



## Y Ranch squarrose knapweed control and pasture restoration

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### Abstract

Almost half the total land area of the United States is used for pasture and grazing, and nearly all of it is infested with weeds (Monaco et al., 2002) Rangeland pastures worldwide are often invaded by various weed species (Vasques et al., 2010). These invasions cause significant biological (Christensen et al., 2011) and economic loss (Whitesides, 2004). In the Mountain West region of Utah, cheatgrass, knapweed, medusa head, and hoary cress are just a few of the numerous invaders. Even though weeds are a serious problem and are difficult to control, it is possible to manage weeds (Jones et al, 2010) and restore pasture health and productivity.

We undertook a pasture renovation project in 2012 at the Y Ranch in Tooele County and Juab County, Utah in the Great Basin Region of the western United States. Invasive weeds, primarily knapweed, had degraded Y Ranch pastures. We aerielly sprayed herbicide to kill weeds in a 728-hectare pasture then later fertilized the pasture; we did no seeding. Two years later AUMs had increased by 200. We wanted to measure forage production after ten years of livestock grazing to see how many AUMs were currently available twelve years after the renovation.

A forage production sample taken in May 2024 showed 91 kg/ha. The primary forage species was Crested Wheatgrass, *Agropyron cristatum*. Although crested wheatgrass is an introduced species in the Great Basin, it has shown an ability to establish when and where other species struggle. This pasture currently provides 225 AUMs of grazing where before the treatment it provided virtually no AUMs.

### Introduction

Many rangeland pastures are infested with weeds that reduce their usefulness and productivity. Livestock grazing and wildlife diversity and numbers are diminished when non-useable plant species dominate. Squarrose knapweed (*Centaurea virgata* ssp. *squarrosa*) is particularly troublesome as it is a long-lived, tap

rooted perennial (Whitson et al. 2006). It can often form dense stands that crowd out useful plant species. Mature plants are from 30 to 46 centimetres tall and are very rough and abrasive. Wildlife will avoid moving through impenetrable patches. Knapweed and other invasive weed species can be eliminated by using the right herbicide and with proper application timing. Pastures can be restored and maintained in a productive state for several years if managed properly (Bidwell and Woods, 2017). The objective of this project was to eliminate Squarrose knapweed with herbicide so that useful forage species would have a chance to re-establish and grow. Our objective for the present study was to see how much forage production was available twelve years after our initial herbicide and fertilization treatment of Y Ranch pastures.

### Methods

An area of 728 ha of rangeland pastures on Y Ranch, Tooele/Juab Counties, Utah was treated with Milestone® herbicide (Active ingredient: Aminopyralid, an auxin type growth hormone) and LINK® 30L foliar fertilizer (30-0-0, 30% polymer-based Nitrogen). Milestone® was applied aerially at the rate of 0.198 kg/ha in May 2012. LINK® 30L was applied with a ground rig boom sprayer in November 2012 at the rate of 14 L/ha.

### Results

Dense stands of Squarrose knapweed were eliminated and by November 2012 we were able to apply fertilizer to encourage forage growth for the following season. Forage grass species, primarily Crested Wheatgrass, *Agropyron cristatum*, grew in abundance. Grazing of livestock on the treated area was deferred for two growing seasons. In the summer of 2014 AUMs of available forage had increased from 25 to 200 (Figure 1). After ten years of grazing, forage species were still abundant (Figure 2). Samples taken in May 2024 showed forage levels of 91 kg/ha and 225 AUMs. There was no sign of Squarrose knapweed on the treated area.



Figure 1. Before and after treatment of Squarrose Knapweed

### Discussion and Conclusions

Much emphasis has been placed on reseeding with native plant species to restore rangeland, however many native species are unable to establish successfully because of aggressive invasive annual species. Downy brome, *Bromus tectorum* L., is especially troublesome on rangelands of the western United States. It is a prolific seed producer with a high rate of germination as both an annual and winter annual (meaning it can germinate in either late fall or early spring) and is an early maturer prone to ignition from sparks, lightning, and other sources of fire. It has been responsible for many failed seedings.

Crested Wheatgrass is known for resilience to weed invasion (Looman and Heinrichs 1973). It has shown potential (Hulet et al. 2010) to be a transition species by out competing invasives such as Downy brome and allowing other species, especially natives, to establish.

Because forage production on treated Y Ranch land has remained high for ten years and because knapweed is non-existent, Crested Wheatgrass may also be effective in preventing re-establishment of invasive perennials.

In this project it has also demonstrated its longevity. It is known to have a 15–20-year lifespan (Looman and Heinrichs 1973).

Steps can be taken to reverse the effects of weeds and pasture productivity can be restored. Use of an effective herbicide combined with proper timing of application can bring about positive results. In our project a combination of herbicide and fertilizer proved to be very effective. No reseeding was necessary.



Figure 2. Y Ranch Pasture May 2024

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