



## Phylogenetic relationships of *Ibervillea* and *Tumamoca* (Coniandreae, Cucurbitaceae), two genera of the dry lands of North America

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### Abstract

We examine the limits and phylogenetic relationships of *Ibervillea* and *Tumamoca* belonging to tribe Coniandreae in the Cucurbitaceae. These taxa are found in xeric areas from southern United States to Guatemala. There has been no previous phylogenetic studies considering all their taxa together, just partially. Furthermore, we include as well species of *Dieterlea*, another similar and sympatric genus which recognition is under debate, formerly considered as a synonym of *Ibervillea*. Using molecular and morphological characters we performed molecular and total evidence parsimony and Bayesian analyses. Our results confirm that species in *Ibervillea* and *Dieterlea* are part of a monophyletic group, supporting the integration of both genera as proposed in previous phylogenetic and taxonomic studies. By examining all the species of the three genera, our results are the first to suggest that *Tumamoca* is also part of this monophyletic group. Therefore we propose that the species of *Ibervillea*, *Dieterlea*, and one species of *Tumamoca* should be included into the same genus. According to the priority rule, *Ibervillea* is the name to be used. *Tumamoca macdougalli* needs to be transferred to *Ibervillea* and the combination is made here. We suggest that the second species in *Tumamoca*, *T. mucronata*, known by a single specimen that is lost, does not deserve recognition.

**Key words:** Parsimony analyses, Bayesian inference, Total evidence analyses.

### Introduction

The tribe Coniandreae M. Roem. in the Cucurbitaceae comprises both New World [i. e. *Doyerea* Grosourdy, *Ceratosanthes* Adans., *Apodanthera* Arn., *Gurania* (Schltdl.) Cogn., *Psiguria* Arn.] and Old World taxa (i. e. *Kedrostis* Medik., *Dendrosicyos* Balf. f., *Corallocarpus* Benth. & Hook. f.) with a total of 19 genera (Jeffrey 2005, Schaefer & Renner 2011a). Among the American genera are *Dieterlea* E.J. Lott, *Ibervillea* Greene, and *Tumamoca* Rose found from southern United States to Guatemala (see Table 1). Recent phylogenetic studies have shown that tribe Coniandreae is closely related to the tribes Cucurbiteae Dumort. and Benincaseae Ser. (Kocyan *et al.* 2007, Schaefer & Renner 2011a). Some of the genera of Coniandreae, such as *Ibervillea* and *Dieterlea*, deserve further study to establish their controversial limits. *Dieterlea* was originally described as monotypic and endemic to Mexico (Lott 1986). Kearns (1994a) reduced *Dieterlea* to a synonym of *Ibervillea*, proposing that the latter has nine species, including a species that had been described for *Dieterlea* (*D. fusiformis* Lott) as *Ibervillea fusiformis* (Lott) Kearns. More recently, McVaugh (2001), in his taxonomic treatment of the Cucurbitaceae for the Flora of Nueva Galicia (Mexico), recognized both genera as independent and included two additional species of *Dieterlea*, transferring the species *Ibervillea maxima* Lira & Kearns to this genus, under the combination *D. maxima* (Lira & Kearns) McVaugh. In addition, this author included *Ibervillea hypoleuca* (Standl.) C. Jeffrey as a synonym. As a result of these modifications, the number of species of *Ibervillea sensu* Kearns (1994a) was reduced to seven (including an undescribed species). Among the morphological features considered in the proposals of Kearns (1994a) and McVaugh (2001) were stamen structure, leaf pubescence, fruit size and the number of placentae, stigmas and staminodia.

*Tumamoca*, another genus from dry lands of North America, comprises two species: *T. macdougallii* Rose, which grows from southern Arizona, U.S.A., to Sonora, Mexico, and *T. mucronata* Kearns, which is endemic to the state of Zacatecas, Mexico (Kearns 1994b). However, the differentiating characters mentioned for these two species

*Maximowiczia sonora* S. Watson var. *peninsularis* I.M. Johnst., Proc. Calif. Acad. Sci., Ser. 4: 1178. 1924. *Ibervillea sonora* (S. Watson) Greene var. *peninsularis* (I.M. Johnst.) Wiggins, Fl. Baja Calif.: 391. 1980. Type:—Mexico. Cerralbo Island, Gulf of California, on a sandy point just north of Gordas point, 6 June 1921, I.M. Johnston 4026 (holotype CAS-81373, <http://plants.jstor.org/specimen/cas0003376?s=t>). (Holotype was erroneously cited as 4026, however the correct number is 4025).

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