Forage Kochia in Seeding Mixtures with Perennial Grass to Improve Disturbed Areas

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Forage kochia (*Bassia prostrata*) is considered a valuable species for both reclamation and forage. It has been found to successfully grow in areas that are disturbed, degraded, and dominated by annual invasive weeds such as cheatgrass (*Bromus tectorum*) and halogeton (*Halogeton glomeratus*). It provides high-quality forage for livestock and wildlife even during fall and winter months when most forage grasses become dormant. Although forage kochia has the ability to persist in disturbed areas, its establishment is affected mainly by seed quality and planting time followed by subsequent environmental conditions. Planting recently harvested seeds at the right time can improve establishment of forage kochia. Additionally, mixing forage kochia with cool-season perennial grasses (e.g., thickspike wheatgrass, bluebunch wheatgrass, and tall fescue) may improve disturbed lands by providing improved stands and high-quality forage.

**Objectives**

The objectives were to evaluate planting time and seeding mixtures on forage kochia establishment.

**Materials and Methods**

The study was established in 2014 at the James C. Hageman Sustainable Agriculture Research and Extension Center (SAREC) near Lingle. Species used were: ‘Immigrant’ forage kochia, four native perennial grasses (thickspike wheatgrass, bluebunch wheatgrass, basin wildrye, and western wheatgrass), and two introduced perennial grasses (crested wheatgrass and tall fescue). The experiment was laid out in a split-plot randomized complete block with two planting times as the main plot factor, eight seeding mixture treatments as the subplot factor, and four blocks. Eight seeding mixture treatments included: 1) forage kochia monoculture, 2) four native grasses, 3) forage kochia with four native grasses, 4) forage kochia w/crested wheatgrass, 5) forage kochia w/tall fescue, 6) forage kochia w/crested wheatgrass and tall fescue, 7) forage kochia w/four native and two introduced grasses, and 8) untreated control. Different forage kochia-grass mixture treatments were planted at two times: winter planting on the snow in March 2014, and early spring planting in April 2014.

Data were collected during summer and fall 2014. This included density and height of forage kochia and grasses, and weed coverage. Seeding success of forage kochia and grasses was calculated simply by dividing the number of plants observed per unit area by the estimated number of seeds planted per unit area and expressed as a percentage.

**Results and Discussion**

During the establishment year, a dense stand of annual weeds—including green foxtail, annual kochia, Russian thistle, and cheatgrass—was present throughout the study site. Despite this,
the study revealed that April planting resulted in overall higher seeding success (higher plant density) of forage kochia and grass than the March planting (Figure 1). This difference may stem from subsequent weather conditions after each planting. Considering April planting only (as it performed better than March planting), the forage kochia monoculture treatment produced a higher number of forage kochia seedlings than the rest of the seeding mixtures (data not shown). Other seeding mixtures also resulted in satisfactory forage kochia density (>1 seedlings per square foot). Additionally, all seeding mixture treatments containing grasses with or without forage kochia produced a similar number of grass seedlings (data not shown). Results from all seeding mixtures showed possibility of successful establishment of forage kochia either as a sole species or as mixture with perennial grass species in areas dominated by weeds, especially when planted in April. The current study (data collection) is continuing this year; however, future monitoring is needed to determine the persistence, competitive ability against weeds, and forage production of different seeding mixture treatments of forage kochia and other perennial grasses. Continuation of this research, which depends on funding, could provide valuable information regarding potential use of forage kochia in seeding mixtures containing native or nonnative perennial grasses in degraded and disturbed areas in Wyoming and beyond.

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