PRODIVA WP 3

Variety mixtures for weed suppression 2016

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PRODIVA annual meeting – 23-24.01.2017, RIGA
ACTIVITIES 2016

Field experiments
(6 var. of barley, 3 var. of oat, mixtures)

Dissemination
(conferences, posters, oral presentations; Organic Eprints)
Selection of varieties:
The same barley and oat varieties
Based mainly on the plant height, varieties popularity in the central region of Poland and based on the registration year (quite new varieties)
Field experiments 2016

Field Experimental Station in Winna Góra
METHODS

Strict field experiments
Barley: 6 varieties, sole crops and mixtures = 21 objects (42 plots – natural infestation + model weed)
Oat: 3 varieties, sole crops and mixtures = 6 objects (12)
4 replications
Seeding rate: barley 300 no./m$^2$, oat 400 no./m$^2$, model weed – Sinapis alba - 60 no./m$^2$
(according to the weight of 1000 grains/seeds and germination capacity)
Plot size: 16.5 m$^2$ – each plot divided to 2 sub-plots:
1. natural infestation, 2. model weed (Sinapis alba var. Maryna)
# Field experiments 2016

**OBJECTS: Oat varieties**

- Sławko (S)
- Nagus (N)
- Rajtar (R)

- S + N (50%+50%)
- S + R (50%+50%)
- N + R (50%+50%)

**Spring barley varieties**

- KWS Olof (Ol)
- KWS Artika (At)
- KWS Orphelia (Or)
- Kucyk (K)
- Raskud (R)
- Argento (Ae)

- Ol + At (50%+50%)
- Ol + Or (50%+50%)
- Ol + K (50%+50%)
- Ol + R (50%+50%)
- Ol + Ae (50%+50%)
- At + Or (50%+50%)
- At + K (50%+50%)
- At + R (50%+50%)
- At + Ae (50%+50%)
- Or + K (50%+50%)
- Or + R (50%+50%)
- Or + Ae (50%+50%)
- K + R (50%+50%)
- K + Ae (50%+50%)
- R + Ae (50%+50%)
## Field experiments 2016

### OAT EXPERIMENT

<table>
<thead>
<tr>
<th>Replication</th>
<th>S + N</th>
<th>S</th>
<th>N + R</th>
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Example of plot (15.5 m²=1.5x11 m) for variety mixtures included two sub-plots:

- Variety X + Variety Y
- Model weed, without natural weed flora
- 1/3 of plot size
- 2/3 of plot
- Natural weed flora
Field experiments 2016

Analysis and observations

Barley and oat plant density 2 x 0,5 m
Tillering: number of tillers with and without ears (69 BBCH), 5 plants per plot
Weeds weight:
   weed species composition, weeds dry weight (0,25x0,5 m, two times on each plot)
   at the end of cereal flowering – 69 BBCH
Dry weight of barley and oat plants
   (69 BBCH, 5 plants per each plot)
Barley and oat plant height (10 plants per plot)
Leaf area index – on the field: using AccuPAR LP-80 9 (4 times during vegetation season)
Leaf area index for leaves, stems, ears separately, 5 plants per plot
Parts of plant were scanned, green area was calculated by counting „green points“ using computer programme
Grain yield
Grain parameters
   Weight of 1000 grains
   Grain quality: protein, grain humidity, starch (Infratec grain analyser by Foss)
Field experiments 2016

Weed composition

**OAT**
- Chenopodium album
- Matricaria inodora
- Centaurea cyanus
- Polygonum aviculare
- Lycopsis arvensis
- Capsella bursa-pastoris

**BARLEY**
- Chenopodium album
- Matricaria inodora
- Centaurea cyanus
- Polygonum aviculare
- Lycopsis arvensis
- Polygonum convolvulus
- Polygonum lapathifolium
- Cirsium arvense
- Viola arvensis
- Geranium pusillum
- Galium aparine
- Thlaspi arvense
- Erodium cicutarium
Field experiments

RESULTS - BARLEY
Field experiments 2016

Average for sole crops 31.85
Average for mixtures 28.98

Average for sole crops 43.35
Average for mixtures 39.13
Field experiments 2016

Average for sole crops 18,28
Average for mixtures 15,10

Average for sole crops 92,74
Average for mixtures 76,27
Field experiments 2016
Field experiments 2016

barley height [cm] - natural infestation

barley height - model weed
Field experiments 2016

grain yield [t/ha] - natural infestation

grain yield - model weed
## Field experiments 2016

**TOP 3 FOR BARLEY!!!**

<table>
<thead>
<tr>
<th>VAR.</th>
<th>Weeds no</th>
<th>W.biomass</th>
<th>LAI</th>
<th>Oat bmass</th>
<th>Oat height</th>
<th>Grain yield</th>
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Field experiments

RESULTS - OAT
Field experiments 2016

Average for sole crops 47,2
Average for mixtures 53,0

Average for sole crops 63,3
Average for mixtures 67,7
Field experiments 2016

Average for sole crops 48,41
Average for mixtures 57,74

Average for sole crops 151,66
Average for mixtures 194,23
Field experiments 2016

LAI - natural infestation

LAI - model weed
Field experiments 2016

**oat biomass - natural infestation**

- S
- S+R
- N+R
- S+N
- N
- R

**oat biomass - model weed**

- S
- N
- S+N
- S+R
- N+R
- R
Field experiments 2016

- oat height [cm] - natural infestation
- oat height - model weed
Field experiments 2016

grain yield [t/ha] - natural infestation

grain yield - model weed
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Dissemination 2017

Conferences

5-7. 10.2016, Puszczykowo, Konferencja naukowa: „Rolnictwo ekologiczne – stan obecny i perspektywy rozwoju”
11-13.05.2016, Dymaczewo Nowe, Konferencja naukowa: „Rola odmiany i ochrony roślin w intensyfikacji produkcji roślinnej”
19-25.06.2016, Praga International Weed Science Congress
9-10. 02.2017, Poznań, 11-12 luty 2016, National Symposium of Institute of Plant Protection
Dissemination 2017

Conference presentations


Plans for 2017

Field experiments:
Barley (6 varieties) and oat (3 varieties) and variety mixtures
– natural infestation and model weed
List of observations and Methods the same as in 2015 and 2016

Collecting and analyzing data
Comparing results from three vegetation seasons
Conclusions
Publication 😊
THANK YOU!!!