

SHORT COMMUNICATION

***Allocasuarina anfractuosa* (Casuarinaceae), a new sheoak from southern Western Australia**

Allocasuarina anfractuosa Wege & S.R.Barrett, *sp. nov.*

Type: north of Pallinup River, Western Australia [precise locality withheld for conservation reasons], 1 August 2014, *S. Barrett* SB 2215 (*holotype*: PERTH 08730148 [sheet 1 of 2], PERTH 08730156 [sheet 2 of 2]; *isotype*: NSW).

Allocasuarina sp. Boxwood Hill (S. Barrett 2090), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 1 March 2016].

Monoecious, bushy *shrub* to *c.* 1.5 m high. *Branchlets* spreading, sinuous or occasionally twisted, 5–20 cm long; articles 7–27 mm long, 0.9–1.5 mm wide, surface smooth, glabrous or shortly pubescent in furrows; phyllichnia with a small but definite ridge; teeth 11–15 per whorl, erect to spreading, not overlapping, 0.6–1.1 mm long, ciliate, marcescent. *Male spikes* head-like, 3.5–4.5 mm long, dense; anthers 0.8–1 mm long. *Cones* sessile or on a peduncle to 5 mm long, cylindrical to subcylindrical, pubescent, the hairs white or dark yellowish; cone body 28–35 mm long, 28–30 mm wide; bracts prominent and thickened, acuminate with a hair-like, flexuous extension to 4.5 mm long (piliferous); bracteoles acuminate, sometimes shortly bifid or trifid (obtuse to acute in old cones), dorsal protuberance shorter than the bracteole body (obscured by hairs in young cones), divided into 3 or 4 bodies that are fused to the bracteole except for their acuminate to caudate tips. *Samara* 10–12 mm long, 2.5–3.8 mm wide, dark brown, glabrous. (Figure 1)

Diagnostic features. *Allocasuarina anfractuosa* is highly distinctive in view of its sinuous branches with 11–15 teeth per whorl. Its cones are unique in having the following combination of characters: prominent, acuminate and piliferous bracts; acuminate bracteoles (sometimes shortly bifid or trifid); short bracteole protuberances that are divided into three or four bodies and fused to the bracteole except for the acuminate to caudate tips (Figure 1).

Specimens examined. WESTERNAUSTRALIA: [localities withheld for conservation reasons] 16 Dec. 2011, *S. Barrett* 2083 (PERTH); 2 May 2012, *S. Barrett* 2090 (PERTH); 4 Aug. 2014, *S. Barrett* SB 2212 (PERTH); 4 Aug. 2014, *S. Barrett* SB 2213 (PERTH, NSW).

Phenology. Flowers have been observed in August.

Distribution and habitat. *Allocasuarina anfractuosa* is known only from an area to the north-west of Boxwood Hill in Western Australia's Fitzgerald subregion (Esperance Plains bioregion; Department of the Environment 2013), where it occurs on broad hill crests or upper slopes in brown sandy loam on granite, often forming dense stands. It is recorded from heathland, with or without emergent

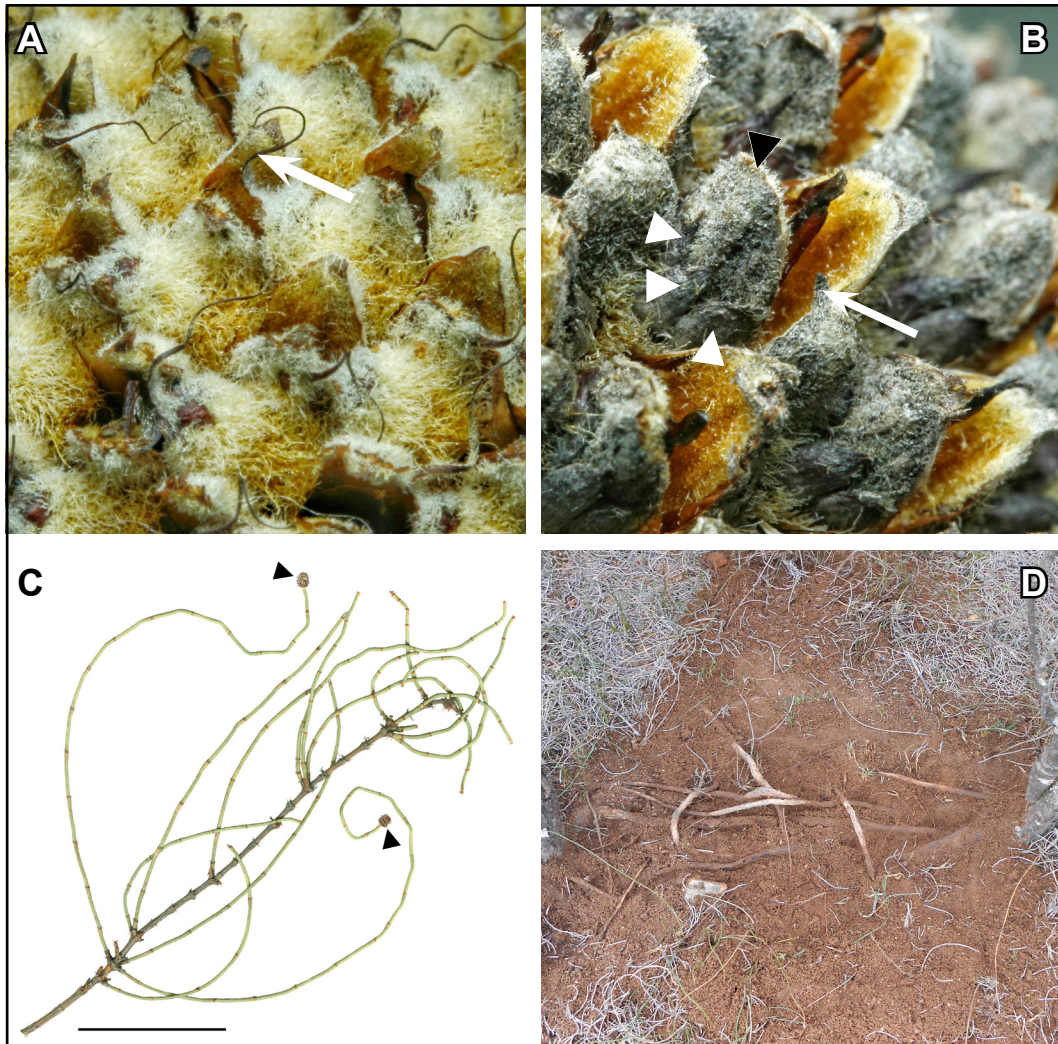


Figure 1. *Allocasuarina anfractuosa*. A – young, pubescent cones showing the hair-like, flexuous extension on the bracts (white arrow). Note the bracteole protuberances are obscured by hairs; B – a more mature cone showing the bracteole protuberances (white triangles) divided into bodies with acuminate to caudate apices that are shorter than the bracteole (black triangle). Note the hair-like extension on the bract apex has dropped off (white arrow); C – sinuous to twisted branchlets, with head-like male spikes (black triangles), scale bar 5 cm; D – clonal spreading. Images © J. Wege (A–C) and S. Barrett (D) from S. Barrett 2215.

A. huegeliana; associated species include *A. campestris*, *Acacia mimica* var. *angusta*, *Calothamnus quadrifidus*, *Petrophile crispata*, *Grevillea* spp., *Anarthria polyphylla*, *Neurachne alopecuroidea*, *Lepidoperma* sp. and *Gahnia* sp.

Conservation status. Listed by Jones (2015) as Priority One under Department of Parks and Wildlife Conservation Codes for Western Australian Flora, under the name *A. sp.* Boxwood Hill (S. Barrett 2090). *Allocasuarina anfractuosa* is currently known from three locations, all of which are on private property; one of these locations (S. Barrett 2212) is a Bush Heritage property managed for conservation. At each of these sites it is rare but dominant across a small area.

Etymology. From the Latin *anfractuusus* (sinuous), in reference to its branchlets.

Proposed vernacular name. Sinuous Sheoak.

Affinities. The precise affinities of *A. anfractuosa* are unclear. It is perhaps best compared with *A. campestris* (Diels) L.A.S.Johnson, a species that is widespread in south-western Australia and co-occurs with *A. anfractuosa*. Like *A. anfractuosa*, *A. campestris* has phyllichnia with a small but definite ridge, sessile or shortly pedunculate, pubescent cones with prominently mucronate bracts, and bracteole protuberances that are mostly fused to the bracteole bodies; however, it has branchlets that are ascending rather than sinuous and with fewer teeth (7–9), cone bracts that are less conspicuous, and bracteoles that are obtuse to broadly acute rather than acuminate. Unlike *A. anfractuosa*, which has bracteole protuberances with acuminate to caudate tips, the tip of the bracteole protuberance in *A. campestris* is marked by a curved or straight line or an indentation close to the bracteole body apex, or rarely by a tiny mucro on the surface of body.

Allocasuarina acutivalvis (F.Muell.) L.A.S.Johnson shares with *A. anfractuosa* branchlets with many teeth per whorl (10–14) and acuminate cone bracts and bracteoles; however, its branchlets are ascending rather than sinuous and, in *A. acutivalvis* subsp. *acutivalvis*, the cone bracteole is indistinguishable from the protuberance. In *A. acutivalvis* subsp. *prinsepiana* (C.P.R.Andrews) L.A.S.Johnson, the protuberance is divided into two or three bodies with somewhat pungent, mucronate apices that, unlike *A. anfractuosa*, are longer than the bracteole body. *Allocasuarina acutivalvis* is widespread in south-western Australia, with subsp. *acutivalvis* occurring in close proximity to *A. anfractuosa* at the type locality.

Allocasuarina tortiramula E.M.Benn., a Threatened species from the Western Mallee subregion (Western Australian Herbarium 1998–), has sinuous or twisted branchlets but is unlikely to be confused with *A. anfractuosa* since it only has six or seven teeth per whorl and its cones are smaller (8–15 mm long) and have inconspicuous cone bracts and obtuse bracteoles with obtuse or shortly mucronate protuberances.

Notes. *Allocasuarina anfractuosa* was discovered during targeted surveys of *Grevillea maxwellii* McGill. and *Gastrolobium humile* G.Chandler & Crisp, two Threatened species that co-occur at the type locality. At this site, female flowers and cones have only been observed on one clump of individuals (*S. Barrett* 2090 and *S. Barrett* 2215). Collections from the two remaining populations (*S. Barrett* 2212 and *S. Barrett* 2213) are sterile but are referred to *A. anfractuosa* on the basis of their branchlet morphology.

This species spreads clonally from roots or underground stems (Figure 1D). A small quantity of seed recently examined by staff at the Department of Parks and Wildlife's Threatened Flora Seed Centre was found to be aborted (*A. Cochrane* pers. comm.).

Acknowledgements

We thank Rob Davis for his initial taxonomic assessment of this species, Terry Macfarlane for helpful comments on the manuscript, and Bush Heritage, Bill and Jane Thompson, and Chas and Julie Johns for on-ground assistance.

References

- Jones, A. (2015). *Threatened and Priority Flora list for Western Australia*. (Department of Parks and Wildlife: Kensington, Western Australia.)
- Department of the Environment (2013). *Australia's bioregions (IBRA)*, IBRA7, Commonwealth of Australia. <http://www.environment.gov.au/land/nrs/science/ibra#ibra> [accessed 1 March 2016].
- Western Australian Herbarium (1998–). *FloraBase—the Western Australian Flora*. Department of Parks and Wildlife. <https://florabase.dpaw.wa.gov.au/> [accessed 1 March 2016].

Juliet A. Wege¹ and Sarah R. Barrett²

¹Western Australian Herbarium, Department of Parks and Wildlife,
Locked Bag 104, Bentley Delivery Centre, Western Australia 6983

²South Coast Region, Department of Parks and Wildlife,
120 Albany Highway, Albany, Western Australia 6630

¹Corresponding author, email: Juliet.Wege@dpaw.wa.gov.au