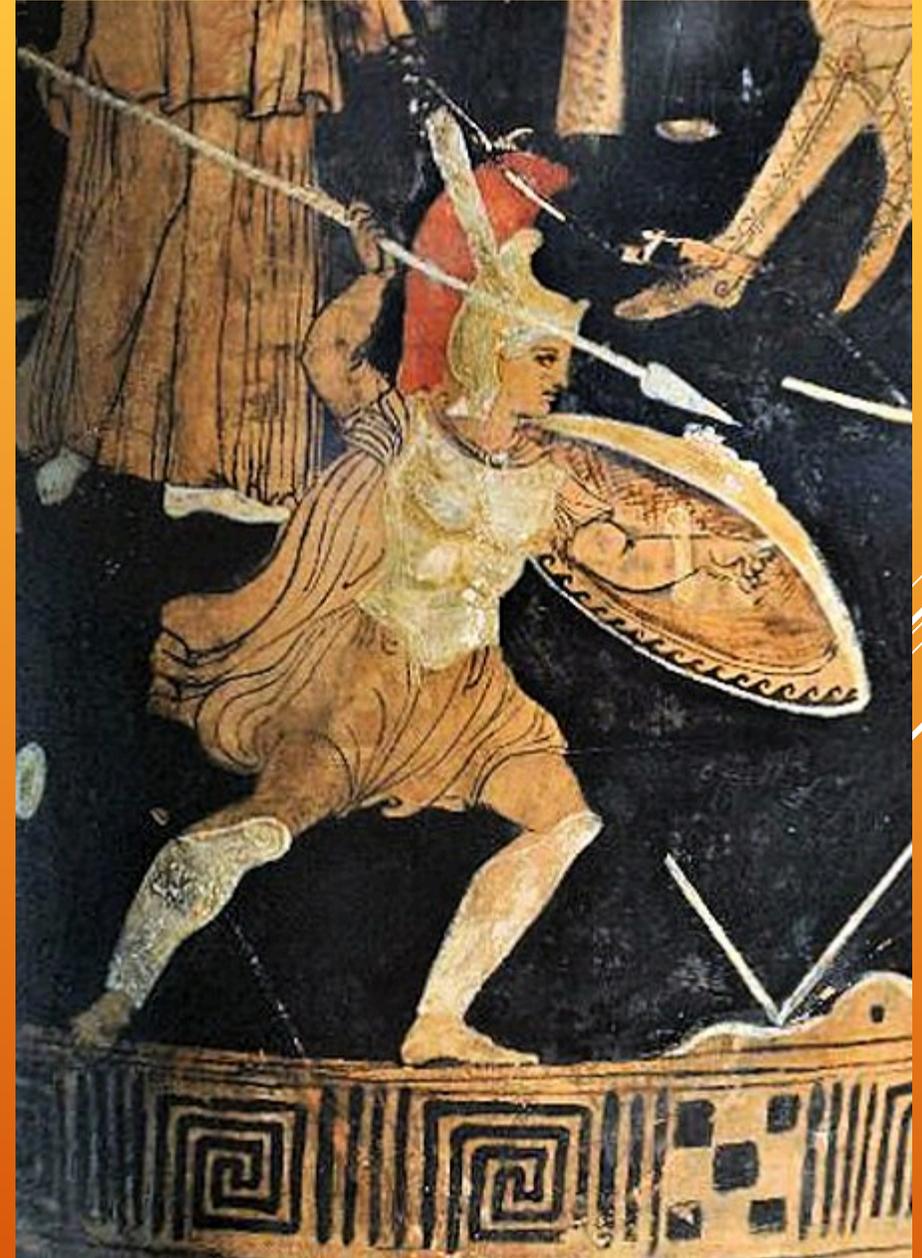


ASOTIN COUNTY MASTER GARDENERS 2020



YARROW



TROY



COMMON YARROW

ACHILLEA MILLEFOLIUM



**Common names
Scientific names
and
Cool Plants**



- ▶ **Arctostaphylos uva ursi**

BURNETT
SANGUISORBA STIPULATA





OROBANCHE UNIFLORA

A textbook weed is “a plant that is competitive, persistent, invasive, and interferes with human activities and is therefore undesirable.”



Weeds cause multiple problems for gardeners, farmers, and land managers.

- **Weeds compete with plants we are trying to grow as crops or landscape plants
- **Weeds may harbor plant-harming diseases and insects
- **Weeds also may attract and hide rodents
- **Weeds can reduce the aesthetic value of landscapes



As early as 700 B.C., red animals (foxes, dogs, cows) were sacrificed to the rust god Robigus by the Romans each spring in hopes of protection for their grain fields from the reddish/brown rust spores¹.



YST

2005 7 11

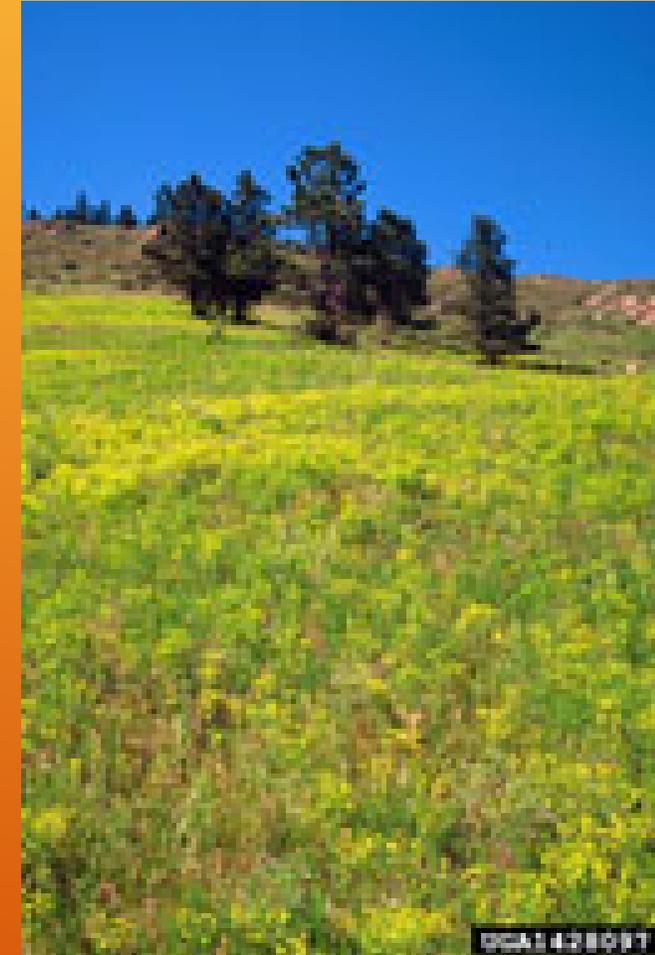
**On roadsides, weeds obstruct sight lines and can shorten the life span of asphalt shoulders

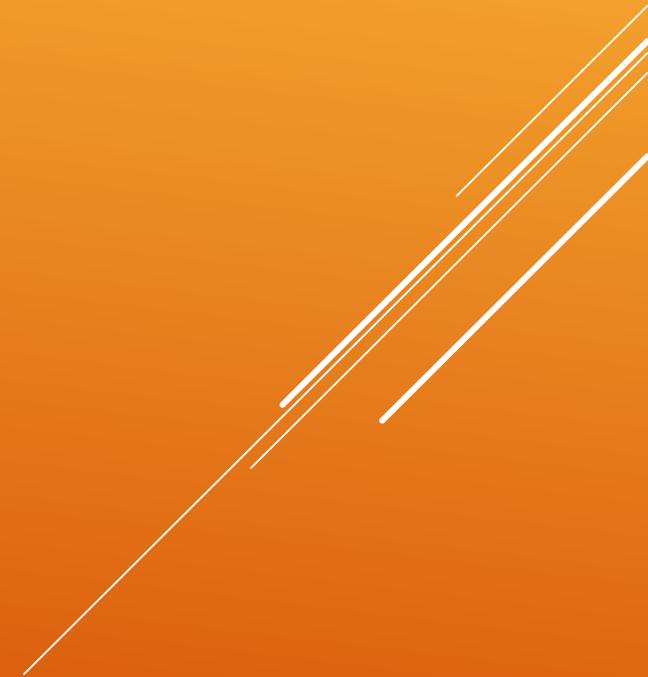
** In waterways, weeds can interfere with water drainage patterns

**Weeds can create a fire hazard

**Weeds may present direct allergy or toxicity hazards for humans and livestock through skin contact, inhalation, or ingestion.

**Weeds may negatively affect native plant and animal communities in forests, rangelands, and streams





common cowparsnip
(*Heracleum maximum*)





GIANT HOGWEED
HERACLEUM MANTEGAZZIANUM

This is not to say that weeds are wholly without positive attributes. As Ralph Waldo Emerson observed, a weed is "a plant whose virtues have not yet been discovered."

*** St. Johnswort, for example, was once simply a bad weed of rangelands throughout the West, but is now prized as an herbal antidepressant.



*** Many weed species are a delight to the eye, nose, or taste buds, and sometimes are planted purposefully for those uses. One need look no further than purple loosestrife to find a beautiful ornamental that soon becomes too much of a good thing.

PHRAGMITES



*Environmental Weeds
of Australia*

Stem density

Native Haplotypes



Introduced Haplotypes





Native Haplotype



Introduced Haplotype

Most problem weeds in North America are native to foreign regions where many of our common agricultural crops had their beginnings: in Europe and Asia. This shouldn't be a surprise. After all, as crops such as wheat, barley, oat, pea, beet, cabbage, and many others were brought by early settlers to North America.

Musk thistle



Russian knapweed



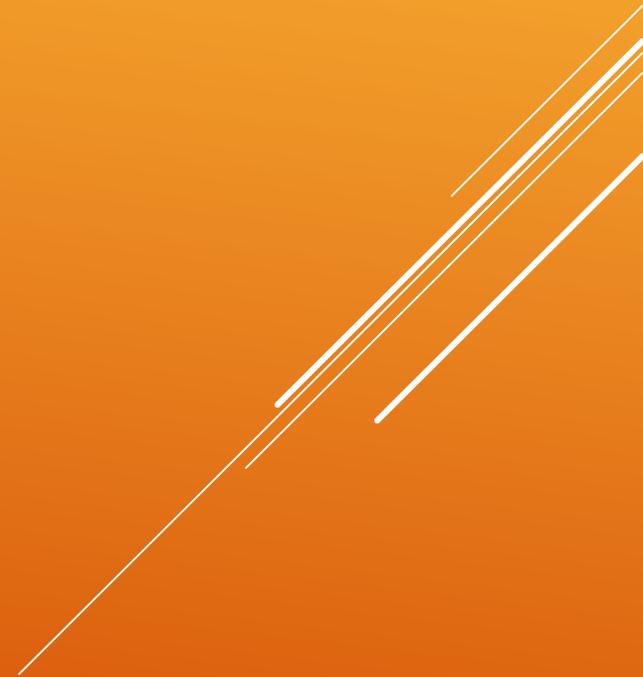
For the most part, weedy species are problems outside their homeland. This is not to say that these plants weren't weedy in their native lands (they were and they still are), but there is a tendency for many species to be more aggressive in their new homes than where they came from. This is usually because plants in their homeland are generally surrounded by natural enemies— **diseases or insects** that attack the plant and keep the population in check. Another factor may be that since certain plants evolved under more **severe conditions** in their homeland than in their new location, the new environment is more conducive to their growth and spread.



Sometimes these new plant species fill a previously empty niche in their introduced environment, such as was found and exploited by downy brome (cheatgrass) throughout the Intermountain West. Or perhaps it was a combination of these reasons, giving plants like yellow starthistle, kochia, or purple loosestrife the opportunity to establish themselves and dominate their new surroundings.



Although we may not always think in these terms when talking about plants, it is **survival of the fittest** in our lawns and gardens, and "the fittest" plants are often weeds. You'll remember that we defined weeds as plants that are **competitive, persistent, invasive, and interfere** with what we want to do with the land. Why are weeds are so good at what they do.



Plants compete with each other for four things: **light, water, nutrients, and space.**

Often it is the first plant on the scene that enjoys a competitive advantage in gaining the lion's share of these four resources. Because most garden soil is chock-full of weed seeds, usually the first plant emerging from disturbed soil is a weed. This pioneer plant occupies physical space

(1), rapidly produces a root system to gather water

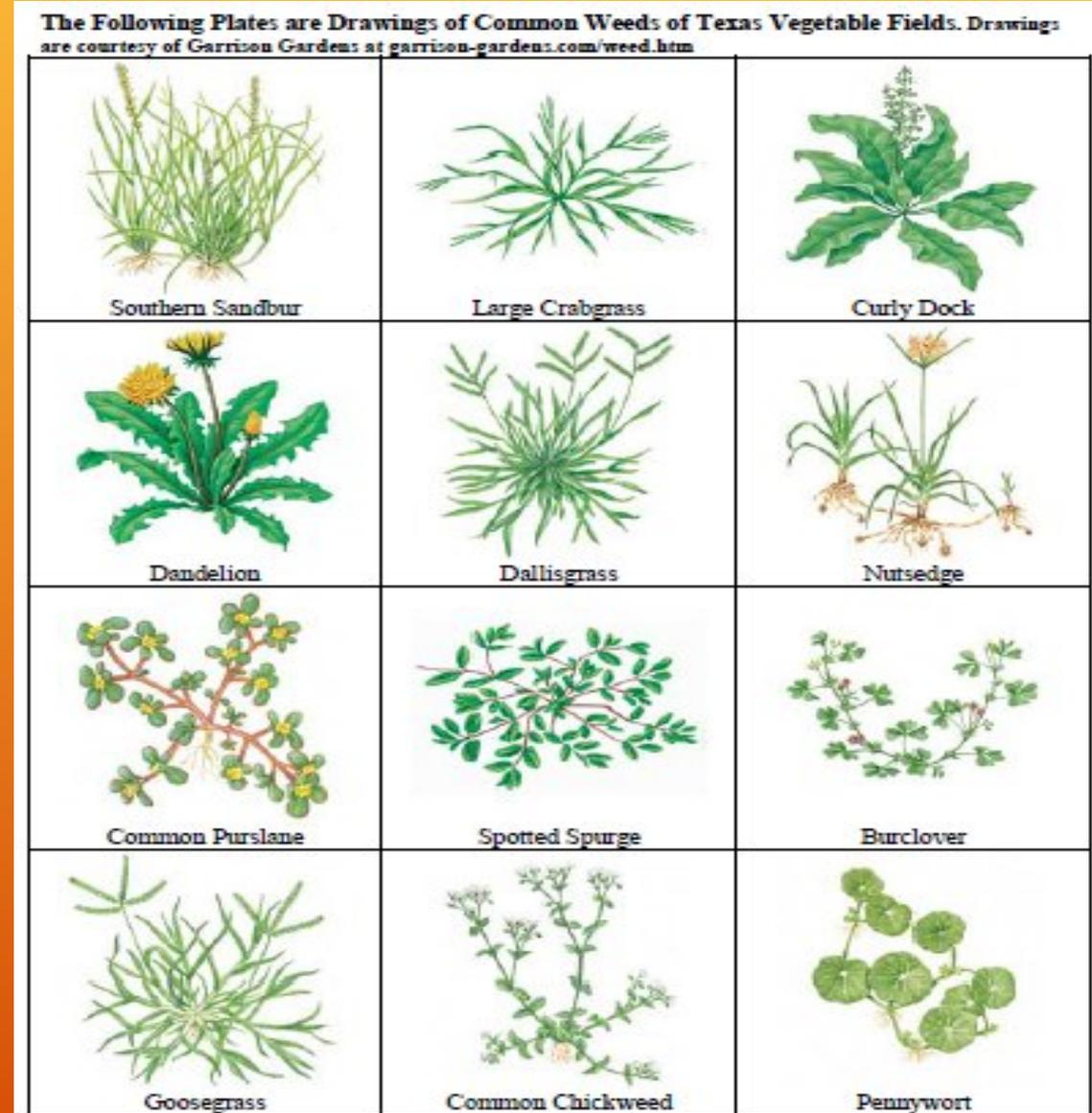
(2) and nutrients

(3) from the soil before another plant can do the same, and grows a leaf canopy to harvest light energy

(4) while shading out other, smaller plants. The bigger a weed gets, the better it is at competing against other vegetation, and the more of these four resources it gets.

Research has shown that if weeds are controlled early in a cropping system, crop plants grow larger early in the season and become increasingly better able to compete with late-germinating weeds and yield loss can be avoided.

For example, pigweed, lambsquarters, purslane, sparges, chickweed, annual mustards and crabgrass often are found in tomatoes, peppers, vine crops, sweet corn and in other summer cultivated crops.



Weed density can also play a role in competition.

Given that the number of weeds in garden soil commonly exceeds 100 seedlings per square foot, it becomes clear that weed densities are almost always high enough to severely restrict crop productivity. Such reductions can be exacerbated if more than one species of weed is competing with our crop at the same time, since different weeds may compete with crops in different ways. It may be that one redroot pigweed plant and one field pennycress plant growing with one broccoli plant may be worse for the crop than two pigweeds or two pennycresses with the same broccoli plant

Hoary cress



Ventenata



Another way weeds outcompete other plants is through **allelopathy**. This is the production or accumulation of certain compounds in the leaves, stems, or roots of certain plants that, upon release into the soil, inhibit the growth of surrounding vegetation. Most of these allelopathic chemicals affect all the plants growing at a particular site. Salt cedar plants, for example, exude excess salts on the surface of their leaves and this, over time, makes the underlying soil less suitable for new plant establishment, giving the established perennial an advantage against everything else that might challenge it.



Once a weed has established itself or gone to seed in a garden, it seems we have that weed (or its progeny) to deal with every year afterwards. What makes weeds so persistent?

***They may break off in your hands if you try to pull them, growing back from small pieces of root or crowns left in the soil.

***They also produce lots of seeds, averaging tens of thousands per plant compared to only several hundred seeds produced by most crop plants.

Common mullein

PRODUCES 100,000-
250,000 SEEDS



SEEDS PRODUCED BY COMMON WEEDS

- giant foxtail--10,000
- common ragweed--15,000
- purslane--52,000
- lambsquarters--72,000
- pigweed--117,000

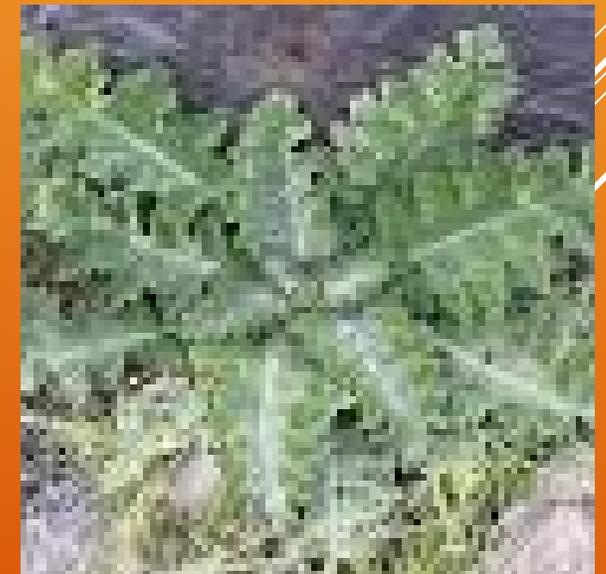
Unlike crop plants, weed seeds typically do not all germinate at the same time.

Weed seeds tend to germinate only when conditions are right

So weeds that like warm temperatures, such as puncturevine wont germinate till soil temps reach 65* for two weeks.



Most weed seeds also won't germinate unless they are exposed to some light, regardless of soil temperature. Such a germination response is important to prevent weed seeds from germinating when they are buried too deeply to allow their seedlings to emerge. It also allows weeds to respond quickly to disturbance of soil or vegetation which creates an empty space where the weed can thrive.



Most weed seeds also display a high level of dormancy, so that some weed seeds remain safely alive, but not germinating, even when conditions are right for germination. These dormant seeds allow the species to persist even if a late frost kills all the early germinating seedlings.

Most weed seeds germinate or rot away within the first three or four years after they are produced, provided that conditions are adequate for germination. It is the last 0.5 to 1% of the total seed production that lies buried that is the problem. Of course, if only 0.5% of the perhaps 20,000 seeds that a single weed can produce in a single year survives for 25 years, we're still talking about 100 seeds—not an inconsequential number of weed seedlings to deal with!



Seeds aren't the only way weeds can beat you. As many plants do, weeds also reproduce vegetatively through creeping roots, rhizomes, stolons, bulbs, or tubers. These vegetative reproductive structures contain a lot of stored sugars and starch that provide a young plant with much more energy than is available from most seeds. New shoots arising from a tuber or rhizome fragment, then, are able to emerge from a greater soil depth than a shoot from a seed ever could. Such shoots also usually grow faster and capture space (and the light, water, and nutrients within that space) much more quickly than will a typical weed or crop seedling.

Rush Skeletonweed



Weeds don't stay where they first grow.

They do this primarily by means of seeds, many of which are well-suited for movement after they are mature.

****hooks, spines, or awns which attach to fur or feathers or clothing. Examples include burdock, catchweed bedstraw, and foxtail barley.

****Some seeds bear hairs or wings which allow them to blow with the wind; examples include dandelion, Canada thistle, and showy milkweed.

****Some are corky or hollow and extremely buoyant in water; one example is curly dock and yellow flag iris.

****Some are borne in tasty or colorful fruits that are consumed by animals and spread in their fecal material; examples include Himalayan blackberry. Such adaptations mean there will be no shortage of weed seeds in most yards and gardens waiting for their chance to sprout and establish in these new areas.

Curley dock :



long spine sandbur :



western salsify





common burdock



blackberries





Nelle Murray, Asotin County NWCB



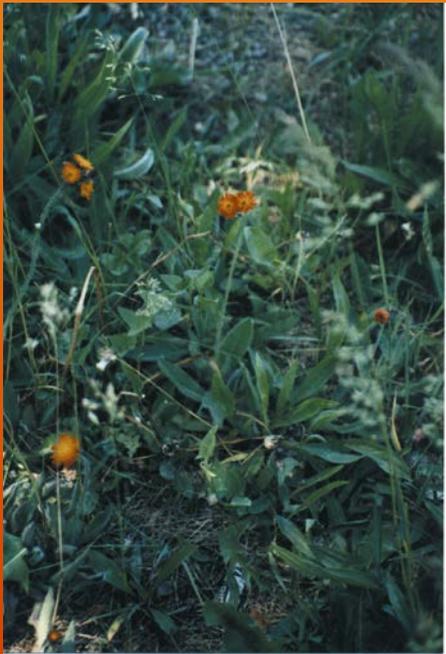
Richard Old
www.xidservices.com

Photo by
Richard Old
www.xidservices.com



COMMON CRUPINA

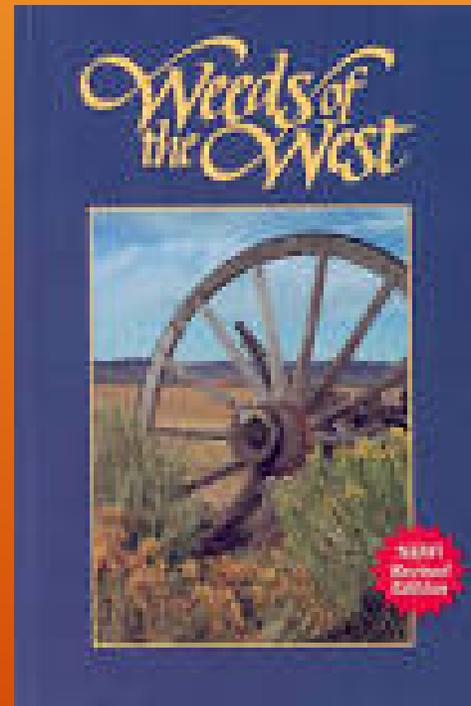
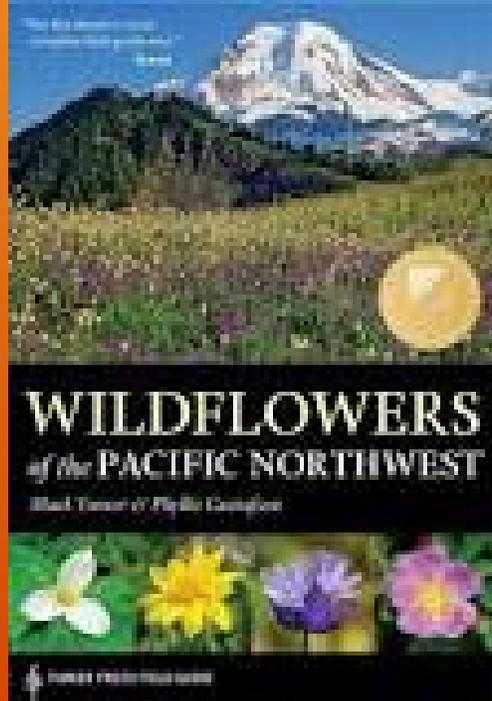
Weeds also spread vegetatively, not only by means of the reproductive structures mentioned above, but also by movement of the plants themselves. Mowers, vehicles, and cultivation equipment constantly dislodge and move plants from one place to another, often resulting in weed introductions into new areas. Animal bedding, bird seed, or hay bales may contain weed seed that either gets deposited on the ground or ingested or otherwise spread by the animal. People purposely introduce potential weed species for their beautiful foliage or sweet-smelling flowers, but are unaware of their weedy nature. Sometimes these introductions are accidental, through purchase of containerized plants growing in infested potting soil, weed rhizomes entwined in bare root ornamentals, or weed propagules in contaminated mulch, beauty bark, compost, or topsoil.



Weed Identification

The best way to control any weed species is to hit it at its weakest point. Therefore, you must know something about the weed in question: its biology, its habits, its strategies for success.

The process of weed identification is easier if you know a little about the plant in the first place. Taxonomically, weeds (as with all other plants) are classified by what they look like: are they a monocot, dicot, or miscellaneous (moss, ferns, horsetails, etc.)? What plant family are they in, and what are the main family characteristics?.



Why is knowing family characteristics important? Consider that there are approximately 250,000 plant species in the world. Of these, only about 3% (8000 species) of all plants are weedy in agriculture, while about 250 or 0.1% of the total are major problems in world agriculture. By knowing a few characteristics of an unidentified plant, we can often link a plant to its family— often removing 90% or more of known plants from the list of possible plants in one fell swoop.



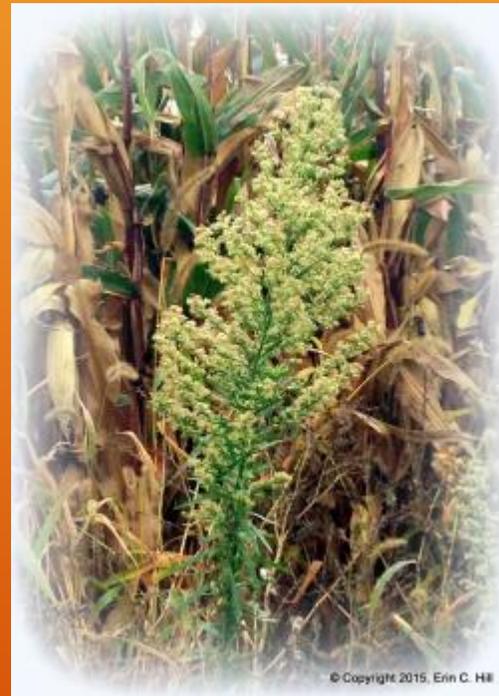




CURLYCUP GUMWEED

Sunflowers

Asteraceae family



horseweed



common sunflower



SOW THISTLE

PLATTE THISTLE





▶ **Common cocklebur**



spiny cocklebur

THE BAD BOYS: SUNFLOWER FAMILY



Rush skeletonweed

orange hawkweed



THE CENTAUREA BAD BOYS



Spotted knapweed



diffuse knapweed



yellow starthistle



THE CENTAUREA BOYS RELATIVES



bachelor's button

CENTAUREAS WE HAVEN'T FOUND YET



purple starthistle



meadow knapweed

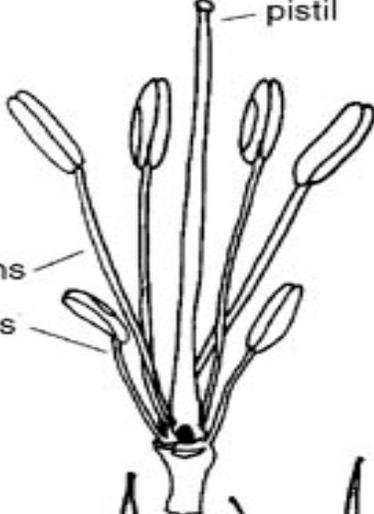
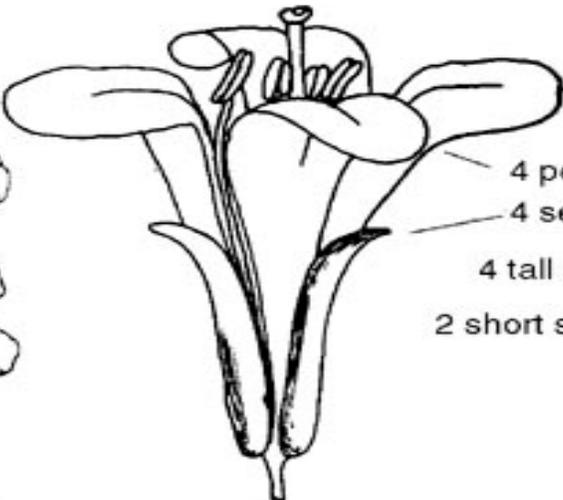


Nancy Ness 2003

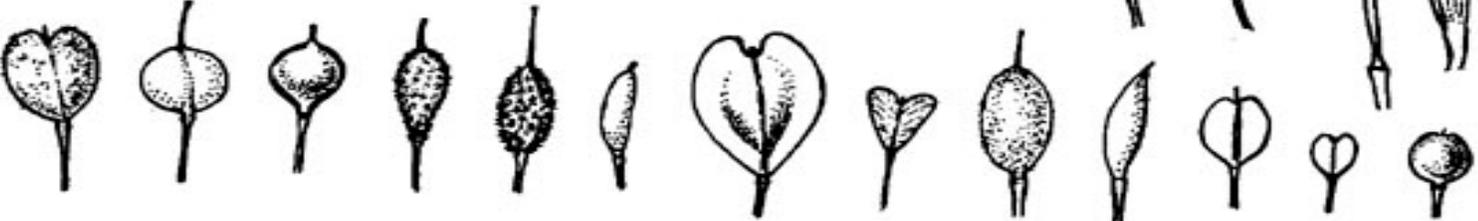
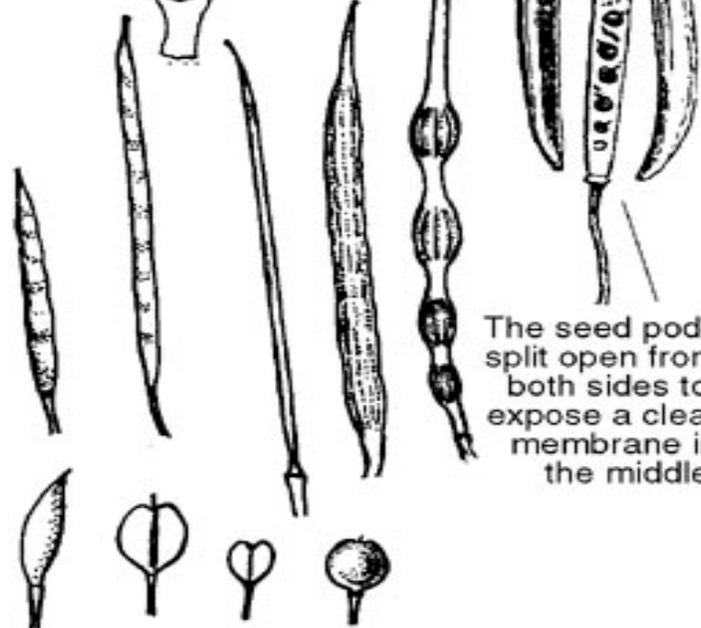
THE MUSTARDS BRASSICACEAE



Mustard seed pods come in many shapes and sizes, but always occur on the plant in the same radial pattern around the stalk, a "raceme".



Patterns of the Mustard Family



PERENNIAL PEPPERWEED



CLASPING PEPPERWEED



A VERY BAD MUSTARD



Hoary cress

SPRING MUSTARDS



Blue mustard

black mustard

shepherd's purse

JIM HILL MUSTARD



WHERE WOULD WE BE WITHOUT THE BORAGE FAMILY



Coast fiddleneck



catchweed



THE BAD BOYS OF THE BORAGE FAMILY



houndstongue



THE BUGLOSSES OF THE BORAGES



Viper's



annual



common



Vipers Bugloss

THE THREE CHENOPODIUMS THAT WE CARE ABOUT



Lambsquarters

kochia

Russian thistle

WHITE BRYONY

OTHER COMMON NAMES:

*WILD HOP

*LADIES SEAL

*ENGLISH MANDRAKE

*FALSE MANDRAKE

*TETTERBURY

*TAMUS

WHITE BRYONY

BRYONIA ALBA

Bryony is a vigorous herbaceous perennial vine resembling Kudzu in its habit--forming dense mats which shade out all vegetation it grows upon. The vines grow 12 feet or more. Major destructive potential to native vegetation, forest communities, and urban horticulture. Berries are toxic to humans. It has thick, fleshy, light yellow roots. Stems have long curling, not branched tendrils and the flowers are from leaf axils.

**Robin Kusske, Franklin County
Noxious Weed Control Board**





Robin Kusske, Franklin County Noxious Weed Control Board





Native Clematis

White bryony

White bryony has black mature berries with 3 to 6 ovoid to oblong seeds in each one. The berries are especially poisonous (though all parts of the plant are).



WHITE BRYONY REPRODUCES BY SEED THAT IS SPREAD BY BIRDS. PLANTS CAN ALSO RESPROUT FROM THE ROOTS.



Name _____

Address _____

Phone _____

Project _____

Clear Crop Protection Division (CCPD) are available for the shape of herbicide
Have printed your notebook number & name on your field notes at the J. I. Darling Corporation.

A BAD GRASS?



Pampas grass



Ravenna grass

MORE BAD GRASSES THAT WILL MAKE YOU SLEEPLESS

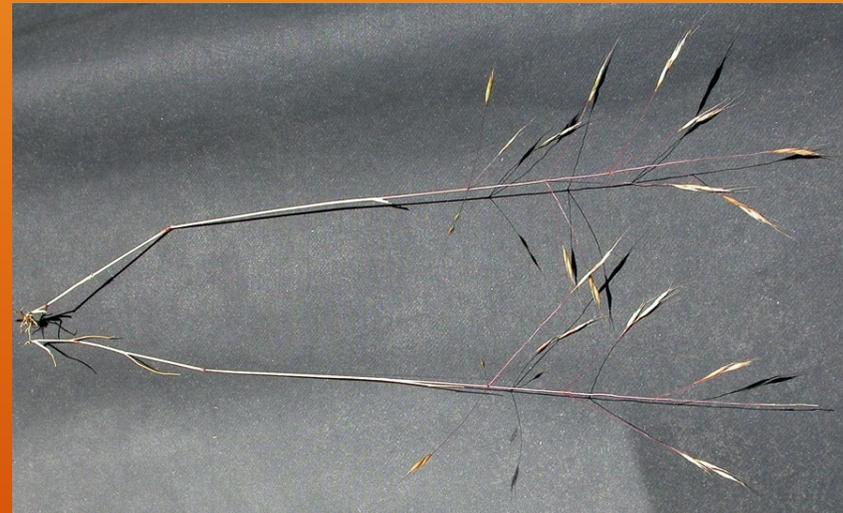


Cheatgrass



Japanese brome

MEDUSAHEAD AND VENTENATA GRASSES



LONGSPINE SANDBUR



BULBOUS BLUEGRASS



THE ROSE FAMILY

WE HAVE THREE COMMON NATIVE ROSE SPECIES IN THE INLAND PACIFIC NORTHWEST:

- ****BALDHIP ROSE (*ROSA GYMNOCARPA*),
- ****NOOTKA ROSE (*R. NUTKANA*),
- ****WOODS' ROSE (*R. WOODSII*).

WE HAVE TWO INVASIVE ROSES IN OUR AREA

- ****DOG ROSE (*R. CANINA*)
- ****SWEETBRIAR ROSE (*R. RUBIGINOSA*)

IDENTIFICATION:

A RULE OF THUMB FOR DIFFERENTIATING INVASIVE AND NATIVE ROSES IS: IF THE ROSE HAS THORNS THAT CURVE DOWN, IT IS INVASIVE. IF THE THORNS ARE STRAIGHT, IT IS NATIVE. ALSO THE THORNS ARE TYPICALLY NOT AS LARGE AS THOSE ON INVASIVE ROSES. WHILE THIS RULE IS USUALLY TRUE IN OUR REGION, IT DOES NOT APPLY TO ROSES OUTSIDE OF OUR REGION.



DOG ROSE

SWEETBRIAR ROSE
(MULTIFLORA ROSE)





GALL FORMING WASP



BALDHIP ROSE





WOODS ROSE



NOOTKA ROSE



SULFUR CINQUEFOIL

NW CINQUEFOIL



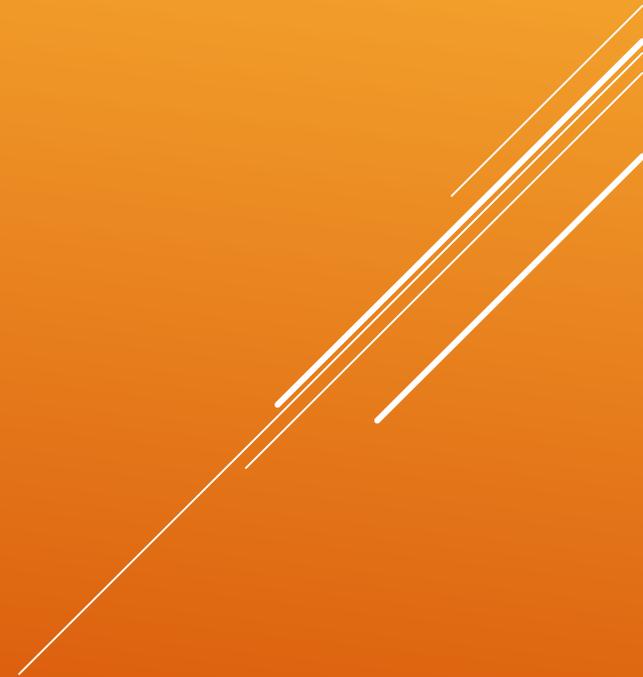
NATIVE CINQUEFOIL



b
u
!^



ITS IMPORTANT TO KNOW LOOK-A-LIKES





PROSTRATE
KNOTWEED



PURSLANE



SPOTTED
SPURGE

REFER TO YOUR ASOTIN COUNTY NOXIOUS
WEED LIST

lorraine

Preventing the spread of weeds is the concept behind noxious weed

laws. Noxious weeds are non-native species declared by the state to be plants that cause harm to the state's agricultural, range, or forest lands, or roadsides or waters. The responsibility of controlling noxious weeds rests with the owner of the land on which the noxious weed is found. In Washington, the law has three tiers, or classes, of weeds: A, B, and C.

Class A designations are for weeds with very small distributions. The goal is to eradicate these species before they become too widespread.

Class B weed species may be locally abundant, but are not found throughout the state. Some counties, then, may choose not to require control of the species since nearly everyone already has it (Class B nondesignate), but other counties may designate that species for control because they have no, or very small, local infestations (Class B designate). Another Class B designate might be a weed that may cause severe local harm if left to grow unchecked.. To avoid such losses, it is listed a Class B designate in counties producing carrots or carrot seed but Class B non-designate elsewhere.

Class C weeds are those that may or may not be widespread in the state, but are a priority for certain counties county to control.

Weed Life Cycles

Weeds, like garden plants, can also be classified by their life cycle: annuals, biennials, and perennials. Weed control strategies are often similar for weeds with the same life cycle, so knowing and applying this information can pay you off with some very practical benefits.

Annual plants live for one growing season and then die, while **perennials** regrow every spring. **Biennials** live for two years.

Annuals. Annual weeds progress from seed to seed in less than 12 months; indeed, some annual weeds may germinate and reproduce viable seed in as short as 45 days! The successful reproductive strategy employed by annuals is to produce lots of seed in as short amount of time as possible, then die and get out of the way for the coming generation. There are two major types of annuals: winter and summer.

Winter annuals are typified by those species whose seed are programmed to germinate during times of cooling soil temperatures, increased soil moisture, and shorter day lengths—common conditions in the fall of the year. Some common winter annuals include downy brome, field pennycress.

Summer annuals are those plants whose seeds germinate when soils are moist, day lengths and soil temperatures are increasing, usually in the spring but sometimes not until early summer. After setting seed in late summer to fall, most summer annuals die. Common summer annual weeds in Washington include barnyardgrass, crabgrass, the pigweeds, and common lambsquarters,

Biennials

Biennial weeds take 12 to 24 months to progress from seed to seed. Seeds will germinate whenever favorable conditions occur during the first year, often in spring but sometimes after the onset of fall rains. Biennial weeds are strictly vegetative their first season, regardless of when seed germination occurred, usually forming tight rosettes of leaves. Following bolting, flowering, and seed production, biennials normally die. Some common biennial weeds in Washington include wild carrot, bull thistle, and Mediterranean sage.

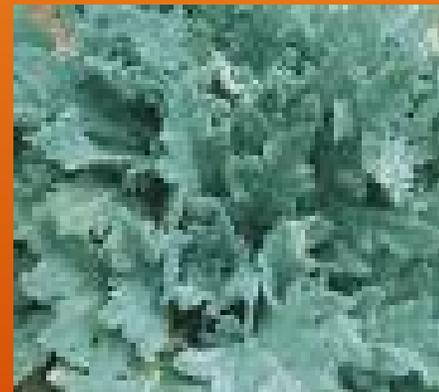
Scotch thistle



bull thistle



Mediterranean sage



wild carrot



Perennials.

Perennial weeds live longer than two years and remain alive even after they produce seed. As with other plants, perennial weeds are usually subdivided into two categories: woody and herbaceous.

Woody perennials are species with above-ground structures that survive winter. Because these shoots are exposed to colder air than are roots, branches of woody perennials are made up of tough (woody) tissue and produce buds to protect tender meristematic tissue from being injured by winter temperatures. Examples of woody perennials in Washington include wild rose, and blackberry (note that blackberries produce biennial canes from a perennial root system).

Wild rose



blackberry



Herbaceous perennials are weed species that grow from sometimes massive root systems. The roots of herbaceous perennials, however, produce flowering/fruitleting shoots each year but, because they are cannot survive cold temperatures, they die back to the ground each winter. Some herbaceous perennial weeds in Washington are field bindweed, Canada thistle, dandelion, horsetail, quackgrass, and Japanese knotweed.

quackgrass



rush skeletonweed



horsetail



Japanese knotweed



Perennial weeds can also be classified as to whether they are simple or creeping.

Simple perennials spread primarily by seed, although they can produce multiple crowns on the same root. Simple perennials include dandelion, broadleaf plantain, curly dock, and spotted knapweed.

dandelion



spotted knapweed



CREEPING PERENNIALS, SPREAD VEGETATIVELY AS WELL AS BY SEED. COMMON CREEPING PERENNIALS ARE CANADA THISTLE, HORSETAIL, FIELD BINDWEED, QUACKGRASS, AND CREEPING BUTTERCUP.

FIELD BINDWEED



CANADA THISTLE



Prevention

The old saw about "an ounce of prevention being worth a pound of cure" is abundantly true with regard to weed management. And any good weed control program must begin with a positive identification of the plant(s) in question. Remember that a weed population is far, far easier to kill before it has had a chance to establish itself on a site. If control measures had been implemented at the time a species was first detected, it might have been eradicated and the infestation avoided altogether. It pays to be vigilant!



We are often our own worst enemies in regard to spread of weeds. While there is ample evidence that weedy plants get around very well on their own devices, people are very good at aiding them in their spread. A weed's travel is enhanced through movement of equipment and vehicles through contaminated seedlots, plant materials, mulch, or animal feed/bedding ---think about that cut-rate lawn seed you bought or that bargain beauty bark you spread



Eileen Sande,
Ferry County
NWCB



Monks Hood

Aconitum sp

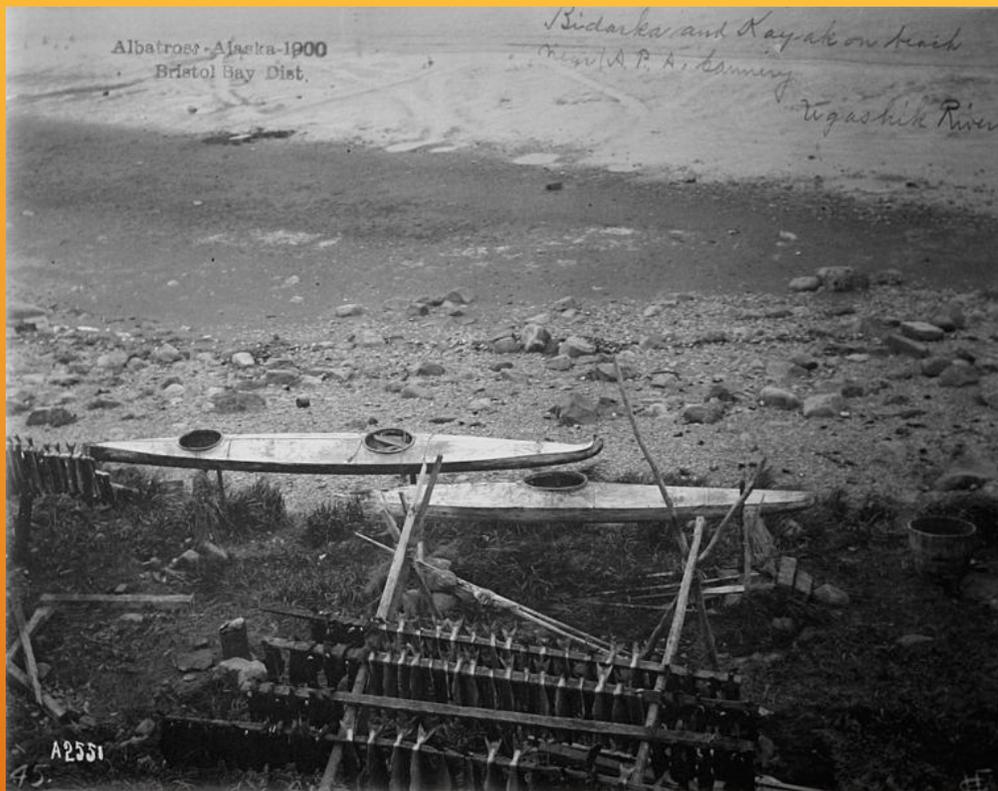


Monkshood and other members of the genus *Aconitum* contain substantial amounts of the highly toxic aconitine and related alkaloids, especially in their roots and tubers. Aconitine is a potent neurotoxin and cardiotoxin



HUMPBACK WHALE





- ▶ Aconite poison contains an alkaloid that paralyzes the nervous system and lowers both body temperature and blood pressure.
- ▶ Aconitine is a potent neurotoxin and cardiotoxin
- ▶ Severe toxicity is not expected from skin contact

If it is ingested:

Marked symptoms may appear almost immediately, usually not later than one hour, and "with large doses death is almost instantaneous". Death usually occurs within two to six hours in fatal poisoning (20 to 40 ml of tincture may prove fatal).^[20] The initial signs are gastrointestinal, including nausea, vomiting, and diarrhea. This is followed by a sensation of burning, tingling, and numbness in the mouth and face, and of burning in the abdomen.^[3] In severe poisonings, pronounced motor weakness occurs and cutaneous sensations of tingling and numbness spread to the limbs. Cardiovascular features include hypotension, sinus bradycardia, and ventricular arrhythmias. Other features may include sweating, dizziness, difficulty in breathing, headache, and confusion. The main causes of death are ventricular arrhythmias and asystole, or paralysis of the heart or respiratory center.^{[20][21]} The only *post mortem* signs are those of asphyxia.^[3]

Treatment of poisoning is mainly supportive.





LARKSPUR



One other designation of importance is the plant quarantine list. Quarantined species are particular noxious weeds that are usually ornamental; that is, they may bear bright foliage or produce attractive flowers that would entice many people to plant them in their landscape. Once planted, they almost invariably escape to become new noxious weed infestations. In Washington, it is illegal to move, buy, sell, or offer to sell a species on the quarantine list. More information on the Washington State Quarantine List is at http://www.nwcb.wa.gov/weed_laws/quarantine_overview.htm. The noxious weed list for Washington State is at http://www.nwcb.wa.gov/weed_list/weed_list.htm

Dalmatian toadflax



Mechanical Control

Mechanical weed control is physically doing something to an individual weed in order to kill it (this method is also, logically, referred to as "physical weed control").

Cultivation is the most common method of mechanical weed control, typically handpulling, hoeing, or rototilling. These methods uproot the weeds, causing them to dry out and, hopefully, die. Further, it is advisable to weed early in the day so uprooted weeds are exposed to maximal water stress during the heat of the day rather than weeding in the evening, which provides freshly-uprooted plants time to recover during nighttime hours when cooler, darker, and more humid conditions prevail. It is the seedling in the cotyledon stage of growth that is most vulnerable to cultivation, because older plants have substantial stored energy and water in leaves, stems, and roots which allow that plant to re-root or re-grow from a root or crown fragment.

Keep in mind, too, that while soil disturbance may kill the emerged weed, it also brings new weed seeds to the soil surface where they can then germinate and leave you as weedy as where you were before. So be careful not to hoe too deeply!

SCOTCH THISTLE



Controlling established perennial species using mechanical weed control methods is tough, especially controlling those perennials with vegetative reproductive structures. Because such perennials generally have considerable stored energy in their roots, they are able to recover from considerable injury, even total defoliation. Perennial roots must expend substantial energy to accomplish that re-growth, however, and unless they are able to replace that energy through photosynthesis, carbohydrate reserves in those roots can be depleted to the point of root death. Certain perennials, such as Canada thistle and field horsetail, are actually quite sensitive to defoliation, provided that all shoots are removed whenever they become photosynthetically self-sufficient.

The image features a solid orange background. In the bottom right corner, there are several white, parallel diagonal lines that create a sense of motion or a graphic element.

Rototilling

**** cuts weed roots and foliage into small pieces and buries them. This usually results in excellent control of most small annual and biennial weeds.

**** However, perennial weeds with vegetative reproductive structures greatly benefit from rototilling, since cutting their rhizomes or roots into small pieces creates a massive number of new shoots for you to contend with a week or two later. Bulbs and tubers can also be scattered from the mother plant to new sites through the tillage operation. **Unless employed frequently, then, rototilling established perennial weeds is not advisable.**

Mowing is another method of mechanical weed control. It is most often used in turf, but can also be used along roadsides, bare areas, or under trees. Annuals in particular tend to be susceptible to mowing through the summer.

Exceptions are those weeds with a prostrate growth habit (such as prostrate knotweed or puncturevine), since most of their foliage is found below the blade of a lawn mower. It is especially doubtful that low-growing perennials (such as white clover, creeping buttercup, dandelion, or many of the speedwell species) sustain much damage from mowing.

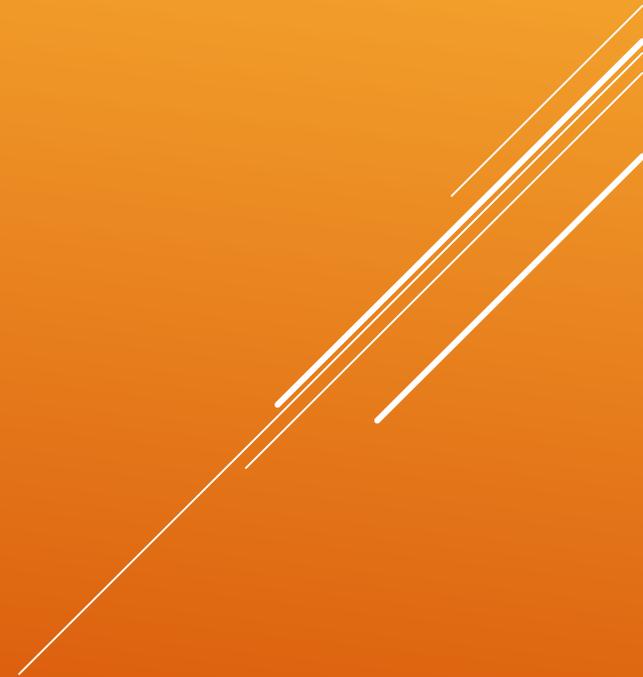
yellow starthistle



Another mechanical method of weed control is the use of mulches.

Mulches function by depriving light from either the young weed or non-germinated seed, and usually consist of gravel, pumice, bark, or wood chips. Mulches have the added benefit of slowing water loss from soil, which helps keep the soil cool and moist during hot summer months.

Black plastic is also used as a 'mulch'



Cultural Control

Cultural methods of weed control manage the level of competition between desired plants and weeds. The idea is to make conditions as favorable as possible for shrubs, turf, or vegetables while making things as difficult as possible for the weeds. Gardeners can achieve this in a number of ways.

****Be sure your desirable vegetation is as healthy as it can be—whether we're talking about landscape plants, turf, or vegetables.

****Choose plants that are well-adapted to their environment, fertilize and irrigate them properly.

****Mow lawns to keep their growth vigorous, and prevent outbreaks of diseases or insects which decrease overall plant health and competitive ability.



A second means of employing cultural weed control is to use transplants when possible. Remember that weeds compete with desirable plants for physical space, and space capture usually goes to the first plant that shows up to occupy it. Often that first plant is a weed, and often that weed emerges several days sooner than does our carefully planted crop seed. Weed seedlings often also grow faster than crop seedlings, which results in dominance of the soil by weeds. When gardeners use transplants, space capture usually goes to the crop plant, and since transplants usually grow faster than younger weed seedlings, the competitive ability of the crop is improved at the expense of the weed.



Improve weed control culturally with crop rotations.

****Weeds often will do best when growing with crop plants that share similar life cycles and growing conditions. For example, when hardy vegetables such as lettuce, spinach, or peas are seeded in late winter or early spring, early germinating weed species (usually winter annuals such as common chickweed, shepherd's-purse, and field pennycress) tend to dominate the weed spectrum because these species prefer cool soils.

****Barnyardgrass or purslane may not even get an opportunity to germinate, since the crop plants and winter annuals have already captured the space and are providing shade to the soil surface and making conditions unfavorable for further seed germination.

****Non-hardy vegetables such as squash, sweet corn, or beans are seeded in late-spring to early-summer and thus compete with late germinating weed species such as redroot pigweed or green foxtail.

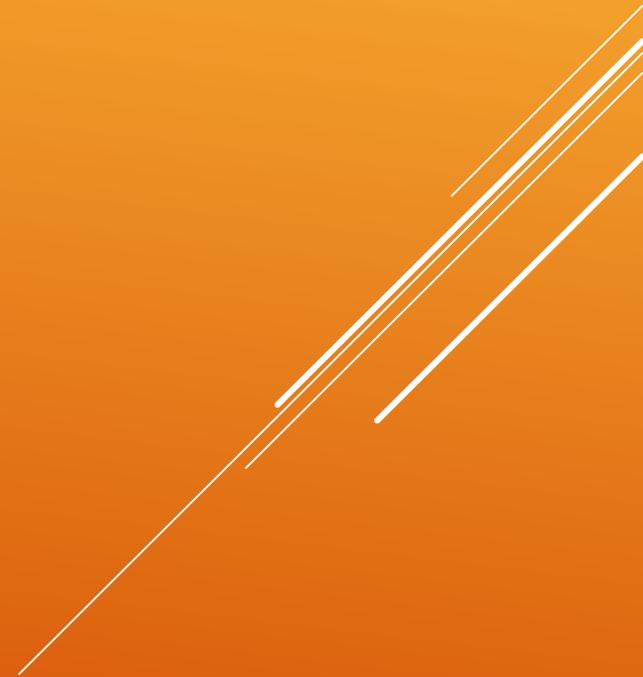
More Cultural control

**** Winter cover crops can also be used to aid in weed control. Planting winter hardy, densely-growing crops in the fall allows them to capture space in your garden and reduce the amount of weed growth compared with bare soil. This is particularly true in eastern Washington, where winters are cold enough to slow the growth of, or even kill, weeds that germinated at the same time as the cover crop.

**** Disadvantages of cover cropping include delayed crop seeding in the spring --cover crops must be incorporated into the soil and have time for initial breakdown of foliage

**** Ground covers can often be used to good effect—both aesthetically and as a tool against weeds. Good ground covers do exactly that: they cover the ground and don't allow light to reach the soil surface, thereby limiting the germination of most weedy species. Ground covers also compete well with weed seedlings, making them less likely to establish and reproduce themselves. The biggest concern about ground covers may be that they could become weedy in their own right. Be sure to thoroughly investigate unproven ground covers to see if they are weedy elsewhere in the United States or in similar climates throughout the world before using or recommending them for planting.

BIOLOGICAL CONTROL



Biological weed control, or biocontrol, uses an organism to act on or control a weed species.

****The classic use of biological control organisms is against non-native weeds of range and forest lands— usually after that weed has infested thousands of acres and other methods of weed control won't be cost-effective.

****Most weed species are not native to where they are weedy, due, in part, to lack of damaging insects or diseases in their new habitat that might slow their spread.

****Entomologists and plant pathologists, then, travel to a weed's country of origin to identify insects and disease pathogens that are detrimental to the health of that weed species and prevent it from dominating its native land. These organisms are then tested in greenhouses to determine whether they will exclusively feed on or infect our out-of-control weed, and whether they damage any closely-related crops or native plant species.





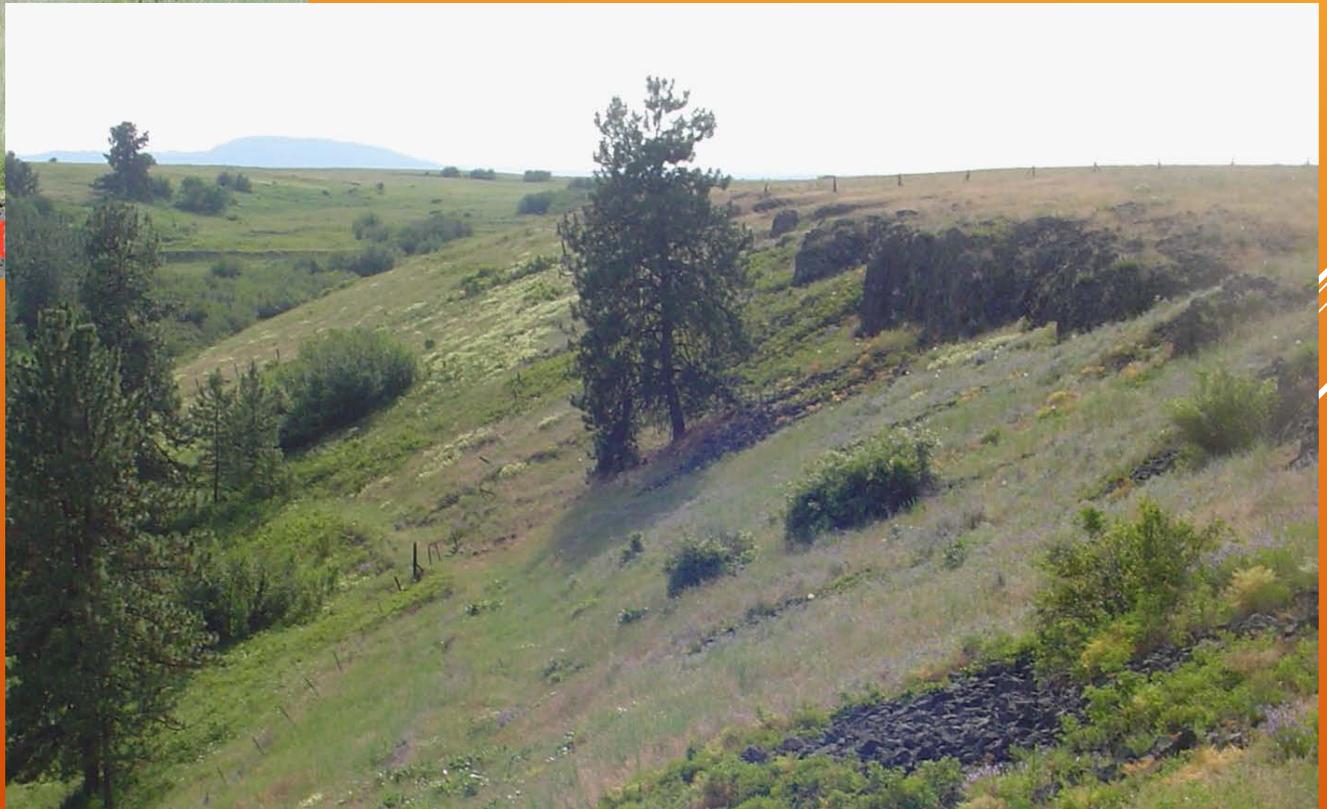
2005 7 11



YELLOW STARHISTLE BIOCONTROLS







20

ST JOHN'S WORT



DIFFUSE KNAPWEED



Sphenoptera



Larinus minutus



Cyphocleonus

DALMATIAN TOADFLAX



Mecinus

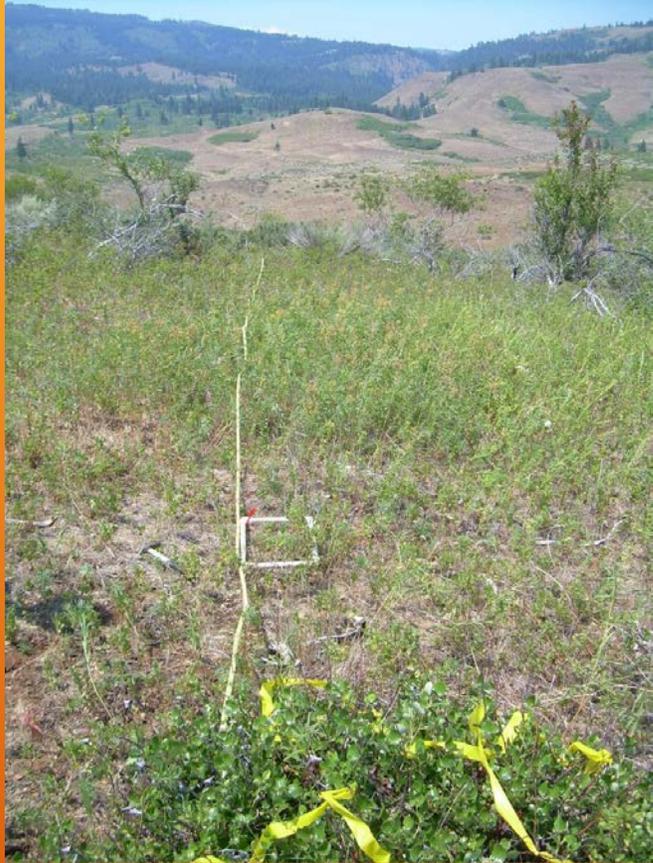


LEAFY SPURGE: APTHONA FLEA BEATLE

- ▶ Adams County

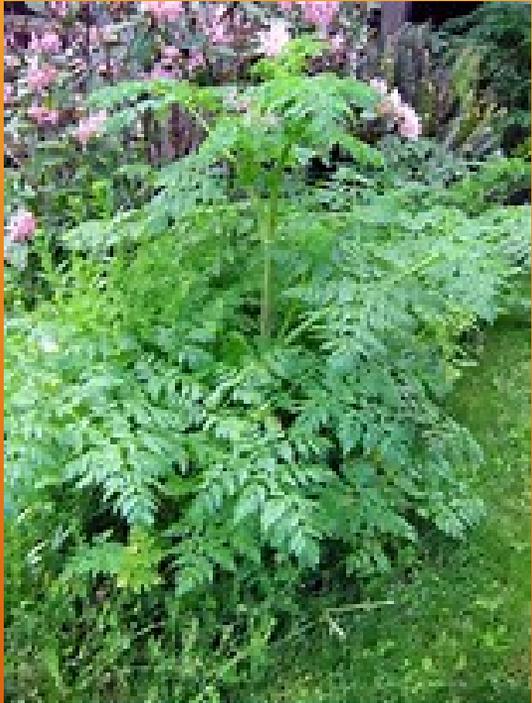
- ▶ Left picture taken in 2007

- ▶ Right picture taken in 2014





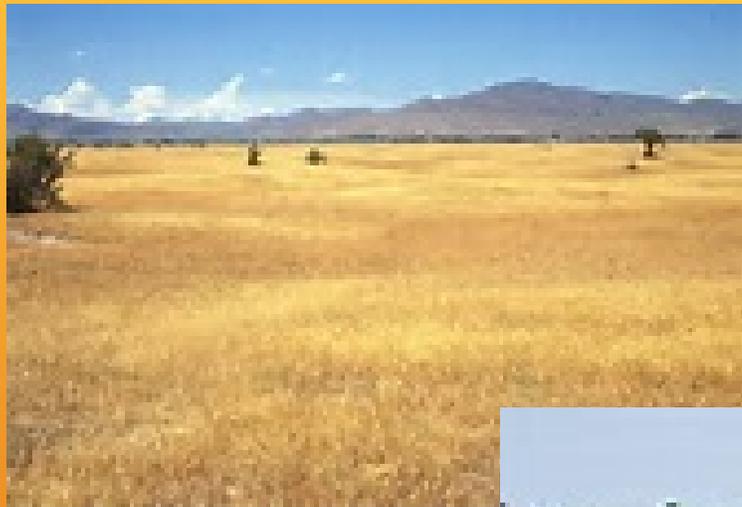
POISON HEMLOCK



AGONOPTERIX

PSEUDOMONAS FLUORESCENS

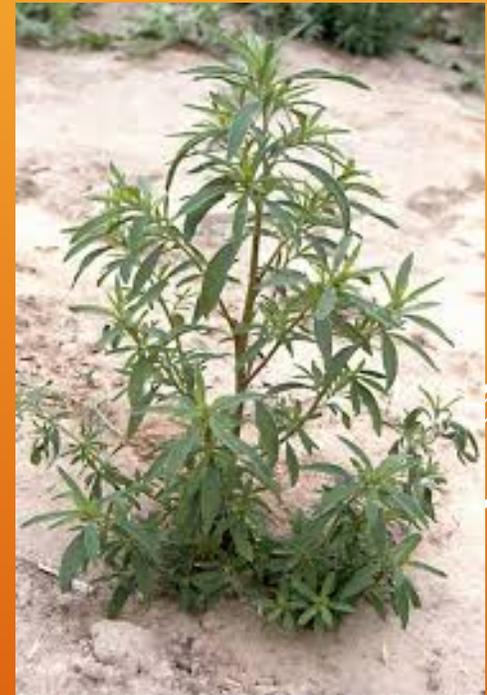








FORAGE KOCHIA

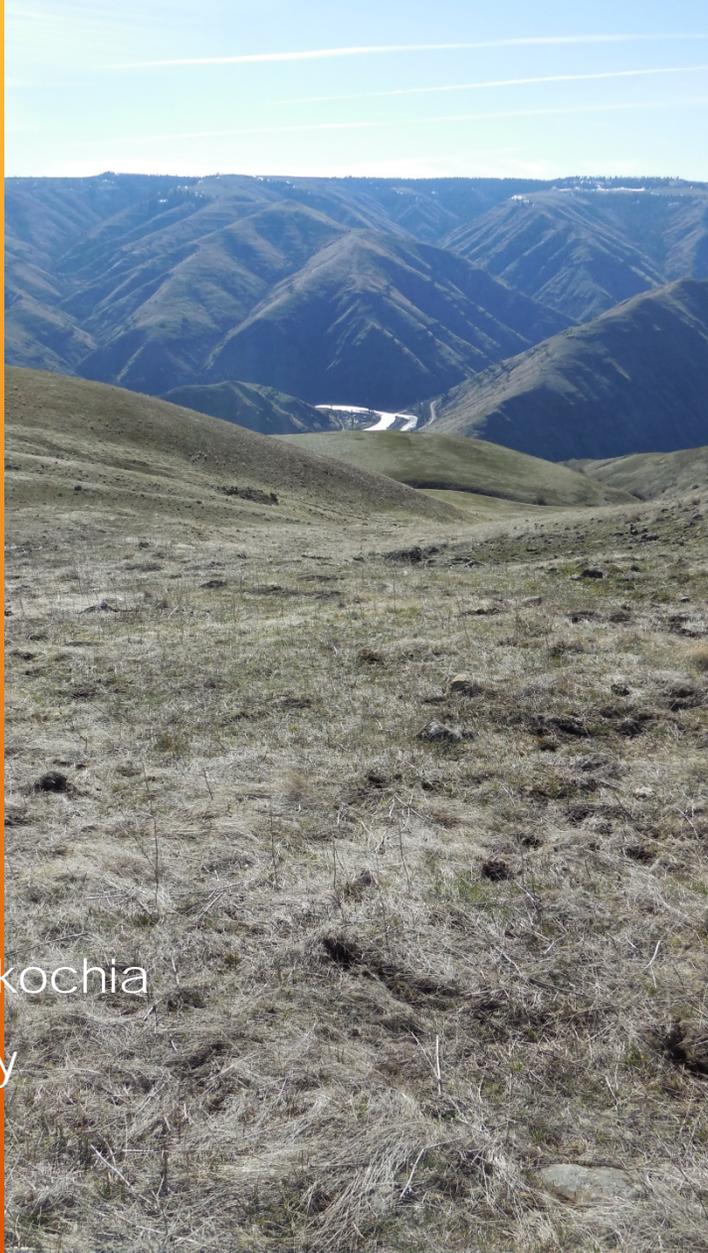


Annual kochia





Forage kochia
February
2016

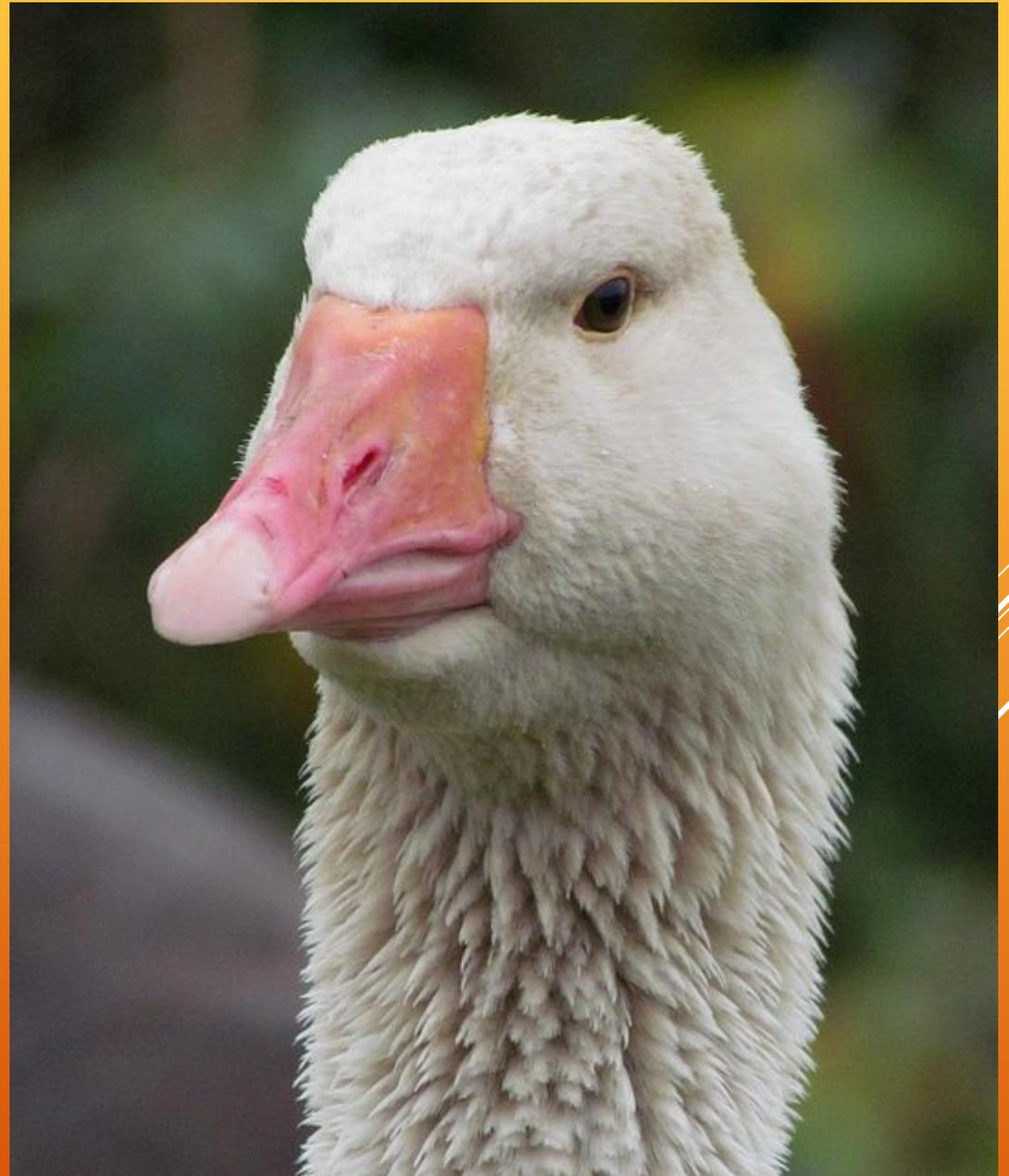
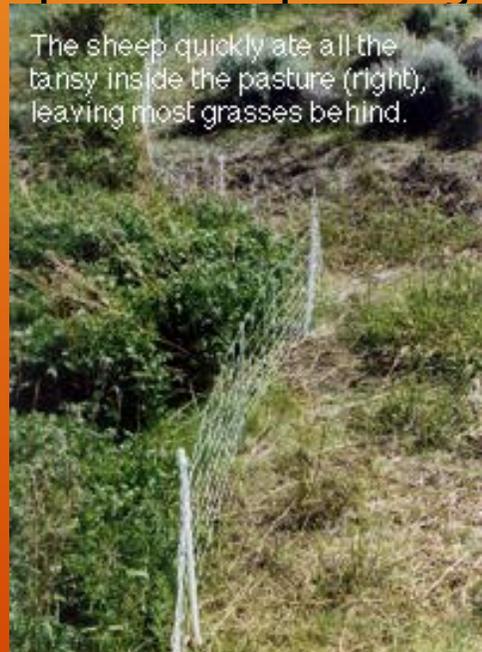


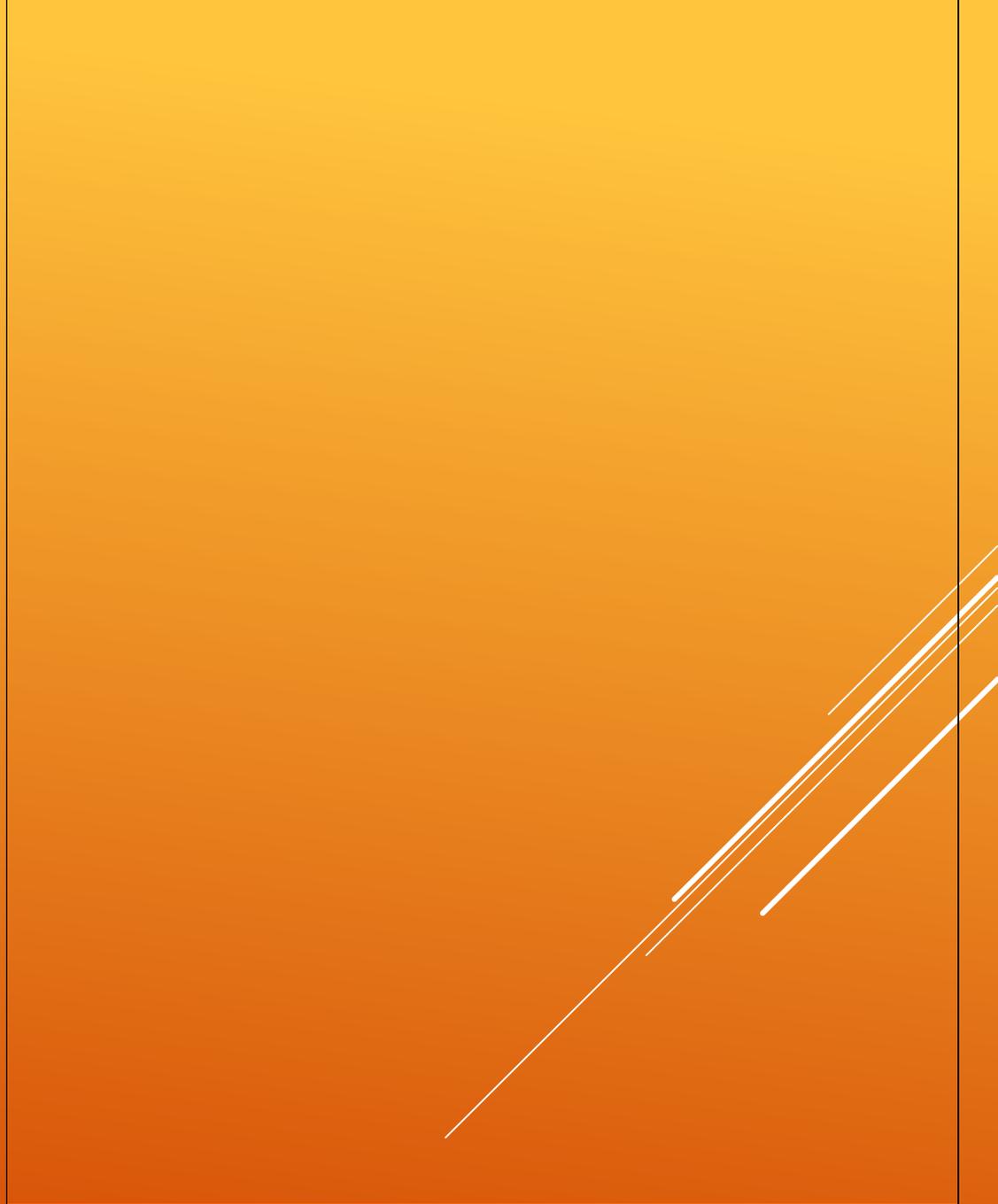
Grazing animals can also be used for weed control.

****Goats and sheep preferentially graze broadleaf plants and often are less affected by plant toxins that may injure horses or cattle, so they have been used to selectively remove range weeds such as leafy spurge or tansy ragwort.

****Cows: timing is the key

****"Weeder geese" have also been used to forage for grassy weeds in perennial plantings or broadleaf row crops.





BIOLOGICAL CONTROL OF WEEDS

PRO'S

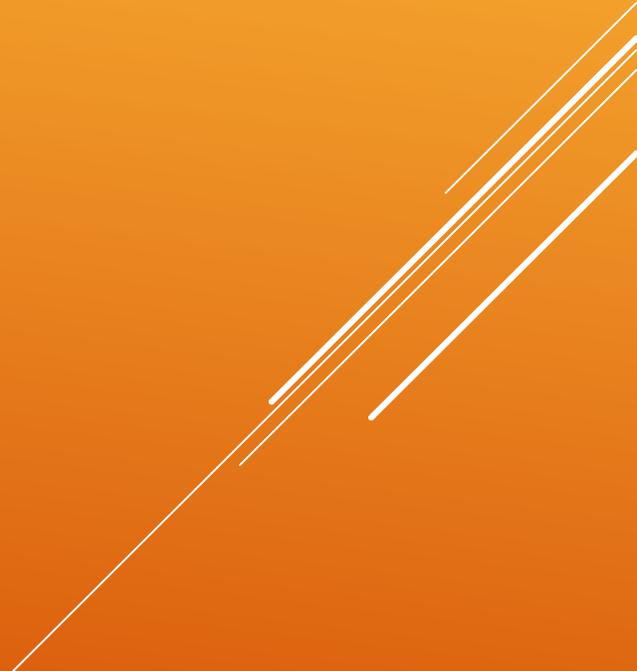
&

CON'S

- ▶ Environmentally sound
- ▶ Low cost per acre
- ▶ Self perpetuating
- ▶ Mobile
- ▶ Selective to target weed
(agent is "HOST SPECIFIC")

- ▶ Slow
- ▶ Control NOT Eradication
- ▶ Limited availability
- ▶ Environmental conditions may not suit

In general, biological weed control has less to offer backyard gardeners than other methods of weed control.

The image features a solid orange background. In the bottom right corner, there are several white, parallel diagonal lines that create a sense of movement or a graphic element.

BEEES AND CHEMICALS



APPLYING CHEMICALS









2007 5 21







2007 7 11























Chemical Control

****Chemical weed control involves the use of herbicides to disrupt certain plant functions, thereby killing the treated plant.

**** Many herbicides are registered for commercial use in various agricultural, horticultural, and non-crop situations, homeowners have access to only a fraction of these products.

- ▶ **There are 5 classes of herbicides that Master Gardeners will use the most**
- ▶ **** Class 2: Amino acid biosynthesis inhibitors: Escort
- ▶ **** Class 4: Growth regulators: 2,4-D, dicamba, Milestone, triclopyr
- ▶ **** Class 9: Enzyme disrupter: Glyphosate
- ▶ **** Class 20: cell wall biosynthesis inhibitor: Casoron
- ▶ **** Class 23 :interrupting mitosis: Preen

Herbicide types

****Herbicides are usually one of two types: **contact** products or **translocating** products.

******Contact herbicides** are applied directly to weed foliage and result in leaf/shoot kill or damage. Once absorbed, contact herbicides do not move around inside the plant, for example, from the leaves to the roots. Examples of home and garden contact herbicides include diquat, glufosinate, or oxyfluorfen, potassium salts of fatty acids, and acetic acid (vinegar)

**** **Translocating herbicides** are absorbed into the plant and then move, for example, from roots to leaves, from leaves to roots, or from leaves to other sites of meristematic activity. These herbicides are pre or post emergent. Some common home and garden soil-applied products include diclobenil, trifluralin, and oryzalin; foliar-applied products include 2,4-D, MCPA or MCPP, dicamba, triclopyr, and glyphosate.

EPA Signal Words

What Are Signal Words?

Signal words are found on pesticide product labels, and they describe the acute (short-term) toxicity of the formulated pesticide product. The signal word can be either: **DANGER**, **WARNING** or **CAUTION**. Products with the **DANGER** signal word are the most toxic.

The Environmental Protection Agency (EPA) requires a signal word on most pesticide product labels. They also require it to be printed on the front panel, in all capital letters, to make it easy for users to find. The only pesticide products that are not required to display a signal word are those that fall into the lowest toxicity category by all routes of exposure (oral, dermal, inhalation, and other effects like eye and skin irritation).

CAUTION

Products with the signal word **CAUTION** are lower in toxicity. A "**CAUTION**" label means the pesticide product is slightly toxic if eaten, absorbed through the skin, inhaled, or it causes slight eye or skin irritation.

WARNING

"**WARNING**" indicates the pesticide product is moderately toxic if eaten, absorbed through the skin, inhaled, or it causes moderate eye or skin irritation.

DANGER

"**DANGER**" means that the pesticide product is highly toxic by at least one route of exposure. It may be corrosive, causing irreversible damage to the skin or eyes. Alternatively, it may be highly toxic if eaten, absorbed through the skin, or inhaled. If this is the case, then the word "**POISON**" must also be included in red letters on the front panel of the product label.

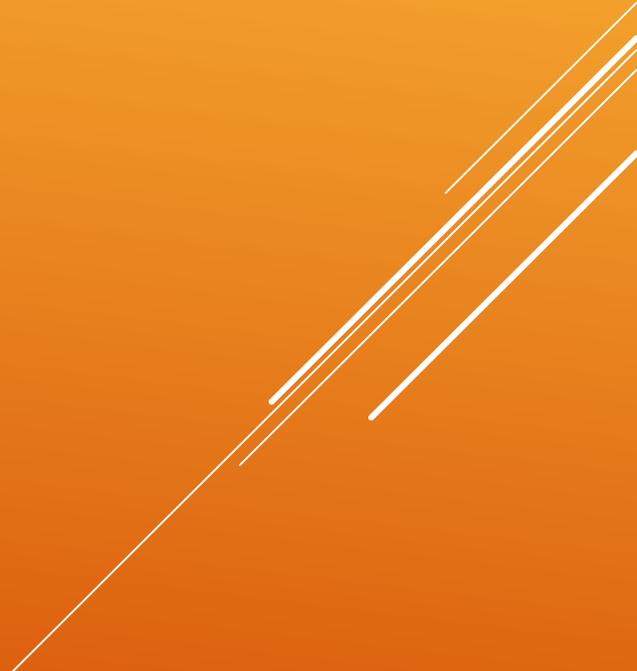
• Toxicity

1. Highly Toxic Herbicides (LD50 < 50 mg/kg)
2. moderately Toxic Herbicides (LD50 = 50 to 500 mg/kg)
3. Slightly Toxic Herbicides (LD50= 500 to 5,000 mg/kg)
4. Almost Nontoxic Herbicides (LD50 > 5,000 mg/kg)

Labels are legal documents providing directions on how to mix, apply, store, and dispose of a **pesticide** product. This means using a **pesticide** in a manner inconsistent with its **labeling** is a violation of federal law. The **label** is the manufacturer's main way to give the user information about the product.

The background of the slide is a gradient of orange and yellow. In the bottom right corner, there are several white, parallel diagonal lines that create a sense of motion or a modern design element.

If possible, keep **pesticides** in a locked cabinet in a well-ventilated utility area or garden shed. Never **store pesticides** in cabinets with or near food, animal feed, or medical supplies. **Store** flammable liquids outside your living area and far away from an ignition source such as a furnace, car, grill, or lawn mower.

The background is a solid orange color. In the bottom right corner, there are several white, parallel diagonal lines that create a sense of motion or a modern design element.

Insecticides and **Herbicides** do not have an **expiration** date. Most all insecticides and **herbicides** are made to last for years and years on the shelf. Most all will last at least 5 years as long as you keep the lid on tight and keep it out of direct sunlight and areas of high heat.

The image features a solid orange background. In the bottom right corner, there are several white, parallel diagonal lines that create a sense of motion or a graphic element.

Freezing temperatures shouldn't have any effect on the efficacy of the herbicide simply because **glyphosate** doesn't **freeze** until the temperature falls below minus 20 degrees Fahrenheit. That's low enough to kill the weeds whether or not you spray them

A decorative graphic consisting of several parallel white lines of varying lengths, slanted upwards from left to right, located in the bottom right corner of the slide.

Is it too cold to spray those weeds, according to the manufacturer the ideal temperature for applying Roundup is between 53 and **77** degrees Fahrenheit.



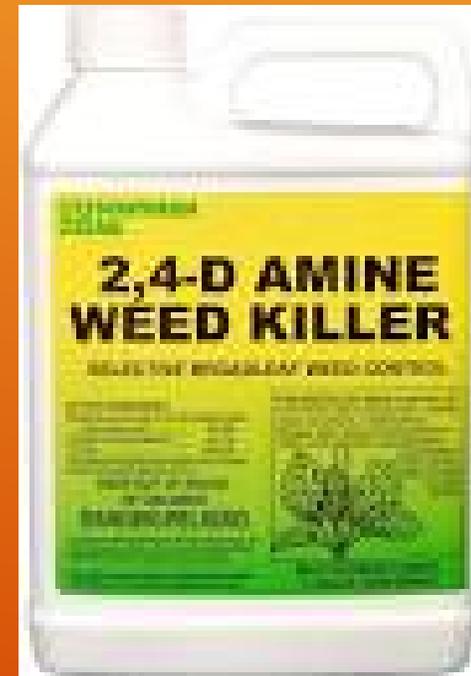
While the surfactants in formulations generally do not increase the **toxicity** of **glyphosate** itself, it is likely that they contribute to its acute **toxicity**. A 2000 review concluded that "under present and expected conditions of new use, there is no potential for **Roundup** herbicide to pose a health risk to **humans**"

The image features a solid orange background. In the bottom right corner, there are several white, parallel diagonal lines that create a sense of motion or a graphic element.

Selective or non-selective:

******Selective herbicides** provide control of certain weeds but don't damage other vegetation. An example of a selective herbicide is 2,4-D, which selectively kills broadleaf weeds in turf while not injuring the grass.

******Non-selective herbicides** damage plants of all kinds. Some are contact products such as diquat; others are translocating like glyphosate (Roundup). These products must be applied with great care to avoid unintentionally spraying foliage of desirable vegetation



Herbicide damage

Common symptoms include stems that are flattened, or that twist or corkscrew. Leaves may have abnormal shapes, sizes or textures. In addition, leaves or leaf veins may yellow or redden. In severe cases, plants may brown and die



Foliar-applied herbicides, typically, are liquid formulations. They are available either as pre-mixed (ready-to-use or RTU) sprays, or concentrates that must be mixed with water before application.



Soil-applied products are available to homeowners typically as granular products. Most are very volatile and placement on clay or finely ground materials helps to stabilize the active ingredient and keeps it from evaporating immediately after application.

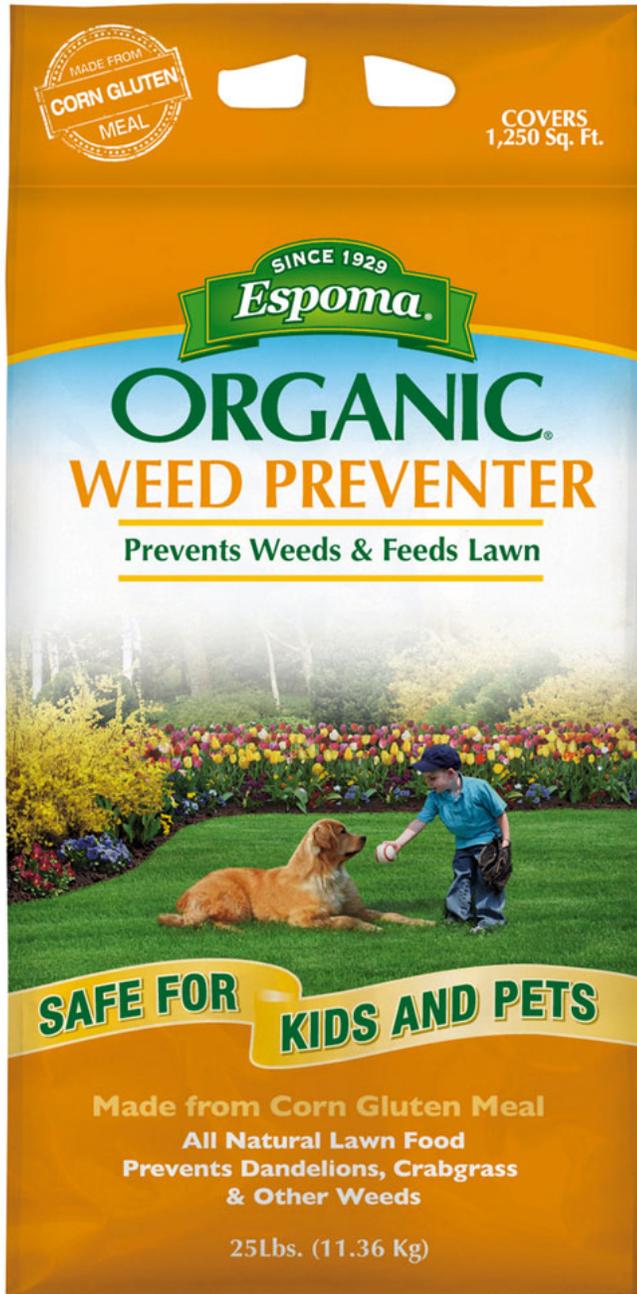
**** **Weed-and-feed** products are fertilizers that have been mixed with broadleaf herbicides such as 2,4-D or dicamba. Weed-and-feeds are formulated to be applied just like any commercial fertilizer blend—preferably using a drop-type spreader rather than a cyclone-type spreader which may fling the product into places you don't want it to go.

Organic-style herbicides.

**** **The first is acetic acid**, which can also be called vinegar. When the concentration is above 8% it's called acetic acid and this higher concentration is what is used as an herbicide.

**** Grocery store vinegar is not labeled for use as an herbicide and may not be recommended as such.

**** **The second organic herbicide** commonly available to homeowners is corn gluten meal (CGM). CGM reduces elongation of the roots from germinating seeds of many species, resulting in weed seedlings that are less able to withstand periods of drought. CGM therefore has no ability to control established weeds, only germinating seeds. CGM has not been shown to be particularly effective at killing weed seedlings in the field, even at high rates. Consequently, corn gluten meal is not currently recommended by Washington State University for weed control



Mixing and applying herbicides

When mixing liquid herbicide concentrates, follow these steps:

- (1) Add approximately half the water to the spray tank,
- (2) add the measured amount of concentrate to the spray tank,
- (3) add the rest of the water to the spray tank,
- (4) put the lid on the spray tank, and shake vigorously to fully mix the product,
- (5) pressurize the tank, and
- (6) apply the herbicide.

Liquid, foliar-applied products usually require about six hours of contact time to fully move into plant tissues. Avoid spraying during wet weather—spraying wet foliage results in runoff of the herbicide, while rainfall shortly after application washes the herbicide from the plant. Most herbicides also are bound up by soil and organic matter, so weeds that are dusty or crusted with dried mud will not be fully controlled. Consequently, foliar-applied liquid sprays work best when applied to clean, dry weeds that are actively growing.

Always read and follow label directions for any chemicals.

There is always the potential for drift of herbicide sprays There are two kinds of drift: physical drift and vapor drift.

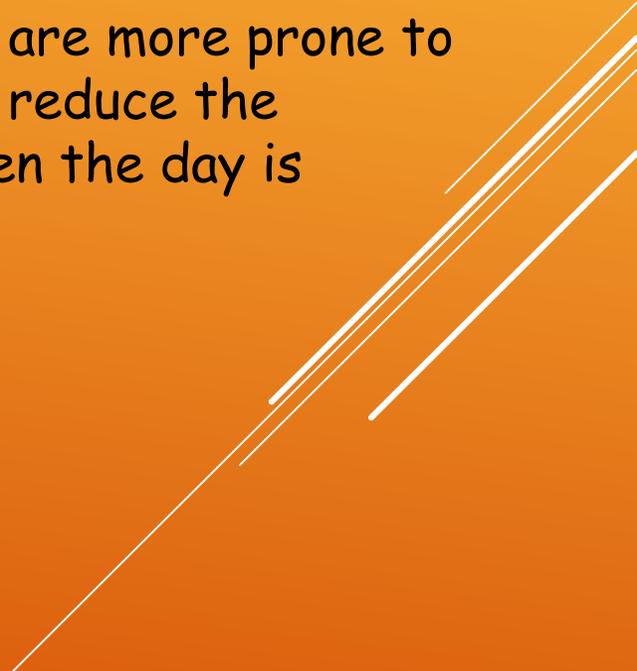
**** **Physical drift** occurs when the mist from a liquid herbicide application doesn't land where you wanted to apply the product. This is most likely to occur if you are spraying when winds are over about seven miles per hour, or in very calm (inversion) conditions when small droplets may linger in the air for several minutes or even hours. Inversions frequently occur during early morning hours, and often about sunset. Under inversion conditions, occasional breaths of wind may move these suspended droplets quite a distance from where you sprayed the product. If these droplets move to a susceptible species, that plant can be injured.

**** **Vapor drift** occurs when environmental conditions cause the applied herbicide to volatilize or evaporate from either the vegetation or soil surface. Humid conditions, followed by bright sun and warm temperatures and/or spraying when soil is saturated with water

Minimizing drift

******First**, don't apply herbicides when winds are greater than seven miles per hour, or when the air is very still. A light breeze is usually better than no wind at all, since the spray droplets more quickly disperse and evaporate in a breeze than during dead calm conditions.

******Second**, do not use too fine a mist because the smallest droplets are more prone to floating off-target. Instead, use a coarser spray at lower pressure to reduce the formation of these small droplets. Finally, don't spray wet soils, or when the day is supposed to get hot.

A decorative graphic consisting of several parallel white lines of varying lengths, slanted diagonally from the bottom right towards the top right, located in the lower right quadrant of the slide.

In order to be successful, herbicide applications should coincide with the time when the weed is the weakest or most susceptible to the herbicide's action.

**** shortly after germination

**** or seedlings

Control of second-year biennials and established perennial weeds generally requires treatment with a foliar-active herbicide that translocates from shoots to roots. After application to leaves, this type of herbicide moves within the plant to kill growing points both above and under ground, reducing the weed's ability to resprout.

Personal Safety

Minimize exposure of people to herbicides

******** Wear protective clothing (long sleeves and long pants) and eye protection when mixing and applying herbicides. Exposure to liquid herbicide sprays can be minimized by keeping pets and people away from treated areas until sprays have dried.

******** Granular products are normally watered-in, so direct exposure to these herbicides after application is minimal.

******** Remember that herbicides, as well as any other pesticides, should be stored out of the reach of children and pets and should be kept in their original containers.

Integrated weed management

****Integrated weed management involves combining two or more methods of weed control in an effort to more effectively manage the weeds in our lawns, landscapes, or gardens.

****The strategies should be employed in such a way as to target the weed when it is most susceptible to being controlled by each particular strategy.

****A three-part integrated weed management plan for a larger vegetable garden infested with winter annual weeds might be formulated as follows:

- (1) Till the garden in the spring (mechanical weed control).
- (2) Wait three weeks for weed seeds brought to the surface to germinate, then spray the area with an approved weed killer (chemical weed control).
- (3) Transplant vegetable seedlings three days after spraying (cultural weed control).

It is very important to keep weed management goals realistic! Most of us tend to overestimate the effectiveness of any weed control program, while at the same time underestimating the amount of labor generally required to make that program effective.

NELLE MURRAY 509 751-7505
 907 764-0244

ASOTIN COUNTY WEED BOARD

SARA MURT 509 243-2098



