

Corn Grain & Forage Yield of Alfalfa-Corn Cropping Systems

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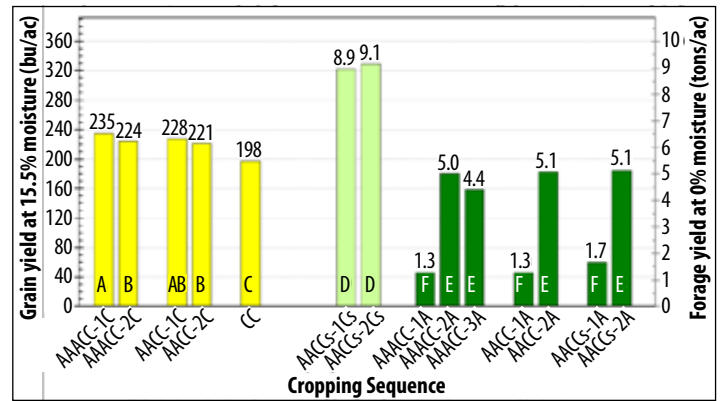
Corn and alfalfa balance one another in forage systems for Midwest dairy farms. Alfalfa and corn forages have complementary nutritional characteristics benefiting livestock when both are included in diets. Growing and feeding alfalfa in conjunction with corn can improve economic and environmental sustainability of crop and livestock production. Growing alfalfa in rotation with corn reduces fertilizer nitrogen (N) and pest control inputs, spreads labor activities, and reduces cropland vulnerability to soil erosion and nutrient runoff.

Since 2010, research has been conducted at UW Agricultural Research Stations (Arlington and Marshfield) to determine the effect of alfalfa-corn cropping systems on grain and forage yield. Management is similar to commercial production practices in the surrounding area. Rates of 160 lbs N/ac were applied to 1C (first-year corn) and 2C in all rotations, while 190 lbs N/ac were applied to continuous corn. Alfalfa was established in the spring of the year following corn production. All plots were established using no-till practices. The “set-up” years (2010-2013) were discarded.

Figure 1 shows corn grain, corn forage, and alfalfa forage yields for 2014-2018 production seasons at Arlington. Grain yields of 1C were 15-19% greater than continuous corn, while 2C yields were 12-13% greater. Yield increase of 2C in this alfalfa-corn system is double that of 2C in a corn-soybean system (5%) adjacent experiment. In separate plots, corn forage yields of 1C and 2C were similar. Likewise, alfalfa forage yields were similar for the establishment year (1A) among cropping systems, as well as 2A treatments. Alfalfa forage yield increased 3.4-3.8 tons/ac for 2A. Alfalfa yields increased from 1.3-1.7 tons/ac to 5.0-5.1 tons/ac between 1A and 2A.

Only one rotation cycle has been completed. Time will tell if yield differences develop between AACC where corn stover remains on the field and AACCs where all above-ground plant matter (alfalfa and corn) is removed.

Figure 1. Rotation effect in Alfalfa-Corn (grain & silage) cropping systems.



A=Alfalfa, C=Corn, Cs=Corn forage, 1C=First-year corn, 2C=Second-year corn, CC=Continuous corn
Data derived from Arlington, WI (2014-2018)