



New species of *Crotonia* (Acari: Oribatida: Camisiidae) from *Nothofagus* and *Eucalyptus* forests in Victoria, Australia, with a redescription of the fossil species *Crotonia ramus* (Womersley, 1957)

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Abstract

Six new species of oribatid mite belonging to the genus *Crotonia* are described from wet forests in Victoria, Australia. *Crotonia alpina* **sp. nov.**, *C. cornuta* **sp. nov.** and *C. victoriae* **sp. nov.** belong to the *Capistrata* species-group, having the full complement of notogastral setae in the *c* series; whilst *C. momittoi* **sp. nov.**, *C. blacki* **sp. nov.** and *C. gadubanudi* **sp. nov.** are members of the *Cophinaria* species-group, lacking setae *c*₂. The fossil species *Crotonia ramus* (Womersley, 1957), also a member of the *Cophinaria* group, is redescribed from Tertiary Kauri pine resin (*Agathis yellournensis*). The new members of the *Capistrata* group share a unique combination of characters, including long flagelliform setae *c*₃, shorter setiform *c*₂ and with setae *c*₃ the shortest of the *c* series; lateral strips of the notogastral shield ornamented with fields of tubercles; narrow, blunt bothridial auriculae and elongate parallel apophyses of setae *h*₂ projecting horizontally. The morphological homogeneity of this cluster of species is mirrored by the members of the *Cophinaria* species-group described herein which, together with *C. pyemaireneri* Colloff, 2009 and *C. tasmanica* Łochyńska, 2008 from Tasmania, plus *C. jethurmerae* Lee, 1985 from South Australia, share relatively well-developed setae *d*₂, a porose notogastral shield with narrow lateral tuberculate strips; elongate, acute bothridial auriculae; long, flagelliform setae *p*₁ and relatively short apophyses of setae *h*₂, divergent apically, and projecting posteriodorsally. The Victorian members of the *Capistrata* and

Cophinaria species-groups represent two homogeneous clusters of species associated with temperate rainforest refugia and wet sclerophyll forest in high-rainfall zones. An identification key is provided to the Australian species of *Crotonia*.

Key words: Mite, taxonomy, morphology, refugia, biogeography, temperate rainforest

Introduction

The Gondwanan genus *Crotonia* is of considerable interest from biogeographical and evolutionary perspectives. Its biogeography indicates a mix of harmonic Gondwanan and disjunct trans-Pacific vicariant distribution patterns, with evidence of oceanic dispersal events (Colloff, 2009b). From an evolutionary perspective, *Crotonia* may have re-evolved sexuality from thelytokous parthenogenetic ancestors, whose ancestors in turn were sexual (Domes et al., 2007). In a phylogenetic analysis, Colloff & Cameron (2009) relegated the family Crotoniidae to subfamily status within the Camisiidae; the Gondwanan sexual clade of *Crotonia*, *Austronothrus* and *Holonothrus* having the parthenogenetic, Holarctic genus *Camisia* as its sister group.

In a recent review of *Crotonia*, Colloff (2009b) recognised 43 species and proposed a revised series of six species-groups of *Crotonia*, of which three occur in Australia: Capistrata, Cophinaria and Lanceolata. Additional species not included in this review are *C. tasmanica* Łochyńska, 2008 from Australia, *C. camilae* Łochyńska, 2008 from Brazil and *C. longisetosa* Łochyńska, 2008 from New Zealand, bringing the total to 52 including those described herein.

Crotonia spp. are often found in moss and litter in high-rainfall forests, though some notable exceptions were detailed by Colloff & Cameron (2009). In Tasmanian rainforests *Crotonia* spp. showed slightly higher frequency in corticolous than saxicolous or terricolous mosses (Colloff, 2009a). The nine extant Australian species of *Crotonia* described hitherto are almost entirely confined to rainforest or wet sclerophyll forest in Tasmania and Eastern Australia. The mainland records are mostly from high-rainfall, high-altitude locations along the Great Dividing Range in Northern Queensland (*C. ardala* Luxton, 1987, *C. borbora* Luxton, 1987 and *C. capistrata* Luxton, 1987) and New South Wales (*C. tryjanowskii* Olszanowski, 2000). Tasmanian species are associated with moss on *Nothofagus cunninghami* in temperate rainforest (*C. ovata* Olszanowski, 2000, *C. tasmaniana* Colloff 2009; *C. pyemaireneri* Colloff 2009 and *C. tasmanica* Łochyńska, 2008). A single species, *C. jethurmerae* Lee, 1985 was described from litter in wet sclerophyll forest at 540 m on Mt. Lofty, South Australia. The only *Crotonia* described from Victoria is the fossil species, *Crotonia ramus* (Womersley, 1957). Records exist for *C. tasmanica* and *C. ardala* Luxton, 1987 from Cumberland Nature Reserve (Łochyńska, 2008c) but these may be doubtful (cf. discussion below).

The purpose of this paper is to describe six new species from forests in Victoria, three belonging to the Capistrata species-group, *C. alpina* sp. nov., *C. cornuta* sp. nov. and *C. victoriae* sp. nov., and three belonging to the Cophinaria species group, *C. momittoi* sp. nov., *C. blacki* sp. nov., and *C. gadubanudi* sp. nov., and to redescribe the fossil species *Crotonia ramus* (Womersley, 1957). This brings the number of species of *Crotonia* recorded from Australia to sixteen: over a third of the global fauna.

Materials and methods

Specimens from moss collected by us were extracted via Tullgren funnels and stored in 70% ethanol. Specimens were placed in a cavity slide and macerated in lactic acid (70% aqueous) with 50% glycerol (1:1) on a hot plate at 50°C. The cerotegument was removed with a fine brush. Body length was measured in ventral view from the tip of the rostrum to the posterior margin of the opisthosoma, excluding the apophyses. Breadth was measured in dorsal view at the point of the widest part of the notogastral plate. Lamellar apophyses were measured from the apex to the point of transverse inflexion. All measurements are given in