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Nine new species of *Timonius* (Rubiaceae) from Kinabalu Park, Borneo

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Abstract

Nine new species of *Timonius* (Rubiaceae) from Kinabalu Park are described: *T. abanii*, *T. beamanii*, *T. bullatus*, *T. kinabaluensis*, *T. leopoldii*, *T. ophioliticus*, *T. pannosus*, *T. stenolobus*, and *T. tambuyukonensis*. Of the nine species, six are likely to be endemic to the Kinabalu massif, and four appear to occur exclusively on ultramafic soils.

Introduction

Timonius Candolle (1830: 461) is a genus in the Rubiaceae nested within the tribe Guettardeae of the subfamily Cinchonoideae (Bremer 2009). Darwin (2010a) estimated that the genus comprises about 200 species, although a revision of the western Malesian species is still in progress. The distribution of *Timonius* is within the paleotropics, encompassing Malesia, Sri Lanka, Seychelles, Micronesia, Taiwan, and some regions of tropical Australia and the south Pacific (Darwin 2010a). Species richness is highest in Malesia, including the Philippines (Merrill 1923), the Malay Peninsula (Wong 1988), Borneo (Puff & Wong 1993), and Papuasia (Darwin 1993, 1994, 1997, 2010a,b).

The diagnostic characters of *Timonius* are the following: dioecious trees; axillary, cymose inflorescences with few to many flowers on male plants, and single to few flowers on female plants; infundibular to salverform corollas with valvate lobes; as many stamens as corolla lobes with included anthers; several- to many-celled ovary; drupaceous fruit containing several to many pyrenes; and a pendulous, solitary ovule within each pyrene.

Kinabalu Park is located in the Malaysian state of Sabah, at the northern tip of Borneo. This physiographically complex and isolated mountain habitat is a World Heritage Site, and harbours one of the richest floras in the World (Barthlott *et al.* 1996, Beaman 2005). *Timonius* species occur principally in lower and upper montane forests (900−2200 m), and are particularly frequent as small- to medium-sized trees in cloud forests, which have a characteristic dense packing of small-stemmed trees with abundant epiphytes and mosses. This habitat is frequently mist-covered, which contributes to the water saturation of the substrate, which in turn promotes development of mor-humus (Grubb & Whitmore 1966). The most recent enumeration of the Kinabalu flora (Parris *et al.* 1992; Wood *et al.* 1993; Beaman & Beaman 1998; Beaman *et al.* 2001; Beaman & Anderson 2004) listed over 5000 vascular plant species, and has provided crucial baseline information for revising the Kinabalu *Timonius*. Their enumeration is monumental both for its coverage and utility to taxonomists.

In early enumerations of the Kinabalu flora, Stapf (1894) and Gibbs (1914) did not record any *Timonius* species. As collecting effort increased, Beaman & Anderson (2004) listed five named and four undetermined species of *Timonius*. Meanwhile, a revision of the genus in Borneo has been initiated by two of us (Chen and Wong), and it has been possible to rectify several previous misidentifications as well as clarify circumscriptions of taxa occurring in Kinabalu Park. Our revision of these taxa now show that there are 13 species (the nine species newly described below, in addition to *T. borneensis* Valeton (1909: 48), *T. clementis* Merrill (1917: 244), *T. mutabilis* (Korthals 1851: 212) Walpers (1852: 765), and *T. palawanensis* Elmer (1912: 1360).

Beaman & Anderson's (2004) concept of *T. borneensis* contained mixtures including typical *T. borneensis*; their inclusion of *T. esherianus* W.W. Smith (1915: 327) and *T. polyneurus* Valeton (1909: 59) were based on

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Additional specimens examined (paratypes):—BORNEO. Sabah: Kinabalu Park, Mount Tambuyukon, 13 April 2011 (♀ plant), *Van der Ent et al. SNP 24479* (SNP), 18 March 1991 (♀ plant), *Jamili et al. SNP 4078* (SAN, SNP); Mount Tambuyukon, sub-station Monggis, 1400 m, 19 August 2007 (♂ plant), *Yabainus & Barkman SNP 14310* (SNP); Mount Tambuyukon, trail from Rajah Camp to the top of Mount Tambuyukon, 7 October 2009 (♀ plant), *Rimi et al. SNP 17555* (SNP); Mount Tambuyukon, trail to summit from Kampung Monggis, 11 March 1993 (♀ plant), *Jamili et al. SNP 5560* (SAN).

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