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Sinalliaria, a new genus of Brassicaceae from eastern China, based on morphological and molecular data

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Abstract

Sinalliaria is described here as a new genus of the family Brassicaceae from eastern China, based on the morphological characters and molecular sequences. *Sinalliaria* differs from the related genus *Orychophragmus* in having basal leaves petiolate, simple or rarely with 1–3 lateral lobes (not pinnatisect); cauline leaves petiolate, cordate at base (not sessile, auriculate or amplexicaul at base); petals obovate to narrowly obovate, claw inconspicuous (not broadly obovate, with a claw as along as sepal); siliques truncate (not long-beaked) at apex. The microscopic characters of seed testa also show significant differences between *Sinalliaria* and *Orychophragmus*. Phylogenetic evidence from DNA sequences of nuclear ribosomal ITS and plastid region *trn*L-*trn*F indicates that *Sinalliaria* is a distinct group related to *Orychophragmus* and *Raphanus*, but these three genera do not form a clade. The new genus *Sinalliaria* is endemic to eastern China and has only one species and one variety. The new combinations, *S. limprichtiana* (Pax) X. F. Jin, Y. Y. Zhou & H. W. Zhang and *S. limprichtiana* var. *grandifolia* (Z. X. An) X. F. Jin, Y. Y. Zhou & H. W. Zhang are proposed here.

Key words: Cruciferae, microscopic and morphological characters, new combination, nrDNA and cpDNA, taxonomy

Introduction

Brassicaceae (also known as Cruciferae) contains approximately 3660 species which belong to 320 genera (Al-Shehbaz 2012, Koch *et al.* 2012). The family is distributed worldwide and includes many economically important vegetables in the genus *Brassica* Linnaeus (1753: 666), such as broccoli, cabbage, cauliflower, kale, rape, rutabaga and turnip. *Arabidopsis thaliana* (Linnaeus 1753: 665) Heynhold (in Holl & Heynhold 1842: 538) is best known as the model organism of flowering plants (Al-Shehbaz *et al.* 2006). In China, there are 102 genera with 412 species in total (Zhou *et al.* 2001).

Cardamine limprichtiana Pax (1911: 27), with the conduplicate cotyledons, is not consistent to the other members in *Cardamine* Linnaeus (1753: 654), and cotyledons of *Cardamine* are accumbent. *Alliaria grandifolia* An (1985: 396) was collected and described from north-western Zhejiang, and it has no garlic smell when crushed. The new species was described only from a fruiting collection, and flower structure was not provided in the protologue (An, 1985). Zhang (1993) firstly gave the description on flower character in Flora of Zhejiang, but it did not agree with another description (Ding & Hong, 1997).

The systematic position of *Alliaria grandifolia* and *Cardamine limprichtiana* is doubtful till now. The former was placed in the tribe Arabideae and the latter in Sisymbrieae respectively (An 1987, Cheo 1987, Zhang 1993). Because of the conduplicate cotyledons, Al-Shehbaz and Yang (2000) transferred *C. limprichtiana* to *Orychophragmus* Bunge (1835: 81) as *O. limprichtianus* (Pax) Al-Shehbaz & Yang (2000: 351), and reduced *A. grandifolia* to its synonym. In the genus *Orychophragmus* Bunge (1835: 81), *O. violaceus* (Linnaeus 1753: 667) O. E. Schulz (1916: 56) was treated as a highly variable species (Al-Shehbaz & Yang 2000, Cheo *et al.* 2001). Together with *O. diffusus* Z. M. Tan & J. M. Xu (in Tan *et al.* 1998: 547), *O. hupehensis* (Pampanini 1910: 279) Z. M. Tan & X. L. Zhang (in Tan *et al.* 1998: 546) and *O. taibaiensis* Z. M. Tan & B. X. Zhao (in Tan *et al.* 1998: 544), the differentiation in karyotype indeed exists, and the evidence of molecular phylogeny was provided as well (Zhou *et al.* 2008, 2009).

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