

Report on weed mapping surveys in the Czech Republic, Slovenia, Slovakia and Austria: 2011-2013

Michaela Kolářová

Dept. of Agroecology and Biometeorology
Czech University of Life Sciences Prague
Czech Republic



Proposals

- Applied methodology for regional surveys (Sampling and Monitoring)
- Current activities
- Reports from organized actions
- Status of planned actions for 2013-14

Contact persons: J. Májeková, P. Eliáš, Š. Týr, J. Smatana

Weed mapping survey in Slovakia

Method: Braun-Blanquet approach (extended scale)
→ 1-9 ordinal scale

Relevé size: 100 m²

Software: TURBOVEG, JUICE, STATISTICA,
CANOCO, SYNTAX 2000, DMAP

Jehlík V., Májeková J., Zaliberová M. (2013): **New discovered adventive plants from eastern Slovakia**. *Thaiszia* 23: 61-66.

- 2012-2013: research on the rail transshipment yards, grain silos
- Eastern Slovakia
- *Objective:* to compare situation **30-40 years ago**

- one new species for Slovakia:

Euphorbia davidii

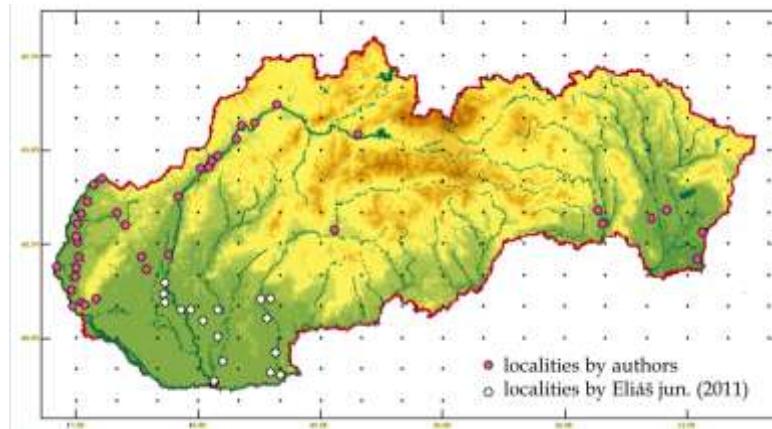
- imported cereals from Ukraine?



- 2011-2012: ***Geranium purpureum*** on the railway stations
- neophytic species
- 1st record in Slovakia - 2010

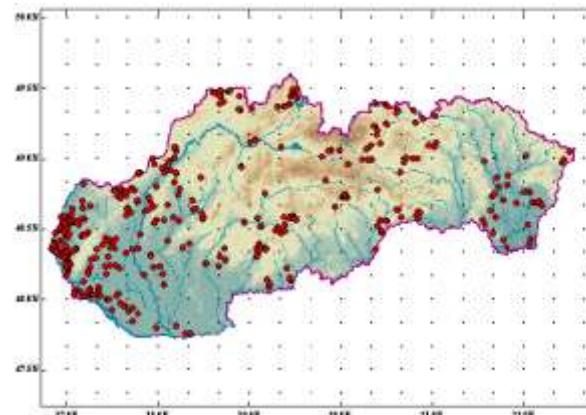
Eliáš P. (2011): ***Geranium purpureum* Vill. – new alien species to the Slovak flora.** *Thaiszia* 21: 21-28. – 18 railway stations)

- 38 from 100 railway stations

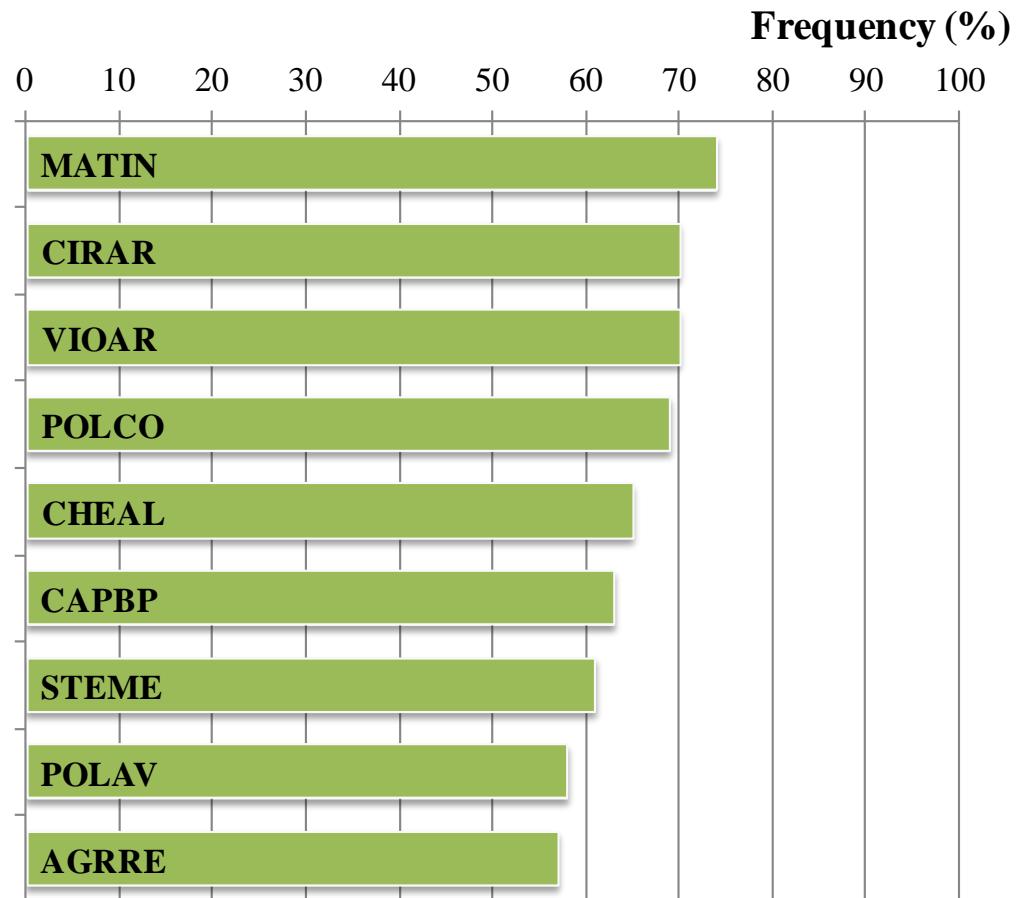


Májeková J., Zaliberová M. (2014): *Phytosociological study of arable weed communities in Slovakia. Tuexenia.*

- whole territory of Slovakia
- cereals, root crops, fodder crops, winter rape, stubble, fallow
- **2002-2008:** 508 relevés
- *Central database of phytocenological data in Slovak Republic*



- 13 weed communities in the class *Stellarietea mediae*
- 381 weed species (32 rare and endangered)



... Slovakia ...

Jana Májeková

Contact person: U. Šilc

Weed mapping survey in Slovenia

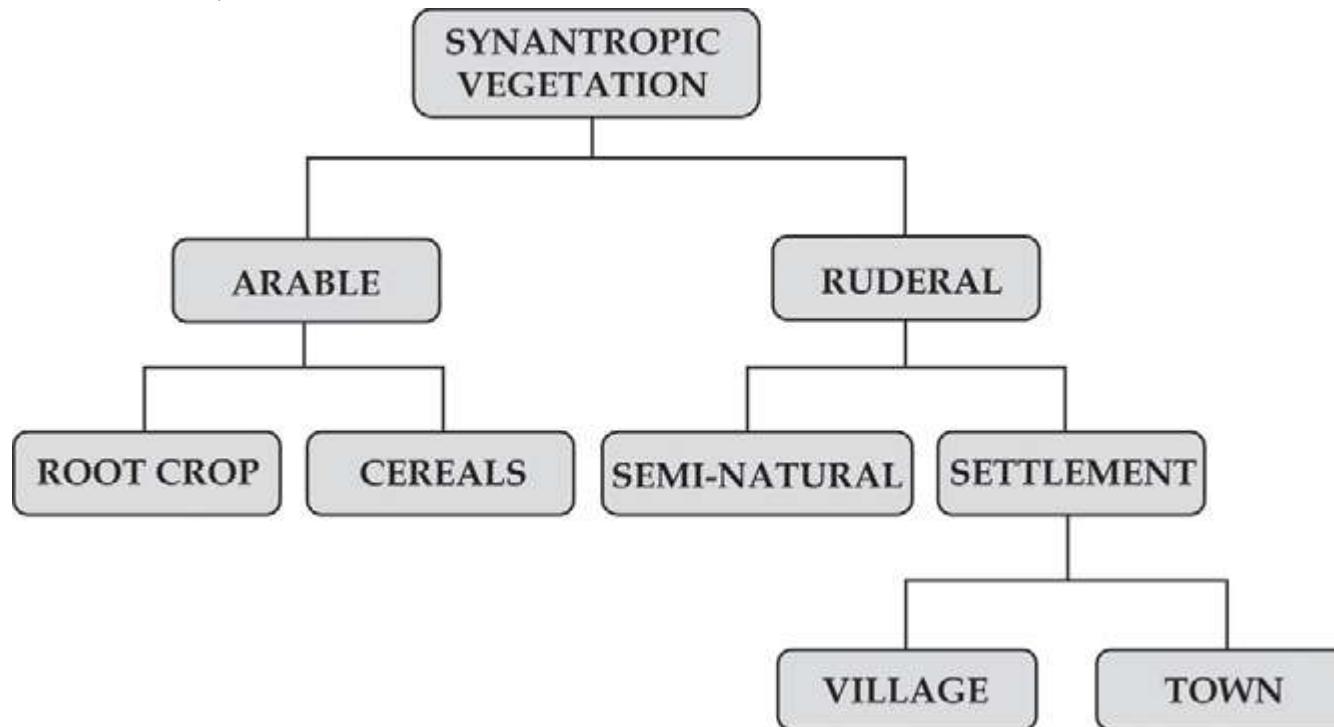
Method: Braun-Blanquet approach (extended scale)
 → 1-9 ordinal scale

Relevé size: 2-1000 m² (81 % 20-200)

Software: TURBOVEG, JUICE, CANOCO, PC-ORD 5

Šilc U. (2011): *Synanthropic vegetation: pattern of various disturbances on life history traits*. Acta Botanica Croatica 69, 215-227.

- 2404 relevés:



Ačić S., Šilc U., Vrbničanin S., Cupać S., Topisirović G., Stavretović N., Dajić Stevanović Z. (2013): ***Grassland communities of Stol Mountain (Eastern Serbia): Vegetation and environmental relationships.*** Archives of Biological Science 65, 211-227.

Šilc U., Čarni A., Vrbničanin S., Božić D., Dajić Stevanović Z. (2012): ***Alien plant species and factors of invasiveness of anthropogenic vegetation in the Northwestern Balkans - a phytosociological approach.*** Central European Journal of Biology 7, 720-730.

Contact persons: CULS, Z. Lososová, J. Winkler, J. Mikulka

Weed mapping survey in the Czech Republic

Method: Braun-Blanquet approach (extended scale)

→ 1-9 ordinal scale

in the past: Domin 11-degree scale

→ 1-9 ordinal scale

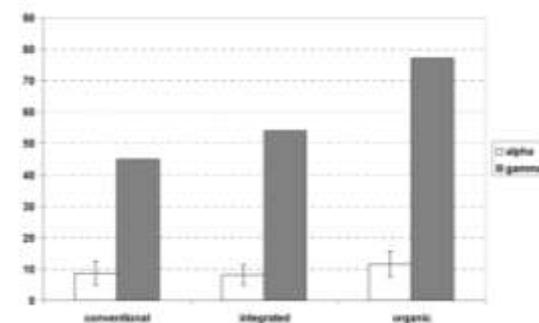
Relevé size: 8-100 m²

Software: TURBOVEG, JUICE, CANOCO, R,
PC-ORD 5, STATISTICA, DMAP

... Czech Republic ... Zdeňka Lososová

Lososová Z., Kolářová M., Tyšer L., Lvončík S. (2011): *Organic, integrated and conventional management in apple orchards: effect on plant species composition, richness and diversity.* Acta univ. agric. et silvic. Mendel. Brun.: 151-158.

- 30 permanent plots 1x1 m, 3 x per season
- 201 plant species (127 native species, 65 archaeophytes, and 9 neophytes)



Kolářová M., Tyšer L., Soukup J. (2013): **Diversity of current weed vegetation on arable land in selected areas of the Czech Republic.** *Plant, Soil and Environment* 59: 208-213

Kolářová M., Tyšer L., Soukup J. (2013): **Survey about the weed occurrence on arable land in the Czech Republic.** *Scientia agriculturae bohemica* 44: 63–69

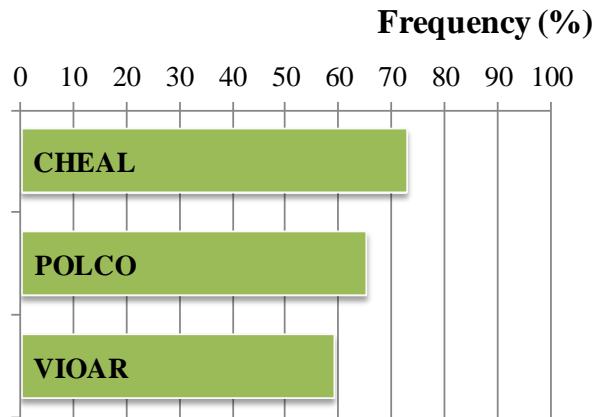
- **2006-2008:** 290 relevés
- whole territory of Czech Republic
- winter and spring cereals, root crops

- 172 species from 32 families

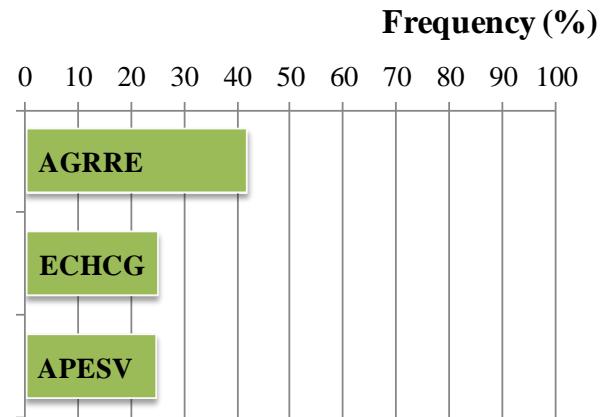
... Czech Republic ...

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DICOTS



MONOCOTS



Altitude

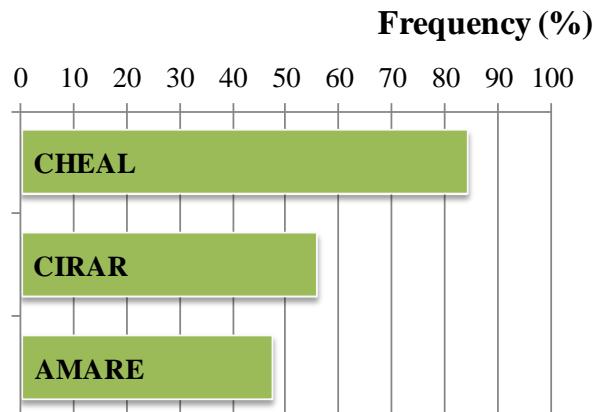


Crop

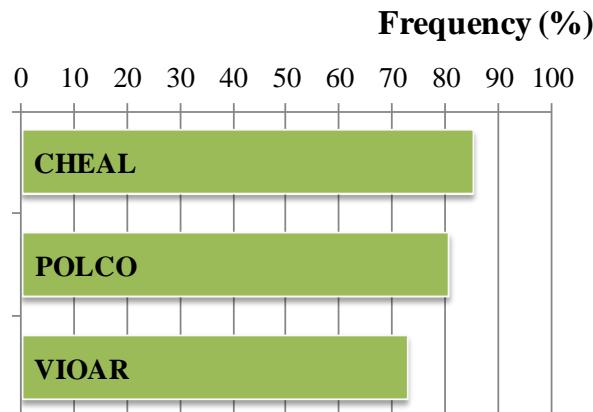


Type of farming

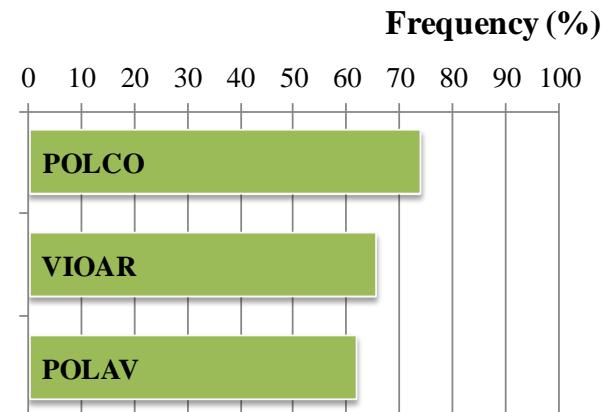
ROOT CROPS



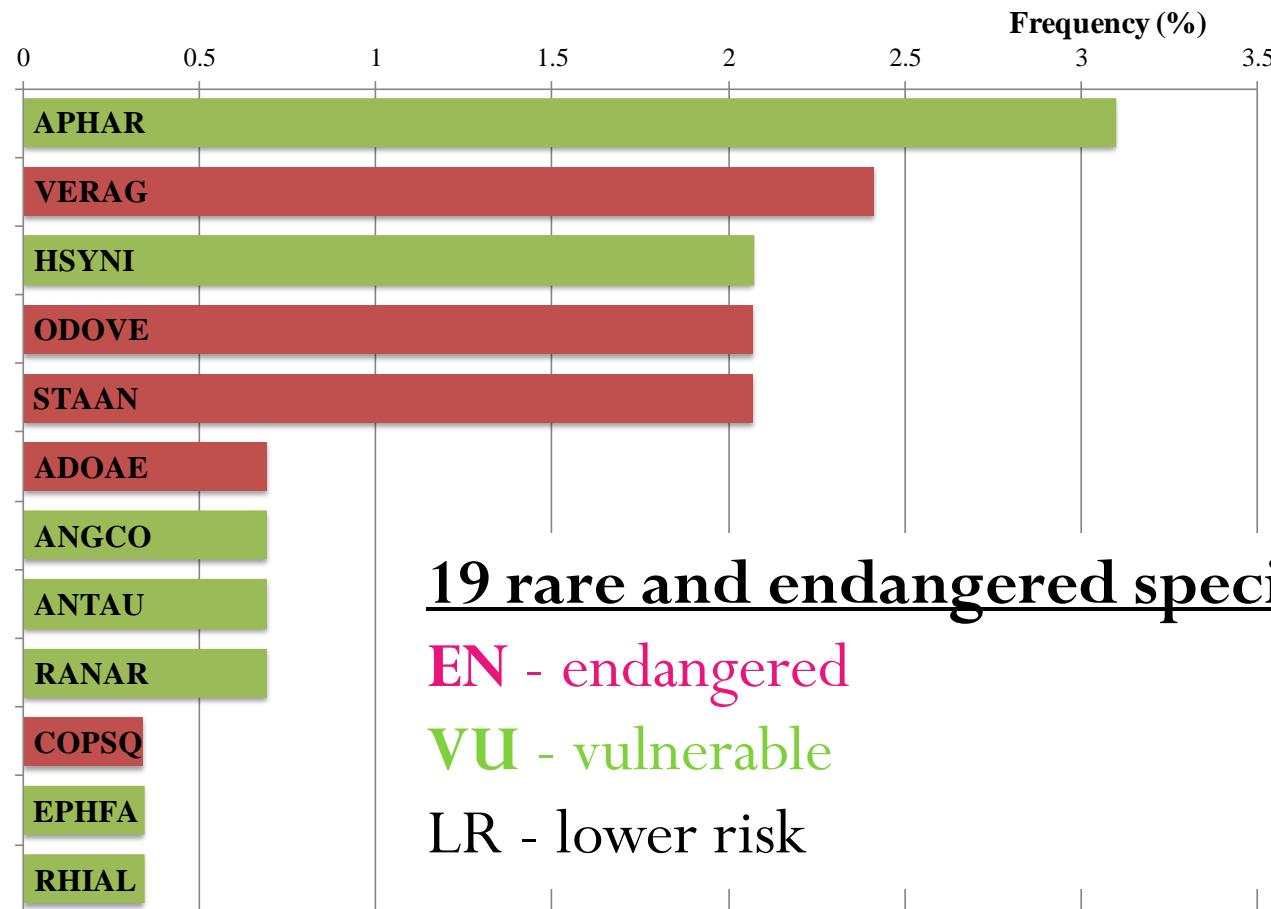
SPRING CEREALS



WINTER CEREALS



Kolářová M., Tyšer L., Soukup J. (2013): *Impact of site conditions and farming practices on the occurrence of rare and endangered weeds on arable land in the Czech Republic.* Weed Research.



- monitoring of endangered weed species occurrence - localities chosen properly, 1 relevé = 50 m², direct cover estimation

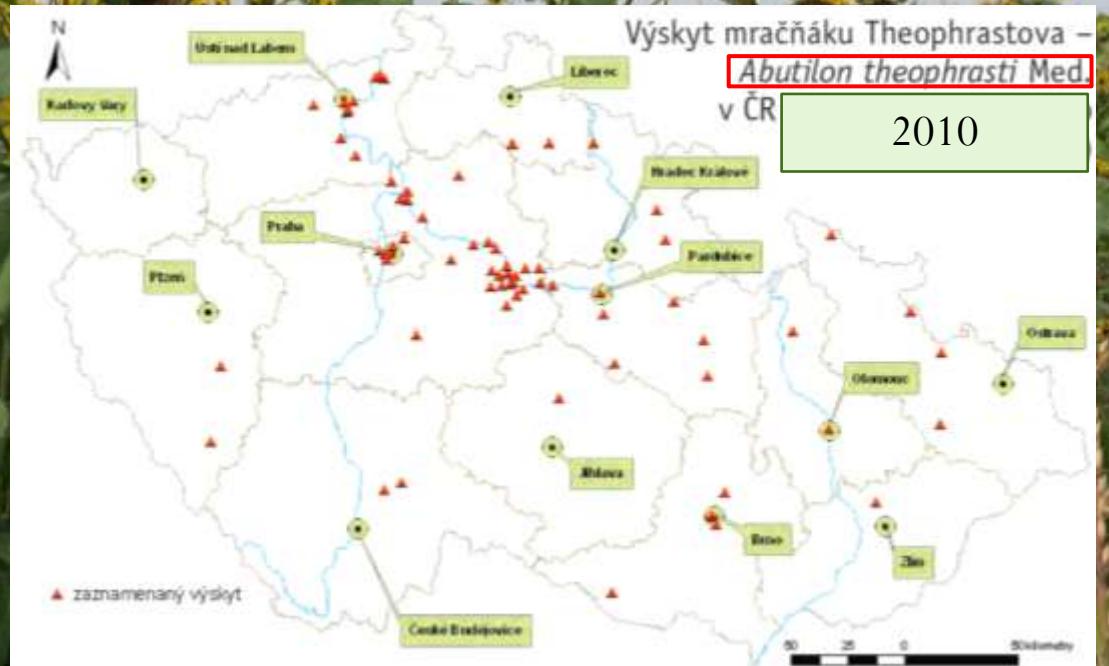
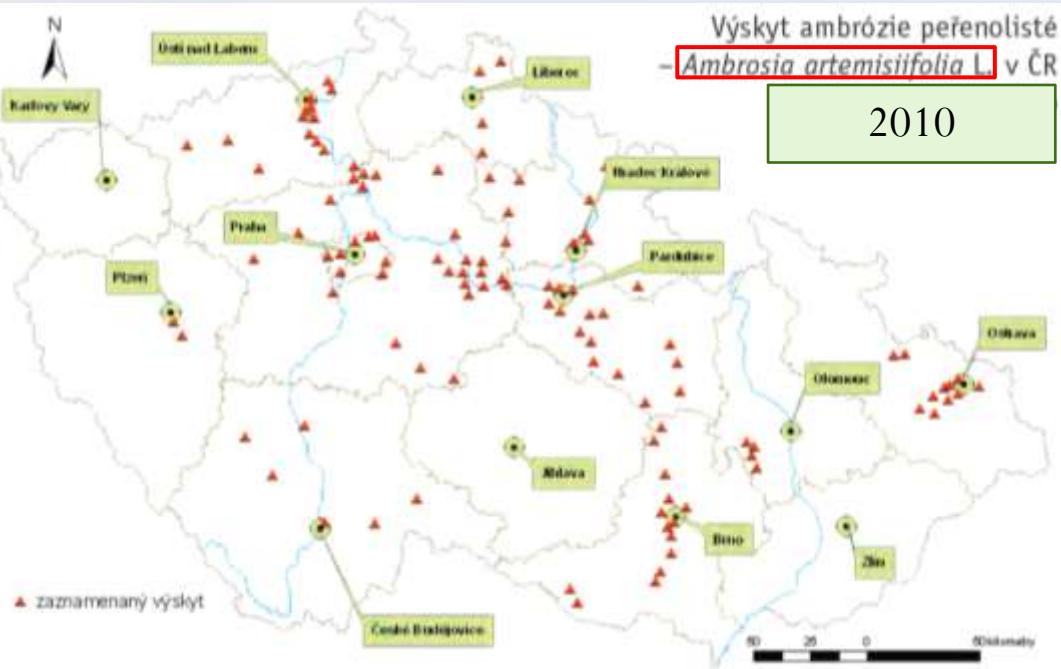


„weed cemetery“:
100 species
(*Asperula arvensis*, *Vaccaria hispanica*, ...)

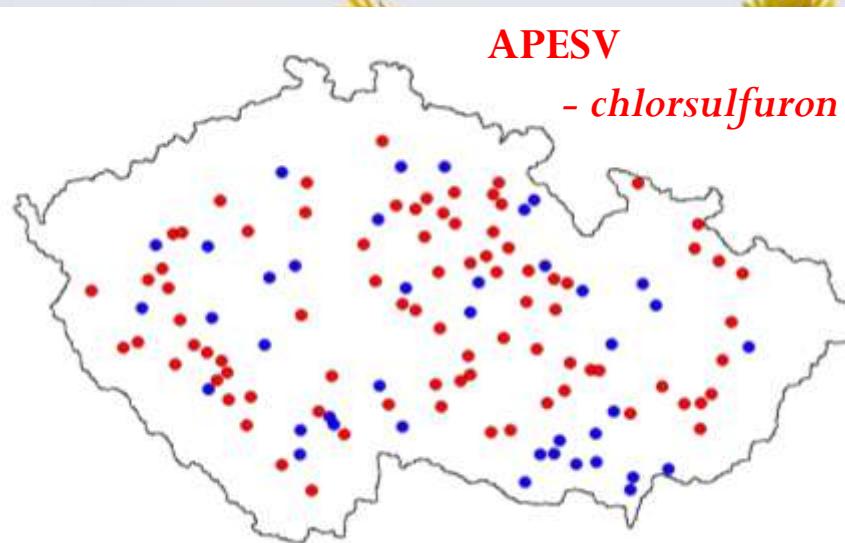
CE	Species	Number of localities
CRITICALLY ENDANGERED	<i>Bupleurum rotundifolium</i>	2
	<i>Conringia orientalis</i>	1
	<i>Erysimum repandum</i>	1
	<i>Galium tricornutum</i>	2
	<i>Misopates orontium</i>	2
	<i>Nigella arvensis</i>	2
ENDANGERED	<i>Ajuga chamaepitys</i>	2
	<i>Bifora radians</i>	2
	<i>Caucalis platycarpos</i>	17
	<i>Kickxia elatine</i>	1

- Monitoring and mapping of invasive weed species occurrence:
 - *Abutilon theophrasti, Amaranthus albus, A. blitoides, Ambrosia artemisiifolia , weed beet, Kochia scoparia, weed sunflower, Solanum physalifolium, Iva xanthiifolia*





- Monitoring and mapping of resistant weeds:
 - 2010-2013: *Conyza canadensis* - railway stations
(30-40/1 year), *glyphosate* ✓
 - 2004-2013: *Apera spica-venti* - arable land, *ALS inh.* ✓,
PSII inh. ✓, *ACC inh.* ✓
 - 2013: *Bromus sterilis* - arable land, *ALS inh.* ?, *ACC inh.* ?,
glyphosate ?
 - 2011: *Echinochloa crus-gali* - arable land, *ACC inh.* ✓
 - 2006-2013: *Alopecurus myosuroides* - *ALS inh.* ✓
 - 2014: PAPRH, CENCY - *ALS inh.* ? GALAP - *synthetic auxins* ?

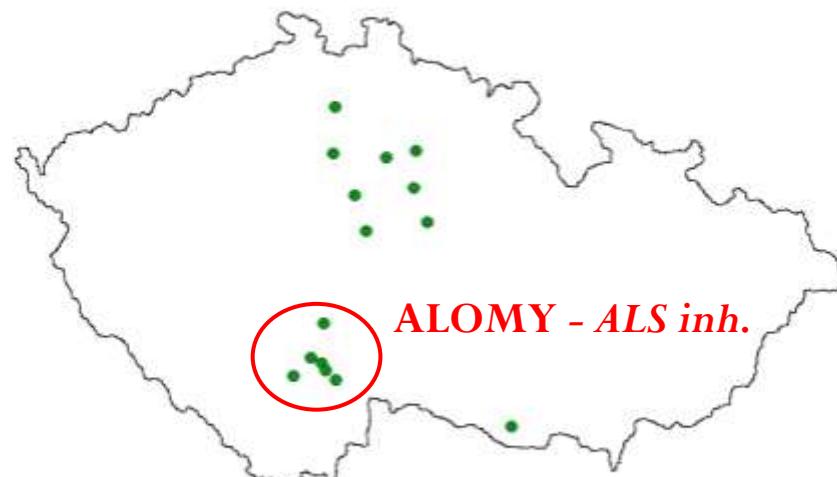


- 2013: *Bromus sterilis* - a glyphosate ?
- 2011: *Echinochloa crus-galli*
- 2006-2013: *Alopecurus myosuroides*
- 2014: PAPRH, CENCY -

of resistant weeds:

sis - railway stations

ti - arable land, *ALS inh.* ✓,



... Czech Republic ...

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WEEDMAP

INTERNATIONAL DATABASE FOR WEED MAPPING

This application was designed for the collection of data on weed occurrence on agricultural and non-agricultural land. The public section of the database allows searching and displaying the collected data in well-enriched maps of weed distribution. Secured section of the database is available for registered users only, it allows entering, viewing and exporting data in form of photodocological relieves.

Search species



Analyze species distribution

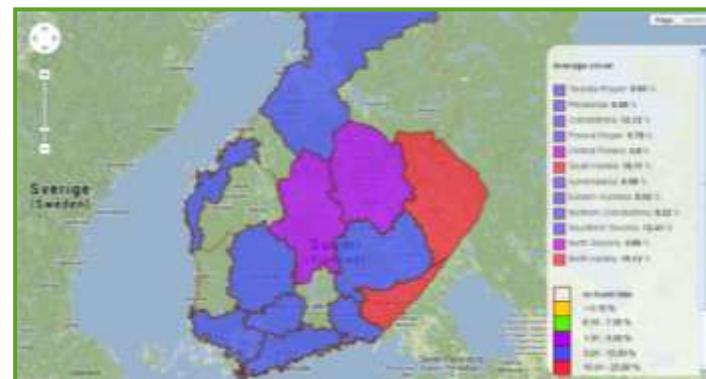


Add new record.



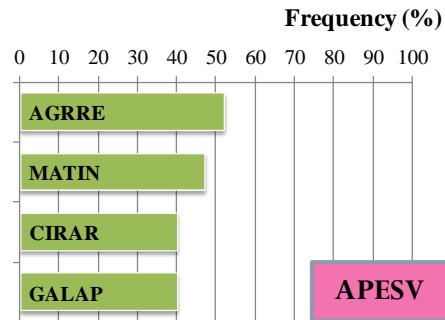
Contact

Department of Agroecology and Biometeorology, Faculty of Agrobiology, Food and Natural Resources, Czech University of Life Sciences in Prague, e-mail: weedmap@kau.cz

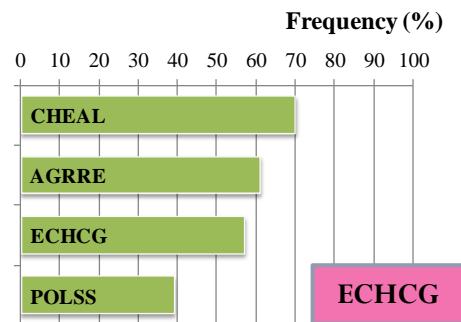


... Czech Republic ...

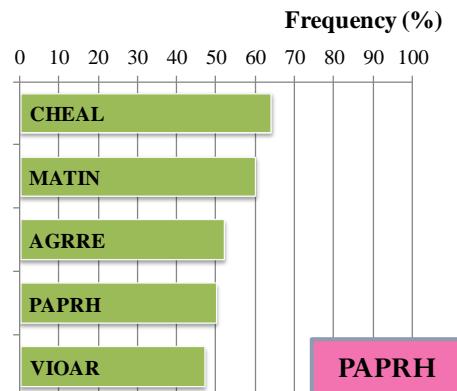
- since 1971, different crops, 382 permanent plots
- 2011: 181 species



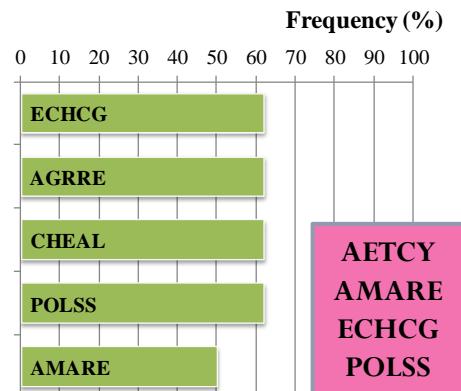
WINTER WHEAT



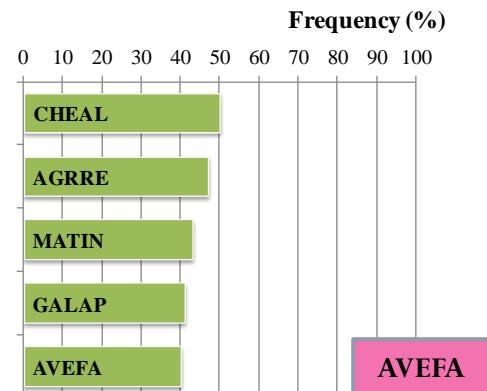
MAIZE



WINTER RAPE



SUGARBEET



BARLEY

Contact persons: S. Folak, D. Wedenig

Weed mapping survey in Austria

Method: single records (invasive species)
Braun-Blanquet approach (extended scale)
→ 1-9 ordinal scale

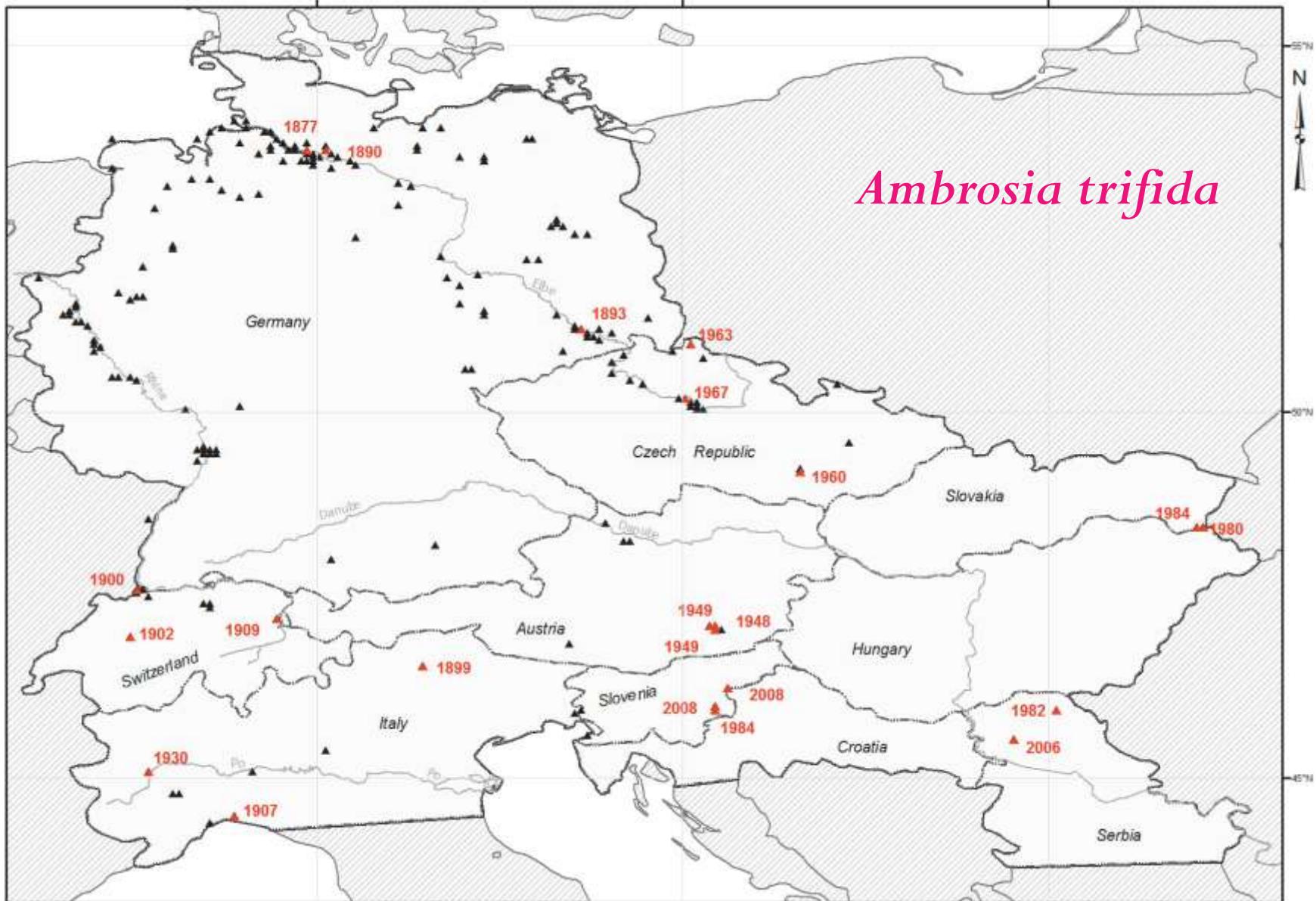
Software: TURBOVEG, JUICE, R

Follak S., Dullinger S., Kleinbauer I., Moser D., Ess F. (2013):
***Invasion dynamics of three allergenic invasive Asteraceae
(Ambrosia trifida, Artemisia annua, Iva xanthiifolia) in
central and eastern Europe.*** Preslia 85: 41-61.

- Austria, Czech Republic, Germany, Hungary, Slovakia, Slovenia, Switzerland and northern parts of more southerly countries like Croatia, Italy and Serbia
- 1804 records of *A. annua*, 1063 of *I. xanthiifolia* and 324 of *A. trifida*

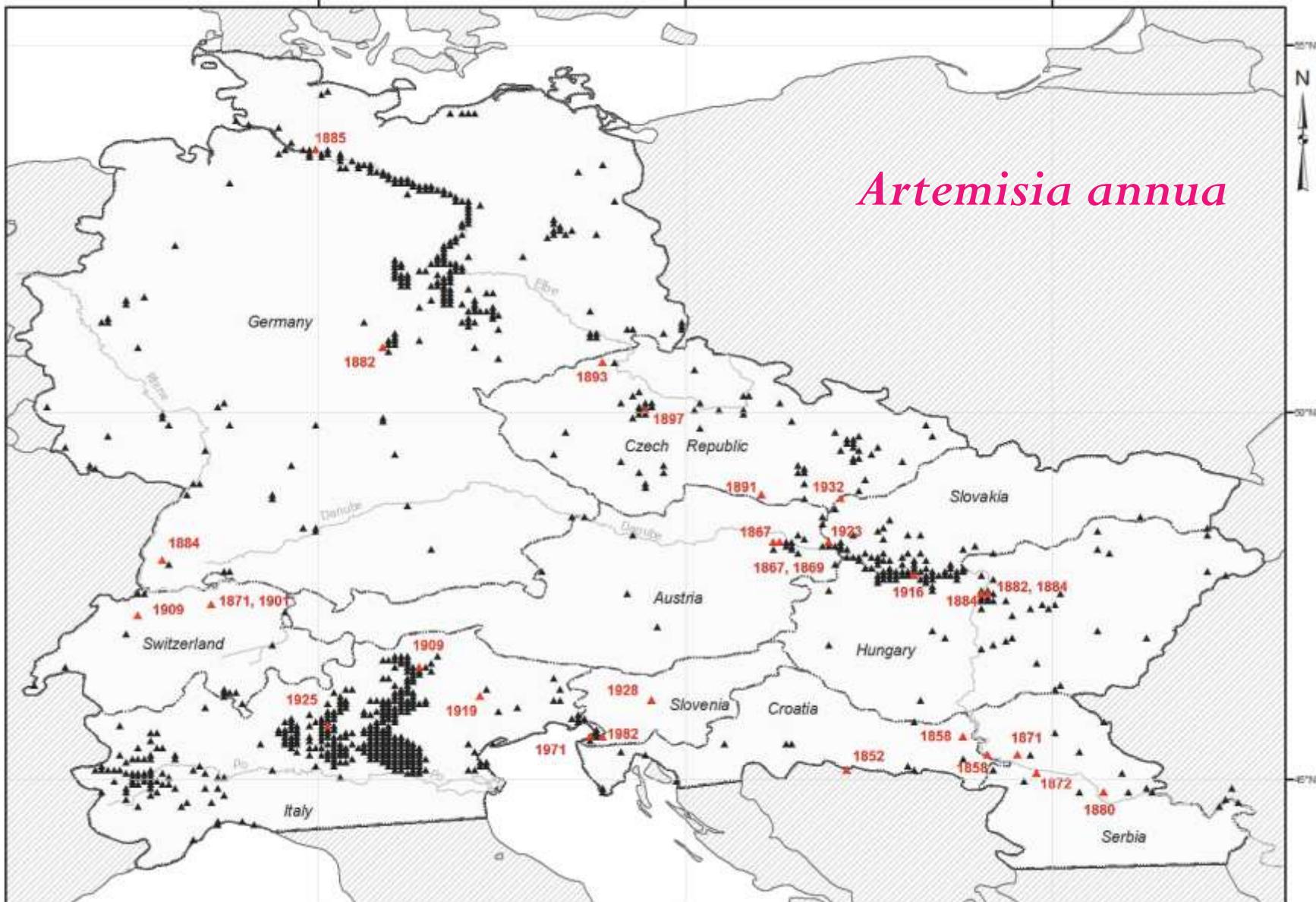
... Austria...

Swen Folak



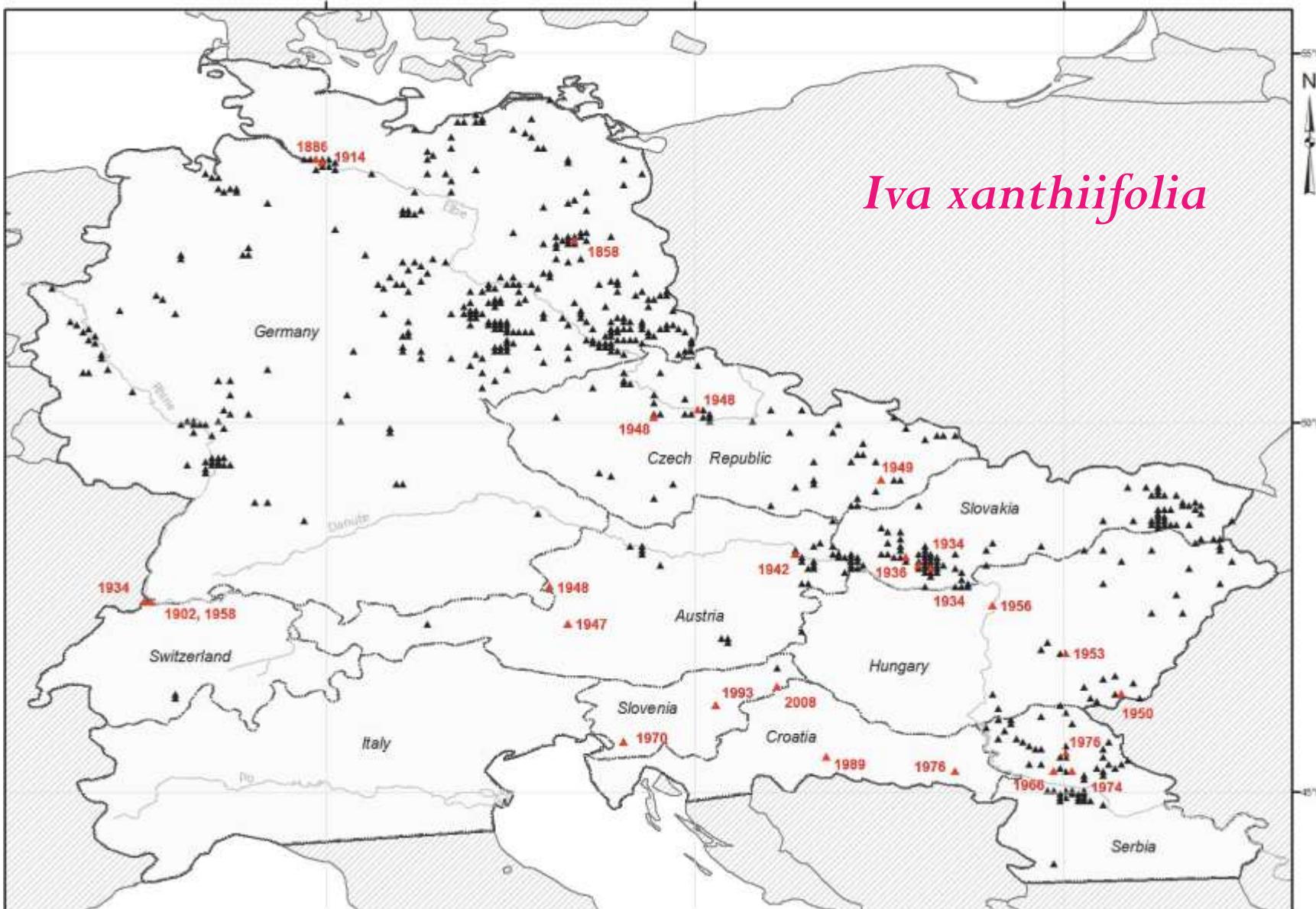
... Austria...

Swen Folak



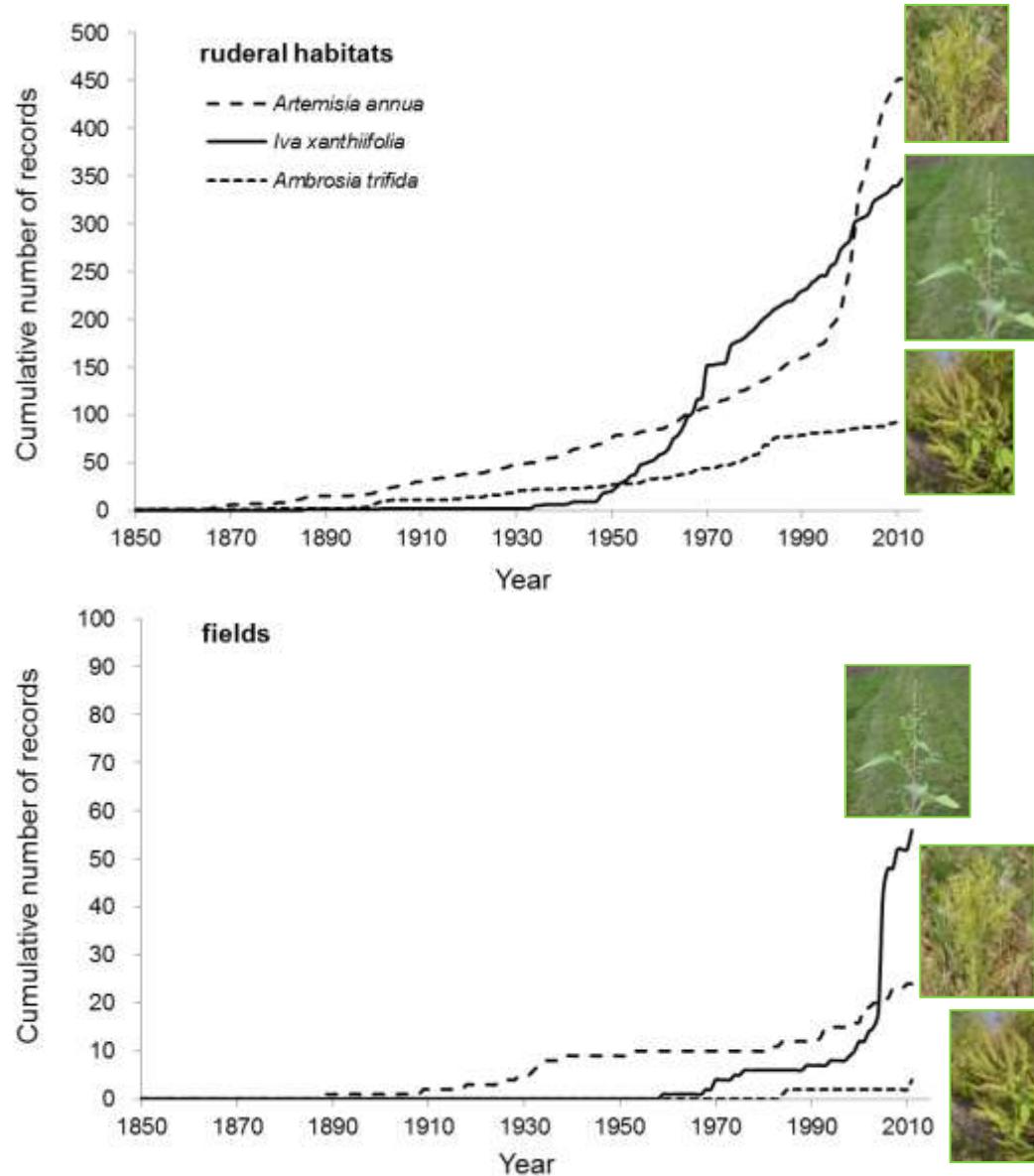
... Austria...

Swen Folak



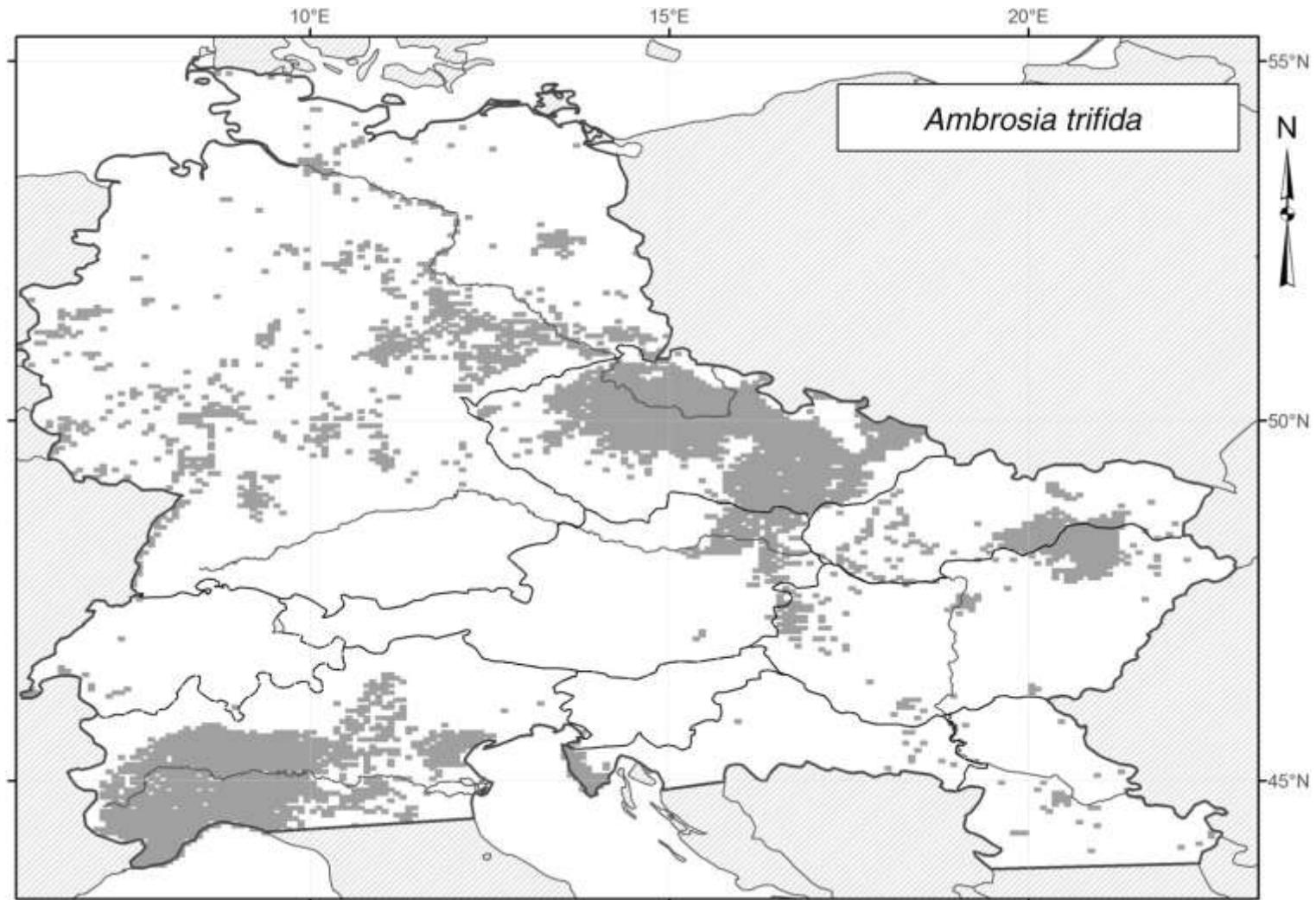
... Austria...

Swen Folak



... Austria...

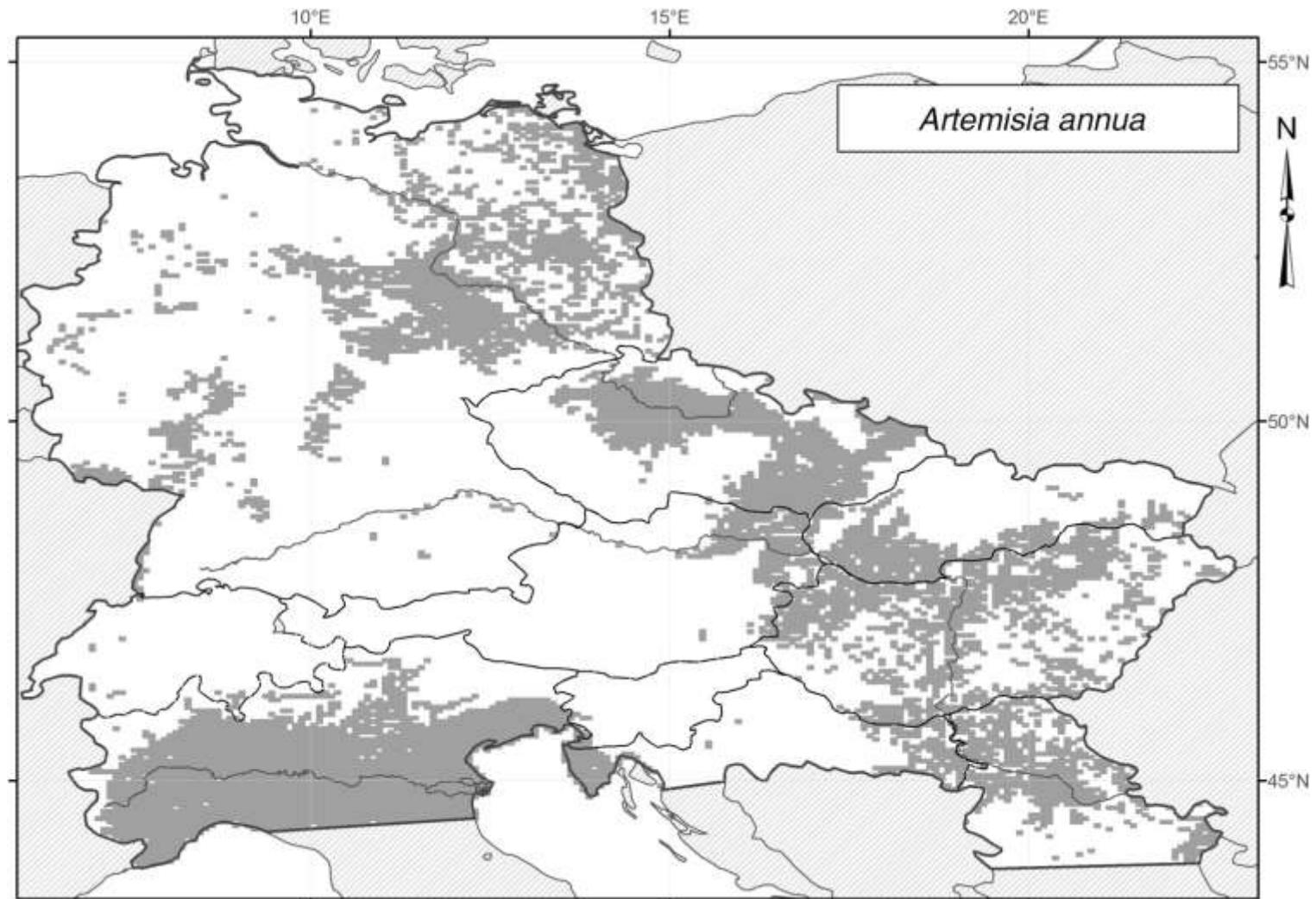
Swen Folak



Maps of habitat suitability under current climatic conditions in CEE

... Austria...

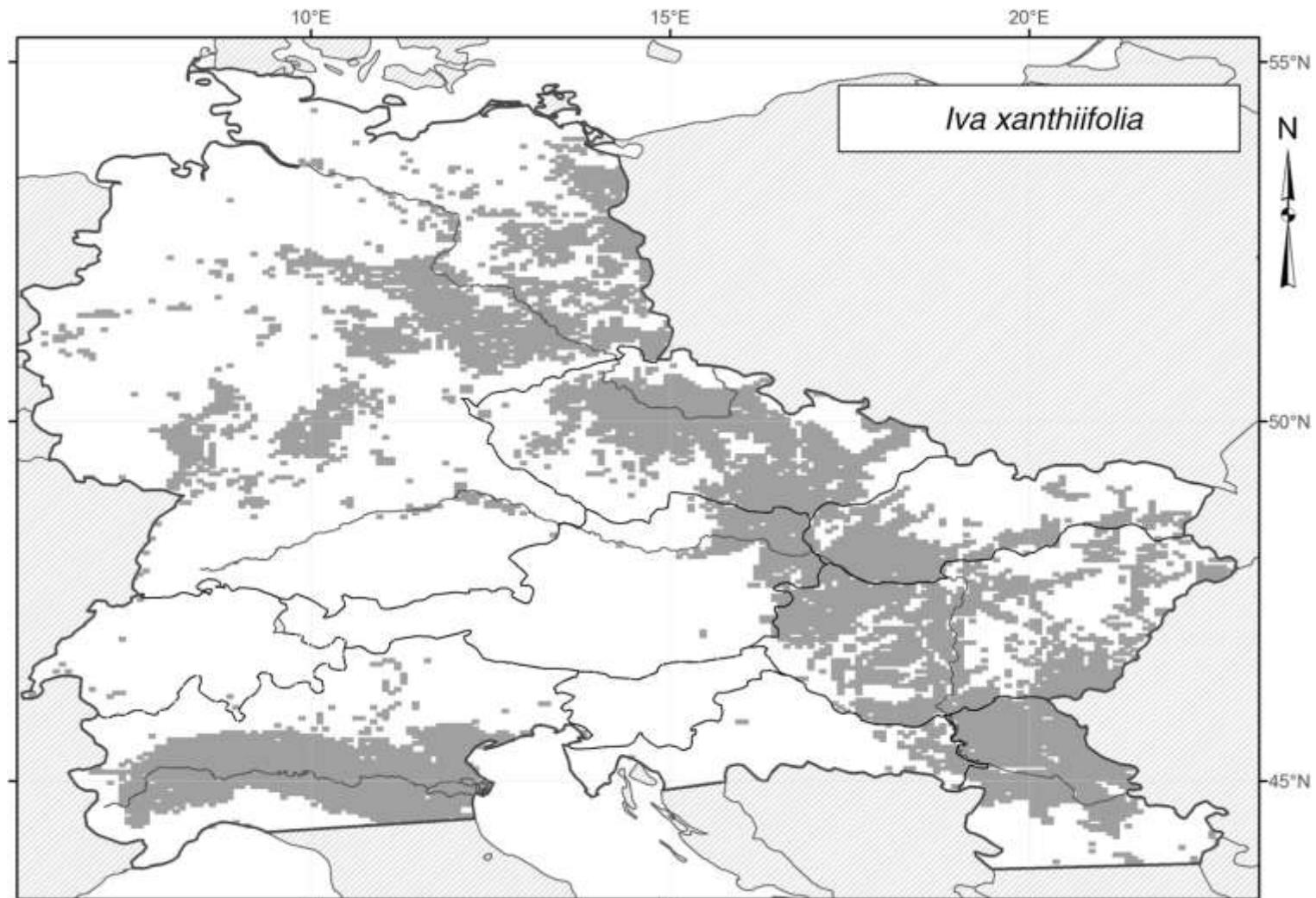
Swen Folak



Maps of habitat suitability under current climatic conditions in CEE

... Austria...

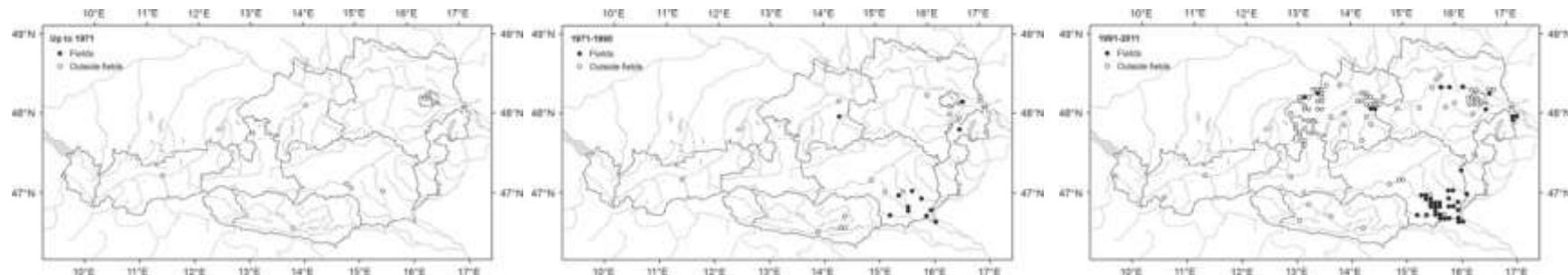
Swen Folak



Maps of habitat suitability under current climatic conditions in CEE

Follak S., Essl F. (2013): *Spread dynamics and agricultural impact of Sorghum halepense, an emerging invasive species in Central Europe*. Weed Research 53, 53–60.

- 302 records
- grain maize and oil-pumpkin, southern and eastern lowlands



- may emerge as a major weed in crop fields in the near future in Austria (other parts of Central Europe - e.g. Germany, Czech Republic)

... Conclusions ...

Method : extended Braun-Blanquet scale (Domin scale) –
→ nine-degree ordinal scale

Suitability of relevé method for further numerical analysis:

- ✗ *Podani (2006)*: burdened by much bias, subjectivity, inconsistency, arbitrariness, circular argumentation and large sampling error
- ✓ *Van der Maarel (2007)*: a tool for classification and ecological community description; explanatory and predictive ecology - more sophisticated measurements

BB	r	+	1	2m	2a	2b	3		4	5	
Domin	+	1	2	3	4	5	6	7	8	9	10
OT	1	2	3	4	5	6	7	7	8	9	9

... Conclusions ...

- ***Relevé size:*** 2-1000 m² (25-100 recommended for weed com.)
- ***arable land - thousands of relevés in last 60-70 years:***
 - *Czech Republic* (since 1954)
 - *Slovakia* (since 1949)
 - *Slovenia* (since 1939)
- **SOFTWARE:**
 - TURBOVEG – storing of relevés
 - JUICE – sorting, synoptical tables, calculating indices of diversity
 - STATISTICA, CANOCO (R programme)
 - SYN-TAX 2000, PC-ORD 5
 - GIS, DMAP (mapping in geographical grids)



...THANK YOU...