



Puncturevine (*Tribulus terrestris*) Control in the South Okanagan

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Puncturevine

- First recorded in California in 1903
- First discovered in Canada in 1970's
- In Canada, only occurs in Okanagan and Similkameen Valleys



Puncturevine

- Prefers dry, sandy or gravelly soil.
- Distinguishing feature is it's spiny seed pod.
- Spines can damage feet of humans, wildlife and domestic animals and can injure the mouth, stomach or intestinal lining of animals when ingested.
- The spiny pods can also puncture bicycle tires.



- Annual reproduces by seed only
- A single plant may produce up to 1 million seeds
- The seeds are found within the spiny seed pods
- Germination usually starts in late May in the Okanagan
- Germination will continue throughout the summer until frost
- Three weeks after plants appear, flowering begins and seed pods occur 1-2 weeks later.

Puncturevine biology



Puncturevine Control

- Physical Control
 - First plants found in an area should be removed before seedpods begin to form
 - Plants should be disposed of by burning or burial at landfill if seed pods present
 - Hoeing, shallow tillage or hand pulling of small patches
 - Established patches – plants must be removed annually
- Biological Control
 - Two species of weevils were introduced in US in 1961 and when used in conjunction they have provided effective control
 - Unable to successfully establish in the Okanagan
- Chemical Control
 - Puncturevine is not listed on any known herbicide label in Canada
 - Multiple applications (up to 5 per year) of glyphosate used in non crop areas.



Puncturevine trials

1. Pre-emerge Trial
2. Early Post-emerge Trial
3. Seeding and Mulching Trial

2015 site



2016 site



Pre-Emerge treatments 2015

1. **Untreated Check**
2. **Alion[®]** (Indaziflam) – Registered for Orchards and grapes
3. **Prism[®]** (Rimsulfuron) – Registered in some vegetable crops and in Washington State in grapes.
4. **Devrinol[®]** (Napropamide) – Registered in grapes, some berry crops and some vegetable crops.
5. **Roundup[®]** (Glyphosate)
6. **Chateau[®]** (Flumioxazin) – Registered in Orchards and grapes and some vegetable crops
7. **Authority[®]** (Sulfentrazone) – Registered in grapes, apples, some berry crops and some vegetable crops.
8. **Sandea[®]** (Halosulfuron) – Registered on Apples and some vegetable crops

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Treatment Application



- 5 km/h
- 40 psi
- 200 l/ha



Pre-emerge trial 2015

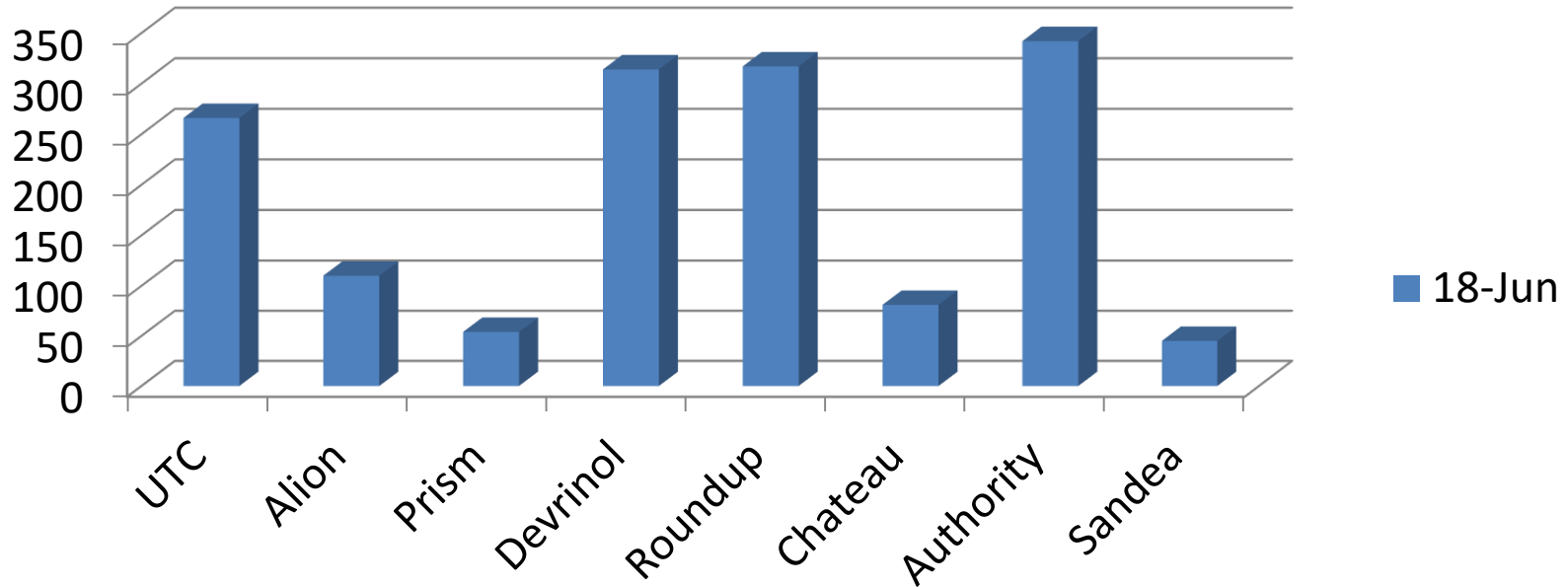
- All treatment were applied on May 21, 2015.
- Puncturevine was emerging at this time so Roundup Transorb was applied with all treatments
- A garden sprinkler was used to apply 1/4 inch (6 mm) of rainfall equivalent to the area 2 hours after application.

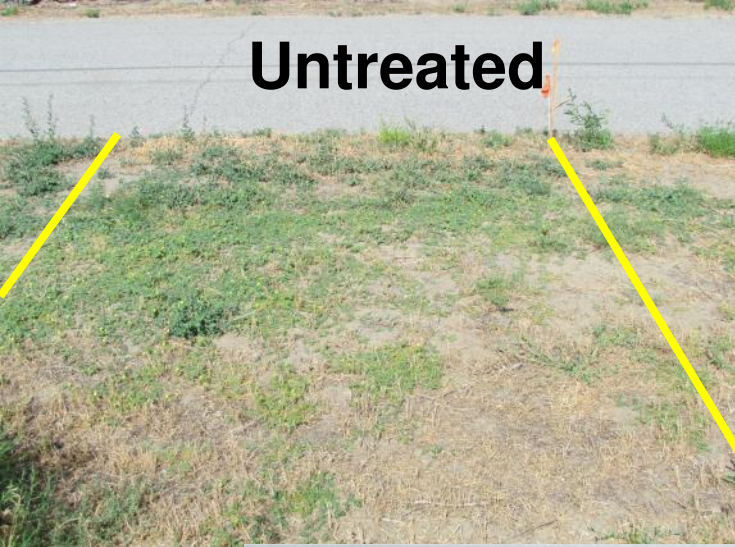


Pre-e Trial 2015

Puncturevine Count

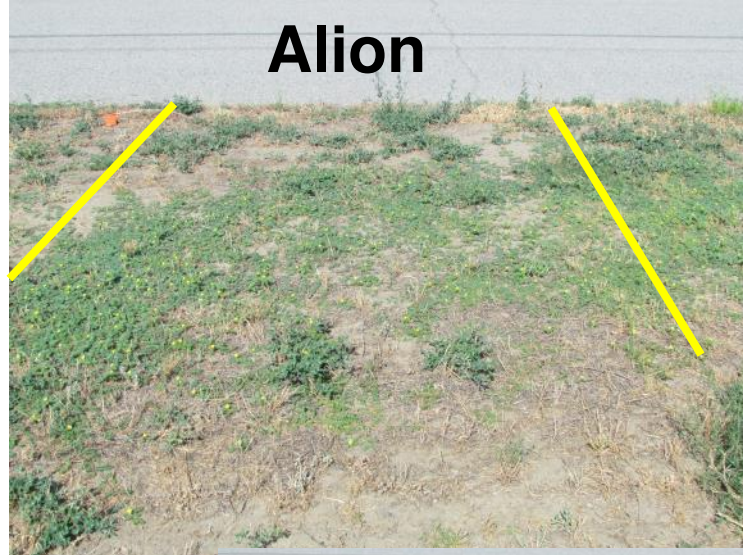
Plants/M2





Untreated

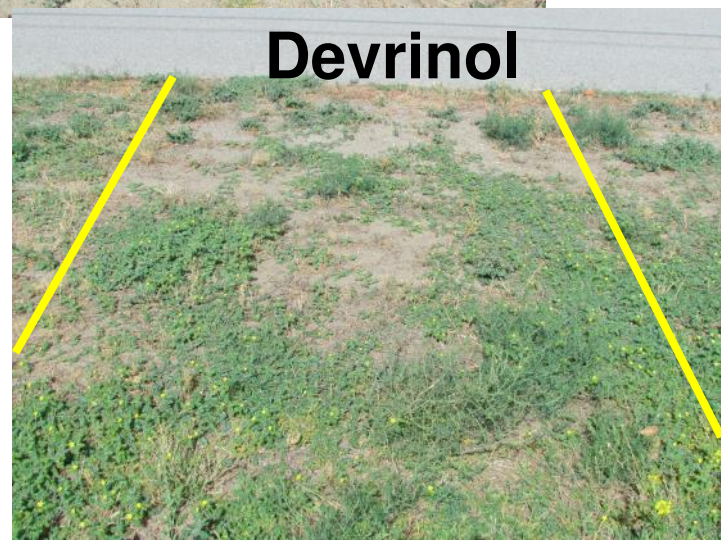
July 15



Alion



Prism

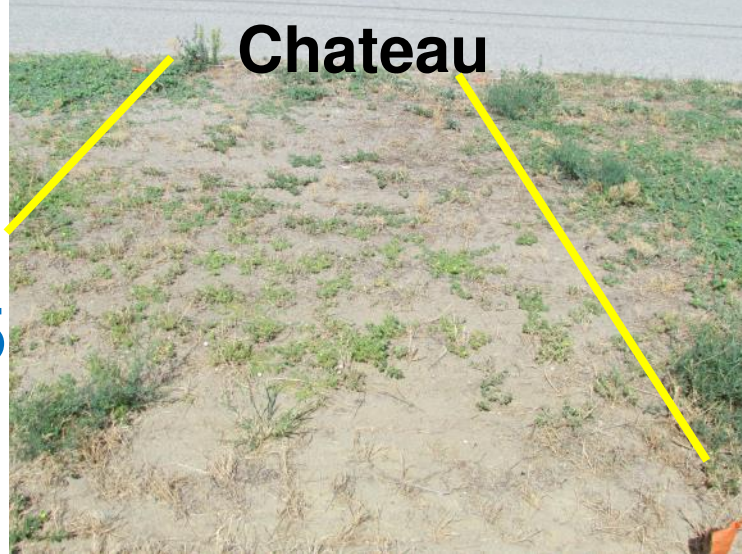


Devrinol



Roundup

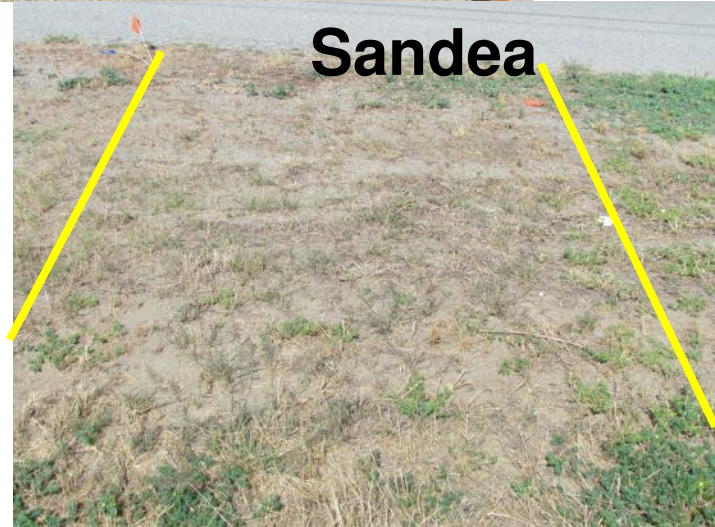
July 15



Chateau



Authority



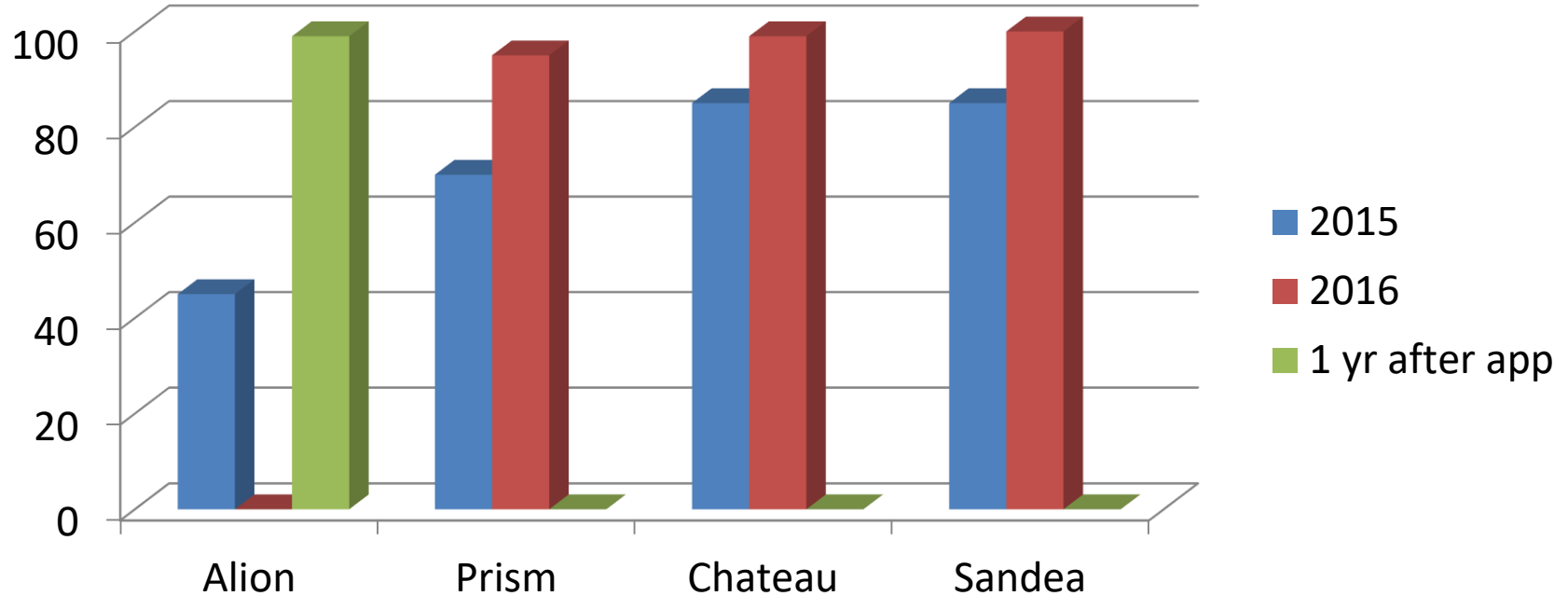
Sandea

Prism

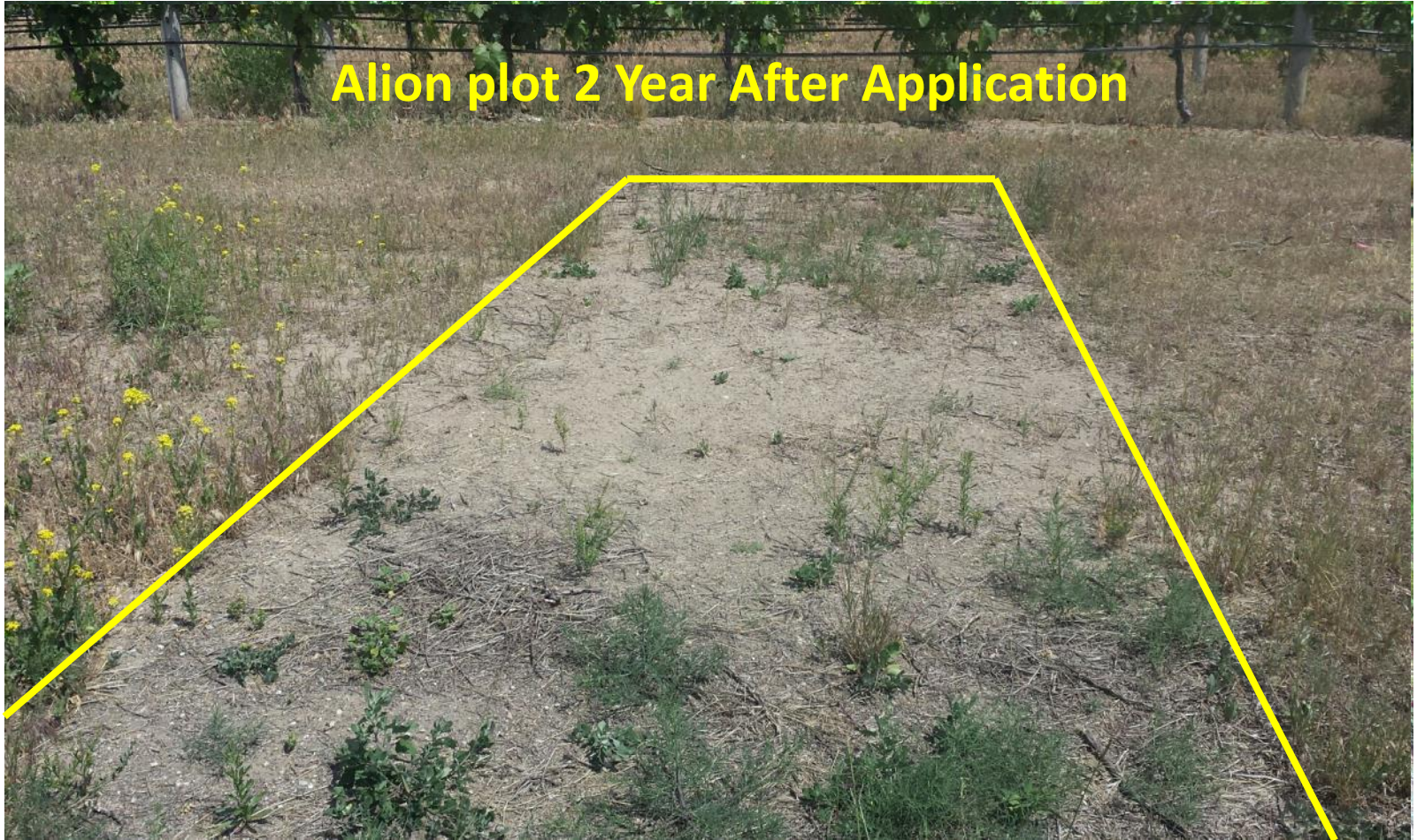




Puncturevine control by the end of July



Alion plot 2 Year After Application



Post-Emerge treatments 2015

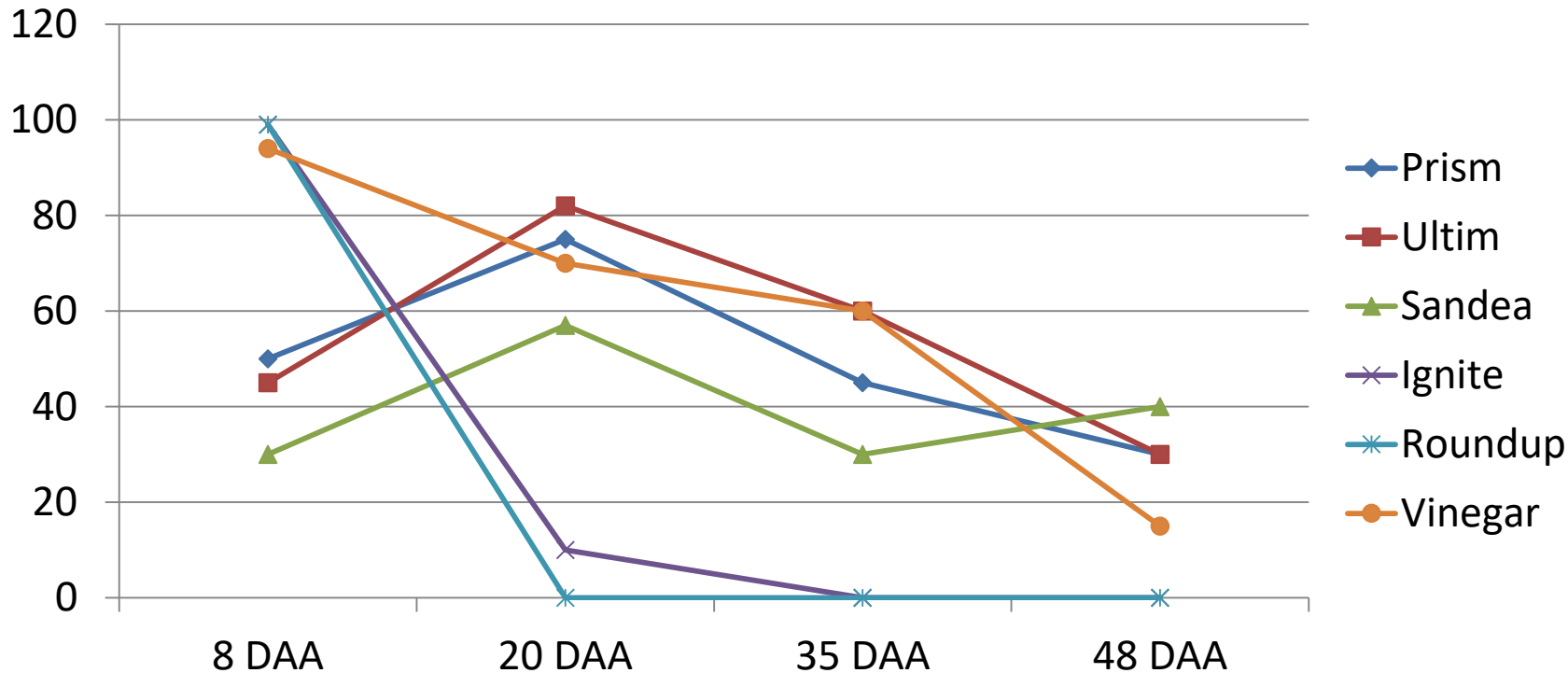
Applied at 2 leaf stage

1. Untreated Check
2. Prisim
3. Ultim
4. Sandea
5. Ignite
6. Roundup
7. Vinegar



Post-E trial – 2 leaf stage

% Control



Post emergent trial 2016

Products are approved in Invasive Species Management Plan

- **Lontrel** (clopyralid) did not control puncturevine.
- **Clearview** (aminopyralid + metsulfuron) controlled puncturevine 100% from 14 DAA through the entire growing season.
- **Overdrive** (dicamba + diflufenzapyr) controlled puncturevine 97% to 100% from 14 DAA through the entire growing season.
- **Arsenal** (imazapyr) controlled puncturevine 100% through the entire growing season. However Arsenal also controlled every other plant species that was growing in the plot and left bare ground for the entire growing season. by September the first plant species that was germinating was puncturevine.

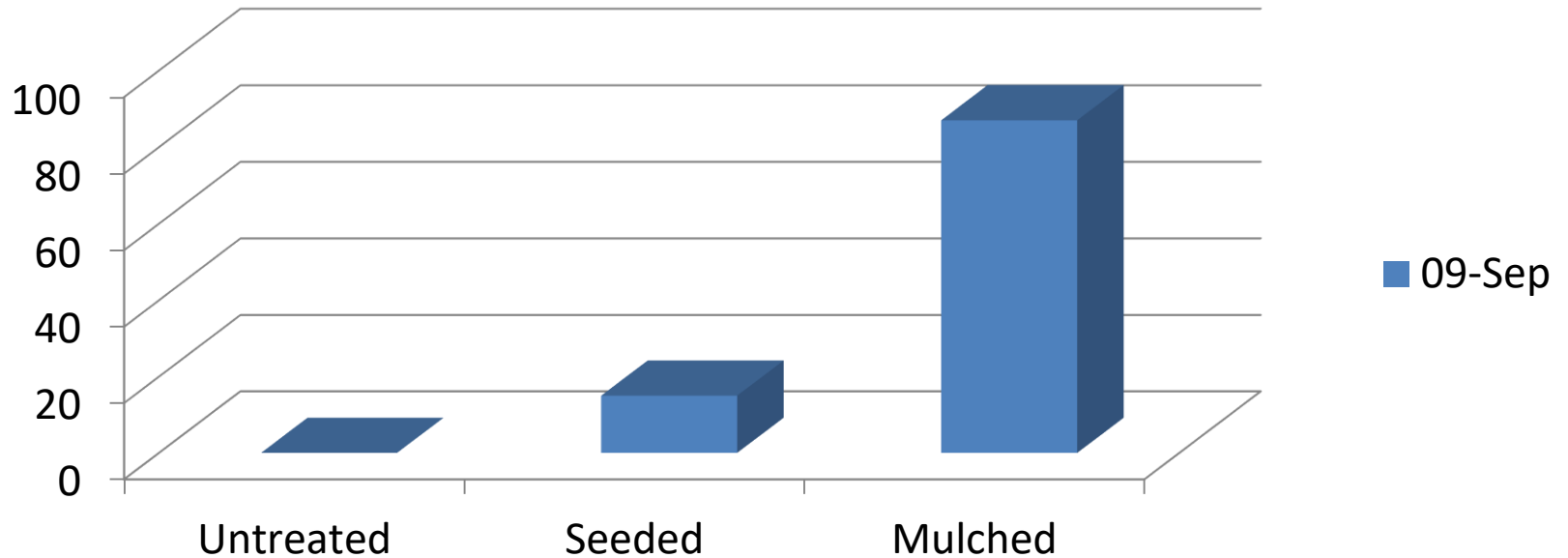
Seeding and Mulching

1. Untreated Check
2. Grass seed mixture -
seeded on May 21st, raked
in and 10 mm (0.4 in.) of
water added after seeding
3. Mulching – Orchard mulch
applied June 3rd at 7.5 cm
(3 in.) depth



Seeding & Mulching Trial

% Puncturevine Control



*Any control from seeding was due to the raking that removed puncturevine seedlings



Untreated



Seeded



Mulch

Mulch

September 2015
Year of application



June 2016
1 year after application

- June 2017





- **Pre-emerge Trial**
 - **Alion, Prism, Chateau** and **Sandea** appear to have suppressed or controlled puncturevine through part or all of the growing season.
- **Post-emerge Trials**
 - **Clearview** and **Overdrive** provided season long control of puncturevine.
- **Seeding & Mulch Trial**
 - **Mulching** with 3 inches of wood mulch significantly reduced puncturevine for 3 years.

2016 site – Longspine Sandbur

- **Prism** applied pre-emergent was the only product that provided season long control of Longspine Sandbur



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Agriculture Environment Initiative

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Questions

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