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IMPLEMENTING INTEGRATED SITE-SPECIFIC WEED MANAGEMENT

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Recent technological advancements make it possible to manage weed populations within fields according to spatial variability in weed populations, soil properties, and crop yield potential. This ability could potentially reduce herbicide use, especially if decisions are part of an integrated site-specific weed management strategy. A study was conducted in western Kansas to determine the economic feasibility of reducing preemergent herbicide rate in field corn. A uniform rate of atrazine (1.2 kg/ha) was applied on an entire 15.4 ha field with varying soil characteristics and weed population and three rates (1/3, 2/3, and 1X = 0.41 kg/ha) of premixed flufenacet and isoxaflutole were applied in repeated parallel strips across the field. Untreated areas were interspersed within the strips. Individual weed species in 1 m² quadrats were counted and mapped at 2,176 grid points, then uniformly sprayed with a postemergent tank mixture of prosulfuron, primisulfuron, and diflufenzopyr at 0.001 + 0.001 + 0.32 kg/ha. Six weeks later weeds were remapped at the original grid points and the populations used to calculate competitive load values according to species and competitive index. Because drought forced harvesting the corn for silage, corn grain yield was predicted based on a model in the WeedSOFT computer program that estimates yield loss from weed species competition. Quadratic production functions were created from the silage data and estimated grain yield data to calculate optimal herbicide rate and to capture the negative relationship of applying too much herbicide. The preemergent herbicide rate of flufenacet and isoxaflutole premixture providing maximum economic return was the 2/3 rate.