

**Arkansas Wheat Promotion Board
Annual and Quarterly Report**

TITLE: Weed Management in Wheat

PRIORITY AREA: Agronomic Research: Weed Control

INVESTIGATORS: Bob Scott, Extension Weed Specialist, Little Rock
Dick Oliver, Nilda Burgos, UA-CSES, Fayetteville

PERIOD OF PROGRESS: January 2004 to December 2004

UPDATE: A new project after combining two previously funded projects that will utilize experiment stations and four to five on-farm locations. Ryegrass samples will be submitted, in part, by county agents, producers, and consultants

OBJECTIVES:

1. To develop integrated weed management systems for the control of Hoelon-resistant ryegrass and other problem weeds in conventional and no-till wheat. (Scott and Oliver)

In 2003-04, 12 applied research trial were conducted for weed control in wheat. The focus of our research program has been around the new herbicide Osprey (mesosulfuron) for the control of ryegrass, Hoelon-resistant ryegrass and certain broadleaf weeds. Data has been generated on a new formulation of Osprey (13.5%WG). This work has supported the addition of Osprey herbicide recommendations into the MP-44 for 2005. A full registration for Osprey was received from the EPA for its use this fall (2004).

Ryegrass control with Osprey continues to look excellent. The new formulation has worked the same as other versions of this herbicide that have been evaluated. Control of Hoelon resistant ryegrass has been equal to that of non-Hoelon resistant. Ryegrass control with Osprey is ranging from 85 to 99%. Typically end of season ratings for Osprey on ryegrass have been comparable to Hoelon on the non-Hoelon resistant sites. However, this year due to spring flushes of ryegrass, the level of control reported for Osprey declined. Sequential postemergence applications of Osprey at 1 to 2 leaf ryegrass fb(followed by) Osprey at 4 leaf to 2 tillers ryegrass and Axiom (flufenacet + metribuzin) fb Everest (flucarbazone) provided excellent (90%) control. Finesse (chlorsulfuron + metsulfuron) was the most effective preemergence treatment. A preemergence treatment Finesse fb Osprey also gave equivalent control to the best treatments. The important concept to obtain wheat yield equivalent to the weed-free check has been maintaining 80+% ryegrass control for the first 5 months following emergence. This illustrates the need for us to examine more Osprey timings, sequential applications and tank-mix partners. These treatments are the focus of our studies this fall.

Several of our studies this year included tank-mixtures of Osprey with other broadleaf herbicides. One of the major drawbacks to Hoelon over the years has been the restriction on tank-mixtures with broadleaf materials, such as, Harmony Extra (thifensulfuron/tribenuron) for the control of wild garlic (*Allium vineale*) in a one-pass tank mix. So far, our data with Osprey indicates that tank mixtures with broadleaf herbicides, including Harmony Extra will be possible.

A Clearfield wheat cultivar production system was evaluated on Hoelon-resistant ryegrass at Willow Beach but wheat yield was not obtained. In the past Beyond (imazamox) has been best when applied at 1- to 2- leaf wheat or with a repeat application at 3- to 4- leaf wheat. However, this year under extreme ryegrass pressure (15/ft²) in October to (30/ft²) in November all treatments were not effected (40 to 50% single and 70 to 80% repeat) due to late emergence which prevented harvesting. The sequential treatments of Beyond fb Beyond, Beyond fb Osprey, Finesse (pre) fb Beyond, or Prowl (pendimethalin) + Beyond fb Prowl + Beyond were the most effective. Prowl improved Beyond control 10 to 20%. The imidazolinone herbicide Beyond has proven to be another valuable option for control of resistant ryegrass in wheat, if a high yielding cultivar is developed.

In our wild garlic control work, Finesse, Peak (prosulfuron), and Harmony Extra continue to perform well. Tank mixtures with Osprey did not result in diminished control of ryegrass or garlic. Due to rainfall and cold temperatures we failed to get a good stand of wheat at our wild garlic location near Jonesboro and these plots were not harvested. However, weed control data from this site was good. Two new wild garlic and broadleaf weed locations are being secured for plots this fall.

Our full report showing all the data is complete. A copy will be mailed to each board member. So far this fall only one study has been planted. Rainfall began 2 weeks ago and has not stopped. Once the research sites dry out we have approximately eleven studies to initiate.

2. To determine resistance and cross-resistance patterns and to conduct genetic analysis of resistant ryegrass populations. (Burgos)

Confirmation of resistance and evaluation of resistance level of ryegrass populations. In June, 2004 four Italian ryegrass seed samples were evaluated for resistance. These samples were received from Lee county. Whole plant bioassay was conducted in the greenhouse. Seeds were planted in pots, thinned to ten seedlings per pot, and sprayed with Hoelon at 0 to 8 lb ai/A of Hoelon plus a non-ionic surfactant. Efficacy was evaluated 2 weeks after herbicide application. All four samples were resistant to Hoelon at a rate of up to 8 lb/A. At the highest rate, ryegrass control was only 55 to 70%. The recommended rate is around 1 lb ai/A (2.7 pints Hoelon), which should control at least 90% of a susceptible population. The four fields in Lee county are infested with highly resistant ryegrass populations. Alternative herbicides and cultural practices should be used for ryegrass management in these fields. A research publication on the genetic relationships of ryegrass populations in Arkansas is in review.

3. To study the biology/ecology of Hoelon-resistant ryegrass and other problem weeds. (Oliver and Scott)

These studies will be initiated in late fall or spring once natural weed infestations established themselves.

PUBLICATIONS:

Bararpour, M.T., L.R. Oliver, and N.R. Burgos. 2003. Morphological characteristics of the Arkansas diclofop-resistant ryegrass population. Proc. South. Weed Sci. Soc. 56:187.

Bararpour, M.T., D.O. TeBeest, and L.R. Oliver. 2003. Infection of grain sorghum, corn, and selected weed species by zonate leaf spot (*Gloeocercospora sorghi*). Abstr. Ark. Crop Prot. Assoc. 7:13.

Oliver, L.R., J.W. Barnes, and J.A. Bond. 2003. Evaluation of mesosulfuron in soft red winter wheat. Proc. South. Weed Sci. Soc. 56:59.

Rajguru, S.N., Bevitori, R., Burgos, N.R., Talbert, R.E., and Stewart, J.M. 2004. A genetic marker for diclofop-resistant ryegrass (*L. multiflorum*). Abstr. Weed Sci. Soc. of Am. 44:45-46.