Results from a Brassica Variety Trial in MN and MI

John Durling, USDA-NRCS Rose Lake PMC
Miriam Gieske, Univ. of Minn.
Victoria Ackroyd, Michigan State Univ. Extension
John Durling, USDA-NRCS Rose Lake PMC
University of Minnesota St. Paul, MN
Well-drained silt loam

USDA-NRCS Rose Lake Plant Materials Center East Lansing, MI
Poorly-drained loamy sand
### PREVIOUS CROP & CULTURAL PRACTICES

<table>
<thead>
<tr>
<th>Soybean green manure</th>
<th>Oats</th>
</tr>
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<tbody>
<tr>
<td>Soybeans mowed August 2010</td>
<td>Grain harvested August 2010</td>
</tr>
<tr>
<td>Soybeans (50-60 lbs/acre N) incorporated with tillage</td>
<td>Straw and 30 lbs/acre N incorporated with tillage</td>
</tr>
</tbody>
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### FIELD PLOT DESIGN & MANAGEMENT

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Randomized complete block with 4 replicates</td>
<td></td>
</tr>
<tr>
<td><strong>19 or 20 accessions of</strong> Raphanus sativus and Brassica spp.</td>
<td></td>
</tr>
<tr>
<td>Planted 17 August 2010</td>
<td>Planted 13 August 2010</td>
</tr>
<tr>
<td>Oilseed and tillage radish @ 10 lbs/acre</td>
<td></td>
</tr>
<tr>
<td>Mustard @ 8 lbs/acre</td>
<td></td>
</tr>
<tr>
<td>Rapeseed @ 5 lbs/acre</td>
<td></td>
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<tr>
<td>Forage turnip @ 2 lbs/acre</td>
<td></td>
</tr>
<tr>
<td>Hand weeding 7 days after planting</td>
<td></td>
</tr>
<tr>
<td>Herbicide to manage volunteer oats</td>
<td></td>
</tr>
<tr>
<td>No irrigation</td>
<td>Irrigation</td>
</tr>
</tbody>
</table>
Rose Lake (MI)

Photo by Sergio Perez, Rose Lake PMC
## DATA COLLECTION

Canopy cover and flowering at 1-2 week intervals late August through mid-November

<table>
<thead>
<tr>
<th>Two 0.25 m² subsamples</th>
<th>One 2 ft² subsample</th>
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</thead>
<tbody>
<tr>
<td>Biomass and % nitrogen</td>
<td>Biomass and % nitrogen</td>
</tr>
<tr>
<td>mid-October</td>
<td>mid-October</td>
</tr>
<tr>
<td>at 64 days after planting</td>
<td>at 60 days after planting</td>
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</tbody>
</table>

Other plant growth parameters for crop models
Victoria Ackroyd, Michigan State Univ. Extension
GDD calculated using base $50^\circ\text{F}$, no cutoff. Data points correspond to 17, 30, 45, 59, and 76 days after planting.

*GDD calculated using base $50^\circ\text{F}$, no cutoff. Data points correspond to 17, 30, 45, 59, and 76 days after planting.
% Cover (MI)

*GDD calculated using base 50°F, no cutoff. Data points correspond to 14, 28, 45, 60, 75, and 89 days after planting.

8 Yr Avg. GDD 266 476 675 771 810 841

Groundhog  Pacific Gold  Pasja

Accumulated Growing Degree Days (GDD)
% Cover October 25

Planted August 16

Planted August 30

Planted September 13

Planted September 29

Photos by Miriam Gieske, Univ. of Minn.
Roots, Roots, and More Roots:

Groundhog radish, MN, Oct. 30

Pasja turnip, MN, Oct. 16

Worm castings

Groundhog radish, MN, Oct. 16

Photos by Miriam Gieske, Univ. of Minn.
Radishes

OSR Driller

OSR Daikon Nema Common
Forage Turnip and Rapeseed

Forage Turnip Pasja

Rapeseed Dwarf Essex
Miriam Gieske, Univ. of Minn.
Shoot and total biomass were greater in MN than in MI.

Radish had greater root biomass and root:shoot ratio than the other species.

Average total biomass ranged from 1.7 to 3.1 tons per acre.
Radish varieties did not differ significantly in shoot or total biomass.

Driller radish had a higher root biomass and root:shoot ratio than the other varieties in MN but not in MI.

Total radish biomass ranged from 1.6 to 2.2 tons/acre in MI and 2 to 3.2 tons/acre in MN.
What You See, What You Get

OSR Defender

OSR Defender
Root:Shoot Ratios – No Surprise

Mustard Pacific Gold

OSR Groundhog
Nitrogen Accumulation by Species

- Brassicas accumulated 95-145 lbs/acre N.
- Most of the N was in the shoots.
- In MI, turnips accumulated significantly more N than mustards.
Victoria Ackroyd, Michigan State Univ. Extension
Flowering and Pollinators (MI)

November 10, 2010
Flowering and Seed Set (MN)

• Brown mustard, Ida Gold and Pacific Gold had green seed pods Nov. 8.

• Nema Common Daikon and Midwood Daikon had a few plants with flowers or green seed pods.

• The rapeseed, turnips, and most of the “named” radishes (e.g. Driller, Groundhog) did not bloom.
Flowering and Seed Set (MI)

- Most of the named radishes did not flower; neither did the turnips and rapeseed.

- All of the mustards flowered, as did Daikon VNS, Daikon Nema Common, and Midwood Daikon.

Photo by Victoria Ackroyd, MSUE
Hardiness and Winter Kill

- Brassicas will generally tolerate light frosts, and are hardy to at least 28° F.
- There have been reports of oilseed radish overwintering under snow cover.
- Hardiness is another component of this study which we will continue investigating this spring.
Thanks to…

• Dave Burgdorf, John Durling, Elaine Gerona, Jerry Grigar, Bill Kuenstler, John Leif, and Sergio Pérez of USDA-NRCS

• Don Wyse, Bev Durgan, Doug Miller, Brad Kinkaid, Kevin Betts, Joshua Larson, Jackeline Verra, João Benevides, and Miriam Gieske of the Univ. of Minn

• Dale Mutch, Dean Baas, Todd Martin, Tim Dietz, Victoria Ackroyd, Paul Gross, and Christina Curell of Michigan State Univ. and MSU Extension

• Funding sources including Project GREEEN and the Great Lakes Regional Water Program
Thank you. Questions?

Pacific Gold mustard (left) and Midwood Daikon.