

## Can Cattle Be Used to Control *Sericea Lespedeza*?

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# Can Cattle Be Used to Control Sericea Lespedeza?

By Gregory K. Mantz, Juan J. Villalba, and Frederick D. Provenza

## On the Ground

- Supplemental polyethylene glycol (PEG), a polymer that neutralizes the negative effects of tannins, can increase intake and preference of cattle for fresh-cut sericea lespedeza (*Lespedeza cuneata*), an invasive, tannin-containing legume for the tallgrass prairie region of the Great Plains.
- In grazing trials, steers supplemented with PEG plus a high-protein supplement tended to eat more sericea than did steers only supplemented with the high-protein supplement.
- Supplementing cattle with PEG, protein, or a combination of the two has the potential to enhance the amount of sericea consumed by cattle, contributing to the control of this weed.

**Keywords:** polyethylene glycol (PEG), season, sericea lespedeza, intake, preference, grazing, tallgrass prairie.

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**S**ericea lespedeza (*Lespedeza cuneata*) is an important forage in some parts of the southeastern United States. An introduced legume that thrives in soils of low fertility, older varieties of sericea introduced in the tallgrass prairie region of the Great Plains became invasive because of their competitive characteristics that are, in part, attributable to high concentrations of condensed tannins (CTs), which discourage grazing and reduce performance of cattle.<sup>1–3</sup> CTs in concentrations below 50–60 g CT/kg dry matter (DM) benefit ruminants by reducing incidence of bloat and improving nitrogen balance.<sup>4,5</sup> Higher concentrations of CT negatively affect digestive processes,<sup>6</sup> rumen microbes,<sup>7</sup> and gut mucosa,<sup>8</sup> which collectively deter foraging. CT content of older sericea varieties often exceeds 100 g/kg DM.<sup>9</sup>

Biological control of sericea with insects is problematic because of their potential to spread and decimate important forage. Although goats can control sericea,<sup>10</sup> cattle ranchers in the tallgrass prairie region are not inclined to use goats in numbers large enough to provide effective control of sericea. Accordingly, we evaluated cattle grazing as a means of reducing the density of sericea stands enough to allow the native plant species to coexist with sericea. Yellow sweet clover (*Melilotus officinalis*), abundant in the mid- and short-grass prairies of western Kansas, is a good analogy. Although sweet clover is an aggressive species that can replace native species, this seldom occurs because grazing by cattle keeps the density of sweet clover low. In doing range inventories, we observed that if the cover of sericea is less than 60%, native plant species can coexist with sericea. Our challenge was how to help cattle cope with the high concentrations of CT.

## Phase I: Tannins, Sericea, and Feedback

Polyethylene glycol (PEG) binds with tannins to form an insoluble complex that prevents CT from binding to protein in the rumen.<sup>11</sup> PEG has been used to counteract the adverse effects of CT, improving digestibility, palatability, and intake.<sup>12,13</sup> The premise behind using PEG to induce cattle to eat sericea is the postingestive feedback theory of diet selection.<sup>14</sup> According to this theory, cattle do not avoid sericea and other tannin-rich plants because they find them inherently distasteful but because they associate the taste of forages with negative postingestive consequences because of excesses of compounds like CT. If so, using PEG to reverse the negative postingestive effects of tannins in sericea should entice cattle to eat it.

We conducted a pen trial to measure intake and preference using procedures approved by the Utah State University Institutional Animal Care and Use Committee (IACUC No. 1297). In the intake experiment, eight control steers and eight PEG-supplemented steers were offered prairie hay and fresh-cut sericea in separate meals across six trial periods with each trial period lasting 6 days. The day after each of trial periods 2 to 6, we conducted a preference test in which the

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