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Food forest project in the Bavarian Alps

Identified dangers and their defense

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A few informations about the plot of land and its management

- General conditions of the management
- Principles of management
- Nature of the plot of land
- Climatic conditions

General conditions of the management

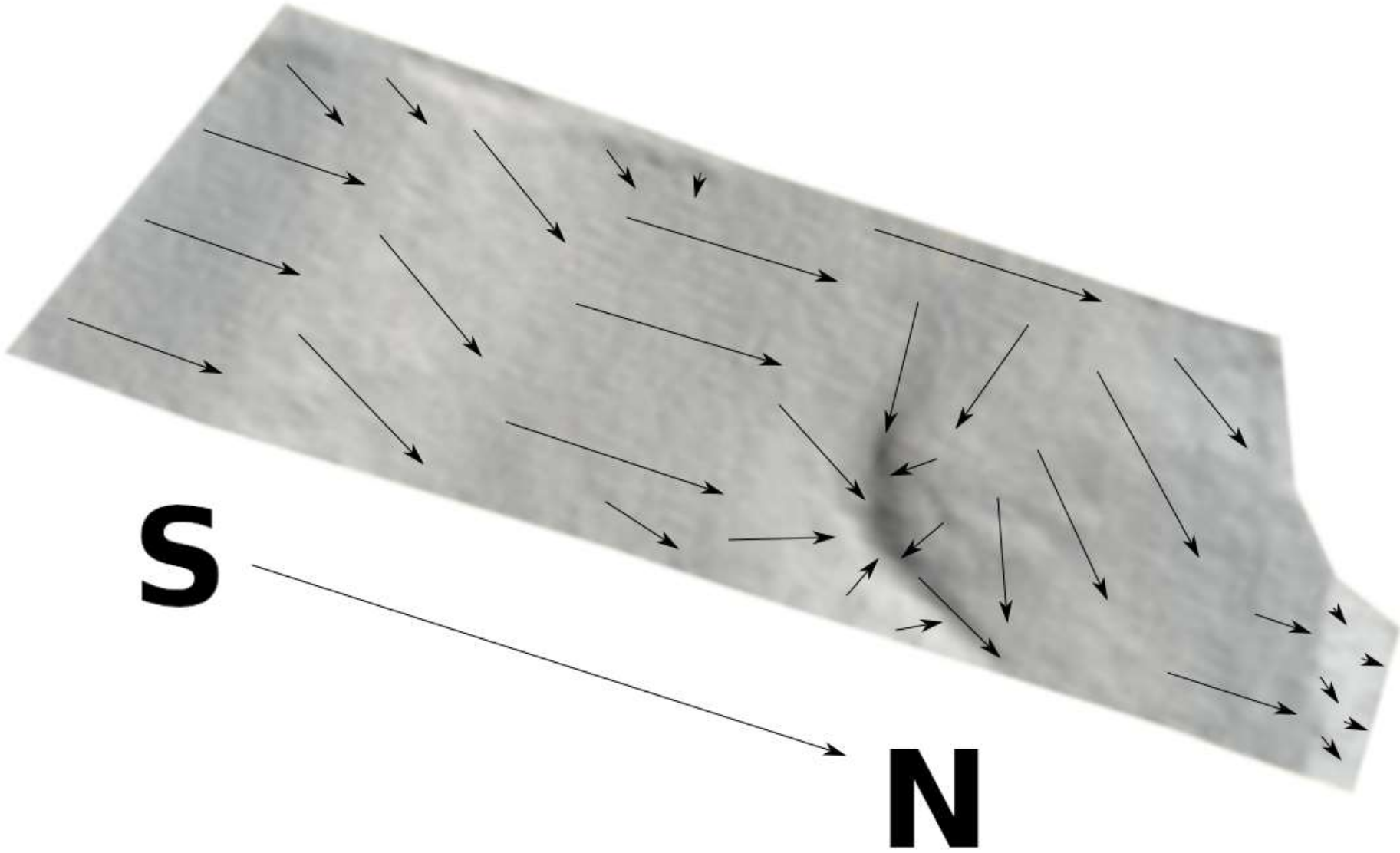
- Long journey
- Management by 1-2 persons
- 1-2 days a week
- Water protection area
- Large-area mowing not possible

Principles of management

- No use of (heavy) machines with combustion engine
- No use of plastics as far as possible
- If possible, only raw materials will be used that come from the plot of land itself

Nature of the plot of land

- Originally regularly mowed grassland
- Almost 2 acre in size.
- Uneven and more or less terraced
- The height difference is about 28 m (611 m - 639 m)
- Soil contains stones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Climatic conditions

- Temperature range (2015-2020): -19.6 °C to +39.1 °C
- Highest absolute annual minimum temperature (2019/2020): -8.3 °C
- Annual precipitation: 1200-1500 mm

Dangers for plants

- Deer
- Hares
- Field mice and voles
- Slugs
- Couch grass
- Solar radiation

Woven and non-woven black plastic sheeting in danger

- Holes made by field mice and voles
- Tearing by predators
- Tearing by couch grass
- Disintegration by solar radiation

Defence against danger from deer and hares
Challenge wildlife fence

- Failed attempt
- Alternatives
- Why it is necessary
- How the construction succeeds

Why the first attempt failed

- Stones in the ground
- Uneven terrain
- High effort

Alternatives to the wildlife fence

- Individual protections
- Wildlife defence hedges
- Impenetrable deadwood hedges
- Exclusive use of resistant plants

Wildlife defence hedges
Two attempts, one basic idea

- Six rows, two each outside and two inside
- Stable on the inside, force-absorbing and thorny on the outside
- Outer rows resistant and slip-through-proof
- Outer rows protect inner rows

Exclusive use of resistant plants
My experiences and observations regarding

- Browsing
- Buck rub
- Gnawing on trunk bases by mice
- Gnawing off of roots by voles

Table abbreviations

- ‚X‘ Damage occured
- ‚-‘ No damage occured
- ‚D‘ Deer (refers to)
- ‚H‘ Hare (refers to)
- ‚S‘ Damage by slugs (to very young trees)
- ‚F‘ Damage only to flowers

Damage to shrubs 1/2

Scientific name	Browsing damage	Buck rub	Trunk base-gnawing	Root-gnawing
Asimina triloba	- (D)		-	
Caragana arborescens	X		-	
Chaenomeles speciosa			X	
Corylus avellana	X	X	-	
Crataegus monogyna	X	X		X
Cytisus scoparius	X	-	-	X
Elaeagnus angustifolia			-	
Elaeagnus x ebbingei	X	X	-	
Gaultheria procumbens			-	

Damage to shrubs 2/2

Scientific name	Browsing damage	Buck rub	Trunk base-gnawing	Root-gnawing
Hippophae rhamnoides	X	X		
Ribes alpinum	X	X	-	
Ribes sativa		X	-	
Ribes uva-crispa			X	
Rosa canina	X	-	-	X
Rosa rugosa	X	X		
Rubus tricolor	X	-	-	
Sambucus nigra	X	X	-	
Vinca minor	-	-	-	

Damage to trees 1/2

Scientific name	Browsing damage	Buck rub	Trunk base-gnawing	Root-gnawing
Alnus cordata	X (D)			
Alnus glutinosa		X		
Castanea sativa				X
Gleditsia japonica	S			
Gleditsia triacanthos			(-)	
Malus domestica	X		X	
Malus sylvestris	X		X	

Damage to trees 2/2

Scientific name	Browsing damage	Buck rub	Trunk base-gnawing	Root-gnawing
Prunus avium			-	
Prunus domestica ‚Ontariopflaume‘			X	
Pyrus pyrifolia			X	
Quercus bicolor			-	
Robinia pseudoacacia	X (D+H)	X	-	
Tilia cordata	X			
Toona sinensis			X	

Damage to herbaceous perennials 1/2

Scientific name	Browsing damage	Root-gnawing
Agastache foeniculum ‚Purple Haze‘	-	
Allium tuberosum	X	
Armoracia rusticana	S	
Artemisia dracunculus	- or F	
Hemerocallis fulva		X
Matteuccia struthiopteris	-	
Medicago sativa	F	
Melissa officinalis	-	

Damage to herbaceous perennials 2/2

Scientific name	Browsing damage	Root-gnawing
Mentha arvensis ‚Thai'	-	
Myrrhis odorata	(S)	
Nepeta cataria	-	
Origanum vulgare ssp. hirtum	-	
Rheum palmatum	-	
Saponaria officinalis	F	
Symphytum ibericum ‚Miraculum'	S	
Symphytum officinale	S	X

Why a wildlife fence is necessary

- Wildlife defense and deadwood hedges are based on resistant woody plants.
- There are rather no sufficiently resistant woody plants
- Long-term individual plant protection is not practical

How the construction succeeds

The solution lies in the tool, which in German is called "Locheisen"

Defense against dangers from mice and slugs

- Attraction of natural enemies by stone piles
- Remodelling of the habitat
- Groups of similar perennial herbaceous plants should not be too small

Defence against couch grass

- Edge plantings to prevent couch grass to grow into the patches
- Living mulch carpets
- Use of stone mulch as an alternative to (woven) black plastic sheeting
- Slowing down growth of couch grass by shading

Defense against dangers from predators

Use of stone mulch as an alternative to woven and non-woven black plastic sheeting

Defense against dangers from solar radiation

- Exclusive use of woven and non-woven black plastic sheeting made of PP or PE
- Use of alternatives to (woven) black plastic sheeting
- Protection of young trees by co-planting

Alternatives to (woven) black plastic sheeting

- Digging the soil with weeding
- Using stones and paving slabs as mulch
- Fiber mats made of hemp, flax and/or coconut

Conclusion and outlook

- A wildlife fence is necessary and will be completed
- The highest danger by plants comes from the couch grass
- Shrub and tree layer before herb layer
- High use of coppicable and pollardable trees and shrubs
- Increased use of stone mulch and stone piles