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Taxonomic revision of the genus *Amaranthus* (Amaranthaceae) in Italy

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Abstract

A taxonomic revision of the genus *Amaranthus* (Amaranthaceae) in Italy is here presented. Field surveys were carried out during the period 2006–2014. 58 herbaria (both European and American, including 12 personal herbaria) were consulted (more than 3,000 specimens were examined) as well as extensive literature was analized. Twenty-seven non-hybrid taxa (twenty-four species, and six varieties) are recognized (*A. crassipes* and *A. graecizans* subsp. *graecizans* are considered doubtful for the flora of Italy). Three taxa (*A. blitum*, *A. cacciatoi*, and *A. graecizans* subsp. *sylvestris*) are native, one (*A. bouchonii*) has doubtful origin, while the others are to be considered aliens, mostly neophytes native to the Americas. Information about nomenclature (accepted names, main synonyms, and types), morphology, chromosome number, chorology (for native taxa) or alien status (for exotic taxa, at national and regional levels), occurrence in Italy (at regional scale), ecology (preferential habitat, phenology, elevation), taxonomic annotations are provided for each taxon, as well as original photos were prepared. Diagnostic keys at species and infraspecific levels (for *A. blitum* subsp. *blitum* s.l., *A. emarginatus* s.l., and *A. graecizans* s.l.) are given. An isolectotype for the name *A. bouchonii* was found at Z. A list of the seven hybrids recorded and their main morphological characteristics are also given. Among them, *A.* × *mauritii* is recorded in the present study for the first time in Italy. The nomenclatural change *Amaranthus* × *pyxidatus comb. et stat. nov.* is proposed. Two specimens preserved at MPU are designated as lectotype and isolectotype of the name *A.* × *mauritii s.s.*, while for *A.* × *mauritii* f. *ramosissima* the holotype was found; the two names are to be considered heterotypic synonyms (new synonymy).

Key words: Aliens, Europe, hybridization, morphology, new combination, subgenus *Acnida*, subgenus *Albersia*, subgenus *Amaranthus*, taxonomy

Introduction

Amaranthus L. is a genus of about 70 mostly annual monoecious and dioecious species with worldwide distribution. Approximately 40 species are native to the Americas, the remaining ones to the other continents (see e.g., Costea *et al.* 2001a). Several American species are used as ornamentals and some of these are able to escape from cultivation mainly causing economical impacts in agricultural systems with reduction in productivity and crop quality.

This genus is critical from the taxonomical point of view due to its high phenotypic variability which led to nomenclatural disorder and misapplication of names (see e.g., Mosyakin & Robertson 1996, Costea *et al.* 2001a, Iamonico 2009a).

On the basis of the revision by Mosyakin & Robertson (1996), *Amaranthus* includes 3 subgenera: subgenus *Acnida* (L.) Aellen ex K.R.Robertson with 3 sections, subgenus *Albersia* (Kunth) Gren. & Godr. with 4 sections, and subgenus *Amaranthus*, with 3 sections and 2 subsections. However, the proposed classification does not appears conclusive and new taxa (at section and subsection levels) could be described (Mosyakin & Robertson 1996).

A comprehensive world monograph of the genus *Amaranthus* is lacking. Taxonomic works at continental level were rarely published [e.g., Palmer (2009) for Australia] or they are included in Flora projects [e.g., Aellen (1959) and Akeroyd (1993) for Europe, Mosyakin & Robertson (2003) for North America]. Most of the revisions at

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