**Mereďa P. Jr., Kučera J., Marhold K., Senko D., Slovák M., Svitok M., Šingliarová B. & Hodálová I. (2015): Ecological niche differentiation between tetra- and octoploids of *Jacobaea vulgaris*. – Preslia 85: 113–136.**

**Electronic Appendix 1. –** Previously published data on the chromosome counts of *Jacobaea vulgaris* from Slovakia until 2006 (data are supplemented or corrected according to Marhold et al. 2007).

| Pop. no. | Locality (sampling site)<br>(each locality is given as follows: phytogeographical district according to Futák 1984; closest town or village; other data) | Chromosome number | Literature |
|---|---|---|---|
| A | SK, Podunajská nížina, Bratislava-Petržalka | 2n = 40 | Letz et al. (1999) |
| B | SK, Bukovské vrchy, Ulič | 2n = 40 | Murín et al. (1999) |
| C | SK, Čergov, Kamenica | 2n = 40 | Murín et al. (1999) |
| D | SK, Ipeľsko-rimavská brázda, Lučenec, motorway restaurant of Halier | 2n = 40 | Murín et al. (1999) |
| E | SK, Liptovská kotlina, Liptovská Mara, Havránok hill | 2n = 40 | Murín et al. (1999) |
| F | SK, Nízke Beskydy, Topoľovka | 2n = 40 | Murín et al. (1999) |
| G | SK, Považský Inovec, Nová Lehota, Bezovec hill | 2n = 40 | Murín et al. (1999) |
| H | SK, Spišské kotliny, Primovce | 2n = 40 | Murín et al. (1999) |
| CH | SK, Spišské vrchy, Nižné Ružbachy | 2n = 40 | Murín et al. (1999) |
| I | SK, Stredné Pohornádie, Obišovce | 2n = 40 | Murín et al. (1999) |
| J | SK, Strážovské vrchy, Slopná, Mt. Ostrá Malenica | 2n = 40 | Murín et al. (1999) |
| K | SK, Strážovské vrchy, Záskalie, Manínska tiesňava gorge | 2n = 40 | Murín et al. (1999) |
| L | SK, Strážovské vrchy, Bojnice | 2n = 40 | Murín et al. (1999) |
| M | SK, Šarišské vrchy, Fintice | 2n = 40 | Murín et al. (1999) |
| N | SK, Štiavnické vrchy, Lehôtka pod Brehmi | 2n = 40 | Murín et al. (1999) |
| O | SK, Turčianska kotlina, Turčianska Štiavnička | 2n = 40 | Murín et al. (1999) |
| P | SK, Veľká Fatra, Blatnica, Dedošová dolina valley | 2n = 40 | Murín et al. (1999) |
| R | SK, Podunajská nížina, Bratislava-Petržalka | 2n = 40 | Májovský et al. (2000) |
| S | SK, Slovenský kras, Turňa nad Bodvou, edge of the village, near the road to the castle ruins | 2n = 80 | Murín & Váchodvá (1970) |
| T | SK, Záhorská nížina, Plavecký Štvrtok | 2n = 80 | Murín & Májovský (1987) |
| U | SK, Devínska Kobyla, Bratislava-Devín, above abandoned orchard E of the cottage community Svätopluk | 2n = 80 | Feráková et al. (1997) |
| V | SK, Burda, Chľaba, Burda hill | 2n = 80 | Murín et al. (1999) |
| W | SK, Slovenský kras, Turňa nad Bodvou | 2n = 80 | Murín et al. (1999) |
| Y | SK, Stredné Pohornádie, Košice, Hradová hill | 2n = 80 | Murín et al. (1999) |
| Z | SK, Tribeč, Nitra, Zobor hill | 2n = 80 | Murín et al. (1999) |
| X | SK, Záhorská nížina, Skalica, Veterník hill | 2n = 80 | Murín et al. (1999) |

**References**


Feráková V., Kochjarová J., Králik E., Schwarzová T. & Záborský J. (1997): Cievnaté rastliny, pp. 86–156. – In: Feráková V. & Kocianová E. (eds), Flóra, geológia a paleontológia Devínskej Kobyly, Litera, Bratislava.

Letz R., Uhríková A. & Májovský J. (1999): Chromosome numbers of several interesting taxa of the flora of Slovakia. – Biologia (Bratislava) 54: 43–49.

Májovský J., Uhríková A., Javorčíková D., Mičieta K., Králik E., Dúbravcová Z., Feráková V., Murín A., Černušáková D., Hindáková M., Schwarzová T. & Záborský J. (2000): Prvý doplnok karyotaxonomického prehľadu flóry Slovenska. – Acta Fac. Rerum Nat. Univ. Comen., Bot. Supplementum 1: 1–127.

Marhold K. & Hindák F. (1998): Checklist of non-vascular and vascular plants of Slovakia. – Veda, Bratislava.

Marhold K., Mártonfi P., Mereďa P. jun. & Mráz P. (eds) (2007): Chromosome number survey of the ferns and flowering plants of Slovakia. – Veda, Bratislava.

Murín A. & Májovsky J. (1987): Karyological study of the Slovak flora XIX. – Acta Fac. Rerum Nat. Univ. Comen., Bot. 34: 3–20.

Murín A., Svobodová Z., Májovský J. & Feráková V. (1999): Chromosome numbers of some species of the Slovak flora. – Thaiszia 9: 31–40.

Murín A. & Váchová M. (1970): Reports. – In: Májovský J. et al. (eds), Index of chromosome numbers of Slovakian flora (part 1). – Acta Fac. Rerum Nat. Univ. Comen., Bot. 16: 20.

**Electronic Appendix 2. –** List of the studied *Jacobaea vulgaris* populations. Each record is given as follows:

– population (voucher) number (Pop. no.; populations marked with "#" were used in the study of environmental data);

– locality description [all localities are in Slovakia and are given as follows: closest village or town, and other information; date of collection (if the plants were collected on the locality more than twice, only the dates of the first and the last collection are given; name of collector(s)];

– geographic coordinates (in WGS84); altitude (Alt; in m a. s. l.);

– habitat type [meadow/pasture (E2.1, E2.7, E7), steppic grassland (E1.2), thermophile fringe (E5.2, F3.1, F3.2, incl. overgrown meadows and pastures), sand dune/steppe (E1.1, E1.9), forest (G1, G3); codes of habitats given in parentheses corresponding to the EUNIS habitat classification (Davies et al., 2004)];

– habitat naturalness [low = vegetation strongly influenced or created by humans, with a higher proportion (more than 15 % of abundance) of ruderal or alien species (e.g. intensively managed or disturbed grasslands, abandoned fields); medium = semi-natural vegetation with moderate proportion (up to 15 % of abundance) of ruderal or alien species (e.g. grazed grasslands, road margins, steppe grasslands in the close proximity of houses); high = natural and semi-natural vegetation without a strong anthropogenic influence and with absence or very low proportion of ruderal or alien species (e.g. steppe grasslands out of proximity of houses, natural forests)];

– geological substrate [granites and gneisses, andesites, loam sediments, shales, loesses, sandy sediments, flysch, calcareous flysch, quartzites, limestones, dolomites, and travertines; correspondence between 12-degree classification and those of Káčer (2005) is explained in the Electronic Appendix 4].

– the number of individuals who were analysed for the DNA ploidy level (by flow cytometric assessment; the numbers labelled with "DC" were also determined by a direct counting from the mitotic cells), with the author(s) of the measurements of ploidy level or place of the original publication of the analyses; the ploidy level data marked with asterisks were taken from the literature: *[1] – from Hodálová et. al. (2007), *[2] – from Hodálová et al. (2010), *[3] – from Hodálová et al. (2015); all other data (given in bold) represent new records.

Other abbreviations and symbols that were used for collectors and authors of the ploidy level analyses were as follows: DD – D. Dítě, IH – I. Hodálová, JS – J. Somogyi, MV – M. Valachovič, Pen – M. Peniašteková, PM – P. Mereďa jun.

| Pop. no. | Locality description | Geographic coordinates | Alt | Habitat type | Habitat natu-ralness | Geological substrate | DNA ploidy level | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 4x | 6x | 8x |
| 12 | Čebovce-Opava, western edge of the village, xerophilous places near the road, 27 Jul 2001, IH | 48°11' N 19°10' E | 420 | – | – | – | 4*[1] | – | **1** |
| 13# | Plešivec, S of the town, xerophilous places near the road, 27 Jul 2001, IH; 15 Jul 2009, IH & PM | 48°31'48" N 20°23'32" E | 220 | meadow/pasture | medium | dolomites | 5*[1] +13*[3] | – | – |
| 14# | Bratislava-Devínska Nová Ves, Štokeravská vápenka stone-pit, between the road and railway, 25 Jul 2002, IH; 16 Jul 2008, IH | 48°12'19" N 17°00'32" E | 170 | meadow/pasture | medium | loam sediments | 3DC*[1] +5*[1] +29*[2] | 1*[2] | – |
| 15# | Bratislava-Karlova Ves, road margin to the city quarter of Dúbravka, 16 Jul 2001, IH; 18 Jul 2008, IH | 48°10'02" N 17°02'54" E | 200 | meadow/pasture | medium | loam sediments | 5*[1] +15*[2] | – | – |

| Pop. no. | Locality description | Geographic coordinates | Alt | Habitat type | Habitat natu-ralness | Geological substrate | DNA ploidy level | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 4x | 6x | 8x |
| 16 | Čachtice, xerophilous meadows under the stone-pit, 17 Jul 2001, IH | 48°43' N 17°47' E | 200 –250 | – | – | – | 1*[1] | – | – |
| 17# | Rudno nad Hronom, west of the village, road margin, 22 Aug 2002, IH | 48°25'30" N 18°40'04" E | 220 | meadow/pasture | medium | loam sediments | 2*[1] | – | – |
| 18# | Vinné, ner the entrance to the camping Hôrka, 27 Aug 2001, IH | 48°47'48" N 21°58'11" E | 150 | meadow/pasture | medium | andesites | 3*[1] | – | – |
| 19# | Folkušová, foot of Mt. Havranová skala, 29 Jul 2001, Pen | 48°58'25" N 18°57'56" E | 660 | meadow/pasture | medium | loam sediments | 3*[1] | – | – |
| 20# | Snina, eastern edge of the town, road margin to Stakčín village, 28 Jul 2001, IH | 48°59'04" N 22°11'26" E | 240 | meadow/pasture | medium | loam sediments | 2*[1] | – | – |
| 21 | between the town of Snina and village of Stakčín, road margin, 28 Jul 2001, IH | 48°59' N 22°12' E | 240 –270 | – | – | – | 1*[1] | – | – |
| 36# | Krásnohorské Podhradie, castle hill Krásna Hôrka, 12 Jul 2003, IH; 15 Jul 2009, IH & PM | 48°39'25" N 20°36'05" E | 440 | steppic grassland | high | limestones | – | – | 6*[1] +8*[3] |
| 37 | Bratislava-Devínska Nová Ves, cottage settlement of Devínske Jazero, near the railway, 16 Jul 2001, IH | 48°15'02" N 16°57'42" E | 148 | – | – | – | – | – | 2*[1] |
| 38# | Bratislava-Devínska Nová Ves, cottage settlement of Devínske Jazero, 16 Jul 2001, IH | 48°15'36" N 16°57'49" E | 165 | sand dune/steppe | medium | sandy sediments | – | – | 3*[1] |
| 39# | Gajary, near the fish-pond of Starý Rybník, 7 Aug 2002, IH, DD & JS | 48°29'41" N 16°55'33" E | 150 | sand dune/steppe | medium | sandy sediments | – | – | 2*[1] |
| 40# | Plavecký Mikuláš, near the gamekeeper lodge of Haluška, 10 Aug 2001, IH; 25 Oct 2008, IH & PM | 48°31'21" N 17°16'07" E | 195 | meadow/pasture | medium | sandy sediments | 42*[3] | 1DC*[2] +2*[2] | 5*[1] +32*[2] |
| 41# | Bratislava-Devínska Nová Ves, National Nature Reserve Devínska Kobyla, Sandberg hill (type locality of the subspecies), 25 Jul 2002, IH; 25 Jul 2013, PM | 48°12'05" N 16°58'26" E | 190 | steppic grassland | high | sandy sediments | – | – | 6*[1] +25*[2] |
| 42 | Senec, near the highway, 22 Aug 2002, IH | 48°14' N 17°22–25' E | 120 –160 | – | – | – | – | – | 2*[1] |
| 43# | Mužla-Čenkov, National Nature Reserve Čenkovská step, 15 Jul 2001, IH | 47°46'08" N 18°31'10" E | 110 | sand dune/steppe | high | sandy sediments | – | – | 1*[1] |
| 44# | Štúrovo, Nature Reserve Vŕšok, 15 Jul 2001, IH | 47°49'10" N 18°39'24" E | 180 | steppic grassland | high | andesites | – | – | 3*[1] |
| 45# | Malý Kamenec, Tarbucka hill, 17 Jul 2002, IH & MV; 16 Jul 2009, IH & PM | 48°21'35" N 21°47'21" E | 230 | steppic grassland | high | andesites | – | – | 2*[1] +23*[3] |
| 46# | Kočín-Lančár, near the stone-pit, 17 Jul 2001, IH | 48°35'33" N 17°38'41" E | 290 | steppic grassland | high | dolomites | – | – | 4*[1] |
| 50# | Demandice, east of the village, 15 Jul 2002, IH; 25 Oct 2008, IH & PM | 48°07'52" N 18°47'32" E | 170 | thermophile fringe | high | andesites | 3*[1] +16*[2] | – | 3*[1] |

| Pop. no. | Locality description | Geographic coordinates | Alt | Habitat type | Habitat natu-ralness | Geological substrate | DNA ploidy level | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 4x | 6x | 8x |
| 51 | Lehota, near the highway, 22 Aug 2002, IH | 48°19' N 17°58' E | 180 –190 | – | – | – | 1*[1] | – | 1*[1] |
| 64# | Vinné, southern foot of the Vinné castle hill, 16 Jul 2009, IH & PM | 48°48'59" N 21°57'00" E | 150 | meadow/pasture | high | andesites | **2** | – | – |
| 65# | Jasenov, near the northern edge of the village, margin of the road no. 582, 17 Jul 2009, IH & PM | 48º48'04" N 22º09'54" E | 175 | meadow/pasture | medium | loam sediments | **2** | – | – |
| 66# | Vojnatina, road margin to Priekopa village, 17 Jul 2009, IH & PM | 48°44'14" N 22°14'08" E | 140 | meadow/pasture | medium | loam sediments | **3** | – | – |
| 67# | Podhoroď, nort-western foot of the Podhoroď castle hill, 17 Jul 2009, IH & PM | 48°49'20" N 22°18'12" E | 370 | meadow/pasture | medium | calcareous flysch | **3** | – | – |
| 68# | Socovce, on the top of the Stráž hill, 11 Aug 2009, IH & PM | 48°56'53" N 18°51'37" E | 534 | meadow/pasture | high | loam sediments | **1** | – | – |
| 69# | Lisková, road margin to the town of Ružomberok, foot of the Mních hill, 11 Aug 2009, IH & PM | 49°05'10" N 19°20'06" E | 500 | meadow/pasture | medium | dolomites | **3** | – | – |
| 70# | Beckov, Skalice hill, near the former quarry, 25 Jul 2009, PM | 48°46'32" N 17°53'38" E | 200 –260 | meadow/pasture | high | limestones | **5** | – | – |
| 71# | Beckov, meadow 0.2–0.4 km south-east from the castle, 25 Jul 2009, PM | 48°47'21" N 17°54'03" E | 220 –250 | meadow/pasture | high | limestones | **5** | – | – |
| 72# | Dolná Súča, Krasín hill, meadows on the south-eastern slopes, 25 Jul 2009, PM | 48°57'33" N 18°01'27" E | 340 | meadow/pasture | high | limestones | **6** | – | – |
| 73# | Dubnica nad Váhom, pastures 1.3 km north-west-west from the Ostrý vrch hill, 25 Jul 2009, PM | 48°56'43" N 18°10'35" E | 270 | meadow/pasture | medium | dolomites | **4** | – | – |
| 74# | Vršatské Podhradie, Vršatec hill, 26 Jul 2009, PM | 49°04'20" N 18°09'24" E | 840 | meadow/pasture | high | loam sediments | **6** | – | – |
| 75# | Horná Poruba, south-western slopes of the Mt. Vápeč, 10 Aug 2009, IH & PM | 48°56'07" N 18°18'45" E | 490 | meadow/pasture | high | calcareous flysch | **3** | – | – |
| 76# | Dolné Vestenice, cote of 287.8, west of the village, 10 Aug 2009, IH & PM | 48°42'11" N 18°23'21" E | 280 | meadow/pasture | medium | dolomites | **2** | – | – |
| 77# | Nitrianske Rudno, meadows near the crossroads to Bojnice village, 10 Aug 2009, IH & PM | 48°48'04" N 18°28'38" E | 330 | meadow/pasture | medium | loam sediments | **2** | – | – |
| 78# | Jasenovo, slope under the cemetery near the road to Nitrianske Pravno village, 11 Aug 2009, IH & PM | 48°52'46" N 18°43'19" E | 520 | meadow/pasture | medium | limestones | **3** | – | – |
| 79# | Slovenské Pravno, slopes above the road no. 519, 11 Aug 2009, IH & PM | 48°53'50" N 18°45'11" E | 490 | meadow/pasture | medium | loam sediments | **2** | – | – |
| 80# | Brezová pod Bradlom, Bradlo hill, 6 Aug 2010, PM | 48°40'46" N 17°33'41" E | 510 | meadow/pasture | medium | limestones | **6** | – | – |
| 81# | Mokrý Háj, slope above the water reservoir, 6 Aug 2010, PM | 48°48'13" N 17°13'33" E | 250 | meadow/pasture | low | loam sediments | **4** | – | – |

| Pop. no. | Locality description | Geographic coordinates | Alt | Habitat type | Habitat natu-ralness | Geological substrate | DNA ploidy level | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 4x | 6x | 8x |
| 82# | Skalica, on the top of the Veterník hill, 6 Aug 2010, PM | 48°48'59" N 17°13'50" E | 315 | meadow/pasture | high | sandy sediments | – | **1** | **6** |
| 83# | Bešeňová, Natural Monument Bešeňovské travertíny, 11 Aug 2009, IH & PM | 49°06'15" N 19°26'13" E | 525 | meadow/pasture | high | travertines | **6** | – | – |
| 84# | Beňadiková, slope near the road to the town of Liptovský Mikuláš, 11 Aug 2009, IH & PM | 49°04'23" N 19°40'37" E | 615 | meadow/pasture | medium | flysch | **3** | – | – |
| 85# | Hôrka-Primovce, Nature Reserve Primovské skaly and meadows in their surroundings, 11 Aug 2009, IH & PM; 20 Jul 2012, PM | 49°01'02" N 20°22'53" E | 600 –650 | thermophile fringe | high | andesites | 35*[3] | **1** | 2*[3] |
| 86# | Spišské Podhradie, National Nature Reserve Sivá brada [hill], 11 Aug 2009, IH & PM; 5 Aug 2012, IH | 49°00'21" N 20°43'16" E | 470 –480 | steppic grassland | high | travertines | 14*[3] | – | 2*[3] |
| 87# | Spišské Podhradie, pastures opposite to Spiš castle, 12 Aug 2009, IH & PM | 48°59'53" N 20°46'17" E | 570 | thermophile fringe | high | travertines | **4** | – | – |
| 88# | Veľký Folkmar, Folkmar saddle, 12 Aug 2009, IH & PM | 48°51'02" N 21°01'53" E | 540 | meadow/pasture | medium | shales | **3** | – | – |
| 165# | Muráň, meadow in the saddle between the Mt. Cigánka and Mt. Šiance, 15 Jul 2012, PM | 48º45'50" N 20º03'50" E | 840 | thermophile fringe | high | dolomites | **1** | – | – |
| 166# | Lisková, pastures between the villages of Lisková and Turík, 20 Jul 2012, PM | 49º05'48" N 19º22'14" E | 530 –600 | meadow/pasture | medium | flysch | **3** | **1** | – |
| 167# | Gánovce, Gánovce travertines no. II, pastures around the spring, 20 Jul 2012, PM | 49º01'38" N 20º20'11" E | 620 | thermophile fringe | high | travertines | **3** | – | – |
| 168# | Granč-Petrovce, Sobotisko hill, 21 Jul 2012, PM | 48º59'55" N 20º47'01" E | 510 –540 | thermophile fringe | high | travertines | **3** | – | – |
| 169# | Spišské Podhradie, Dreveník hill, pastures near the road to Dobrá Vôľa settlement, 21 Jul 2012, PM | 48º58'43" N 20º45'54" E | 420 –450 | meadow/pasture | medium | flysch | **3** | – | – |
| 170# | Margecany, near the cross of the roads no. 546 and 547, 21 Jul 2012, PM | 48º53'13" N 21º00'19" E | 340 | meadow/pasture | medium | granites and gneisses | **2** | – | – |
| 171# | Trsťany (near Spišský Hrušov village), pasture above the road, 21 Jul 2012, PM | 48º58'03" N 20º43'21" E | 450 –500 | thermophile fringe | high | flysch | **7** | – | – |
| 172# | Spišský Hrhov-Doľany, xerothermic habitat south-east from the village, 21 Jul 2012, PM | 49º00'32" N 20º39'38" E | 550 | thermophile fringe | medium | flysch | **1** | – | – |
| 173# | Dravce, south-western edge of the village, road margin, 21 Jul 2012, PM | 49º01'01" N 20º28'54" E | 660 | meadow/pasture | medium | flysch | **1** | – | – |
| 174# | Dlhé Stráže, south of the village, road margin, 21 Jul 2012, PM | 49º01'09" N 20º31'31" E | 570 | meadow/pasture | medium | flysch | **1** | – | – |
| 175# | Kišovce, Nature Reserve Švábovská stráň, 21 Jul 2012, PM | 49º01'53" N 20º22'50" E | 650 | meadow/pasture | high | flysch | **3** | – | – |

| Pop. no. | Locality description | Geographic coordinates | Alt | Habitat type | Habitat natu-ralness | Geological substrate | DNA ploidy level | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 4x | 6x | 8x |
| 219# | Marcelová, Nature Reserve Mašan, 14 May 2013, PM | 47º46'12" N 18º19'06" E | 125 | sand dune/steppe | high | sandy sediments | – | – | **3** |
| 220# | Lúka, near the north-eastern edge of the village, south-west-western slope, 23 May 2013, IH & PM | 48º39'46" N 17º53'35" E | 230 | steppic grassland | high | dolomites | – | – | **5** |
| 221# | Nové Mesto nad Váhom, Prepadliská hill, 21 Jun 2013, IH & PM | 48º46'43" N 17º50'18" E | 273 | thermophile fringe | medium | limestones | **3** | – | – |
| 222# | Dovalovo, north-west of the village, near the highway, 6 Jul 2013, IH | 49º03'29" N 19º45'21" E | 680 | meadow/pasture | medium | loam sediments | **3** | – | – |
| 223# | Hybe, north-north-west of the village, near the highway, 6 Jul 2013, IH | 49º03'24" N 19º49'18" E | 760 | meadow/pasture | medium | loam sediments | **3** | – | – |
| 224# | Timoradza, southern edge of the village, above the road to Podlužany village, 6 Jul 2013, PM | 48º47'34" N 18º14'45" E | 235 | meadow/pasture | high | dolomites | **3** | – | – |
| 225# | Timoradza, betwwen the southern edge of the village and Zlobiny settlement, 6 Jul 2013, PM | 48º47'53" N 18º15'03" E | 280 | meadow/pasture | high | dolomites | **4** | – | – |
| 226# | Lúka, cote of 212.3, ca 0.7 km north-east from the north-east edge of the village, 8 Jul 2013, IH & PM | 48º39'54" N 17º53'57" E | 220 | thermophile fringe | high | dolomites | – | – | **3** |
| 227# | Lúka, between cote of 212.3 and north-east edge of the village, 8 Jul 2013, IH & PM | 48º39'45" N 17º53'48" E | 210 | thermophile fringe | high | dolomites | **1** | – | – |
| 228# | Lúka, northern edge of the village, near the road to Hrádok village, 8 Jul 2013, IH & PM | 48º40'11" N 17º52'25" E | 170 | meadow/pasture | medium | loam sediments | **2** | – | – |
| 231# | Tachty, slope near the western edge of the village, 11 Jul 2013, PM | 48°09'16" N 19°56'00" E | 290 | thermophile fringe | high | sandy sediments | **6** | – | – |
| 233# | Hajnáčka-Šťavica, northern slope above the south-eastern edge of the village, 12 Jul 2013, PM | 48°11'42" N 19°57'35" E | 290 | meadow/pasture | high | sandy sediments | **3** | – | **1** |
| 234# | Hajnáčka, Zaboda hill, southern slope, oak forest, 12 Jul 2013, PM | 48°13'52" N 19°58'20" E | 380 | forest | high | sandy sediments | **1** | – | – |
| 235# | Hajnáčka-Gortva, Plešivská dolina valley, 12 Jul 2013, PM | 48°14'56" N 19°58'01" E | 220 | meadow/pasture | low | loam sediments | **2** | – | – |
| 236# | Šurice, slopes east from the Soví hrad castle, 12 Jul 2013, PM | 48°13'33" N 19°55'02" E | 250 | steppic grassland | high | sandy sediments | **3** | – | – |
| 237# | Belina, south-east of the village, slopes of the Belina hill, 12 Jul 2013, PM | 48°14'43" N 19°51'15" E | 240 | meadow/pasture | high | sandy sediments | **2** | – | – |
| 238# | Šimonovce, near the raod to Hostice village, near the crossroads to Petreš settlement, 12 Jul 2013, PM | 48°15'40" N 20°05'51" E | 185 | meadow/pasture | medium | sandy sediments | **1** | – | – |
| 239# | Gemerský Jablonec, north-east of the village, road margin, 13 Jul 2013, PM | 48°12'05" N 19°59'18" E | 290 | meadow/pasture | low | sandy sediments | **1** | – | – |
| 240# | Drňa, slopes ca 1 km north-east-east of the village, 13 Jul 2013, PM | 48°15'59" N 20°07'50" E | 190 | steppic grassland | high | sandy sediments | **3** | – | **4** |

| Pop. no. | Locality description | Geographic coordinates | Alt | Habitat type | Habitat natu-ralness | Geological substrate | DNA ploidy level | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 4x | 6x | 8x |
| 241# | Holíč, near the cemetery, small hill with three crucifixes, 16 Jul 2013, PM | 48°48'21" N 17°09'58" E | 205 | meadow/pasture | medium | loesses | – | – | **2** |
| 242# | Holíč, south-east of the town, edge of the cottage settlement, 16 Jul 2013, PM | 48°47'44" N 17°10'17" E | 220 | thermophile fringe | high | loesses | – | – | **6** |
| 243# | Lopašov, north-east of the village, 16 Jul 2013, PM | 48°45'24" N 17°20'07" E | 315 | thermophile fringe | high | sandy sediments | **3** | – | – |
| 244# | Sobotište, east of the village, 16 Jul 2013, PM | 48°44'12" N 17°25'25" E | 330 | thermophile fringe | high | sandy sediments | – | – | **2** |
| 245# | Vrbovce-Vápeník, southern edge of the settlement, road margin, 16 Jul 2013, PM | 48°45'51" N 17°27'52" E | 465 | meadow/pasture | medium | flysch | **1** | – | – |
| 246# | Vaďovce, slope opposite to the railway station, 16 Jul 2013, PM | 48°43'55" N 17°43'32" E | 260 | thermophile fringe | high | sandy sediments | **2** | – | – |
| 247# | Višňové, National Nature Reserve Čachtický hradný vrch, foot of the Čechtice castle hill, 16 Jul 2013, PM | 48°43'23" N 17°45'31" E | 280 | thermophile fringe | high | dolomites | **3** | – | – |
| 248# | Višňové, NNR Čachtický hradný vrch, mountain ridge south of the castle, 16 Jul 2013, PM | 48°43'22" N 17°45'46" E | 360 | steppic grassland | high | dolomites | **3** | – | **2** |
| 249# | Závada, Protected Site Dolné lazy, 17 Jul 2013, PM | 48°38'21" N 18°04'43" E | 250 –270 | thermophile fringe | high | dolomites | **4** | – | **3** |
| 250# | Závada, pine forest above the stone-pit, 17 Jul 2013, PM | 48°38'44" N 18°03'40" E | 410 | forest | high | dolomites | **2** | – | – |
| 251# | Klátova Nová Ves, north-western foot of the Kostrín hill, 17 Jul 2013, PM | 48°33'34" N 18°17'51" E | 240 | thermophile fringe | high | limestones | **1** | – | – |
| 252# | Podhorany, Veľký Bahorec hill, south-south-western slope, 20 Jul 2013, PM | 48°22'39" N 18°05'38" E | 180 –190 | meadow/pasture | low | quertzites | **3** | – | – |
| 253-1# | Podhorany, Veľký Bahorec hill, north-eastern slope, 20 Jul 2013, PM | 48°22'54" N 18°05'56" E | 190 | meadow/pasture | medium | quertzites | – | – | **2** |
| 253-2# | Podhorany, Malý Bahorec hill, southern slope near the small stone-pit, 20 Jul 2013, PM | 48°23'07" N 18°06'09" E | 195 | steppic grassland | high | dolomites | – | – | **4** |
| 253-3# | Podhorany, Malý Bahorec hill, forest near the top of the hill, 20 Jul 2013, PM | 48°23'09" N 18°06'10" E | 205 | forest | high | quertzites | **3** | – | – |
| 253-4# | Podhorany, Malý Bahorec hill, steppic grassland near the top of the hill, 20 Jul 2013, PM | 48°23'14" N 18°06'05" E | 200 –208 | steppic grassland | high | quertzites | **3** | – | **7** |
| 254# | Kovarce, north-western foot of the cote of 345.3, 20 Jul 2013, PM | 48°29'26" N 18°10'44" E | 230 –250 | meadow/pasture | medium | loam sediments | **2** | – | – |
| 255# | Krásno, north-east of the village, 20 Jul 2013, PM | 48°35'53" N 18°19'10" E | 245 | thermophile fringe | medium | dolomites | **1** | – | – |

| Pop. no. | Locality description | Geographic coordinates | Alt | Habitat type | Habitat natu-ralness | Geological substrate | DNA ploidy level | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 4x | 6x | 8x |
| 256# | Oslany, Nature Reserve Veľký vrch, foot of the hill above the road, 20 Jul 2013, PM | 48°38'35" N 18°27'11" E | 225 | thermophile fringe | high | dolomites | – | – | **19** |
| 257# | Dolné Vestenice, south-west-west of the village, cote 287.8, north-west-west slope, 22 Jul 2013, PM | 48°41'58" N 18°23'06" E | 250 | steppic grassland | high | dolomites | – | – | **3** |
| 258# | Dolné Vestenice, north of the villge, 22 Jul 2013, PM | 48°42'32" N 18°23'16" E | 300 | steppic grassland | high | dolomites | – | – | **4** |
| 259# | Nitrianske Sučany, Háj hill, 22 Jul 2013, PM | 48°43'48" N 18°28'38" E | 320 | meadow/pasture | medium | shales | **3** | – | – |
| 260# | Trenčianske Mitice-Zemianske Mitice, above the village, 23 Jul 2013, PM | 48°49'19" N 18°06'58" E | 400 –420 | meadow/pasture | high | limestones | **2** | – | – |
| 261# | Trenčianske Mitice-Rožňovské Mitice, eastern margin of the stone-pit, 23 Jul 2013, PM | 48°48'58" N 18°06'36" E | 380 –400 | thermophile fringe | high | dolomites | **4** | – | – |
| 262# | Haluzice, Hájnica hill, 23 Jul 2013, PM | 48°49'04" N 17°52'05" E | 290 –340 | meadow/pasture | high | dolomites | **4** | **2** | – |
| 263# | Nové Mesto nad Váhom, Nature Reserve Turecko and meadows in their surroundings, 23 Jul 2013, PM | 48°46'49" N 17°51'21" E | 240 –270 | thermophile fringe | medium | limestones | **2** | – | **1** |
| 264# | Kuzmice-Dancov Potok, road margin near the southern edge of the village, 30 Jul 2013, PM | 48°33'36" N 21°33'35" E | 200 | meadow/pasture | medium | loam sediments | **6** | – | – |
| 265# | Somotor, Somotorská hora hill, surroundings of the cote of 150.6, 30 Jul 2013, PM | 48°24'32" N 21°48'20" E | 140 –150 | meadow/pasture | high | andesites | – | **1** | **7** |
| 266# | Brehov, Veľký vrch hill, north-western slopes, 31 Jul 2013, PM | 48°29'37" N 21°48'33" E | 210 –240 | steppic grassland | high | andesites | – | – | **3** |
| 267# | Sirník, cote of 238.5, 31 Jul 2013, PM | 48°31'15" N 21°47'30" E | 200 –230 | meadow/pasture | high | andesites | **7** | – | – |
| 268# | Kazimír, west of the village, 31 Jul 2013, PM | 48°31'34" N 21°34'23" E | 190 | meadow/pasture | high | loam sediments | **3** | – | – |
| 269# | Malá Bara, Stredný vrch hill, north-western slopes, 31 Jul 2013, PM | 48°25'03" N 21°43'30" E | 140 –150 | meadow/pasture | medium | quertzites | **2** | – | – |
| 270# | Nižná Myšľa, southern edge of the village, site Várhegy, 1 Aug 2013, PM | 48°37'00" N 21°22'07" E | 190 | meadow/pasture | medium | loam sediments | **2** | – | – |
| 271# | Bidovce, south-eastern edge of the village, 1 Aug 2013, PM | 48°43'51" N 21°26'47" E | 270 | meadow/pasture | low | loam sediments | **2** | – | – |
| 272# | Vyšná Kamenica, north-eastern edge of the village, above the stone-pit, 1 Aug 2013, PM | 48°46'53" N 21°29'17" E | 380 | steppic grassland | high | andesites | **6** | – | – |
| 273# | Demjata, Nature Reserve Demjatské kopce, 1 Aug 2013, PM | 49°06'35" N 21°17'51" E | 400 | thermophile fringe | high | limestones | **6** | – | – |
| 274# | Fintice, north of the village, near the stone-pit, 2 Aug 2013, PM | 49°03'58" N 21°16'46" E | 390 | forest | low | andesites | **1** | – | – |

| Pop. no. | Locality description | Geographic coordinates | Alt | Habitat type | Habitat natu-ralness | Geological substrate | DNA ploidy level | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 4x | 6x | 8x |
| 275# | Záhradné, southern and south-western slopes north-west of the village, 2 Aug 2013, PM | 49°05'16" N 21°15'28" E | 330 –350 | meadow/pasture | high | sandy sediments | **21** | – | – |
| 276# | Šarišské Sokolovce, east of the village, surroundings of the stope-pit, 2 Aug 2013, PM | 49°06'13" N 21°10'42" E | 480 | meadow/pasture | high | flysch | **9** | – | – |
| 277# | Krížová Ves, north-western slopes of the Najhy hill, 7 Aug 2013, PM | 49°10'54" N 20°29'13" E | 640 –680 | meadow/pasture | medium | flysch | **7** | – | – |
| 278# | Podolínec,Osí vrch hill, eastern slopes, 7 Aug 2013, PM | 49°15'05" N 20°31'04" E | 580 –620 | meadow/pasture | medium | flysch | **12** | – | – |
| 279# | Nižné Ružbachy, south of the village, slopes above the railway tunnel, 7 Aug 2013, PM | 49°16'24" N 20°34'25" E | 560 –620 | steppic grassland | high | flysch | **8** | – | – |
| 280# | Vyšné Ružbachy, Nature Monument Kráter, 7 Aug 2013, PM | 49°18'19" N 20°33'38" E | 640 | meadow/pasture | medium | travertines | **1** | – | – |
| 281# | Haligovce, north-western edge of the village, 8 Aug 2013, PM | 49°22'43" N 20°26'28" E | 510 –540 | meadow/pasture | high | calcareous flysch | **8** | – | – |
| 282# | Veľký Lipník, Lesnícke sedlo saddle, pastures on the southern slopes, 8 Aug 2013, PM | 49°22'57" N 20°29'37" E | 700 | meadow/pasture | medium | calcareous flysch | **3** | – | – |
| 283# | Údol, Nature Monument Skalky pri Údole and pastures in their surroundings, 8 Aug 2013, PM | 49°17'20" N 20°48'12" E | 530 | thermophile fringe | high | limestones | **2** | – | – |
| 284# | Kyjov, south-west of the village, northern slope of the prominent rock, 8 Aug 2013, PM | 49°12'35" N 20°55'57" E | 680 –690 | steppic grassland | high | limestones | **4** | **1** | – |
| 285# | Kamenica, Kamenica castle hill, 8 Aug 2013, PM | 49°11'43" N 20°58'08" E | 600 –700 | steppic grassland | high | limestones | **10** | – | – |
| 286# | Vranov nad Topľou, hill north of the town, 9 Aug 2013, PM | 48°53'42" N 21°41'12" E | 200 –230 | thermophile fringe | medium | loesses | **3** | – | – |
| 287# | Trhovište, north of the village, 9 Aug 2013, PM | 48°42'50" N 21°48'31" E | 170 | meadow/pasture | medium | loesses | **3** | – | – |
| 288# | Brekov, Klokočiny hill, north-eastern slope, 9 Aug 2013, PM | 48°54'00" N 21°50'03" E | 230 | thermophile fringe | high | dolomites | **5** | – | – |
| 289# | Jasenovce-Poloma, north of the village, road margin, 9 Aug 2013, PM | 49°00'23" N 21°44'49" E | 160 | meadow/pasture | medium | flysch | **2** | **1** | – |
| 290# | Hrabovec, eastern edge of the village, road margin, 9 Aug 2013, PM | 49°16'14" N 21°23'16" E | 230 | meadow/pasture | medium | loam sediments | **3** | – | – |
| 291# | Miklušovce, Zajačia hora hill, south-eastern slope, 10 Aug 2013, PM | 48°55'20" N 21°05'01" E | 610 | thermophile fringe | high | flysch | **2** | – | – |
| 292# | Družstevná pri Hornáde-Malá Vieska, north of the village, under the church, 10 Aug 2013, PM | 48°48'50" N 21°14'07" E | 240 | meadow/pasture | high | dolomites | **9** | – | – |
| 293# | Nemčiňany, south-east of the church, 13 Aug 2013, PM | 48°18'00" N 18°27'41" E | 240 | meadow/pasture | medium | sandy sediments | **2** | – | – |

| Pop. no. | Locality description | Geographic coordinates | Alt | Habitat type | Habitat natu-ralness | Geological substrate | DNA ploidy level | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 4x | 6x | 8x |
| 294# | Červený Hrádok, east of the villge, near the water reservoir, 13 Aug 2013, PM | 48°17'49" N 18°24'18" E | 225 | meadow/pasture | medium | sandy sediments | **3** | – | – |
| 295# | Čifáre, south of the village, 13 Aug 2013, PM | 48°13'45" N 18°23'21" E | 170 | thermophile fringe | high | sandy sediments | **4** | **1** | – |
| 296# | Hronský Beňadik, Horný Koniec street, road margin, 13 Aug 2013, PM | 48°20'44" N 18°33'02" E | 210 | meadow/pasture | medium | andesites | **3** | – | – |
| 297# | Počúvadlo, north-east of the village, 14 Aug 2013, PM | 48°22'11" N 18°50'22" E | 590 | meadow/pasture | high | andesites | **3** | – | – |
| 298# | Jabloňovce, north-north-west of the village, 14 Aug 2013, PM | 48°19'43" N 18°47'08" E | 350 | meadow/pasture | high | andesites | **3** | – | – |
| 299# | Lišov, north of the village, road margin, 14 Aug 2013, PM | 48°15'18" N 18°51'36" E | 300 | meadow/pasture | high | andesites | **1** | – | – |
| 300# | Krupina, Vartovka hill, in the former stone-pit, 14 Aug 2013, PM | 48°20'43" N 19°04'39" E | 320 | meadow/pasture | medium | andesites | **1** | – | – |
| 301# | Krupina, north-east of the town, cote of 454.4, 14 Aug 2013, PM | 48°21'59" N 19°05'48" E | 440 | meadow/pasture | low | andesites | **3** | – | – |
| 302# | Senohrad, north of the village, 14 Aug 2013, PM | 48°22'00" N 19°11'35" E | 650 | meadow/pasture | medium | loam sediments | **3** | – | – |
| 303# | Podzámčok, slope above the road, near the railway station, 14 Aug 2013, PM | 48°29'55" N 19°05'51" E | 350 | meadow/pasture | medium | loam sediments | **3** | – | – |
| 304# | Breziny, slope above the road between settlements of Horné Breziny and Šnajderovci, 14 Aug 2013, PM | 48°30'53" N 19°05'16" E | 350 | thermophile fringe | high | andesites | **3** | – | – |
| 305# | Plášťovce, north-east edge of the village, 15 Aug 2013, PM | 48°09'47" N 18°59'36" E | 210 | meadow/pasture | high | andesites | **3** | – | – |
| 306# | Slovenské Ďarmoty, Biely vrch hill, north-east-east of the top of the hill, 15 Aug 2013, PM | 48°05'46" N 19°17'53" E | 210 | meadow/pasture | low | loesses | **1** | – | – |
| 307# | Záhorce-Selešťany, Nature Reserve Seleštianska stráň, 15 Aug 2013, PM | 48°05'40" N 19°21'55" E | 150 –190 | steppic grassland | high | loesses | – | – | **10** |
| 308# | Opatovská Nová Ves, north of the village, 15 Aug 2013, PM | 48°07'30" N 19°16'52" E | 170 | meadow/pasture | medium | loesses | **2** | – | – |
| 309# | Malá Lehota, northern edge of the village, road margin, 16 Aug 2013, PM | 48°30'04" N 18°34'26" E | 595 | meadow/pasture | high | shales | **3** | – | – |
| 310# | Malá Lehota, Tomov štál settlement, 16 Aug 2013, PM | 48°31'06" N 18°33'31" E | 660 –680 | meadow/pasture | high | granites and gneisses | **16** | – | – |
| 311# | Rudno nad Hronom, south-western edge of the village, sourroundings of the chapel, 20 Aug 2013, PM | 48°25'42" N 18°40'52" E | 255 | meadow/pasture | medium | sandy sediments | **2** | – | – |
| 312# | Trnavá Hora, Plešiny hill, 20 Aug 2013, PM | 48°35'36" N 18°56'10" E | 370 –410 | meadow/pasture | low | andesites | **5** | – | – |

| Pop. no. | Locality description | Geographic coordinates | Alt | Habitat type | Habitat natu-ralness | Geological substrate | DNA ploidy level | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 4x | 6x | 8x |
| 313# | Banská Bystrica-Rakytovce, stone-pit margin, 20 Aug 2013, PM | 48°40'58" N 19°07'17" E | 360 –380 | thermophile fringe | high | dolomites | **7** | – | – |
| 314# | Banská Bystrica, Nature Reserve Malachovské skalky, 20 Aug 2013, PM | 48°42'51" N 19°06'51" E | 400 –450 | thermophile fringe | high | dolomites | **6** | – | – |
| 315# | Dolná Mičiná, National Nature Monument Mičinské travertíny, 20 Aug 2013, PM | 48°40'03" N 19°13'50" E | 380 | meadow/pasture | high | travertines | **8** | – | – |
| 316# | Dolná Mičiná, slopes south-west of the villages, 20 Aug 2013, PM | 48°40'04" N 19°13'44" E | 390 –420 | meadow/pasture | high | andesites | **9** | – | – |
| 317# | Jelšava, Skalka hill, southern foot of the hill, 21 Aug 2013, PM | 48°36'47" N 20°14'08" E | 300 | thermophile fringe | medium | dolomites | – | – | **2** |
| 318# | Prihradzany, 1.7 km north-west-west of the church, 21 Aug 2013, PM | 48°35'11" N 20°13'04" E | 330 –350 | steppic grassland | high | dolomites | – | – | **11** |
| 319# | Prihradzany, 1.5 km north-west-west of the church, 21 Aug 2013, PM | 48°35'08" N 20°13'11" E | 330 | meadow/pasture | high | dolomites | **2** | – | – |
| 320# | Slizké, pastures in the surroundings of the cememetry, 21 Aug 2013, PM | 48°31'11" N 20°05'41" E | 390 –430 | meadow/pasture | medium | andesites | **11** | – | – |
| 321# | Muránska Dlhá Lúka, southern slopes of the cote of 488.1, 22 Aug 2013, PM | 48°43'09" N 20°04'34" E | 360 –420 | meadow/pasture | medium | granites and gneisses | **10** | – | – |
| 322# | Rochovce, south-western slopes of the Dúbrava hill, 22 Aug 2013, PM | 48°42'18" N 20°18'17" E | 380 –500 | meadow/pasture | medium | shales | **7** | – | – |
| 323# | Koceľovce, 0.9 km north-west of the church, 22 Aug 2013, PM | 48°42'45" N 20°19'53" E | 350 –420 | meadow/pasture | high | limestones | **20** | – | – |
| 324# | Dobšiná, small hill situated 1 km east of the Martoň hill, 22 Aug 2013, PM | 48°49'43" N 20°21'32" E | 540 –600 | meadow/pasture | medium | shales | **3** | – | – |
| 325# | Medzev, cote of 405.0, near the Jarná ulica street, 22 Aug 2013, PM | 48°42'14" N 20°53'49" E | 350 | meadow/pasture | medium | granites and gneisses | **3** | – | – |
| 326# | Moldava nad Bodvou, Výhľad hill, 22 Aug 2013, PM | 48°36'53" N 20°58'58" E | 270 –280 | steppic grassland | medium | limestones | – | **1** | **15** |
| 327# | Kyjatice-Kadlub, 0.5 km south of the settlement, 23 Aug 2013, PM | 48°32'29" N 19°59'56" E | 540 | meadow/pasture | medium | shales | **3** | – | – |
| 328# | Ožďany-Tehlovňa, small hill south of the settlement, 23 Aug 2013, PM | 48°22'58" N 19°54'11" E | 255 | thermophile fringe | high | loesses | **3** | – | – |
| 329# | Slovenské Kľačany, west of the village, pastures near the road no. 75, 24 Aug 2013, PM | 48°15'55" N 19°26'28" E | 210 | meadow/pasture | medium | andesites | **3** | – | – |
| 330# | Malé Zlievce, road margin near the cote of 166.5, 24 Aug 2013, PM | 48°10'36" N 19°27'58" E | 170 | meadow/pasture | medium | loam sediments | **2** | – | – |
| 331# | Plachtinské lazy, pasture near the road, 24 Aug 2013, PM | 48°15'15" N 19°14'15" E | 540 | meadow/pasture | medium | andesites | **3** | – | – |

| Pop. no. | Locality description | Geographic coordinates | Alt | Habitat type | Habitat natu-ralness | Geological substrate | DNA ploidy level | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 4x | 6x | 8x |
| 332# | Hrušov-Krížne cesty, northern slope of the Matiášov vrch hill, 24 Aug 2013, PM | 48°10'34" N 19°05'13" E | 430 –450 | meadow/pasture | medium | andesites | **5** | – | – |
| 333# | Hrušov-Prašný vrch, Prašný vrch hill and a small hill south-west of the settlement, 24 Aug 2013, PM | 48°10'04" N 19°05'34" E | 480 –510 | meadow/pasture | high | andesites | **5** | – | – |
| 334# | Trstín, ca 1 km north-west of the village, pasture near the field margin, 27 Aug 2013, PM | 48°32'16" N 17°26'43" E | 240 | meadow/pasture | medium | dolomites | **3** | – | – |
| 337# | Turňa nad Bodvou, National Nature Reserve Turňa castle hill, 10 Sep 2014, PM | 48°36'41" N 20°52'24" E | 320 –350 | steppic grassland | high | limestones | – | – | **3** |
| 338# | Lipovce, west of the village, 11 Sep 2014, PM | 49°03'14" N 20°56'34" E | 550 | meadow/pasture | high | loam sediments | **3** | – | – |

**Electronic Appendix 3.** - List of environmental variables measured at sites of *Jacobaea vulgaris* tetra- and octoploids. Abbreviations used: delta of solar incidence angle – the delta of maximum to each value of solar incidence angle for a point on an inclined plane at all time steps; maximum solar incidence angle – the maximum solar incidence angle for a point on an inclined plane; maximum of solar incidence angle – maximum of solar incidence angle for a point on an inclined plane; min – minimum, max – maximum, mean – arithmetic mean, sd – standard deviation.

| Environmental variable [variable explanation] | | J. vulgaris subsp. vulgaris (2n = 40 = 4x) (N = 144) | | | | J. vulgaris subsp. pannonica (2n = 80 = 8x) (N = 37) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | min | max | mean | sd | min | max | mean | sd |
| 1. | HABITAT TYPE [for explanation see Materials and Methods] | - | - | - | - | - | - | - | - |
| 2. | Habitat naturalness (0 -low, 0.5 - medium, 1 - high) | 0 | 1 | 0,71 | 0,3 | 0,5 | 1 | 0,89 | 0,21 |
| 3. | GEOLOGICAL SUBSTRATE [for explanation see Materials and Methods] | - | - | - | - | - | - | - | - |
| 4. | Altitude [m a. s. l.] | 140 | 840 | 357,7 | 168,13 | 110 | 650 | 241,6 | 99,67 |
| 5. | Exposure (0-4) | 0 | 3,911 | 1,623 | 1,13 | 0,022 | 3,933 | 1,509 | 1,08 |
| 6. | Inclination [°] | 0 | 31 | 10,29 | 6,5 | 0 | 24 | 10,71 | 6,45 |
| 7. | Precipitation: January [monthly sum, at 2 m, mm] | 22,9 | 71,6 | 39,61 | 9,04 | 22,9 | 47,9 | 36,63 | 5,66 |
| 8. | Precipitation: February [monthly sum, at 2 m, mm] | 24,8 | 64,7 | 37,78 | 7,96 | 24,8 | 46,7 | 35,85 | 5,50 |
| 9. | Precipitation: March [monthly sum, at 2 m, mm] | 28 | 62,5 | 37,66 | 6,16 | 27,5 | 40,7 | 34,43 | 3,93 |
| 10. | Precipitation: April [monthly sum, at 2 m, mm] | 40,4 | 73,9 | 50,38 | 6,12 | 39,8 | 60,1 | 45,73 | 4,90 |
| 11. | Precipitation: May [monthly sum, at 2 m, mm] | 58,6 | 111,3 | 75,07 | 10,38 | 54,9 | 88,6 | 66,93 | 8,60 |
| 12. | Precipitation: June [monthly sum, at 2 m, mm] | 67,8 | 129 | 88,14 | 11,45 | 64,3 | 99,4 | 78,35 | 8,53 |
| 13. | Precipitation: July [monthly sum, at 2 m, mm] | 52,9 | 115,3 | 74,54 | 13,6 | 51,6 | 82,8 | 64,97 | 8,15 |
| 14. | Precipitation: August [monthly sum, at 2 m, mm] | 52,4 | 110,1 | 72,76 | 11,65 | 54,4 | 81,2 | 65,32 | 6,84 |
| 15. | Precipitation: September [monthly sum, at 2 m, mm] | 41,3 | 84 | 52,97 | 7,63 | 41 | 55,3 | 46,53 | 3,80 |
| 16. | Precipitation: October [monthly sum, at 2 m, mm] | 37 | 78,9 | 46,61 | 7,14 | 33,3 | 52,2 | 41,34 | 4,71 |
| 17. | Precipitation: November [monthly sum, at 2 m, mm] | 42 | 95,7 | 58,34 | 10,63 | 42,4 | 65,9 | 54,8 | 6,24 |
| 18. | Precipitation: December [monthly sum, at 2 m, mm] | 29,4 | 94,4 | 50,82 | 12,61 | 29,4 | 62,7 | 46,42 | 8,40 |
| 19. | Precipitation: yearly sum [at 2 m, mm] | 556,8 | 1076,6 | 684,65 | 90,3 | 537,6 | 731,1 | 617,27 | 55,08 |
| 20. | Air temperature: January [monthly average, at 2 m, °C] | -5,6 | -1,8 | -3,7 | 0,99 | -5,5 | -1,8 | -3,08 | 0,88 |
| 21. | Air temperature: February [monthly average, at 2 m, °C] | -3,3 | 0,4 | -1,35 | 1,1 | -3,2 | 0,6 | -0,57 | 0,90 |
| 22. | Air temperature: March [monthly average, at 2 m, °C] | 0,2 | 4,6 | 2,75 | 1,18 | 0,8 | 4,9 | 3,55 | 0,88 |
| 23. | Air temperature: April [monthly average, at 2 m, °C] | 5,2 | 9,9 | 8,17 | 1,19 | 6,1 | 10,2 | 8,93 | 0,82 |
| 24. | Air temperature: May [monthly average, at 2 m, °C] | 10,2 | 14,8 | 13,08 | 1,16 | 11,1 | 15,2 | 13,87 | 0,85 |
| 25. | Air temperature: June [monthly average, at 2 m, °C] | 13,2 | 17,7 | 16,04 | 1,15 | 14,1 | 18,2 | 16,83 | 0,83 |
| 26. | Air temperature: July [monthly average, at 2 m, °C] | 14,7 | 19,3 | 17,56 | 1,2 | 15,6 | 19,7 | 18,4 | 0,85 |
| 27. | Air temperature: August [monthly average, at 2 m, °C] | 14,2 | 18,7 | 16,9 | 1,22 | 14,9 | 19,2 | 17,76 | 0,89 |
| 28. | Air temperature: September [monthly average, at 2 m, °C] | 10,8 | 14,9 | 13,23 | 1,06 | 11,5 | 15,4 | 13,99 | 0,78 |
| 29. | Air temperature: October [monthly average, at 2 m, °C] | 6,3 | 9,7 | 8,24 | 0,92 | 6,7 | 10 | 8,86 | 0,75 |
| 30. | Air temperature: November [monthly average, at 2 m, °C] | 1 | 4,2 | 2,8 | 0,84 | 1,4 | 4,4 | 3,35 | 0,67 |
| 31. | Air temperature: December [monthly average, at 2 m, °C] | -3,5 | -0,1 | -1,68 | 0,91 | -3,3 | 0 | -1,08 | 0,81 |
| 32. | Air temperature: yearly average [at 2 m, °C] | 5,4 | 9,3 | 7,67 | 1,06 | 5,9 | 9,6 | 8,4 | 0,79 |
| 33. | Insolation time of beam solar radiation: January [monthly sum,hrs] | 0,2 | 266 | 220,16 | 45,43 | 144,2 | 268,85 | 232,44 | 29,87 |
| 34. | Insolation time of beam solar radiation: February [monthly sum, hrs] | 86,55 | 277,7 | 243,84 | 29,86 | 190,4 | 281,75 | 251,08 | 19,10 |
| 35. | Insolation time of beam solar radiation: March [monthly sum, hrs] | 184,75 | 361,9 | 327,75 | 26,95 | 293,3 | 364,1 | 332,87 | 18,29 |
| 36. | Insolation time of beam solar radiation: April [monthly sum, hrs] | 239,2 | 405,8 | 372,18 | 25,52 | 326,1 | 405,15 | 376,35 | 19,06 |
| 37. | Insolation time of beam solar radiation: May [monthly sum, hrs] | 309,5 | 468 | 429,92 | 29,03 | 369,4 | 466,2 | 434,81 | 23,44 |
| 38. | Insolation time of beam solar radiation: June [monthly sum, hrs] | 318,55 | 477,3 | 438,43 | 30,66 | 372,5 | 476,7 | 443,06 | 26,19 |
| 39. | Insolation time of beam solar radiation: July [monthly sum, hrs] | 321,75 | 481,3 | 442,14 | 30,26 | 377,75 | 480 | 447,16 | 24,93 |
| 40. | Insolation time of beam solar radiation: August [monthly sum, hrs] | 272,9 | 438,7 | 403,34 | 27,07 | 350,65 | 437,75 | 407,69 | 20,94 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 41. | Insolation time of beam solar radiation: September [monthly sum, hrs] | 200,95 | 371,75 | 339,27 | 25,26 | 301,3 | 372,75 | 343,81 | 17,74 |
| 42. | Insolation time of beam solar radiation: October [monthly sum, hrs] | 149,35 | 328,1 | 291,76 | 29,77 | 240,1 | 331,4 | 298,15 | 19,46 |
| 43. | Insolation time of beam solar radiation: November [monthly sum, hrs] | 7,5 | 269,4 | 228,66 | 39,27 | 166,95 | 272,95 | 239,07 | 25,20 |
| 44. | Insolation time of beam solar radiation: December [monthly sum, hrs] | 0 | 252,9 | 202,21 | 53,26 | 98,55 | 255,05 | 216,24 | 36,11 |
| 45. | Insolation time of beam solar radiation: yearly sum [hrs] | 2213,95 | 4383,05 | 3939,65 | 347,39 | 3405,5 | 4399,55 | 4022,77 | 236,32 |
| 46. | Beam solar radiation: January [monthly sum, W.m$^{-1}$] | 0,81 | 65718,91 | 30253 | 12857 | 4322,84 | 65247,9 | 33186 | 13995,61 |
| 47. | Beam solar radiation: February [monthly sum, W.m-1] | 13522,26 | 82204,75 | 48738 | 13542,91 | 19121,16 | 83084,61 | 51241 | 14652,64 |
| 48. | Beam solar radiation: March [monthly sum, W.m-1] | 49989,5 | 132136,5 | 96247 | 16342,4 | 58940,59 | 132893,2 | 99325 | 17280,21 |
| 49. | Beam solar radiation: April [monthly sum, W.m-1] | 90710,61 | 158794,1 | 135405 | 13790,24 | 106034,9 | 159611,9 | 138398 | 13537,79 |
| 50. | Beam solar radiation: May [monthly sum, W.m-1] | 122922,3 | 179436,7 | 161412 | 11404,81 | 144255,9 | 185782 | 167443 | 9935,25 |
| 51. | Beam solar radiation: June [monthly sum, W.m-1] | 127611,1 | 177364,3 | 160128 | 11156,63 | 146654,3 | 180911,5 | 167135 | 8081,99 |
| 52. | Beam solar radiation: July [monthly sum, W.m-1] | 121430,8 | 175564,8 | 158872 | 10030,73 | 142857,9 | 177332 | 163519 | 8515,15 |
| 53. | Beam solar radiation: August [monthly sum, W.m-1] | 91398,61 | 155875,8 | 131722 | 11865,09 | 108393,5 | 156135,4 | 135936 | 11129,00 |
| 54. | Beam solar radiation: September [monthly sum, W.m-1] | 56639,78 | 123255,4 | 94826 | 13694,83 | 67505,22 | 123992,2 | 99699 | 13829,24 |
| 55. | Beam solar radiation: October [monthly sum, W.m-1] | 24222,51 | 96546,02 | 62560 | 14428,43 | 31873,23 | 98381,22 | 67188 | 15503,77 |
| 56. | Beam solar radiation: November [monthly sum, W.m-1] | 965,96 | 70915,48 | 35439 | 13297,3 | 7951,84 | 70715,79 | 38492 | 14346,60 |
| 57. | Beam solar radiation: December [monthly sum, W.m-1] | 0 | 56539,05 | 24768 | 12302,3 | 1264,86 | 56911,87 | 27411 | 13306,91 |
| 58. | Beam solar radiation: yearly sum [W.m-1] | 728797,25 | 1470851 | 1140368 | 145632,1 | 842969,93 | 1478241 | 1188980 | 148227,60 |
| 59. | Diffuse solar radiation: January [monthly sum, W.m-1] | 13722,06 | 24385,37 | 18151 | 2175,64 | 14053,65 | 24159,6 | 18492 | 2535,90 |
| 60. | Diffuse solar radiation: February [monthly sum, W.m-1] | 18204,25 | 30524,76 | 24402 | 2425,57 | 18908,14 | 30141,24 | 24718 | 2686,65 |
| 61. | Diffuse solar radiation: March [monthly sum, W.m-1] | 29306,41 | 42828,46 | 37037 | 2902,06 | 30524,41 | 42719,89 | 36844 | 2997,97 |
| 62. | Diffuse solar radiation: April [monthly sum, W.m-1] | 39851,12 | 51672,34 | 46652 | 2623,73 | 40009,08 | 50861,85 | 45815 | 2648,89 |
| 63. | Diffuse solar radiation: May [monthly sum, W.m-1] | 54490,25 | 70269,75 | 62460 | 3977,88 | 54730,36 | 68524,59 | 59371 | 3096,31 |
| 64. | Diffuse solar radiation: June [monthly sum, W.m-1] | 60525,55 | 81946,25 | 69418 | 5464,82 | 61535,18 | 78008,36 | 65294 | 3587,36 |
| 65. | Diffuse solar radiation: July [monthly sum, W.m-1] | 60663,98 | 77432,57 | 69092 | 3649,1 | 62644,77 | 74599,59 | 66472 | 2757,07 |
| 66. | Diffuse solar radiation: August [monthly sum, W.m-1] | 53774,49 | 68919,85 | 61856 | 3380,69 | 55318,41 | 67117,42 | 59949 | 2933,22 |
| 67. | Diffuse solar radiation: September [monthly sum, W.m-1] | 37803,81 | 52680,52 | 46655 | 3280,52 | 38058,42 | 50892,54 | 45050 | 3483,97 |
| 68. | Diffuse solar radiation: October [monthly sum, W.m-1] | 25151,52 | 39848,09 | 33080 | 3153,36 | 25067,74 | 38873,82 | 32242 | 3468,90 |
| 69. | Diffuse solar radiation: November [monthly sum, W.m-1] | 15096,99 | 25961,18 | 19796 | 2303,7 | 15211,78 | 25713,72 | 20029 | 2615,43 |
| 70. | Diffuse solar radiation: December [monthly sum, W.m-1] | 11040,79 | 21630,63 | 15238 | 1981,39 | 12268,08 | 21403,65 | 15718 | 2362,89 |
| 71. | Diffuse solar radiation: yearly sum [W.m-1] | 432846,75 | 569418,9 | 503838 | 31509,87 | 431339,81 | 549068,7 | 489999 | 31119,47 |
| 72. | Reflected solar radiation: January [monthly sum, W.m-1] | 0 | 434,82 | 69,61 | 73,12 | 0 | 434,82 | 74,48 | 83,80 |
| 73. | Reflected solar radiation: February [monthly sum, W.m-1] | 0 | 738,63 | 113,55 | 120,96 | 0 | 738,63 | 116,63 | 137,11 |
| 74. | Reflected solar radiation: March [monthly sum, W.m-1] | 0 | 1234,51 | 205,78 | 217,5 | 0 | 708,5 | 220,83 | 196,60 |
| 75. | Reflected solar radiation: April [monthly sum, W.m-1] | 0 | 2176,07 | 330,43 | 357,88 | 0 | 1052,05 | 348,98 | 305,31 |
| 76. | Reflected solar radiation: May [monthly sum, W.m-1] | 0 | 3051,87 | 474 | 519,6 | 0 | 1480,98 | 483,32 | 429,34 |
| 77. | Reflected solar radiation: June [monthly sum, W.m-1] | 0 | 3323,96 | 474,1 | 526,49 | 0 | 1644,05 | 495,29 | 439,56 |
| 78. | Reflected solar radiation: July [monthly sum, W.m-1] | 0 | 2715,9 | 448,97 | 486,89 | 0 | 1506,25 | 473,02 | 420,33 |
| 79. | Reflected solar radiation: August [monthly sum, W.m-1] | 0 | 2172,67 | 359,77 | 392,32 | 0 | 1153,57 | 370,98 | 321,10 |
| 80. | Reflected solar radiation: September [monthly sum, W.m-1] | 0 | 1462,62 | 246,11 | 263,17 | 0 | 853,17 | 256,12 | 229,41 |
| 81. | Reflected solar radiation: October [monthly sum, W.m-1] | 0 | 880,1 | 152,2 | 159,87 | 0 | 545,35 | 162,42 | 141,86 |
| 82. | Reflected solar radiation: November [monthly sum, W.m-1] | 0 | 431,43 | 67,19 | 75,22 | 0 | 431,43 | 85,46 | 89,62 |
| 83. | Reflected solar radiation: December [monthly sum, W.m-1] | 0 | 346,13 | 24,9 | 44,85 | 0 | 346,13 | 27,97 | 59,25 |
| 84. | Reflected solar radiation: yearly sum [W.m-1] | 0 | 18246,73 | 2966 | 3171,25 | 0 | 10377,25 | 3115,54 | 2797,77 |
| 85. | Solar incidence angle for a point on an inclined plane: January [monthly average, °] | 5,59 | 18,7 | 12,84 | 1,6 | 10,95 | 16,82 | 13,07 | 1,19 |
| 86. | Solar incidence angle for a point on an inclined plane: February [monthly average, °] | 7,95 | 22,63 | 16,94 | 2,88 | 9,77 | 21,08 | 17,22 | 2,78 |
| 87. | Solar incidence angle for a point on an inclined plane: March [monthly average, °] | 8,06 | 29,22 | 22,38 | 4,87 | 10,47 | 27,66 | 22,84 | 4,67 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 88. | Solar incidence angle for a point on an inclined plane: April [monthly average, °] | 8,63 | 34,76 | 27,48 | 6,85 | 10,48 | 33,46 | 27,98 | 6,80 |
| 89. | Solar incidence angle for a point on an inclined plane: May [monthly average, °] | 8,79 | 38,22 | 30,82 | 8,09 | 11,04 | 36,56 | 31,28 | 7,83 |
| 90. | Solar incidence angle for a point on an inclined plane: June [monthly average, °] | 8,08 | 39,22 | 31,84 | 8,98 | 9,89 | 38,81 | 32,83 | 9,12 |
| 91. | Solar incidence angle for a point on an inclined plane: July [monthly average, °] | 9,47 | 38,89 | 31,72 | 8,26 | 11,53 | 37,41 | 32,46 | 8,14 |
| 92. | Solar incidence angle for a point on an inclined plane: August [monthly average, °] | 7,43 | 36,65 | 28,64 | 7,88 | 9,24 | 35,14 | 29,07 | 7,81 |
| 93. | Solar incidence angle for a point on an inclined plane: September [monthly average, °] | 10 | 30,91 | 24,65 | 5,13 | 11,87 | 29,57 | 25,02 | 4,93 |
| 94. | Solar incidence angle for a point on an inclined plane: October [monthly average, °] | 6,67 | 25,21 | 18,71 | 4,12 | 8,42 | 23,75 | 18,99 | 4,06 |
| 95. | Solar incidence angle for a point on an inclined plane: November [monthly average, °] | 6,95 | 20,03 | 14,39 | 1,64 | 12,1 | 18,26 | 14,78 | 1,32 |
| 96. | Solar incidence angle for a point on an inclined plane: December [monthly average, °] | 4,17 | 17,11 | 11,17 | 1,79 | 7,51 | 14,86 | 11,1 | 1,51 |
| 97. | Solar incidence angle for a point on an inclined plane: yearly average [°] | 8,51 | 29,19 | 22,63 | 4,97 | 10,27 | 27,77 | 23,06 | 4,86 |
| 98. | Delta of solar incidence angle: January [monthly average from daily maximum, °] | 2,85 | 9,95 | 7,01 | 1,02 | 5,04 | 8,9 | 7,24 | 0,97 |
| 99. | Delta of solar incidence angle: February [monthly average from daily maximum, °] | 5,33 | 44,51 | 16,55 | 12 | 6,22 | 42,95 | 13,71 | 10,05 |
| 100. | Delta of solar incidence angle: March [monthly average from daily maximum, °] | 4,5 | 18,34 | 13,62 | 3,2 | 5,6 | 17,17 | 13,87 | 3,22 |
| 101. | Delta of solar incidence angle: April [monthly average from daily maximum, °] | 4,13 | 24,22 | 18,24 | 5,26 | 5,59 | 22,95 | 18,56 | 5,08 |
| 102. | Delta of solar incidence angle: May [monthly average from daily maximum, °] | 4,09 | 30,36 | 22,48 | 7,18 | 5,13 | 28,85 | 22,93 | 7,17 |
| 103. | Delta of solar incidence angle: June [monthly average from daily maximum, °] | 4,54 | 32,9 | 24,96 | 7,82 | 6,27 | 30,57 | 24,94 | 7,44 |
| 104. | Delta of solar incidence angle: July [monthly average from daily maximum, °] | 3,82 | 32 | 23,49 | 7,78 | 4,74 | 30,05 | 23,69 | 7,63 |
| 105. | Delta of solar incidence angle: August [monthly average from daily maximum, °] | 5,02 | 26,18 | 20,32 | 5,52 | 7,03 | 24,95 | 20,78 | 5,36 |
| 106. | Delta of solar incidence angle: September [monthly average from daily maximum, °] | 3,66 | 21,26 | 15,25 | 4,43 | 4,5 | 19,79 | 15,67 | 4,43 |
| 107. | Delta of solar incidence angle: October [monthly average from daily maximum, °] | 5,67 | 15,18 | 11,38 | 1,55 | 7,95 | 14,04 | 11,69 | 1,36 |
| 108. | Delta of solar incidence angles: November [monthly average from daily maximum, °] | 3,61 | 10,83 | 7,5 | 1,35 | 4,39 | 9,86 | 7,59 | 1,22 |
| 109. | Delta of solar incidence angle: December [monthly average from daily maximum, °] | 1,72 | 12,41 | 6,75 | 1,71 | 4,72 | 10,66 | 7,27 | 1,56 |
| 110. | Delta of solar incidence angle: yearly average [°] | 5,69 | 20,7 | 15,63 | 3,29 | 5,95 | 21,53 | 15,66 | 3,47 |
| 111. | Maximum of solar incidence angle: January [monthly average from daily maximum, °] | 8,2 | 28,44 | 19,8 | 2,52 | 15,99 | 25,71 | 20,28 | 2,02 |
| 112. | Maximum of solar incidence angle: February [monthly average from daily maximum, °] | 13,31 | 36,37 | 26,51 | 4,39 | 15,99 | 33,64 | 27,08 | 4,13 |
| 113. | Maximum of solar incidence angle: March [monthly average from daily maximum, °] | 13,39 | 47,38 | 35,84 | 8 | 16,07 | 44,64 | 36,53 | 7,81 |
| 114. | Maximum of solar incidence angle: April [monthly average from daily maximum, °] | 13,4 | 58,94 | 45,62 | 12,06 | 16,07 | 56,2 | 46,45 | 11,84 |
| 115. | Maximum of solar incidence angle: May [monthly average from daily maximum, °] | 13,49 | 67,95 | 53,27 | 15,24 | 16,17 | 65,21 | 54,19 | 14,98 |
| 116. | Maximum of solar incidence angle: June [monthly average from daily maximum, °] | 13,49 | 72,12 | 56,8 | 16,73 | 16,17 | 69,38 | 57,77 | 16,46 |
| 117. | Maximum of solar incidence angle: July [monthly average from daily maximum, °] | 13,59 | 70,21 | 55,19 | 16,01 | 16,27 | 67,46 | 56,14 | 15,74 |
| 118. | Maximum of solar incidence angle: August [monthly average from daily maximum, °] | 13,6 | 62,74 | 48,87 | 13,34 | 16,28 | 59,99 | 49,73 | 13,10 |
| 119. | Maximum of solar incidence angle: September [monthly average from daily maximum, °] | 13,7 | 51,99 | 39,78 | 9,5 | 16,38 | 49,24 | 40,52 | 9,30 |
| 120. | Maximum of solar incidence angle: October [monthly average from daily maximum, °] | 13,72 | 40,39 | 29,97 | 5,53 | 16,39 | 37,64 | 30,58 | 5,32 |
| 121. | Maximum of solar incidence angle: November [monthly average from daily maximum, °] | 10,52 | 30,76 | 21,84 | 2,8 | 16,49 | 28,01 | 22,34 | 2,37 |
| 122. | Maximum of solar incidence angle: December [monthly average from daily maximum, °] | 5,88 | 26,13 | 17,92 | 2,4 | 15,12 | 23,38 | 18,37 | 1,81 |
| 123. | Maximum of solar incidence angle: yearly average [°] | 13,56 | 49,45 | 37,62 | 8,66 | 16,23 | 46,71 | 38,33 | 8,47 |

**Electronic Appendix 4.** – Geological substrates occurring on studied sampling sites of *Jacobaea vulgaris* in Slovakia.

| Geological units used in the study (see Table 3). | Geological units according to Digital geological map of the Slovak Republic at scale 1:50,000 (Káčer 2005) |
|---|---|
| **I. Igneous rocks and rocks derived from them** | |
| **granites and gneisses** | gr19; gray-green medium-grained, mylonitised hercynian granodiorites (blastomylonites) [sivozelené strednozrnné, mylonitizované hercýnske granodiority (blastomylonity)] |
| | mg3; migmatites, orthogneisses, strongly directed hybrid granitic rocks and paragneisse horizons (hybrid complex) [migmatity, ortoruly, výrazne usmernené hybridné granitoidy a polohy pararúl (hybridný komplex)] |
| | mg5; fine-grained biotite gneisses and metatexite migmatites with a substantial proportion of substrate [jemnozrnné biotitické ruly a oftalmitické migmatity s podstatným podielom substrátu] |
| | trD1; fine- to medium-grained metarhyolite tuffites [jemno-strednozrnné metaryolitové tufity] |
| **andesites** | a1a31S2; extrusive breccias of hornblende-hypersthene andesites [extruzívne brekcie amfibolicko-hypersténických andezitov] |
| | b1a34S12; ignimbrites of biotite-hornblende-pyroxene andesites [ignimbrity biotiticko-amfibolicko-pyroxénických andezitov] |
| | b3a3B23; pumice tuffs and tuffs of hornblende-pyroxene andesites [pemzové tufy a tufy amfibolicko-pyroxénických andezitov] |
| | e1a23S12; block-and-ash pyroclastic flows of pyroxene andesites [blokovo-popolové pyroklastické prúdy pyroxénických andezitov] |
| | h3a23S12; epiclastic volcanic breccias of pyroxene andesites [epiklastické vulkanické brekcie pyroxénických andezitov] |
| | k1a2B23; coarse to block epiclastic volcanic breccias/conglomerates of intermediate andesites [hrubé až blokové epiklastické vulkanické brekcie až konglomeráty intermediálnych andezitov] |
| | k1a23B23; coarse to block epiclastic volcanic breccias/conglomerates of pyroxene andesites [hrubé až blokové epiklastické vulkanické brekcie až konglomeráty pyroxénických andezitov] |
| | k3a3B1; fine epiclastic volcanic breccias/conglomerates of hornblende-pyroxene andesites [drobné epiklastické vulkanické brekcie až konglomeráty amfibolicko-pyroxénických andezitov] |
| | Na23S1; extrusions of pyroxene andesite [extrúzie pyroxénického andezitu] |
| | Na28B12; extrusive domes of augite-hypersthene andesites [extruzívne dómy augiticko-hypersténických andezitov] |
| | Na31S2; extrusions of hornblende-hypersthene andesites [extrúzie amfibolicko-hypersténických andezitov] |
| | Na42S2; extrusive domes of hypersthene-hornblende andesites [extruzívne dómy hypersténicko-amfibolických andezitov] |
| | Na45B1; garnet-bearing extrusive domes of pyroxene-hornblende andesites [extruzívne dómy pyroxénicko-amfibolických andezitov s granátom] |
| | Nr71B3; extrusions of rhyodacite [extrúzie ryodacitu] |
| | n1a28B12; coarse epiclastic volcanic conglomerates of augite-hypersthene andesites [hrubé epiklastické vulkanické konglomeráty augiticko-hypersténických andezitov] |
| | Oa23S(1); lava flows of pyroxene andesite [lávové prúdy pyroxénického andezitu] |
| | Oa34S12; lava flows of biotite-hornblende-pyroxene andesites [lávové prúdy biotiticko-amfibolicko-pyroxénických andezitov] |
| | p1a23B2; coarse epiclastic volcanic sandstones of pyroxene andesites [hrubé epiklastické vulkanické pieskovce pyroxénických andezitov] |
| | t2a2B3; tuffaceous sandstones of intermediate andesites with horizons of minute conglomerates [tufirické pieskovce intermediálnych andezitov s polohami drobných konglomerátov] |
| | p2a23B23; epiclastic volcanic sandstones of pyroxene andesites |

| | |
|---|---|
| | [epiklastické vulkanické pieskovce pyroxénických andezitov] |
| | p7a23B2; epiclastic volcanic sandstones and siltstones of pyroxene andesites<br>[epiklastické vulkanické pieskovce a siltovce pyroxénických andezitov] |
| | p7a3B23; epiclastic volcanic sandstones and siltstones of hornblende-pyroxene andesites<br>[epiklastické vulkanické pieskovce a siltovce amfibolicko-pyroxénických andezitov] |
| | t6a2S12; tuffaceous sediments of intermediate andesites with gravel horizons of neovolcanic material<br>[tufitické sedimenty intermediálnych andezitov s polohami štrkov s nevulkanickým materiálom] |
| | vP2h; II. eruptive phase: tholeite basalts and andesites<br>[erupčná fáza: tholeiitové bazalty a andezity] |
| **II. Sedimentary rocks and derived metamorphic rocks** | |
| **loam sediments (clayey to loam sediments)** | d; deluvial sediments altogether: lithologicaly undifferenciated slope-sediments and rubbles<br>[deluviálne sedimenty vcelku: litofaciálne nerozlíšené svahoviny a sutiny] |
| | dfh; deluvial-fluvial sediments: mainly loam, sandy loam with fragments, fine-grained sands and sediments from loess<br>[deluviálno-fluviálne sedimenty: prevažne ronové hliny, piesčité hliny s úlomkami, jemnozrnné piesky a splachy zo spraší] |
| | dhk; deluvial sediments: mainly loamy-stony (rarely sandy- stony) slope-sediments and rubbles<br>[deluviálne sedimenty: prevažne hlinito-kamenité (podradne piesčito-kamenité) svahoviny a sutiny] |
| | fhh; fluvial sediments: lithologicaly undifferenciated alluvial loam, or sandy to gravel loam of valley floodplains and floodplains of mountain brooks<br>[fluviálne sedimenty: litofaciálne nečlenené nivné hliny, alebo piesčité až štrkovité hliny dolinných nív a nív horských potokov] |
| | iHu; claystones predominant over sandstones and conglomerates<br>[ílovce v absolútnej prevahe nad pieskovcami a zlepencami] |
| | koS23; Kochanovce Formation: clays, coal clays, lignites, bentonites<br>[kochanovské súvrstvie: íly, uhoľné íly, lignity, bentonity] |
| | pgh; deluvial-polygenetical sediments: loamy-clayey and sandy slope loam<br>[deluviálno-polygenetické sedimenty: hlinito-ílovité a piesčité svahové hliny] |
| | phr2; proluvial sediments: loamy and sandy gravels with fragments of rocks in lower middle alluvial cones with deposits of loess and deluvial sediments<br>[proluviálne sedimenty: hlinité a piesčité štrky s úlomkami hornín v nižších stredných náplavových kužeľoch s pokryvom spraší a deluviálnych splachov] |
| | phš; proluvial sediments: loam, sandy loam and loamy gravels with fragments of rocks in upper alluvial cones<br>[proluviálne sedimenty: hliny, piesčité hliny a hlinité štrky s úlomkami vo vyšších nivných náplavových kužeľoch] |
| | pr2; proluvial sediments: loamy and sandy gravels with fragments of rocks in lower middle alluvial cones<br>[proluviálne sedimenty: hlinité a piesčité štrky s úlomkami hornín až rezíduá v nižších stredných náplavových kužeľoch] |
| | pw; proluvial sediments: loamy and sandy gravels with fragments of rocks in lower alluvial cones<br>[proluviálne sedimenty: hlinité a piesčité štrky s úlomkami hornín v nízkych náplavových kužeľoch] |
| | stS1; Stretava Formation: clays, sands, tuffs<br>[stretavské súvrstvie: íly, piesky, tufy] |
| **shales (clayey, sandy, calcareous to recrystallized shales, including phyllites)** | BeT1; Benkov Formation: sandstones, clayey and clayey-sandy shales<br>[benkovské súvrstvie: pieskovce, ílovité a ílovito-piesčité bridlice] |
| | bpCsg; alternation of metasandstones and shales<br>[striedanie metapieskovcov a bridlíc] |
| | cfC1sg; chloritic phyllites<br>[chloritické fylity] |
| | fbD23; phyllites with intercalations of metabasaltic tuffs and tuffits<br>[fylity s vložkami metabazaltových tufov a tufitov] |
| | sCh; gray/black cyclically arranged sandstones, shales, sporadically conglomerates, locally with thin intermediate volcanic rocks and their volcanoclastics<br>[sivé až čierne cyklicky usporiadané pieskovce, bridlice, sporadicky zlepence, at places with |

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| | tenkými telesami intermediárnych vulkanitov a ich vulkanoklastík] |
| | zpP1sg; violet and greenish-gray sandstones, shales with interlayers of polymictic conglomerates<br>[fialové a zelenosivé pieskovce, bridlice s medzivrstvami polymiktných zlepencov] |
| **loesses** | drE; Fiľakovo Formation - Ďarmoty Member: friable siltstones, claystones, conglomerates<br>[fiľakovské súvrstvie - ďarmotské vrstvy: rozpadavé prachovce, ílovce, zlepence] |
| | hoS1; Holíč Formation: calcareous claystones, siltstones, interlayers of sandstones and acid tuffs<br>[holíčske súvrstvie: vápnité ílovce, prachovce, medzivrstvy pieskovcov a kyslých tufov] |
| | OvBp; Opatová Member: calcareous silts to clays with thin coal seams<br>[opatovské vrstvy: vápnité aleurity až íly s tenkými slojkami uhlia] |
| | sePt; Senné Formation: variegated clays, silts, sands, gravels, lignites, freshwater limestones<br>[senianske súvrstvie: pestré íly, prachy, piesky, štrky, lignity, sladkovodné vápence] |
| | ssBp; Szeczén sandy marlstones: calcareous silts - siltstones, rarely with sandy and clay horizons<br>[szeczénský šlír: vápnité silty - siltovce, ojedinele s polohami piesku a ílu] |
| | vrB2; Vranov Formation: siltstones, claystones, sandstones<br>[vranovské súvrstvie: prachovce, ílovce, pieskovce] |
| **sandy sediments (sandy to gravelly sediments, including sandstones and conglomerates)** | chE; Lužice Formation - Chropov Conglomerate: conglomerates<br>[lužické súvrstvie - chropovský zlepenec: zlepence] |
| | čeE; Čelovce Formation: sandstones, claystones, conglomerates, volcanoclastics, thin coal seams<br>[čelovské súvrstvie: pieskovce, ílovce, zlepence, vulkanoklastiká, slojky uhlia] |
| | fep; fluvial-eolian sediments: fluvial sands with short eolian transport<br>[fluviálno-eolické sedimenty: fluviálne piesky s krátkym eolickým transportom] |
| | fp; fluvial sediments: fine- and medium-grained sands/sandy gravels in dikes<br>[fluviálne sedimenty: jemnozrnné a strednozrnné piesky až piesčité štrky v agradačných valoch] |
| | hh2; fluvial sediments: alluvial flood fine-sandy loam, fine- to medium-grained sands<br>[fluviálne sedimenty: nivné povodňové jemnopiesčité hliny, jemno až strednozrnné piesky] |
| | npPl; Volkovce Formation: sands, gravels, clays, coal clays<br>[volkovské súvrstvie: piesky, štrky, íly, uhoľné íly] |
| | plOK; Planina Formation: silts, claystones, conglomerates, breccias, sandstones<br>[planinské súvrstvie: prachy, ílovce, zlepence, brekcie, pieskovce] |
| | sa2B3; Studienka Formation - Sandberg Member: sands, sandstones with intercalations of gravels<br>[studienske súvrstvie - sandberské vrstvy: piesky, pieskovce s vložkami štrkov] |
| | šhw; fluvial sediments: gravels, sandy gravels and sands in lower terraces with cover of loesses and deluvial sediments<br>[fluviálne sedimenty: štrky, piesčité štrky a piesky v nízkych terasách s pokryvom spraší a deluviálnych splachov] |
| | šm; fluvial sediments: gravels, sandy gravels and residual gravels of undifferentiated accumulations of younger terraces<br>[fluviálne sedimenty: štrky, piesčité štrky a reziduálne štrky nerozlíšených akumulácií mladších terás] |
| | šm2; fluvial sediments: gravels, sandy gravels and residual gravels of 2nd upper terrace<br>[fluviálne sedimenty: štrky, piesčité štrky a reziduálne štrky 2. vrchnej terasy] |
| | taE; Fiľakovo Formation - Tachty Sandstone: sandstones, siltstones<br>[fiľakovské súvrstvie - tachtiansky pieskovec: pieskovce, prachovce] |
| | voPl; Volkovce Formation - Nemčiňany Gravel sand: gravels, sands, gravel sands<br>[volkovské súvrstvie - nemčiniansky štrkopiesok: štrky, piesky, štrkopiesky] |
| | wiE; Lužice Formation - Winterberg Conglomerate: conglomerates, sandstones<br>[lužické súvrstvie - winterberský zlepenec: zlepence, pieskovce] |
| **flysch** | fBj; Javorina Member and Svodnica Formation: claystones and graywacke sandstones - uncategorized (flysch)<br>[javorinské vrstvy a svodnické súvrstvie: ílovce a drobové pieskovce - nerozčlenené (flyš)] |
| | ifZu; flysch with mainly claystones and claystone horizons in flysch<br>[flyš s prevahou ílovcov a ílovcové polohy vo flyši] |
| | kfBi; conglomerate flysch: thick benches of polymictic conglomerates, thin horizons of siltstones/claystones |

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| | [konglomerátový flyš: hrubé lavice polymiktných zlepencov, tenké polohy siltovcov až ílovcov] |
| | KvZu; Kežmarok Member: thick benches of sandstones, thin claystone horizons<br>[kežmarské vrstvy: hrubé lavice pieskovcov, tenké polohy ílovcov] |
| | St; "Older Malcov Formation": sandstones with small cavings of claystones, microconglomerates (coarse sandy flysch)<br>["staršie malcovské súvrstvie": pieskovce so závalkami ílovcov, drobnozrnné zlepence (hrubopsamitický flyš)] |
| | zHu; horizons of polymictic conglomerates<br>[polohy polymiktných zlepencov] |
| | Zu; normal flysch: claystones, siltstones and sandstones<br>[normálny flyš: ílovce, siltovce a pieskovce] |
| **calcareous flysch** | Pr; carbonate sandstones, conglomerates, claystones, marlstones (carbonate flysch)<br>[karbonátové pieskovce, zlepence, ílovce, slieňovce (karbonátový flyš)] |
| | PoK12; Poruba Formation: marlstones, clayey-sandy shales, sandstones, sandy limestones, orthoconglomerates<br>[porubské súvrstvie: slieňovce, ílovito-piesčité bridlice, pieskovce, piesčité vápence, ortokonglomeráty] |
| | PuK2; Púchov Formation: variegated marls and marlstones with calcareous sandstone horizons or sandy limestones<br>[púchovské súvrstvie: pestré sliene a slieňovce s polohami vápnitých pieskovcov, resp. piesčitých vápencov] |
| **quartzites** | LuT1; Lužňany Formation: pale-gray, pink and red quartzites, quartz sandstones, arkosic sandstones, conglomerates<br>[lúžňanské súvrstvie: svetlosivé, ružové, červené kremence, kremenné pieskovce, arkózové pieskovce, konglomeráty] |
| **limestones (including marbles)** | ckv; gray, greenish and red crinoidal limestones<br>[sivé, zelenkavé a červené krinoidové vápence] |
| | DzBp; (carbonate) Drieňov Conglomerates<br>[(karbonatické) drienovské zlepence] |
| | Gb; breccias composed of fragments of cherty limestones and limestones of Late Jurassic to Lower Cretaceous (Gregorian, Záskalie Breccias)<br>[brekcie zložené z úlomkov rohovcových vápencov a vápencov vrchnej jury až spodnej kriedy (gregoriánske, záskalské brekcie)] |
| | GvT2; Guttenstein Formation (Guttenstein Member) - Guttenstein (Annaberg) Limestones: dark-gray and black thick-benched, bedded, worm-like limestones<br>[gutensteinské súvrstvie (gutensteinské vrstvy) - gutensteinské (annabergské) vápence: tmavosivé a čierne hrubolavicovité, vrstevnaté, červíkovité vápence] |
| | HT2; Honce Formation: Honce limestones - light massive, recrystallized limestones (marbles)<br>[hončianske súvrstvie: hončianske vápence - svetlé masívne, kryštalické vápence (mramory)] |
| | RvT23; Reifling and Pseudoreifling limestones: chert-bearing gray bedded limestones<br>[reiflinské a pseudoreiflinské vápence: sivé vrstevnaté vápence s rohovcami] |
| | SbK2m; limestones of Široké klipp: organodetritic and organogenic limestones, fine-grained conglomerates<br>[vápence Širokého bradla: organodetritické a organogénne vápence, jemnozrnné zlepence ] |
| | StvT2; Steinalm Limestones: pale organodetritic limestones, locally dolomites<br>[steinalmské vápence: svetlé organodetritické vápence, miestami dolomity] |
| | TlJ1t; Trlen Formation: gray to dark-gray, sandy-crinoidal limestones with silicites, calcareous sandstones with interlayers of dark calcareous claystones<br>[trlenské súvrstvie: sivé až tmavosivé, piesčito-krinoidové vápence so silicitmi, vápnité pieskovce s medzivrstvičkami tmavých vápnitých ílovcov] |
| | vJ3K1; platy to schistose dark-gray and brown-gray limestones<br>[doskovité až bridličnaté tmavosivé a hnedosivé vápence] |
| | WvT23; Wetterstein Limestones: pale-gray organodetritic a organogenic massive, riff limestones<br>[wettersteinské vápence: svetlosivé organodetritické a organogénne masívne, rifové vápence] |
| | ZaT2; Zámost Formation: dark-gray bedded, organodetritic limestones with isolated particles of black cherts<br>[zámostské súvrstvie: tmavosivé vrstevnaté, organodetritické vápence s ojedinelými hľuzami čiernych rohovcov] |

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| **dolomites** | dpP3; dolomite sandstones with concretions and travertines<br>[dolomitové pieskovce s konkréciami a travertíny] |
| | dT3; Hauptdolomite: pale, gray massive and bedded dolomites<br>[hlavné dolomity: svetlé, sivé masívne a vrstevnaté dolomity] |
| | GdT2; Guttenstein Dolomites: dark-gray bedded dolomites, dolomite breccias<br>[gutensteinské dolomity: tmavosivé vrstevnaté dolomity, dolomitové brekcie] |
| | RdT2; Ramsau Dolomites: gray bedded dolomites<br>[ramsauské dolomity: sivé vrstevnaté dolomity] |
| | RHdT23; Ramsau Dolomites and Hauptdolomite: gray bedded dolomites and pale, gray massive and bedded dolomites<br>[ramsauské dolomity a hlavné dolomity: sivé vrstevnaté dolomity a svetlé, sivé masívne a vrstevnaté dolomity] |
| | SiT1; Szin Member: shales, limestones, dolomites, organodetritic limestone horizons, rauhwackes; Kampil Member: marly and sandy shales, limestones<br>[sinské vrstvy: bridlice, vápence, dolomity, polohy organodetritických vápencov, rauvaky; "kampilské vrstvy: slienité a piesčité bridlice, vápence] |
| | WdT23; Wetterstein Dolomites: pale-gray bedded dolomites, lagoon bedded dolomites, cherty dolomites<br>[wettersteinské dolomity: svetlosivé vrstevnaté dolomity, lagunárne vrstvovité dolomity, rohovcové dolomity] |
| **travertines** | vp; chemogene-organogenic sediments: freshwater limestones (travertines, calcareous tufas, calcareous flowstones)<br>[chemogénno-organogénne sedimenty: sladkovodné vápence (travertíny, penovce, vápnité sintre)] |

**Electronic Appendix 6.** Environmental characteristics of 144 populations of tetraploid *Jacobaea vulgaris* subsp. *vulgaris* and 37 populations of octoploid *J. vulgaris* subsp. *pannonica* from Slovakia. Displayed are proportions for categorical variables and mean values (minimum–maximum) for continuous variables. For variable explanations, see Electronic Appendices 2, 3 and 4.

| Environmental characteristics | *J. v.* subsp. *vulgaris* (2n = 4x = 40) | *J. v.* subsp. *pannonica* (2n = 8x = 80) |
|---|---|---|
| Habitat type | | |
| meadow/pasture (%) | 70.8 | 16.2 |
| steppic grassland (%) | 6.3 | 48.7 |
| thermophile fringe (%) | 20.2 | 24.3 |
| sand dune/steppe (%) | 0.0 | 10.8 |
| forest (%) | 2.8 | 0.0 |
| Habitat naturalness | | |
| low (%) | 6.3 | 0.0 |
| medium (%) | 46.5 | 21.6 |
| high (%) | 47.2 | 78.4 |
| Geological substrate | | |
| granites and gneisses (%) | 2.8 | 0.0 |
| andesites (%) | 15.2 | 16.2 |
| loam sediments (%) | 18.0 | 0.0 |
| shales (%) | 4.2 | 0.0 |
| loesses (%) | 3.5 | 8.1 |
| sandy sediments (%) | 11.1 | 27.0 |
| flysch (%) | 10.4 | 0.0 |
| calcareous flysch (%) | 2.8 | 0.0 |
| quartzites (%) | 2.8 | 5.4 |
| limestones (%) | 9.7 | 10.8 |
| dolomites (%) | 14.6 | 29.8 |
| travertines (%) | 4.9 | 2.7 |
| Topography | | |
| altitude (m) | 358 (140–840) | 242 (110–650) |
| exposure (°) | 1.6 (0.0–3.9) | 1.5 (0.0–3.9) |
| inclination | 10 (0–31) | 11 (0–24) |
| Climate (annual characteristics) | | |
| precipitation (mm) | 685 (557–1077) | 617 (538–731) |
| temperature (°C) | 7.7 (5.4–9.3) | 8.4 (5.9–9.6) |
| TIM (hours.year$^{-1}$ × 10$^{2}$) | 39 (22–44) | 40 (34–44) |
| BEAM (W.m$^{-2}$.year$^{-1}$ × 10$^{4}$) | 114 (73–147) | 119 (84–148) |
| DIFF (W.m$^{-2}$.year$^{-1}$ × 10$^{4}$) | 50 (43–57) | 49 (43–55) |
| REF (W.m$^{-2}$.year$^{-1}$ × 10$^{2}$) | 30 (0–182) | 31 (0–104) |
| sun angel (°) | 23 (9–29) | 23 (10–28) |
| sun angle delta (°) | 16 (6–21) | 16 (6–22) |
| sun angle max (°) | 38 (14–49) | 38 (16–47) |