



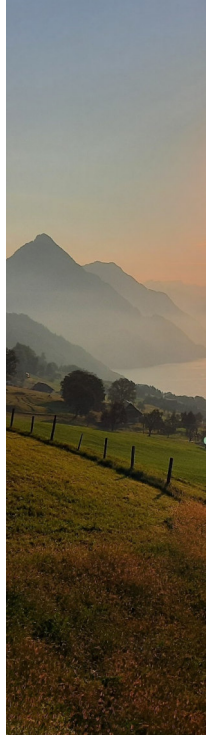
Strengthening the resilience of grasslands against the unpalatable C4 grass *Setaria pumila*

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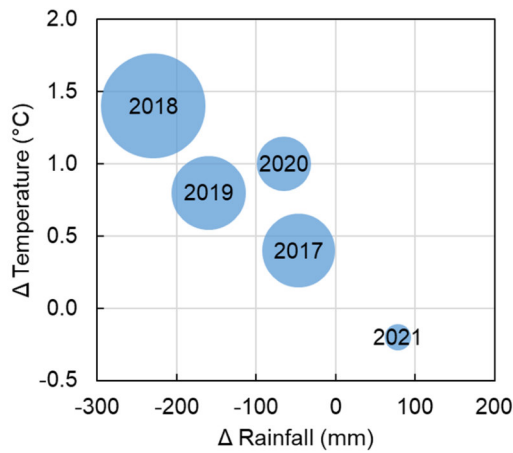
Setaria pumila is **unpalatable** for the livestock and can even **cause injuries** in the mouth



Pictures: Agridea



Setaria pumila is an **annual C4 plant**. It benefits from **dry and hot years** or locations and can become **dominant in summer**



Size of the circles = relative abundance *S. pumila*
Δ = difference from average 1991-2020

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Research and knowledge exchange project in a milk production region

- **Aim:** Develop and promote grassland management options to strengthen the resilience of grasslands against adverse weather conditions that benefit *Setaria pumila* (strengthen the competitive ability of the forage grasses)
- Co-creation
- On-farm survey
- Field experiment



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Field experiment

- Main grasses in the initial sward: *Lolium multiflorum* (35%), *L. perenne* (10%), *Dactylis glomerata* (10%), *Poa pratensis* (10%), *Setaria pumila*

- Factors:**

- Mowing height**, either **low** (3 cm) or **high** (8 cm)

- Summer Breaks** (cutting frequency during the dry and hot season)

		t1 Mai	t2 June	t3 July	t4 Aug.	t5 Sept.	t6 Oct.
a) No summer break	0SB	H1	H2	H3	H4	H5	H6
b) 1 summer break	1SB	H1	H2	--	H3	H4	H5
c) 2 summer breaks	2SB	H1	--	H2	--	H3	H4

- Overseeding**, yes or no.



Field experiment

- Why choose these factors?

Mowing height



8-cm high

3-cm low

Summer breaks

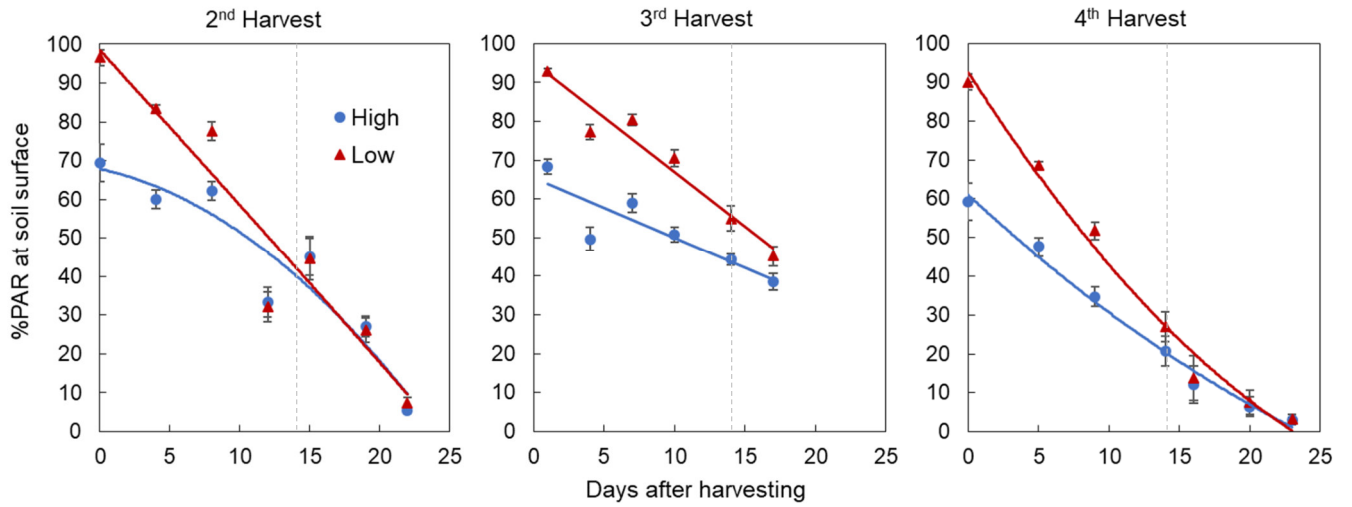


Young plant of *S. pumila*
at the beginning of July

- All combinations = 12 treatments x 4 replicates
- Five years (2017 – 2021)



The effect of cutting height on the amount of sunlight reaching the soil lasted for about 2 weeks after cutting

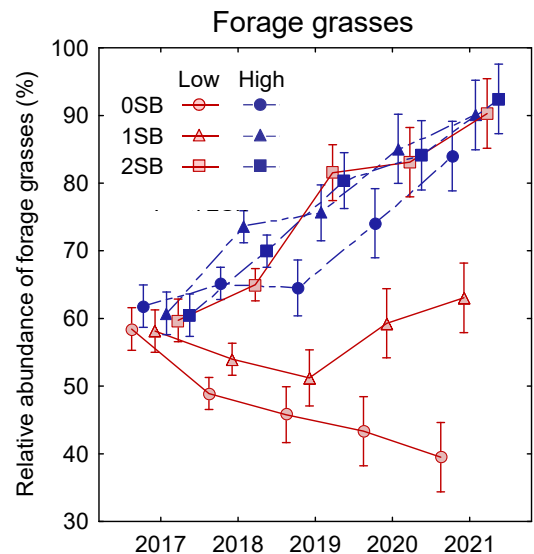
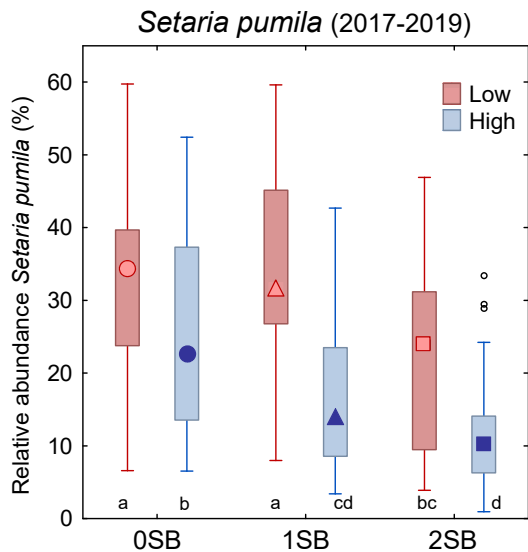


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Increased mowing height and summer breaks decreased *S. pumila* and increased forage grasses

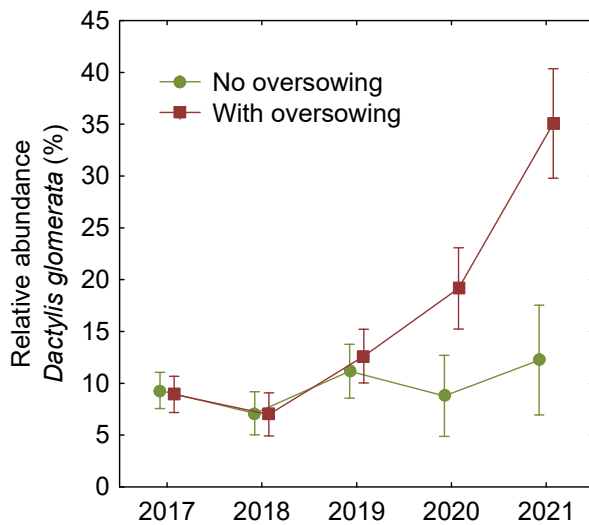


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Overseeding increased the abundance of *Dactylis glomerata* only from the fourth year onwards

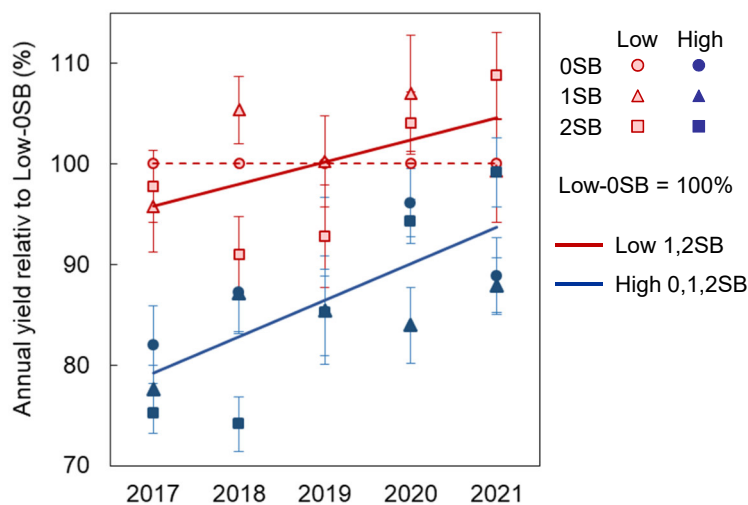


- The 5th experimental year was a wet and rather cool year with only few *S. pumila*
 - No effect of overseeding on the abundance of *S. pumila* was observed in this experiment
 - Could maybe help during the next dry and hot year ?

Overseeding was performed yearly with a mixture of *D. glomerata*, *L. perenne*, *Poa pratensis* and *Festuca rubra*.

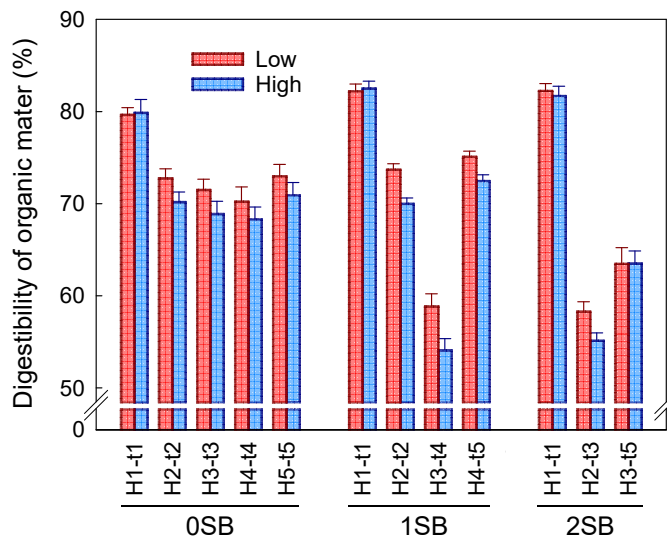


Yield reduction due to increased mowing height decreased over time but was not fully compensated





Having two summer breaks would be very costly because of decreased forage digestibility



Proportion of yield from the different harvests during a dry year (2018)

Harvest time	0SB	1SB	2SB
t1	29	31	33
t2	31	36	
t3	10		39
t4	7	14	
t5	22	19	29

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Conclusions

- Caring for the forage grasses with an adapted mowing height and time interval between harvests increases the competitive ability of the good quality grasses and decreases *S. pumila* abundance.
 - Management helps mitigating the negative effects of dry and hot years.
- Decreasing the abundance of *S. pumila* comes at a cost (mowing height - dry matter yield; summer breaks - forage digestibility)
 - Adjusting management to the weather conditions of the year
 - Tolerance threshold for *S. pumila* abundance and best strategy must be adjusted according to the targeted production systems

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Thank you for your attention

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