

## **The genus *Taraxacum* (Asteraceae, Cichorieae) in Italy IV. Two new species of *T.* sect. *Palustria***

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## The genus *Taraxacum* (Asteraceae, Cichorieae) in Italy IV. Two new species of *T.* sect. *Palustria*

### Abstract

Carlesi V. & Peruzzi L.: The genus *Taraxacum* (Asteraceae, Cichorieae) in Italy IV. Two new species of *T.* sect. *Palustria*. – Willdenowia 42: 191–197. December 2012. – Online ISSN 1868-6397; © 2012 BGBM Berlin-Dahlem. Stable URL: <http://dx.doi.org/10.3372/wi.42.42204>

Two species of *Taraxacum* sect. *Palustria* from the regions of Campania (southern Italy) and Tuscany (central Italy), respectively, are described as new to science: *T. annalisae* ( $2n = 32$ ) and *T. mannoccii* ( $2n = 24$ ). Morphological, cytotaxonomic and distributional data are illustrated and discussed.

Additional key words: *Compositae*, *Taraxacum annalisae*, *Taraxacum mannoccii*, taxonomy, karyology, Campania, Tuscany

### Introduction

Due to a general scarce knowledge of the whole genus *Taraxacum* Wigg. (Asteraceae, tribe Cichorieae) in Italy, we started a series of morphological and cytotaxonomic papers devoted to the study of the Italian populations of this difficult genus (Aquaro & Peruzzi 2007; Aquaro & al. 2008, 2009, 2010; Peruzzi 2008, 2010; Carlesi & Peruzzi 2010).

According to the recent literature, *Taraxacum* sect. *Palustria* (H. Lindb.) Dahlst. comprises 132 taxa (Kirschner & Štěpánek 1998; Sonck 1998; Štěpánek & Kirschner 2001; Aquaro & al. 2008; Marciniuk & al. 2012). Only two of all its known species exhibit obligate sexuality, both at the diploid level. The other species of the section are apomicts and polyploids. The majority of species are confined to lower altitudes and foothills, preferring wet or temporarily wet, mineral rich to subsaline sites with

competition suppressed by flooding, grazing, mowing or other factors. The main diversity of the section is found in Central and southern Europe, but its geographical range includes also Anatolia and Transcaucasus in the East.

Eighteen species are reported to occur presently in Italy, mainly in its northern part (Kirschner & Štěpánek 1998; Sonck 1998; Conti & al. 2005; Kirschner & al. 2006–07; Aquaro & al. 2008; Carlesi & Peruzzi 2010; Peruzzi & Carlesi 2011): *Taraxacum amplexum* Sonck (Veneto); *T. arachnoideum* Kirschner & Štěpánek (Friuli-Venezia Giulia); *T. carthusianorum* Aquaro & al. (Calabria); *T. ciliare* Soest (Emilia-Romagna); *T. divulsifolium* Soest (Emilia-Romagna and Tuscany); *T. dolomiticum* Soest, *T. huterianum* Soest, *T. lacustre* Soest and *T. madidum* Kirschner & Štěpánek (Trentino-Alto Adige); *T. friscicum* Soest and *T. limosicola* Kirschner & Štěpánek (Emilia-Romagna); *T. lilianae* Aquaro & al. (Basilicata); *T. multisinuatum* Kirschner & al. (Calabria); *T. notero-*

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*philum* Kirschner & al. (Tuscany); *T. olivaceum* Soest (Friuli-Venezia Giulia and Tuscany); *T. scaturiginosum* G. E. Haglund (Veneto, Friuli-Venezia Giulia and Tuscany); *T. siculum* Soest (Calabria and Sicily); and *T. tenuifolium* (Hoppe & Hornschuch) Koch (Tuscany, Emilia Romagna, Veneto, Trentino-Alto Adige and Friuli-Venezia Giulia), which is one of the two sexually reproducing species. Further eight species reported for Italy are documented only by old herbarium specimens or bibliographic references, so that their present occurrence needs confirmation: *T. aginnense* Hofstra, *T. delanghei* Soest and *T. pauckertianum* Hudziok (Tuscany); *T. odiosum* Kirschner & Štěpánek (Campania); *T. reffectum* Sonck (Marche); *T. subolivaceum* Sonck (Emilia-Romagna); *T. trilobifolium* Hudziok (Campania, Marche and Tuscany) and *T. turfosum* (Sch. Bip.) Soest (Trentino-Alto Adige). For large areas of central and southern Italy, only a vague “*T. palustre* (group)” is recorded (Conti & al. 2005).

Aim of the present study is to clarify the taxonomy of two so far unnamed populations of *Taraxacum* sect. *Palustria* in Tuscany (central Italy) and Campania (southern Italy), respectively.

## Material and methods

The study is based on live plants (10–15 for each taxon) collected during the years 2007–2008 and partly preserved as herbarium specimens, partly cultivated in the Botanic Garden of Pisa University. As the reference for already known species, we used the descriptions, iconographies and analytical keys by Kirschner & Štěpánek (1998), Sonck (1998), Štěpánek & Kirschner (2001) and Aquaro & al. (2008).

Karyological studies were carried out on plants cultivated in the Botanic Garden of Pisa University from the loci classici (see holotypes for information on the source localities). Root tips were pretreated with a 0.3 % colchicine solution and fixed in Carnoy; afterwards they were hydrolysed in 1N HCl solution for 7 min, stained with fuchsine and finally squashed in a 45 % solution of acetic acid for counting and studying of the chromosomes.

## Results and Discussion

As the result of our morphological studies, two apomict taxa (whose achenes begin the development at the very early stages of anthesis) belonging to *Taraxacum* sect. *Palustria* are identified. As far as we are aware, they are not identifiable with any known taxon.

A very large population from Lake of Matese, Campania (here described as *Taraxacum annalisae*), morphologically very homogeneous, is similar to *T. huterianum*, but the plants are well differentiated from the latter species. Besides, no other population of *T. sect. Palustria* is

presently known to occur in Campania (Santangelo & al. 2010), while the former reported presence of *T. odiosum* and *T. trilobifolium* was limited to lowland areas (Carlesi & Peruzzi 2010), which are at present very disturbed. However, none of these species is morphologically similar to *T. annalisae*.

Two morphologically very homogeneous populations from ophiolitic outcrops near Leghorn, Tuscany (here described as *Taraxacum mannoccii*), appear related to *T. glabricaule* (endemic to Greece), but are well differentiated from the latter species. For Tuscany, several other species of *T. sect. Palustria* are reported (Carlesi & Peruzzi 2010), but none from the Leghorn area. Moreover, many of the species reported for Tuscany are morphologically very distinct from *T. mannoccii*. Among the morphologically less distinct ones, *T. olivaceum* is known from several sites tens of kilometres away from the range of *T. mannoccii*, while *T. tenuifolium* is known to occur in a single mountain locality in the Apuan Alps (again, very far from *T. mannoccii*).

The two species are described as new to science.

### *Taraxacum annalisae* Carlesi & Peruzzi, **sp. nov.**

Holotypus: Italy, Campania, Matese Massif, northern shores of Matese Lake (UTM: 33T 504.4584, humid meadow, 1.6.2007, L. Peruzzi (PI; isotypi: B, FI) – Fig. 1.

Differt a *Taraxaco huteriano* squamis exterioribus ciliolatis et numero chromosomatico ( $2n = 32$  versus  $2n = 40$ ).

Planta 6–12 cm alta. *Folia* suberecta, viridia, plerumque 5–10 cm longa et 1–2.5 cm lata, indivisa vel sinuato-dentata; *petiolus* angustissimus, viridis vel purpureo-coloratus, 2–3.5 cm longus. *Scapus* 6–10(–20) cm longus. *Involucrum* basi 0.7–1.5 cm diametro; squamae interiores ad 10–11 mm longae et 1.8–2 mm latae; squamae exteriores 10–13, non imbricatae, ovatae vel lanceolatae, 4–5 mm longae, 1.5–3 mm latae, virides-purpurascens, marginibus angustis ad 0.3 mm latis. *Stigmata* obscura vel pallide lutea. *Antherae* polliniferae, grana pollinis diametro valde variantia. *Achenium* pallide griseo-brunneum, superne breviter dense spinulosum, (2.8–)3.1–3.2 mm longum (pyramide exclusa), in pyramidem cylindricam (1.2–)1.5 mm longam subabrupte abiens. *Rostrum* 6–6.5(–9) mm longum. *Pappus* albus 4.5–5.5 mm longus.

Perennial slender medium-sized herb, 6–12 cm tall, scarcely hairy, with scapes (somewhat hairy above) ± equalling the leaves in length. *Leaves* suberect, light olive green, 5–10 cm long, 1–2.5 cm wide, entire to slightly lobed, lateral lobes 2–3(–4), petiole reddish green, not winged, 2–3.5 cm long. *Scape* reddish brown, 6–10(–20) cm long. *Involucre* 0.7–1.5 cm wide at base; inner bracts 10–12, 10–11 mm long and 1.8–2 mm wide; outer bracts 10–13, not imbricate, ovate-lanceolate to lanceolate, ap-

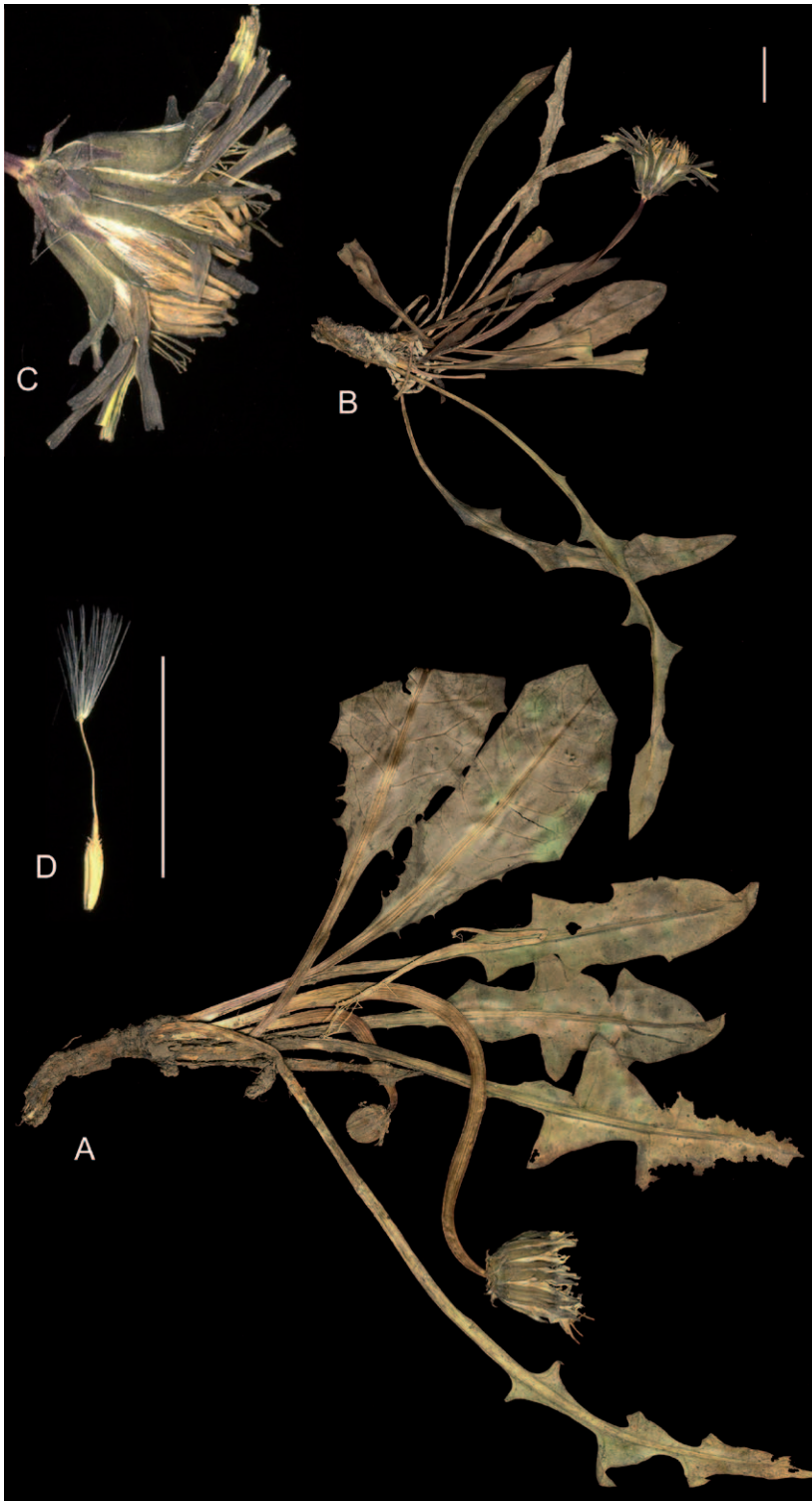


Fig. 1. *Taraxacum annalisae* – A–B: habit; C: capitulum; D: achene. – All from the holotype collection, from the northern shores of Matese Lake. – Scale bars = 1 cm.

pressed to erect, 4–5 mm long and 1.5–3 mm wide, purplish green, with membranous margin 0.1–0.3 mm wide,  $\pm$  ciliate. *Stigma* brownish yellow. *Anthers* with pollen grains of variable size. *Achenes* grey brown, with dense short spines in the upper portion; body (2.8–)3.1–3.2 mm long, gradually tapering into a cone, (1.2–)1.5 mm long;

rostrum 6–6.5(–9) mm long. *Pappus* white, 4.5–5.5 mm long.

*Eponymy* — The epithet of this species honours Dr Annalisa Santangelo (University of Naples), student of the flora of Campania and organizer of the Italian Botanical Society's excursion during which the new species was discovered and denoted as “*Taraxacum* sect. *Palustria*” (Santangelo & al. 2010).

*Chromosome number* —  $2n = 32$  (Fig. 2).

*Distribution and ecology* — Presently known only from the northern Matese Lake shores (Fig. 3), Campania, southern Italy, where it grows in humid and inundated grasslands of the mountain belt at an altitude of c. 1000 m.

*Taxonomy* — The species is most closely related to *Taraxacum huterianum* of the *T. tenuifolium*/*T. subolivaceum*/*T. mendax* group, to which in our opinion also *T. annalisae* belongs. They are well distinguished by the outer involucre bracts and the chromosome number: *T. huterianum* has outer bracts with glabrous margins and a chromosome number of  $2n = 40$  (Kirschner & Štěpánek 1998), while *T. annalisae* has more or less ciliate outer involucre bracts and  $2n = 32$ .

Another similar species having 10–13 ovate to lanceolate, erect to appressed outer bracts, entire to slightly lobed leaves and pollen present is *Taraxacum glaucolivaceum* Kirschner & Štěpánek (endemic to Bulgaria), of the same group. *T. annalisae* is easily distinguished from the latter species in having brownish yellow stigmas.

*Taraxacum annalisae* is also somewhat similar to *T. mannoccii* (see below), from which it is easily

distinguished by longer inner and shorter outer bracts, achene body and cone, and the different chromosome number.

The  $2n = 32$  tetraploid level is quite common within the *T. tenuifolium*/*T. subolivaceum*/*T. mendax* group; indeed, besides *T. annalisae* and *T. glaucolivaceum*



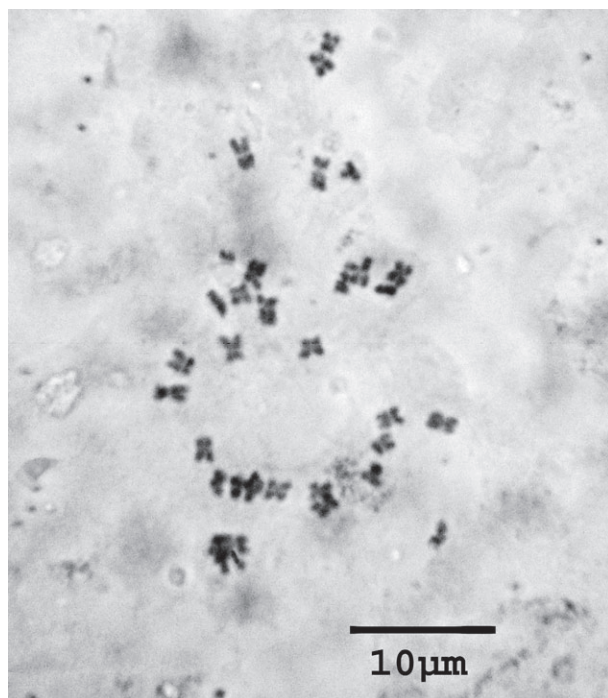


Fig. 2. *Taraxacum annalisae* – metaphase plate showing  $2n = 32$  chromosomes. – Collection: northern shores of Matese Lake (UTM: 33T 504.4584), 1.6.2007, L. Peruzzi (PI)].

(Kirschner & Štěpánek 1998), also *T. glabricaule* (Sonck 1993), *T. olivaceum* (Kirschner & Štěpánek 1998; Carlesi & Peruzzi 2010), *T. subolivaceum* (Kirschner & Štěpánek 1998), *T. reffectum* (Malecka 1981) and *T. arachnoideum* (Kirschner & Štěpánek 1998) share the same chromosome number.

***Taraxacum mannoccii* Carlesi & Peruzzi, sp. nov.**

Holotypus: Italy, Tuscany: Monti Livornesi (Leghorn) Rio Ugione, loc. Infernaccio, Valle della Sambuca (UTM: 32T 613.4822–613.4823), on green rocks close to the water, 29.3.2008, M. Mannocci (PI; isotypi: B, FI) – Fig. 4.

Paratypi: Italy, Tuscany, Monti Livornesi (Leghorn), Rio Ugione, loc. Infernaccio, Valle della Sambuca (UTM: 32T 613.4822–613.4823), on green rocks close to the water, 17.5.2007, M. Mannocci (PI); Monti Livornesi (Leghorn), Monte Pelato (UTM: 32T 615.4809), on wet soils derived from green rocks, 19.3.2011, G. Gestri (PI); ibid., 3.4.2011, G. Gestri (PI); ibid., 10.4.2011, G. Gestri (PI).

Differt a *Taraxaco glabricaule* squamis exterioribus minoribus longitudine et amplitudine et numero chromosomatico ( $2n = 24$  versus  $2n = 32$ ).

Planta 12–25 cm alta. *Folia* suberecta, viridia, plerumque 5–16 cm longa et 1–2.5 cm lata, indivisa, dentata vel lobata; *petiolus* angustissimus, viridis vel purpureus, 4–9 cm longus. *Scapus* paulo brunnescens, araneosus,

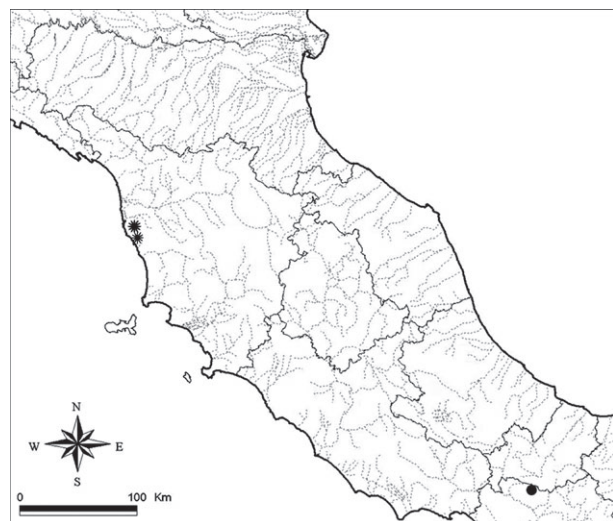


Fig. 3. Geographical distribution of *Taraxacum annalisae* (full circle) and *T. mannoccii* (star).

12–25 cm longus. *Involucrum* basi 0.7–1 cm diametro, squamae interiores ad 10–12 mm longae et 1.8–2 mm latae; squamae exteriores 10–13, non imbricatae, ovatae vel lanceolatae, 5.2–6 mm longae, 2–3.8 mm latae, obscure virides vel purpurascens, marginibus angustis ad 0.4 mm latis, ciliolatis. *Stigmata* luteo-obscura. *Antherae* polliniferae, grana pollinis diametro valde variantia. *Achenium* olivaceo-stramineum, superne sparse spinulosum, 3.1–3.5 mm longum (pyramide exclusa), in pyramidem cylindricam 1.4–1.8 mm longam subabrupte abiens; *rostrum* 6–7.5 mm longum. *Pappus* albus 4.5–6 mm longus.

Perennial medium-sized herb, 12–25 cm tall, scapes (somewhat hairy above)  $\pm$  equalling the leaves in length. *Leaves* suberect, light olive green, 5–16 cm long, 1–2.5 cm wide, dentate to slightly lobed; *petiole* reddish brown, not winged, 4–9 cm long. *Scape* reddish brown, scarcely hairy, 12–25 cm long. *Involucre* 0.7–1 cm wide at base; inner bracts 10–12, 14 mm long and 1.8–2 mm wide; outer bracts 10–13, not imbricate, ovate-lanceolate to lanceolate, appressed, 5.2–6 mm long and 2–3.8 mm wide, greenish purplish, with a membranous margin 0.1–0.4 mm wide, ciliolate. *Stigma* brownish yellow. *Anthers* with pollen grains of variable size. *Achenes* greenish grey, with rare, short, dense spines in the upper portion; body 3.1–3.5 mm long, gradually tapering into a cone, 1.4–1.8 mm long; rostrum 6–7.5 mm long. *Pappus* white, 4.5–6 mm long.

*Eponymy* — The epithet honours Dr Mairo Mannocci (Leghorn), student of Tuscan Archipelago and Leghorn province flora, who first collected this species.

*Chromosome number* —  $2n = 24$  (Fig. 5).

*Distribution and ecology* — The species is presently known only for two localities near Leghorn (Fig. 3),



Fig. 4. *Taraxacum mannocii* – A: general view; B: capitulum; C: achene. – All from the holotype collection, from Monti Livornesi. – Scale bars = 1 cm.

growing on humid ophiolitic rocks near streams, at c. 100–300 m altitude.

**Taxonomy** — The species most similar to *Taraxacum mannocii* is *T. glabricaule* of the *T. tenuifolium*/*T. subolivaceum*/*T. mendax* group, to which in our opinion also *T. mannocii* belongs. They are well distinguished, however, by their outer involucre bracts, achene dimensions and chromosome numbers: *T. glabricaule* has out-

er bracts of  $4.2 \times 7.5$  mm and a chromosome number of  $2n = 32$  (Sonck 1993), while *T. mannocii* has outer bracts of  $2\text{--}3.8 \times 5.2\text{--}6$  mm and a chromosome number of  $2n = 24$ .

Another similar species sharing the same chromosome number and the size of the outer bracts, with scarcely lobed leaves and pollen present is *Taraxacum glaucolivaceum*. *T. mannocii* is easily distinguished from the latter species in having a shorter achene body.

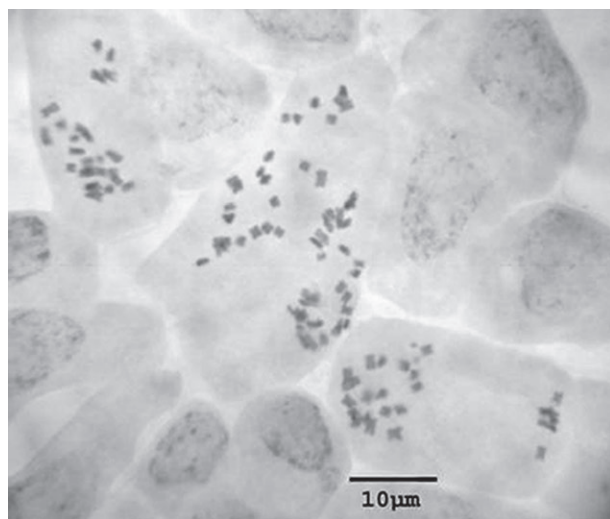


Fig. 5. *Taraxacum mannoccii* – four metaphase plates showing  $2n = 24$  chromosomes each. – Collection: Monti Livornesi (Leghorn) Rio Ugione, loc. Infernaccio, Valle della Sambuca (UTM: 32T 613.4822–613.4823), 29.3.2008, M. Mannocci (PI).

The new species is somewhat similar also to *Taraxacum annalisae* (see above), from which it is easily distinguished by the shorter inner bracts, longer outer bracts, the cones and a different chromosome number. The triploid level is very rare within the *T. tenuifolium*/*T. subolivaceum*/*T. mendax* group and besides *T. mannoccii* only *T. lilianae* has  $2n = 24$  chromosomes (Aquaro & al. 2008).

## Conclusions

The two new agamospecies of *Taraxacum* sect. *Palustria*, the tetraploid *T. annalisae* ( $2n = 32$ ) and the triploid *T. mannoccii* ( $2n = 24$ ), appear to be endemic to Italy and belong to the *T. tenuifolium*/*T. subolivaceum*/*T. mendax* group. They raise the number of *Taraxacum* sect. *Palustria* species recorded for Italy to 29, of which seven seem endemic: *T. amplexum*, *T. annalisae*, *T. carthusianorum*, *T. lacustre*, *T. lilianae*, *T. mannoccii*, *T. siculum*. These microspecies (and the section as a whole) deserve special conservation attention, because they are prone to extinction in Italy due to the loss of their natural habitat, as recently ascertained also for Poland (Marciniuk & al. 2010).

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Giovanni Gestri (Prato) is gratefully acknowledged for sharing his collections from Monte Pelato (Leghorn). The authors also wish to thank the reviewers Ingo Uhlemann, Jan Štěpánek and Jan Kirschner for their critical and constructive criticisms on a previous version of this paper.

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