

Taraxacum zajacii (Asteraceae), a new species from Poland

Paweł Marciniuk^{1,*}, Krystyna Musiał², Andrzej J. Joachimiak²,
Jolanta Marciniuk¹, Krzysztof Oklejewicz³ & Mateusz Wolanin³

¹⁾ Department of Botany, Siedlce University of Natural Sciences and Humanities, ul. Prusa 12, PL-08-110 Siedlce, Poland (*corresponding author's e-mail: pawelm@uph.edu.pl)

²⁾ Department of Plant Cytology and Embryology, Institute of Botany, Jagiellonian University, ul. Grodzka 52, PL-31-044 Kraków, Poland

³⁾ Department of Botany, Rzeszów University, ul. Zelwerowicza 4, PL-35-601 Rzeszów, Poland

Received 12 Dec. 2011, final version received 30 Mar 2012, accepted 3 Apr. 2012

Marciniuk, P., Musiał, K., Joachimiak, A. J., Marciniuk J., Oklejewicz, K. & Wolanin, M. 2012: *Taraxacum zajacii* (Asteraceae), a new species from Poland. — *Ann. Bot. Fennici* 49: 387–390.

A description of *Taraxacum zajacii* J. & P. Marciniuk, a new species of *T.* sect. *Palustria* in Poland is given. *Taraxacum zajacii* is a pentaploid ($2n = 40$). Morphologically, the new species is closest to the *T. subalpinum*/*T. neterophilum* group.

Taraxacum sect. *Palustria* includes 131 mostly apomictic species, markedly different in their karyology. Sexually reproducing diploids are represented in the section by only two rare Mediterranean species, *Taraxacum raii* and *T. tenuifolium*. The apomictic taxa form a series of polyploids, from common triploids ($2n = 24$) and tetraploids ($2n = 32$) to rare pentaploids ($2n = 40$) and very rare hexaploids ($2n = 48$) represented by only two species, which are *T. ranunculus* and *T. flos-lacus* (Kirschner & Štěpánek 1998, Tikhomirov 2003, Aquaro *et al.* 2008). In Poland, *T.* sect. *Palustria* includes 23 exclusively apomictic species with 15 triploids, six tetraploids and two pentaploids (Marciniuk *et al.* 2010b, Marciniuk 2012).

A large population of a distinct taxon which, after morphological and karyological studies, appeared to be a new species was found in 2008. The description of this species is given in this paper.

Morphometric analyses were made on herbarium materials collected in the field and on cultured live plants. In total, 100 individuals and herbarium specimens were analysed.

For karyological studies, seeds collected from the cultured plants were germinated on moistened filter paper in Petri dishes. Three- to four-day-old seedlings were incubated in 8-hydroxyquinoline for 4 h at room temperature. Then they were rinsed in distilled water and fixed in 96% ethanol/glacial acetic acid (3:1) for 24 h. The fixed material was stained in 2% acetic orcein for 3–4 days at room temperature. The stained seedlings were rinsed in 45% acetic acid, then heated to a boiling point over a flame. For slide preparation, root tip meristems were cut off and squashed in a drop of 45% acetic acid, dry-iced, air-dried and mounted in Entellan. The chromosomes were counted during the mitotic metaphase and photographed using a Nikon Eclipse 80i microscope equipped with a monochrome CCD camera.

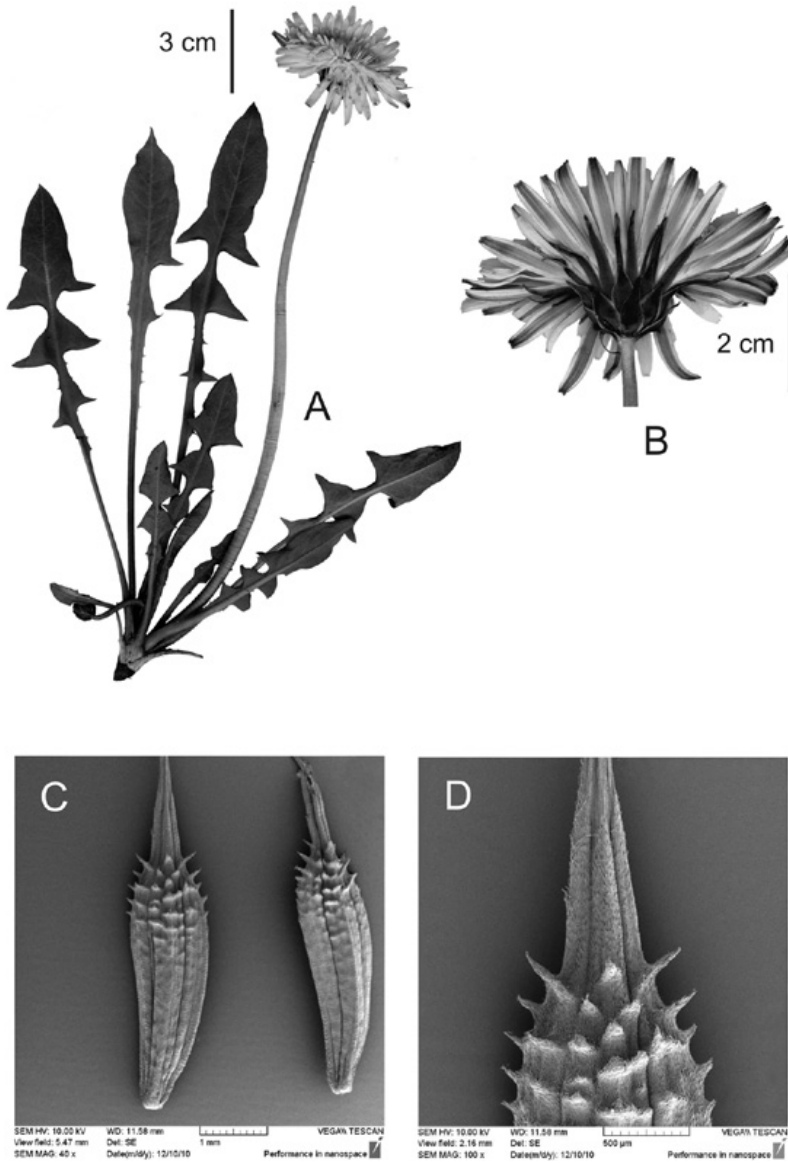


Fig. 1. *Taraxacum zajacii* (A and B from the holotype, C and D from the paratype). — A: Habit. — B: Capitulum. — C and D: Morphology of achenes (SEM).

***Taraxacum zajacii* J. & P. Marciniuk, sp. nova** (Fig. 1)

Planta mediocris usque ad grandem, sat robusta. Folia erecta, in forma oblongata, ab medio-viridia ad atro-viridia, nuda vel anguste in nervis pilosa. Folia profunde divisa, lobi laterales triangulares, raro deltoidei, plerumque patentes, nonnumquam expedite reflexi, in 2–3(–4) paribus plerumque regularibus, margo superior loborum lateralium integerrimus plerumque directus, rarius leniter convexus vel concavatus; margo

inferior integerrimus plerumque directus vel paululum concavatus, interlobia solite atre limbata plerumque integerrima, nonnumquam denticulata. Lobus apicalis plerumque grandis, lobis lateralibus maior, hastatus. Petiolus angustus, purpureus. Pedunculus viridicato-fuscus, nudus, sub calathio modo anguste pilosus. Involucri foliola extranea (12–)13–19 laxe appressa, in calathiis vetustioribus saepe erecta vel paululum patentia, plerumque regulariter imbricata, fere glabra aut breviter ciliata, atro-viridia vel pullo-viridia, lato-lanceolata aut ovato-lanceo-

lata, plerumque (8–)9–12 mm longus et (3.8–)4–5 mm latus. Limbus distinctus, angustus, albidus, 0.2–0.4 mm latus. Calathium flavum, magnitudine (4–)4.5–5(–5.2) cm in diametro, ligula in floribus externis subrueteo-pulla, denticuli florum internorum flavi vel subrueteo-flavi. Stigmata sat atra, pullo-viridicatio-flava. Anthera copiosa. Achenia (4–)4.2–4.8(–5) mm longa, sat gradatim in pyramidem subcylindricam 0.8–0.9 mm longam abeuntia, rostellum 9–11 mm longum, pappus 6.5–7.5 mm longus.

HOLOTYPE: Poland. Pogórze Dynowskie foothills, Harta, 49°50'N, 22°13'E, 9 May 2008 J. & P. Marciniuk 0393422 (KRA). — PARATYPE: Poland. Pogórze Dynowskie foothills, Harta, 14 May 2008 M. Wolanin 0393423 (KRA).

ETYMOLOGY. The species is dedicated to the outstanding Polish botanist Prof. dr. hab. Adam Zajac from the Institute of Botany, Jagiellonian University, on the occasion of his 70th birthday.

Plants medium to large, fairly stout. Leaves erect, slightly elongated, medium to dark green, glabrous or scarcely hairy, leaves deeply divided, lateral lobes triangular, rarely deltoid, usually patent, sometimes slightly recurved, in 2–3(–4) usually regular pairs, upper edge of lateral lobes entire, usually straight, rarely slightly convex or concave, lower edge entire, usually straight or slightly concave, interlobes usually with a dark border, entire, sometimes with tiny teeth. Terminal lobe usually large, larger than the side lobes, hastate, rarely sagittate. Petiole narrow and purple. Scapes greenish-brown, glabrous, only under capitulum scarcely hairy. Outer bracts (12–)13–19 loosely adpressed, on older capitulum often erect or slightly patent, usually imbricate, nearly smooth or shortly ciliated, dark green or blackish-green, broadly-lanceolate or ovate-lanceolate, usually (8–)9–12 mm long, (3.8–)4–5 mm wide. Borders distinct, narrow, whitish, 0.2–0.4 mm wide. Capitulum yellow, large (4–)4.5–5(–5.2) cm in diameter, stripe on external ligules reddish-grey, teeth of internal ligules yellow or reddish-yellow. Stigmata rather dark, grey-greenish-yellow. Pollen present, relatively large and regular. Achenes (4–)4.2–4.8(–5) mm long, achene body spinulose above, subgradually narrowing to a subcylindrical, 0.8–0.9 mm long cone, rostrum 10–11 mm long, pappus 6.5–7.5 mm long.

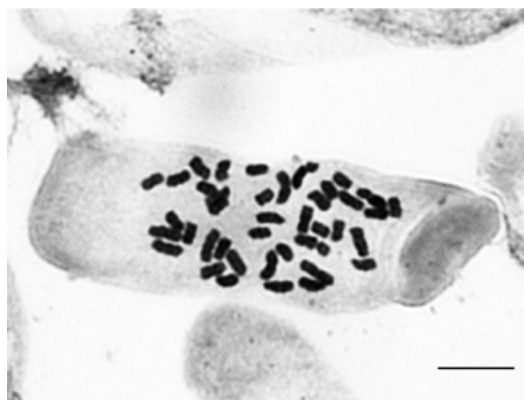


Fig. 2. Mitotic chromosomes of *Taraxacum zajacii*, $2n = 5x = 40$, stained in acetic-orcein. Scale bar = 5 μm .

The chromosome count for this species showed pentaploid chromosome number of the examined seedlings $2n = 5x = 40$ (Fig. 2).

Taraxacum zajacii is so far known from only one site in Harta on Pogórze Dynowskie foothills. It is very abundant (several thousands of plants) on a wet meadow of the alliance *Molinion*.

Taraxacum zajacii is characterised by relatively wide, distinctly dissected leaves, with usually dark-bordered interlobes and a large, hastate terminal lobe and very dark, distinctly narrowly bordered and loosely adpressed or erect outer bracts. These features make the species similar to the group *T. subalpinum*/*T. neterophilum* described in the monograph of *T. sect. Palustria* (Kirschner & Štěpánek 1998), in which *T. subalpinum* is the most similar in leaf morphology. The species differ, however, significantly in the morphology of the inflorescence. *Taraxacum zajacii* produces abundant pollen, in *T. subalpinum* the pollen is invisible. Moreover, the capitulum in *T. zajacii* is much larger, and the outer bracts are larger and more numerous than in *T. subalpinum*.

The leaves of *T. declivicola* are also of similar shape as in *T. zajacii*. The former species differs from *T. zajacii* by having a smaller capitulum (3–3.5 cm in diameter), a smaller terminal lobe, a narrowly yet prominently winged petiole (*T. zajacii* has non-winged petioles), a hardly visible margin of outer bracts, and a different color of stripes on the underside of the external ligules and in the teeth of the internal ligules.

Table 1. A morphological comparison of *Taraxacum zajacii* and *T. inundatum*.

	<i>T. zajacii</i>	<i>T. inundatum</i>
Leaf width	usually more than 2.5 cm	about 2 cm
Terminal lobe	large, hastate, undivided	triangular, often elongated and sublobate
Lateral lobes	2–4, triangular, patent, upper margin usually straight	2–4, triangular, patent, upper margin often convex
Diameter of capitulum	usually 4.5–5 cm	usually 4–5.5 cm
Outer bracts	9–12 mm long, 4–5 mm wide, all equal, margin clear, 0.2–0.4 mm wide	8.5–10.5 mm long, 3–4.4 mm wide, extremely external, often narrow about 2 mm wide, clear margin, 0.8–1.2 mm wide
Scapes	naked, scarcely haired only below the capitulum usually	entirely arachnoid
Achene	4.2–4.8 mm long, cone 0.8–0.9 mm long, fairly numerous spines	usually 4.1–4.8 mm long, cone 0.9–1.1 mm long, numerous spines

Other species of that group differ from *T. zajacii* by having a different shape of the terminal lobe, a clearly smaller capitulum (less than 3.5 cm in diameter, while in *T. zajacii* it is more than 4 cm in diameter) as well as smaller external outer bracts (at most 8.5–10 mm long, and 3–5 mm wide at *T. extimum*, whereas they are 9–12 mm long and 4–5 mm wide in *T. zajacii*). Moreover, all the species in the *T. subalpinum*/*T. neterophilum* group have a triploid ($2n = 24$) chromosome number (Kirschner & Štěpánek 1998), which clearly distinguishes them from the pentaploid ($2n = 40$) *T. zajacii*.

The similarity to other species and groups of species in *T. sect. Palustria* is less distinct. Among the pentaploid species, *T. inundatum* resembles *T. zajacii* most as regards to the size of the capitulum, dimensions of outer bracts, and leaf shape. The former species differs from *T. zajacii* by having narrower leaves with a different shaped terminal lobe, a wider margin of outer bracts, hairier scapes as well as more spiny achenes with longer cones (Table 1). Other pentaploid species from *T. sect. Palustria* have narrow and undivided (*T. skalinskianum*) or very shallowly sublobate or only dentate leaves (*T. domabile*, *T. mendax*, *T. huterianum* and *T. pseudosuecicum*), as well as a small capitulum (3–3.5 cm in diameter); besides, they differ from *T. zajacii* in their shape, size, and width of the margin of the outer bracts.

The pollen grains of *T. zajacii* are relatively large and regular, as in the pentaploid species

T. mendax (Marciniuk & Rudzińska-Langwald 2008, Marciniuk *et al.* 2010a).

Acknowledgements

This work was supported by the grant N303 807940 of the Ministry of Science and Higher Education.

References

- Aquaro, G., Caparelli, K. F. & Aquaro, L. P. 2008: The genus *Taraxacum* (Asteraceae) in Italy. I. A systematic study of *Taraxacum* sect. *Palustria*. — *Phytologia Balcanica* 14: 61–67.
- Kirschner, J. & Štěpánek, J. 1998: *A monograph of Taraxacum sect. Palustria*. — Institute of Botany, Academy of Sciences of the Czech Republic, Průhonice.
- Marciniuk, J. 2012: *Taraxacum sect. Palustria in Poland*. — University of Natural Sciences and Humanities, Siedlce.
- Marciniuk, J. & Rudzińska-Langwald, A. 2008: Morphological diversity of pollen from selected species of the genus *Taraxacum*, according to their ploidal level. — *Acta Agrobotanica* 61: 65–69.
- Marciniuk, J., Grabowska-Joachimiak, A. & Marciniuk, P. 2010a: Differentiation of the pollen size in five representatives of *Taraxacum* sect. *Palustria*. — *Biologia Section Botany* 65: 954–957.
- Marciniuk, J., Rerak, J., Grabowska-Joachimiak, A., Jastrząb, I., Musiał, K. & Joachimiak, A. J. 2010b: Chromosome numbers and stomatal cell length in *Taraxacum* sect. *Palustria* from Poland. — *Acta Biologica Cracoviensia Series Botanica* 52: 117–121.
- Tikhomirov, V. 2003: [Generis *Taraxacum* Wigg. (Asteraceae) species nova e Belorussia]. — *Novosti Sistematiki Vysshikh Rastenii* 35: 207–210. [In Latin and Russian].