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Program

Butterfly abundance trends

Based on the Israeli Butterfly
Monitoring Scheme transects

Orr Comay

HaMaarag and The Entomology
Laboratory for Applied Ecology



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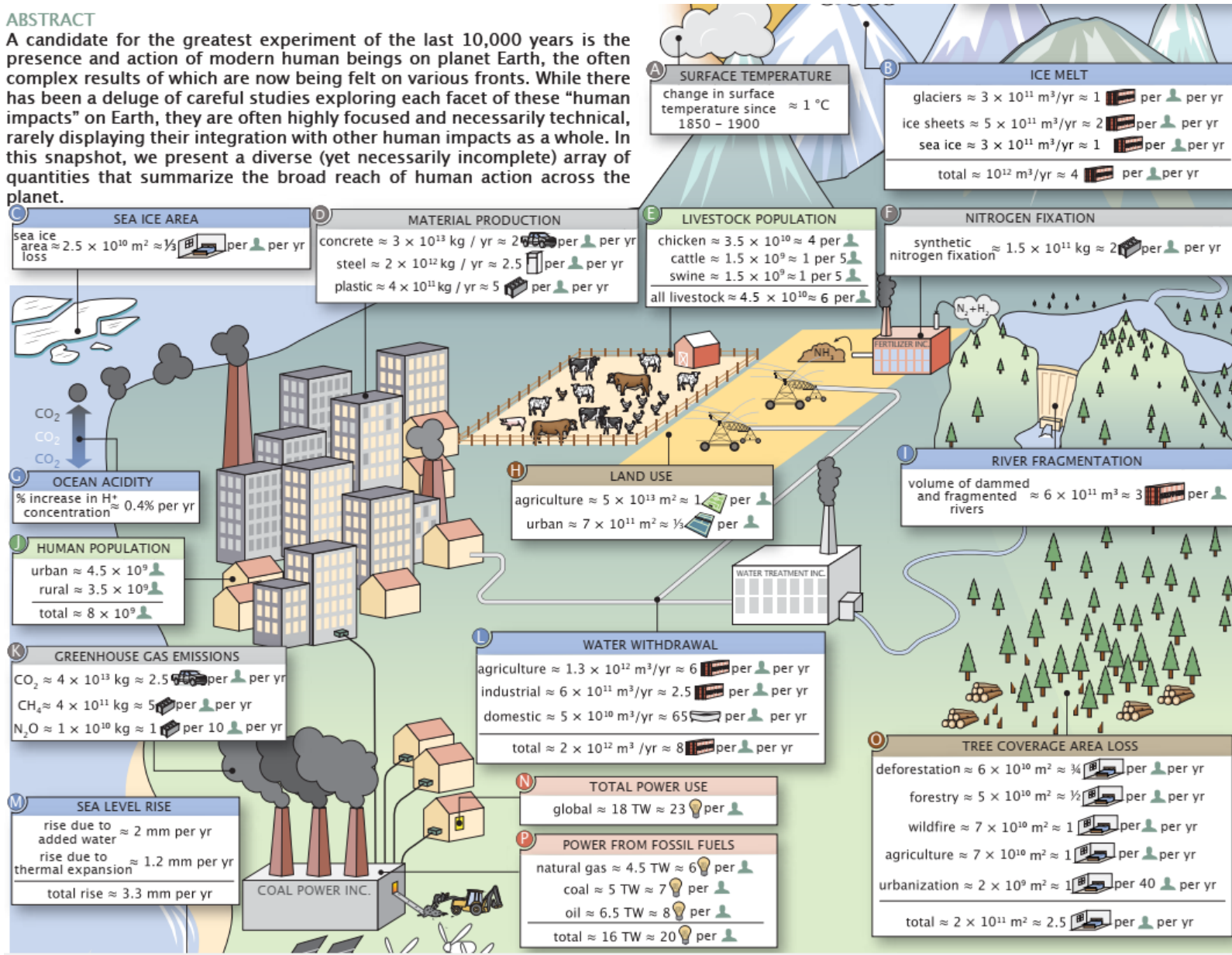
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Introduction Anthropocene

Biodiversity crisis

ABSTRACT

A candidate for the greatest experiment of the last 10,000 years is the presence and action of modern human beings on planet Earth, the often complex results of which are now being felt on various fronts. While there has been a deluge of careful studies exploring each facet of these "human impacts" on Earth, they are often highly focused and necessarily technical, rarely displaying their integration with other human impacts as a whole. In this snapshot, we present a diverse (yet necessarily incomplete) array of quantities that summarize the broad reach of human action across the planet.



<http://www.anthroponumbers.org>

Chure et al. 2021

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Introduction

Measuring biodiversity

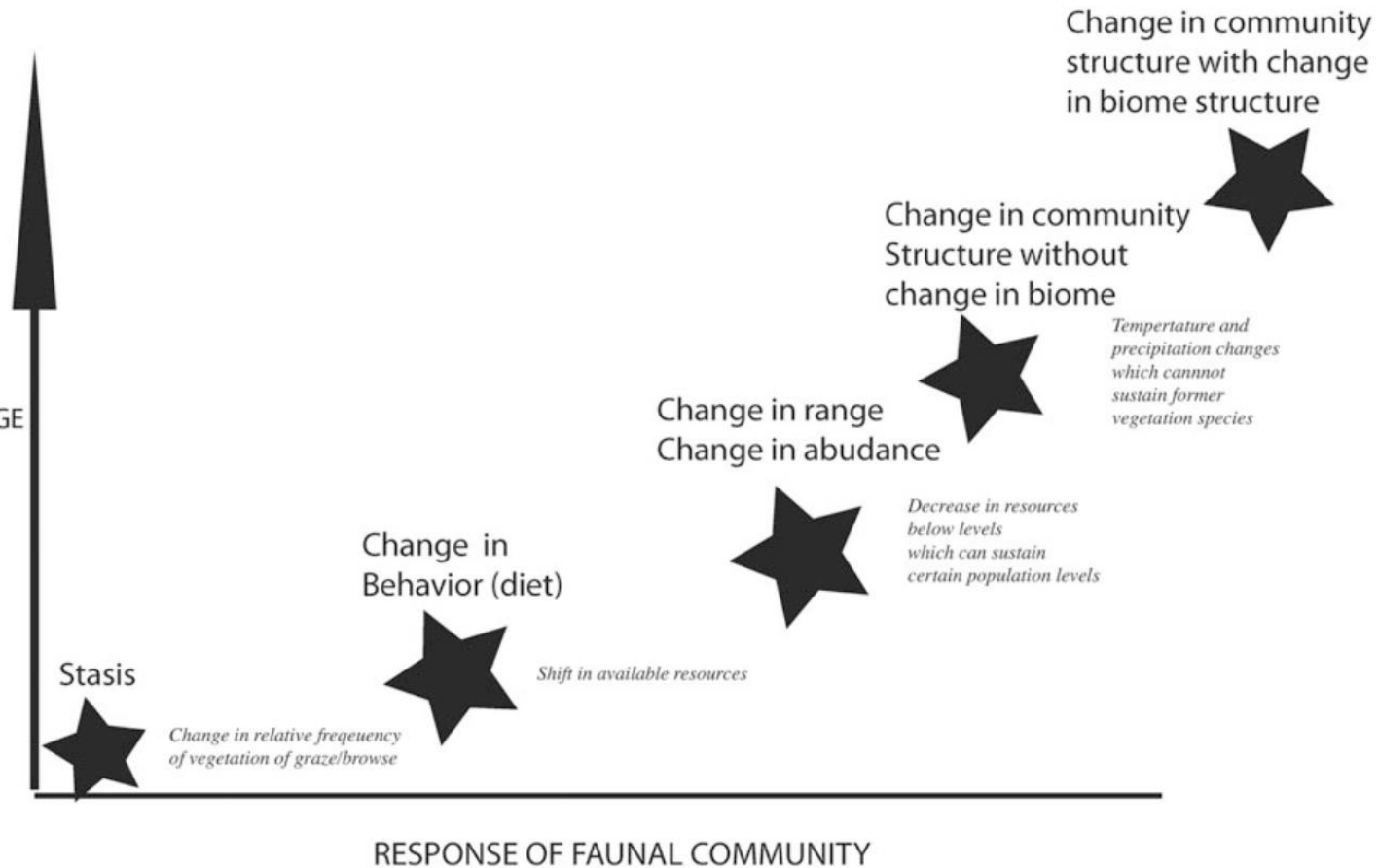
Species richness

Species lists

Abundance

Behavior and phenology

AMPLITUDE,
FREQUENCY AND
VARIANCE
OF CLIMATE CHANGE





Methods

Measuring abundance

Pollard Walks

Frequency

Seasonality

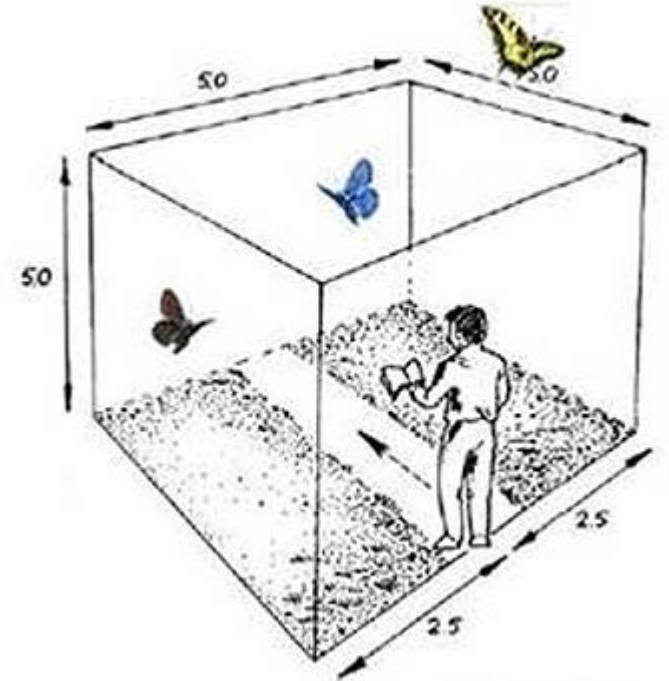
Environment

Observer skill

Model:

Response: Total butterflies in transect

Predictors: "noise" + long term trend



© Chris van Swaay

Asanus jesus
כחלון הינבוט





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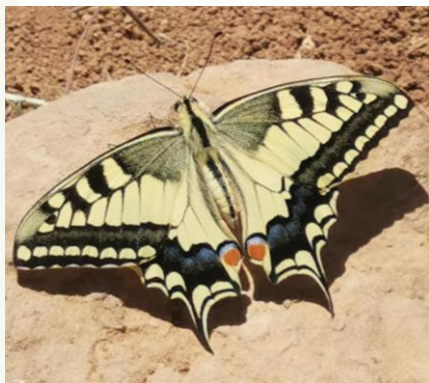
Methods

Measuring abundance per species

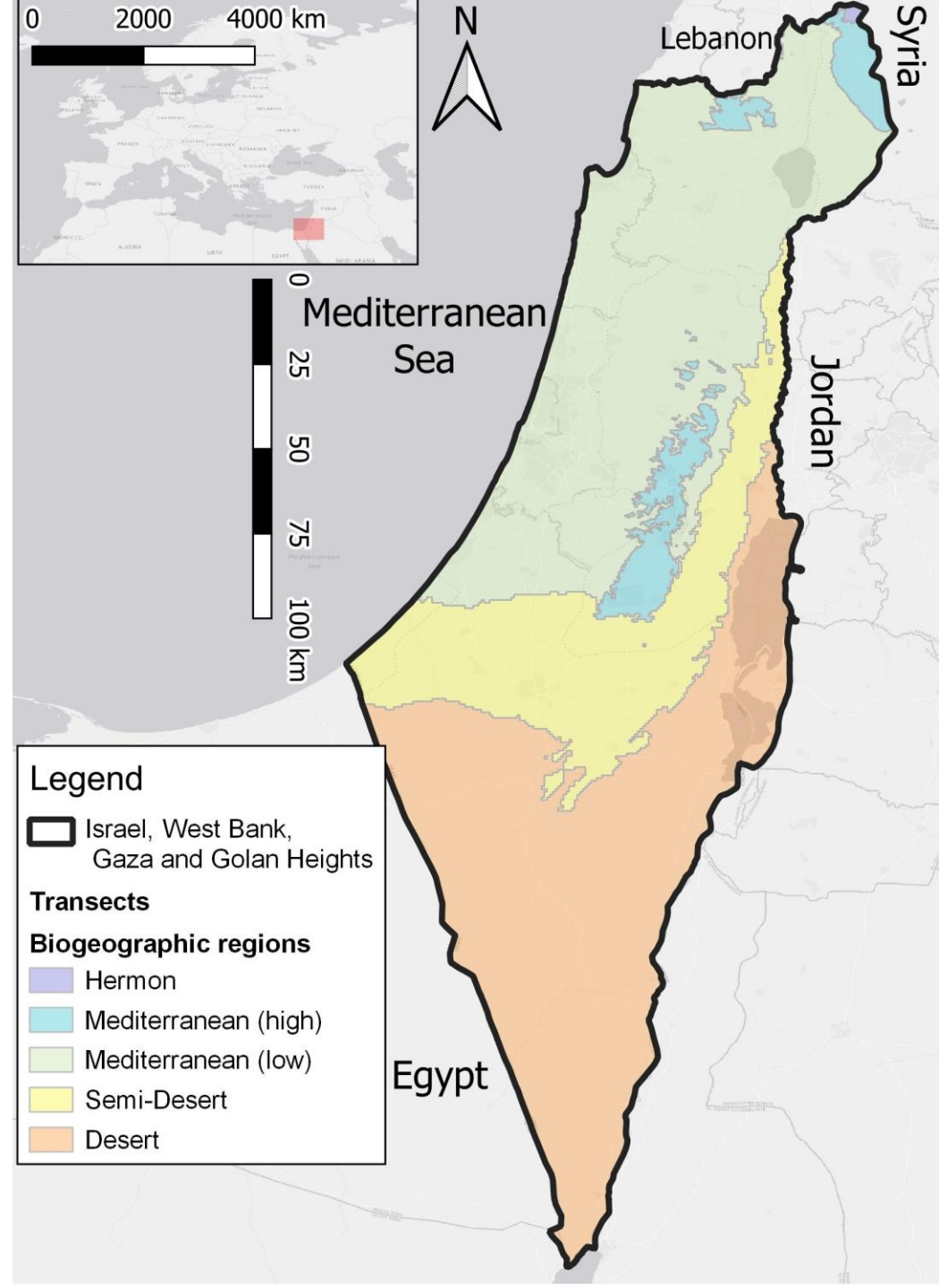
Seasonality

Missing counts

Regional GAM



Papilio machaon
זנב סנונית נאה



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Methods

Measuring abundance per species

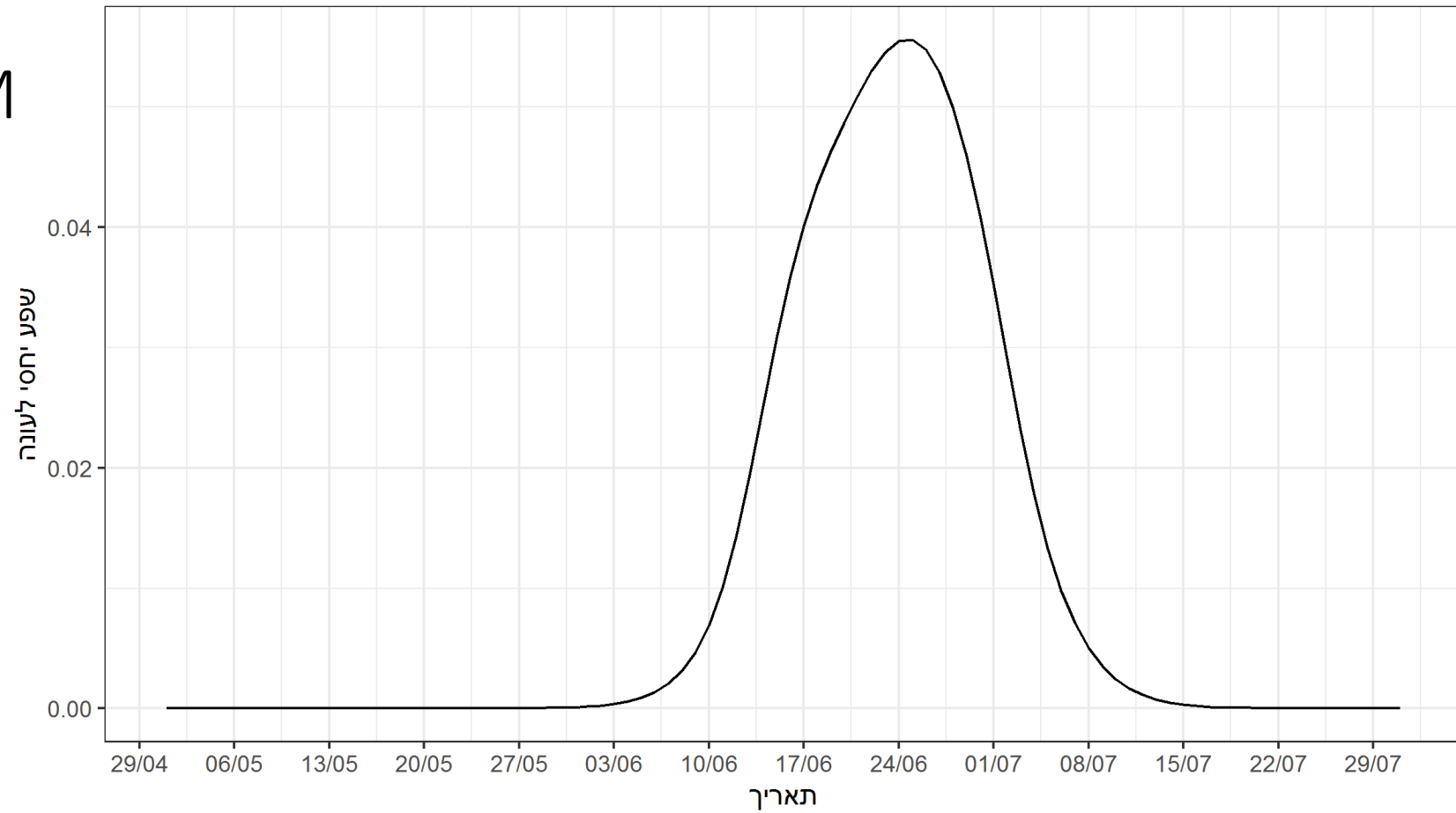
Seasonality

Regional GAM

Fill in missing
counts

Abundance
index:

נחשתן נמלים גילי בגליל העליון 2019



How many butterflies would have been observed if the transect was visited every week?



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Melanargia titea
אביבית משוישת

Methods

Estimating species abundance trend

Subset the database:

- Full dataset (all transects, all years)

- Transects in the species' distribution

- Transects with at least 3 years of data

- Transects monitored 2012-2022

- Transects where the species was observed

Compare several models:

- Environment only

- Environment and trend \longrightarrow Quantify trend

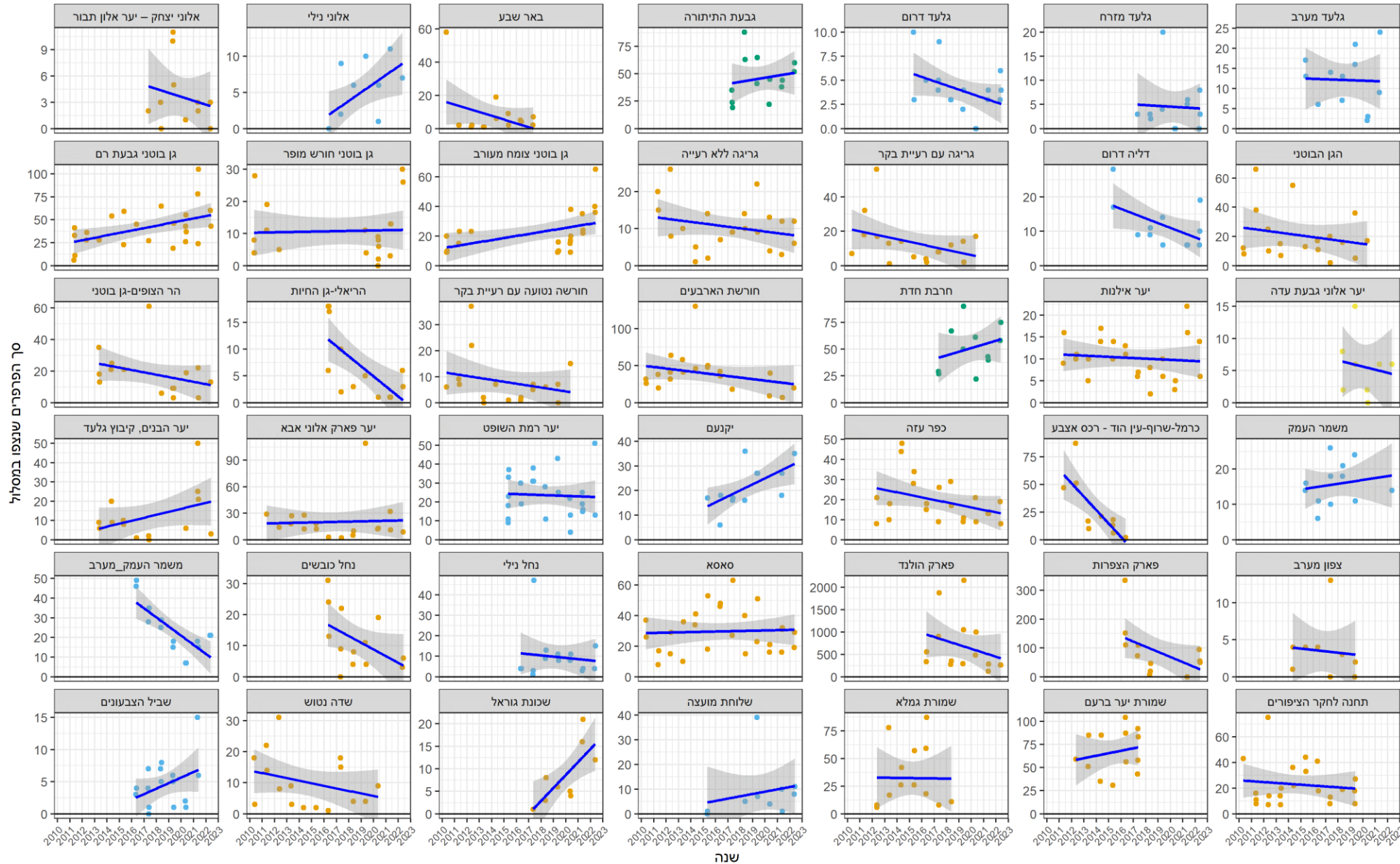




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Results

מגמות בשפע הפרפרים בחודש מאי (שיא שפע הפרפרים)
המודל הכללי מצביע על ירידה מובהקת של 8.7% בסך הפרפרים הנצפים במסלולים תוך חמש שנים
מוצגים מסלולים שנטרו במאי 5-שנים שונות לפחות
שימו לב להבדלים בין מסלולים בציר האנכי



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Preliminary results!

17 Increasing species:

Archon apollinus צבעון שקוף

Pieris brassicae לבנין הכרוב

Colotis fausta דרומי הצלף

Danaus chrysippus דנאית הדורה

Ypthima asterope טבעית זוטית

Hipparchia fatua סטירית אפלה

Maniola telmessia סטירית פקוחה

Lasiommata megera חומית הציבורת

Satyrium ilicis שעיר האלון

Deudorix livia כחליל הרימון

Lycaena thersamon נחשתן החומעה

Tarucus balkanicus כחלון הבלקן

Azanus jesus כחלון הינבוט

Chilades galba כחליל הקטנית

Zizeeria karsandra כחליל הקוטב

Azanus jesus כחלון הינבוט

Muschampia hieromax אפורית

השלהבית



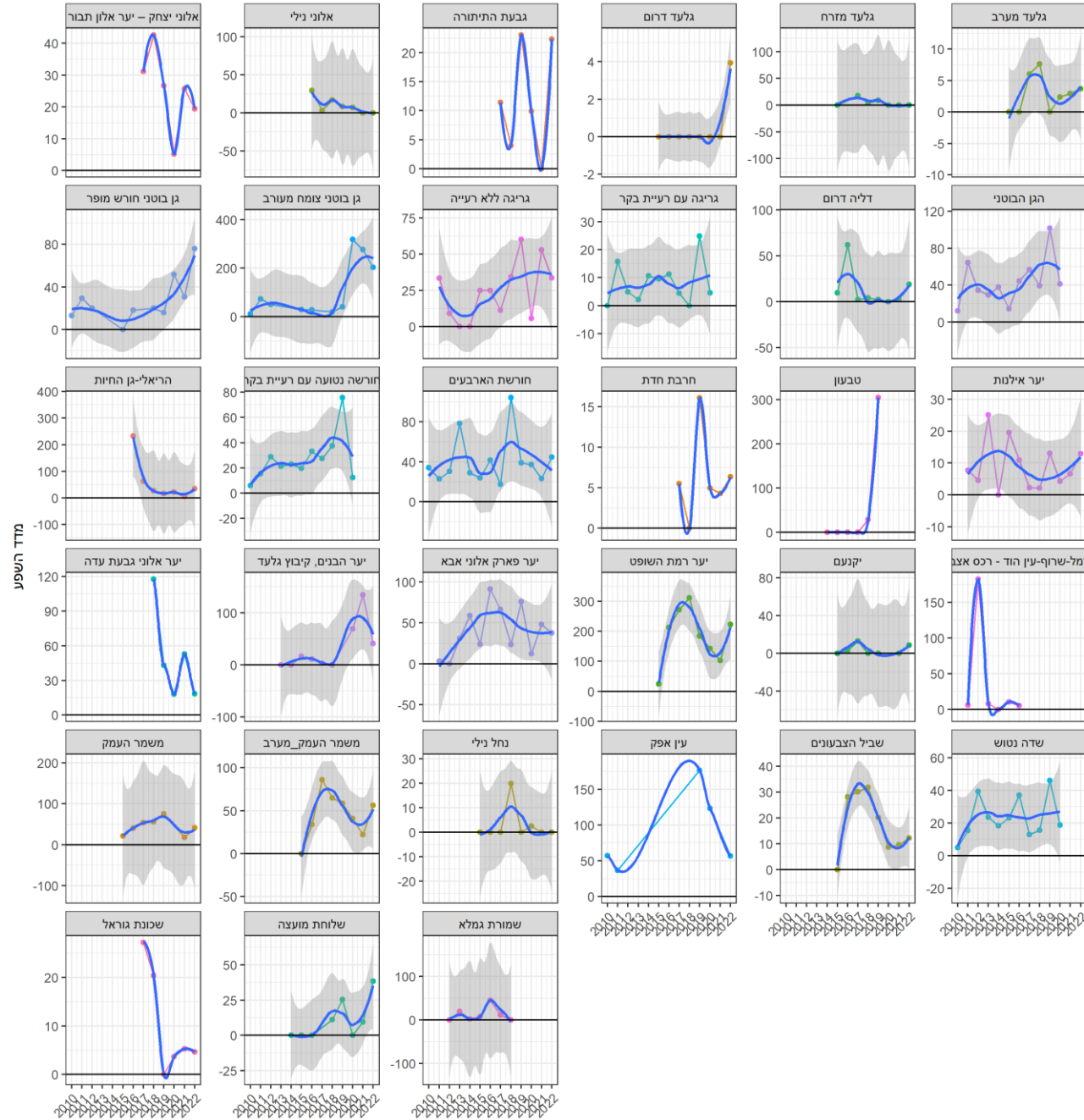


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לבגין הכרוב Pieris brassicae

מדד השפע (מתוקן לעונתיות ולמאמץ הדיגום) באתרים שנסקרו באופן אפקטיבי במשך לפחות חמש שנים

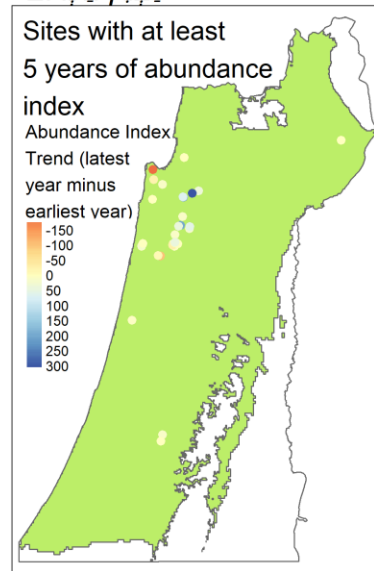
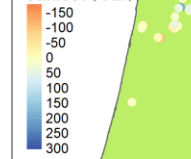


Pieris brassicae לבגין הכרוב

Sites with at least
5 years of abundance
index

Abundance Index

Trend (latest
year minus
earliest year)



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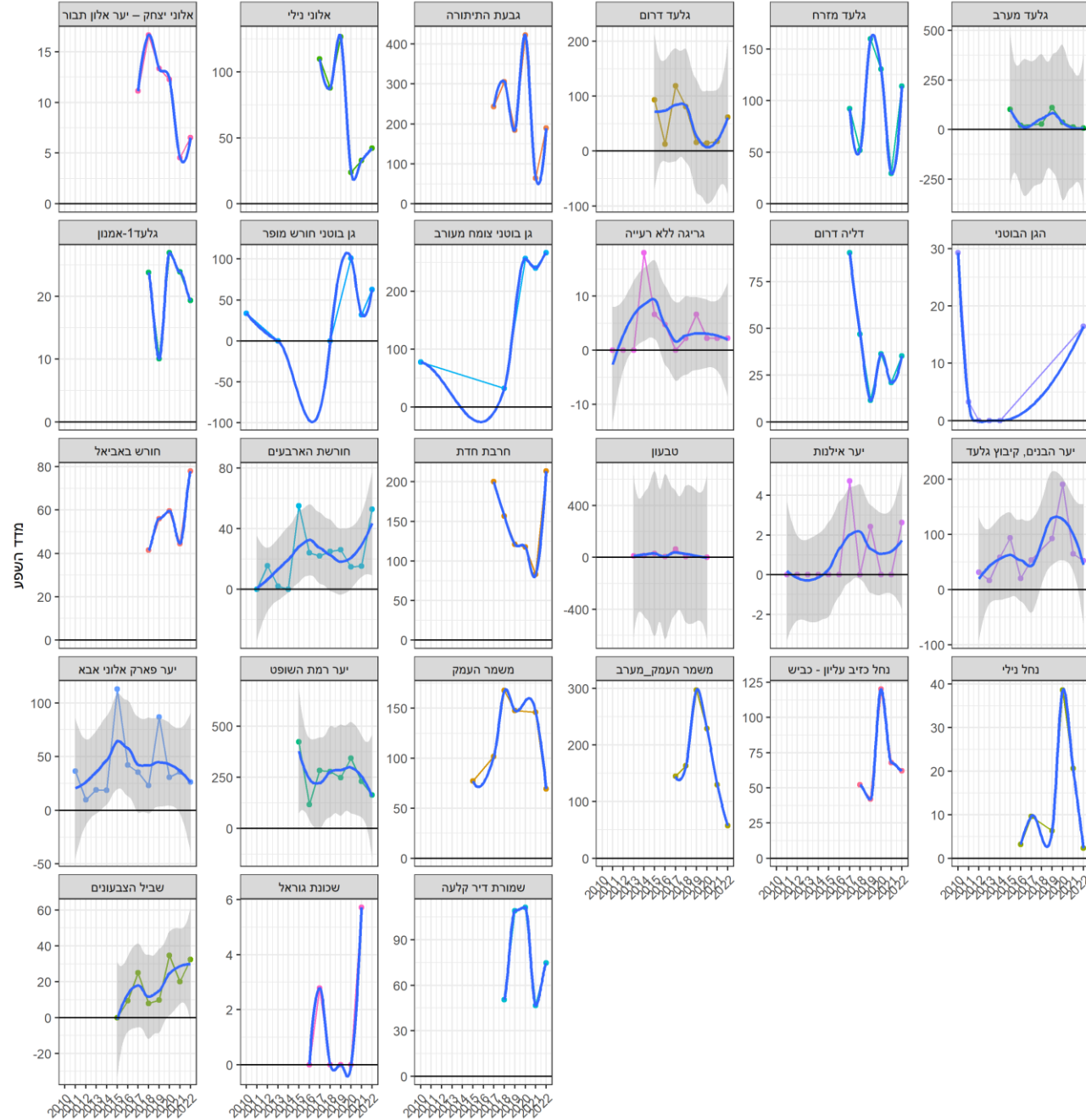


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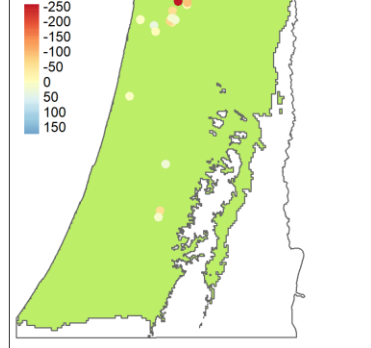
דרומי הצ'לף *Colotis fausta*

מדד השפע (מתוקן לעונתיות ולמאמץ הדיגום) באתרים שנסקרו באופן אפקטיבי במשך לפחות חמש שנים



Colotis fausta דרומי הצ'לף

Sites with at least
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Abundance Index
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9 Decreasing species:

Euchloe belemia ירוק-כנף מפוספס

Pontia daplidice לבנין הרכפה

*Colias crocea** צהבוני התלתן

*Gonepteryx cleopatra** לימוני האשחר

*Satyrium spini** שעיר האשחר

*Corcharodus alceae** אפורית החלמית

*Spialia orbifer** נקדית הורדיים

*Pelopidas thrax** הספרית הדוחן

*Gegens pumilio** הספרית שחורה

*Preliminary results!

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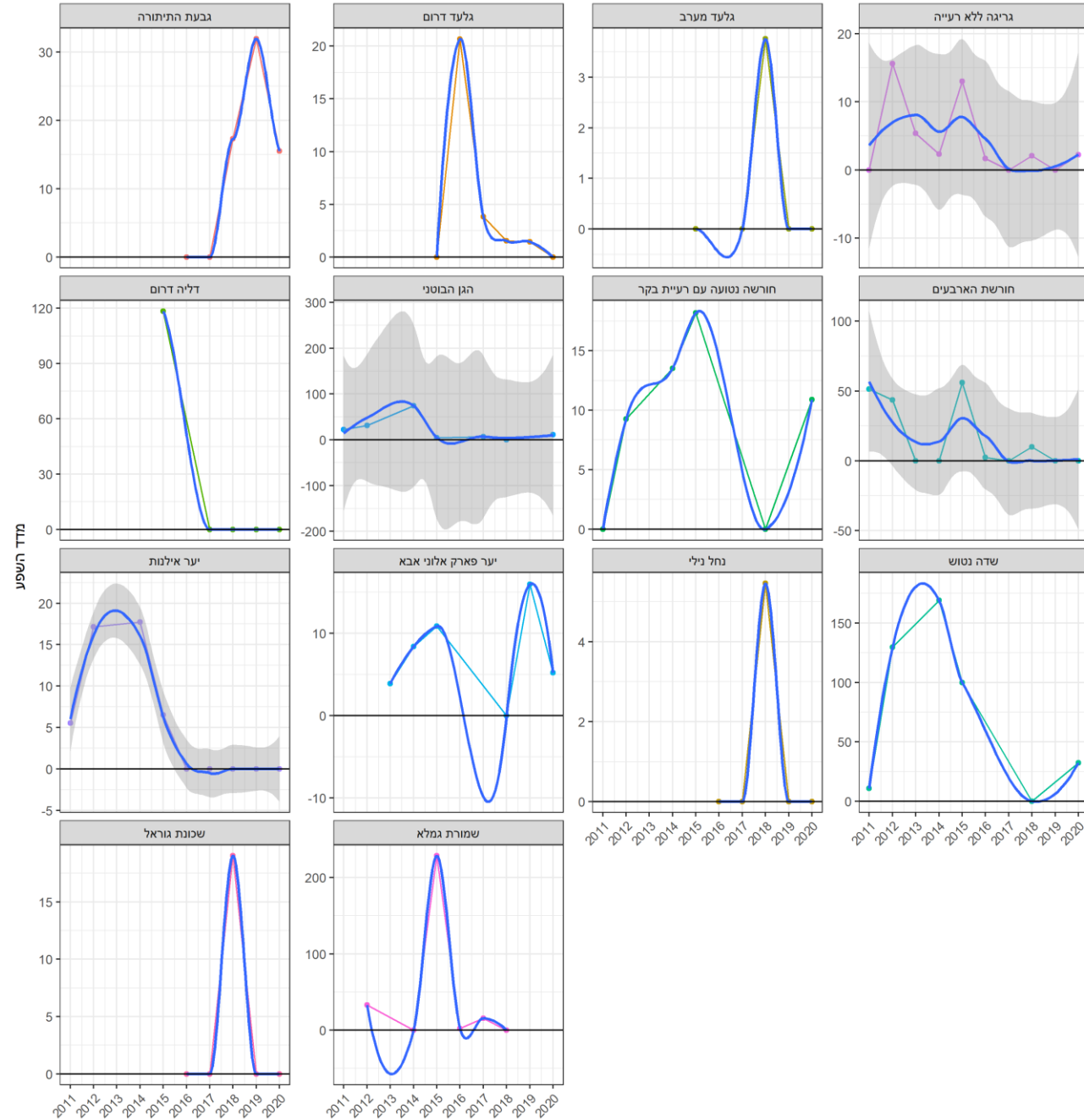


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ירק-כנף מפספס
Euchloe belemia

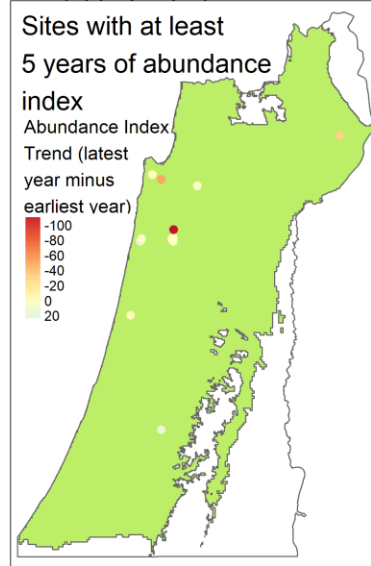
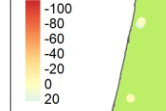
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Euchloe belemia

ירק-כנף מפספס

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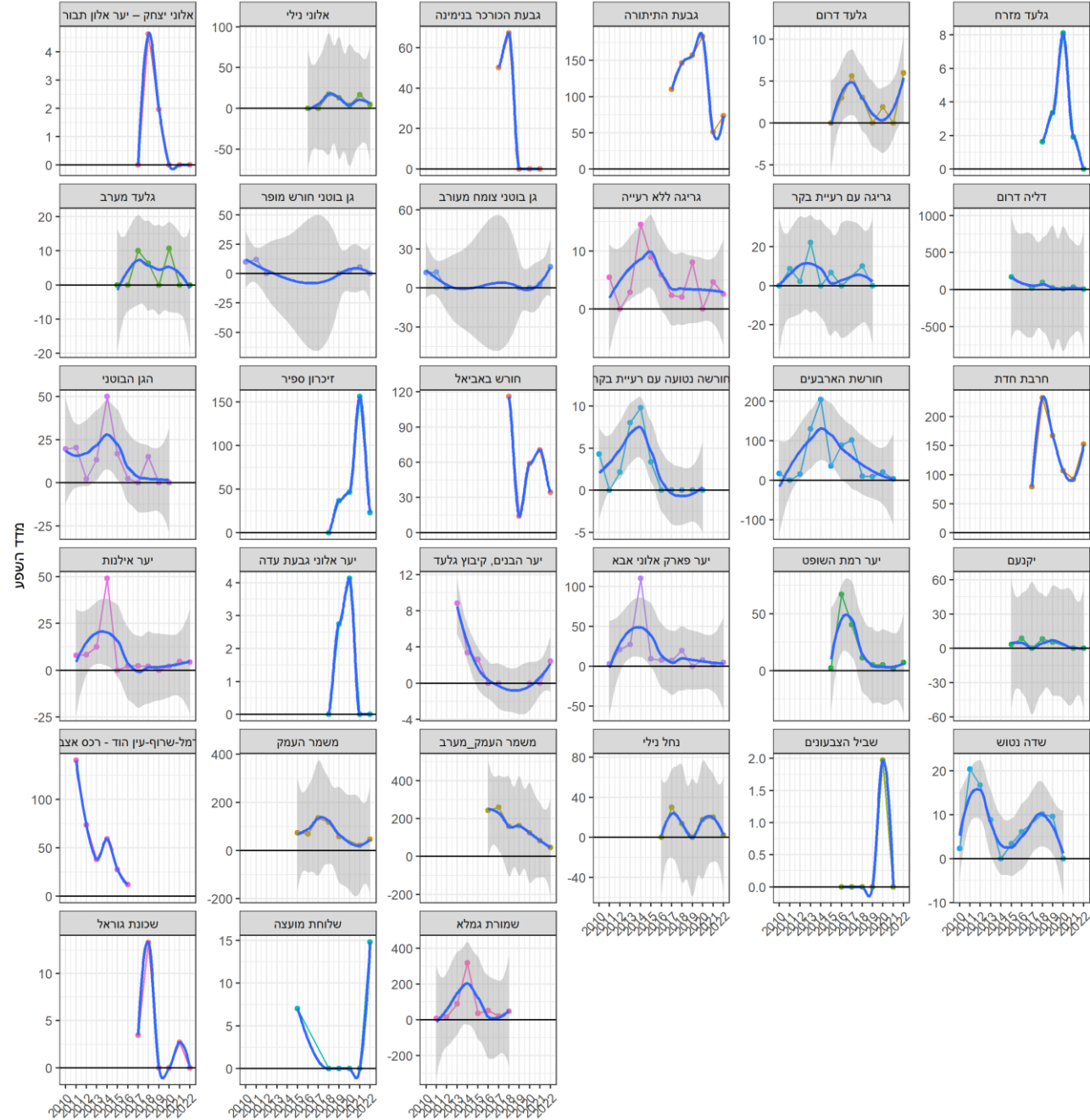
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לבנין הרקפה

Pontia daplidice

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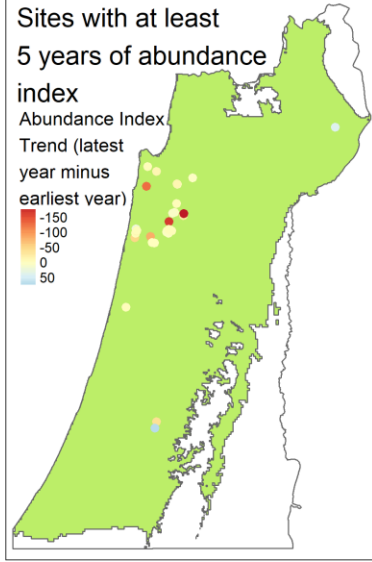
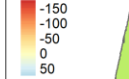


Pontia daplidice

לבנין הרקפה

Sites with at least
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Summary

Overall decline in number of butterflies

Preliminary: 17 increasing species

Preliminary: 9 decreasing species

Lycaena thersamon
נחשתן החומעה



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Discussion

Challenges:

Fluctuations

Short time series (since 2010)

Few veteran transects

Inter-transect variation

Overview allows trend detection

Drivers?

Keep monitoring!

Melitaea arduinna
כתמית הזרזר



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References

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