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Revision of the tropical African genus *Zygotritonia* (*Iridaceae*)

P. GOLDBLATT

Summary : Four species are included in the tropical African genus *Zygotritonia* Mildbr. Of the 7 species previously described, four are placed in synonymy and 1 new species, *Z. hysterantha* is recognized. *Zygotritonia bongensis*, including *Z. crocea*, occurs across West Africa from Senegal to Sudan, *Z. praecox*, extend from Senegal to the Central African Republic, *Z. hysterantha* is endemic to the Central African Republic, and *Z. nyassana* is restricted to western Tanzania, Malawi, Zambia and southern Zaïre. All species have similar, strongly zygomorphic flowers with a large, arched and hooded upper tepal, relatively small floral bracts with the inner usually larger than the outer, and plicate, folded or ridged leaves. This combination of characters combined with the undivided style with a terminal unexpanded stigma, unique in *Ixioideae*, defines the genus. The relationships of *Zygotritonia* within subfamily *Ixioideae* are obscure and it seems unlikely that it is allied to *Tritonia* and *Crocosmia*, genera centred in southern Africa but extending into tropical Africa, as has been suggested in the past. A chromosome number, $2n = 14$ is recorded in *Z. nyassana*, this being the first count for the genus.

Résumé : *Zygotritonia* Mildbr., genre d'Afrique tropicale, renferme quatre espèces. Parmi les 7 espèces décrites précédemment, quatre sont mises en synonymie. Une nouvelle espèce, *Z. hysterantha*, est reconnue. *Zygotritonia bongensis*, y compris *Z. crocea*, se rencontre en Afrique de l'ouest du Sénégal au Soudan, *Z. praecox* du Sénégal à la République Centrafricaine, *Z. hysterantha* est endémique de la République Centrafricaine, et *Z. nyassana* est limité à la Tanzanie occidentale, le Malawi, la Zambie et le Zaïre méridional. Les fleurs de toutes les espèces sont semblables, très zygomorphes, avec un tépale supérieur de grande taille, arqué et en forme de capuchon, des bractées florales relativement petites, les internes fréquemment plus grandes que les externes, et des feuilles plissées, pliées ou striées. Cette combinaison de caractères, associée à un style entier terminé par un stigmate non élargi, unique chez les *Ixioideae*, définit le genre. Les rapports de *Zygotritonia* au sein de la sous-famille des *Ixioideae* sont obscurs et il semble peu probable que ce genre soit allié à *Tritonia* et *Crocosmia*, genres concentrés en Afrique méridionale mais s'étendant jusqu'en Afrique tropicale, comme cela a été autrefois suggéré. Le nombre chromosomique $2n = 14$ est rapporté pour *Z. nyassana*, ce qui constitue le premier recensement pour ce genre.

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Zygotritonia is a small genus of *Iridaceae* subfamily *Ixioideae* restricted to tropical Africa and extanding from Malawi and southern Tanzania in the southeast to Senegal in the northwest. Described by J. MILDBRAED in 1923 and endorsed by STAPF (1927), some 7 species and one variety have been assigned to the genus. The first species was initially referred to *Tritonia* by PAX in 1893 and was so treated by BAKER in Flora of Tropical Africa (BAKER, 1898). Four species are recognized in this treatment, *Z. bongensis, Z. nyassana, Z. praecox* and

the new *Z. hysterantha*. Diagnostic features of *Zygotritonia* are the strongly zygomorphic flower with a much enlarged upper tepal and linear, twisted lateral and lower tepals; short floral bracts, the inner about as long or often larger than the outer; plicate, folded or ridged leaves; and remarkable for *Ixioideae*, an undivided style with a terminal stigma.

Perianth colour, although somewhat variable, appears similar in all species. The perianth has a pale whitish to cream background, with the distal parts of the upper or all the tepals lightly to heavily suffused with reddish purple to brown. Recorded flower colours for *Z. nyassana* range from white shaded with pink or mauve, to white and red, or in one collection, white with the upper tepal tinged with green. A similar range of variation appears to prevail in the other species.

MORPHOLOGY AND RELATIONSHIPS

The major features of *Zygotritonia*, a basally rooting corm, spicate inflorescence and medianly zygomorphic flower with a perianth tube leave no doubt that it belongs in the Old World and predominantly African *Ixioideae* (cf. GOLDBLATT, in press). However, the immediate relationships of *Zygotritonia* are uncertain. It may be most closely allied to the tropical and southern African genera *Crocosmia* (6 sp.) and *Tritonia* (ca. 30 sp.) with which it corresponds in general aspect, small floral bracts, and predominantly orange to reddish flowers. However, the leaves with generally more than one primary vein; inner flower bracts typically larger and longer than the outer; and the strongly zygomorphic flowers with a large, hooded upper tepal and much smaller lower tepals (Fig. 1, 3) recall the southern African *Tritoniopsis* and *Anapalina*. The latter have unusual seeds with a somewhat spongy and sculptured testa, and in this respect differ from *Zygotritonia* which has hard, globose-ellipsoid seeds with an obscurely reticulate testa, more or less comparable with many *Ixioideae* including species of *Crocosmia* and *Tritonia*.

Anatomically *Zygotritonia* does not correspond with either *Tritonia* and *Crocosmia* or with *Tritoniopsis* and *Anapalina*. In both these two groups the genera have a leaf anatomy which combines strongly thickened marginal epidermal cells and the absence of submarginal sclerenchyma (DE VOS, 1982*a*; GOLDBLATT, unpublished data) whereas the *Zygotritonia* leaf has unmodified marginal epiderma cells and extensive submarginal sclerenchyma. Other anatomical differences such as the lack of pairing of the laminar bundles and the peculiar pseudomidrib that consists of one large and one small bundle on each surface (DE VOS, 1982*a*) are also discordant with the *Tritonia* and *Tritoniopsis* groups. However, this difference may be directly related to the plicate or ridged nature of the *Zygotritonia* leaf and thus have little bearing on generic relationships.

The chromosome number, $2n = 14$ and karyotype of two large and 12 much smaller pairs, reported here for one species, are remarkably similar to some species of *Lapeirousia* (GOLDBLATT, 1972), a genus to which it is almost certainly only distantly related. The karyotype differs from other *Ixioideae* most of which have smaller chromosomes and lack such pronounced karyotypic bimodality. *Tritoniopsis* and *Anapalina* have $n = 17, 16, 15$ (GOLDBLATT, 1971, 1981) and *Crocosmia* and *Tritonia* have $x = 11$ ($n = 11, 10$) (GOLDBLATT, 1971; DE VOS, 1982*b*, 1984).

The disparity in chromosome number, karyotype and leaf anatomy suggest, as DE VOS (1982*a*) has already concluded, that *Zygotritonia* can no longer be reasonably allied with *Crocosmia* and *Tritonia*. The relationships of *Zygotritonia* remain to be determined.

GEOGRAPHY AND PHYLOGENY

Zygotritonia nyassana and *Z. bongensis* have mutually exclusive ranges across tropical Africa (Fig. 2). They are fairly similar morphologically and appear to occupy the same niche, open, often more or less rocky sites or shallow soils in savanna woodland. Although so similar in overall appearance and in the size and shape of their flowers they can usually be distinguished by subtle differences. *Z. nyassana* has slightly smaller flowers and bracts, the latter provided with inconspicuous pale papillae, lacking in *Z. bogensis* which sometimes has very broad leaves, (12-)15-40 mm wide. The bracts of *Z. nyassana* are light green and the capsules are also a pale colour whereas *Z. bongensis* usually has thicker, brown bracts and brown capsules.

Zygotritonia praecox has vegetative features that are strikingly different. It has a narrow, partly to almost entirely sheathing basal leaf (Fig. 3, *2*), and produces assimilatory leaves from separate shoots on the same corm later in the season. It seems to be specialized for a more xeric habitat and occurs in interior West Africa apparently in dry grassland, extending from Senegal to the Central African Republic.

Little can be said about *Zygotritonia hysterantha* (Fig. 3, *1*) with confidence. It is known from only two collections, from rocky sandstone sites, within the range of *Z. bongensis*. It is leafless at flowering time and the flowering stem bears 2-3 large sheathing bracts. Presumably the species is adapted for flowering early in the wet season, thus rapid production of flowers precedes leaf elaboration. The latter presumably occurs later, when adequate moisture is ensured for growth and the maturation of seeds and renewal of the corm. Judging by its large size, it appears to have been directly derived from *Z. bongensis*, but there is a possibility that it is more closely allied to *Z. praecox* which has a similar ecology and hysteranthous leaf production.

Floral differentiation is minimal in *Zygotritonia*, the only minor exception being *Z. praecox* which has smaller flowers than the other species. It seems reasonable to assume that the flowers are adapted for pollination by the same or a similar set of pollinators. Speciation in the genus appears to be geographic in the case of *Z. bongensis* and *Z. nyassana*, whereas ecological adaptation appears to be involved in the differentiation of *Z. praecox* in West Africa and *Z. hysterantha* in Central African Republic into seasonally drier habitats. Both are likely to have evolved from an ancestor close to if not identical with *Z. bongensis* or its immediate ancestor.

SYSTEMATICS

ZYGOTRITONIA

Bot. Jahrb. Syst. 58 : 230 (1923); STAPF, Hooker's Icon. Pl., ser. 5, 2 : *tab. 3120* (1927); HUTCHINSON & DALZIEL, Fl. W. Tropical Africa, ed. 1, 2 : 379 (1936); HEPPER, Fl. W. Tropical Africa, ed. 2, 3 (1) : 144 (1968).

— *Tritonia* KER in part : PAX, Bot. Jahrb. Syst. 15 : 152 (1892); BAKER, Handbk Irid. : 196 (1982); Fl. Tropical Africa 7 : 357 (1898).

Herbaceous seasonal perennials with a cormous rootstock. *Corms* globose, tunics coriaceous to membranous, or fibrous and reticulate. *Cataphylls* 2-3, sheathing the base of the plant, membranous to firm, acute to truncate. *Leaves* synanthous or hysteranthous and produced after flowering on separate shoots; 1-few, more or less plicate or folded, usually with at least two major veins and no single midrib evident, basal leaves largest (when synanthous), those inserted above the ground smaller and becoming partly to entirely sheathing. *Stem* terete, often with several branches. *Inflorescence* a spike with several to many flowers per axis; *bracts* 2, firm-membranous to coriaceous, comparatively short, herbaceous and dry only apically or becoming dry and rust-coloured entirely, the outer (abaxial) acute, somewhat smaller and often shorter than, or about as long as, the inner, the inner bilobed. *Flowers* medianly zygomorphic, the uppermost tepal much exceeding the others and arched over the unilateral stamens and style; perianth united in a short tube; *tepals* unequal, linear-spathulate, channeled, obtuse, the uppermost held apart from the others and arched over the stamens, the others spreading outwards. *Filaments* filiform, inserted in the middle of the tube, arched under the upper tepal, curving downwards near the apex; *anthers* unilateral, dehiscing longitudinally. *Ovary* globose, 3-locular; *style* filiform, arching behing the stamens, reaching to about the middle of the anthers, undivided, curving downwards when receptive, stigmatic apically. *Capsule* more or less globose-trigonous (but often only 2 or 1 locules developed); *seeds* rounded to ellipsoid, glossy, with an obscurely reticulate surface, 1(-2) per locule. *Basic chromosome number* $x = 7$ (? based on one count).

Species 4; extending from Senegal in the west, across central Africa to southern Sudan in the east and to western Tanzania, northern Malawi and northwestern Zambia in the south.

Key to the species

1. Plants with flowering stems bearing foliage leaves, the blades much exceeding the sheaths and at least 5 mm wide.
   2. Uppermost cataphyll more or less truncate, the margins revolute; bracts pale and usually minutely papillate; plants of south-central Africa (Katanga, Zambia, Tanzania, Malawi). *Z. nyassana*
   2′. Uppermost cataphyll acute, the margins not revolute; bracts smooth or slightly rugose, not regularly papillate; plants of west and north-central Africa ..... *Z. bongensis*

1′. Plants with flowering stems bearing only sheathing leaves or the basal leaf with a blade shorter than the sheath and < 4 mm wide.
   3. Plants rarely exceeding 25 cm; flowering stem bearing one basal leaf, this sheathing the stem for most of its length, with a free blade shorter than the sheath and 1.5-3 mm wide. *Z. praecox*
   3′. Plants rarely less than 25 cm and up to 50 cm high; flowering stem bearing 2-3 imbricate sheathing bract-leaves without a free blade ..... *Z. hysterantha*

1. **Zygotritonia nyassana** Mildbr.

Bot. Jahrb. syst. 58 : 231 (1923). Type : Tanzania, Mbeya Region, Rukwa, Nyassahochland, Station Kyimbila (in the protologue as "Landschaft Urambia (Bulambya), am Stevenson Road, etwa. 100 km westlich vom N.-Einde des Nyassa-Sees, 1000-1200 m"), *Stolz 1944* (holo-, B; iso-, B, BM, G, K, L, MO, P, S, Z).

— *Zygotritonia gracillima* Mildbr., Bot. Jahrb. Syst. 58 : 232 (1923); de Wildeman, Contrib. Fl. Katanga Suppl. 1 : 6 (1927). Type : Zaire, Katanga, Mafumbi, *Kassner 2502a* (holo-, B; iso-, BM, BR, E, K, P), *syn. nov.*

— *Zygotritonia giorgii* DE WILDEMAN, Contrib. Fl. Katanga, Suppl. 1 : 5 (1927). TYPES : Zaire, Katanga, Kafubu, *De Georgi 353* (syn-, BR); Katanga, env. d'Elisabethville, *De Georgi s.n.* (syn-, not seen), *syn. nov.*

— *Zygotritonia homblei* DE WILDEMAN, Contrib. Fl. Katanga, Suppl. 1 : 7 (1927). TYPES : Zaire, Katanga, Mafumbi, *Homblé 122* (lecto-, BR, chosen here); Katanga, Welgelegen, *Corbusier sub Homblé 617* (syn-, BR), *syn. nov.*

— *Lapeirousia anisochila* VAUPEL, *mss. in herb.* (*Stolz 1944*).

Plants 20-45 cm high. *Corm* 15-20 mm in diam., tunics of moderately coarse reticulate to thick clawed fibres. *Cataphylls* 2, membranous, the upper somewhat enlarged apically, more or less truncate and the margins revolute. *Leaves* synanthous, lanceolate, sometimes narrowly so, 6-10(-12) mm wide, plicate to weakly folded, 3-4, the lower 1 or 2 basal or nearly so, the lowermost largest, reaching at least to the base of the spike, sometimes barely exceeding it, the upper leaves cauline and reduced in size, a single main vein or sometimes 2-3 primary veins produced. *Stem* with 3 or more branches. *Spike* with 20 or more flowers on the main axis, fewer on the branches; *bracts* herbaceous with light brown dots, dry only near the apex, often densely papillate, the outer about 2 mm long, the inner nearly 3 mm. *Flowers* purple and cream; *perianth tube* 3-4 mm long, widening gradually from base to apex; *tepals* more or less linear-spathulate, the upper 10-12 mm long, slightly wider in the upper third and then about 2 mm wide, the other tepals 5-6 mm long, recurving and twisted loosely. *Filaments* ca. 10 mm long; *anthers* ca. 2 mm long. Ovary ca. 2 mm long, style reaching to about the middle of the anthers. *Capsule* globose-trigonous (when all 3 locules developed) or 2-lobed or globose, with only 1 locule developed, 3-4 mm wide, smooth or lightly and sparsely warty, greenish to pale straw with brown pellucid dots; *seeds* usually 1 per locule, ellipsoid, 1.8-2 mm long, surface obscurely reticulate, dark red-brown. *Chromosome number* $2n = 14$ (*Pawek 1946*).

FLOWERING TIME : Mid December to early March.

DISTRIBUTION : Restricted to south-central tropical Africa, *Zygotritonia nyassana* occurs in southwestern Tanzania, northern Malawi, northern Zambia, and southern Zaire (Shaba) (Fig. 2). The type locality cited in the protologue, northern Nyassaland, (Ulambya) 100 km west of the northern end of Lake Malawi, along the Songwe stream, would place the source in Zambia or northwestern Malawi. However, Bulambya (Ulambya) is in the Rungwe district of Tanzania (POLHILL, 1988) through which the Songwe R. passes, later to flow into Lake Malawi where it forms the border between Malawi and Tanzania. This is east of the northern end of Lake Malawi and corresponds with the locality data on the type material, "Nyassahochland, Station Kyimbila", to which is sometimes added Bulambya.

Most closely allied to the West African *Zygotritonia bongensis*, *Z. nyassana* can generally be recognized by its well-branched inflorescence, slightly smaller flowers and short bracts 2-3 mm long, the outer of which is consistently smaller than the inner. The bract surface usually has a distinctly papillate surface, a feature unusual in *Iridaceae* and unique in the genus. A useful feature in distinguishing *Z. nyassana* is its truncate inner cataphyll.

Zygotritonia gracillima Mildbr., described at the same time as *Z. nyassana*, is reduced to synonymy here. I can see no differences of any significance between the two, although the types were collected a considerable distance from one another, *Z. gracillima* in Zaire and

Z. nyassana in southwestern Tanzania. The Katangan species *Z. giorgii* and *Z. homblei* described by DE WILDEMAN in 1927, are conspecific with *Z. nyassana* and were distinguished from one another and from *Z. nyassana*, although not explicitly from the latter, on quite trivial grounds.

SPECIMENS EXAMINED. — MALAWI : NORTHERN PROVINCE : Rumphi district, ca. 14 km north Rumphi, dambo, 26.2.1978 (fr.), *Pawek 13922* (K, MAL, MO); Chitipa district, Kaseye Mission, 10 miles east of Chitipa, 5.4.1969 (fr.), *Pawek 1946* (K, MAL); *ibid.*, 18.4.1976 (fr.), *Pawek 11085* (BR, K, MAL, MO, WAG); *ibid.*, 23.3.1977 (cult. Mzuzu), *Pawek 12507* (MO). — TANZANIA : MBEYA : Rungwe, Nyassahochland, Station Kyimbila (or Bulambya), 1400 m, 15.3.1913, "*Lapeirousia anisochila* Vpl.", *Stolz 1944* (B, BM, G, K, L, MO, P, S, Z); Upigu, Ulambya, 4000 ft, 1.1970, *Leedal 666* (K). RUKWA : Ufipa, Kalambo Falls, 4500 ft, 26.2.1957, *Vezey-Fitzgerald sub Bullock 3730* (K, MO, P); Ufipa, Kawa River gorge, 15.2.1959, *Richards 10884* (B, BR, K). TABORA : Kakoma, south of Tabora, miombo, 3800 ft, 22.2.1936, *Lloyd 70* (K). — ZAIRE : SHABA : Parcelles expérimentales de la Luiswishi, ville Lubumbashi, 1200 m, 16.1.1986, *Bamps & Malaisse 8059* (BR); Kiubo, zone Mitwaba, 850 m, 4.2.1986, *Bamps & Malaisse 8629* (BR); colline de Kiswishi près de Lubumbashi, 24.2.1987, *Billiet & Jadin 4214* (BR); Forêt claire, Kasapa, 10.10.1969, *Bulaimu 41* (BR, K); village Kamina (Kasenga), sur butte rocheuse, 2.1.1972, *Bulaimu 305* (BR); Elisabethville, 22.1.1926, *Hirschberg 232* (K); Katanga, Lupaka R., 6.2.1908, *Kassner 2461* (K); Mafumbi, 8.2.1098, *Kassner 2502a* (B, BM, BR, E, K, P); Lubumbashi, campus de l'Université, 3.1.1971, *Léonard 5239* (BR); près de Mutunga, 2.2.1971, *Lukuesa 889* (BR, K); Forêt de la Kasapa, 11 km au NW de Lubumbashi, 29.12.1970, *Malaisse 6785* (BR, K, P); miombo de la Liuswishi, 28 km NE de Lubumbashi, 1208 m, 12.1.1972, *Malaisse 7172* (BR); Parc National des Kundulungu, chutes de la Lutshipuka, forêt claire, 9.2.1982, *Malaise & Robbrecht 1919* (BR); Elisabethville, près des bâtiments de l'Université, 6.2.1962, *Poelman 122* (BR, K); Haut Katanga, vallée de Lubumbashi, 2.1935, *Quarré 4459* (BR, K, P); Elisabethville, savane, sol rouge pierreux, *Quarré 6972* (BR); Boitsfort, route de la Lubumbashi, 11.3.1926, *Robyns 1639* (BR); Elisabethville, ancien golfe, 28.4.1937, *Salésiens 1074* (BR); Dembo 10 km S d'Elisabethville, 2.2.1954, *Schmitz 4584* (BR); Kipopo, 22 km NO d'Elisabethville, 11.1.1961, *Schmitz 7005* (BR); *ibid.*, 22.1.1963, *Schmitz 8173* (BR, P). — ZAMBIA : COPPERBELT : Kitwe, miombo, 20.1.1969, *Fanshawe 10505* (NDO); Kitwe, plateau woodland, 10.2.1954, *Fanshawe 800* (K); *ibid.*, 26.2.1956 (fr.), *Fanshawe 2798* (BR, K, NDO); Nchanga, 1.1942, *Ferrar 4807* (K). NORTHERN PROV. : Entre Musosa et Kaputa, 1.1940, *Bredo 3692* (BR); Isoka district, 18 km from Tunduma to Mbala, shallow sand over rock by river, 10.1.1975, *Brummitt & Polhill 13691* (BR, K, NDO, WAG); Kalambo Falls, 24.3.1955, *Exell et al. 1277* (BM); Mpika-Kasama road, 16 km towards Mpika from Chambeshi R., 25.1.1974, *Faden & Faden 74/117* (MO); Mpika, plateau woodland, 31.1.1955, *Fanshawe 1905* (K, NDO); Mbala district, top of escarpment above Chilongwelo, 5000 ft, 5.3.1952, *Richards 1036* (BR, K); Mbulu Island, Lake Tanganyika, 17.2.1955, *Richards 4523* (BR, K); near Nakatali, 25.1.1957, *Richards 8024* (BR, K); top of Kambole escarpment, 1650 m, 1.2.1959, *Richards 10830* (K); Kambole, 1500 m, 28.1.1964, *Richards 18854* (K); Kalambo Falls, 900 m, 15.2.1964, *Richards 19027* (BR, K); 10 km east of Kasama, 4.2.1961, *Robinson 4349* (K); Mpulusugu, edge of Lake Tanganyika, 1.3.1969, *Sanane 462* (P); Sansia Falls, Kalambe R., woodland, 5000 ft, 31.1.1971, *Sanane 1515* (B, BR, K, P). NORTHWESTERN PROV. : Kalengwa copper mine, 208 km west of Kitwe, 22.1.1975, *Gassner & Williamson 2361* (K).

2. **Zygotritonia bongensis** (Pax) Mildbr. — Fig. 1.

Bot. Jahrb. Syst. 58 : 230 (1923).

— *Tritonia bongensis* PAX, Bot. Jahrb. Syst. 15 : 153 (1892); BAKER, Handbk Irid. : 196 (1892); Fl. Tropical Africa 7 : 357 (1898). TYPE : Sudan, Equatoria, Ghasalquellengebied, am Lehssi, in der Nähe von Uringamas Dorf [on the type collection Bongo], *Schweinfurth 4025*, June 1870 (holo-, B; iso-, E, K, P, Z).

— *Zygotritonia bongensis* var. *robusta* MILDBR., Bot. Jahrb. Syst. 58 : 230 (1923). TYPE : Central African Republic, Baja Plateau, bei Batara zwischen Bosum und Buar, *Tessmann 2659* (holo-, B, photo seen; iso-, K).

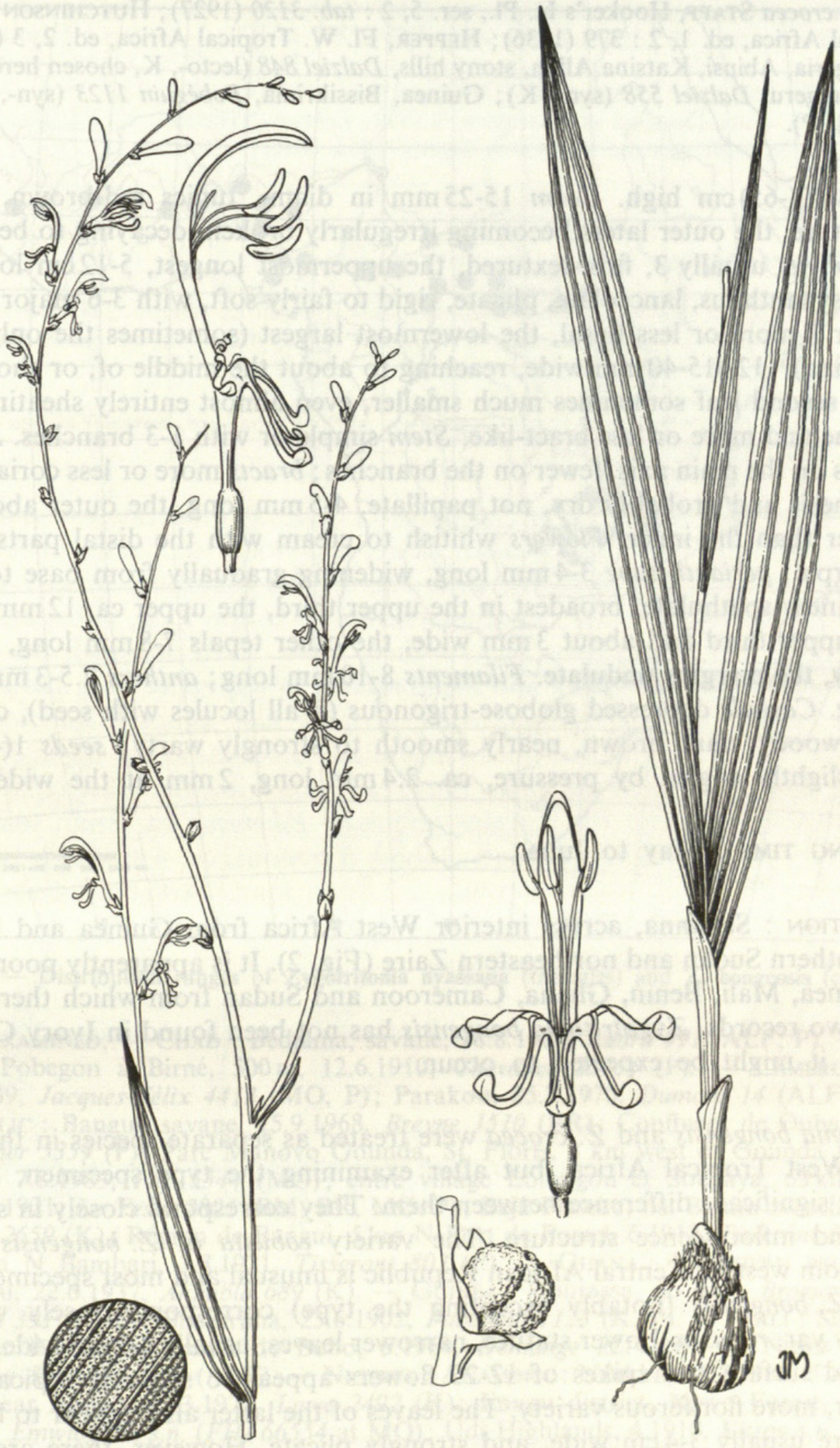

Fig. 1. — Habit and details of flower, fruit and leaf surface of **Zygotritonia bongensis**. Habit life size, flower, fruit and leaf surface variously enlarged.

— *Zygotritonia crocea* STAPF, Hooker's Ic. Pl., ser. 5, 2 : *tab. 3120* (1927); HUTCHINSON & DALZIEL, Fl. W. Tropical Africa, ed. 1, 2 : 379 (1936); HEPPER, Fl. W. Tropical Africa, ed. 2, 3 (1) : 144 (1968). TYPES : Nigeria, Abinsi, Katsina Allah, stony hills, *Dalziel 848* (lecto-, K, chosen here; isolecto-, K); Nigeria, Zungeru, *Dalziel 558* (syn-, K); Guinea, Bissikrima, *Pobéguin 1123* (syn-, K [mixed with *Z. praecox*], P).

Plants 18-40(-65) cm high. *Corm* 15-25 mm in diam., tunics red-brown, with a thick subfibrous texture, the outer laters becoming irregularly broken, decaying to become coarsely fibrous. *Cataphylls* usually 3, firm-textured, the uppermost longest, 5-12 cm long, the apices acute. *Leaves* synanthous, lanceolate, plicate, rigid to fairly soft, with 3-6 major veins, (1-)2-3, the lower 1 or 2 more or less basal, the lowermost largest (sometimes the only one with an expanded lamina), (12-)15-40 mm wide, reaching to about the middle of, or shortly exceeding the spike, the second leaf sometimes much smaller, even almost entirely sheating, the third if present, cauline and more or less bract-like. *Stem* simple or with 1-3 branches. *Spike* with 12-25(-40) flowers on the main axis, fewer on the branches; *bracts* more or less coriaceous, usually brown at anthesis and probably dry, not papillate, 4-5 mm long, the outer about as long or slightly shorter than the inner. *Flowers* whitish to cream with the distal parts of the tepals reddish to purple; *perianth tube* 3-4 mm long, widening gradually from base to apex; *tepals* more or less linear-spathulate, broadest in the upper third, the upper ca. 12 mm long, slightly wider in the upper third and about 3 mm wide, the other tepals 7-8 mm long, recurving and twisted loosely, the margins undulate. *Filaments* 8-10 mm long; *anthers* 2.5-3 mm long. Ovary ca. 2 mm long. *Capsule* depressed globose-trigonous (if all locules with seed), ca. 4 mm long, more or less woody, dark brown, nearly smooth to strongly warty; *seeds* 1(-2) per locule, globose but slightly angled by pressure, ca. 2.4 mm long, 2 mm at the widest diam.

FLOWERING TIME : May to June.

DISTRIBUTION : Savanna, across interior West Africa from Guinea and Mali, through Nigeria to southern Sudan and northeastern Zaire (Fig. 2). It is apparently poorly collected or is rare in Guinea, Mali, Benin, Ghana, Cameroon and Sudan from which there are no more than one or two records. *Zygotritonia bongensis* has not been found in Ivory Coast, Togo or Congo where it might be expected to occur.

Zygotritonia bongensis and *Z. crocea* were treated as separate species in the two editions of Flora of West Tropical Africa, but after examining the type specimen, I can find no taxonomically significant difference between them. They correspond closely in size, leaf shape and flower and inflorescence structure. The variety *robusta* of *Z. bongensis* described by MILDBRAED from western Central African Republic is unusual and most specimens assigned in the past to *Z. bongensis* (notably excepting the type) correspond closely with the form represented by var. *robusta*. Lower stature, narrower leaves, usually 1-2 cm wide, with a brown pellucid dotted surface and spikes of 12-25 flowers appear to separate typical *Z. bongensis* from the taller, more floriferous variety. The leaves of the latter also appear to be of a thinner texture and are usually 3-4 cm wide, and strongly plicate. However, there are a number of intermediates that cannot be assigned with confidence to either and the utility of preserving the variety as a formal taxon remains to be demonstrated when more material is collected.

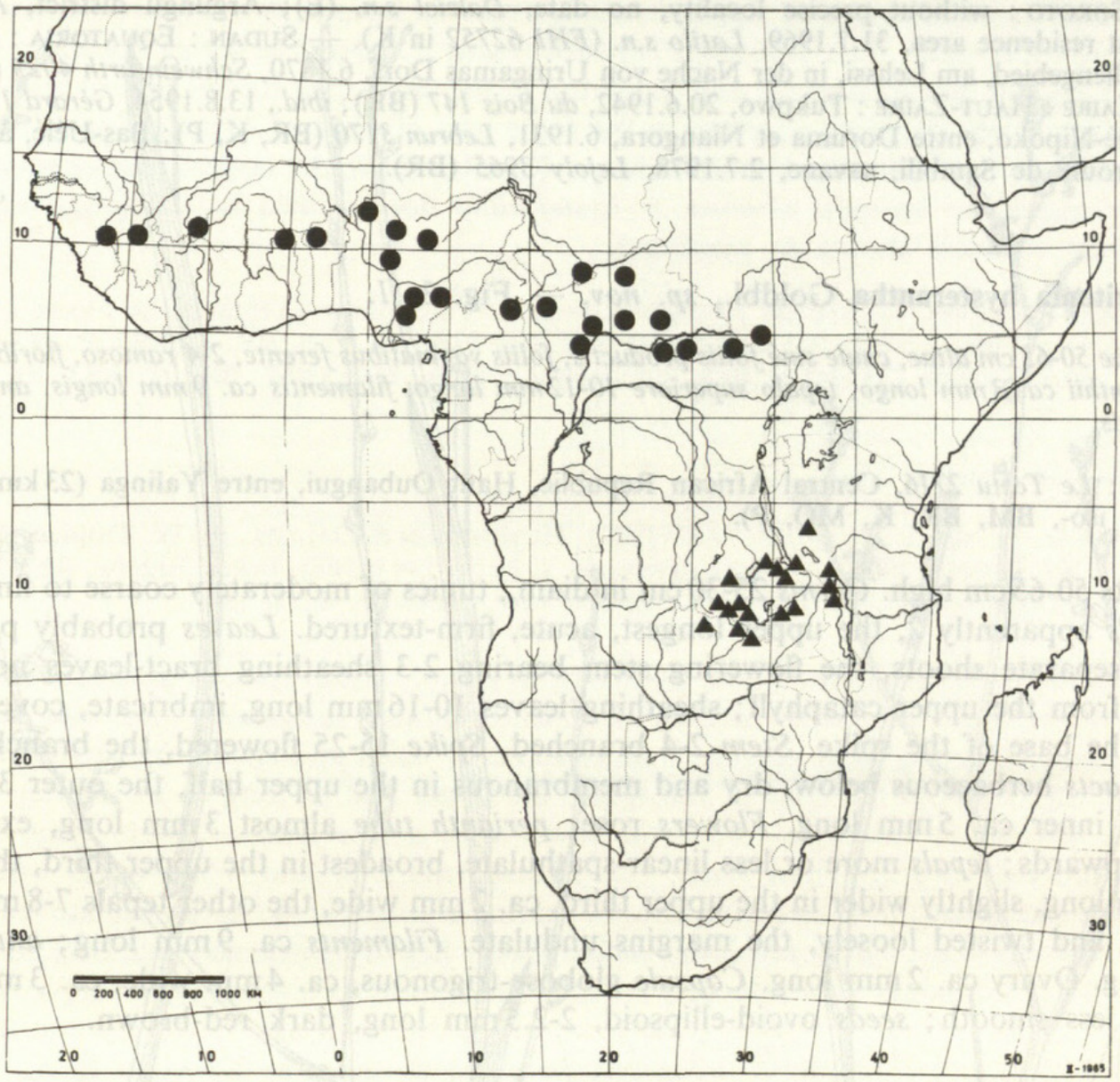

Fig. 2. — Distribution ranges of **Zygotritonia nyassana** (triangles) and **Z. bongensis** (circles).

MATERIAL EXAMINED. — CHAD : Bedjama, savane, 28.8.1964, *Audru 991* (ALF, P). — BENIN : Mts Atacora, entre Pobegon à Birné, 500 m, 12.6.1910, *Chevalier 23964* (P). — CAMEROON : Mbéré à Meiganga, 7.1939, *Jacques-Félix 4413* (MO, P); Parakou, 25.7.1970, *Dumont 14* (ALF). — CENTRAL AFRICAN REPUBLIC : Bangui, savane, 25.9.1968, *Breyne 1510* (BR); Confluent de Oubangui et Kemó, 4.9.1902, *Chevalier 5359* (P); Parc Manovo Gounda, St. Floris, 8 km west of Gounda Bridge, base of laterite outcrop, 7.8.1983, *Fay 5544* (MO); entre village Lolongou et Sougaya, 65 km S Yalinga à Bangassou, 31.5.1921, *Le Testu 2801* (BM, BR, MO, P); Baja Plateau, bei Batara zwischen Bosum und Buar, *Tessmann 2659* (K); Région de Bangui, 5 km N Fort de Possel, 6.1912, *Tisserant 24* (P); près riv. Ambonge, 35 km N Bambari, 3.8.1921, *Tisserant 803* (P). — GHANA : NORTHERN PROV. : Gambago district, Nalerugu, 22.6.1937, *Akpabla 689* (K). — GUINEA : Kourassa, no date, *Brossert 75* (P); *ibid.*, 8.1900, *Pobéguin 391* (K, P); Bissikrima, 23.6.1902, *Pobéguin 1123* (K, P). — MALI : Sikasso, savanna near bridge over R. Farako, route de Bobo, 5.1964, *Demange 2214* (P). — NIGER : Gaya-Tarda, 17.9.1980, *Saadou & Garba 1591* (ALF). — NIGERIA : ANAMBRA : Nsukka, 25.7.1964, *Tuley 801* (K, P); Enugu Ngwo, near Enugu, 31.3.1972, *Lowe 2492* (K); Enugu district, Ngwo Forest, open savanna, 4.6.1973 (fl., fr.), *Emwiogbon s.n.* (*FHI 66554* at MO); Udi Highlands, 4.1910, *Kitson s.n.* (BM). BENUE : Abinsi, Katsina Allah, stony hills, *Dalziel 848* (K); Zungeru, *Dalziel 558* (K); Abinsi, no date, *Dalziel 846* (E). KADUNA : Birnin Gwari, Mando, between Karu and R. Kuka, 7.6.1950, *Keay s.n.* (*FHI 25854*, B, K, P); Ancho, shallow soil on granite, 5.1936, *Hepburn 142* (BR, K, P). NIGER : Zungeru, no date, *Dalziel*

558 (K). SOKOTO : without precise locality, no date, *Dalziel s.n.* (E); Argungu district, Argungu, government residence area, 31.7.1969, *Latilo s.n.* (*FHI 62752* in K). — SUDAN : EQUATORIA : (Bongo), Ghasalquellengebied, am Lehssi, in der Nache von Uringamas Dorf, 6.1870, *Schweinfurth 4025* (B, E, K, P, Z). — ZAIRE : HAUT-ZAIRE : Tukpwo, 20.6.1942, *du Bois 147* (BR); *ibid.*, 13.8.1954, *Gérard 1759* (BR, K, P); Uélé-Nipoko, entre Doruma et Niangora, 6.1931, *Lebrun 3170* (BR, K, P); Bas-Uélé, à 5 km de Baye sur route de Sambili, savane, 2.7.1978, *Lejoly 3965* (BR).

3. **Zygotritonia hysterantha** Goldbl., *sp. nov.* — Fig. 3, *1*.

Plantae 50-65 cm altae, caule sine foliis productis, foliis vaginatibus ferente, 2-4 ramoso, floribus roseis, tubo perianthii ca. 3 mm longo, tepalo superiore 10-12 mm longo, filamentis ca. 9 mm longis, antheris ca. 3 mm longis.

TYPE : *Le Testu 2716*, Central African Republic, Haut Oubangui, entre Yalinga (23 km) et Bria (holo-, P; iso-, BM, BR, K, MO, P).

Plants 50-65 cm high. *Corms* 25-30 cm in diam., tunics of moderately coarse to fine fibres. *Cataphylls* apparently 2, the upper longest, acute, firm-textured. *Leaves* probably produced later on separate shoots, the flowering stem bearing 2-3 sheathing bract-leaves not much different from the upper cataphyll; sheathing leaves 10-16 mm long, imbricate, covering the stem to the base of the spike. *Stem* 2-4 branched. *Spike* 15-25 flowered, the branches with fewer; *bracts* herbaceous below, dry and membranous in the upper half, the outer 3.5-4 mm long, the inner ca. 5 mm long. *Flowers* rose; *perianth tube* almost 3 mm long, expanding slightly upwards; *tepals* more or less linear-spathulate, broadest in the upper third, the upper 10-12 mm long, slightly wider in the upper third, ca. 2 mm wide, the other tepals 7-8 mm long, recurving and twisted loosely, the margins undulate. *Filaments* ca. 9 mm long; *anthers* ca. 3 mm long. Ovary ca. 2 mm long. *Capsule* globose-trigonous, ca. 4 mm wide, ca. 3 mm long, more or less smooth; *seeds* ovoid-ellipsoid, 2-2.5 mm long, dark red-brown.

FLOWERING TIME : Mid April and May.

DISTRIBUTION : Known only from two collections from Central African Republic (Fig. 3); occurring in wet rocky sites.

Zygotritonia hysterantha appears to be most closely related to *Z. bongensis* with which it shares a similar robust habit, large corm, and several-branched stem. It can immediately be distinguished from the latter and all other species of the genus by absence of foliage leaves on the flowering stem. Instead, the stem is sheathed by imbricate bract-leaves. It appears likely that foliage leaves are produced later in the season on separate shoots, as is the case with several other tropical African *Iridaceae*, notably species of *Gladiolus* such as *G. goetzii* Vaupel and *G. atropurpureus* Baker and *Moraea stricta* Baker and *M. thomsonii* Baker. In the structure and dimensions of the bracts and flowers, *Z. hysterantha* differs little from other members of the genus, although the bracts are among the largest, with the inner consistently exceeding the outer and ca. 5 mm long. The texture of the bracts, dry and membranous in the upper half, also appears to differ from those of *Z. bongensis* in which the bracts appear to usually be completely dry or nearly so at anthesis and to have a more coriaceous texture.

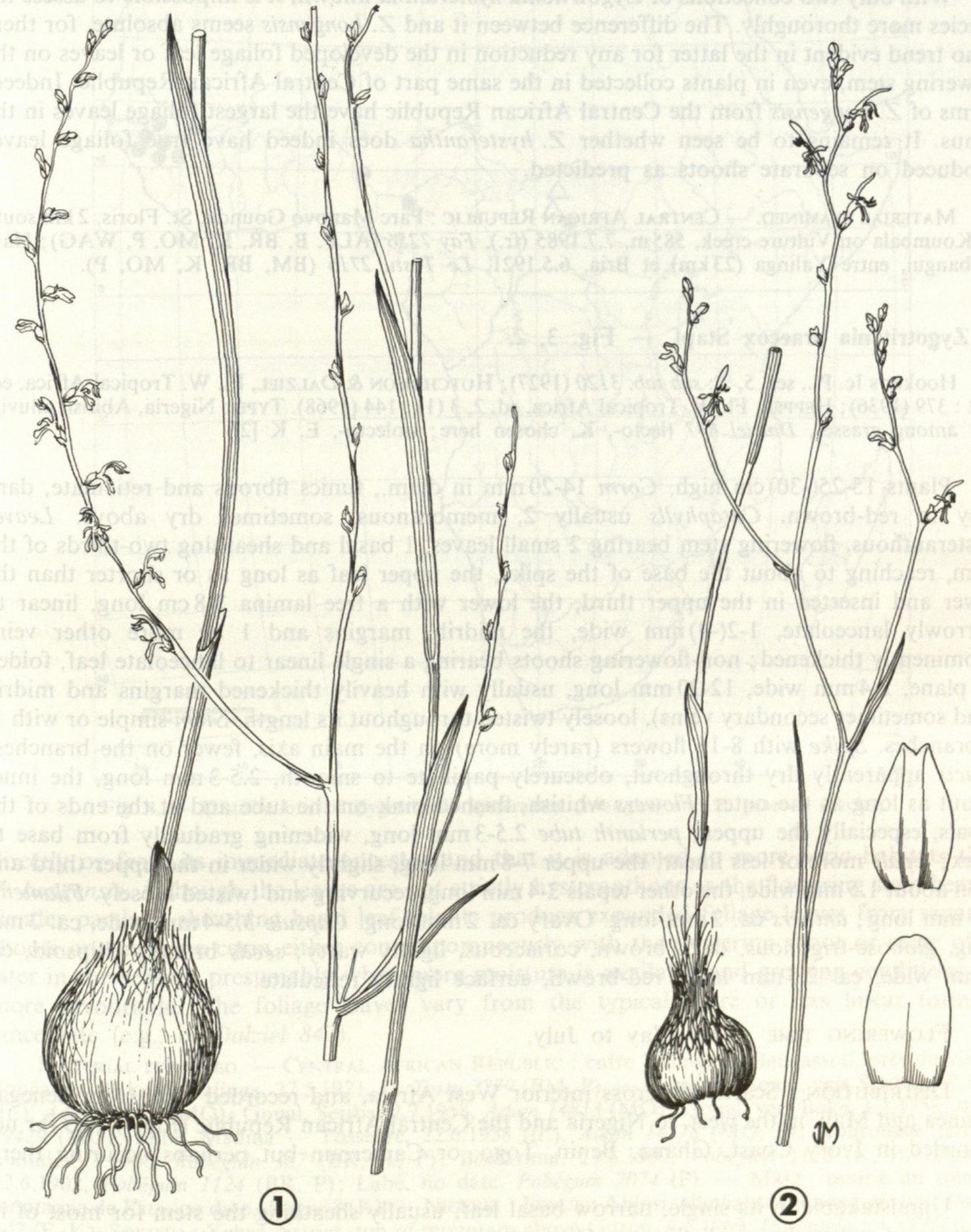

Fig. 3. — **Zygotritonia hysterantha** (1) and **Z. praecox** (2), habits life size; floral bracts (*Z. praecox*) much enlarged.

With only two collections of *Zygotritonia hysterantha* known, it is impossible to assess the species more thoroughly. The difference between it and *Z. bongensis* seems absolute, for there is no trend evident in the latter for any reduction in the developed foliage leaf or leaves on the flowering stem, even in plants collected in the same part of Central African Republic. Indeed, forms of *Z. bongensis* from the Central African Republic have the largest foliage leaves in the genus. It remains to be seen whether *Z. hysterantha* does indeed have true foliage leaves produced on separate shoots as predicted.

MATERIAL EXAMINED. — CENTRAL AFRICAN REPUBLIC : Parc Manovo Gounda, St. Floris, 2 km south of Koumbala on Vulture creek, 585 m, 7.7.1985 (fr.), *Fay 7256* (ALF, B, BR, K, MO, P, WAG); Haut Oubangui, entre Yalinga (23 km) et Bria, 6.5.1921, *Le Testu 2716* (BM, BR, K, MO, P).

4. **Zygotritonia praecox** Stapf. — Fig. 3, *2*.

Hooker's Ic. Pl., ser. 5, 2 : *sub tab. 3120* (1927); HUTCHINSON & DALZIEL, Fl. W. Tropical Africa, ed. 1, 2 : 379 (1936); HEPPER, Fl. W. Tropical Africa, ed. 2, 3 (1) : 144 (1968). TYPE : Nigeria, Abinsi, alluvial soil among grasses, *Dalziel 847* (lecto-, K, chosen here; isolecto-, E, K [2]).

Plants 15-25(-30) cm high. *Corm* 14-20 mm in diam., tunics fibrous and reticulate, dark grey to red-brown. *Cataphylls* usually 2, membranous, sometimes dry above. *Leaves* hysteranthous, flowering stem bearing 2 small leaves, 1 basal and sheathing two-thirds of the stem, reaching to about the base of the spike, the upper leaf as long as or shorter than the lower and inserted in the upper third, the lower with a free lamina 3-8 cm long, linear to narrowly lanceolate, 1-2(-4) mm wide, the midrib, margins and 1 or more other veins prominently thickened; non-flowering shoots bearing a single linear to lanceolate leaf, folded or plane, 2-4 mm wide, 12-20 mm long, usually with heavily thickened margins and midrib (and sometimes secondary veins), loosely twisted throughout its length. *Stem* simple or with 1-2 branches. *Spike* with 8-16 flowers (rarely more) on the main axis, fewer on the branches; *bracts* apparently dry throughout, obscurely papillate to smooth, 2.5-3 mm long, the inner about as long as the outer. *Flowers* whitish, flushed pink on the tube and at the ends of the tepals, especially the upper; *perianth tube* 2.5-3 mm long, widening gradually from base to apex; *tepals* more or less linear, the upper 7-8 mm long, slightly wider in the upper third and then about 1.5 mm wide, the other tepals 3-4 mm long, recurving and twisted loosely. *Filaments* 4-5 mm long; *anthers* ca. 2 mm long. Ovary ca. 2 mm long. *Capsule* 3.5-4 mm wide, ca. 3 mm long, globose-trigonous, dark brown, coriaceous, lightly warty; *seeds* broadly ellipsoid, ca. 3 mm wide, ca. 2.5 mm long, red-brown, surface lightly reticulate.

FLOWERING TIME : Mid May to July.

DISTRIBUTION : Scattered across interior West Africa, and recorded only from Senegal, Guinea and Mali, in the west, to Nigeria and the Central African Republic (Fig. 4); so far not recorded in Ivory Coast, Ghana, Benin, Togo, or Cameroun but perhaps occuring there.

Unmistakable in its single, narrow basal leaf, usually sheathing the stem for most of its length and unusually small flowers, *Zygotritonia praecox* is undoubtedly specialized in the genus. It seems likely that it is derived from the other West African species, *Z. bongensis*

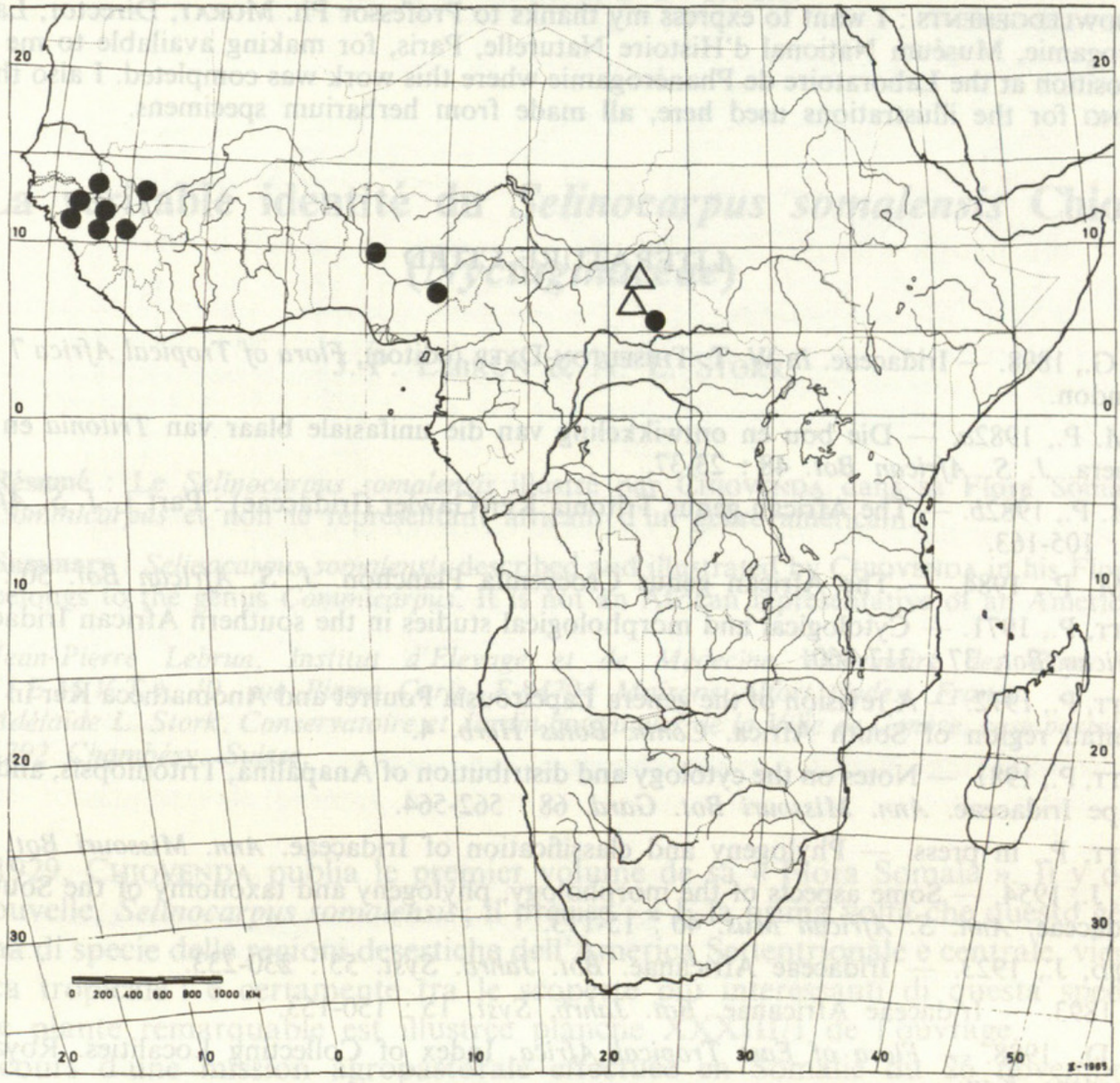

Fig. 4. — Distributions of **Zygotritonia hysterantha** (triangles) and **Z. praecox** (circles).

directly or from its immediate ancestor and that it is adapted to more xeric habitats than *Z. bongensis*. Although the leaves are not strictly hysteranthous as the flowering stem bears a slender partially sheathing basal leaf, plants produce expanded foliage leaves from separate shoots on the same corm either contemporaneously with the flowering shoot or more often later in the season, presumably when more moisture is available and growing conditions are more favourable. The foliage leaves vary from the typical more or less linear form to lanceolate (e.g., in *Dalziel 847*).

MATERIAL EXAMINED. — CENTRAL AFRICAN REPUBLIC : entre Yalinga et Bangassou, près du village Souganga, 40 km S Yalinga, 27.5.1921, *Le Testu 2779* (BM, P). — GUINEA : Goual, vers Sériba, 1.7.1958 (fr.), *Adam 14786* (MO); Goual, Sériba, 2.7.1958, *Adam 14813* (MO); Goual, vers Boké, 1.7.1758, *Adam 29479* (MO); Labé, Medina — Tossékré, 22.6.1958 (fr.), *Adam 14578* (MO, P); Kouroussa, terrains humides, 7.1900, *Pobéguin 367* (BR, K, P); Bissikrima, 23.6.1902, *Pobéguin 1123* (K, P); Dabola, 22.6.1902, *Pobéguin 1124* (BR, P); Labé, no date, *Pobéguin 2074* (P). — MALI : prairie du sommet montagne de Kita, no date, *Jaeger 8* (K). — NIGERIA : BENUE : Abinsi, alluvial soil among grasses, *Dalziel 847* (E, K). SOKOTO : Yelwa district, top of mountain above Gurun, 4.5.1969, *Daramola s.n.* (*FHI 62707* in K, WAG). — SÉNÉGAL : Kanéméré, zone engorgée près de la Gambie, 24.7.1965, *Fotius K278* (ALF, K, P).

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