

## Australian coralloid fungi II — a new species of *Ramaria* (Gomphales) from Western Australia: *Ramaria citrinocuspidata* sp. nov.

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### Abstract

The new Australian species *Ramaria citrinocuspidata* sp. nov. is formally described. Its known distribution (currently only from Western Australia) and colour photographs are provided.

**Key Words:** fungi, systematics, *Ramaria*, Australia.

### Introduction

Apart from the authors' own paper (Young & Fechner, 2007), the last paper specifically addressing Australian species of *Ramaria* (Fr.) Bonord. was that of Petersen & Watling (1989). Their paper considered those taxa principally found in eastern Australia and resourced herbarium specimens that mostly originated from New South Wales, Victoria and South Australia. Petersen & Watling (1989) examined only two collections from Western Australia and both were identified as *Ramaria capitata* (Lloyd) Corner.

In his two-part census of the larger fungi of Western Australia, Hilton (1982, 1988) lists a number of collections of species of *Ramaria* that have been made from that state: *Ramaria botrytoides* (Peck) Corner and *R. flaccida* (Fr.) Ricken [Part I]; *R. fumigata* (Peck) Corner, *R. gracilis* (Fr.) Quél., *R. ochraceosalmonicolor* (Cleland) Corner and *R. sinapicolor* (Cleland) Corner [Part II]. Bougher & Syme (1998) included two species: *Ramaria ochraceosalmonicolor* (Cleland) Corner and *R. versatilis* Quél. Recent collections of a lemon-yellow *Ramaria* from Western Australia do not match to any of the species previously reported from that state, and are described as a new species, *Ramaria citrinocuspidata*.

### Materials and methods

Four collections from PERTH form the basis of the work in this paper. Specimen samples were examined under an Olympus CX40 research light microscope (with drawing tube) using both ammoniated congo red and cotton blue in lactic acid as the mountants. Congo red was the preferred initial stain for all tissues, while cotton blue (with the sample pre-heated for a few seconds in the mountant) was used to provide accurate observations of the spore wall and its structures. Q's are omitted for basidia because the basidial lengths appear to vary considerably with both fruiting body maturity and sampling location on the fruiting body. Even basidial means should be accepted cautiously. Colour chip references for the specimens were not recorded in the field notes. The distribution chart was developed using DMAP (Morton, 2005). Chemical tests were not recorded for fresh material.

### Taxonomy

*Ramaria citrinocuspidata* A.M.Young & N.A.Fechner sp. nov. (Figs 1,2)

Mycobank MB 515247.

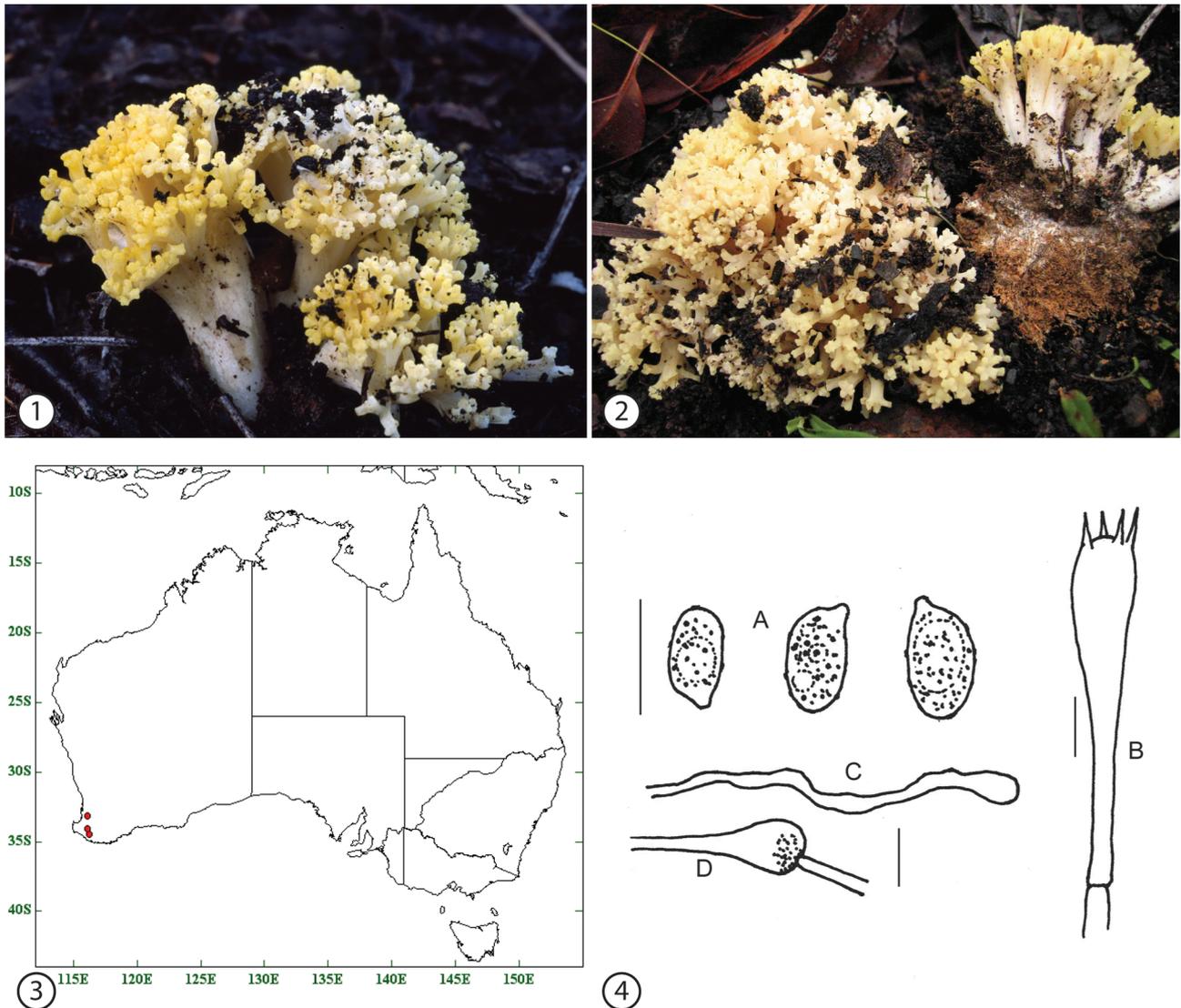
Basidiomata ad 8.0 × 7.5 cm, ramosa, in circumscriptione obconica ad obtriangularia. Apicibus citrinis, cuspidatis, sicci; ramis subflavidis, cylindricis, glaberis, ramulis numerosis, subflavidis; axillis rotundis; stipite indivisibilis, ad 5.0 × 2.0 cm, albis, glaberis. Sporis (6.5–)7.9–10.4(–11.0) × 4.0–6.8(–7.2) μm, ovoideis ad ellipsoideis, verruculosis; basidiis (46–)52–79(–90) × 9.5–13 μm, sterigmatibus 4; hyphis 5–15 μm latis, afibulatis. In humo in silvis.

*Holotypus hic designatus*: PERTH 06436536: Australia. Western Australia, Edward Forest Block, Caversham Road, near Harris River, R.M.Robinson, R.H.Smith & K.Pearce, 30 Jun. 2003.

*Basidiomata* 4.5–8.0 × 3.0–7.5 cm (height × width); overall shape obconical to obtriangular with the apices loosely clustered so that an open but 'cauliflower-like' appearance is produced; *apices* bright lemon-yellow, short and blunt-rounded, never inflating or fusing, dichotomous to ±cuspidate in groups of five, dry at all stages; *branches* at first white where they leave the stipe, but then soon yellow tinted upwards, with the yellow becoming more intense on the branches just below the apices, major branches about four in number, then producing clusters of smaller branches, angular near the stipe becoming cylindrical and then 'compressed', smooth, dry; *axils* deep V-shaped but rounded at the base of the V, without groove running from the axil down the branch; *stipe* 3.0–5.0 × 1.0–2.0 cm, white, ±cylindrical, smooth; *aborted branches* present. *Flesh* white, solid, ± fibrous, without any colour change. *Odour* 'mushroomy'. *Taste* not recorded. *Rhizomorphs* absent, or if present then very poorly developed, white, soft, short.

Macrochemical reactions: not recorded.

*Basidiospores* (6.5–)7.9–10.4(–11.0) × 4.0–6.8(–7.2) μm, mean 8.9 × 5.4 μm, Q: 1.4–2.0(–2.3), mean Q: 1.68, broadly oval to ellipsoidal, frequently uniguttulate, ornamentation of low and randomly scattered warts, profile very finely rough and uneven, hilar appendix moderately prominent; *basidia* (46–)52–79(–90) × 9.5–13 μm, mean 67.6 × 10.8 μm, 4-spored, clamps absent;



**Figs 1–4** *Ramaria citrinocuspidata*. 1 PERTH 06435637, showing lemon-yellow, cuspidate apices and a thick, white stipe. © R.Robinson. 2 PERTH 06640621, showing the clustered habit. © R.Robinson 3 distribution map 4 microdetails. A, basidiospores; B, basidium; C, gleoplerous hypha showing swollen ending; D, ampulliform septum. All bars = 10  $\mu$ m.

*sterigmata* up to 7  $\mu$ m long, conical and straight to slightly curved; *trama* composed of thin-walled, cylindrical to inflated, septate hyphae 5–15  $\mu$ m diam., clamps absent; *ampulliform septa* present, 8–15  $\mu$ m diam., stalactitic ornamentation sometimes present or only where the next hyphal segment is attached; *gleoplerous hyphae* frequent, often consisting of long refractive hyphae with a swollen ending suggestive of an ampulliform septum about to form (Fig. 4).

*Habit*: forming compact, fasciculate masses on soil amongst deep litter in open forest and often almost buried in the litter.

*Habitat*: open forest (comprising at least *Eucalyptus marginata*, *Corymbia calophylla*, *Banksia grandis*, *Xanthorrhoea preissii* and *Podocarpus drouynianus*, WA).

*Etymology*: from Latin, *citrinus*, lemon-yellow; *cuspideus*, cuspidate, referring to the shape of the clustered apices which together resemble the crown of a molar tooth.

#### Material Examined

**Western Australia**: Easter Forest Block, 34° 06' 24"S, 116° 08' 33"E, 11 Jul. 2003, *R.M.Robinson* FC420, (PERTH 06435637); Easter Forest Block, 34° 06' 24"S, 116° 08' 33"E, 17 Jun. 2004, *R.M.Robinson & L.McGurk* FC646, (PERTH 06640621); Edward Forest Block, 33° 11' 20"S, 116° 10' 22"E, 30 Jun. 2003, *R.M.Robinson, R.H.Smith & K.Pearce* FC499, (PERTH 06436536) (holotype); Sutton Forest Block, 34° 29' 42"S, 116° 18' 03"E, 29 Jul. 1999, *R.M.Robinson* FF959, (PERTH 0565056).

#### Discussion

Western Australian material examined by the authors has confirmed that several species of *Ramaria* are common to eastern and western areas of the Australian continent [eg. *R. lorithamnus* (Berk.) R.H.Petersen, *R. fennica* (P.Karst.) Ricken var. *fumigata* (Peck) Schild and *R. capitata* (Lloyd) Corner var. *capitata*], however the number of species endemic to Western Australia is presently unknown. The new species described in this paper is currently unknown from the eastern part of

Australia. It should also be noted that the distribution chart (Fig. 3) is more a record of where collecting has occurred than being representative of the true range of the taxon.

The “lemon-yellow” cuspidate apices with much paler branches and white stipe make identification of *Ramaria citrinocuspida* relatively simple. There are absolutely no colour changes on bruising and this also separates it from a number of other yellowish species, which produce reddish, vinaceous or brownish colours when bruised [e.g., *Ramaria lorithamnus* (Berk.) R.H.Petersen; *R. xanthosperma* (Peck) Corner, var. *australiana* R.H.Petersen & Watling].

No known taxon conforms with *Ramaria citrinocuspida*. *Ramaria lorithamnus* is yellow, but has much smaller spores,  $5.8\text{--}7.2(-8.3) \times 3.6\text{--}5.0(-5.8) \mu\text{m}$ , and exhibits fasciculate slender stipes rather than the robust stipe of the WA taxon. Petersen (1988) described two yellow to golden taxa from New Zealand: *Ramaria basiorobusta* R.H.Petersen and *Ramaria junquilleovortex* R.H.Petersen; the former has bright golden-orange branches and light yellow-orange apices both of which become deep red-brown with age, the latter has white branches which then slowly become cream-coloured and its spores [ $10.1\text{--}11.5 \times 4.7\text{--}5.4 \mu\text{m}$ ] are larger than those of the WA species.

Although Corner (1950) is regarded as a significant contribution to the taxonomy of *Ramaria*, his species descriptions must sometimes be applied with caution, because many of Corner's records are literature collations rather than accounts of material he actually examined. It is not surprising, therefore, that conflicts may appear in Corner's successive writings. While this observation is tangential to the discussion, it is nevertheless highly relevant whenever Corner (1950) is used as a reference for Australian taxa.

Macroscopically, *Ramaria citrinocuspida* appears to be most similar to the European species *Ramaria flava* (Schaeff.:Fr.) Quél. *sensu* Corner (1950). Unfortunately, Corner (1950) implied by example that *Ramaria flava* possessed numerous clamp connections, however in his later work (Corner, 1970), he indicated that clamp connections were either absent or very scattered. Regardless, both of Corner's species concepts for *Ramaria flava* have now been superseded by the erection of a neotype (Schild, 1991).

Schild (1991) proposed a neotype for *Ramaria flava* based on topotype material, and his concept has been supported by later authorities [Petersen (1997); Franchi & Marchetti (2001)]. On that basis, *Ramaria flava* is

described as a species that displays clamps on both hyphae and basidia, and produces cylindrical spores,  $(9.9\text{--})10.4\text{--}15.7(-16.5) \times (3.2\text{--})3.7\text{--}6.0 \mu\text{m}$ , ornamented with longitudinal ridges of warts. Since *Ramaria citrinocuspida* does not possess clamps on either hyphae or basidia and has much smaller elliptical spores with irregularly scattered warts, the authors consider that *R. citrinocuspida* is readily separated from *R. flava*. The recent review of Pacific North-western United States taxa by Exeter *et al.* (2006) contains no species that might indicate a close affinity.

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