

## MINNESOTA—Alfalfa is Profitable & Controls a Super Weed!

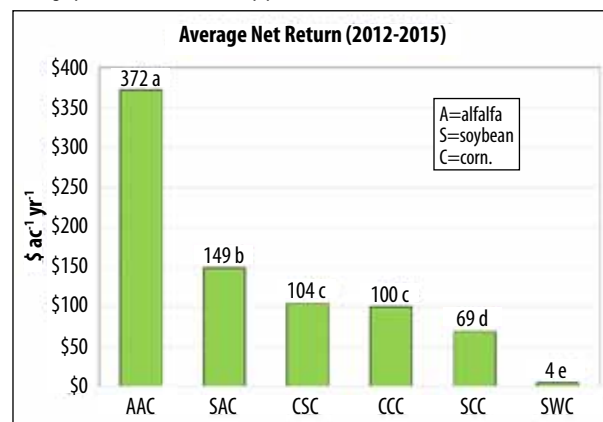
Jared Goplen, University of Minnesota

Alfalfa brings numerous benefits to crop rotations including increased profitability, according to new University of Minnesota research. Rotations including alfalfa had increased net returns compared to rotations with corn, soybean, and wheat. Alfalfa also eased management of herbicide-resistant weeds and reduced input costs for subsequent crops.

Crop rotations included continuous corn (CCC), soybean-corn-corn (SCC), corn-soybean-corn (CSC), soybean-wheat-corn (SWC), soybean-alfalfa-corn (SAC), and alfalfa-alfalfa-corn (AAC). The study took place in southeastern Minnesota from 2012–2015. We found the average net return for the AAC rotation was  $>\$350 \text{ ac}^{-1} \text{ yr}^{-1}$ , more than double the net return of the next most profitable rotation (Figure 1). Along with the AAC rotation being more profitable over the 3-year study, it also had less financial risk compared to other rotations. One of the reasons alfalfa had less financial risk is because alfalfa prices in 2012–2015 were more stable than corn, soybean, and wheat prices. Alfalfa price only varied 29% between the high and low price, while corn price varied nearly 50% and soybean and wheat prices varied 40%. The AAC rotation also reduced input costs for the subsequent corn crop, further adding to increased profitability. Even though all crop prices are lower now than during 2012–2015, University of Minnesota FINBIN data shows alfalfa has remained profitable in Minnesota, with an average net return of nearly  $\$150 \text{ ac}^{-1}$  in 2017, compared to a  $\$17 \text{ ac}^{-1}$  net return for soybean and a  $-\$51 \text{ ac}^{-1}$  net return for corn.

The study found alfalfa improves control of herbicide-resistant giant ragweed. The AAC rotation had similar levels of weed seed bank depletion compared to the other crop rotations, but had less giant ragweed emergence. Less ragweed coupled with the competitive nature and cutting schedule of alfalfa ensured no herbicide-resistant giant ragweed was able to produce seed during the years alfalfa was produced. Preventing seed production for just 2 years depleted the weed seed bank by 96%. In order to prevent seed production in corn and soybean rotations, hand weeding was required in most years. This research shows planting alfalfa in weedy fields can give you an edge over herbicide-resistant weeds while providing numerous agronomic and economic benefits.

**Figure 1.** Average net return in  $\$ \text{ ac}^{-1} \text{ yr}^{-1}$  for the six 3-year crop rotations researched near Rochester, MN, in 2012–2015. Net return was calculated using average production costs and crop prices for Minnesota.



Averages in net return followed by the same letter are not statistically significant.

The full list of contributing authors and the full open-source publication can be accessed at [dl.sciencesocieties.org/publications/aj/articles/110/1/260](https://dl.sciencesocieties.org/publications/aj/articles/110/1/260).