

Screening Herbicides for Use in Basil

Spring 2021 Continuing Education for Pest Management

Zheng Wang, Ph.D.

University of California Cooperative Extension

March 23, 2021

In the next 50 minutes...

- **Commercial basil production in California**
- **Weed control in basil**
- **Potential herbicide evaluation**

CAUTION

- **Except specifically noted, the herbicides tested in these trials are currently not registered for use on basil in California.**
- **The rates tested in these studies are designed for research purpose only and do not necessarily reflect the actual use on your crops.**
- **Always follow the herbicide label directions attached to the herbicide container you are using. The label is the law.**

In the next 50 minutes...

- **Commercial basil production in California**
- **Weed control in basil**
- **Potential herbicide evaluation**



Basil (*Ocimum basilicum*) is a culinary herb of the family Lamiaceae (mint family).

Basil is a heat-lover plant, meaning major production is located in sunnier regions (CA, NM, AZ, FL).

In CA, basil is a summer crop (highly susceptible to frost damage), requiring long days of full sun with cultivated temperature steadily around 80°F or above.

In CA's warmer climates, basil is harvested 3-5 times.



Basil can be direct-seeded or transplanted.

Commercial basil in CA is usually planted from seeds.

Basil is planted on raised beds of 40-in wide with 2 or 3 lines (10-15 inches between lines).

Sprinkler or drip irrigation is applied.

It takes over 10 days for basil seed to germinate and about two weeks to emerge.



For commercial production, basil is usually cut at about 4-5 inches above soil to make sure regrowth for subsequent cut.

Hand (harvest sickle) or machine-harvest (e.g., sickle bar/mower pulled by tractor) is possible.

The harvest height is pre-set depending on how many harvests growers want to make.

In machine harvest, mowed/cut basil is dumped into a trailer pulled by another tractor.

In the next 50 minutes...

- Commercial basil production in California
- Weed control in basil
- Potential herbicide evaluation

Commercial basil is typically grown with limited herbicide application especially after crop emergence. Most frequently used herbicide is applied pre-emergently.

GROUP 15 HERBICIDE



For use on certain Nuts, Small Fruits, Vegetables and Tobacco

ACTIVE INGREDIENT	
Napropamide	50%
OTHER INGREDIENTS	50%
TOTAL	100%

EPA Reg. No. 70506-36

KEEP OUT OF REACH OF CHILDREN
CAUTION

FIRST AID

IF IN EYES:

- Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.
- Call a Poison Control Center or doctor for treatment advice.

IF SWALLOWED:

- Call a Poison Control Center or doctor immediately for treatment advice.
- Have person sip a glass of water if able to swallow.
- Do not give anything by mouth to an unconscious person.
- Do not induce vomiting unless told to by a Poison Control Center or doctor.

IF ON SKIN OR CLOTHING:

- Take off contaminated clothing.
- Rinse skin immediately with plenty of water for 15-20 minutes.
- Call a Poison Control Center or doctor for treatment advice.

IF INHALED:

- Move person to fresh air.
- If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible.
- Call a Poison Control Center or doctor for further treatment advice.

Devrinol DF-XT (50% Napropamide a.i.) is a selective surface-applied or incorporated Group 15 herbicide for use in newly planted or established nuts, small fruit, vegetables, and tobacco. It does not control established weeds.

University of California
Agriculture and Natural Resources

CROP	RATE DEVRINOL DF-XT/A	USE DIRECTIONS AND RESTRICTIONS
Herbs: Basil, Marjoram, Rosemary, Savory (summer and winter)	2-4 lbs./A (1-2 lbs. a.i.)	<p>Apply as a preplant/preemergence application. Apply with ground spray equipment only, in 20 to 100 gallons of water per acre. Apply to a weed free surface. Shallow incorporate no deeper than seeding depth or sprinkler irrigate within 24 hours using sufficient water to wet the soil to a depth of 2 to 4 inches. Use the lower rate on light soil (coarse textured-sandy) and the higher rate on heavy soil (fine textured-clay). A list of weeds controlled is provided on page 4 of this label.</p> <p>DEVRINOL DF-XT Herbicide is not recommended for use on soil containing more than 10% organic matter. Spraying on ground heavily covered with leaves or trash may adversely affect weed control. Do not apply to frozen ground.</p> <p>Restrictions: Do not apply more than once per season. Do not apply this product through any type of irrigation system. There is no restriction between last application and harvest.</p>

From Devrinol DF-XT

GROUP 15 HERBICIDE



DEVTRINOL®

2-XT

SELECTIVE HERBICIDE

For use on certain Nuts, Small Fruits, Vegetables and Tobacco

Also for use on Container-Grown Ornamentals, Field-Grown Nursery Stock, Liner Stock, Ground Covers, and Turfgrass

ACTIVE INGREDIENT

Napropamide* 22%

OTHER INGREDIENTS 78%

TOTAL 100%

*contains 240 grams/liter or 2 pounds active ingredient per gallon.

EPA Reg. No. 70506-301

KEEP OUT OF REACH OF CHILDREN

CAUTION

FIRST AID

IF IN EYES:

- Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.
- Call a Poison Control Center or doctor for treatment advice.

IF SWALLOWED:

- Call a Poison Control Center or doctor immediately for treatment advice.
- Have person sip a glass of water if able to swallow.
- Do not give anything to an unconscious person.

Devrinol 2-XT (22% of Napropamide as the a.i.) can also use on container-grown ornamentals, field-grown nursery stock, liner stock, ground covers, and turfgrass.

University of California
Agriculture and Natural Resources

HERB CROPS

CROP	USE RATE/ACRE	USE DIRECTIONS AND RESTRICTIONS
Basil Marjoram Rosemary Savory (summer and winter)	2-4 quarts/A (1-2 lbs. a.i.)	<p>Apply as a preplant/preemergence application. Apply with ground spray equipment only, in 20-100 gallons of water per acre. Apply to a weed free surface. Shallow incorporate no deeper than seeding depth or sprinkler irrigate within 24-72 hours using sufficient water to wet the soil to a depth of 2 to 4 inches. Use the lower rate on light soil (coarse textured - sandy) and the higher rate on heavy soil (fine textured - clay).</p> <p>Restrictions: Apply a maximum of one application per year. There is no restriction between last application and harvest.</p>

From Devrinol 2-XT

CLETHODIM GROUP 1 HERBICIDE



Intensity one

POST-EMERGENCE GRASS HERBICIDE



FIRST AID

- If in eyes:**
 - Hold eye open and rinse slowly and gently with water for 15 to 20 minutes.
 - Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.
 - Call a poison control center or doctor for treatment advice.
- If on skin or clothing:**
 - Take off contaminated clothing.
 - Rinse skin immediately with plenty of water for 15 to 20 minutes.
 - Call a poison control center or doctor for treatment advice.
- If swallowed:**
 - Immediately call a poison control center or doctor.
 - Do not induce vomiting unless told to do so by the poison control center or doctor.
 - Do not give any liquid to the person.
 - Do not give anything by mouth to an unconscious person.
- If inhaled:**
 - Move person to fresh air.
 - If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible.
 - Call a poison control center or doctor for further treatment advice.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment.

NOTE TO PHYSICIAN: Ingestion of this product or subsequent vomiting can result in aspiration of light hydrocarbon liquid, which can cause pneumonitis. If ingested, probable mucosal damage may contraindicate the use of gastric lavage.

FOR A MEDICAL EMERGENCY INVOLVING THIS PRODUCT CALL:
1-866-944-8565.

ACTIVE INGREDIENT:	% By Wt.
*Clethodim	12.6%
OTHER INGREDIENTS:	87.4%
	TOTAL 100.0%

* (E)-2[1-[[[(3-chloro-2-propenyl)oxy]imino]propyl]-5-[2-(ethylthio)propyl]-3-hydroxy-2-cyclohexen-1-one

Contains Petroleum Distillates
Intensity® One Post-Emergence Grass Herbicide is an emulsifiable concentrate containing 0.97 lb clethodim active ingredient per gallon.

KEEP OUT OF REACH OF CHILDREN

CAUTION

For Additional Precautionary Statements, Complete First Aid, Directions for Use, Storage and Disposal and Other Use Information, See Inside This Label Booklet.

EPA REG. NO. 34704-976

050319 V1D 05R19

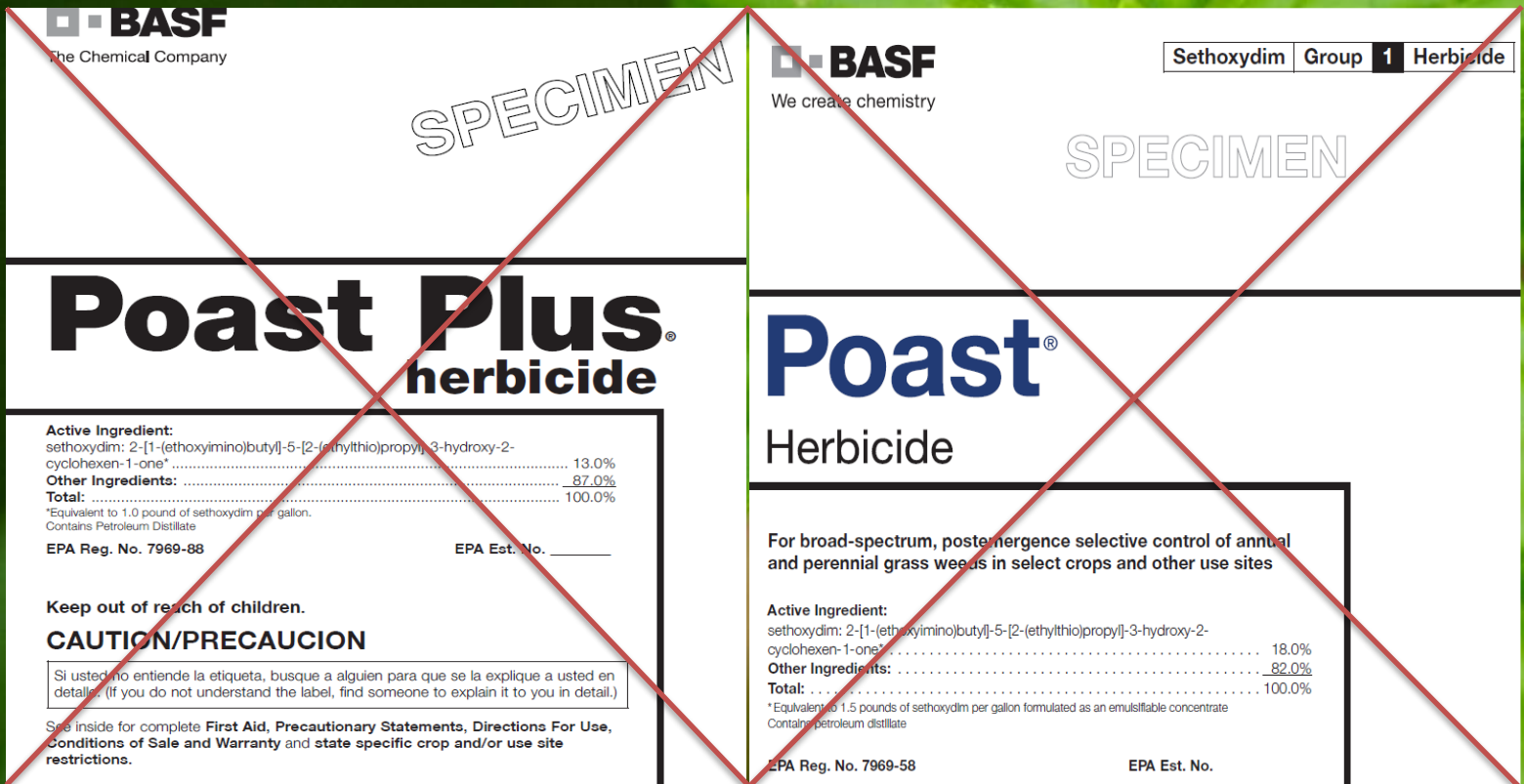
FORMULATED FOR

LOVELAND PRODUCTS, INC.®, P.O. BOX 1286, GREELEY, COLORADO 80632-1286

Intensity One (12.6% Clethodium as the a.i.) is a Group 1 selective post-emergence herbicide for control of annual and perennial grasses (e.g., foxtail, crabgrass, johnsongrass) in labeled crops. It does not control sedges or broadleaf weeds.

University of California
Agriculture and Natural Resources

Post-emergence grass herbicide is usually not used by some commercial basil growers.



Poast (Plus) are not registered for use in basil for post-emergent grass control!

Broadleaf weeds can be a big problem (e.g., nut sedge, mallow, and purslane) due to a huge lack of registered herbicide that can avoid hurting basil plants. Hand removal will have to be enforced.



In the next 50 minutes...

- Commercial basil production in California
- Weed control in basil
- Potential herbicide evaluation

The goal is to...

introduce the herbicide evaluation screening trials of collecting plant growth and weed control efficacy data to facilitate product registration for commercial use.

Pre-emergent weed control is critical and probably the most cost-effective way to save labor and post-emergent herbicide in the season. We need evaluate other potential, currently non-registered pre-emergent herbicide on basil weed control to find partners and alternatives that can be rotated with the Devrinol products.



Starting in 2019, we compared the performance of non-registered per-emergent herbicide with the registered Devrinol products on basil weed control and biomass to facilitate the registration.



GROUP 14 HERBICIDE

ATTENTION

Although this label may appear similar to the label on a product you may have used, there may be important label differences. Users must read, understand and strictly follow all label directions, precautions and restrictions.
 It is the user's responsibility to be sure the product is approved for sale or use on the intended crop and for use in the specific geographic area.
 -It is the user's responsibility to be aware of and to follow all State or local precautions or restrictions not appearing on this product label.
 Prior to purchase or use of this product, read the Terms of Sale or Use and Limitation of Warranty and Liability on page 2 of this label. If the terms and conditions are unacceptable, return the product immediately in the original and unopened container.

It is not registered for use in California!

EPA Reg. No. 279-3220

EPA Est. 279-IL-1

Active Ingredient: Sulfentrazone 39.6%
 Other Ingredients: 60.4%
 100.0%

Contains 4 pounds of active ingredient per gallon.

**KEEP OUT OF REACH OF CHILDREN
 CAUTION**

Si usted no entiende esta etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand this label, find someone to explain it to you in detail.)

FIRST AID

If Inhaled: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. Call a poison control center or doctor for further treatment advice.

If on Skin or Clothing: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

If in Eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes. Then continue rinsing eye. Call a poison control center or doctor for treatment advice.

If Swallowed: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison control center or doctor. Do not give anything by mouth to an unconscious per-

Active ingredient 2
 Agricultural Use Requirements 2
 Allowable Use Information 5
 Application Information 3
 Blueberries 6
 Bushberry 6
 Caneberry 6
 Conditions of Sale and Warranty 2
 Crop Rotational Restrictions 5
 Directions for Use 2
 Environmental Hazards 2
 First Aid Instructions 1
 Grapes 6
 Label Tracking Information 8
 Lemons 6
 Mixing and Loading Instructions 6
 Orange 6
 Physical/Chemical Hazards 2
 Pistachios 6
 Precautionary Statements and PPE Requirements 1
 Product Information 3
 Replanting Instructions 7
 Resistance Management Recommendations 3
 Restricted Entry Intervals (REI) 2
 Spray Drift Management 4
 Sprayer Equipment Cleanout 6
 Storage and Disposal 2
 Walnut (black & English) 6

PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals

Caution
 Causes moderate eye irritation. Harmful if inhaled, swallowed, or absorbed through skin. Avoid breathing vapor or spray mist. Avoid con-

- The tested herbicide is Zeus XC (39.6% Sulfentrazone as the a.i.).
- It is a selective Group 14 soil-applied herbicide to control broadleaf, grass, and sedge weeds for berries, grapes, lemon, orange, pistachio, and walnuts.
- Once it is applied to soil, germinating weed seeds and seedlings take up Sulfentrazone from soil solution.

General Mode of Action: PPO inhibitor-Cell membrane disrupter

Mode of Action

Mitochondrial Matrix

Mitochondrion

Protoporphyrin IX Protoporphyrinogen IX

PPO_m

Intermembrane Space

Chloroplast

Thylakoid Matrix

Protoporphyrin IX

PPO_p

Glu → Porphobilinogen → Protoporphyrinogen IX

Protoporphyrinogen IX

Protoporphyrin IX

Cytosol

Cell wall

*Protoporphyrin IX

¹O₂

↑ hv

Protoporphyrin IX

↑ Peroxidase

Protoporphyrinogen IX

- Protoporphyrinogen Oxidase (PPO) is an enzyme in chloroplast cell.
- The PPO inhibitor blocks the biosynthesis pathway of chlorophyll.
- The inhibition of PPO results in forming reactive molecules that destroy lipids and protein membranes.
- Cell becomes leaky and disintegrates rapidly.

2019 Trials- Two trials were conducted from April 12 to July 12

Herbicide trade name	Active ingredient	Rate of products	Rate of active ingredient	Reported in this presentation
Untreated-hand weeding	N/A			UTC
Zeus XC	Sulfentrazone	4 fl. oz/acre	0.125 lb./acre	Low-ZEUS
Zeus XC	Sulfentrazone	6 fl. oz/acre	0.188 lb./acre	Med-ZEUS
Zeus XC	Sulfentrazone	8 fl. oz/acre	0.25 lb./acre	High-ZEUS
Devrinol DF-XT	Napropamide	2.5 lbs./acre	1.25 lbs./acre	DEV-alone

Herbicide was pre-emergently applied to soil 1 day after seeding (DAS).

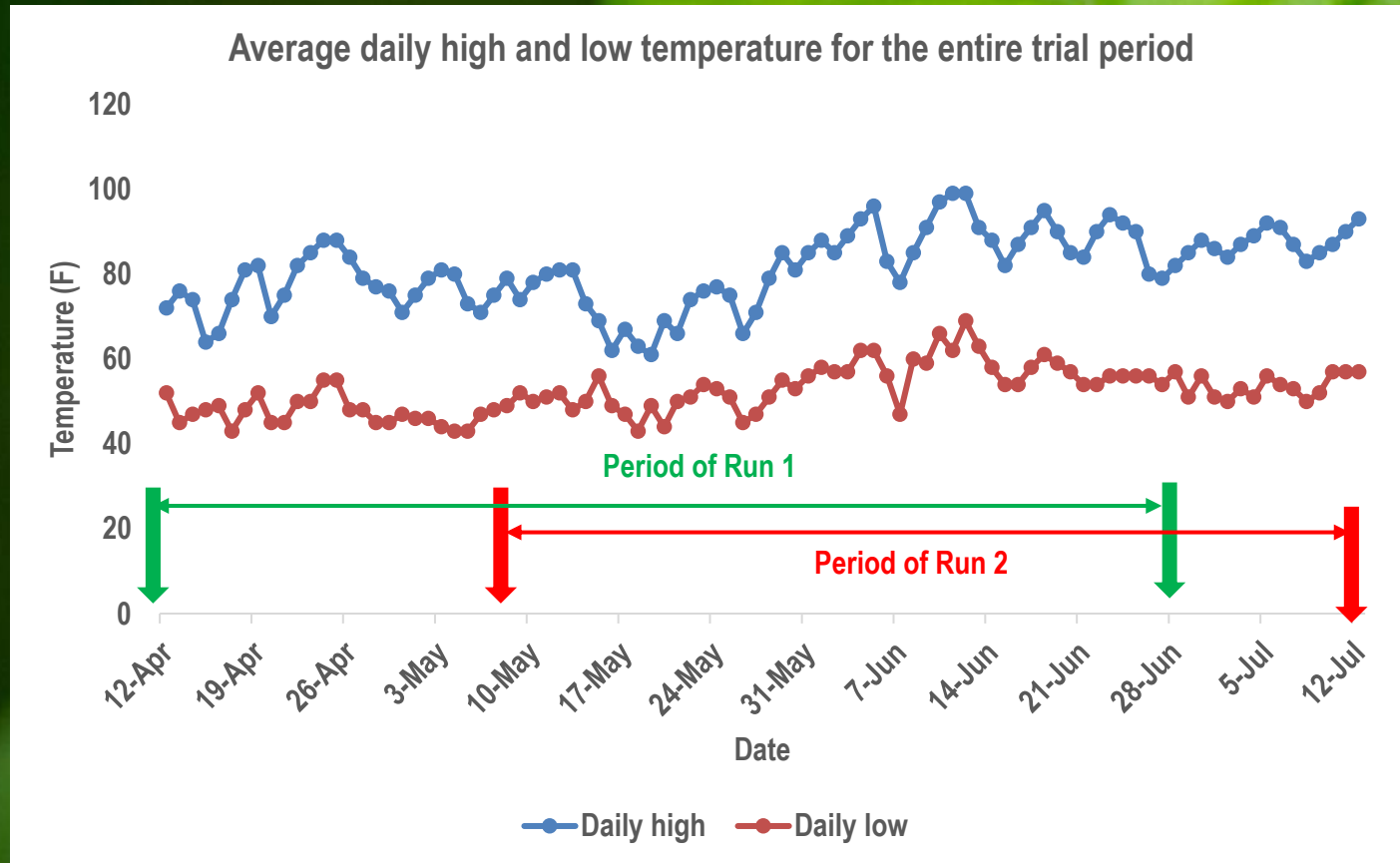
- Four basil varieties were double-line seeded.
- For each variety, all treatments were replicated four times.
- Herbicide treatments were made using a backpack sprayer.

2019 Trials- Two trials were conducted from April 12 to July 12



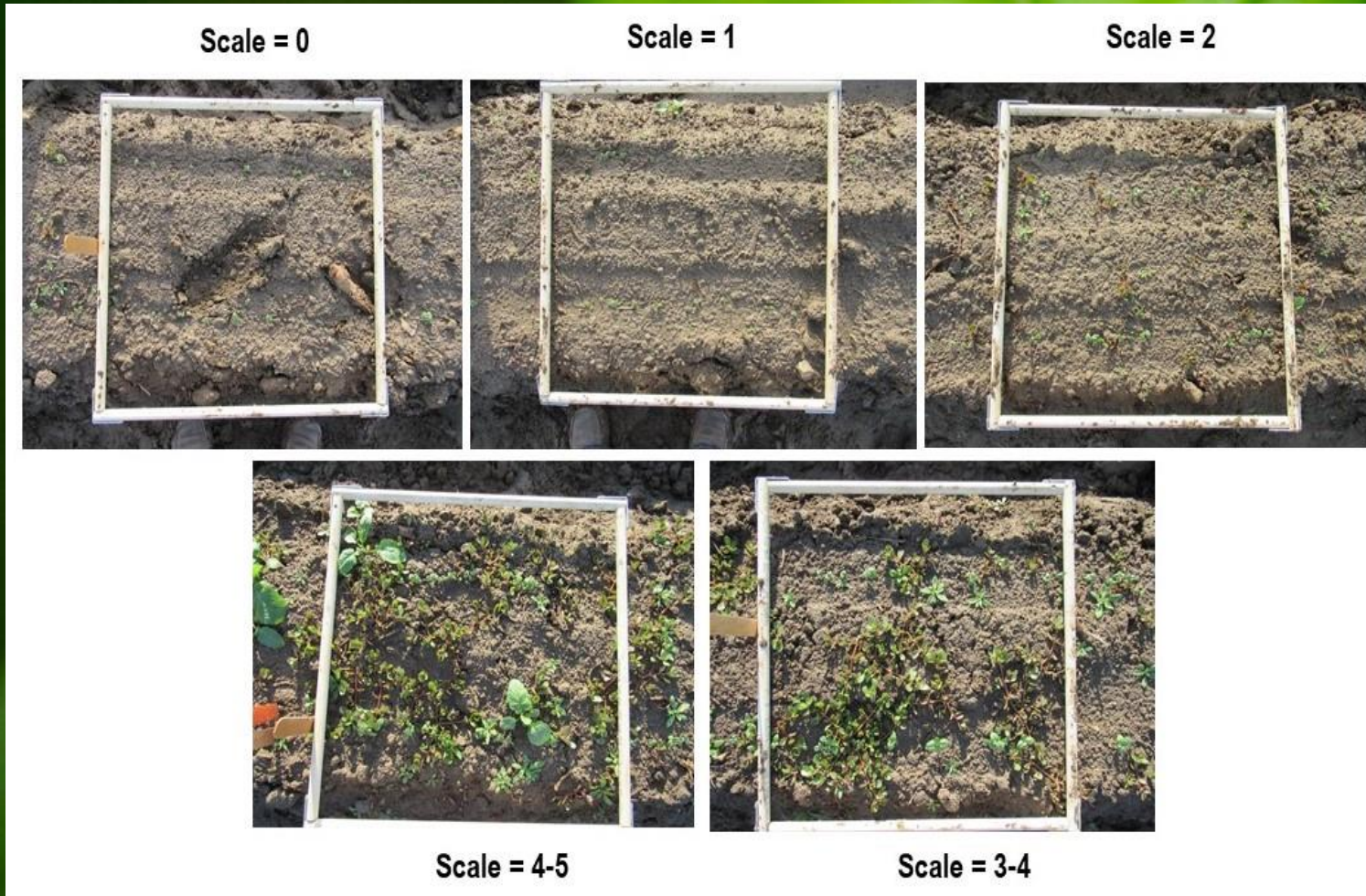
- V1 = 'Passion'
- V2 = 'Obsession'
- V3 = 'Devotion'
- V4 = 'Helena'
- Weed ratings, crop injury, and leaf biomass were analyzed and compared.

2019 Trials- Two trials were conducted from April 12 to July 12



- Trial/Run 1: April 12 to June 28;
Trial/Run 2: May 7 to July 12

2019 Trials- Weed ratings



0 = no visible weeds in the frame;
1 = visible weeds no more than 10% of the frame;
2 = visible weeds between 10% and 25%;
3 = visible weeds between 25% and 50%;
4 = visible weeds between 50% and 75%;
5 = visible weeds over 75%.

Pictorial example of weed rating

2019 Trials- Weed control (7-28 DAS)

After 35 DAS, all plots were hand weeded as the grower's standard practice.

<i>Variety = 'Passion'</i>	7 DAS		14 DAS		21 DAS		28 DAS	
Trials	One	Two	One	Two	One	Two	One	Two
UTC	0	0	1	1	2	2	4	4
Low-ZEUS	0	0	1	1	1	1	2	1
Med-ZEUS	0	0	0	0	1	1	2	2
High-ZEUS	0	0	1	0	1	1	2	2
DEV-alone	0	0	0	0	1	1	2	1
<i>Variety = 'Obsession'</i>								
UTC	0	0	1	1	2	2	4	4
Low-ZEUS	0	0	0	0	1	1	1	2
Med-ZEUS	0	0	0	0	1	1	2	1
High-ZEUS	0	0	1	0	1	1	2	2
DEV-alone	0	0	0	0	1	0	2	1
<i>Variety = 'Devotion'</i>								
UTC	0	0	1	1	2	2	4	3
Low-ZEUS	0	0	1	1	1	1	2	2
Med-ZEUS	0	0	1	0	1	1	1	1
High-ZEUS	0	0	1	1	2	1	3	2
DEV-alone	0	0	0	0	1	1	2	2
<i>Variety = 'Helena'</i>								
UTC	0	0	1	1	2	2	4	3
Low-ZEUS	0	0	0	0	1	1	1	2
Med-ZEUS	0	0	0	0	1	1	1	1
High-ZEUS	0	0	1	1	1	1	2	1
DEV-alone	0	0	0	0	0	1	2	2

2019 Trials- Leaf injury (36 DAS in Trial 2)

Variety = 'Passion'

UTC

DEV-alone

Variety = 'Obsession'

UTC

DEV-alone

Low-ZEUS

Med-ZEUS

High-ZEUS

Low-ZEUS

Med-ZEUS

High-ZEUS

Variety = 'Devotion'

UTC

DEV-alone

Variety = 'Helena'

UTC

DEV-alone

Low-ZEUS

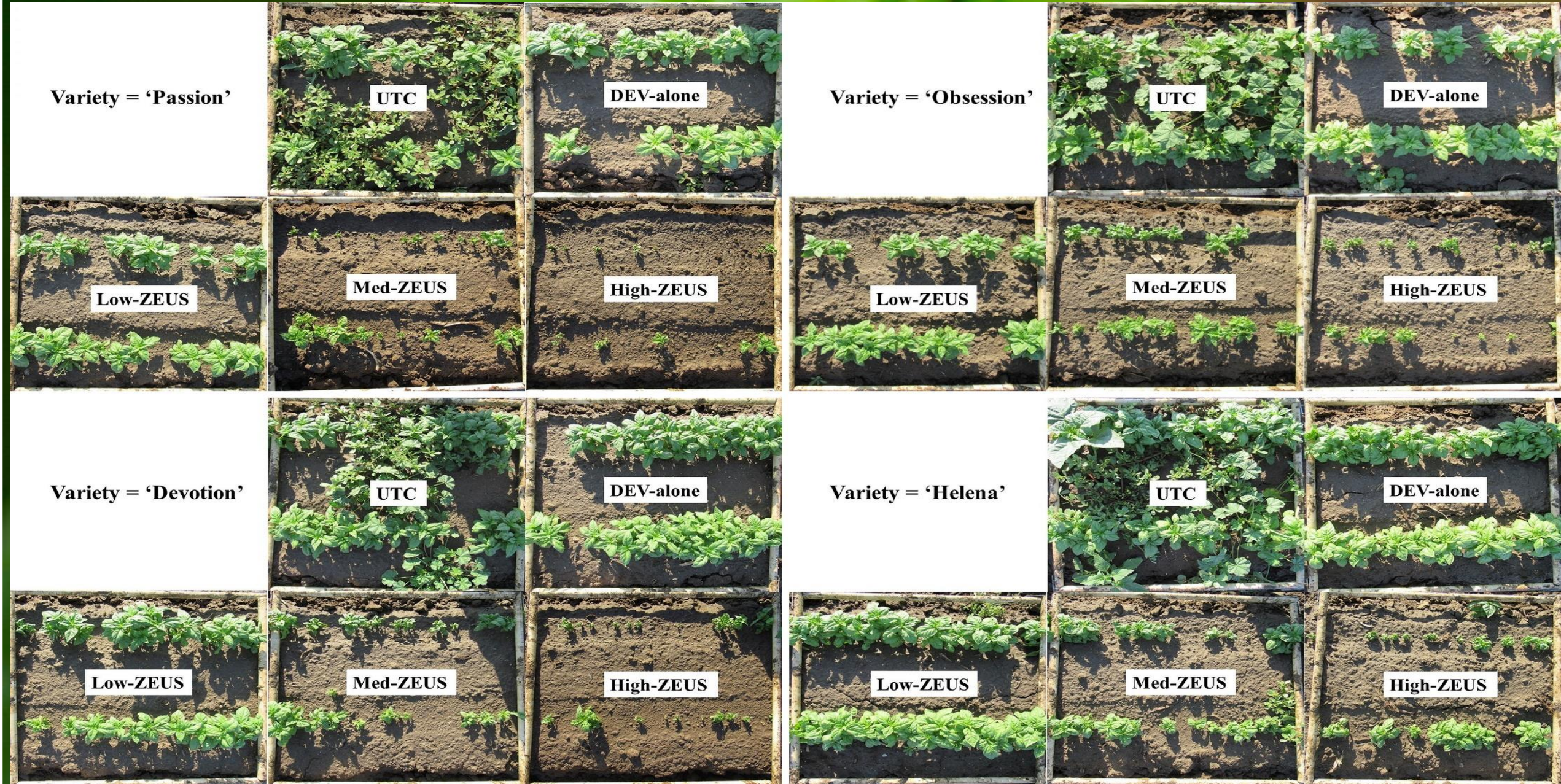
Med-ZEUS

High-ZEUS

Low-ZEUS

Med-ZEUS

High-ZEUS



2019 Trials- Basil leaf biomass

Applying Zeus XC right after seeding at 4 oz/acre (Low-ZEUS) produced comparable biomass and weed control without hurting basil plants.

Variety = 'Passion'	Leaf biomass (lbs./acre)	
	Trial 1	Trial 2
UTC	9455 A	18825 A
Low-ZEUS	9555 A	19110 A
Med-ZEUS	10655 A	12595 B
High-ZEUS	9500 A	4370 C
DEV-alone	10265 A	19765 A
Variety = 'Obsession'		
UTC	9790 AB	18825 A
Low-ZEUS	9765 AB	16610 A
Med-ZEUS	9500 AB	12490 B
High-ZEUS	8615 B	9005 C
DEV-alone	10315 A	18800 A
Variety = 'Devotion'		
UTC	9635 B	20370 A
Low-ZEUS	10420 AB	16470 B
Med-ZEUS	11075 A	15905 BC
High-ZEUS	10030 AB	12410 C
DEV-alone	10475 AB	18015 AB
Variety = 'Helena'		
UTC	10260 B	15660 A
Low-ZEUS	11755 AB	15080 A
Med-ZEUS	11755 AB	19045 A
High-ZEUS	13325 A	16990 A
DEV-alone	11890 A	13425 A

Biomass values followed by the same letter are not significantly different at $P \leq 0.05$ according to Tukey's Studentized Range Test.

2020 Trial- Test 4 oz/acre rate used alone and in tank mixes with Devrinol

Herbicide trade name	Active ingredient	Rate of products	Rate of active ingredient	Reported in this presentation
Zeus XC	Sulfentrazone	4 fl. oz/acre	0.125 lb./acre	DPRE
Zeus XC	Sulfentrazone	4 fl. oz/acre	0.125 lb./acre	ZEUS-alone
Zeus XC + Devrinol 2-XT	Sulfentrazone + Napropamide	4 fl. oz/acre + 3 qt./acre	0.125 lb./acre + 1.5 lbs./acre	ZEUS-DEV1
Zeus XC + Devrinol 2-XT	Sulfentrazone + Napropamide	3 fl. oz/acre + 3 qt./acre	0.094 lb./acre + 1.5 lbs./acre	ZEUS-DEV2
Devrinol 2-XT	Napropamide	4 qt./acre	2 lbs./acre	DEV-alone
Weed-free control		N/A		UTC

DPRE = Delayed pre-emergent application at 7 DAS.
Other herbicide treatments were made immediately after seeding.

- Same basil varieties.
- Five replications per treatment per variety.
- Backpack spray.

2020 Trial
Seeding on April 29
Harvest on July 7



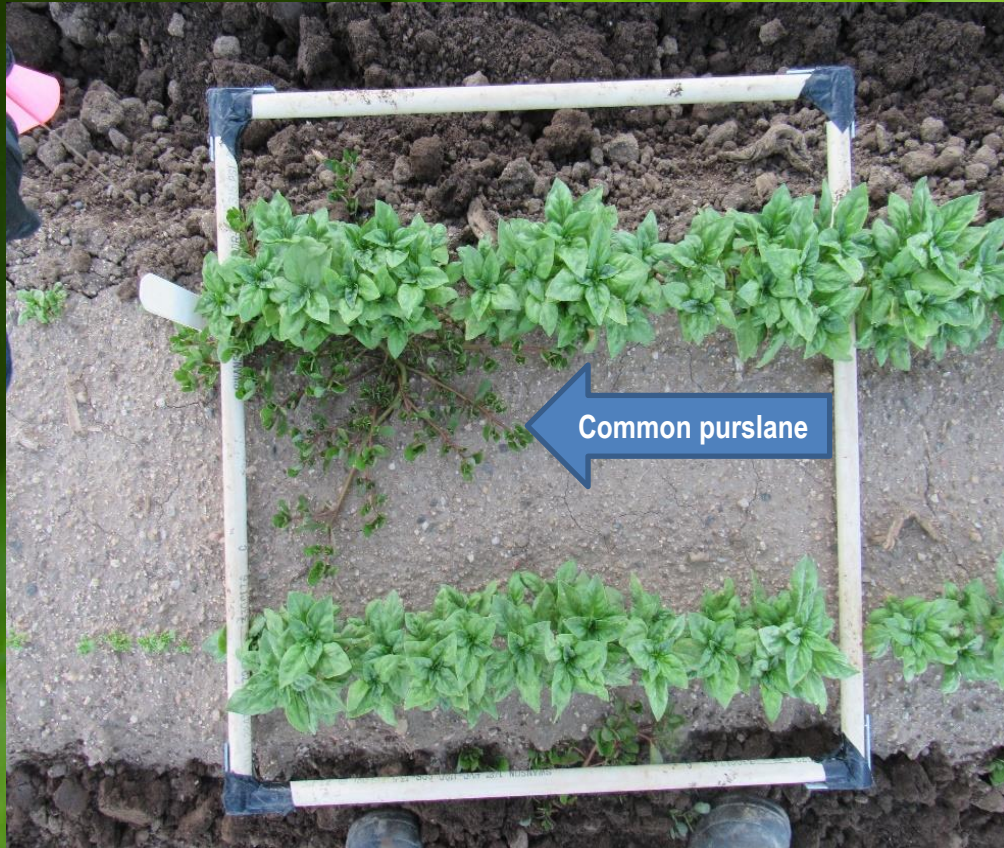
2020 Trial

Weed control (14 to 56 DAS)

Same 0-5 scales as 2019

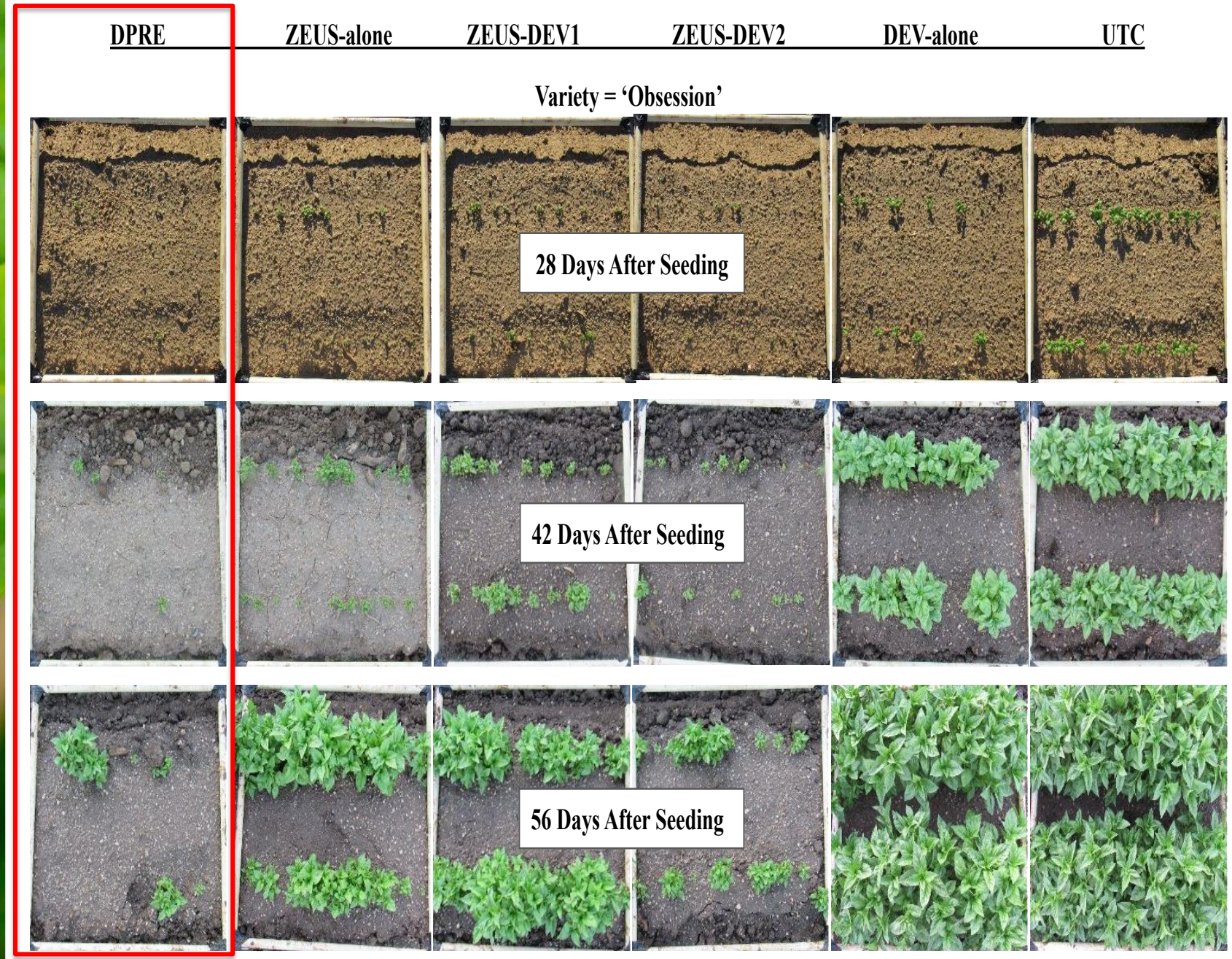
<i>Variety = 'Passion'</i>	14 DAS	28 DAS	42 DAS	56 DAS
DPRE	0	0.2	0.5	0
ZEUS-alone	0	0.2	0.4	0
ZEUS-DEV1	0	0	0	0
ZEUS-DEV2	0	0	0	0
DEV-alone	0	0	0	0
UTC	0	0	0	0
<i>Variety = 'Obsession'</i>				
DPRE	0	0	0.2	0
ZEUS-alone	0	0.4	0	0
ZEUS-DEV1	0	0	0	0
ZEUS-DEV2	0	0	0	0
DEV-alone	0	0	0	0
UTC	0	0	0	0
<i>Variety = 'Devotion'</i>				
DPRE	0	0.2	0	0
ZEUS-alone	0	0.2	0.2	0
ZEUS-DEV1	0	0	0	0
ZEUS-DEV2	0	0	0	0
DEV-alone	0	0	0	0
UTC	0	0	0	0
<i>Variety = 'Helena'</i>				
DPRE	0	0	0.2	0
ZEUS-alone	0	0.2	0	0
ZEUS-DEV1	0	0	0	0
ZEUS-DEV2	0	0	0	0
DEV-alone	0	0.2	0	0
UTC	0	0	0	0

2020 Trial- Weed species



2020 Trial

Comparisons of leaf injury and loss of germination.



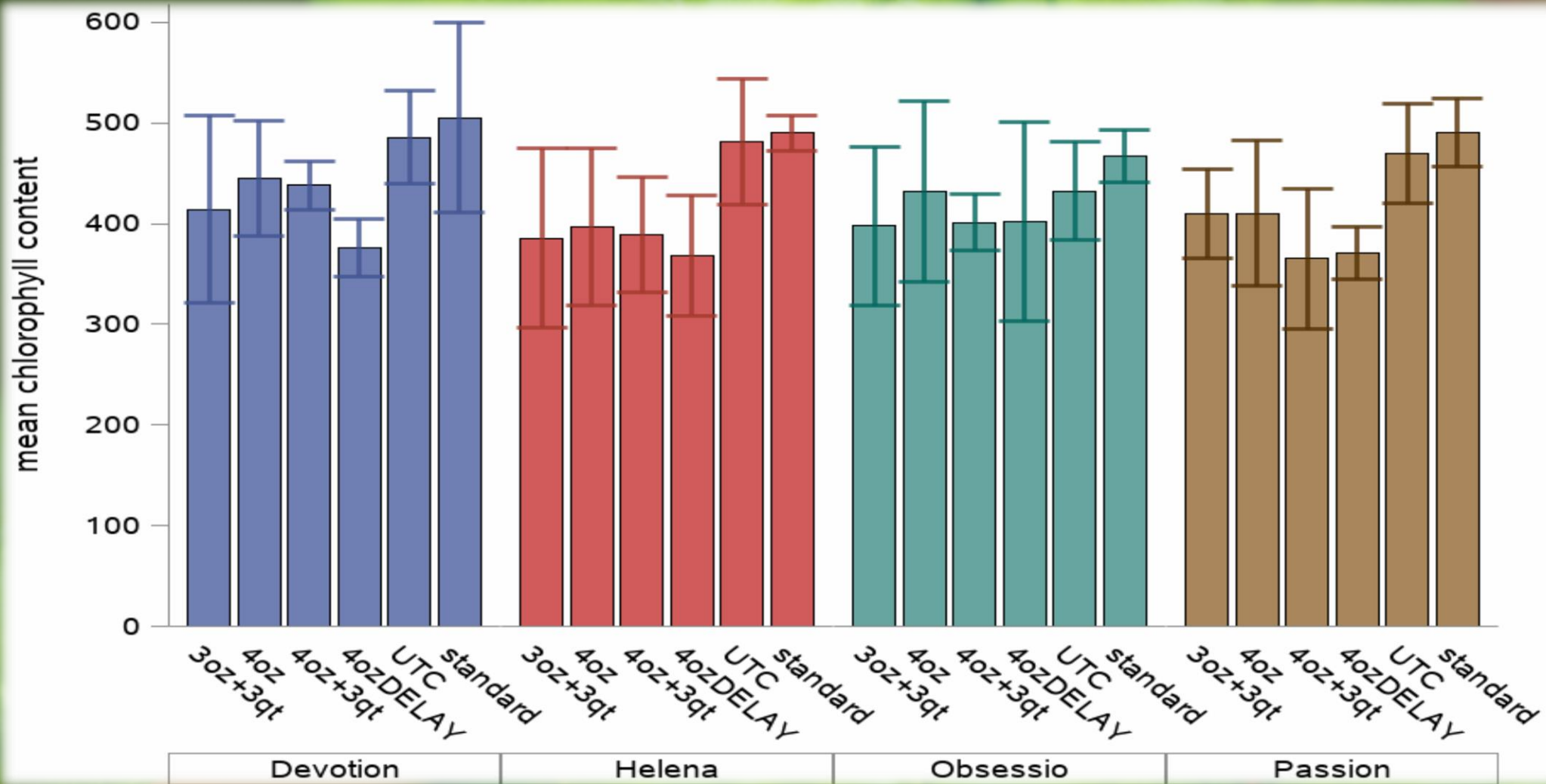
2020 Trial

% leaf injury and growth inhibition

Delayed application caused severe leaf injury and growth/germination inhibition.

Variety = 'Passion'	28 DAS	42 DAS	56 DAS
DPRE	76 A	73 A	55 BC
ZEUS-alone	63 B	62 B	52 C
ZEUS-DEV1	76 A	76 A	68 A
ZEUS-DEV2	72 A	72 A	62 AB
DEV-alone	17 C	21 C	13 D
UTC	2 D	4 D	0 E
Variety = 'Obsession'			
DPRE	73 A	67 A	50 A
ZEUS-alone	46 C	42 B	30 B
ZEUS-DEV1	70 A	65 A	50 A
ZEUS-DEV2	60 B	60 A	53 A
DEV-alone	19 D	12 C	12 C
UTC	1 E	0 D	0 D
Variety = 'Devotion'			
DPRE	93 A	88 A	68 A
ZEUS-alone	63 C	62 C	48 C
ZEUS-DEV1	72 B	70 B	50 BC
ZEUS-DEV2	62 C	59 C	55 B
DEV-alone	23 D	9 D	5 D
UTC	2 E	3 E	0 D
Variety = 'Helena'			
DPRE	76 A	76 A	65 A
ZEUS-alone	54 C	48 B	45 B
ZEUS-DEV1	61 B	52 B	50 B
ZEUS-DEV2	51 C	49 B	45 B
DEV-alone	12 D	8 C	2 C
UTC	2 E	2 D	0 C

2020 Trial- Leaf chlorophyll concentration at 56 DAS



2020 Trial

Basil leaf biomass

- From the two years' screening trials, applying Zeus XC immediately after seeding at 4 oz/acre produced comparable biomass and weed control compared to Devrinol and weed-free plots.
- The delayed application or tank-mixed with Devrinol were not viable practices.

Variety = 'Passion'	Leaf biomass (lbs./acre)
UTC	15250 A
DPRE	6775 C
ZEUS-alone	11880 AB
ZEUS-DEV1	9360 BC
ZEUS-DEV2	8050 BC
DEV-alone	14370 A
Variety = 'Obsession'	
UTC	20130 A
DPRE	11780 B
ZEUS-alone	17440 AB
ZEUS-DEV1	14270 AB
ZEUS-DEV2	13320 B
DEV-alone	18100 AB
Variety = 'Devotion'	
UTC	17185 A
DPRE	10375 B
ZEUS-alone	17675 A
ZEUS-DEV1	14695 AB
ZEUS-DEV2	15745 AB
DEV-alone	20225 A
Variety = 'Helena'	
UTC	27660 A
DPRE	10965 D
ZEUS-alone	18230 BC
ZEUS-DEV1	14270 CD
ZEUS-DEV2	16695 BCD
DEV-alone	21960 AB

Where are we now?

All performance data from the two years' trials along with paperwork will be submitted for DPR review and inspection. The final approval will perhaps take years. It will not be adjudicated immediately after all trials are completed.

GOOD LUCK!

THANK YOU

Zheng Wang, Ph.D.
UCCE Vegetable Crops Farm Advisor
209.525.6822
zzwwang@ucanr.edu