

**Krahulec F., Krahulcová A., Urfus T. & Doležal J. (2020) Populations of *Pilosella* species in ruderal habitats in the city of Prague: consequences of the spread of *P. aurantiaca* and *P. rothiana*. Preslia 92: 167–190.**

Electronic appendix 1. – Individual plants recorded and their taxonomic, karyological and reproductive attributes. Locality codes: 1 – Háje; 2 – Hrnčře; 3 – Řepy. Taxonomic determination was done by F. Krahulec and J. Chrtek; in questionable cases, the plants were revised/determined by Siegfried Bräutigam (Dresden, Germany). Methods used for determination of the reproductive system (RS): A – emasculation/open pollination experiment; B – FCSS analysis of seed doublets; C – FCSS analysis of pooled seed samples (six to ten seeds per sample) detecting the ploidal diversity among embryos; D – Chromosome number screening of germinating seeds detecting the karyological diversity among progeny. Using the method B, C, and D, the number of analysed seeds originating from open-pollinated maternal plants is given in parentheses. For description of the methods used for determination of RS, see Material and Methods section. Symbol M behind the chromosome number signifies the presence of a long hemizygous "marker" chromosome in the karyotype.

Taxonomic identity	Combination	Plant individual	Locality code	Year of collection	DNA-ploidy level	Chromosome number	RS	Determination of RS	Ploidy/chromosome number of embryos	Remark
<b>Basic species</b>										
<i>P. aurantiaca</i>		1489	1	2008	2n~4x		apomictic	C (50)	4x, 2x	rare dihaploid embryos (2x)
		1604	1	2009	2n~4x					
		1606	1	2009	2n~4x					
		1874	1	2010	2n~4x		apomictic	B (20)	4x	
		2030A	1	2012	2n~4x					
		2141	2	2013	2n~4x		apomictic	B (18)	4x	
<i>P. bauhini</i> subsp. <i>bauhini</i>		1481A	1	2008	2n~5x					
		1481B	1	2008	2n~5x		apomictic	C (50)	5x	
		1481C	1	2008	2n~5x					
		1603	1	2009	2n~5x		apomictic	C (26)	5x, ca 2.2x, ca 2.8x	polyhaploid embryos (ploidy corresponding to ca 2.2x and 2.8x)
		1873	1	2010	2n~5x		apomictic	A, B (14)	5x	
		1484	1	2008	2n~6x		apomictic	C (50)	6x, 3x	rare trihaploid embryos (3x)
		1876	1	2010	2n~6x		apomictic	A, B (16)	6x	
		2130	2	2013	2n~5x		apomictic	B (10)	5x, ca 2.7x	a single polyhaploid embryo (ploidy

										corresponding to ca 2,7x)
		2137	2	2013	2n~5x					
		2144	2	2013	2n~5x					
		2145	2	2013	2n~5x					
		2233	2	2018		2n= 6x= 54, M	apomictic	A		
		2236	2	2018		2n= 6x= 54, M				
<i>P. bauhini</i> subsp. <i>magyarica</i>		2240	2	2019		2n= 6x= 54				
<i>P. caespitosa</i>		1486A	1	2008	2n~4x		apomictic	B (49)	4x	
		1486B	1	2008	2n~4x					
		1487	1	2008	2n~4x		apomictic	B (40)	4x	
		1602	1	2009	2n~4x		apomictic	A		
		1605	1	2009	2n~4x					
		1877A	1	2010	2n~4x					
		1877B	1	2010	2n~4x					
		2029	1	2012	2n~4x	2n=4x=36, M				
		2127	2	2013	2n~4x					
		2128	2	2013	2n~4x					
		2134	2	2013	2n~4x		apomictic	B (10)	4x	
		2138	2	2013	2n~4x					
		2140	2	2013	2n~4x					
		2143	2	2013	2n~4x					
		2181	2	2014	2n~4x					
		2225	2	2017		2n=4x=36, M	apomictic	A		
		2133	2	2013	2n~5x					
		2136	2	2013	2n~5x					
<i>P. officinarum</i>		1488A	1	2008	2n~4x		sexual	A		
		1488B	1	2008	2n~4x		sexual	A		

		1495A	1	2008	$2n\sim 4x$		sexual	A		
		1495B	1	2008	$2n\sim 4x$		sexual	A		
		2152	2	2013	$2n\sim 4x$					
<i>P. piloselloides</i>		2126	2	2013	$2n\sim 5x$		apomictic	A, B (8)	5x	
		2129	2	2013	$2n\sim 5x$		apomictic	A		
		2135	2	2013	$2n\sim 5x$		apomictic	A, B (10)	5x	
		2232	2	2018		$2n=5x=45$ , M	apomictic	A		
<b>Intermediate species</b>										
<i>P. densiflora</i>	<i>P. bauhini</i> – <i>P. cymosa</i>	2242	2	2019		$2n=5x=45$ , M	apomictic	B (16)	5x	
<i>P. glomerata</i>	<i>P. caespitosa</i> – <i>P. cymosa</i>	2228	2	2018		$2n=5x=45$ , M	apomictic	A, B (10)	5x	
<i>P. rothiana</i>	<i>P. echioides</i> > <i>P. officinarum</i>	1480A	1	2008	$2n\sim 4x$		apomictic	C (50)	4x	
		1493A	1	2008	$2n\sim 4x$					
		1493B	1	2008	$2n\sim 4x$		apomictic	A		
		2132	2	2013	$2n\sim 4x$					
		2142	2	2013	$2n\sim 4x$					
		2230	2	2018		$2n=4x=36$	apomictic	A		
<i>P. polymastix</i>	<i>P. bauhini</i> – <i>P. caespitosa</i>	1491B	1	2008	$2n\sim 4x$		apomictic	C (40)	4x	
<i>P. bauhini</i> – <i>P. setigera</i>	<i>P. bauhini</i> –[ <i>P. cymosa</i> – <i>P. echioides</i> ]	2235	2	2018	$2n\sim 5x$		apomictic	B (16)	5x	
		2241	2	2019		$2n=5x=45$	apomictic	B (8)	5x	
<i>P. visianii</i>	<i>P. officinarum</i> ≤ <i>P. piloselloides</i>	2131	2	2013	$2n\sim 4x$					
		2139	2	2013	$2n\sim 4x$					
		2184	3	2015	$2n\sim 4x$		apomictic	B (20)	4x	
<b>Recent hybrids</b>										
<i>P. xbrachiata</i>	<i>P. bauhini</i> ≤ <i>P. officinarum</i>	1482A	1	2008	$2n\sim 4x$		apomictic	A, C (50)	4x	
		1483A	1	2008	$2n\sim 4x$		apomictic	C (50)	4x, 2x	a single dihaploid embryo

		1483B	1	2008	$2n\sim 4x$		apomictic	C (29)	4x	
		1491A	1	2008	$2n\sim 4x$		apomictic	C (50)	4x	
		1494C	1	2008	$2n\sim 4x$		apomictic	A, C (50)	4x, 2x	rare dihaploid embryos (2x)
<i>P. xleptophyton</i>	<i>P. bauhini</i> > <i>P. officinarum</i>	1480C	1	2008	$2n\sim 4x$					
		2031	1	2012	$2n\sim 4x$					
<i>P. officinarum</i> > <i>P. brachiata</i>	<i>P. officinarum</i> × [ <i>P. bauhini</i> ≤ <i>P. officinarum</i> ]	1485A	1	2008	$2n\sim 4x$		sexual	A		
		1485B	1	2008		$2n=4x=36$ , M	sexual	A, C (7)	4x	
		1485C	1	2008	$2n\sim 4x$		sexual	A, B (10)	3x, 4x	
		1496	1	2008	$2n\sim 4x$		sexual	A		
<i>P. aurantiaca</i> × <i>P. leptophyton</i>	<i>P. aurantiaca</i> × [ <i>P. bauhini</i> > <i>P. officinarum</i> ]	1492	1	2008	$2n\sim 4x$		sexual, semisterile	A, C (20)	5x, 6x, 7x	
		1490A	1	2008	$2n\sim 6x$		sexual	A, B (12)	5x, 6x, 8x	a single octoploid embryo of $2n+n$ origin
		1490B	1	2008	$2n\sim 6x$					
<i>P. x bifurca</i>	<i>P. officinarum</i> × <i>P. rothiana</i> [ <i>P. echioides</i> ≤ <i>P. officinarum</i> ]	2231	2	2018		$2n=6x=54$	a low seed-set, parthenogenetic RS	A, B (10)	3x, 6x, 7x	embryos mostly trihaploid, a single heptaploid embryo of $n+2n$ origin.
<i>P. aurantiaca</i> × <i>P. bifurca</i>	<i>P. aurantiaca</i> × <i>P. bifurca</i>	2237	2	2019		$2n=5x=45$	seed-sterile	A		
<i>P. aurantiaca</i> × <i>P. rothiana</i>	<i>P. aurantiaca</i> × <i>P. rothiana</i>	2239	2	2019		$2n=6x=54$				
<i>P. x derubella</i>	<i>P. aurantiaca</i> × <i>P. piloselloides</i>	2223	2	2017		$2n=5x=45$	a reduced seed-set, sexual RS	A, B (6), D (13)	diverse, between 3x and 5x	common aneuploid progeny
<i>P. x fuscoatra</i>	<i>P. aurantiaca</i> × <i>P. caespitosa</i>	2226	2	2017		$2n=4x=36$	sexual	D (12)	3x, 5x	progeny diverse in ploidy from a maternal plant
		2238	2	2019		$2n=4x=36$	apomictic	A, B (8)	4x	

<i>P. ×heterodoxa</i>	<i>P. piloselloides</i> × <i>P. rothiana</i> <i>P. piloselloides</i> × [ <i>P. echioides</i> > <i>P. officinarum</i> ]	2243	2	2018		$2n=ca6x=53/54$ (a somatic mosaic)	combined RS: parthenogenetic and potentially sexual	B (6)	3x, 4x, 6x	most of seeds damaged by insects, only six achenes available for FCSS analysis (four trihaploid embryos detected among them)
<i>P. ×rubra</i>	<i>P. aurantiaca</i> > <i>P. officinarum</i>		2	2020	$2n\sim6x$					
<i>P. aurantiaca</i> × <i>P. visianii</i>	<i>P. aurantiaca</i> × [ <i>P. officinarum</i> ≤ <i>P. piloselloides</i> ]	2186	3	2015	$2n\sim4x$		seed-sterile	A		

Electronic Appendix 2. – Summarized karyological and reproductive data on *Pilosella* taxa that are involved in this study irrespective of the locality. The findings are compared with author's previous two papers that referred to these taxa of *Pilosella* coming from other ruderal habitats in the city of Prague. Items on ploidy level are based on flow cytometry and/or chromosome counting. For hybrid formulae illustrating the parental combination in both intermediate species and recent hybrids, see Table 1. Abbreviations and symbols used: n.d. – reproduction mode not determined; • – the hybrid morphotypes corresponding to either *P. brachiata* or *P. leptophyton* were not distinguished in paper by Krahulcová et al. (2009), because all the hybrids between *P. bauhini* and *P. officinarum* were evaluated as one collective category. References: <sup>a</sup>Krahulcová et al. 2009; <sup>b</sup>Křišťálová et al. 2010.

Taxon	Present data Ploidy level (2n), reproduction mode	Published data Ploidy level (2n), reproduction mode <sup>reference</sup>
<b>Basic species</b>		
<i>P. aurantiaca</i>	4x, apomictic	the species found but not studied <sup>b</sup>
<i>P. bauhini</i> subsp. <i>bauhini</i>	5x, apomictic; 6x, apomictic	4x, apomictic <sup>a</sup> ; 5x, apomictic <sup>a,b</sup> ; 6x, apomictic <sup>b</sup> ; 6x, n.d. <sup>a</sup> ; 7x, variable <sup>a</sup>
<i>P. bauhini</i> subsp. <i>magyarica</i>	6x, n.d.	
<i>P. caespitosa</i>	4x, apomictic; 5x, n.d.	4x, n.d. <sup>b</sup> ; 5x, n.d. <sup>b</sup>
<i>P. officinarum</i>	4x, sexual	4x, sexual <sup>a, b</sup> ; 5x, sexual <sup>a</sup> ; 6x, sexual <sup>b</sup> ; 7x, n.d. <sup>b</sup>
<i>P. piloselloides</i>	5x, apomictic	5x, apomictic <sup>b</sup>
<b>Intermediate species</b>		
<i>P. densiflora</i>	5x, apomictic	the species found but not studied <sup>b</sup>
<i>P. glomerata</i>	5x, apomictic	5x, apomictic <sup>b</sup>
<i>P. rothiana</i>	4x, apomictic	4x, apomictic <sup>b</sup>
<i>P. bauhini</i> – <i>P. setigera</i>	5x, apomictic	the species found but not studied <sup>b</sup>
<i>P. polymastix</i>	4x, apomictic	
<i>P. visianii</i>	4x, apomictic	4x, apomictic <sup>b</sup>
<b>Recent hybrids</b>		
<i>P. aurantiaca</i> × <i>P. rothiana</i>	6x, n.d.	
<i>P. aurantiaca</i> × <i>P. bifurca</i>	5x, seed-sterile	
<i>P. aurantiaca</i> × <i>P. leptophyton</i>	4x, sexual; 6x, sexual	
<i>P. aurantiaca</i> × <i>P. visianii</i>	4x, seed-sterile	
• <i>P. bauhini</i> × <i>P. officinarum</i>		4x, sexual <sup>a</sup> ; 4x, apomictic <sup>a</sup> ; 5x, sexual <sup>a</sup> ; 5x, apomictic <sup>a</sup> ; 6x, sexual <sup>a</sup> ; 7x, apomictic <sup>a</sup> ; 7x, variable <sup>a</sup> ; 8x, variable <sup>a</sup> ; aneuploids > 4x, mostly sexual <sup>a</sup>
<i>P. ×leptophyton</i>	4x, n.d.	5x, apomictic <sup>b</sup>
<i>P. ×brachiata</i>	4x, apomictic	4x, seed-sterile <sup>b</sup> ; 4x, n.d. <sup>b</sup>
<i>P. officinarum</i> > <i>P. brachiata</i>	4x, sexual	
<i>P. ×bifurca</i>	6x, variable	
<i>P. ×derubella</i>	5x, sexual	
<i>P. ×fuscoatra</i>	4x, apomictic; 4x, sexual	
<i>P. ×heterodoxa</i>	6x, variable	



Det./Rev. J. Chrtek & F. Krahulec 26. 7. 2016

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No.

*Pilosella leptophyton* (Nägeli. & Peter) P.D.Sell &  
C.West × *P. aurantiaca* (L.) F.W.Schultz & Sch.Bip.

Locality: Czech Republic, Central Bohemia, Praha:  
urban neighbourhood Praha 4 – Háje, along the path  
between the former farmhouse and the fishpond  
“Kančík” at the N periphery of “Miličovský les”  
wood, ca. 300 m a.s.l., 50°01'39"N, 14°32'28"E.

Habitat: this voucher comes from garden cultivation  
in Průhonice (collected 19. 8. 2008)

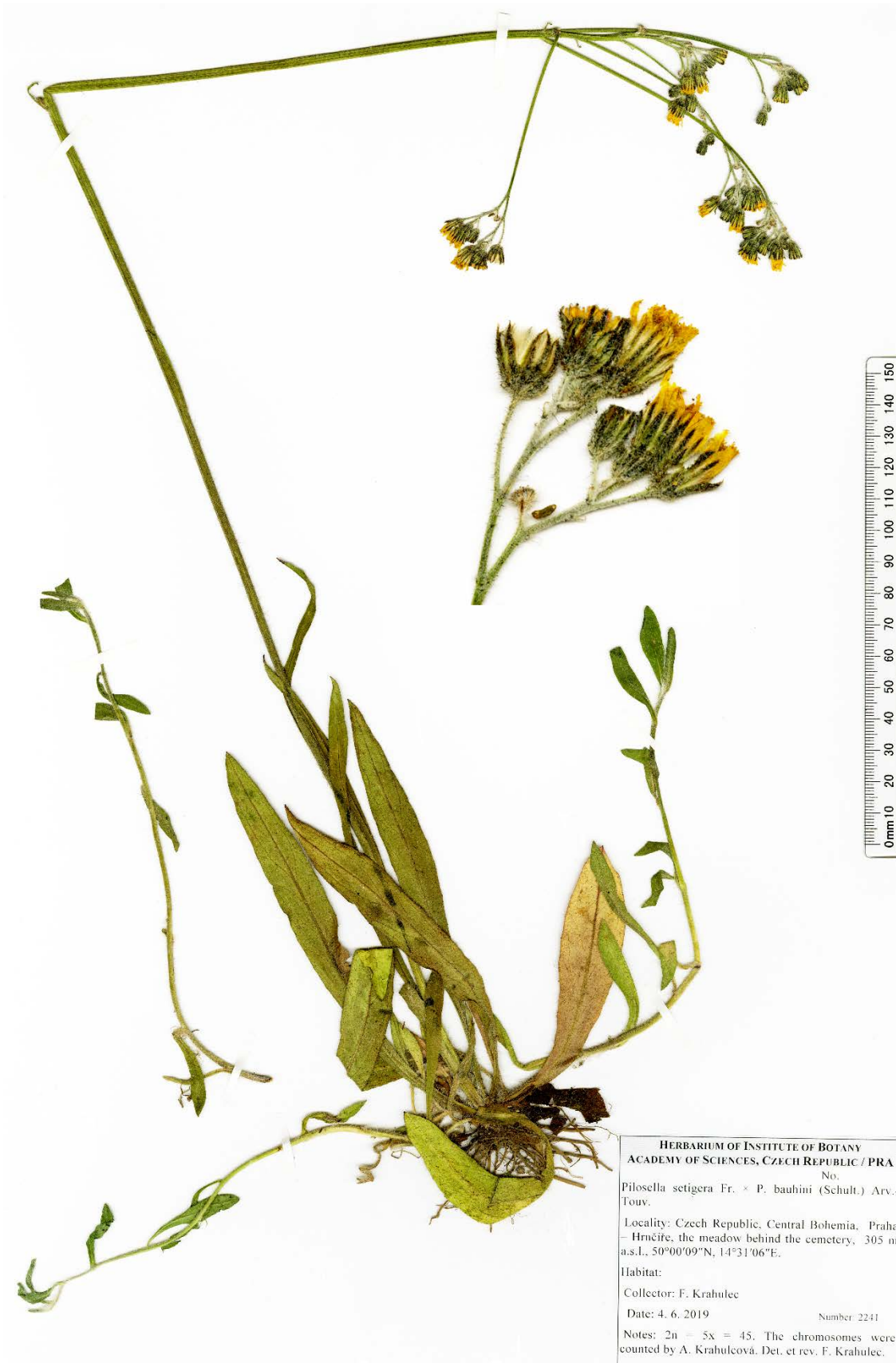
Collector: J. Chrtek

Date: 6. 6. 2008

Number: 1490, plant B

Notes: 2n = 6x (FCM)

Electronic Appendix 3. – *Pilosella aurantiaca* × *P. leptophyton*, hexaploid plant..



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No.  
*Pilosella setigera* Fr. × *P. bauhini* (Schult.) Arv.-  
Touv.  
Locality: Czech Republic, Central Bohemia, Praha  
– Hrnčife, the meadow behind the cemetery, 305 m  
a.s.l., 50°00'09"N, 14°31'06"E.  
Habitat:  
Collector: F. Krahulec  
Date: 4. 6. 2019  
Number: 2241  
Notes:  $2n = 5x = 45$ . The chromosomes were  
counted by A. Krahulcová. Det. et rev. F. Krahulec.

Electronic Appendix 4. – *Pilosella bauhini* × *P. setigera*





Appendix 5. – *Pilosella* ×*bifurca*.

Electronic



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No.  
*Pilosella fuscoatra* (Nägeli & Peter) Soják [*P.*  
*caespitosa* × *P. aurantiaca*]  
Locality: Czech Republic, Central Bohemia, Praha  
– Hrnčíře, the meadow behind the cemetery, 305 m  
a.s.l., 50°00'09"N, 14°31'06"E.  
Habitat:  
Collector: F. Krahulec  
Date: 4. 6. 2019  
Number: 2238  
Notes:  $2n = 4x = 36$ . The chromosomes were  
counted by A. Krahulecová.

Electronic Appendix 6. – *Pilosella* ×*fuscoatra*. Apomictic plant.



Electronic Appendix 7. – *Pilosella* × *fuscoatra*. Sexual plant.