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Economic analysis of sheep grazing of leafy spurge: Preliminary results

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Abstract:

Leafy spurge, a widely established exotic, noxious, perennial weed is a major threat to the viability of commercial grazing and to the beneficial outputs of wildlands in the Upper Great Plains. Treatments for leafy spurge are usually based on indicators of physical control, rather than economic criteria. A major benefit to land managers is the identification of economical control methods and an understanding of the economic factors influencing long-term treatment decisions.

The focus of this study was to evaluate grazing scenarios that would most likely be experienced by ranchers adopting sheep grazing as a control method for leafy spurge. The model starts with initial values describing the physical and economic characteristics of an infestation (e.g., infestation size, AUM value). The opportunity cost of no control is measured by estimating the loss of grazing from the initial infestation and the subsequent losses from expansion. The benefits of control include (1) recapturing grazing outputs from current infestations and (2) maintaining existing grazing outputs by preventing infestation expansion. The costs of control included either (1) material, labor, equipment, and lease expenses in the scenarios examining lease arrangements or (2) net returns from sheep enterprises. Net returns (revenues less expenses) from sheep enterprises could be positive or negative, depending upon profitability of the enterprise.

The model estimates the economic viability of using sheep to control leafy spurge by (1) comparing only treatment expenses with treatment returns (i.e., benefit-cost approach) and (2) comparing potential overall losses with sheep grazing versus losses without control (i.e., least-loss approach).

When a sheep enterprise produces positive net returns (enterprise revenues are greater than production costs), leafy spurge control will be economical. However, when a sheep enterprise has negative net returns (production costs exceed revenues), those costs (losses from the sheep enterprise) must be compared to the benefits of leafy spurge control. Likewise, costs of leasing sheep for leafy spurge control must be compared to the benefits of control.

To represent a reasonable range of production possibilities for a new sheep enterprise, eight enterprise scenarios were developed to consider different levels of enterprise performance, debt, and size. Initial budgeting analyses indicated that four out of the eight scenarios examined should/could produce positive enterprise net returns. The initial enterprise characteristics resulting in negative net returns included poor flock performance (e.g., low lambing percentage, light weaning weights) and enterprise debt (e.g., financing the purchase of breeding stock and equipment). Thus, analyses have focused on evaluating the feasibility of the scenarios with negative net returns.

With leafy spurge infestations of 50 to 250 acres, \$15/AUM, 0.2 to 0.4 AUMs/acre carrying capacity, and a 15 percent leafy spurge canopy cover, preliminary results indicate that annual sheep enterprise losses down to (\$2.30)/ewe would still result in control benefits exceeding control costs over a 10-year period. Adjusting for carrying capacity ranges of 0.4 to 0.6 and 0.6 to 0.8 AUMs/acre, annual enterprise losses down to (\$3.85) and (\$5.40)/ewe, respectively, would result in control benefits exceeding control costs.

Assuming the same initial conditions (50 to 250-acre infestations, \$15/AUM, 0.2 to 0.4 AUMs/acre carrying capacity, and a 15 percent leafy spurge canopy cover), annual sheep enterprise losses down to (\$4.70)/ewe would result in less economic loss than no control (i.e., doing nothing to control the infestation) over a 10-year period. Adjusting for carrying capacity ranges of 0.4 to 0.6 and 0.6 to 0.8 AUMs/acre, annual enterprise losses down to (\$7.90) and (\$11.00)/ewe, respectively, would result in less economic loss than no control.

Preliminary results indicate that using sheep to control leafy spurge can be economical in many situations found in the Upper Great Plains, even when net returns from sheep enterprises are negative. However, further refinement of the model is needed, as some model components are partially based on “best guesses” of range and weed scientists.