Seedling survival in small-scale disturbances in pasture

Tereza Vacková, Marie Konečná, Jan Lepš
Department of Botany, Faculty of Science, University of South Bohemia, České Budějovice (CZ)
@PlantEcolCB
e-mail: vackot02@prf.jcu.cz

Introduction

- seedling germination and survival is critical stage of a plant life (White and Pickett 1985)
- small-scale disturbances increase site heterogeneity and provide survival opportunity for seedlings (Seifan et. al 2010)
- vegetation, mosses, and litter could occupy free space important for seedlings (špačková et. al 1998)

Questions

1. **Are there more seedlings in disturbances than in the vegetation? Does it depend on the type of disturbance?**
2. **How does the number of seedlings change with time since disturbance and vegetation colonisation?**

Methods

Where?

- mesophilic mown pasture
- vegetation type – *Violion caninae*


[3]


[1]

When?

- 19 measurements across 3 years

How?

- 2 resident species
- 5 different types of plots
- 10 replicates of each
- cover estimate of litter, vegetation, mosses, stones

mixture of 100 seeds of each species in all plots

Achillea millefolium


[3]

Trifolium pratense


[2]

natural occuring disturbances

intact vegetation

artificial gap

wild boar disturbance

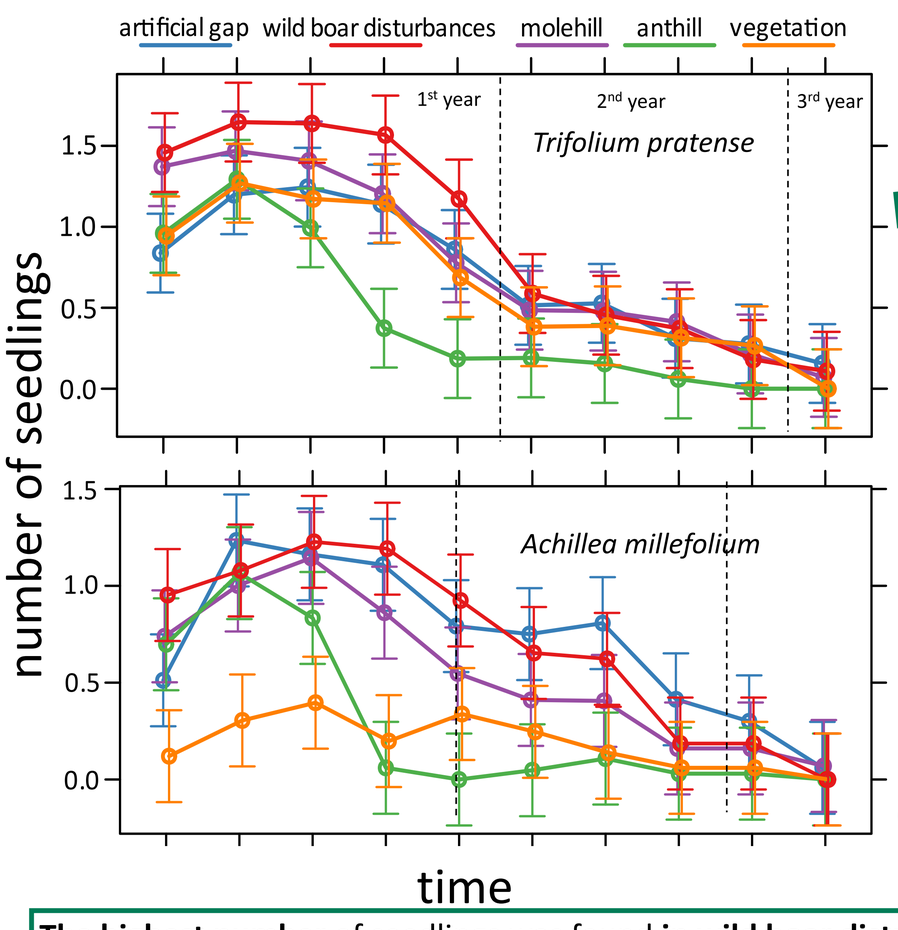
molehill

anthill

Results

1. Is the temporal dynamic of seedling number affected by the type of disturbance?

Significant difference between **disturbance types** in number of seedlings **in first year** ($F_{4,45}$=5.34, p=0.001) for ***Trifolium pratense*** but **not** in second year and for first and second year ($F_{4,45}$=10.69, p<0.001; $F_{4,45}$=4.12, p=0.006) for ***Achillea millefolium.***

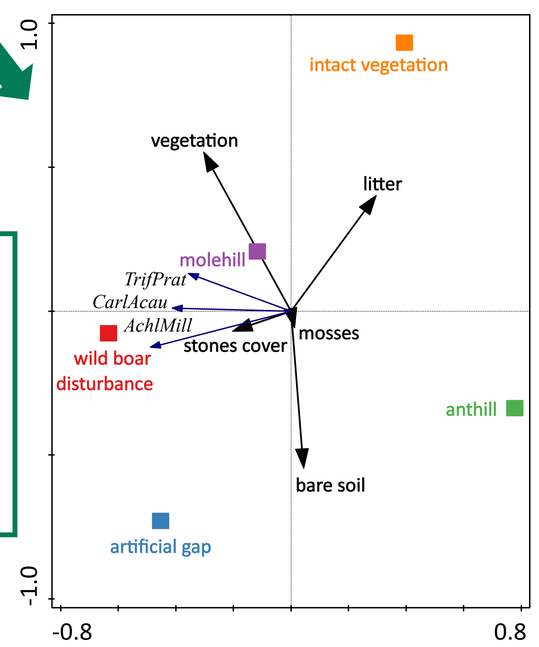


The highest number of seedlings was **in wild boar disturbances** and **the lowest in anthills.** Number of seedlings in intact vegetation was intermediate.

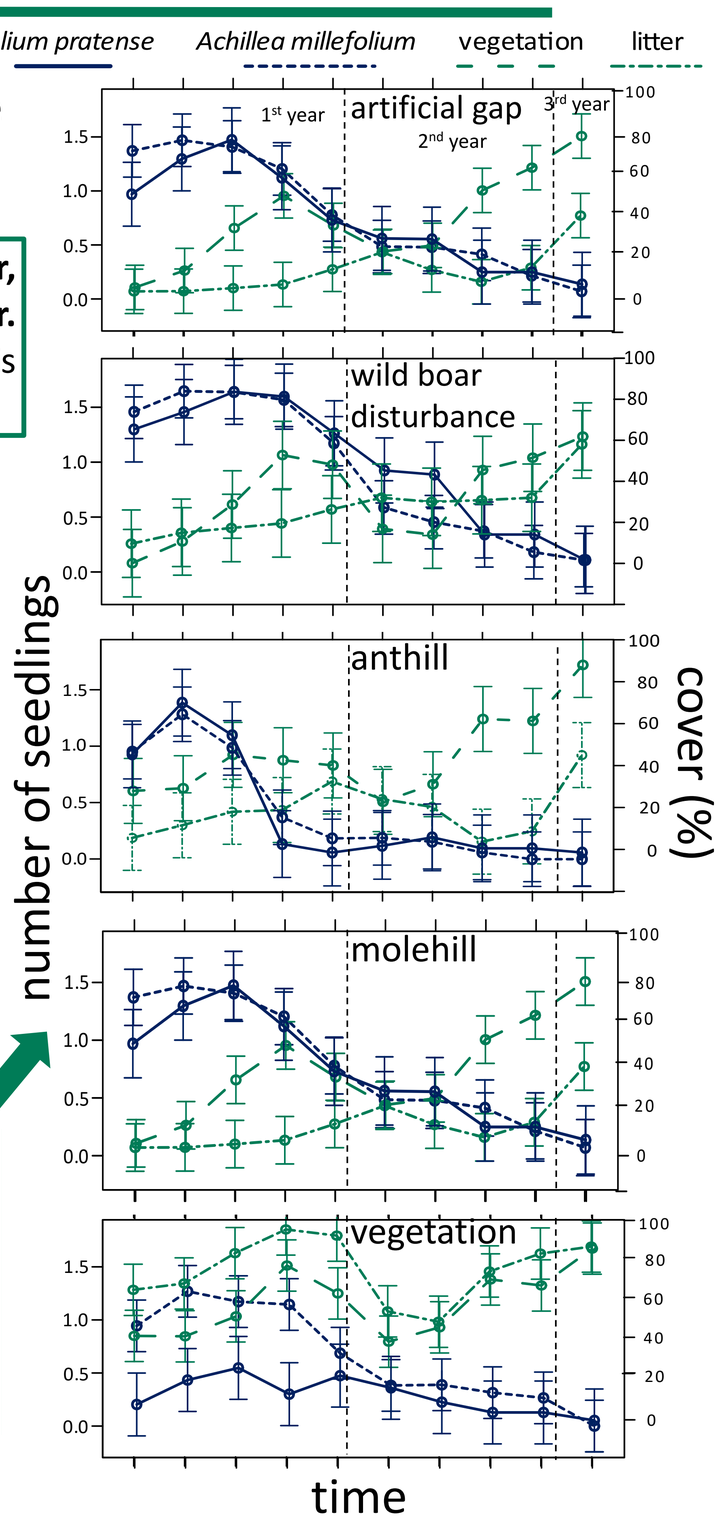
The highest number of seedlings was found **in wild boar disturbances** and also **in artificial gaps** while the lowest number of seedlings in anthills. Number of seedlings **in intact vegetation** was much lower and the trend more **stable** than for *Trifolium pratense.*

2. How does the number of seedlings change with time since disturbance and vegetation colonisation?

RDA ordination **diagram of litter, mosses, vegetation and stones cover.** Adjusted explained variation is 28.54%. Pseudo-F= 38.00, p<0.01



There is a visible pattern that **with increasing vegetation cover** the number of **seedlings is decreasing for both species**. Also, vegetation cover is increasing through years. Within growing season, **the peak** of number **of seedlings** is **earlier than the peak of vegetation** cover.



Discussion

- disturbances are **dynamic** and serve as **temporal microsite** for seedlings establishment
- different microsites favour different species establishment and contribute to species diversity

Take home message

Small-scale disturbances are the crucial site for seedling survival; however, the refuge for seedlings is temporal.

References

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[3] https://upload.wikimedia.org/wikipedia/commons/e/ec/Achillea_millefolium_seeds.jpg

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