



# Differentiation of the endemic Greek genus *Hymenonema* and its relatives of subtribe Scolyminae (Compositae, Cichorieae) based on a multilocus species tree reconstruction

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Received: 15 February 2018 / Accepted: 17 September 2018 / Published online: 17 October 2018  
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## Abstract

*Hymenonema* (Compositae, tribe Cichorieae) together with the genera *Catananche*, *Gandelia*, and *Scolymus* forms the subtribe Scolyminae. It is endemic to Greece and consists of two species, *Hymenonema laconicum* and *Hymenonema graecum*, which occur in the south Peloponnisos and central Aegean area, respectively. The present contribution aims at a phylogenetic reconstruction of evolutionary relationships among the 12 species of the subtribe, focusing on the temporal and spatial framework for its evolution. The phylogenetic relationships among the members of Scolyminae were inferred from molecular data based on the multi-copy region of the nrDNA internal transcribed spacers ITS1 and ITS2, two intergenic spacers of the cpDNA (*trnL-trnF*, *rp32-trnL*), and one single-copy nuclear region (*DfD*). The gene trees were reconstructed using Bayesian phylogenetic methods. All gene trees support the monophyly of *Hymenonema* and the sister-group relationship with the genus *Scolymus*. The further sister-group relationship of this group (*Hymenonema*–*Scolymus*) with *Catananche* is also supported by nrDNA and cpDNA analyses. Finally, a species tree (inferred in a Bayesian coalescent framework) was reconstructed and dates the divergence time between the two *Hymenonema* species to the Pleistocene (around 1.3 Ma ago). Maximum likelihood-based biogeographical reconstructions suggest a Miocene (pre-Messinian) differentiation of the subtribe on the northern Tethyan platform, followed by Miocene/Pliocene dispersal events to the western Mediterranean and North-African platforms and final, small-scale vicariance events within the genera in the Pleistocene.

**Keywords** Aegean · Asteraceae · Biogeography · Phylogeny · Pleistocene · Pliocene

Handling Editor: Terry A.J. Hedderson.

**Electronic supplementary material** The online version of this article (<https://doi.org/10.1007/s00606-018-1545-9>) contains supplementary material, which is available to authorized users.

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## Introduction

Narrow endemism is the cornerstone of plant diversity in the Mediterranean area, and its geographical patterns and their geological, climatological, and ecological correlates are fundamental for understanding the region's plant biogeography, evolutionary biology, and conservation biology (Thompson 2005). In this respect, small, and in many cases unispecific

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# Compositae Tribe Cichorieae

**Marta S.. Walters**



## **Compositae Tribe Cichorieae:**

**Compositae, Tribe Cichorieae** E. G. Bobrov, Vladimir Leont'evich Komarov, N. N. Tzvelev, 2000 A translation of a series on the flora of the USSR completed with editorial collaboration from renowned botany experts this volume covers species such as Compositae and Tribe Cichorieae A New Classification of the Tribe Cichorieae, Family Compositae George Ledyard Stebbins, 1953 **Chromosomes and Phylogeny in the Compositae, Tribe Cichorieae** George Ledyard Stebbins, James A. Jenkins, Marta Sherman Walters, 1953 *Chromosomes and Phylogeny in the Compositae, Tribe Cichorieae* G. Ledyard Stebbins, Marta Sherman Walters, James A. Jenkins, 1953 *Chromosomes and Phylogeny in the "Compositae", Tribe "Cichorieae", by G. Ledyard Stebbins, Jr., James A. Jenkins and Marta S. Walters* Marta Sherman Walters, G. Ledyard Stebbins (jr.), James A. Jenkins, Marta S. Walters, 1953 *Chromosomes and Phylogeny in the Compositae, Tribe Cichorieae* Marta S. Walters, 1953 Flora of the USSR: Compositae Tribe Cichorieae, 1997 **Flora of the USSR**, 2000 **Asteraceae tribe Cichorieae** S. R. Safavi, 2013 *Flora of the U.S.S.R.: Compositae : Tribe Cichorieae*, Flora of the U.S.S.R., 2000 **Flora of the U.S.S.R.**, 2000 **Flora of the USSR. 29 : Compositae. Tribe Cichorieae** Evgenij G. Bobrov, Botanicheskiĭ institut im. V.L. Komarova, 2000 **Flora of the USSR** V. L. Komarov, E. G. Bobrov, N.N. Tzvelev, 2000 *Palynology and the Systematics of Tribe Cichorieae, Family Compositae* Stephen Blackmore, 1976 **Chromosomes and Phylogeny in the Compositae, Tribe Cichorieae. By G.L. Stebbins ... James A. Jenkins, and Marta S. Walters** George Ledyard STEBBINS, 1953 **Flora of the USSR**, 2000 **Asteraceae of Louisiana** Kancheepuram Natarajan Gandhi, R. Dale Thomas, 1989 **Compositae of Southern California** Harvey Monroe Hall, 1909 **Taxonomy of Lygodesmia (Asteraceae)** A. Spencer Tomb, 1980

## **Compositae Tribe Cichorieae** Book Review: Unveiling the Magic of Language

In an electronic digital era where connections and knowledge reign supreme, the enchanting power of language has become more apparent than ever. Its capability to stir emotions, provoke thought, and instigate transformation is really remarkable. This extraordinary book, aptly titled "**Compositae Tribe Cichorieae**," published by a highly acclaimed author, immerses readers in a captivating exploration of the significance of language and its profound affect our existence. Throughout this critique, we will delve to the book is central themes, evaluate its unique writing style, and assess its overall influence on its readership.

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### **Compositae Tribe Cichorieae Introduction**

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