

**Research Proposal for the Agricultural Research Foundation
Oregon Wheat Commission**

TITLE: **Development of Yellow Nutsedge Management Strategies in Wheat**

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COOPERATOR(S): Lynn Jensen, Malheur County Extension
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BASF, DOW, and Syngenta Company area representatives

FUNDING HISTORY: No funding prior to this request
Amount requested for fiscal year 2010-2011.....\$16,450

ABSTRACT: Winter wheat is by far the preferred rotational crop preceding onion mainly because it does not generate excessive amount of crop residue. Growers are easily able to plow under and incorporate the wheat stubble to buildup soil structure and improve soil quality. Since wheat is harvested in July, growers have ample time to prepare the fields, fumigate the soil, and form beds during the fall preceding planting of onions. Growers tend to irrigate the fields immediately after wheat harvest to create favorable plowing conditions. This practice tends to stimulate growth of yellow nutsedge that had been suppressed by the wheat canopy. As a result, new tubers are produced to rejuvenate the ample supply in the soil seedbank. The proposed project will study the positive contributions of growing Clearfield Wheat and spraying Beyond® herbicide, which has a proven efficacy on yellow nutsedge. We further intend to evaluate KIH-485 herbicide for yellow nutsedge suppression in winter wheat. KIH-485 is a new herbicide being developed by Kumiai Chemical Industry for possible use on wheat. Evaluation of herbicides is a required process for EPA registration of new products for use on all crops. The information we seek will include weed efficacy (including yellow nutsedge control), crop tolerance, and environmental behavior in the high pH soils of the Treasure Valley in Eastern Oregon. Yellow nutsedge has become a crop production threat in the Treasure Valley, and the products currently being used to control weeds in winter wheat do not control the weed. If adopted, the use of Beyond® herbicide on Clearfield Wheat as well as KIH-485 on conventional wheat may reduce yellow nutsedge in successive crops grown in rotation.

OBJECTIVES:

1. Evaluate yellow nutsedge control with Beyond® herbicide in Clearfield Wheat.
2. Evaluate new wheat herbicides for weed control (including yellow nutsedge) in wheat and soil residue effects on rotational crops.

PROCEDURES:

1). Field studies will be conducted at the Malheur Experiment Station to evaluate yellow nutsedge control with Beyond® herbicide on Clearfield Wheat. The field will be plowed, disked to create a suitable seedbed, and bedded on 30-inch spacing following standard winter wheat production procedures in furrow irrigate fields. Herbicide treatments will be applied post-emergence (POST) during spring following label recommendations. Herbicide treatments will include Beyond® alone and as a tankmix partner with other herbicides including Clarity®, Buctril®, MCPA amine®, KIH-485, and Bronate®. Studies will follow a randomized complete block design with four replications of each treatment in the study. Herbicide treatments will be applied using a CO₂ pressurized backpack sprayer fitted with a boom equipped with six EVS8002 flat fan nozzles. Treatments will be applied in 20 gallon per acre spray volume. The wheat plots will be evaluated for weed control and crop injury visually at 7, 21, 42 days after treatment and just before harvest. Visual rating scale of 0-100% (where 0%=no weed control/no crop injury and 100%=complete crop damage/excellent weed control) will be used. A small plot harvester will be used to harvest wheat at maturity. Yield parameters established by USDA for winter wheat will be used to determine the final marketable yield.

2). A field study will be established to evaluate KIH-485, a new herbicide being evaluated developed and evaluated for weed control in wheat. KIH-485 is a soil active herbicide and may provide yellow nutsedge control in wheat. The study will also include newly registered products that have not been evaluated in the Treasure Valley; including GoldSky® and PowerFlex® from Dow AgroScience and Sharpen™ from BASF. The herbicides will applied alone and as tankmix partners with standard products on the market for weed control in wheat. Upon harvest, the study area will be geo-referenced, disked, and plot integrity maintained to allow seeding of rotational crops to test soil persistence under the high pH soils of the Treasure Valley. Rotational crops in the successive year will be sugar beet, onion, and dry beans. The study will follow a randomized complete block design with four replications. Wheat crop will be visually evaluated for injury and level of weed control at 7, 21, and 42 days after treatment. The visual scale described in the previous section will be used. Rotational crops will be visually evaluated for injury following similar procedures at 7, 14, 21, 28, and 42 days after emergence. These results will help to assure growers the safety of these products to crops grown in rotation with wheat. The data from both objectives will be subjected to analysis of variance using appropriate procedures and means compared using Fisher's protected least significant difference (LSD) at $P \leq 0.05$.

TIMELINES:

1). Clearfield Wheat will be seeded during fall 2010 and treatments applied spring 2011. The proposed study will be repeated over a two year period. The exact number of treatments will be determined in consultation with herbicide company representatives. Evaluating the potential of Beyond®

herbicide to control yellow nutsedge in Clearfield wheat will contribute positively to efforts currently being tested to control nutsedge in all crops grown in rotations practiced in the Treasure Valley. This particular study will be conducted from July 1, 2010 – July 31, 2012.

2). Evaluation of KIH-485 and newly registered wheat herbicides will be conducted for two years starting July 1, 2010 and concluding in July 2012. However, soil residue evaluation will be concluded in October 2012.

JUSTIFICATION: Winter wheat is the number one crop grown in rotation preceding onions in the Treasure Valley. Herbicides currently used to control weeds in wheat do not control yellow nutsedge. Consequently, yellow nutsedge tend to emerge under the wheat canopy and only grow to maturity after the crop is harvested in July and the fields are watered to facilitate plowing. The study proposed in objective one seeks to evaluate the potential of Beyond® herbicide to provide herbicidal soil residual control to manage yellow nutsedge in Clearfield Wheat. Growing conditions in the Treasure Valley are characterized by furrow irrigation, which provides ample moisture and create a favorable environment for yellow nutsedge growth. Current efforts by the weed control program at Malheur Experiment Station stresses providing some level of yellow nutsedge control in each crop grown in a rotation. This proposal is the first attempt to evaluate products that will provide yellow nutsedge control in wheat.

Evaluation of potential new herbicide for use on furrow irrigated wheat fits into the required process for products registration by EPA. Traditionally we have relied on chemical companies to provide support for herbicide testing under different conditions. However, in the recent past this support has been dramatically reduced mainly due to changes in market forces. However, chemical companies still rely on University product testing as an unbiased source of performance data under local conditions. Product evaluation in cooperation with industry partners has been a reliable channel of registering products for special local needs. Also, it is important to evaluate the effects of soil residue for newly registered products to crops grown in rotation with wheat. Soils in the Treasure Valley tend to have high pH, a factor which necessitates evaluation of newly registered product performance in these conditions. The requested funds will help defray the labor and material cost for conducting these studies. The potential benefits to growers include reduction of yellow nutsedge build up in the fields and improved yield for rotational crops. Use of effective products helps to minimize pesticide movement in the environment and contribute positively to sustainable agriculture. The long-term benefit of these studies is to enhance yellow nutsedge control in the entire crop rotation scheme in the Treasure Valley.

BUDGET:**BUDGET SHEET**

Item	Objective 1	Objective 2
Salaries:		
Technician (0.15 FTE)	2,925	2,925
Contract labor (150 hours at \$8.50/hr)	550	725
Other Students (100 hours at \$8.50)	425	425
Other Labor (specify type)		
OPE for all categories	2,052	2,114
Travel: No Foreign Travel Allowed		
Domestic (in state)	250	250
Domestic (out of state) – Professional meetings	750	1,075
Services:	240	240
Supplies:	532	1,000
Equipment:	0	0
No indirect costs or overhead allowed	0	0
Total	\$7,724	8,754
Grand Total	\$16,450	


RELATION TO OTHER RESEARCH: Wheat weed management studies in the Treasure Valley of eastern Oregon are conducted in collaboration with members of the chemical industry and other research staff in the area. The proposed studies will complement the ongoing research to develop crop rotation systems to manage yellow nutsedge in the valley. Efforts to manage yellow nutsedge in all crops grown in local rotation schemes are of great importance to growers in order to sustain agricultural productivity in the area.

SIGNATURE PAGE

PROPOSAL TITLE: **Development of Yellow Nutsedge Management Strategies in Wheat**

SUBMITTED TO: AGRICULTURAL RESEARCH FOUNDATION FOR
THE OREGON WHEAT COMMISSION

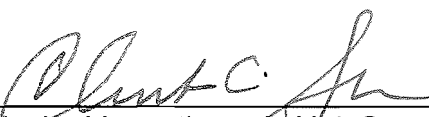
SUBMITTED BY:



Date: Dec 29, 2009

Principal Investigator(s)
Use separate line for each additional P.I.

APPROVED BY:



Date: Dec. 29, 2009

Principal Investigator's Unit Supervisor(s)
(Department Head, Superintendent, or County Chair)

Principal Investigator's Academic College

Date: _____

Agricultural Research Foundation

Date: _____

CURRENT AND PENDING SUPPORT

NAME	SUPPORTING AGENCY	TOTAL \$ AMOUNT	EFFECTIVE AND EXPIRATION DATES	% OF TIME COMMITTED	TITLE OF PROJECT
Current:					
Felix, J.	Idaho/Eastern Oregon Onion Research	20,456	3/1/2009-6/30/2010	10%	Development of Effective Yellow Nutsedge Management Rotations
Felix, J.	Oregon Potato Commission	16,599	3/1/2009-6/30/2011	10%	Evaluation of Imazosulfuron Herbicide for Yellow Nutsedge Control in Potato and soil residue to rotational crops
Felix, J.	Nyssa-Nampa Sugar beet Growers	13,500	3/1/2009-7/31/2011	5%	Herbicide Evaluation for Dodder Control in Furrow-Irrigate Sugar beet
Felix, J.	Oregon State ARF	12,385	3/1/2008-7/31/2010	10%	Potential Use of Activated Carbon to Protect Onions From Pre-Emergence Herbicides
Pending:					
Felix, J. and S. Norberg	Oregon State ARF	12,500	3/1/2010-7/31/2011	5%	Research for Development of Weed Management Tools in Teff (<i>Eragrostis tef</i>)
Felix, J.	Oregon State ARF	12,500	3/1/2010-7/31/2011	10%	Development of Strip-Tillage in Furrow-Irrigated Sugar Beet
Felix, J.	Oregon Wheat Comm.	16,450	7/1/2010-6/30/2011	10%	Development of Yellow Nutsedge Management Techniques in Wheat
Felix, J.	Oregon Potato Comm.	15,590	3/1/2010-7/31/2011	5%	Evaluation of Fomesafen (Reflex) Herbicide for Control of Yellow Nutsedge in Potato