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TAXONOMIC AND ECO-GEOGRAPHICAL NOTES
ON *CELTIS TOURNEFORTII* LAM. (*Ulmaceae*, *Celtidoideae*)
IN SICILY*

SUMMARY

After the recent finding of a population of *Celtis tournefortii* Lam. s.l. on Rocca Busambra (Western Sicily), *locus typicus* of *C. asperrima* Lojac., the taxonomy of the group in Sicily has been revised, on the ground of field investigations, examination of herbarium specimens and critical reading of classic and recent bibliography. The names of *C. australis* L. var. *lutescens* Guss. and *C. tournefortii* Lam. var. *aetnensis* Tornab. were typified. The populations occurring on the Etna, formerly reported as a distinct *taxon* (*C. aetnensis* [Tornab.] Strobl), together with the population of Rocca Busambra and the other few Sicilian populations, resulted to be conspecific on the ground of morphology; moreover, the morphological characters fall into the range of variability of *C. tournefortii* Lam., as the analysis of herbarium specimens and bibliographical data has revealed. Thus, the genus *Celtis* L. in Sicily is represented by two species (*C. australis* L., *C. tournefortii* Lam.); another *taxon*, *C. betulina* Lojac., remains obscure. Ecological notes on the Sicilian population of *C. tournefortii* and observations on their relict nature in the island are given.

RIASSUNTO

Note tassonomiche ed ecogeografiche su Celtis tournefortii Lam. (Ulmaceae, Celtidoideae) in Sicilia. Dopo il recente rinvenimento di un popolamento di *Celtis tournefortii* Lam. s.l. su Rocca Busambra (Sicilia Occidentale), *locus typicus* di *C. asperrima* Lojac., è stata rivista criticamente la tassonomia del gruppo in Sicilia, sulla base di indagini di campo, di erbario e della letteratura classica e recente. I nomi di *C. australis* L. var. *lutescens* Guss. e *C. tournefortii* Lam. var. *aetnensis* Tornab.

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sono stati tipificati. Le popolazioni dell'Etna, precedentemente considerate una specie distinta (*C. aetnensis* [Tornab.] Strobl), quella di Rocca Busambra, e le poche altre presenti sull'isola, sono risultate conspecifiche, almeno sul piano morfologico; inoltre, i caratteri morfologici rientrano nel *range* di variabilità di *C. tournefortii* Lam., come risulta dall'analisi dei campioni d'erbario e dei dati della letteratura. Quindi il genere *Celtis* è presente in Sicilia con due specie (*C. australis* L., *C. tournefortii* Lam.); un altro *taxon*, *C. betulina* Lojac., rimane oscuro. Vengono fornite notizie sulla ecologia di *C. tournefortii* in Sicilia e considerazioni sul carattere relittuale della sua presenza sull'isola.

1. INTRODUCTION

After the recent finding of a population of *Celtis tournefortii* Lam. s.l. on Rocca Busambra (Western Sicily), bibliographical investigations and examination of specimens in herbaria and in the wild were carried out in order to place the population in the right *taxon*. Rocca Busambra, in fact, is the *locus typicus* of *Celtis asperrima* Lojac., species described at the beginning of the century (LOJACONO-POJERO, 1904-1907) and found no more since then (RAIMONDO *et al.*, 1994).

From a taxonomic point of view, the group formed by *C. tournefortii* Lam., *C. caucasica* Willd., *C. glabrata* Steven ex Planchon and *C. australis* L. is highly difficult (cf. ZIELINSKI, 1979), owing to high infraspecific variability (hardly understandable on herbarium specimens), muddled nomenclature, and close relationships among species.

Four taxa belonging to the genus *Celtis* L. are reported for Sicily: *C. australis* L., *C. aetnensis* (Tornab.) Strobl, *C. asperrima* Lojac. and *C. betulina* Lojac. The first is well known and widespread in the island, sometimes cultivated; *C. aetnensis*, first described as a variety of *C. tournefortii* Lam., is considered a distinct endemic species by some authors (STROBL, 1881; PIGNATTI, 1982) and a synonym of *C. tournefortii* Lam. by others (PARLATORE, 1867; LOJACONO-POJERO, 1904-1907; POLI *et al.*, 1974; TUTIN, 1993); *C. asperrima* Lojac. was considered conspecific with *C. tournefortii* Lam. occurring on the Etna (Eastern Sicily) on the ground of herbarium specimens (POLI *et al.*, 1974) and mentioned in MEIKLE (1985) as a *taxon* referring to the *C. tournefortii* aggr., but otherwise forgotten. Finally, *C. betulina*, described by LOJACONO-POJERO (1904-1907) on the ground of a specimen collected by Tineo in 1829 on the Etna, was found no more since then, though POLI *et al.* (1974, p. 35) found it different from the other *taxa* occurring in Sicily.

2. TAXONOMY

In order to disentangle the taxonomy of the *Celtis tournefortii* group in Sicily, I tried to value the taxonomic import of the controversial *taxa* by means

of comparative analysis of morphological characters; thus, protologues and specimens of every *taxon* were compared. When it was possible, type specimens were designated and checked, and a considerable amount of individuals (dry ones, in the Herbaria of Florence [FI], Bologna [BOLO], Palermo [PAL], and Catania [CAT], or living ones, in several Sicilian populations) was examined to estimate the variability. Moreover, classic and recent bibliography was consulted.

A complete revision of *C. tournefortii* aggr., including the examination of all «typi» and large amounts of specimens from many populations, together with the observation of living individuals and the possible use of biosystematic techniques, is far beyond the aims of this paper. Nevertheless, I think that it contributes to a better knowledge of this species complex, and of the Sicilian flora, too. The results of the investigations were as follows.

2.1. *Taxa belonging to C. tournefortii* aggr. described for Sicily

- *Celtis australis* L. var. *lutescens* Guss., Fl. Sicul. Syn. 2 (2): 645. 1844

TYPUS (here designated): CUPANI (1713), vol. 2, tab. 256, sub «Lotus arbor Armeniaci Mali folis fructu e luteo rubro Ætnensis» (table-numbers according to the copy in the Regional Library of Palermo, see below) (fig. 1).

Gussone described this *taxon* on the ground of the description and iconography of CUPANI (1713); in fact, he did not see any specimen (living or dry) belonging to this plant («Bronte ex Cup., sed non vidi».¹ The Cupani's «Panphyton Siculum» is a very rare book, published after the death of the author, collecting tables representing plants and animals from Sicily. Only 3 or 4 complete copies are known (PRIOLO, 1996), the sequence of the tables being not the same in the different copies. I have seen the complete copy kept in the Regional Library of Palermo («Biblioteca Centrale della Regione Siciliana», Palermo), that is the copy of the «Bibl. Soc. Jes. Pan.» examined by GUSSONE (1844-45, p. 899). He reported the table as «n. 156», probably for a misprint (this wrong reference is kept in PARLATORE, 1867, and TORNABENE, 1891).

ICONOGRAPHY: CUPANI (1713) (fig. 1), see above.

NOTES: The table of Cupani (fig. 1) represents a fruiting branch of *Celtis tournefortii* s.l. In the last volume of his work on the flora of Sicily, Gussone understood that plant was different from *C. australis*; lacking the examination of dry or live specimens, he failed to identify it, considering it a variety of *C. australis*.

¹ In the collection «Gussone-Sicilia» (NAP) two sheets with specimens of «*C. tournefortii*» from Aetna are preserved. No collection data are indicated. The enclosed label, with a general description of «*C. aetnensis* Torn.», seems to be Tornabene's handwriting: probably he sent the specimens to Gussone after the publication of the last volume of the «Synopsis» (GUSSONE, 1844-45) and before the publication of his report (TORNABENE, 1855).



Fig. 1 — Iconography of «Lotus arbor Armeniaci Mali folis fructu e luteo rubro Ætensis» in CUPANI (1713), pag. 509, tab. 256; the same is the *typus* of the name *Celtis australis* var. *lutescens* Guss.; reproduction from the copy preserved in the Biblioteca Centrale della Regione Siciliana, Palermo.

- *Celtis tournefortii* Lam. var. *aetnensis* Tornab., in Atti Accad. Gioenia Sci. Nat., Catania, ser. 2, 11: 195. 1855

≡ *Celtis aetnensis* (Tornab.) Strobl

TYPUS (lectotype, here designated): «*Celtis tournefortii* / var. *Aetnensis* / fr. albo / Aetnae 1850 / Boschi di Biancavilla / ex-Feudo Pandolfina, / e Cavaleri de' Be- / nedettine», leg. F. Tornabene (specimen in CAT).

In the same specimen the writing «Ex Flora Sicula Exiccata / Tornabene / Hortus Catinensis» and another (later) label: «*Celtis Tournefortii* / Lk. / var. *Aetnensis* Torn. / fl. Aprile - Maggio / Etna / N. It. () / N. Sic. Minicuccu fim- / minedda. / frutto giallo».

ICONOGRAPHY: TORNABENE (1855) [reproduced in PIGNATTI (1982)].

NOTES: TORNABENE (1855) noted that the plants growing on Etna differed from the descriptions of *C. tournefortii* Lam. for the following characters: tree to 20 (*versus* 30 and more) feet high, «more unequal» leaves, «nearly always ovate» and not elliptical fruits, with sweet taste.

STROBL (1881) compared a plants from Etna, cultivated in the Botanical Garden of Catania, with another one, cultivated in the Botanical Garden of Vienna and known as *C. tournefortii* Lam. He inferred that the plants from Etna were specifically distinct from *C. tournefortii* on the ground of the following other characters: leaf 30-38 (*versus* 25-30) mm wide, upper leaf lamina with spots invisible (*versus* visible) to the naked eye, with all (*versus* only main) nervations well visible, larger fruiting peduncles.

The features reported by STROBL (1881) to segregate his *C. aetnensis* appear without diagnostic value, on the ground of the examined material. Leaf width and asymmetry, spots, nervations, and other characters, vary at infra-populational level, so that it is not possible to discriminate any population from the others. Moreover, characters as plant size, fruit form and taste are difficult to verify on dry specimens, even if they seem equally variable.

- *Celtis asperrima* Lojac., Fl. Sicul. 2 (2): 355: 1904-1907

TYPUS: LOJACONO-POJERO (1904-1907) mentioned two specimens of his new species, one collected by him (June 1889) and the other by Ross (July 1889) on Rocca Busambra («*Rupi elevatissime calcaree sul M. Busambra, alt. 1300 m*») and kept in «Herb. Pan.» (PAL); POLI *et al.* (1974) saw these specimens (labelled as «*C. scaberrima* Lojac.»). I did not find them in the available collections in PAL. Hoping they can be found in the near future, I preferred to suspend the typification.

ICONOGRAPHY: None.

NOTES: The plants that I collected on Rocca Busambra appear undistinguishable from the ones from Etna. Scabrid leaves, considered typical of *C. asperrima*, occur with smooth ones in the same plant in both localities, as already reported in POLI *et al.* (1974, pp. 34-35). This name, proposed by LOJACONO-POJERO (1904-1907) in a dubitative way, has to be considered a synonym of *C. tournefortii* Lam.

MEIKLE (1985), in the attempt to clarify the taxonomy of the *C. tournefortii*

aggr., distinguished two «segregates»: one, including the type of the species as well as *C. aetnensis*, with glabrous leaves and petiole, and leaf margins with few, flattened serrations; the other one, including *C. aspera* (Audib. ex Spach) Steven and *C. asperrima* Lojac., with pubescent leaves and petiole, and leaf margins with numerous acute serrations. Such a distinction of two segregates (along the lines of SPACH, 1841, pp. 38-39) seems to be not possible. In fact, it is based on characters (scabrid *versus* smooth leaves, serration of the leaf margins) that vary at the populational (or individual) level, and consequently have not taxonomic significance.

- *Celtis betulina* Lojac., Fl. Sicul. 2 (2): 355. 1904-1907

TYPUS: LOJACONO-POJERO (1904-1907) described this species on the ground of a specimen («M. Etna alla Faida, Tin.! 26 Julio 1829! sine fl. ac fructu») kept in «Herb. Pan.» (PAL); POLI *et al.* (1974) saw that specimen, but I did not find it. As I said for *C. asperrima* Lojac., I preferred to suspend the typification.

ICONOGRAPHY: LOJACONO-POJERO (1904-1907), tab. V.

NOTES: POLI *et al.* (1974), on the ground of the *exsiccatum*, considered it a different species; unfortunately, it has not been recovered after 1829, and the only specimen is not available. The leaf shape, as it results from the iconography, seems peculiar, but a drawing is not sufficient to define a species.

2.2 Taxonomical conclusions

At the present status of the biosystematic knowledge, on the ground of morphology and ecology (see below), all the Sicilian populations have to be placed under the binomial *Celtis tournefortii* Lam. The only critical binomial remains *C. betulina* Lojac.

- *Celtis tournefortii* Lam., Encycl. 4: 138. 1797

= *Celtis australis* L. var. *lutescens* Guss., Fl. Sicul. Syn. 2 (2): 645. 1844

= *Celtis tournefortii* Lam. var. *aetnensis* Tornab., in Atti Accad. Gioenia Sci. Nat., Catania, ser. 2, 11: 195. 1855

= *Celtis aetnensis* (Tornab.) Strobl, in Oest. Bot. Zeit. 31 (12): 397. 1881

= *Celtis asperrima* Lojac., Fl. Sicul. 2 (2): 355. 1904-1907

DIAGNOSIS: «*Celtis foliis ovatis, crenato-serratis; junioribus subcordatis; fructu luteo*» (Lam., cit.).

TYPUS: «Armenia, Carmili», sub «*Celtis orientalis, minor, foliis minoribus et crassioribus, fructu flavo*», Tournefort (holotypus, P-TOURN. 6060 (BROWICZ & ZIELINSKI, 1982). Cultivated from seeds collected by Tournefort (MEIKLE, 1985).

ICONOGRAPHY: CUPANI (1713), vol. 2, tab. 256 (see above); JAUBERT & SPACH (1850-53), vol. 4, tab. 400; TORNABENE (1855).

GENERAL DISTRIBUTION: Sicily, former-Yugoslavia, Greece, Crete, Rhodes, Cyprus, Anatolia, N Iraq, NW Iran, S Transcaucasia (Nakhichevan).

REGIONAL DISTRIBUTION (SICILY) (Fig. 2): SW Etna (cf. POLI *et al.*, 1974), southern Nebrodi Mts. in a narrow area (cf. GIARDINA, 1988), SW Sicani Mts. in one locality near Caltabellotta (cf. MARCENÒ *et al.*, 1995), Rocca Busambra.

SPECIMINA VISA: Sicily: Aetna, Boschi di Biancavilla, ex-Feudo Pandolfina, e Cavaleri de' Benedettine, 1850; F. Tornabene (sub *C. tournefortii* var. *aetnensis* fr. albo) (typus) (CAT) - Aetna, Bosco di Paternò, F. Tornabene (CAT) - Etna, Monte San Leo, 11.VI.1990, S. Brullo (CAT) - Etna, Bosco di Belpasso, 19.VII.1983, S. Brullo (CAT) - Adernò [= Adrano] (ad occid. montis Aetnae), *Nicotra* (sub *C. tournefortii* var. *aetnensis* Torn.) (BOLO) - Adrano (Etna), S.S. n. 284 al Km 26 + 300 (tra Adrano e Bronte), quota circa 630 m s.l.m., su rocce vulcaniche, suolo pH = 7.5, 29.VIII.1996, A. Troia & S. Martorana (BOLO) - Rocca Rapiti, Cesarò (Messina), spuntoni rocciosi del flysch di Monte Soro fortemente fessurati, suolo sabbioso siliceo, 1230 m s.l.m., 12.IX.1988, G. Giardina (sub *C. aetnensis* [Torn.] Strobl) (FI) - Rocca Nadore, Cesarò (Messina), id., id., 1035 m s.l.m., 12.XI.1988, G. Giardina (sub *C. aetnensis* [Torn.] Strobl) (FI) - C.da Mercadante, Cesarò (Messina), S.S. 120 al Km 161, 875 m s.l.m., 12.IX.1988, G. Giardina (sub *C. aetnensis* [Torn.] Strobl) (FI) - *Ibidem*, 29.VIII.1996, A. Troia & S. Martorana (BOLO) - Rocca Busambra, versante meridionale, ad Ovest della cima principale, nei pressi della cresta, 1100-1200 m s.l.m., su rocce carbonatiche, suolo pH = 7.6, 2.VIII.1995, A. Troia & A. Sgroi (BOLO). Greece: Acropolis Pellenes pr. Trikala Corinthiae, *Heldreich* (BOLO) - In Acropoli Pellenes prope Zougra, m. Kyllenes Corinthiae, alt. 2500', fruct. 15.VIII.1851, florib. 4.V.1854, *Heldreich* (BOLO) - In regione inferiore montes Kyllenes Achaiae prope Pellenem, Th. G. *Orphanides* (PAL). Kurdistan: Prope p. Gara Kurdist., 11.VIII.1841, *Kotschy*, Pl. alepp. Kurd. moss. 393 (PAL).

3. ECOGEOGRAPHICAL NOTES ON *C. TOURNEFORTII* IN SICILY

The population of Rocca Busambra, recovered after one century, consists of many plants. The ones I found are gathered in a south-facing dolina, on calcareous rock, between 1100 and 1200 m a.s.l. The exact number of individuals is not determinable, since the aggregations may hide single genetic individuals, but it is of the order of tens at least. They are shrubs, sometimes little trees (2-2.5 m in height), disturbed by grazing and fires. The most numerous group occurs in an open scrub, where it is the dominant species. From a phytosociological point of view, the presence of species such as *Quercus ilex* L., *Euphorbia characias* L., *Pistacia terebinthus* L., *Lonicera etrusca* Savi, together with *Ballota rupestris* (Biv.) Vis. and *Smyrniium rotundifolium* Miller, leads to place the coenosis in the order *Quercetalia ilicis* Br.-Bl. 1936 em. Rivas Martinez 1975 (*Quercetea ilicis* Br.-Bl. 1947), unlike the not-far *C. tournefortii* vegetation on calcareous rock of Caltabellotta, placed by MARCENÒ *et al.* (1995) in the more termophilous *Oleo-Euphorbietum dendroidis* Trinajstić 1974 (*Oleo-Ceratonion* Br.-Bl. 1936, *Pistacio-Rhamnietalia alaterni* Rivas Martinez 1975, *Querceta ilicis* Br.-Bl. 1947). It is noteworthy that the above listed species occur in the *C. tournefortii* communities on Etna, classified as *Celtido aetnensis-Quercetum virgilianae* Brullo & Marcenò 1984 (*Quercion ilicis* Br.-Bl. 1936, *Quercetalia ilicis* Br.-Bl. 1936) (BRULLO & MARCENÒ, 1984).

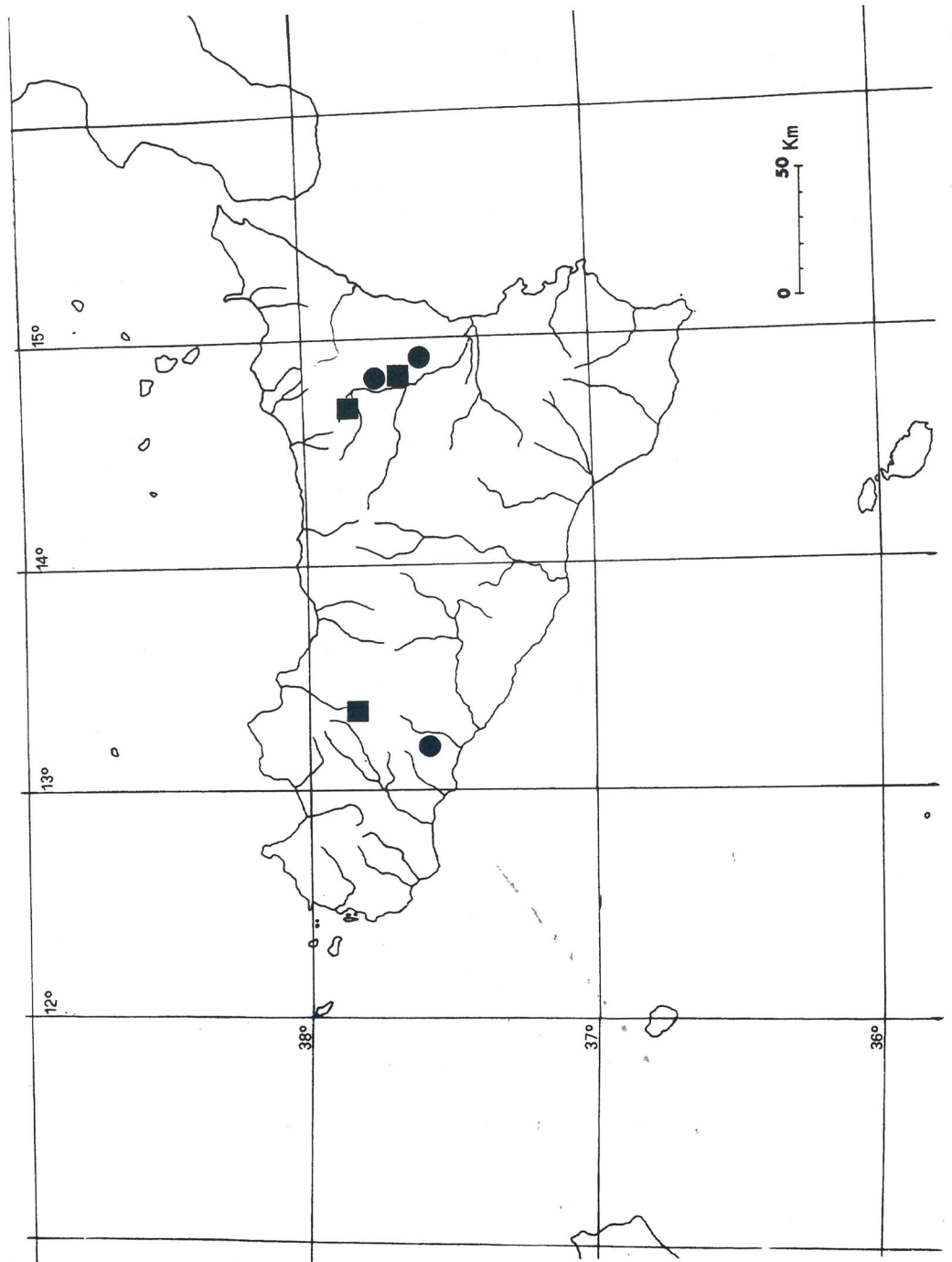


Fig. 2 — Distribution of *Celtis tournefortii* Lam. in Sicily: data from herbarium specimens (squares) and bibliography (circles).

In Sicily the species occurs in uniform ecological conditions (open vegetation on rocky soils, in south-facing hillsides and mountains, from 400 to 1200 m a.s.l.), but looks euryoecious as far as phytocoenoses and soil types is concerned. This fact, together with other ones (disjunction of Sicilian populations from Eastern ones, fragmentary regional distribution, extreme localization of western populations, scanty fruit production [verified in R. Busambra population]), confirm the evidence that *C. tournefortii* in Sicily, at the western limit of its distribution, is a relict element. Similar ecological conditions are reported to occur in the other insular populations in the Eastern Mediterranean Sea (cf. TURLAND *et al.*, 1993; MEIKLE, 1985). It is a confirmation of the role of Mediterranean islands as conservative repositories for plant species during the climatic «crises» in the recent geological past (cf. GREUTER, 1979). Such «relict» species offer the opportunity to study the influence of isolation and interruption of gene flow on the genetic structure of the populations, whether with morphological differentiation (e.g. *Zelkova sicula* Di Pasquale, Garfi & Quézel, *Serapias orientalis* (Greuter) Baumann & Kunkele subsp. *siciliensis* Bartolo & Pulvirenti) or not (e.g. *Celtis tournefortii* Lam., *Platanus orientalis* L., *Prunus webbii* [Spach] Vierh.).

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Fig. 2 — Distribution of *Celtis tournefortii* Lam. in Sicily: data from herbarium specimens (squares) and bibliography (circles).

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