Use of Alfalfa in Crop Rotation to Control Herbicide Resistant Pigweed

John Jennings, University of Arkansas;
Syam Dodla, Montgomery Alison, Louisiana State University

RATIONALE & OBJECTIVES

- Trials and farm demonstrations were conducted in Louisiana and Arkansas to evaluate either alfalfa or summer annual grasses for hay production in rotation with soybeans to reduce herbicide resistant pigweed.
- Extremely wet weather in fall 2018 prevented fall-planting of alfalfa so alfalfa was spring-planted in 2019. Incidence of pigweed and growth of alfalfa and summer annual grasses were evaluated through the alfalfa establishment year.

STUDY DESCRIPTION

Rsearch plot layout and location:

Replicated irrigated plots in a site infested with herbicide resistant pigweed at the LSU AgCenter Red River Research Station in northwest Louisiana.

Research treatments:

- Control (continuous soybean).
- 1-year summer-annual grass followed by soybean.
- 2 years alfalfa followed by soybean.
- 3 years alfalfa followed by soybean.
- 4 years alfalfa followed by soybeans.

Farm demonstrations setup and location:

A 25-acre and 22-acre field were planted in eastern Arkansas in soybean fields infested with herbicide resistant pigweed. Rotation back to soybean was planned for ⅓ of each field following 2, 3, and 4 years.

RESULTS

- The spring-establishing alfalfa stands did not develop quickly enough in the establishment year to provide adequate competition for the pigweed. Pigweed competition shaded out the alfalfa stand in research plots by end of the first season, thus stands were replanted in fall 2019. In farm demonstrations, good stands of alfalfa eventually developed, but pigweed competition, insect pests, and deer damage reduced the number of hay harvests and total yield to 1.1 ton/acre. For year-two, the alfalfa stands should be on track to provide competition and monthly harvest benefits in 2020.
- Pearl millet grown for hay or soybean with multiple herbicides both gave similar control of pigweed with very low weed counts (<0.02 pigweed plts ft^{-2}) after harvest. Weed control from the pearl millet suggests that a hay crop can be a good strategy for controlling pigweed.
- Fall-established alfalfa would be expected to provide much better competition with weeds and higher hay yield than spring-seeded stands during the establishment year.

Table 1. Percent row coverage and stand occupancy of alfalfa and pigweed in Randolph and Cross County farm demonstrations.

Date	% alfalfa row coverage	% alfalfa occupancy	% pigweed occupancy
Randolph County			
May 13	82	83	0
July 9		97	33
July 23		91	38
August 6		89	23
Cross County			
May 13	80	97	13
July 9		99	61
July 23		96	39
August 6		94	59

Growth of spring-seeded alfalfa and glyphosate resistant pigweed by June 7, 2019 at the Red River Research Station near Bossier City, LA.

Alfalfa field after first growing season in September 2019 at Randolph County farm demonstration site.

Harvest strip from spring-seeded alfalfa stand with glyphosate resistant pigweed on July 25, 2019 at the Red River Research Station near Bossier City, LA.

Spring-seeded alfalfa field after first growing season in September 2019 at Cross County farm demonstration site.

Pearl millet stubble in early November 2019 following September hay harvest at LSU Red River Research Station. Note the absence of pigweed regrowth.

Alfalfa
U.S. Alfalfa Farmer Research Initiative

Funding for this project was provided by the U.S. Alfalfa Farmer Research Initiative of the National Alfalfa & Forage Alliance.