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A revision of the genus *Cynoglossum* L. (Boraginaceae Juss.) in Nepal and notes on the widespread Asian species

JULIA KÖNIG[1], MOHAN SIWAKOTI[2], HARTMUT H. HILGER[3] & MAXIMILIAN WEIGEND[1]*

[1]*NEES-Institut für Biodiversität der Pflanzen, Rheinische Friedrich-Wilhelms-Universität Bonn, D-53113 Bonn, Germany. E-mail: mweigend@uni-bonn.de*

[2] *Central Department of Botany, Tribhuvan University, Kirtipur, Kathmandu, Nepal. E-mail: mohansiwakoti@live.com*

[3] *Institut für Biologie, Freie Universität Berlin, D-14195 Berlin, Germany. E-mail: hartmut.hilger@fu-berlin.de*

* *corresponding author*

Abstract

Cynoglossum is one of the most complex genera of Boraginaceae, with both species limits and the delimitation of the genus and its generic segregates highly problematic. Several hundred taxa and more than one thousand names are currently assigned to the genus and its segregates. The geographical centres of distribution are found in Asia and the Mediterranean. The present study investigates the genus *Cynoglossum* for Nepal, based mainly on herbarium collections from Nepal and across Asia, including most types, and some living accessions in Bonn Botanical Gardens. Based on this revision a total of five species of *Cynoglossum* are recognised for Nepal: *Cynoglossum amabile, C. furcatum, C. lanceolatum, C. microglochin* and *C. wallichii. Cynoglossum microglochin*, a large-fruited taxon, is here for the first time reported from Nepal and is the only species restricted to the Himalayas. All other species are widespread. The widely used name *Cynoglossum zeylanicum* is not available and the specimens so identified belong to *C. furcatum*, which is shown to extend to Georgia (Caucasus) in the West. Species described under *Paracynoglossum* and *Cynoglossum,* respectively, are found to be synonymous with each other, arguing for abandoning the problematic recognition of *Paracynoglossum* as a distinct genus. Diagnostic characters are described, micromorphological characters are illustrated and a key for identifying the five species is provided.

Key words: *Cynoglossum amabile, Cynoglossum furcatum, Cynoglossum lanceolatum, Cynoglossum microglochin, Cynoglossum wallichii, Paracynoglossum,* Nepal, Himalaya, Asia, SEM

Introduction

The generic limits in tribe Cynoglosseae W.D.J Koch (1837) remain problematic while those of the other tribes of the Boraginaceae de Jussieu (1789)—Lithospermeae (Seibert 1978; Thomas *et al.* 2008; Cecchi and Selvi 2009; Weigend *et al.* 2009), Boragineae (Guşuleac 1923, 1928; Hilger *et al.* 2004; Weigend *et al.* 2010) and Echiochileae (Lönn 1999; Langström & Chase 2002)—are largely resolved. Cynoglosseae is the largest and taxonomically and morphologically most complex tribe of the Boraginaceae. A recent molecular study retrieved a monophyletic *Cynoglossum s.l.*-group within the Cynoglosseae (Weigend *et al.* 2013), that is largely unresolved and includes a range of previously recognized genera, such as *Paracynoglossum* Popov s.str. (1953), *Solenanthus* Ledebour (1829) and *Mattiastrum* Brand (1915) together with the bulk of species of *Cynoglossum*. Morphologically, this is the most confusing group, including robust, often biennial to perennial herbs with large, glochidiate and sometimes conspicuously winged fruits, but also some very small-fruited annuals and biennials. Historically, there has been excessive confusion with regards to genus and species limits and some long-standing problems have either not been resolved, or their resolution has not found general acceptance. Species of what has been historically considered as *Cynoglossum* are retrieved on several unrelated clades in recent molecular studies and additional sampling and better phylogenetic resolution are required in order to progress with a more satisfactory resolution of this group. However, in order to be able to improve sampling, a taxonomic resolution of the constituent species is required: For the Asian region ca. 150 names in *Cynoglossum* are available Hilger *et al.* (2015) and the present study concentrates on resolving the taxonomy and systematics of the genus for Nepal in preparation of the Flora of Nepal treatment for Boraginaceae, which necessarily includes the resolution of

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