Straw Management and Crop Rotation Alternatives to Stubble Burning:

Assessing Crop Rotation and Weed Management Options

Co-Principle Investigators

Dave Huggins, Soil Scientist

Drew Lyon, Weed Scientist

Kate Painter, Ag. Economist

New Project Objectives

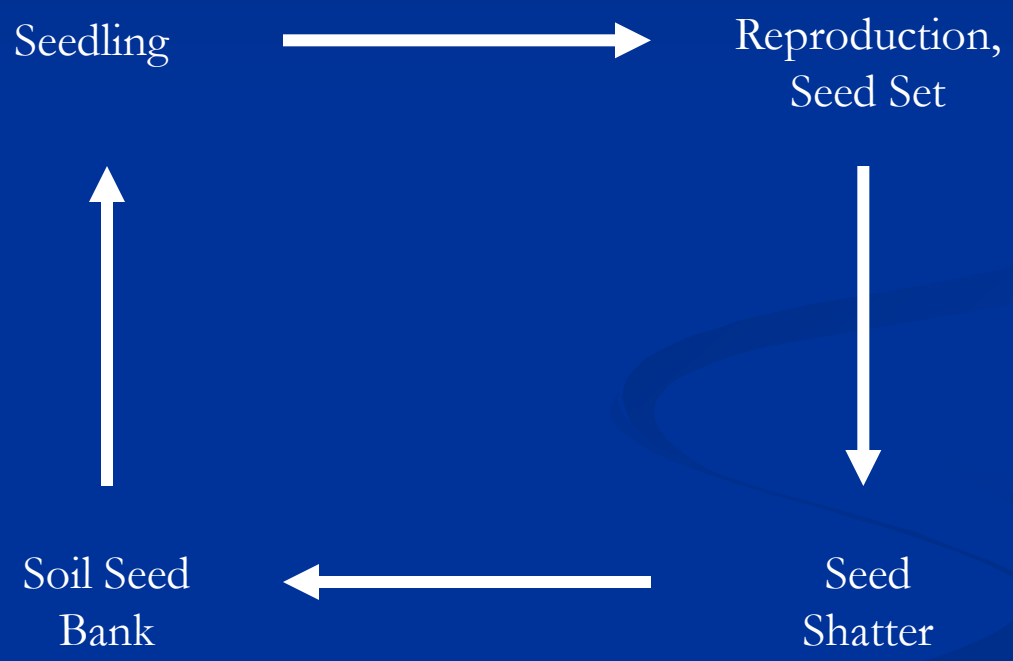
- Identify and economically assess crop rotations and sequences that benefit from retaining winter wheat residues in direct-seed systems;
- Document effects of wheat straw management on several troublesome grass weeds; and
- Convey project findings through electronic and print media, field days, conferences and research site tours.

Weed Management

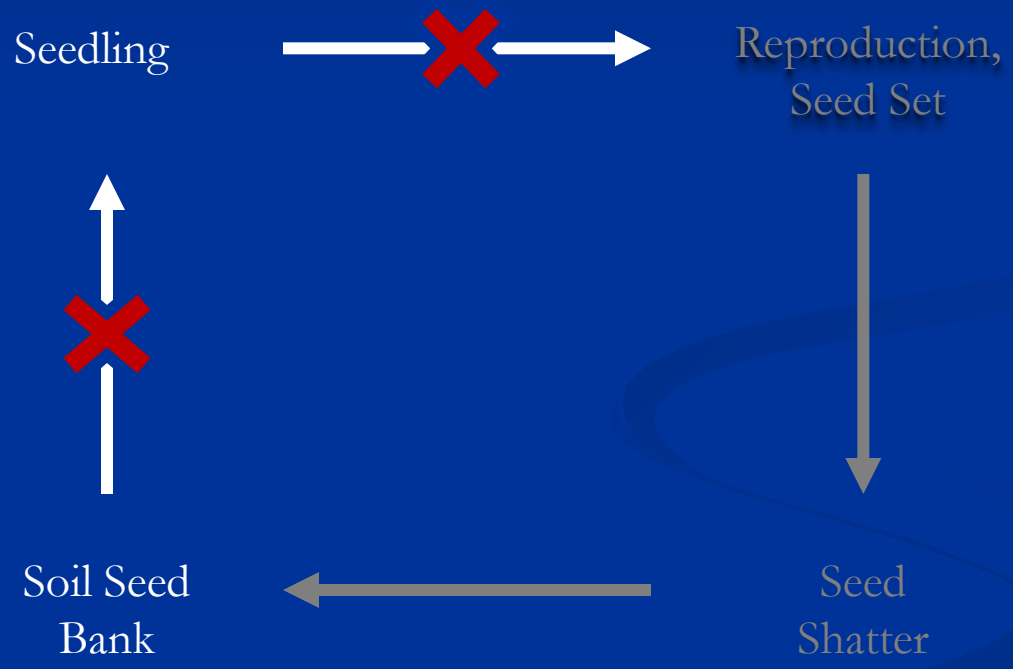
Conservation Farming and Herbicide Resistance

- Direct seed and reduced tillage systems dependent on herbicides for weed control
- Herbicide resistance a growing problem worldwide and in the Pacific Northwest
- Last new herbicide mode of action introduced 20 years ago, nothing new expected for another 20 years

Weed Life Cycle



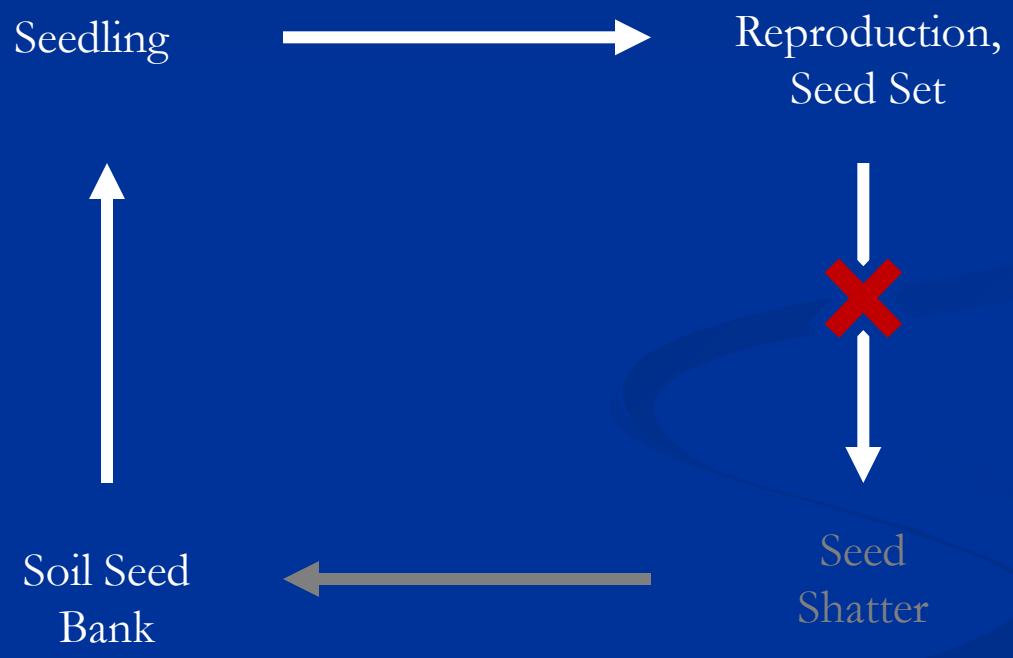
Interrupting Weed Life Cycle, Herbicides



Weed Seed in Chaff Fraction

Rewarding the Survivors!!

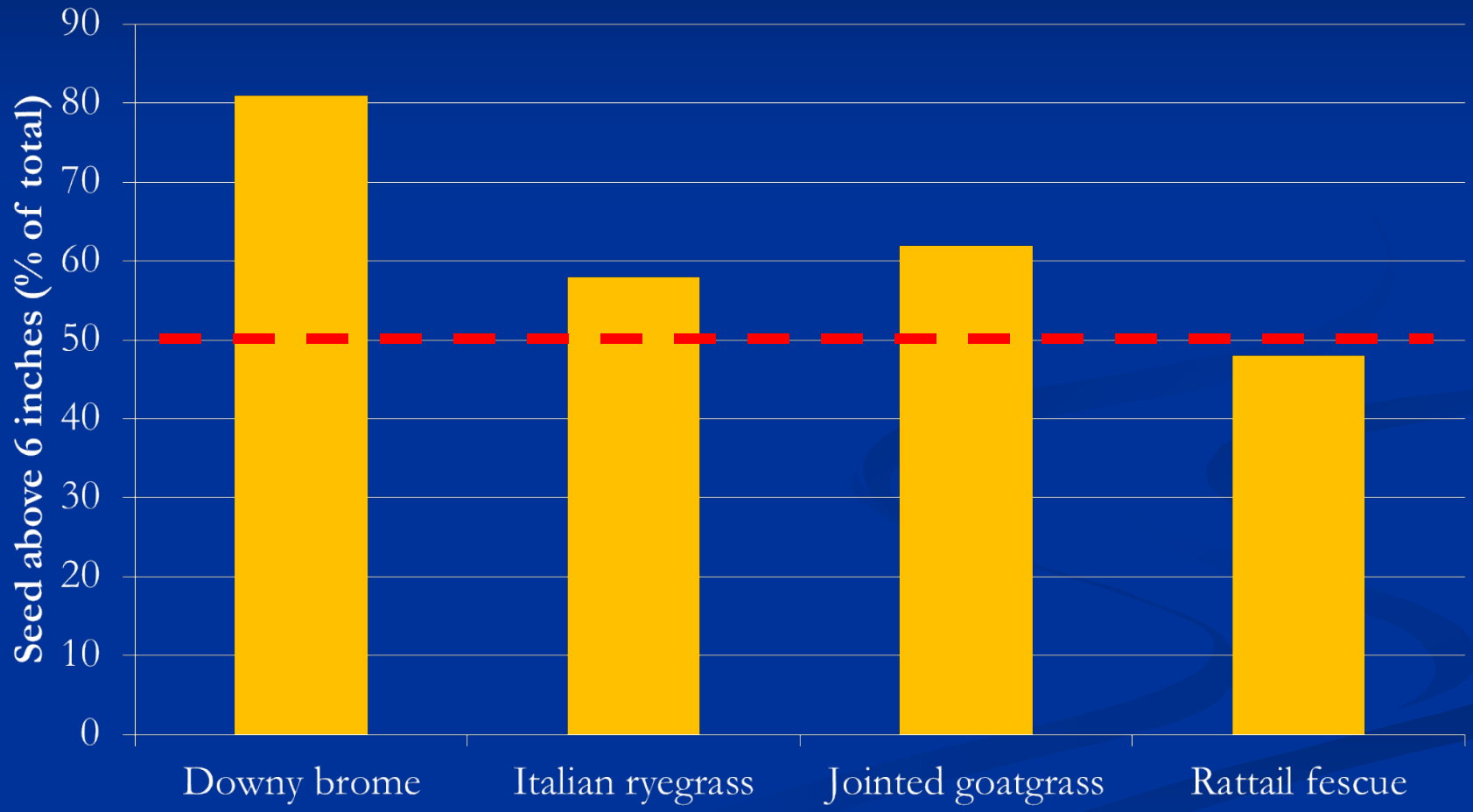
Interrupting Weed Life Cycle, Harvest Weed Seed Control



Harvest Weed Seed Control

- Biological attribute needed for system to work: mature seed do not shatter before grain harvest, held above cutting bar height

Seed Retention at Harvest



Narrow Windrow Burning

Concentrate residues at harvest

Burn residues in autumn

Narrow Windrow Burning

99% control of *Lolium* and *Raphanus*

Most Western Australian growers use this technique

Pullman Study
Windrows to be Burned

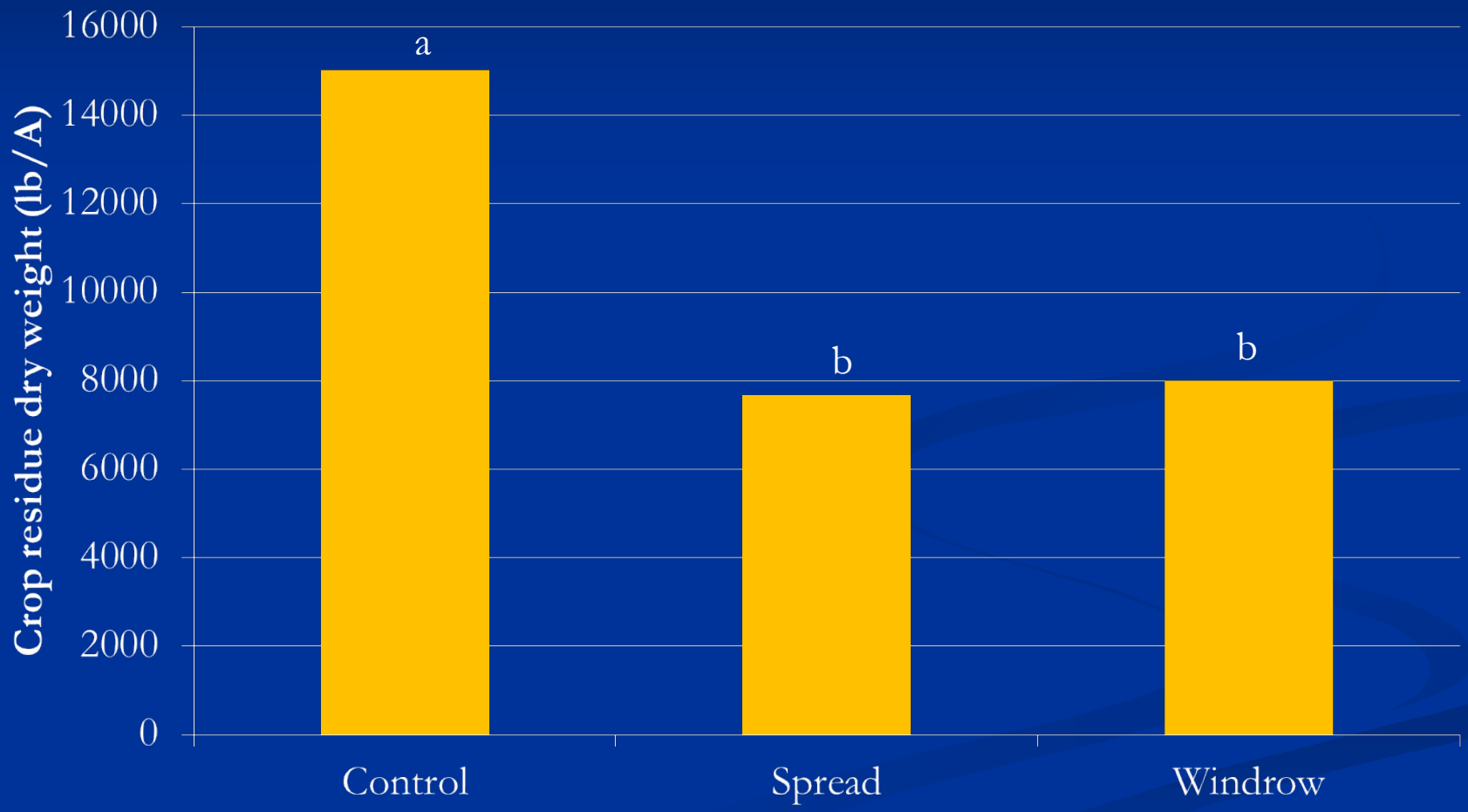
Burning Windrows

Burning All Crop Residue

Three Weeks After Burning

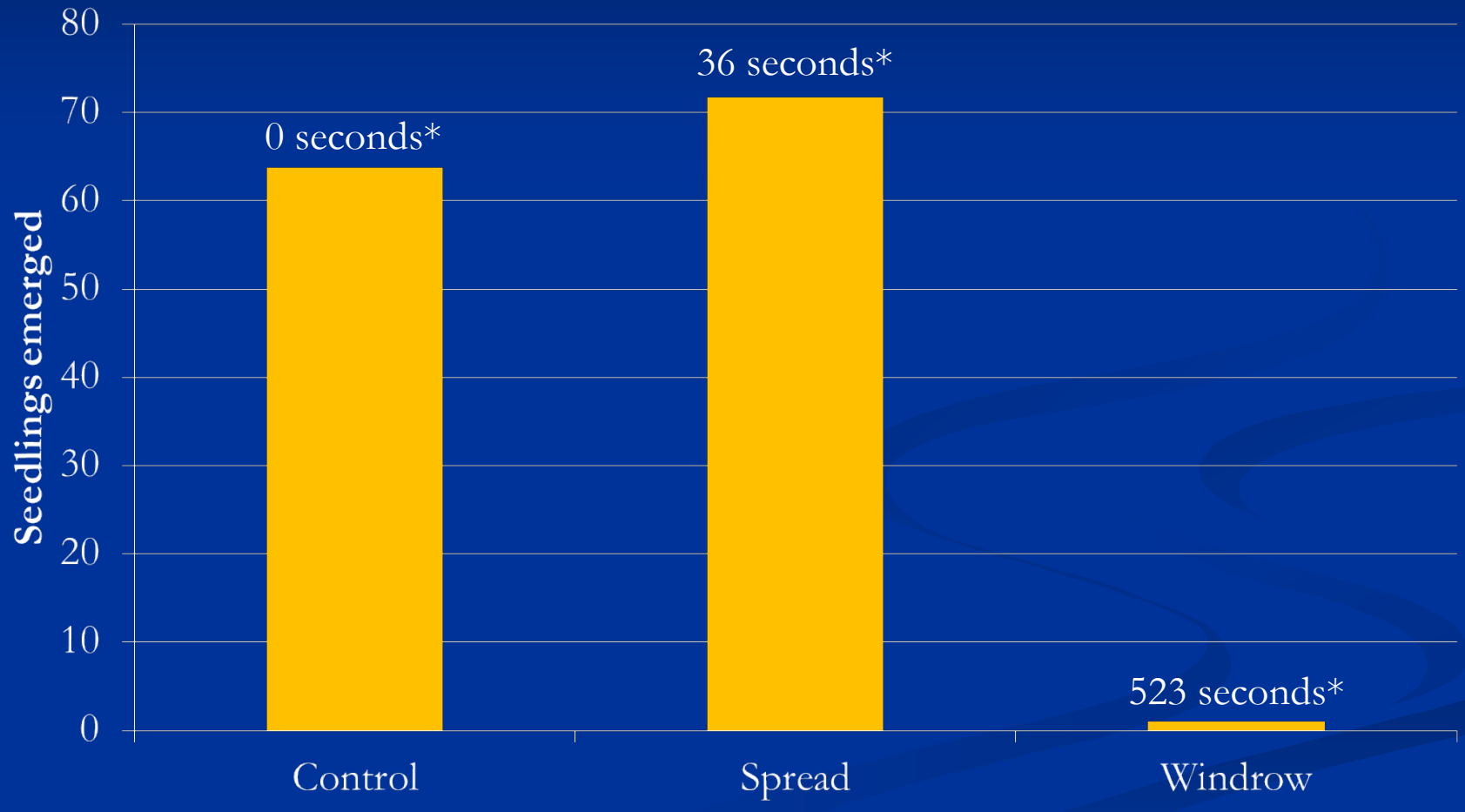
Collecting Crop Residues

Crop Residue after Burning



Germinating Italian Ryegrass After Burning

Italian Ryegrass Survival



* Seconds above 100° C

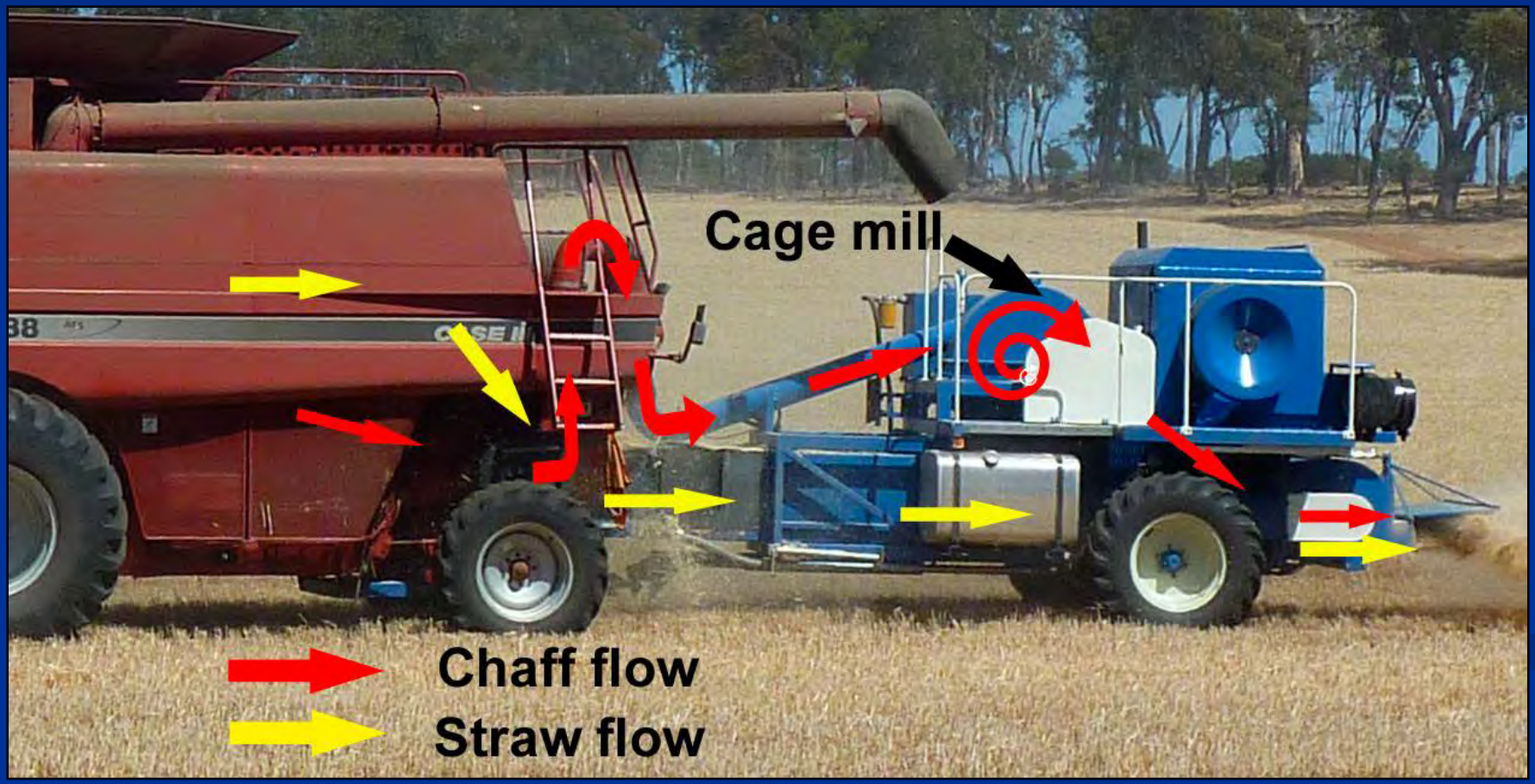
Alternatives to Field Burning
Chaff Collection

Up to 85% of *Lolium* and *Raphanus* seed collected and removed

Glenvar Bale Direct System

Up to 95% of *Lolium* seed collected and removed in baled harvest residues

Harrington Seed Destructor



Future Work

- Investigate potential for non-burning harvest weed seed control
- Repeat seed harvest, burning trials in 2014
- Possible field scale demonstration plots, grower outreach

Crop Rotation

Crop Rotation

Crop Rotation

- Pairs of burned and non-burned plots established Oct 2013 in ww stubble
- Will be planted to garbanzo beans, spring barley, spring wheat, and spring canola for 2014
- Data collection spring-fall 2014 – pathogens and yield
- Completes 2 years of previous data

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Questions?