

Koolwitjes...

Van het Tuinmeetnet
Naar Spanje
En tot aan de Noordkaap

Koolwitjes in het tuinmeetnet...

- Niet het gemakkelijkst...
- Wellicht ondergerapporteerd...
- => Trends



Klein koolwitje (*Pieris rapae*)
Klein geaderd witje (*Pieris napi*)

Foto : Stefan De Decker

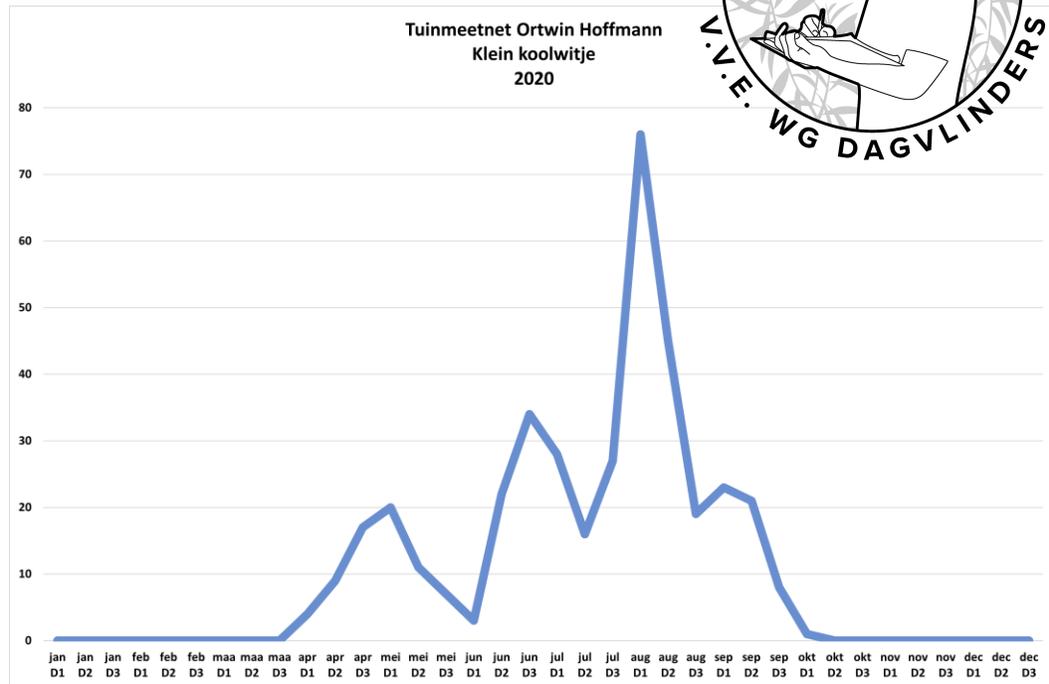


Tuinmeetnet data :

- Fenogram / Fenologie
- Imago's



Tuinmeetnet Ortwin Hoffmann
Klein koolwitje
2020



Tuinmeetnet VVE WG Dagvlinders
Klein koolwitje 2020

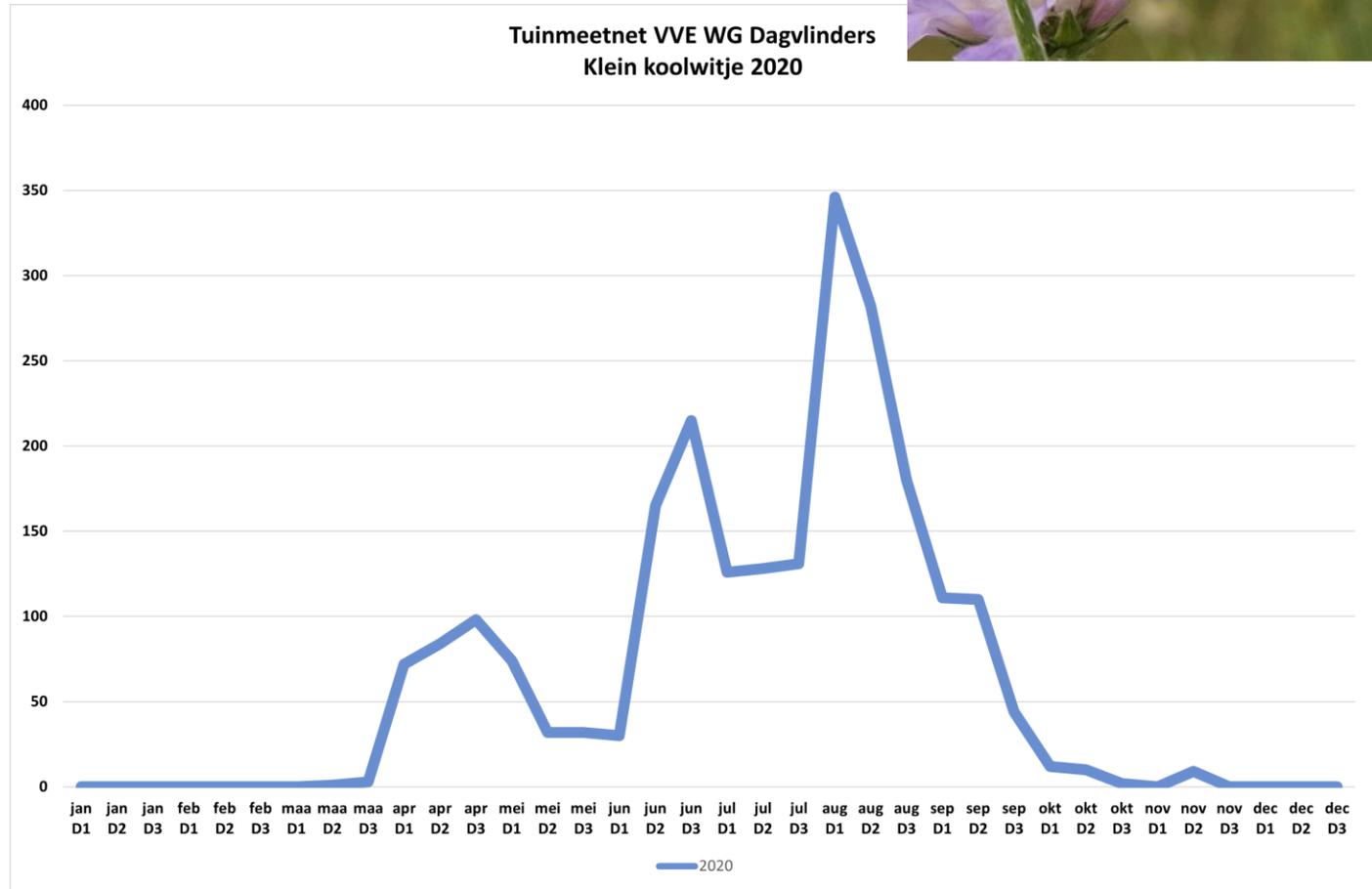
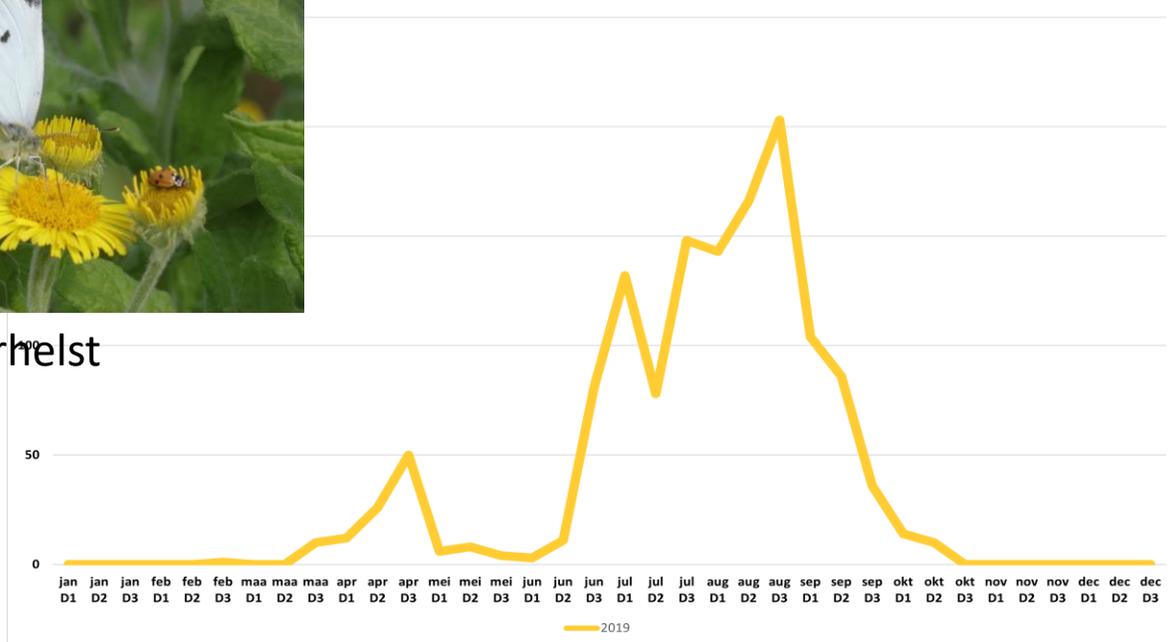




Foto : Luc Verhelst

Tuinmeetnet VVE WG Dagvlinders
Klein koolwitje 2019



Tuinmeetnet VVE WG Dagvlinders
Klein koolwitje 2020

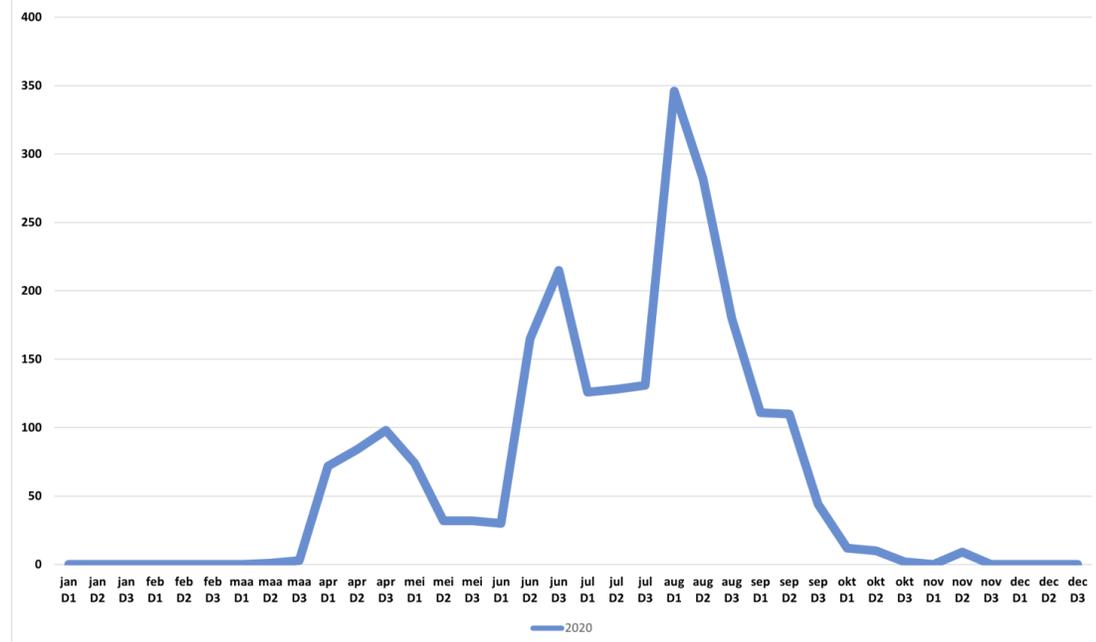
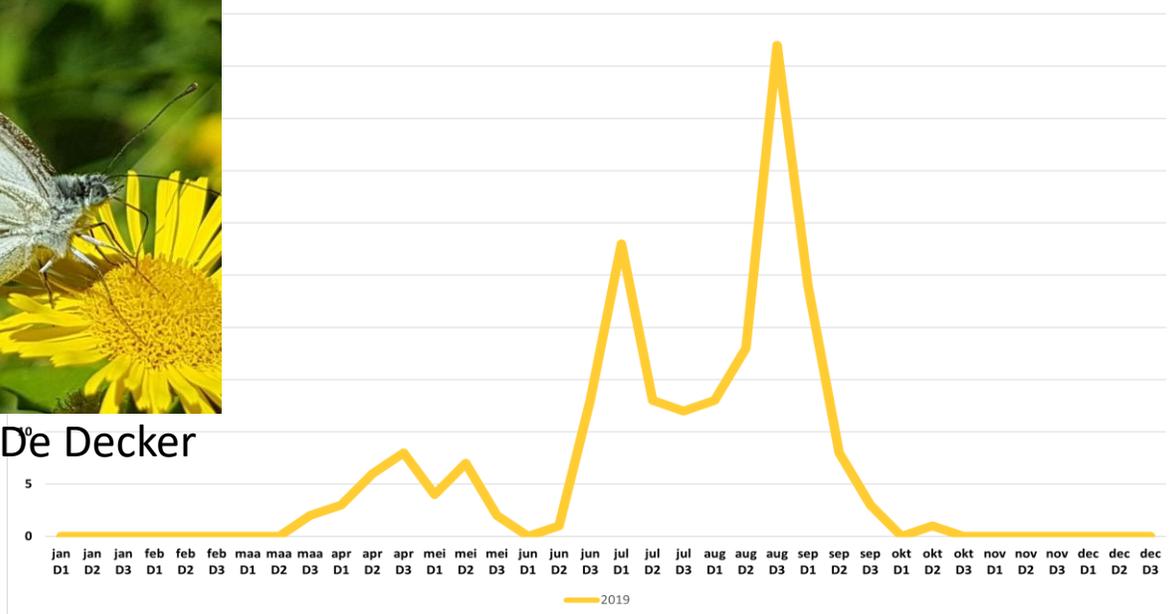
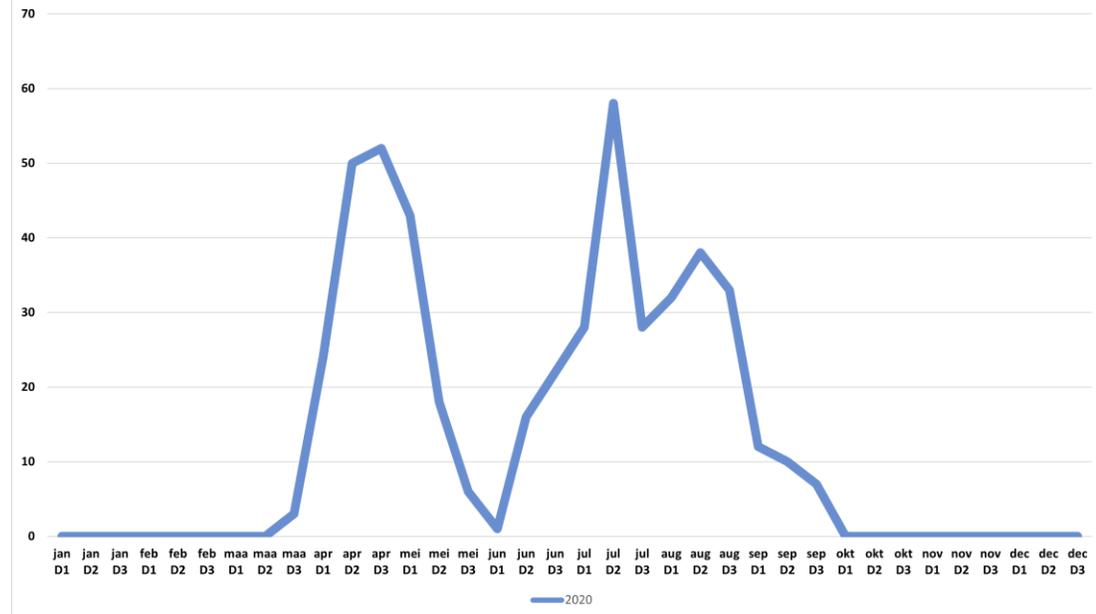


Foto : Stefan De Decker

Tuinmeetnet VVE WG Dagvlinders
Klein geaderd witje 2019



Tuinmeetnet VVE WG Dagvlinders
Klein geaderd witje 2020





Tuinmeetnet VVE WG Dagvlinders
Klein koolwitje 2021



Tuinmeetnet VVE WG Dagvlinders
Klein koolwitje 2022

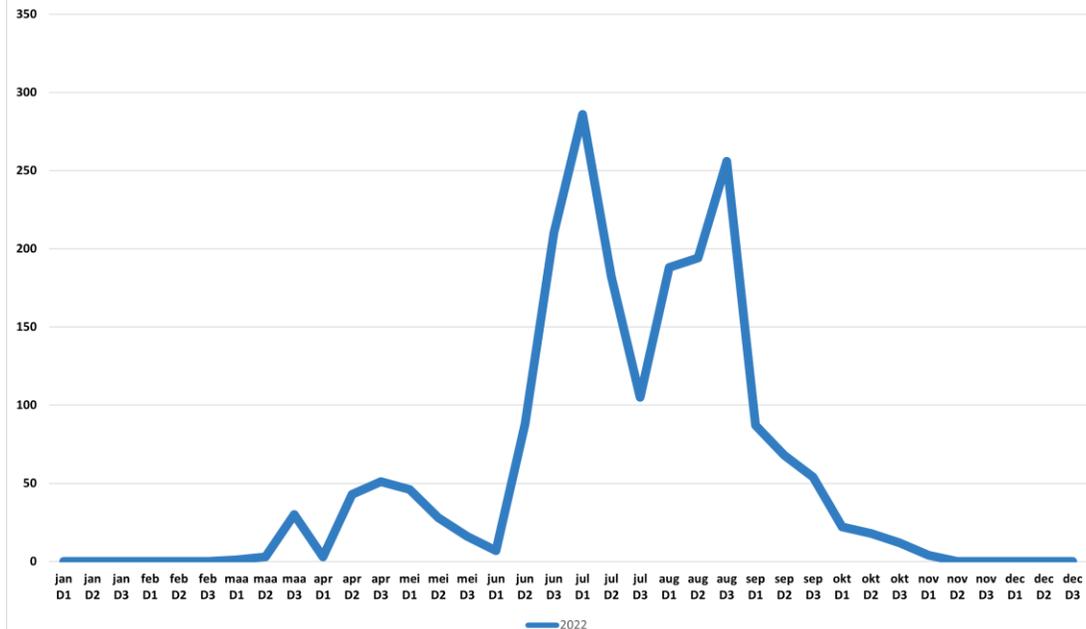


Foto : Ortwin Hoffmann



Tuinmeetnet VVE WG Dagvlinders
Klein geaderd witje
2021



Tuinmeetnet VVE WG Dagvlinders
Klein geaderd witje
2022

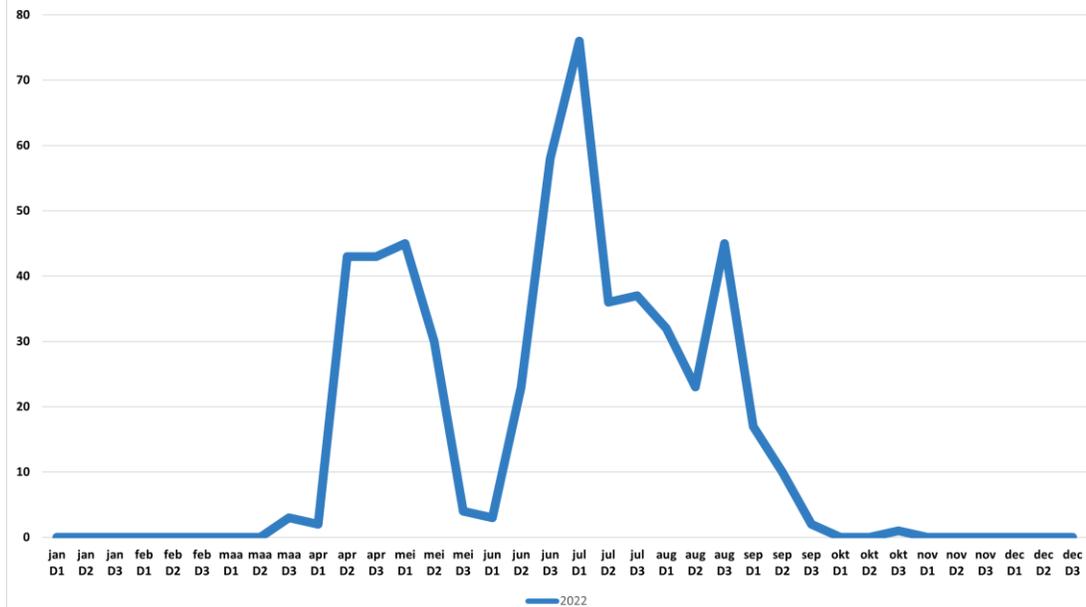
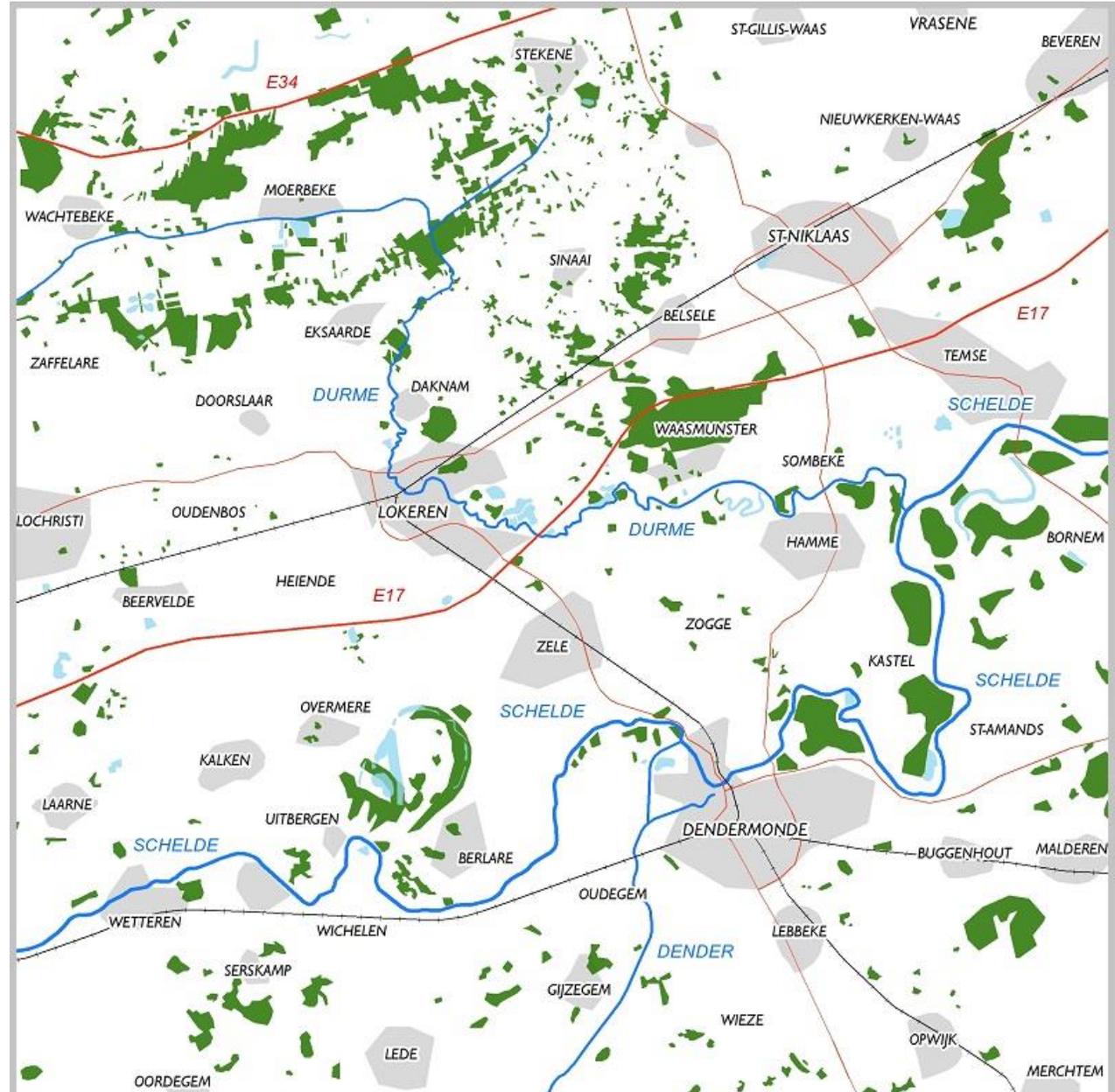
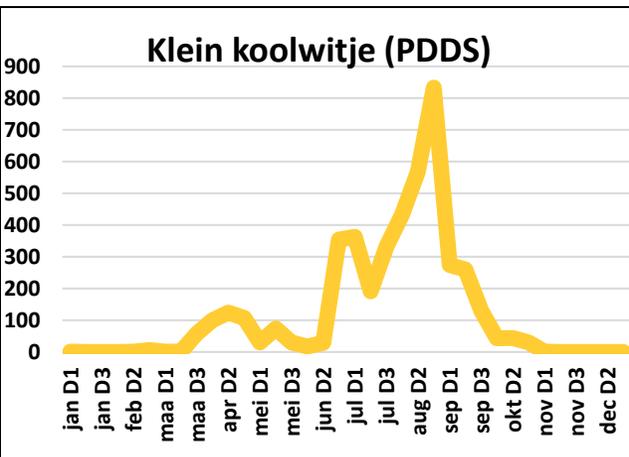


Foto : Sandra Casier

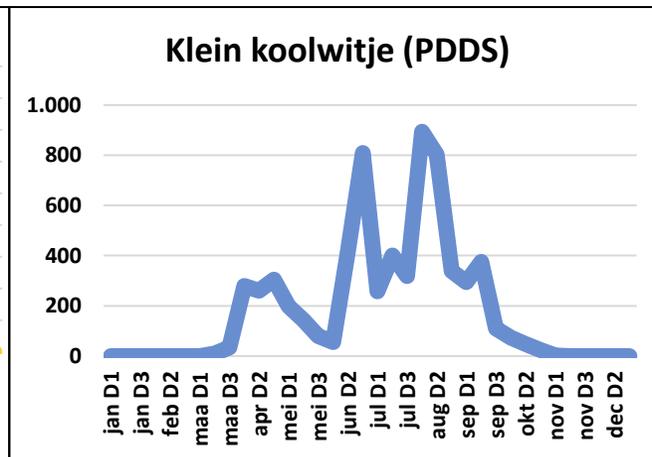
- © Project Dagvlinders Durme- en Scheldegebied.
- PDDS



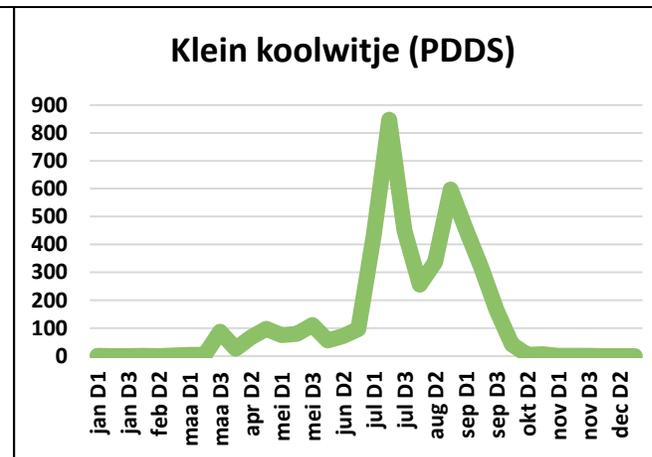
2019



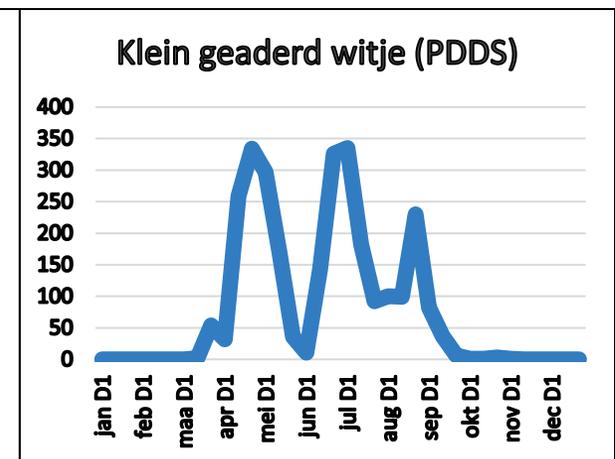
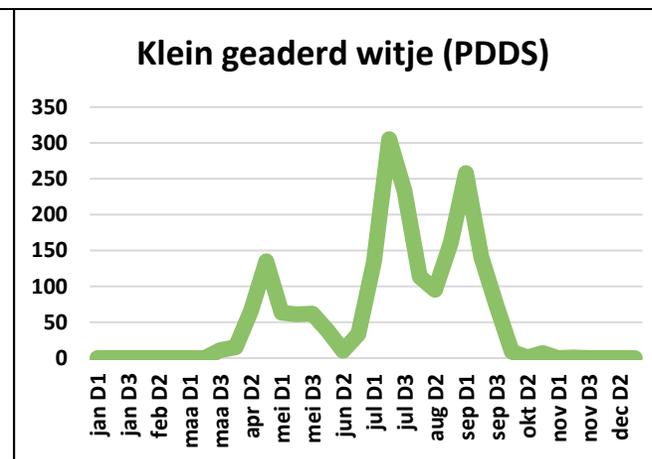
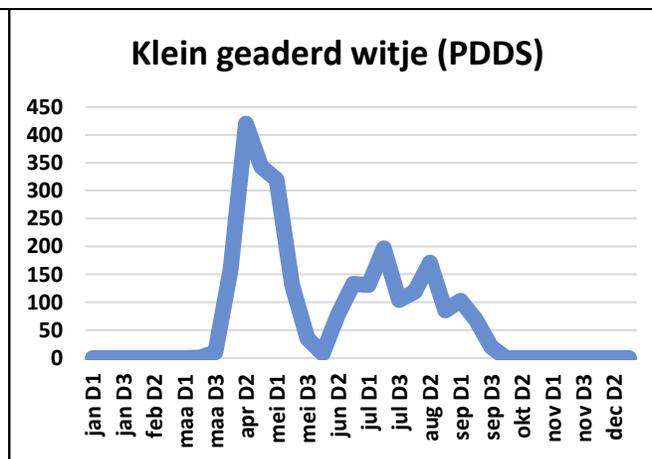
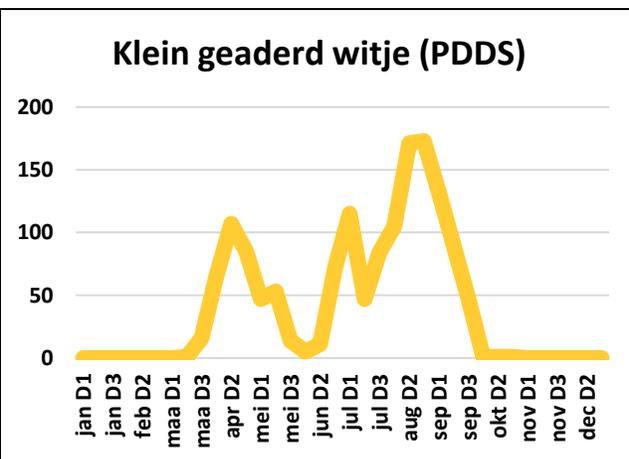
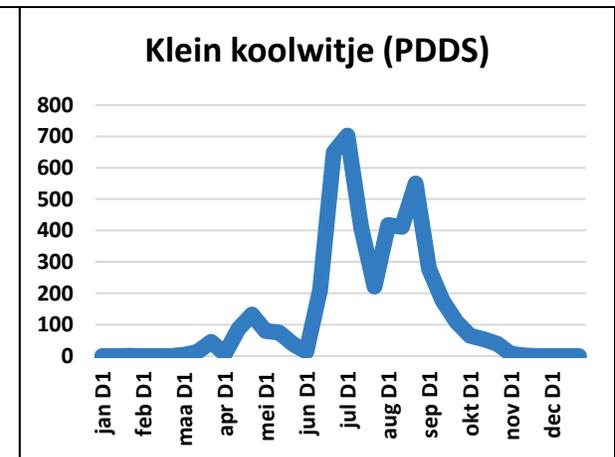
2020



2021



2022



Fenogram : wat leren we ?

- Beide soorten in Vlaanderen (Tuin – Tuinmeetnet – PDDS):
 - Meestal 3 generaties, 2 gedeeltelijk overlappende zomergeneraties, in zeer gunstige jaren zelfs een vierde generatie
 - Voorjaarsgeneratie relatief gezien groter bij Klein geaderd witje

Scandinavië : artikel :

Seasonal specialization drives divergent population dynamics in two closely related butterflies
nature portfolio

June 2023 · [Nature Communications](#) 14(1)

DOI:[10.1038/s41467-023-39359-8](https://doi.org/10.1038/s41467-023-39359-8)

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Authors:



Loke von Schmalensee



Pauline Caillault



Katrín Hulda Gunnarsdóttir



Karl Gotthard



Philipp Lehmann

Pieris rapae (Klein koolwitje)

Pieris napi (Klein geaderd witje)

- 2 “gelijkaardige” soorten :
 - Vliegen tijdens dezelfde periodes
 - Grotendeels gelijklopende generaties
 - “Gelijkaardige” waardplanten
 - Overwinteren als pop
- Algemene vraag :
 - Hoe passen soorten zich aan aan de seizoenen ? : warmte, koude ?
 - Bv : trekvogels/**trek**vlinders cfr standvogels/**overwintering** vlinders in verschillende stadia : afhankelijk van de genen (genotype) uiting als **fenotype**
- Citizen Science Data (cfr : waarnemingen.be)

Pieris rapae (Klein koolwitje)

Pieris napi (Klein geaderd witje)

- Pieris rapae (Klein koolwitje) heeft vergeleken met P. napi (Klein geaderd witje)
 - Sterkere populatietoename in de zomer
 - Lager overwinteringssucces
 - Seizoensgebonden specialisatie
- Verschillende manieren om zich aan te passen :
 - **Zomerspecialisten** : aangepast om tijdens de zomer te floreren
 - sterktst (fittest) in de zomer
 - maar heeft het dan moeilijker (meer sterfte) in de winter
 - **Winterspecialisten** : aanpassingen om de verliezen in de winter te beperken
 - Sterkst (fittest) in de winter

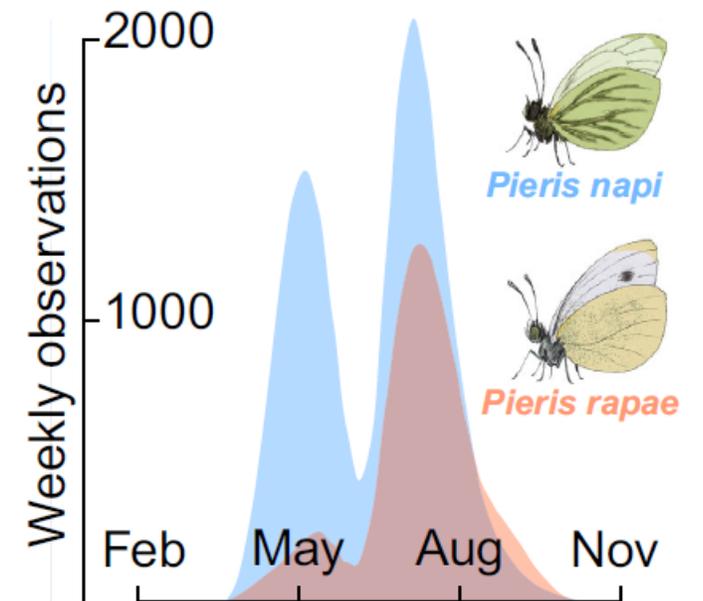


Fig. 1 | Differences in within-year population dynamics. Observations of *Pieris rapae* (red area $n = 10,236$) and *P. napi* (blue area, $n = 20,492$) within their common Swedish geographical range over the years 2010–2021. Both species display two distinct flight peaks, but in *P. rapae* the relative size of the spring peak, constituted by overwintering individuals, is much smaller than in *P. napi*. Data from the Swedish Species Information Centre⁵⁴.

Pieris napi (Klein geaderd witje)

Pieris rapae (Klein koolwitje)

- Vergelijking aantallen
 - van lente- naar zomergeneratie
 - Van najaarsgeneratie naar lentegeneratie volgend jaar
- *Pieris napi* (Klein geaderd witje)
 - Winterspecialist :
 - gelijkaardige aantallen in de lente en in de zomergeneraties
- *Pieris rapae* (Klein koolwitje)
 - Zomerspecialist :
 - lagere aantallen in de lente,
 - grotere toename in de zomergeneraties

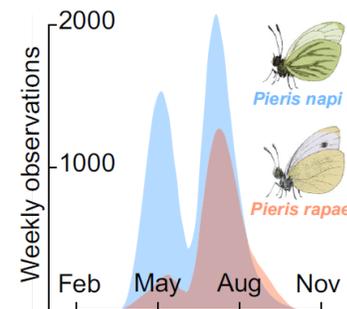


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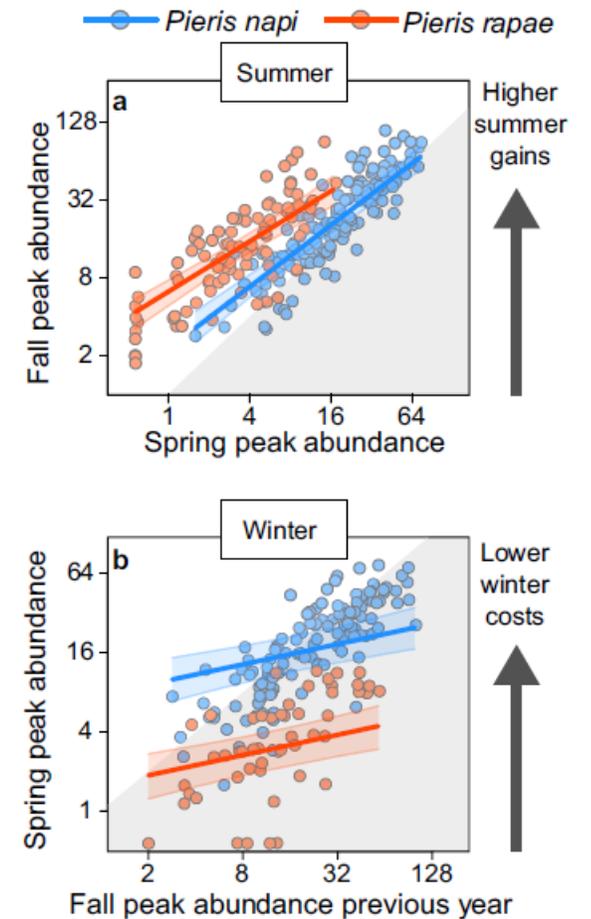


Fig. 5 | Differences in summer and winter success in nature. Estimated relationships between the abundance of two consecutive flight peaks. **a** The relationship between the abundance in the spring peak of a given year and province (x-axis) and the abundance of the following fall peak that year in the same province (y-axis). **b** The relationship between the abundance in the fall peak of a given year and province (x-axis) and the abundance of the following spring peak the next year in the same province (y-axis). Grey shaded areas represent estimated population

Overwinteringssucces : (pop in diapause)

- Kweken => poppen => laten uitkomen op 17°C :
- *Pieris napi* (Klein geaderd witje)
 - 89% overwinteringssucces
- *Pieris rapae* (Klein koolwitje)
 - 73% overwinteringssucces

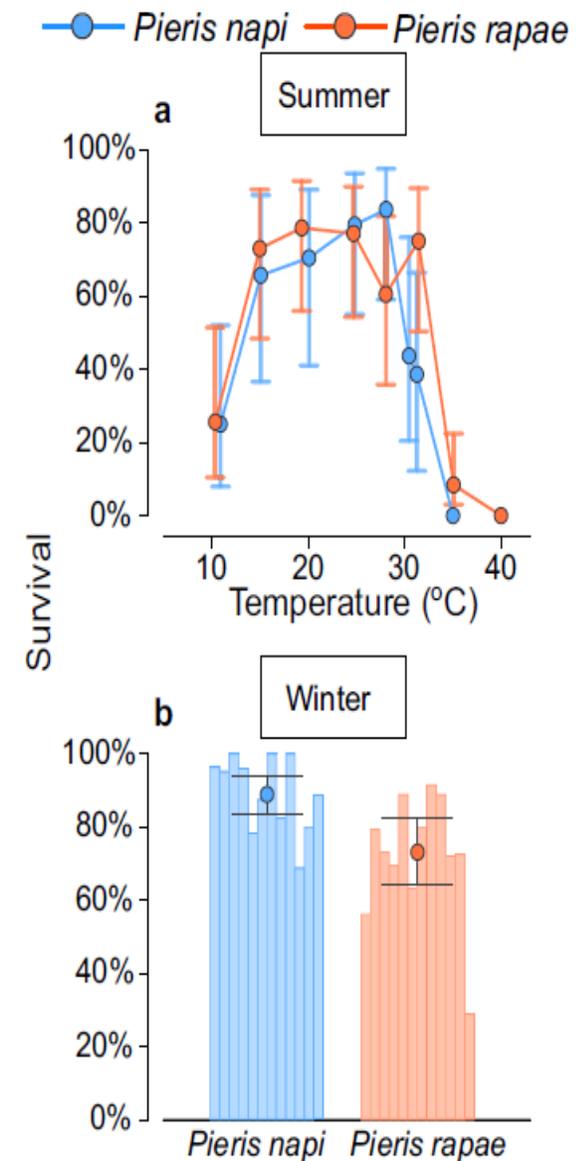
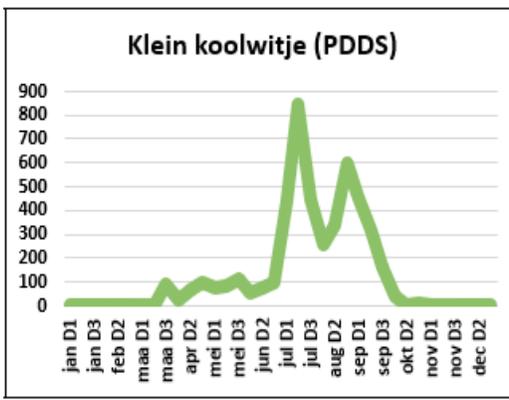


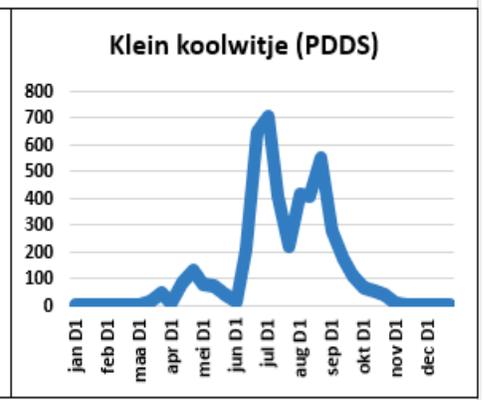
Fig. 4 | Differences in overwintering success. Estimated survival during development and overwintering in diapause. a Estimated relationships between constant

Pieris rapae (Klein koolwitje)

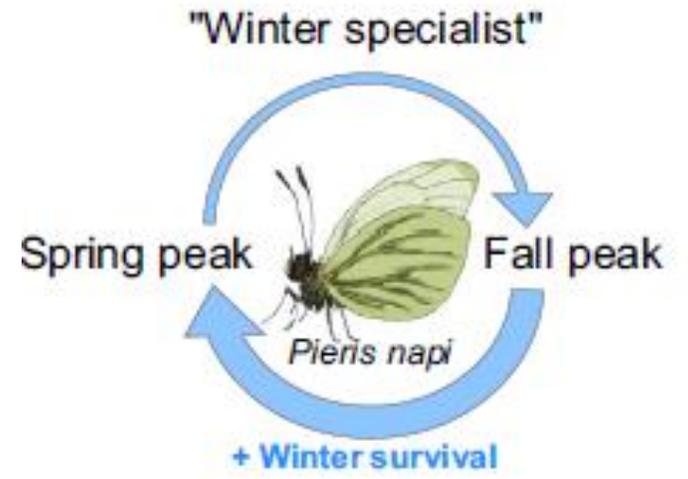
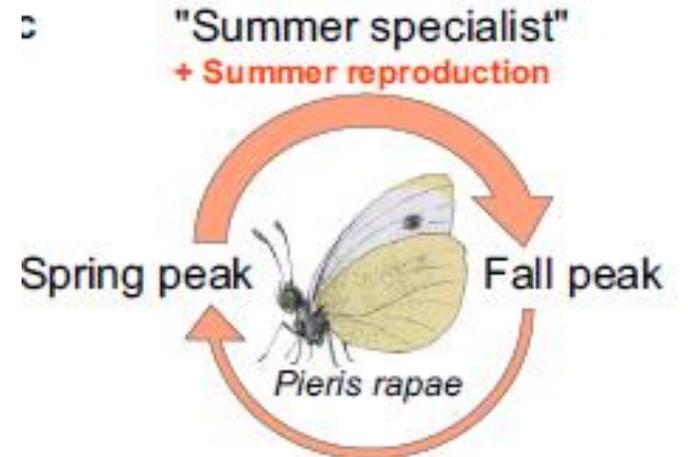
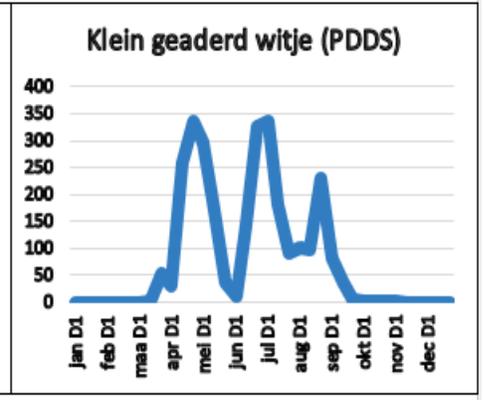
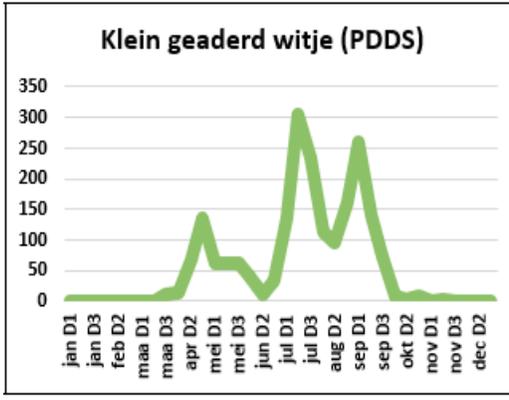
2021



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Pieris napi (Klein geaderd witje)



Zweden : Het Klein koolwitje (*P. rapae*) neemt toe, Klein geaderd witje (*P. napi*) neemt af

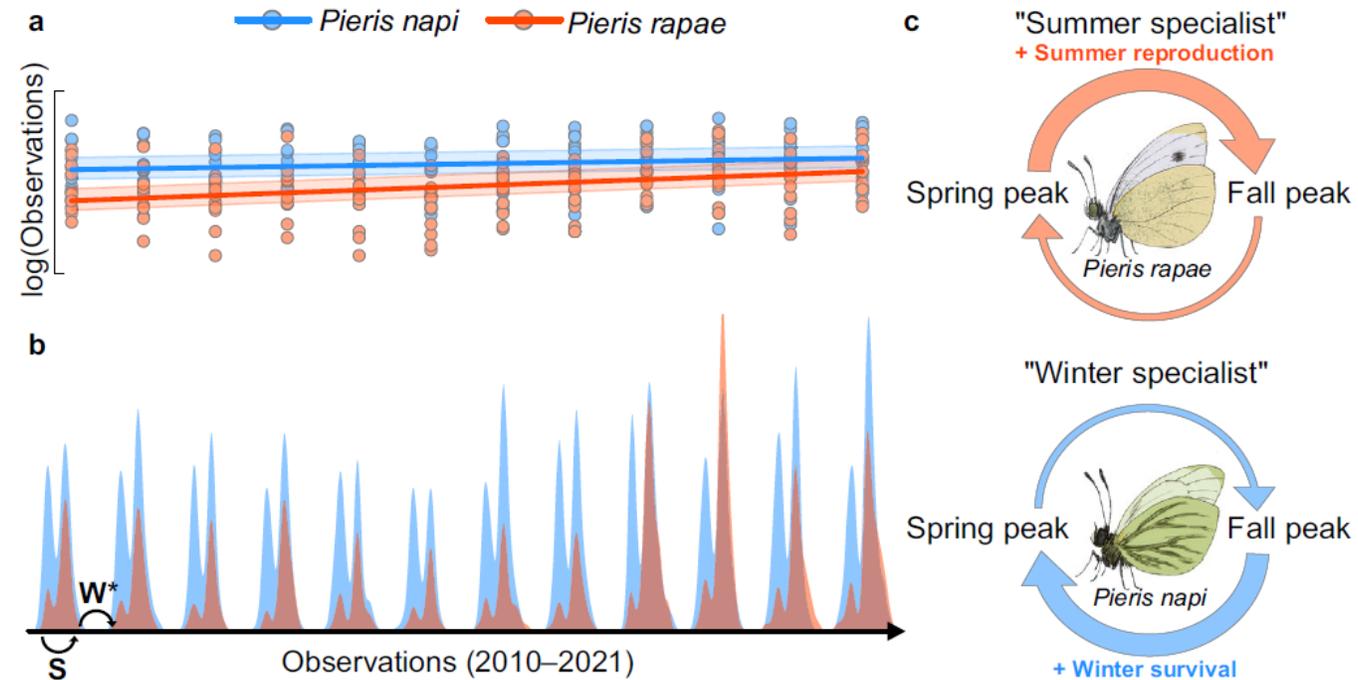
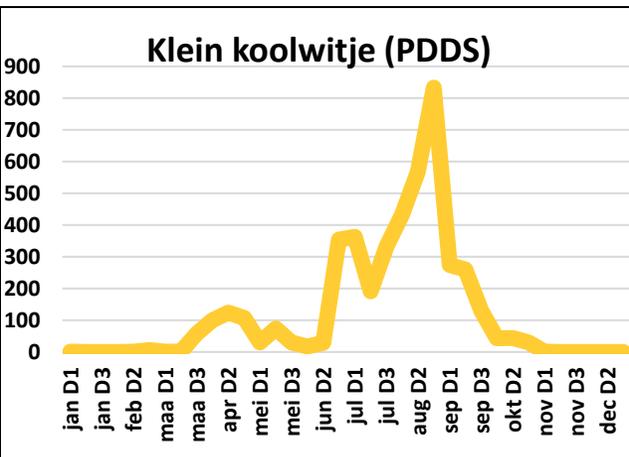


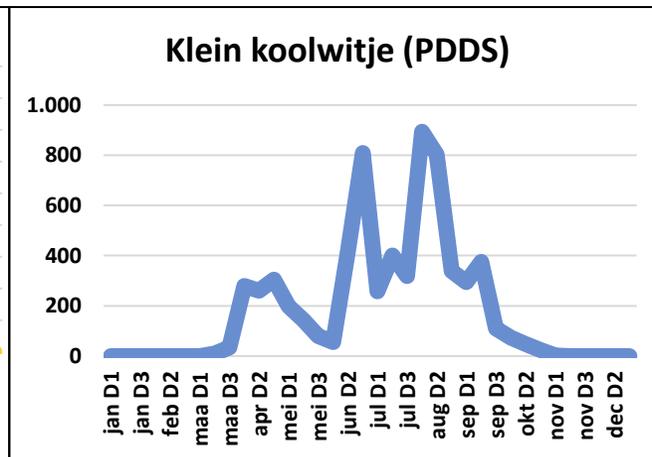
Fig. 6 | The summer specialist is catching up to the winter specialist. **a** Estimated proportional increases in butterfly observations over 11 years for *Pieris rapae* and *P. napi*. Note the steeper slope for *P. rapae*, indicating that its population sizes are increasing relative to *P. napi* population sizes. Points are clustered on the x-axis by year (2010–2021) and represent total observations per province that year. Lines show the estimated increase of observations over the years (based on posterior modes), and bands represent 90% credible intervals. **b** Density plot showing the distribution of *P. rapae* (red areas) and *P. napi* (blue areas) observations across their

common range in Sweden over the years 2010–2021. Peak amplitudes have been scaled by the total number of observations for each species that year. Since observations span relatively large latitudinal gradients, the phenology has for visualization purposes been centered within each province. The letter S denotes one summer period, and the letter W denotes one winter period. The relative length of the winter period has been shortened to save space. **c** Conceptual demonstration of *P. rapae*'s and *P. napi*'s seasonal specialization. Upper arrows represent summer, lower arrows represent winter, and large arrows represent high relative fitness.

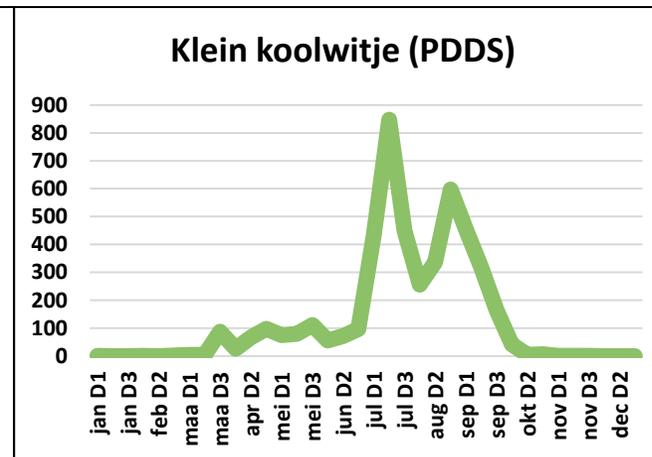
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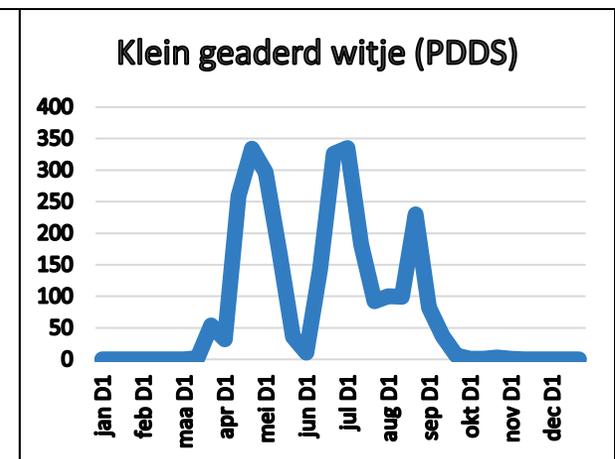
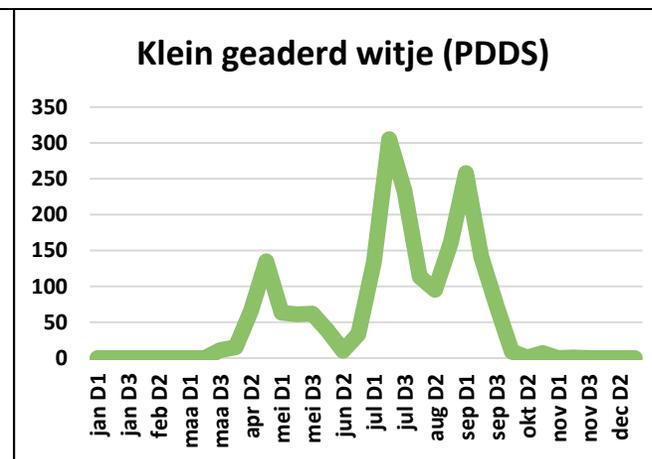
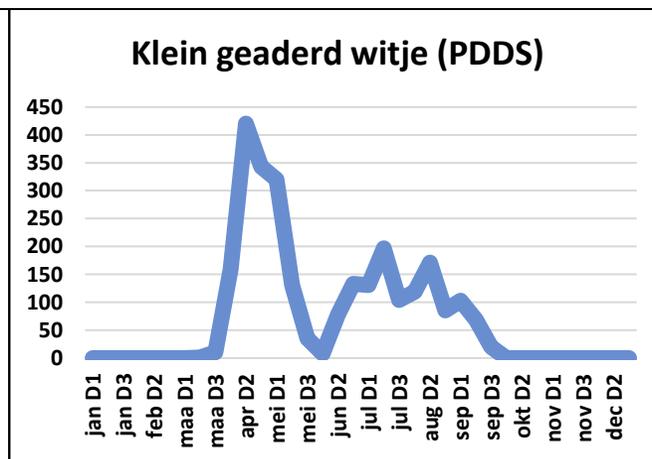
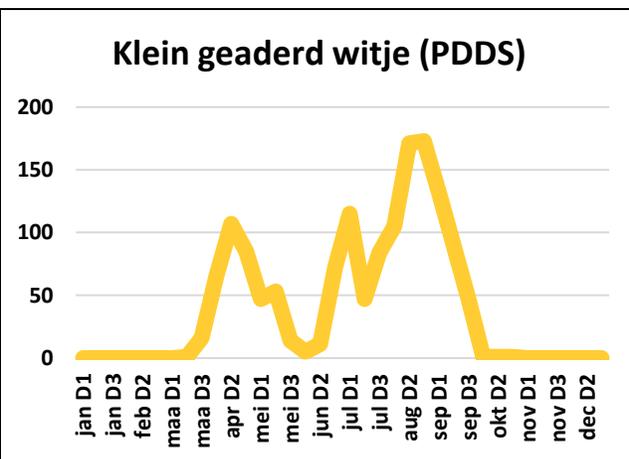
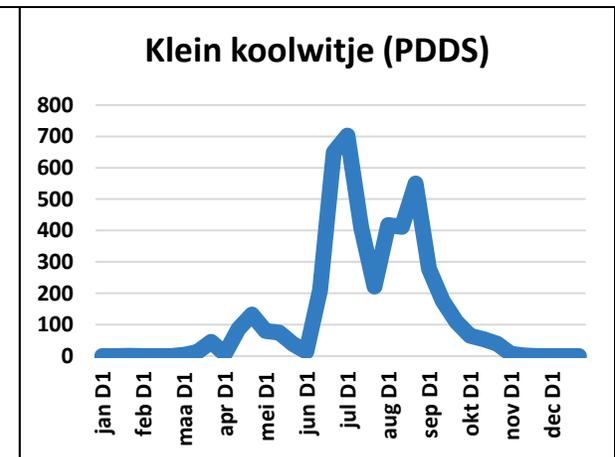
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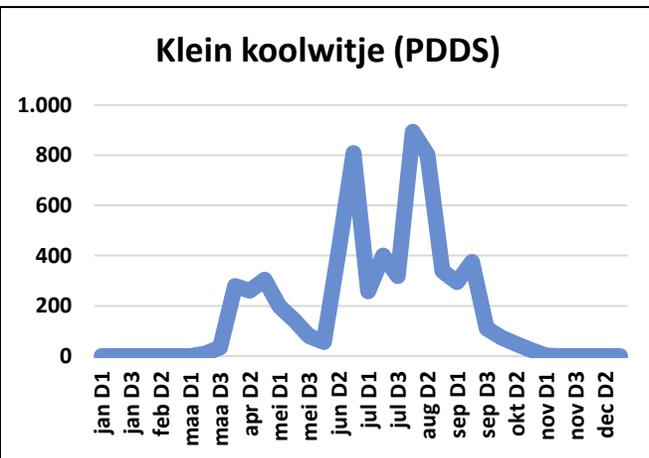
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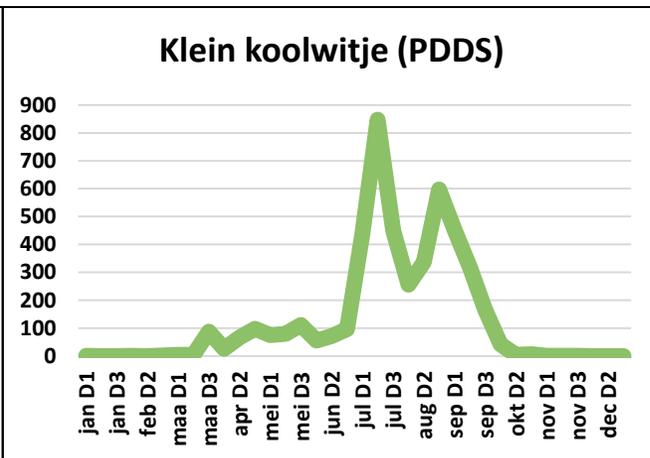
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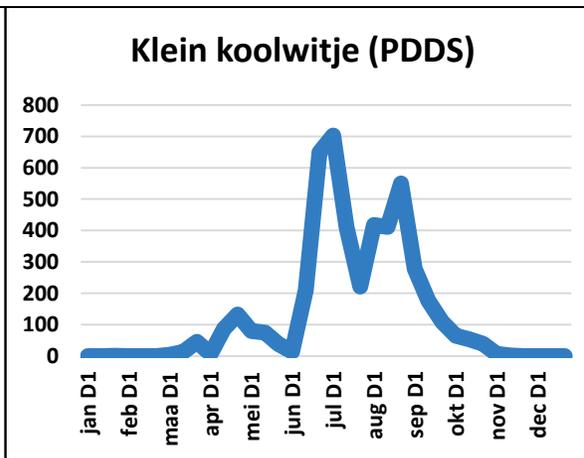
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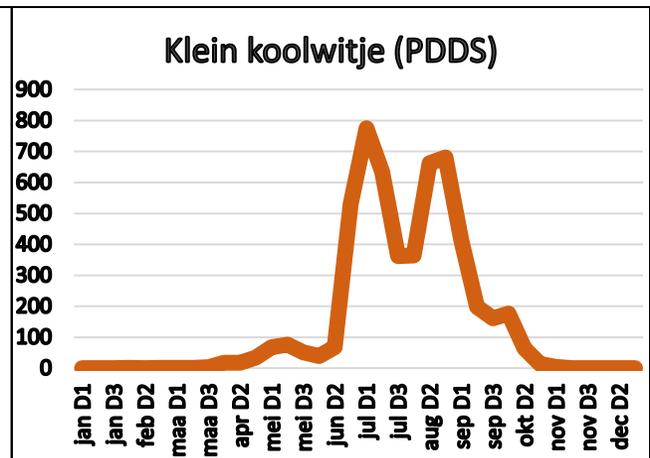
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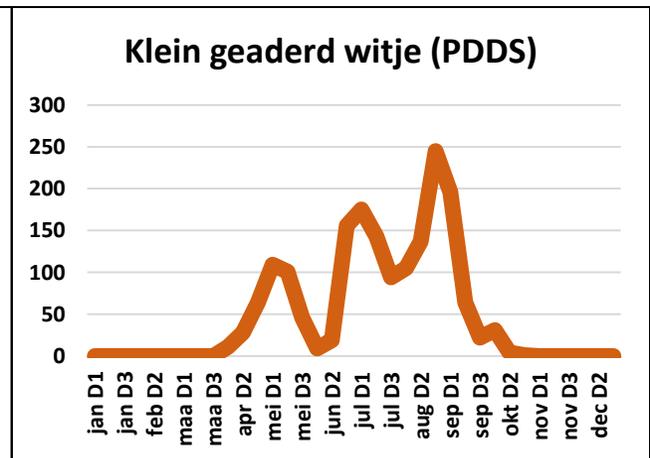
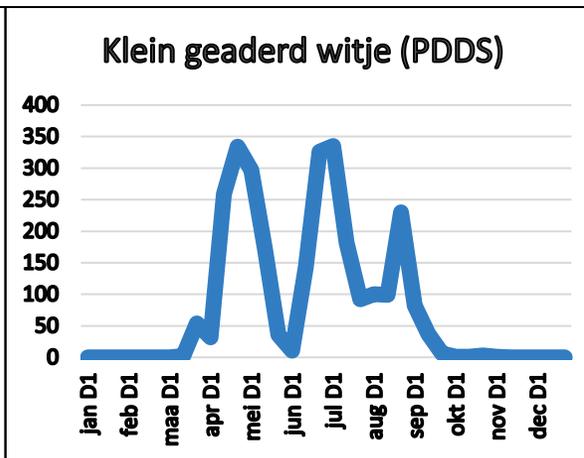
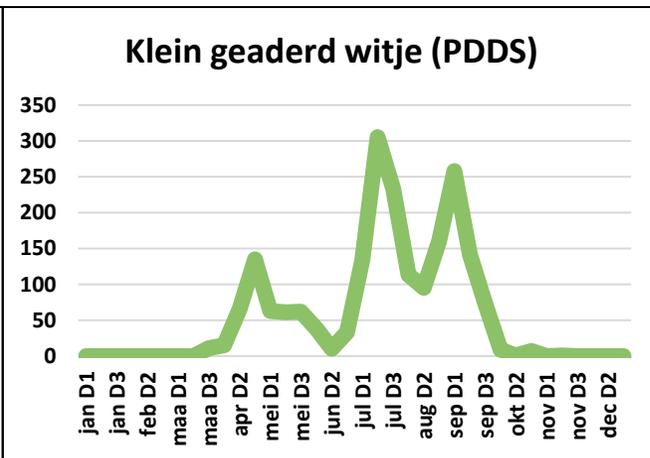
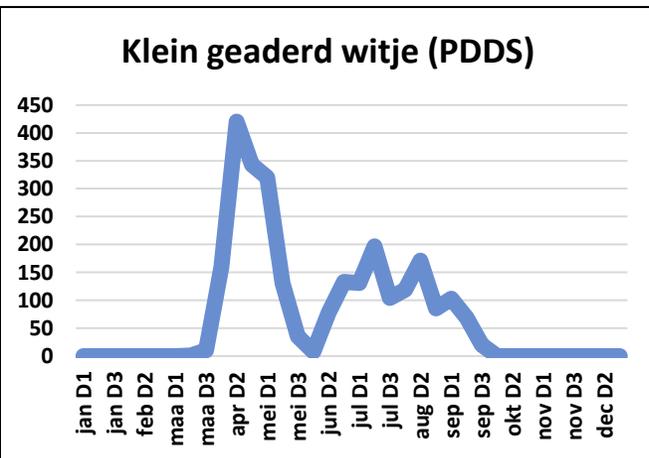
2022



2023



➔ Voorspelling 2024 ??



Spaanse studie (2022) : Pieris rapae and P. napi

<https://esajournals.onlinelibrary.wiley.com/doi/10.1002/ecm.1561>

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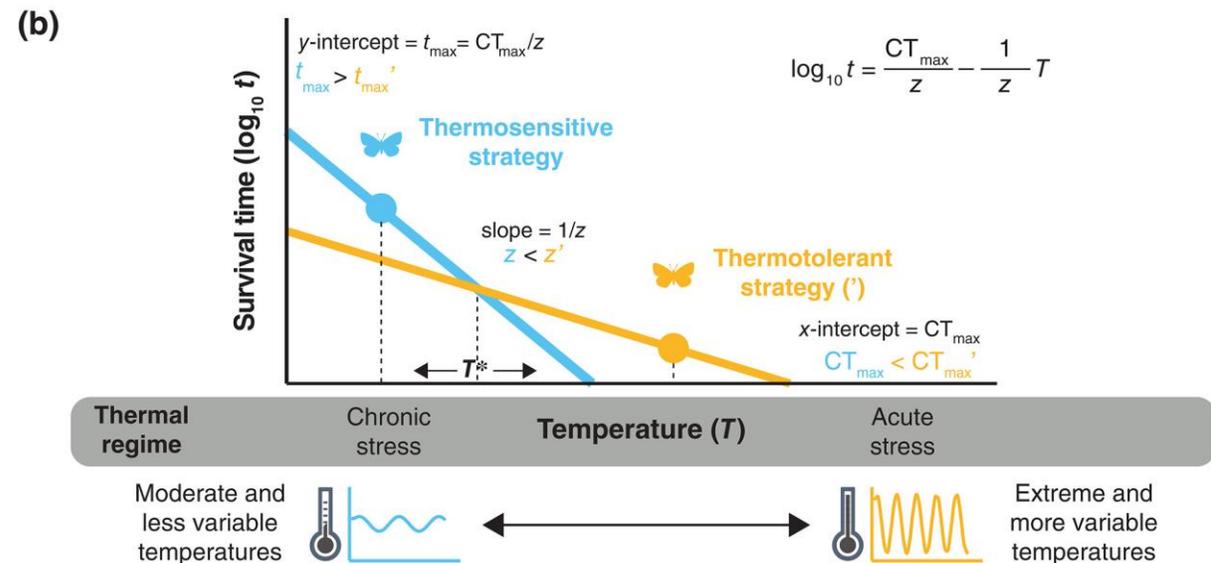
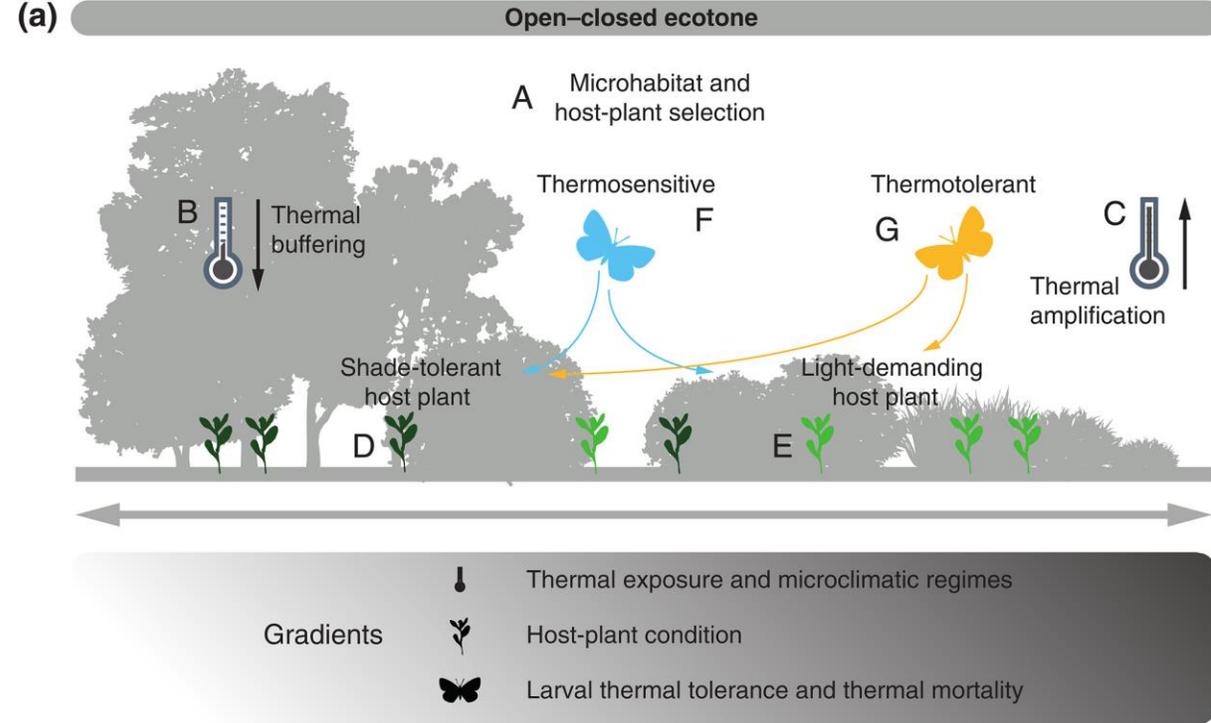
Interspecific differences in microhabitat use expose insects to contrasting thermal mortality

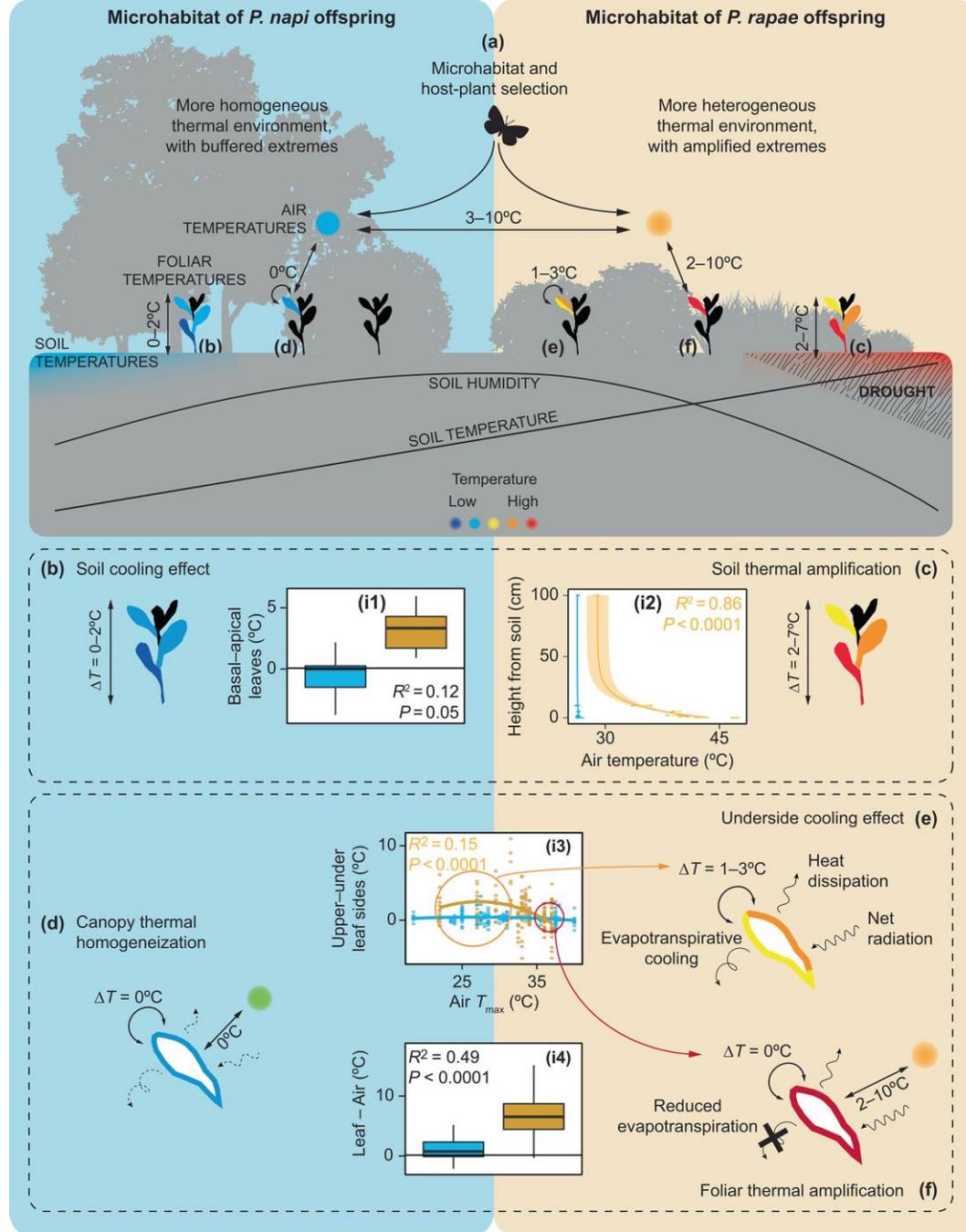
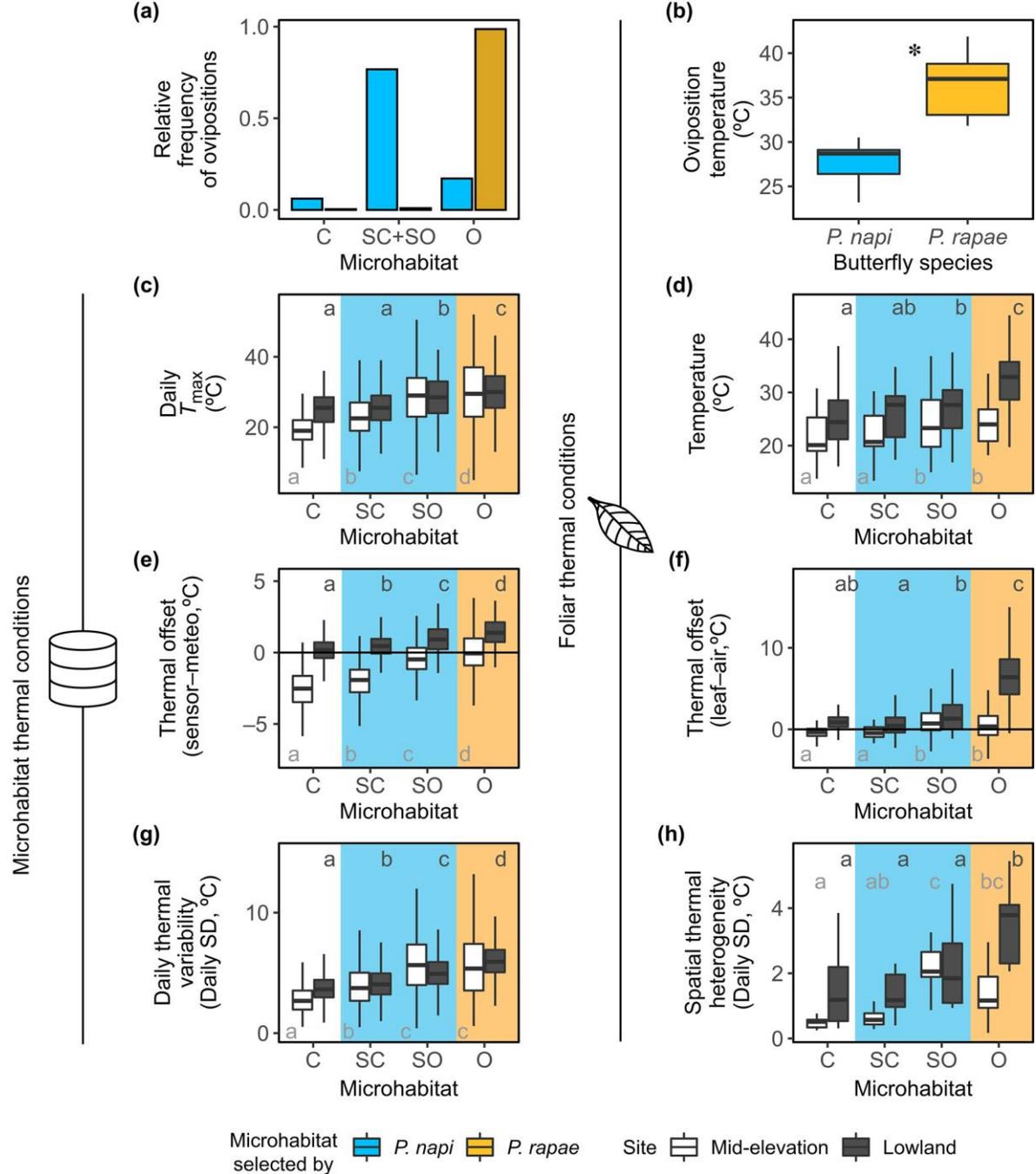
Maria Vives-Inglà, Javier Sala-García, Constantí Stefanescu, Armand Casadó-Tortosa, Meritxell Garcia, Josep Peñuelas, Jofre Carnicer 

First published: 09 December 2022 | <https://doi.org/10.1002/ecm.1561> | Citations: 1

Spaanse studie (2022) : Onderzoek :

- Temperatuurgevoelige soorten
- Temperatuurtolerante soorten
- Overlevingskansen bij hogere temperaturen (heat stress) verschillen
- Waar vliegen ze ?
- Waar leggen ze eitjes ? (oviposition)

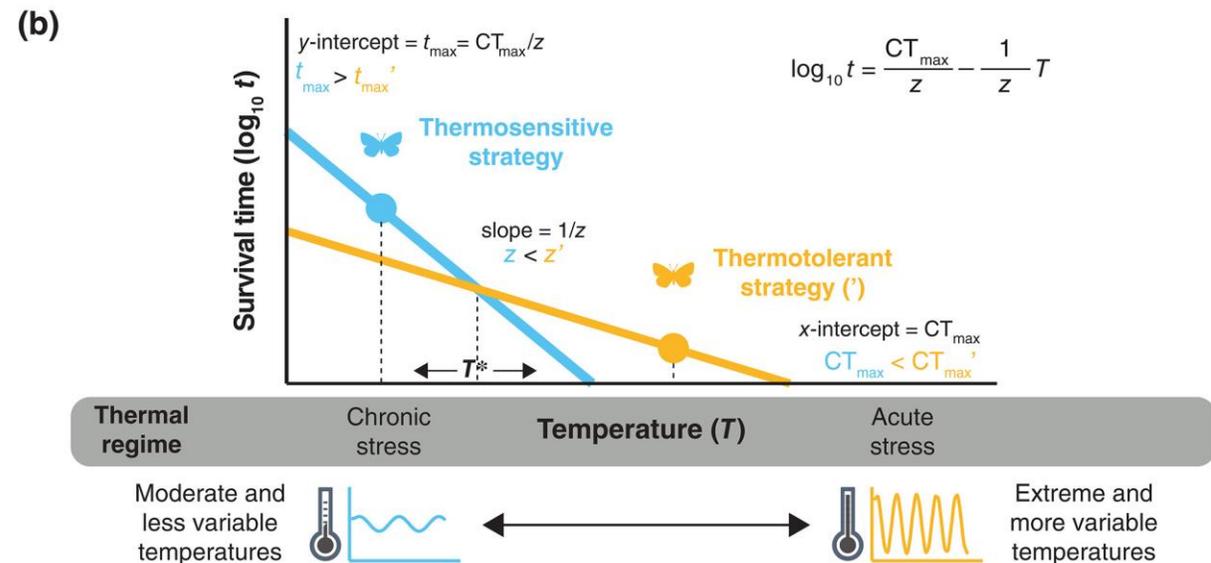
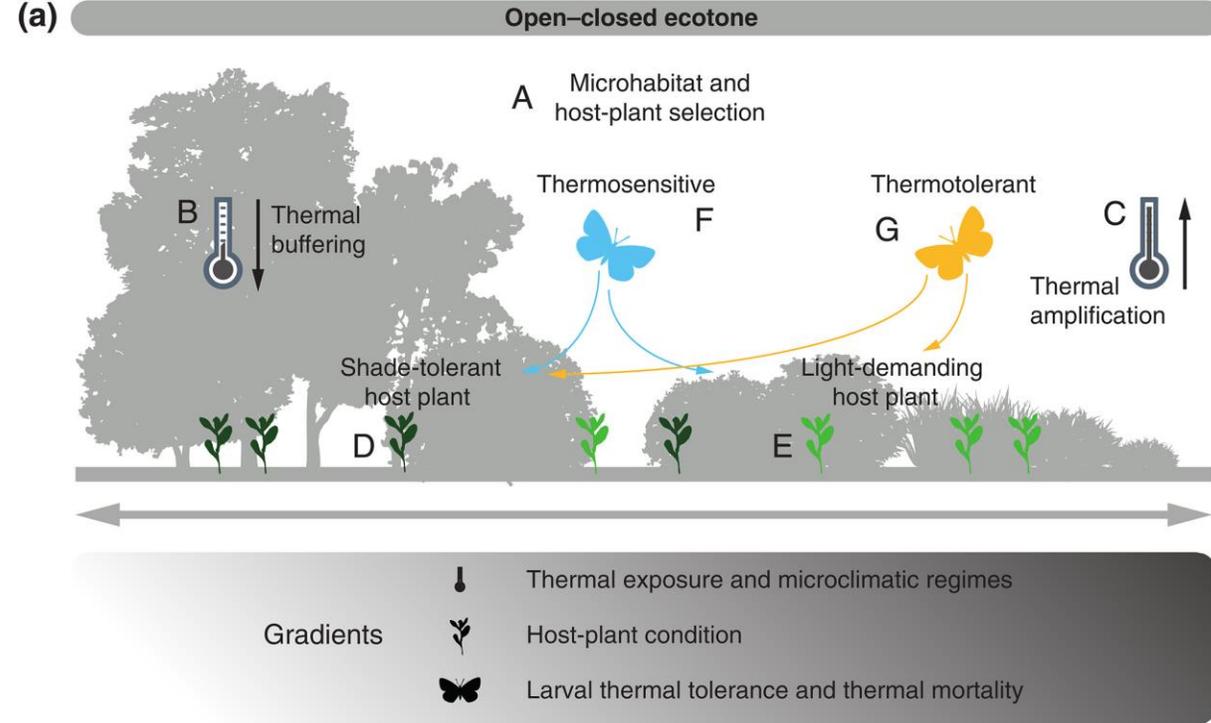




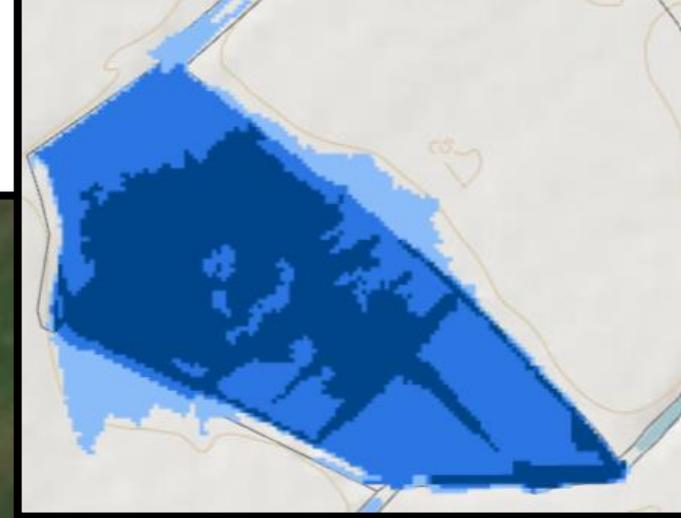
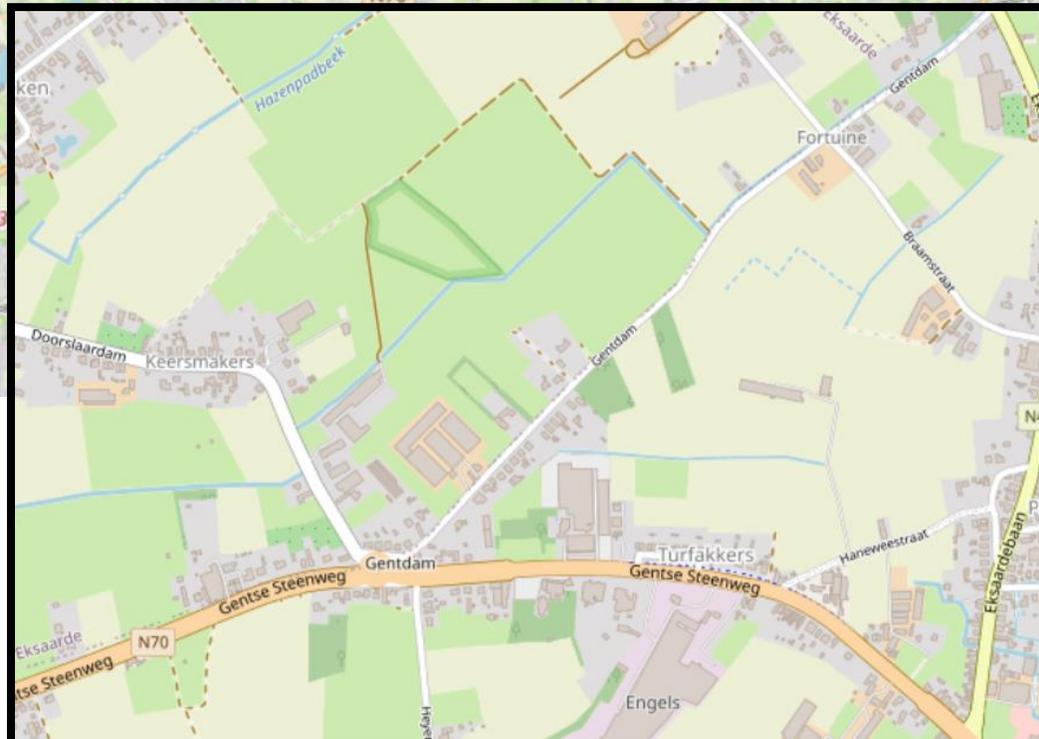
b: temp onderkant blad

Spaanse studie (2022) : Bevindingen :

- **Temperatuurgevoelige** soorten
 - F (blauw) : *P. napi* (Klein geaderd witje)
 - Zoeken de schaduw op bij te heet weer
 - Lagere temperatuur
 - Prefereren schaduwtolerante planten
 - Vochtigere habitats
- **Temperatuurtolerante** soorten
 - G (oranje) : *P. rapae* (Klein koolwitje)
 - Leggen eitjes in drogere / open microhabitats
- Overlevingskansen bij hogere temperaturen (heat stress) verschillen
 - Achteruitgang Klein geaderd witje



Eventjes naar de Moortels (Doorslaar, vzw Durme)



Quizvraag ??

Eventjes naar de Moortels (Doorslaar, vzw Durme)

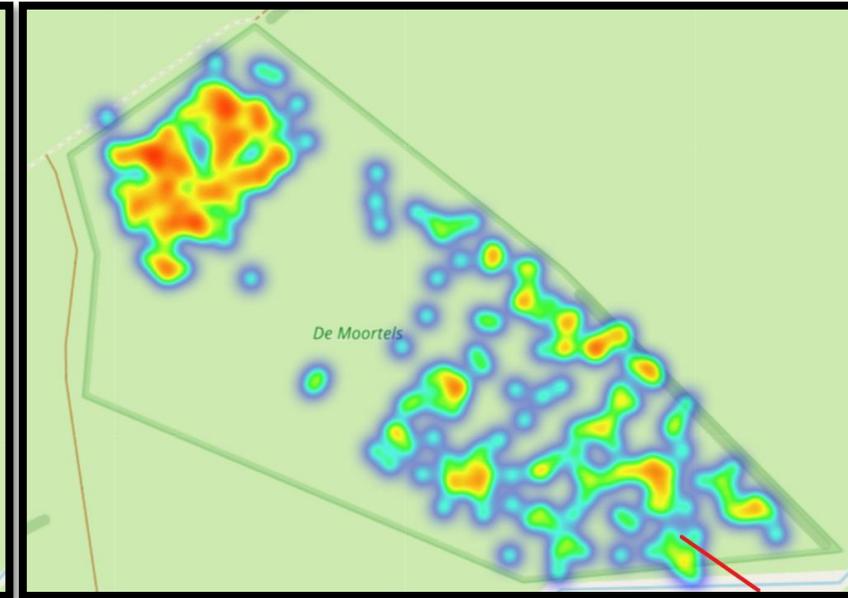
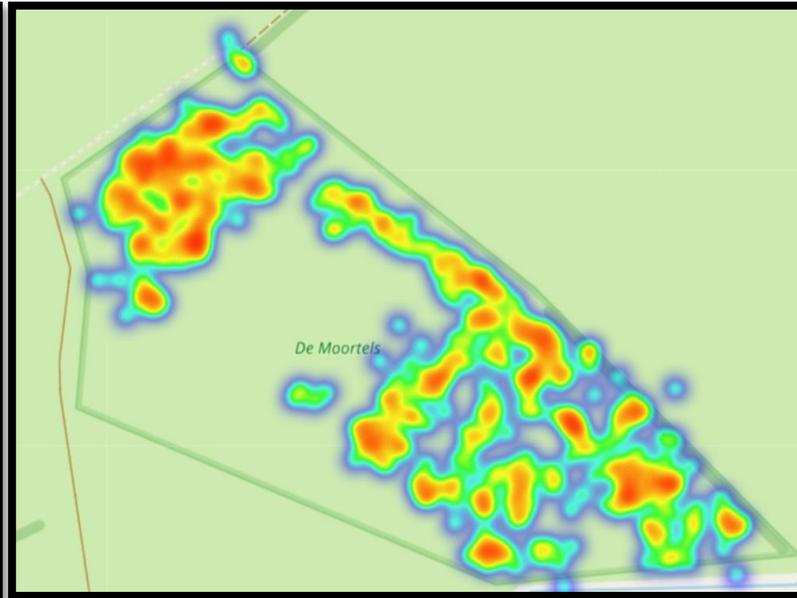
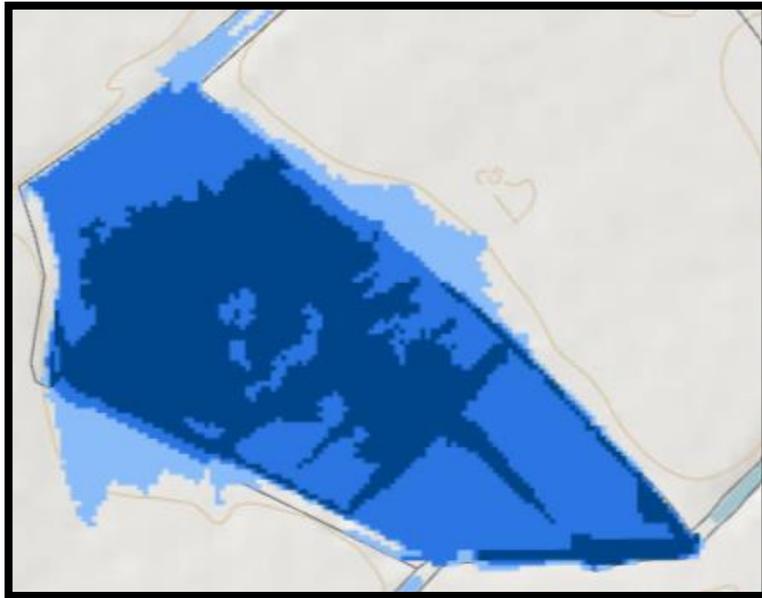
- Waterinfo.be

-

Heatmap (waarnemingen.be)

P. napi (Klein geaderd witje) ↔

P. rapae (Klein koolwitje)



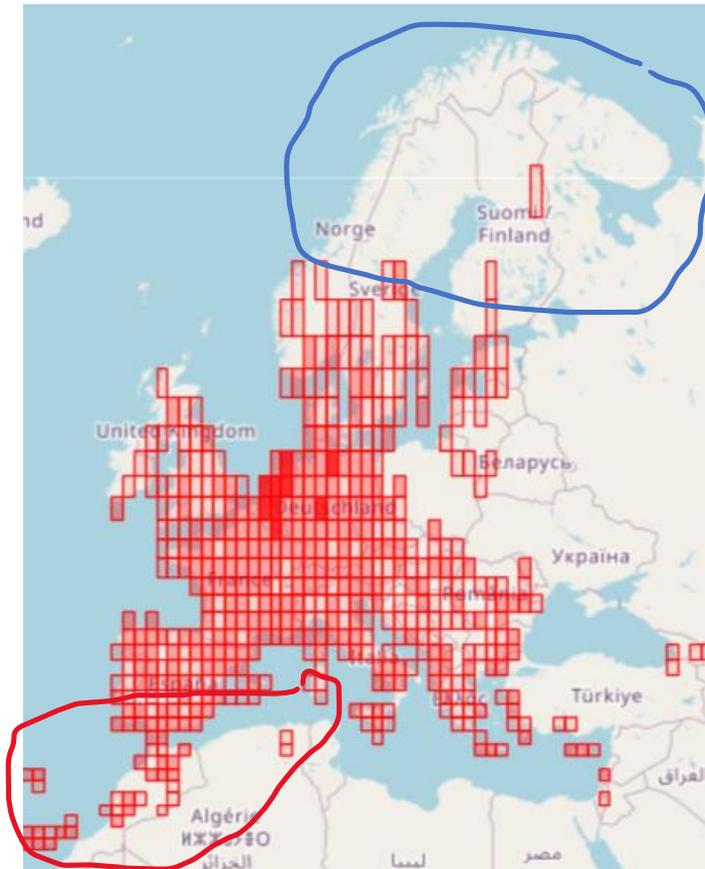
Pieris rapae (Klein koolwitje)

Pieris napi (Klein geaderd witje)

- Pieris rapae (Klein koolwitje)
 - Zomerspecialist : lagere aantallen in de lente, toename in de zomergeneraties
 - => houdt van warmer en droger microklimaat
- Pieris napi (Klein geaderd witje)
 - Winterspecialist : gelijkaardige aantallen in de lente en in de zomergeneraties
- Gevolg op verspreiding in Europa ?!

- Pieris rapae (Klein koolwitje)

- Zomerspecialist :
 - toename in de zomergeneraties
 - minder overleving tijdens de winter
 - lagere aantallen in de lente
- => **Moeite om univoltien te worden !!**
- Temperatuurtolerant :
- => **kan overleven in de Zuiderse warmte !!**



Verspreiding in Europa ?

- Pieris napi (Klein geaderd witje)
 - Winterspecialist

- Beau en Daan et al.



Pieris napi ssp. adalwinda ♂

- Vervangt nominaatvorm *P. napi*
- Donkere bestuiving aders
- Doet denken aan *P. bryoniae*

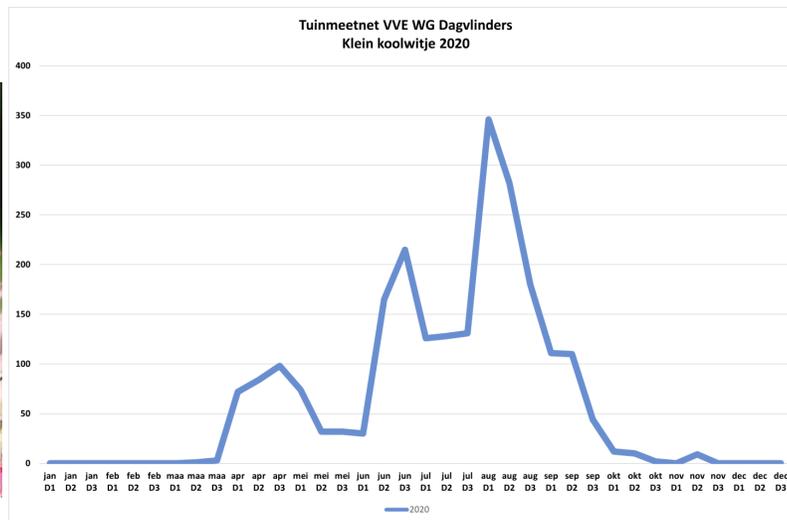
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- Gewoonlijk Europese
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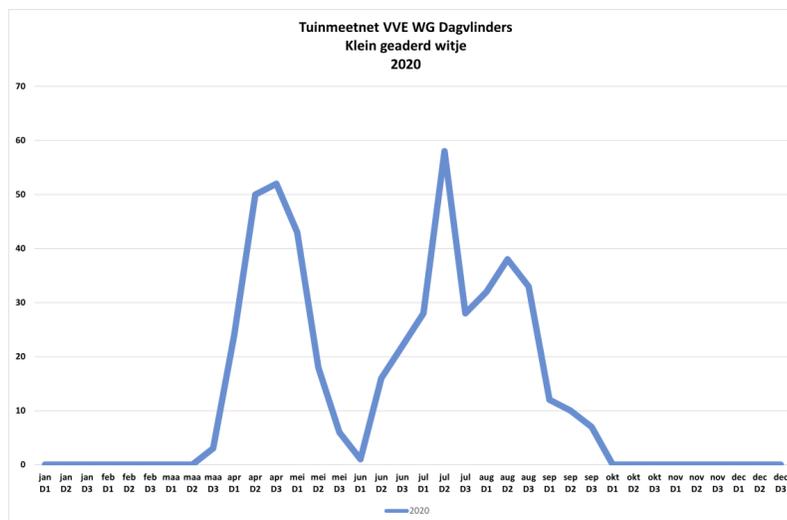


Van het tuinmeetnet, via Spanje tot de Noordkaap :

P. rapae : **Klein koolwitje** Foto: Tom Vermeulen



P. napi : **Klein geaderd witje**
Foto : Katy Beke



PS : ook het Groot koolwitje (P. brassicae) vertoont hetzelfde patroon als het Klein koolwitje

- Bedankt voor uw waarnemingen !
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 - de data + verwerking + grafieken !
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