



Molecular and cytogenetic confirmation of the hybrid origin of *Jacobaea* × *mirabilis* (Asteraceae, Senecioneae), with nomenclatural notes on this name

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Abstract

Jacobaea × *mirabilis* is a hybrid taxon, formerly included in the genus *Senecio*, originating from *J. adonidifolia* and *J. leucophylla* as progenitors. It inhabits a few French mountain locations in the Pyrenees and in the Massif Central. In this paper, we characterize the hybrid and its parental taxa using molecular phylogenetic and cytogenetic (genome size) methods. These data are useful to confirm the hybrid status of the studied taxon. Additionally, we clarify nomenclatural issues connected with this species and fulfil the conditions for valid publication of its name in *Jacobaea*. The name of this hybrid is also lectotypified.

Key words: genome size, homoploid hybridization, nomenclatural combination, phylogeny, *Senecio* × *mirabilis*, typification

Introduction

Hybridization has classically been and is still recognized as a powerful evolutionary mechanism in plants, particularly in diversification and speciation through genetic exchange (Anderson 1949; Stebbins 1959; Arnold 2006). *Senecio* Linnaeus (1753: 866) (Asteraceae, Senecioneae) s.l. does not at all constitute an exception to this assertion, comprising many examples of hybrid formation (e.g. Lowe & Abbott 2004; James & Abbott 2005; Calvo *et al.* 2013). It has a cosmopolitan distribution and is one of the largest plant genera, with circa 1250 species, many of them in South America and southern Africa (Nordenstam 2007). Recently, 43 Euro-Mediterranean species were segregated from *Senecio* and placed in the genus *Jacobaea* Miller (1754: 667) (Greuter 2006) based upon molecular systematic studies (Pelser *et al.* 2006). Among these species, there are two Franco-Iberian endemic taxa, *J. adonidifolia* (Loiseleur) Méral (1812: 325) [≡ *Senecio adonidifolius* Loiseleur (1807: 566), *J. adonidifolia* (Loiseleur) Pelsler & Veldkamp in Pelsler *et al.* (2006: 2)] and *J. leucophylla* (Candolle) Pelsler in Pelsler *et al.* (2006: 7) [≡ *S. leucophyllus* Candolle (1813: 144)]. Again, the role of hybridization is not negligible in this rather small genus, also involving its type species, *J. vulgaris* Gaertner (1791: 445) [≡ *Senecio jacobaea* Linnaeus (1753: 870)] (Kirk *et al.* 2004; Winter *et al.* 2013).

A hybrid between *J. adonidifolia* and *J. leucophylla* was described in 1853 by Alfred Huet du Pavillon under the name “*Senecio leucophyllo-adonidifolius*” from Mount Canigó (also named Canigou, Pyrénées-Orientales, France, top at 2784 m). Huet du Pavillon (1853) recognized the unique specimen he found as perfectly intermediate in morphology between the parental taxa. Its name, however, was not validly published under Art. H.10.2 of the ICN (McNeill *et al.* 2012).

Based on an individual found in Jonquet’s herbarium, also collected in Mount Canigó but 29 years later, Jonquet & Loret in Loret (1880: 270) proposed another new name, also invalidly published, “*Senecio adonidifolio-leucophyllus*”. In 1882 a new hybrid specimen was found, referred to as “*Senecio leucophyllo* × *adonidifolius* Jonquet & Loret”, but in the northern part of Mount Canigó (LY s.n. in the Rouy herbarium, CAS-435501; Gautier 1891). Later, in his *Catalogue raisonné de la flore des Pyrénées-Orientales*, Gautier (1897) introduced for the first time the name *Senecio mirabilis* “Rouy in herb.” with indirect references to “*S. leucophyllo* × *adonidifolius*” in Huet du Pavillon (1853) and