Russian-thistle Management

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Russian-thistle History in North America

• Native to mountainous regions of southwest Asia (Ukraine)
• First introduction to North America in 1873 near Scotland, SD
  – Contaminant of flax seed brought by German-Russian immigrants
Russian-thistle Ecology

• Aggressive primary colonizer and early successional species of disturbed sites
• Declines as succession proceeds
• Typical sites
  – Overgrazed range and pasture
  – Roadsides and right-of-ways
  – Waste ground
  – Cropland, especially small grains

http://courses.missouristate.edu
Russian-thistle Biology

• Summer annual
• C4 photosynthesis
  – High water use efficiency
• High soil water extraction
  – Down to 2% by volume
  • Wheat to 4% by volume
  – Extensive tap-root system
    • 5 ft. wide x 6 ft. depth
• Salt-, heat-, and drought-tolerant
Russian-thistle Biology

• Does not produce true seed
  – calyx contains coiled seedling
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• Germination consists of uncoiling
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• Relatively low moisture required for germination over wide range of temperatures
  – Contributes to prolonged emergence period
Russian-thistle Biology

- Indeterminate growth and flowering
  - initiated early summer, continuing through first killing frost
- High seed production
  - 150,000+ by large plants
- Tumbleweed habit
Russian-thistle Growth

Dry weight (oz/plant)

- Fallow
- Spring wheat
- Winter wheat

Harvest dates

PNW492 – Young, Veseth, Thill, Schillinger, and Ball.
Russian-thistle Seed Production Following Spring Wheat Harvest

Seed production (no./plant)

1-Aug, 15-Aug, 29-Aug, 12-Sep, 26-Sep, 10-Oct

PNWCTHS17 – Schillinger, Young, Schafer, and McGrew.
Gene Flow From Seed

61,700 seeds → 3 miles/42 days → 11 seeds/yd² → 15,800 seeds

Russian thistle seed dispersal
Russian-thistle Impacts

• Economic
  – Direct control and yield losses estimated to cost growers over $50 million annually (2006 values)

• Agronomic
  – Soil water loss
  – Present throughout rotation
  – Contributes to avoidance of spring crops

• Conservation
  – Promotes use of tillage
Russian-thistle Diversity

- Anecdotal and observational evidence suggests multiple stable ‘morphotypes’ are present in the Inland Pacific Northwest.
- Work in California uncovered unexpected diversity.
Russian-thistle Sample Points

288 Individuals from 72 Sites
Russian-thistle Diversity
Russian-thistle Diversity

Phenotypic characters of note in 2014

Leaf Morphology
Russian-thistle Diversity

Phenotypic characters of note in 2014

General growth form
Russian-thistle Diversity

Phenotypic characters of note in 2014

Density of branching
Russian-thistle Diversity

Phenotypic characters of note in 2014

Bract Arrangement
Russian-thistle Diversity

• Characterize genetic variability and define groups
• Describe consistent and easily observed phenotypic differences between groups
• Screen groups for response to commonly used herbicides
Post-Harvest Russian-thistle Control
Lind, WA

- Two application times
  - Dawn
    - Air temp. = 61/57 F
    - Soil temp. = 53/70 F
    - RH = 60/64%
  - Mid-afternoon
    - Air temp. = 91/84 F
    - Soil temp. = 84/84 F
    - RH = 17/25%
Post-Harvest Russian-thistle Control

2013 - 4 WAT

Visual control (%)

- Morning
- Afternoon

Gramoxone Inteon (48)
Gramoxone + Karmex (32 + 5)
Buctril + Dicamba (24 + 8)
Roundup PowerMax (32)
Roundup PowerMax (64)
Roundup + Sharpen (32 + 1)
Post-Harvest Russian-thistle Control

2014 - 4 WAT

Visual control (%)

Grammar Inteon (48)
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Morning
Afternoon
Russian-thistle Control in Spring Wheat

Russian-thistle visual control (%)

Spartan 4F rate (oz/acre)

1 2 3 4 5

- 0 10 20 30 40 50 60 70 80 90 100

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Russian-thistle Management Strategies – in Crop

• Grow a competitive wheat crop
  – Winter wheat more competitive than spring wheat
  – Fertilize, use competitive varieties, large seed, narrow row spacing, etc.
  – If spring wheat is planted:
    • Seed early, shallow, and in narrow rows
    • Place fertilizer below and near seed
    • Minimize tillage
Russian-thistle Management Strategies – in Crop

• Use a tank mix of herbicides with at least two mechanisms of action that are effective for Russian-thistle control
  – Huskie + 2,4-D or MCPA
  – Starane NXT
  – Rave
  – Dicamba + 2,4-D

• Apply before weeds are 2 inches tall
  – First plants to emerge are most competitive
Russian-thistle Management Strategies – in Crop

• Consider a pre-harvest herbicide application
  • 2,4-D
  • WeedMaster (dicamba + 2,4-D)
  • Aim EC
  • glyphosate
    – Improves harvest efficiency
    – Reduces weed size, seed production, and soil water use
    – May eliminate need for post-harvest tillage
Russian-thistle Management Strategies – in Fallow

- Consider a post-harvest herbicide application
  - Gramoxone SL 2.0
  - Glyphosate
    - Apply within 10 to 14 days of harvest
- Consider tillage within 2 weeks of harvest
- Delay spring herbicide application or tillage until after first heavy flush of Russian-thistle
Non-labeled Uses

Some of the pesticides discussed in this presentation were tested under an experimental use permit granted by WSDA. Application of a pesticide to a crop or site that is not on the label is a violation of pesticide law and may subject the applicator to civil penalties up to $7,500. In addition, such an application may also result in illegal residues that could subject the crop to seizure or embargo action by WSDA and/or the U.S. Food and Drug Administration. It is your responsibility to check the label before using the product to ensure lawful use and obtain all necessary permits in advance.
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- Insects, Diseases, and Weeds
- Organic Production
- Soil and Fertilizer Management
- Current Market Prices
- And more

Dynamic decision tools will help you:
- Select the right variety for your region
- Analyze nitrogen levels
- Predict yield of spring wheat
- And more
Questions?