

A new species of *Ornithogalum* subgenus *Urophyllon* (Hyacinthaceae) from central South Africa and southern Namibia

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A new, highly toxic species of *Ornithogalum*, *O. toxicarium* from central South Africa and southern Namibia is described. Symptoms in small livestock correspond with 'krimsiekte' and not with typical *Ornithogalum* (chinchinchee) poisoning. The plant is characterised by a dwarf stature, filiform leaves, capitate inflorescence, large capsule and large winged seeds.

Keywords: Acute cardiac glycoside intoxication, Namibia, new species, *Ornithogalum*, South Africa

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Introduction

The inconspicuous small species *Ornithogalum toxicarium*, here described, has had a long history of taxonomic neglect and misidentification although it is well known to farmers and veterinarians in Namibia and South Africa as a highly toxic plant. In one season it caused the death of nearly 3 000 small livestock.

Description of the new species

Ornithogalum toxicarium C. Archer & R.H. Archer sp. nov. ad subgenus *Urophyllon* (Salisb.) Baker pertinens; *O. tenuifolium* subsp. *aridum* affinis remote sed plantae minutae, inflorescentia subcapitata et seminibus alatis.

TYPUS.—Western Cape, 3222 (Beaufort West): Beaufort West Dist., Farm Ryst Kuil 351, in vicinity of disused uranium mine, (–DB), 8.10.1983, Retief & Reid 239 (PRE, holo.).

Plants (to apex of inflorescence) up to 25 mm high. *Bulb* solitary, ovoid, 15–25 mm diam., attenuated into a 30–50 mm long fused ('gamophyllous', see Müller-Doblies & Müller-Doblies 1996: 374) neck below ground; dry outer tunics thin, soft, brownish. *Leaves* just emergent or well developed at flowering, erect to suberect, 4–10, terete with adaxial surface flat to channelled, 1.0–1.5 mm diam., somewhat glaucous. *Inflorescence* a subcapitate raceme with flowers densely packed, with few (1 or 2) opening simultaneously; peduncle 13–20 × 2.5 mm diam.; rachis lengthening somewhat during anthesis; bracts small, translucent with brownish base and midrib, deltoid with obtuse apex, membranous, 1.2 mm long; pedicels 1.5–2.2 mm long. *Perianth segments* recurved, oblong with obtuse and slightly cucullate apex, whitish with central longitudinal brownish to green stripe on reverse, 4.5 × 2.5 mm. *Style* erect, 1 mm long; stigma small. *Ovary* conical, 3-locular with ±10 ovules per locule, few maturing, 2.5 mm long, 2 mm diam., narrowing to style. *Stamens* 6; filaments fleshy, white, triangular, without appendages, 1.5 × 0.8 mm; *anthers* yellow, 1.8 mm long, tight against stigma. *Fruit* a capsule, few (±2–4) per peduncle, erect, with persistent dry remains of perianth at base and remains of style at apex, ovoid, up to 10 × 15 mm. *Seeds* black, oval, broadly winged, 8 × 5–6 mm. Figure 1.

Diagnostic features and affinities

The genus is currently divided into three subgenera (Obermeyer 1978; Müller-Doblies & Müller-Doblies 1996). The new species clearly belongs in subgenus *Urophyllon* (Salisb.) Baker due to the central longitudinal stripe on the perianth segments, the erect style with small stigma, the large tricostate capsule soon exposed but with the remains of the perianth adhering, and the large flat seeds. Within the subgenus it keys out to section *Urophyllon*, series *Urophyllon* (Müller-Doblies & Müller-Doblies 1996) and

is similar in some vegetative and floral characters to another, mainly Northern Cape taxon of the series, *O. tenuifolium* F. Delarocche subsp. *aridum* Oberm. That taxon differs by having

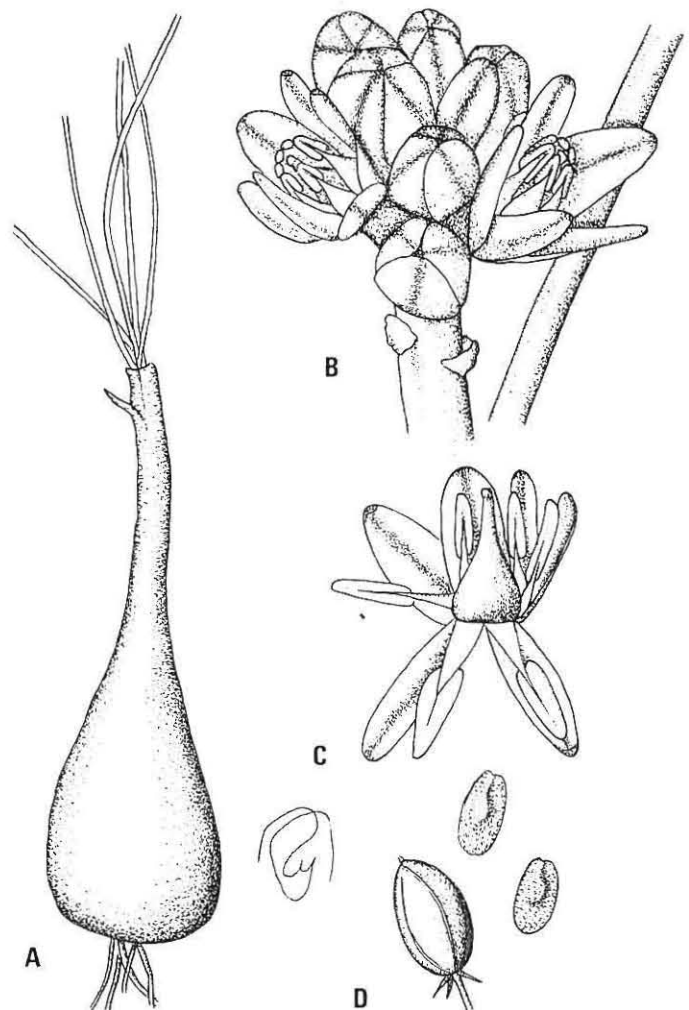


Figure 1 *Ornithogalum toxicarium*. A, bulb with long neck and leaves, × 1; B, subcapitate inflorescence with portion of a leaf, × 6; C, flower with front tepals and stamens flattened forward, × 7; D, capsule and seeds, × 1.5. Drawn from photographs and preserved material of cultivated plants donated by Toxicology Section, Onderstepoort Veterinary Institute, originally from Farm Schanzen, Namibia.

Table 1 A summary of characters distinguishing *Ornithogalum tenuifolium* subsp. *aridum*, *O. nannodes* and *O. toxicarium*

	<i>O. tenuifolium</i> subsp. <i>aridum</i>	<i>O. nannodes</i>	<i>O. toxicarium</i>
Bulb tunics	papyraceous	hard and leathery	soft and membranous
Bulb neck	not gamophyllous, with horizontal markings due to senescence	not gamophyllous, without horizontal markings	gamophyllous, without horizontal markings
Old leaf bases	early deciduous from top of bulb neck	persisting as a tuft on top of bulb neck	early deciduous from top of bulb
Leaf number	many	many	4–10
Inflorescence shape	raceme	raceme	subcapitate raceme
Total inflorescence height	up to 400 mm	up to 150 mm	up to 25 mm
Shape of floral bract apex	long-acuminate	aristate	obtuse
Flower shape	crateriform to stellate	crateriform to stellate	campanulate
Pedicel length	2–5 mm	15–30 mm	1.5–2.2 mm
Fruit length	7 mm	7 mm	10–15 mm
Seed description	mostly semilunar, not winged	comma-shaped, not winged	oval, broadly winged
Seed dimensions	2–4 mm long	0.5 mm long	8 × 5–6 mm

spreading (i.e. not gamophyllous) papery leaf bases with undulate horizontal markings (lines of senescence) forming a loose neck on top of a much larger bulb, involute leaves, inflorescence a long raceme, long-acuminate floral bracts, filaments often with marginal appendages, and seeds not winged (see also Table 1). Within the subgenus there are in fact no species that are obviously closely related to *O. toxicarium*; those of section *Urophyllon*, where this new species evidently belongs, are all much larger, with long racemes 150 mm to 1 m long, and with prominent bracts. The broadly winged seeds of *O. toxicarium* are comparatively large but are not unusual in the subgenus and indicate that the species is highly adapted for dispersal by wind.

The species was incorrectly identified at WIND as *O. nannodes* (note the correct spelling; see Müller-Doblies & Müller-Doblies 1996: 459) but that species is very different (Table 1). Furthermore *O. nannodes* is placed in an entirely different subgenus, *Aspasia* (Salisb.) Baker, by both Obermeyer (1978) and Müller-Doblies and Müller-Doblies (1996), characterised by capsules fusiform to ellipsoid, hidden by or protruding above the dry closed perianth; and perianth without a dark line or this only appearing at senescence.

The earliest known herbarium specimen of *O. toxicarium* was collected by Tyson between 1869 and 1872, while living at Murraysburg. MacOwan, who sent it to Bolus, suggested that it was a new species of *Drimia*. Mrs Mauve saw the specimen in 1981, when she began a revision of *Urginea* while working at the National Herbarium, Pretoria (PRE). At that time the only specimen in PRE was *Acocks 2444* from Hay District, Northern Cape. She gave it the manuscript name *Urginea longicollis*. Presumably she was misled by the very short bracts, which are very delicate and can become crumpled in the drying process, giving the impression of a minuscule spur. Further herbarium material was collected by the first author (Retief & Reid 239) in the Beaufort West District and recently live vegetative material was sent via Onderstepoort Veterinary Institute for identification. When some of these bulbs flowered in cultivation, a careful examination showed that the plant is undoubtedly a species of *Ornithogalum*: the bracts, although very short, are persistent and clearly not spurred. The filaments are much broadened below, not 'filiform to somewhat flattened' (Dyer 1976), and the remains of the perianth adhere to the base of the capsule and are not circumscissile below as described for *Urginea* (Dyer 1976). Meanwhile in *Ornithogalum* the epithet *longicollum* has been used by Müller-

Doblies and Müller-Doblies (1996) for one of their new species in subgenus *Aspasia* from Namaqualand.

Toxicity

The aerial parts of the plant appear to be extremely toxic. In 1996 it caused severe stock losses (2 077 sheep and 759 goats) in southern Namibia following unusually heavy winter rains (Bamhare 1998). Prior to this episode it had been well known to farmers in the Karas Mountains as a 'krimpsiekte' (shrinking disease) plant. In South Africa, State Veterinarians in the Beaufort West and Merweville Districts reported 'kwylbek krimpsiekte' or 'natbek krimpsiekte' which they ascribed to a 'small bulbous plant' (Botha *et al.* in press). The term 'krimpsiekte' refers to the tucked-in posture adopted by animals which have been poisoned by grazing on the aerial parts of various plant families, in particular Crassulaceae. These symptoms are known to be caused by cardiac glycoside intoxication, and the presence of these substances in *O. toxicarium* has been confirmed (Bamhare 1998). The animals examined in 1996 had severe haemorrhages of the heart and congestion and oedema of the lungs. Interestingly, these symptoms and pathological findings differ from those already known to be caused by *Ornithogalum* (or chinchinchee) poisoning, including several species of subgenus *Urophyllon*, in South Africa, namely a severe to fatal diarrhoea and in cattle accompanied by blindness (see Kellerman *et al.* 1988). It is noteworthy that *O. tenuifolium* is reported to be non-toxic (Watt & Breyer-Brandwijk 1962); no data are available regarding subsp. *aridum*, however. Further testing of *O. toxicarium* is under way (Prof. C.J. Botha pers. comm. and Botha *et al.* in press), but with no isolation of the toxic principles yet.

Geographical distribution and ecology

It is not surprising that *O. toxicarium* has only recently become known to botanical science. Although widespread in South Africa and Namibia (Figure 2), the little plants often grow in stony ground where they are cryptic even when in flower. Plants from Schanzen Farm, Namibia kindly donated by the Toxicology Section, Onderstepoort Veterinary Institute, were observed and photographed when they flowered in cultivation in Pretoria in October 1998. The flowers seem to open only in warm, sunny weather in early spring and the flowering period is rather brief, although most collectors noted that the plants were locally

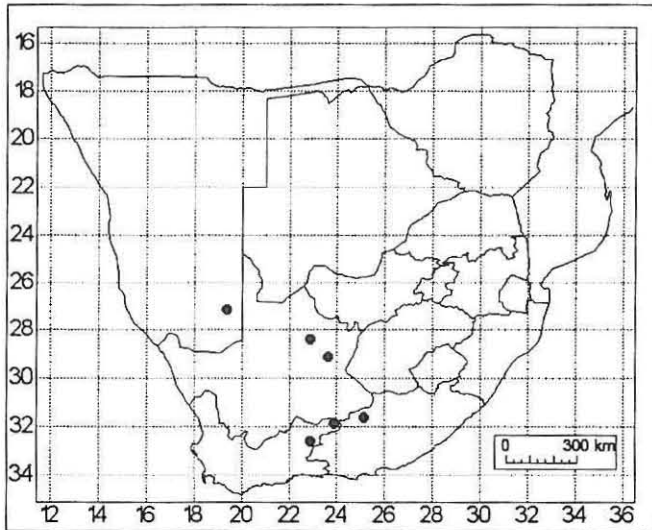


Figure 2 Known geographical distribution of *Ornithogalum toxicarium*.

common. Only two specimens in PRE are cited for Namibia, but Bamhare (1998: figure 2) indicates that it is widespread in the Karas Mountains of the Keetmanshoop District. Similarly, it is probably widespread in the Merweville District of South Africa although apparently no herbarium material has been preserved.

Material studied

Namibia

—2719 (Träntental): Keetmanshoop Dist., Farm Träntental KEE 299, (–AB), Joubert PRE35849 (PRE); Farm Schanzen KEE 281, *State Veterinarian s.n.* (PRE).

South Africa

—2822 (Glen Lyon): Hay Dist., Wolhaarkop, (–BD), *Acocks 2444* (PRE).

—2923 (Douglas): Herbert Dist., Mazelsfontein near Douglas, (–BA),

Anderson NBG1923/29 (BOL [PRE, photostat]).

—3123 (Victoria West): Murraysburg, (–DD), *Tyson BOL6877* (BOL [PRE, photostat]).

—3125 (Steynsburg): Middelburg Dist., Farm Thorn Springs, (–CA), *Pienaar 278, 279* (STEU [PRE, photostat]).

—3222 (Beaufort West): Beaufort West Dist., Farm Ryst Kuil 351, in vicinity of disused uranium mine, (–DB), *Retief & Reid 239* (PRE).

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