Marine-derived fertilisers for fodder crops

Organic-PLUS webinar
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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)

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
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...)

![Image of a person working in a field]

![Image of fertilizer bags]

![Image of people planting in soil]

![Image of a jar containing fish bones]
2019: Yields of oats, July 31

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Avling, tons DM/ha</th>
<th>Yield relative to Control (100%)</th>
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</thead>
<tbody>
<tr>
<td>K0, no fertiliser</td>
<td>2.7</td>
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<tr>
<td>AF (algae)</td>
<td>2.5</td>
<td>- 9%</td>
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<tr>
<td>GO (poultry manure)</td>
<td>3.8</td>
<td>+ 38%</td>
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<tr>
<td>Mix (AF+FB)</td>
<td>4.4</td>
<td>+ 60%</td>
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<tr>
<td>FB (fishbones)</td>
<td>4.8</td>
<td>+ 74%</td>
</tr>
</tbody>
</table>
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/m²
(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)