

The reduction of *Oenostachys*, *Homoglossum* and *Anomalesia*, putative sunbird pollinated genera, in *Gladiolus* L. (*Iridaceae-Ixioideae*)

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Summary : Three currently accepted genera of *Iridaceae-Ixioideae*, *Oenostachys* Bullock, *Homoglossum* Salisb. (syn. *Petamenes* Salisb. ex J. W. Loud.) and *Anomalesia* N. E. Br. (incl. *Kentrosiphon* N. E. Br.) are closely related to *Gladiolus* L., and share with it the same series of specialized characteristics, including broadly winged seeds and a basic chromosome number of $x = 15$. They differ from *Gladiolus* in having similarly specialized flowers, with a dimorphic perianth tube, slender below and abruptly widening into a cylindrical upper part, a red to orange perianth and well exerted stamens. In each genus at least some of the species have a disproportionately enlarged upper tepal and reduced, sometimes scale-like, lower tepals. Despite similar flowers, the three genera differ significantly in their vegetative features and they probably acquired their similarly modified flowers independently. These flowers are thought to be adapted to pollination by sunbirds. Close examination of the species included in *Oenostachys* and *Homoglossum* suggests that neither genus is monophyletic and that each comprises at least two separate lines. Moreover, *Homoglossum* has been found to have an earlier synonym, *Petamenes*, now conserved over *Homoglossum*. We suggest that *Oenostachys*, *Homoglossum-Petamenes* and *Anomalesia* be treated as synonyms of *Gladiolus*. Such treatment is consistent with that of the related *Watsonia* Miller, which includes species with a wide range of different flowers adapted to a variety of insect and bird pollinators. The nomenclatural changes that our conclusions necessitate are included together with an outline of the taxonomic history of these segregate genera of *Gladiolus* and a brief discussion of species relationships. The description of a new variety, *G. watsonius* var. *maculosus* is included.

Résumé : *Oenostachys* Bullock, *Homoglossum* Salisb. (syn. *Petamenes* Salisb. ex J. W. Loud.) et *Anomalesia* N. E. Br. (incl. *Kentrosiphon* N. E. Br.), genres d'*Iridaceae-Ixioideae* actuellement acceptés, sont étroitement liés à *Gladiolus* L., avec lequel ils ont en commun un ensemble de caractéristiques, en particulier des graines largement ailées et le nombre chromosomique de base $x = 15$. Ils diffèrent de *Gladiolus* par leurs fleurs spécialisées présentant un dimorphisme du tube du périanthe lequel, étroit dans la partie inférieure, s'élargit brusquement en forme de cylindre vers le haut, par la couleur du périanthe (rouge à orange), et par les étamines bien exsertes. Au sein de chaque genre, au moins quelques espèces ont des fleurs dont le tépale supérieur est disproportionnellement élargi et les tépales inférieurs réduits, ressemblant parfois à des écailles. Bien qu'ils présentent des fleurs similaires, les trois genres diffèrent entre eux par leurs caractères végétatifs et ont probablement acquis leurs caractéristiques florales de manière indépendante. On considère que leurs fleurs sont adaptées à une pollinisation par les souimangas. Une analyse approfondie des espèces incluses dans *Oenostachys* et *Homoglossum* suggère qu'aucun de ces deux genres n'est monophylétique et qu'ils comprennent chacun au moins deux lignées séparées. De plus, *Homoglossum* possède un synonyme antérieur, *Petamenes*, qui a été utilisé à l'encontre de *Homoglossum*. Les auteurs suggèrent de mettre en synonymie *Oenostachys*, *Homoglossum-Petamenes* et *Anomalesia* sous *Gladiolus*. Un tel traitement est compatible avec celui du genre *Watsonia* Miller qui renferme des espèces ayant une grande diversité de fleurs adaptées à

plusieurs modes de pollinisation par les insectes et les oiseaux. Les changements nomenclaturaux nécessités par ces conclusions sont établis; un aperçu de l'histoire taxonomique de ces genres réunis dans *Gladiolus* et une brève discussion à propos des affinités spécifiques sont présentés. Une nouvelle variété, *G. watsonius* var. *maculosus*, est décrite.

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INTRODUCTION

The large genus *Gladiolus* L. comprises some 180 species of *Iridaceae-Ixioideae* distributed across Africa, Madagascar and Eurasia. It is centered in southern Africa where the taxonomy is well known and some 113 species are recognized (LEWIS et al., 1972; GOLDBLATT & VLOK, 1989). *Gladiolus* is also well represented in tropical Africa but here the taxonomy is confused and species limits of many taxa are disputed or have yet to be established satisfactorily. *Gladiolus* is almost certainly monophyletic, and well defined in subfamily *Ixioideae* by the following basic characters: herbaceous floral bracts; a secund spike; simple but apically expanded style branches; and seeds with a prominent circumferential wing. In addition, all species so far examined also have the same basic chromosome number, $x = 15$, unusual in the family (GOLDBLATT, 1971).

The same base number and identical suite of characters are also found in *Homoglossum* Salisb. (1866) [= *Petamenes* Salisb. ex J. W. Loud. (1841), with 10 species in the Cape region of southern Africa (DE VOS, 1976)]; *Anomalesia* N. E. Br. (1932) [incl. *Kentrosiphon* N. E. Br. (1932)], with 3-4 species of Namibia and western and southern South Africa (GOLDBLATT, 1971); and *Oenostachys* Bullock (1930), with 4-6 species in tropical Africa and northern Namibia. These genera are universally acknowledged to be closely related to *Gladiolus* (LEWIS, 1954; GOLDBLATT, 1971, 1990; DE VOS, 1976) and have until now been considered generally to be monophyletic assemblages conveniently segregated from the larger genus, and related to different species or species groups in *Gladiolus*.

Homoglossum, *Anomalesia* and *Oenostachys* have broadly similar flowers, notably different from those found in *Gladiolus* as currently circumscribed (LEWIS et al., 1972). The basic specializations in all species of the three genera (Fig. 1) include: a dimorphic perianth tube with a narrow, cylindric lower part, abruptly expanded into a broadly cylindric upper part; a prominent, horizontally extended upper tepal; well exerted, more or less horizontally extended stamens with anthers lying under or beyond the upper tepal; and a bright red, or occasionally partly or entirely orange perianth. Such flowers are thought to be adapted for sunbird pollination (cf. VOGEL, 1954; REBELO, 1987; GOLDBLATT, 1989). Among the southern African *Iridaceae* similarly modified flowers occur in some species of *Watsonia* Miller (GOLDBLATT, 1989), and in all the species of *Antholyza* L., *Anapalina* N. E. Br. and *Chasmanthe* N. E. Br., each most closely related to ancestors with short- or long-tubed, predominantly insect pollinated flowers (LEWIS, 1954; GOLDBLATT, 1971).

The value of according generic status to the minor segregates of *Gladiolus* has grown

increasingly doubtful and we are now convinced that it is not only unnecessary but undesirable to maintain them. Each is here reduced to synonymy in *Gladiolus*. The history of each assemblage is confused, and intertwined so that a review of their common history is necessary. Each species cluster is briefly discussed together with a review of the component species and the necessary nomenclatural changes that we propose. We have also taken this opportunity to describe a new variety of *Gladiolus* (*Homoglossum*) *watsonius* Thunb.

HISTORY

Species of *Iridaceae* with extremely zygomorphic flowers with a dimorphic perianth tube, prominent upper tepal and red perianth, as described above, were often in the past routinely placed in the genus *Antholyza* L., although the exact circumscription of the genus varied considerably (THUNBERG, 1820; BAKER, 1892, 1896, 1898). Only species of *Watsonia* Miller, the type of which has just such flowers, were treated as a separate genus and by 1892 *Watsonia* thus included both actinomorphic and zygomorphic, short- and long-tubed species. However, as more plants with an *Antholyza*-type flower were discovered, and species relationships began to be more critically evaluated, it became increasingly clear that *Antholyza*, even excluding *Watsonia* and *Homoglossum*, described in 1866 and sometimes accorded generic status, was an unnatural and unacceptable assemblage. BROWN (1932) made a major effort to remedy the situation by dividing *Antholyza* into what he considered were natural genera, nine in total, although he did not elaborate on their relationships.

His solution was endorsed by LEWIS (1954) who demonstrated on the basis of comparison of vegetative characteristics, the relationships of all of BROWN's genera. Among these, *Petamenes*, *Homoglossum*, *Anomalesia*, and *Kentrosiphon*, are allied to *Gladiolus* (GOLDBLATT, 1971). All have the circumferentially winged seeds, secund spike and basic chromosome number of $x = 15$ (GOLDBLATT, 1971) that define the genus, but each shares with certain species of the latter, similarities in the morphology of either the corm tunics, leaf, bracts or capsule.

As circumscribed by BROWN, *Petamenes* included largely tropical African species. The type, *P. abbreviatus* is, however, a Cape plant, and was considered by GOLDBLATT (1971) to be most closely related to species of the Cape genus *Homoglossum* to which it was accordingly transferred. GOLDBLATT placed the tropical species of *Petamenes* sensu BROWN in *Oenostachys* Bullock (1930), until then monotypic, and peculiar in its large wine-coloured floral bracts that conceal all except the tips of the largely pale coloured, long-tubed, *Petamenes*-like flowers. GOLDBLATT (1971) also merged *Anomalesia* and *Kentrosiphon*. The assumption at that time was that *Homoglossum*, *Oenostachys* and *Anomalesia* were each monophyletic, related to different lines within *Gladiolus* and that their maintenance had merit in taxonomic utility.

Since then it has been discovered that *Petamenes* is an earlier name than *Homoglossum* (MABBERLEY, 1980) and a proposal to conserve *Homoglossum* (DE VOS, 1984), was rejected (BRUMMITT, 1987), so that species of *Homoglossum* should now be transferred to *Petamenes* if the assemblage is to continue to be treated as separate from *Gladiolus*. Also, it now seems possible, even likely, that neither *Homoglossum* nor *Oenostachys*, as currently circumscribed, is monophyletic, an aspect that is discussed below. It seems clear that it is no longer useful and

actually undesirable to continue to recognize *Homoglossum-Petamenes* or *Oenostachys*. Consistency compels the same treatment for *Anomalesia*.

HOMOGLOSSUM-PETAMENES, AND THE UNIFOLIATAE GROUP OF GLADIOLUS

Apart from their similarly modified flower, the outstanding feature of the species of *Homoglossum* sensu DE VOS (1976) is their solitary basal foliage leaf, a characteristic shared with the informal taxonomic group *Unifoliatæ* of *Gladiolus* (LEWIS et al., 1972). The species of section *Homoglossum* have leaves with somewhat to heavily thickened and raised margins and midribs that are very reminiscent of a group of the *Unifoliatæ* species that includes *G. carinatus*, *G. gracilis* and *G. tristis* amongst others. However, those of *Homoglossum* section *Linearifolium* have nearly plane leaves without raised and thickened margins and midrib. Of these *H. guthriei* and *H. merianellum* have plane leaves with scattered pubescence. The species of section *Linearifolium* may not be immediately related to the other members of the *Homoglossum* group but may be more closely allied to Cape species of *Gladiolus* such as *G. punctulatus*, *G. aureus* and the hysteranthous leafed *G. brevifolius*. *Gladiolus aureus* resembles particularly closely *H. merianellum* in its corms, seeds and leaf morphology (LEWIS et al., 1972). That *Homoglossum* as currently circumscribed may not be monophyletic provides additional justification for its reduction in *Gladiolus*.

Homoglossum is centered in the SW Cape region of South Africa (DE VOS, 1976), an area of extraordinary speciation and radiation in *Iridaceæ* (GOLDBLATT, 1978; BOND & GOLDBLATT, 1984). It is also an area where sunbird pollination is particularly frequent in the family and, excepting SW Australia, is conspicuous compared with other areas of the world with similar climates (VOGEL, 1954; REBELO, 1987). We conclude that strong selection for this form of pollination in the SW Cape has resulted in the proliferation of species of *Iridaceæ* with flowers adapted for sunbird pollination. However, there is no *a priori* justification for the segregation such species in separate genera when their immediate allies are known and they differ only in their adaptations for a particular type of pollination. The example of *Watsonia* (also *Ixiodeæ*) is a useful parallel. Floral variation in this genus of 52 species is extensive (GOLDBLATT, 1989). Flowers range from actinomorphic to bilabiate, usually with a short tube, and with shortly exerted stamens and a pink to purple perianth, to long-tubed and zygomorphic with a red perianth and well exerted stamens. There has never been any perceived need to segregate species with these different flower types in separate genera since the late 19th century (BAKER, 1896 : 99). Thus the inclusion of *Homoglossum-Petamenes* in *Gladiolus* seems fully justified in the current treatment of at least one other genus of African *Iridaceæ*. We suggest that other genera, not only of *Iridaceæ*, that appear to be based on floral adaptations for bird pollination alone be critically evaluated in the light of the examples of *Watsonia* and *Gladiolus*.

Species transferred to *Gladiolus* are as follows. New combinations are provided where necessary and are so indicated with only the basionyms cited; where a new combination is not needed we present the synonym in *Homoglossum*. The full synonymy for all species is available in DE VOS (1976) and is not repeated here. The species are arranged below following DE VOS's treatment. The name *Homoglossum* (= *Gladiolus*) *merianellum* is illegitimate (GOLDBLATT, 1989 : 114) and we propose a new name *G. bonaespei* for this Cape Peninsula endemic. Its only

legitimate synonym is *Watsonia pilosa* Klatt but the epithet *pilosus* has already been used in *Gladiolus*. New names in *Gladiolus* are also provided for *H. guthriei* (*G. overbergensis*) and *H. muirii* (*G. teretifolius*). We include the description of a new variety of *G. watsonius*, var. *maculosus*.

1. **Gladiolus priorii** (N. E. Br.) Goldbl. & de Vos, *comb. nov.*

— *Antholyza priorii* N. E. BR., Kew Bull. 1929 : 244 (1929).

2. **Gladiolus bonaespei** Goldbl. & de Vos, *nom. nov.*

— *Watsonia pilosa* KLATT, Trans. S. African Phil. Soc. 3 : 200 (1885), *non Gladiolus pilosus* ECKLON (1827).

— *Homoglossum merianellum* sensu auct. (e. g., BAKER, 1896; DE VOS, 1976), *nom. illeg. superfl. fide* GOLDBLATT, 1989).

3. **Gladiolus overbergensis** Goldbl. & de Vos, *nom. nov.*

— *Antholyza guthriei* L. BOLUS, Ann. Bolus Herb. 3 : 12 (1920), *non Gladiolus guthriei* F. BOLUS (1917).

4. **Gladiolus vandermerwei** (L. Bolus) Goldbl. & de Vos, *comb. nov.*

— *Antholyza vandermerwei* L. BOLUS, J. Bot. (London) 69 : 14 (1931).

5. **Gladiolus watsonius** Thunb., Diss. de Gladiolo : 167 (1784).

— *Homoglossum watsonium* (THUNB.) N. E. BR., Trans. Roy. Soc. S. Africa 20 : 278 (1932).

G. watsonius var. **maculosus** de Vos & Goldbl., *var. nov.*

A varietate typica floribus pallide vel intense daucinis, tubo perigonii in parte lata segmentisque lateritio-maculosis, florentis augusto.

TYPE : *H. & R. Ferreira s.n.*, sub de Vos 2711, South Africa, Cape Prov., Kapteinskloof, rocky hillsides on farm Banghoek (3218-DA) (holo-, STE; iso-, NBG).

Variety *maculosus* differs from typical var. *watsonius* in its apricot-orange (or pale to bright carrot coloured) perianth, densely mottled with slightly elongated brick-red blotches on the wide upper portion of the perianth tube and on the tepals. Style branches apricot-orange. Known only from the type locality which is some 40 km distant from the nearest recorded site for var. *watsonius*.

An unnamed variety very similar to the present one was figured in CURTIS's Bot. Mag. 16 : tab. 569 (1802), as *G. watsonius* var. B, with a short diagnosis.

6. **Gladiolus teretifolius** Goldbl. & de Vos, *nom. nov.*

— *Antholyza muirii* L. BOLUS, Ann. Bolus Herb. 3 : 12 (1920), non *Gladiolus muirii* L. BOLUS (1915).

7. **Gladiolus quadrangularis** (Burm. f.) Aiton, Hort. Kew., ed. 2, 1 : 97 (1810).

— *Homoglossum quadrangulare* (BURM. f.) N. E. BR., Trans. Roy. Soc. S. Africa 20 : 279 (1932).

8. **Gladiolus huttonii** (N. E. Br.) Goldbl. & de Vos, *comb. nov.*

— *Homoglossum huttonii* N. E. BR., Trans. Roy. Soc. S. Africa 20 : 278 (1932).

9. **Gladiolus fourcadei** (L. Bolus) Goldbl. & de Vos, *comb. nov.*

— *Antholyza fourcadei* L. BOLUS, Ann. Bolus Herb. 4 : 117 (1927).

10. **Gladiolus abbreviatus** Andr., Bot. Rep. 3 : tab. 166 (1801).

— *Homoglossum abbreviatum* (ANDR.) GOLDBL., J. S. African Bot. 37 : 443 (1971).

ANOMALESIA AND ITS RELATIONSHIPS

Anomalesia was first recognized as a separate genus by SWEET (1830, 1831) as *Anisanthus*, a name considered by BROWN (1932) to be an illegitimate homonym for *Anisanthes* Willd. It includes the fairly common SW Cape, *A. cunonia*; the closely related *A. splendens*, from the western Karoo of South Africa; and *A. saccata*, which extends from northern Namibia to southern Namaqualand in South Africa. The two former have 2 or more plane, lanceolate basal leaves and large upper lateral tepals (e.g. Fig. 1, 3) whereas *A. saccata* (Fig. 1, 4) has 5-6 basal leaves and flowers with short, narrow upper lateral tepals which together with the three lower tepals, form a prominent spur. It seems rather different from *A. cunonia* and *A. splendens* in its flower but shares with them the unusual lower tepals which just diverge above the apex of lower part of the perianth tube so that the upper part of the tube is hardly developed (Fig. 1, 3, 4). Their inclusion in one genus by GOLDBLATT (1971) on the basis of having spurred flowers is not satisfactory, for the pouch is so weakly developed except in *A. saccata* that it hardly merits this description. The relationships of the species assigned to *Anomalesia* are at present uncertain but there can be no doubt that the genus is a minor segregate of *Gladiolus* and is better included in the latter.

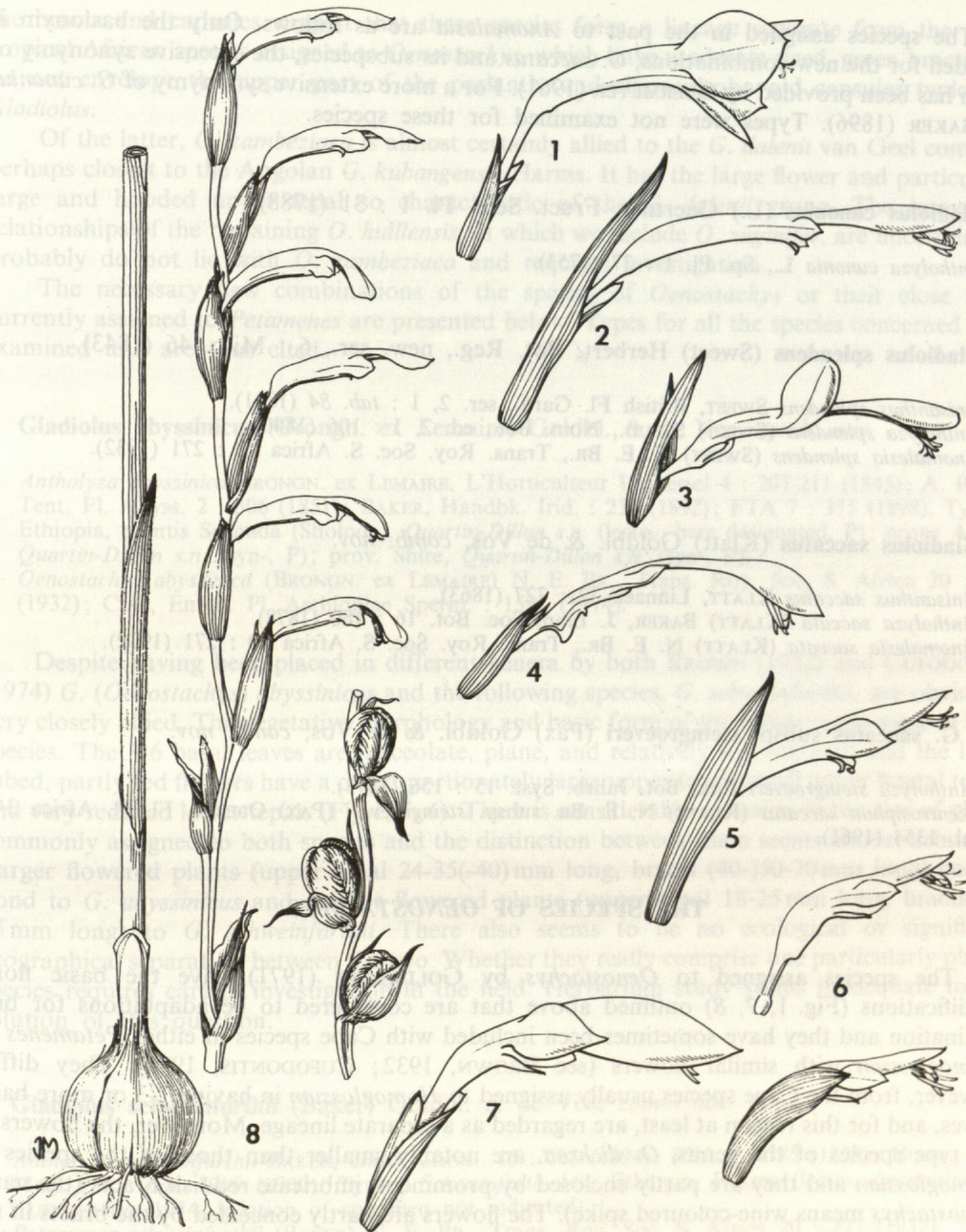


Fig. 1. — Flowers of selected species that were at one time assigned to either *Homoglossum*, *Oenostachys*, *Petamenes* or *Anomalesia*: 1, *Gladiolus* (*Homoglossum merianellum*) *bonae-spei*; 2, *G.* (*Homoglossum*) *abbreviatus*; 3, *G.* (*Anomalesia*) *cunonius*; 4, *G.* (*Anomalesia*) *saccatus*; 5, *G.* (*Oenostachys*) *abyssinicus*; 6, *G.* (*Petamenes*) *schweinfurthii*; 7, *G.* (*Oenostachys zambeziaca*) *magnificus*; 8, *G.* (*Oenostachys*) *huillensis*. All full size (Del. J. C. MANNING).

The species assigned in the past to *Anomalesia* are as follows. Only the basionym is provided for the new combinations, *G. saccatus* and its subspecies, the extensive synonymy of which has been provided by OBERMEYER (1961). For a more extensive synonymy of *G. cunonius* see BAKER (1896). Types were not examined for these species.

1. ***Gladiolus cunonius* (L.) Gaertner, Fruct. Sem. Pl. 1 : 31 (1788).**

— *Antholyza cunonia* L., Sp. Pl. 1 : 37 (1753).

2. ***Gladiolus splendens* (Sweet) Herbert, Bot. Reg., new. ser., 6 : Misc. 46 (1843).**

— *Anisanthus splendens* SWEET, British Fl. Gard., ser. 2, 1 : tab. 84 (1831).

— *Antholyza splendens* (SWEET) STEUD., Nom. Bot., ed. 2, 1 : 106 (1840).

— *Anomalesia splendens* (SWEET) N. E. BR., Trans. Roy. Soc. S. Africa 20 : 271 (1932).

3. ***Gladiolus saccatus* (Klatt) Goldbl. & de Vos, *comb. nov.***

— *Anisanthus saccatus* KLATT, Linnaea 32 : 727 (1863).

— *Antholyza saccata* (KLATT) BAKER, J. Linn. Soc. Bot. 16 : 180 (1878).

— *Anomalesia saccata* (KLATT) N. E. BR., Trans. Roy. Soc. S. Africa 20 : 271 (1932).

G. saccatus* subsp. *steingroeveri* (Pax) Goldbl. & de Vos, *comb. nov.

— *Antholyza steingroeveri* PAX, Bot. Jahrb. Syst. 15 : 156 (1893).

— *Kentrosiphon saccatus* (KLATT) N. E. BR. subsp. *steingroeveri* (PAX) OBERM., Fl. Pl. Africa 34 : pl. 1354 (1961).

THE SPECIES OF *OENOSTACHYS*

The species assigned to *Oenostachys* by GOLDBLATT (1971) have the basic floral modifications (Fig. 1, 7, 8) outlined above that are considered to be adaptations for bird pollination and they have sometimes been included with Cape species in either *Petamenes* or *Homoglossum* with similar flowers (see BROWN, 1932; CUFODONTIS, 1974). They differ, however, from the Cape species usually assigned to *Homoglossum* in having 2-3 or more basal leaves, and for this reason at least, are regarded as a separate lineage. Moreover, the flowers of the type species of the genus, *O. dichroa*, are notably smaller than those of the species of *Homoglossum* and they are partly enclosed by prominent, imbricate reddish bracts (the name *Oenostachys* means wine-coloured spike). The flowers are partly concealed by the bracts in the Ethiopian and SW Arabian *O. abyssinica* and *O. schweinfurthii* and in all three the perianth is pale coloured where concealed and only red where exposed. These species are most probably related to the East African mountain species *G. watsonioides*, itself at one time included in *Antholyza*, and share with it globose capsule, rare in *Gladiolus*. The unusual specializations of

the bracts and capsules suggest that these species form a lineage separate from the south tropical African species assigned to *Oenostachys*, which have moderate sized, green bracts that do not envelope the upper part of the perianth, and ellipsoid-obovoid capsules typical of *Gladiolus*.

Of the latter, *O. zambeziaca* is almost certainly allied to the *G. dalenii* van Geel complex, perhaps closest to the Angolan *G. kubangensis* Harms. It has the large flower and particularly large and hooded upper tepal so characteristic of the *G. dalenii* group. The immediate relationships of the remaining *O. huillensis*, in which we include *O. vaginifer*, are uncertain but probably do not lie with *O. zambeziaca* and requires investigation.

The necessary new combinations of the species of *Oenostachys* or their close allies currently assigned to *Petamenes* are presented below. Types for all the species concerned were examined and are thus cited.

1. ***Gladiolus abyssinicus*** (Brongn. ex Lemaire) Goldbl. & de Vos, *comb. nov.*

- *Antholyza abyssinica* BRONGN. ex LEMAIRE, L'Horticulteur Universel 4 : 207-211 (1845); A. RICH., Tent. Fl. Abyss. 2 : 306 (1851); BAKER, Handbk. Irid. : 231 (1892); FTA 7 : 375 (1898). Types : Ethiopia, montis Selleuda (Sholoda), *Quartin-Dillon s.n.* (lecto-, here designated, P); prope Adoua *Quartin-Dillon s.n.* (syn-, P); prov. Shire, *Quartin-Dillon s.n.* (syn-, P).
- *Oenostachys abyssinica* (BRONGN. ex LEMAIRE) N. E. BR., Trans. Roy. Soc. S. Africa 20 : 280 (1932); CUF., Enum. Pl. Aethiopiae Sperm. : 1591 (1974).

Despite having been placed in different genera by both BROWN (1932) and CUFODONTIS (1974) *G. (Oenostachys) abyssinicus* and the following species, *G. schweinfurthii*, are obviously very closely allied. The vegetative morphology and basic form of the flower is the same in both species. The 3-6 basal leaves are lanceolate, plane, and relatively soft-textured and the long-tubed, partly red flowers have a disproportionately large upper tepal, small upper lateral tepals and very reduced lower tepals (Fig.1, 5, 6). There is considerable variation in the size of plants commonly assigned to both species and the distinction between them seems almost arbitrary. Larger flowered plants (upper tepal 24-35(-40) mm long, bracts (40-)50-70 mm long) correspond to *G. abyssinicus* and smaller flowered plants (upper tepal 18-25 mm long, bracts 25-35 mm long) to *G. schweinfurthii*. There also seems to be no ecological or significant geographical separation between the two. Whether they really comprise one particularly plastic species requires careful investigation in the field. Herbarium study seems inadequate to the solution of this question.

2. ***Gladiolus schweinfurthii*** (Baker) Goldbl. & de Vos, *comb. nov.*

- *Antholyza schweinfurthii* BAKER, Gard. Chron. 15 : 588 (1894); FTA 7 : 375 (1898); HOOK., Bot. Mag. 126 : tab. 7709 (1900). Type : *Schweinfurth 143*, Ethiopia, Eritrea (lecto-, designated by CUFODONTIS, 1974, location of specimen not indicated).
- *Petamenes schweinfurthii* (BAKER) N. E. BR., Trans. Roy. Soc. S. Africa 20 : 277 (1932).
- *Homoglossum schweinfurthii* (BAKER) CUF., Enum. Pl. Aethiopiae Sperm. : 1591 (1974).
- Additional synonyms include *Petamenes latifolius* N. E. BR. and *A. degasparisianus* BUSCAL. & MUSCHLER and their combinations in other genera cf. BROWN (1932 : 277) and CUFODONTIS (1974 : 1591).

3. **Gladiolus dichrous** (Bullock) Goldbl., *comb. nov.*

- *Oenostachys dichroa* BULLOCK, Kew Bull. : 465 (1930). Type : *Lankester s.n.*, Uganda, Mt. Elgon, in 1921 (holo-, K).

The affinities of this species seem to be with the East African mountain species *Gladiolus watsonioides* and the Ethiopian *G. abyssinicus*. It is remarkable in its much enlarged floral bracts, up to 6 cm long and 4 cm wide, usually red or purplish, which conceal all of the perianth except the long upper tepal of the comparatively small flower. The concealed part of the flower is whitish and only the exposed upper tepal is red. In *G. abyssinicus*, which also has unusually large bracts that partly conceal the flower, the perianth tube is whitish and only the exposed parts of the tepals are red. *Gladiolus dichrous* is restricted to the higher mountains of eastern Uganda.

4. **Gladiolus huillensis** (Welw. ex Baker) Goldbl., *comb. nov.*

- *Antholyza huillensis* WELW. ex BAKER, Trans. Linn. Soc. Bot., ser. 2, 1 : 270 (1878); Handbk. Irid. : 232 (1892); FTA 7 : 374 (1898). Type : *Welwitsch 1539*, Angola, Huilla, between Lopollo and Humpata (holo-, ?BM, not seen; iso-, K, P).
- *Oenostachys huillensis* (WELW. ex BAKER) GOLDBL., J. S. African Bot. 37 : 443 (1971).
- *Petamenes vaginifer* MILNE-REDH., Hook. Ic. Pl. 35 (ser. 5, 5) : tab. 3478 (1950). Type : *Milne-Redhead 3111*, Zambia, Mwinilunga district, E of Dobeka bridge (lecto-, K, here designated; iso-lecto-, K).
- *Oenostachys vaginifer* (MILNE-REDH.) GOLDBL., J. S. African Bot. 37 : 443 (1971).

There seems no doubt that *Petamenes (Oenostachys) vaginifer*, based on a NW Zambian collection, and *Gladiolus huillensis*, from SW Angola, are conspecific. MILNE-REDHEAD, who described the former, regarded them as closely related and differing largely in the degree of development of the leaf blade, *P. vaginifer* having more or less vestigial blades. Although the comparatively short-statured specimen of *G. huillensis* that he examined has a well developed blade, 8 cm long, this plant is not representative of the species in western Angola. Other specimens, including duplicates of the type collection, have taller stems and somewhat shorter leaf blades. The degree of development of the leaf blade varies throughout the range of the species and in some Zambian collections the leaf blades are up to 10 cm long. The pubescence on the leaf sheaths so characteristic of the species is the same in all collections, and specimens from Angola and northern Zambian have nearly identical flowers. Zambian plants appear to have slightly longer bracts and flowers with a darker red perianth. The relationships of this plant are uncertain but it does not appear to be closely related to any of the other species assigned in the past to *Oenostachys* or to *Petamenes*.

5. **Gladiolus magnificus** (Harms) Goldbl., *comb. nov.*

- *Antholyza magnifica* HARMS, Warburg, Kunene-Sambesi Expedit. : 201 (1903). Type : *Baum 651*, Angola, am Longa bei Minnesera, 1200 m, 11.1.1901 (holo-, ?B, not seen; iso-, K).

- *Antholyza zambeziaca* BAKER, Handbk. Irid. : 232 (1892) « *zambesiaca* »; FTA 7 : 374 (1898); non *Gladiolus zambeziacus* BAKER (1892) « *zambesiacus* ». Type : Holub s.n., Zimbabwe, south of the Zambezi R., Leshumo valley, before 1883 (holo-, K).
- *Petamenes zambeziacus* (BAKER) N. E. BR., Trans. Roy. Soc. S. Africa 20 : 277 (1932).
- *Oenostachys zambeziaca* (BAKER) GOLDBL., J. S. African Bot. 37 : 443 (1971).

Restricted to the Kalahari sands of western Zambia, Angola, northern Botswana and Namibia, and western Zimbabwe, this striking species is allied to the widespread *Gladiolus dalenii* complex, perhaps most closely to the Angolan *G. kubangensis*. Its bright red flowers differ from those of other species in the complex only in their more extreme zygomorphy. The lower tepals are reduced almost to scales while the upper are large and hooded and the perianth tube is rather abruptly expanded into a short upper part. The name *G. zambeziacus* has already been used in *Gladiolus* which prevents the transfer of *Antholyza* (*Oenostachys*) *zambeziaca*, the earliest name for the species. The next available synonym, *Antholyza magnifica*, is thus transferred to *Gladiolus*.

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LITERATURE CITED

- BAKER, J. G., 1892. — *Handbook of the Irideae*. George Bell & Sons, London.
- BAKER, J. G., 1896. — Irideae. In W. T. THISELTON-DYER (editor), *Flora Capensis* 6 : 7-171. Reeve & Co., Ashford, Kent.
- BAKER, J. G., 1898. — Irideae. In W. T. THISELTON-DYER (editor), *Flora of Tropical Africa* 7 : 337-371. Lovell Reed & Co., London.
- BOND, P. & GOLDBLATT, P., 1984. — Plants of the Cape flora. *J. S. African Bot. Suppl.* 13, 455 p.
- BROWN, N. E., 1932. — Contributions to a knowledge of the Transvaal Iridaceae. *Trans. Roy. Soc. S. Africa* 20 : 270-280.
- BRUMMITT, R., 1897. — Report of the Committee for Spermatophyta : Homoglossum vs Petamenes. *Taxon* 36 : 739.
- BULLOCK, A. A., 1930. — A new genus of Iridaceae from East Africa. *Kew Bull.* 1930 : 465-466.
- CUFODONTIS, G., 1974. — Iridaceae. In *Enumeratio Plantarum Aethiopia*, Spermatophyta 2. Jardin Botanique de Belgique, Meise.
- DE VOS, M. P., 1976. — Die Suid-Afrikaanse species van Homoglossum. *J. S. African Bot.* 42 : 301-359.
- DE VOS, M. P., 1984. — Proposal to conserve 1312 Homoglossum against Petamenes (Iridaceae). *Taxon* 33 : 740-742.
- GOLDBLATT, P., 1971. — Cytological and anatomical studies in the southern African Iridaceae. *J. S. African Bot.* 37 : 317-460.
- GOLDBLATT, P., 1978. — Characteristics, origins and relationships of the southern African flora. *Ann. Missouri Bot. Gard.* 65 : 369-436.

- GOLDBLATT, P., 1989. — The genus *Watsonia*. *Ann. Kirstenbosch Bot. Gard.* 19, 148 p.
- GOLDBLATT, P., in press. — Phylogeny and classification of Iridaceae. *Ann. Missouri Bot. Gard.* 77.
- GOLDBLATT, P. & VLOK, J. J., 1989. — New species of Cape *Gladiolus* and the status of *G. lewisiae*. *S. African J. Bot.* 55 : 255-264.
- LEWIS, G. J., 1954. — Some aspects of the morphology, phylogeny and taxonomy of the South African Iridaceae. *Ann. S. African Mus.* 40 : 15-113.
- LEWIS, G. J., OBERMEYER, A. A. & BARNARD, T. T., 1972. — *Gladiolus* : A revision of the South African species. *J. S. African Bot. Suppl.* 10, 316 p.
- LOUDON, J. W., 1840. — *The Ladies Flower Garden of Ornamental Bulbous Plants*. W. Smith, London.
- MABBERLEY, D. J., 1980. — Generic names published in Salisbury's reviews of R. Brown's work. *Taxon* 29 : 597-606.
- OBERMEYER, A. A., 1961. — *Kentrosiphon saccata* subsp. *steingroeveri*. *Fl. Pl. Africa* 34 : tab. 1354.
- REBELO, A., 1987. — Bird pollination in the Cape flora Pp. 83-108. In A. G. REBELO (editor), *A Preliminary Synthesis of Pollination Biology in the Cape Flora*. *S. African Natl. Sci. Progr. Rep.* 141.
- SALISBURY, R. A., 1866. — *The Genera of Plants*. Van Voorst, London.
- SWEET, R., 1830. — *Sweet's Hortus Britannicus*, ed. 2. Ridgway, London.
- SWEET, R., 1831. — *Anisanthus splendens*. *British Fl. Gard.*, ser. 2, 1 : tab. 84.
- THUNBERG, C. P., 1820 [ie 1818-1820]. — *Flora Capensis* 1 (1) : 90-94. Bonnier, Copenhagen.
- VOGEL, H., 1954. — Blütenbiologische Typen als Elemente der Sippengliederung. *Bot. Stud. Jena* 1 : 109.

LITERATURE CITED

- BARNARD, T. T., 1971. — *Gladiolus*. *J. S. African Bot.* 37 : 443 (1971).
- BARNARD, T. T., 1972. — *Gladiolus*. *J. S. African Bot.* 38 : 443 (1972).
- BARNARD, T. T., 1973. — *Gladiolus*. *J. S. African Bot.* 39 : 443 (1973).
- BARNARD, T. T., 1974. — *Gladiolus*. *J. S. African Bot.* 40 : 443 (1974).
- BARNARD, T. T., 1975. — *Gladiolus*. *J. S. African Bot.* 41 : 443 (1975).
- BARNARD, T. T., 1976. — *Gladiolus*. *J. S. African Bot.* 42 : 443 (1976).
- BARNARD, T. T., 1977. — *Gladiolus*. *J. S. African Bot.* 43 : 443 (1977).
- BARNARD, T. T., 1978. — *Gladiolus*. *J. S. African Bot.* 44 : 443 (1978).
- BARNARD, T. T., 1979. — *Gladiolus*. *J. S. African Bot.* 45 : 443 (1979).
- BARNARD, T. T., 1980. — *Gladiolus*. *J. S. African Bot.* 46 : 443 (1980).
- BARNARD, T. T., 1981. — *Gladiolus*. *J. S. African Bot.* 47 : 443 (1981).
- BARNARD, T. T., 1982. — *Gladiolus*. *J. S. African Bot.* 48 : 443 (1982).
- BARNARD, T. T., 1983. — *Gladiolus*. *J. S. African Bot.* 49 : 443 (1983).
- BARNARD, T. T., 1984. — *Gladiolus*. *J. S. African Bot.* 50 : 443 (1984).
- BARNARD, T. T., 1985. — *Gladiolus*. *J. S. African Bot.* 51 : 443 (1985).
- BARNARD, T. T., 1986. — *Gladiolus*. *J. S. African Bot.* 52 : 443 (1986).
- BARNARD, T. T., 1987. — *Gladiolus*. *J. S. African Bot.* 53 : 443 (1987).
- BARNARD, T. T., 1988. — *Gladiolus*. *J. S. African Bot.* 54 : 443 (1988).
- BARNARD, T. T., 1989. — *Gladiolus*. *J. S. African Bot.* 55 : 443 (1989).
- BARNARD, T. T., 1990. — *Gladiolus*. *J. S. African Bot.* 56 : 443 (1990).
- BARNARD, T. T., 1991. — *Gladiolus*. *J. S. African Bot.* 57 : 443 (1991).
- BARNARD, T. T., 1992. — *Gladiolus*. *J. S. African Bot.* 58 : 443 (1992).
- BARNARD, T. T., 1993. — *Gladiolus*. *J. S. African Bot.* 59 : 443 (1993).
- BARNARD, T. T., 1994. — *Gladiolus*. *J. S. African Bot.* 60 : 443 (1994).
- BARNARD, T. T., 1995. — *Gladiolus*. *J. S. African Bot.* 61 : 443 (1995).
- BARNARD, T. T., 1996. — *Gladiolus*. *J. S. African Bot.* 62 : 443 (1996).
- BARNARD, T. T., 1997. — *Gladiolus*. *J. S. African Bot.* 63 : 443 (1997).
- BARNARD, T. T., 1998. — *Gladiolus*. *J. S. African Bot.* 64 : 443 (1998).
- BARNARD, T. T., 1999. — *Gladiolus*. *J. S. African Bot.* 65 : 443 (1999).
- BARNARD, T. T., 2000. — *Gladiolus*. *J. S. African Bot.* 66 : 443 (2000).
- BARNARD, T. T., 2001. — *Gladiolus*. *J. S. African Bot.* 67 : 443 (2001).
- BARNARD, T. T., 2002. — *Gladiolus*. *J. S. African Bot.* 68 : 443 (2002).
- BARNARD, T. T., 2003. — *Gladiolus*. *J. S. African Bot.* 69 : 443 (2003).
- BARNARD, T. T., 2004. — *Gladiolus*. *J. S. African Bot.* 70 : 443 (2004).
- BARNARD, T. T., 2005. — *Gladiolus*. *J. S. African Bot.* 71 : 443 (2005).
- BARNARD, T. T., 2006. — *Gladiolus*. *J. S. African Bot.* 72 : 443 (2006).
- BARNARD, T. T., 2007. — *Gladiolus*. *J. S. African Bot.* 73 : 443 (2007).
- BARNARD, T. T., 2008. — *Gladiolus*. *J. S. African Bot.* 74 : 443 (2008).
- BARNARD, T. T., 2009. — *Gladiolus*. *J. S. African Bot.* 75 : 443 (2009).
- BARNARD, T. T., 2010. — *Gladiolus*. *J. S. African Bot.* 76 : 443 (2010).
- BARNARD, T. T., 2011. — *Gladiolus*. *J. S. African Bot.* 77 : 443 (2011).
- BARNARD, T. T., 2012. — *Gladiolus*. *J. S. African Bot.* 78 : 443 (2012).
- BARNARD, T. T., 2013. — *Gladiolus*. *J. S. African Bot.* 79 : 443 (2013).
- BARNARD, T. T., 2014. — *Gladiolus*. *J. S. African Bot.* 80 : 443 (2014).
- BARNARD, T. T., 2015. — *Gladiolus*. *J. S. African Bot.* 81 : 443 (2015).
- BARNARD, T. T., 2016. — *Gladiolus*. *J. S. African Bot.* 82 : 443 (2016).
- BARNARD, T. T., 2017. — *Gladiolus*. *J. S. African Bot.* 83 : 443 (2017).
- BARNARD, T. T., 2018. — *Gladiolus*. *J. S. African Bot.* 84 : 443 (2018).
- BARNARD, T. T., 2019. — *Gladiolus*. *J. S. African Bot.* 85 : 443 (2019).
- BARNARD, T. T., 2020. — *Gladiolus*. *J. S. African Bot.* 86 : 443 (2020).
- BARNARD, T. T., 2021. — *Gladiolus*. *J. S. African Bot.* 87 : 443 (2021).
- BARNARD, T. T., 2022. — *Gladiolus*. *J. S. African Bot.* 88 : 443 (2022).
- BARNARD, T. T., 2023. — *Gladiolus*. *J. S. African Bot.* 89 : 443 (2023).
- BARNARD, T. T., 2024. — *Gladiolus*. *J. S. African Bot.* 90 : 443 (2024).
- BARNARD, T. T., 2025. — *Gladiolus*. *J. S. African Bot.* 91 : 443 (2025).



Goldblatt, Peter and De Vos, M P. 1989. "The reduction of Oenostachys, Homoglossum and Anomalesia, putative sunbird pollinated genera, in Gladiolus L. (Iridaceae-Ixioideae)." *Bulletin du Muse*

um National d'Histoire Naturelle Section B, Adansonia, botanique, phytochimie 11(4), 417–428.

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