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Two new species of *Astrotricha* (Araliaceae) from New South Wales

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Abstract

Makinson, R.O. (National Herbarium of New South Wales, Royal Botanic Gardens, Mrs Macquaries Road, Sydney, NSW, Australia 2000) 1991. Two new species of Astrotricha *(Araliaceae) from New South Wales.* Telopea *(4)2: 313–319. A. roddii* and *A. obovata* are described and illustrated, with notes on distribution, ecology, conservation status and similar species.

Introduction

Astrotricha is a mesophyllous to sclerophyllous shrub genus, with ten named and recognised species, all but one endemic to south-eastern Australia (the exception being a Western Australian endemic, *A. hamptonii*). The genus is currently under revision by Makinson and M. Henwood, University of Sydney, and the number of recognised species is expected to rise to about 16. Two new names are published here, with notes and illustrations, to make them available for Flora treatments. Both taxa have been studied in the field by the author. Descriptions are based on field notes and herbarium specimens, including spirit and rehydrated material.

Astrotricha roddii *R. Makinson*, **sp. nov.**

Folia 10–18 cm longa, acuta, anguste elliptica vel anguste ovata, petioli ≤ 2 cm longi. Inflorescentiae purpuratae trichomatibus albidis; flores glabripetali; mericarpia trilocellata.

HOLOTYPE: NEW SOUTH WALES: North Western Slopes: Macintyre Falls, 3 km S of junction of Macintyre and Severn Rivers, *A.N. Rodd 4096*, 23 Nov 1984 (NSW 198521). ISOTYPES: BRI, MEL.

Erect weakly woody shrub 1.5–2.5(–3.5) m high, unbranched or with 2–4 ascending branches from c. ½ height, habit sympodial; vegetative stems light green (not empurpled) beneath the hairs; stems with a dense firmly floccose indumentum of stellate hairs, indumentum of stems and leaves made up of stellate hairs of c. 0.5–0.7 mm diam., those of the flowering axes smaller, c. 0.3–0.4 mm diam. *Leaves* with densely hairy petioles 10–15(–20) mm long; restricted to recent growth, alternate, spreading, somewhat convex adaxially, lamina narrowly elliptical to narrowly ovate, (9–)11–18 cm long, 10–25(–28) mm wide; apex acute to very long-acute; base rounded to broadly cuneate; upper surface on very young leaves with stellate hairs, on mature leaves glabrous, usually rather glossy, all veins evident and recessed, otherwise smooth (lacking asperities); lower surface with a dense thick greenish white indumentum, the midvein and main lateral veins evident; margin shortly recurved. *Inflorescence* a terminal panicle, erect, up to 40 cm long, with 3–5 orders of branching, branches numerous and ascending, subtended by bracts (the lowermost sometimes foliose), inflorescence axes usually deep purple beneath the persistent open whitish indumentum; secondary peduncles 1–2 cm long, bracteate; ultimate bracteoles narrowly ovate to oblong-subulate, 0.8–2.0 mm long at anthesis, usually slightly longer in fruiting stage, 0.3–0.5 mm wide, green to brownish purple, outer surface with an

open indumentum, inner surface glabrous. *Buds* ridged along the petal sutures. *Flowers* protandrous; *pedicels* usually 2–4 mm long on flowers, to c. 6 mm in fruit, with an open to dense indumentum; hypanthium hairy but with some surface tissue visible, 1.0–1.5 mm long in male stage, elongating to 1.5–3.0 mm long in female stage; *sepals* 5, minute, more or less triangular, 0.3–0.6 mm long, hairy outside, persistent on fruit; *petals* 5, glabrous, incurved to erect in male stage, spreading to strongly reflexed in female stage, oblong-triangular, 2.6–2.8 mm long, 0.7–1.5 mm wide, purple, not persistent on young fruit. *Stamens* 5, alternate, soon falling; anthers whitish in bud becoming pale purple before dehiscence, 1.5–2.0 mm long; pollen yellow; filament attached slightly below the medial position. *Styles* purplish, connate and c. 1 mm long and enclosed during male stage, elongating to c. 2 mm long in female stage and diverging, persistent and robust and arching strongly outwards in fruiting stage. *Fruit* a tardily or non-dehiscent dry schizocarp, ellipsoid to slightly obovoid and usually slightly laterally compressed, usually with rounded longitudinal ridges, 4.5–5 mm long, 3–4 mm wide, surmounted by the persistent styles and inconspicuous erect calyx lobes, often a few persistent hairs about the apex; mericarps internally three-chambered, the central (seed) chamber flanked by two partially pith-filled locelli. *Seed* wedge-shaped in cross section, slightly arcuate in face view, 3–4 mm long. Figure 1.

The species is named for Anthony Norman Rodd (1940 –), botanist, who collected the species in 1984 at the Macintyre Falls site; the epithet is given also in grateful acknowledgement of the encouragement and assistance that Tony Rodd has always given to newer workers in botany.

DISTRIBUTION: The species is known from only three sites N of Inverell in the North Western Slopes botanical district of N.S.W. The largest population, of a few hundred plants, occurs at Macintyre Falls, about 25 km (direct) NNW of Ashford; a second, much more sparse population occurs a few kilometres to the south-east along the Severn River. A third population has recently been found at Pindari Reservoir, 20 km SE of Ashford. A nineteenth century collection (*Lau*, MEL 119649) is annotated 'New England QL', suggesting the possibility of collection on the Queensland side of the border.

HABITAT AND ECOLOGY: All three sites bear a mixed dry woodland of *Callitris endlicheri* and *Eucalyptus* spp. (ironbarks) around granite or (at Pindari) porphyry exposures.

The relatively undisturbed sites at Macintyre Falls (400 m altitude) and Pindari Reservoir (600 m) have a fairly rich sclerophyllous shrub understorey. Establishment and survival of *A. roddii*, like some other *Astrotricha* species, is likely to be strongly affected by the density of surrounding understorey vegetation and degree of canopy shading; in this case a semi-open canopy and shrub layer seem to be favoured. The species also has an extremely vigorous taproot and favours crevices or areas of rock rubble for establishment; it is largely absent from nearby areas of level ground.

The exact size and extent of the Macintyre Falls population remain to be determined, but it certainly comprises more than 200 plants. Field observations in 1988 and 1989 show that seedlings are able to establish in the absence of fire. Some plants flower at only about 1.5 m high, probably at about 18 months old; a longevity of about 3–8 years seems likely from the degree of branching observed.

A smaller population of the species, about 4.5 km upstream from the confluence of the Severn and Macintyre Rivers, is on freehold land. It is of uncertain extent, and of very low density — 18 plants were found along about 1 km of riverbank, mostly next to or among rock exposures and boulders. The site is subject to grazing and fire, and undergrowth is very sparse.

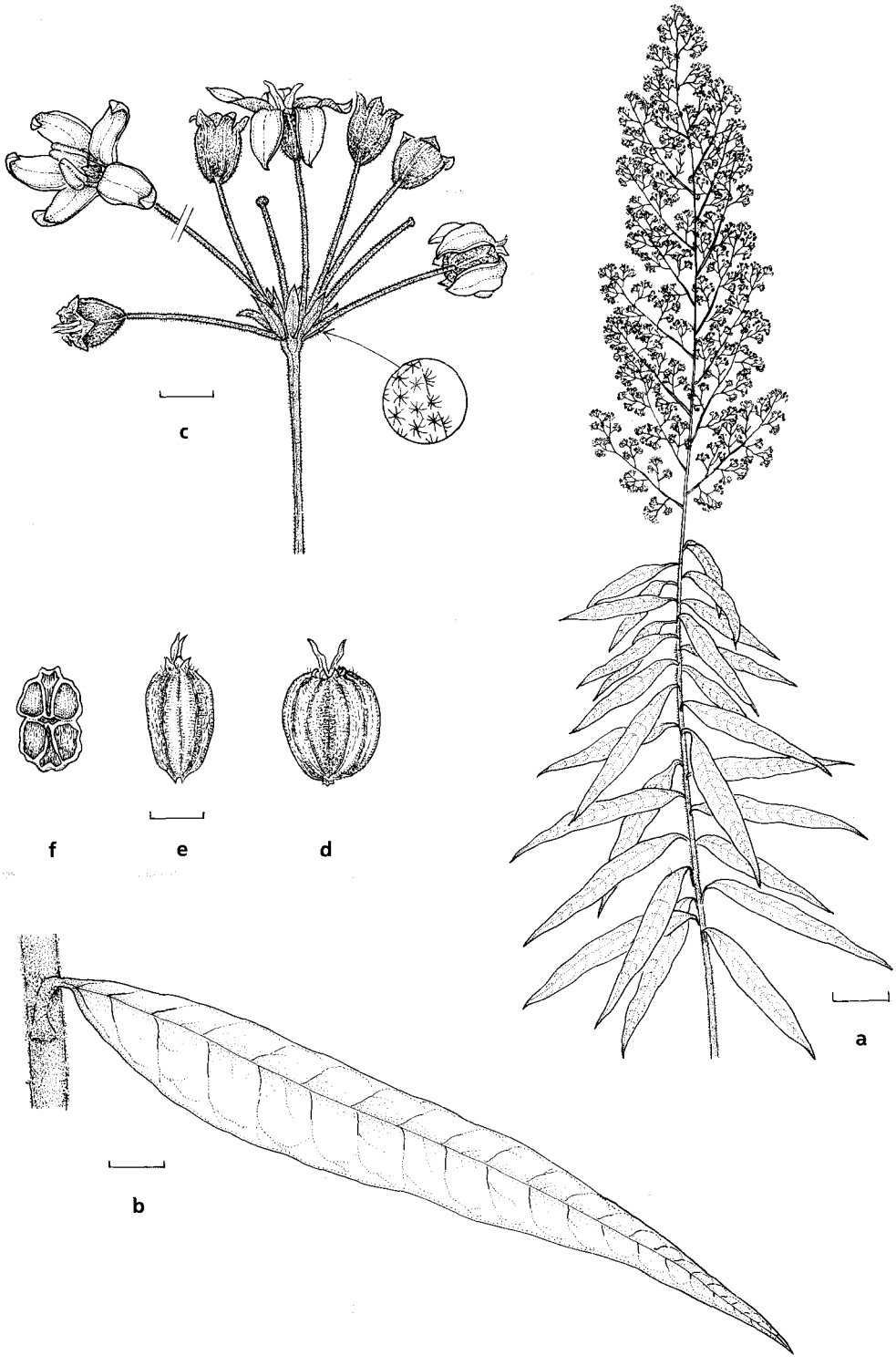

Figure 1. *Astrotricha roddii*. **a,** flowering branch, scale 20 mm. **b,** leaf, adaxial surface, scale 10 mm. **c,** umbel (inset showing stellate hairs), scale 2.5 mm. **d, e,** fruit, face and edge views respectively, scale 2.5 mm. **f,** fruit, transverse medial section to show trilocellate mericarps. (a, b from holotype; d–f from *Makinson 567*).

The third known population occurs on the upper slopes of a hill known as The Barbs just south of Pindari Reservoir. Thirty-one plants were found during a search in October 1990, scattered in small groups or singly. Numerous other hills and ridges in the area are likely to provide suitable habitat. The species' occurrence at this site on a porphyrytic substrate, and on granite elsewhere, suggests a potential (albeit sporadic) geographic range covering much of the North West Slopes region.

CONSERVATION STATUS: The Macintyre Falls population is largely contained within an Inverell Shire Council Flora and Fauna Reserve, from which stock are excluded by fences and grids. Land-use at the Pindari Reservoir site is controlled by the Water Resources Commission. The species seems potentially vulnerable to changes in fire frequency and grazing regime. Pending searches for further populations, a conservation coding of 2RC or 2EC is suggested, in accordance with the criteria given in Briggs & Leigh (1988); see summary of codes at back of issue.

Plants at the type locality suffered heavily from casual vandalism in late 1989. Of 200 plants counted in early December, 140 (70%) were flowering adults; of these, 40 had been deliberately broken at about half height, i.e. a total of 20% of all plants and roughly one-third of all adult plants. Some trampling of adults and juveniles had also occurred. It seems likely that the damage was caused by children, which may have implications for management of the problem. The Reserve is likely to be subject to increasing visitation as a local tourist attraction.

SIMILAR TAXA: The affinities of *A. roddii* are as yet unclear. There is a superficial resemblance to *A. floccosa* (a Sydney Basin endemic with cream flowers), to *A. longifolia* (cream flowers and smaller leaves), and *A. biddulphiana* (purple flowers but much less hairy, and with smaller leaves and stature). The 3-chambered mericarp of *A. roddii* is apparently unique in the genus, although the pith-filled locelli may prove to be homologous with the schizocarp wings of the *A. pterocarpa* complex.

SELECTED SPECIMENS: NEW SOUTH WALES: North Western Slopes: Macintyre Falls Reserve, 29° 10′ S, 150°57′ E, *Makinson 567 & Krauss*, 20 Oct 1988 (NSW 222280 – 2 sheets, BRI), *Makinson 601*, 11 Dec 1989 (NSW 226601, CANB, MEL); 22 km (direct) NNW of Ashford, Severn R. 1.5 km upstream of Severn Falls, *Makinson 602*, 12 Dec 1989 (NSW 226602, CBG, CHR, K); upper slopes of The Barbs, just S of Pindari Reservoir, *Makinson 639 & Coveny*, 8 Oct 1990 (NSW). Locality uncertain: New England QL, *H. Lau*, – (MEL 119649, ?P).

A. obovata *R. Makinson*, **sp. nov.**

Folia obovata vel raro oblonga, 1–3 cm longa, prope marginem asperata. Inflorescentiae breves, pauciflorae; petala cum staminibus cadentia.

HOLOTYPE: NEW SOUTH WALES: Central Coast: Colo Heights to Putty Road at mile peg 50 miles [80 km] north of Windsor ... rocky ridge on right hand side of road going north, *E.F. Constable s.n.*, 23 Nov 1959 (NSW 228124, CANB, MEL). [The material here designated as type, clearly relatable to a single rootstock, has been separated from a large multi-plant collection registered as *NSW 220544*; the balance of the gathering, under that number, is excluded from type status].

Erect slender or compact bushy shrub 0.3–1.0 m high, often several-stemmed from, or below, ground level, resprouting from upper rootstock after damage. Most of plant clad with a close, firm, dense (non-floccose) indumentum of stellate hairs, the hairs usually 0.2–0.4 mm diam. on vegetative parts, those on flowering axes 0.1–0.3 mm diam. *Leaves* ascending, flat or shallowly V-shaped in transverse section, with densely hairy petioles 1–3 mm long; lamina usually oblong-obovate to obovate or occasionally narrow-oblong or narrow-oblong-elliptical, 1–3 cm long, 3.5-10 mm wide; apex obtuse or occasionally slightly emarginate; base cuneate to rounded; upper surface glabrous

(except on very young leaves), matt to glossy, with the midvein only faintly evident as a channel, usually with few to many widely-spaced (sometimes inconspicuous or absent) peak-like obtuse to acute asperities 0.1–0.2 mm high on or near margin (sometimes giving the leaf a denticulate appearance), or rarely scattered over whole upper surface; lower surface with a dense close greyish to pale gold indumentum, the midvein barely evident in relief; margin slightly recurved to flat. *Inflorescences* terminal, weakly erect, very loose, sometimes inconspicuous, 1–6 cm long, simple or few-branched with 1–5(–7) umbellate clusters of flowers, each cluster with (1–)2–4(–5) flowers; secondary peduncles 10–15 mm long, bracteate; ultimate bracteoles narrow-triangular, 0.5–1.9 mm long, 0.3–0.5 mm wide, hairy outside, glabrous inside. *Flowers* protandrous; *pedicels* 1–5 mm long, elongating to c. 7.5 mm long in female and fruiting stages, densely hairy; hypanthium c. 1.5 mm long in male stage, becoming 2.0–2.3 mm long and urceolate in female stage; *sepals* 5, more or less triangular, 0.2–0.6 mm long; *petals* 5, suberect to reflexed, soon falling, oblong-ovate to subtriangular, 1.9–2.2 mm long, 0.9–1.4 mm wide, densely hairy outside, greenish yellow and glabrous inside. *Stamens* 5, alternate, falling early; anthers cream, 1.5–1.8 mm long; filaments attached at or just below the medial position. *Styles* in late bud and male stage straight and narrowly divergent, 1.0–1.2 mm long, elongating to c. 1.6 mm long in female stage and becoming strongly curved outwards. *Fruit* a tardily dehiscent, laterally compressed schizocarp, 4.2–4.5 mm long, c. 4.7 mm wide, 1.8 mm thick, surmounted by the persistent styles and by a 'crown' formed of the calyx lobes connate into a ring at their bases; surface of the mericarps with knobbly longitudinal ridges, mericarps single-chambered. Figure 2.

The epithet is from the Latin *obovatus*, obovate, referring to the typical shape of the leaves, distinctive within the genus.

VARIATION: A few specimens have all leaves narrow-oblong or narrow-oblong-elliptical, e.g. *Benson & Bryant* (NSW 220532); *Burgess* (NSW 220537). These collections have scarcely any asperities on the upper (adaxial) leaf surface. The collection *Blakely* (NSW 220533) also has rather narrow subelliptical leaves, but has typical peaked asperities atypically distributed across the whole upper surface (denser in, but not confined to, the marginal one or two millimetres). These specimens are respectively from the northern, southern, and eastern extremities of the known range. Instances of asperities scattered all over the upper surface also occur sporadically in populations with the typical obovate leaf form, e.g. *Beesley 195* (CBG, NSW).

DISTRIBUTION AND CONSERVATION STATUS: Found in the northern part of the Central Coast botanical division of New South Wales, in a dissected sandstone plateau area bounded on the south by the Hawkesbury River, on the west by the Colo and Capertee Rivers, and in the north by the Hunter Valley. Single records are known from adjacent parts of the Central Tablelands division (near Glen Davis), and North Coast division (Weston, near Cessnock). The species is well represented in Dharug, Wollemi and Yengo National Parks, and does not appear to be under any threat.

HABITAT AND ECOLOGY: The species occurs on shallow sandy soils on sandstone, in dry sclerophyll woodland or forest with a shrubby understorey, at 250–660 m altitude. Associated species often include *Angophora euryphylla*, *A. bakeri* subsp. *bakeri*, *Eucalyptus fibrosa* subsp. *fibrosa*, *E. punctata*, *E. oblonga*, *Grevillea mucronulata*, *G. buxifolia* subsp. *buxifolia*, *Persoonia levis*, *Xylomelum pyriforme* and *Lambertia formosa*.

A. obovata is fairly tolerant of physical and fire disturbance and is probably semi-successional following fire episodes. It may also be found on or near road verges and old gravel quarries. The coppicing habit has been seen at various sites; in some cases the triggering factor seems to have been damage caused by fire, in others by physical disturbance. New stems sprout from near the root/stem junction, just below ground

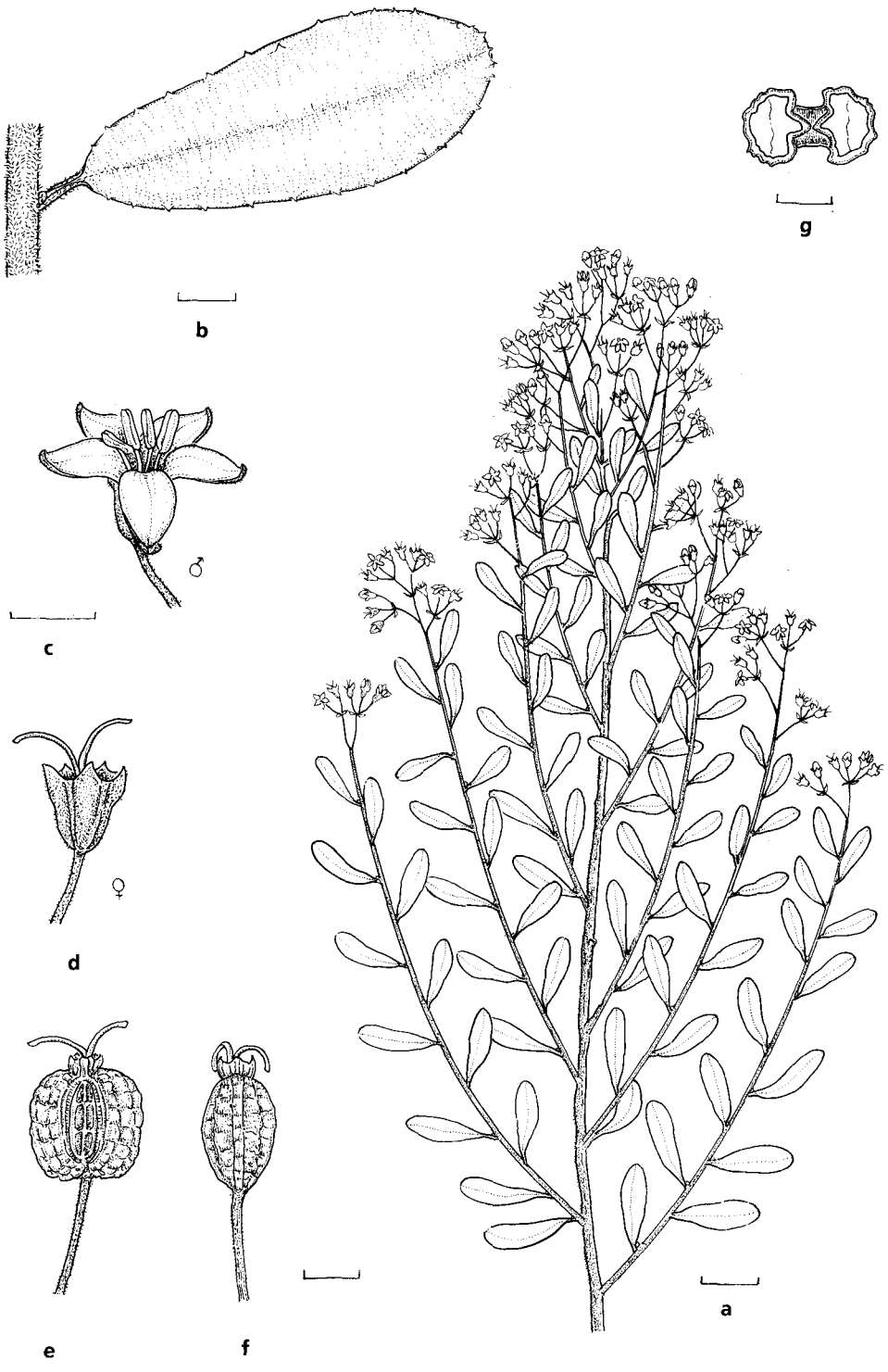

Figure 2. *Astrotricha obovata*. **a,** flowering branch, scale bar 10 mm. **b,** leaf, adaxial surface, scale bar 2 mm. **c,** flower, male stage, scale bar 2 mm. **d,** flower, female stage, scale bar 2 mm. **e, f,** fruit, face and edge views respectively, scale bar 2 mm. **g,** fruit, transverse medial section, scale bar 2 mm. (a-c from *Beesley 195*, d-g from *Henderson & Rodd 2705*).

level; this zone may be quite thick (about 12 mm diam.), but tapers gradually into the lower root. Whether this thickened zone is a true (stem-derived) lignotuber is undetermined, but the mode of regrowth is similar. Remote suckers (from far-spreading roots) have not yet been confirmed.

FLOWERING: occurs in (at least) November and December, and is not as tightly synchronous on a plant as is usual in most species of *Astrotricha*; it is not unusual to find very young buds, open flowers, and fruits on one plant.

SIMILAR SPECIES: *A. obovata* most nearly resembles, and is perhaps most closely related to, *A. ledifolia* DC. The latter name is often erratically applied, but properly refers to a taxon confined to the Central and Southern Tablelands of N.S.W. and montane regions of far north-eastern Victoria. *A. ledifolia* has obtuse oblong (not obovate) leaves, the upper surfaces of which bear many fine asperities (< 0.1 mm high) scattered over the whole leaf surface; only occasionally are the asperities either larger than this and strongly acute, or confined to the submarginal area. *A. ledifolia* also has a much more conspicuous, elaborated and floriferous inflorescence (usually 6–15 cm long), with numerous spreading branches, secondary peduncles to 4 cm long, and petals usually persistent to the fruiting stage. Both species can commonly regenerate from the base, which is unusual in the genus; *A. ledifolia* can have remote suckers from a laterally-wandering root. The geographical range of *A. ledifolia* approaches that of *A. obovata* in the area north of Lithgow; there is a disjunction of about 45 km between the nearest known occurrences of the two species. The actual disjunction (to judge by available habitat) is probably less. Nevertheless, they are separated by the Capertee and Colo Rivers and by an altitudinal difference of about 300–400 m. No morphologically intermediate collections are known.

SELECTED SPECIMENS: NEW SOUTH WALES: North Coast: c. 2 km directly NNE of Weston, near Cessnock, *Benson & Bryant*, 2 Dec 1981 (NSW 220532). Central Coast: Colo Heights to Putty road, at mile peg 50 miles [80 km] N of Windsor, *Constable*, 23 Nov 1959 (NSW 220544, AD, BRI, CANB, CHR, DNA, E, G, HO, K, L, MEL, MO, P, PERTH, UNE, plus further duplicates to be distributed); Putty Road, Howes Valley, c. 1.5 km NW of Howes Mtn, *Bishop, Goodwin & James 604*, 13 Nov 1984 (NSW 220542, AD, BRI, CANB, MEL); Bucketty, 33°07′ S 151°08′ E, *Henderson & Rodd 2705*, 19 Nov 1974 (NSW 220536, BRI, K, MO); Mogo Creek, N of St Albans, *Burgess*, 16 Oct 1961 (NSW 220537); Kulnura, *Blakely*, May 1937 (NSW 220533); 23 km from Yarramalong along Brush Creek towards 'The Letter A', *Beesley 195 et al.*, 21 Nov 1984 (CBG 8411582, NSW). Central Tablelands: 4 miles [6.4 km] by road NE of Gospers [Uraterer] Mtn, alt. 660 m, *Rodd & Coveny 294*, 7 Jul 1968 (NSW 102028).

Acknowledgements

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Reference

Briggs, J.D. & J.H. Leigh (1988). *Rare or threatened Australian plants.* Australian National Parks & Wildlife Service Special Publication no. 14.

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