Effects of supplemental feed and white-tailed deer density on vegetation

Timothy E . Fulbright[1] , Charles A . DeYoung[1] , David G . Hewitt[1] , Eric Grahmann[1] , Reagan Gage[1] , Ryan Darr[1] ,Don Draeger[2]
Caesar Kleberg Wildlife Research Institute , Texas A&M University-Kingsville , MSC 218 , Kingsville , Texas , USA 78363 , E-mail : timothy .fulbright@ tamuk .edu .[2] Comanche Ranch , Carrizo Springs , Texas , USA 78834

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Introduction Southwestern Texas is at the xeric edge of the range of white-tailed deer (*Odocoileus virginianus*) in North America . Land managers commonly provide dry , pelleted feeds to increase white-tailed deer nutritional status . Provision of pelleted feeds may alleviate constraints on foraging time , enabling herbivores to selectively feed on the most palatable plants , potentially resulting in habitat degradation (Murden and Risenhoover 1993) . We tested the hypothesis that compared to no supplemental feeding , provision of pelleted feed results in habitat degradation . We predicated an interaction between increasing density of white-tailed deer and feeding treatment , in which high density and supplemental feeding reduces canopy cover of forbs and shrubs eaten by deer and reduces forb species richness compared to low density and no supplemental feeding .

Materials and methods The experimental design was a randomized , complete-block with a block at each of 2 locations 37 km apart . Two 486 ha sites were subdivided into six 81 ha paddocks separated by 3 .1 m tall fences . Pelleted feed (～20% crude protein) was randomly assigned to 3 of the 6 paddocks at each location . In 2004 , 10 , 25 , or 40 white-tailed deer were randomly assigned to an enclosure with pelleted feed provided *ad libitum* and an enclosure with no pelleted feed . Twenty 50-m transects were randomly established within each enclosure . We estimated canopy cover of forbs and shrubs and forb species richness during summer 2004-2007 . Plants palatable to deer were determined in bite count experiments . Data were analyzed using repeated measures analysis of variance with the difference between mean canopy cover and species richness from 2005-2007 and these values on the initial sampling date as the dependent variables . Supplemental feeding treatment , white-tailed deer density , and the feeding x density interaction were independent variables .

Results There was no treatment x density interaction ($P > 0.05$) for any of the dependent variables . Canopy cover of palatable forbs declined about 4% in paddocks with no supplemental feed , averaged across sampling dates and densities , but did not decline relative to canopy cover at the beginning of the study in paddocks with supplemental feed (Figure 1) . Differences in canopy cover of shrubs and forb species richness between 2005-2007 and 2004 were similar ($P > 0.05$) between feeding treatments (Figure 2) . None of the dependent variables differed significantly ($P > 0.05$) among white-tailed deer densities , averaged across feeding treatments and sampling dates .

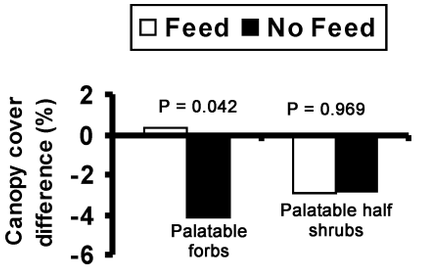

Figure 1 *Difference in canopy cover of palatable forbs and half shrubs between the mean of the subsequent sampling dates and the initial sampling date , averaged across densities .*

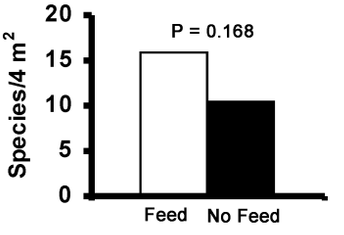

Figure 2 *Difference in herbaceous species richness between the mean of the subsequent sampling dates and the initial sampling date , averaged across densities .*

Conclusions In contrast to our hypothesis , supplemental feeding appeared to alleviate foraging pressure on palatable forbs . Our results should be considered preliminary because extreme annual variation in rainfall may have ameliorated impacts of supplemental feed and white-tailed deer densities on vegetation .

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Reference

Murden , S . B . and K . L . Risenhoover (1993) . Effects of habitat enrichment on patterns of diet selection . *Ecological Applications* 3 , 497-505 .