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A 'New' Ally Against an Old Foe; Rust Fungus and the Fight Against Canada Thistle

By Brook Skagen, Prairie Conservation Forum

Across Alberta's open landscapes, a remarkable variety of wildflowers can be found. From sunlit clusters of goldenrod and buffalo-bean glowing in the prairie sun, to the bowed heads of blue harebells and pink avens nodding in the summer wind, our grasslands contain a beautiful diversity of flowering plants. However, not all conspicuous plants are welcome. Weeds such as Canada (creeping) thistle have become among the province's most persistent invaders, resisting decades of control efforts and thriving in almost every type of landscape, often with severe ecological consequences.

The word "weed" simply refers to a plant growing where it is not wanted, but in practice it is most often applied to introduced species that spread aggressively and disrupt ecological or economic systems. Under Alberta's Weed Control Act, weeds fall into two broad categories: unregulated "nuisance" species and provincially regulated species designated as either *Noxious* or *Prohibited Noxious*, which require active control to prevent establishment or further spread.

Canada thistle, also known as creeping thistle, is classified as a *Noxious* weed under Alberta's weed control act.

Among these, Canada (creeping) thistle *(Cirsium arvense)* remains one of the most persistent and difficult Noxious weeds to manage. With the ability to spread by shoots or seeds, it is able to aggressively spread into newly-disturbed areas. Once established, it readily outcompetes native vegetation for moisture, nutrients, and space, and forms a root system which anchors itself deep enough to resist most attempts of removal.

Managing Canada thistle typically involves an integrated pest management approach, employing a combination of chemical herbicides, mechanical means such as pulling, mowing, cultivating, and grazing management strategies, or the use of additional living (biological) control agents such as introduced stem weevil *(Mecinus janthiniformis)*, which naturally predates upon the plant. While these methods can be effective under the right circumstances, they can be costly, labor-intensive, and in some cases pose risks to non-target plants, beneficial insects, or water resources. Furthermore, only biological agents and carefully managed grazing offer the potential for long-term suppression of severe infestations without constant reapplication. However, interest has been growing in an unexpected partner in thistle management: one that's been here all along.

Rust Fungus and the Fight Against Canada Thistle (continued)

Meet the Fungus Likely Already in Your Field

Canada thistle rust fungus (*Puccinia punctiformis*) or "thistle rust" is a naturally-occurring pathogen to Canada thistle which is now found across much of North America. This host-specific fungus lives within the roots of infected Canada thistle plants, acting as a systemic parasite. Thistle rust shows in infected plants as dusty orange or brown spots on leaves, and may go missed upon first glance. However, growing research in both Canada and the United States suggests it may be a powerful tool in Canada thistle management.

Canada thistle rust fungus (*Puccinia punctiformis*) or "thistle rust" appears on infected plants as dust orange or brown spots.

When *P. punctiformis* spores first makes contact with the thistle, the plant takes on an orange freckle-like appearance. The rust makes a sweet, sticky nectar that attracts flies, which then carry spores to nearby thistles. Wildlife movement, livestock, and wind also help spread the infection. Early infections slowly chip away at the plant's ability to photosynthesize, gradually weakening it. However, the most important phase happens later in the season. As foliage dies back in the fall, the fungus produces darker spores on the underside of the leaves and moves into the thistle's root system. There, hidden beneath the soil, it quietly settles in for the winter. This is where its real impact begins.

Canada thistle survives Alberta's winters by relying on carbohydrate reserves stored in its rhizomes. Come spring, those reserves fuel the flush of new shoots that quickly spread. But when the rust fungus has overwintered inside those roots, those reserves are already depleted. Shoots emerge stunted or weakened and spread new spores throughout the patch, while others don't emerge at all. Over time the thistle patch begins to thin; stems become fewer and less vigorous, and the plant loses its competitive edge over surrounding native vegetation. Thistle patches may show significant reductions in size and density after several cycles of infection. Prairie climates, with their warm summers, intermittent moisture, and reliably cold winters, seem particularly well-suited to the fungus's full life cycle.

Slow, Subtle, and Surprisingly Effective

Rust fungus isn't a silver bullet. It won't wipe out a thistle patch in a season, and it doesn't replace the need for careful rangeland or integrated pest management approaches - but unlike mowing or herbicide treatments, which must be repeated frequently and often offer only temporary relief, systemic rust infections create a slow, sustained pressure that persists without continual intervention. Because it spreads gradually through spores and plant material, its effectiveness is greatest when introduced during cool, damp fall conditions, when healthy rosettes are most vulnerable.

Studies in North America have documented this slow-motion weakening effect. A statewide rust inoculation effort across more than 150 sites in Colorado found that Canada thistle stem counts were nearly halved in over three-quarters of monitored locations over an eight-year period (Bean et al. 2024). Similar monitoring efforts are underway in Utah and at Elk Island National Park in Alberta, with promising early observations, though published results are still forthcoming.

Rust Fungus and the Fight Against Canada Thistle (continued)

One of the most encouraging aspects of *P. punctiformis* is its host specificity. It targets creeping thistle alone, making it a safe addition to integrated pest management programs where non-target impacts are a concern. And because it's already present across Canada, working with it often means amplifying a natural process rather than introducing something entirely new. To date, there are many gaps in our understanding of how prevalent the fungus is distributed in the prairie provinces; a citizen science initiative is currently underway to collect a better picture of just how prevalent it is across the province.

A New Chapter in Thistle Management

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As awareness of *Puccinia punctiformis* grows among landowners, farmers, municipalities, and restoration practitioners, so does the possibility of working with this fungus intentionally and effectively. Ongoing research continues to explore how to encourage infections, how conditions influence success, and how it can be used to best complement other controls.

The best weed control strategy is always prevention, but for the patches that have already taken hold, integrating multiple approaches tends to be the most successful long-term strategy. Rust fungus fits neatly into that model. It's not immediate, but it offers a sustained, natural pressure on a notoriously resistant plant.

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To learn how to get started using rust fungus on your land, visit the Alberta Invasive Species Council program information: https://abinvasives.ca/wp-content/uploads/2025/07/Biocontrol-How-to-Release-Canada-Thistle-Rust-Fungus.pdf

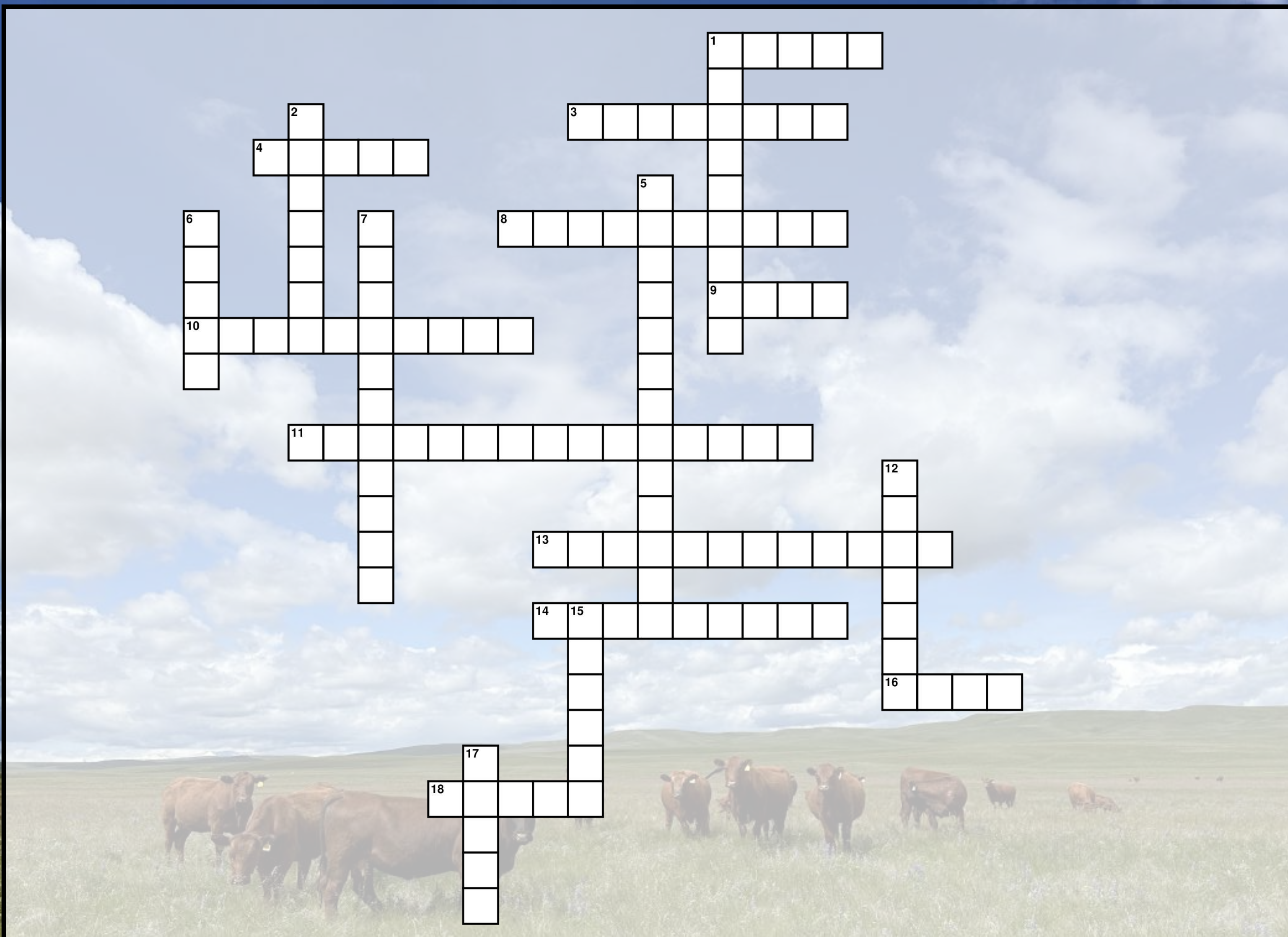
Visit iNaturalist to see where rust fungus has been observed in Alberta, or add observations of your own!

At Home on the Range
A Rangeland Crossword Challenge!

By Trinie Chisholm, Alberta Conservation Association

Test your range management know-how!

From grazing strategies and soil types to grass identification and rangeland health, test your crossword skills on all things rangeland!



Across

[1] A type of soil with excellent drainage, sometimes used to build castles
[3] A transitional area between aquatic and terrestrial landscapes
[4] A type of land where vegetation is grazed and managed as a natural ecosystem
[8] A negative impact on rangeland soils often caused by heavy animals, like cows
[9] Leaving a pasture ungrazed to allow recovery
[10] The natural subregion that Lethbridge, Alberta is in
[11] A grass that sews. 3 words
[13] Spreading grazing pressure evenly across a pasture
[14] A grass that flaunts lashes. 2 words
[16] A type of pasture specializing in non-native forages
[18] Delaying grazing until plants have grown enough to handle it

Down

[1] Variation necessary for plants to utilize all soil and plant canopy zones
[2] Matching livestock numbers with what the land can sustainably provide. Also a type of beam
[5] A noxious weed that's true, north, strong, and prickly. 2 words
[6] A type of soil that is rich and fertile, composed of sand, silt, and clay
[7] The ability of rangelands to perform key functions
[12] A soil feature with subsurface hardpan layer caused by excess sodium, or a voluminous hairstyle
[15] Collected to estimate a site's ability to retain moisture
[17] Often used to separate lands to be managed differently

High Voltage Homes: the Peril of Raptors Nesting on Power Lines

By Cindy Kemper, Bird on a wire environmental services Inc.

As you journey through southern Alberta in late spring, you have, from time to time, undoubtedly noticed large stick nests on power lines that crisscross Alberta's prairies. These typically belong to large raptors (e.g., eagles, osprey, and hawks) that call Alberta home for the breeding season. And why wouldn't they nest there? As raptor real estate goes, they have it all; sufficient clearance off the ground to provide protection from ground predators, a commanding view of the landscape, enough structural stability to support a nest that can get extremely heavy, and even a bit of structure through which they can weave sticks. If you journey though again later in the season, you might see fuzzy heads of nestlings popping out of the nest, or even fledglings spreading their wings ready to attempt their first flight. No problem, right?

A Swainson's hawk nest on a transmission line in southern Alberta in 2025.

Well…sometimes no, but often…yes. So let's get into it a bit. There are two types of power lines that you will encounter in Alberta: first, there are higher voltage transmission lines (typically 138kV-500kV) – these are the very large, often steel, towers that carry electricity over long distances. Due to their higher voltage, transmission lines are constructed with greater distances between conductors. Raptors, especially osprey, frequently choose these towers for nesting. Thanks to the wider spacing of equipment, utility companies can generally accommodate nests on these structures, though there are occasional exceptions. For the purposes of this discussion, these transmission towers are considered relatively "safe" for raptor nesting.

Compare those with the second type, lower voltage distribution lines (usually 25V or less) – the higher density, wooden poles that run along range roads, and into people's rural yards. Distribution poles are the ones we are concerned about when it comes to avian electrocution risk, as they have much more energized equipment such as transformers, and much smaller clearances between and among energized and grounded components of the pole.

A ferruginous hawk nest on distribution tangent pole in southern Alberta in 2025. Smaller distribution poles can pose a significant hazard to nesting raptors.

Electrocution occurs when a bird simultaneously contacts either two energized components of a pole, or one energized component and one grounded component, thereby unwittingly completing the electrical circuit. This typically causes the death of the bird, a power outage for the customers in the area, and more often as the climate warms, grass fires. Large birds are particularly vulnerable to electrocution as it is easier to bridge the electricity gap, and those in the grasslands are even more susceptible to electrocution because they rely more heavily on power lines with the lack of trees. Electric utility companies often add insulation ("bird protection") to electrical components on certain structures to reduce electrocution risk to raptors that briefly perch on the poles.

High Voltage Homes: the Peril of Raptors Nesting on Power Lines (continued)

So that brings us back to the nests. Any material used in constructing a nest (sticks, bailing twine, loose wire etc.) can conduct electricity, particularly when wet with rain or whitewash from the occupants. Even prey remains can do so; basically, anything not designed to be on the pole increases the risk of an electrical flashover, electrocution, power outage, and grass fire. And the bird protection that is sometimes present on the pole is, despite what many believe, not designed to withstand the sustained contact from sticks, prey remains, and multiple birds. In short, there is no safe nest on a distribution power pole.

Cindy Kemper

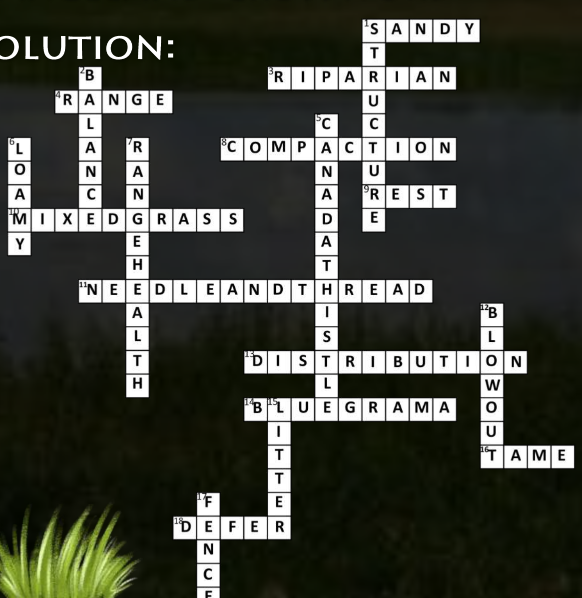
Red-tailed hawk nestlings on a distribution transformer pole in southern Alberta in 2025.

To exacerbate the problem, power lines stretch across remote regions of the province, making it quite common for hawks to build a nest and lay eggs before it is even detected. Even if detected by landowners or those recreating or working in the prairies, many individuals are unaware of the dangers these nests pose and often fail to alert the power companies. If electric companies are made aware of the risk, these nests can often be mitigated by temporarily diverting power, or, with appropriate permissions and permits (as active raptor nests and their occupants are protected by legislation such as the Alberta *Wildlife Act* and the federal *Species at Risk Act),* moving the nest to a temporary nest platform. Other solutions may also be determined on a case-by-case basis.

What can you do if you spot a nest on a distribution power line?

Please report it to the electric utility ASAP. If you don't know which company operates the line, you can also report the concern to your local Fish and Wildlife biologist, or your friends at MULTISAR for additional support. Together we can ensure these raptors have a safe conclusion to their nesting season, with the ultimate goal of keeping the birds safe, the lights on and the prairies intact!

Rangeland Crossword Solution:



The Range Science Forum is happening December 11 in Foremost.

This forum is geared towards landowners and is focused on the history of range management in southern Alberta, drought impact and resilience, post-wildfire management, precision ranching, range health metrics and much more! Don't miss it!

Species Profile: Wyoming Flax

By Stephanie Jaffray, Prairie Conservation Forum

Wyoming flax (*Linum compactum*) is one of three native flax species in Alberta.

Description: Wyoming flax (*Linum compactum*) is a small size forb in the flax (Linaceae) family. This little plant is one of three flax species in Alberta. Other species include wild blue flax and stiff yellow flax. Wyoming flax is a fairly compact plant and grows quite close to the ground which is key to its ability to survive heat, wind, and grazing animals. Wyoming flax is an annual herb. It is typically shorter than its cousins, growing between 5-30 cm erect and branched from the base with a bushy appearance. The linear shaped, almost grass-like leaves are alternate and are around 10-28 mm long and 1-1.5 mm wide. Margins are entire or sometimes sparsely toothed on the distal leaves. Growth form may vary slightly depending on site conditions. On drier, exposed ridges, plants can be more compact (5–15 cm tall). On slightly richer or protected soils, plants may reach 20–30 cm and branch more.

The petals are bright yellow, five-petaled and obovate in shape, and approximately 6-11 mm long, about the size of a fingernail. Sepals are 5-9 mm, lanceolate and remain on the plant for an extended amount of time before dropping. Stamens are 4-6 mm; anthers are 0.4-0.8 mm. Capsules are ovoid (~3.5–4.4 × 2.7–3.5 mm) and dehisces into five 2-seed segments. Seeds are approximately 2.6–3.1 × 1–1.3 mm in size. Flowering time is from June through August, and occasionally in September.

Status: Wyoming flax currently does not have a provincial conservation ranking (SU), due to the lack of scientific information or substantially conflicting information.

Habitat: Wyoming flax thrives in places that many plants consider too harsh. The best place to look for it is on sagebrush flats, mixedgrass prairies, foothills slopes, open woodlands and hot rocky hillsides. It grows in dry, well-drained, sandy, gravelly, and stony soils. It thrives where competition is low and sunlight is plentiful and at elevations from 600-1800 meters. Wyoming flax ranges across western and central North America reaching the furthest northern portion of its range in Alberta and Saskatchewan. It often grows alongside needle-and-thread grass, blue grama, Junegrass, biscuitroot and moss phlox.

Threats: Habitat loss and degradation from human activities such as resource development, urbanization, cultivation of native grasslands and invasion by non-native plant species. Additionally, diseases like rust can impact the health of native flax populations.

Ecological Importance

Wyoming flax is a pollinator lifeline when resources are scarce. It provides nectar and pollen primarily to native solitary bees such as mason bees, sweat bees, small mining bees and occasionally hoverflies and bee flies. The flowers open in full sun, matching the activity patterns of many native ground-nesting bees. Since they bloom mid-late summer, they fill the nectar gap between early spring wildflowers and later flowering ones such as asters and goldenrods. They are generally not preferred by livestock but are sometimes lightly browsed by deer or small mammals. Because of their low palatability they are usually avoided, helping them to persist in grazed rangelands.

Species Profile: Wyoming Flax (continued)

Know Your Flaxes

Wild blue flax is easily to identify, but stiff yellow flax and Wyoming flax are very similar plants and it can be difficult to distinguish which is which. How do you know which flax you are looking at? The following table might help you to decide.

	Wyoming Flax *(Linum compactum)*	**Stiff Yellow Flax** *(Linum rigidum)*	**Wild Blue Flax** *(Linum Lewisii)*
			
Plant Height	5-30 cm	20-30 cm	20-70 cm
Growth habit	Branching from the base, bushy in appearance	More erect, few branches	Slender, but erect. Usually several together, branching flowers
Leaves	Narrow, linear, 10-28 mm long, often slightly spreading	Narrow, but usually stiffer, appressed	Numerous and overlapping, linear and one nerved, hairless with the top pointed to blunt
Flower color	Clear yellow	Bright yellow	Blue
Flower size	Small (6-11 mm petals)	Larger (10-18 mm petals)	Largest (10-20 mm petals)
Habitat	Dry prairie, sagebrush flats, open slopes	Dry, often calcareous/ upland grasslands	Foothills, montane, and parkland regions. Absent from driest sites.
Bloom time	June-August	May-July	May-July

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