

# *Polygala kalaboensis* (Polygalaceae), a new species from Zambia

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**Summary.** *Polygala kalaboensis* Paiva, a new species from Zambia is described and illustrated. It belongs to the subgenus *Polygala*, section *Tetrasepalae* and subsection *Hexandriae*, a subsection with sixteen species from Tropical Africa and two from Madagascar.

**Key Words.** Endemic, subgen. *Polygala*, sect. *Tetrasepalae*, taxonomy.

## Introduction

*Polygala* L. (Linnaeus 1753: 701) is a genus with about 750 species (Paiva 2007) with a subcosmopolitan distribution (absent in New Zealand and arctic and Antarctic areas) and introduced in Polynesia and Greenland. The new species, *P. kalaboensis* Paiva, belongs to the subgenus *Polygala*, section *Tetrasepalae* Chodat (1893: 336) and subsection *Hexandriae* Paiva (1998: 288). Section *Tetrasepalae* is mainly characterised by having the two anterior sepals united for at least half their length, while in all other sections the five sepals are free. The main feature of subsection *Hexandriae* Paiva (1998: 288) is having 6 fertile stamens and two sterile ones (staminodes), while all other subsections have 8 fertile stamens. Sixteen species from Tropical Africa and two from Madagascar belong to subsection *Hexandriae* Paiva.

## Taxonomic Account

***Polygala kalaboensis* Paiva, sp. nov.** Type: Zambia, Kalabo, 15 Oct. 1963, *Fanshawe* 8089 (K, holotype).

<http://www.ipni.org/urn:lsid:ipni.org:names:77150603-1>

Procumbent *shrublet* or perennial *herb*, branched, with shoots up to 40 cm long. *Stems* arcuate-ascending, slender, glabrous. *Leaves* alternate, petiole 0.5–1 mm, glabrous, lamina obovate-oblong to spatulate-oblong, 1.5–2.5 × 0.4–0.7 cm, rounded at the apex with a recurved mucro, cuneate at the base, glabrous. *Flowers* purple-bluish, in terminal or pseudo-terminal simple racemes, few-flowered (up to 12 flowers), (3–) 6–12 cm long; rachis glabrous; bracts linear-lanceolate, acute, 2–2.25 × 0.5 mm, ciliate, caducous; bracteoles linear, 0.5–1 mm long, ciliate, caducous; pedicels 2–

3 mm, sparsely pubescent. Posterior sepal keel-shaped, 3.5–4 × 1–1.5 mm, ciliate; wing sepals obliquely ovate-elliptic, 9–10 × 3.5–4 mm, acute, 5-veined from the base, ciliate to glabrescent; anterior sepals keel-shaped, 3 × 1 mm, ciliate, connate. Upper petals obliquely obovate, 5–6 × 4 mm, rounded at the apex; carina 7–8 × 4 mm, ciliate at the base; crest 4–4.5 mm, fimbriate. *Stamens* 6, fertile with 2 staminodes. *Capsule* somewhat immature, oblong elliptic in outline 6–6.5 × 3–3.25 mm, notched, winged, wing 0.15–0.4 mm wide. *Seeds* immature, ellipsoid, 4 × 1.25 mm, with white, silky hairs; caruncle asymmetric kidney shaped, ± 1 mm long, hairy, appendages scarcely developed. Fig. 1.

**RECOGNITION.** *Polygala poggei* Gürke, from Angola and Democratic Republic of Congo, is the closest species, but has shorter racemes (up to 6 cm long), with distinctive pubescent rachis and much smaller flowers (wing sepals 6–8 × 3 mm).

**DISTRIBUTION.** Endemic to Zambia. Map 1.

**SPECIMENS EXAMINED. ZAMBIA.** Kalabo, 15 Oct. 1963, *Fanshawe* 8089 (K!, holotype); Kalabo, W of Sikongo, 15 Nov. 1959, *Drummond & Cookson* 6483 (K!).

**HABITAT.** Kalahari sand in degenerate woodland with many cassava patches.

**CONSERVATION STATUS.** Data Deficient (DD). Little is known about the true distribution of this species. It is here described from only two herbarium collections and locality information is only available for one of them (*Drummond & Cookson* 6483). Pope & Pope (1998) place *Drummond & Cookson* collections from 1959 at the following location: Kalalo 14°57'S 22°40'E. Kalabo is a district in the Western Province of Zambia, less than 100 km from the Angolan border. It is an area near floodplains,



**Fig. 1.** *Polygala kalaboensis*. A habit; B leaf, underside; C inflorescence detail; D young flower; E flower, showing petals; F posterior sepal, abaxial; G wing sepal, adaxial; H anterior sepals, abaxial; J pistil, stamens and staminodes; K young capsule; L immature seed. A – C from Fanshawe 8089; D – L from Drummond & Cookson 6483. DRAWN BY JULIET WILLIAMSON.

covered by Zambezi river waters during the rainy season. North of Kalabo there is a protected area called Liuwa Plains National Park. However the

specimen appears to have been collected outside this protected area. This is one of Zambia's less populated areas where development pressure is

**Table 1** Comparative features of four species of *Polygala*, section *Tetrasepalae*.

	<i>P. kalaboensis</i>	<i>P. poggei</i>	<i>P. homblei</i>	<i>P. luteo-viridis</i>
Leaf shape	obovate-oblong to spatulate-oblong	oblanccolate to oblong-lanccolate	linear-elliptic to narrowly elliptic	oblanccolate to obovate-linear, exceptionally linear
Leaf dimensions (mm)	15 – 25 × 4 – 7	8 – 30 × 2 – 6	5 – 30 × 2 – 5	5 – 25 × 2 – 6
Racemes length (cm)	(3 –) 6 – 12	1.5 – 6	3 – 5	3 – 6
No. of flowers per raceme	few-flowered: up to 12	few-flowered	few-flowered	many-flowered
Rachis	glabrous	pubescent	pubescent	sparsely pubescent to glabrescent
Wing sepals (mm)	9 – 10 × 3.5 – 4	6 – 8 × 3.25	10 – 11 × 7 – 9	4 – 5.5 × 2.5 – 3.5
Fertile stamens	6	6	8	6
Capsules (mm)	6 – 6.5 × 3 – 3.25	7 × 4.5	8 – 10 × 7 – 8	3.5 × 2 – 2.5
Ecology	kalahari sand in degenerate woodland with many cassava patches	savannah woodlands or grasslands	open stony ground and termite mounds	mountain grasslands
Distribution	Zambia	Angola and Democratic Republic of Congo	Zambia and Democratic Republic of Congo	Kenya, Tanzania and Rwanda

**Map 1.** Distribution of *Polygala kalaboensis*.

likely to be low. The only possible threat to its native vegetation is the one posed by cattle grazing, a common activity in this area (Timberlake, pers. comm. September 2014). More fieldwork in this region is required to fully understand the distribution of this species and the size of the population, as well as any threats. The lack of data leads to uncertainty in regard to Red List conservation rating. It could plausibly be a restricted range species qualifying under Criterion B or D, but it could equally be possible that the area could support a healthy population under no particular threat that would warrant a Least Concern or Near Threatened category at most. As a result, according to IUCN categories and criteria (2012), this species is assessed as Data Deficient (DD).

**NOTES.** There are four species of the section *Tetrasepalae* which have similar morphologies. However, they all have features which distinguish them as shown in Table 1. All species are procumbent shrublets or perennial herbs sending up annual shoots, sparsely pubescent to glabrescent in *Polygala homblei* Exell and *P. luteo-viridis* Chodat or glabrous in *P. poggei* and *P. kalaboensis*. *P. kalaboensis* and *P. homblei* are the species with larger flowers, but *P. homblei* has 8 fertile stamens, narrower leaves and shorter racemes than *P. kalaboensis*, which has only 6 fertile stamens. *P. poggei* has smaller flowers and shorter racemes with a pubescent rachis whereas *P. kalaboensis* has a glabrous rachis. *P. luteo-viridis* has more flowers per raceme and smaller flowers. *P. poggei* is the only one of this group which is greenish when dried, similar to *P. dewevrei* Exell, another species with 6 stamens (subsection *Hexandriae*), which has subcapitate, lateral racemes, while the racemes of *P. poggei* are terminal and lateral, not subcapitate.

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### References

- Chodat, R. (1893). Monographia Polygalacearum. II. *Mém. Soc. Phys. Genève* 31 (2): I – XIII, 1, 500; tbs. 13 – 35.
- IUCN (2012). *IUCN Red List Categories and Criteria: Version 3.1*. Second edition. Gland and Cambridge. <http://www.iucnredlist.org/technical-documents/categories-and-criteria>.
- Linnaeus, C. von. (1753). *Species plantarum*, Vol. 1. Salvius, Stockholm.
- Paiva, J. A. R. (1998). Polygalarum africanarum et madagascariensium prodromus atque gerontogaei generis *Heterosamara* Kunze, a genere *Polygala* L. segregati et a nobis denuo recepti, synopsis monográfica. *Fontqueria* 50: I – VI; 1 – 346.
- \_\_\_\_ (2007) Polygalaceae. In: H. J. Beentje & S. A. Ghazanfar (eds), *Flora of Tropical East Africa*. Royal Botanic Gardens, Kew.
- Pope, G. V. & Pope, D. G. (1998). *Collecting localities in the Flora Zambesiaca area*. Royal Botanic Gardens, Kew.