Het synergistische effect van stikstof depositie en hitte stress bij herbivore insecten:

netel-vlinders als model organismen

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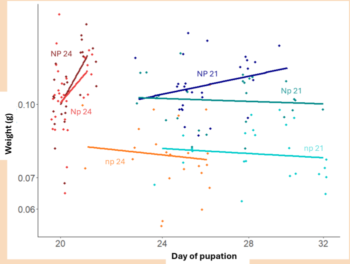
VUB

IN·DEI·NOMINE·FELICITER

INSTITUUT NATUUR- EN BOSONDERZOEK

- Vrije universiteit Brussel (VUB)
- Radboud Universiteit Nijmegen en het INBO

Onderzoek



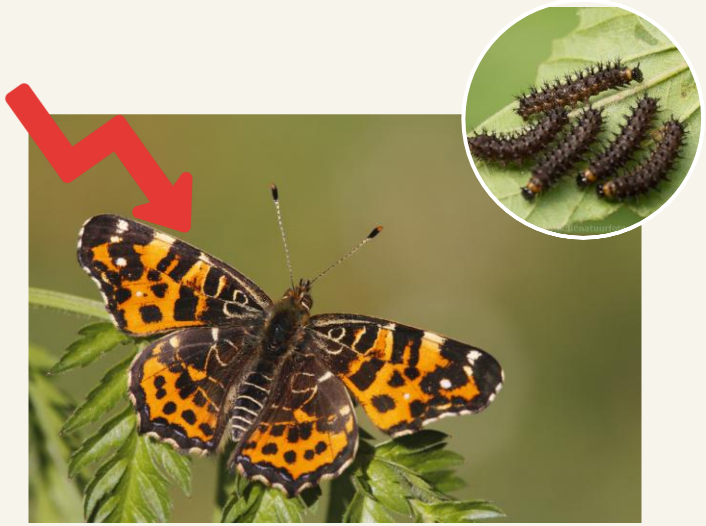
Educatie

Berber Meulepas

berber.meulepas@ru.nl

“Winners”	“Losers”

Dagpauwoog, *Aglais io*



Landkaartje, *Araschnia levana*

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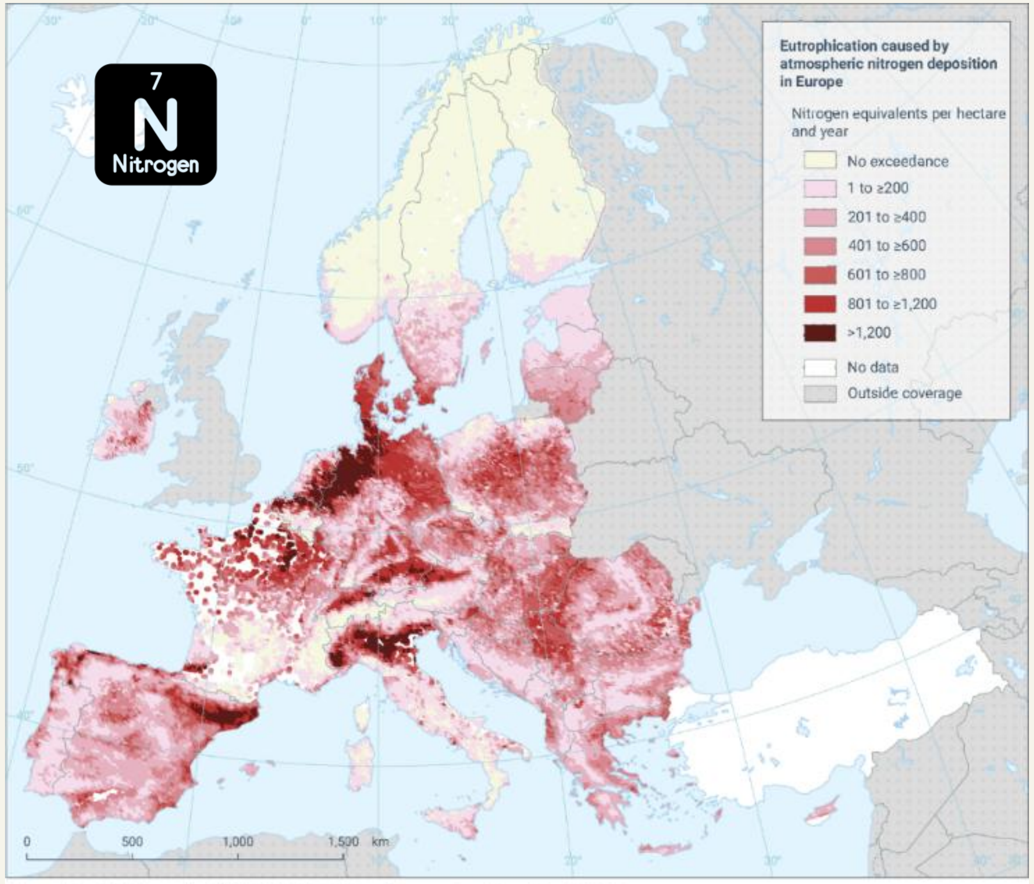
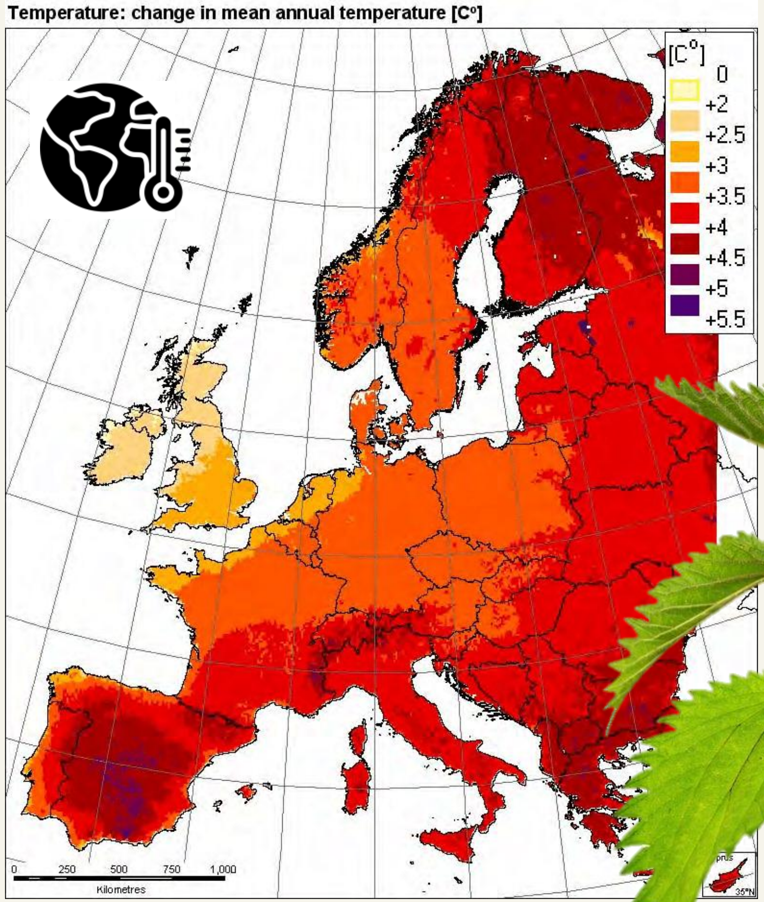
Kleine vos, *Aglais urticae*

De Grote Brandnetel, *Urtica dioica*



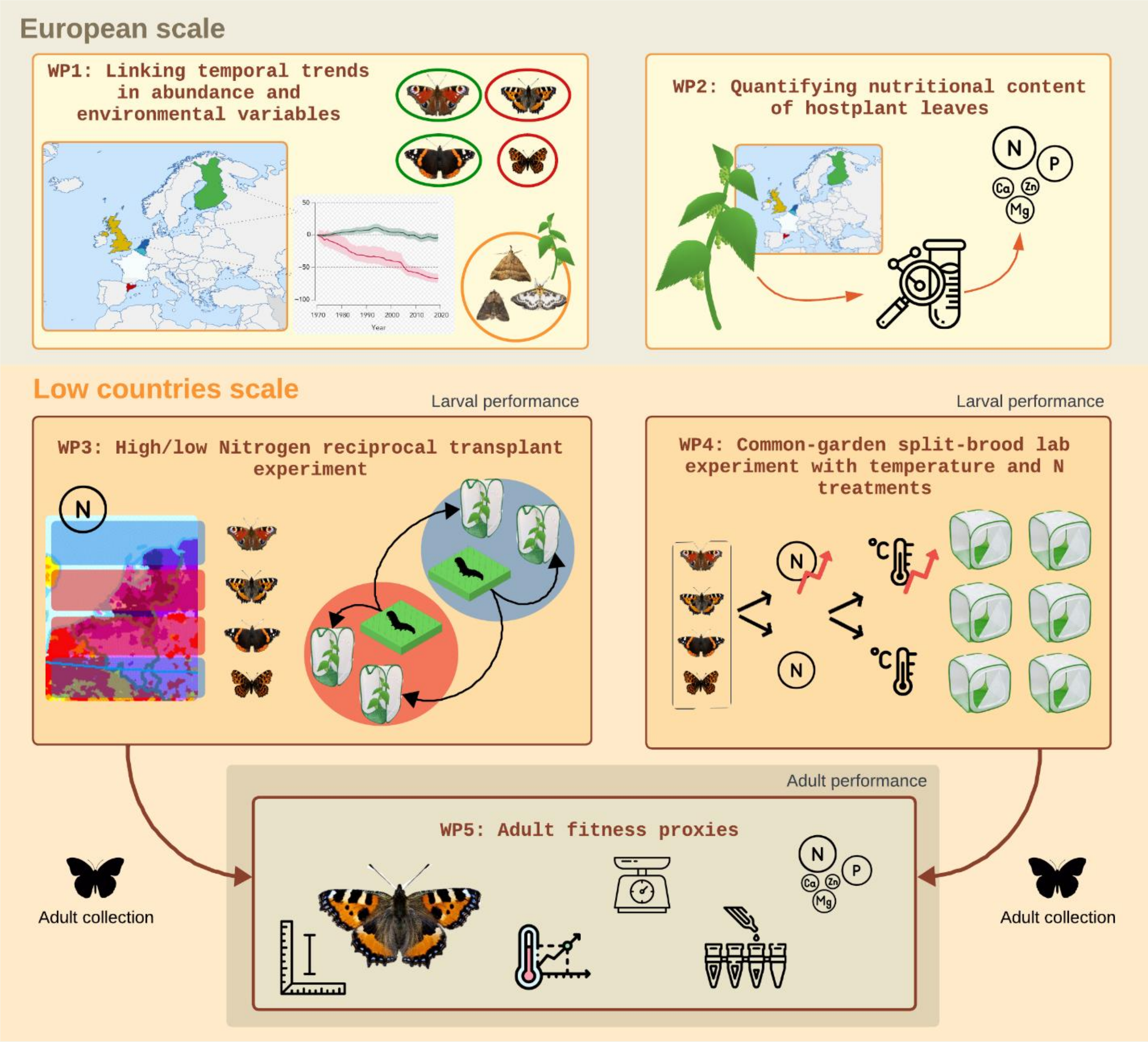
Reference data: © EuroGeographics, © FAO (UN), © TurkStat Source: European Commission – Eurostat/GISCO



Stikstof vervuiling

Hitte stres

De Grote Brandnetel, *Urtica dioica*

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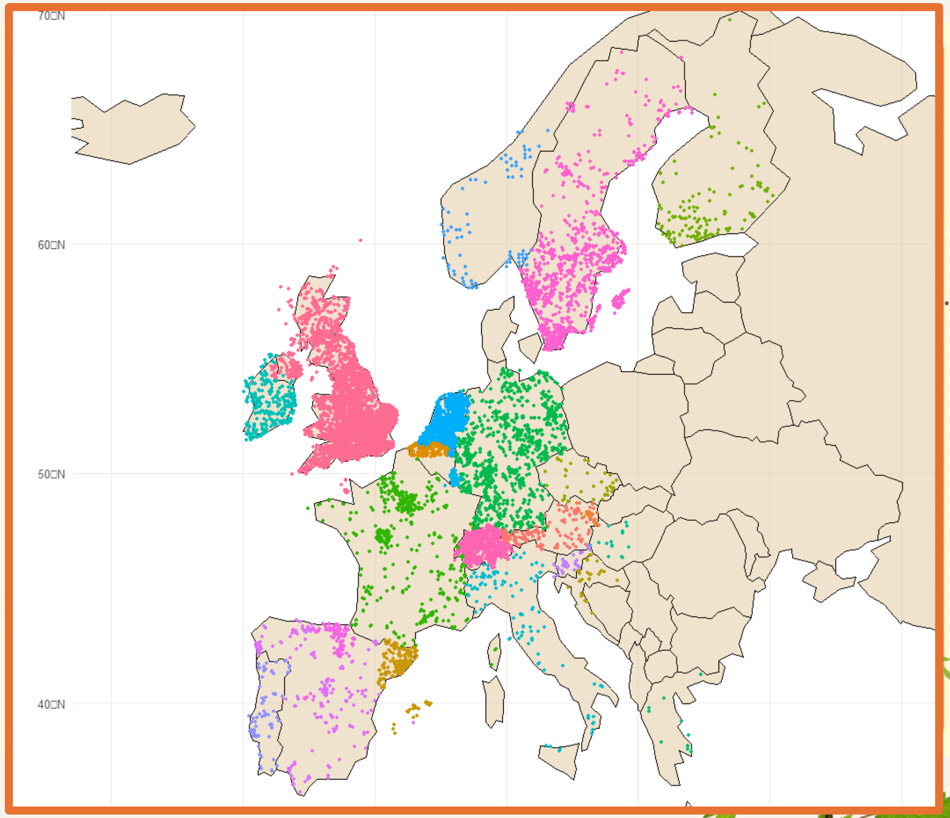
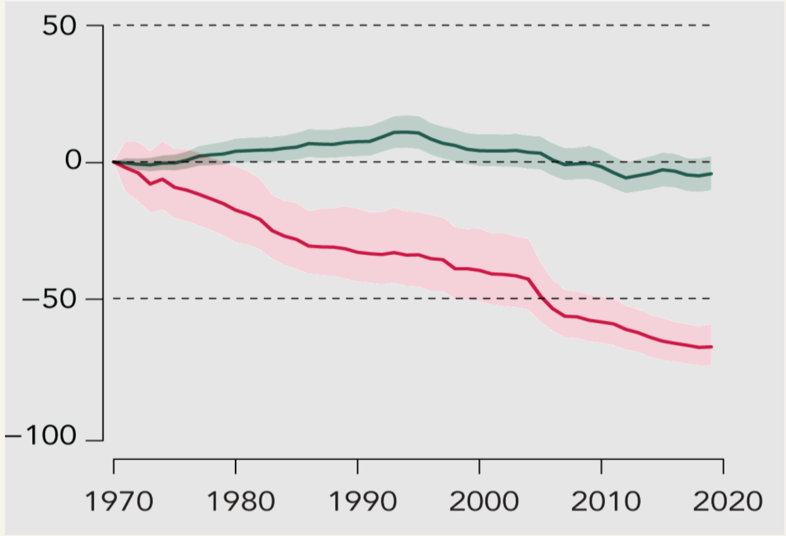
Het **synergistische effect** van stikstof depositie en hitte stres op herbivore insecten.

WP1: het linken van temporele trends in abundantie aan omgevingsvariabelen





- eBMS monitoring data van de 4 doelsoorten
- Catalonië (sinds 1994), UK (sinds 1976), NL en Vlaanderen (sinds 1991) en Finland (sinds 1999).
- Relatie met klimaat verandering, stikstof-depositie en verandering van grondgebruik.

WP2: Nutrient samenstelling brandnetel planten

- **02-04-2025:** Vraag voor medewerki

Request for cooperation

- Coordinators of 14 countries have already signed-up (shown in green).

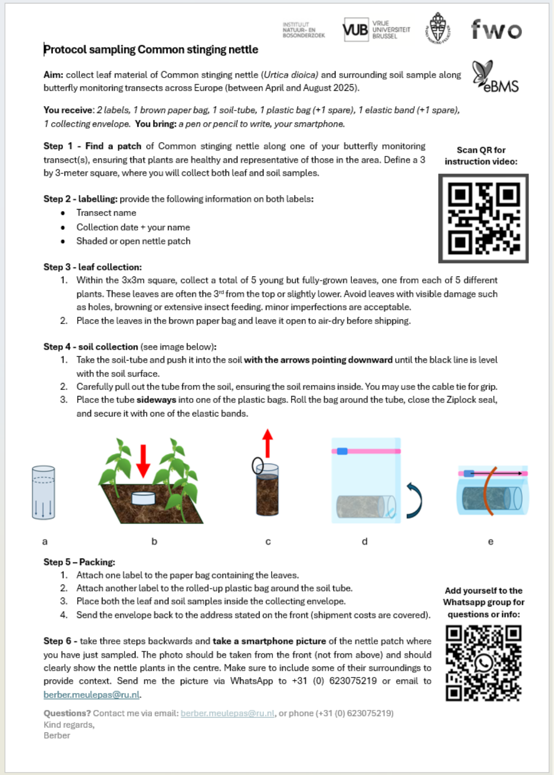
Option (1): Handing over the total # of sampling kits to the coördinator. Distribute the samples across the volunteers.

- Bring back samples today, or provide a shipping adress.

Sign-up Stinging-nettle sampling

Thank you for your interest in helping with the sampling of stinging nettle along butterfly monitoring transects across Europe! Please fill in your details below to sign up. Once registered, you will receive additional information and the necessary sampling materials. If you have any questions,

forms.gle



INSTITUUT NATUUR- EN BOSONDERZOEK
VUB VRIJE UNIVERSITEIT BRUSSEL
fwo
eBMS

Protocol sampling Common stinging nettle

Aim: collect leaf material of Common stinging nettle (*Urtica dioica*) and surrounding soil sample along butterfly monitoring transects across Europe (between April and August 2025).

You receive: *2 labels, 1 brown paper bag, 1 soil-tube, 1 plastic bag (+1 spare), 1 elastic band (+1 spare), 1 collecting envelope.* **You bring:** *a pen or pencil to write, your smartphone.*

Step 1 - Find a patch of Common stinging nettle along one of your butterfly monitoring transect(s), ensuring that plants are healthy and representative of those in the area. Define a 3 by 3-meter square, where you will collect both leaf and soil samples.

Scan QR for instruction video:

Step 2 - labelling: provide the following information on both labels:
- Transect name
- Collection date + your name
- Shaded or open nettle patch

Step 3 - leaf collection:
1. Within the 3x3m square, collect a total of 5 young but fully-grown leaves, one from each of 5 different plants. These leaves are often the 3rd from the top or slightly lower. Avoid leaves with visible damage such as holes, browning or extensive insect feeding. minor imperfections are acceptable.
2. Place the leaves in the brown paper bag and leave it open to air-dry before shipping.

Step 4 - soil collection (see image below)**:**
1. Take the soil-tube and push it into the soil **with the arrows pointing downward** until the black line is level with the soil surface.
2. Carefully pull out the tube from the soil, ensuring the soil remains inside. You may use the cable tie for grip.
3. Place the tube **sideways** into one of the plastic bags. Roll the bag around the tube, close the Ziplock seal, and secure it with one of the elastic bands.

a b c d e

Step 5 – Packing:
1. Attach one label to the paper bag containing the leaves.
2. Attach another label to the rolled-up plastic bag around the soil tube.
3. Place both the leaf and soil samples inside the collecting envelope.
4. Send the envelope back to the address stated on the front (shipment costs are covered).

Add yourself to the Whatsapp group for questions or info:

Step 6 - take three steps backwards and **take a smartphone picture** of the nettle patch where you have just sampled. The photo should be taken from the front (not from above) and should clearly show the nettle plants in the centre. Make sure to include some of their surroundings to provide context. Send me the picture via WhatsApp to +31 (0) 623075219 or email to berber.meulepas@ru.nl.

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Kind regards,
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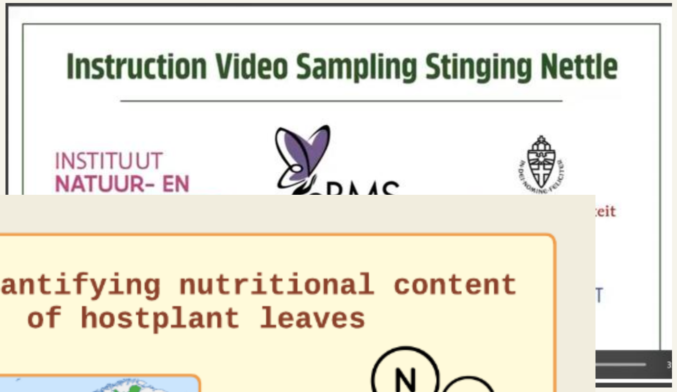

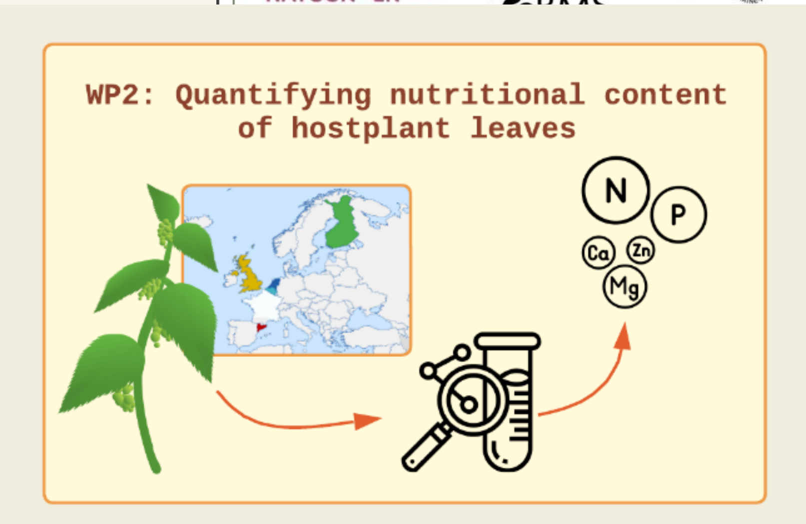

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Kind regards,
Berber

Meer dan 400 monster verzonden!

WP2: Nutrient samenstelling brandnetel planten

Contribuez à une étude sur les Vanesses des orties

Dans le cadre des échanges que nous avons avec différents chercheurs européens, nous vous transmettons le message d'une jeune chercheuse Belge. C'est l'occasion de contribuer à une étude à l'échelle européenne !

"Chers observateurs,

Je m'appelle Berber Meulepas, et je suis à la recherche de bénévoles qui accepteraient de collecter des feuilles d'Ortie commune (*Urtica dioica*) et un petit échantillon de sol, provenant de transects Sterf-eBMS suivis à travers la France.

Je fais des recherches sur les effets des dépôts d'azote et du stress thermique sur quatre papillons mangeurs d'orties : le Paon du jour, la Carte géographique, le Vulcain et la Petite tortue, à travers l'Europe.

Dans le cadre de ce projet, nous souhaitons obtenir 40 échantillons à travers la France, et je vous demande de m'aider à atteindre cet objectif !

En quoi consiste l'échantillonnage ?

Le processus est simple et comprend la collecte de feuilles d'ortie fraîches, ainsi c échantillon de sol à proximité, puis l'envoi de ces échantillons par la poste. Je fo protocole écrit, une trousse d'échantillonnage et une enveloppe d'expédition (frai prépayés).

Seriez-vous intéressé à aider en prélevant un échantillon le long de l'un des transects

fice.com/mail/inbox/id/AAQkADkwNzg5ODhhLWVlMWYtNGNhOC1hYmQ0LTA3ODc2ZmQ5ODFhZgAQAEI

06 E-mail - Meulepas, B.M.J.W. (Berber) - Outlook

Merci de vous inscrire via le lien suivant !

(note des animateurs du Sterf : le formulaire est en anglais, n'hésitez pas à cliq bouton "traduire" du menu de votre navigateur si vous n'êtes pas à l'aise avec l'anglai

Une fois inscrit, vous recevrez des instructions supplémentaires et votre kit d'échantillonnage.

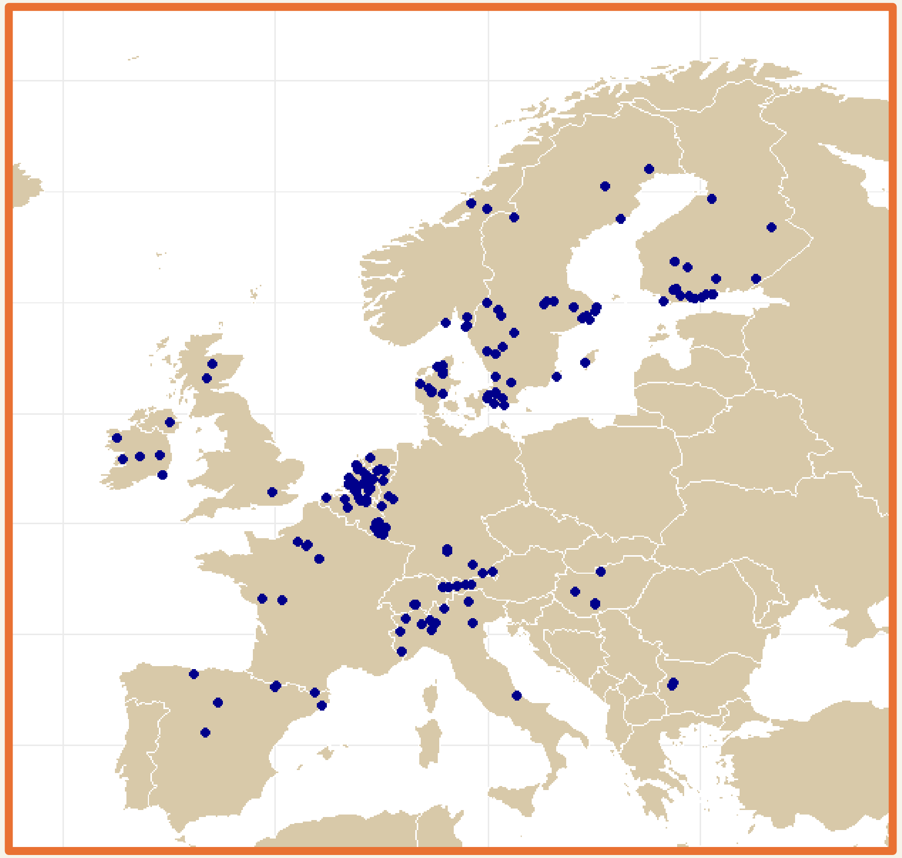
J'ai hâte d'avoir de vos nouvelles sur votre intérêt à participer, merci de prendre en compte ma demande !"

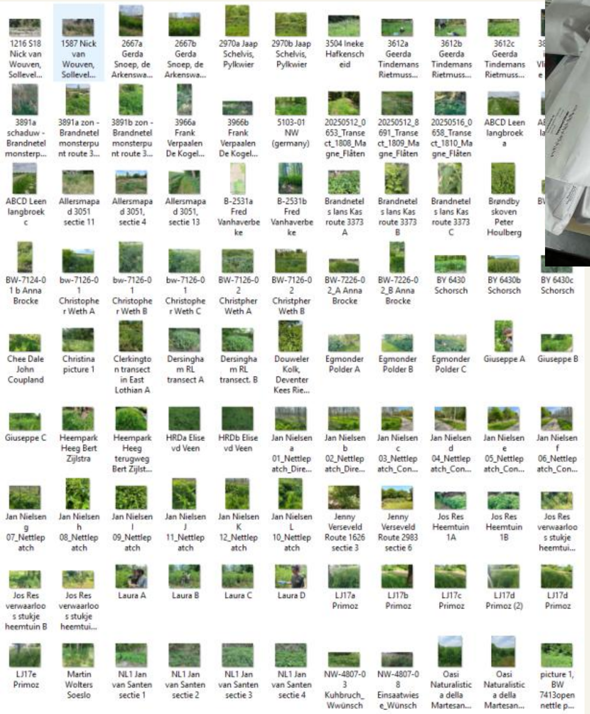
Berber

RICERCA E CITIZEN SCIENCE

APAM COLLABORA A UN PROGETTO OLANDESE SULLE FARFALLE

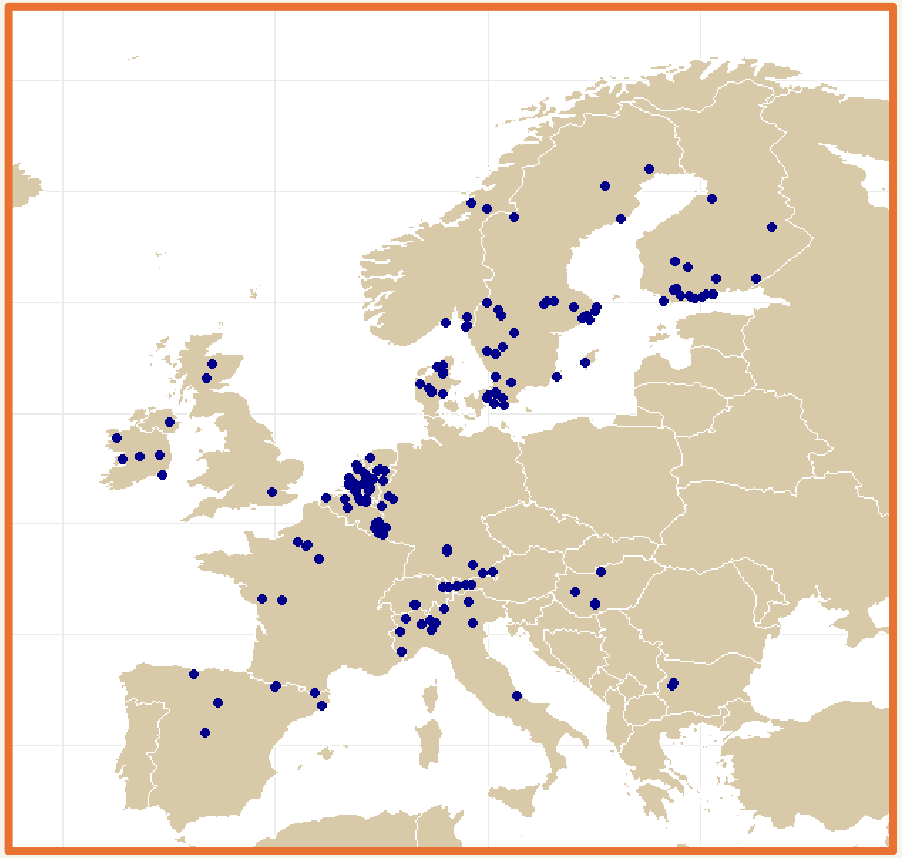
WP2: Nutrient samenstelling brandnetel planten



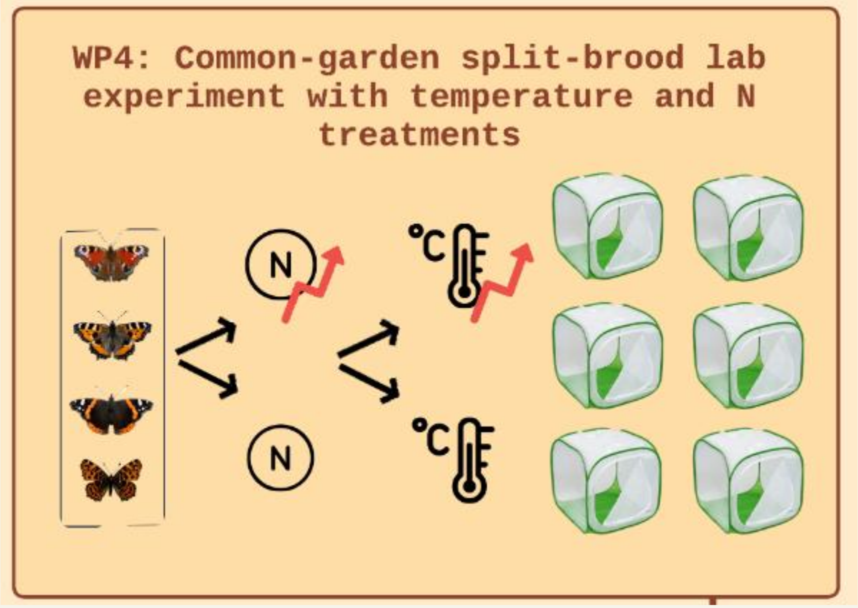


- ~300 monsters verzameld
- Vanuit 16 Europese landen!

WP2: Nutrient samenstelling brandnetel planten



WP4: Rupsen experimenten in het lab met temperatuur en stikstof behandelingen.



Waard plant kwaliteit

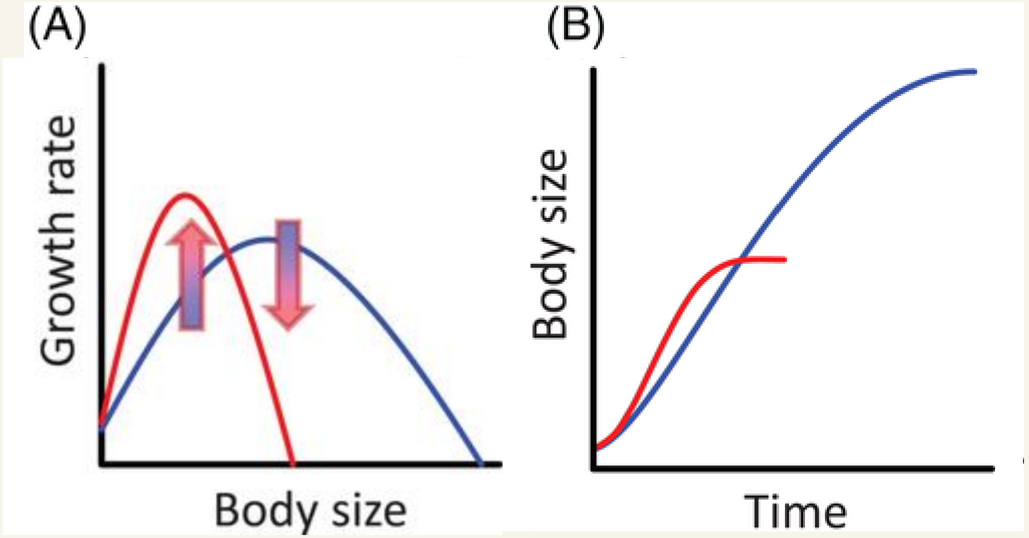
- Plant stoichiometrie

N:P $\downarrow$ N-limitatie

N:P $\uparrow$ P-limitatie

Stinging nettle, *Urtica dioica*

Temperature-size rule



Verberk, W. C., Atkinson, D., Hoefnagel, K. N., Hirst, A. G., Horne, C. R., & Siepel, H. (2021). Shrinking body sizes in response to warming: explanations for the temperature–size rule with special emphasis on the role of oxygen. *Biological Reviews*, *96*(1), 247-268.

Landkaartje, *Araschnia levana* (Linnaeus, 1758)

Dagpauwoog, *Aglais io* (Linnaeus, 1758)

Atalanta, *Vanessa atalanta* (Linnaeus, 1758)

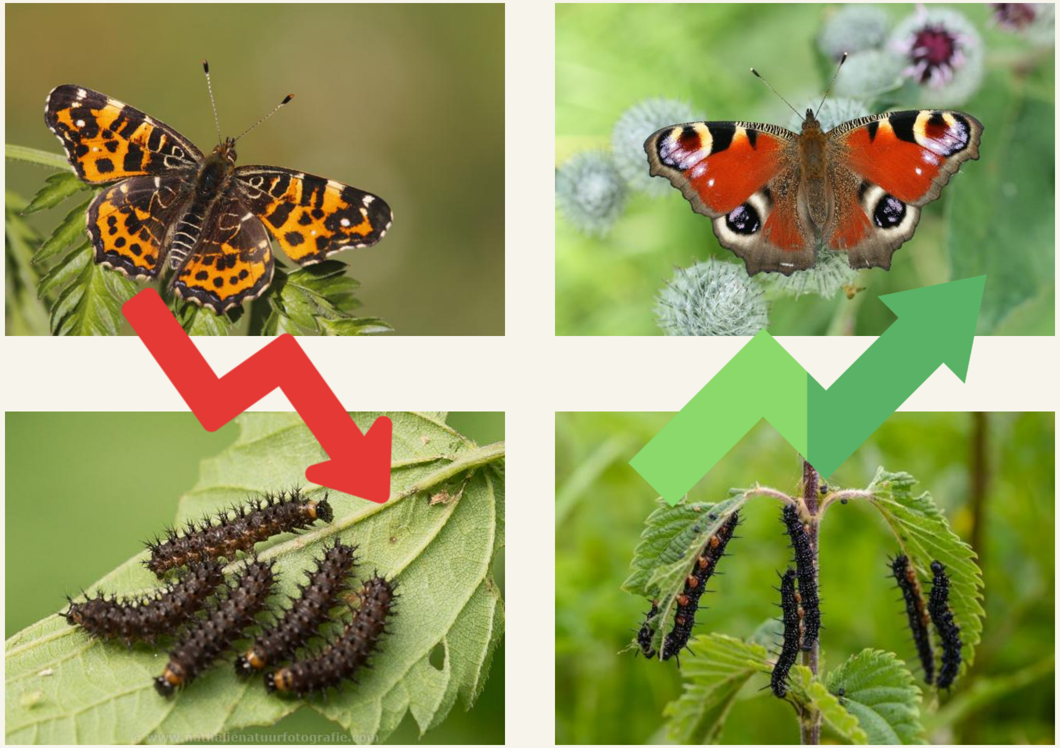
Kleine vos, *Aglais urticae* (Linnaeus, 1758)

2024

Onderzoeksvraag:

Wat zijn de effecten van **waard plant kwaliteit** en **opwarming** op prestatie?

- Ontwikkeling
- Groei
- Hitte tolerantie



Landkaartje, *Araschnia levana* (Linnaeus, 1758)

Dagpauwoog, *Aglais io* (Linnaeus, 1758)

Methodology: Experimental set-up

7
N
Nitrogen

21 °C
14 °C

Low (np)

Ratio (Np)

High (NP)

X

24 °C
16 °C

Low (np)

Ratio (Np)

High (NP)

X

Rups :
- Groei snelheid
- Ontwikkelingstijd
- Overleving
- Pop gewicht

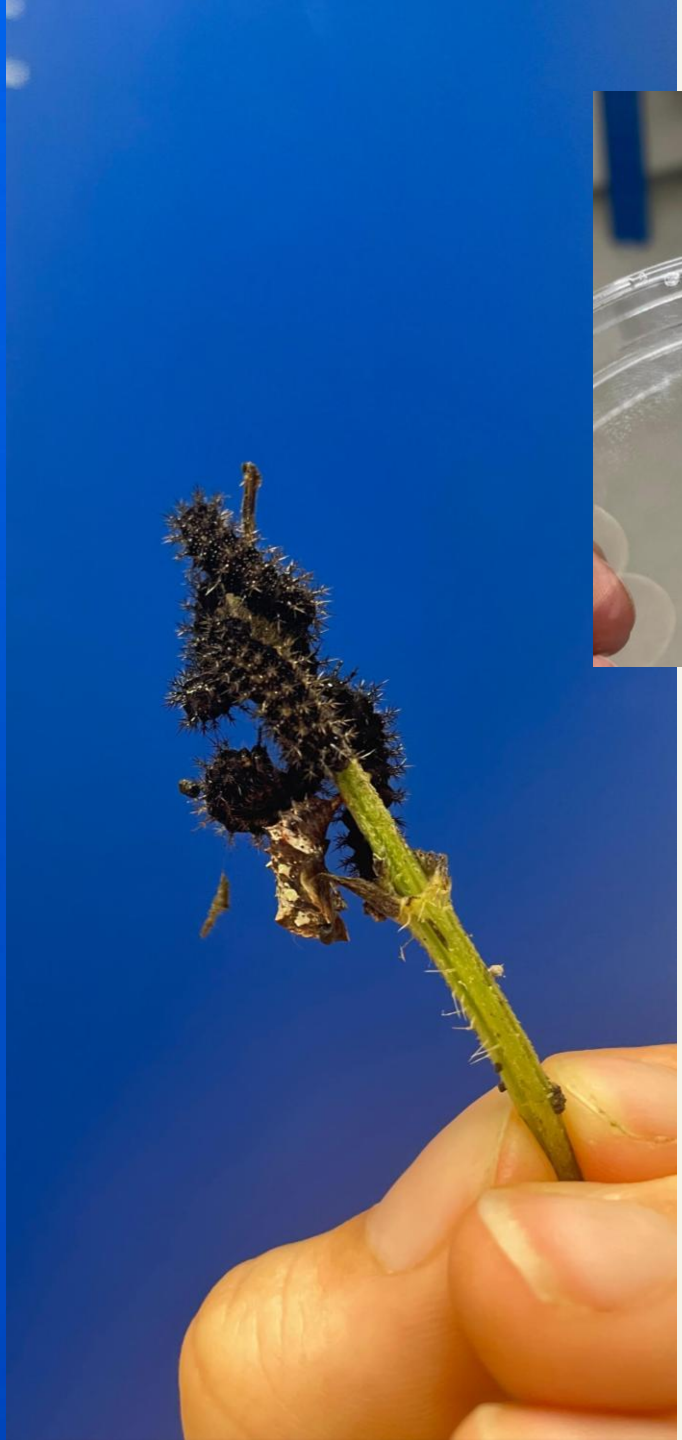
Adult :
- Vers gewicht
- Hitte tolerantie


Aglais io


Araschnia levana

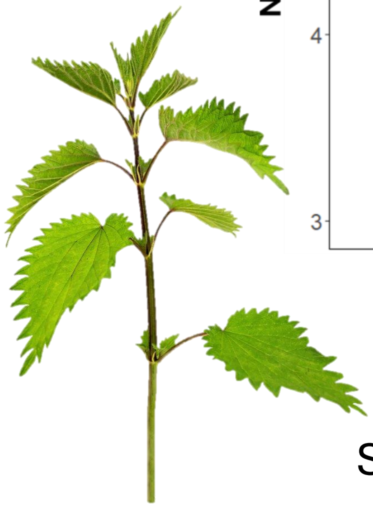
Aglais io, 15 dagen oud.

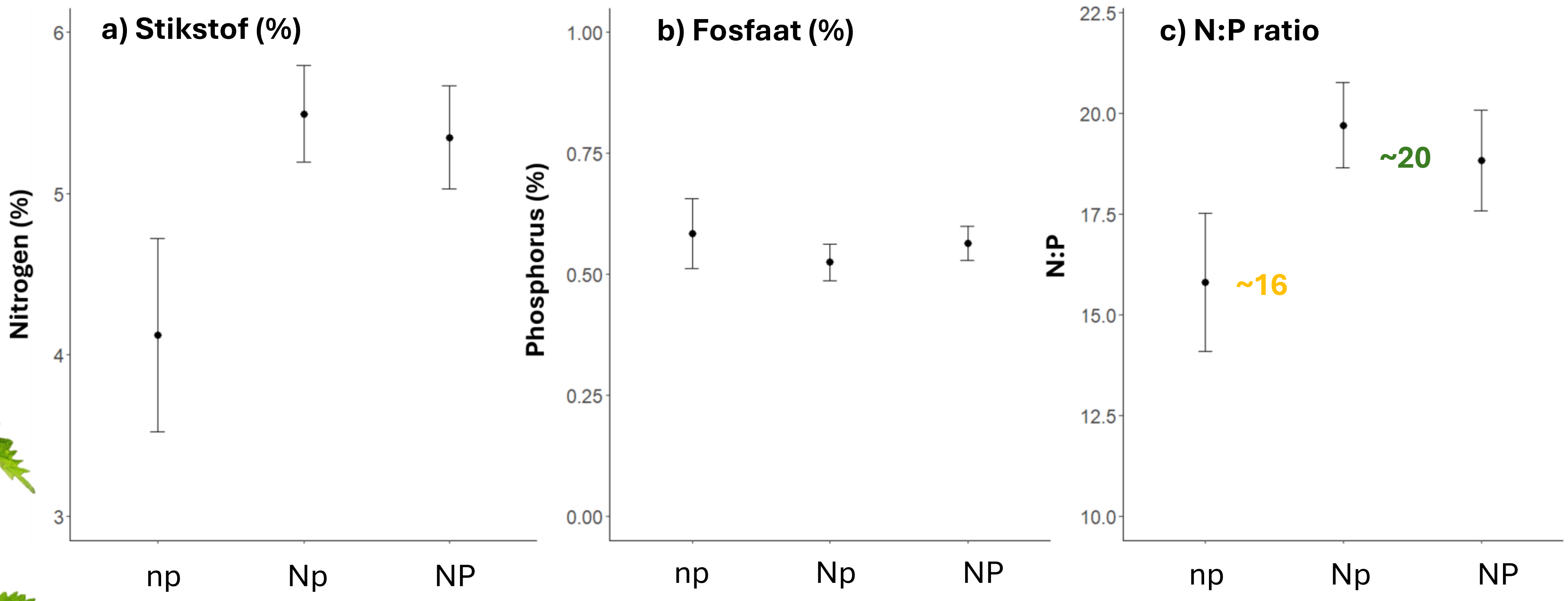
Araschnia levana, 15 dagen oud

Brandnetel bemesting

Brandnetel bemesting



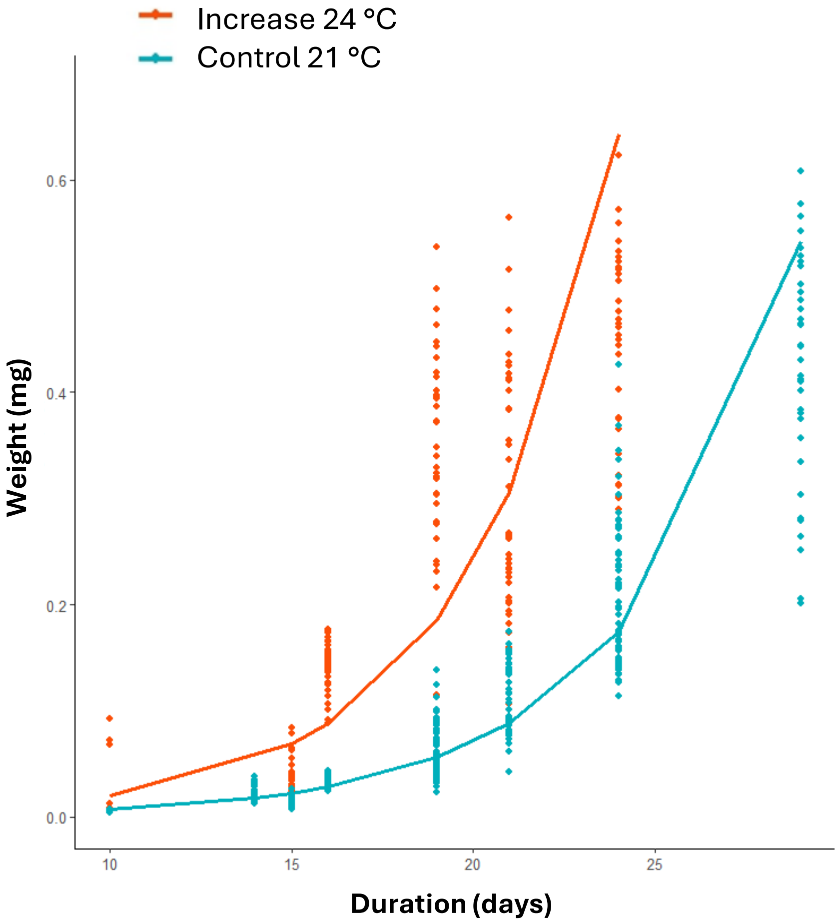


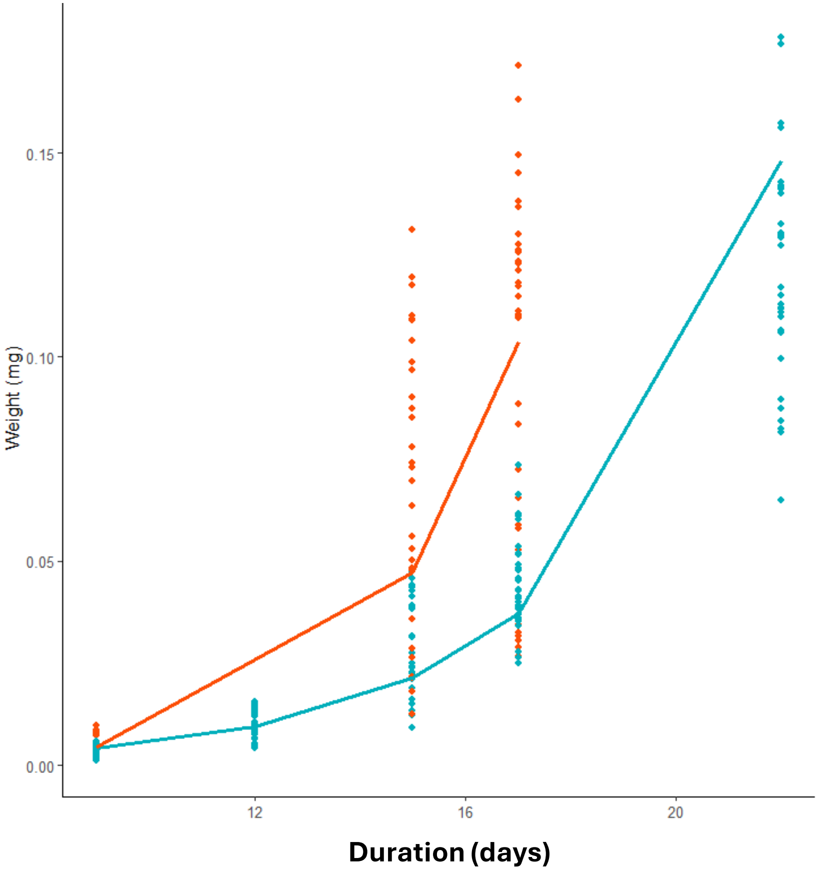
Stikstof bemesting veranderd de **stikstof concentratie**, en creëert **gunstige** en **ongunstige** N:P ratio's in de brandnetel bladeren.

Larvale groei curves

Araschnia levana

Aglais io





Grote **temperatuur** effecten, beide soorten reageren vergelijkbaar.

Larvale ontwikkeling

Araschnia levana 

Een toename in temperatuur zorgt voor **toename in groei snelheid,**
en versnelde ontwikkeling

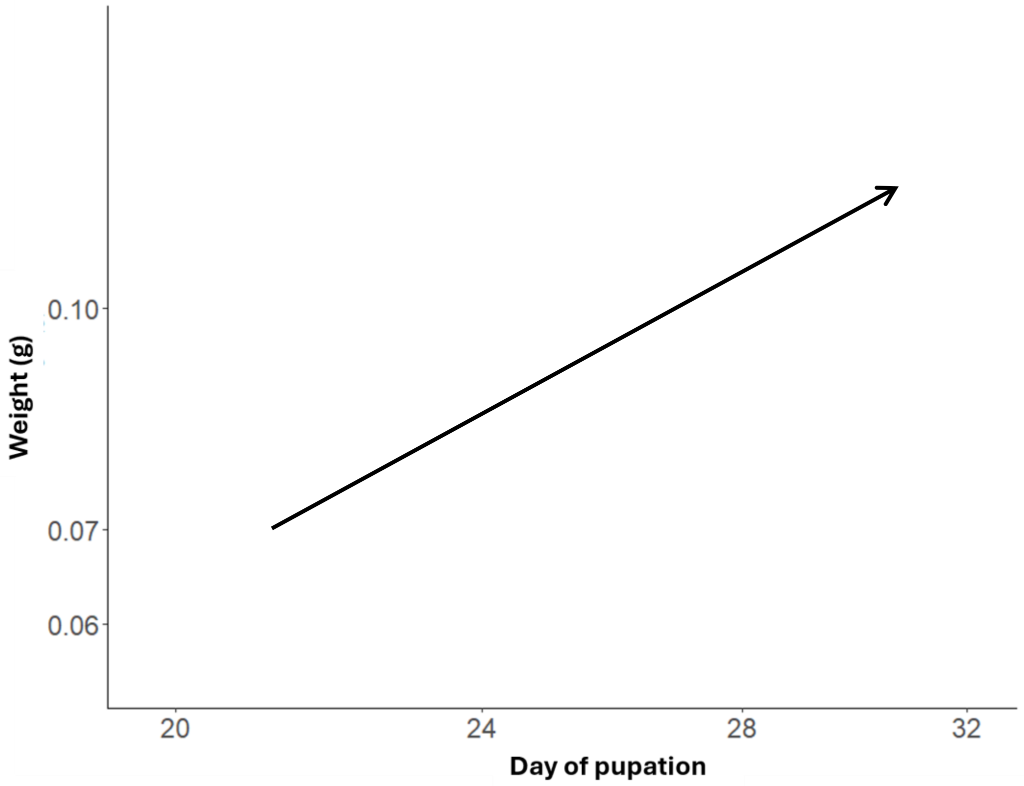
Gunstige NP ratio in de brandnetel, **versneld groei**, en **vergroot pop gewicht**

Trade-off: ontwikkelingstijd en gewicht

Araschnia levana

Snelle ontwikkeling vs. zwaarder gewicht

Verwacht: een positieve relatie tussen gewicht en tijd



Trade-off: size and age at maturity

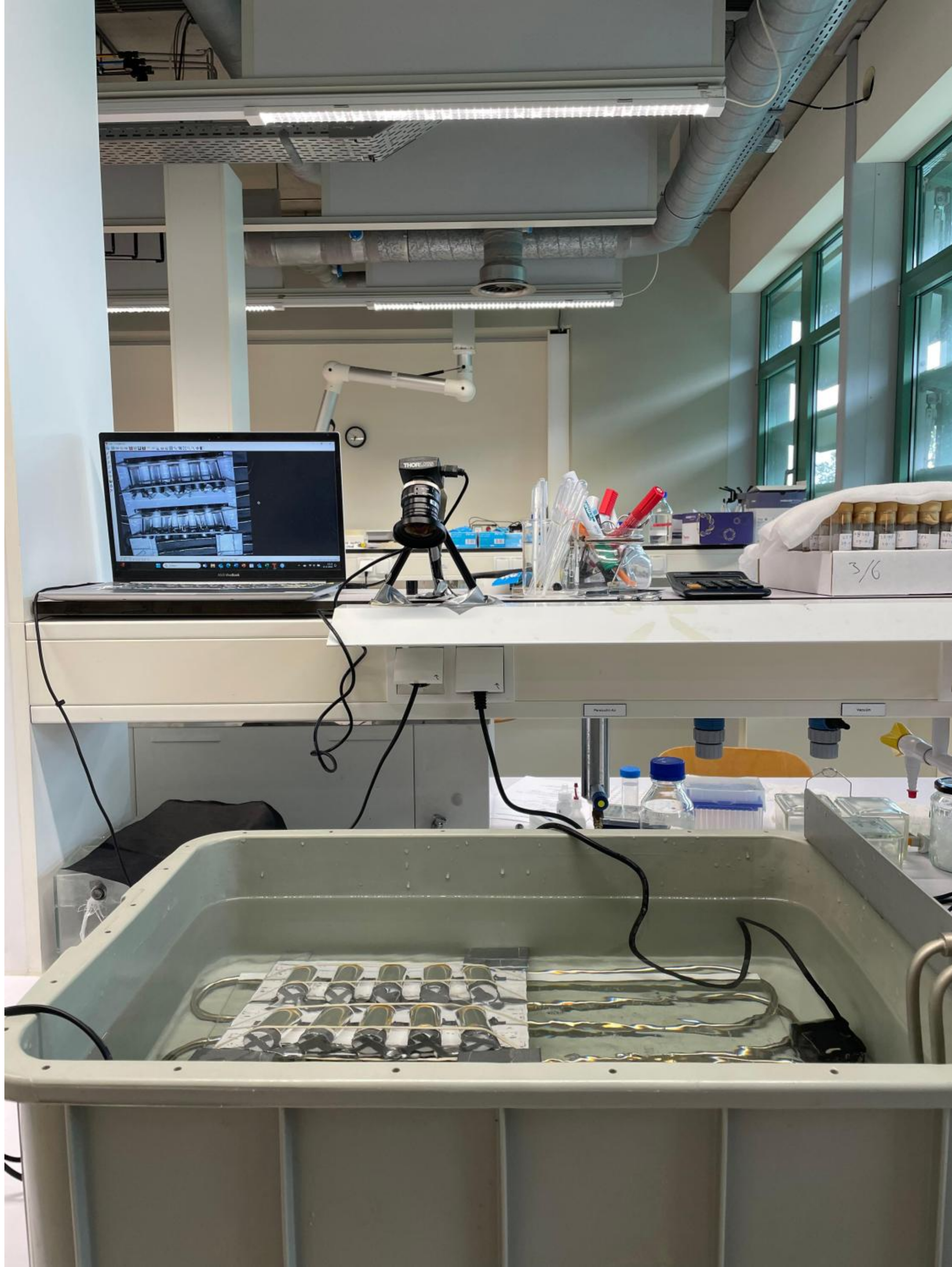
Araschnia levana

Snelle ontwikkeling vs. zwaarder gewicht

Gunstige NP behandeling bij hoge temperatuur laten een positieve trend zien.

Ongunstige NP behandeling hebben langer nodig om te ontwikkelen, en blijven kleiner.

Hitte tolerantie

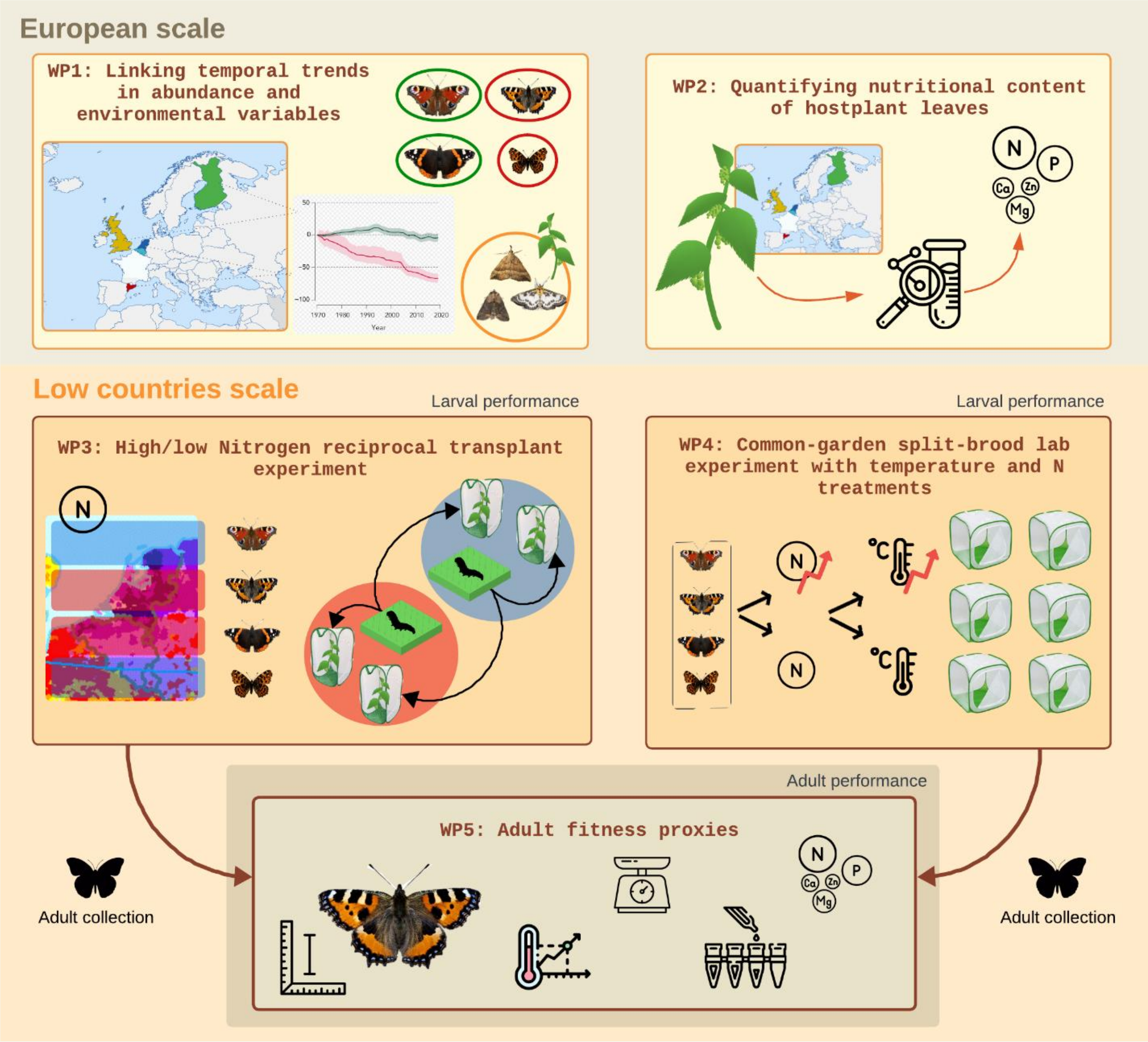


Hitte tolerantie

Araschnia levana

2025

Wordt vervolgd..



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