

Chrysojasminum, a new genus for *Jasminum* sect. *Alternifolia* (Oleaceae, Jasmineae)

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Abstract - Recent phylogenetic investigations about *Jasminum* s.l. have shown that species possessing both alternate leaves and yellow flowers (sect. *Alternifolia*) constitute a clade (monophylum) that is sister to all the other sections of the genus or even to *Jasminum* itself plus the American/South African genus *Menodora*. Such evidence sets the need to revise the generic delimitation of *Jasminum* by establishing a separate genus for the species belonging to sect. *Alternifolia*. As a consequence, the new genus *Chrysojasminum* is here established and the relevant nomenclatural combinations are supplied for fifteen taxa.

Riassunto - *Chrysojasminum*, un nuovo genere per *Jasminum* sect. *Alternifolia* (Oleaceae, Jasmineae).

Recenti indagini filogenetiche sulle Jasmineae e, in particolare, sul genere *Jasminum* s.l. hanno dimostrato come le specie provviste di foglie alterne e fiori gialli, correntemente attribuite alla sezione *Alternifolia*, costituiscano un gruppo monofiletico. Tale clado appare consistente in entrambe le topologie risultanti dall'analisi filogenetica, presentandosi in una sister del clado formato dalle altre sezioni di *Jasminum* (con *Menodora* sister di *Jasminum*), nell'altra addirittura sister di *Menodora* + *Jasminum*.

Si rende dunque necessaria la separazione della sect. *Alternifolia* in un proprio genere, il quale, non disponendo di nomi nella letteratura, viene qui istituito ex novo assieme alle relative, necessarie combinazioni nomenclaturali per le specie.

Key-words: *Jasminum*, phylogeny, new genus, nomenclatural combinations.

INTRODUCTION

So far as known, the genus *Jasminum* L., depending on the authors' delimitation, includes about 200 species ranging from Europe, Africa, Asia, Pacific Islands to Australia (Green & Miller, 2009). Together with the approximately 30 American and South African species of *Menodora* Bonpl., they constitute a descent (monophylum) in the family Oleaceae identified by the tribe Jasmineae Lam. & DC. (Wallander & Albert, 2000). The literature is rather poor on the relationships between these two genera, the most significant contribution being due to Rohwer (1997), who investigated the fruit morpho-functional features in *Jasminum mesnyi* (sect. *Primulina*) and *Menodora* species. Regarding the in-

frageneric diversity, the current belief about *Jasminum* taxonomy attributes to this genus five sections recognized on the basis of morphological features, namely sect. *Jasminum* (= *Pinnatifolia* DC.), *Trifoliolata* DC., *Unifoliolata* DC., *Primulina* P.S.Green (= *Nudiflora* Tzvelev, nom. illeg.) and *Alternifolia* DC. The first three appear not clearly delimited one from another, nor free from artificiality (Green & Miller, 2009) because the number of leaf segments (leaflets), on which they are founded, is an inconstant and homoplastic character. On the contrary, the never yellow corolla (white or reddened to various extent) identifies a synapomorphic condition over these sections.

Sect. *Primulina* (2 species) is marked by some consistent characters, the most obvious of which being the yellow corolla combined with opposite leaves.

A biomolecular approach to the phylogeny of *Jasminum* was developed in the cited paper of Wallander & Albert (2000), where authors, based on *RPS16* and *TRNL-F* loci sequence data, found a complete monophyly for the tribe Jasmineae (jackknife value: 100) that turned out sister (jackknife value: 76) to the tribe Oleaceae. Inside the tribal monophylum they have shown that *Jasminum* sect. *Alternifolia* (where the type name species *J. humile* L. is included in the analysis), with a jackknife value of 100, results clearly sister to *Menodora* + other species of *Jasminum* including, besides members of the sections *Trifoliolata* (*J. fluminense* Vell., *J. sinense* Hemsl.) and *Unifoliolata* (*J. laurifolium* Roxb. ex Hornem. f. *nitidum* (Skan) P.S.Green), the type name species and the type species, respectively, of sections *Primulina* (*J. nudiflorum* Lindl.) and *Jasminum* (*J. officinale* L., that is obviously the type species also for the genus).

Lee *et al.* (2007) have highlighted the existence of important gene relocations in the *Jasminum* and *Menodora* chloroplast genome, derived from multiple overlapping inversions and they have shown that such relocations mark phylogenetic steps in the evolution of the tribe Jasmineae. They also dated each step correlatedly with the occurrence of synapomorphies that are relevant to sections and genera. It is true that in this work the

sampling was extended to a quite small number of species (1 *Unifoliolata*: *J. simplicifolium* G.Forst. subsp. *simplicifolium* and subsp. *le-ratii* (Schltr.) P.S.Green, 1 *Trifoliolata*: *J. abyssinicum* Hochst. ex DC., 2 *Primulina*: *J. mesnyi* Hance and the type name species *J. nudiflorum* Lindl., 2 *Alternifolia*: *J. fruticans* L. and *J. subhumile* W.W.Sm. and 2 *Menodora*: *M. longiflora* Engelm. ex A.Gray, *M. scabra* A.Gray), however reliability and phylogenetic significance of the investigated genomic features are strong enough, with jackknife values never <100, to allow us to exclude that in the future more extensive investigations on *Jasminum* and *Menodora* diversity will change the outlines surfaced in the present phylogenetic framework. Finally, it is worth to remind the paper of Kim & Kim (2011) on Forsythieae phylogeny, where, besides focusing evolutionary relationships in *Abeliophyllum*, *Forsythia* and remaining Oleaceae, *Fontanesia* turns out significantly closer to *Jasmineae* than to any other tribe in the family.

Quite certainly the sections of *Jasminum*, *Unifoliolata* and *Trifoliolata* must be reconducted to the nominal sect. *Jasminum*, while the sect. *Primulina*, as shown by Lee et al. (2007), is sister to the former one. With regard to *Menodora*, this genus results differently placed in two topologies, that is a) sister to the section *Alternifolia* with which it constitutes the sister group of *Jasminum* + *Primulina* and b) sister to *Jasminum* + *Primulina*, both sister to the section *Alternifolia*; in any case, *Alternifolia* clearly shows not being subordinated to *Jasminum* + *Primulina*. Even if future investigations on the former section *Pinnatifida* (not treated in the paper of Lee et al., 2007), consisting of few species among which the genus type *J. officinale* L., will demonstrate the need to make changes to the taxonomy of white flowered jasmins, neither sect. *Primulina* nor, least of all, sect. *Alternifolia* and *Menodora* will be affected by this issue.

Therefore, according with phylogenetic data, two alternative solutions can be proposed: 1) including *Menodora* in *Jasminum* and keeping four sections in the genus: *Jasminum*, *Primulina*, *Alternifolia* and *Menodora*, 2) establishing a new genus to raise *Alternifolia*, that, together with *Jasminum* (2 sections) and *Menodora*, will outline the tribe *Jasmineae*.

Between these options, I definitely choose the second one because merging *Menodora* into *Jasminum* is not advisable, the former representing a very consistent evolutionary lineage that has diverged from *Jasminum* also geographically. It doesn't seem possible to find in literature denominations that are recoverable at the genus rank for *Jasminum* sect. *Alternifolia*. Therefore it becomes necessary to establish a new genus name.

Chrysojasminum Banfi, gen. nov.

≡ *Jasminum* L. sect. *Alternifolia* DC., Prodr. 8: 312. 1844.

Typus: *Jasminum humile* L., Sp. Pl. 1: 7. 1753., here designated also for the section *Alternifolia* on the base of the type name, as indicated in The International Plant Name Index

Etymology: *Chryso* from the greek χρυσός (latin: *aurum*), gold and *jasminum*, jasmin, referring to the colour of the flower.

From *Jasminum*, *Chrysojasminum* is distinguished by the alternate leaves, from *Menodora* by the valvate corolla lobes.

New combinations

Fifteen nomenclatural combinations are here established with the indication of basionyms; a complete synonymy for each taxon was done by Green (1961) to which readers are referred. This should explain the fact that the author of the present paper agrees with those who don't like a too enlarged species concept when different infraspecific units, even if constituting together a monophylum, show each a definite morphological, biogeographical (allopatric) and ecological consistency. In my opinion, for such taxa, the species rank seems to be the most suitable choice bio-ecogeographically acceptable and taxonomically practical. We shall really ask ourselves how, in these cases, we think to be able to identify the exact completion degree reached by a taxon along its historical differentiation to which a definite infraspecific rank may be applied.

Sometimes I believe that it is better to refer just to the species rank than trying to adapt to the case an infraspecific rank without a suitable and objective support. Lowest infraspecific ranks (variety and form) are usefully applied to the weakest component of the variation to represent the internal species diversity and supply a concrete taxonomical representation as a whole, but a large use of the subspecies rank often betrays an excess of interpretative caution, right where recognizing a species seems to be just a plausible and convincing issue. The choice of the species rank, here regarding just a single case, is further supported by the fact that the subspecific taxon involved (*J. odoratissimum* subsp. *goetzeanum*) is largely allopatric and well isolated from its nominal relative, the subsp. *odoratissimum* being indeed endemic to Macaronesia (Madeira and Tenerife) whereas the subsp. *goetzeanum* occurs in tropical Africa.

Chrysojasminum bignoniaceum (Wall. ex G.Don) Banfi, comb. nov.

≡ *Jasminum bignoniaceum* Wall. ex G.Don, *Gen. Hist.* 4: 63. 1837-1838.

subsp. **bignoniaceum**

subsp. **zeylanicum** (P.S.Green) Banfi

≡ *Jasminum bignoniaceum* Wall. ex G.Don subsp. *zeylanicum* P.S.Green, *Kew Bull.* 40: 229. 1985.

Chrysojasminum floridum (Bunge) Banfi, comb. nov.

≡ *Jasminum floridum* Bunge, *Enum. Pl. Chin. Bor.* [A.A. von Bunge]: 42. 1833.

Chrysojasminum fruticans (L.) Banfi, comb. nov.

≡ *Jasminum fruticans* L., *Sp. Pl.* 1: 7. 1753.

Chrysojasminum humile (L.) Banfi, comb. nov. (Fig. 1)

≡ *Jasminum humile* L., *Sp. Pl.* 1: 7. 1753.

var. **humile**f. **humile**

f. **farreri** (Gilmour) Banfi, comb. nov.

≡ *Jasminum farreri* Gilmour, *Bot. Mag.* 157: t. 9351. 1934.

≡ *Jasminum humile* L. f. *farreri* (Gilmour) P.S.Green, *Trees and Shrubs Brit. Isl.* ed. 8, 2: 465. 1976.

f. **wallichianum** (Lindl.) Banfi, comb. nov.

≡ *Jasminum wallichianum* Lindl., *Edward's Bot. Reg.* 17: t. 1409. 1831.

≡ *Jasminum humile* L. f. *wallichianum* (Lindl.) P.S.Green, *Baileya* 1: 148. 1965.

var. **microphyllum** (Chia) Banfi, comb. nov.

≡ *Jasminum humile* L. f. *microphyllum* Chia, *Acta Phytotax. Sin.* 2: 27. 1952.

≡ *Jasminum humile* L. var. *microphyllum* (Chia) P.S.Green, *Notes Roy. Bot. Gard. Edinburgh*, 23 (3): 370. 1961.

Chrysojasminum leptophyllum (Rafiq) Banfi, comb. nov.

≡ *Jasminum leptophyllum* Rafiq, *Novon* 6: 295-297. 1996.

Chrysojasminum odoratissimum (L.) Banfi, comb. nov.

≡ *Jasminum odoratissimum* L., *Sp. Pl.* 1: 7. 1753.

Chrysojasminum goetzeanum (Gilg) Banfi, comb. nov.

≡ *Jasminum goetzeanum* Gilg, *Bot. Jahrb. Syst.* 28 (4): 451. 1900.

≡ *Jasminum odoratissimum* L. subsp. *goetzeanum* (Gilg) P.S.Green, *Notes Roy. Bot. Gard. Edinburgh*, 23(3): 375. 1961.

Chrysojasminum parkeri (Dunn) Banfi, comb. nov.

≡ *Jasminum parkeri* Dunn, *Bull. Misc. Inform. Kew*, 1920: 69. 1920.

Chrysojasminum stans (Pax) Banfi, comb. nov.

≡ *Jasminum stans* Pax in Engler, *Bot. Jahrb. Syst.* 39: 641. 1907.

Chrysojasminum subhumile (W.W.Sm.) Banfi & Galasso, comb. nov.

≡ *Jasminum subhumile* W.W.Sm., *Notes Roy. Bot. Gard. Edinburgh* 8: 127. 1913.

var. **subhumile**

var. **glabricyosum** (W.W.Sm.) Banfi & Galasso, comb. nov.

≡ *Jasminum heterophyllum* Roxb. var. *glabricyosum* W.W.Sm., *Notes Roy. Bot. Gard. Edinburgh* 12 (59): 209. 1920, nec *J. taiwanianum* Masam., *J. Soc. Trop. Agric.* 2: 152. 1930.



Fig. 1 - *Chrysojasminum humile*, the type species of the genus (Photo E. Banfi).

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