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Israel National
Ecosystem Assessment
Program

Impact of Agriculture on Desert Arthropod Biodiversity

Orr Comay^{1,2}, Adi Ramot¹, Gilad Ben Zvi¹ and Ittai
Renan^{1,2}

1 – The Entomological Laboratory for Applied
Ecology

2 – HaMaarag

The Steinhardt Museum of Natural History, Tel Aviv
University





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Introduction

Desert

Water & Nutrient scarcity
Resource Unpredictability
Temperature Extremes
Radiation

Agriculture

Irrigation
Fertilizers
Shelter
Shade
Pesticides

Impact on biodiversity?

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Introduction

Arthropods

Abundant

Species rich

Adaptive

Respond quickly

Easy to analyze



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Methods

Study design

Sites:

Be'er Milka

Shunra Dunes

Agriculture

Near Agriculture:

Semi-stable dunes

Shifting dunes

Far from Agriculture:

Semi-stable dunes

Shifting dunes

Far from Agriculture:

Semi-stable dunes

Shifting dunes

Pitfalls

Survey years: 2017, 2019, 2021



Methods

Analysis

Biodiversity indices:

Species Richness
Total Abundance



Generalized Linear Mixed Models

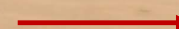
Community Composition:

Model-based Ordination



ecoCopula

Species-specific Abundance



Generalized Linear Latent
Variable Models

Akaike Information Criterion

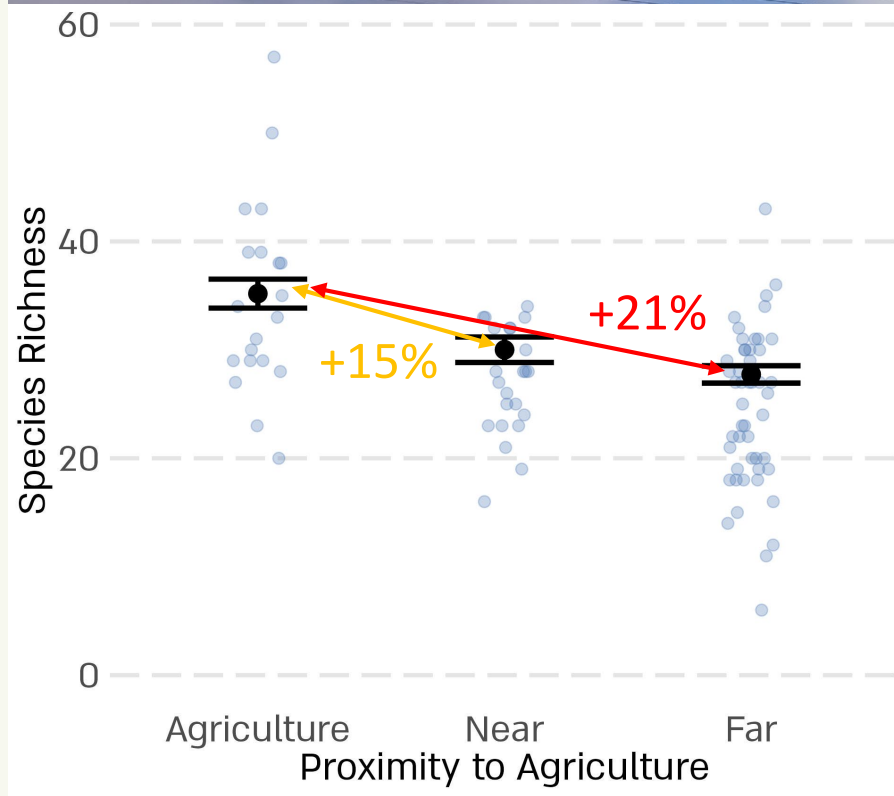


Results

Biodiversity indices

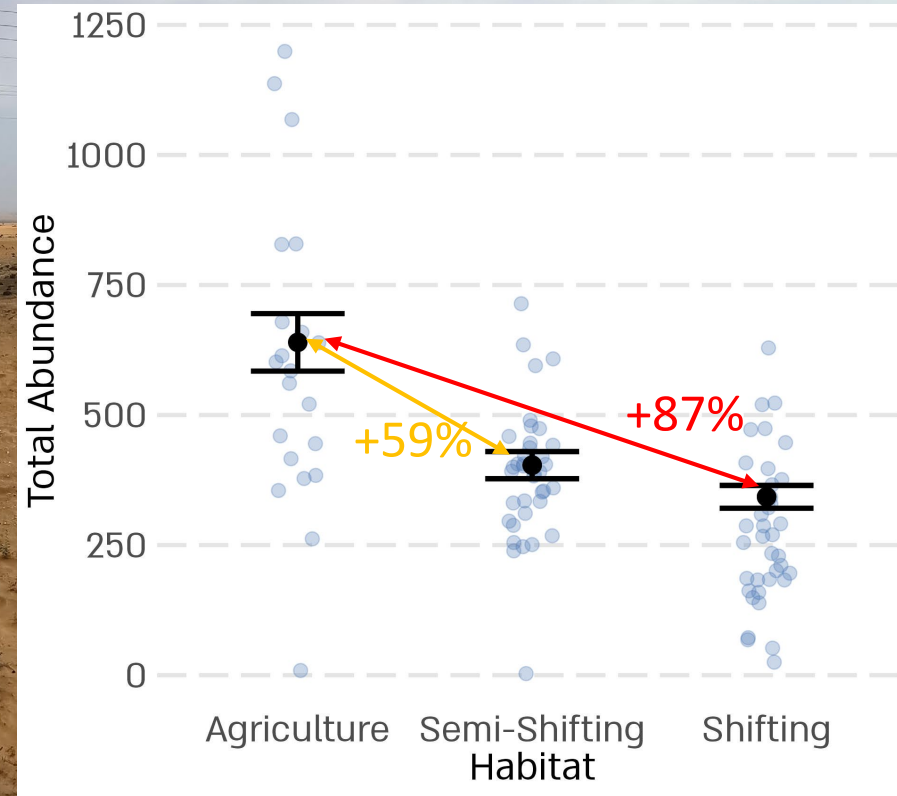
Species Richness

Agriculture > Dunes



Total Abundance

Agriculture > Dunes



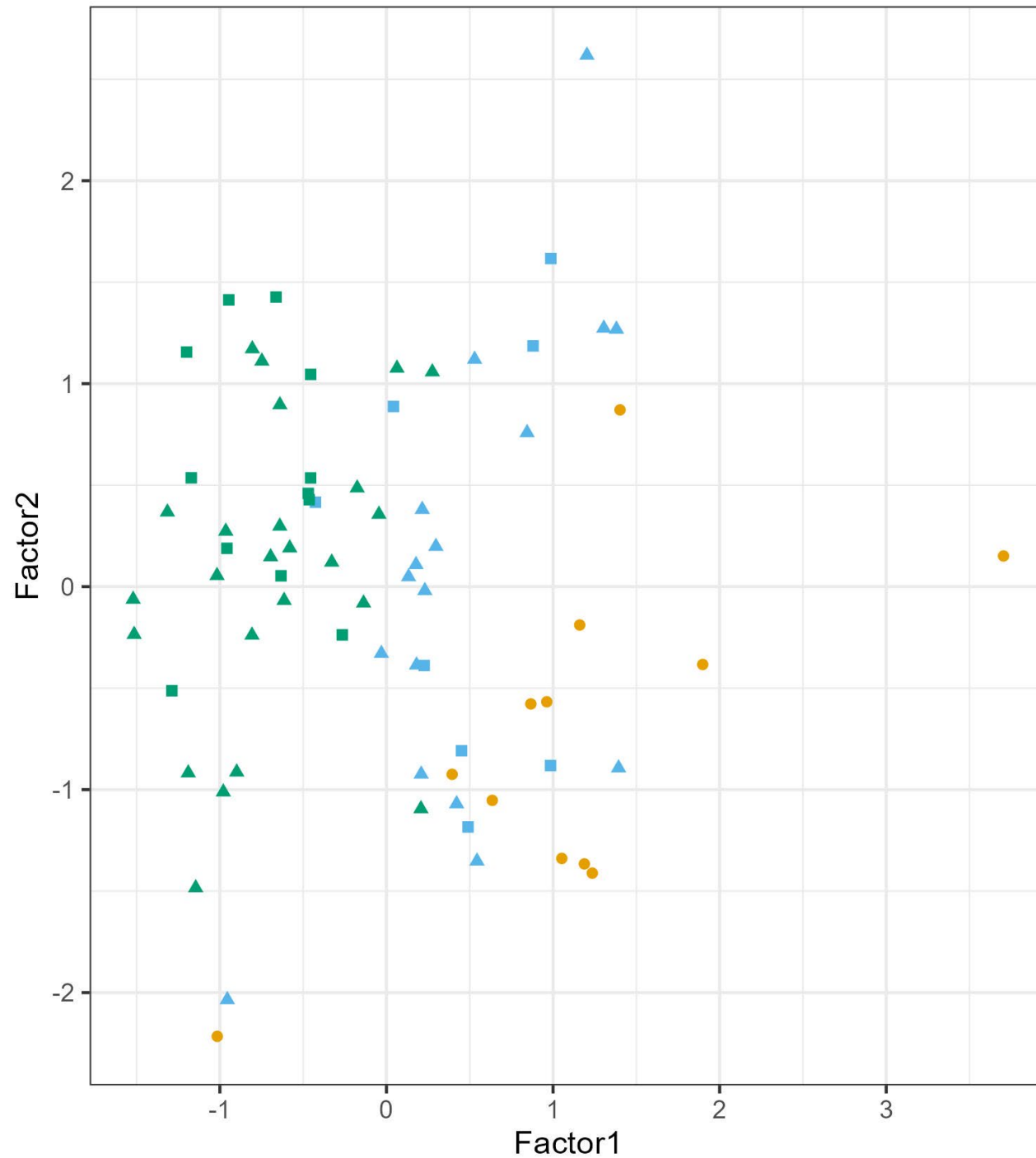


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Results

Community Composition

Agriculture \neq Dunes



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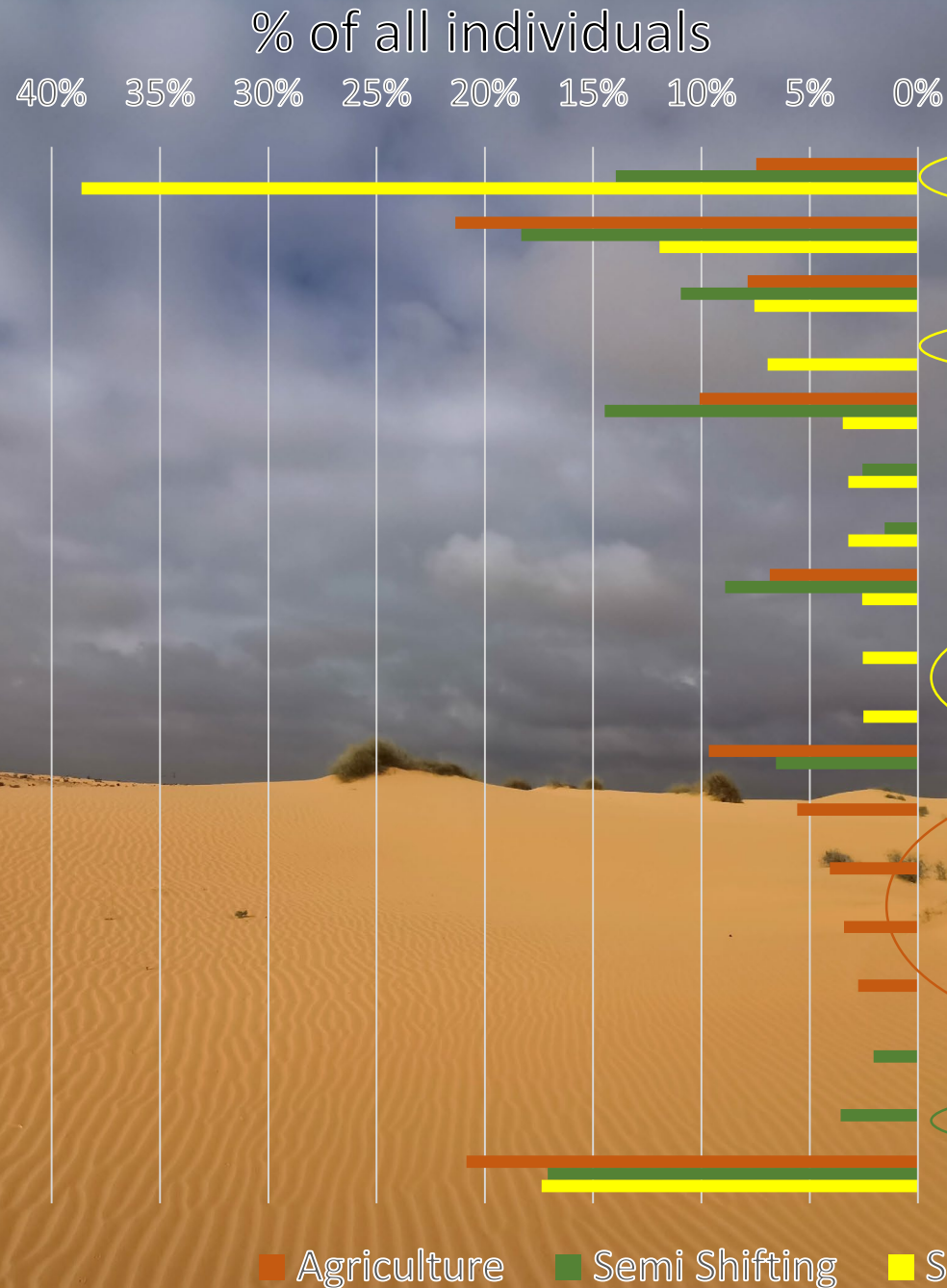
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Results

Community Composition

Agriculture > Dunes
In Mediterranean
species

Agriculture < Dunes
In desert species



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Discussion

Summary

Agriculture > Dunes (species richness, total abundance)

Agriculture ≠ Dunes (community composition)

Possible mechanisms

Agricultural resources

Trends

Agricultural expansion



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Questions?

