Crooked Calf Syndrome: Managing Lupines on Rangelands of the Channel Scablands of East-Central Washington State

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The Channel Scablands of east-central Washington was created by enormous cataclysmic floods toward the end of the last ice age about 12,000–15,000 years ago. Before that time, large glacial masses pushed south, filling the Okanogan Valley of Washington, the Flathead and Swan Valleys of Montana, and the Purcell Valley of Idaho. As the glaciers expanded southward across northern Idaho into Montana, ice dams blocked the Clark Fork River drainage, creating the ancient glacial Lake Missoula. It is reported that the ice dams filling those valleys were over 30 miles wide. Lake Missoula had no outlet, and the water rose until it finally floated the ice dam, suddenly breaking loose, releasing huge torrents of water in a very short time (three-to-five days). These massive releases of water (which occurred multiple times) scoured the rich Palouse silt from the landscape, cutting deep into the basalt bedrock on its rapid descent across east-central Washington down the Columbia River basin to the Pacific Ocean (Fig. 1). Repeated flooding left massive areas of rocky, gravelly moonscapes, exposed bedrock, dry creek beds, and “coulees.” Outcroppings or large mounds of rich farm land supporting crops of wheat and lentils are interspersed within the flood-stripped scablands, a reminder of the rich soil that once covered this region.

Lupines flourish in the rugged scabland region of east-central Washington (Fig. 2). Deep-rooted leguminous lupines take advantage of scant soil moisture and remain green late into the grazing season, when they become a preferred feed for grazing cattle. Several lupine species have been identified on range pastures in Washington State: Lupinus sericeus (sily or bitter lupine), Lupinus leucophyllus (velvet or sweet lupine), and Lupinus sulphureus are common on scabland pastures. The lupine L. leucophyllus contains the alkaloid anagyrine. When pregnant cows graze anagyrine-containing lupines during the last half of the first trimester and early part of the second trimester of gestation they are susceptible to “crooked calf syndrome” (40–100 days gestation). Although toxic alkaloids are believed to be a deterrent to cattle grazing lupines, the presence of senescent grasses and dormancy of once desirable forbs provide few options late into the grazing season, and hunger apparently overrides deterrent factors. As a result, cattle resort to grazing lupines, including L. leucophyllus, a species that causes birth defects (teratogenic). In addition to being toxic, this species is rich in nutrients (8–10% protein in vegetative portions and over 15% protein in seed pods).

The incidence of crooked calf syndrome on ranches utilizing the Cow Creek drainage of the Channel Scablands, an area covering approximately 800 square miles, is 1–5% annually. Most ranchers have come to accept this degree of risk as part of running cow-calf operations in this region. However, when the incidence exceeds 5%, as it has on a cyclic basis during the last 50 years or more, losses are unacceptable and can be catastrophic. Since 1980 eight years have been recorded in which one or more ranchers on the scablands have reported high incidence of lupine-induced crooked calf syndrome. The losses attributed to crooked calf disease represent a severe constraint to management and threaten the economic viability of ranches and local communities.

In 1997 ranches in this area sustained the loss of 40–65% of their calf crop. The details of these episodes of crooked calf disease are provided by Lee et al. The occurrence of crooked calves can be represented using a bell-shaped