# Weed issues in SJV Small Grains

**Nick Clark**, CCA, Agronomy & Nutrient Mgmt. Farm Advisor – UC Cooperative Extension in Tulare, Kings & Fresno Counties. neclark@ucanr.edu; 559-852-2788

Acknowledging Jose Luiz Carvalho de Souza Dias

January 14, 2022

SJC and Delta Field Crops Meeting

University of California
Agriculture and Natural Resources

# Outline

- SJV Small Grain Production
- Weed Problems
- UC Small Grain Weed Mgmt. Web Resources
- Chickweed in SJV Small Grains
- APPENDIX – more details for you to peruse

# Small Grain Production

Statistics from the San Joaquin Valley

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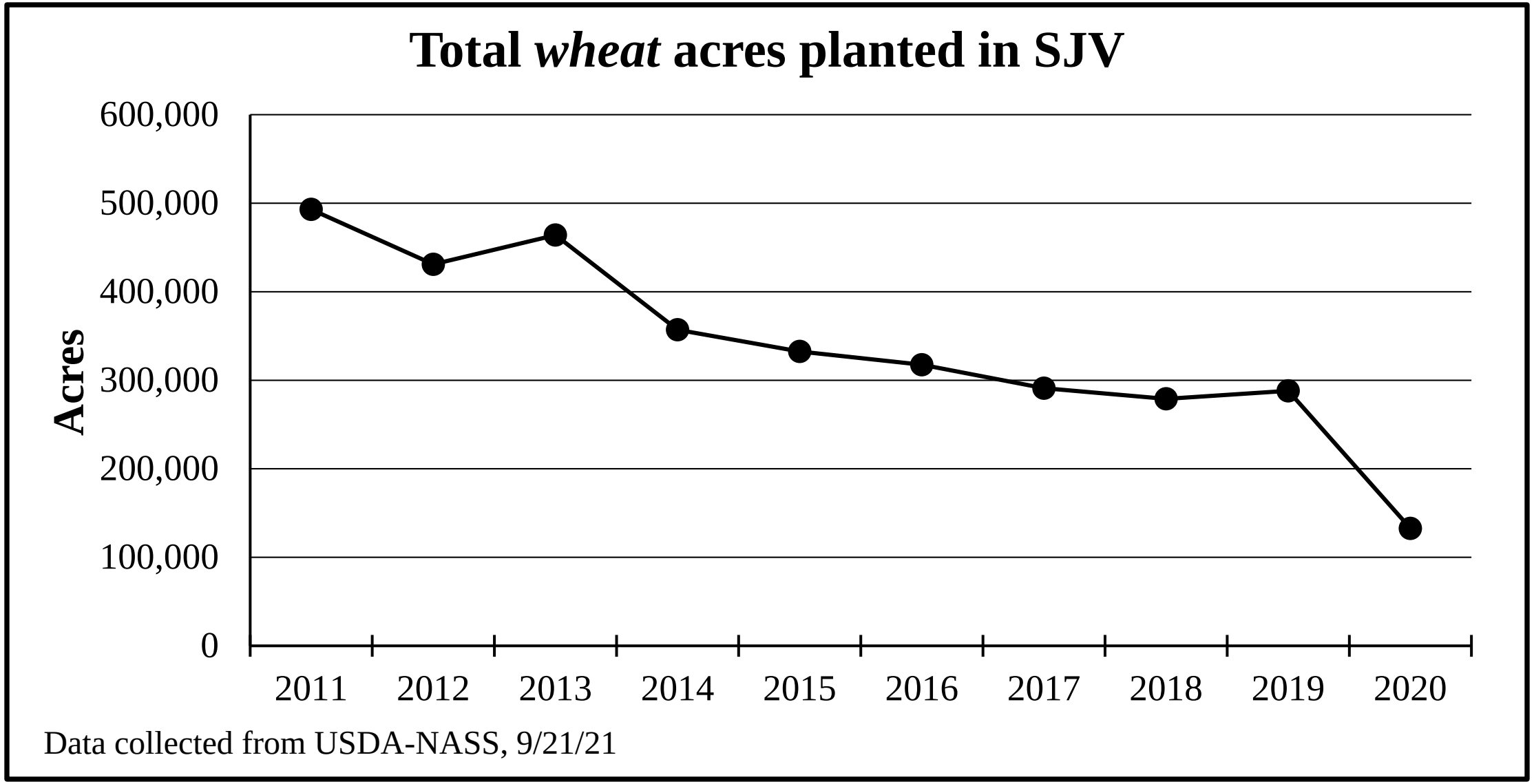
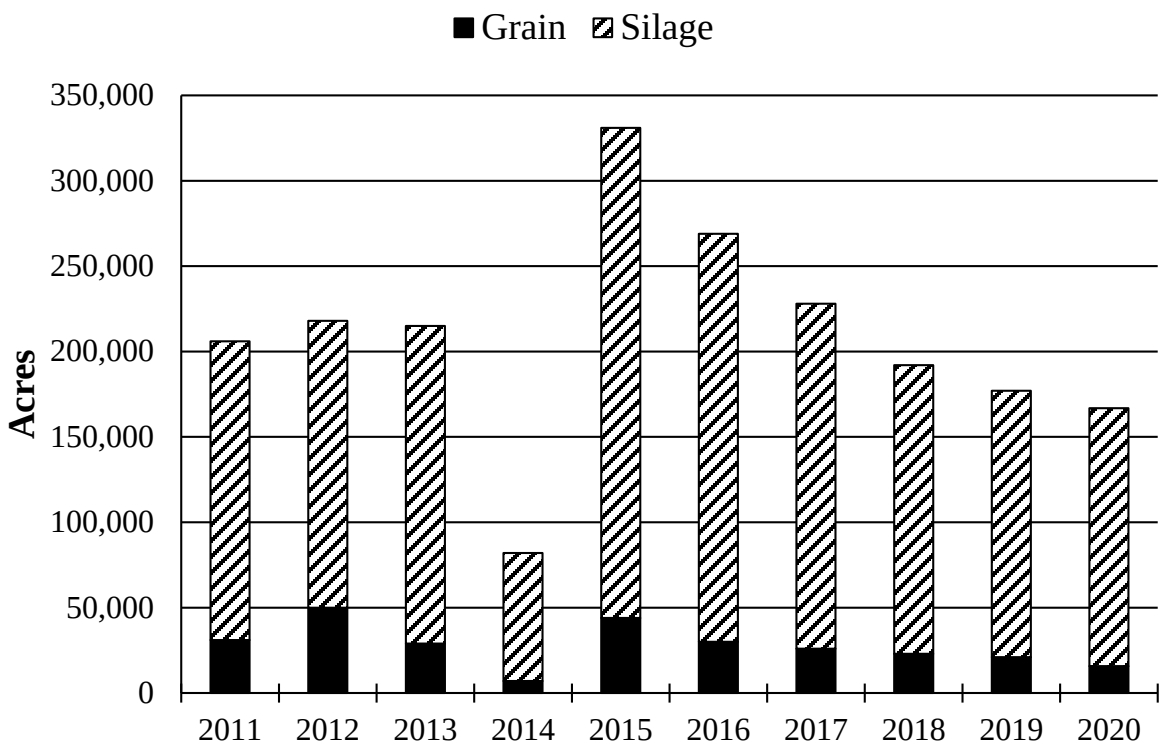
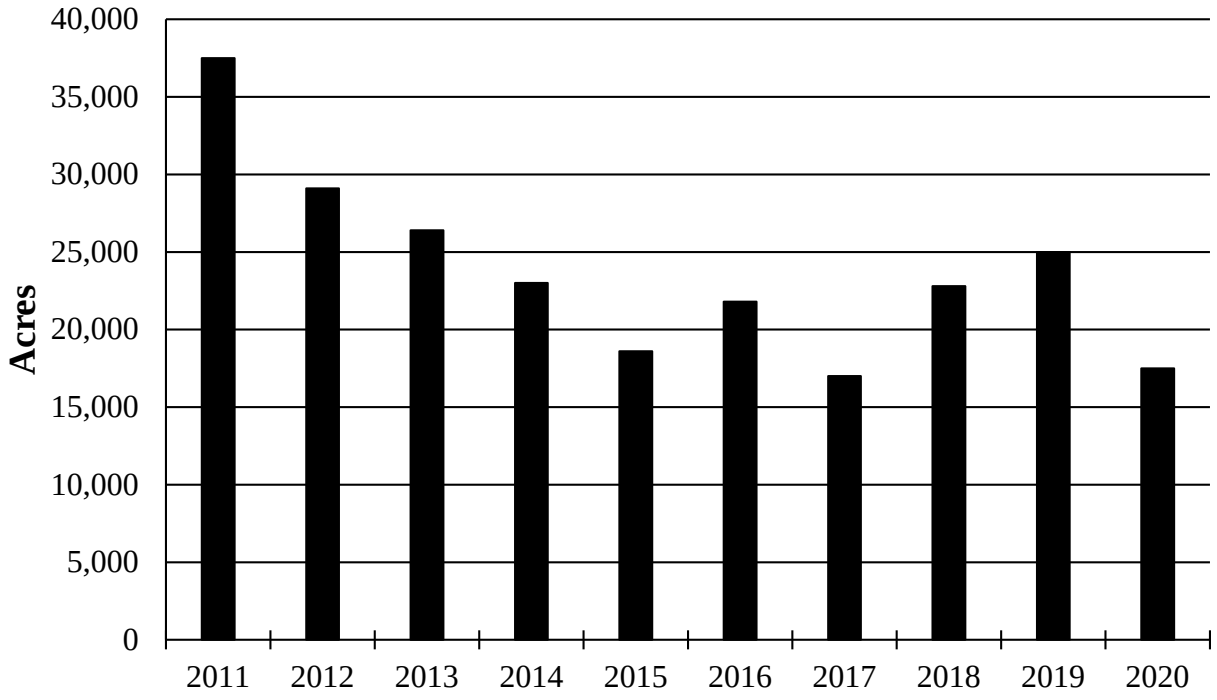

Total *wheat* acres planted in SJV
Acres
600,000
500,000
400,000
300,000
200,000
100,000
0
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Data collected from USDA-NASS, 9/21/21

## Tulare County Harvested Small Grain Acreage and End Use



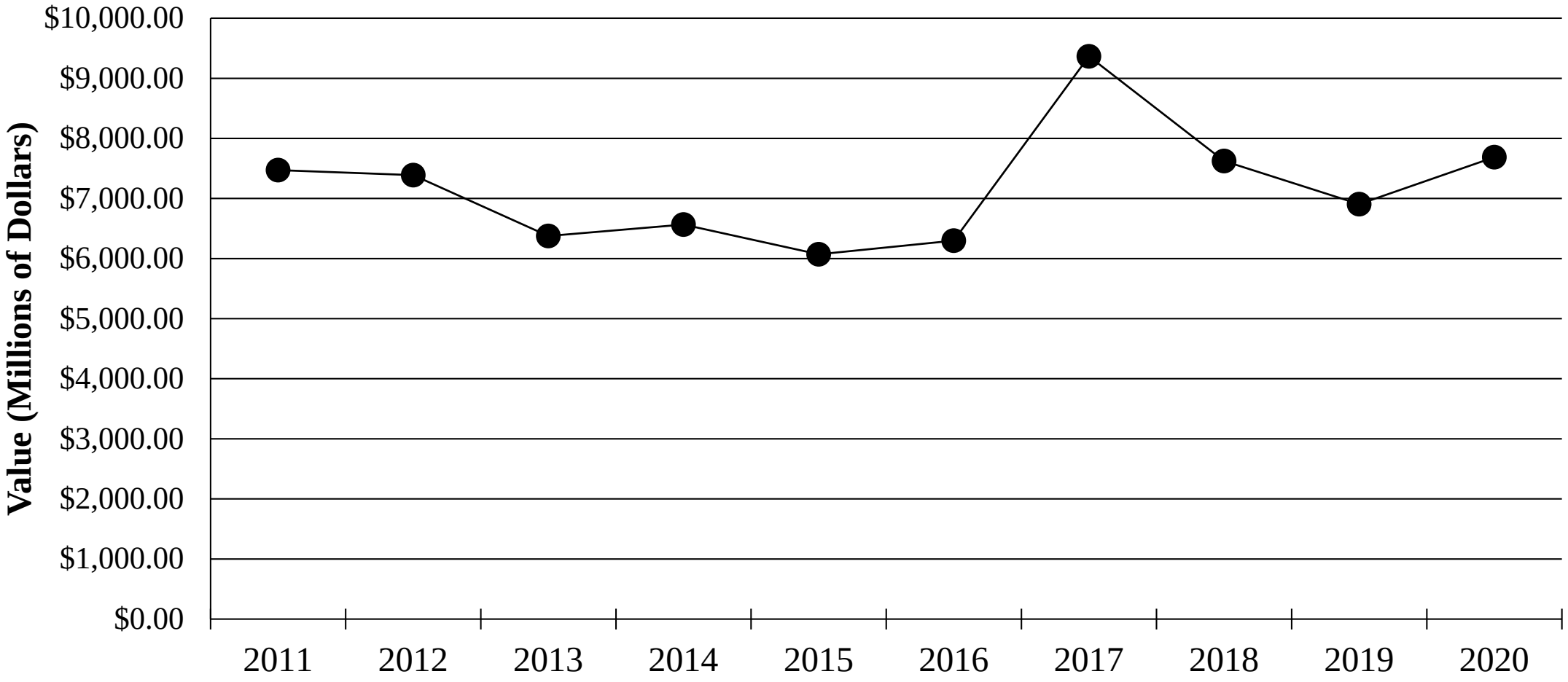

Data collected from Tulare County Ag Commissioner Annual County Crop Reports

## San Joaquin County Harvested Small Grain Acreage for Grain Market




Data collected from San Joaquin County Ag Commissioner Annual County Crop Reports. Small grain silage not reported separately. "Other" silage ~ 4X grain acreage.

# California Milk Production Value




Data collected from USDA-NASS, 1/13/22

# Weed Problems in SJV Small Grains

Dairy, polling, informal interviews,
and the most recent research

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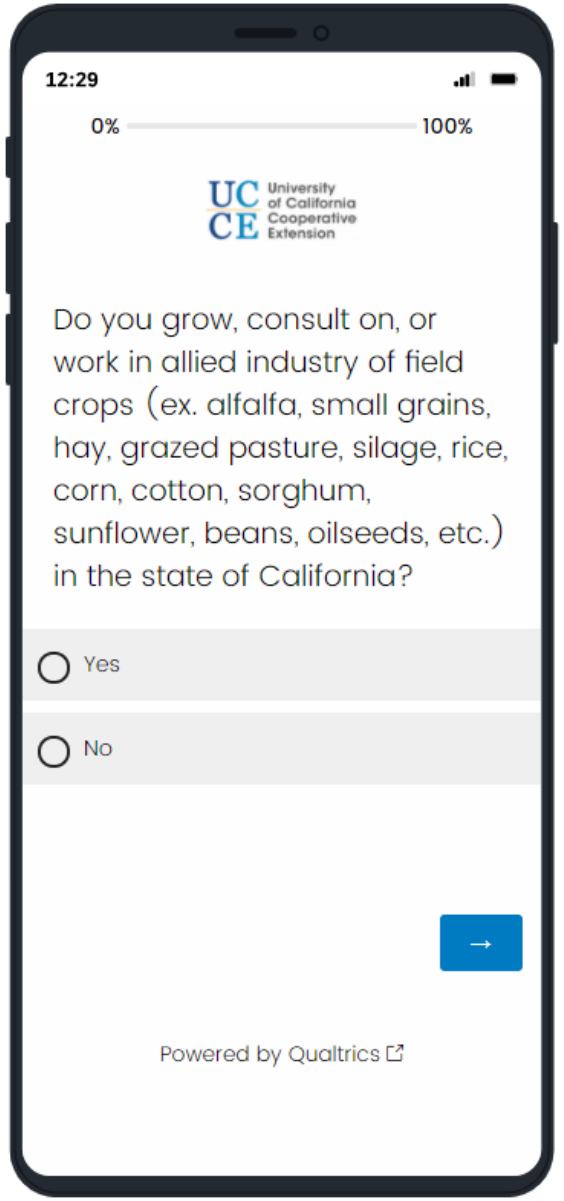


# What did the S. SJV have to say?

- 30 of 182 S. SJV respondents had small grains as top-three crop
- 38% noted **weed control** a top priority
- 54% said UC should make **weed control** research and education a high priority
- Only 27% of those said they were highly satisfied with UC effort on **weed control**

Full study:
https://acsess.onlinelibrary.wiley.com/doi/10.1002/agj2.20897

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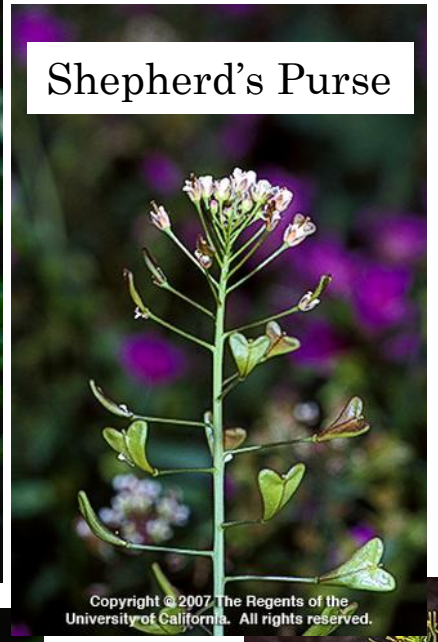
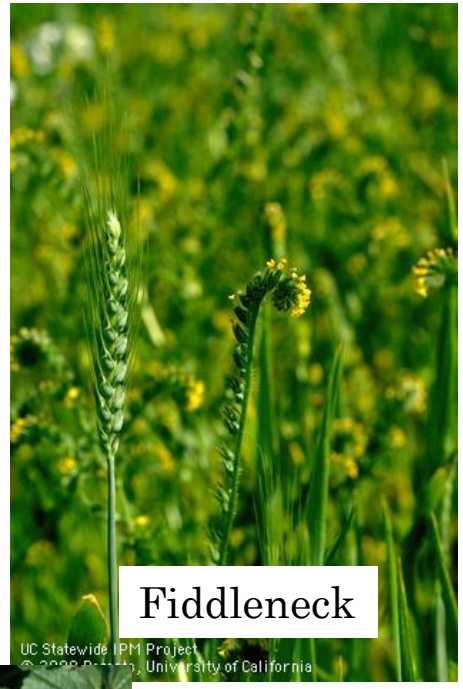
# Weeds commonly found in SJV small grains – informal interviews


Canarygrass

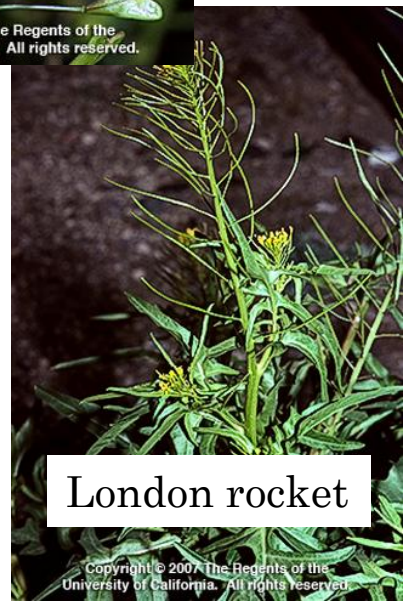

Shepherd's Purse


Chickweed

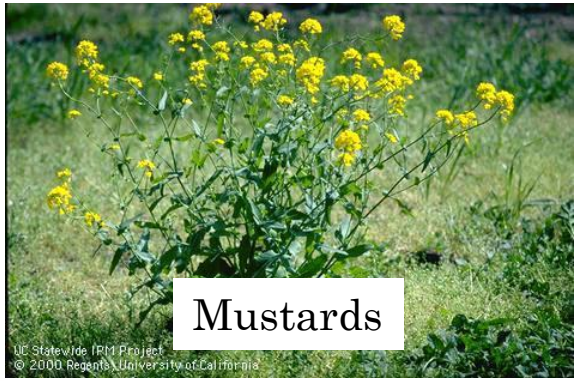

Fiddleneck


Nettle


Italian ryegrass


London rocket


Mallow


Mustards

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# Recent CA research

California Wheat Commission

1240 Commerce Ave., Woodland CA 95776* (530) 661-1292 * FAX: (530) 661-1332

**PROJECT TITLE:** **Weed Management in California Wheat 2013-2014**

**Project Leaders**
**Steve Wright**

[Link to study]

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**Table 3. Burning Nettle (*Urtica urens*) Percent Control**

| Treatments | Rate/A | 7 DAT | 14 DAT | 21 DAT | 28 DAT | 36 DAT |
|---|---|---|---|---|---|---|
| 1. Express + MCPA Amine + Axial + NIS | 0.25 oz + 1 pt + 16.4 floz + 0.25% | 2 | 1 | 30 | 30 | 90 |
| 2. Express + MCPA Amine + Axial + NIS | 0.5 oz + 1 pt + 16.4 floz + 0.25% | 0 | 10 | 80 | 90 | 98 |
| 3. Express + MCPA Amine + Axial | 0.25 oz + 1 pt + 16.4 floz | 0 | 1 | 20 | 45 | 90 |
| 4. Express + MCPA Amine + Axial | 0.5 oz + 1 pt + 16.4 floz | 0 | 10 | 45 | 90 | 100 |
| 5. Express + MCPA Amine + Axial + NIS | 0.25 oz + 12 floz + 16.4 floz + 0.25% | 0 | 0 | - | - | - |
| 6. Express + MCPA Amine + Axial + NIS | 0.5 oz + 12 floz + 16.4 floz + 0.25% | 0 | 5 | - | - | - |
| 7. Express + MCPA Amine + Axial | 0.25 oz + 12 floz + 16.4 floz | 0 | 8 | - | - | - |
| 8. Express + MCPA Amine + Axial | 0.5 oz + 12 floz + 16.4 floz | 0 | 0 | - | 90 | 100 |
| 9. Express + 2,4-D + Axial + NIS | 0.25 oz + 1 pt + 16.4 floz + 0.25% | 0 | 1 | 50 | 55 | 90 |
| 10. Express + 2,4-D + Axial + NIS | 0.5 oz + 1 pt + 16.4 floz + 0.25% | 0 | 0 | - | 80 | 100 |
| 11. Express + 2,4-D + Axial | 0.25 oz + 1 pt + 16.4 floz | 2 | 8 | 40 | 50 | 95 |
| 12. Express + 2,4-D + Axial | 0.5 oz + 1 pt + 16.4 floz | 0 | 0 | - | - | - |
| 13. Express + 2,4-D + Axial + NIS | 0.25 oz + 12 floz + 16.4 floz + 0.25% | 2 | 0 | - | - | - |
| 14. Express + 2,4-D + Axial + NIS | 0.5 oz + 12 floz + 16.4 floz + 0.25% | 0 | 0 | - | - | - |
| 15. Express + 2,4-D + Axial | 0.25 oz + 12 floz + 16.4 floz | 0 | 0 | 50 | 90 | 100 |
| 16. Express + 2,4-D + Axial | 0.5 oz + 12 floz + 16.4 floz | 0 | 0 | 30 | 35 | 90 |
| 17. Express + Clarity + Axial + NIS | 0.25 oz + 4 floz + 16.4 floz + 0.25% | 0 | 0 | 60 | 75 | 100 |
| 18. Express + Clarity + Axial + NIS | 0.5 oz + 4 floz + 16.4 floz + 0.25% | 0 | 0 | - | - | - |
| 19. Express + Clarity + Axial | 0.25 oz + 4 floz + 16.4 floz | 0 | 0 | - | - | - |
| 20. Express + Clarity + Axial | 0.5 oz + 4 floz + 16.4 floz | 0 | 0 | - | - | - |
| 21. UTC | ----- | 0 | 0 | 0 | 0 | 0 |

**Table 4. Common Chickweed (*Stellaria media*) % Control**

| Treatments | Rate/A | 7 DAT | 14 DAT | 21 DAT | 28 DAT | 36 DAT |
|---|---|---|---|---|---|---|
| 1. Express + MCPA Amine + Axial + NIS | 0.25 oz + 1 pt + 16.4 floz + 0.25% | 0 | 3 | 23 | 56 | 96 |
| 2. Express + MCPA Amine + Axial + NIS | 0.5 oz + 1 pt + 16.4 floz + 0.25% | 0 | 5 | 19 | 45 | 96 |
| 3. Express + MCPA Amine + Axial | 0.25 oz + 1 pt + 16.4 floz | 0 | 6 | 25 | 80 | 99 |
| 4. Express + MCPA Amine + Axial | 0.5 oz + 1 pt + 16.4 floz | 0 | 4 | 23 | 60 | 96 |
| 5. Express + MCPA Amine + Axial + NIS | 0.25 oz + 12 floz + 16.4 floz + 0.25% | 0 | 4 | 16 | 61 | 93 |
| 6. Express + MCPA Amine + Axial + NIS | 0.5 oz + 12 floz + 16.4 floz + 0.25% | 0 | 4 | 19 | 50 | 99 |
| 7. Express + MCPA Amine + Axial | 0.25 oz + 12 floz + 16.4 floz | 0 | 5 | 33 | 54 | 99 |
| 8. Express + MCPA Amine + Axial | 0.5 oz + 12 floz + 16.4 floz | 0 | 4 | 18 | 44 | 91 |
| 9. Express + 2,4-D + Axial + NIS | 0.25 oz + 1 pt + 16.4 floz + 0.25% | 0 | 6 | 33 | 60 | 94 |
| 10. Express + 2,4-D + Axial + NIS | 0.5 oz + 1 pt + 16.4 floz + 0.25% | 0 | 8 | 35 | 68 | 94 |
| 11. Express + 2,4-D + Axial | 0.25 oz + 1 pt + 16.4 floz | 0 | 7 | 26 | 78 | 98 |
| 12. Express + 2,4-D + Axial | 0.5 oz + 1 pt + 16.4 floz | 0 | 4 | 25 | 49 | 95 |
| 13. Express + 2,4-D + Axial + NIS | 0.25 oz + 12 floz + 16.4 floz + 0.25% | 0 | 5 | 26 | 59 | 98 |
| 14. Express + 2,4-D + Axial + NIS | 0.5 oz + 12 floz + 16.4 floz + 0.25% | 0 | 7 | 25 | 56 | 90 |
| 15. Express + 2,4-D + Axial | 0.25 oz + 12 floz + 16.4 floz | 0 | 4 | 29 | 61 | 96 |
| 16. Express + 2,4-D + Axial | 0.5 oz + 12 floz + 16.4 floz | 0 | 6 | 25 | 71 | 96 |
| 17. Express + Clarity + Axial + NIS | 0.25 oz + 4 floz + 16.4 floz + 0.25% | 0 | 4 | 20 | 54 | 94 |
| 18. Express + Clarity + Axial + NIS | 0.5 oz + 4 floz + 16.4 floz + 0.25% | 0 | 5 | 26 | 60 | 93 |
| 19. Express + Clarity + Axial | 0.25 oz + 4 floz + 16.4 floz | 0 | 5 | 28 | 43 | 95 |
| 20. Express + Clarity + Axial | 0.5 oz + 4 floz + 16.4 floz | 0 | 1 | 21 | 51 | 96 |
| 21. UTC | ----- | 0 | 0 | 0 | 0 | 0 |

# What about dairy manure?

- Dry cow pens = 21,755 seed/ton manure
- Liquid manure = 15,872 seed/ton manure
- Composted manure < 2,000 seed/ton manure
- Dry cows had more viable weed seed than lactating cows. **Why?**
- Compost longer than 6-8 weeks, deeper piles, supplement moisture
- Focus especially on dry cows


Link to study

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# Weed Management

UC web resources available

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Agriculture / Small Grains

Top of home page

Agriculture: Pest Management Guidelines

# Small Grains

Near bottom of page

## Weeds

- Integrated Weed Management
- Special Weed Problems
- Common and Scientific Names of Weeds
- Susceptibility of Winter Weeds to Herbicide Control
- Susceptibility of Spring and Summer Weeds to Herbicide Control
- Herbicide Treatment Table

https://www2.ipm.ucanr.edu/agriculture/small-grains/

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- Susceptibility of Winter Weeds to Herbicide Control
- Susceptibility of Spring and Summer Weeds to Herbicide Control

Agriculture: Small Grains Pest Management Guidelines

# Susceptibility of Winter Weeds to Herbicide Control



| | BRO | CAR | CHS | CLO | DIA* | FEN | GLY | MCA* | MES | PAR* | PEN | PYR | TRI | 24D* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ANNUAL WEEDS | | | | | | | | | | | | | | |
| barley, hare | N | N | C | N | N | N | N | N | C | P/C+ | N | N | — | N |
| bluegrass, annual | N | N | C | N | N | N | N | N | C | P/C+ | C | N | C | N |
| brome, ripgut | N | N | C | N | N | N | N | N | P | N | P | N | C | N |
| burclover, California | N | P | C | C | C | N | C | P | N | P | — | — | — | C |
| canarygrass, hood | N | N | C | N | N | C | N | N | C | N | C | N | C | N |
| canarygrass, littleseed | N | N | C | N | N | C | N | N | C | N | C | N | C | N |
| chamomile, mayweed | C | — | C | — | C | N | C | N | P | C | N | — | — | N |
| chickweed, common | N | P | C | — | P | N | C | N | C | C | P | C | C | N |
| fiddleneck, coast | C | C | C | — | P | N | C | P | P | P | C | N | C | P |
| filarees | N | P | — | P | C | N | P | P | — | C | P | — | — | C |
| groundsel, common | P/C+ | — | C | — | P | N | C | C | P | C | N | — | — | C |
| henbit | N/P+ | — | C | — | C | N | C | C | P | C | C | C | C | C |
| knotweed, prostrate | N | — | C | N | C | N | P | C | N | N | N | C | C | C |
| ladysthumb | P/C | — | — | C | C | N | — | C | P | P | N | C | — | C |
| lettuce, prickly | C | — | C | — | P | N | P | C | P | C | N | C | — | C |

C = control | P = partial control | N = no control | — = no information

| | | | |
|---|---|---|---|
| BRO | = bromoxynil (Buctril) | MCA | = MCPA Amine* |
| CAR | = carfentrazone (Shark) | MES | = mesosulfuron (Osprey) |
| CHS | = chlorsulfuron (Glean) | PAR | = paraquat* (Gramoxone) |
| CLO | = clopyralid (Stinger) | PEN | = pendimethalin (Prowl H20) |
| DIA | = dicamba* (Banvel, Clarity) | PYR | = pyraflufen-ethyl (ET) |
| FEN | = fenoxaprop (Puma) | TRI | = trifluralin (Treflan) |
| GLY | = glyphosate (Roundup) | 24D | = 2,4-D Amine* |

* Permit required from county agricultural commissioner for purchase or use.

\+ Control varies depending on size of weed at application; the smaller the weed, the better the control.

https://www2.ipm.ucanr.edu/agriculture/small-grains/Susceptibility-of-Weeds-to-Herbicide-Control/

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- Weed information & resources
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  - herbicide susceptibility
  - herbicide symptoms
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## What's New

- Weedy rice: survey and season wrap-up
- Mapping waterhyacinth drift and dispersal in the Sacramento–San Joaquin Delta using GPS trackers
- Water temperature controls the growth of waterhyacinth and South American sponge plant
- Seasonal growth and phenology of water hyacinth, curlyleaf pondweed, and Brazilian egeria in the Sacramento-San Joaquin River Delta
- Fire and Smoke: ponderings on disturbance and invasive weeds
- NEW BOOK :: Manage Weeds on Your Farm – a guide to ecological strategies
- An overview of the Delta Region Areawide Aquatic Weed Project for improved control of invasive aquatic weeds in the Sacramento–San Joaquin Delta
- JOB ANNOUNCEMENT :: Area IPM Advisor :: deadline: Dec. 5, 2021
- Root inhibiting herbicide injury on processing tomatoes
- Weeds as reservoir for Impatiens Necrotic Spot Virus (INSV)
- Weed control information for weeds in natural areas (western U.S.)

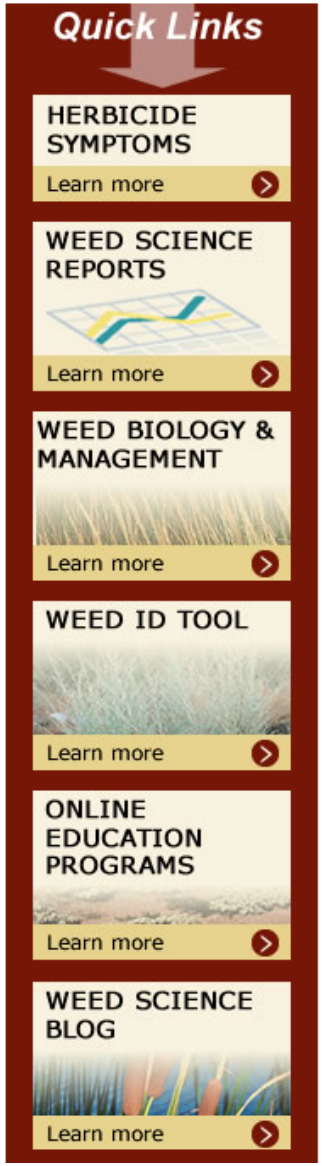
## Calendar

**2022**

- Jan. 19-21 :: CA Weed Science Society (CWSS) annual meeting :: Sacramento, CA
- Feb. 21-24 : Weed Science Society of America (WSSA) annual meeting organized jointly with the Canadian Weed Science Society (CWSS) :: Vancouver, Canada
- Mar. 7-10 :: Western Society of Weed Science (WSWS) annual meeting :: Newport Beach, CA
- Mar. 7-11 :: Western Aquatic Plant Management Society (WAPMS) annual meeting :: Tucson, AZ
- June 20-23 :: European Weed Research Society (EWRS) symposium :: Athens, Greece
- Dec. 4-10 :: International Weed Science Congress (IWSC) 2022 :: Bangkok, Thailand

**2023**

- Jan. 18-20 :: CA Weed Science Society (CWSS) annual meeting :: Monterey, CA
- Jan. 30-Feb. 2 : Weed Science Society of America (WSSA) annual meeting :: Arlington, Virginia

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# UC WEED SCIENCE

Weed control, management, ecology, and minutia

## Poor control of common chickweed with ALS-inhibitor herbicides reported in multiple small grain fields in the southern San Joaquin Valley. Is it a new case of herbicide resistance in California?


**Author: Jose Luiz Carvalho de Souza Dias**
**Author: Nicholas Clark**
**Author: Konrad Mathesius**
**Author: Sarah Light**
View More...



**Published on: August 4, 2021**


Common chickweed (*Stellaria media*) (Figure 1) is a winter annual found throughout California and considered to be one of the most common broadleaf weeds infesting cereal crops (also referred as small grains) in the state (Wilen 2006). Herbicides can provide effective control of chickweed; however, overreliance on a single herbicide (or group of herbicides with the same site of action), is likely to result in resistance to that herbicide (or group of herbicides) (Tranel and Wright 2017). Even though herbicide-resistant common chickweed populations have not been confirmed in California, lack of effective control with post-emergence applications of the ALS-inhibiting herbicides pyroxsulam (Simplicity) and tribenuron (Express TotalSol) was observed in several triticale fields located in the southern San Joaquin Valley in early 2021 (Figure 2). Additionally, ALS-resistant common chickweed has been identified in other states in the US and Canada (Table 1). Therefore, the main objectives of this article are to discuss how the University of California Cooperative Extension (UCCE) plans to investigate this possible new case of herbicide resistance in California, as well as to provide information and tools to help Pest Control Advisers (PCAs) and growers in developing more diversified integrated weed management programs for cereal crops.

Figure 1. Mature common chickweed flower and leaves close-up.

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https://ucanr.edu/blogs/ucdweedscience/

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Nicholas Clark you can leave a message:

**Your comments:**

Nick Clark is such a phenomenal speaker. He deserves a raise.

Save Comments

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# Common Chickweed

An emerging problem in SJV small grains?

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# What PCA's reported

- 2-3 years in a row
- Chickweed escapes
- Pyroxsulam (Simplicity)
- Tribenuron (Express)

# What UCCE checked

- Environmental conditions
- Other weeds present
- Unsprayed areas in field
- Application records
- Modified efficacy test, 2021



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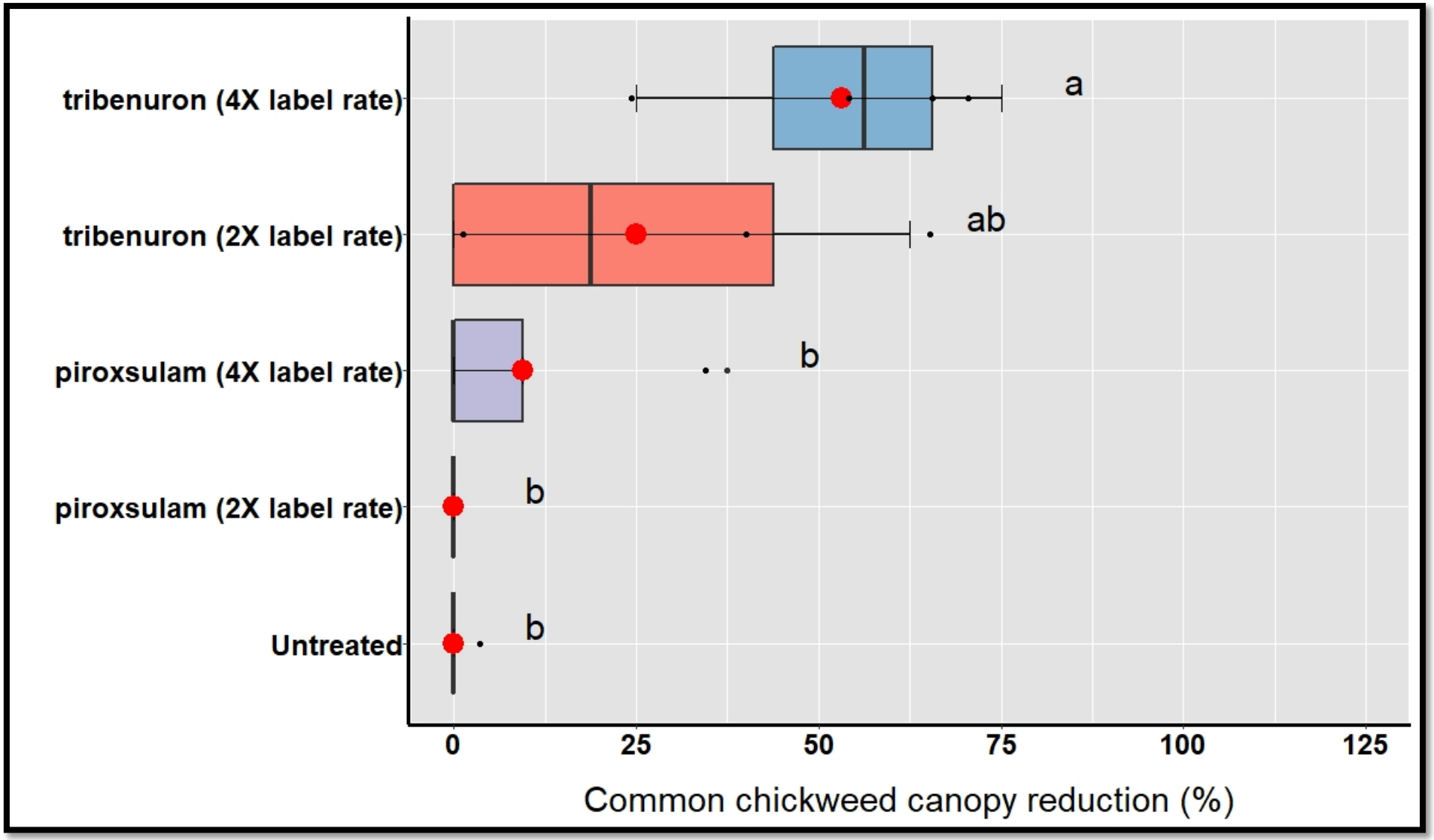
# Early work to rule out herbicide resistance

# Effect of herbicides on chickweed in wheat




https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=50181

# Couldn’t rule out resistance – What’s next?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# THANK YOU

**Nick Clark**, CCA, Agronomy & Nutrient Mgmt. Farm Advisor – UC Cooperative Extension in Tulare, Kings & Fresno Counties. neclark@ucanr.edu; 559-852-2788

Acknowledging Jose Luiz Carvalho de Souza Dias

January 14, 2022

SJC and Delta Field Crops Meeting

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# APPENDIX

More details on small grain herbicide research, the UC IPM small grains page, and resources documenting herbicide resistance

# Recent CA research results summarized

California Wheat Commission

1240 Commerce Ave., Woodland CA 95776* (530) 661-1292 * FAX: (530) 661-1332

**PROJECT TITLE:** **Weed Management in California Wheat 2013-2014**

**Project Leaders**
**Steve Wright**

Link to study

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## Table 1. Percent Wheat (*Triticum*) Injury

| Treatments | Rate/A | 7 DAT | 21 DAT | 28 DAT |
|---|---|---|---|---|
| 1. Express + NIS | 0.5 oz + 0.25% | 0 | 0 | 0 |
| 2. Simplicity + NIS | 6.75 floz + 0.25% | 0 | 5 | 2 |
| 3. Osprey + NIS | 4.75 oz + 0.25% | 0 | 9 | 4 |
| 4. Axial + NIS | 16.4 floz + 0.25% | 0 | 0 | 0 |
| 5. Express + Simplicity + NIS | 0.25 oz + 6.75 floz + 0.25% | 0 | 6 | 3 |
| 6. Express + Simplicity + NIS | 0.375 oz + 6.75 floz + 0.25% | 0 | 6 | 3 |
| 7. Express + Simplicity + NIS | 0.5 oz + 6.75 floz + 0.25% | 0 | 5 | 3 |
| 8. Express + Osprey + NIS | 0.25 oz + 4.75 oz + 0.25% | 0 | 10 | 6 |
| 9. Express + Osprey + NIS | 0.375 oz + 4.75 oz + 0.25% | 0 | 10 | 6 |
| 10. Express + Osprey + NIS | 0.5 oz + 4.75 oz + 0.25% | 0 | 10 | 6 |
| 11. Express + Axial + NIS | 0.25 oz + 16.4 floz + 0.25% | 0 | 0 | 0 |
| 12. Express + Axial + NIS | 0.375 oz + 16.4 floz + 0.25% | 0 | 0 | 0 |
| 13. Express + Axial + NIS | 0.5 oz + 16.4 floz + 0.25% | 0 | 0 | 0 |
| 14. Express + MCPA + Axial + NIS | 0.5 oz + 12 floz + 16.4 floz + 0.25% | 0 | 0 | 0 |
| 15. Untreated | ----- | 0 | 0 | 0 |

## Table 2. Italian ryegrass (*Lolium multiflorum*) % Control

| Treatments | Rate/A | 7 DAT | 21 DAT | 28 DAT |
|---|---|---|---|---|
| 1. Express + NIS | 0.5 oz + 0.25% | 0 | 25 | 44 |
| 2. Simplicity + NIS | 6.75 floz + 0.25% | 0 | 25 | 36 |
| 3. Osprey + NIS | 4.75 oz + 0.25% | 0 | 16 | 41 |
| 4. Axial + NIS | 16.4 floz + 0.25% | 0 | 38 | 59 |
| 5. Express + Simplicity + NIS | 0.25 oz + 6.75 floz + 0.25% | 0 | 21 | 34 |
| 6. Express + Simplicity + NIS | 0.375 oz + 6.75 floz + 0.25% | 0 | 30 | 43 |
| 7. Express + Simplicity + NIS | 0.5 oz + 6.75 floz + 0.25% | 0 | 23 | 39 |
| 8. Express + Osprey + NIS | 0.25 oz + 4.75 oz + 0.25% | 0 | 34 | 54 |
| 9. Express + Osprey + NIS | 0.375 oz + 4.75 oz + 0.25% | 0 | 33 | 53 |
| 10. Express + Osprey + NIS | 0.5 oz + 4.75 oz + 0.25% | 0 | 34 | 50 |
| 11. Express + Axial + NIS | 0.25 oz + 16.4 floz + 0.25% | 0 | 35 | 60 |
| 12. Express + Axial + NIS | 0.375 oz + 16.4 floz + 0.25% | 0 | 36 | 63 |
| 13. Express + Axial + NIS | 0.5 oz + 16.4 floz + 0.25% | 0 | 34 | 60 |
| 14. Express + MCPA + Axial + NIS | 0.5 oz + 12 floz + 16.4 floz + 0.25% | 0 | 36 | 59 |
| 15. Untreated | ----- | 0 | 0 | 0 |

## Table 1. Percent Wheat (*Triticum*) Injury

| Treatments | Rate/A | 7DAT | 14DAT | 21DAT | 28DAT |
|---|---|---|---|---|---|
| 1. ET + Axial | 1.0 floz + 16.4 floz | 15 | 20 | 19 | 11 |
| 2. ET + Express + Axial | 0.5 floz + 0.5 oz + 16.4 floz | 9 | 13 | 18 | 11 |
| 3. ET + Shark + Axial | 0.5 floz + 0.5 oz + 16.4 floz | 23 | 28 | 31 | 11 |
| 4. ET + MCPA + Axial | 0.5 floz + 16 floz + 16.4 floz | 14 | 19 | 23 | 11 |
| 5. ET + Prowl H2O + Axial | 0.5 floz + 3 pts + 16.4 floz | 14 | 19 | 21 | 10 |
| 6. Shark + Express + Axial | 0.5 floz + 0.5 oz + 16.4 floz | 14 | 19 | 20 | 13 |
| 7. Shark + MCPA + Axial | 0.5 floz + 16 floz + 16.4 floz | 18 | 25 | 29 | 14 |
| 8. Shark + Prowl H2O + Axial | 0.5 floz + 3 pts + 16.4 floz | 13 | 20 | 24 | 13 |
| 9. Express + Prowl H2O + Axial | 0.5 floz + 3 pts + 16.4 floz | 0 | 0 | 5 | 5 |
| 10. Untreated | ----- | 0 | 0 | 5 | 2 |

## Table 2. Shepherdspurse (*Capsella bursa-pastoris*) % Control

| Treatments | Rate/A | 7DAT | 14-DAT | 21-DAT | 28-DAT |
|---|---|---|---|---|---|
| 1. ET + Axial | 1.0 floz + 16.4 floz | 45 | 60 | 61 | 63 |
| 2. ET + Express + Axial | 0.5 floz + 0.5 oz + 16.4 floz | 45 | 54 | 59 | 66 |
| 3. ET + Shark + Axial | 0.5 floz + 0.5 oz + 16.4 floz | 59 | 81 | 85 | 95 |
| 4. ET + MCPA + Axial | 0.5 floz + 16 floz + 16.4 floz | 44 | 69 | 75 | 86 |
| 5. ET + Prowl H2O + Axial | 0.5 floz + 3 pts + 16.4 floz | 46 | 80 | 83 | 87 |
| 6. Shark + Express + Axial | 0.5 floz + 0.5 oz + 16.4 floz | 56 | 95 | 98 | 100 |
| 7. Shark + MCPA + Axial | 0.5 floz + 16 floz + 16.4 floz | 73 | 94 | 98 | 100 |
| 8. Shark + Prowl H2O + Axial | 0.5 floz + 3 pts + 16.4 floz | 56 | 92 | 96 | 99 |
| 9. Express + Prowl H2O + Axial | 0.5 floz + 3 pts + 16.4 floz | 0 | 4 | 51 | 73 |
| 10. Untreated | ----- | 0 | 0 | 0 | 0 |

## Table 3. Burning Nettle (*Urtica urens*) % Control

| Treatment | Rate/A | 7DAT | 14-DAT | 21-DAT | 28-DAT |
|---|---|---|---|---|---|
| 1. ET + Axial | 1.0 floz + 16.4 floz | 80 | 98 | 100 | 100 |
| 2. ET + Express + Axial | 0.5 floz + 0.5 oz + 16.4 floz | 65 | 98 | 100 | 100 |
| 3. ET + Shark + Axial | 0.5 floz + 0.5 oz + 16.4 floz | 93 | 100 | 100 | 100 |
| 4. ET + MCPA + Axial | 0.5 floz + 16 floz + 16.4 floz | 77 | 97 | 100 | 100 |
| 5. ET + Prowl H2O + Axial | 0.5 floz + 3 pts + 16.4 floz | 68 | 99 | 100 | 100 |
| 6. Shark + Express + Axial | 0.5 floz + 0.5 oz + 16.4 floz | 90 | 100 | 100 | 100 |
| 7. Shark + MCPA + Axial | 0.5 floz + 16 floz + 16.4 floz | 91 | 100 | 100 | 100 |
| 8. Shark + Prowl H2O + Axial | 0.5 floz + 3 pts + 16.4 floz | 90 | 100 | 100 | 100 |
| 9. Express + Prowl H2O + Axial | 0.5 floz + 3 pts + 16.4 floz | 0 | 0 | 60 | 80 |
| 10. Untreated | ----- | 0 | 0 | 0 | 0 |

## Table 4. Swinecress (*Coronopus didymus*) % Control

| Treatment | Rate/A | 7DAT | 14-DAT | 21-DAT | 28-DAT |
|---|---|---|---|---|---|
| 1. ET + Axial | 1.0 floz + 16.4 floz | 38 | 28 | 40 | 49 |
| 2. ET + Express + Axial | 0.5 floz + 0.5 oz + 16.4 floz | 41 | 56 | 66 | 69 |
| 3. ET + Shark + Axial | 0.5 floz + 0.5 oz + 16.4 floz | 63 | 76 | 86 | 89 |
| 4. ET + MCPA + Axial | 0.5 floz + 16 floz + 16.4 floz | 43 | 65 | 68 | 73 |
| 5. ET + Prowl H2O + Axial | 0.5 floz + 3 pts + 16.4 floz | 36 | 53 | 55 | 58 |
| 6. Shark + Express + Axial | 0.5 floz + 0.5 oz + 16.4 floz | 50 | 93 | 98 | 99 |
| 7. Shark + MCPA + Axial | 0.5 floz + 16 floz + 16.4 floz | 70 | 94 | 96 | 98 |
| 8. Shark + Prowl H2O + Axial | 0.5 floz + 3 pts + 16.4 floz | 50 | 89 | 93 | 95 |
| 9. Express + Prowl H2O + Axial | 0.5 floz + 3 pts + 16.4 floz | 0 | 4 | 43 | 45 |
| 10. Untreated | ----- | 0 | 0 | 0 | 0 |

**Table 1. Percent Wheat (*Triticum*) Injury**

| Treatments | Rate/A | 7 DAT | 14 DAT | 21 DAT | 28 DAT | 36 DAT |
|---|---|---|---|---|---|---|
| 1. Express + MCPA Amine + Axial + NIS | 0.25 oz + 1 pt + 16.4 floz + 0.25% | 0 | 0 | 6 | 5 | 2 |
| 2. Express + MCPA Amine + Axial + NIS | 0.5 oz + 1 pt + 16.4 floz + 0.25% | 0 | 0 | 5 | 5 | 2 |
| 3. Express + MCPA Amine + Axial | 0.25 oz + 1 pt + 16.4 floz | 0 | 0 | 5 | 5 | 3 |
| 4. Express + MCPA Amine + Axial | 0.5 oz + 1 pt + 16.4 floz | 0 | 0 | 6 | 5 | 2 |
| 5. Express + MCPA Amine + Axial + NIS | 0.25 oz + 12 floz + 16.4 floz + 0.25% | 0 | 0 | 6 | 5 | 2 |
| 6. Express + MCPA Amine + Axial + NIS | 0.5 oz + 12 floz + 16.4 floz + 0.25% | 0 | 0 | 5 | 5 | 2 |
| 7. Express + MCPA Amine + Axial | 0.25 oz + 12 floz + 16.4 floz | 0 | 0 | 5 | 5 | 2 |
| 8. Express + MCPA Amine + Axial | 0.5 oz + 12 floz + 16.4 floz | 0 | 0 | 5 | 5 | 2 |
| 9. Express + 2,4-D + Axial + NIS | 0.25 oz + 1 pt + 16.4 floz + 0.25% | 0 | 0 | 5 | 5 | 3 |
| 10. Express + 2,4-D + Axial + NIS | 0.5 oz + 1 pt + 16.4 floz + 0.25% | 0 | 0 | 6 | 5 | 2 |
| 11. Express + 2,4-D + Axial | 0.25 oz + 1 pt + 16.4 floz | 0 | 0 | 5 | 5 | 2 |
| 12. Express + 2,4-D + Axial | 0.5 oz + 1 pt + 16.4 floz | 0 | 0 | 6 | 5 | 3 |
| 13. Express + 2,4-D + Axial + NIS | 0.25 oz + 12 floz + 16.4 floz + 0.25% | 0 | 0 | 5 | 5 | 2 |
| 14. Express + 2,4-D + Axial + NIS | 0.5 oz + 12 floz + 16.4 floz + 0.25% | 0 | 0 | 5 | 5 | 2 |
| 15. Express + 2,4-D + Axial | 0.25 oz + 12 floz + 16.4 floz | 0 | 0 | 6 | 5 | 2 |
| 16. Express + 2,4-D + Axial | 0.5 oz + 12 floz + 16.4 floz | 0 | 0 | 6 | 5 | 3 |
| 17. Express + Clarity + Axial + NIS | 0.25 oz + 4 floz + 16.4 floz + 0.25% | 0 | 0 | 7 | 5 | 3 |
| 18. Express + Clarity + Axial + NIS | 0.5 oz + 4 floz + 16.4 floz + 0.25% | 0 | 0 | 7 | 5 | 3 |
| 19. Express + Clarity + Axial | 0.25 oz + 4 floz + 16.4 floz | 0 | 0 | 9 | 6 | 3 |
| 20. Express + Clarity + Axial | 0.5 oz + 4 floz + 16.4 floz | 0 | 0 | 7 | 5 | 3 |
| 21. UTC | ----- | 0 | 0 | 4 | 3 | 1 |

**Table 2. Shepherdspurse (*Capsella bursa-pastoris*) % Control**

| Treatments | Rate/A | 7 DAT | 14 DAT | 21 DAT | 28 DAT | 36 DAT |
|---|---|---|---|---|---|---|
| 1. Express + MCPA Amine + Axial + NIS | 0.25 oz + 1 pt + 16.4 floz + 0.25% | 2 | 8 | 48 | 65 | 91 |
| 2. Express + MCPA Amine + Axial + NIS | 0.5 oz + 1 pt + 16.4 floz + 0.25% | 2 | 11 | 48 | 65 | 93 |
| 3. Express + MCPA Amine + Axial | 0.25 oz + 1 pt + 16.4 floz | 2 | 9 | 38 | 68 | 88 |
| 4. Express + MCPA Amine + Axial | 0.5 oz + 1 pt + 16.4 floz | 2 | 10 | 43 | 65 | 91 |
| 5. Express + MCPA Amine + Axial + NIS | 0.25 oz + 12 floz + 16.4 floz + 0.25% | 2 | 10 | 45 | 55 | 90 |
| 6. Express + MCPA Amine + Axial + NIS | 0.5 oz + 12 floz + 16.4 floz + 0.25% | 2 | 10 | 45 | 59 | 91 |
| 7. Express + MCPA Amine + Axial | 0.25 oz + 12 floz + 16.4 floz | 2 | 8 | 50 | 54 | 95 |
| 8. Express + MCPA Amine + Axial | 0.5 oz + 12 floz + 16.4 floz | 4 | 10 | 53 | 64 | 89 |
| 9. Express + 2,4-D + Axial + NIS | 0.25 oz + 1 pt + 16.4 floz + 0.25% | 3 | 10 | 50 | 59 | 90 |
| 10. Express + 2,4-D + Axial + NIS | 0.5 oz + 1 pt + 16.4 floz + 0.25% | 2 | 10 | 50 | 60 | 88 |
| 11. Express + 2,4-D + Axial | 0.25 oz + 1 pt + 16.4 floz | 2 | 10 | 50 | 61 | 93 |
| 12. Express + 2,4-D + Axial | 0.5 oz + 1 pt + 16.4 floz | 1 | 8 | 45 | 65 | 91 |
| 13. Express + 2,4-D + Axial + NIS | 0.25 oz + 12 floz + 16.4 floz + 0.25% | 2 | 10 | 58 | 64 | 94 |
| 14. Express + 2,4-D + Axial + NIS | 0.5 oz + 12 floz + 16.4 floz + 0.25% | 3 | 9 | 43 | 53 | 85 |
| 15. Express + 2,4-D + Axial | 0.25 oz + 12 floz + 16.4 floz | 2 | 9 | 48 | 50 | 94 |
| 16. Express + 2,4-D + Axial | 0.5 oz + 12 floz + 16.4 floz | 2 | 10 | 55 | 58 | 90 |
| 17. Express + Clarity + Axial + NIS | 0.25 oz + 4 floz + 16.4 floz + 0.25% | 2 | 14 | 58 | 63 | 94 |
| 18. Express + Clarity + Axial + NIS | 0.5 oz + 4 floz + 16.4 floz + 0.25% | 2 | 11 | 38 | 46 | 89 |
| 19. Express + Clarity + Axial | 0.25 oz + 4 floz + 16.4 floz | 2 | 11 | 40 | 48 | 91 |
| 20. Express + Clarity + Axial | 0.5 oz + 4 floz + 16.4 floz | 1 | 3 | 55 | 60 | 89 |
| 21. UTC | ----- | 0 | 0 | 0 | 0 | 0 |

**Table 3. Burning Nettle (*Urtica urens*) Percent Control**

| Treatments | Rate/A | 7 DAT | 14 DAT | 21 DAT | 28 DAT | 36 DAT |
|---|---|---|---|---|---|---|
| 1. Express + MCPA Amine + Axial + NIS | 0.25 oz + 1 pt + 16.4 floz + 0.25% | 2 | 1 | 30 | 30 | 90 |
| 2. Express + MCPA Amine + Axial + NIS | 0.5 oz + 1 pt + 16.4 floz + 0.25% | 0 | 10 | 80 | 90 | 98 |
| 3. Express + MCPA Amine + Axial | 0.25 oz + 1 pt + 16.4 floz | 0 | 1 | 20 | 45 | 90 |
| 4. Express + MCPA Amine + Axial | 0.5 oz + 1 pt + 16.4 floz | 0 | 10 | 45 | 90 | 100 |
| 5. Express + MCPA Amine + Axial + NIS | 0.25 oz + 12 floz + 16.4 floz + 0.25% | 0 | 0 | - | - | - |
| 6. Express + MCPA Amine + Axial + NIS | 0.5 oz + 12 floz + 16.4 floz + 0.25% | 0 | 5 | - | - | - |
| 7. Express + MCPA Amine + Axial | 0.25 oz + 12 floz + 16.4 floz | 0 | 8 | - | - | - |
| 8. Express + MCPA Amine + Axial | 0.5 oz + 12 floz + 16.4 floz | 0 | 0 | - | 90 | 100 |
| 9. Express + 2,4-D + Axial + NIS | 0.25 oz + 1 pt + 16.4 floz + 0.25% | 0 | 1 | 50 | 55 | 90 |
| 10. Express + 2,4-D + Axial + NIS | 0.5 oz + 1 pt + 16.4 floz + 0.25% | 0 | 0 | - | 80 | 100 |
| 11. Express + 2,4-D + Axial | 0.25 oz + 1 pt + 16.4 floz | 2 | 8 | 40 | 50 | 95 |
| 12. Express + 2,4-D + Axial | 0.5 oz + 1 pt + 16.4 floz | 0 | 0 | - | - | - |
| 13. Express + 2,4-D + Axial + NIS | 0.25 oz + 12 floz + 16.4 floz + 0.25% | 2 | 0 | - | - | - |
| 14. Express + 2,4-D + Axial + NIS | 0.5 oz + 12 floz + 16.4 floz + 0.25% | 0 | 0 | - | - | - |
| 15. Express + 2,4-D + Axial | 0.25 oz + 12 floz + 16.4 floz | 0 | 0 | 50 | 90 | 100 |
| 16. Express + 2,4-D + Axial | 0.5 oz + 12 floz + 16.4 floz | 0 | 0 | 30 | 35 | 90 |
| 17. Express + Clarity + Axial + NIS | 0.25 oz + 4 floz + 16.4 floz + 0.25% | 0 | 0 | 60 | 75 | 100 |
| 18. Express + Clarity + Axial + NIS | 0.5 oz + 4 floz + 16.4 floz + 0.25% | 0 | 0 | - | - | - |
| 19. Express + Clarity + Axial | 0.25 oz + 4 floz + 16.4 floz | 0 | 0 | - | - | - |
| 20. Express + Clarity + Axial | 0.5 oz + 4 floz + 16.4 floz | 0 | 0 | - | - | - |
| 21. UTC | ----- | 0 | 0 | 0 | 0 | 0 |

**Table 4. Common Chickweed (*Stellaria media*) % Control**

| Treatments | Rate/A | 7 DAT | 14 DAT | 21 DAT | 28 DAT | 36 DAT |
|---|---|---|---|---|---|---|
| 1. Express + MCPA Amine + Axial + NIS | 0.25 oz + 1 pt + 16.4 floz + 0.25% | 0 | 3 | 23 | 56 | 96 |
| 2. Express + MCPA Amine + Axial + NIS | 0.5 oz + 1 pt + 16.4 floz + 0.25% | 0 | 5 | 19 | 45 | 96 |
| 3. Express + MCPA Amine + Axial | 0.25 oz + 1 pt + 16.4 floz | 0 | 6 | 25 | 80 | 99 |
| 4. Express + MCPA Amine + Axial | 0.5 oz + 1 pt + 16.4 floz | 0 | 4 | 23 | 60 | 96 |
| 5. Express + MCPA Amine + Axial + NIS | 0.25 oz + 12 floz + 16.4 floz + 0.25% | 0 | 4 | 16 | 61 | 93 |
| 6. Express + MCPA Amine + Axial + NIS | 0.5 oz + 12 floz + 16.4 floz + 0.25% | 0 | 4 | 19 | 50 | 99 |
| 7. Express + MCPA Amine + Axial | 0.25 oz + 12 floz + 16.4 floz | 0 | 5 | 33 | 54 | 99 |
| 8. Express + MCPA Amine + Axial | 0.5 oz + 12 floz + 16.4 floz | 0 | 4 | 18 | 44 | 91 |
| 9. Express + 2,4-D + Axial + NIS | 0.25 oz + 1 pt + 16.4 floz + 0.25% | 0 | 6 | 33 | 60 | 94 |
| 10. Express + 2,4-D + Axial + NIS | 0.5 oz + 1 pt + 16.4 floz + 0.25% | 0 | 8 | 35 | 68 | 94 |
| 11. Express + 2,4-D + Axial | 0.25 oz + 1 pt + 16.4 floz | 0 | 7 | 26 | 78 | 98 |
| 12. Express + 2,4-D + Axial | 0.5 oz + 1 pt + 16.4 floz | 0 | 4 | 25 | 49 | 95 |
| 13. Express + 2,4-D + Axial + NIS | 0.25 oz + 12 floz + 16.4 floz + 0.25% | 0 | 5 | 26 | 59 | 98 |
| 14. Express + 2,4-D + Axial + NIS | 0.5 oz + 12 floz + 16.4 floz + 0.25% | 0 | 7 | 25 | 56 | 90 |
| 15. Express + 2,4-D + Axial | 0.25 oz + 12 floz + 16.4 floz | 0 | 4 | 29 | 61 | 96 |
| 16. Express + 2,4-D + Axial | 0.5 oz + 12 floz + 16.4 floz | 0 | 6 | 25 | 71 | 96 |
| 17. Express + Clarity + Axial + NIS | 0.25 oz + 4 floz + 16.4 floz + 0.25% | 0 | 4 | 20 | 54 | 94 |
| 18. Express + Clarity + Axial + NIS | 0.5 oz + 4 floz + 16.4 floz + 0.25% | 0 | 5 | 26 | 60 | 93 |
| 19. Express + Clarity + Axial | 0.25 oz + 4 floz + 16.4 floz | 0 | 5 | 28 | 43 | 95 |
| 20. Express + Clarity + Axial | 0.5 oz + 4 floz + 16.4 floz | 0 | 1 | 21 | 51 | 96 |
| 21. UTC | ----- | 0 | 0 | 0 | 0 | 0 |

Agriculture / Small Grains

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Agriculture: Pest Management Guidelines

# Small Grains

Near bottom of page

## Weeds

- Integrated Weed Management
- Special Weed Problems
- Common and Scientific Names of Weeds
- Susceptibility of Winter Weeds to Herbicide Control
- Susceptibility of Spring and Summer Weeds to Herbicide Control
- Herbicide Treatment Table

https://www2.ipm.ucanr.edu/agriculture/small-grains/

UC CE

University of California
Agriculture and Natural Resources

- Common and Scientific Names of Weeds

Agriculture: Small Grains Pest Management Guidelines

# Common and Scientific Names of Weeds

Weeds Pages

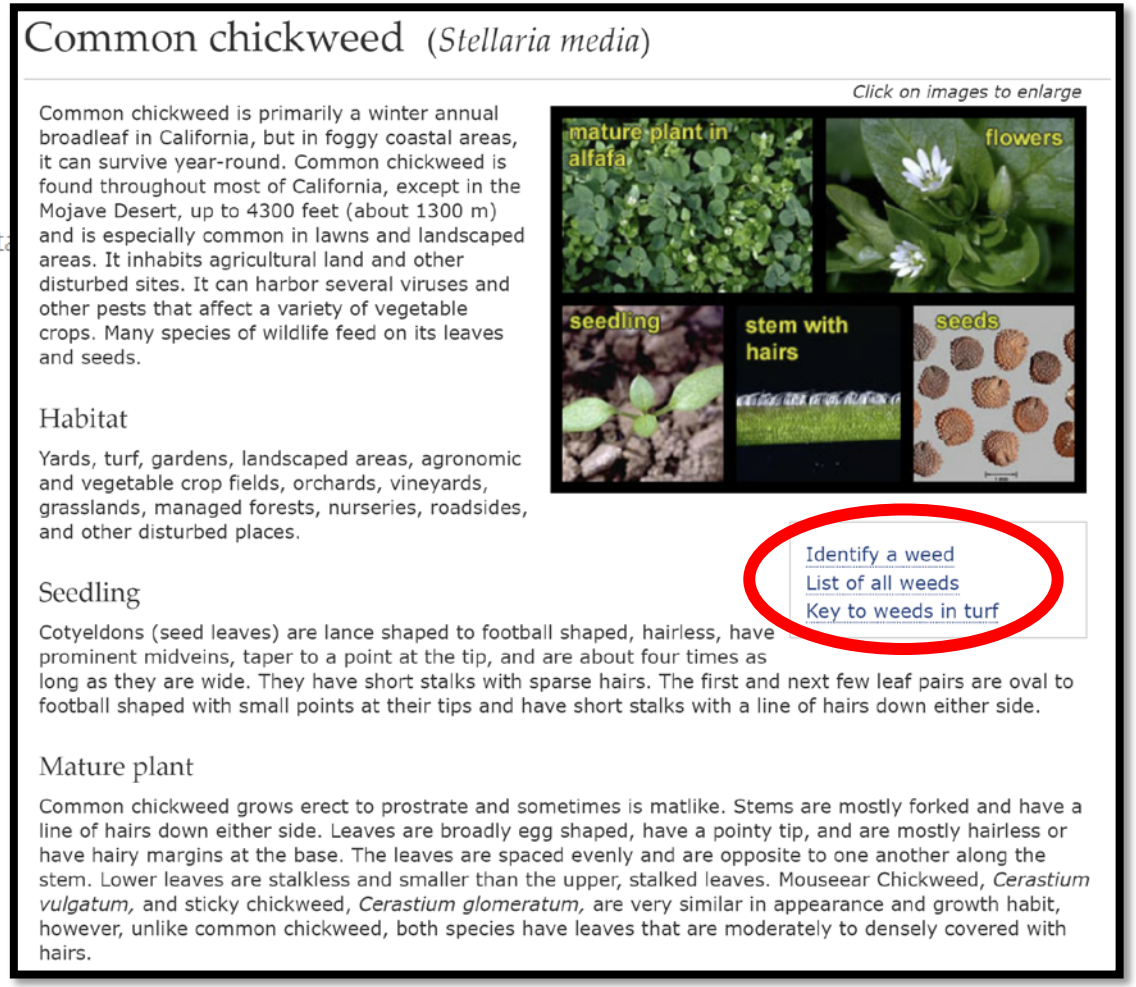
Integrated Weed Management

Special Weed Problems

– Common and Scientific Names of Weeds

Common names link to pages with weed descriptions and photos often showing several st development.

| Common Name | Scientific Name |
|---|---|
| barley, hare | *Hordeum leporinum* |
| barnyardgrass | *Echinochloa crus-galli* |
| bassia, fivehook | *Bassia hyssopifolia* |
| bindweed, field | *Convolvulus arvensis* |




https://www2.ipm.ucanr.edu/agriculture/small-grains/Common-and-Scientific-Names-of-Weeds/

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Identify a weed

List of all weeds

Key to weeds in turf

View by weed name

**Plant forms**

Spreading plants

Plants that form rosettes

Whorled leaves

**Mature leaf characteristics**

Roundish (orbicular)

Egg to football (ovate to elliptic)

Heart shaped (chordate)

YES NO

Identify your weeds

*Broadleaf*
Leaves are wide, veins branch out in different directions.
**Identification** | **Tutorial** | **Broadleaf list**

*Grass*
Leaves are narrow, arranged in sets of two; stems are rounded or flattened.
**Identification** | **Tutorial** | **Grass list**

http://ipm.ucanr.edu/PMG/weeds_intro.html

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- Susceptibility of Winter Weeds to Herbicide Control
- Susceptibility of Spring and Summer Weeds to Herbicide Control

Agriculture: Small Grains Pest Management Guidelines

# Susceptibility of Winter Weeds to Herbicide Control



| | BRO | CAR | CHS | CLO | DIA* | FEN | GLY | MCA* | MES | PAR* | PEN | PYR | TRI | 24D* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ANNUAL WEEDS | | | | | | | | | | | | | | |
| barley, hare | N | N | C | N | N | N | N | N | C | P/C+ | N | N | — | N |
| bluegrass, annual | N | N | C | N | N | N | N | N | C | P/C+ | C | N | C | N |
| brome, ripgut | N | N | C | N | N | N | N | N | P | N | P | N | C | N |
| burclover, California | N | P | C | C | C | N | C | P | N | P | — | — | — | C |
| canarygrass, hood | N | N | C | N | N | C | N | N | C | N | C | N | C | N |
| canarygrass, littleseed | N | N | C | N | N | C | N | N | C | N | C | N | C | N |
| chamomile, mayweed | C | — | C | — | C | N | C | N | P | C | N | — | — | N |
| chickweed, common | N | P | C | — | P | N | C | N | C | C | P | C | C | N |
| fiddleneck, coast | C | C | C | — | P | N | C | P | P | P | C | N | C | P |
| filarees | N | P | — | P | C | N | P | P | — | C | P | — | — | C |
| groundsel, common | P/C+ | — | C | — | P | N | C | C | P | C | N | — | — | C |
| henbit | N/P+ | — | C | — | C | N | C | C | P | C | C | C | C | C |
| knotweed, prostrate | N | — | C | N | C | N | P | C | N | N | N | C | C | C |
| ladysthumb | P/C | — | — | C | C | N | — | C | P | P | N | C | — | C |
| lettuce, prickly | C | — | C | — | P | N | P | C | P | C | N | C | — | C |

C = control | P = partial control | N = no control | — = no information

| | | | |
|---|---|---|---|
| BRO | = bromoxynil (Buctril) | MCA | = MCPA Amine* |
| CAR | = carfentrazone (Shark) | MES | = mesosulfuron (Osprey) |
| CHS | = chlorsulfuron (Glean) | PAR | = paraquat* (Gramoxone) |
| CLO | = clopyralid (Stinger) | PEN | = pendimethalin (Prowl H20) |
| DIA | = dicamba* (Banvel, Clarity) | PYR | = pyraflufen-ethyl (ET) |
| FEN | = fenoxaprop (Puma) | TRI | = trifluralin (Treflan) |
| GLY | = glyphosate (Roundup) | 24D | = 2,4-D Amine* |

* Permit required from county agricultural commissioner for purchase or use.

\+ Control varies depending on size of weed at application; the smaller the weed, the better the control.

https://www2.ipm.ucanr.edu/agriculture/small-grains/Susceptibility-of-Weeds-to-Herbicide-Control/

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# Herbicide Treatment Table

Weeds Pages

Integrated Weed Management

Special Weed Problems

Common and Scientific Names of Weeds

Susceptibility of Winter Weeds to Herbicide Control

Susceptibility of Spring and Summer Weeds to Herbicide Control

– Herbicide Treatment Table

| Common name | Amount per acre | REI‡ | PHI‡ |
|---|---|---|---|
| (Example trade name) | | (hours) | (days) |

Pesticide precautions | Protect water | Calculate VOCs

Protect bees

Not all registered pesticides are listed. The following are listed alphabetically. When choosing a pesticide, consider information relating to environmental impact, resistance management, the pesticide's properties, and application timing. Tank mixes may be necessary to achieve desired control; see Susceptibility of Winter Weeds to Herbicide Control and Susceptibility of Spring and Summer Weeds to Herbicide Control for information on specific weed control. Always read the label of the product being used.

*NOTE: When choosing an herbicide, an important factor to consider is the developmental growth stage of the crop (see DEVELOPMENTAL GROWTH STAGES).*

*FALLOW PERIOD*

| A. DICAMBA* | | | |
|---|---|---|---|
| (Banvel) | 0.25–2.0 lb a.e. (0.5–4.0 pt) | 24 | 0 |
| (Clarity) | 1 lb a.e. (2 pt) | 24 | 0 |
| WSSA MODE-OF-ACTION GROUP NUMBER[1]: 4 | | | |

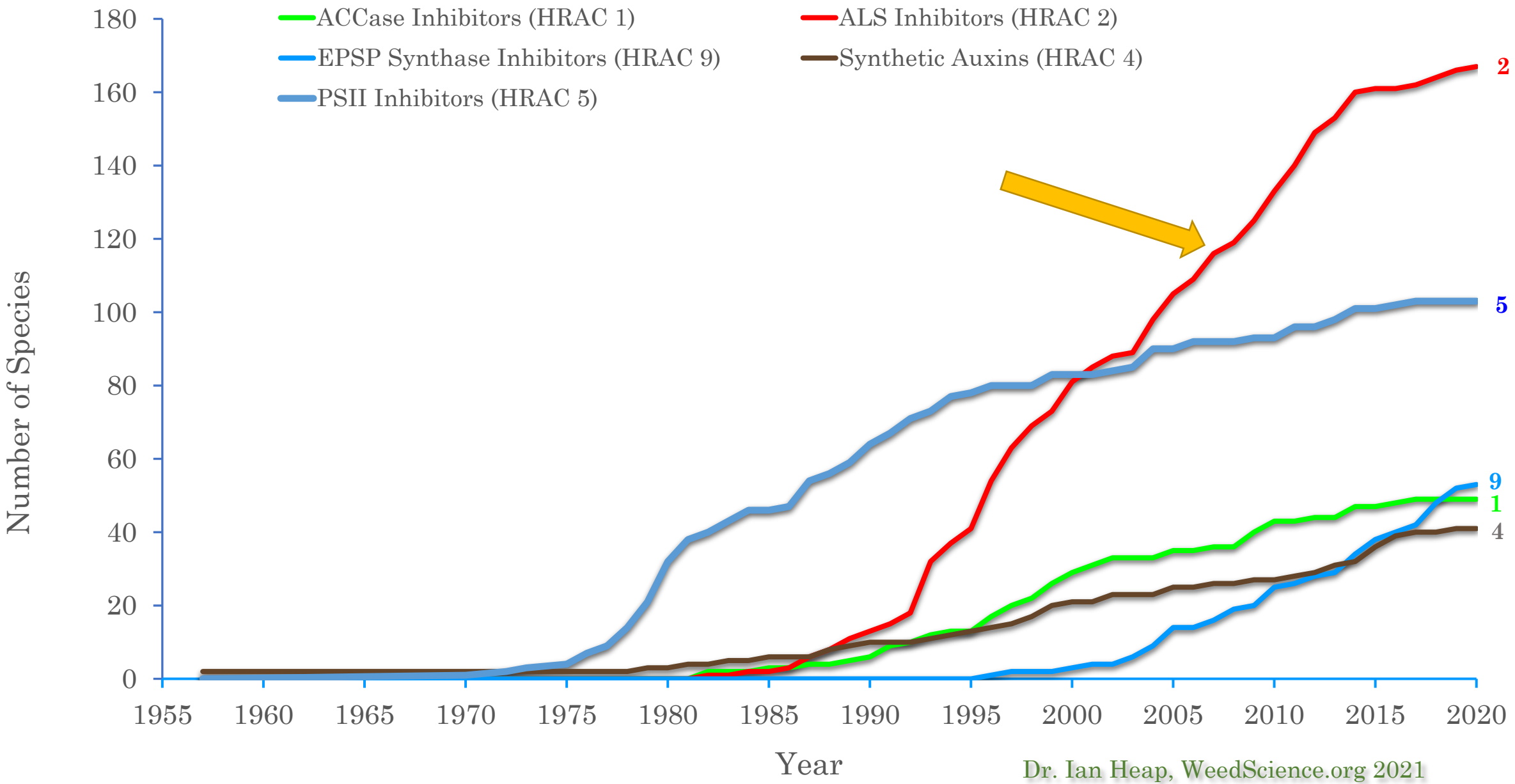
https://www2.ipm.ucanr.edu/agriculture/small-grains/Herbicide-Treatment-Table/

# Common Chickweed herbicide resistance reports in North America

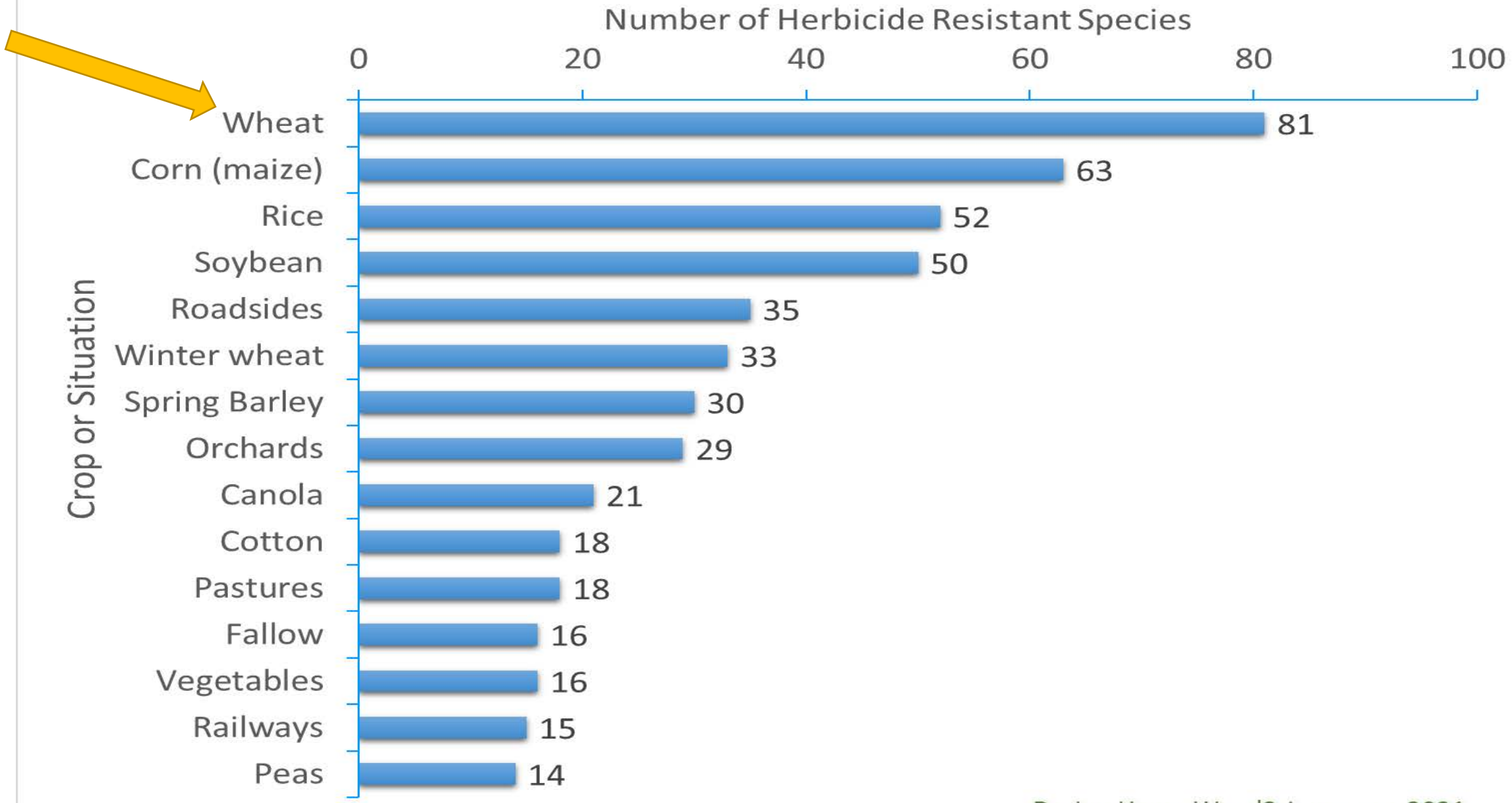
| Country Province/State | Year | Crops | Active Ingredients | Sites of Action |
|---|---|---|---|---|
| US-Kentucky | 2013 | Wheat | chlorsulfuron, flucarbazone, thifensulfuron, tribenuron | ALS inhibitors |
| US-Delaware | 2012 | Wheat | thifensulfuron, tribenuron | ALS inhibitors |
| US-Pennsylvania | 2010 | Alfalfa, Spring Barley, and Wheat | pyroxsulam, thifensulfuron, tribenuron | ALS inhibitors |
| US-Maryland | 2009 | Wheat | chlorsulfuron, mesosulfuron, thifensulfuron, tribenuron | ALS inhibitors |
| Canada-Manitoba | 2008 | Peas | thifensulfuron, tribenuron | ALS inhibitors |
| US-Virginia | 2008 | Wheat | thifensulfuron | ALS inhibitors |
| Canada-Saskatchewan | 2005 | Spring Barley, and Wheat | thifensulfuron, tribenuron | ALS inhibitors |
| Canada-Alberta | 1988 | Cereals and Wheat | chlorsulfuron, ethametsulfuron, imazamethabenz, metsulfuron, sulfometuron, thifensulfuron | ALS inhibitors |

http://www.weedscience.org/Home.aspx

# Number Resistant Species for Several Herbicide Sites of Action (HRAC Codes)



# Number of Herbicide-Resistant Species by Crop

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