Somatic chromosome numbers are given for the following *Taraxacum* species: *T. pieninicum*, 2n=16; *T. dentatum*, 2n=24; *T. fascinans*, 2n=24; *T. mendax*, 2n=40; *T. subalpinum*, 2n=24; *T. telmatophilum*, 2n=24; *T. cyanolepis*, 2n=24; *T. fulgidum*, 2n=24; *T. gentile*, 2n=24; and *T. undulatum*, 2n=24. Chromosome numbers from Poland are published for the first time for *T. dentatum*, *T. fascinans*, *T. mendax*, *T. subalpinum*, *T. telmatophilum*, *T. cyanolepis*, *T. fulgidum*, *T. gentile* and *T. undulatum*.

**Key words:** Asteraceae, *Taraxacum*, section *Palustria*, section *Erythrocarpa*, section *Ruderalia*, chromosome number, Poland.

**INTRODUCTION**

The species-rich genus *Taraxacum* is interesting from many aspects. Like the genera *Rubus* and *Hieracium*, it groups hundreds of apomictic microspecies and by many researchers is treated as a model taxon for studies of this mode of reproduction (Richards, 1970; van Dijk, 2003; Martonfiova et al., 2007). Many dandelion species are medicinal plants and honey plants, and some of them are burdensome weeds. The majority, especially those of sect. *Palustria*, are rare, poorly known, and in danger of extinction due to the disappearance of the habitats where they grow (Marciniuk, 2012).

The genus *Taraxacum* includes diploid species (2n=2x=16) which reproduce sexually, the most widespread triploid apomictic species (2n=3x=24), and less numerous higher polyploids which usually are agamous (Záveská Drábková et al., 2009). Knowledge of chromosome numbers within the genus is far from sufficient. According to Gacek et al. (2011), 91% of the *Taraxacum* species from Poland remain to be studied. The most substantial contribution to karyological research on dandelions from Poland, especially those of sect. *Palustria*, was made by Prof. Janina Malecka (1972, 1973, 1978). In the context of changes in the natural environment and our poor knowledge of the mechanisms of karyological variability in this group of plants, there is a need to supply missing data and to confirm some previous reports.

We studied the karyology of 10 *Taraxacum* species from Poland belonging to the *Palustria*, *Erythrocarpa* and *Ruderalia* sections (Tab. 1). The plant material was examined and identified by P. Marciniuk, and the identity of problematic specimens was verified by Jan Štepánek (*T. dentatum*, *T. mendax*, *T. telmatophilum*), Ingo Uhlemann (*T. fascinans*, *T. subalpinum*), Piet Oosterveld (*T. fulgidum*, *T. undulatum*) and Bohumil Trávníček (*T. gentile*). The herbarium material is deposited in the Herbarium of the Jagiellonian University in Cracow (KRA).

Roots of juvenile seedlings or grown specimens were incubated for 4 h in saturated solution of 8-hydroxychinoline and then fixed in 3:1 acetic alcohol. For chromosome counts the root tips were stained in acetic orcein or hydrolyzed with 1N HCl at 60°C and stained with toluidine blue.
CHROMOSOME NUMBERS

*Taraxacum pieninicum* Pawl.
(sect. *Erythrocarpa*). 2n=16 (Fig. 1a)

Endemic to the Pieniny Mts., critically endangered (Zarzycki et al., 2001). Its *locus classicus* on the slopes of Okrąglica has disappeared and for many years it was considered extinct (Mirek et al., 2002). *T. pieninicum* reproduces sexually but it is also capable of vegetative reproduction. It grows well in cultivation, a fortunate feature should it become extinct in nature. Also, recently an efficient system of in vitro micropropagation has been developed for it (Trejgell et al., 2013).

Previous published reports of chromosome number 2n=16 in this taxon come only from the mid 20th century (Malecka, 1958, 1961). According to Wróbel and Zarzycki (2008) it was also recorded in 2002 by Prof. Romana Czapik. Although we confirmed the diploid number in seedlings and plantlets grown from seeds collected in the Pieniny Mts., tetraploid metaphase plates were observed in the studied material equally often (Fig. 1d), indicating polysomy of root-tip meristems or chromosomal instability of the studied specimens. This requires further research.

*Taraxacum dentatum* Kirschner & Štepánek
(sect. *Palustria*). 2n=24 (Fig. 1b).

A Central European species with localities spread from Germany to Hungary through Poland, the Czech Republic and Slovakia. It is quite variable morphologically and produces pollen. In the long term the species is threatened with extinction because the localities are dispersed and its populations are never abundant. Another adverse factor is competition from other plants which displace it into abnormal habitats such as wheel ruts or trampled places (Marciniuk, 2012). This is the first chromosome number report from Poland for this taxon. The triploid chromosome number of the species was reported by Kirschner and Štepánek (1985) for plants growing in two localities in Slovakia. This is the first chromosome number report from Poland for this taxon.

*Taraxacum telmatophilum* Kirschner & Štepánek
(sect. *Palustria*). 2n=40 (Fig. 1e).

The center of distribution of this species is located in the Western Carpathians. It grows in dispersed localities in Austria, the Czech Republic, Slovenia and Hungary. In Poland *T. mendax* occurs in the Carpathians, Ponidzie and Silesia. Its low variability makes it difficult to mistake for another dandelion species in the flora of Poland. Due to its narrow habitat requirements – it grows in wet meadows (*Molinion*) and fertile fens (*Caricion davallianae*) – it is in danger of extinction. It produces pollen (Marciniuk et al., 2010). The pentaploid chromosome number of the species was reported by Kirschner and Štepánek (1988) for plants growing in two localities in Slovakia. This is the first chromosome number report from Poland for this taxon.

*Taraxacum cyanolepis* Dahlst.
(sect. *Ruderalia*). 2n=24 (Fig. 1g).

It occurs in Fennoscandia, Scotland, Belgium, Holland, the Czech Republic and Slovakia in meadows and at roadsides (Sell and Murrell, 2006). In Poland it was found in Mazovia and Podlasie and was described as a species new for Poland (Głowacki et al., 2007). *T. cyanolepis* is common in the vicinity of Siedlce (Głowacki et al., 2001). This is the first chromosome number report from Poland for this taxon. Previously its chromosome number was given only for plants from Germany (Lippert, 2006).

*Taraxacum fulgidum* G.E. Haglund (sect. *Ruderalia*).
2n=24 (Fig. 1h).

The species is characteristic of Northern Europe: Fennoscandia, the British Isles, Iceland, Ireland, Belgium and Holland, where it grows in wet meadows (Sell and Murrell, 2006). Like *T. cyanolepis*, in...
Chromosome numbers in *Taraxacum*

Mitotic chromosomes of (a) *T. pieninicum* 2n=16, (b) *T. dentatum* 2n=24, (c) *T. undulatum* 2n=24, (d) *T. pieninicum* 2n=32, (e) *T. mendax* 2n=40, (f) *T. telmatophilum* 2n=24, (g) *T. cyanolepis* 2n=24, (h) *T. fulgidum* 2n=24, (i) *T. fascinans* 2n=24, (j) *T. gentile* 2n=24, (k) *T. subalpinum* 2n=24. Bar in k=5 μm and corresponds to all figures.

**Fig. 1.** Mitotic chromosomes of (a) *T. pieninicum* 2n=16, (b) *T. dentatum* 2n=24, (c) *T. undulatum* 2n=24, (d) *T. pieninicum* 2n=32, (e) *T. mendax* 2n=40, (f) *T. telmatophilum* 2n=24, (g) *T. cyanolepis* 2n=24, (h) *T. fulgidum* 2n=24, (i) *T. fascinans* 2n=24, (j) *T. gentile* 2n=24, (k) *T. subalpinum* 2n=24. Bar in k=5 μm and corresponds to all figures.
Poland it was found and identified by Głowacki and Øllgaard (1999) in Mazovia and Podlasie. The chromosome number 2n=24 agrees with the number already established by den Nijs and Sterk (1982) for plants from outside Poland. This is the first chromosome number report from Poland for this taxon.

**Taraxacum fascinans** Kirschner, Mikoláš & Štepánek (sect. Palustria), 2n=24 (Fig. 1i).

It is a Pannonian Central European species, occurring in Poland, the Czech Republic, Slovakia, Germany and Hungary. In Poland it is known from two localities in the Lower Vistula Valley. It grows in wet meadows (Molinion, Calthion, Alopecurion and Cnidion dubii). The species shows low morphological variation and is considered to be an intermediate taxon between sections Ruderalia and Palustria. It produces pollen (Marciniuk, 2012). This is the first chromosome number report from Poland for this taxon. It agrees with the triploid number established for this species by Kirschner and Štepánek (1997, cit. from Index to Plant Chromosome Numbers (IPCN)).

**Taraxacum gentile** Haglund & Railonsala (sect. Ruderalia), 2n=24 (Fig. 1j).

This species varies little morphologically and thus is easy to distinguish. It grows mainly in Germany, Switzerland, Austria and the Czech Republic, and also occurs in other European countries, including Poland, where 36 confirmed natural localities in the eastern part of the country were described. Like representatives of sect. Palustria it prefers wet places; less often it grows in human-altered localities. It is considered rare throughout its distribution area (Marciniuk and Marciniuk, 2012). This is the first chromosome number report from Poland for this taxon. These results add to the chromosome numbers reported for Polish representatives of the genus Taraxacum, particularly those belonging to the karyologically diverse Palustria section. So far, chromosome numbers are known for 14 of the 23 Palustria species whose localities have been confirmed recently in Poland (Marciniuk, 2012; Marciniuk et al., 2012). Eight of them are triploids, four are tetraploids, and two (T. skalinskianum, T. zajacii) are pentaploids. The data on *T. dentatum* (2n=24), *T. fascinans* (2n=24), *T. mendax* (2n=40), *T. subalpinum* (2n=24) and *T. telmatophilum* (2n=24) contribute to the list. *T. balticum*, *T. hollandicum*, *T. madidum* and *T. subpolonicum* remain to be investigated.

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