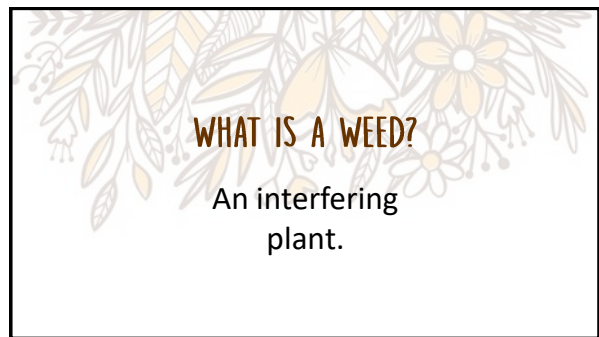
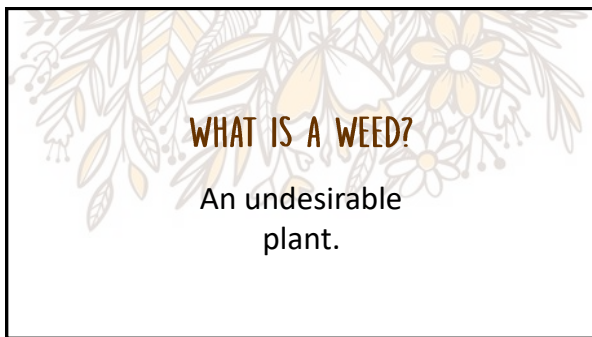
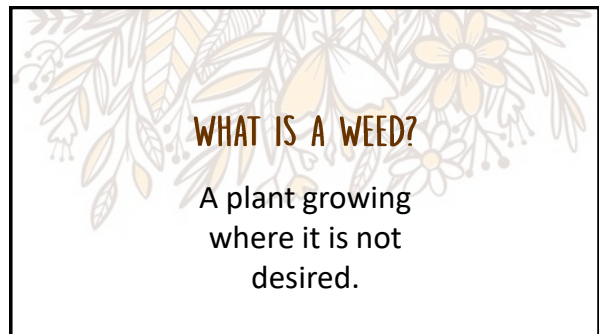
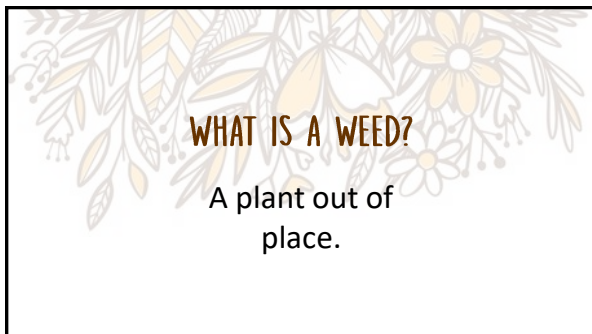
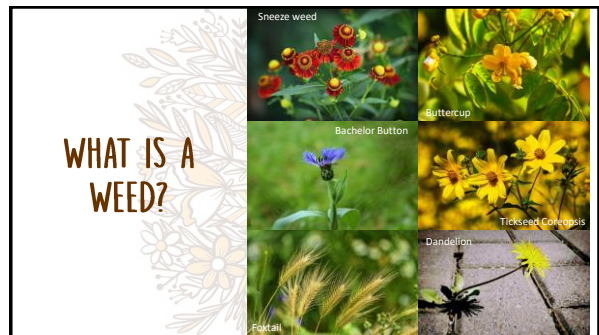
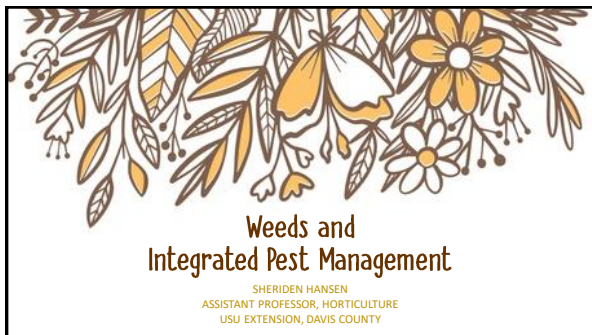




WHAT IS A WEED?

"A plant whose virtues have not yet been discovered."

~ Ralph Waldo Emerson

WHAT IS A WEED?

A plant that has mastered every survival skill except how to grow in rows.

WHAT IS A WEED?

A plant that someone will spend time and money to kill.

WHAT IS A WEED?

If it is lush, green, and thriving in the garden, it is a WEED!

WHAT IS A WEED?

Any plant that interferes with the management objectives for a given area of land (or body of water) at a given point in time.

COMMON GARDEN and LANDSCAPE WEEDS

DANDELION
Taraxacum officinale



WHITE CLOVER
Trifolium repens



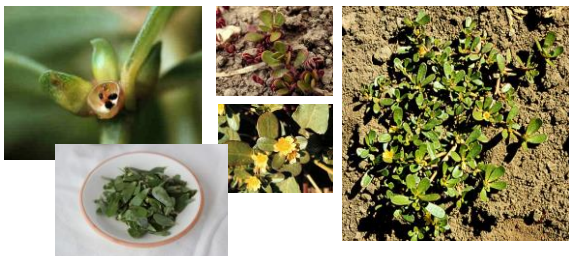
BLACK MEDIC
Medicago lupulina



CRABGRASS
Digitaria sanguinalis



PURSLANE
Portulaca oleracea



Prostrate Spurge
Euphorbia maculata



Redroot Pigweed
Amaranthus retroflexus



LAMBSQUARTERS
Chenopodium album



HAIRY NIGHTSHADE
Solanum sarrachoides



WHAT IS AN INVASIVE WEED?

An aggressive plant that spreads into sites and takes over, displacing other plants.



WHAT IS A NOXIOUS WEED?



WHAT IS A NOXIOUS WEED?

A plant designated by law as undesirable and requiring control

UTAH'S NOXIOUS WEEDS

- Bermudagrass
- Field Bindweed
- Hoary Cress
- Johnson Grass
- Diffuse Knapweed
- Russian Knapweed
- Spotted Knapweed
- Squarrose Knapweed
- Purple Loosestrife
- Medusahead
- Perennial Pepperweed
- Quackgrass
- Leafy Spurge
- Yellow Starthistle
- Canada Thistle
- Musk Thistle
- Scotch Thistle
- Dyer's Woad

UTAH'S NOXIOUS WEEDS

landscape concerns

- Bermudagrass
- Field Bindweed
- Hoary Cress
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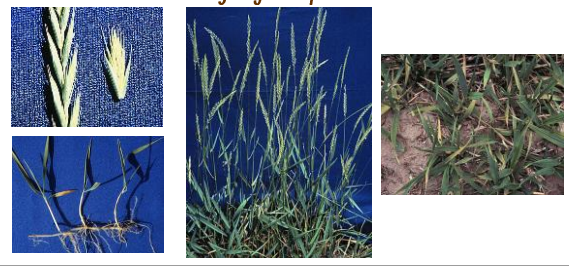
BERMUDA GRASS *Cynodon dactylon*



JOHNSON GRASS *Sorghum halepense*



QUACKGRASS *Elytrigia repens*



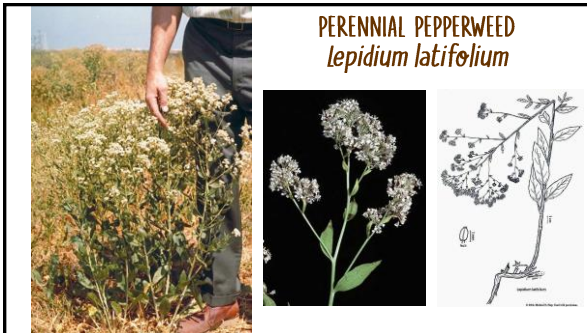
FIELD BINDWEED
Convolvulus arvensis



HOARY CRESS
Leidum draba 'Whitetop'



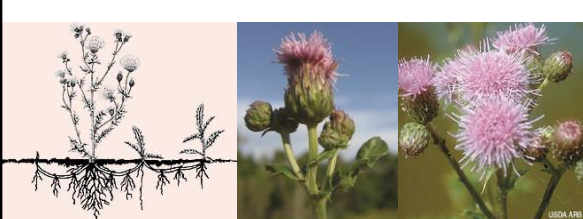
PERENNIAL PEPPERWEED
Leidum latifolium



YELLOW STARThISTLE
Centaurea solstitialis



CANADA THISTLE
Cirsium arvense



SCOTCH THISTLE
Onopordum acanthium



RUSSIAN KNAPWEED
Acroptilon repens



PURPLE LOOSESTRIFE
Lythrum salicaria



DYER'S WOOD
Isatis tinctoria

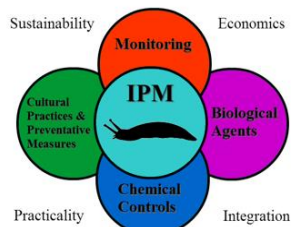


SO HOW DO WE CONTROL ALL OF THIS?

Integrated
Pest
Management

WHAT IS IPM?

- Philosophy of control founded on ecological principles
- Goal is to avoid crop loss and minimize harmful environmental effects



WHAT IS IPM?

- More tolerant approach to pest/weed control than traditional programs
- Involves using several tactics based on:
 - Knowledge of the **crop**, **pest**, and **associated natural enemies**



HISTORY OF IPM

- Synthetic pesticide era launched after WWII
- 1936 - 30 registered pesticides/herbicides
- 1972 - >900 registered pesticides/herbicides
- Chemicals were **EFFECTIVE, EASY TO USE**, and **INEXPENSIVE**



HISTORY OF IPM

- Broad spectrum or non-selective sprays were the answer to most problems
- Sprays were being used on a routine basis, whether they were needed or not



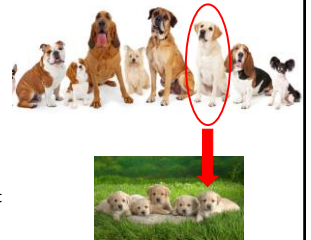
RESISTANCE

- Insects and plants began to develop **RESISTANCE**
- Resistance is a significant decrease in the sensitivity to a chemical
- A population is made up of individuals that vary in genetic make-up.
 - Dogs: border collie, lab, husky, hound, pug – but all are dogs



RESISTANCE

- Resistance is the ability of one of the variants in the population to survive chemical exposure
- All dogs are susceptible **BUT** the Labrador
- The Labrador then has puppies that are resistant
- Now you can't control the Labradors... they are **RESISTANT**



RESISTANCE

- The natural ability of a variation of an organism to survive exposure to a pesticide or herbicide that would normally kill and individual of that species
- This occurs with **INSECTS, WEEDS, FUNGI**, and other pests



RESISTANCE

- Resistant weeds can survive repeated exposures
- They reproduce and create a resistant variation
- If resistance is managed from the beginning using IPM... chemicals remain effective and useful.



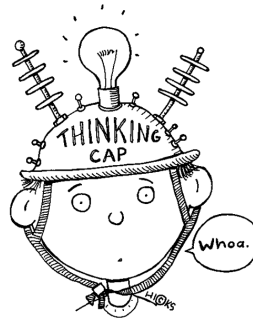
CONVENTIONAL MANAGEMENT

- Reliance solely on chemical control is called **CONVENTIONAL PEST MANAGEMENT**
- Applications of sprays are done based on a calendar date only
- No thought about the chemicals used
- Lacks a system-wide perspective



IPM COMPONENTS

- **KNOWLEDGE**
 - Of the pest
 - Of the biology
 - How it reproduces
 - Where it is usually found (disturbed sites, etc.)
 - Host plant (insect only)



KNOWLEDGE

- **THE PEST:** Canada Thistle
- **THE BIOLOGY:** perennial weed, very deep roots, dioecious with male and female plants
- **REPRODUCES:** seeds and rhizomes
- **WHERE IT IS FOUND:** deep moist soils in the Great Basin
- **WHAT TO DO:** don't till, application of herbicides, followed by cutting of plant at crown



IPM COMPONENTS

- **KNOWLEDGE**
- **MONITORING**
 - Visual observation



WHY MONITOR?

- Early warning of potential problems
- Determines life cycle stage of insects and plants
 - Biennials vs. Perennials
- Determine if you should treat
- Determine if your management strategies are working



METHODS OF CONTROL

- **CULTURAL**
- **MECHANICAL**
- **BIOLOGICAL**
- **PHYSICAL**
- **CHEMICAL**





CULTURAL CONTROL

- CULTURAL
 - Modification of practices to make the environment less favorable
 - Sanitation
 - Crop rotation
 - Cover crops
 - High density plant stands



SOLARIZATION

- FORM OF CULTURAL CONTROL
 - Works by heating the soil
 - between 105-130°F
 - for 3-6 weeks
 - Soil should be moist (improved heat conduction)
 - Use clear plastic
 - Allows sun to penetrate, but traps IR radiation, keeping temperatures high



MECHANICAL CONTROL

- MECHANICAL
 - Directly remove or kill pests
 - Popular and effective with gardeners and home owners
 - Cultivation
 - Hand picking



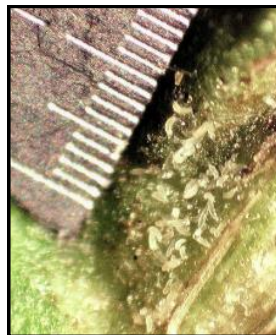
BIOLOGICAL CONTROL

- BIOLOGICAL
 - Predators: seek out and eat undesirable plant



BIOLOGICAL CONTROL

- CACTUS MOTH LARVA
 - Australia 1925 – prickly pear
 - Imported a moth from Argentina
 - Larvae burrow into cactus
 - Within 10 years it decimated the prickly pear population
 - Cost to develop is extremely high



BIOLOGICAL CONTROL

- BINDWEED MITE
 - Available in Colorado
 - Form galls and thicken leaves eventually killing the plant
 - Not yet available in Utah



PHYSICAL CONTROL

- **PHYSICAL**
 - Methods that physically keep pests from reaching their hosts
- Barriers (screens, row covers, plant collars, weed barrier)
- Traps



CHEMICAL CONTROL

- **CHEMICAL**
 - The use of chemicals to kill pests or to inhibit their feeding, mating, or other essential behaviors
- Repellants
- Insecticides and miticides
- Herbicides

RECORD KEEPING

- Keep a record of what you have applied
- When you applied it
- Rate that it was applied at



DRIFT or VOLATILIZATION

- Look for temperature limitations on the label.
- 2,4-D should not be used above 80-degrees F
- Certain plants are more susceptible to herbicide drift
- Damage is called EPINASTY



A WORD ABOUT TOXICITY...

(LD50)

Vitamin D	10	Banvel	2630
Nicotine	53	Citric Acid	3000
Paraquat	157	Acetic Acid	3310
Caffeine	192	Table Salt	3320
Gasoline	200	Pelargonic Acid	5000
2,4-D	700	Roundup	5400
Asprin	750	Ethanol	6037
Clove Oil	1930	Tordon	8200
Vitamin A	2000	Sugar	29700

AMOUNT TO KILL AVG. 150-LB HUMAN

Paraquat	2 Teaspoons
Caffeine	100 cups of coffee
2,4-D	1.4 - 4.0 ounces
Asprin	100 tablets
Banvel	7 ounces
Table Salt	0.5 pound
Roundup	1.7 pints
Ethanol	1.3 quarts of liquor
Tordon	5.0 pints
Sugar	4.5 pounds

