



IRS 2022

INTERNATIONAL RAGWEED SOCIETY
CONFERENCE

BUDAPEST, HUNGARY



RÉSEAU NATIONAL DE SURVEILLANCE AÉROBIOLOGIQUE

Photoperiod Ragweed

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Acknowledgments

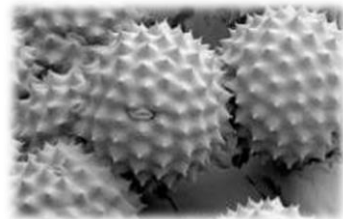
- Matthias and Barbora WERCHAN (Berlin data)
- Łukasz GREWLING (Poznań data)
- Orsolya UDVARDY and Donát MAGYAR (Budapest data)
- Jordina BELMONTE (Barcelona data)
- Mirjana MITROVIC MITROVIĆ JOSIPOVIĆ (Belgrade data)





Photoperiod

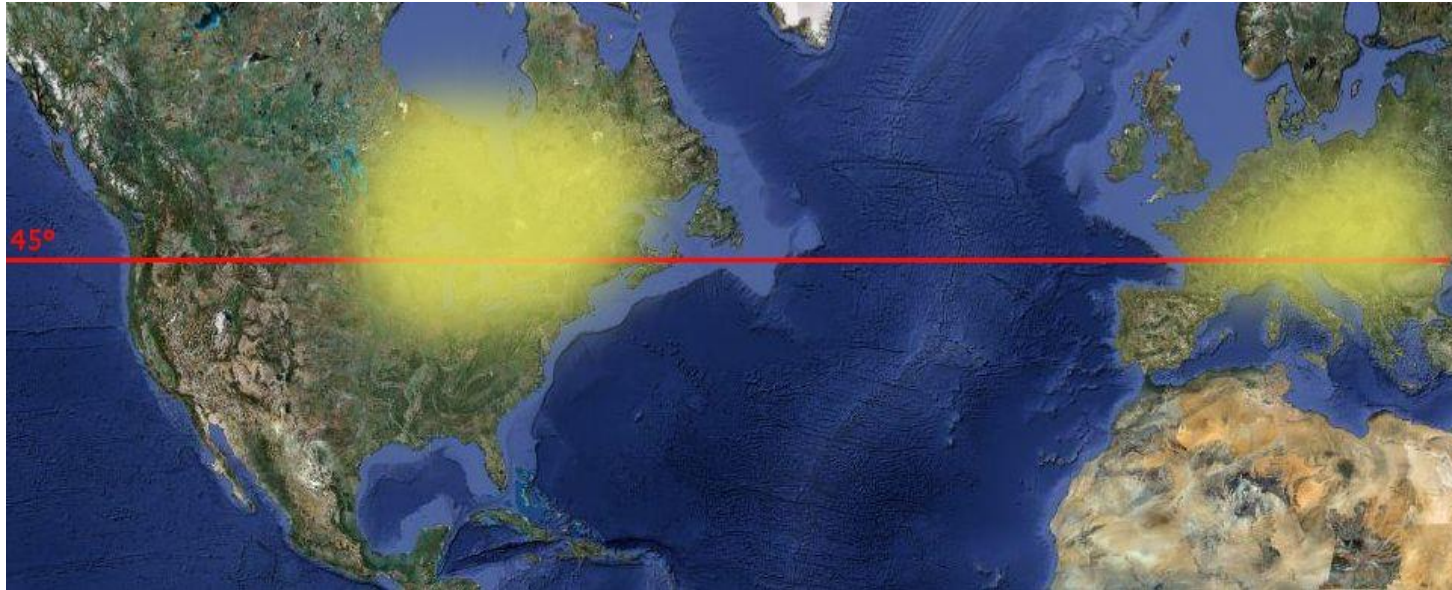
- **Definition:** time period of each day during which an organism receives illumination; day length
- It remains constant between years at a given time in the annual cycle for a geographic location.
- **Latitude** is the own parameter of photoperiod
- **Photoperiodism** refers to the response of plants and animals to the length of day or night. **Photoperiod** has an important role in agriculture as it determines fundamental physiological developments in some plants. ...
- This is crucial as plants are able to program themselves to develop in line with the right season





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Ragweed in the world (North)



Around the 45th parallel

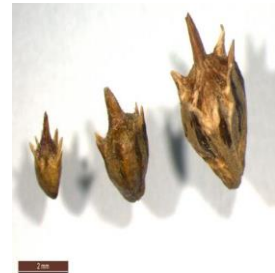


Photoperiod

Many studies try to show the possible spread of Ragweed to Northern countries (e.g. Bullock (1990), Scalone (1996) et Deen (1998a and 1998b). The main idea is

- **Temperature** may increase the **vegetative parameter of the plant's production** and the possibility of Northern production
- **Photoperiod** cannot increase or decrease **vegetative production** but is an **essential parameter regulating the reproduction.**
- **Climate change** (temperature increase) -> the plant can grow at northern latitude,

Photoperiod doesn't permit it to produce **productive grains.**





Key parameters



Photoperiod



Temperature



No
competition



Drought

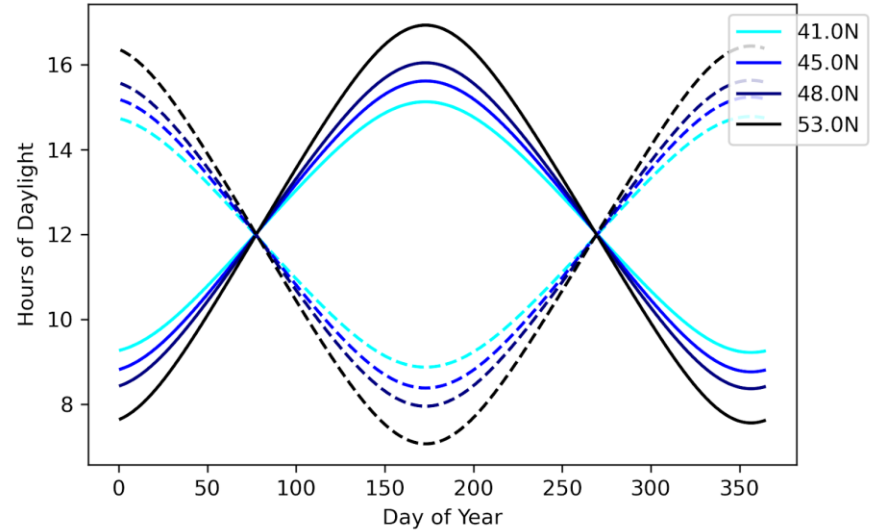
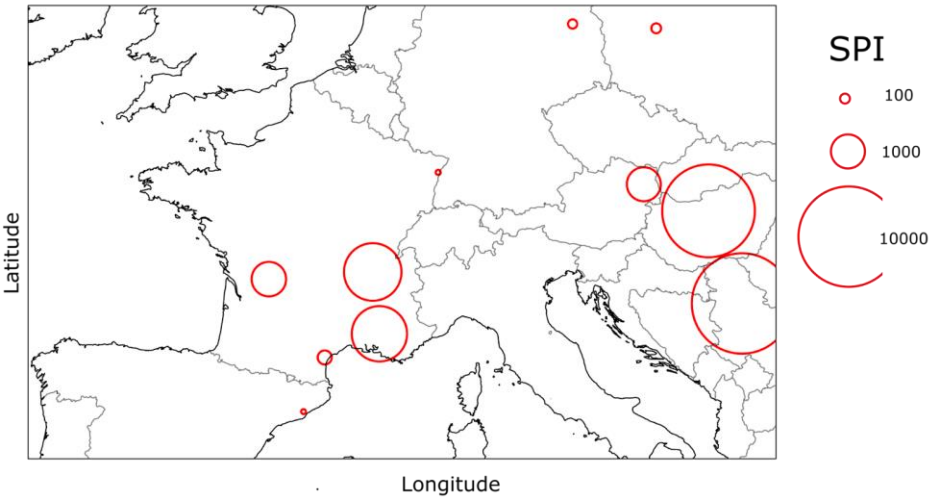


Plant diffusion





Photoperiod Ragweed





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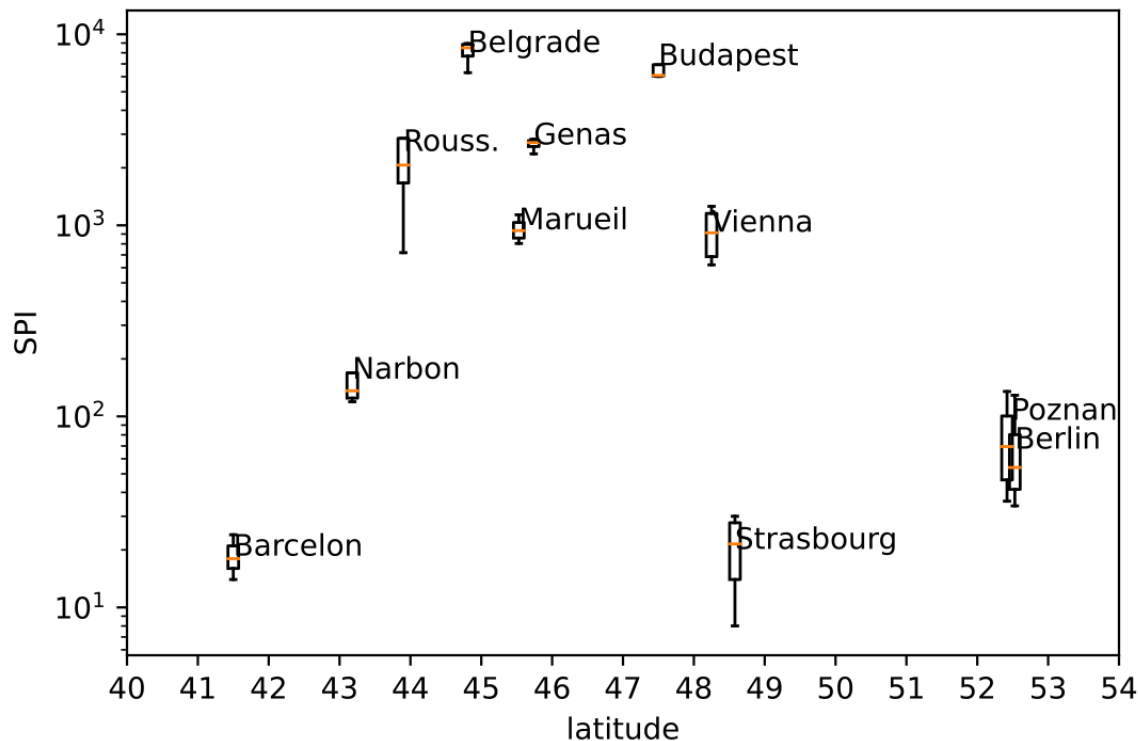
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Photoperiod Ragweed – list of selected sites and latitude

Station	Total-4 years	Average	Latitude
Barcelona	75	19	41.39
Narbonne	630	158	43.18
Belgrade	32231	8058	44.49
Roussillon	9806	2451	45.37
Mareuil	3816	954	45.45
Genas	10611	2653	45.73
Budapest	27558	6890	47.47
Vienna	3705	926	48.20
Strasbourg	81	20	48.57
Poznan	310	78	52.41
Berlin	271	68	52.52

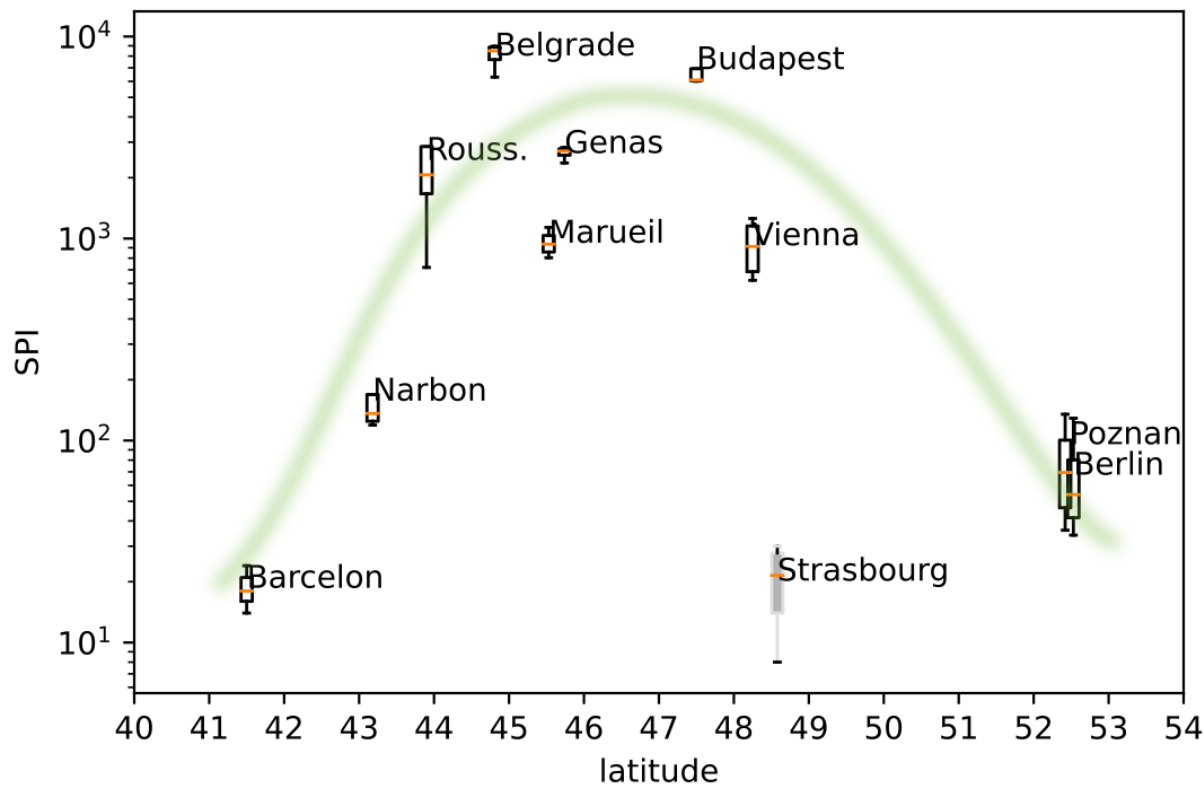


SPI Index (average) for the selected sites and latitudes



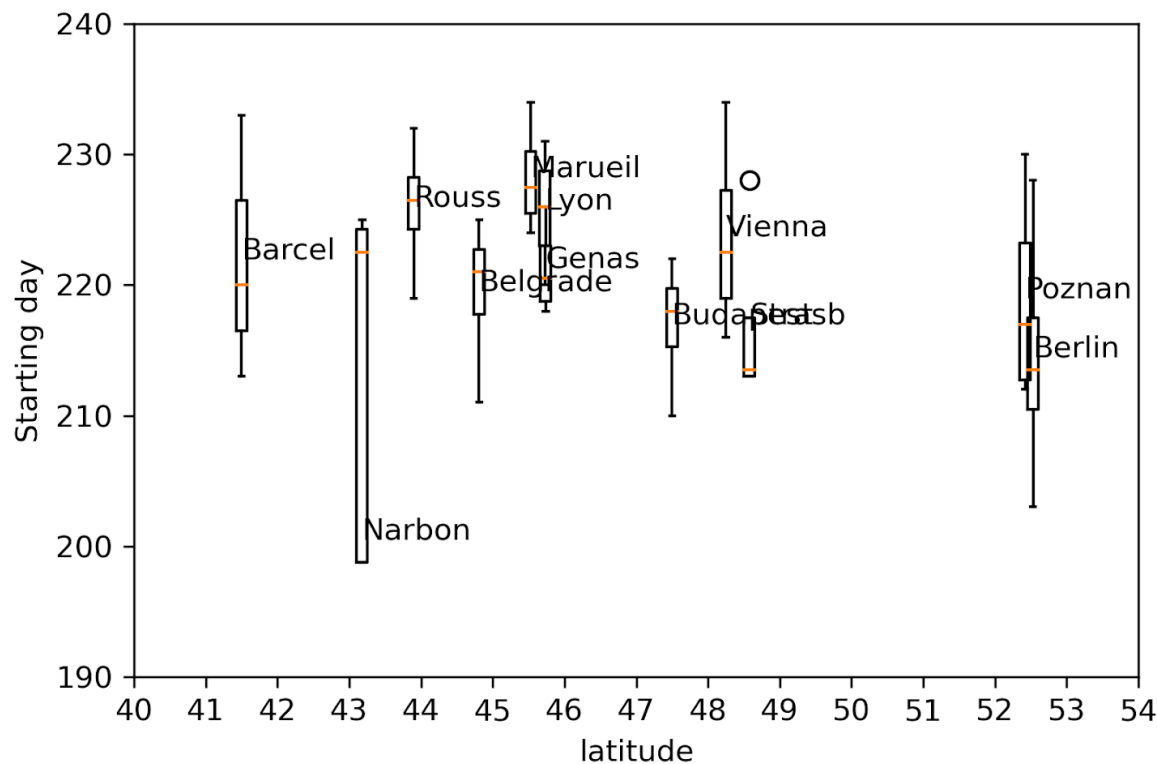


SPI Index average and curve / latitude





Starting day and latitude





Conclusion



- Photoperiodic responses are the most important factors limiting the European distribution of invasive plants such as *Ambrosia artemisiifolia*.
- Attempts to predict the northward range shift of ragweed have led to the conclusion that the extension of the range limit is to a large extent constrained by the photoperiod requirement for induction of **flowering then seed production**.
- The positioning of the dates of the start of pollination, of the main peak and of the end of pollination on each of the curves makes it possible to understand that the day accumulation delays as the site is further North or South.
- At the latitude of North and South sites, there is not enough pollen in the air, therefore **not enough seeds for plant reproduction**. This is why *ambrosia* does not develop very well at these latitude.
- The **modelling** works must take into account photoperiod to be in the good way!





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Thank you for your attention



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