THE IDENTITIES AND SYSTEMATIC RELATIONSHIPS OF
MATHIEUA KLOTZSCH AND PLAGIOLIRION BAKER
(AMARYLLIDACEAE)

Alan W. Meerow

Summary

Mathieua and Plagiolirion are two poorly known, monotypic genera of petiolate-leaved neotropical Amaryllidaceae that have been variously treated as synonyms for Eucharis, Urceolina or Hymenocallis subg. Elisena. Taxonomic history, morphological characters, phytogeography, and ecology of both genera are reviewed. From the available data, Mathieua appears most closely related to Stenomesson. Plagiolirion shows greatest relationship to Hymenocallis subg. Elisena. The supposition that Linden’s combination of Eucharis galanthoides was based on Mathieua galanthoides is shown to be false, and E. galanthoides is declared a nomen nudum. The significance of a number of rare and small or monotypic genera of Amaryllidaceae in the northern Andes, with characters intermediate between various larger genera, is discussed.

Mathieua Klotzsch and Plagiolirion Baker are two poorly known, monotypic genera of petiolate-leaved neotropical Amaryllidaceae. Traub (1963) listed both as synonyms for Eucharis Planchon & Linden in his Genera of the Amaryllidaceae. When Traub (1971) later transferred Eucharis into Urceolina Reichb. (nom. cons.), he designated Mathieua and Plagiolirion as two of five subgenera in Urceolina. Traub never published any explanation of these taxonomic changes.

My monographic work on Eucharis and other Andean genera of Amaryllidaceae has revealed information about these obscure taxa that sheds light on their probable systematic affinities with other genera of Neotropical Amaryllidaceae. In this paper, I review the taxonomic history of Mathieua and Plagiolirion, summarize the available information about these genera, and attempt to resolve their respective phylogenetic positions.

Mathieua

The monotypic genus Mathieua was established by Klotzsch (1853) to accommodate a single Warscewicz collection from Paita in north coastal Peru. It has not since been collected. Klotzsch described the sole species, M. galanthoides, as having sessile, capitulate, small, white flowers. He allied the genus with Herbert’s (1837) “suborder” Pancratiformes, because the flower exhibited basal connation of the filaments.

Linden (1862) listed a Eucharis galanthoides in his annual trade catalog. Since then, Mathieua galanthoides Klotzsch has been treated historically in the literature as a synonym for E. galanthoides Hort. Linden [as E. galanthoides (Klotzsch) Lind.; e.g., Macbride, 1936; Traub, 1963, 1967]. Examination of a photocopy of Linden’s catalog of 1862 reveals that the plant called E. galanthoides by Linden was collected by Gustave Wallis along the Rio Negro in Peru, and received by Linden under the name Pancratium galanthoides, a name with no prior taxonomic standing. As no type, description, or illustration appears to exist for Linden’s plant, its exact identity must remain a mystery, though it is likely referable to one of several small-flowered Amazonian species of Eucharis. In any event, it was not...
Klotzsch’s plant that Linden intended to reduce to synonymy with *Eucharis*, and *E. galanthoides* is probably best considered a nomen nudum.

The holotype of *M. galanthoides* Klotzsch (*Warscewicz s.n., B*) consists of a single flower without ovary (Fig. 1), which complicates proper placement of this taxon in relation to other genera of pancratioid Amaryllidaceae [“infrafamily” Pancratioidinae Traub (1957)]. Ovary, fruit and seed morphology are the most important characters for delimiting pancratioid tribes (Meerow, 1985a, 1986, 1987). Leaves of *Mathieua* are known only from Klotzsch’s (1853) description. They are long-petiolate with an ovate lamina. Klotzsch’s material was two- to four-flowered. He described the scape as “polyphylla,” although it is unclear whether he was referring to the outer bracts alone or including the largest series of bracteoles as well. Total length of the single flower in the fragmentary type is ca. 3.5 cm. The narrowly subulate staminal filaments are dilated at their base and joined into a membranous staminal cup which is edentate and adnate to the throat of the tube. The ovate anthers are dorsifixed, at first erect, later horizontal in habit. The style of *Mathieua* is somewhat declinate, exserted beyond the perianth; the stigma is short and three-lobed. Klotzsch had no information on the mature fruit, presumably a loculicidal capsule typical of most pancratioid genera. The ovary is described as trigonous; the ovules as numerous per locule, biseriate, affixed horizontally, and compressed.

Examination of the holotype of *M. galanthoides*, coupled with Klotzsch’s description, suggests morphological resemblance to taxa in pancratioid tribes (sensu Traub, 1963) *Euchareae* (cf. *Urceolina*, *Caliphruria* Herbert) and *Stenomesseae* (cf. *Stenomesson* Herbert). Klotzsch’s description of the ovules of *Mathieua* as “compressiuscule,” is not a character associated with any member of *Euchareae*, even those taxa with ovules numerous per locule [e.g., *Eucharis* subg. *Heterocharis* Meerow, *Urceolina urceolata* (R. and P.) M. L. Green, *Hymenocallis quitensis* Herbert], all of which have globose ovules. Lateral compression of the ovules is characteristic of genera in tribe *Stenomesseae* (Baker, 1888; Traub, 1963; pers. obs.).
Table 1. Comparison of Mathieua with Caliphruria, Urceolina, and Stenomesson. (+) = present, (-) = absent, (±) = variable.

<table>
<thead>
<tr>
<th>Character</th>
<th>Mathieua</th>
<th>Caliphruria</th>
<th>Urceolina</th>
<th>Stenomesson</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petiolate leaf</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>±</td>
</tr>
<tr>
<td>Ventricose perianth</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>±</td>
</tr>
<tr>
<td>Perianth white</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Concrecent limb</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Sessile flowers</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Staminal connation reduced</td>
<td>±</td>
<td>±</td>
<td>+</td>
<td>±</td>
</tr>
<tr>
<td>Tri-lobed stigma</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Ovules laterally compressed</td>
<td>±</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Xeric ecology</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>

Mathieua galanthoides has been collected only in north coastal Peru, in the vicinity of Paita (ca. 5°S, 81°W), a region of sparse, xeric woodlands. It was on the basis of this fact alone that Ravenna (1982, 1983) did not accept this taxon as a subgenus of Urceolina. Both Urceolina and Caliphruria are entirely mesophytes of rainforest understory. Of the genera phenetically similar to Mathieua, the ecology of Stenomesson is closest to that of Mathieua. Numerous species of Stenomesson grow in seasonally dry or xeric habitats of the western Andes and South American coast (Ravenna, 1978; pers. obs.). From the incomplete data available, Mathieua galanthoides shows greater relationship with the panicratoid tribe Stenomesseae than with Caliphruria and Urceolina (Table 1). Nonetheless, the lack of additional morphological data and the depauperate holotype prevent me from assigning Mathieua to synonymy with any particular extant genus in the tribe.

Plagiolirion

Plagiolirion Baker (1883), a rare Colombian taxon, was considered by Baker (1883) to be intermediate between Eucharis and Eucrosia Ker-Gawler. He later (Baker, 1888) allied the monotypic genus to Eucharis and Caliphruria. Hutchinson (1959) treated Plagiolirion as synonymous with Hymenocallis subg. Elisena (Herbert) Traub, which he recognized at the rank of genus.

Leaves of Plagiolirion horsmanii are long-petiolate with an elliptic lamina. The perianth is small and zygomorphic (Fig. 2a). The tube is less than 1 cm long. Five of the lanceolate tepals are ascendent while one is declinate. Stamens of Plagiolirion are filiform, declinate, half as long as the segments, and united below into a short staminal cup that is toothed between each free filament (Fig. 2b). In Plagiolirion the style is ascendent, the stigma capitate, and there are two ovules per locule in all material I have examined (e.g., Lehmann 8401, 8960, K). The ovules are globose and collateral at the basal end of the ovary (Fig. 3). This type of ovarian morphology is not found in either Eucharis or Urceolina.

The zygomorphy and declinate staminal cup and style of Plagiolirion are characters found in Hymenocallis subg. Elisena (Fig. 2c–d), and also in Eucrosia (Fig. 2e). A pair of basal, collateral ovules in each locule is a characteristic of subg. Elisena (Fig. 2d), and is common in other species of Hymenocallis (Traub, 1962). Several species of Hymenocallis subg. Hymenocallis possess distinctly petiolate leaves with well-expanded laminae (e.g., H. tubiflora Salisb.).

Plagiolirion horsmannii seems to have occurred in but one locality in western Columbia, the vicinity of Cajamarca and Roldanillo in the Cauca valley (ca. 4°30'N, 76°10'W). I did not succeed in collecting this plant in 1984 from the now largely deforested type locality. Plagiolirion was collected by Lehmann between 1800 and 2000 m in elevation, the "selvasubandina" of Cuatrecasas (1958).

Plagiolirion is contrasted with Eucharis, Eucrosia, and Hymenocallis subg. Elisena in...

Table 2. The morphology of the perianth, androecium, and ovary best supports Hutchinson’s (1959) inclusion of Plagiolirion within Hymenocallis subg. Elisena.

Discussion
The northern Andes, particularly in Peru, are a great center of diversity for the pancratioide Amaryllidaceae (Ellenebecker, 1975; Meerow, 1985a, b). A number of small or rare monotypic genera which are phenetically intermediate between other, often larger, genera have been reported from this area. Despite certain characters of intermediacy, these small genera can exhibit autapomorphies (sensu Hennig, 1969) that justify their separation at the generic level. Several cases in point follow.

Rauhia Traub consists of three species narrowly distributed in seasonally dry woodlands
of the Rio Marañon valley of Peru (Ravenna, 1978, 1981). In a number of characters of floral morphology, *Rauhia* exhibits phenetic intermediacy between the larger genera *Phaeodranassa* Herbert and *Eucrosia* (Meerow, 1987). The leaves of *Rauhia*, however, are bizarrely carnose and frequently tessellate (Ravenna, 1978; pers. obs.). The epidermal cells of the leaves are papillose (Meerow, 1987). These foliar characters are strict autapomorphies of *Rauhia*.

*Pucara* Ravenna (1972), a monotypic genus allied to the larger genus *Stenomessson* (ca.
Table 2. Comparison of *Plagiolirion* with *Eucharis, Hymenocallis subg. Elisena*, and *Eucrosia*. (+) = present, (−) = absent, (±) = variable.

<table>
<thead>
<tr>
<th>Character</th>
<th>Plagiolirion</th>
<th>Eucharis</th>
<th>Elisena</th>
<th>Eucrosia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petiolate leaf</td>
<td>+</td>
<td>+</td>
<td>−</td>
<td>+</td>
</tr>
<tr>
<td>Zygomorphic perianth</td>
<td>+</td>
<td>−</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Short perianth tube</td>
<td>+</td>
<td>±</td>
<td>+</td>
<td>±</td>
</tr>
<tr>
<td>Staminal cup</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Declinate stamens</td>
<td>+</td>
<td>−</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Captitate stigma</td>
<td>+</td>
<td>−</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Basal, collateral ovules</td>
<td>+</td>
<td>−</td>
<td>+</td>
<td>−</td>
</tr>
<tr>
<td>Ovules globose</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>−</td>
</tr>
</tbody>
</table>

35 species, was described from Cajamarca department of Peru. *Pucara* represents a vague connecting link between *Stenomesson* and the related genera *Pamianthe* Stapf and *Paramongaia* Velarde, but also exhibits idiosyncratic perianth and staminal cup morphology.

*Hymenocallis quitoensis* Herbert, found only in xeric lowlands of southwestern Ecuador and northwestern Peru, has been variously treated as the monotypic genus *Lepidochiton* Sealy (1937), a species of *Pamianthe* (Stapf, 1933), an element of *Hymenocallis subg. Ismene* (Salisb.) Traub (1962) and as part of *Hymenocallis sect. Hymenocallis* (Traub, 1981). Though pollen and internal seed morphology indicate close relationship to *Hymenocallis* (Meerow and Dehgan, 1985), the seed of this species has a brown phytomelanous (Huber, 1969) testa, unlike all other species of *Hymenocallis*, the seeds of which lack phytomelan. Snoad (cited in Darlington and Wylie, 1952) reported a chromosome number of $2n = 24$ for this species. Material I have in cultivation from both Ecuador and Peru has $2n = 34$ (Meerow, unpubl. data). The most common chromosome number in *Hymenocallis* is $2n = 46$ (Flory, 1976).

In my work on *Eucharis*, I recognize two subgenera: *Eucharis* and *Heterocharis* Meerow (Meerow, 1986). On the basis of cladistic analyses of *Eucharis*, subg. *Heterocharis* is a paraphyletic (sensu Hennig, 1966) assemblage of three relict species, each of narrow distribution, but widely dispersed in relation to each other. Each of the three exhibits a number of autapomorphies, but as a group share a large number of putatively primitive characters. My hypothesis is that these three species represent the fragmented remains of the ancestral complex of *Eucharis* (Meerow, 1986).

The reasons for this richness of relict taxa in the northern Andes are no doubt complex. It may seem facile to single out particular factors, but the geologically recent uplift of the Andean geosyncline (Van der Hammen, 1974, 1979) and subsequent changes in vegetation patterns during the Pleistocene (Prance, 1982a, b; Van der Hammen, 1974, 1979) have likely been among the most important. The high degree of homoplasy (Meerow, 1985a), and the reoccurrence of a somatic chromosome number of $2n = 46$ (Di Fulvio, 1973; Flory, 1976, 1977; Meerow, 1985a, b, 1987; Williams, 1981) among Neotropical pancratioid genera suggests a scenario of rapid mosaic evolution (sensu Stebbins, 1984) within a monophyletic, tetraploid group.

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**Literature Cited**


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