Weed dynamics and management strategies for cropping systems in the northern Great Plains

Doug A. Derksen *, Randy L. Anderson b, Robert E. Blackshaw c and Bruce Maxwell d

Abstract

Cropping systems in the northern Great Plains (NGP) have evolved from wheat (Triticum aestivum L.)–fallow rotations to diversified cropping sequences. Diversification and continuous cropping have largely been a consequence of soil moisture saved through the adoption of conservation tillage. Consequently, weed communities have changed and, in some cases, become resistant to commonly used herbicides, thus increasing the complexity of managing weeds. The sustainability of diverse reduced tillage systems in the NGP depends on the development of economical and effective weed management systems. Utilizing the principle of varying selection pressure to keep weed communities off balance has reduced weed densities, minimized crop yield losses, and inhibited adverse community changes toward difficult-to-control species. Varied selection pressure was best achieved with a diverse cropping system where crop seeding date, perennation, and species and herbicide mode of action and use pattern were inherently varied. Novel approaches to cropping systems, including balancing rotations between cereal and broadleaf crops, reducing herbicide inputs, organic production, fall-seeded dormant canola (Brassica napus and B. rapa), and the use of cover crops and perennial forages, are discussed in light of potential systems-level benefits for weed management.

Please view the pdf by using the Full Text (PDF) link under 'View' to the left.

### Agronomy Journal

<table>
<thead>
<tr>
<th>Articles Published</th>
<th>21810</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Downloads</td>
<td>3167601</td>
</tr>
<tr>
<td>Average downloads per article</td>
<td>145</td>
</tr>
</tbody>
</table>

### Article History

<table>
<thead>
<tr>
<th>Downloads (6 weeks)</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Downloads (1 year)</td>
<td>101</td>
</tr>
<tr>
<td>Downloads (cumulative)</td>
<td>1909</td>
</tr>
</tbody>
</table>

### Cited By

- Impact of cropping systems on the weed seed banks in the northern Great Plains, USA
  - Weed Biology and Management
  - 2009 9:2
- Weed species composition and density under conservation agriculture with varying fertiliser rate
  - South African Journal of Plant and Soil
  - 2018 35:5
- Application method of nitrogen fertilizer affects weed growth and competition with winter wheat
  - Weed Biology and Management
  - 2004 4:2
- Reduced herbicide doses in field crops: A review
  - Weed Biology and Management
  - 2006 6:1
- Effects of human-mediated processes on weed species composition in internationally traded grain commodities
  - Weed Research
  - 2008 48:1
- The possibilities of weed control in the intercropping system of field pea and oats
  - Acta herbologica
  - 2018 27:2
- Slowing weed evolution with integrated weed management
  - Canadian Journal of Plant Science
  - 2013 93:5
- Occurrence of Viruses in Wheat in the Great Plains Region, 2008
  - Plant Health Progress
  - 2009 10:1
- Cultivar and Nitrogen Splitting Effects on Amaranth Forage Yield and Weed Community
  - Pakistan Journal of Biological Sciences
  - 2008 11:1
- Biology of milk thistle (Silybum marianum) and the management options for growers in north-western Pakistan
  - Weed Biology and Management
  - 2009 9:2
- Annual warm-season grasses vary for forage yield, quality, and competitiveness with weeds
  - Archives of Agronomy and Soil Science
  - 2011 57:8
- Weed Communities in Semiarid Rainfed Croplands of Central Argentina: Comparison between Corn (Zea mays) and Soybean (Glycine max) Crops
  - Weed Science
  - 2018 66:03
However, there is only sparse information on infestation by weeds in the cultivation of winter spelt. In this study, it was assumed that this crop is invaded by weeds to a lesser extent than wheat, especially after unfavorable forecrops. The study was based on a field experiment conducted in the east part of Poland. Derksen DA, Anderson RL, Blackshaw RE, Maxwell B. Weed dynamics and management strategies for cropping systems in the Northern Great Plains. Agron J. 2002;94(2):174–185. https://doi.org/10.2134/agronj2002.1740. Sieling K, Stahl C, Winkelmann C, Christen O. Growth and yield of winter wheat in the first 3 years of a monoculture under varying N fertilization in NW Germany. Cropping systems in the northern Great Plains (NGP) have evolved from wheat (Triticum aestivum L.)-fallow rotations to diversified cropping sequences. Diversification and continuous cropping have largely been a consequence of soil moisture saved through the adoption of conservation tillage. The sustainability of diverse reduced tillage systems in the NGP depends on the development of economical and effective weed management systems. Utilizing the principle of varying selection pressure to keep weed communities off balance has reduced weed densities, minimized crop yield losses, and inhibited adverse community changes toward difficult-to-control species.