

2017 USAFRI Research Project Objectives

Use of Alfalfa in Crop Rotation to Control Herbicide Resistant Pigweed University of Arkansas - Jennings

Project Award: \$20,675

Justification:

- Use of herbicide resistant grain crops has caused a move toward continuous cropping and a move away from historical crop rotation recommendations that included the use of a hay crop. Crop production in Arkansas and the Southeast is complicated by the infestation of herbicide resistant weeds which require expensive strategies for control. In soybeans, for example, a glyphosate herbicide program is no longer successful in controlling pigweed (*Amaranthus palmeri*, also referred to as Palmer amaranth or Palmer pigweed) that has become glyphosate resistant. In Arkansas, over 3.5 million acres are cropped to soybeans and cotton annually (2012 USDA Ag Census) and nearly all fields are infested with herbicide resistant weeds. Research has shown yield losses of 17% at a pigweed population of one weed per 10 feet of row and the population in many fields is much higher (Klingaman and Oliver, 1994). Costs of controlling resistant weeds have risen by \$30-\$40 per acre with a potential added cost of over \$100 million (Bob Scott, personal communication). Research has indicated that over 90% of the pigweed seedbank will be depleted in 4 years if no additional seed are added (Barber et al., 2015).

Several hay and livestock producers in Arkansas are developing agreements with crop producers to lease resistant weed infested fields for growing hay. What hay crop will serve them best is a question to be answered, but in northeast Arkansas, some livestock growers are interested in alfalfa due to its value for their own livestock and also market opportunities. Growing alfalfa in rotation with soybeans could be beneficial to reduce weed populations and to rebuild soil structure contributing to improved soil health. The dense canopy provided by alfalfa could reduce pigweed emergence and the frequent hay cutting schedule (every 30 days) could prevent pigweed from producing mature seed. It has been noted that pigweed is seldom a problem in wheat grown for grain in that region, but is a significant problem in soybeans (Dr. Bob Scott, personal communication). Grain yields are reported in many studies to be 10-25% higher following alfalfa in a rotation.

Alfalfa could provide quality feed for livestock producers that lease these infested fields. There is also the long-term possibility of cash sales of alfalfa hay across the state and the southeast and to an operating pelletizing mill in northeast Louisiana that specializes in alfalfa based feeds. Arkansas has over 954,000 beef cattle, 22,100 dairy cattle, 61,000 horses, and 60,000 sheep and goats (2012 USDA Ag Census) all of which could benefit from improved quality hay. Typical hay grown in the area is tall fescue, annual ryegrass or bermudagrass which are often harvested at a late stage of maturity which has low forage quality. Small square baled alfalfa typically sells for \$7-8 for the horse market and large bales (800 lbs) are valued over \$50-\$75 for moderate quality alfalfa hay. The estimated gross value of an annual alfalfa crop would be \$625 to \$1,600 per acre depending on bale type and marketing. The major row crop region of eastern Arkansas is also ideally located for potentially shipping quality hay throughout the southeast. If this approach is shown to be feasible, it could impact grain crop areas throughout the Southeast U.S.

Objectives:

- The objectives of this project are to 1) Determine if inclusion of alfalfa grown for hay in a crop rotation could reduce populations of herbicide resistant weeds in grain crop fields.