

## *Taraxacum zajacii* (section *Palustria*) – an endemic from Pogórze Dynowskie. Distribution and habitat requirements

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*Summary:* *Taraxacum zajacii* is a pentaploid bog dandelion described in 2012. As other dandelions belonging to the section *Palustria*, it is an endangered species. In spring 2014, we performed field studies aimed at estimating the range and characterising sites of this taxon. Present range of the species includes 6 sites, all situated in Pogórze Dynowskie. Habitat preferences of *Taraxacum zajacii* were determined based on phytosociological relevés. It grows on wet loamy soils in mown but not undersown meadows of the order *Molinietalia*, mainly of the alliance *Calthion*. As a rule, it is accompanied by other dandelion species from the section *Palustria*: *T. portentosum*, *T. vindobonense*, *T. polonicum* and *T. mendax*. Representatives of these accompanying species were definitely less numerous. Probably *T. zajacii* performs better when competing with tall meadow plants.

*Keywords:* *Taraxacum zajacii*, Asteraceae, distribution, habitat requirements, Poland

The genus *Taraxacum* belongs to the largest and most diverse apomictic complexes. So far, more than 3000 species classified into 56 sections have been described (KIRSCHNER & ŠTĚPÁNEK 1997; MARCINIUK et al. 2010). *Taraxacum* sect. *Palustria* is one of the best recognised European sections. At present, we know about 140 species of bog dandelions (KIRSCHNER & ŠTĚPÁNEK 1998; AQUARO et al. 2008; MARCINIUK et al. 2012), 24 of which grow in Poland (MARCINIUK et al. 2012; MARCINIUK 2012). Most of them have well recognised ranges and habitat preferences (KIRSCHNER & ŠTĚPÁNEK 1998; MARCINIUK 2012; SCHMID 2002). *Taraxacum zajacii* J. Marciniuk & P. Marciniuk, a pentaploid bog dandelion described in 2012 from only site (Harta in Pogórze Dynowskie, 2×2 km ATPOL square: FF8621 (MARCINIUK et al. 2012)) is an exception. It is a species of outstanding morphological features. From other species of the section *Palustria* it differs in some unique properties like: impressive height, very wide leaves (more than 2.5 cm) ending with a large spear-shaped top leaflet and exceptionally large capitula of a diameter exceeding 4.5 cm (Fig. 1 A).

The aim of this study was to analyse the distribution of sites, to determine the range and to broaden the knowledge about the ecology of *Taraxacum zajacii*.

### Materials and methods

New sites of *Taraxacum zajacii* were searched for with the patrol method in May 2014. Phytosociological relevé was made in each site according to the classical method (BRAUN-BLANQUET 1964). The size and condition of population was estimated and habitat conditions were determined by calculating Ellenberg's indices (ELLENBERG et al. 1991) with respect to light (L), temperature (T), continentality of climate (K), soil moisture (F), soil pH (R) and nitrogen content in soil (N) for each relevé. Sites of *T. zajacii* were localised in the ATPOL network of squares 2×2 km (ZAJAĆ 1978). Syntaxonomic affiliation was adopted after MATUSZKIEWICZ (2001). Names of species were taken from MIREK et al. (2002).

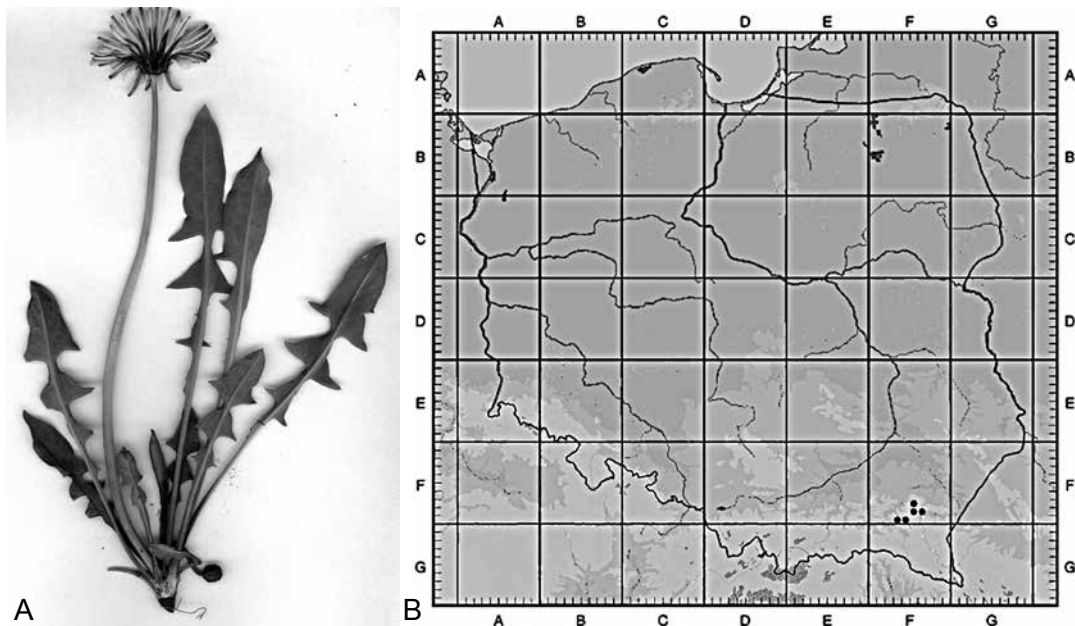


Figure 1. *Taraxacum zajacii*: A – flowering specimen; B – total range.

## Results and Discussion

### Distribution

Seven sites of *Taraxacum zajacii* (six of them new) were found during field studies. All were situated in Pogórze Dynowskie (Figs 1 B; 2): 1) Harta (*locus classicus*) FF8621, 49°50'47,79" N, 22°13'59,53" E; 2) Harta FF8610, 49°51'57,67" N, 22°11'54,16" E; 3) Harta FF8514, 49°51'59,30" N, 22°11'39,80" E; 4) Hyżne FF7534, 49°54'54,47" N, 22°11'17,67" E; 5) Lutcza FF 9303, 49°48'26,40" N, 21°52'56,80" N; 6) Lutcza FF9400, 49°48'10,70" N, 21°54'58,80" E; 7) Blizne FF9421 (numbers of sites in the text are the same as in Fig. 2).

*Taraxacum zajacii* is such an outstanding dandelion that it is impossible for the authors of the section *Palustria* monography (KIRSCHNER & ŠTĚPÁNEK 1998) or authors of German papers (UHLEMANN 2003; SCHMID 2002) to pass over the plant of so distinct features. Therefore, one

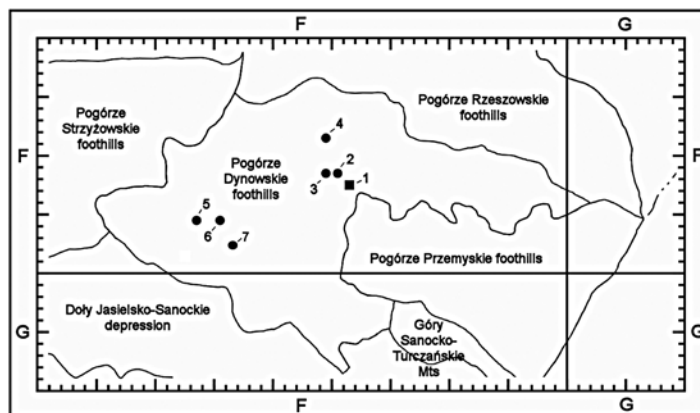
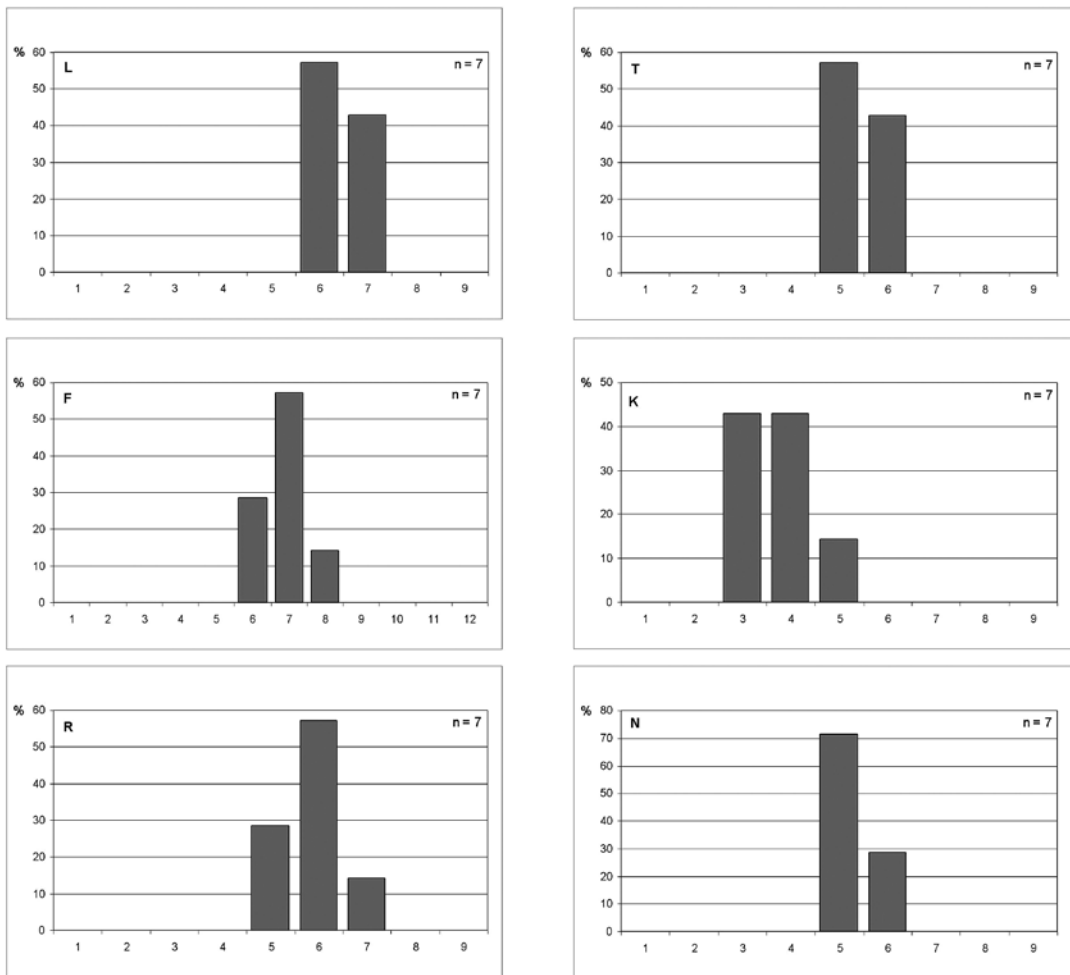


Figure 2. Location of sites of *Taraxacum zajacii*: ■ – locus classicus; ● – new sites.

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**Figure 3.** Ellenberg's indicator values for plots with *Taraxacum zajacii*: L – light; T – temperature; F – soil moisture; K – continentality of climate; R – soil pH; N – soil nitrogen.

may assume with a great probability that the range of *Taraxacum zajacii* is limited to Pogórze Dynowskie and the species in an endemic of this part of the External West Carpathians.

### Ecological characteristics of sites

*Taraxacum zajacii* grows on wet loamy soils in mown but not undersown meadows of the order *Molinietalia*. Based on the evaluation of habitat conditions (ELLENBERG et al. 1991), such places may be defined as partially shaded, moderately warm or warm, on moist or wet soils of pH close to neutral and of moderate abundance of nitrogen compounds (Fig. 3).

Floristic composition of these communities (Table 1) shows species characteristic of the *Calthion* alliance such as *Caltha palustris*, *Cirsium rivulare* and *Scirpus sylvaticus*. Species of the alliance *Alopecurion*, despite their permanent presence, do not play a role of dominants in any of the sites. This fact inclined us to attribute meadows with *Taraxacum zajacii* to the *Calthion* alliance (KUCHARSKI 1999). Relevés were made too early, however, to attribute these phytocoenoses to particular communities. In the classical site (Harta, ATPOL square FF8621), *Taraxacum zajacii* grows on a wet meadow from the *Calthion* alliance, characterised by a great share of *Carex nigra*

Table1. Communities with *Taraxacum zajacii* in Poland.

No. of relevé	1	2	3	4	5	6	7
Locality	Harta FF8621	Lutcza FF9400	Harta FF8514	Harta FF8610	Lutcza FF9303	Hyżne FF7534	Blizne FF9421
Date	09.05.2008	23.04.2014	22.04.2014	22.04.2014	23.04.2014	22.04.2014	02.05.2015
Density of herb layer C (%)	80	70	80	70	70	60	80
<i>Taraxacum zajacii</i>	+	+	2	1	1	+	+
<b>Alopecurion</b>							
<i>Alopecurus pratensis</i>	1	2	2	2	1		3
<i>Ranunculus auricomus</i>	2	1	1	1	+		1
<i>Glechoma hederacea</i>		1		1	+	1	+
<b>Calthion</b>							
<i>Cirsium rivulare</i>	+	1	+	+	1	1	1
<i>Scirpus sylvaticus</i>	+		1	1	1	2	3
<i>Caltha palustris</i>	2	1	2	2		1	
<i>Myosotis palustris</i>	+	+	+				
<b>Molinietalia</b>							
<i>Equisetum palustre</i>	+	+	1	+	+	+	+
<i>Taraxacum portentosum</i>	+			+	+	+	
<i>Lychnis flos-cuculi</i>		+	+	+	+		
<i>Taraxacum vindobonense</i>	+		1			+	
<i>Angelica sylvestris</i>		+	+				+
<i>Taraxacum polonicum</i>			+	+	+		
<i>Deschampsia caespitosa</i>		+			+		
<i>Taraxacum mendax</i>			+				
<b>Molinio-Arrhenatheretea</b>							
<i>Cerastium holosteoides</i>	3	+	+	+	1	+	+
<i>Cardamine pratensis</i>	1	+	1	+	+	+	+
<i>Ranunculus repens</i>	+		3	2	2	2	1
<i>Trifolium repens</i>	2	1	+	+		+	3
<i>Plantago lanceolata</i>		+	+	+	+		+
<i>Bellis perennis</i>	+		+	+		+	
<i>Holcus lanatus</i>		1			+	+	
<i>Trifolium pratense</i>		+		+	+		
<i>Ranunculus acer</i>	+	+	+		+	+	3
<i>Rumex acetosa</i>	+	+	+		+	+	1
<i>Filipendula ulmaria</i>	+	1	1				2
<i>Taraxacum</i> sect. <i>Ruderalia</i>			+	+		+	+
<i>Phleum pratense</i>		+	+				+
<i>Lathyrus pratensis</i>		+	+				+
<b>Others</b>							
<i>Carex nigra</i>	4	1	+	+		+	
<i>Ficaria verna</i>	+	+			+		3

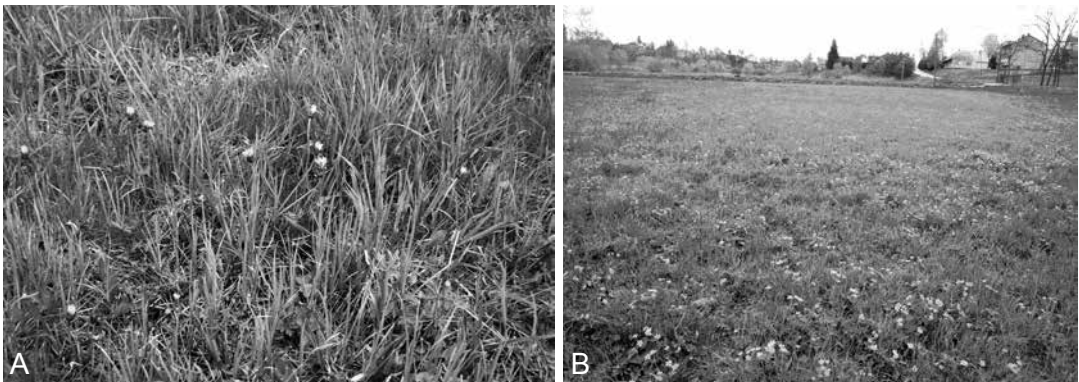
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Figure 4. *Taraxacum zajacii*: A – on meadow with left hay (Lutcza FF9400); B – in kingcup meadow (Harta FF8610).

(Table 1, rel. 1), which indicates its reference to low peatlands of the alliance *Caricion nigrae*. In new sites in Harta and Lutcza, *T. zajacii* grows in communities of king-cup meadows (Fig. 4 A, B), which show a distinct reference to communities of the *Alopecurion* alliance. *Alopecurus pratensis* and *Ranunculus auricomus* exhibited a large coverage in all sites (Table 1, rel. 2–5). In Hyžne, *T. zajacii* grows in a local depression, with slightly boggy form of a meadow of the *Calthion* alliance, clearly referring to the association *Scirpetum sylvatici*. *Taraxacum zajacii* is as a rule accompanied by other species of the section *Palustria*: *T. portentosum*, *T. vindobonense*, *T. polonicum* and *T. mendax*. All mentioned species were definitely less numerous. It is probable that *T. zajacii*, much higher than the other species, performs better in competition with tall perennials and grasses.

The size of *T. zajacii* population is quite variable among sites. In Harta, in both *locus classicus* and newly found sites, the species was represented by more than 1000 individuals on each meadow. Populations in Lutcza are small, each meadow hosts about 100 individuals. The smallest population of about 50 individuals is in Hyžne.

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► **Sporadic species:** *Taraxacum amplum* 5(+); *Taraxacum ancistrolobum* 5(+); *Taraxacum clarum* 5(+), 6(+); *Taraxacum corynodes* 5(+); *Taraxacum crassum* 7(+); *Taraxacum fascians* 5(+); *Taraxacum freticola* 5(+); *Taraxacum gelertii* 5(+); *Taraxacum hepaticum* 3(+); *Taraxacum lacinulatum* 5(+); *Taraxacum lucidum* 3(+), 5(+), 7(+); *Taraxacum oblongatum* 5(+); *Taraxacum ochrochlorum* 5(+); *Taraxacum pallidipes* 5(+); *Taraxacum pectinatifforme* 5(+); *Taraxacum pulchrifolium* 5(+), 7(+); *Taraxacum quadrangulum* 7(+); *Taraxacum sinuatum* 2(+), 3(+); *Taraxacum stridulum* 7(+); *Taraxacum tortuosipallidum* 7(+); *Taraxacum zdravovodense* 4(+), 5(+); *Aegopodium podagraria* 6(+); *Agrostis stolonifera* 5(1), 6(1); *Ajuga reptans* 2(+); *Anthoxanthum odoratum* 2(+), 4(+), 7(+); *Bromus hordeaceus* 1(+); *Carex brizoides* 5(+), 7(1); *Carex cuprina* 2(+); *Carex hirta* 5(+); *Carex spicata* 5(+); *Carex vulpina* 2(+), 7(+); *Carum carvi* 5(+); *Crepis biennis* 2(+); *Festuca arundinacea* 5(+); *Festuca pratensis* 5(+); *Festuca rubra* 1(+); *Galium palustre* 2(+); *Geranium pratense* 7(2); *Glyceria* sp. 1(+); *Heracleum sphondylium* 2(+), 7(+); *Juncus conglomeratus* 3(+); *Juncus effusus* 4(+); *Juncus inflexus* 5(+); *Leontodon hispidus* 4(+); *Lolium perenne* 1(1); *Lotus corniculatus* 6(+); *Luzula campestris* 7(+); *Lysimachia nummularia* 3(+); *Lythrum salicaria* 2(+); *Mentha aquatica* 3(+); *Mentha longifolia* 2(+); *Phalaris arundinacea* 5(+); *Phragmites australis* 1(+); *Pimpinella saxifraga* 3(+); *Poa pratensis* 2(+); *Potentilla anserina* 2(+), 5(+); *Rumex crispus* 2(+), 5(+); *Stellaria graminea* 5(+); *Symphytum officinale* 2(+), 3(+), 7(1); *Trifolium hybridum* 2(+), 5(+); *Urtica dioica* 6(+); *Valeriana simplicifolia* 2(1); *Veronica persica* 6(+).

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