

TAXONOMICAL, MORPHOLOGICAL, ECOLOGICAL AND CHOROLOGICAL NOTES ON *OXYBASIS CHENOPODIOIDES* AND *O. RUBRA* (CHENOPODIACEAE) IN ITALY

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Abstract

On the basis of floristic surveys, examination of herbarium specimens and review of literature, notes on the taxonomy, morphology, and ecological features are given of *Oxybasis chenopodioides* and morphologically fairly similar *Oxybasis rubra*. Their distributions in Italy according to Provinces are discussed and mapped.

Key words: *Amaranthaceae*, *Chenopodium*, distribution, Italy, new records.

Izvlček

Na podlagi florističnih raziskav, proučevanj herbarijskih primerkov in pregleda literature smo podali opombe k taksonomiji, morfologiji in ekologiji vrste *Oxybasis chenopodioides* in morfološko zelo podobne *Oxybasis rubra*. Prikazali in obravnavali smo njihovo razširjenost v provincah Italije.

Ključne besede: *Amaranthaceae*, *Chenopodium*, razširjenost, Italija, novi podatki.

1. INTRODUCTION

The genus *Chenopodium* L. s. lat. has a worldwide distribution, and it includes about 150–200 species (Western Australian Herbarium 1998–2009, Mosyakin & Clemants 2002, 2008, Zhu et al. 2003, Verloove & Lambinon 2006, APG III 2009, Fuentes-Bazan et al. 2012a). It is considered taxonomically critical because of the morphological variability and lack of good characters and, to some extent, hybridization. Recent molecular studies clearly show that the genus in its widest sense is polyphyletic resulting in six independent lineages (Kadereit et al. 2003, 2005, Fuentes-Bazan et al. 2012a, 2012b). Consequently, a new taxonomic classification of the *Chenopodioideae* Burnett was proposed (Fuentes-Bazan et al. 2012a), including four tribes (*Atriplicae* Duby, *Anserineae* Dumort., *Dysphaniae* Pax, *Axyridae* G. Kadereit & Sukhor.) and ten genera (*Axyris* L., *Blitum* L., *Ceratocarpaceae* L., *Chenopodiaceae* S. Fuentes, Uotila & Borsch, *Chenopodium* L., *Dys-*

phania R. Br., *Krascheninnikovia* Gueldenst., *Lipandra* Moq., *Oxybasis* Kar. & Kir., *Teloxys* Moq.).

The genus *Oxybasis* was resurrected to accommodate the *Chenopodium* species with branched stem, leaves not in basal rosette, inflorescence in not fleshy glomerules and usually dimorphic flowers with 3–5 tepals and horizontal and vertical seeds (Fuentes-Bazan et al. 2012a, Sukhorukov 2013). Four European and Italian taxa (Iamónico 2012b) are included in the genus: *O. glauca* (L.) S. Fuentes, Uotila & Borsch (≡ *Chenopodium glaucum* L.), *O. urbica* (L.) S. Fuentes, Uotila & Borsch (≡ *Chenopodium urbicum* L.), *O. chenopodioides* (L.) S. Fuentes, Uotila & Borsch (= *Chenopodium botryodes* Sm.), *O. rubra* (L.) S. Fuentes, Uotila & Borsch (≡ *Chenopodium rubrum* L.).

Oxybasis chenopodioides and *O. rubra* represent a critical pair of species having fairly similar gross morphology, even though they do not seem to be close relatives (see e.g. Fuentes-Bazan 2012a). Variability of vegetative morphology and difficulties to see essential floral and fruit charac-

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ters have resulted in misinterpretations of names and misidentifications.

The aim of this work is to provide clarity to the taxonomy, morphology and ecology and revise the chorology of the species in Italy as a part of the treatment of Chenopodiaceae for the new Flora of Italy, Ed. S. Pignatti (see e.g. Iamonico 2009, 2010, 2011a, 2012a, 2013, Iamonico & Kadereit 2012, Iamonico & Sukhorukov 2013).

2. MATERIALS AND METHODS

The present study is based on an extensive analysis of literature (protologues included), personal field investigations (specimens collected by the author are preserved in the *Herbarium Flaminio*, HFLA), examination of herbarium material from AO, FI, RO and TR and checking of images of Linnean specimens, available on the web at Linnean Society Collections Online 2009). The nomenclature follows Conti et al. (2005) and Iamonico (2012b). The descriptions are based on Italian material and personal observations.

3. RESULTS AND DISCUSSION

NOTES ON TAXONOMY AND MORPHOLOGY

Oxybasis chenopodioides was first described as *Blitum chenopodioides* by Linnaeus (1771) “... in *Tartaria; nunc in Suecia*”. Hiitonen (1933) proposed subgeneric rank for *Blitum* L. under *Chenopodium*. Aellen (1933) proposed the new combination *Chenopodium chenopodioides* (L.) Aellen (\equiv *Blitum chenopodioides* L.), and discussed the affinity of the species with the related *C. crassifolium* Hornem. and *C. rubrum*, the first one considered a synonym of *C. chenopodioides*. As regard the relationship with *C. rubrum*, Aellen (1933) examined the photograph of two Linnean specimens (Nos. 14.3 and 14.4, both received by Linnaeus from Arduino and labelled as “*tataricum*”), concluding that the original description was not written on the basis of these specimens because of the disharmony between their characters and the original description. He also supposed that the sheets could represent the taxon called *C. rubrum*. Problems and doubts of the correct application and typification of the name *B. chenopodioides* led some authors (e.g. Brenan 1964) to use the next safe name: *C. botryodes* Sm. The Italian floras (e.g. Fiori 1923, Zangheri 1976, Pignatti

1982, Conti et al. 2005) always accept *C. botryodes* (sometimes *C. chenopodioides* doubtfully indicated in synonymy). On the basis of an extensive discussion, Uotila (2001a) removes the possibility that the name *C. chenopodioides* might be a synonym of *C. rubrum*, and a neotype was designated. Currently, the name *C. chenopodioides* was accepted in several important works (e.g. Akeroyd 1993, Uotila 1990, 2001b, Clemants & Mosyakin 2003, Zhu et al. 2003). On the basis of recent molecular studies, Fuentes-Bazan et al. (2012a) recently resurrected the genus *Oxybasis* and proposed the new combinations *O. chenopodioides* and *O. rubra*.

On the basis of the protologues (Linnaeus 1753, 1771), *O. chenopodioides* and *O. rubra* differ in the tepals features: connate nearly to tip [Linnaeus (1771) reported “*Calix ... concavus, connivens ...*”] and free or connate only at base, respectively. Other characters [shape of the leaves (subtriangular vs. subrhomboidal) and margins (entire or slightly toothed with obtuse teeth vs. toothed with acute teeth)] were often considered as diagnostic, but they partially overlap (Uotila 2001). In the Italian specimens the only constant diagnostic character is the difference in the tepals. As to the leaves, they are usually subtriangular with entire margins (sometimes coarsely toothed with obtuse teeth) and with truncate base in *O. chenopodioides*, while subrhomboidal with toothed margins (teeth acute or acuminate with tip to distal part of the blade) and cuneate base in *O. rubra*. A further diagnostic character can be seen in the field: *O. chenopodioides* is usually prostrate and *O. rubra* erect (Table 1).

Oxybasis chenopodioides (L.) S. Fuentes, Uotila & Borsch, *Willdenowia* 42: 15 (2012)

Bas.: *Blitum chenopodioides* L., *Mant. Pl. Altera*: 170 (1771) – Type (designated by Uotila 2001: 95–96): Russia, Republic of Dagestan, XIX century, *C. Steven s.n.* (neotype H-1037202).

\equiv *Chenopodium chenopodioides* (L.) Aellen, *Ostenia*, *Festschr. Osten.*: 98 (1903).

\equiv *Chenopodium botryoides* Sm., *Engl. Bot.* 32, tab. 2247 (1811).

Description: Annual herb (therophyte), 5–50 cm tall. Stem usually prostrate or prostrate-ascending, reddish, glabrous (rarely slightly farinose), branched at the basal part. Leaf blade ovate, subtriangular (2–4 × 4–7 cm), entire (sometimes with 1 basal tooth on both sides) or sometimes (distal leaves) irregularly toothed with ob-

Table 1: Diagnostic characters between *Oxybasis chenopodioides* and *O. rubra*.**Tabela 1:** Razlikovalni znaki med vrstama *Oxybasis chenopodioides* in *O. rubra*.

<i>Oxybasis chenopodioides</i>	<i>Oxybasis rubra</i>
Tepals of lateral flowers connate almost to tip	Tepals of lateral flowers connate halfway or less
Leaf blade subtriangular, entire (somentimes with 1 basal tooth on both sides) or somentimes (distal leaves) irregularly toothed with obtuse teeth and truncate base	Leaf blade subrhomboidal, toothed with acute or acuminate teeth (rarely entire) and base cuneate
Plants usually prostrate or prostrate-ascending	Plants erect

tuse teeth, stalked (petiole 1–4 cm), slightly succulent, often reddish; base truncate, apex obtuse. Floral glomerules arranged in terminal and/or lateral spike-like inflorescences; flowers dimorphic: terminal flowers bisexual, with 5 tepals; lateral flowers bisexual and/or female, usually with 3 tepals (tepals always connate nearly to tip); fruit covered by the tepals, with one seed, usually vertical, brown, shiny (diameter 0.6–0.8 mm). $2n = 18$ (Uotila 1990).

Vegetation and ecology: *O. chenopodioides* prefers to colonize habitats characterized by a seasonal cycle of submersion (mainly during the

winter, with rain) and emersion (during the summer and autumn). The life cycle is short, 2–3(–4) months between August and November, and is completed during the submersion phase. Soil is humid, scarcely evolved, scarcely structured and with a fine texture (pers. obs.). *O. chenopodioides* frequently grows along sandy coastal habitats near the sea level, even though (for example in Sardinia; see Iamónico & Calvia 2010) it may be also found far from the coast line, up to 160–180 m a.s.l. (Fig. 1). During the later summer, *O. chenopodioides* can be often found from halophilous vegetation communities ascribed to the class



Figure 1: *Oxybasis chenopodioides* population along the Manu river (near Lake Coghinas), at locality Muros, in Olbia-Tempio Province of Sardinia. Photo by G. Calvia.

Slika 1: Populacija *Oxybasis chenopodioides* ob reki Manu (v bližini jezera Coghinas), lokacija Muros v provinci Olbia-Tempio, Sardinija. Foto: G. Calvia.

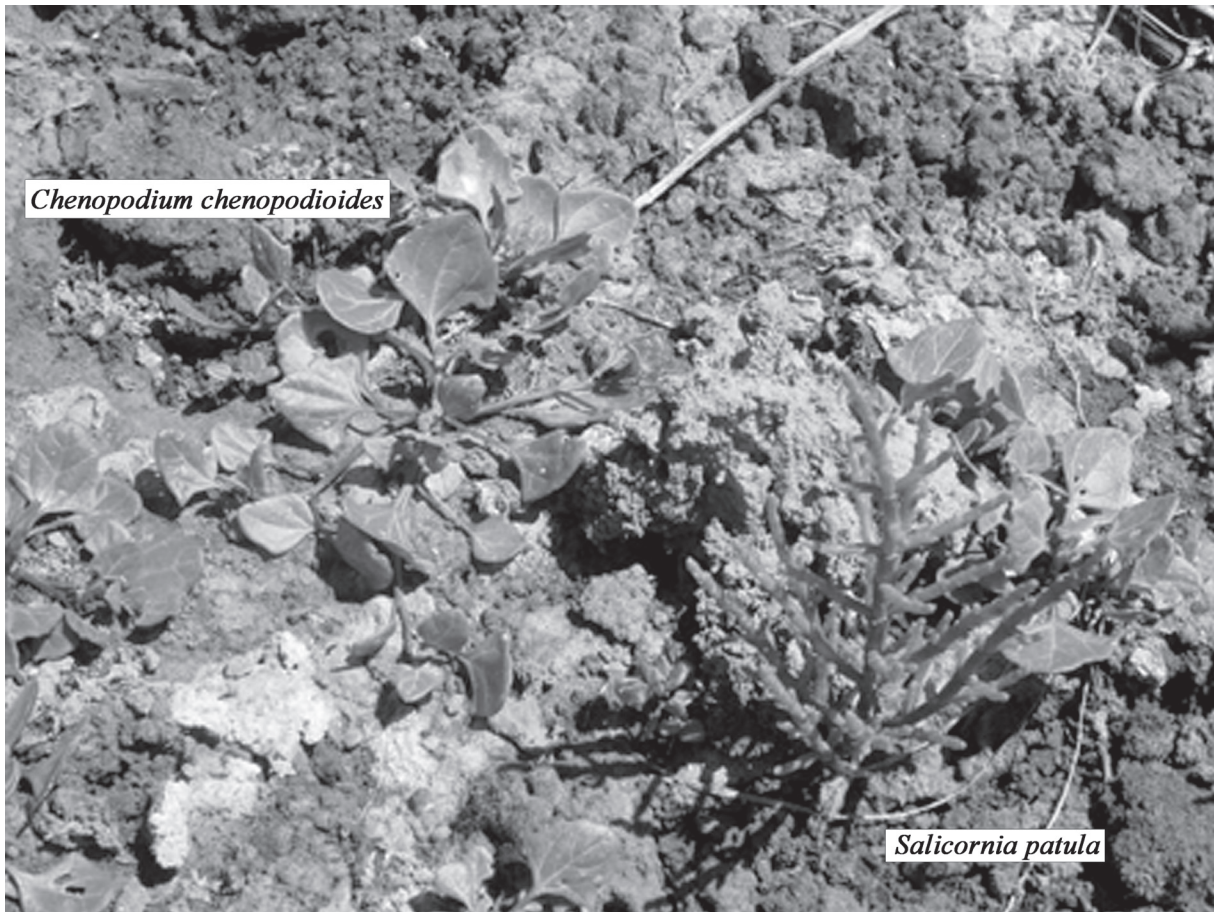


Figure 2: *Oxybasis chenopodioides* and *Salicornia patula* associated on shore of the Manu river in Delta del Po Park, Emilia-Romagna Region of Ravenna Province, north-eastern Italy. Photo by S. Montanari.

Slika 2: *Oxybasis chenopodioides* in *Salicornia patula* na obali reke Manu v delti reke Pad, regija Emilia-Romagna, provinca Ravenna, severovzhodna Italija. Foto: S. Montanari.

Thero-Salicornietea, order *Thero-Salicornietalia* (for example, in Emilia-Romagna region; see Iamonico & Montanari 2010); the phytocenoses are characterized by the dominance of *O. chenopodioides*, *Suaeda maritima*. and *Salicornia patula* (Fig. 2). *O. chenopodioides* can be considered a halo-nitrophilous species.

General Distribution: *Oxybasis chenopodioides* is distributed in Europe, central and south-western Asia, northern Africa, and North America (Clemants & Mosyakin 2003, Zhu et al. 2003, Uotila 2011).

Occurrence in Italy: Earlier *Oxybasis chenopodioides* has been recorded in the Regions of Friuli-Venezia Giulia, Veneto, Lazio and Campania (Conti et al. 2005), but it was found recently from four further Regions: Emilia-Romagna (Iamonico & Montanari 2010), Sardinia (Iamonico & Calvia 2010), Puglia (Iamonico 2011b)

and Toscana (Iamonico et al. 2013). Concerning the Lombardia region (northern Italy) Pignatti (1982) reported “*Chenopodium botryoides* ... lit. ... raram. all’interno (Bergam.)” (= “*Chenopodium botryoides* ... coasts ... rarely in the inland (Bergamo)”) and probably referred to Fiori and Paoletti (1898, who reported “*Quà e la nel Bergamasco ...*”), Fiori (1923) (who reported “*Bergam.*”) and Rodegher & Venanzi (1894). The same record was also published by Martini (2012) in the *Flora Vascolare della Lombardia centro-orientale* (= *Vascular Floras of the central-eastern Lombardia*). These authors also indicated another station in Bergamo province (along the Brembo river) on the basis of D’auria & Zavagno (1995). Conti et al. (2005) recently excluded *O. chenopodioides* (sub *Chenopodium botryoides*) from Lombardia [“*segnalata in precedenza per errore*” (“*recorded in the past by mistake*”)] considering the species as casual (G.

Galasso, personal communication). In fact, there are not clear reasons to consider *O. chenopodioides* as alien species for Bergamo province. This species naturally occurs in humid areas (both coastal and inland) of Europe, Asia and North Africa and it can be considered autochthonous for Italy. The discovery by D'Auria & Zavagni (1995) along the riverbanks of the Brembo river allows to hypothesize that *O. chenopodioides* is autochthonous for the Bergamo territory. We found at FI one specimen collected in locality "Valle di Sermede" (Mantova Province, Lombardia Region) in the XIX century (ante 1842) sub *Ch. rubrum* and previously revised (1977) by P. Uotila. We confirmed (D. Iamonico, January 2010) the determination by Uotila, so highlighting for the first time the occurrence for this species in the Province.

Finally, the Herbarium examination allowed also to find one specimen in FI (sub *Ch. melanospermum*) collected in the XIX century (ante Dec 1866) in Messina Province (Sicily) in locality "Murtiddi". We confirmed (D. Iamonico, January 2008) the previous determination by P. Uotila (1977) (see the final specimen list). *O. chenopodioides* was not indicated in the recent *Catalogue of plants growing in Sicily* (Giardina et al. 2007) and in the subsequent update (Raimondo & Spadaro 2009). G. Domina (personal communication) confirms the absence of findings and literature data of the species for Sicily. Therefore, the specimen found represents a new floristic data for the region. Since the date of collection, it has to be considered as disappeared occurrence. At the current state of knowledge, we cannot know the real reasons for this apparent extinction. We know that the genus *Chenopodium* s. lat. is very poorly known and studied in Italy and that the urbanized areas (where several *Chenopodium taxa* grow) are less investigated than the natural ones (Iamonico 2009), so it is possible that further field investigations could allow to rediscover the taxon.

Oxybasis chenopodioides has a fragmented distribution in Italy and it can be considered rare. The main reason for this is the rarity of the habitat in which the species occurs. These habitats are threatened by human activities (mainly tourism) that could cause the extinction of *O. chenopodioides* and other associated taxa. The extinction can be confirmed for the area named "Valli di Sermede" (Mantova Province, Lombardia region, northern Italy) where the habitat cannot be seen nowadays because of human recoveries (G. Galasso, personal communication).

List of Italian Regions and Provinces in which *O. chenopodioides* occurs (Fig. 4a):

- Friuli-Venezia Giulia: Udine (Pospichal 1897, Gortani & Gortani 1905, sub *C. botryoides*);
- Veneto: Rovigo (Benetti & Marchiori 1995, Masin et al. 2009, sub *C. botryoides*);
- Lombardia: Bergamo (Rodegher & Venanzi 1894, Fiori 1923, sub *C. rubrum* β-*botryoides*, Pignatti 1982, sub *C. botryoides*, D'Auria & Zavagni 1995, Martini 2012), Mantova (first record for the Province – see the final specimen list);
- Emilia-Romagna: Ravenna (Iamonico & Montanari 2010);
- Toscana: Lucca (not recorded since 1861), Pisa (not recorded since 1862), Siena (Iamonico et al. 2013).
- Lazio: Latina, Roma (not recorded since 1920) (Anzalone et al. 2010, sub *C. botryoides*);
- Campania: Napoli (Terracciano 1910, 1917, sub *C. boryoides*, Agostini 1956, sub *C. boryoides*, Motti & Ricciardi 2005);
- Puglia: Foggia (Iamonico 2011b);
- Sardegna: Olbia-Tempio (Iamonico & Calvia 2010);
- Sicily: Messina (first record for the region – see final specimen list).

***Oxybasis rubra* (L.) S. Fuentes, Uotila & Borsch, Willdenowia 42: 15 (2012)**

≡ *Chenopodium rubrum* L., Sp. Pl. 1: 218 (1753) – Type (designated by Uotila 1993): Herb. Linnaeus 313.5 (lectotype LINN!).

≡ *Blitum rubrum* (L.) Rchb., Fl. Germ. Excurs. 2(1): 582 (1832).

Description: Annual herb (therophyte), 10–100 cm tall. Stem erect, green or ± reddish, glabrous or nearly so, branched. Leaf blade ovate or lanceolate, subrhomboidal (2.5–6 × 4–8 cm), toothed with teeth acute or acuminate (rarely entire), stalked (petiole 2–4 cm), sometimes slightly succulent, often red; base cuneate, apex acute. Floral glomerules arranged in terminal and/or lateral spike-like inflorescences; flowers dimorphic: terminal flowers bisexual, with 5 tepals; lateral flowers bisexual and/or female, usually with 3 tepals (tepals free or connate up to the middle at most); fruit with one seed, usually vertical, brown, shiny (diameter 0.6–1.1 mm). 2n = 18, 36 (Uotila 1990).

Vegetation and ecology: *Oxybasis rubra* mostly occurs in ruderal habitats and wastelands, at altitudes between 0–600 m a.s.l. It can be found in vegetation communities of the class *Stellarietea*

mediae Tüxen, Lohmeyer & Preising ex von Rochow 1951, order *Chenopodietalia muralis* Br.-Bl. 1936 (personal observation). Recently, the new association *Polygono orientalis-Chenopodietum rubri* (class *Bidentetea tripartitae*, order *Bidentetalia tripartitae* – Sciandrello 2009) was described from Sicily for phytocenoses that occur in habitat characterized by seasonal cycles of submersion (during the winter-spring period) and emersion (during the summer-autumn period) on clayey-muddy, nitrophilous and humid soils. *O. rubra* is a dominant species in this association. Floristic investigations (carried out in 2008) in Finale Ligure locality (Province of Savona in Liguria, north-western Italy) also revealed that *O. rubra* grows in sandy coastal zone (Figure 3) potentially occupied by the association *Salsolo kali-Cakiletum maritimae* (Class *Cakiletea maritimae*, order *Euphorbietalia peplis*). *O. rubra* seems to have wider ecological demands than *O. chenopodioides*: it can colonize both synanthropic habitats (mostly open wastelands with low soil humidity) and riverbanks (with humid soils also during the emersion phase). The species can be considered nitrophilous or hygro-nitrophilous.

General Distribution: *Oxybasis rubra* is distributed in Europe (mainly in Central territories, while it is rare in the Mediterranean area and it does not occur in the extreme east and north territories), central and south-western Asia, and in North America (Clemants & Mosyakin 2003, Zhu et al. 2003, Uotila 1990, 2011). The occurrence in Italy has a general interest because of the rarity of this species in the Mediterranean area (see e.g. Jalas & Suominen 1980, Greuter et al. 1984).

Occurrence in Italy: *Oxybasis rubra* was reported from nine Regions, Friuli-Venezia Giulia, Veneto, Trentino-Alto Adige, Lombardia, Liguria, Emilia-Romagna, Toscana, Abruzzo, Campania and Basilicata by Conti et al. (2005), and recently from two more, Valle d'Aosta by Pistarino et al. (2010) and Puglia by Iamónico & Dura (2013) and it is mentioned but not confirmed from Umbria (Iamónico in press). In the past the species was recorded by mistake from Lazio (Iamónico & Iberite 2008) and Sardegna Regions (Conti et al. 2007). Recent floristic surveys (January 2008) allowed to confirm the presence of *O. rubra* in Savona Province (locality Finale Ligure), where no record is known since the 1980s (G. Barberis, personal communication).

Oxybasis rubra has a wider distribution in Italy than *O. chenopodioides* since it appears to have a



Figure 3: *Oxybasis rubra* in sandy substrate in Savona Province of Liguria Region, north-western Italy. Photo by D. Longo.

Slika 3: Vrsta *Oxybasis rubra* na peščeni podlagi v provinciji Savona v regiji Liguria, severozahodna Italija. Foto: D. Longo.

larger ecological demand, also colonizing ruderal habitats at altitudes up to 600 m a.s.l. However, its distribution is fragmented, especially in central and southern Italy. The species can be considered common in northern Italy, and less frequent in central and southern Italy.

List of Italian Regions and Provinces in which *O. rubra* occurs (Fig. 4b):

- Friuli-Venezia Giulia: Gorizia (Pospichal 1897, Poldini 2002, 2009), Pordenone (Poldini 2002), Trieste (Marchesetti 1896, Mazzena & Polli 1982), Udine (Poldini 2002);
- Veneto: Belluno (Argenti & Lasen 2004), Padova (Masin & Tietto 2005, 2006), Vicenza (Curti & Scortegagna 1998), Verona (Bianchini 1976);
- Trentino-Alto Adige: Bolzano (Wilhelm et al. 2006), Trento (Prosser 1995);
- Lombardia: Bergamo (Pignatti 1982);
- Piemonte: Alessandria (Iamónico & Soldano 2012b);
- Valle d'Aosta: Aosta (Pistarino et al. 2010);

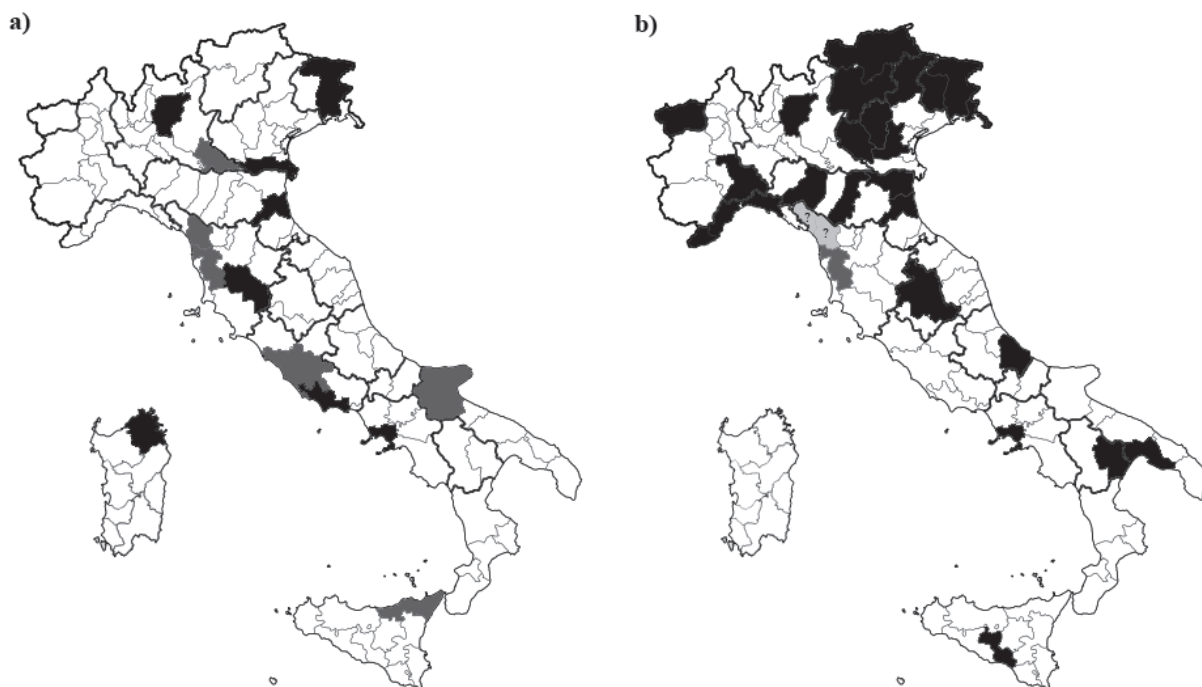


Figure 4: Distribution map of *Oxybasis chenopodioides* (a) and *Oxybasis rubra* (b) in Italy according to Provinces. Provinces with present records are marked in black, old records in gray and doubtful records in light gray with question marks.

Slika 4: Karte razširjenosti vrst *Oxybasis chenopodioides* (a) in *Oxybasis rubra* (b) v provincah Italije. Province z novimi podatki so označene s črno, stari podatki so predstavljeni s sivo in vprašljivi podatki s svetlo sivo in vprašajem.

- Liguria: Genova (Bertoloni 1804), Imperia (L. Aita et G. Barberis, personal communication) and Savona (in this latter Province the species is confirmed in the locality Finale Ligure).
- Emilia-Romagna: Ferrara (Beguinot 1910, Zavatti 1999–2000), Modena (Delfini 2003, Alessandrini et al. 2010), Parma (Ghilliani et al. 2004, Petraglia et al. 2005, Ghilliani 2010), Ravenna (Zangheri 1966, Lazzari et al. 2007, Bassi 2004);
- Toscana: Lucca [Montelucci (1964) reported “...*specialmente in base alla verticalità dei semi e che forse si avvicinano alla var. botryoides (Sm.) Fiori*” (“... ‘especially based on the vertical seeds’ that are maybe similar to the var. botryoides (Sm.) Fiori”), so the species can be considered doubtful for this province), Massa-Carrara (Ferrarini & Marchetti (1994) indicated a question mark, so the species is to be considered doubtful), Pisa (Caruel 1860, Baroni 1897–1908);
- Umbria: Perugia (Bencivenga et al. 1977–1978, Iamónico in press);
- Abruzzo: Chieti (Leporatti et al. 2001a, 2001b);
- Campania: Napoli (Tenore 1823, 1831, Motti & Ricciardi 2005);
- Puglia: Taranto (Iamónico in press, Iamónico & Dura 2013);
- Basilicata: Matera (Gavioli 1947);
- Sicilia: Caltanissetta (Giardina et al. 2007, Sciandrello 2009).

4. ACKNOWLEDGEMENTS

Thanks are due to Directors and Curators of all quoted Herbaria for their support during my visits, loans of specimens/photographs or requests for information. I am also grateful to A. Alessandrini (Bologna), C. Argenti (Belluno), P. V. Arrigoni (Firenze), G. Barberis (Genova), F. Conti and F. Bartolucci (Barisciano), E. Del Guacchio (Salerno), G. Galasso and E. Banfi (Milano), M. Iberite (Latina), F. Prosser (Rovereto), A. Soldano (Vercelli), M. Vidali (Trieste) and T. Wilhelm (Bolzano) for information on the distribution. I thank my friends G. Calvia (Berchidda), D. Longo (Genova) and S. Montanari (Pangipane) for the permission to reproduce their photographs. Finally, I am grateful to P. Uotila and the other anonymous reviewer for the constructive comments.

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6. APPENDIX

Selected specimens seen.

Oxybasis chenopodioides (L.) S. Fuentes, Uotila & Borsch – **ITALY: Emilia-Romagna**. Ravenna, Parco Delta del Po, Pineta di San Vitale, bassura tra le paleodune (a nord del canale "Viacerba"), 0 m a.s.l., 20 Sep 2009, leg. S. Montanari, Det. D. Iamónico et S. Montanari (FI, *Herb. Iamónico*).

Lazio. Latina, Circeo, Lago di Fogliano, depressioni retrodunali inondate, 0 m a.s.l., 1997, leg. M. Iberite (FI, RO, *Herb. M. Iberite*).

Lombardia. Mantova, Valle di Sermide, XIX century (ante 1842), *sine coll.* (sub *Ch. rubrum*), rev. P. Uotila (1977), conf. D. Iamónico (08 Jan 2010) (FI).

Puglia. prope Cerignola, in argillosis inundatis abulia, XIX century (ante Apr 1851), *sine coll.* (sub *Chenopodium sp.*), rev. P. Uotila (1977), conf. D. Iamónico (08 Jan 2010) (FI).

Sardegna. Oschiri (Olbia-Tempio province), lago Coghinas, loc. Muros, sabbie e fanghi vicino al ruscello, 162–164 m a.s.l., 19 Nov 2006, leg. G. Calvia, det. D. Iamónico et G. Calvia (*Herb. Iamónico*); Berchidda (Olbia-Tempio province), loc. Silvani, Rio Mannu di Berchidda-Oschiri, fanghi e pietraie, 162–163 m a.s.l., 04 Nov 2009, leg. G. Calvia, det. D. Iamónico et G. Calvia (FI, *Herb. Iamónico*).

Sicilia. Messina, ai Murtiddi, XIX century (ante Dec 1866), *sine coll.* (sub *Ch. melanospermum*), rev. P. Uotila (1977) (sub *Ch. cfr. chenopodioides*), conf. D. Iamónico (08 Jan 2010) (FI).

Toscana. Lucca, palude di Massaciuccoli, 5 Sep 1861, leg. Beccari (sub *Ch. rubrum* β -*crassifolium*), rev. P. Uotila (1977), conf. D. Iamónico (08 Jan 2010) (FI); Pisa, Colmata di Tombolo, 10 Sep 1861, leg. Bec-

cari (sub *Ch. rubrum* β -*crassifolium*), rev. P. Uotila (1977), conf. D. Iamónico (08 Jan 2010) (FI); Pisa, Macchia di Pisa in Tombolo, Sep 1862, leg. *Bec-cari* (sub *Ch. rubrum*), rev. P. Uotila (1977), conf. D. Iamónico (08 Jan 2010) (FI); Siena, lago di Chiusi, sponde fangose del lago, 20 Sep 2012, leg. L. Lastrucci, D. Viciani et R. Viganò, det. D. Iamónico et L. Lastrucci (FI).

Oxybasis rubra (L.) S. Fuentes, Uotila & Borsch – **ITALY: Campania.** Napoli, Lago d’Agnano, 19-19-1870, *sine coll.* (RO). **Liguria.** Genova, alveo

del torrente Polcevera contro la conceria in quel di Fegino (Borzoli), 30-09-1904, *sine coll.* (RO); Savona, Finale Ligure, Jan 2008, leg. L. Longo det. D. Iamónico s.n. (HFLA). **Puglia.** Taranto, spiaggia, 27-07-1905, *sine coll.* (RO). **Trentino-Alto Adige.** Trento, presso malghe, 08 (XIX sec.), leg. et det. Rabbi (sub *Blitum virgatum* L.), rev. F. Prosser 23-12-2009 (TR). **Valle d’Aosta.** Aosta, Hône, incolti sulla riva destra della Dora, 2010, 345 m a.s.l., leg. et det. M. Bovio et al, conf. D. Iamónico (AO).

Received 23.6.2013

Revision received 23.11.2013

Accepted 6.12.2013