

Marianas Grazing and Livestock Academy
Basic Principles of Weed Management
Chemical/Mechanical/Grazing Management
Introduction and Topics for Discussion and Definitions
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Definitions:

1. Range – Land producing forage for animal consumption harvested by grazing. Rangeland may have inputs targeting forage management such as fencing to allow burning, protect sensitive riparian zones and rest on a large scale.
2. Pasture-Land, usually fenced, producing forage for animal consumption harvested by grazing. Pasture usually has annual or more frequent cultivation, seeding, fertilization irrigation, pesticide application or other similar practices applied to it.
3. Herbicides approved for Range and Pasture.

The label on herbicide products state that the product is cleared for pasture and range. If an herbicide is to be used for aerial is an approved application.

There are two basic types of herbicides used in range and pasture weed management. There are broad leaf herbicides and non-selective herbicides. Products designed to manage broad leaf plants can be separated into products for soft broad leaf and woody broadleaf plants. If products formulated to manage broad leaf plants are applied at recommended rate and the target area are not over dosed, grasses should not be damaged.

Non-selective herbicides are indiscriminate and will damage most plants.

Topics for Discussion

1. Application Techniques-Foliar, Basal Bar, Sub- bark (cut surface), stump treatment and ground applied.

Foliar application applies to spraying a mist on leaves if a targeted plant. Foliar applications usually employ the use of a surfactant or sticker spreader. The plant absorbs the herbicide through pores and is trans-located to the point of life cycle interruption. This point depends on the mode of action of the herbicide. The surfactant allows more pores to be reached by removing waxy protective coverings and/or spreading the herbicide mixture over a larger area of the leaves and increasing surface tension of the mixture. Because of the low concentration of herbicide and the large surface covered this method employs a greater total volume.

Basal bark application is applying the herbicide to the bark of brush or trees. This method employs a carrier that will penetrate the bark and carry the herbicide into the tree with it. The carriers are usually oils like forestry crop oil or diesel oil. Diesel oil however is smelly, can soil shoes or clothes and if O-rings in your equipment are not chemical resistant, diesel oil can disintegrate them. The concentration of herbicide is usually greater than in foliar application however the total volume is less.

Sub-bark or cut surface involves cutting that bark with an ax or machete and applying the mixture into the cut. This method is more labor intensive but often gets the herbicide where it is wanted. A high herbicide concentration is also used with this method.

Stump treatment refers to applying herbicide (high concentrate) to the stump of a targeted plant after it cut down with a pruner or chain saw. This method stops re-growth from the stump.

Ground applied herbicides refer to products that are applied in the drip zone of targeted plants. This type of herbicide may be liquid or dry pellets. Ground applied products usually require two or more inches of rain to activate. Dry pellets offer the advantages of being easily transported in vehicles or on horseback, will not volatilize or deteriorate for months while waiting for rain and can be applied with only a gloved hand. Non-targeted plants whose roots encroach into the targeted plant will also suffer damage.

Grazing Management – Rotation and Rest, Soils (fertilizer, Ph Management), Multi Species Grazing Technique, Temporary Electric Cross Fencing.

One of the most rewarding and effective methods of weed management is the elimination of discouragement of weeds directly related to a string, tight stand of desirable and palatable forage grasses and legumes on our range or pasture. This is often a dream especially where water is restricted, grazing intensity is not optimal and infrastructure is not adequate. The four topics above address these obstacles.

Rotation and rest go together. **Ideally**, if you had all of your available grazing land divided into 40 paddocks, you had adequate rainfall, soil nutrition was close to optimal, and your stocking rate was adjusted so your herd had adequate feed by taking about ½ of available forage each day, you could rotate paddock each day and each paddock would have 40 days of rest. This is not always the case and difficult to achieve at best. Rest and rotation are still effective tools and can be used in most situations to assist in weed management. If over grazing can be avoided, opportunistic weeds can be held at an minimum be reducing open soil space for weeds and increasing competition for those spaces with desirable forage.

If economically achievable soil Ph and fertility can be managed for production closer to optimal. Economics can be made more favorable by relying on soil tests to provide you with accurate amounts of amendments and fertilizer profiles.

Multi-species grazing is another tool that has proven effective in many situations. Cattle, sheep, and goats often prefer or at least tolerate different forages. In a rotation of beef cattle the cattle can lead a procession of choices by consuming the grasses and legumes they prefer. Sheep may follow and consume some other grasses and weedy forbs with the goats following to clean up woody plants other brush. This takes management skills and man power but is the only form of weed management that provides a return on the weed control equipment.

Light weight and portable, modern electric fencing powered by an energizer that is activated by a solar voltaic charged battery is a quick way to increase stocking rate of all species. This animal control method can be reconfigured daily to force grazing ruminants to consume plants that they would not normally eat.

Foliar Application

A. What to Apply (efficacy, selectivity, formulation, surfactants)

The two basic types of herbicides (broad leaf and grass) are used in foliar application in pasture weed management. These can be divided into systemic and contact.

Systemic herbicides enter the plant by one of the chosen application methods and travel to the roots where the life cycle is broken.

Contact products usually stop plant growth by interfering with an essential function where they make contact such as photosynthesis.

B. When to Apply (Timeliness, Stress on target, Weather)

Herbicides are more effective when target plants are actively metabolizing. Young growing plants that are not slowed down by dehydration or out of their growing season are examples. Stress from insects, cold, imbalance (dry/flood) of water and plants that are wet from rain or when rain is eminent are not great targets.

C. How to Mix and Apply (Safety, Spray to wet, Carriers, Coverage)

Today herbicides are safer than ever. Herbicides are not only more user friendly, they are also more environmentally friendly. All herbicides we need for weed management can be purchased over the counter, have a short half life (are not persistent in the soil or water table) and with a few precautions can be applied safely. Surfactants, soaps and detergents are designed to dissolve oils and wax they can be extremely drying on human skin and can be especially dangerous if allowed to get in your eyes. Goggles and long sleeve shirts should be worn when spraying and more so when mixing when products are at full strength.

Mixing is usually done on a percentage basis or how much of each component is in the total volume in your sprayer.

For spot spraying there are three basic numbers you need to know. You need to know the total volume of mixture you will mix. If you plan to spray one tank full this may be the size of your tank in gallons or liters. You will need to know the percentage of

herbicide you plan to use (from the label on the herbicide container) and if you need to add surfactant the percentage of surfactant you plan to use.

Example:

You have a 5 gallon sprayer and plan to spray one whole tank.

Remember-the whole tank should be used up in one session. One of the reasons our herbicides are safe today is their short active life. Microbes in the soil begin breaking down herbicides as soon as they come in contact. Microbes in the tap water you use in your mix act in the same way. A portion of your mix that is left over night in your tank will be ineffective the next day.

If you use the metric system the process is easier because the amounts are based on 1, 10, 100 etc.

You have a 20 liter tank and have determined that you want a 1.5 percent of herbicide mix.

Reminder: one liter = 1000 milliliters (ml)

20 liters then has 20,000 ml

$0.015 \times 20,000 = 300$ ml of herbicide

The surfactant at $\frac{1}{4}$ of one percent of total volume would be $.25 \times .01 \times 20,000 = 50$ ml

D. Equipment (Single Nozzles, Boom sprayers, tanks, back pack or wheeled sprayers)

There many types and configurations of spray equipment. Spray equipment can be two liter back pack sprayers are effective especially for spot spraying. Four wheel vehicles with a multi-use, economics and terrain applicability. Nozzles offer very narrow jets to very wide spray patterns according to application needs.

Basal Bark Application

A. Method

Sprayed or painted on the bark of the target plant.

B. Carrier

Oil or diesel fuel

C. Herbicide

Basal bark application is most often done on woody brush.

In most cases an herbicide formulated for woody weeds would be selected.

Cut-Surface Method

A. Tree Injector

Tools that carry herbicide and when thrust into a trunk injects herbicide.

B. Notching employees a tool to cut through bark. Herbicide is then applies into the notch.

C. Stump Treatment

Herbicide is applied to the surface after a tree or bush is cut down.

Ground Applied

A. Spike

B. An herbicide pellet dropped in the drip zone of a targeted plant. Spike needs about two inches of rain to be activated.

C. Other

There are several liquid herbicides that can be applied to the soil to kill grasses or broadleaf plants.

Mechanical

A. Mowing

This is effective method to cut and set back taller undesirable plants in a pasture and allow nutrients and moisture to be available for desirable plants.

B. Grubbing

This method uses equipment or man power to rip plants out of the soil.

This is an expensive method and used only in a few situations.

C. Weed Wrench

This device is available in three sizes and is often used where herbicides are restricted because of the proximity of desirable plants or close to a boundary.

Grazing Management

A. Rotation

B. Rest

C. Soils

D. Multi-species Grazing

E. Stocking Rate

F. Temporary Electric Cross Fencing

G. Seasonality and Weather Patterns

H. Other