

## Studies on the genus *Atriplex* L. (Amaranthaceae) in Italy. IV. *Atriplex bocconei* Guss.

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### Abstract

Studies on the genus *Atriplex* L. (Amaranthaceae) in Italy. IV. *Atriplex bocconei* Guss. – *Atriplex bocconei* Guss. is here typified on one herbarium specimen kept in NAP. The identity of the species is also clarified on the basis of literature analysis and examination of type material and other specimens that allowed to include it in the synonym of *A. glauca* L. An extensive synonymy of *A. glauca* was also reported, including two new combinations. Notes on the ecology and present distribution of the species are also provided.

**Keywords:** *Atriplex glauca* L., *Atriplex halimus* L., new combination, new synonymy, typification

### Introduction

*Atriplex* L. (Amaranthaceae) is a genus of about 260 species of annual herbs and shrubs, mostly distributed in arid and semi-arid regions of Eurasia, America and Australia (Sukhorukov & Danin 2009). The genus is taxonomically critical, mainly because of its high morphological variability (Al-Turki *et al.* 2000). Consequently, several units (species, subspecies, varieties and forms) have been described, especially before 1950 (IPNI 2008). A primary consequence is nomenclatural disorder caused by the misapplication of names.

In Italy, some species described by Gussone (1844) need clarification. In this paper the identity of *Atriplex bocconei* Guss. is discussed [*«bocconei»* is the correct specific epithet for *«bocconi»*, this latter reported by Gussone (1844) and all subsequent authors]. The work is part of a more comprehensive study on the taxonomy and distribution of the genus *Atriplex* in Italy (Iamónico 2010, 2011).

### Materials & Methods

The work is based on an extensive analysis of literature, on personal investigations, and on examination of the specimens kept in the following herbaria (abbreviated according to Holmgren & Holmgren 1998): Università di Catania, Catania (CAT); Museo di Storia Naturale dell'Università, Firenze (Florence) (FI); Linnean Society of London (LINN); Università Degli Studi di Napoli Federico II, Napoli (Naples) (NAP); Herbarium Mediterraneum Panormitanum, Palermo (PAL); Università degli Studi di Roma La Sapienza, Roma (Rome) (RO). Pictures of Linnean specimens are available on the web (Linnean Society Collections Online 2009).

### Literature analysis

*Atriplex bocconei* was first described from Sicily (southern Italy) in 1884 «*In subargillosis collibus maritimis...Sicacca al caricatojo*» (Gussone 1844). Subsequently, De Candolle (1849) included *A. bocconei* in the list «*Species non satis notæ*» and provided a short description (including a part of the protologue by Gussone 1844) and the locality «*...Sicilia*». Bertoloni (1854) indicated *A. bocconei* for «*Sicilia*». Arcangeli (1882, 1894) reported the species sub *A. laciniata* L.  $\beta$ -*bocconi* (Guss.) for «*...Sicilia e nel Veneto*». Cesati *et al.* (1884) reported *A. tatarica* L.  $\beta$ -*bocconi* Guss. in «*Colli presso il mare in Sicilia*» («*Hills by the sea in Sicily*»).

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Caruel (1893) listed only the genera of Chenopodiaceae referring to Bertoloni (1854). Fiori & Paoletti (1986-1998) indicated *A. bocconei* as form of *A. laciniatum* L.  $\gamma$ -*tataricum* (L. hb.) [“*A. laciniatum* L.  $\gamma$ -*tataricum* (L. hb.) d-*bocconei* (Guss.)”] in «*Sicilia a Sciacca*». Lojacono-Pojero (1904) reported *A. bocconei* in «*Sciacca alla Marina*» and in Lampedusa island (sub *Obione glauca* Moq.). Fiori (1923) reported a note in which *A. bocconei* was synonymized with *A. glauca* L. and observed in «*Sic. a Sciacca e a Lampedusa, forse avventizio*» [«*Sic. at Sciacca and at Lampedusa, maybe casual*»]. Zangheri (1976) did not cite *A. bocconei*, although he reported a note after *A. halimus*: «...*A. glauca* L. per la Sicilia (*Sciacca*)...*é decumbente alla base e giunge all’altezza d’una cinquantina di cm, con fg. piccole ( $\pm 10$  per 5 mm, di r. più) da oblungo-lanceolate a orbicolari; infioresc. a lung. spiga.*» [«...*A. glauca* L. for Sicily (*Sciacca*)...it is decumbent and it reaches the height of about 50 cm, with small leaves (about 10 x 5 mm, rarely longer), oblong-lanceolate to orbicular; inflorescence in long spike»]. Pignatti (1982) did not report this species but he recorded *A. glauca* «...in Sic. a Sciacca...», probably referring to *A. bocconei* [regarding the genus *Atriplex* S. Pignatti (*in verbis*) refers to Fiori (1923)]. Greuter *et al.* (1984) and the recent contributions to the Italian Vascular Flora (Conti *et al.* 2005, Conti *et al.* 2007) did not cite *A. bocconei*. Finally, Giardina *et al.* (2007) considered this species as synonym both of *A. halimus* L. (doubtfully «...?incl. *A. bocconi* Guss. ...») that was recorded «*Everywhere in the region*» and of *A. glauca* («...incl. *A. bocconi* Guss fide sententia Cl. A. Fiori...») observed at «...*Sciacca al Caricatojo*»; the latter species is considered «?EX» [«?Extinct»] because the localities quoted «...have not been confirmed...». The same authors (Giardina *et al.* 2007) also highlighted that «*A further study of the specimens is recommended*».

## Typification

Checking of the herbaria discovered two herbarium specimens kept in NAP in the Gussone collections (see Specimina Visa). The first sheet includes one plant and three labels (Fig. 1). A first label reports «*Maggio. Sciacca al caricatojo*», the second one also reports the synonymy «*Halimus procumbens. Bocc. Herb. Apud Juss. p. 16*», while on the third label is written «*4. Atriplex bocconi Guss. Halimus procumbens. Bocc. Herb. Apud Juss. p. 16 Majo, Septembri; basi ħ In argillosis maritimis Sciacca al caricatojo*». All information perfectly match with the protologue by Gussone (1844), both the code of the species and the habitat, the locus classicus and synonymy. The second sheet includes only one label that reports «*Maggio Sciacca al Caricatojo*»; no determination was made.

## Discussion

Based on the analysis of the original description (Gussone 1844) and the specimen collected by G. Gussone, *A. bocconei* can be included in the Sect. *Coriacea* Aellen characterized by shrubby plants with inflorescences leafless, mainly terminal and fruiting bracts entire or dentate, not tuberculate (Zohary 1966). In particular, the species seems to be related to *A. glauca* L. and to *A. halimus* L.

*A. glauca* was described by Linnaeus (1755) in «*Gallia australi e Hispaniae maritimis*»; according to the protologue, this species is characterized by an ascending and suffruticose stem, leaves sessile ovate with margins entire (superior leaves) or subdentate (inferior leaves). The lectotypification of *A. glauca* was made by Castroviejo (1987) on an iconography (*Atriplex maritima Hispan. frutescens and procumbens* Tourn.) in Dillenius (1732). The specimen in LINN 1221.6 [marked by C. Linnaeus with «*Atriplex tatania Planta fruticosa [illegible] ramosissima* Ard. 20» and identified by J. E. Smith as «*glauca H B*» (according to Savage 1945)] cannot be the type because it was sent by Arduino in the year 1761 [later date of the protologue by Linnaeus (1755)].



**Fig. 1:** Lectotypus of the name *Atriplex bocconei* Guss. (NAP).

*A. halimus* was described by Linnaeus (1753) «*Hispaniae, Lusitaniae, Virginiae sepibus maritimis*» as «*ATRIPLEX caule fruticoso, foliis deltoideis integris*» and lectotypified two centuries later by Brenan (1954) on a Linnean specimen (LINN 1221.1).

Several authors (e.g. Aellen 1964, Pignatti 1982, Castroviejo 1990, Akeroyd 1993) considered these species morphologically related, highlighting two main diagnostic characters: the shape of the fruiting bracts (orbicular in *A. halimus* vs. rhombic or deltoid in *A. glauca*) and the height of plants (up to 2.5 m in *A. halimus*, up to 50 cm in *A. glauca*). The examination of the types (LINN 1221.1 and iconography by Dillenius) and several other specimens (see Specimina Visa) permitted confirmation that these are the only characters marking the two species. The leaves are variable both in the shape (ovate to ovate-lanceolate), margins (entire or dentate) and apex of the blade (acute or obtuse), and they cannot be used to separate morphologically *A. halimus* from *A. glauca*.

The specimens of *A. bocconei* are perennial plants about 50 cm high, with the fruiting bracts deltoid. The leaves are ovate, with an acute apex and margins entire (superior leaves) or dentate (inferior leaves).

## Conclusion

Extensive analysis of the literature, careful herbarium investigations and comparison of the protologues allowed the designation of a lectotype for the name *A. bocconei*, and clarification of the identity of this species: it can be considered a synonym of *A. glauca*. An extensive synonymy was also reported, including two new combinations.

*Atriplex glauca* L., Cent. Pl. 1: 33 (1755) – Lectotypus: “*Atriplex maritima Hispan. frutescens and procumbens Tourn.*” in Dillenius, Hort. Eltham., 1: 46, t. 40, f. 46, 1732.

= *Chenopodium vestitum* Thunb., Prodr. Pl. Cap. 1: 48 (1794).

≡ *Atriplex vestita* (Thumb.) Aellen, Bot. Jahrb. Syst. 70: 391 (1940).

= *Atriplex parvifolia* Lowe, Trans. Cambridge Philos. Soc. 4: 16 (1831)

= *Atriplex stylosa* Viv., Pl. Aegypt. Dec.: 23 (1831).

≡ *Obione stylosa* (Viv.) Moq., Chenopod. Enum.: 77 (1840).

≡ *Atriplex stylosa* Viv. var. *alexandrina* (Boiss.) Iamonico **comb. nov.**

Bas.: *Atriplex alexandrina* Boiss., Fl. Or., 4: 914 (1879).

≡ *Atriplex parvifolium* Lowe var. *alexandrinum* (Boiss.) Eig, Palestine J. Bot. Jerusalem Ser. 3: 123 (1945).

≡ *Atriplex stylosa* Viv. var. *alexandrina* (Boiss.) Zohary, Flora Palaestina, 1: 146 (1966), comb. inval. [the basionym of the new combination proposed by Zohary (1966) is not clearly indicated - art. 33.4 ICNB].

= *Atriplex stylosa* Viv. var. *conferta* (Eig) Iamonico **comb. nov.**

Bas.: *Atriplex parvifolium* Lowe var. *confertum* Eig, Palestine J. Bot. Jerusalem Ser. 3: 123 (1945).

≡ *Atriplex stylosa* Viv. var. *conferta* (Eig) Zohary, Flora Palaestina., 1: 146 (1966), comb. inval. [the basionym of the new combination proposed by Zohary (1966) is not clearly indicated - art. 33.4 ICNB].

= *Atriplex rotundifolia* Dombey ex Moq., Chenopod. Enum.: 70 (1840)

= *Atriplex bocconei* Guss., Fl. Sicul. 2(2): 588 (1844) - **Lectotypus** (here designated): Italia. Sicilia: Sciacca al Caricatojo, in argillosis collibus maritimis, Majo, Septembri (ante 1844), *G. Gussone s.n.* (NAP!) (Fig. 1).

≡ *Obione glauca* (L.) Moq., Prodr. [DC], 10(3): 108 (1849).

= *Atriplex palaestina* Boiss., Diagn. Pl. Orient., ser. 1, 2(12): 96 (1853).

≡ *Atriplex parvifolium* Lowe var. *palaestinum* (Boiss.) Eig, Palestine J. Bot. Jerusalem Ser. 3: 123 (1945).

= *Atriplex crystallina* Boiss., Fl. Or., 4: 915 (1879).  
= *Atriplex rotundifolia* Boiss., Fl. Or., 4: 915 (1879).

*A. glauca* can be found on arid/saline places characterized by dry soil, not or scarcely structured and with medium or fine texture.

Regarding the distribution, *A. glauca* is recorded in North Africa [Algeria, Morocco, Tunisia, Libya and Egypt (Baratte 1906, Quezel & Santa 1962, Jafri & Rateeb 1978, Al-Turki *et al.* 2000)], Israel (Zohary 1966), Italy (here as an old record - Conti *et al.* 2005, Conti *et al.* 2007, Giardina *et al.* 2007), Saudi Arabia (Al-Turki *et al.* 2000), Spain and Portugal (Castroviejo 1987, 1990).

## Acknowledgements

Thanks are due to Directors and Curators of all quoted herbaria for their support during my visits, loan of specimens/photographs or request for information. I am also grateful to Dr. R. Vallariello (University of Napoli, Italy) for the permission to reproduce the image of the specimen by Gussone.

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## Appendix: Specimina visa selecta

### *Atriplex bocconi* Guss.

**Italia**, Sicily: Sciacca al Caricatojo, in argillosis collibus maritimis, V, IX (ante 1844), *G. Gussone s.n.* (NAP). Sciacca al Caricatolo, V, leg. *G. Gussone s.n.*, det. *D. Iamónico* (NAP). **Tunisia**, Tunisi: Tunisi, V.1868, *L. Caldesi* (FI).

### *Atriplex glauca* L.

*Arduino P.*, *C. Linnaeus, sine loc., sine die* (LINN 1221.6). **Spain**, Murcia: Los Nietos (Mar Menor), en arenales nitrolocados, 12.IV.1984, *J. P. Peris & G. Stübing* (FI); *ibidem* (RO). Alacantí: Santa Pola, matorrales nitrohalófilos, 22.IV.1984, *A. Aguilera & I. Mateu* (FI). Granada: Cullar Baza, salt marsh, 22.VI.1988, leg. *B. Valdés et al.*, det. *M. Watson* (FI). *ibidem*, det. *P. Wilkin* (FI). Almería: Campohermoso, S-facing limestone bank at edge of cultivated area, 17.IV.1994, *S. L. Jury* (FI).

### *Atriplex halimus* L.

**France**, Bouches-du-Rhône: bordi de la Mediterranée aux S. Marces de la Mer (Bouches du Rhone), 09.XI.1882, *R. Neyra* (RO). **Israel**, Jordan valley: banks of Jordan near Kinnereth, 30.XI.1951, *M. Zohary & A. Fahn* (RO). **Italy**, Basilicata: Pomarico, IX.1883, *coll. illeg.* (RO). Calabria: abbonda sui fianchi dei Colli pr. Crotone, lungi dal mare, 26.X.1935, *G. Lusina* (RO). Lazio: zona litoranea presso Civitavecchia verso S. Marinella, 30.X.1980, *B. Anzalone* (RO); Parco Nazionale del Circeo, Caprolace, X.1989, *B. Anzalone* (RO). Liguria: Ager nicaensis, ad marginem agrorum et in ripis torrentis Magnon, 4.X.1904, *A. Goiran & Adr. Fiori* (FI). Marche: Ancona-Falconara, siepi, 18.VII.1947, *A. Bettini* (FI). Puglia: Gravina, 19.VIII.1933, *G. Carasso* (RO). Sardegna: nelle siepi di Cagliari (inselvaticata), VIII (XIX sec.), *sine coll.* (RO). Sicilia: sopra le Cave vulcaniche di Catania, XIX sec., *sine coll.* (RO). Toscana: Isola di Pianosa (Livorno), Cala Giovanna, 20.IX.1999, *R. M. Baldini et L. Vivona* (FI). Umbria: lago Trasimeno (Perugia), 23.VII.1955, *F. Palombini* (FI). **Portugal**, Buarcos: nas muralhas, IX.1888, *A. Moller* (RO). Algarve: Portinão, Praia da Rocha, nos morros proximos da poia, 15.IX.1961, *A. Raimondo* (RO).

### المخلص العربي

دراسات حول جنس أترليكس *Atriplex* (فصيلة أمارانثيسي) في إيطاليا وبالأخص النوع *Atriplex bocconeii*.

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يتناول البحث دراسة جنس أترليكس *Atriplex* (فصيلة أمارانثيسي) في إيطاليا وبالأخص النوع *Atriplex bocconeii*. توجد عينة نمطية وحيدة محفوظة في معشبة ناب (NAP) بإيطاليا. لقد تم فحص العينة وتم توضيح وضع النوع بناءً على فحص المراجع والمصادر النموذجية والعينات الأخرى التي تدرج تحت الاسم المرادف له (*A. glauca* L.). ووجد حالتان إضافيتان عما هو مذكور لترادف النوع محل البحث مع النوع *A. glauca* L. كما تم إضافة مزيد من المعلومات عن البيئة والتوزيع الحالي للنوع.