Goat Browsing and Multi-Species Land Use
Why do you want goats?

• You want to raise goats (goats are product)

  OR

• To control brush and weeds to maximize pasture production for other livestock (goats are a tool)

• Knowing *WHY* determines *HOW* you need to manage the pasture
The Goat

- A true browser – do not force to graze!
  - Diet more similar to deer than other livestock
  - 60% of diet is browse, remainder grass and forbs

- Provide excellent weed and brush control

- Requires special fencing and handling methods in regards to land management
Graze vs. Browse

• Graze – consumption of grass and forbs

• Browse – consumption of brush (aka browse)
How Grass Grows

• Seedling
  – Emerges from soil as one-leaf structure (legumes as two-leaf structure)
  – *Use carbohydrate reserves from previous growing season or seed* (little photosynthesis is performed)

• Vegetative Stage
  – Leaves develop, emerge, unfold and senesce
  – Highest forage yield, most resistant to defoliation
  – Energy for growth comes from photosynthesis, excess energy replenishes CHO reserves
How Grass Grows

• Jointing/Elongation
  – Internodes elongate to prepare for seedhead
  – Growing point may be elevated and may be removed by grazing or mowing

• Reproduction
  – Flowering Stage
  – Energy is shunted from other functions to produce the flower
  – Leaf production and growth decline
  – Stem becomes fibrous – palatability and digestibility low
What this means for you

• Plant growth (biomass) can be graphed as an S-shaped curve
  – Phase 1: Weak, immature plant performing little photosynthesis. High quality, low quantity
  – Phase 2: Plants are rapidly growing and leaf area is increasing. High rates of photosynthesis. CHO reserves being replenished. High quality and high quantity. Optimum grazing
  – Phase 3: Begins when reproductive structures are formed. Higher leaves shade lower leaves. Growth and forage quality decline. Low quality, high quantity.
Simple forage curve

Figure 1. Forage Growth Curve.

From ATTRA publication “Rotational Grazing”
Forage growth curve

1. Freshly grazed
2. Lush vegetative growth
3. Flowering and seeding

Best time to graze

Quality

Yield
What happens to the roots?

- When grazed, plants “self-prune” their roots so that they can be supported by above ground structures.
- The pruned roots decompose into valuable OM.
What happens to the roots?

- Severe grazing reduces leaf area, which reduces CHO supplied to the roots.
- Fewer CHO reserves and plant stress weaken the plant and leave it susceptible to disease, insects, drought, and premature grazing.
- Managers must allow enough time for the leaves and roots to regrow AND rebuild CHO reserves.
Grass and Legume Regrowth

• Energy comes from “root reserves”
  – Expansion and growth of remaining leaves
  – Rhizomes and stolons
  – Basal or elevated growing points
Brush Regrowth

- Energy comes from “root reserves” or photosynthesis (depending on amount leaves left)
  - Lateral buds
  - Shoots from base
  - Rhizomes or stolons
Grazing and Browsing Concepts
Some Basic Concepts

• Selective grazing
  – Animals graze according to nutritional needs, palatability and ease
  – Choose specific plants or parts of plants
  – If not controlled, results in undesirable plants dominating the pasture (increasers) and desirable plants decreasing or disappearing (decreasers)
Some Basic Concepts

• Overgrazing
  – Does not refer to number of animals
  – Does not refer to level of stubble
  – Refers specifically to length of time animals are allowed to graze OR how quickly animals return to the paddock
  – “The same plant being bitten twice without recovery”

  – Overgrazing is a function of time!
Some Basic Concepts

• Deferment
  – Delay grazing until key forage species has “set seed” (seed maturity)
  – Allows best forage species to gain vigor and reproduce
  – Grazing loads on other paddocks increased

• Rest
  – Grazing area is not used for a full year (rather than just growth period)
  – Longer recovery period
  – Provides wildlife feed during dormant period
  – Grazing loads on other paddocks increased
Continuous Grazing

- Livestock graze without restriction
- Season or year-long grazing
- Least management and capital input
- Can lead to overgrazing
  - Same plants bitten multiple times
  - Leads to reduced plant vigor and mortality
- Increaser species dominate
  - Most desirable species grazed frequently
  - Least desirable species grazed least
Continuous Grazing

- Reduced amounts of usable forage
  - Trampling, zone of repugnance
- If sufficient forage, high per-animal gains
  - Each animal selects forage to meet needs
- Animal health and nutrition suffers when pastures overstocked/low forage availability
- Preferred areas (near water, cover, flatter areas, etc) get “hit” harder
Balancing graze and rest periods

- Manage grazing to keep forages in phase 2
- Remove livestock when grass gets around 4 inches (or pasture shows other signs)
- Return livestock (or mow) when grass gets 12 – 18 inches
  ***Measure the grass species that will be grazed, not the weeds that were left in the field!
- Use high stock densities, mow, or use several species with different plant preferences to minimize selection and competition
Grazing Systems

Maximize animal performance and pasture production by controlling the severity, duration and frequency of use.
Rotational Grazing and MIG

- Periodically moving livestock to fresh paddocks in order to let grazed pastures recover
- Rotational Grazing – grazing and resting paddocks in a sequence according to a schedule (calendar)
- Management-intensive Grazing (MIG) – moving paddocks based on livestock and pasture needs (level of use, stage of regrowth, class or number of animal)
- Management and capital input can be high
- Requires knowledge and skill
Rotational Grazing and MIG

- Benefits:
  - Plants recover before being regrazed
  - Opportunity to regrow
  - Time for CHO stores to replenish
- Increases pounds animal production/acre
  - Amount of benefit depends on management and condition of land when program is started
- Many grazing systems exist
  - Best system will depend on individual property attributes and management time/skill
Seasonal Grazing

• Animals allowed to graze specific pasture only for a specific season every year
  – Pasture is under snow or cannot be accessed during part of year
  – Pasture includes sensitive areas; animals removed during critical times

• BLM, USFS, State lands and parks, etc
• Desirable plants may not be able to set seed; over time may disappear or be outcompeted
Deferred-rotation

- Grazing is deferred until primary forage species has set seed
- Each pasture divided into at least two paddocks
- Each paddock is deferred grazed every 2-4 years in sequence
- Provides preferred plants and areas chance to respond or develop
Change sequence of use from year to year so that no pasture is used in the same season twice in one rotation
Rest-Rotation Grazing

• One pasture receives year-long rest
• Other pastures absorb grazing load
• Decreases livestock distribution and forage utilization problems
• Reduced selectivity
  – Animal performance not reduced under moderate stocking rates
• Allows forage recovery
• Improves soil health and infiltration
Good Grazing Management

• No “perfect” grazing system exists for all situations – design one that fits your situation
• Understand how to use grazing to stimulate grass and associated root growth
• Use grazing process to feed livestock and soil organisms
• Maintain 100% soil cover 100% of time
• Initiate or maintain natural soil forming processes
• Provide adequate rest from grazing without overresting
Goat Browsing
Goat Browsing

• Browse animals
  – Prefer brush and shrubs, then forbs
• Require higher quality forage than cattle
• Highly selective - “prehensile lips”
• Begin at top of shrub and work down
  – Intake drops when forage availability drops below 1000-1200 lbs/acre
• Goats given plenty of browse have fewer parasite problems
  – Parasite eggs in manure, larvae climbs up grass short way
Goat Browsing

- Goats used for brush/weed control
  - Use pasture management principles to weaken and eliminate undesirable species
    - Graze with high animal numbers
    - Return animals as soon as leaves and buds appear on unwanted species
    - Repeat until plant dies and/or is trampled into ground
    - Replace undesirable plant with desirable species that is well suited for environment - or Mother Nature will do it for you!
  - Quickly will run out of feed - what will you do with them during “rest” periods?
  - Can take several years to truly eliminate weeds or brush. Difference seen almost immediately.
Goat Browsing

• Goats as a product / continuing part of your ranch:
  – Manage paddocks to maximize, or at least provide, brushy forage
  – Allow adequate rest
    • Brush and shrubs take longer to recover than grass
  – Lighter use means quicker recovery
  – Start with fewer animals than you think you’ll need OR plan on selling most of them after brush is under control
Before, April 6
Feed for Goats

Pasture
- Orchardgrass
- Clovers
- Ryegrass
- Tall Fescue
- Soft Chess
- Etc.

Brush/Weeds
- Blackberry
- Yellow Star Thistle
- Poison Oak
- Scrub Oak
- Wild (and planted) Rose
- Wild (and planted) Grape
- Curly Dock
- Scotch Broom
- Much more!
Multi-Species Land Use
## Diet Preference Differences (% of diet)

<table>
<thead>
<tr>
<th></th>
<th>Grass</th>
<th>Weeds</th>
<th>Browse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horse</td>
<td>90</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Cattle</td>
<td>70</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Sheep</td>
<td>60</td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td>Goats</td>
<td>20</td>
<td>20</td>
<td>60</td>
</tr>
</tbody>
</table>

Adapted from “Diversified Specie Grazing For Brush, Range and Pasture”, An Peischel, 1999
Multispecies Land Use

- Run as one mob, “leader” system, or alternate
- Different species prefer different plants
  - Even and efficient utilization of pasture
  - Yields more lbs product/acre than single-species grazing
  - Control of weedy/shrubby species increases grass production. Depending on pasture condition:
    - 1-12 goats per cow per pasture without decreasing (cow) carrying capacity. Overall increase in CC.
  - Individual animal performance increases
Multispecies Land Use

• Increases plant diversity
  – More even grazing, competition between plants

• More even forage utilization
  – Sheep graze closer to cattle manure piles
  – Cattle eat taller grasses that sheep reject

• Reduced predation after bonding occurs

• Most parasites are species specific
  – Except sheep and goats!
  – Run species in sequence – “vacuum cleaners”

• Many poisonous plants species-specific
Poisonous Plants – Leafy Spurge

• Deep, extensive root system
• If mowed, regrows from buds on roots
• Milky “juice” irritates skin, causes skin loss on hooves of cattle and horses
• Irritates digestive system; can cause death
• CP = 27-20% throughout growing season
• Provides excellent feed for sheep and goats
Poisonous Plants – Yellow Star Thistle

• Toxic to horses in large amounts - "chewing disease."
• Inability to eat or drink, muscles of the lips, face, and tongue become stiff and swollen. Permanent brain damage, eventually die of thirst and starvation.
• Sheep, cows and other livestock are not affected
• Very high in protein and energy, excellent pasture for “flushing” goats
Problems - Multispecies Land Use

• “Bully” animals
  – After bonding, may not allow handler close

• Different water requirements

• Supplemental feeding
  – Mineral levels in supplements differ between species; use supplements only for species listed
    • Run animals in sequence

• Fencing
  – Height, number of strands, voltage varies with species

• Require different types of working facilities
• Require different marketing
Problems – Multispecies Land Use

• More complex to manage than single species
  – Knowledge of each specie nutrition, behavior, diseases, health maintenance, etc.

• Requires patience to run species together
  – Different behaviors and psychology
  – “Horses walk 5 mph, cows 3 mph, sheep stroll, goats are getting into trouble…in the middle are the livestock guardian dogs…the next factor is the breed of stock dog and the ability of the stockman…” An Pieschel
Final Thoughts

• Land (and animal) productivity is limited by site characteristics (soil, topography, etc.)
  – *The land you own is best for a certain type of animal. Forcing production of browsing animals on pasture is asking for trouble and LOTS of work.*

• Goats are browsers. If the entire mob has its head down, its time to move on. They are losing nutrition and gaining parasites.

• Learn to manage pasture and browseland to minimize cost and stress.

• Know your goals BEFORE you buy goats
  *Goats are a blast – have fun!!!*
Questions?

Angela Boudro
890-4014
angiejinks@hotmail.com