EU PoMS

Developing an EU Pollinator Monitoring Scheme

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The challenge (2018)

- Substantial evidence of major shifts in pollinators, but big picture remains unclear (across taxa, habitats & MS)
- Occurrence and diversity data is relatively good, but species abundance data is lacking (except butterflies?)
- Many initiatives, local and national, underway (>50)
- Need to design a network, standardised methods and indicators, recorders and taxonomic resources to provide high quality species abundance data for the EU

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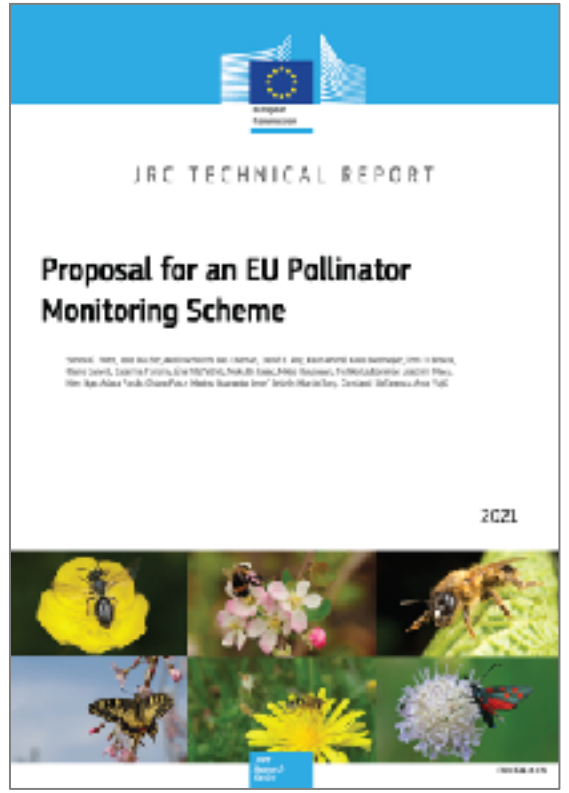
STING 1: Develop options for EU PoMS (2019)

- **STING 1**: Science & Technology for Pollinating Insects
- Funded by DG ENV
- 20 experts from 10 countries plus JRC, EEA, & IUCN
- 2019 – 2021
- Co-development with MS representatives (met in March and June 2020)



Potts et al. (2021) Proposal for an EU Pollinator Monitoring Scheme. doi:10.2760/881843

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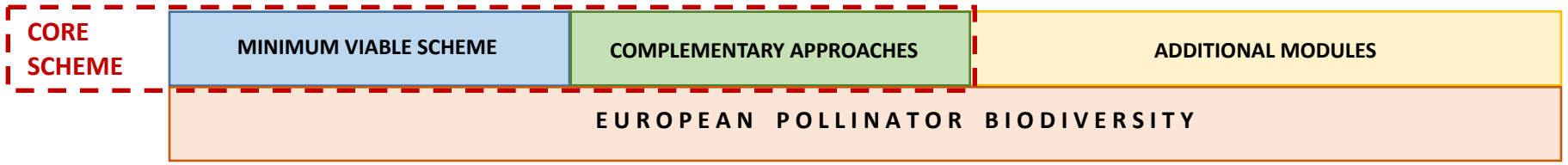
EU PoMS modular design

Core scheme: those taxa which are essential to monitor

Minimum Viable Scheme: Feasible to implement in the short term

Complementary Approaches: Feasible but need some development

Additional Modules: Options requiring substantial development



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Minimum Viable Scheme

Taxa: Bumble Bees, Butterflies, other Bees*, & Hoverflies*

Methods: Standardised Transects

Recorders: Volunteers & Professionals

Measures: Species Abundance, Diversity & Occupancy

CORE SCHEME

MINIMUM VIABLE SCHEME | COMPLEMENTARY APPROACHES | ADDITIONAL MODULES

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Minimum Viable Scheme

Taxa:	Bumble Bees, Butterflies, other Bees*, & Hoverflies*	**Wild Bees & Hoverflies?**
Methods:	Standardised Transects	**Standardised Pan traps**
Recorders:	Volunteers & Professionals	**Professional**
Measures:	Species Abundance, Diversity & Occupancy	**Diversity & Occupancy**

CORE SCHEME

MINIMUM VIABLE SCHEME | **COMPLEMENTARY APPROACHES** | **ADDITIONAL MODULES**

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Complementary Approaches

Taxa:	Bumble Bees, Butterflies, other Bees*, & Hoverflies*	Wild Bees & Hoverflies?	Rare & Threatened Species
Methods:	Standardised Transects	Standardised Pan traps	Species-Specific Methods
Recorders:	Volunteers & Professionals	Professional	Professionals
Measures:	Species Abundance, Diversity & Occupancy	Diversity & Occupancy	Abundance & Occupancy

CORE SCHEME

MINIMUM VIABLE SCHEME | COMPLEMENTARY APPROACHES | ADDITIONAL MODULES

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Moths coming soon

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Complementary Approaches

Taxa:	Bumble Bees, Butterflies, other Bees*, & Hoverflies*	Wild Bees & Hoverflies?	Rare & Threatened Species	**Moths**
Methods:	Standardised Transects	Standardised Pan traps	Species-Specific Methods	**Light Traps**
Recorders:	Volunteers & Professionals	Professional	Professionals	**Volunteers**
Measures:	Species Abundance, Diversity & Occupancy	Diversity & Occupancy	Abundance & Occupancy	**Species Abundance, Diversity & Occupancy**

CORE SCHEME

MINIMUM VIABLE SCHEME | **COMPLEMENTARY APPROACHES** | **ADDITIONAL MODULES**

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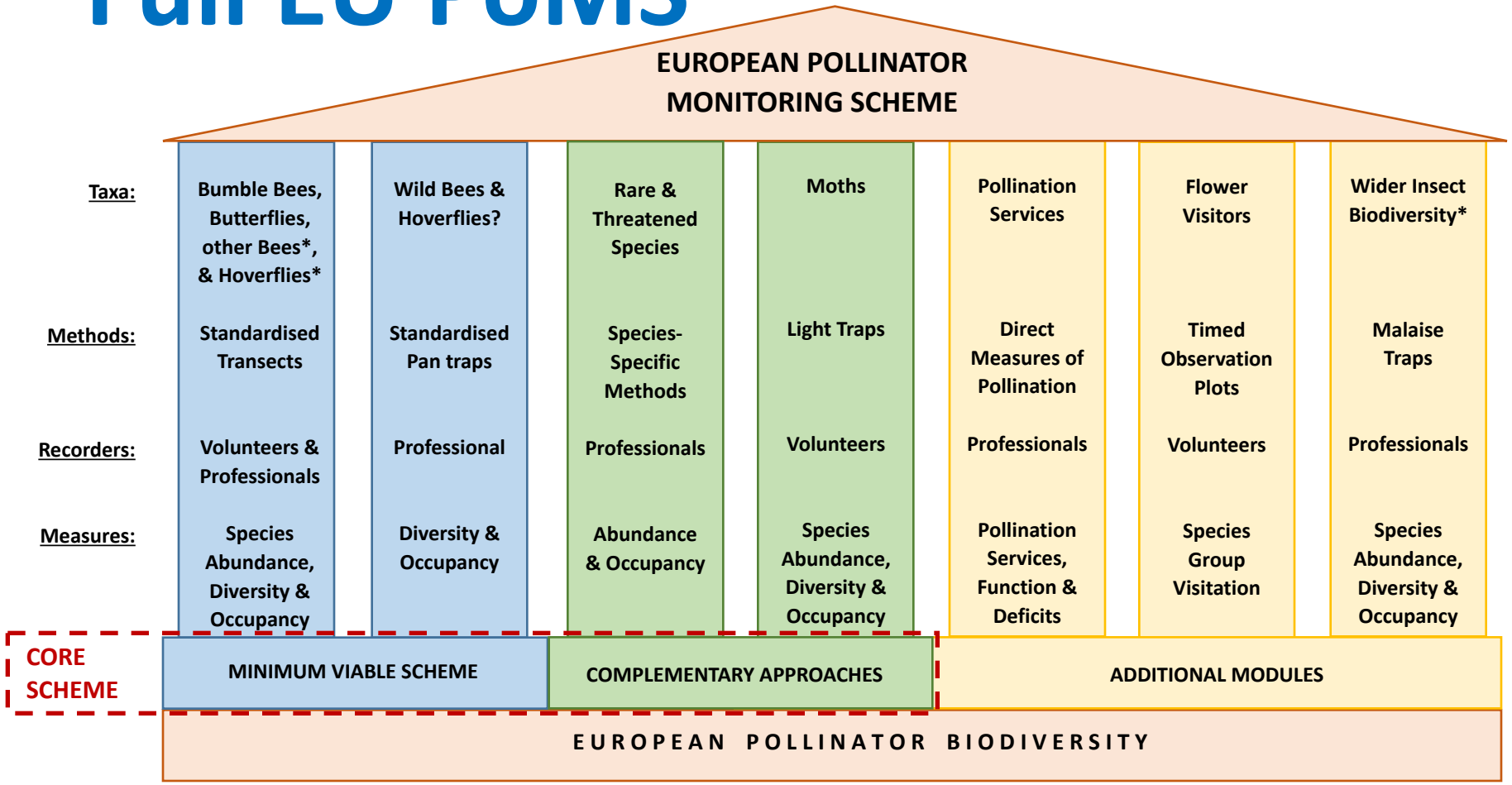
Full EU PoMS



Recommendations (2021):

- Methods refinement
- Indicator testing
- Citizen scientist capacity building
- Taxonomic capacity building
- Resourcing
- Piloting end to end

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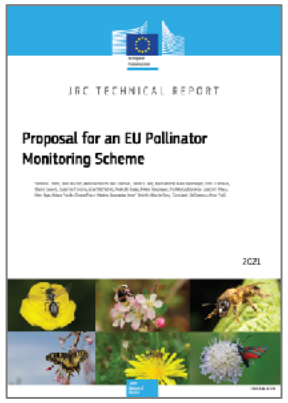
EU PoMS expected timeline

Design (2019-2021) → Pilot, Build Capacity & Refine (2021-2025) → Roll out (2026…)



EU PoMS:
Expert report

Recommendations

ORBIT

SPRING

Butterfly CONSERVATION EUROPE

TaxoFly

EU PoMS:

- **High quality species and abundance data**
- **Standardised Methods**
- **Taxonomic resources**
- **Pollinator Indicator**
- **CAP indicator**

1 2 3

STING: Science and Technology for pollinatING insects

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STING 2: Refining EU PoMS

Implementing the recommendations:

- 26 experts from 10 countries (2022 – 2024)
- Academics, NGO and government sectors
- European-leading expertise
- Coordinated by JRC and DG ENV and supported by EEA and IUCN
- Will engage intensively with wider EU community (EC, MS, EEA, PAs, Horizon projects, eBMS, NGOs etc.)

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Task 1: Implementing & fine-tuning EU-PoMS

Update power analysis

Challenge

- Representative sampling locations
- Sufficient sample size
- Sufficient detections of target species
- Representative sample of species (or all species)
- A temporal sampling scheme designed to aid valid inference

Power is a function of:

- **Sample size**
- **Effect sizes**
- **Variability observed**

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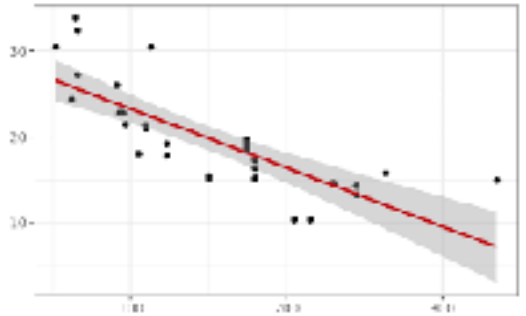
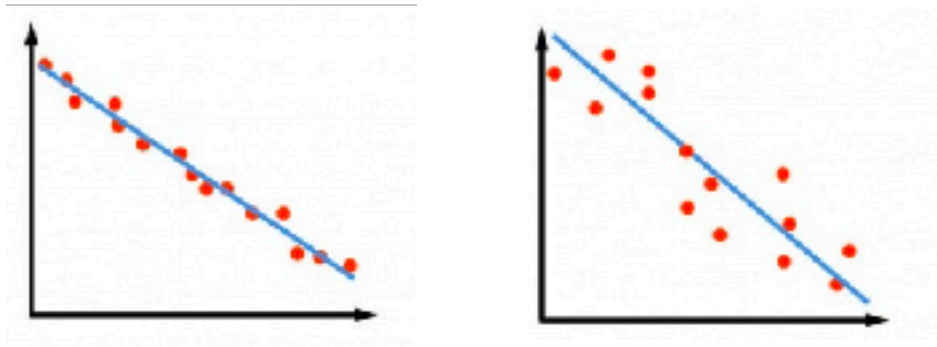
- **Sample size**

- **Effect sizes**



- **Variability observed**



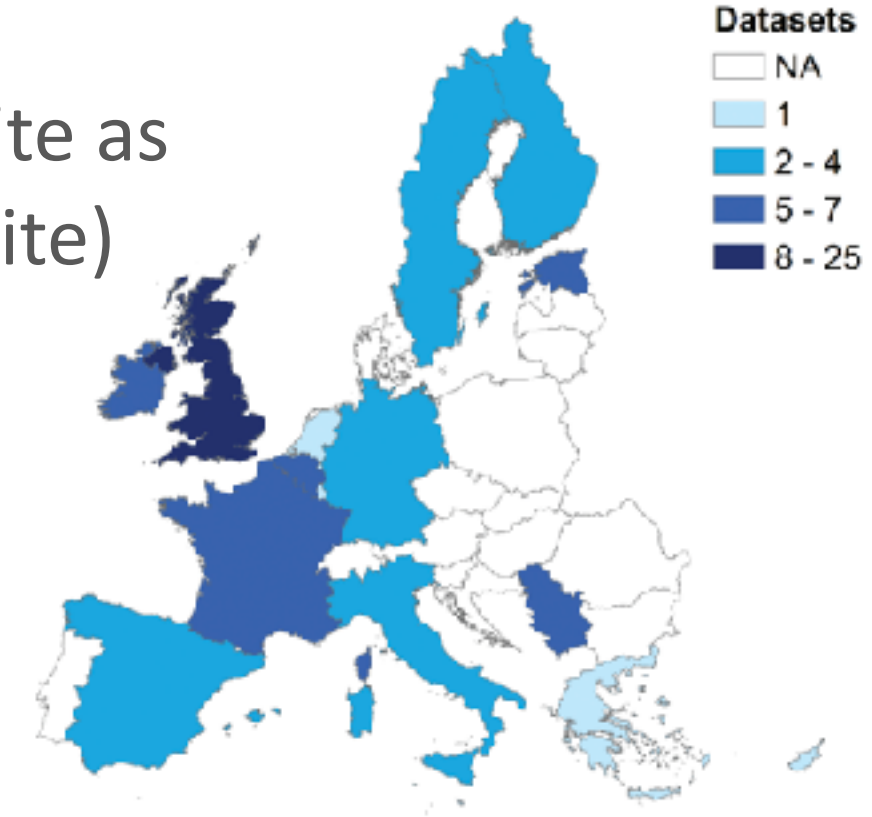
16 of 77 candidate datasets explored

Simulation based Power analysis

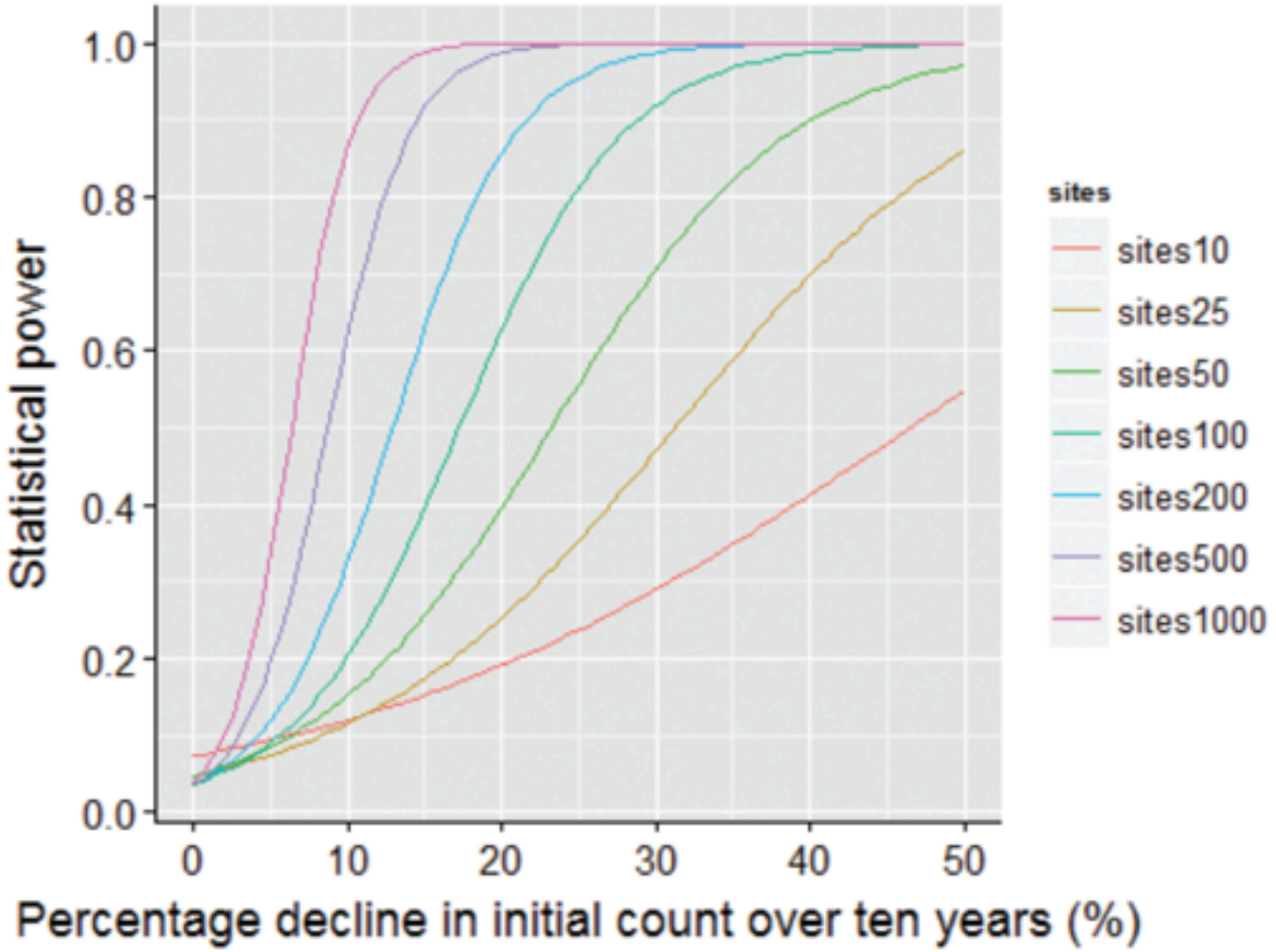
Models with a Poison response and site as random factor (Effect ~ a + b*Year | Site)

SD of both random and fixed effects extracted from real data.

Figure 5.2. Number of candidate datasets by country.



Power to detect a given decline over 10 years as a function of the number of sites

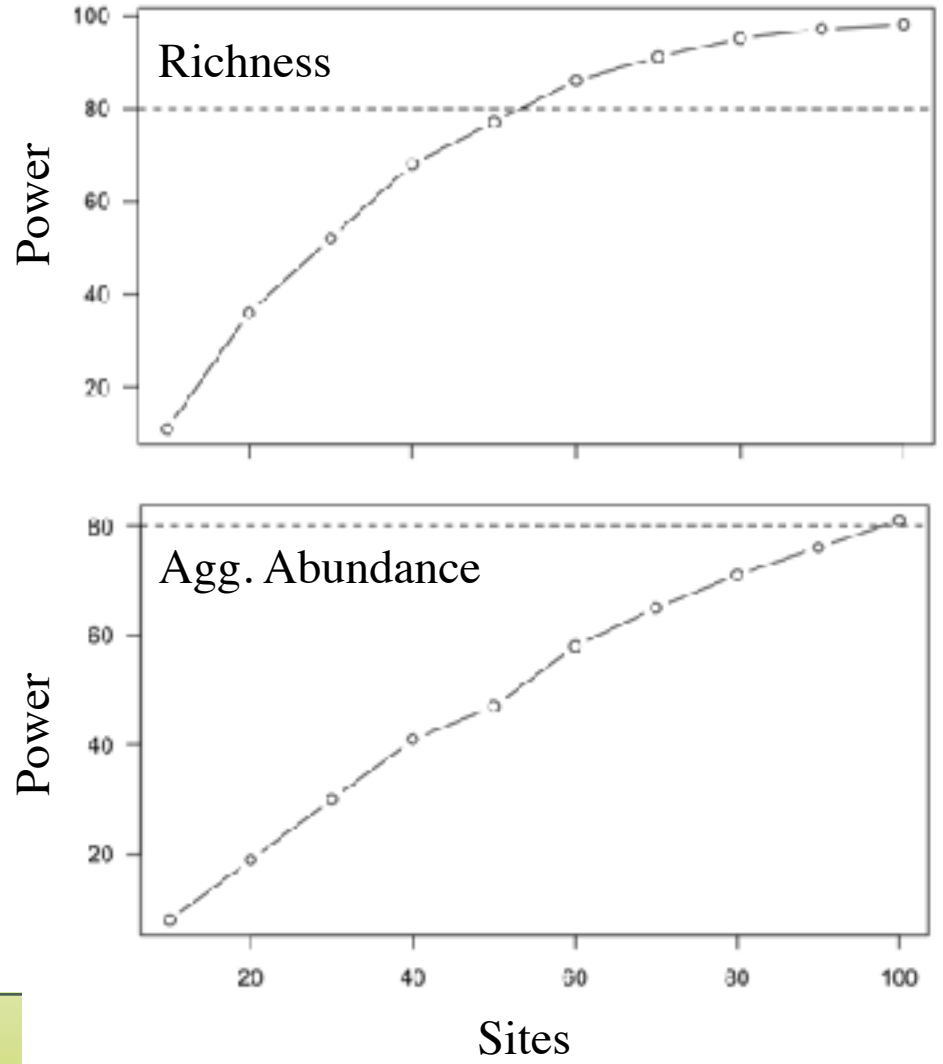


Needed refinements

- Account for Bioclimatic regions within MS
- Account for habitat type (Natural vs. Agricultural)
- More complex models (leverage info for species, genus, guilds,…)
- New data (including SPRING pilot and ongoing long-term monitoring)

BEEFUN data set contains transect data collected from 2015 to 2020 along 12 sites. All transects were ran every 15 days during the flowering season in 100 x 2 m linear transects walked for 30 minuts. From this data we extracted bee richness and abundance per site and year.

Power to detect a **10% decline over 6 years** as a function of the number of sites




WORK IN PROGRESS

Thank you

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