Dr. Leslie Beck

Urban Weeds – Management and Identification
What is a weed?

• A plant out of place
• Any plant that is objectionable or interferes with the activities or welfare of man (WSSA)
  • Often objectionable because they interfere
Weed definitions

- **Invasive weed** – A plant that is both non-native and able to establish, grow quickly, and spread to the point of disrupting plant communities or ecosystems
  - Generally detrimental to native pop.

- **Noxious weed** – Any plant designated by Federal, State, or county government as injurious to public health, AG, recreation, wildlife, or property
  - Not all invasive plants are considered noxious
Why control weeds?

• Aesthetics
  – Lawn vs. xeriscapes vs. vegetable gardens

• Competition for resources

• Harbors insects and diseases

• Alter/transform ecosystems
  – Most often negatively

• Harmful to people
  – Attract bees
  – Cause skin irritation/allergic response
  – Toxic
Weed Management Tools

• How do I achieve successful control?
  – Early bird catches the worm…or in this case, the weed!
    • The younger the plant the ‘easier’ the control
    • Young plants haven’t developed structures that make weed development and growth successful
      – Seed development
  – Develop weed management strategy
Developing weed management strategy

• Determine the specific objectives of your area
• Identifying weed and desirable plant species
• Management
  – Knowledge of tools available to you
  – Keep the weeds ‘off balance’
• Evaluation of control methods
  – Impacts
  – Success
  • Integrated Pest Management
Integrated Pest management (IPM)

- Multiple control options available
  - No single weed control option will be successful!

- IPM = combinations of good management practices are required for effective control
  - Mechanical + cultural + herbicides

- Strategies should be specific to target weed
  - Accurate identification
Weed Management Tools

• How do I manage weeds?
  – Prevention
    • Plant certified seed, clean equipment, weed control prior to seed production, early detection/rapid response
  – Mechanical/Physical
    • Tillage, hoeing, hand pulling, mowing, mulching, weed blankets, etc.
  – Cultural
    • Reduce weeds by managing desired plants
      – Irrigation, fertilization, mowing (benefit of lawn), planting timing
  – Biological
    • Insects or fungi that work negatively on weed
  – Chemical
    • The label is LAW!
    • Effective means of control when used according to the label
      – Offsite damage
      – Resistance
Things to consider with Herbicides

• Chemicals used to kill or suppress unwanted vegetation
  – Can be synthetic or organic

• Primary method of weed control in multiple cropping systems
  – Inexpensive (can help reduce production costs)
    • Organics?
  – Results are often quick and may offer extended control

• Helpful tool
  – Herbicides alone will not eradicate weeds

• Success is always dependent on…
  – Applications in accordance with the label
  – Accurate weed identification
Things to consider with Herbicides

• Always use new or unfamiliar herbicides on a trial basis

• Type of herbicide options
  – Contact (acetic acid) vs. systemic (2,4-D)
  – Selective (2,4-D) vs. non-selective (glyphosate)
  – Preemergence (PRE) vs. postemergence (POST)
    • Depends on weed lifecycle!
Timing of application

• Preemergence (PRE)
  – Applied before the weed emerges from soil
  – Can be applied either before or after desired crop
    • Read the label
    – Requires incorporation into the soil
      • Irrigation, shallow tillage

• Postemergence (POST)
  – Applied after weeds have emerged
  – Allow to dry, no soil incorporation
Preemergence herbicides (PRE)

PRE herbicides do not prevent the weed seed from germinating, they control weeds as they grow through the herbicide treated zone.
Other PRE options

*pendimethalin (Pendulum Aquacap) is a broad spectrum PRE active ingredient

---

Table 1. Commonly Available Herbicides

A. Pre-emergence, Selective Herbicides

- Must be applied to the soil prior to weed seed germination and work best if mixed in to the upper 1-2" of soil or watered in.
- Used to kill annual grass and broad-leaved weed seedlings as they germinate, will not kill emerged weeds.
- Examples:
  - DCPA (Dacthal, Weed & Grass Preventer, and many others)
  - trifluralin (Preen, Treflan, and many others)
  - bensulide (Betasan, Prefar, Squelch)
  - dichlobenil (Casoron)
  - EPTC (Eptam)
  - simazine (Princep)
  - oryzalin (Surflan)
- Uses may include tree, shrub, and flower beds, and some fruit & vegetable crops -- read the label!
Postemergence (POST) weed control

• Treat only areas infested with weeds
  – POST – IWM approach
  – PRE – blanket application

• Used to control weeds that have already germinated
  – At this point most PRE herbicides are useless
Postemergence (POST) weed control

- Sprays give better control than granules
- Avoid extreme temperatures. Apply when temperatures are between 40 and 85ºF and sunny
- Typically need a rain free period of at least 6 hours
- Do not apply to stressed desirable plants
  - Also stressed weeds
- Check the label for instructions on replanting/reseeding application areas
- Multiple active ingredients available for use
  - Dependent on cropping system, site objectives, and accurate weed identification
Other POST options

Weed Control for the Garden and Landscape Extension Publication
Purdue University

B. Post-emergence, Selective Herbicides *

- Applied after weeds are already up and growing.
- They can present a problem by drifting onto non-target plants.
- Examples for broad-leaved weed control, particularly in lawn and in brushkillers:
  - 2, 4-D (sold under many brand names)
  - MCPP (sold under many brand names)
  - dicamba (Banvel and many others)
  - combination formulas (Trimec)
- Examples for grass weed control:
  - fluazifop-butyl (Grass-B-Gon, Fusilade)
  - sethoxydim (Poast)
- Uses may include lawn, tree, shrub, and flower beds, and some fruit crops -- read the label!

*Be careful of using these active ingredients near desirable vegetation and food gardens!

READ THE LABEL!!!
Spectracide®

WEED STOP® FOR LAWNS
PLUS CRABGRASS KILLER

Visible Results in 8 Hours
Won’t Harm Lawns
Kills the Root!

ACTIVE INGREDIENTS:
2,4-D, dimethylamine salt 0.253%
Quinclorac 0.121%
Dicamba, dimethylamine salt 0.029%
Sulfentrazone 0.015%

INERT INGREDIENTS: 99.582%
TOTAL 100.000%

THIS PRODUCT CONTAINS:
Organic Weed Control

- Early detection (scouting)
- Dense vegetation, mulching, etc.
- Mechanical/physical removal
- Soil solarization
- Weed seed germination
Organic Herbicides

• Generally fall under 7 product categories
  – Natural acids
    • Vinegar (acetic acid), citric acids
  – Phytotoxic oils
    • d-limonene, clove oil, rosemary oil
  – Corn gluten meal
    • Preemergent
  – Herbicidal soaps
    • Pelargonic acids, ammoniated soap of fatty acids
  – Salt-based herbicides
    • Potassium or ammonium salts of fatty acids (aka soap salts)
  – Iron-based herbicides
    • Iron HEDTA
  – Combination products
Soil Mender Enhanced Vinegar ready-to-use unique blend of vinegar, orange oil & molasses

Net Contents 1 gal (3.78 L)

GUARANTEED ANALYSIS

Soil Amending Ingredients
- Acetic Acid.........................10%
- Orange Oil.........................1%
- Molasses.........................1%
- Total Other Ingredients........88%

Net Weight - 8.4 lbs (3.8 kg)
EcoLogic Weed & Grass Killer

Active Ingredients:
- Rosemary Oil .................. 1.0%
- Cinnamon Oil .................. 1.0%
- Sodium Lauryl Sulfate ...... 1.0%
- Other Ingredients† .......... 97.0%
Total ................................ 100.0%

†Water, Soap, Lecithins, Glycerin
*When used and stored as directed
††Refers to Rosemary and Cinnamon Oils

Keep Out of Reach of Children
CAUTION See back for additional precautionary statements.
Manténgase fuera del alcance de los niños
PRECAUCIÓN Consulte la parte posterior para conocer las declaraciones preventivas adicionales.

Net Contents 1 gal (128 fl oz/3.78 L) 17-16183
HERBICIDAL SOAP

Kills Moss, Algae & Weeds

Elimina Los Musgos, Algas y Malas Hierbas

Makes 6 Gallons of Finished Spray

Active Ingredient:
Ammoniated soap of fatty acids. ............ 22%

Other Ingredients: ................................ 78%

Total: ............................................ 100%

KEEP OUT
MANTÉGALO

WARNI
(See Attached Book)

U.S. Patent Number 5,919,733
Sold under a license of W. Neudorff GmbH KG, Germany
Made with Finalsan™ herbicidal soap, a trademark of W. Neudorff

EPA Reg. No. 67702-8-54705
EPA Est. No. 48498-C-00368
Dithiopyr

Corn gluten meal

Dithiopyr
ACTIVE INGREDIENT:
Dithiopyr .................................. 0.27%
OTHER INGREDIENTS: .................................. 99.73%
TOTAL .................................. 100.00%

*See Use Directions for complete list of treated weeds
Organic Herbicides

• Things to consider
  – You are still applying a herbicide
    • Must have a viable label with directions for safe and effective application
  – Generally considered to be contact herbicides
    • Injure the plant by burning plant cuticle or disrupting cell walls (plants lose too much water and die)
    • Chelated iron products are taken up by the plant
  – Non-selective
  – Not as effective as synthetic counterparts
    • Important to apply to weeds shortly after germination
    • Must be combined with other IPM practices
  – Expensive
Why identify?

- Annuals vs. Perennials
  - Pre vs. Post control options vary
- Variation in response to management
  - Select the right tool for success
- Life cycle, flowering, seed production
  - Timing of management is essential
Why are weeds successful?

• Rapid colonization of disturbed areas
• Very rapid growth
• Self compatible
• Very high seed production
• Seed dormancy
• Vegetative reproductive structures
• Seed dispersal mechanisms
Vegetative Reproductive Structures

- Bulbs/tubers
- Tillers
- Creeping stems
  - Rhizomes
  - Stolons
Broadleaf identification:

- Key structures on a broadleaf weed
  - Node
  - Internode
  - Leaf stems
    - Petiole
    - Sessile
  - Leaf features
    - Shape
    - Veins
    - Edges (margin)

www.extension.org
Broadleaf identification: Inflorescence

• How the flowers are arranged on the stem
  – Spike
  – Raceme
  – Panicle

• Can also be used to identify grasses
Grass identification: Vernation

- Folded
- Rolled

Goosegrass

Gosegrass

Crabgrass
Grass identification: Ligule

• Collar
  – Found at junction between leaf blade and stem sheath
    • Essential ID characteristic
      – Absence of seedhead
  – Ligule (found at the back of the collar)
    • Membranous
    • Hairy
    • Absent
Sedge identification:

• Monocot
• Leaves similar to grasses
  – Long, narrow, smooth
  – Arranged in threes
  – Waxy/shiny
• Solid, triangular stems
  – Reproduce by seeds, tubers, rhizomes
Weed ID is essential for effective management
Weeds are categorized into one of four lifecycles

1. **Summer annuals**
   - Summer annuals germinate in the spring when soil temperatures reach about 55-65°F, flower in the summer and die in the fall at first frost

2. **Winter annuals**
   - Winter annuals germinate in the fall (55-65°F), grow until spring and die during late spring or early summer

3. **Biennials**
   - Life cycle lasts two years. Few examples

4. **Perennials**
   - Perennial weeds are capable of living more than two years
Annual weed management

- Prevent seeds from entering/forming
- Easier to manage weeds when they are young
- Competition from desirables can be VERY EFFECTIVE
  - Limit the amount of open space for germinating weeds
    - Turf, xeriscapes, garden mulch, etc.
- Wide range of tools available for management
Perennial weed management

• EARLY DETECTION AND RAPID RESPONSE!!

• Thorough understanding of biology
  – Optimize management methods

• Prevent establishment
  – Seeds from forming
  – Continually reduce stored energy in perennial vegetative structures
    • Ex: digging up taproots

• IWM is essential for adequate management

• Long-term management required if population is allowed to establish
Optimum control timings depends on weed lifecycle

- Winter annuals
  - Sept. – Nov. optimum control window
  - Should I apply a herbicide in the spring?
- Summer annuals
  - When at seedling stage (May-June)
- Biennials
  - When in first growing season (rosette stage)
    - Only reproduces by seed
- Perennials
  - Fall management works best!
  - Late Sept. through mid-Nov. is best
    - Depending on temperatures
  - Second best timing is mid-March through May
Summer annuals include:

- Kochia
- Puncture vine
- Prostrate spurge
Kochia (*Kochia scoparia*)

- Identifying features:
  - Leaves long, narrow
  - No leaf stems (petioles)
  - Dull green in color
  - Covered in soft, fine hairs
  - Seeds in clusters
  - Can produce 14,600 seeds per plant
  - Becomes tumbleweed when mature
Puncture vine (Tribulus terrestris)

• Identifying features:

  - Prostrate, mat-forming growth habit
  - Leaves pinnately divided into 4-8 pairs of leaflets per stem
  - Leaves and stems are covered in hairs
  - Leaf stems arranged in a zig-zag pattern on main stem
  - Stems can be brown or reddish in color
  - Yellow, butter-cup like flowers
  - Produces strong, tack-like fruits (goatheads)
  - Leaves toxic to livestock
Prostrate spurge (*Euphorbia maculate*)

• Identifying features:

  - Mat-forming
  - Oval-shaped leaves
  - Opposite orientation on stem
  - Maroon splotch on upper surface
  - Stem exudes milky sap when broken
  - Small cluster of flowers
  - Produces viable seed within weeks of germination
Winter annuals include:

- Cheatgrass
- London rocket
- Annual bluegrass
London Rocket (*Sisymbrium irio*)

- Winter annual:
  - Young plants are a basal rosette
  - Smooth, spear-shaped leaves that are deeply lobed
  - Mature leaves can be spade-shaped
  - Upright flowering stems develop at maturity
  - Small clusters of pale yellow flowers
  - Fruits are long, thin tubular seed pods
Cheatgrass (Bromus techtorum)

- Identifying features:

  - Aka: downy brome
  - All leaves and stems covered in soft, dense hair
  - Papery thin, ragged edged ligule
  - Inflorescence is dense, slender, and usually drooping
  - Can produce 300 seed per plant or more
  - Seed has awns that can be 3/8 to 5/8” long
  - Awns can turn purplish at maturity
Annual bluegrass (*Poa annua*)

- Identifying features:
  - Clump grass with no hairs on blade or sheath
  - Folded light green leaves
  - Leaf blades may have tell-tale crinkle
  - Boat-shaped leaf tips
  - Aggressive tillering
  - Pyramid shaped seedhead
  - Prolific seed producer
Perennial weeds include:

• Dandelion
• Field bindweed
• Khakiweed
Dandelion (*Taraxacum officinale*)

- Identifying features:
  - Deeply toothed leaf margins
  - Older teeth point towards leaf base
  - Milky sap
  - Long, fleshy taproot
  - Bright yellow flowers on long stalks
  - White puff-ball seedhead
Field bindweed (*Convolvulus arvensis*)

- **Identifying features:**
  - Slender climbing viney growth
  - Spreads by rhizomes
  - Smooth stems grow along ground or climb vegetation/objects
  - Arrow-head shaped leaves
  - Funnel shaped flowers (white to pink)
Khakiweed (*Alternanthera pungens*)

- **Identifying features:**
  - Prostrate/mat-like growth from thick taproot
  - Leaves opposite and more rounded towards the tip
  - Dark green, waxy/shiny leaf surface
  - Hairy, red stems
  - Flowers white in stiff-bracted, spiny burs
  - Burs appear summer through early fall
Don’t be afraid to ask for help
Who to contact?

- Your local County Extension Agent
  http://aces.nmsu.edu/county/

- New Mexico State University Specialists
  Leslie Beck
  Extension Weed Specialist

- Diagnostic website
  plantclinic.nmsu.edu
"We never should have waited this long...
Now the weeds have completely taken over."