

Western Regional IPM Grants Research/Extension Accomplishments Report

INSTRUCTIONS: PLEASE PROVIDE ONLY THE ESSENTIAL COMPONENTS OF ACCOMPLISHMENT WHICH ARE:

1. A CLEAR IDENTIFICATION OF THE PROBLEM/ISSUE ADDRESSED BY THE RESEARCH/EXTENSION.
2. A CONCISE EXPLANATION OF HOW THE RESEARCH/EXTENSION ACHIEVEMENT CONTRIBUTED TO THE SOLUTION OF THE PROBLEM/ISSUE BEING RESEARCHED.
3. THE IDENTIFICATION OF OTHER BENEFITS RESULTING FROM THE RESEARCH/EXTENSION, EVEN IF UNPLANNED.
4. PLEASE ATTACH A SUMMARY OF THE PAST YEARS PROGRESS, ONE PAGE MINIMUM.

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PROJECT NUMBER: 2006-34103-16968

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PROJECT TITLE: Wheat seed quality effects on competitive ability with wild oat

PRINCIPAL INVESTIGATOR: Bob Stougaard

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CO-PIs or TEAM MEMBERS: Qingwu Xue, Joe Yenish, and John Burns

THE PROBLEM, ISSUE, OR REASON FOR CONDUCTING THE

RESEARCH/EXTENSION: Wild oat management systems have evolved to the point that producers rely on herbicides to the virtual exclusion of all other strategies. While generally effective, herbicide use erodes profits and poses concerns with respect to environmental quality. Moreover, despite the intensive use of herbicides, wild oat populations continue to persist! Wild oat seed dormancy and variable herbicide efficacy contribute to this problem. However, this situation is worsened due to the wide spread occurrence of herbicide resistant biotypes. A strict reliance on herbicides for wild oat management has not been sufficient. It is therefore critical that integrated weed management systems be developed that provide for more consistent reductions in wild oat growth and fecundity. This requires a proactive approach that shifts focus to the crop rather than the weed, and thus an emphasis on improving crop competitive ability.

THE SINGLE MOST IMPORTANT ACCOMPLISHMENT OR BENEFIT RESULTING FROM THIS RESEARCH/EXTENSION: Crop competitive ability increased as seed size increased.

Plants established from large seed had more rapid emergence, greater initial leaf area and produced greater biomass than plants derived from small seed. Consequently, the use of large seed sizes increase yields by 25% compared to systems where plants were derived from small seed. Similar yield benefits also were realized when reduced rate herbicide applications were included in the system. The effects of wheat seed protein and gibberellic acid (GA) seed treatments were less evident. Seed protein content had minimal effect on wheat competitive ability at Kalispell, which may be related to the high residual nitrate levels present at the site. However, wheat biomass did increase with seed protein at the Pullman location, but only with plants derived from small seed. GA seed treatments occasionally resulted in crop injury, reducing wheat biomass, competitive ability and yield.

ADDITIONAL BENEFITS, SUCH AS:

SOCIAL BENEFITS -

ECONOMIC BENEFITS -

ENVIRONMENTAL BENEFITS -

OTHER -

Wheat seed quality can be manipulated to favor the crop over the weed. The resultant improvement in competitive ability improves weed control, reducing yield losses and dockage penalties in the process. This technology correspondingly improves herbicide efficacy. In turn, this could reduce herbicide input costs, environmental contamination and slow the development of herbicide resistance. If robust associations between these seed quality factors and competitive ability are realized, all three traits could ultimately be used to initiating a breeding program directed toward the development of competitive small grain varieties.

PLEASE SUBMIT A HIGH RESOLUTION DIGITAL IMAGE REPRESENTATIVE OF YOUR RESEARCH/EXTENSION PROJECT THAT WE CAN USE TO HIGHLIGHT YOUR PROJECT!

When you have completed this form, return to both:

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THIS FORM WAS COMPLETED BY:

Bob Stougaard, professor
(Name and Title)