

Møre og Romsdal  
fylkeskommune

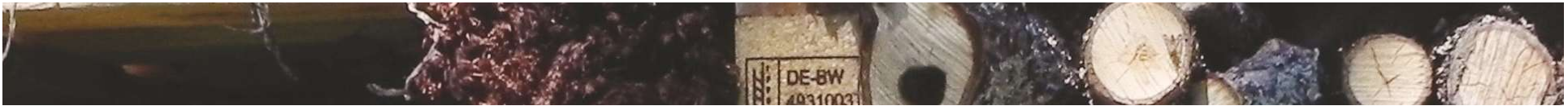
RESTOR

# Marine-derived fertilisers for fodder crops

Organic-PLUS webinar

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Anne-Kristin Løes, Ishita Ahuja



# Experimental design 2019 + 2020

## 2019

- Oats to cover seeds of perennial ley, one cut
- 5 treatments: Control + 4 types of fertiliser, aiming at 160 kg N/ha, 4 blocks (replicates)
- Treatment details: Algae fiber (AF); fishbones conserved with formic acid (FB); mix of AF and FB with 70% of N from FB (Mix); commercial fertiliser from poultry manure, vinasse and meat and bone meal «Grønn Øko» (GO), control with no fertiliser (K0). **AF-FB-Mix-GO-K0**
- Residual effects measured in 2 cuts of 1st year ley 2020 (no fertiliser applied in 2020)

AF	Mix	FB	GO	K0
GO	K0	AF	Mix	FB
AF	FB	K0	Mix	GO
K0	AF	FB	GO	Mix

## 2020

- Ryegrass, 4 cuts
- 9 treatments: Control + 5 types of fertiliser, 2 N levels in 3 treatments, 4 blocks (replicates)
- Treatment details: 300 or 600 kg N/ha applied as AF, FB, Mix, GO or fresh fishbones (F). AF and F only one level of N (300 kg/ha). **AF1-F1-FB1-FB2-Mix1-Mix2-GO1-GO2-K0**

Mix 2	Mix	F	K0	GO 2	FB	GO	FB 2	AF
Mix	F	Mix 2	FB	GO 2	FB 2	GO	AF	K0
AF	FB 2	Mix	FB	GO 2	F	Mix 2	K0	GO
GO	K0	F	GO 2	FB	FB 2	Mix	Mix 2	AF







# Establishing the experimental field, May 2020

Fresh, ground fishbones (rå)



Cultivator used to incorporate fertilisers in soil



Dried fishbones conserved by formic acid

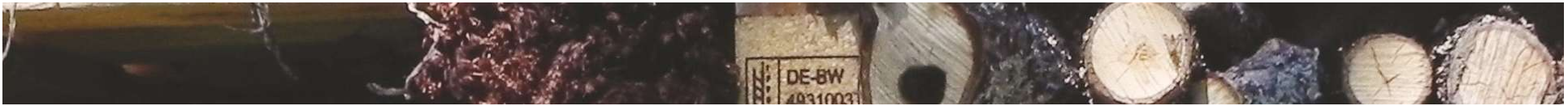




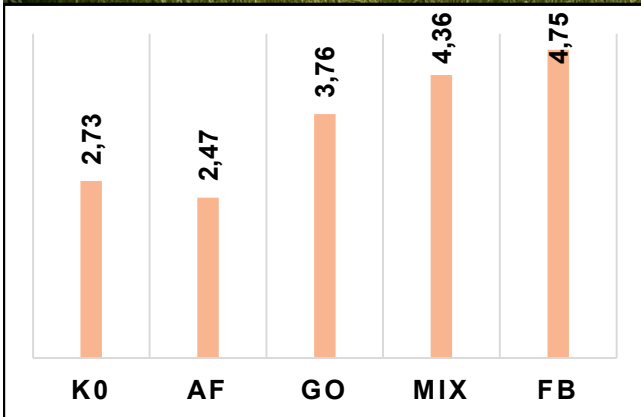


- \* Enriched poultry manure: well balanced fertiliser
- \* Fish bones: rich in N, P, Ca
- \* Algae fiber: rich in K, Mg, S (and Na, As...)



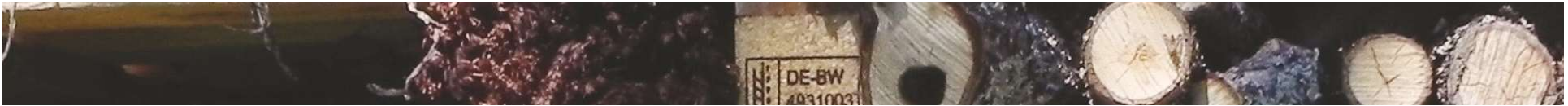


# 2019: Yields of oats, July 31

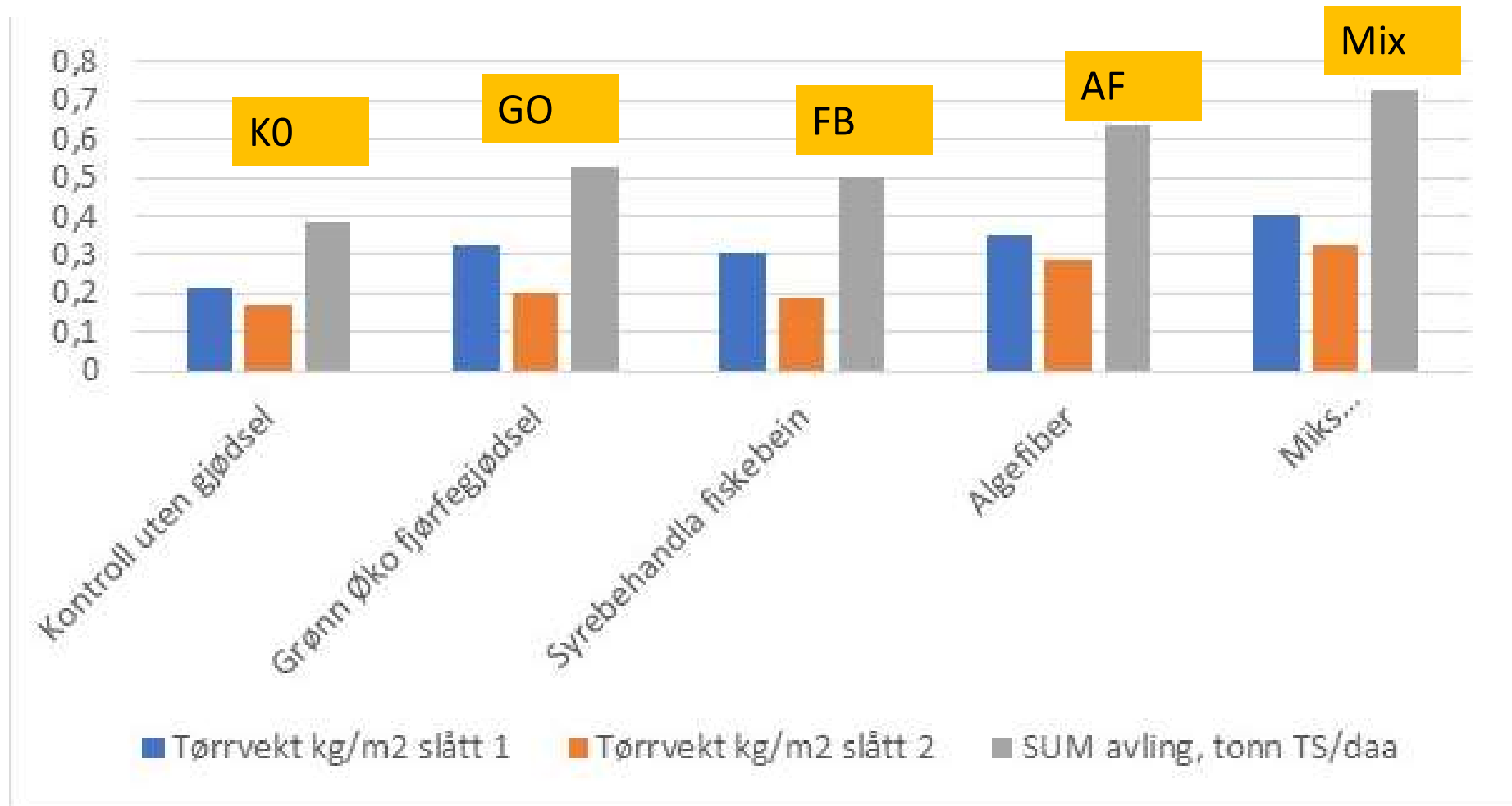


Treatment	Avling, tons DM/ha	Yield relative to Control (100%)
K0, no fertiliser	2.7	
AF (algae)	2.5	- 9%
GO (poultry manure)	3.8	+ 38%
<b>Mix (AF+FB)</b>	4.4	+ 60%
<b>FB (fishbones)</b>	4.8	+ 74%





2020: Good residual effects of algae fiber, > 7 ton DM/ha

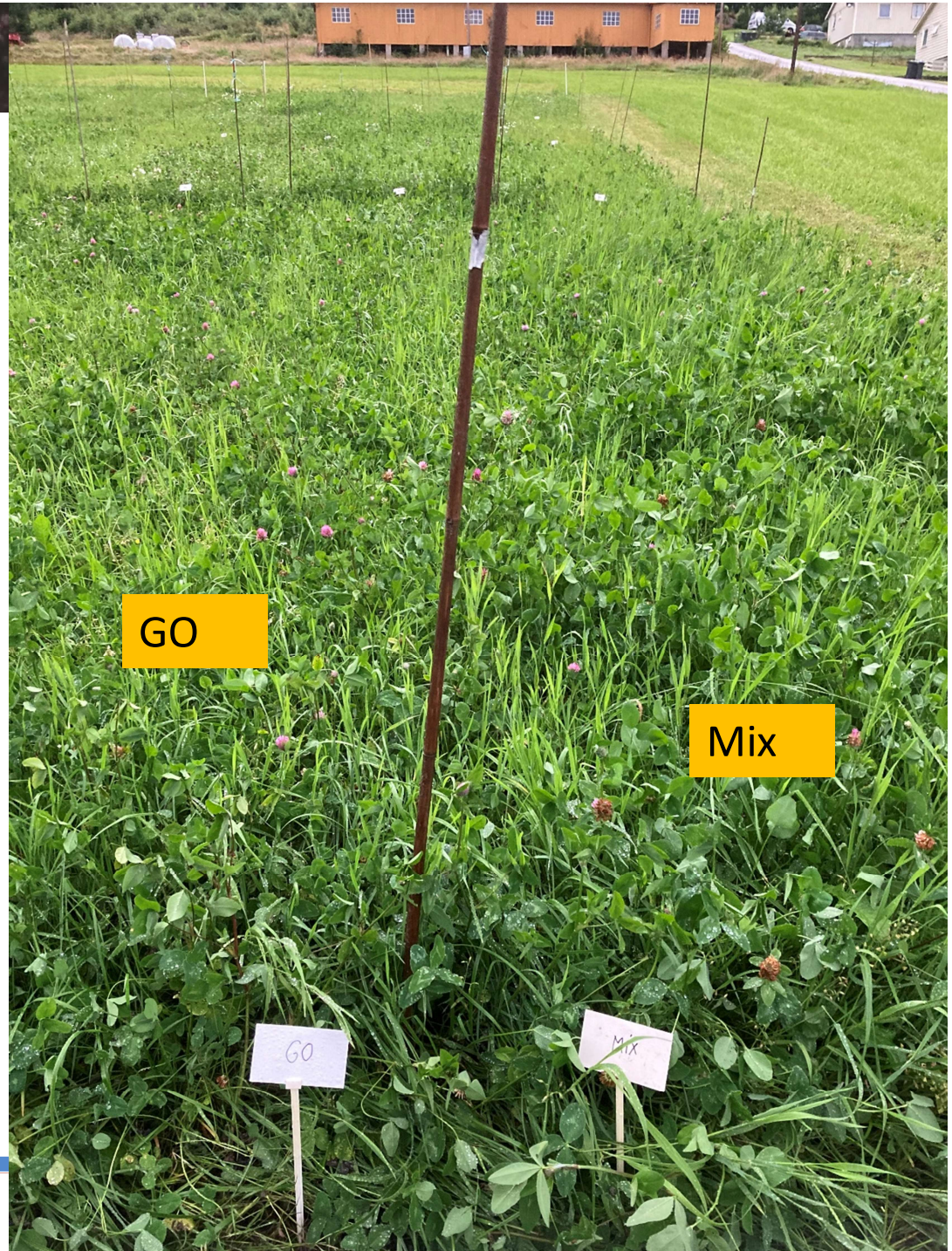


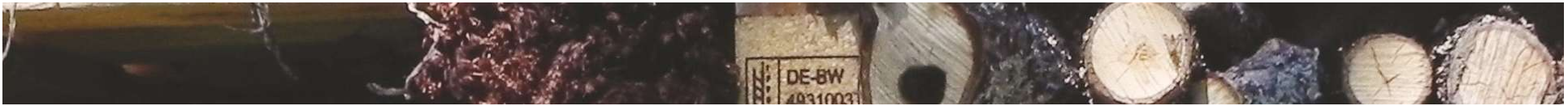




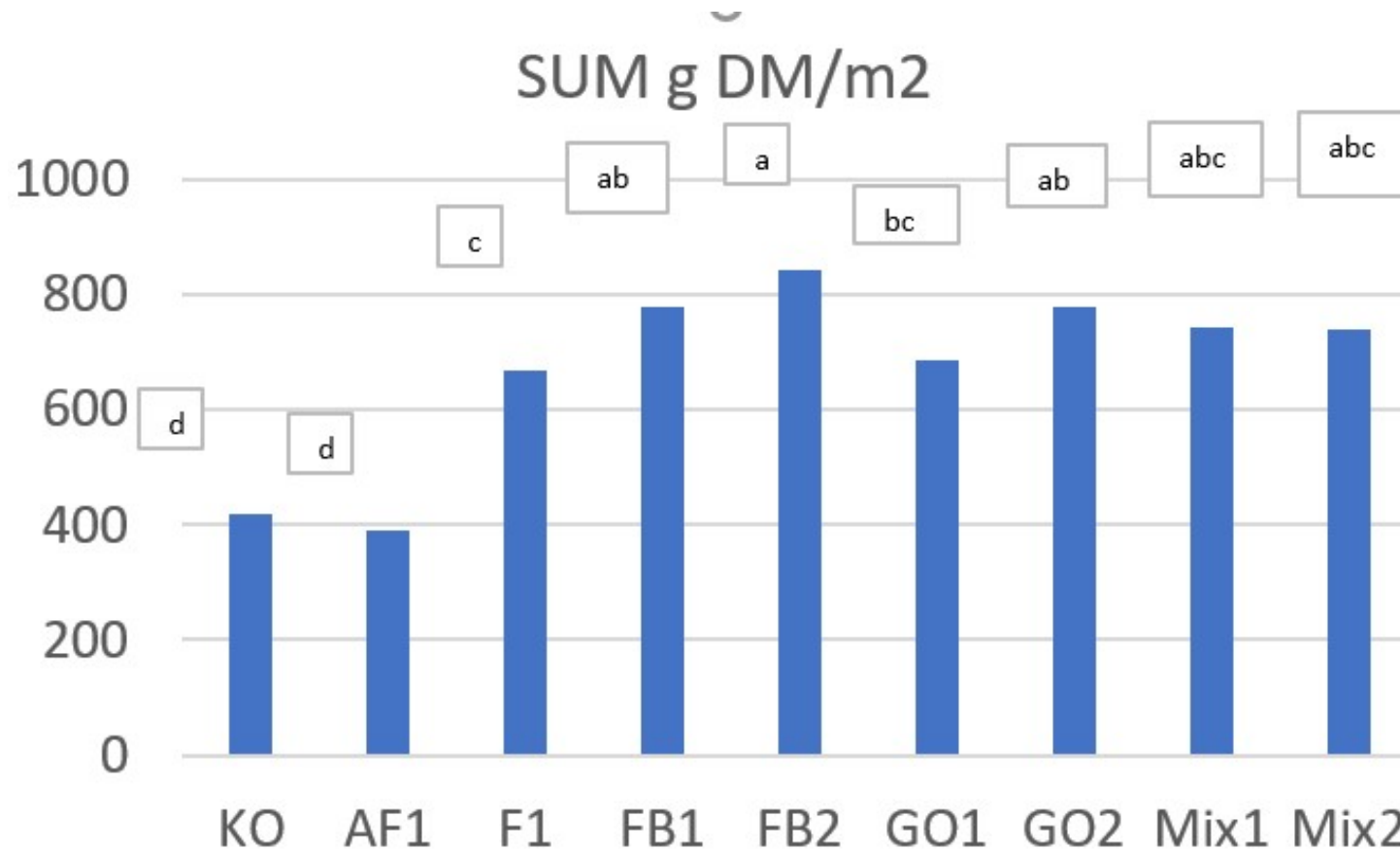
2020: Good  
residual effects of  
algae fiber

Red clover benefits  
from K?



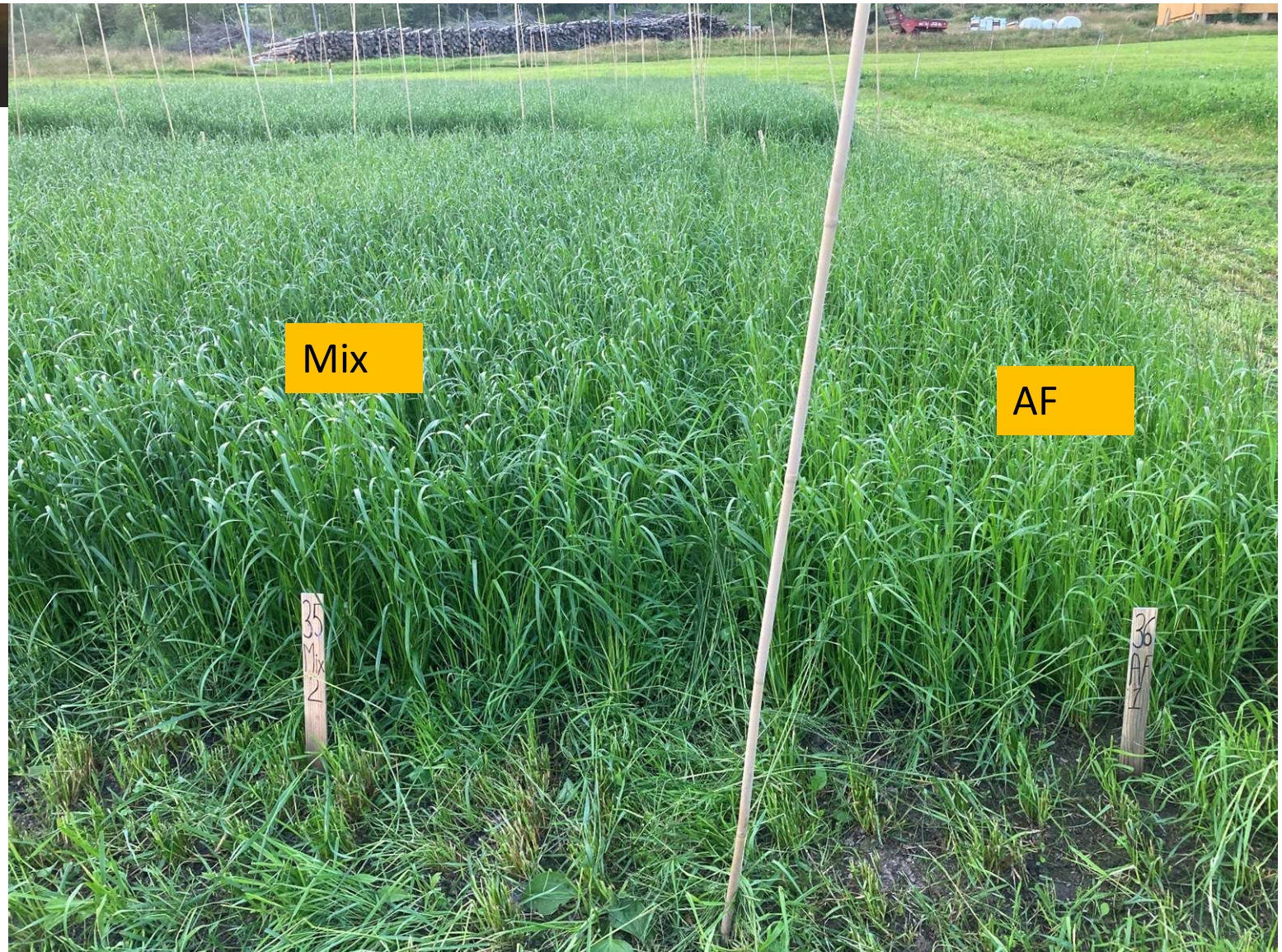


Ryegrass experiment, sum of 4 cuts 2020, about 8 t DM/ha





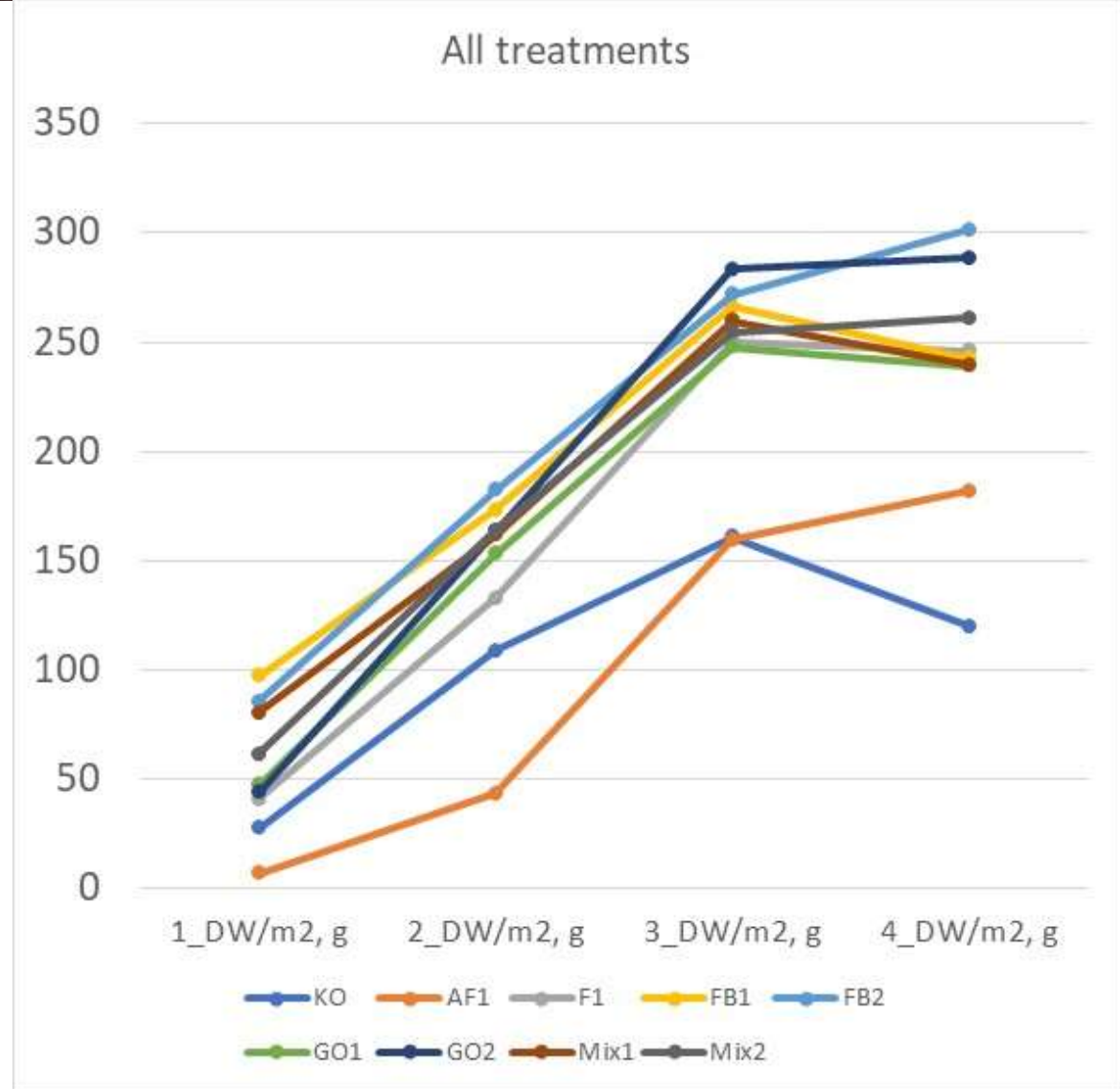
Ryegrass  
experiment  
3rd cut,  
August 13,  
2020







Yields per  
cut, g/m<sup>2</sup>  
(multiply by 10  
to get to kg  
DW/ha)



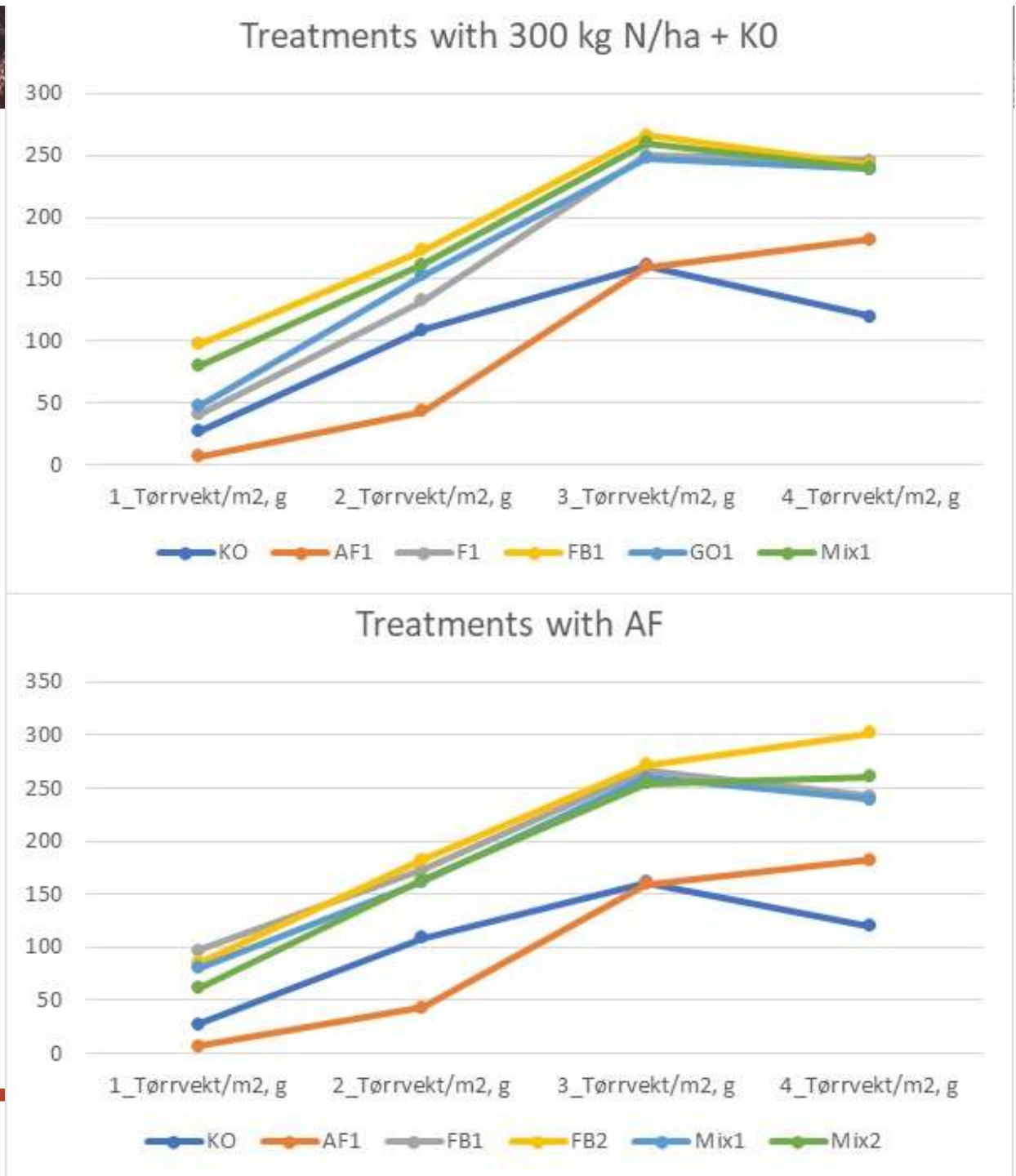




Very similar effects of F, FB, GO and Mix

Very small effect of double amount of fertiliser

Positive effect of AF towards the end of the season





## Preliminary conclusions

- Positive effect of better incorporation in soil (GO)
  - 600 kg N/ha is too high in a field experiment with ryegrass
  - Very rapid growth effect of acid-conserved fish bones
  - Less rapid, but positive growth effect of fresh fish bones (popular feed for soil animals!)
  - Initiation of positive growth effect of algae fiber after about 3 months (May-August)
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