Weed Control 101

Principles of Integrated Pest Management (IPM)

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Defining Weeds!

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- Weed- A plant out of place!
- Invasive Weed- A plant that can spread outside fo it's historic range causing environmental and economic impacts
- Noxious Weed- A plant deemed to cause environmental and economic harm to the state of California. Legally required to be controlled! A, B, and C list species

IPM

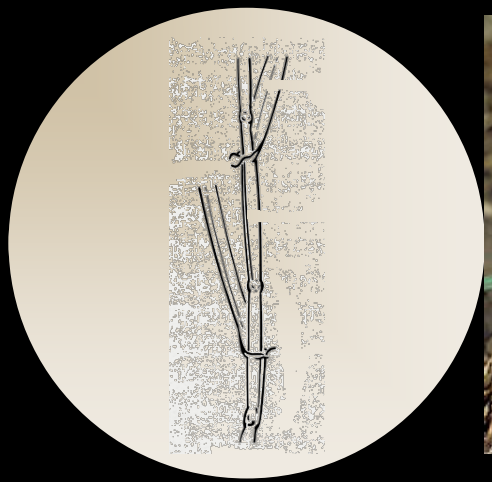
- Principles of IPM
  - Understand the pest
  - Utilize multiple control methods

IPM-First Step: Identification

- Need to Identify the pest!
  - Why?
  - Understand biology
    - Lifecycle
    - Growth patterns
    - Suitable habitat
    - Weakness of pest!!

Narrow it Down

- Grasses, Broadleaves, Sedges
- Leaf type, shape, color,
- Flower type shape color
- Habitat
- Etc…



Identification Resources

- Weed books!
  - Weeds of the West
  - Weeds of California and other Western States
- Online tools!

  Weed RIC- online weed ID tool
- People!
  - Me
  - UC Davis Plant Lab

Step Two: Get information!

- Arm yourself with information
- Weed books, and the internet
- UC IPM website
- Weed Research Information Center
- Questions you should ask
  - How does it reproduce?
  - How does it spread?
  - What condition does it thrive in?
  - What are effective ways to manage it?

Annual Weeds

- Winter Annuals
  - Germinate in fall
- Summer annuals
  - Germinate
    - Early spring to fall

Image courtesy of: http://mint.ippc.orst.edu/puncturevine.htm

Annuals

- Challenges
  - Long germination window
  - Multiple control efforts
  - Lots of seed quickly
- Advantages
  - Can prevent seed
  - Physical methods often effective

Image courtesy of: http://www.co.stevens.wa.us/weedboard/other%20weeds/htm%20pages/shepherd's%20purse.htm

Image courtesy of: http://pnwhandbooks.org/weed/punctureVine-seeds-and-seedlings

Weed Seed Production

	Seed / Plant
Pigweed	**>200,000**
Lambsquarters	**>70,000**
Crabgrass	**53,000**
Annual Bluegrass	**2,000**

Soil Seed Life

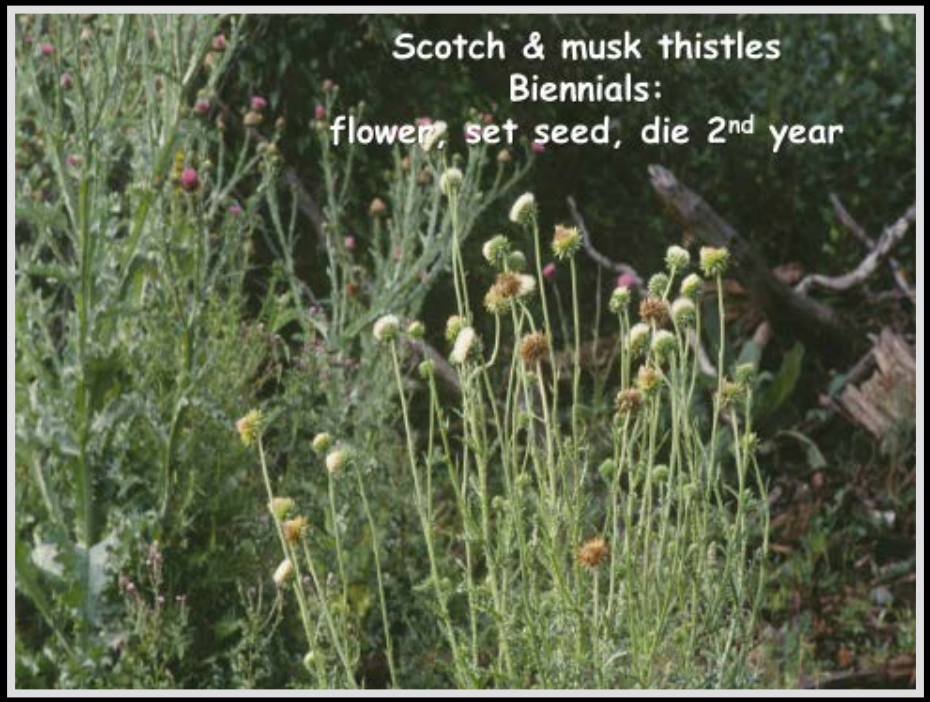
- Dyers Woad- several years
- Cheatgrass- 2-5 years
- Medusahead- 2 years
- Goatheads- 3-6 years
- Scotch Thistle- 7-39 years

Biennial Weeds

- Year one
  - Germinate
  - Grow
  - Often basal rosette

Biennial Weeds

- Year one
  - Germinate
  - Grow
  - Often basal rosette
- Year two
  - Bolt (typically)
  - Flower
  - Set seed
  - Die



Perennial weeds

- Year one
  - Best time to control
  - Seedling=annual

Photo courtesy of : www.forestryImages.org

Perennial weeds

- Year one
  - Best time to control
  - Seedling=annual

- After
  - Reproductive tissue
    - Roots
    - Tubers
    - Nutlets

  - Much more difficult to control!

Photo courtesy of : www.forestryImages.org

Photo Courtesy of : www.Techline News.com

Step 3: Limit/Eliminate Reproduction!

- Prevent Seeds! (prevent flowers!)
- Kill Roots!

- But How?
- Through an integrated approach!

Integrated Pest Management

- Cultural
- Physical
- Biological
- Chemical

Cultural Control

- Prevent dispersal!
  - Clean equipment
  - Don’t move soil
  - Plant clean seed

Image courtesy of : weedsmart.org.au

Cultural Control

- Kill weeds on edges
- Create competitive environment
  - Correct fertilizers
  - Species selection
  - Proper irrigation

Physical

- Hand pulling

Physical

- Hand pulling
- Cultivation

Photo Courtesy: Google Images

Physical

- Hand pulling
- Cultivation
- Mowing

www.twentywheels.com

Physical

- Hand pulling
- Cultivation
- Mowing
- Barriers

Image courtesy of : www.agriculturesolutions.com

Physical

- Hand pulling
- Cultivation
- Mowing
- Barriers
- Solarization

Physical

- Hand pulling
- Cultivation
- Mowing
- Barriers
- Solarization
- Burning
- Etc.

Biological

- Grazing
  - Right time
  - Right Livestock
  - Right weeds
- Often Suppression
- University of Idaho Grazing handbook

Photo Courtesy of:
http://livingsystemslandmanagement.com/images/IMG_1101.JPG

Chemical Control

- Herbicides
  - Chemicals that kill plants (don't have to be used alone!)

Photo courtesy of: no-tillfamer.com

Herbicide trade names are only mentioned for example purposes only, and does not signify and endorsement of UCCE.

The Label is the LAW!!!

- Read the label
- Follow the label
- Labels
  - Protect you
  - Protect other species
  - Protect water
  - *Protects company
- Label Database

http://www.cdms.net/Label-Database

Image courtesy of: www.chemicaloutfiters.com

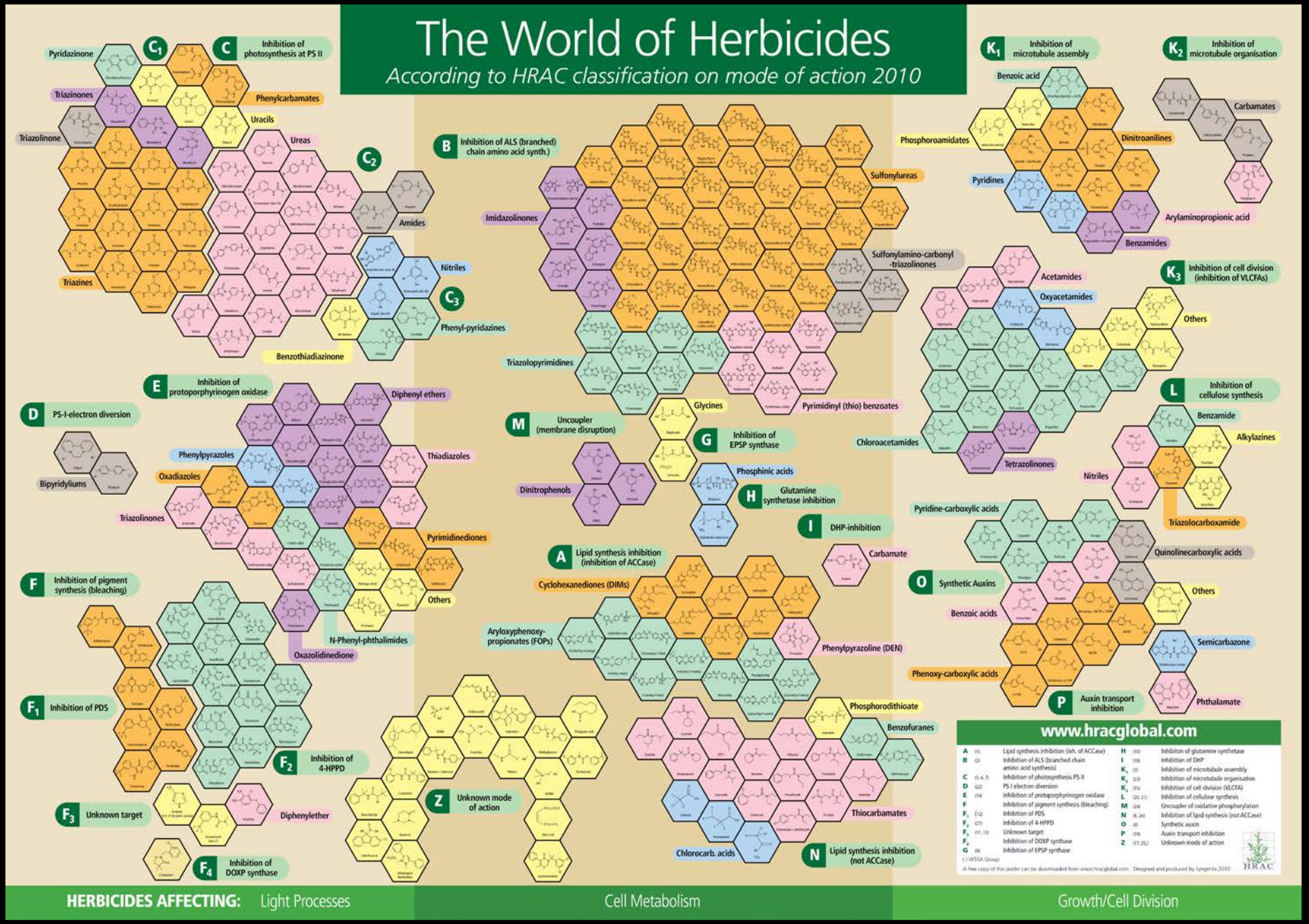


Image courtesy of the Herbicide Resistance Action Comity

Herbicide selectivity

- Effected by
  - Plant species
  - Herbicide
  - Application timing
  - Growth stage (dormant applications)
  - Ect…

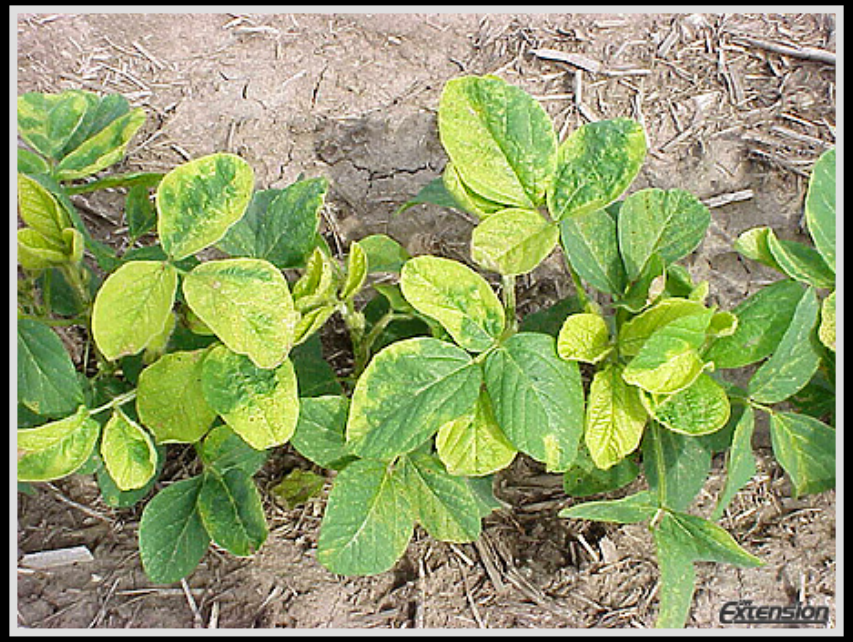
Image courtesy of : gmandchemicalindustry9.wordpress.com

Contact vs. Systemic

- Contact- Does not move through plant (Ex -Vinegar, Shark, Gramoxone)
- Coverage matters
- Only kills top growth

Contact vs. Systemic

- Systemic- Can move through plant (Ex –Roundup, Telar, Arsenal, 2,4-D)
- Can kill roots



Herbicides

- Timing
  - Species
  - Herbicides
- Annuals
  - Typically when small
    - Fall -winter annuals
    - Spring- summer annuals
  - Label will specify timing/growth stage
- Perennials
  - Dependent on species
  - Some in the fall
  - Some mid-growth

Image courtesy of : US Forest Service

Choosing an Herbicide

- Situational!!!
- Weed Species
- Desirable species
- Off target impacts
- Type of land
  - Wheat field vs. Garden
  - Plant back
- Cost

Resources

- UC IPM website
  - Alfalfa
  - Wheat
  - Peppermint
  - Ornamentals
- Extension publications
- Books
- People
  - PCA
  - Advisors
  - Etc.

Calibration

- Most Important Factor!
- How much are you applying?
  - Herbicide effectiveness
  - Off target impacts
  - Residual activities
- Amount Product spread over Amount of area
- Spot
  - % v/v solution

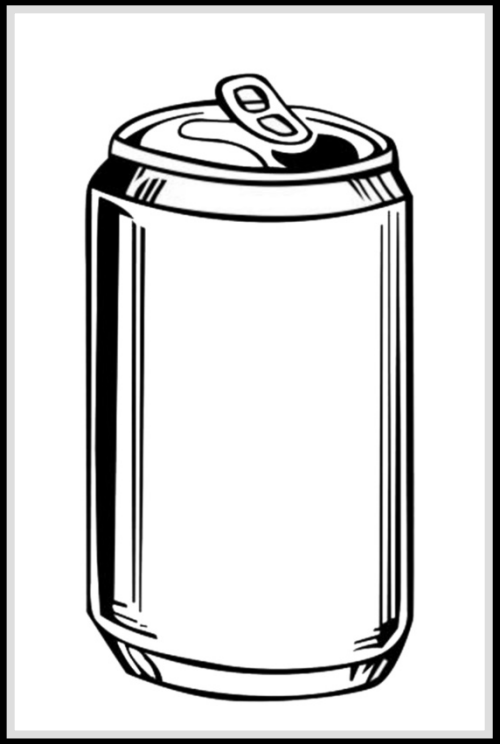


Image courtesy of : www.Clipartbest.com

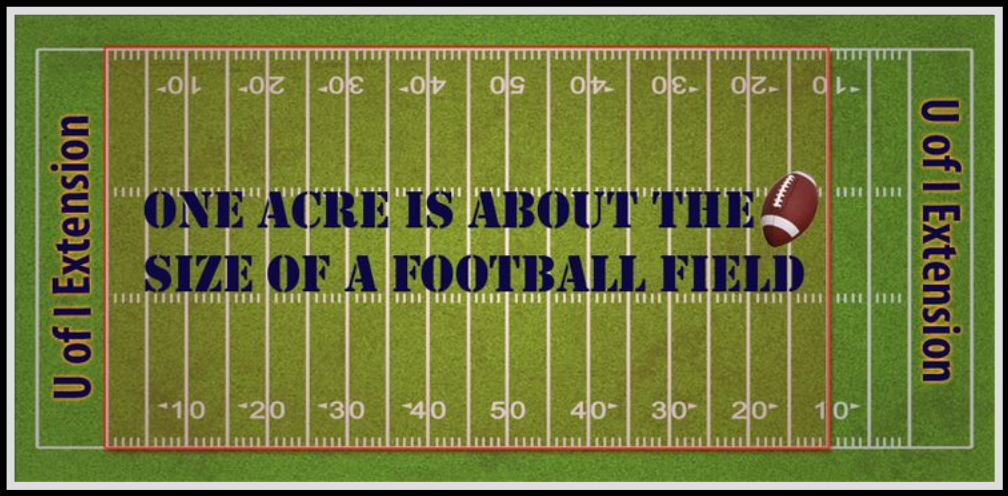


Image Courtesy of: Illinois Extension

Tools

Field Guide Links

http://nvwma.org/pdfs/publications/nevada_noxious_weed_field_guide.pdf

http://www.blm.gov/style/medialib/blm/ca/pdf/eaglelake/weeds.Par.92400.File.dat/Selected_Noxious_Weeds_of_Northeastern_California.pdf

Tools

- Internet
  - UC Resources
    - http://www.ipm.ucdavis.edu/PMG/weeds_intro.html
  - Weed Id tool
    - http://weedid.wisc.edu/ca/weedid.php
  - Other Useful websites
    - http://www.calflora.org/ (not always a weed)
    - http://plants.usda.gov/java/
  - Plant Family Publication
    - http://www.sci.sdsu.edu/plants/plantsystematics/Identifying_50_major_plant_families.pdf
  - Google
  - Seedling ID
    - http://store.msuextension.org/publications/AgandNaturalResources/EB0215.pdf
  - Botany
    - https://ag.arizona.edu/pubs/garden/mg/botany/plantparts.html