An overview on breeding of winter oilseed rape varieties in Europe

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(1) Europe market development

(2) EU27 variety application & registration

(3) Hybrid systems & yield stability factors

(4) Fluctuations in EU27 yield development
   Example: Europe winter kill 2011/12

(5) Yield stability as breeding objective
   Example: Winter hardiness

(6) Summary & Outlook
Wir lassen Qualität wachsen

EU 15 + 3% 4.1 Mln ha
+ NMS - 7% 2.1 Mln ha
EU 27 - 1% 6.2 Mln ha
CIS + 1% 1.7 Mln ha

Source: Official statistics,
+ own estimates RAPOOL/NPZ

Source: WOSR EUROPE TOTAL AREA PLANTINGS F2012/13

Update 2012-11-30
NPZ/SG

PLANTINGS
Thsd ha
CHANGE Δ 2011/12
FORECAST 2012/13

Europa Gesamt Planteinheiten Thsd ha

Source: Official statistics,
+ own estimates RAPOOL/NPZ

Wir lassen Qualität wachsen

LEMBKE®
Wir lassen Qualität wachsen

WOSR EUROPE HYBRID SEED AREA F2012/13

PLANTINGS
Hybrid seed % CS
MARKET SHARES
FORECAST 2012/13

Source: estimations RAPOOL/ NPZ

EU 15   + 19%   2.8 Mln ha (81%)
+ NMS   + 4%    1.4 Mln ha (73%)
EU 27   + 14%   4.2 Mln ha (77%)
CIS     + 4%    0.5 Mln ha (53%)
* EU 27 + Ukraine, Certified seed area

Source: estimations RAPOOL / NPZ
WOSR EU27 VARIETY APPLICATION DEVELOPMENT

Main countries: DE / FR / UK / DK / PL / CZ / SK / HU

Source: National variety registration offices, compiled by RAPOOL

F1, OP 00-Quality
SPEC incl. HEAR, HOLL, SD

F2012 87% F1 12% OP
Wir lassen Qualität wachsen

WOSR EU27 VARIETY REGISTRATION DEVELOPMENT

Source: National variety registration offices, compiled by RAPOOL
Harmonisation via CPVO (?)
On going discussions
## OSR hybrid systems

<table>
<thead>
<tr>
<th>Type</th>
<th>Territory</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polima</td>
<td>CMS</td>
<td>China</td>
</tr>
<tr>
<td>OGU INRA</td>
<td>CMS</td>
<td>Worldwide</td>
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<tr>
<td></td>
<td></td>
<td>Protoplast fusion (patented)</td>
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<tr>
<td>MSL</td>
<td>GMS</td>
<td>Worldwide</td>
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<tr>
<td></td>
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<td>NPZ development</td>
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<tr>
<td>trigenic GMS</td>
<td>GMS</td>
<td>China</td>
</tr>
<tr>
<td>SeedLink</td>
<td>GMS</td>
<td>Canada</td>
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<tr>
<td></td>
<td></td>
<td>Transgenic (patented) plus herbicide tolerance</td>
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</tbody>
</table>
Hybrid yield stability factors

1. Sowing
   - Later sowing dates
     ✓ Flexibility
   - Sowing density
     ✓ Efficiency plants/m²

2. Early development
   - Plant / Root growth
     ✓ Hybrid vigour
     ✓ Weed suppression

3. General stress tolerance
   - Abiotic factors
     ✓ Adaptation to extremes
     ✓ **Winter hardiness**
     ✓ Drought tolerance
   - Biotic factors
     ✓ Plant health / Vigour
     ✓ Regenerative ability

4. Further considerations:
   ✓ Crop rotation support
   ✓ Soil cultivation (Reduced tillage)
   ✓ Optimum fertilisation
   ✓ Integrated Disease & Pest Management
Fluctuations in EU27 yield development

WOSR Germany

WOSR France

WOSR Poland
Winter kill crop losses 2012 as compared to plantings 2011

EU 15 - 3% 3.9 Mln ha
+ NMS - 29% 1.6 Mln ha
EU 27 - 12% 5.5 Mln ha
CIS - 28% 1.2 Mln ha

Source: Official statistics,
+ own estimates RAPOOL / NPZ
Poland after winter/ deep freeze impact ( February 2012 )

WOSR Poland 2011/12
796,6 thsd ha sown
29,3% severely damaged
635,3 thsd ha harvested
approx. 20% ploughed...

Source: GUS 04/2012 modified
Differentiation in winter hardiness / stem elongation tolerance
RAPOOL network 2011/12 – Stem Elongation & Winter Hardiness

\[ y = -0.57x + 9.6926 \]

\[ R^2 = 0.4491 \]
Winter hardiness and re growth / regeneration in spring

VISBY Wagrowiec, 23.03.2012

VISBY Wagrowiec, 02.04.2012 (2 weeks later)
Winter hardness and re growth / regeneration in spring

LSV Neuenstein 07.03.2012

LSV Neuenstein 17.04.2012 (6 weeks later)
Winter hardiness and regrowth / regeneration in spring

Varieties in trial

< 25 dt/ha

> 25 dt/ha

__LSV loc Neuenstein, Baden-Württemberg (due to winter kill not evaluated)__

Source: Winter kill scoring 2012, Versuchsfeldführer Neuenstein
UK Recommended list 2008 – 2012 Stem Stiffness (with pressure*)

* With at least one variety with a score of 5 or less
Summary & Outlook

• European oilseed rape acreage has grown enormously over the last decade in correlation with large percentage of hybrid adoption.

• Variety application and registration have turned accordingly towards hybrid varieties.

• Environmental stress increasing. Winters comeback during the last 3 years.

• Winter hardiness complex has shown breeding progress and differentiation.

• Straw Stiffness remains an important agronomic character

• Many further objectives for the Breeding community...!