PRODIVA
CROP DIVERSIFICATION AND WEEDS

Work package 2:

Crop mixtures for weed suppression

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Annual meeting PRODIVA, 23-24.01.2016, Riga, Latvia
Organic experimental fields (1 ha) in Experimental Station in Winna Góra
Organic experimental fields (1 ha) in Experimental Station in Winna Góra

Annual meeting PRODIVA, 23-24.01.2016 Riga, Latvia
Scheme of the experiment, 2016

<table>
<thead>
<tr>
<th>Number</th>
<th>Treatment</th>
<th>System</th>
<th>Crop species</th>
<th>Seed rate No./m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Organic</td>
<td>Barley</td>
<td>350</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td>Pea</td>
<td>110</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Organic</td>
<td>Barley + pea (70%/30%)</td>
<td>245 + 33</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Organic</td>
<td>Barley + pea (50%/50%)</td>
<td>175 + 55</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Organic</td>
<td>Barley + pea (30%/70%)</td>
<td>105 + 77</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td>Without crop - only natural weeds</td>
<td></td>
</tr>
</tbody>
</table>

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Field experiment

Field experiment:

- four replication,
- plots size 10 m x 1,5 m;

Analysis performed regarding to:

- dry weight of crops and weeds (above the ground)
- LAI, SPAD, gNDVI (Green Normalised Vegetation Index)
- number of ears/grain and pods/seeds (No/m²)
- quantity and quality of yield
Photos using unmanned aircraft systems

Fot. IWING, 08.06.2016
Aerial imagery in panchromatic (gray scale) imagery

Photos using airborne passive imaging systems that detect and record specific wavelength (λ) ranges of reflected solar radiation, which are sections of the electromagnetic spectrum visible light in the range of the spectral reflection:

**Grean**

Fot. IWING, 08.06.2016

**Red**

Fot. IWING, 17.07.2016

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Spectral reflectance of Vegetation - Using Color Infrared (CIR) Imagery

Fot. IWING, 08.06.2016

Fot. IWING, 17.07.2016

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Spectral reflectance of Vegetation – NDVI (Normalized Difference Vegetation Index)

Fot. IWING, 08.06.2016

Fot. IWING, 17.07.2016
Index NDVI (Normalized Difference Vegetation Index)

Organic system

- Spring barley
- Peas
- Spring barley + pea (70/30)
- Spring barley + pea (50/50)
- Spring barley + pea (30/70)

Conventional system

- Spring barley
- Peas
- Spring barley + pea (70/30)
- Spring barley + pea (50/50)
- Spring barley + pea (30/70)
Dry mass of plants (g/m²)

Organic system

<table>
<thead>
<tr>
<th>Organic sys.</th>
<th>Conventional sys.</th>
<th>Crop</th>
<th>Seeds rate (No/m²)</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>11</td>
<td>Barley</td>
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<td>5</td>
<td>15</td>
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Seed yield (t/ha)

**Organic system**

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<th>Seed yield (t/ha)</th>
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**Conventional system**

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**Crop**

- Barley
- Pea
- Barley + pea (70%/30%)
- Barley + pea (50%/50%)
- Barley + pea (30%/70%)
- Without crop - only natural weeds

**Seeds rate (No/m²)**

- 350
- 110
- 245 + 33
- 175 + 55
- 105 + 77
- -

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**Seed barley - protein content (%)**

![Box plots showing seed barley protein content](image)

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Percentage of seeds in yield (%)
1/ Glashouse experiment: weed- *Elymus repens*

2/ Growth chamber experiment: *Sinapis alba* as a model weed
Scheme of controlled experiments (six replications)

1. Weeds (*Elymus repens* and *Sinapis alba* as a model weed)
2. Solo pea
3. Solo barley
4. Barley and pea (50% / 50%)
5. Barley + weeds
6. Pea + weeds
7. Barley and pea (50% / 50%) + weeds
Analyses

- Dry mass of crops and couch grass
- Couch grass rhizomes weight and length per unit
- Number and weight of seeds per unit
- Number of ears/grain and pods/seeds (No/pot)
- Yield quantity
1. **Weeds** (*Elymus repens* and *Sinapis alba* as a model weed)
2. Solo pea
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Glashouse experiment - rhizomes length of AGRRE

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Thank you for your attention