Forages and Pasture Management

Greg Brann
Soil Health and Grazing Specialist
Overview

Disclaimer: livestock preferences vary according to experience and management

$ Keep forage in vegetative state
$ Graze top half or top 1/3 of forage
$ Maintain minimum grazing height
$ Grazing/Rest or Recovery period
$ Grazing Methods
$ Weed Control
$ Fun and entertaining
Reasons for adding Small Ruminants

- Small ruminants eat some forages cattle don’t eat
- Small ruminants and cattle are *vacuums* for the others inter.parasites
- Sheep and Goats *gestation period* is about 5 months
- Can breed at 10 mo
- Produce >1.5 lambs per female
- Annually pounds of offspring produced roughly equals mothers wt
- You can increase stocking rate by ~75% per year, retained ewe lambs
- Animal Unit Equivalent is 5 sheep = 1 cow or 6 goats = 1 cow
- Adding sheep to a cattle operation increases meat production by 24%, adding cattle to sheep increased production 9%
- Safer to handle sheep than cattle, *beware of flying sheep*
- Don’t require as rugged of equipment
- Sheep eat very little hay, typically highest cost of production
Goat heads high, Sheep heads low, Cattle in tall corn

Note: All species will do some browsing and grazing
Rainfall Simulator
Consider these Four Primary Process’s:

- Water Cycle
- Mineral Cycle
- Energy Flow
- Soil Biology
Basic Grazing Management

• Strive to keep grazing height above 5” (internal parasites)
• Minimum of 3 paddocks, 8+ is best
• Sheep consume 2.5 - 4% of their body weight/day in DM
• Goats and sheep require higher quality forage than cattle (first grazer)
• Concentrated tannins are natural dewormers “medicinal pasture”. E.g. lespedeza, multiflora rose,
• To avoid impacting cattle grazing stock 1 to 2 goats per cow or 0.5 to 1 ewe per cow
The Three Phases of Growth and Yield - Quality Compromise

Phase 1: Less rest
Phase 2: More rest
Phase 3: More rest
Effect of post-grazing residual on pasture daily growth rate (MU-FSRC)

Time to grow 1 ton = 64 days

It takes grass to grow grass!
Maintain Healthy Root Systems

- Close continuous grazing depletes carbohydrates needed for topgrowth and root growth.
- Regrowth is high quality but there is very little of it.
- Additionally: less drought tolerance, less nutrient uptake, etc...

30% per year
Day 1

1 in. Once a Week  
3.5 in. Once a Month
Day 6

1 in. Once a Week  3.5 in. Once a Month
Orchardgrass Cutting Height and Fertility Study
University of Kentucky (Ray Smith)

• 4 year old field of Benchmark Plus

• 3 Cutting Heights (last 3 wks ago- Sept 29)
  – 4 inches
  – 2 inches
  – ½ inches

• 4 Fertilizer Rates (3 applications)
  – 0 N and 0 K
  – 60 N and 0 K
  – 0 N and 100 K
  – 60 N and 100 K
Figure 2. Weed percentage after fourth harvest.

[LSO (0.05) = 13%]

- ON - 0K
- ON - 100K
- 60N - 0K
- 60N - 100K

![Bar chart showing weed percentage vs cutting height (in)].

Weed Percentage

Cutting Height (in)

0.5
2
4
Figure 4. Stand persistence after fifth harvest.
LSD (0.05) = 8%
Lambing Options

• Early Lambing: Winter – Early Spring
• Late Lambing: April – May
• Fall Lambing: September – November
• Accelerated Lambing: combination of above
Key Periods Need High Nutrition
Graph based on lambing March 20

- **Breeding** - 45 days: fall cool season growth or winter annuals
- **Last trimester** - (50 days prior to lambing): stockpiled tall fescue or winter annuals, good hay
- **Lactation** – 60 to 90 days: vegetative tall fescue and clovers and crabgrass or other warm season forage

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Last Tri. Birthing Weaning Lowest need Breeding

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- **Cool Season Growth**
- **Small Ruminant Nutritional Needs March 20 lambing**
Late Lambing (April/May)  
Breed November December

- High quality forages (plan 60 or more days prior)
  - Ryegrass
  - Brassicas (70% or less)
  - Cereal grains
    - Oats
    - Rye
    - Wheat Triticale
  - Cool season perennials in vegetative state
    - Max Q tall fescue
    - Select tall fescue
    - Rescuegrass
    - White clover 30%
Late Lambing
(April/May)
Last Trimester
(February March)

• Hold some “stockpile” tall fescue, Cereal rye, wheat of other vegetative fall growth
• How Much? 1 ewe (150 lb x 0.04 = 6 lb/day)
• Standing forage (e.g. 300 lb/ac inch but only graze 50% of this so 150 lb divided by 6 lb/ewe = 25 ewes per acre inch)
• 8 inches of forage/ac could feed 25 ewes for 8 days
• Need 50 days of grazing so in this example for 25 ewes we would need 6 acres.
• May need to supplement some good quality hay
Late Lambing (April/May) Lactation
April - July

- Orchardgrass gives great early growth
- Tall fescue is at its peak in May
- White clover is at peak through June
- July?
  - Sorghum sudangrass
  - Pearl millet
  - Cowpeas
  - Soybeans
  - Native grass big bluestem, indiangrass, little bluestem, eastern gamagrass
  - Bermudagrass with clover
  - Red clover and lespedeza mixed in other seedings
When ewes are dry (non-lactating)
August - October

• whatever
Accelerated Lambing

- 3 lamb crops in 2 years basically lamb every 8 months
- Creep feed lambs while pasturing ewes
- Wean lambs and feed on pasture

“Overgrazing is a function of time on pasture not number of animals”
Control

• You are in charge of how much and when livestock are in a pasture

• Open and close gates, ideal time in a pasture is 3 days or less, ideal time to regraaze a paddock is 14 to 60 or even 90 days depending on forage re-growth, season, livestock nutritional needs and your objective.

• Don’t graze too low unless you have a plan, (e.g. reduce competition, weed control)

Raise the Grazing Height!
Moving stock is not a problem, be sure they are all standing before calling them.
Quality of Grass

Dairy quality

Dry ewe or cow quality

Don’t Graze
Rotate and graze top 1/3 of plant stockpiling every field
Rest/Recovery no longer than 90 days in growing season, 210 days fall through early spring
After Grazing
Brown leaves shading green
Rested a little long
Understocking

Can result in the following:

- Leaving **stools of grass** behind
- Spot grazing
- More **mowing** to get back to vegetative state
- Leaving old warm season grass, **not allowing cool season grass to establish**
Manure an overlooked asset

96-36-84/AU/yr (.26-.09-.23/day)
e.g. Pasture nutrients needed (120-30-30)/ .26-.09-.23 x AU
number = days to graze to fertilize
120 N needed/ 26 (0.26x100) = 5 to 10 days due to N loss
Fertilize any crop with 100 AU, 11 days/ac=
286-99-253/ac

Alchemy?
Each ton of hay removes ($61 fertilizer):
- 40-60 lb. nitrogen
- 13 lb. P$_2$O$_5$
- 48 lb. K$_2$O

3 tons of hay removes ($184/ac fertilizer):
- 150 lb. nitrogen
- 40 lb. P$_2$O$_5$
- 145 lb. K$_2$O
RELATIVE FEED COSTS

$ per lb of TDN

- **PASTURES**
  - Permanent........................  .01-.02
  - Annual................................ .03-.04

- **STORED FORAGES**
  - Hay..................................  .04-.05
  - Silage...............................  .04-.05

- **CONCENTRATES and/or BYPRODUCTS**..............  .05-.15+

NCSU BUDGETS
Sheep are less attracted to hay than cattle.
Goats eat more hay than sheep.
Sheep are at the bottom of the pecking order.
Alternative Forage Species to Plant

• Cool Season
  – Orchardgrass
  – Rescuegrass bromegrass
  – Tall Fescue (Novel or Select)
  – Winter Annuals
  – Alfalfa
  – Brasiccas
  – Chicory

• Warm Season
  – Eastern gamagrass
  – Big bluestem
  – Indiangrass
  – Crabgrass
  – Pearl millet
  – Sudangrass
  – Sorghum x
  – Sericea lespedeza
  – Redroot pigweed
Plants with Condensed Tannins (potent antioxidants)

“Medicinal Pasture”

- anti-cancer properties, as well as a positive impact on heart disease, immune systems and urinary tract infections.
- Sericea Lespedeza
- Annual lespedeza
- Birdsfoot trefoil
- Arrowleaf clover
- Berseem clover
- Crown vetch
- Multiflora-rose
- Autumn olive
- Mulberry
- Mimosa
Internal Parasites

– Cattle are vacuums for small ruminant internal parasites
– Hay or tillage reduce internal parasites
– Rotational grazing can help break the reproductive cycle of internal parasites
– Condensed tannins reduce problems with internal parasites
Weed Control
Manage for what you want not what you don’t want!

• The best weed control is a good grass
• Turn weeds into forbs
  – Multispecies grazing
  – High density grazing
  – Train cows to eat weeds
• Use allelopathic plants
  – Winter rye
  – Annual rye grass
How do weeds compete with this?
## Chemical composition of various plants browsed by goats (%)

<table>
<thead>
<tr>
<th>Browse type</th>
<th>Crude protein</th>
<th>Neutral detergent fiber</th>
<th>Calcium</th>
<th>Phosphorous</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Multiflora rose</strong></td>
<td>18.2</td>
<td>34.5</td>
<td>0.99</td>
<td>0.32</td>
</tr>
<tr>
<td><strong>Black locust</strong></td>
<td>23.0</td>
<td>44.0</td>
<td>1.26</td>
<td>0.21</td>
</tr>
<tr>
<td><strong>Honeysuckle</strong></td>
<td>16.0</td>
<td>34.5</td>
<td>1.21</td>
<td>0.30</td>
</tr>
<tr>
<td><strong>Brambles</strong></td>
<td>17.1</td>
<td>24.5</td>
<td>0.23</td>
<td>0.84</td>
</tr>
<tr>
<td><strong>Privet</strong></td>
<td>20.0</td>
<td>26.8</td>
<td>0.89</td>
<td>0.34</td>
</tr>
<tr>
<td><strong>Green briar</strong></td>
<td>16.1</td>
<td>39.5</td>
<td>0.60</td>
<td>0.18</td>
</tr>
<tr>
<td><strong>Trumpet creeper</strong></td>
<td>16.7</td>
<td>43.1</td>
<td>0.42</td>
<td>0.22</td>
</tr>
</tbody>
</table>
Table 2. Quality of alfalfa occurring in a newly established stand compared to seven annual weeds occurring in a weed nursery on July 16, 1971

<table>
<thead>
<tr>
<th>Species</th>
<th>Invitro digestible dry matter (IVDDM)</th>
<th>Acid detergent fiber (ADF)</th>
<th>Crude protein (CP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alfalfa</td>
<td>72</td>
<td>24</td>
<td>27</td>
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<tr>
<td>Redroot pigweed</td>
<td>73</td>
<td>21</td>
<td>25</td>
</tr>
<tr>
<td>Common lambsquarters</td>
<td>68</td>
<td>22</td>
<td>25</td>
</tr>
<tr>
<td>Common ragweed</td>
<td>73</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Pennsylvania smartweed</td>
<td>51</td>
<td>22</td>
<td>24</td>
</tr>
<tr>
<td>Yellow foxtail</td>
<td>69</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>Giant foxtail</td>
<td>62</td>
<td>33</td>
<td>18</td>
</tr>
<tr>
<td>Barnyardgrass</td>
<td>70</td>
<td>33</td>
<td>18</td>
</tr>
</tbody>
</table>

*bAlfalfa was seeded on May 14, 1971.
*cWeed nursery was seeded naturally in late summer and autumn of 1970.
Table 3. Crude protein (CP) and invitro dry matter digestibility (IVDMD) of common weeds and forages at three stages of maturity

<table>
<thead>
<tr>
<th>Weeds</th>
<th>Vegetative CP</th>
<th>Vegetative IVDMD</th>
<th>Flower/boot CP</th>
<th>Flower/boot IVDMD</th>
<th>Fruit/head CP</th>
<th>Fruit/head IVDMD</th>
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</thead>
<tbody>
<tr>
<td><strong>Herbaceous weeds</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carolina geranium</td>
<td>19</td>
<td>78</td>
<td>19</td>
<td>70</td>
<td>11</td>
<td>68</td>
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<tr>
<td>Curly dock</td>
<td>30</td>
<td>73</td>
<td>19</td>
<td>54</td>
<td>16</td>
<td>51</td>
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<tr>
<td>Cutleaf evening primrose</td>
<td>20</td>
<td>72</td>
<td>14</td>
<td>69</td>
<td>11</td>
<td>52</td>
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<tr>
<td>Henbit</td>
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<td>—</td>
<td>20</td>
<td>78</td>
<td>16</td>
<td>75</td>
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<tr>
<td>Virginia pepperweed</td>
<td>32</td>
<td>86</td>
<td>26</td>
<td>72</td>
<td>17</td>
<td>63</td>
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<td><strong>Grasses</strong></td>
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<tr>
<td>Cheat</td>
<td>23</td>
<td>81</td>
<td>18</td>
<td>69</td>
<td>14</td>
<td>61</td>
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<tr>
<td>Little barley</td>
<td>24</td>
<td>82</td>
<td>18</td>
<td>78</td>
<td>14</td>
<td>62</td>
</tr>
<tr>
<td>Virginia wildrye</td>
<td>23</td>
<td>80</td>
<td>19</td>
<td>74</td>
<td>7</td>
<td>60</td>
</tr>
<tr>
<td>Wild oats</td>
<td>23</td>
<td>75</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
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<tr>
<td><strong>Forages</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hairy vetch</td>
<td>30</td>
<td>80</td>
<td>29</td>
<td>77</td>
<td>26</td>
<td>77</td>
</tr>
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Table 4. Crude protein (CP) and invitro dry matter digestibility (IVDMD) of weeds and forages at three stages of maturity

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<th>Fruit/head</th>
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<tbody>
<tr>
<td></td>
<td>CP</td>
<td>IVDMD</td>
<td>CP</td>
</tr>
<tr>
<td>Herbaceous weeds</td>
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<td></td>
</tr>
<tr>
<td>Bur gherkin</td>
<td>17</td>
<td>81</td>
<td>17</td>
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<tr>
<td>Coffee senna</td>
<td>17</td>
<td>—</td>
<td>22</td>
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<tr>
<td>Common purslane</td>
<td>19</td>
<td>80</td>
<td>19</td>
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<tr>
<td>Cypressvine morningglory</td>
<td>20</td>
<td>80</td>
<td>—</td>
</tr>
<tr>
<td>Florida beggarweed</td>
<td>22</td>
<td>74</td>
<td>17</td>
</tr>
<tr>
<td>Hemp sesbania</td>
<td>31</td>
<td>70</td>
<td>14</td>
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<tr>
<td>Ivyleaf morningglory</td>
<td>20</td>
<td>80</td>
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<tr>
<td>Jimsonweed</td>
<td>25</td>
<td>72</td>
<td>21</td>
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<tr>
<td>Prickly sida</td>
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<tr>
<td>Redroot pigweed</td>
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<td>Sicklepod</td>
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<td>Tall morningglory</td>
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<td>Grasses</td>
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<tr>
<td>Crabgrass</td>
<td>14</td>
<td>79</td>
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<tr>
<td>Crowfootgrass</td>
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<td>67</td>
<td>8</td>
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<tr>
<td>Fall panicum</td>
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<tr>
<td>Texas panicum</td>
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<td>74</td>
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<tr>
<td>Yellow foxtail</td>
<td>18</td>
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<td>12</td>
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<tr>
<td>Forages</td>
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<td></td>
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</tr>
<tr>
<td>Bermudagrass</td>
<td>16</td>
<td>58</td>
<td>7</td>
</tr>
<tr>
<td>Pearl millet</td>
<td>17</td>
<td>59</td>
<td>6</td>
</tr>
</tbody>
</table>

Before grazing by Goats, 600 lbs/ac
After Grazing 30 days by Goats

Note fence for goats is offset electric old barb behind electric
Blackberry briars and Tall fescue before grazing
Blackberry briars and Tall fescue after grazing 1700 lb/ac of goats for 1 wk
Common ragweed
Marestail (horseweed)
Weeds are palatable at certain stages. A fast rotation of 3 days or less on a paddock and returning in ~45 days works well.
BAD WEEDS

Wingstem

Perilla mint

*Mow or trample prior in early bloom stage*

Smooth Amaranths, not so bad
Amaranth consumed best by sheep
Forb or Weed?
Cocklebur: forb or weed
Ironweed eaten well by goats and sheep

Perilla mint very little eaten
Annual Cover Crops

• Purpose
• Fill voids in perennial growth
• High Nutritional demand
• Increase residue
Grazing Corn
Are we suppose to be in here?
What is this stuff?

Cost of corn $7/ac, 150,000 ppa, drilled
Later Day 1, 8/10/2012
Path for fence knocked down with truck, 3 wire poly fence
6 days grazing,

Note: Goat heads high, 
Sheep heads low, Cattle in tall corn 

Note: All species will do some browsing and grazing
August 18, Day 8, of strip grazing
Too much can be eaten, *screw up!*

Not good residue (litter) management should have back fenced, results in reduced fertility, moisture conservation and lower biological activity
High Choice steer harvested after grazing corn 18 days, 36 mo. old
Prairie Bromegrass adapted to shade and heavy manure areas
Same site as previous slide in August
Pigs with Cattle, Goats, Dogs and Sheep
Sheep pasture not mown in 20 years
Summary

• Have a goal
• Start with good stock
• Continuously cull bottom 20%
• Predator control
• Grazing is half the cost of hay
• Hay value in N, P and K is $61/ton
• Manure is not waste it’s fertilizer $80/ac/yr
• Monitor body condition
• Timely Marketing
• Make several calls prior to selling stock
• Take time to enjoy your stock
Finally

- Grazing management and culling can reduce inputs significantly
- Utilize condensed tannins “medicinal pasture”
- Don’t allow long term shading of desirable forage
- Utilize high density short duration grazing
- Set grazing can cause some environmental problems
- Water, fence and culling give you control of livestock
- Match stocking rate to inputs
- Ancillary pasture management benefits can be significant
- Take time to enjoy the fruits of your labor
Comments- Questions

Ruminations?