

Indaziflam Soil Activity After a One and Two-Year Fallow

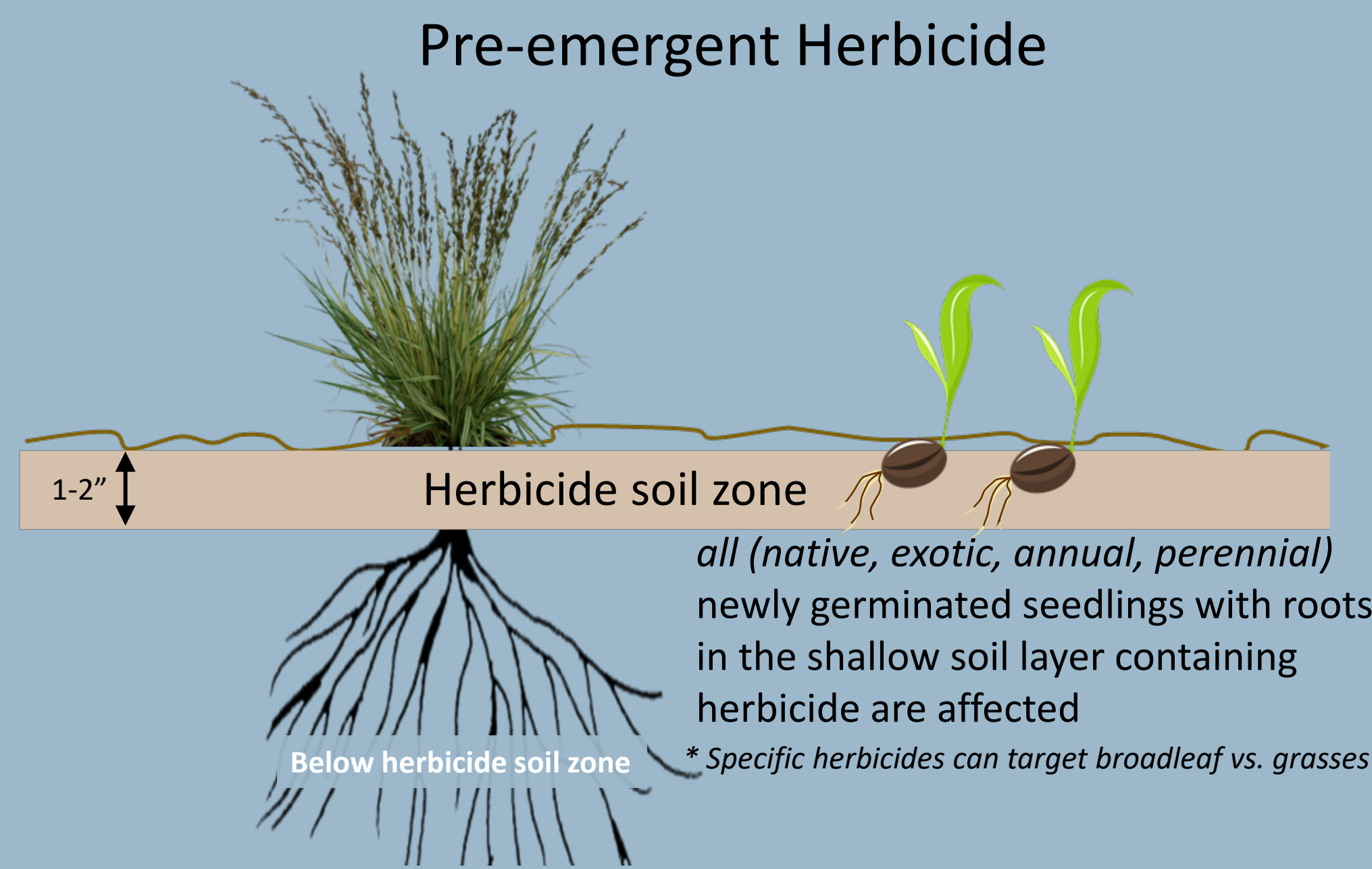
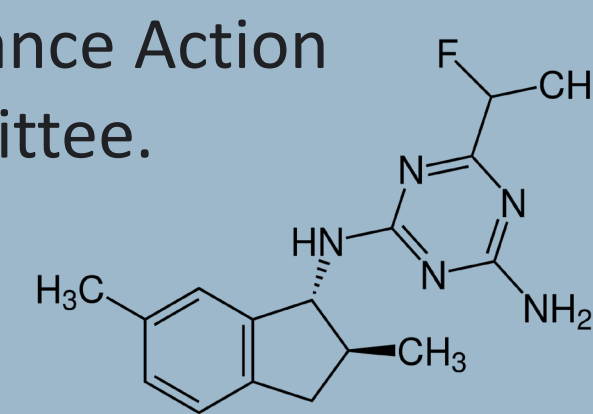
Dan Harmon and Charlie Clements
USDA, Agricultural Research Service, Great Basin Rangelands Research Unit, Reno, NV
Dan.harmon@usda.gov



In the fight against exotic annual grass invasions in the Great Basin, one of the most effective tools is the use of pre-emergent herbicides. This class of herbicides prevent germinated seedlings from becoming established. They have minimal effect on established perennial plants and residual activity can last from a few months to years.



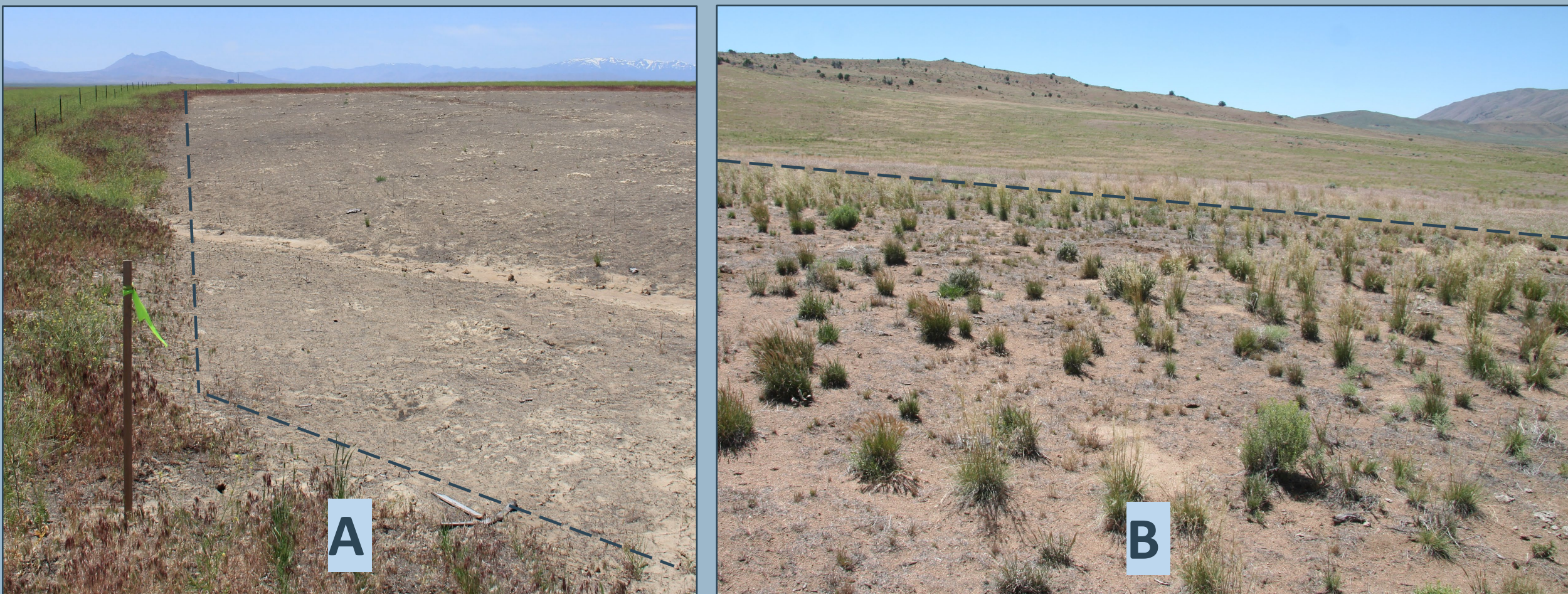
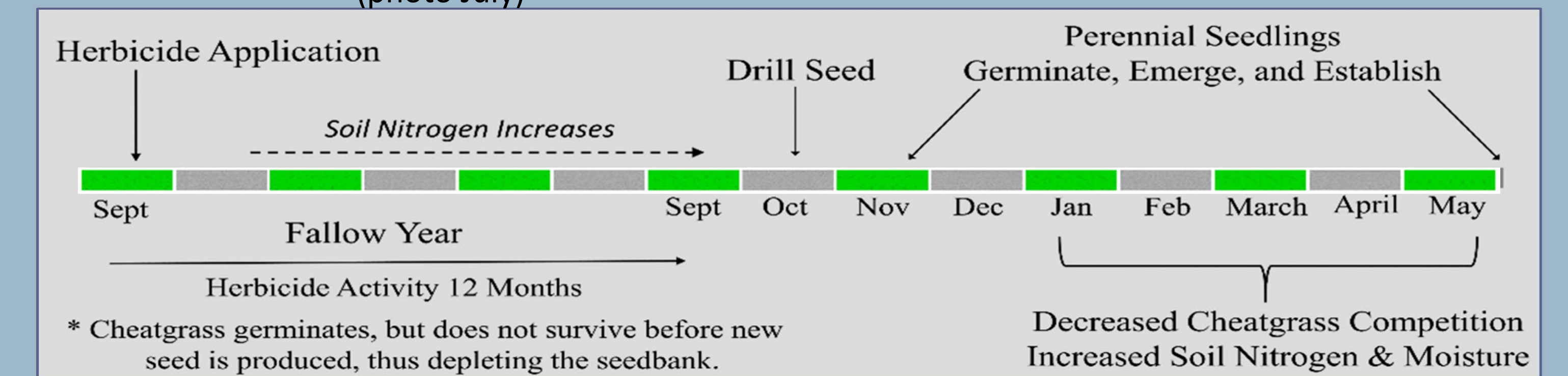
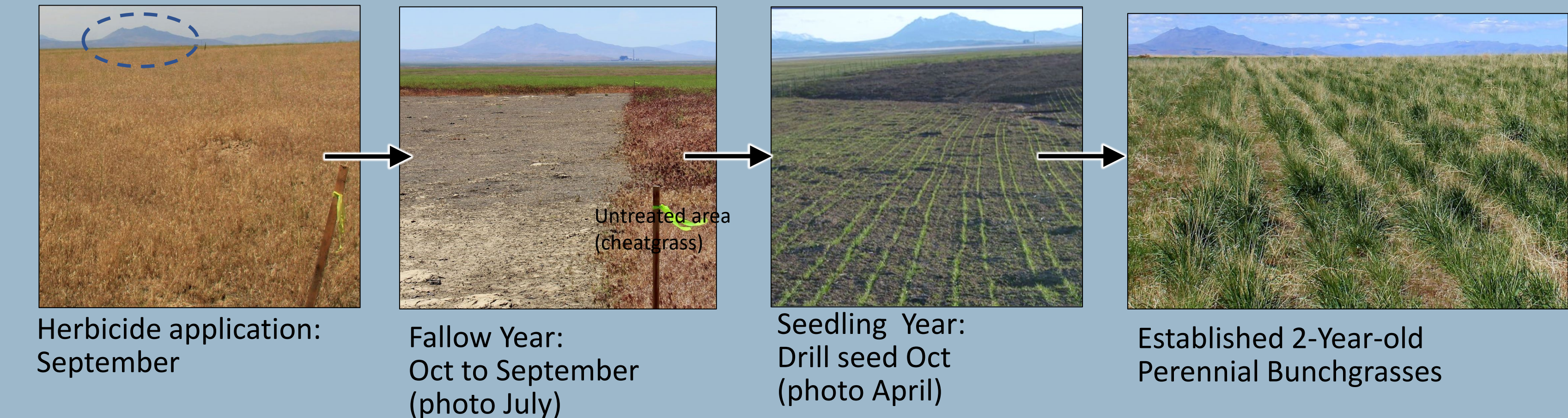
Indaziflam is the key ingredient in Rejuvra™. Indaziflam is an inhibitor of cellulose biosynthesis. The cellulose biosynthesis inhibitors (CBIs) are identified as **Class 29** by the Weed Science Society of America/Herbicide Resistance Action Committee.



Established plants avoid herbicide damage by having their roots deep into the soil profile below the shallow herbicide soil layer. Indaziflam binds strongly to soil particles and has very little movement in the soil profile.

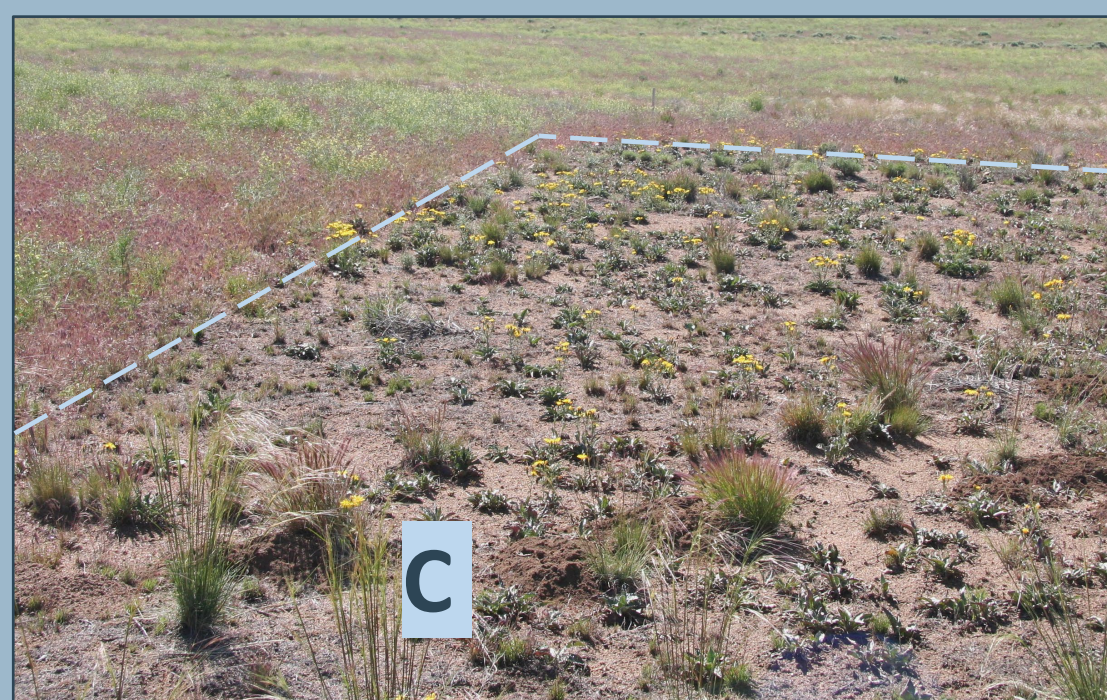
Great Basin Cheatgrass Control: Pre-emergent Herbicide's (PRE) Role

PRE are used to open a short window of opportunity without cheatgrass competition, in order to seed and establish competitive perennial bunchgrasses, which will suppress (resist) cheatgrass long term. In the Great Basin because of a low density of bunchgrasses existing with cheatgrass dominance, they are not intended to be long term control *without* a follow-up perennial grass seeding effort.



3 herbicide landscapes, that all require seeding efforts

- A: No perennials exist (bare ground)
- B: low density per. grass release, (same density that allows cheatgrass invasion, must be "thickened")
- C: Forb release, not competitive enough to resist cheatgrass, same plants allowed invasion before herbicide treatment. Need to add a competitive perennial grass to resist cheatgrass invasion.



TS Ranch

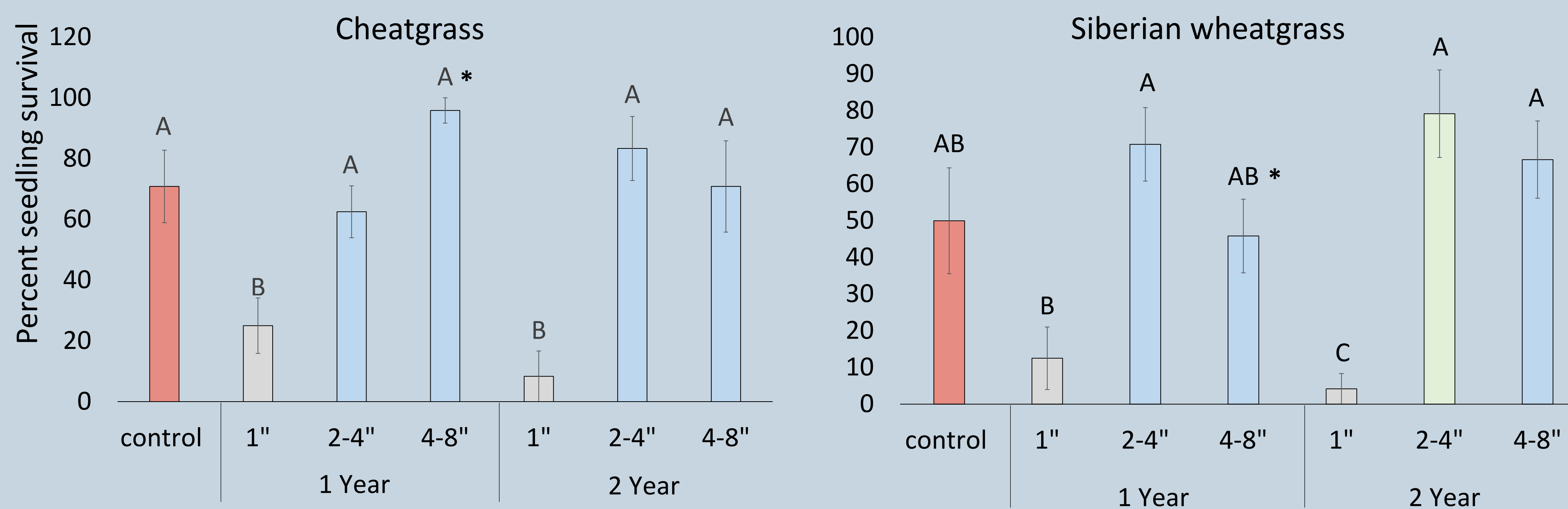


Figure 1. Percent seedling survival after 6 weeks from germination. Control soil was collected from non-sprayed areas at the site. Corresponding letters represent significant differences ($P \leq 0.05$) from control. (*) represents significant difference between cheatgrass and Siberian wheatgrass survival

TS Ranch Soil: Tomera-Cherry Spring association

- H1 - 0 to 9 inches: silt loam
- H2 - 9 to 39 inches: gravelly clay
- H3 - 39 to 60 inches: extremely gravelly sandy loam



Bedel Flat

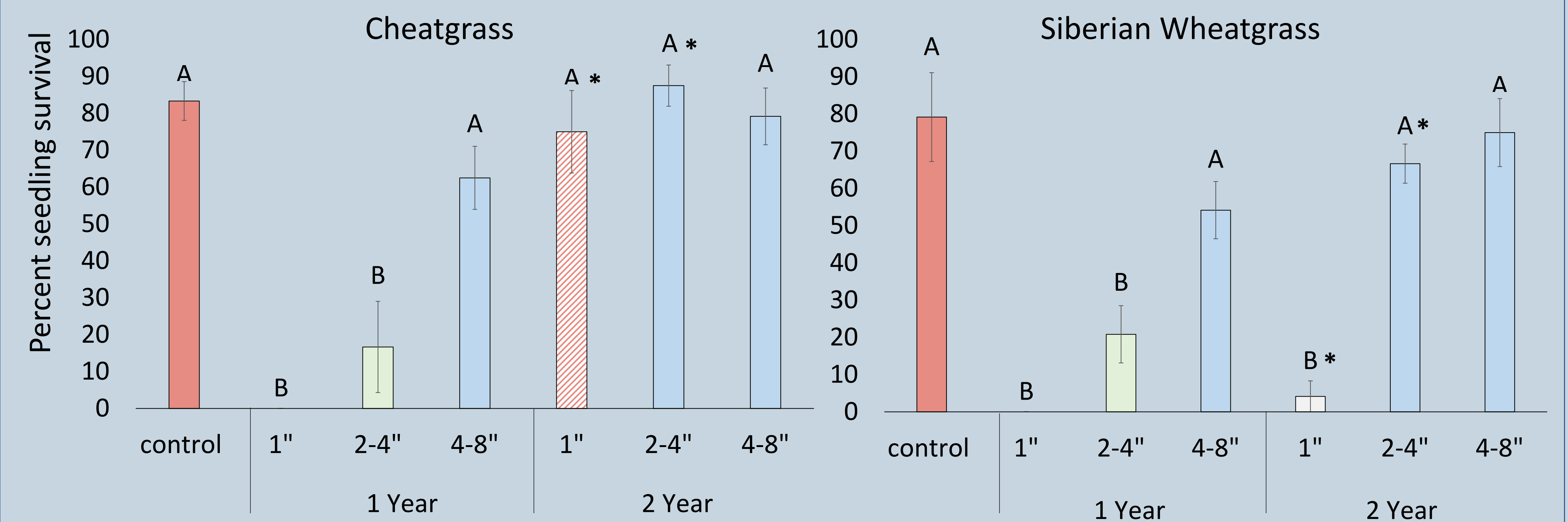


Figure 2. Percent seedling survival after 6 weeks from germination. Corresponding letters represent significant differences ($P \leq 0.05$) from control. (*) represents significant difference between cheatgrass and Siberian wheatgrass survival. / = no effect on cheatgrass in top 1" soil profile

Bedel Flat Soil: Wedertz sandy loam

- H1 - 0 to 6 inches: sandy loam
- H2 - 6 to 22 inches: sandy clay loam
- H3 - 22 to 34 inches: sandy loam
- H4 - 34 to 60 inches: gravelly loamy sand



METHODS

We collected soil from two Rejuvra application sites in northern Nevada at 3 depths (0-1", 2-4" and 4-8") after 17 and 29 months from the application date. Soil was placed in 0.5 quart containers (n=6) in a greenhouse and seeded (n=4) with cheatgrass (*Bromus tectorum*) and Siberian wheatgrass (*Agropyron fragile*), a common rangeland rehabilitation perennial bunchgrass. Seedling emergence and survival was measured after 6 weeks and compared to control soil (from site NO herbicide applied)



RESULTS

Soil from the top 1" of the profile from both sites after 1 and 2-year fallows drastically reduced cheatgrass and Siberian wheatgrass establishment (Fig.1 & 2). Predictably, herbicide activity was deeper (2-4") in the coarser soils (lower matric potential) at Bedel Flat, indicating more herbicide movement, but still minimal.

FUTURE

We continue to research the activity period of Indaziflam, with field seeding trials after 1,2,3 and 4 years post Rejuvra application at these 2 sites in Northern Nevada. Seeding depth is also currently being tested (seeds below the herbicide soil profile) as a means to avoid herbicide effects.