

## Public Abstract

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Title: Evaluation of the Incidence, Severity and Forage Nutritive Value of Common Weed Species in Missouri Pastures

Across the 2015-2016 growing seasons, 43 mixed tall fescue and legume pastures were surveyed to determine the effects of selected soil and forage parameters on the density of individual weed species and overall weed density. The parameters included soil phosphorus (P), potassium (K), magnesium (Mg) and calcium (Ca) concentration, soil pH, cation exchange capacity (CEC), cattle grazing density, total forage groundcover density, tall fescue density, and beneficial legume density, which was comprised of white clover, red clover and annual lespedeza densities. Sampling areas were established in each pasture at a frequency of one representative 20 m<sup>2</sup> area per 4 ha of pasture. Once established, survey locations were sampled every 14 days during a period from April through September. Weed density was divided into categories (total, annual broadleaves, perennial broadleaves, and annual grasses) and also by the most common individual weed species encountered. These datasets were then divided into 3 timings, spring (April-May), summer (June-July), and fall (August-September), and then analyzed using regression tree models. Across all weed types and species, forage groundcover density was the main parameter that affected weed density. Soil K, P, and Mg levels also impacted weed density for many life cycles and weed species. Soil K level was the primary parameter that reduced density of common ragweed in the summer and fall timeframes, and this is one of the most common weed species encountered in Missouri pastures. Similarly, soil P level was the primary parameter that reduced perennial broadleaf weed density in the summer and fall timeframes; when P was greater than 1.5 ppm, there was a 66 and 59% reduction in the density of these species in the summer and fall timeframes, respectively. Cattle grazing densities less than 1.2 units per acre also resulted in fewer annual grass weeds in pastures. Results from this survey indicate that maximizing the groundcover of beneficial forage species is the most important factor that results in weed density reductions in mixed tall fescue and legume pastures, followed by proper maintenance of soil nutrients like P and K.

Weed and representative forage samples were collected from 22 mixed tall fescue and legume pastures during the 2015 and 2016 growing seasons to investigate the seasonal variation in forage quality of 15 common pasture weeds in Missouri. Sampling occurred at 14-day intervals throughout the season and began in early April or when emergence of each weed species was observed. Sampling concluded either at plant senescence or mid- to late-September. There was no significant linear relationship between increasing time and crude protein (CP) concentration or digestibility for buckhorn plantain, dandelion, sericea lespedeza, and yellow foxtail, but CP concentration and digestibility declined linearly through the growing season for all other weed species evaluated. Most weed species also had a linear decline in neutral detergent fiber digestibility (NDFD) and a linear increase in neutral detergent fiber (NDF) as the season progressed. When comparing pure weed samples to the representative forage from the same location, CP concentrations in spiny amaranth, woolly croton, annual fleabane, white snakeroot, Pennsylvania smartweed, and vervain species were not significantly different than their representative forage samples at any sampling interval throughout the season. However, CP concentration of common ragweed, lanceleaf ragweed, horsenettle, and dandelion were often higher than the representative forage sample for the majority of sampling timings throughout the season while yellow foxtail and ironweed species had significantly lower CP concentration than the representative forage samples from July 26 to August 23. Additionally, digestibility of common ragweed, lanceleaf ragweed, broadleaf plantain, Pennsylvania smartweed, dandelion, and common cocklebur was greater than that of the representative forage sample

for the majority of sampling periods throughout the season ( $P < 0.05$ ). These results can be used to understand how the nutritive value of common weed species changes throughout the season and at what times specific weed species have the potential to influence the overall forage quality in mixed tall fescue and legume pastures.