Efficacy of Residual Herbicides for Weed Control & Reducing Weed Impacts on Alfalfa Yield & Quality

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Annual weeds can impact the economics of alfalfa production by reducing forage yield, nutritive value or by contaminating hay. Field studies were conducted in Idaho and Nebraska in 2021 to evaluate the efficacy of pre-plant incorporated (PPI), postemergence, and residual herbicides on annual weeds in newly established non-glyphosate resistant alfalfa. There were 16 treatments (including the untreated control) arranged in a randomized complete block design with four replications. Alfalfa was harvested multiple times and data was collected on visible weed control (common lambsquarters [*Chenopodium album*], kochia [*Bassia scoparia*], redroot pigweed [*Amaranthus retroflexus*]), weed biomass, forage biomass, and nutritive value. At first harvest, common lambsquarters, kochia, and redroot pigweed, control was 44, 54, 50%, respectively for EPTC applied PPI, and 23, 31, 36% for acetochlor applied early postemergence (after 80% emergence). EPTC followed by imazamox or imazamox + bromoxynil provided 86 and 96% common lambsquarters control, 79 and 91% kochia control, 87 and 96% redroot pigweed control which was statistically similar to postemergence application (at third trifoliate) of imazamox, imazamox + bromoxynil or acetochlor followed by postemergence herbicides. The application of paraquat and residual herbicides (pendimethalin, flumioxazin) after the first harvest further improved weed control. High weed density in the untreated and some herbicide treated plots increased weed biomass in forage (9 to 66%) and this reduced crude protein (2 to 6%) and increased the fiber concentration (2 to 5%). This in turn reduced the relative feed value (9 to 23).