

# A remarkable new species of *Colubrina* (Rhamnaceae) from Pondoland

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*Colubrina nicholsonii* Van Wyk & Schrire, a scandent shrub or lax tree endemic to the sandstone region of southern Natal/Pondoland is described. The species occurs in riverine forest and is presently known from three isolated populations in Pondoland. It is unique in being the only known species of *Colubrina* L.C. Rich. ex Brongn. with apetalous flowers. Other diagnostic characters include a scandent habit, spinescent branchlets, eglandular leaves with the lamina entire and fruits with prominent humps on the dorsa of the coccids. Infragenerically it is an isolated taxon probably allied to species of *Colubrina* subg. *Colubrina*. *C. nicholsonii* is the only known member of the genus confined to the African continent. It also constitutes a new generic record for The flora of southern Africa. *S. Afr. J. Bot.* 1986, 52: 379–382

*Colubrina nicholsonii* Van Wyk & Schrire, 'n klimmende struik of boom met los, yl takke endemies in die sandsteengebied van Suid-Natal/Pondoland word beskryf. Die spesie word in rivieroewerwoud aangetref en is tans van slegs drie geïsoleerde bevolkings in Pondoland bekend. Dit is uniek omdat dit die enigste bekende *Colubrina*-spesie met blomme sonder kroonblare is. Ander diagnostiese kenmerke sluit in die klimmende groeivorm, stingeldorings, klierlose blare met die lamina gaafrandig en vrugte met opvallende bulte op die rugkante van die kokkuse. Infrageneries is dit 'n geïsoleerde takson wat moontlik aan die spesies van *Colubrina* subg. *Colubrina* naverwant is. *C. nicholsonii* is die enigste bekende lid van die genus wat tot Afrika beperk is. Dit verteenwoordig ook 'n nuwe genusrekord vir The flora of southern Africa. *S. Afr. Tydskr. Plantk.* 1986, 52: 379–382

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## Introduction

A detailed floristic survey of the sandstone region of southern Natal and Pondoland has recently been rewarded by the discovery of a very rare and previously unrecorded species of *Colubrina* L.C. Rich. ex Brongn. In May 1984 a plant collecting party comprising H.B. Nicholson, A.T.D. Abbott, Marie Jordaan and one of us (B.D. Schrire), discovered on the north bank of the Daza River in the Mkambati Game Reserve a small population of about ten scandent trees which proved to be a distinctive new species of *Colubrina*. Not only does it display some unusual morphological features, but it is also the first known species of *Colubrina* endemic to Africa. The present paper provides a description of the new species, as well as a discussion of its possible affinities and phyto-geographic significance.

It is fitting that in naming this remarkable plant we commemorate a man who has made an outstanding contribution to our knowledge of the botany of the southern Natal/Pondoland region.

Mr H.B. Nicholson first took an interest in the flora of southern Natal when he retired to St Michaels-on-sea in 1962. After a long career associated with timber exploitation in the mining industry he set about creating an arboretum on his property 'Skyline'.

Interest in the natural flora was fueled by his association with Mr R.G. Strey, curator of the Natal Herbarium in Durban, and their collecting partnership, which lasted until the mid 1970's, turned up many fascinating new records revealing the uniqueness of the southern Natal/Pondoland region. His collection of well over 4 000 plants is housed in the herbarium he formed at 'Skyline' and duplicates are located in NH, NU and PRE.

His greatest contribution however, has been in passing on his thorough field knowledge through active involvement in all aspects of conservation in the region. In the more than 20 years since his retirement he has inspired affection and respect in numerous enthusiasts young and old, and at the age of 80 this year, he still leads weekly excursions into the field.

## Description

*Colubrina nicholsonii* Van Wyk & Schrire, sp. nov., affinitate incerta sed probabiliter proxima speciebus pertinentibus ad gen. *Colubrinam* subgen. *Colubrinam*; differt ab omnibus speciebus *Colubrinae* floribus apetalis et in combinatione proprietatum diagnosticarum sequenti; floribus apetalis, habitu scandenti, ramulis spinescentibus, foliis eglandulatis paginis integris, capsulis tumores singulos in dorso

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carpellorum ostendentibus.

TYPUS. — Transkei: Mpunzaana River just south of the confluence of the Hlolweni and Umtamvuna Rivers, 2 March 1985, Abbott 2537 (PRU, holotypus; K, MO, NH, PRE, isotypi).

Evergreen scandent shrubs to lax trees up to 8 m high; stem up to 250 mm in diameter, occasionally armed with simple or variously branched spinescent lateral shoots; bark of mature bole smooth or minutely fissured in a grid-like pattern. *Branchlets* terete, greyish brown, moderately brownish-pubescent, becoming glabrous later, often reduced to axillary spines; internodes (5–)30–60(–70) mm long. *Leaves* alternate, rarely subopposite; petiolate; stipulate; eglandular; lamina brochidodromous, elliptic to elliptic-ovate, (20–)40–100(–150) mm long, (10–)30–60(–70) mm wide; base cuneate to subrotund; apex acute or acuminate with a distinct mucro up to 1 mm long; margin mostly entire and undulate when fresh, also sometimes indistinctly crenate especially when dry; subcoriaceous; dark green, shiny above, pale green below with the midrib and secondary veins sparingly to densely brownish-pubescent; midrib flush with the surface above, becoming narrowly grooved when dry, prominent below; principal lateral veins alternate or opposite, 5–10 pairs, slightly raised above, prominent below; tertiaries slightly raised on both surfaces; petiole (3–)8–12(–16) mm long, semi-terete, channelled above, usually brownish-pubescent; stipules conspicuous, lateral, occasionally semi-intrapetiolar, lanceolate, 4–7 mm long, c. 2 mm wide, rufo-sericeous, caducous with a conspicuous scar remaining on the branchlet. *Inflorescences* cymose, few-flowered, axillary and pedunculate, often brownish-pubescent; the flowers opening sequentially from the base; peduncle 4–25 mm long; bracts minute, deltoid, caducous. *Flowers* 5-merous, actinomorphic, hermaphrodite, c. 4 mm wide, cream in colour; pedicels up to 4 mm long; receptacle hemispherical with the calyx and androecium borne at the rim. *Sepals* valvate in bud, deltoid, spreading, c. 2.5 mm long, c. 2 mm wide, densely pubescent dorsally, glabrous and medially carinate ventrally, deciduous along with the rim of the receptacle. *Petals* absent. *Stamens* alternisepalous, c. 2 mm long, erect with the anthers incurved; filaments free; anthers 2-thecous, 4-sporangiate, dorsifixed, versatile, latrorse, dehiscing by longitudinal slits. *Disc* thick and fleshy, c. 2.5 mm in diameter, glabrous except for a central depression around the styles which is minutely pubescent. *Ovary* 3-locular, entirely immersed in and adnate to the disc and receptacle; ovules anatropous and sub-sessile on basal placentae, 1 per locule; styles (stigmatic lobes?) 3, free, tapering off terminally, c. 1 mm long; stigma indistinct. *Fruit* capsular, pendent when mature, faintly tricoccous with the receptacle and disc surrounding and adhering to more or less the basal third of the fruit, c. 8 mm long and 12 mm diam.; exocarp and mesocarp coriaceous with a distinct hump of spongy tissue on the dorsum of each coccid; endocarp hard and dehiscing into three dry endocarps; stipe and basal part of the capsule (receptacle) persistent. *Seeds* 1 per locule, c. 7 mm long and 6 mm wide, oblong-obovate, dihedral ventrally and strongly convex dorsally, exarillate; hilum narrowly elliptic; testa hard and shiny; embryo flat, with fleshy, broadly elliptical cotyledons, with base mostly cordate and apex retuse, radicle shortly projecting; endosperm abundantly present (Figure 1).

Flowering mainly in summer. Fruits collected in autumn.

### Distribution and habitat

In addition to the first discovery on the Daza River, two isolated populations of *C. nicholsonii* were subsequently found

by A.T.D. Abbott on the Mntentu and Mpunzaana Rivers (Figure 2). All three known populations are small, each consisting of perhaps no more than ten plants growing gregariously. The plants occur in riverine forest in close proximity to, and usually overhanging the water. They grow in shallow acidic soil among sandstone rocks of the Natal Group, Msikaba Formation. Although more populations are likely to be discovered in some of the rather inaccessible and botanically unexplored ravine forests of Pondoland, it is undoubtedly one of the rarest trees in southern Africa. The Daza and Mntentu River populations are protected in the Mkambati Game Reserve. The plants along the Mpunzaana River are to some extent protected by the inaccessibility of the terrain.

### Discussion

In the most recent monographic revision of the genus *Colubrina*, Johnston (1971) recognized 21 species in the American tropics, one in Hawaii, four in Madagascar, four in South East Asia and one widely distributed littoral species, namely *C. asiatica* (L.) Brongn. These are grouped in two subgenera, one of which comprises four sections (Johnston 1963, 1971). *C. nicholsonii* can easily be separated from all known species of the genus by its combination of a scandent habit, spinescent branchlets, eglandular leaves with the lamina essentially entire, apetalous flowers and capsules with distinct swellings dorsally, on the carpels. Its affinity seems to be with *Colubrina* subgen. *Colubrina*. According to the keys in Johnston (1971), *C. nicholsonii* belongs to *Colubrina* sect. *Colubrina*. This section contains five species from the American tropics and Hawaii, none of which seems to be closely related to *C. nicholsonii*. An affinity between *C. nicholsonii* and the four Madagascan species of *Colubrina* appears, at least phytogeographically, to be more likely. These species are all classified in *Colubrina* sect. *Capuronia* M.C. Johnston on account of the alleged presence of minute arils at the base of the seeds (Johnston 1971). The presence of arils, first claimed by Capuron (1966), requires confirmation. Unfortunately, we did not see any fruiting material from Madagascar. We suspect that the so-called arils may be the minute collar-like placental swellings around the point of seed attachment recorded during the present study involving *C. nicholsonii* and a few other species of *Colubrina*. This suspicion is strengthened by Capuron's mention of an aril in *C. asiatica* (Capuron 1966 p. 127) — a species which in our opinion is decidedly exarillate. We are also not convinced that the present subdivision of the genus *Colubrina* is a natural one. Pending further study, the exact infrageneric position of *C. nicholsonii* must therefore remain unclear.

Initially, the apetalous flowers and swellings on the fruits cast some doubt on the generic placement of the new species. Apetaly is unknown elsewhere in *Colubrina*. The phenomenon does, however, occur among members of some predominantly petalous genera of the family, e.g. *Rhamnus* L. and *Phyllica* L. (Suessenguth 1953). Humps of spongy tissue on the dorsa of the coccids appear to be rare in *Colubrina*. We have noticed these in two Mexican taxa, *C. macrocarpa* (Cav.) G. Don var. *macrocarpa* and *C. macrocarpa* var. *macrocarpoides* (Suess.) M.C. Johnston. An illustration clearly depicting the swellings on capsules of the former variety is supplied by Rose (1903). The taxonomic significance of these humps of tissue requires closer scrutiny. Their presence is best detected in living material since the swellings usually shrivel and are rather obscure in herbarium specimens. Although not recorded by Johnston (1971), swellings also appear to be present in specimens





**Figure 1** *Colubrina nicholsonii*. 1. flowering twig,  $\times 1$ ; 2. fruiting twig showing an intact fruit and the fairly persistent remains of one dehiscent,  $\times 1$ ; 3. Basal persistent part of capsule following dehiscence and showing three scars where the seeds were attached,  $\times 2$ ; 4. fruit in apical view,  $\times 2$ ; 5. flower with two stamens removed,  $\times 12$ ; 6. flower, longitudinal section,  $\times 12$ ; 7. seed, basal and ventral views,  $\times 5$ ; 8. embryo,  $\times 5$  (1, 5 & 6 from Schrire, Van Wyk & Abbott 1815; 2, 3, 4, 7 & 8 from Jordaan 326).

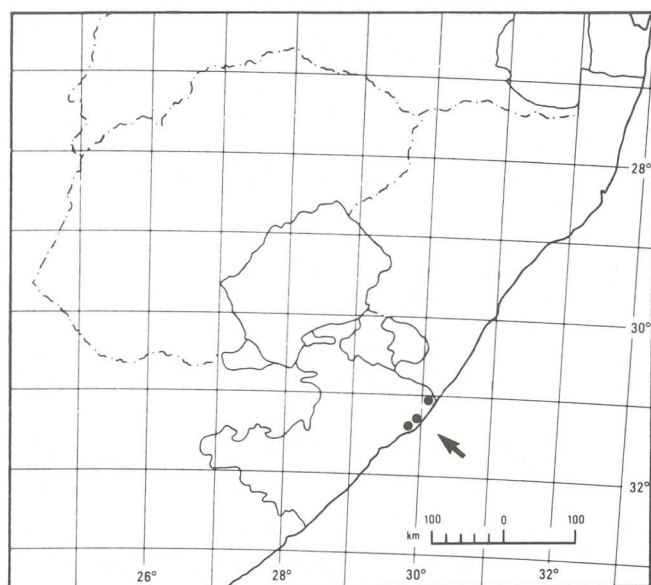


Figure 2 The known geographical distribution of *Colubrina nicholsonii*.

determined as *C. berteroa* Urb. and *C. cubensis* (Jacq.) Brongn. var. *cubensis* (deposited in NY). In species of the American genus *Ceanothus* L. and in the southern African endemic, *Noltea africana* (L.) Reichb. f. there are what may turn out to be homologous proliferations on the dorsa of the carpels.

Despite its unique combination of character states, we have decided to retain the new species in *Colubrina* rather than place it in a genus of its own. It is excluded from the apparently closely related genus *Lasiodiscus* Hook.f. by its stipules being free and not interpetiolar, the seeds containing abundant endosperm and the embryo with a radicle clearly projecting beyond the cotyledons.

Despite prolific flowering, fruitset in *C. nicholsonii* is very poor. The population along the Mpunzaana River has now been under regular surveillance for two seasons and has not yet produced any fruits. Fruits have hitherto only been collected from the Daza River population. From the very scanty remains of dehiscent fruits presently available, we have provisionally deduced that the mericarps in *C. nicholsonii* are not nutlike and indehiscent as in the Madagascan genus *Bathiorhamnus* R. Capuron — a genus closely related to *Colubrina*.

An intriguing aspect of the phytogeography of *Colubrina* is the very wide intercontinental disjunctions in the natural geographic ranges of some of the species (Johnston 1971). Prior to the discovery of *C. nicholsonii*, *C. asiatica* var. *asiatica* (*Colubrina* subgen. *Serrataria* M.C. Johnston) was the only member of the genus known to be indigenous on the African continent. It is a littoral shrub with straggling branches recorded from beaches and coastal lowland in many tropical areas of the world, including the eastern coast of Africa from Kenya to Mozambique. We could not find support for a claim that this species extends as far south as Natal (Drummond 1966). It should, however, be looked for along the coast of northern Natal. Seeds of *C. asiatica* var. *asiatica* are effectively dispersed by sea currents as they can float unharmed for long periods in sea water (Guppy 1906, 1917; Ridley 1930; Carlquist 1974).

The discovery of *C. nicholsonii* is of considerable phyto-geographic interest. Not only is it the first known species of *Colubrina* confined to Africa, but it is also endemic to the sandstone 'island' of southern Natal/Pondoland — an area

exceptionally rich in endemic species of flowering plants, particularly trees and shrubs. *C. nicholsonii* is clearly not a littoral plant and it is unlikely that it has (at least in recent times) reached Pondoland through long-distance sea dispersal. Like several of these sandstone endemics, *C. nicholsonii* appears to be a palaeoendemic on the brink of natural extinction. This is substantiated by the discontinuous distribution of the three known populations, poor reproductive capacity and the fact that no regeneration in the form of young plants has yet been recorded. Perhaps noteworthy is the conclusion by Johnston (1971) that *Colubrina* may be considered the most 'primitive' genus of Rhamnaceae. A number of other sandstone endemics await description. When this has been accomplished a paper which will include a comprehensive assessment of the phytogeographic significance of the southern Natal/Pondoland sandstone flora is envisaged (for some preliminary ideas see Van Wyk 1985).

### Specimens examined

— **3129** (Port St. Johns): Mkambati Game Reserve, Mtentu River Gorge at the alleged crossing of the survivors of the Sao Bento (— BB), Abbott 2554 (NU, PRU); Mkambati Game Reserve, Daza riverine forest (— BD), Abbott 1983 & 2552, Jordaan 326, Schrire, Van Wyk & Abbott 1764, 1765, 1766, 1767, 1768, 1769, 1770 & 1815 (all in NH & PRU).

— **3130** (Port Edward): Mpunzaana River just south of the Um-tamvuna/Hlolweni confluence (— AA), Abbott 2537 (PRU, hol.; K, MO, NH, PRE) & 2658 (NH, PRU); Van Wyk 7244 (NH, PRE, PRU, TEX).

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