

Can cattle be trained to graze weeds?

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Introduction

Plant species that are invading North America are changing and degrading ecosystems. Noxious weeds such as spotted knapweed (*Centaurea stoebe* L.) and Canada thistle (*Cirsium arvense* (L.) Scop.), replace native grasses and forbs on America's northwestern rangelands. Conventional control methods are often not cost-effective and are limited by regulatory guidelines. Using livestock as a tool to manage invasive species offers an alternative with fewer restrictions, is potentially more cost-effective, is less labor intensive, and may limit the spread and regeneration of weed populations.

Livestock, specifically sheep, have been trained to increase their consumption of certain invasive weeds. With high intensity, short-duration grazing, cattle shift their grazing behaviors to consume more Canada thistle. This behavior shift may greatly enhance the potential for using cattle as a biological control for Canada thistle, and potentially other invasive weeds.

Objectives

To determine: 1) if cattle trained to consume weeds in 2004 retained their training in 2011, and 2) if calves and yearlings of trained cattle consume more spotted knapweed and Canada thistle than offspring from untrained cows.

Materials and Methods

Location: Grant Kohrs Ranch, Deer Lodge, Montana (USDI-NPS)

Two Study Sites:

- Spotted knapweed site: grazed 5-11 July, and 13-18 July 2011
 - 2 grass conditioning pastures (42 x 100 m)
 - 2 Infested with spotted knapweed (42 x 100 m)
- Canada thistle site: grazed 1-5 August 2011
 - 2 Canada thistle pastures (23 x 40 m; 20 x 40 m)

Grazing Treatments

Initial Training - 2004: 19 yearlings were trained (T) to graze Canada thistle, spotted knapweed, and leafy spurge.

Grazing Trials - 2011: Two groups of cattle were used:

- Cow-calf pairs: 4 pairs untrained (U), 4 cows trained (T) with 5 calves (one was added as an orphan)
- Yearlings: 5 from untrained (U) cows, 5 from the 2004 trained (T) cows

Behavior:

During the trials, individuals were observed early morning and evening with a bite count technique (Omni-data Polycorder 600). Each bite was categorized into: 1) spotted knapweed/Canada thistle, 2) forb, 3) perennial grass, and 4) annual grass.

Cow-calf pairs: For each morning and evening observation period, each individual was observed for two rounds (3 minutes continuous observation/round).

- The pairs spent 3 days in a grass pasture, adjacent to the spotted knapweed site, to condition them to the new environment and the observers.
- They then spent 3 days at the spotted knapweed site, which was 60% spotted knapweed, 35% crested wheatgrass, and 5% other forbs.
- Two weeks later, they grazed 2 days at the Canada thistle site, which was 20% Canada thistle, 65% perennial grass, and 15% other forbs.

Yearlings: For each morning and evening observation period, each individual was observed for three rounds (3 minutes continuous observation/round).

- The yearlings spent 3 days in a grass pasture, adjacent to the spotted knapweed site, to condition them to the new environment and the observers.
- They then spent 2 days at the spotted knapweed site, which was 55% spotted knapweed, 50% crested wheatgrass, 3% cheatgrass, and 2% other forbs.
- Two weeks later, they grazed 2 days at the Canada thistle site, which was 20% Canada thistle, 65% perennial grass, and 15% other forbs.

Results

- Neither group, trained or untrained, grazed spotted knapweed or Canada thistle more than its availability on the pasture, i.e., they did not prefer these weeds (Figs. 1, 2).
- Trained cattle did not spend more time grazing spotted knapweed or Canada thistle than untrained cattle (Figs. 1, 2).
- Calves from trained cattle did not spend more time grazing spotted knapweed or Canada thistle than calves from untrained cattle (Figs. 1, 2).
- Yearlings from trained cattle did not spend more time grazing spotted knapweed or Canada thistle than yearlings from untrained cattle (Figs. 3, 4).
- For a specific lineage (selected cows), calves, but not yearlings, grazed spotted knapweed considerably more than their dams (Fig. 5).

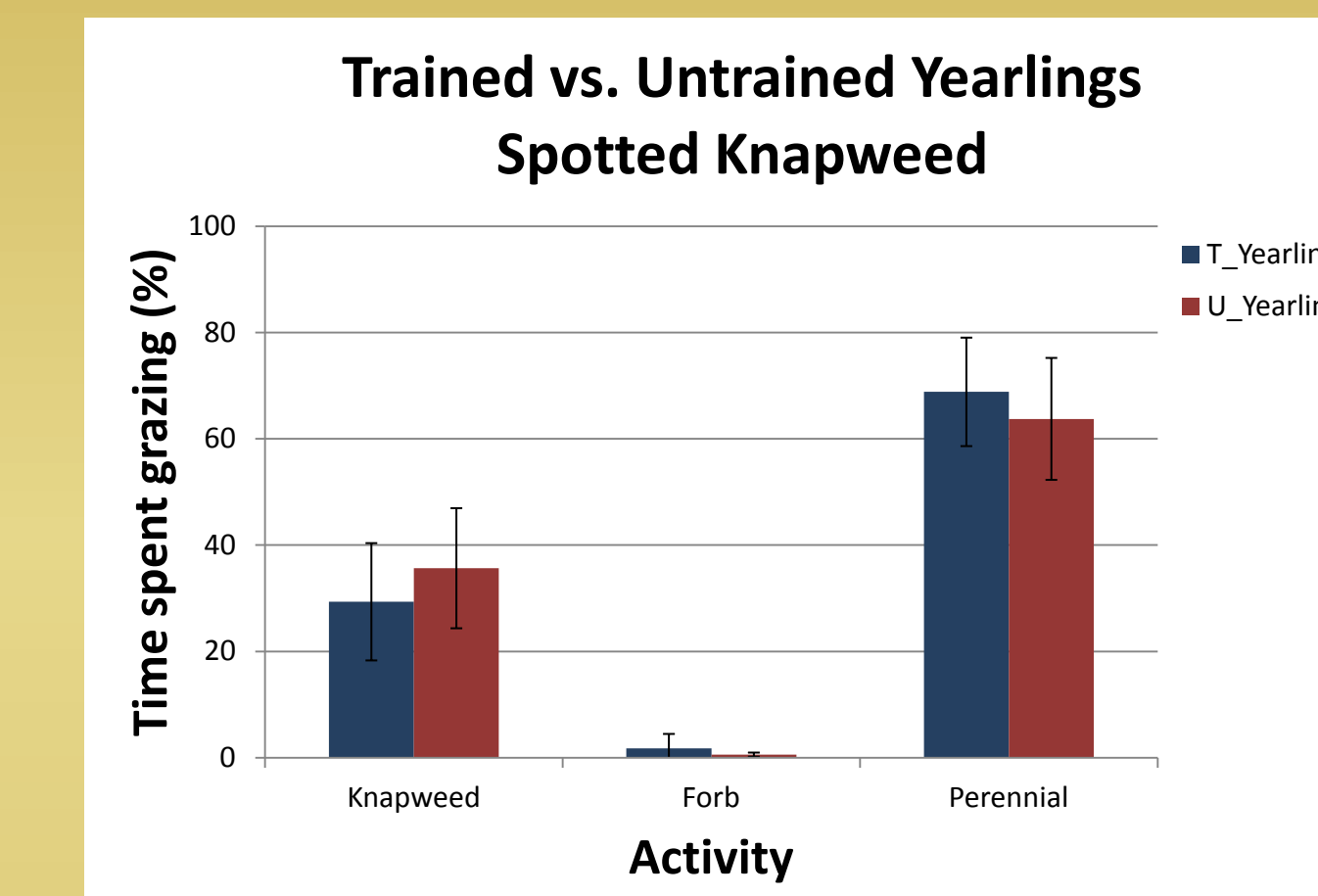


Figure 3. Time spent grazing spotted knapweed, other forbs and perennial grasses by yearlings from trained (T) cows compared with those from untrained (U) cows.

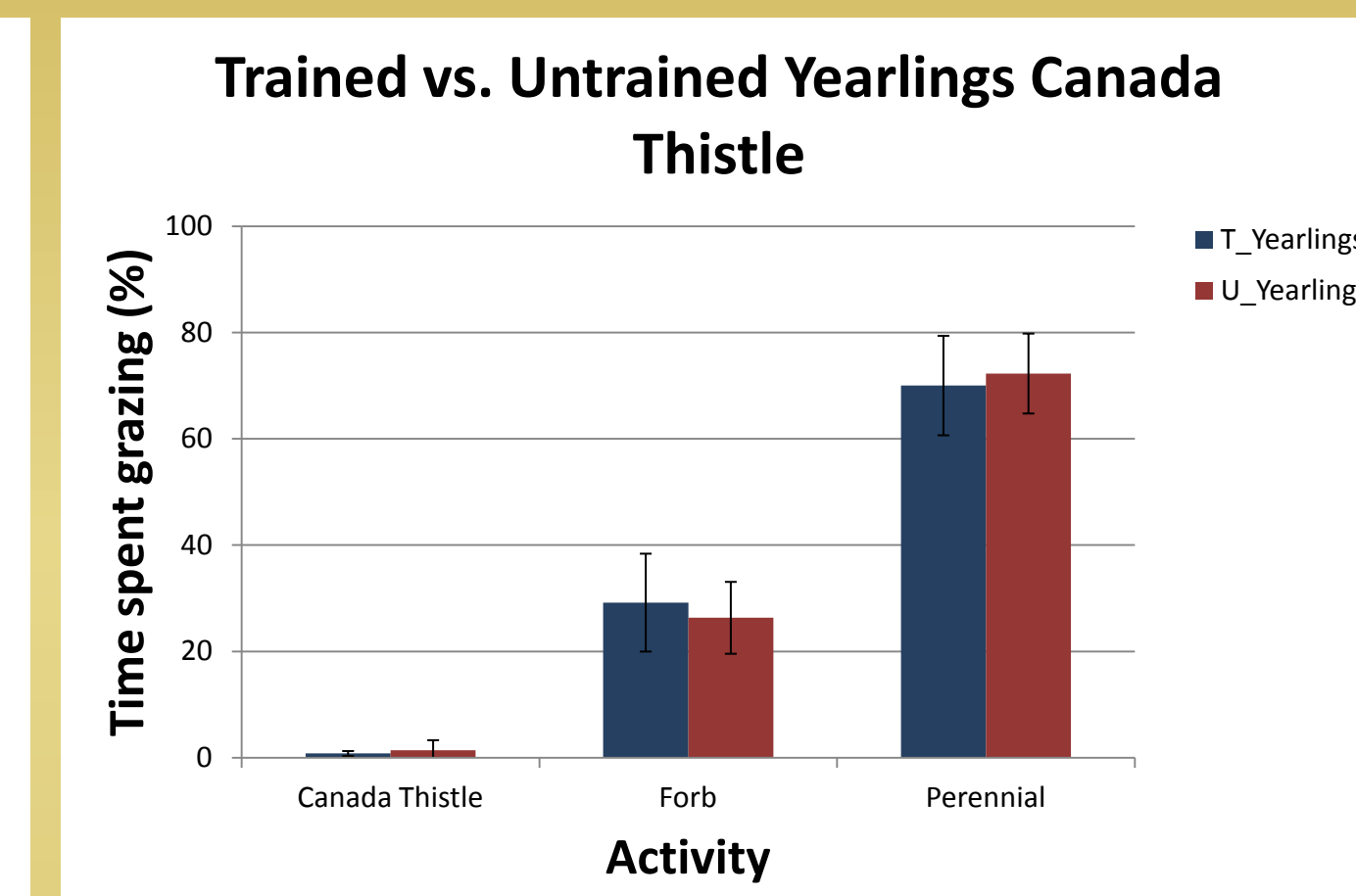


Figure 4. Time spent grazing Canada thistle, other forbs and perennial grasses by yearlings from trained (T) cows compared with those from untrained (U) cows.

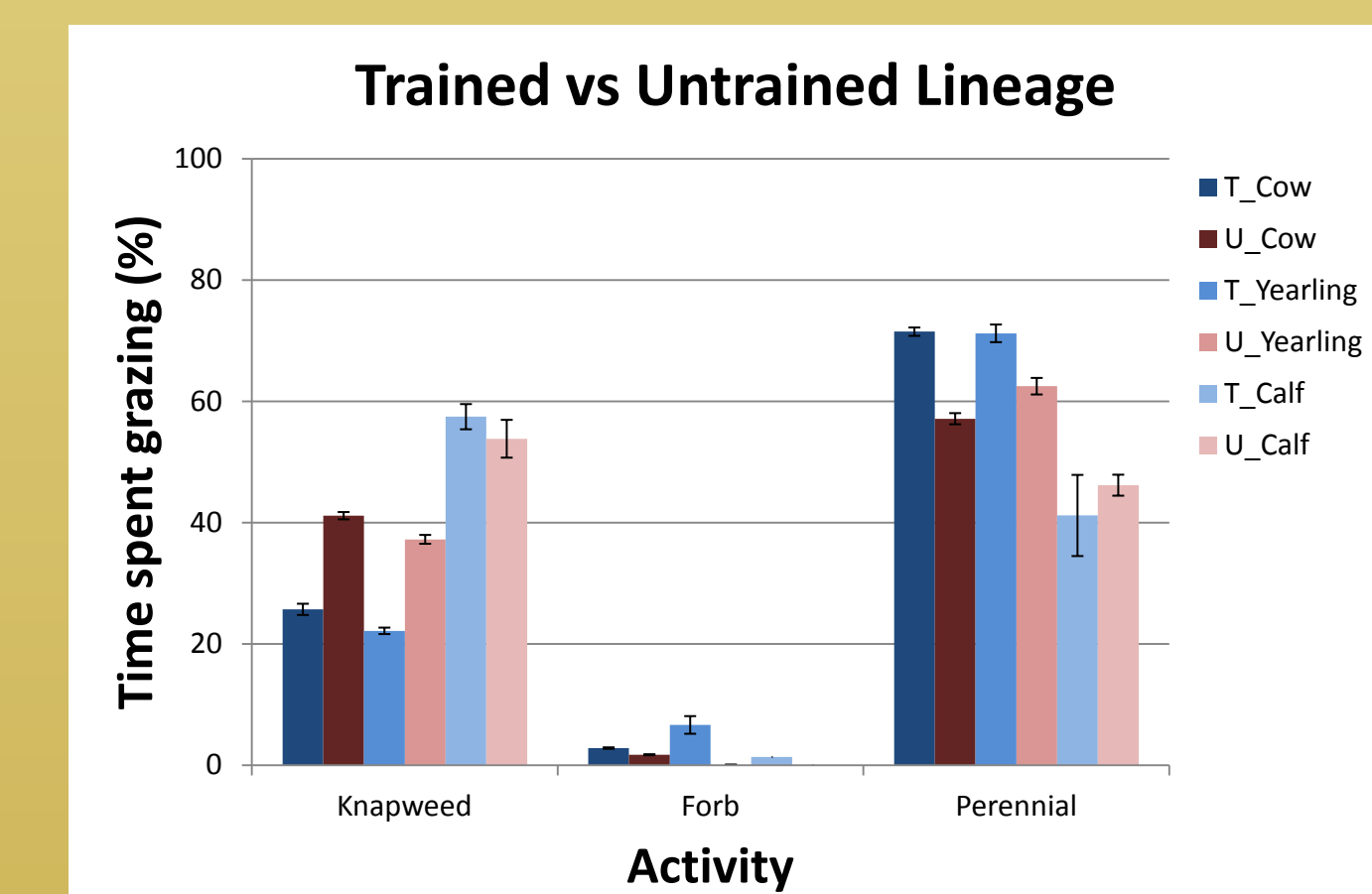


Figure 5. Time spent grazing spotted knapweed, other forbs and perennial grasses by a trained (TC) and an untrained cow (UC), and their calves (Tc, Uc) and yearlings (TY, UY).

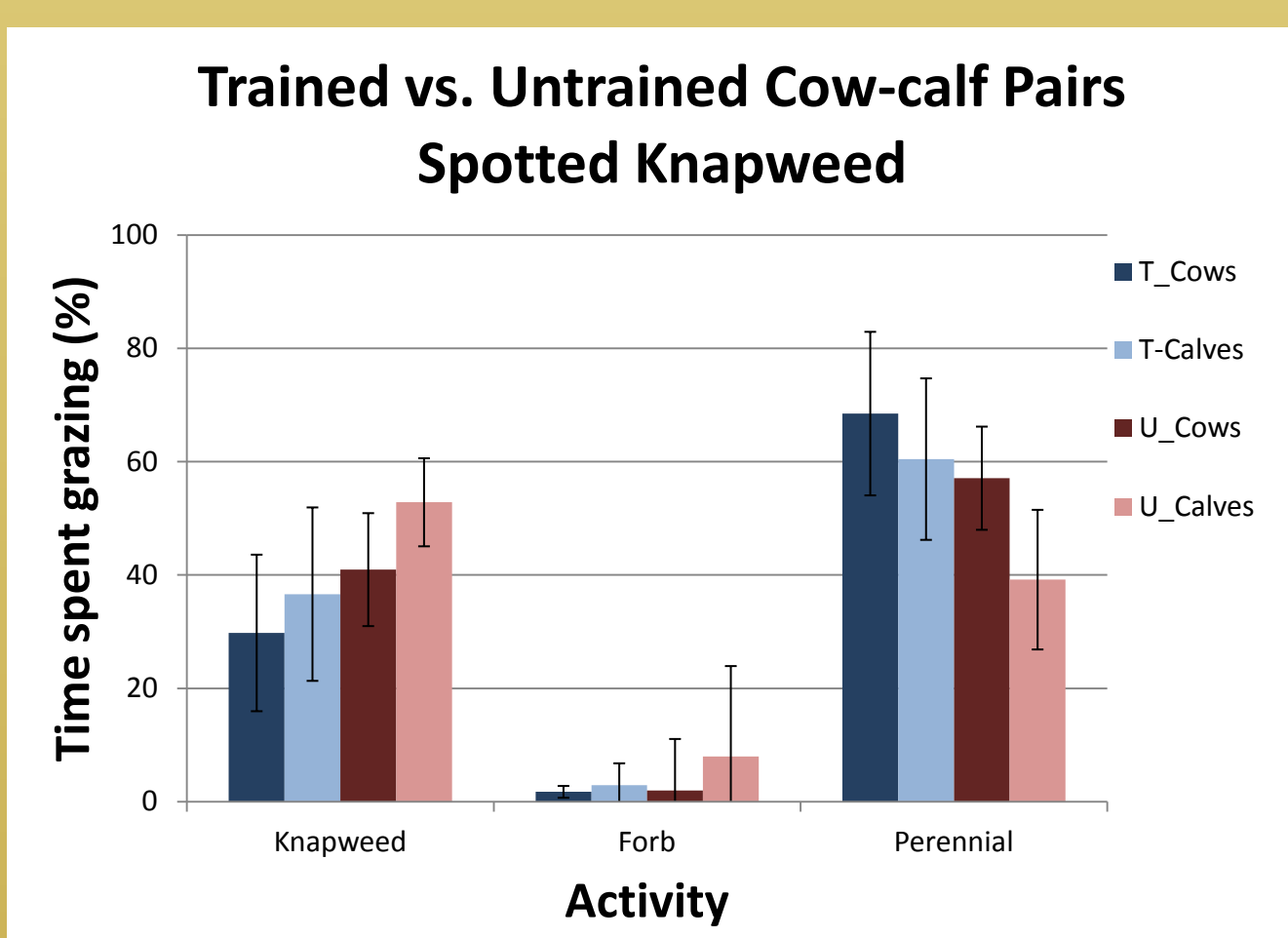


Figure 1. Time spent grazing spotted knapweed, other forbs and perennial grasses by trained (T) and untrained (U) cattle and their calves.

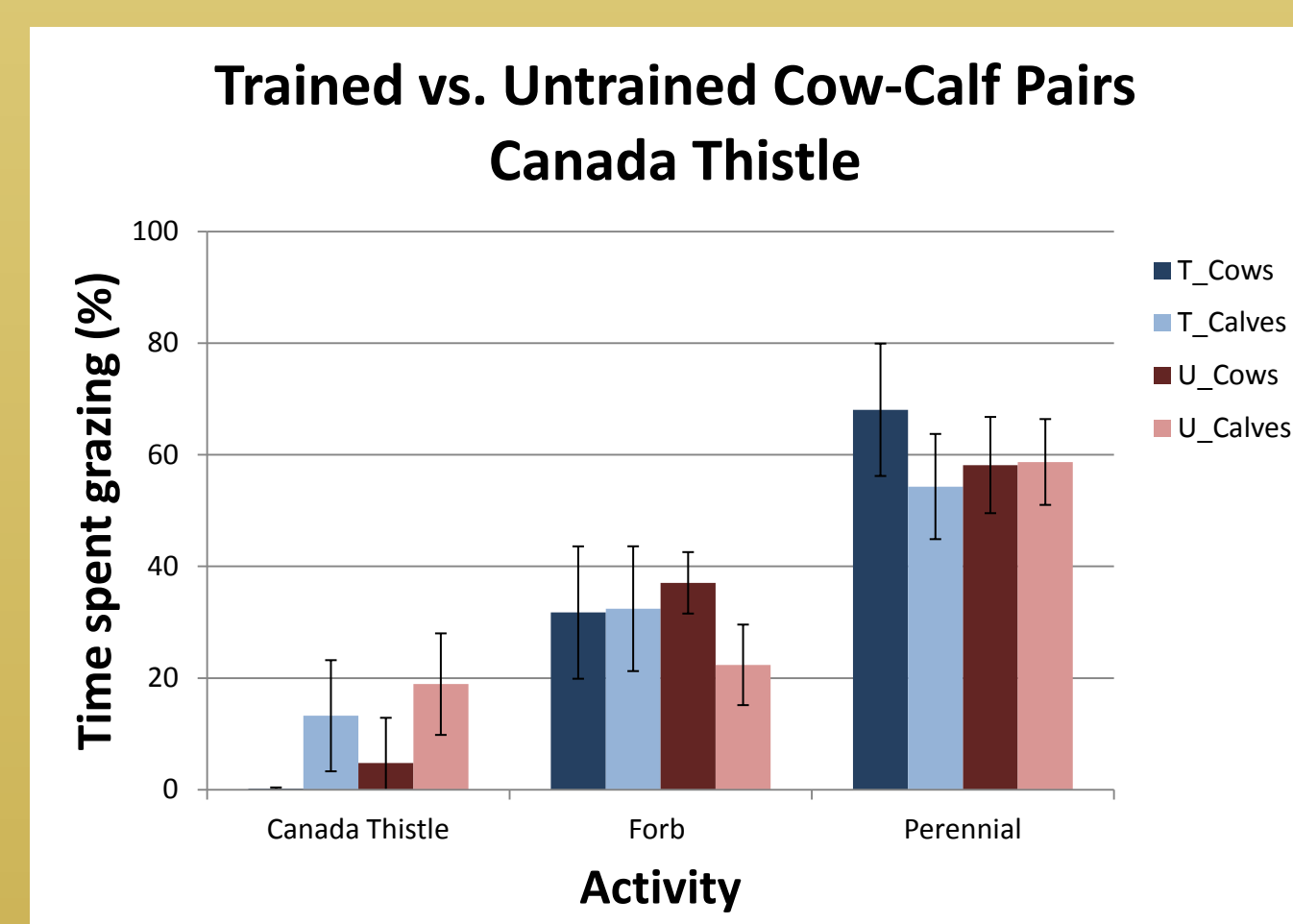
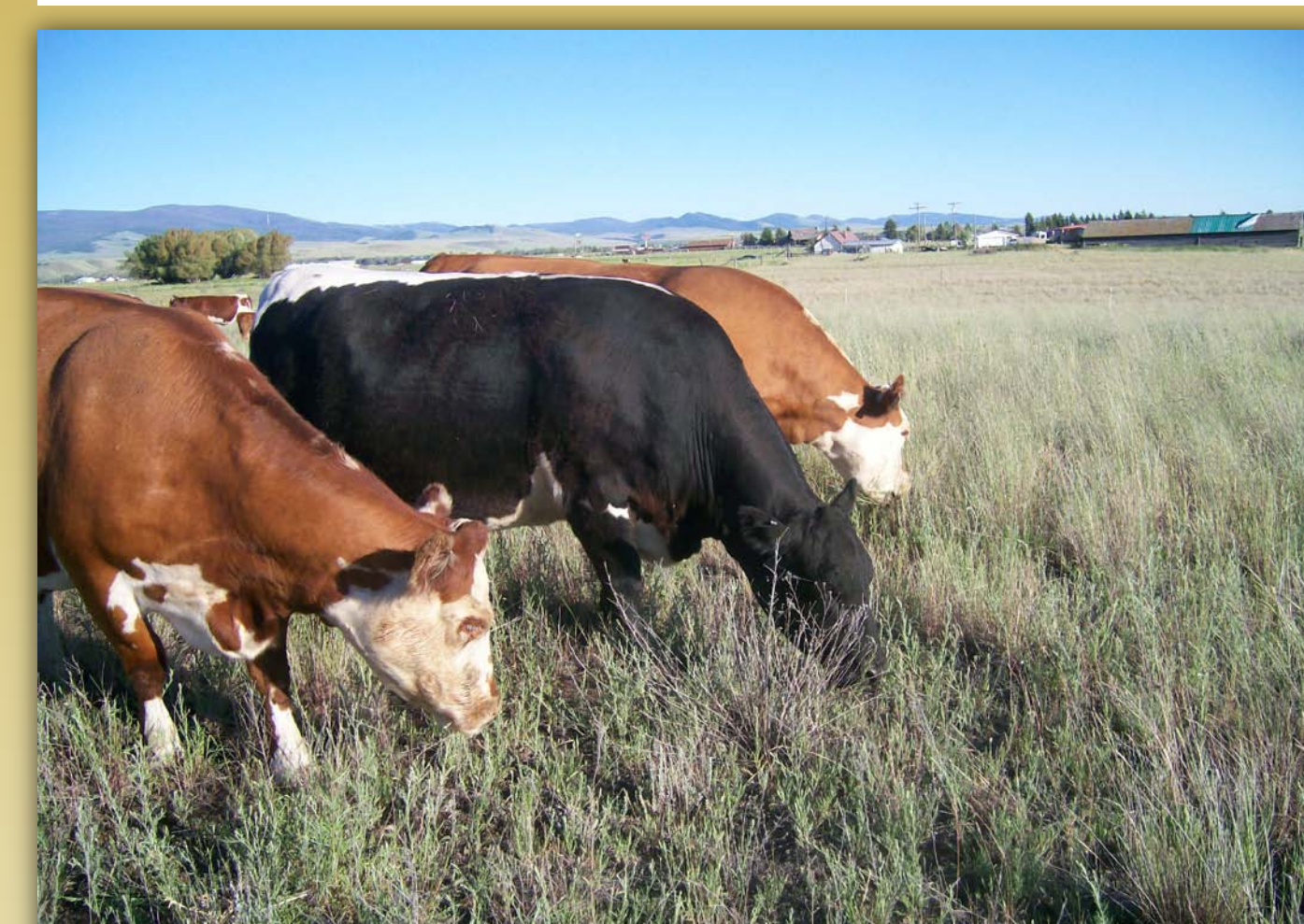


Figure 2. Time spent grazing Canada thistle, other forbs and perennial grasses by trained (T) and untrained (U) cattle and their calves.



Discussion

Trained cattle did not retain their training, and thus did not pass a preference onto their offspring.

Trained and untrained cattle had grazed together since 2005. Because cattle are social learners, untrained cattle may have learned to graze spotted knapweed and Canada thistle from the trained cows. On the other hand, trained cattle may have consumed less of the weeds than expected because of their grazing with untrained cattle since 2005.

Although training of the cows did not affect the amount of time their offspring spent grazing spotted knapweed and Canada thistle, calves from trained and untrained cattle were much more likely to consume these weeds, especially Canada thistle, than their dams. Young animals are curious and seek novelty.