Healthy & Safe

Cropping factors influencing the occurrence of *Fusarium* species and mycotoxins in oats from Swiss harvest samples

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Structure

WP 1: Occurrence

WP 2: Epidemiology

WP 3: Resistance

Cropping, environmental and genetic factors

WP 4: Modelling & forecasting

WP 5: Implementation

Integration of results and implementation
Facts

• Cereal types differ in the occurrence of predominant *Fusarium* species

• Strong effect of cropping and environmental factors on infection by FHB causing species
Occurrence

WP 1

- Growers’ samples (cropping factors)

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Project – Monitoring – Influencing Factors - Outlook/Summary
• 324 oat samples from 16 cantons
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\[ \text{\(\bar{\delta}\) FP} = 3.5\% \]

\[ n = 93 \]
Monitoring 2014

MON 28%

DON 11%

NIV 57%

F. poae 1%

F. graminearum 3%

F. avenaceum

F. langsethiae

F. spp

Ø FP = 5.3%
n = 66

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Monitoring 2015

Ø FP = 10.0%

n = 165

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- *F. poae*
- *F. avenaceum*
- *F. langsethiae*
- Fspp
Avera...e Toxin Contents 2013

n = 93

Toxin content (µg kg⁻¹)

F. langsethiae

F. graminearum

F. poae

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sum T-2 & HT-2 toxins: 350 µg kg⁻¹

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**Average Toxin Contents 2014**

n = 66

F. poae

F. graminearum

F. langsethiae

∑ sum T-2 & HT-2 toxins: 180 µg kg⁻¹
Preliminary Average

Toxin Contents 2015

F. langsethiae

F. poae

F. graminearum

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∅ sum T-2 & HT-2 toxins: 390 µg kg⁻¹

n = 64/165

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Observed Parameters

- Cropping system
- Cereal type
- Variety
- Pre-previous crop
- Previous crop
- Tillage
- Sowing date
- Harvesting date
- Fertilization
- Fungicide treatment
- Growth regulators

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Effect of the **Cropping System** on **F. poae** incidence 2013-15

n=324, p<0.01

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Effect of the **Variety** on *F. poae* incidence 2013-15

n=324, n.s.
Correlation $F.\ poae$ - Nivalenol

$r^2 = 0.32, \ p<0.001$

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Effect of the **Variety** on **F. langsethiæ** incidence 2013-15

2013-15, n=324, p<0.001

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Effect of Tillage & Previous Crop on F. langsethiae incidence (2013-15)

n=324, p=0.02
Correlation *F. langsethiae* – T2/HT2

$r^2 = 0.58$, $p<0.001$
Effect of the **Variety** on **T2/HT2** content 2013-15

n=223, p=0.001

![Chart showing the effect of different varieties on T2/HT2 content.](chart.png)

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Effect of **Tillage & Previous Crop** on **T2/HT2** content 2013-15

n=223, p=0.001

<table>
<thead>
<tr>
<th>Tillage &amp; Previous Crop</th>
<th>T2/HT2 [ppm]</th>
<th>n=</th>
</tr>
</thead>
<tbody>
<tr>
<td>plough</td>
<td>0.4</td>
<td>117</td>
</tr>
<tr>
<td>reduced</td>
<td>0.3</td>
<td>31</td>
</tr>
</tbody>
</table>

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**Crop types**
- Cereal
- Maize
- Other
- Pasture

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Summary

- Main occurring *Fusarium* species in 2013, 14, 15
  - *F. poae* (3.5%; 5.3%, 10.0%)

- Main occurring toxins
  - T2/HT2
  - Nivalenol

- Influencing factors (preliminary results)
  - Variety biggest influence
    - “Wiland” most common variety (in the monitoring) but also most susceptible
  - FL and T2/HT2
    - Precrop Cereal > Risk
Outlook

- finish toxin measurement monitoring 2015
- analysis of toxin data

- qPCR for *F. langsethiae*

- use of the observed influencing factors for future field experiments (crop rotation + tillage)

- research of health promoting compounds against *Fusarium* species and mycotoxins

- use of weather data to study the epidemiology of *F. poae* and *F. langsethiae*
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Thank you for your attention