western Brazil. The range of *Ulearum* previously known from eastern Peru and western Brazil is extended to southern Ecuador. The species may be more widespread than is currently assumed because when not in flower the plants are not markedly conspicuous and could easily be confused for sterile juvenile plants of some other genus, especially *Syngonium*.

According to Michael Hesse (Univ. of Vienna) the pollen of *Ulearum sagittatum*, the only other species in the genus, differs in being more spherical and larger (26–28 microns) with longer spines (to 2 μ). Additionally the pollen of *U. donburnsii* differs from *U. sagittatum* in lacking the nodose thickening of the spines and in having a thickened platelet at the base of the spines.

Despite some reports to the contrary it now appears that most of the stems of Zomicarpeae are rhizomatous. Although *Filarum manserichense* Nicolson was described as being tuberous in the original publication it has proven to be rhizomatous, like *Ulearum donburnsii* (Julius Boos, pers. comm.). The illustration and description of *Filarum* in Genera of Araceae (Mayo *et al.*, 1997) describe *Filarum manserichense* as being tuberous, as does the original description by D. Nicolson (Nicolson, 1966). On the other hand, Wilbert Hetterscheid (Hetterscheid & Sizemore, 1997) redescribed the species as rhizomatous. *Filarum*, *Ulearum* and *Zomicarpella* have all proven to be rhizomatous. Only *Zomicarpa* appears to be tuberous, based on the both the illustrations and description in the Genera of Araceae (Mayo *et al.*, 1997). Though the rhizomes of these genera may be short-creeping and tuber-like, investigations made by Wilbert Hetterscheid (pers. comm.) with *Filarum* are instructive. His observations demonstrated that "segments of the rhizome showed that the apical bud for the new growth was clearly excentric on the stem, that there was a narrowed part on one side of the older part of the rhizome, and that the fresh roots were located on only one side of the rhizome". Accordingly all of these features prove that the stem is rhizomatous rather than tuberous. Even *Zomicarpa*, based on observations by Eduardo Gonçalves (pers. comm.) may have tuber-like rhizomes like those described above by Hetterscheid. If so this would mean that all of Zomicarpeae have rhizomatous stems.

The species is named in honor of our good friend, the late Don Burns, who was a grower of many Araceae, and an active member and officer of the International Aroid Society, whose computer skills were helpful to many. Don was for many years responsible for maintaining membership and thus provided invaluable service. His untimely death on April 27, 2002 prompts us to name this new species to honor his devotion to aroids.

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