Organic Weed Control: Is it Possible?

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Organic

- relating to, being, or dealt with by a branch of chemistry concerned with the carbon compounds of living beings and most other carbon compounds; containing carbon
- organic food is produced by methods that comply with the standards of organic farming. Standards vary worldwide, but organic farming features practices that cycle resources, promote ecological balance, and conserve biodiversity
- without employment of synthetic fertilizers, growth stimulants, antibiotics, or pesticides

Why go organic?

- Perception
- Consumer demand

Successful Weed Management Requires Proper Turfgrass Management

- ***Irrigation***
  - **Drainage**
  - **Frequency/duration**
- ***Mowing***
  - **Limits seedheads**
  - **Promotes growth/lateral spread**
- ***Fertility***
  - **Promotes competitive growth**
- ***Pests***
  - **Disease/insect**
- ***Stress***
  - **Traffic, drought, heat, cold etc.**

<6,700 VS. > 44,500

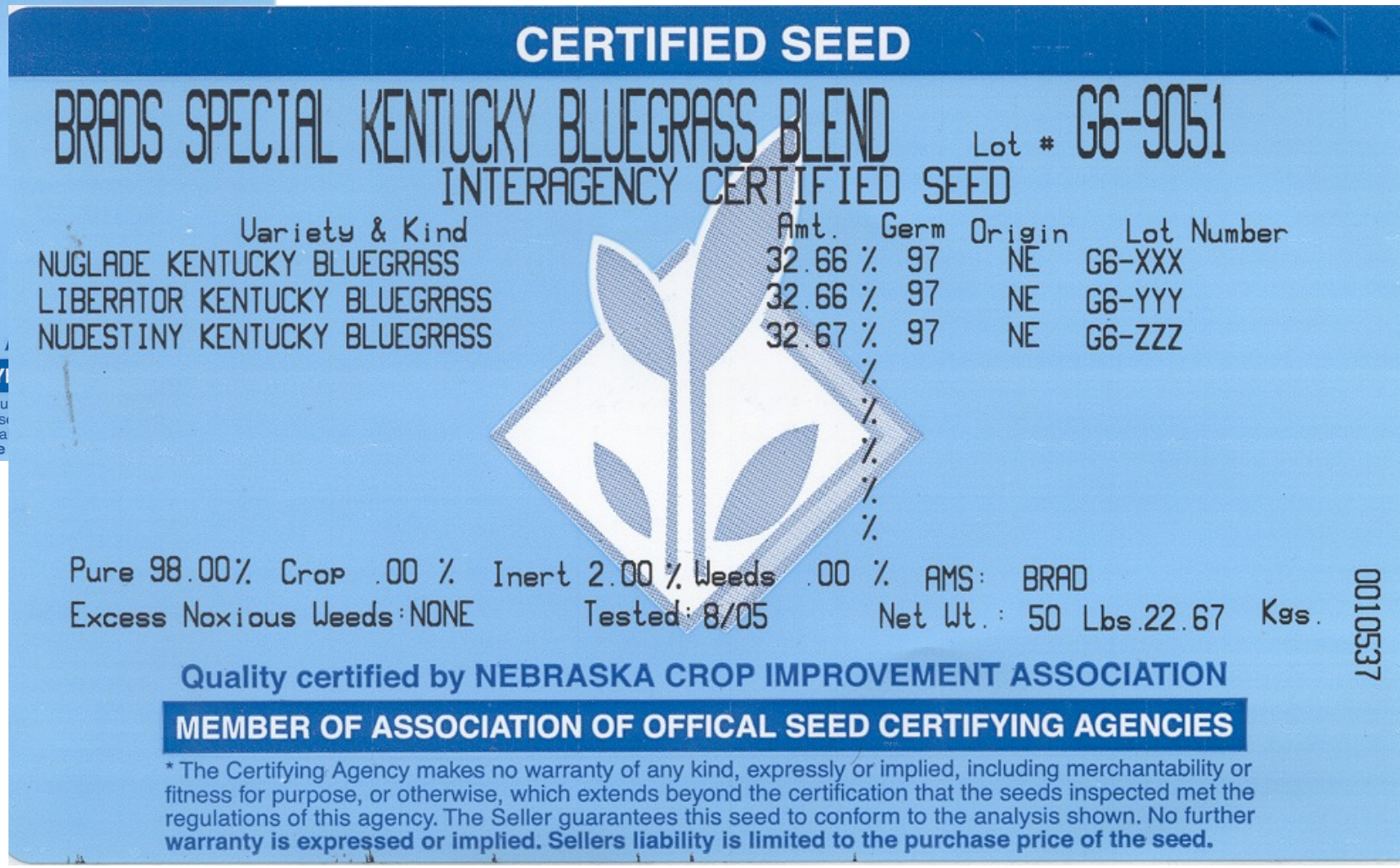
tubers per 1000 sq ft

Turf

No turf

From 8” dia soil core

Always **use Certified Seed !!**



ECONOMY PLUS LAWN SEED MIXTURE
NET WGT. 5 POUNDS (2.265 LGS)

TESTED: 1/98
LOT NO: 093235.7838

PURE SEED

		ORIGIN	GERMINATION
58.20%	ANNUAL RYEGRASS*		90%
24.25%	CREEPING RED FESCUE*	OR	85%
14.55%	PERENNIAL RYEGRASS*	CAN	90%
		OR/AUS	

OTHER COMPONENTS

1.00% CROP SEED
1.58% INERT MATTER
0.42% WEED SEED

* VARIETY NOT STATED

NOXIOUS WEED SEEDS PER POUND: ANNUAL BLUEGRASS,170;
CURLY DOCK,24; ROUGH BLUEGRASS, 27.

...Florida, Georgia, Indiana, Mississippi, North Dakota, Sout...

Organic/natural weed control options

- Preemergence
  - Corn gluten meal
  - Distiller grains
- Postemergence
  - multiple
- Non-selective
  - multiple

Corn Gluten Meal

- Multiple years required to attain equivalent synthetic control (cumulative effect)
- Significant N input in first year
- Available mail order and limited retail

Dried distiller grains (DDGs)

- Dried distiller grains (DDGs) are a co-product of the dry milling process, which currently accounts for approx 75 percent of the domestic ethanol production
- DDGs are used almost exclusively used as animal feed
- Much like corn gluten meal, weed control ,and fertilizer value has been documented
- DDGs contain an estimated 10% fatty oils that causes the byproduct to go rancid if not used in a relatively short time period
- Research by the USDA has been ongoing since 2008

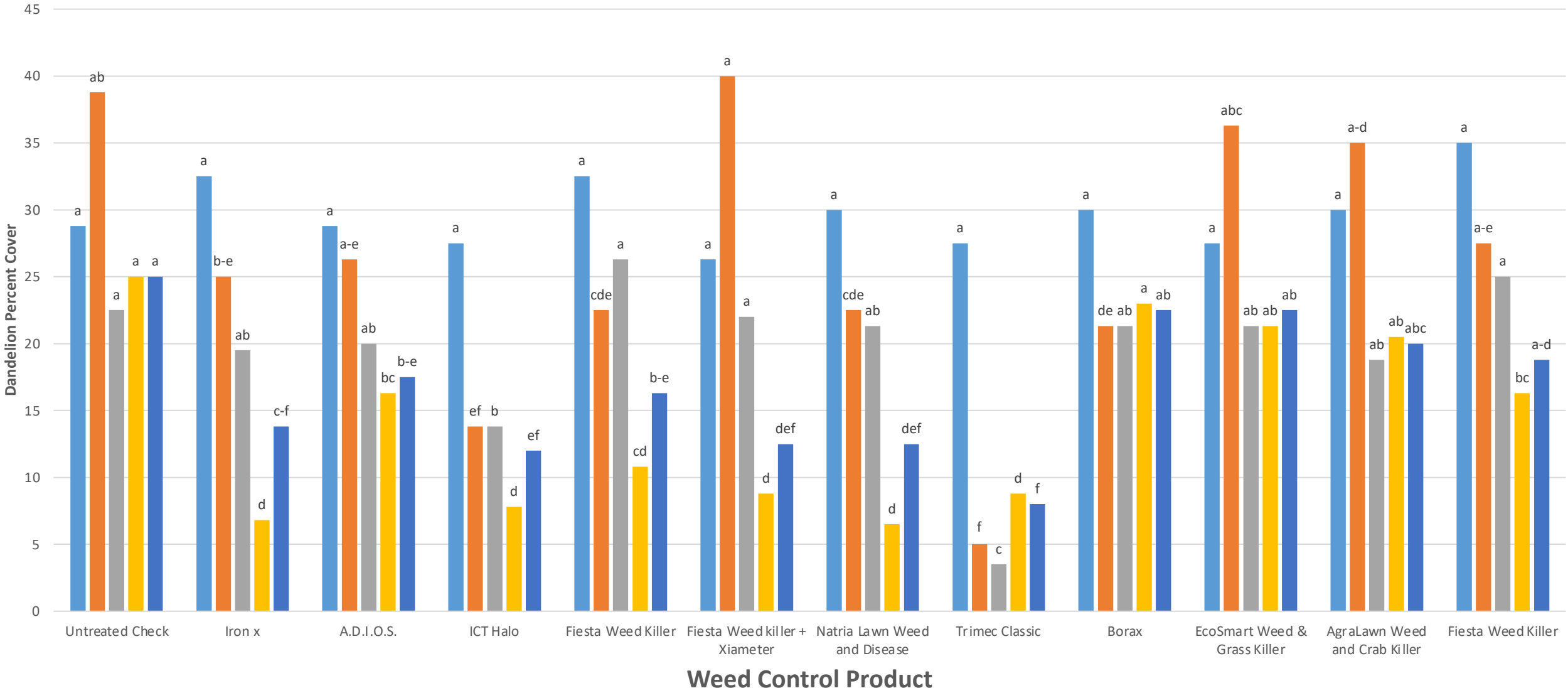
Selective postemergence trial

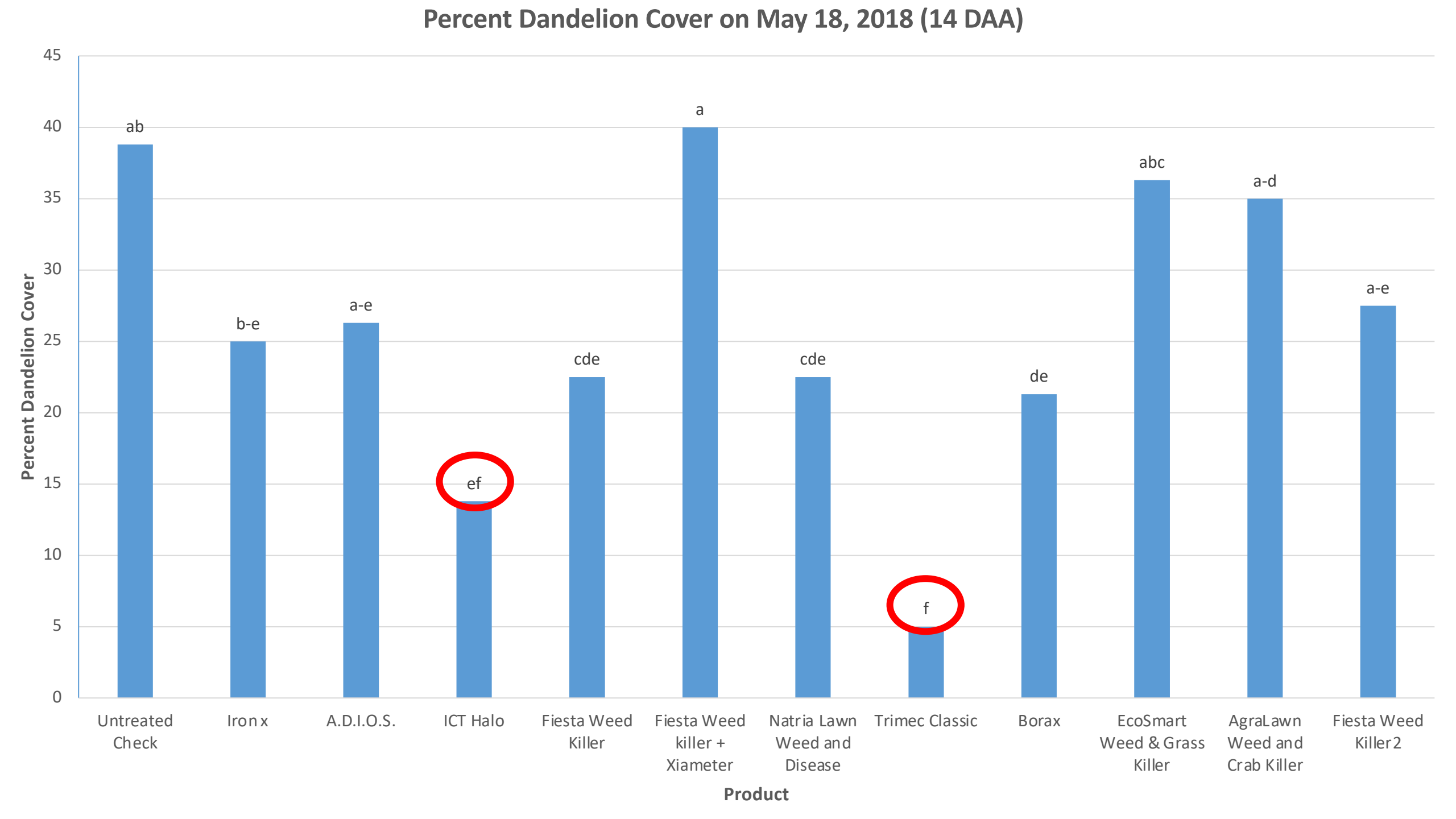
Materials and Methods

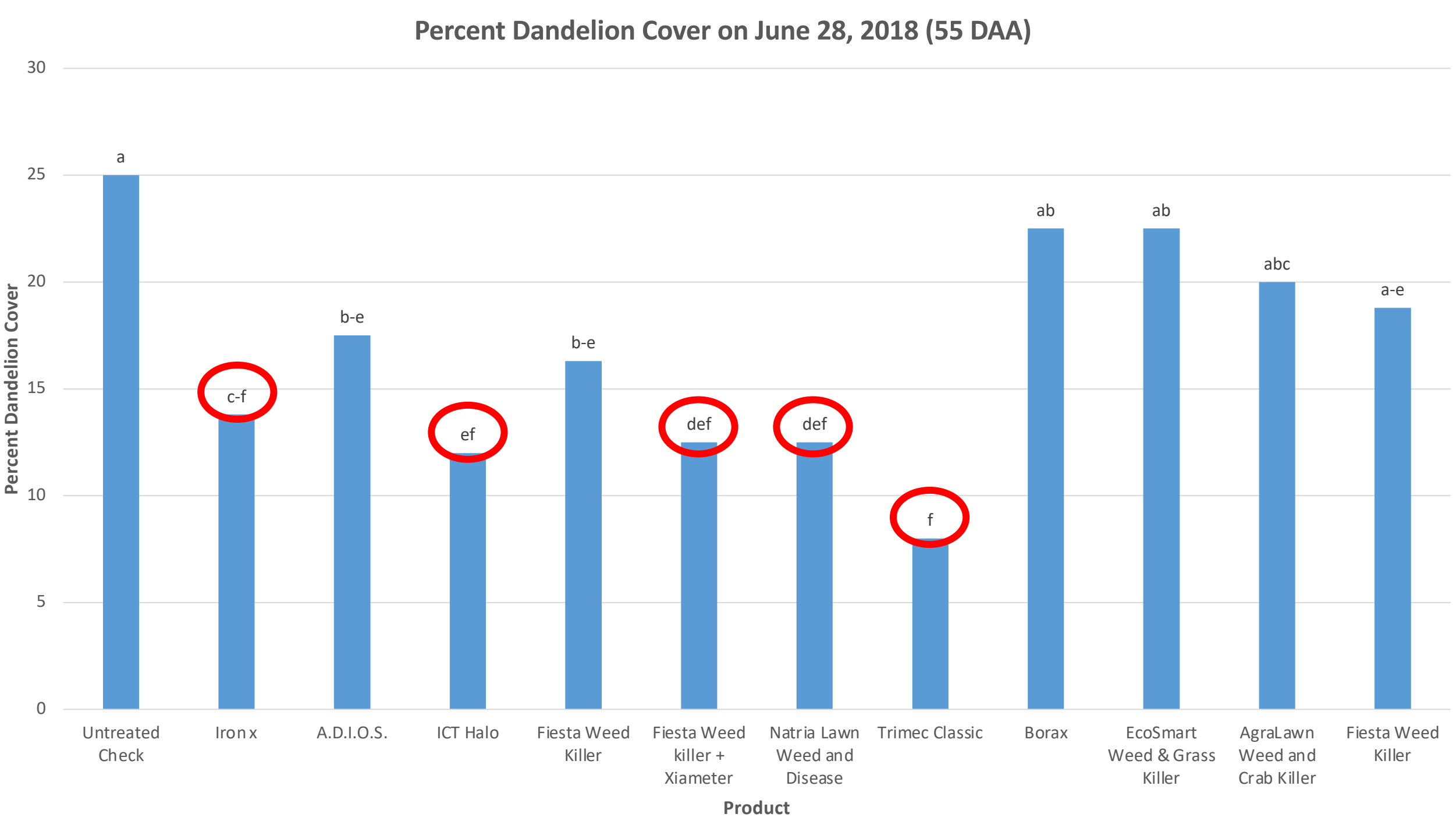
Spring Applications: May 4 and May 31, 2018 (4 weeks after initial treatment)
Fall Applications: September 13 and October 5, 2018

Product	Active Ingredient	Rate
Untreated Check	N/A	N/A
Iron X	26.52% Iron HEDTA	25.2 oz/M
A.D.I.O.S.	Sodium chloride + NIS	1 lb product/gallon
ICT Halo	Eugenol, Clove Oil	10 oz/M
Fiesta Weed Killer	26.52% Iron HEDTA	12.6 fl oz/M or 25.2 fl oz/M
Fiesta Weed Killer + Xiameter OFX-0309	26.52% Iron HEDTA and Silicon Adjuvant	12.6 oz/M
Natria Lawn Weed and Disease Control	26.52% Iron HEDTA	25.2 fl oz/M
Trimec Classic	2,4-D	4 pt/A
Borax	Boric Acid	Spray to runoff
EcoSmart Weed & Grass Killer	Rosemary Oil	Spray to runoff
AgraLawn Weed and Crab Killer	Cinnamon	Shake on foliage

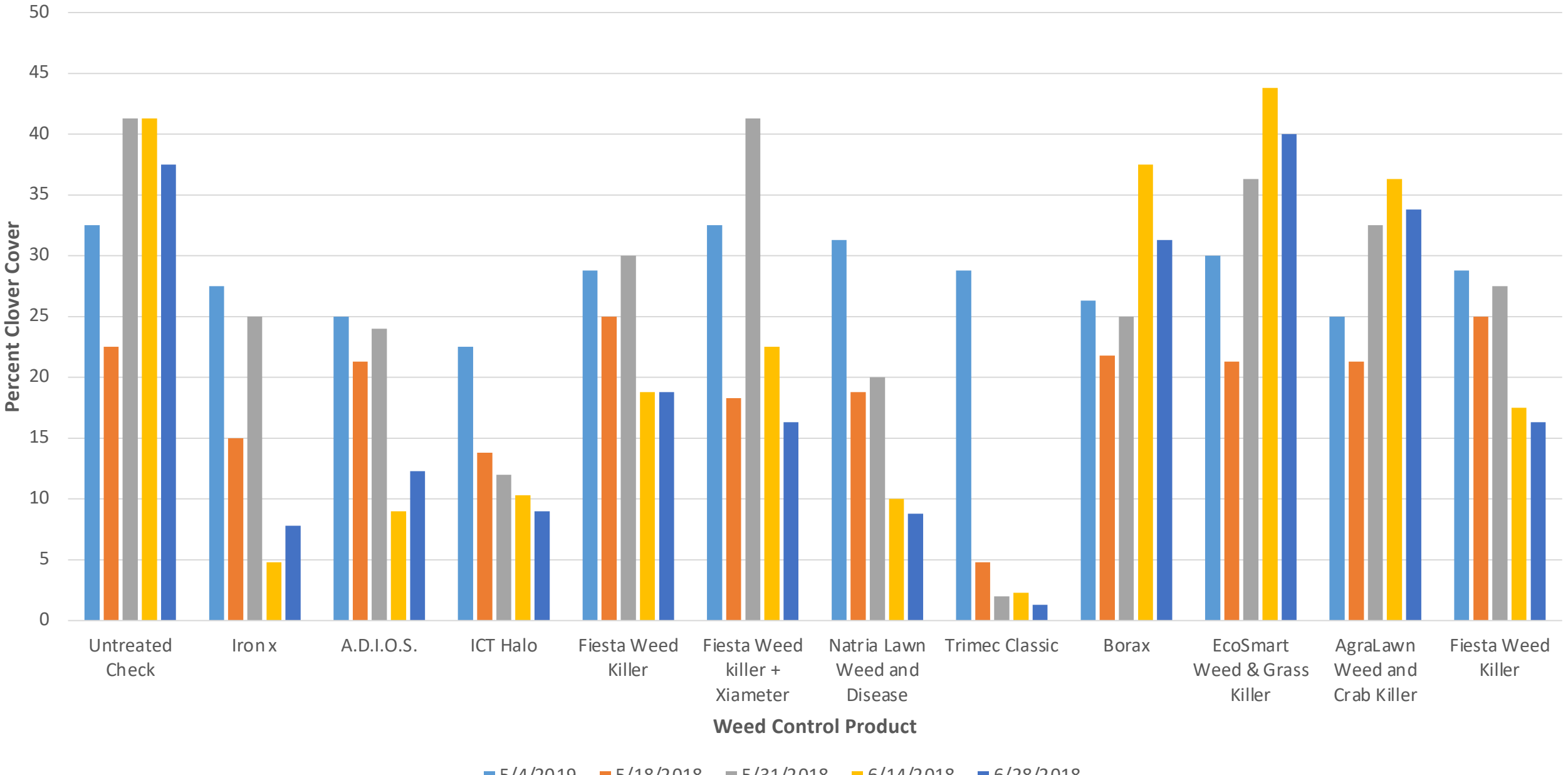
Spring 2018 Organic Weed Post Control Trial
Visual Percent Dandelion Cover

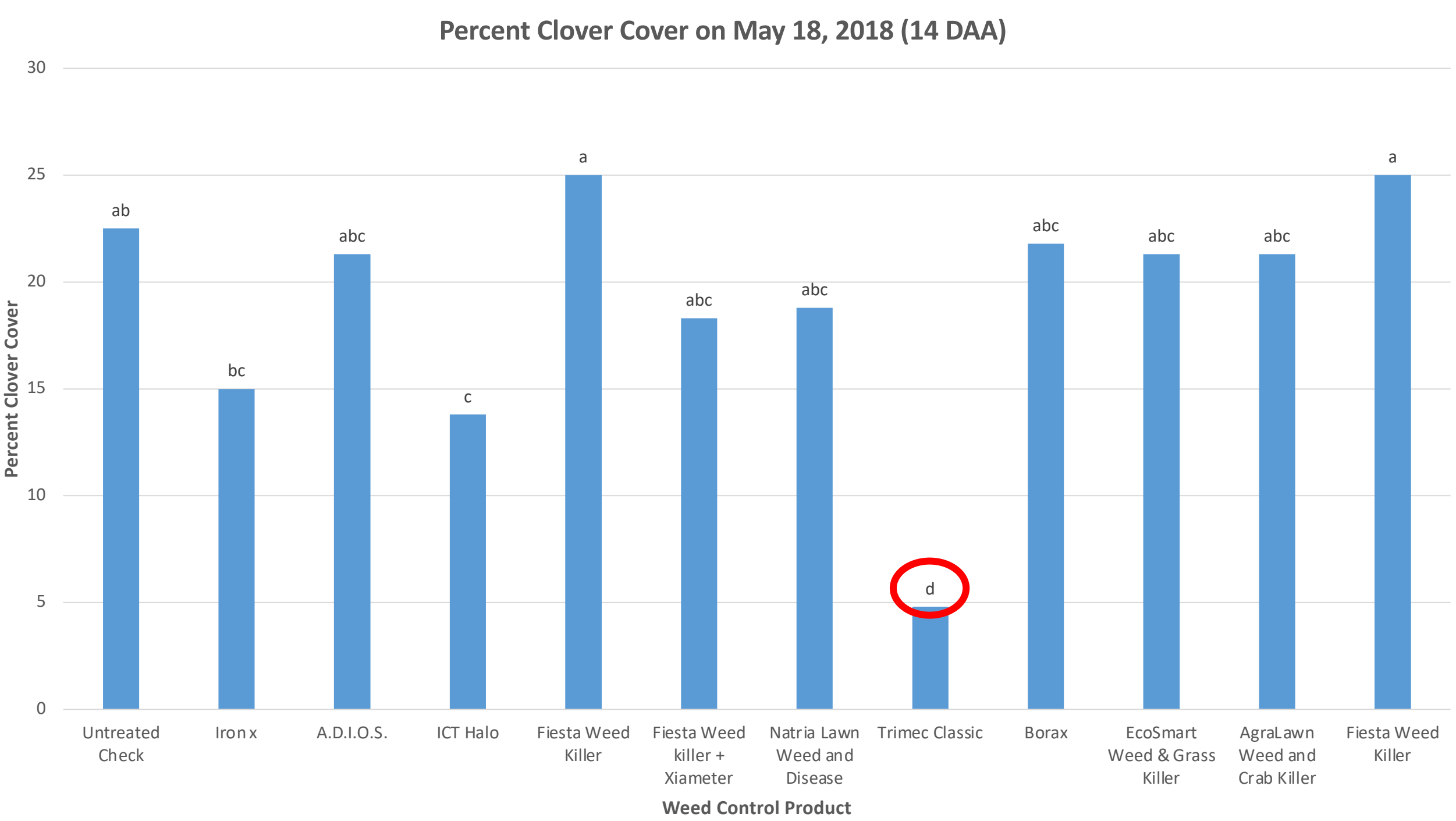



Percent Dandelion Cover on May 18, 2018 (14 DAA)
Percent Dandelion Cover
45
40
35
30
25
20
15
10
5
0
ab
b-e
a-e
ef
cde
a
cde
de
f
abc
a-d
a-e
Untreated Check
Iron x
A.D.I.O.S.
ICT Halo
Fiesta Weed Killer
Fiesta Weed killer + Xiameter
Natria Lawn Weed and Disease
Trimec Classic
Borax
EcoSmart Weed & Grass Killer
AgraLawn Weed and Crab Killer
Fiesta Weed Killer2
Product


Percent Dandelion Cover on June 28, 2018 (55 DAA)
Percent Dandelion Cover
30
25
20
15
10
5
0
a
c-f
b-e
ef
b-e
def
def
f
ab
ab
abc
a-e
Untreated Check
Iron x
A.D.I.O.S.
ICT Halo
Fiesta Weed Killer
Fiesta Weed killer + Xiameter
Natria Lawn Weed and Disease
Trimec Classic
Borax
EcoSmart Weed & Grass Killer
AgraLawn Weed and Crab Killer
Fiesta Weed Killer
Product

Spring 2018 Organic Weed Control Trial
Visual Percent Clover Cover




Percent Clover Cover on May 18, 2018 (14 DAA)
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Percent Clover Cover
ab
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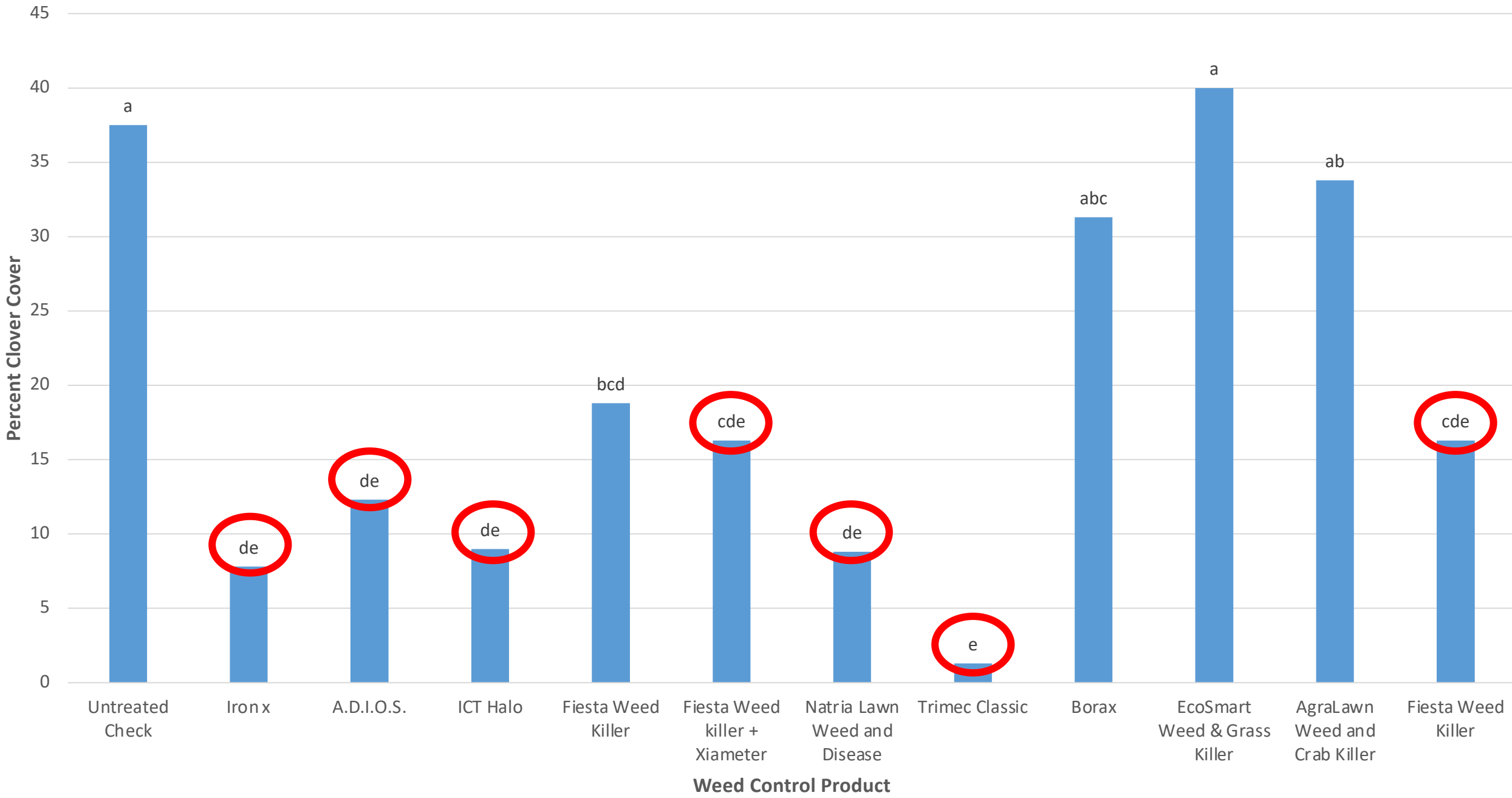
Untreated Check
Iron x
A.D.I.O.S.
ICT Halo
Fiesta Weed Killer
Fiesta Weed killer + Xiameter
Natria Lawn Weed and Disease
Trimec Classic
Borax
EcoSmart Weed & Grass Killer
AgraLawn Weed and Crab Killer
Fiesta Weed Killer
Weed Control Product


Percent Clover Cover on June 28, 2018 (55 DAA)
Percent Clover Cover
45
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Untreated Check
Iron x
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Fiesta Weed Killer
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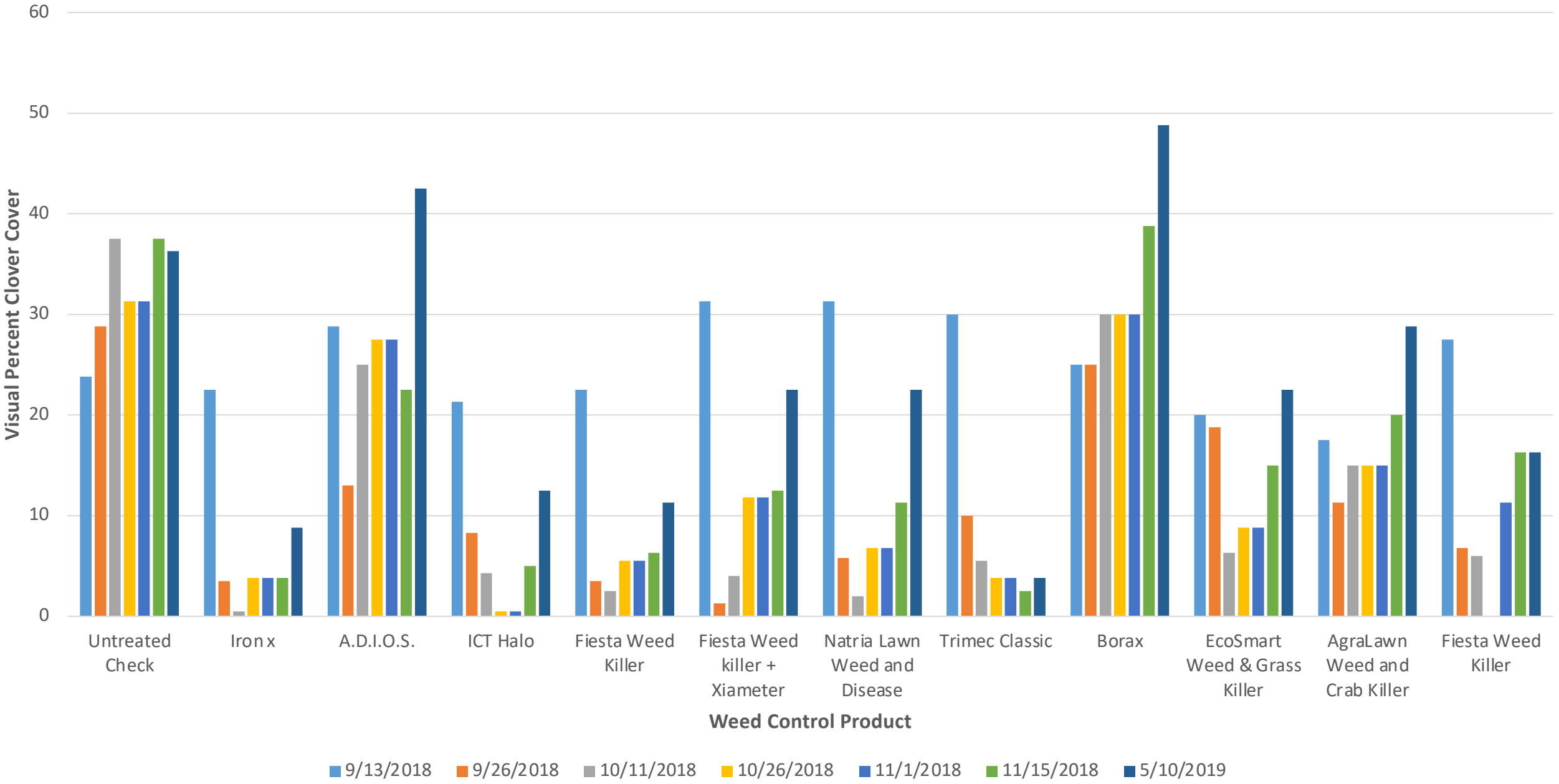
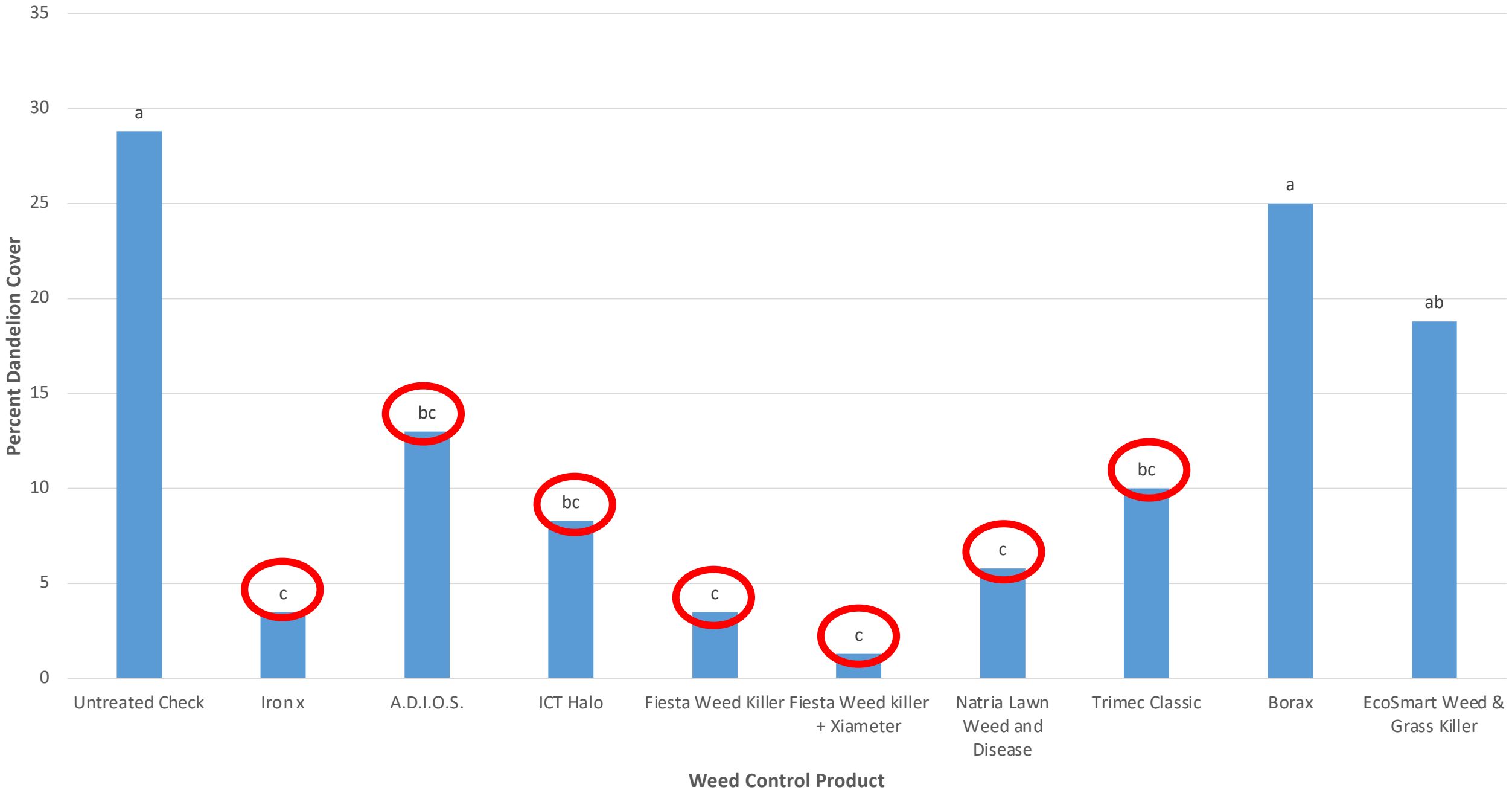
Fall 2018 Organic Weed Control Trial
Visual Percent Dandelion Cover




Percent Dandelion Cover on September 26, 2018 (13 DAA)
35
30
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20
15
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Percent Dandelion Cover
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Untreated Check
Iron x
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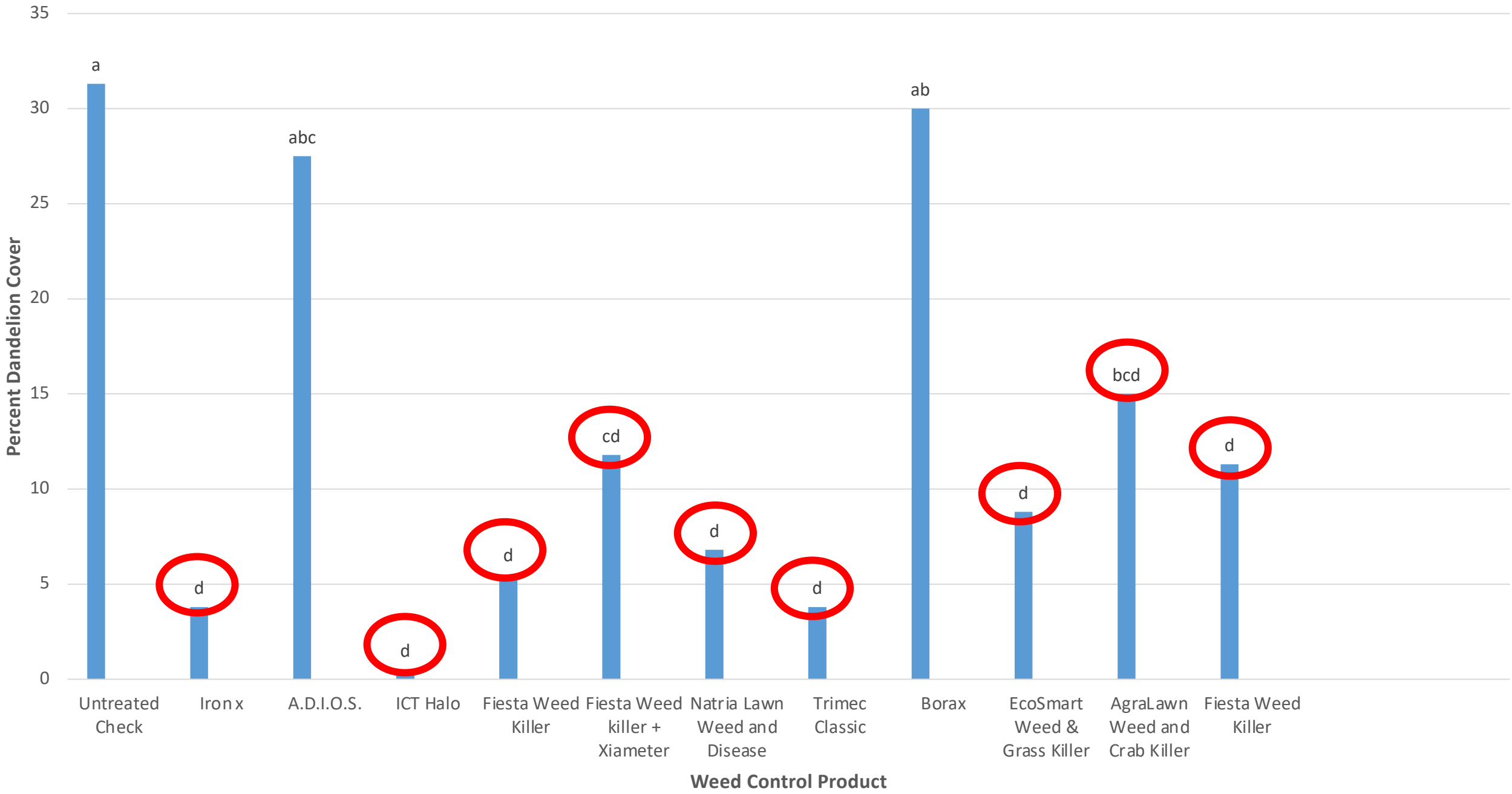
Percent Dandelion Cover on October 26, 2018 (43 DAA)
Percent Dandelion Cover
35
30
25
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d
bcd
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Untreated Check
Iron x
A.D.I.O.S.
ICT Halo
Fiesta Weed Killer
Fiesta Weed killer + Xiameter
Natria Lawn Weed and Disease
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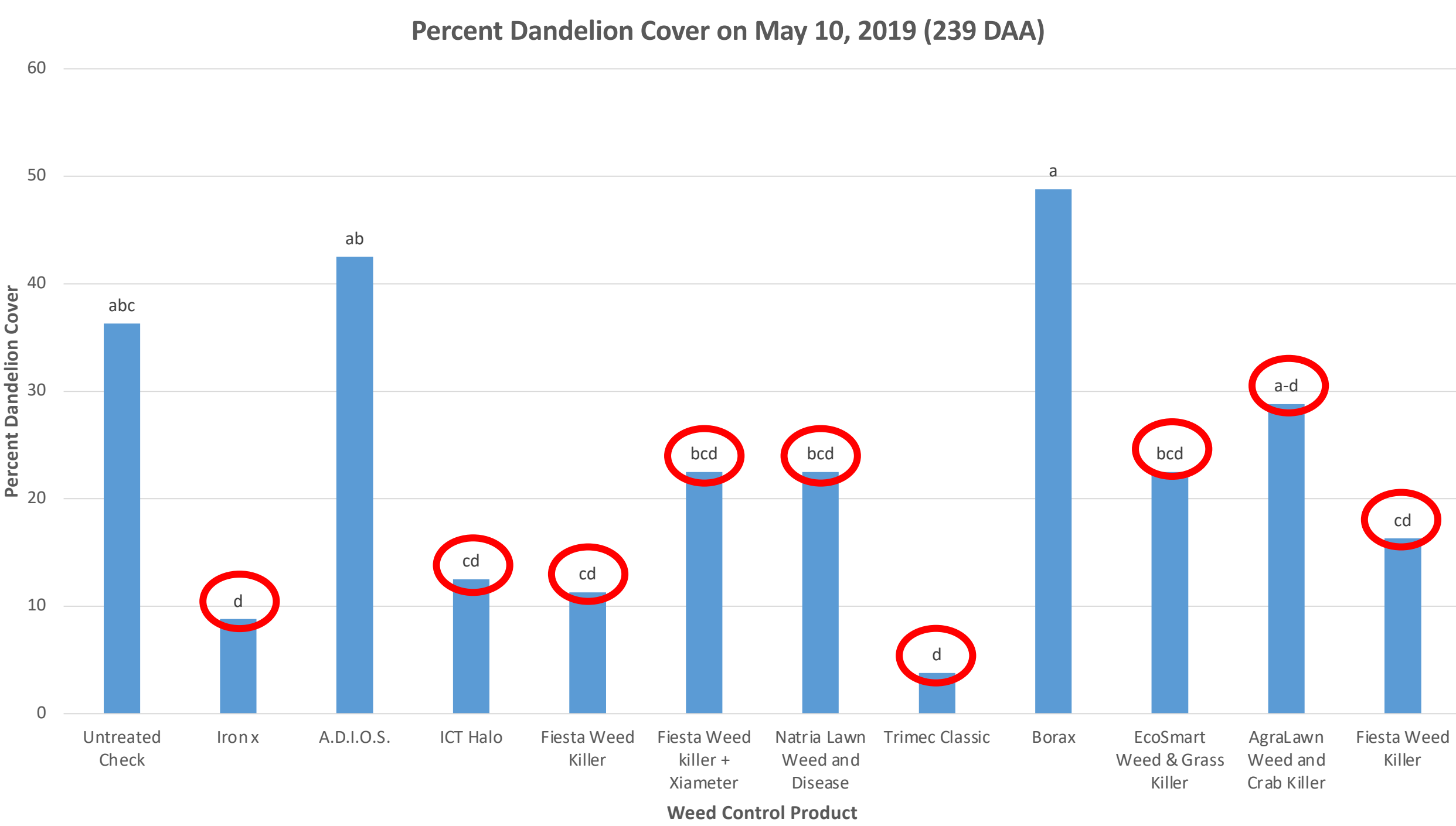
Weed Control Product


Percent Dandelion Cover on May 10, 2019 (239 DAA)
Percent Dandelion Cover
60
50
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30
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abc
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Untreated Check
Iron x
A.D.I.O.S.
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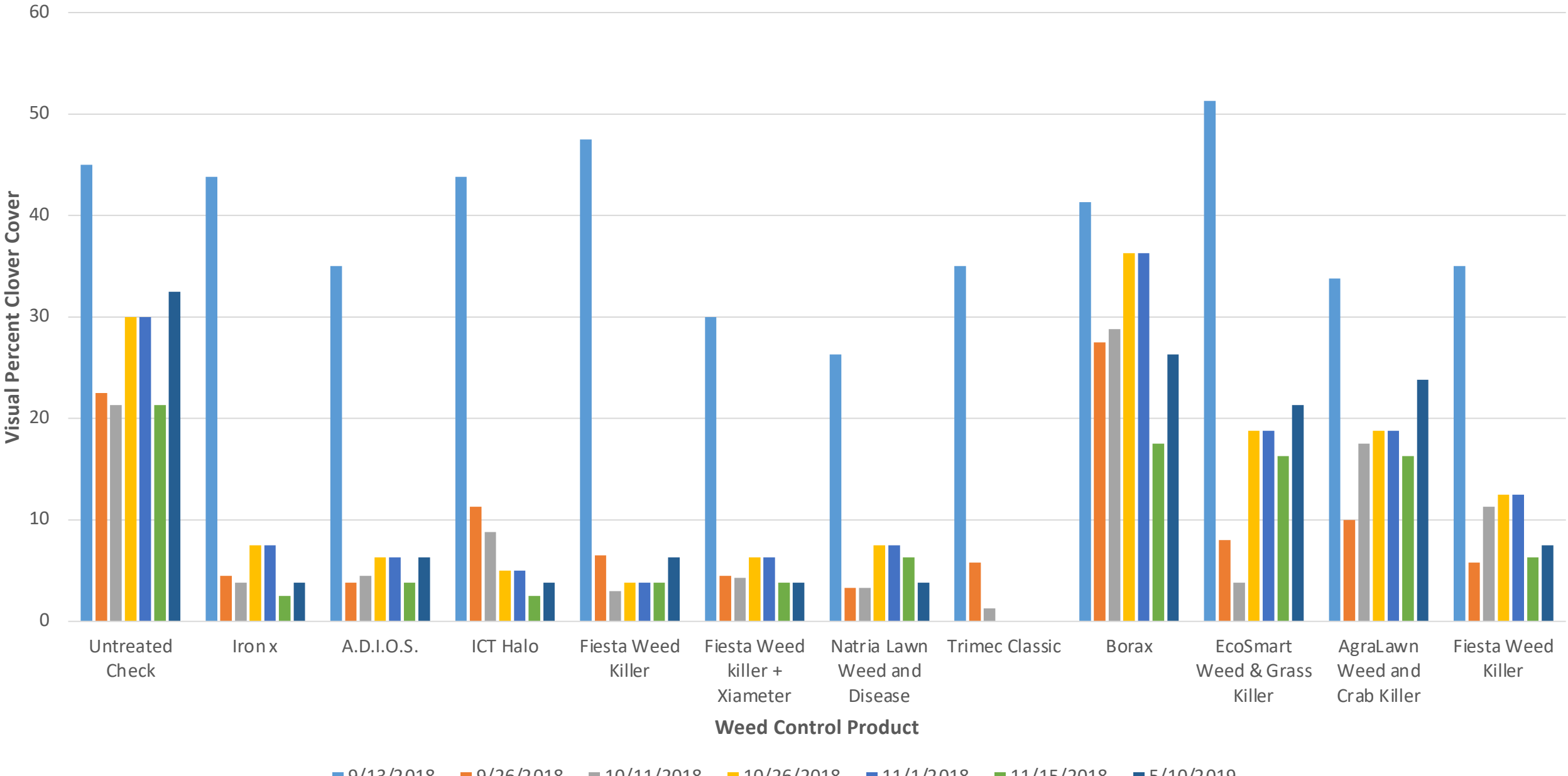
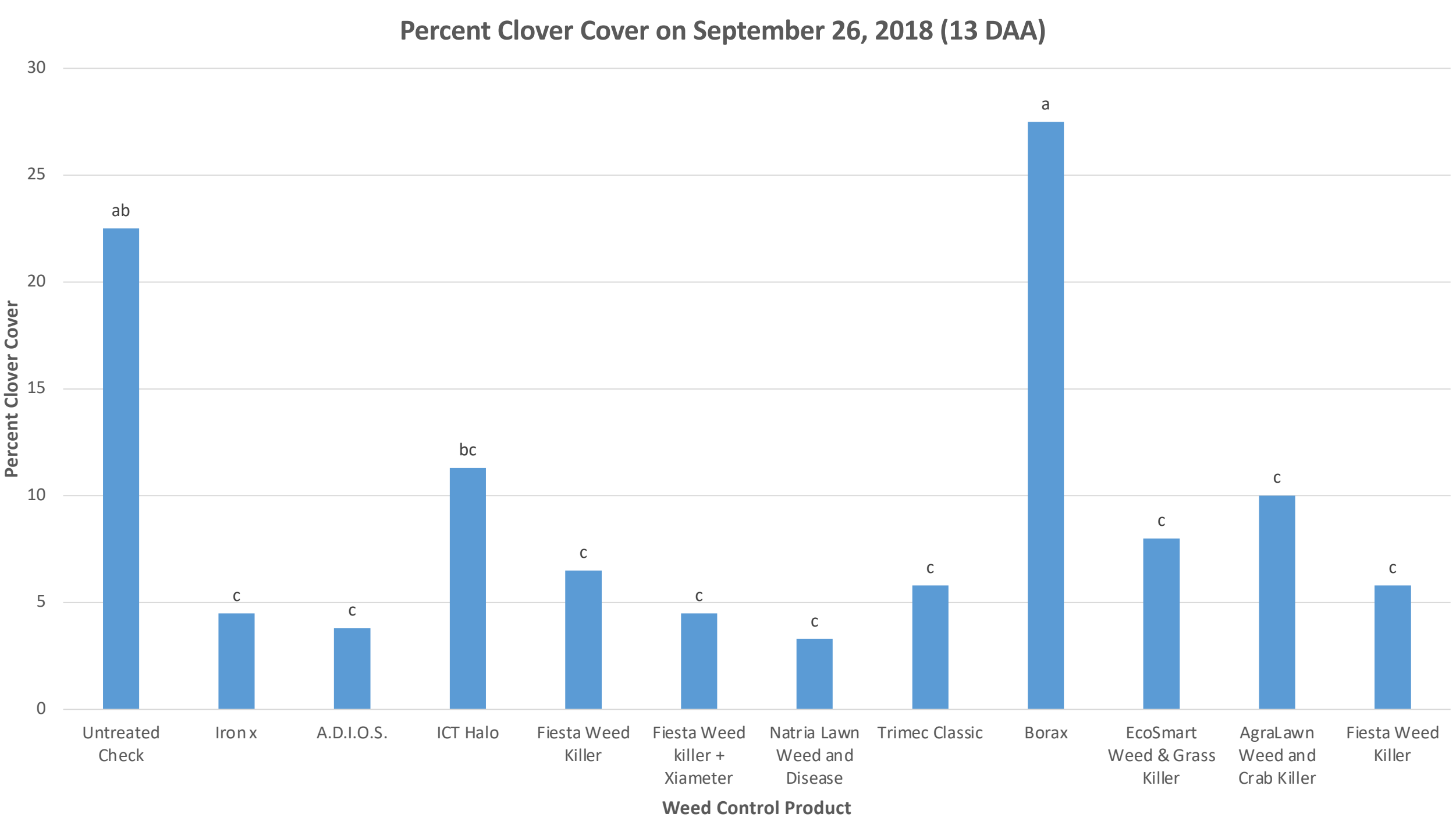
Fall 2018 Organic Weed Control Trial
Visual Percent Clover Cover

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Percent Clover Cover
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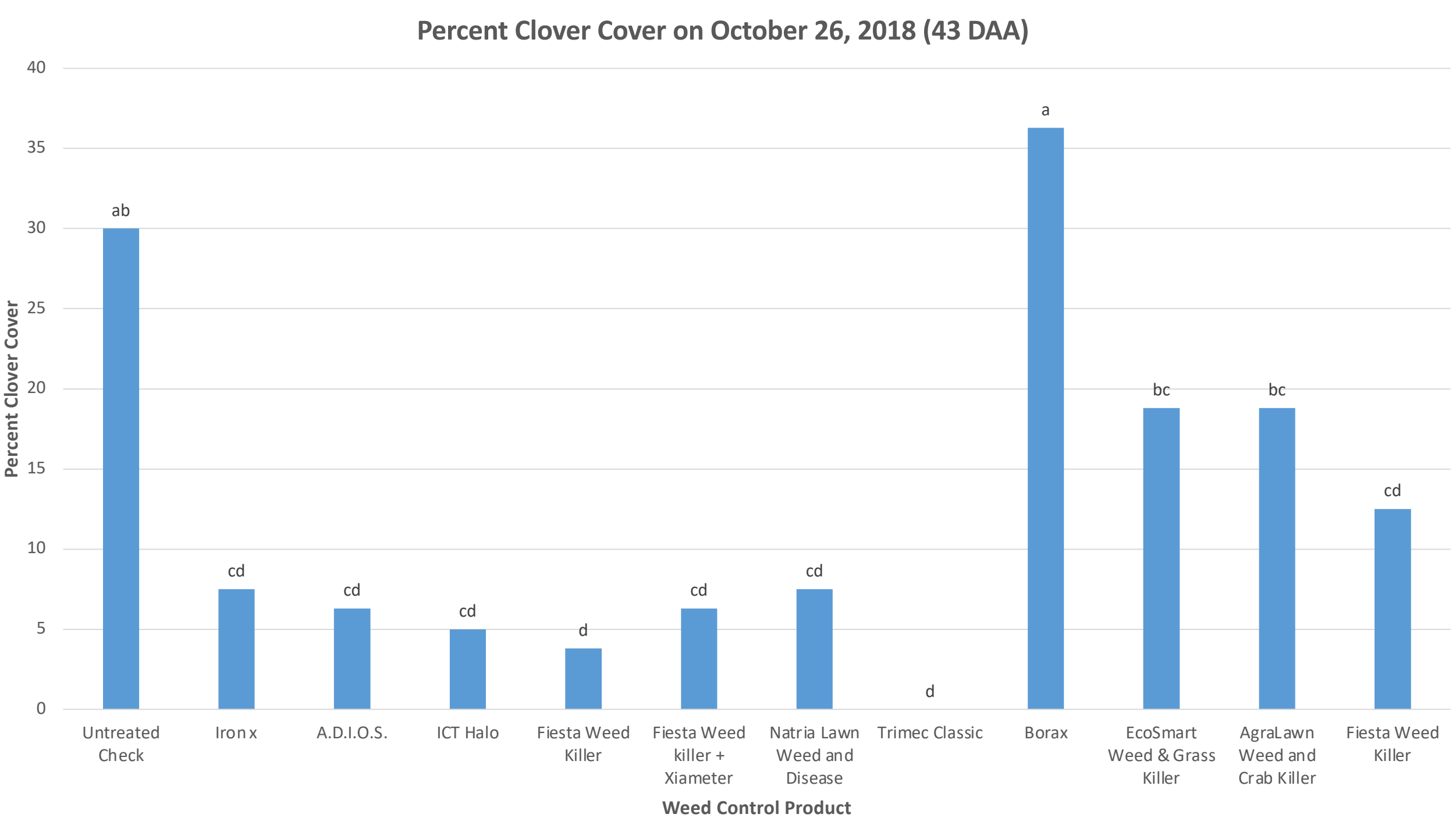
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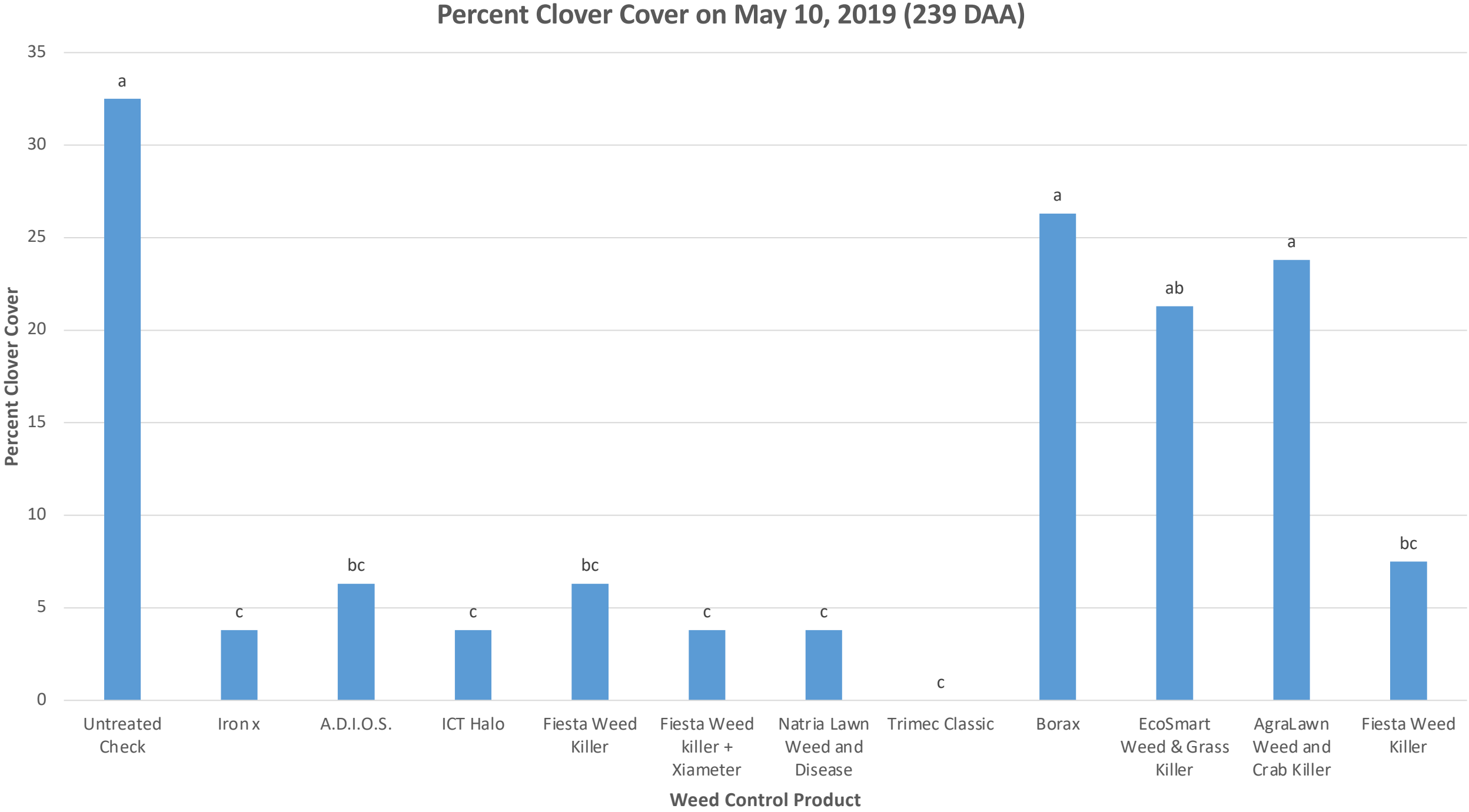
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Conclusions Post BL

- Trimec Classic was always numerically the top performer for both trials
- Products containing iron HEDTA and ICT Halo often were statistically as effective as Trimec Classic
  - Iron X
  - Fiesta Weed Killer (full rate or w/ Xiameter)
  - Natria Lawn Weed and Disease Control
- When using most organics, multiple applications will be required
  - Unpublished UNL study showed significantly diminished effectiveness if no reapplication is made

Organic Pre/Post Crabgrass Trial 2021/2021 % control

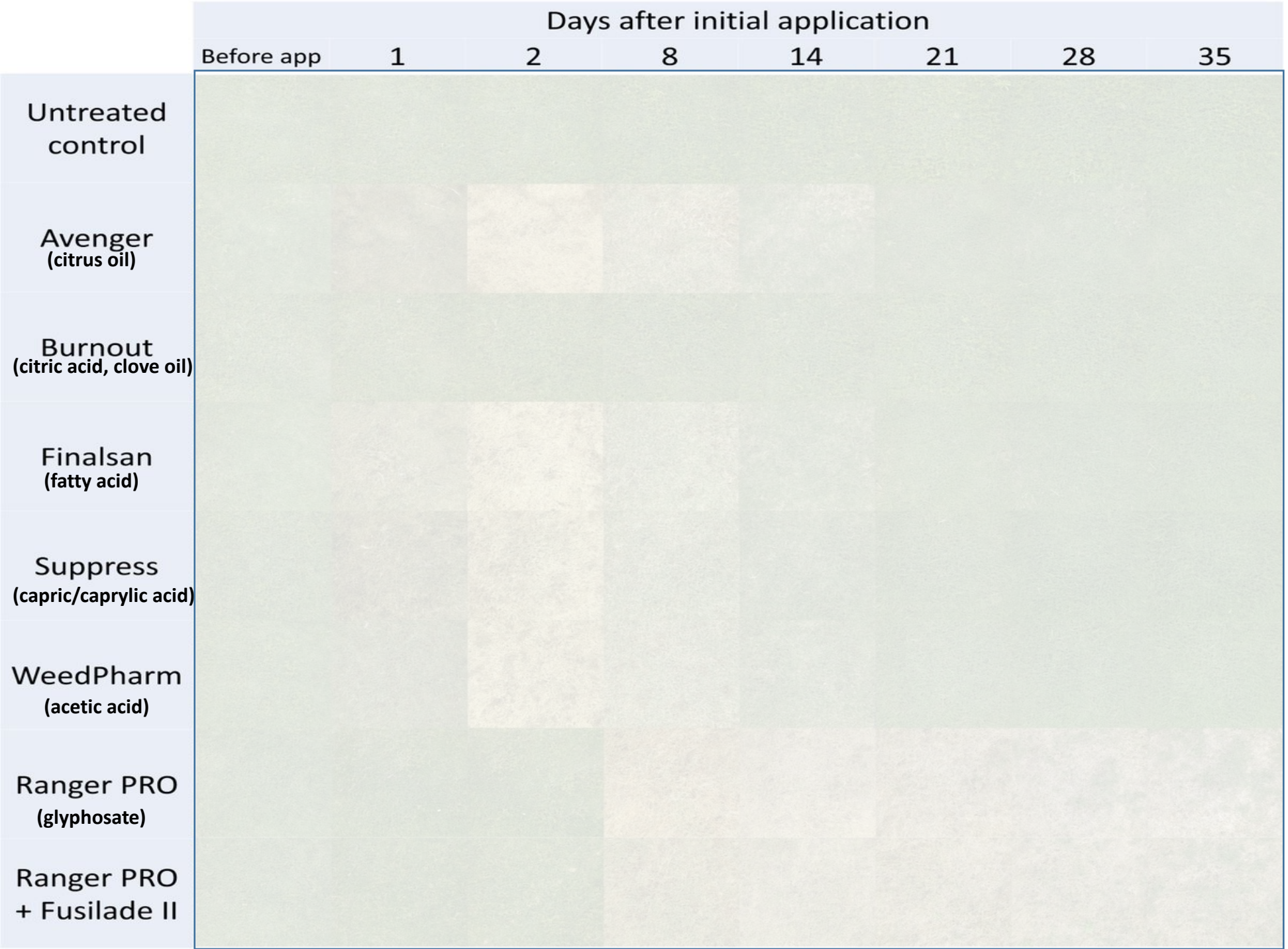
		2021				2022		
Untreated Check		7/1	8/1	9/1		7/1	8/1	9/1
Corn Gluten Meal (CGM)	30 lb	29	15	12		50	46	41
Fiesta (FeHEDTA)	25.2oz	25	5	5		36	20	11
CGM + FeHEDTA		54	9	9		85	68	54
8-2-4	33.7lb	29	24	15		50	23	30
Dimension 2EW	2pt/a	99	83	79		97	91	81

Cost Analysis

Product	Rate	Cost per 1000 sq. ft.
Untreated Check	N/A	--
Iron X	25.2 oz/M	$102.00
A.D.I.O.S.	1 lb product/gallon	$202.74
ICT Halo (name changed to Branch Creek Weed Shield)	10 oz/M	$6.58
Fiesta Weed Killer	25.2 fl oz/M	$16.73
Fiesta Weed Killer + Xiameter OFX-0309	12.6 oz/M	$38.78
Natria Lawn Weed and Disease Control	25.2 fl oz/M	$17.85
Trimec Classic	4 pt/A	$0.61
Borax	Spray to runoff	$5.00/ 64 oz
EcoSmart Weed & Grass Killer	Spray to runoff	$25/ 64 oz
AgraLawn Weed and Crab Killer	Shake on foliage	$23/ 2 lb
Fiesta Weed Killer	12.6 fl oz/M	$8.37

Corn gluten meal is $3-4/lb @30 lbs/1000 = $75-100

Organic glyphosate alternatives (non-selective)



Organic alternatives to glyphosate applied to hybrid bermudagrass in central California

Credit: Maggie Reiter
@maggie_reiter
University of California
Cooperative Extension

Comparison of Acetic Acid to Glyphosate for Weed Suppression in the Garden

Jacob C. Domenghini[1]

Additional index words. garden establishment, organic garden, vinegar

Summary. Interest in organic vegetable gardening has increased in recent years. Organic growers are searching for alternatives to glyphosate for weed suppression. This study was conducted twice. Each data collection period lasted 132 days during the growing seasons of 2016 and 2017 in Richmond, KY. Treatments included application of glyphosate, vinegar [5% acetic acid (AA)], 20% horticulture grade vinegar (20% AA), 30% horticulture grade vinegar (30% AA), and a negative control. Treatments were applied in a factorial arrangement with two application periods (fall and spring or spring only). The percentage of weed cover within plots was evaluated visually with a 0–10 rating scale (0 – 0% weeds or 100% of the plot is dead; 5 – 50% weed growth; 10 – 100% of the plot is alive with weeds). All plots began the study with a rating of 10. After the initial treatment applications, visual ratings of the 5%, 20%, and 30% AA declined to a rating of 0 within 48 hours, whereas the glyphosate required 7 days ($P = 0.05$). Treatments were reapplied to part of the plots (subplots) in the spring when ≈50% of the plot had regrown with weeds. Glyphosate required 71 to 80.8 days to reach 50% regrowth and required only one retreatment. The 20% and 30% AA applications required three (2016) and four (2017) retreatments. Glyphosate has proven to be more effective at weed control in vegetable gardens when compared with vinegar, although 20% AA and 30% AA are viable alternatives.

control weeds globally (Malik et al., 1989). With conservation tillage systems, glyphosate is commonly applied before planting (Bruff and Shaw, 1992) and has been successful at controlling weeds with some residual control (Buhler and Werling, 1989; Wilson and Worsham, 1988). Several studies have evaluated the effectiveness of glyphosate at controlling weeds in crop production systems (Culpepper, 2006; Griffith et al., 2006; Norris et al., 2001; Shaw and Arnold, 2002), whereas others have compared glyphosate with natural products to control weeds (Abouziena et al., 2008; Patton and Weisenberger, 2012; Young, 2004).

Research of the use of natural products to control weeds before garden establishment with continued control throughout the growing season is limited. Additionally, research comparing the efficacy of weed suppression treatments applied in the fall for a spring garden compared to spring-only weed

Table 1. Summary of the weed control products with active ingredients and manufacturer sources used during weed suppression studies in 2016 and 2017 in Richmond, KY.

Weed control product	Product name	Concn in spray solution	Product source or manufacturer
Acetic acid (5%)	Great Value distilled white vinegar	Undiluted	Walmart, Bentonville, AR
Acetic acid (20%)	Natural safe 20% vinegar	Undiluted	Factory Direct Chemicals, Long Island, NY
Acetic acid (30%)	Natural safe 30% vinegar	Undiluted	Factory Direct Chemicals
Glyphosate	FarmWorks 41% glyphosate plus	1.6% a.i.	Ragan and Massey, Ponchatoula, LA

- Results indicated that glyphosate, when compared with AA, is the more effective weed suppression method.
- Although all three AA treatments (5%, 20%, and 30%) initially damaged weeds faster than glyphosate, AA did not control weeds for an extended period like glyphosate.
- The 20% and 30% AA applications required 3 to 4 treatments for equivalent control to glyphosate.

Organic weed control synopsis

- Pro’s
  - Viable options available, with research ongoing
  - Market niche products
- Con’s
  - Product cost
  - Labor cost
  - Contact vs systemic
  - Selectivity
  - Efficacy

Turfgrass Weed Control for Professionals

https://mdc.itap.purdue.edu/item.asp?Item_Number=TURF-100

Format: Book.

Sedge Control Herbicides

From - Turfgrass Weed Control for Professionals

Sedge Control and Turfgrass Tolerance Ratings

Herbicide	Sedge Control				Turf Tolerance								
	Sedges and Kyllinga				Cool-season						Warm-season		
	annual sedge	false-green kyllinga	purple nutsedge	yellow nutsedge	annual bluegrass	creeping bentgrass	fine fescue	Kentucky bluegrass	perennial ryegrass	tall fescue	bermudagrass	buffalograss	zoysiagrass
2,4-D + fluroxypyr + triclopyr + sulfentrazone (Momentum 4-Score)	P	P	P	F	S	S	S	S	S	S	NR	NR	NR
2,4-D + MCPA + dicamba + sulfentrazone (Triad SFZ Select)	P	P	P	F	S	S	S	S	S	S	S	S	S
2,4-D + quinclorac + dicamba + sulfentrazone (Q4 Plus)	P	P	P	F	S	NR	S	S	S	S	S	NR	S
2,4-D + triclopyr + dicamba + sulfentrazone (Foundation)	P	P	P	F	S	NR	S	S	S	S	NR	NR	NR
bentazon (Basagran T/O)	G	F-G	P	F	S	S	S	S	S	S	S	S	S
dimethenamid (Tower[1])	G	G	F	F-G	NR	NR	NR	NR	NR	NR	S	S	S
dimethenamid + pendimethalin (FreeHand)	G	G	F	F-G	NR	NR	NR	NR	NR	NR	S	S	S
flazasulfuron (Katana)	G	G	G-E	G-E	NR	NR	NR	NR	NR	NR	S	S	S
halosulfuron (SedgeHammer)	G	F	G	G-E	NR	S	S	S	S	S	S	S	S
halosulfuron + dicamba (Yukon[2])	G	F	G	G-E	NR	S	S	S	S	S	S	S-I	S
imazapic (Plateau)	F	F	F	F	NR	NR	NR	NR	NR	NR	S	S	NR
imazaquin (Image 70DG)	G	G-E	G	F	NR	NR	NR	NR	NR	NR	S	NR	S
imazosulfuron (Celero)	G	E	G-E	G-E	NR	S	S	S	S	S	S	NR	S
mesotrione (Tenacity)	P	P	P	G	NR	NR	S	S	S	S	NR	S	NR
metolachlor (Pennant MAGNUM)	G	F	F	G	NR	NR	NR	NR	NR	NR	S	NR	S

Other resources:

- http://www.mobileweedmanual.com/ Jim Brosnan, Ph.D.

Contact Information

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Thank you!