SAVANNOSIPHON GEN. NOV., A SEGREGATE OF *LAPEIROUSIA* (IRIDACEAE-IXIOIDEAE)[1]

PETER GOLDBLATT[2] AND W. MARAIS[3]

ABSTRACT

The central African species previously known as *Lapeirousia euryphylla* Harms is transferred to a new genus *Savannosiphon*. Comparisons of *Savannosiphon* with *Lapeirousia*, *Anomatheca* and other Ixioid Iridaceae lead to the conclusion that *Savannosiphon* is allied to *Lapeirousia* and to *Thereianthus* and *Micranthus*, and it should be placed with these genera in tribe Watsonieae. A chromosome number of $n = 7$ has been found in *S. euryphyllus*.

It has been the impression of the authors for several years since we separately began systematic studies of *Lapeirousia* and *Anomatheca* (Goldblatt, 1972; Marais, unpubl.) that the fairly well-known tropical African *Lapeirousia euryphylla* Harms did not belong in *Lapeirousia*, nor did it seem to conform well with the related *Anomatheca*. This opinion was evidently shared by Diels (1930) who placed *L. euryphylla* in *Acidanthera*, a genus nomenclaturally synonymous with *Gladiolus*, though other species at times assigned to *Acidanthera* are now considered to belong to several other genera of Iridaceae-Ixioideae (Lewis, 1941). More recently, we have had the opportunity of growing this plant and close observation has strengthened the conviction that *L. euryphylla* is misplaced. Chromosome counts, made from cultivated material, have also lent some support for our view that *L. euryphylla* should be removed from *Lapeirousia*. We have consequently decided to describe the new genus *Savannosiphon* to accomodate *L. euryphylla*.

CHARACTERISTICS OF *SAVANNOSIPHON EURYPHYLLUS*

Savannosiphon euryphyllus is entirely tropical in distribution (Fig. 1), extending from Shaba Province (Geerinck et al., 1972) of Zaïre and Tanzania, southward through Zambia, Malawi, and northern Mozambique. It has round-based corms (Fig. 1C) which are depressed globose in shape, with often quite coarsely fibrous tunics. Interestingly, the corms of *Savannosiphon* originate from axillary buds, as described by DeVos (1977) in *Lapeirousia*, *Watsonia*, *Thereianthus*, and *Micranthus*, in which feature these genera constitute an apparently unique group in subfamily Ixioideae. *Savannosiphon* has only a few leaves (Fig. 1A), the lowest one inserted on the stem near the ground and others inserted at nodes above ground level. The leaves are unusual, being soft in texture and corrugate-plicate, a feature occurring sporadically in Ixioideae, but not found in *Lapeirousia* or *Anomatheca*. The stem is more or less terete below but flattened and 2-winged below the inflorescence and erect and unbranched. It bears only a few flowers, a two- to six-flowered spike being usual. The bracts are long and herbaceous, but enclose only part of an extremely long, slender, cylindrical perianth tube. The flowers

[1] Supported by U.S. National Science Foundation grant DEB 78-10655.

[2] B. A. Krukoff Curator of African Botany, Missouri Botanical Garden, Post Office Box 299, St. Louis, Missouri 63166, U.S.A.

[3] Royal Botanic Gardens, Kew, Surrey, England TW9 3AE.

ANN. MISSOURI BOT. GARD. 66: 845–850. 1979.

0026-6493/79/0845–0850/$00.75/0

are pure white, apparently scentless, and essentially actinomorphic. They last only about 12 hours, opening at sunset, and fading in the early morning, so that by sunrise they are limp and partly collapsed. The stamens are somewhat unusual in being enclosed in the perianth tube, and only the upper ends of the anthers sometimes protrude from the narrow part of the tube into the wider throat. The style branches are deeply divided.

The chromosome number is $n = 7$ and the karyotype comprises three long and five medium-short to short, acrocentric chromosomes (Fig. 1D). The chromosome number and karyotype are clearly quite unlike the *Anomatheca* pattern (Goldblatt, 1972) where $x = 11$. Nor does the karyotype of *Savannosiphon* bear much resemblance to any recorded pattern in *Lapeirousia* (Goldblatt, 1972, 1980), which is however rather variable in karyotype as detailed in the following section.

SURVEY OF *LAPEIROUSIA* AND *ANOMATHECA*

Lapeirousia, a genus of some 25 species, ranges almost throughout sub-Saharan Africa, occurring from Nigeria and Ethiopia to the Cape Province of South Africa. Its most characteristic feature is a flat-based, conical to bell-shaped corm, the tunics of which are initially entire, and often tough and woody, though the outermost layers may become irregularly broken or fibrous. Most often species have a single produced leaf, which is often characteristically ribbed, though several, flat leaves are present in a few species. Stems are often flattened, and angular, and usually branched. The inflorescence is either a diffuse panicle or a spike, or by reduction a basal rosette. Floral bracts are herbaceous and fairly short in the species with panicles, or quite long in some spicate or rosette species. Flowers range from stellate and actinomorphic to strongly zygomorphic, either with short or extremely long perianth tubes. Style branches are typically deeply divided but undivided style branches are recorded in two species.

Anomatheca is a smaller genus, comprising only five species, which extends from south-tropical Africa to the Cape. The corms are round based, and conic to globose, with soft-textured fibrous tunics. Leaves are flat, soft in texture, numbering from two to several in distichous arrangement, and the stems are usually terete, but are angled in one species. The bracts are short and herbaceous, and the inflorescence is typically an inflexed secund spike, although in *A. fistulosa* each branch of the inflorescence bears a single flower. Flowers are zygomorphic with slender or tapering perianth tubes. As in *Lapeirousia,* the style branches are deeply divided. *Anomatheca* is, we believe, very closely related to *Freesia,* and shares with it all characters except that in *Freesia* the perianth tube has a slender cylindrical basal part and a wide cylindrical upper part. Species of *Freesia* always have a prominently flexed inflorescence, so that the spike is more or less horizontal to the ground. The corm differences between *Anomatheca* and *Freesia,* on the one hand, and *Lapeirousia,* on the other, are considered fundamental and suggest that *Lapeirousia* may not even be particularly closely related to *Anomatheca* and *Freesia.*

Cytological differences reinforce the morphological distinctness of *Lapeirousia* and *Anomatheca* (Goldblatt, 1972). Both *Anomatheca* (and the related *Freesia*) have a basic chromosome number of $x = 11$, the karyotype comprising small, more or less uniform-sized chromosomes. In *Lapeirousia* the cytological situation

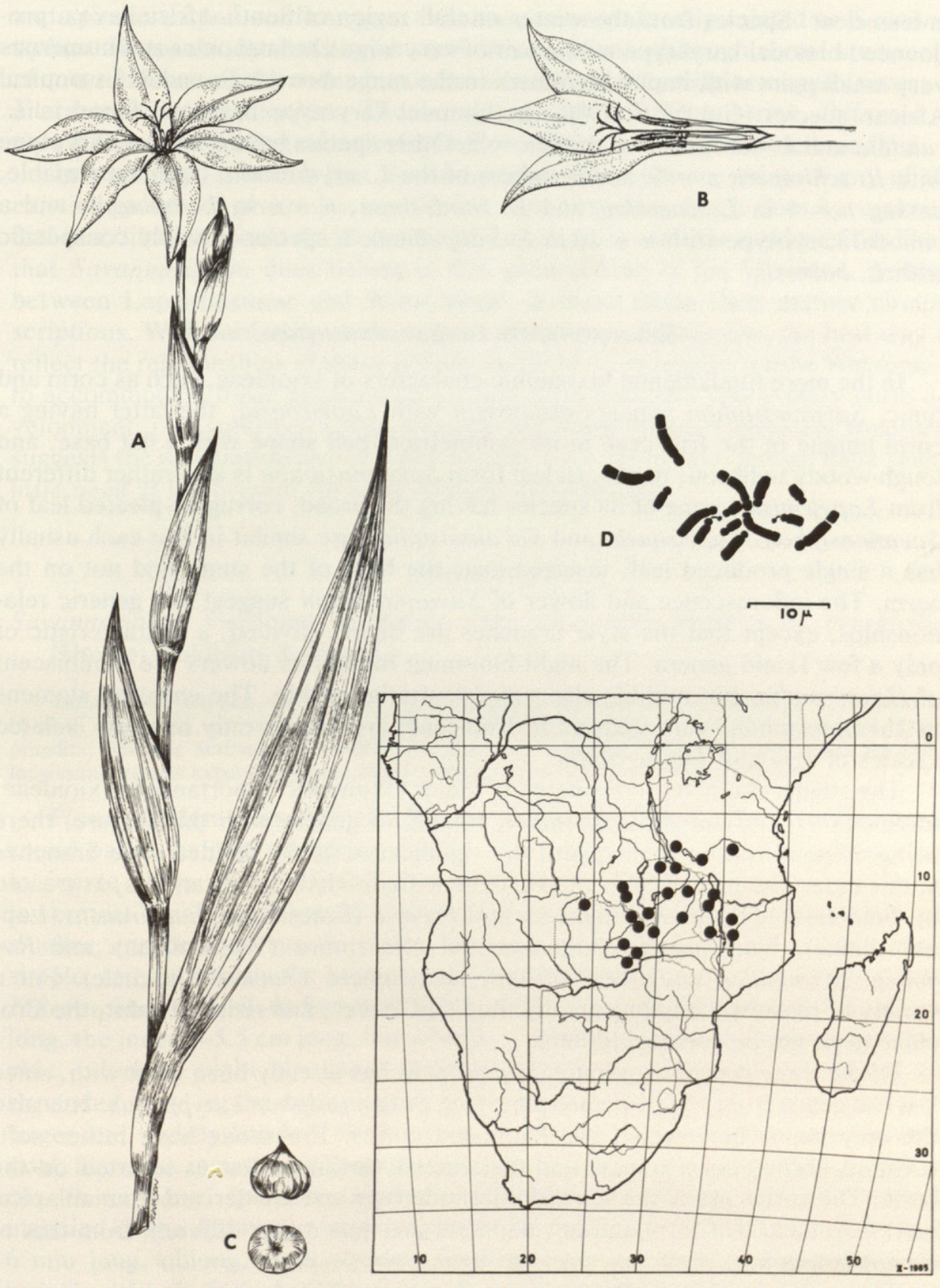

FIGURE 1. Morphology, distribution, and chromosomes of *Savannosiphon euryphyllus*.—A. Aerial parts (×1/2).—B. Section of flower (life size).—C. Corm in side and basal view (×1/2).—D. Mitotic metaphase.

is less clear. Species from the winter rainfall region of South Africa have a pronounced bimodal karyotype with a pair of very large chromosomes and numerous very small pairs with haploid numbers in the range $n = 10$, 9, and 8. In tropical African species (Goldblatt, 1980) the bimodal karyotype has been found in *L. caudata* and *L. odoratissima*, both $n = 8$. Other species have a normal karyotype with *L. schimperi*, $n = 5$, and members of the *L. erythrantha* complex variable, having $n = 4$ in *L. coerulea* and *L. rhodesiana*, $n = 6$ in *L. bainesii*, and a bimodal karyotype with $n = 10$ in *L. vaupeliana*, a species possibly conspecific with *L. bainesii*.

RELATIONSHIPS OF *SAVANNOSIPHON*

In the more fundamental taxonomic characters of Ixioideae, such as corm and tunic, *Savannosiphon* appears discordant with *Lapeirousia*, the latter having a corm unique in the Iridaceae in its symmetrical bell shape with a flat base, and tough woody to fibrous tunics. In leaf form *Savannosiphon* is also rather different from *Lapeirousia*, none of its species having the broad, corrugate-pleated leaf of *Savannosiphon*. *Lapeirousia* and *Savannosiphon* are similar in that each usually has a single produced leaf, inserted near the base of the stem, and not on the corm. The inflorescence and flower of *Savannosiphon* suggest few generic relationships, except that the style branches are deeply divided, a characteristic of only a few Ixioid genera. The night-blooming fugaceous flowers are reminiscent of *Hesperantha*, but nothing else suggests a relationship. The enclosed stamens in *Savannosiphon*, very unusual in Iridaceae, are known only in a few isolated species of *Ixia* and *Hesperantha*.

The stigma character, considered of major taxonomic importance in Ixioideae, forces us to consider *Savannosiphon* related to genera with this feature, there being no good reason to disregard the significance of the divided style branches in this case. The main groups of Ixioideae with divided style branches, as treated by Goldblatt (1971) are *Anomatheca* and *Freesia* (Freesiinae), *Lapeirousia* (Lapeirousiinae), *Watsonia*, *Thereianthus* and *Micranthus* (Watsoniinae), and *Romulea*, *Syringodea* (and the Northern Hemisphere *Crocus*) (Crocinae). For a variety of reasons, including greatly modified leaves, and reduced habit, the Crocinae need not be considered here.

Of the three remaining groups *Lapeirousia* has already been dealt with, since it is the genus from which we are removing *Savannosiphon euryphyllus*. It is also the only genus here which has flat-based corms. Freesiinae have rather soft-textured fibrous corm tunics, and distichously arranged leaves inserted on the corm. The corms are of the several internode type and are derived from an apical bud. Corm and leaf form and development are thus rather different from that of *Savannosiphon*.

The remaining group, Watsoniinae, has round-based corms, which originate from axillary buds in seasons when blooming occurs (DeVos, 1977). In *Micranthus* and *Thereianthus*, both Cape genera of this subtribe, corms are typically of a single internode, and the basal leaf is single, inserted on the stem near ground level. *Savannosiphon* thus has a leaf and pattern of corm development very similar to *Micranthus* and *Thereianthus*. Other features of the latter two genera such as dense, several- to many-flowered spikes, small flowers, small dry bracts,

and spindle-shaped seeds suggest that they are not directly related to *Savannosiphon*. *Watsonia* also has similar corm development, although corms are usually of more than one internode, but it has several distichously arranged leaves, of characteristic tough texture. The remaining genus of this subtribe, *Pillansia*, is very different in having a paniculate inflorescence and simple style branches.

In summary, it seems that *Savannosiphon* does not accord with any of the existing groups of genera having divided style branches, but it does have similar leaf insertion and corm development of *Lapeirousia* and *Micranthus*. It is likely that *Savannosiphon* does belong in this general area of the Ixioideae, perhaps between Lapeirousiinae and Watsoniinae, if these retain their narrow circumscriptions. With subfamily as the major subdivision of Iridaceae, the best way to reflect the relationships of these genera would be to recognize a tribe Watsonieae to accommodate those genera with divided style branches and axillary corm development, i.e., subtribes Lapeirousiinae and Watsoniinae. Consistent treatment suggests the recognition also of a subtribe for *Savannosiphon*, though there seems little need at the present for such detailed classification.

Systematics

Savannosiphon Goldblatt & Marais, gen. nov. TYPE SPECIES: *S. euryphyllus* (Harms) Goldblatt & Marais.

Planta 15–30 cm alta, *cormi* ca. 1 cm in diametro, ad basin versus rotundati. *Folia* producta (1–)2–3, ensiformia, corrugata. *Caulis* bialata supra simplex. *Inflorescentia* spicata 1–4(–6) floribus praedita; *bracteae* herbaceae 2, exterior grandior, 4–15(–30) cm longa. *Flos* albus, tubo perianthio longissimo, tepalis expansis. *Stamina* symmetrica. *Stylus* filiformis ramis perfurcatis.

Plants moderate in size, 15–30 cm tall; stoloniferous. *Corms* subglobose, round based, axillary; single internode, ca. 1 cm in diameter; tunics of medium to coarse fibers, initially forming an entire layer. *Produced leaves* 1–2(–3), the lowermost basal and inserted near ground level, the upper usually cauline and smaller, ensiform, corrugate-plicate, 10–40 cm long, 15–45 cm wide. *Stem* erect, simple, terete towards the base, flattened and 2-winged below the inflorescence. *Inflorescence* a 1–4(–6)-flowered spike; outer bract herbaceous, 4–15(–30) cm long, the inner 3–5.5 cm long, but usually ± subequal. *Flowers* white, actinomorphic, odorless, night blooming; perianth tube 8–12.5 cm long, cylindrical and expanded only at the apex; tepals 4–5 cm long, acute, the upper sometimes larger and slightly hooded, the lower spreading to horizontal. *Stamens* symmetrical; filaments inserted on the perianth tube ca. 15 mm below the throat; anthers ca. 10 mm long, apiculate, symmetrically disposed, facing outwards, entirely included or the upper part emerging from the narrow part of the tube. *Ovary* ca. 6 mm long, oblong; style slender, dividing near the apex of the anthers, the branches deeply forked. *Capsule* ca. 15 cm long, ovoid; seeds round, shiny, ca. 2 mm in diameter. Chromosome number $2n = 14$. (Fig. 1D).

Flowering time: Summer, mid-rainy season, January–February.

Distribution: Southeast and central Africa, including Shaba Province, Zaïre, Zambia, southern Tanzania, Malawi, and northern Mozambique.

The only species is *Savannosiphon euryphyllus* (Harms) Goldblatt & Marais,