Forest site protection and reforestation of calamity areas by means of pioneer vegetation

from the Alps to the Franconian Forest

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Photo: R. Laniewski

Problems with calamity areas

Steep terrains

Limestone Alps

Photo: R. Laniewski

Franconian Forest

Photo: A. Meinhold

Problems with calamity areas

shortly after an event, high temperatures on and in black humus

Photos: A. Göttlein

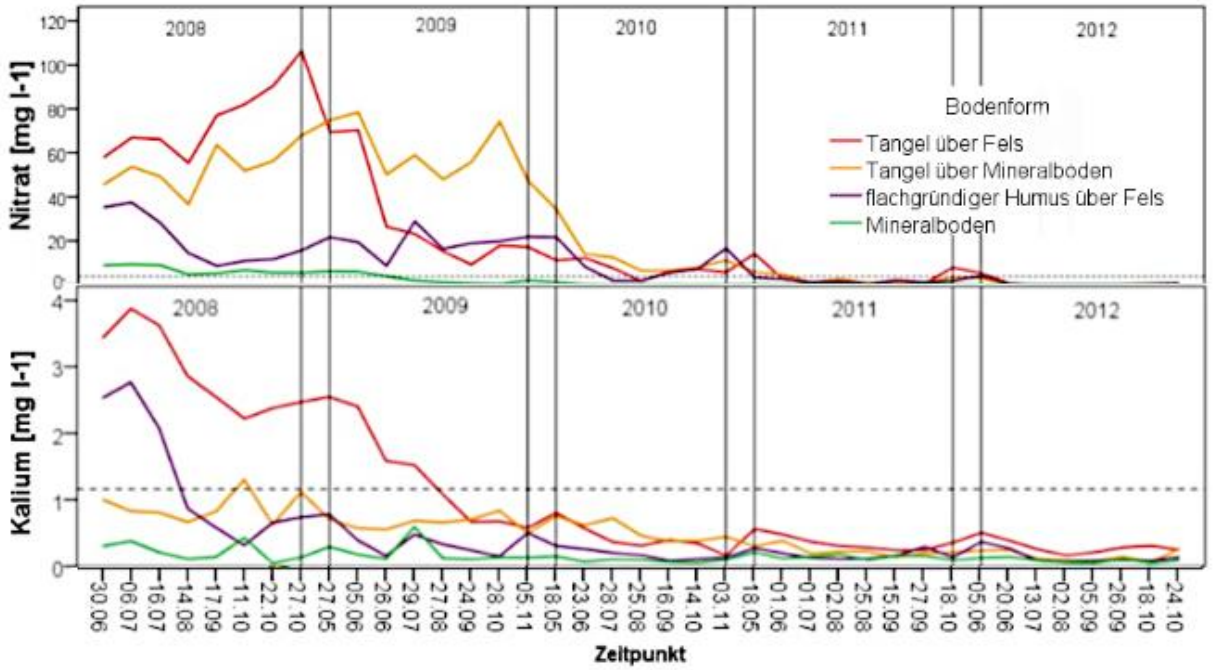
Problems with calamity areas

Shortly after an event, humus loss and high nutrient loss because of seepage water

Humus loss

Photos: A. Göttlein

Nutrient loss



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Forstliche Forschungsberichte München Nr. 107 / 2014
Abschlussbericht zum Forschungsprojekt INTERREG BY/Ö J00183
Standortsicherung im Kalkalpin - SicAlp

Problems with calamity areas

Tendency of grass overgrowth that is hostile to regeneration

Limestone Alps

Photo: A. Göttlein

Franconian Forest

Photo: A. Göttlein

➡ extreme site conditions make natural and artificial regeneration very difficult

Goals on extreme sites

- Maintaining or restoring the forest climate on calamity areas as quickly as possible
- Minimization of nutrient losses through humus decomposition and seepage discharge

Our approach:

- Create pre-forest characteristics as quickly as possible

➡ Spreading pioneer vegetation that does not prohibit growth of other plants (herbs, shrubs, trees)

Solutions for forest site protection

Pioneer vegetation as an intercrop

Photo: R. Laniewski

Pioneer shrubs like *Sambucus racemosa*

Photo: A. Göttlein

Creation of pre-forest structures by means of *Betula pendula*

Solutions for forest site protection

Pioneer vegetation as an intercrop

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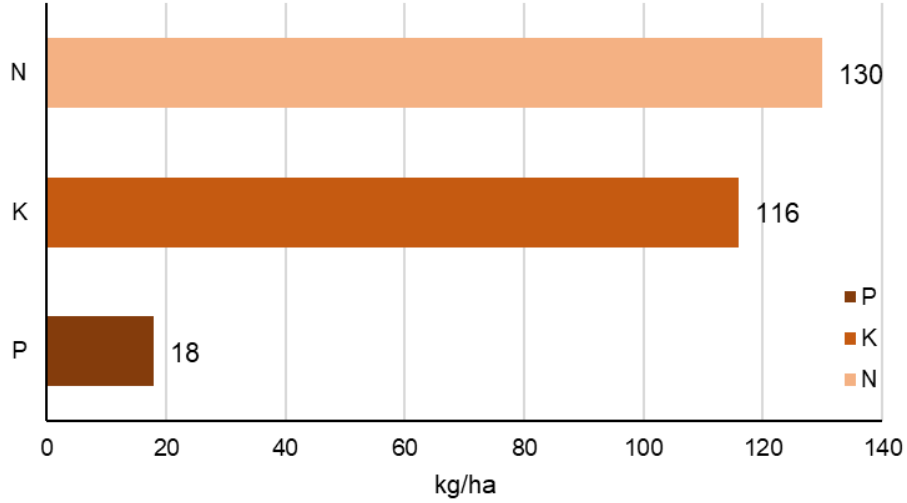
Fireweed (*Epilobium angustifolium*)

- occurs on every site, from acidic to calcareous

- can produce a lot of biomass on damaged areas, but does not prohibit growth of other plants

- prevents extensive grass growth and acts as shade for regeneration in summer

- stores nutrients for the next forest generation



Nutrient protection of Fireweed (*Epilobium angustifolium*)

First seed testing

Photo: R. Laniewski

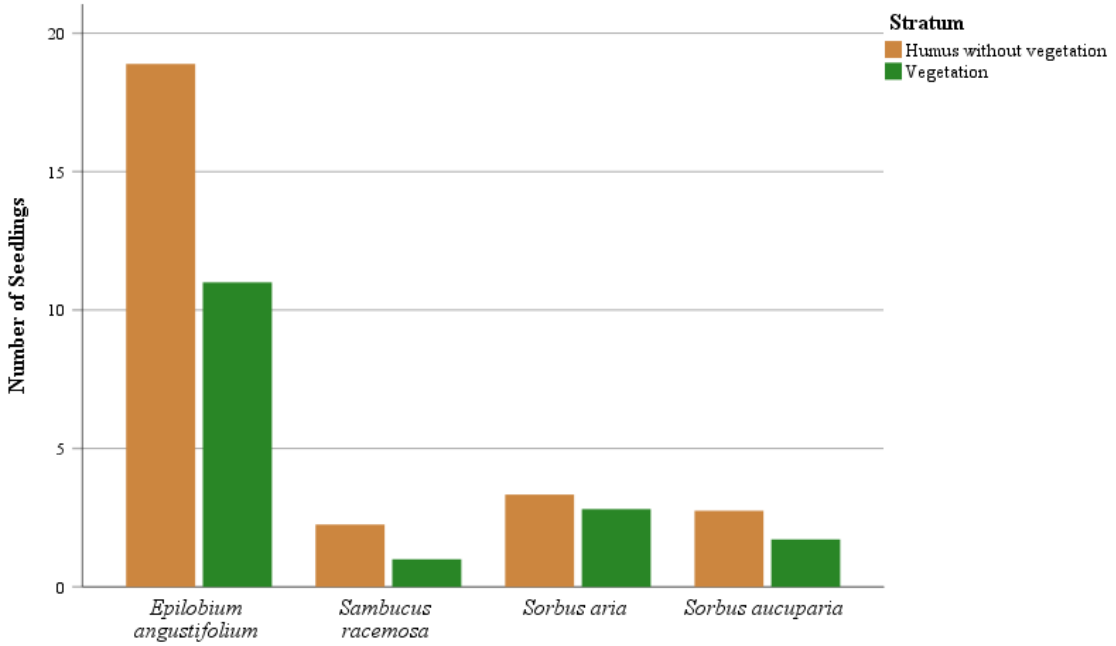
Limestone Alps: 2020

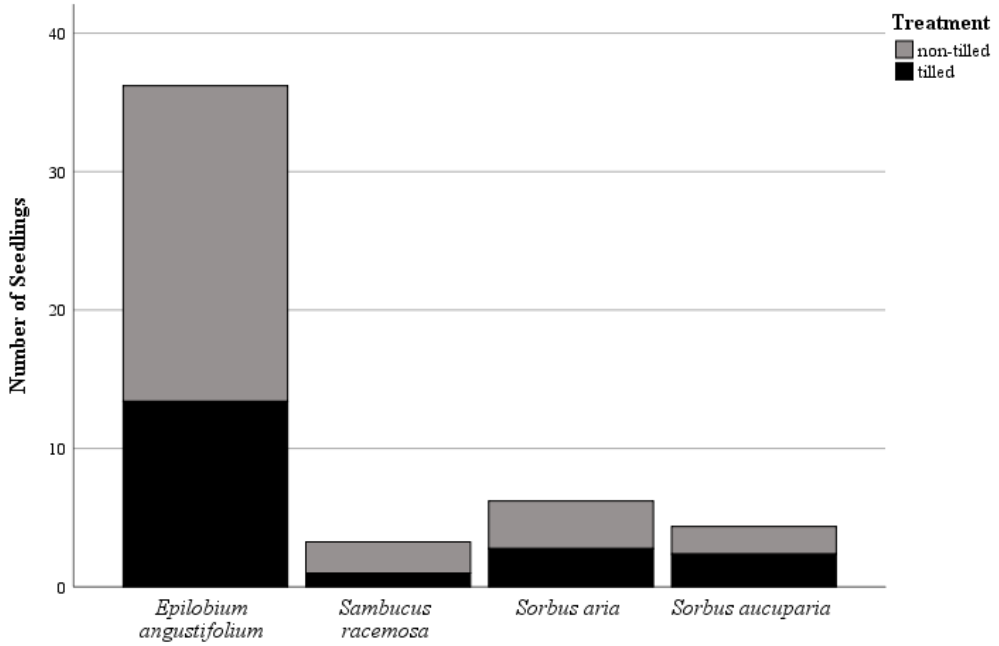
Franconian Forest: 2022

Photo: A. Meinhold

Does soil tillage have a positive effect on the germination of seeds?

First results
Number of seedlings





➡ Competing vegetation makes plant life difficult

Development of fireweed

July 2021

Photos: M. Schneider

5th May 2022

30th May 2022

Fireweed needs two years to grow into plants

Outlook for the upcoming seasons

Pelleting

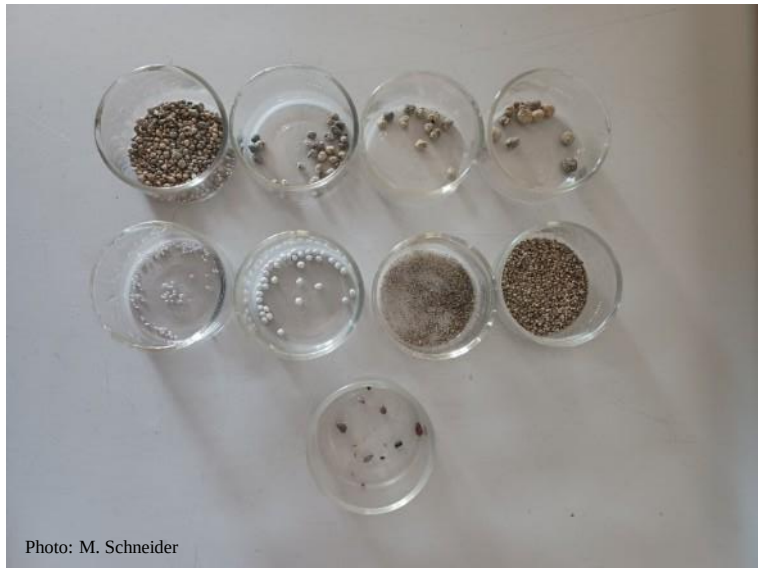
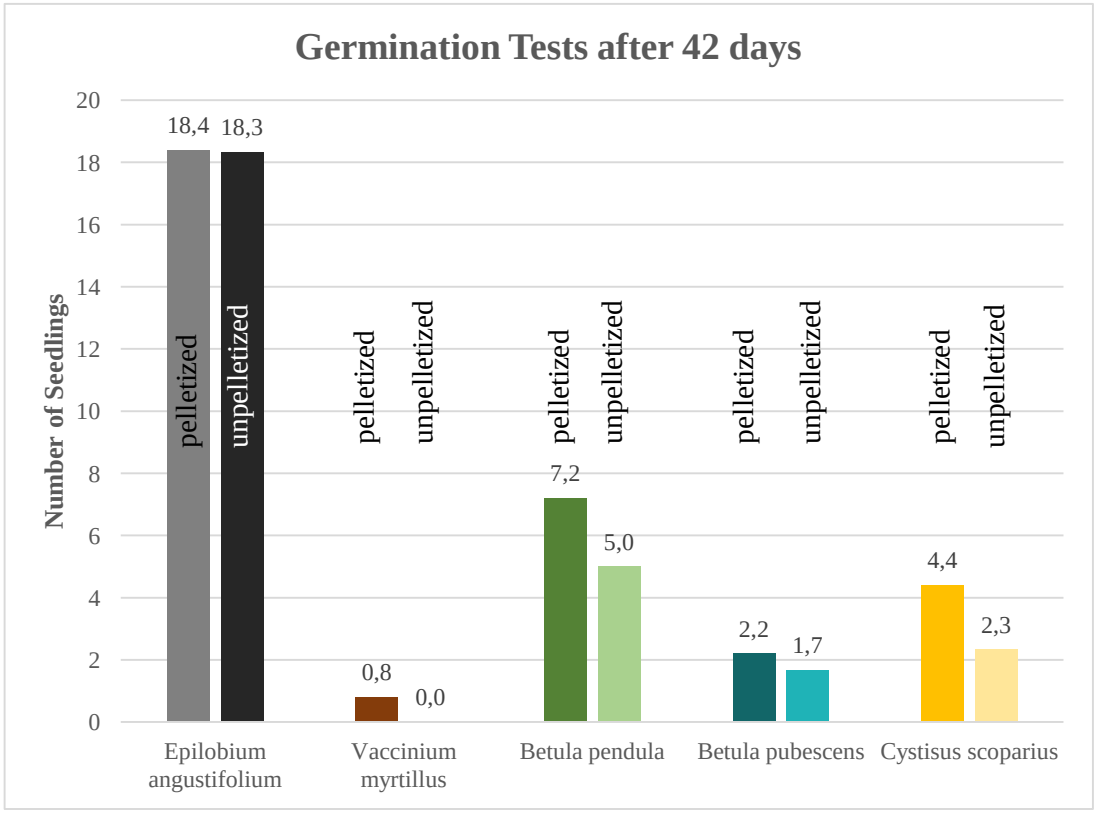


Photo: M. Schneider

Photo: R. Laniewski



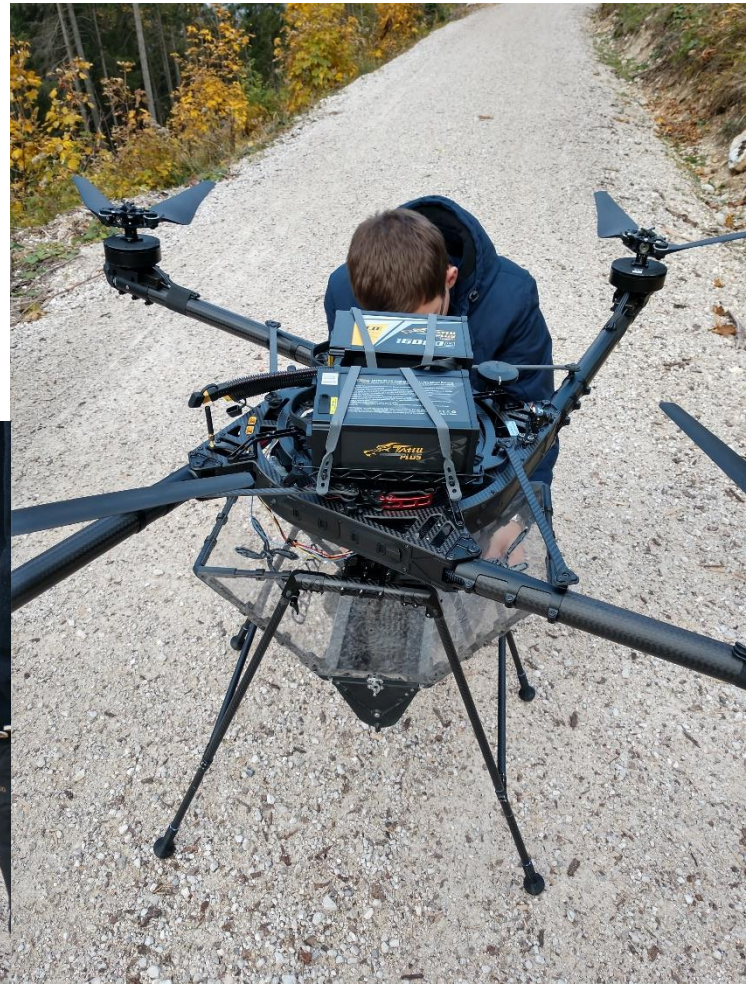
Pelletizing as an Option to support germination and survival in dry periods

Outlook for the upcoming seasons

Drone seeding

Advantages:

- more manageable for foresters
- safer for individuals
- quicker to spread several seeds than via human activity



Photos: R. Laniewski

Take-home message

- **The sooner individuals act after a disturbance in the forest, the better**
- **The introduction of pioneer plants quickly initiates development towards pre-forest characteristics and reduces nutrient losses**
- **By introducing pioneer plants, you gain time for the establishment of the final tree species in the forest**
- **Drones are a suitable tool for pioneer seeding, especially in extreme sites**

Financial support

Our studies have been supported by the Bavarian State Ministry of Food, Agriculture and Forestry Agriculture and Forestry under project numbers B79 and klifW019.