Host-plant selection in a grassland butterfly: a trade-off between prominence, host-plant quantity and microclimate

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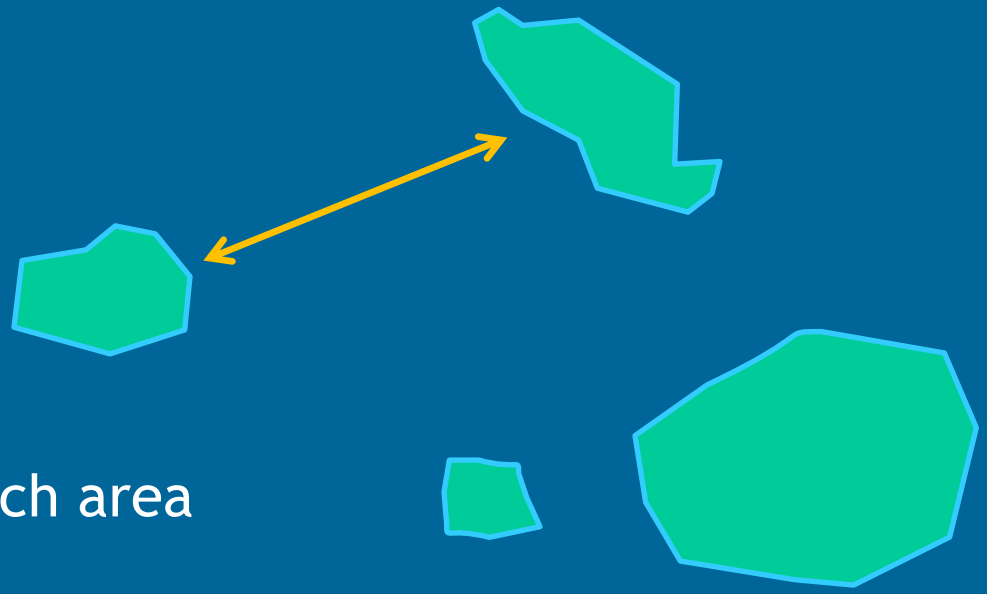
Motivation

Isolation



Patch area

Habitat quality

Habitat quality in butterflies

- Requirements of the immature stages

Structure + microclimate

Host plant size

Host plant quality

Phenology

etc.

Study species: *Pyrgus malvae*

Kudrna *et al.*, 2011, Distribution Atlas of Butterflies in Europe

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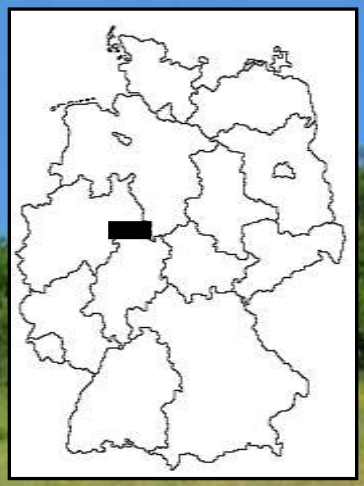
Host plants

Potentilla tabernaemontani

Agrimonia eupatoria

Study area and sampling design

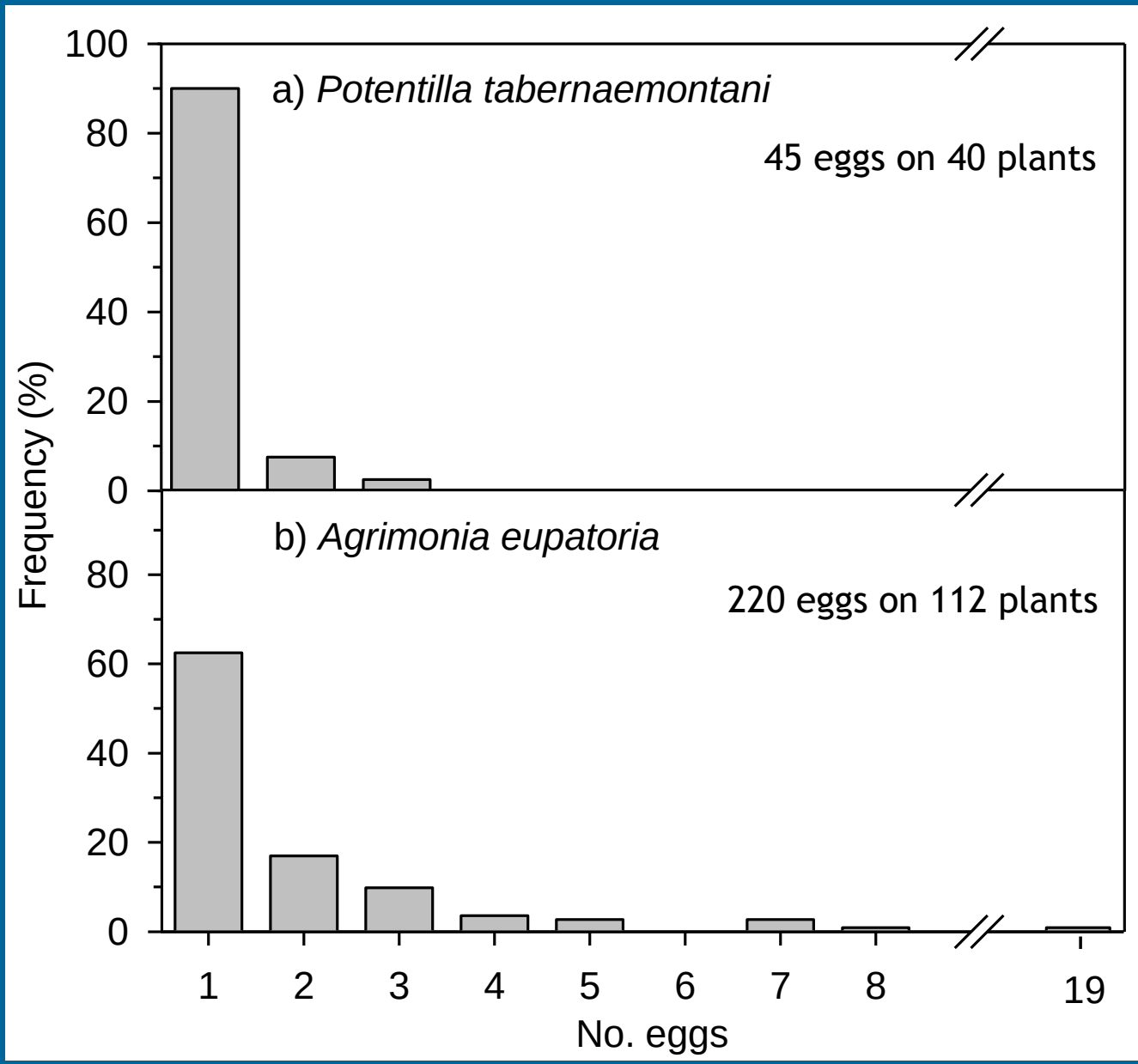


Potentilla
40 vs. 32

Agrimonia
112 vs. 33

Eggs per plant

265 eggs in total



Vegetation structure

	occupied	
	Potentilla	*Agrimonia*
Field layer (%)	-**	-**
Shrub layer (%)	-*	n.s.
Litter layer (%)	-**	n.s.
Bare soil (%)	n.s.	+***
Stony surface (%)	+***	n.s.
Turf height (cm)	-*	-***

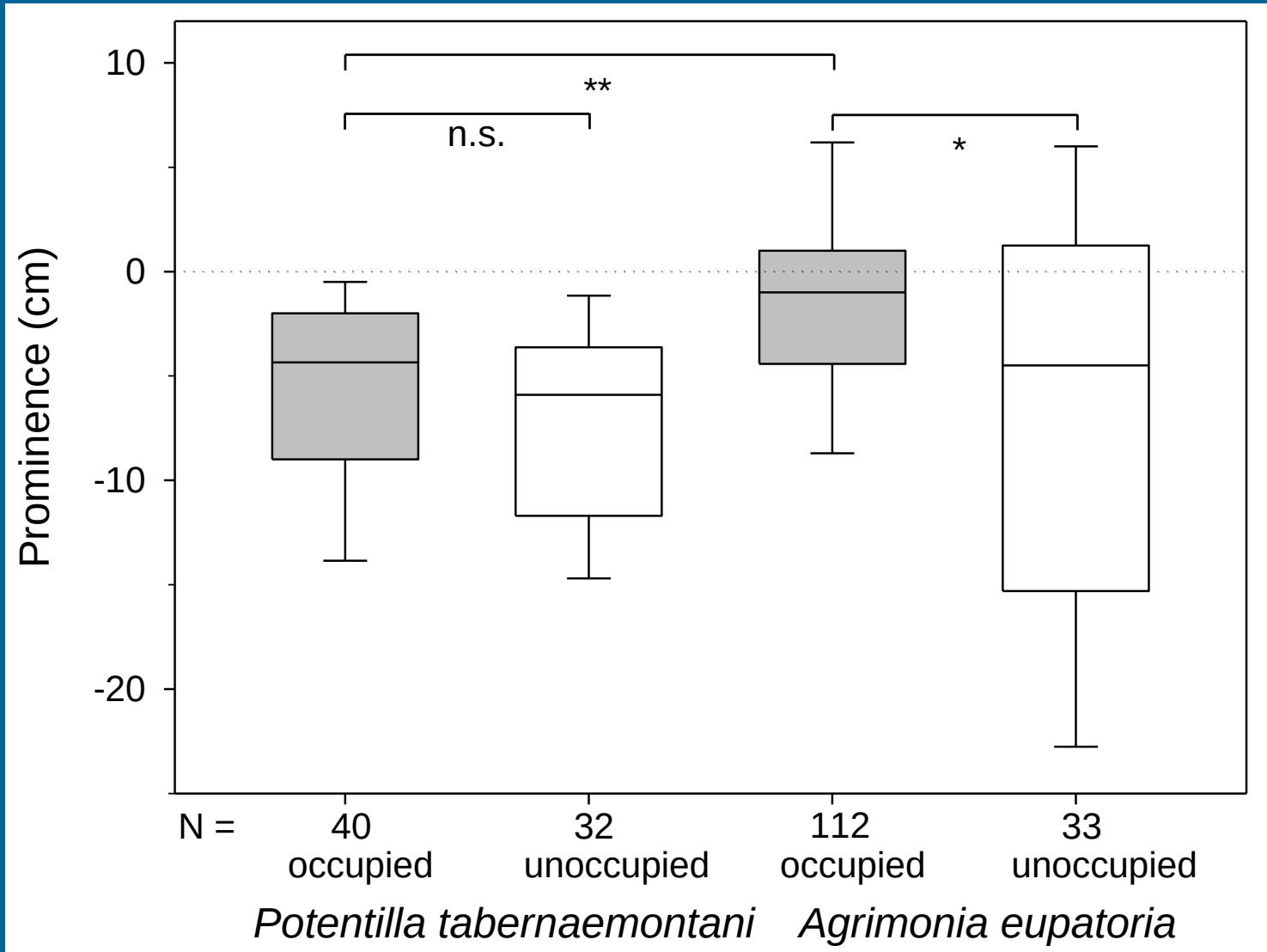
Vegetation structure

	occupied *Potentilla*	occupied *Agrimonia*	
Field layer (%)	55	71	***
Shrub layer (%)	4	1	**
Litter layer (%)	12	20	***
Bare soil (%)	13	11	*
Stony surface (%)	19	1	*
Turf height (cm)	9	14	*

Host-plant characteristics

	occupied		
	Potentilla	*Agrimonia*	
Host-plant height (cm)	4	13	***
Host-plant diameter (cm)	6	15	***

Prominence


10
0
-10
-20
Prominence (cm)
**
n.s.
*
N =
40
occupied
32
unoccupied
112
occupied
33
unoccupied
Potentilla tabernaemontani
Agrimonia eupatoria

GLMM: *Potentilla tabernaemontani*

Response variable: Host-plant occupancy (1 vs. 0)

Random effect:

- Patch (n = 7)

Predictor variable:

- Horizontal vegetation density -***

Excluded: Heat load, sunshine duration, host-plant characteristics etc.

GLMM: *Agrimonia eupatoria*

Response variable: Host-plant occupancy (1 vs. 0)

Random effect:

- Patch (n = 7)

Predictor variable:

- Field layer -*
- Sunshine duration +*
- Prominence +**
- Cover of bare ground +***

Excluded: Heat load, vegetation structure, host-plant characteristics etc.

Conclusion

- Trade-off
  - low risk of extinction

+ prominence
- lower biomass > low egg load
+ warm microclimate
- risk of desiccation

+ prominence
+ more biomass > high egg load
- cooler microclimate
+ no risk of desiccation

Thank you for your attention!

Krämer *et al.*, in press,
Journal of Insect Conservation