

Using Small Ruminants in Silvopasture Development



Charlotte Clifford-Rathert, DVM
State Extension Specialist-Small Ruminants
Lincoln University
clifford-rathertc@lincolnu.edu



BIOLOGICAL CONTROL AGENTS

- Goats are noted for their ability to remove brush
- Sheep are more efficient at removing weeds
- Effective method of controlling exotic invasive species
- Must be managed carefully and not overgrazed
- “The increasing awareness of environmental concerns along with increased costs of mechanical clearing and the use of herbicides have enforced the need for alternative methods” (Luginbuhl et al., 1996)

Benefits of Silvopasture

- The amount of fertilizers, herbicides, and feed inputs are reduced
- Soil moisture losses are reduced compared with open pastures
- Improved plant vigor
- Shade/protection from the elements is provided for livestock –Lowering Animal Stress
- Ultimately increasing net farm income from the diversified addition of new enterprises
 - Longterm income: Selective harvest of woodlands every 10-15 years
 - Annual income: Integrated crop systems

Objectives:

- Manage forage to meet animal nutritional needs
- Maintain pasture condition/available forage
- Manage internal parasite levels



Strategies:

- Utilize a Forest Management Plan
- Utilize proper stocking rates
 - Don't overstock
- Utilize animal grazing behavior to an advantage
 - Plants high in tannins
 - Proper grazing heights
 - Browse/ weeds



How many sheep/goats can you stock?

- Stocking rates vary by . . .
 - Forage quality/production
 - Rainfall: amount and distribution
 - Plant species
 - Time of year/month/season
 - Soil fertility – lime, N, P, K
 - Amount of supplementation
 - Grazing management continuous, rotational, or intensive



Proper Stocking Rate

- Balance livestock demand with forage supply
- Stocking rate: The number of animals or animal live-weight assigned to a grazing unit on a seasonal basis
- Carrying capacity: The stocking rate that provides a target level of performance while maintaining the integrity of the resource base (proper stocking rate).

Stocking Rate Guidelines

Pasture Type	Cows	Sheep	Goats	Cows + Goats
Excellent Pasture	1	5 - 6	6 - 8	1 + 1 - 2
Brushy Pasture	1	6 - 7	9 - 11	1 + 2 - 4
Brush Eradication			8 - 12 / ac	.5 + 6 - 8/ac
Sustainable browse mgmt.			1 - 3 / ac	

Mark Kennedy - 2002

What affects what an animal will consume?

- Availability of other plant species
- Season
- Presence of other grazing animals
- What species of plants animals were exposed to as juveniles (young learn from their mothers what to eat)
- Breed/species



Slide compliments of Mark Kennedy, USDA-NRCS

Diet Selection on Mixed Pasture/Range

Animal Species	Type of Diet		
	Grasses	Broadleaf weeds and legumes	Browse ¹
Cattle	65 – 75	20 – 30	5 – 10
Horses	70 – 80	15 – 25	0 – 5
Sheep	45 – 55	30 – 40	10 - 20
Goats	20 – 30	10 – 30	40 – 60

¹ Shrubs or trees

SOURCE: D. Forbes and G.W. Evers, Texas A&M Univ.; D.I. Bransby, Auburn Univ.; M.A. McCann, Virginia Tech Univ.; and W>R> Getz, Fort Valley State Univ. IN Southern Forages 3rd Edition

To Control Brush and Weeds

- Graze them early
- Defoliate every 6 weeks or less
- Defoliate in the fall
- Ask
 - What are we going to graze after the brush and weeds are gone?
 - What type of stock will be needed?

To Manage Brush as a Renewable Resource

- 1) Graze it later in the spring,
- 2) Longer rotation > 8 wks rest, and
- 3) Do not defoliate late in the fall



Common Perennial Grass and Legume Species for Grazing Goats & Sheep

Perennial Cool-Season Grasses

- Tall fescue
- Orchard grass
- Perennial ryegrass
- Redtop

Perennial Legumes

- Red clover
- Alfalfa
- Sericea lespedeza

Perennial Warm-Season Grasses

- Bermuda grass
- Eastern gama grass
- Indian grass
- Switch grass
- Big bluestem

Common Annual Grass and Legume Species for Grazing Goats & Sheep

Annual Legumes

- Korean/Kobe lespedeza

Winter Annual Grasses

- Rye
- Wheat

Summer Annual Grasses

- Pearl/Foxtail millet
- Sorghum Sudan grass
- Corn

Others

- Chicory
- Brassicas

Common Weed and Understory Plants for Grazing Goats & Sheep

- Multiflora rose
- Buckhorn plantain
- Blackberry
- Cocklebur
- Honeysuckle
- Kudzu
- Ironweed
- Poison Ivy
- Sumac
- Oak spp.
- Hawthorne
- Green Briar
- Elm
- Locust (Honey & Black)
- Dogwood
- Privet
- Mulberry
- Sweet Gum
- Poplar
- Eastern Red Cedar
- Russian Olive

Plants to Caution

- Forbs/ Shrubs
 - Perilla mint
 - Cockle burr
 - Poke weed
- Grasses
 - Fescue
 - Johnson grass
 - Yellow foxtail
- Trees
 - Pitted fruit trees
 - Wild cherry, plum

Requirements

- Nutritional requirements:
 - 4.5-5% of body weight per day in dry matter
 - (5.7-6.6 pounds of dry matter per doe per day)
- Water:
 - 1.5-2 gallons per head per day
- Free choice loose chelated mineral mix and salt

Be careful!

- Sheep and especially goats will destroy tree seedlings.
- Trees with larger diameters often die when goats remove bark.
- Goats and especially sheep will eat perennial grasses if there is no other preferred forage.



Other Considerations

- Facilities
- Fencing
- Predators
- Parasites
- Management

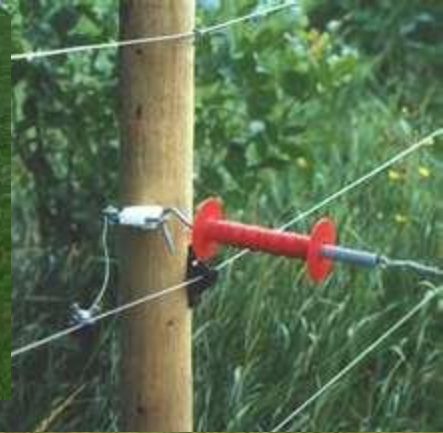


Working facilities



Fencing

- Electric netting
- “Smart Fencing”
- High tensile electric fence
- Barb wire
- Cattle panels



Predator Control

- Dogs
- Donkeys
- Llamas



Current Research Projects

- Busby Farm – Jefferson City
- Elsberry Plant Materials Center
- Crowder College



Busby Farm



Busby Farm, Spring 2012



Data collection

- Body weights
- Fecal egg counts
- Body condition scores
- FAMACHA Scores
- Browsing behavior and activity
- Plant inventory
- Soil fertility and bulk density
- Gas exchange
- Drought Management

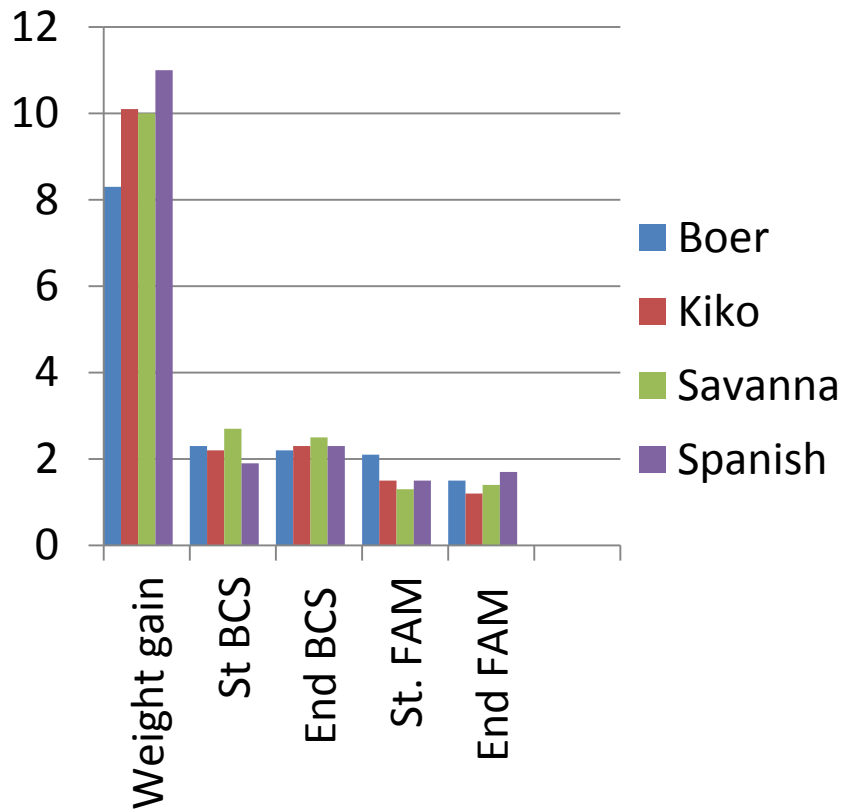


During and After the drought...

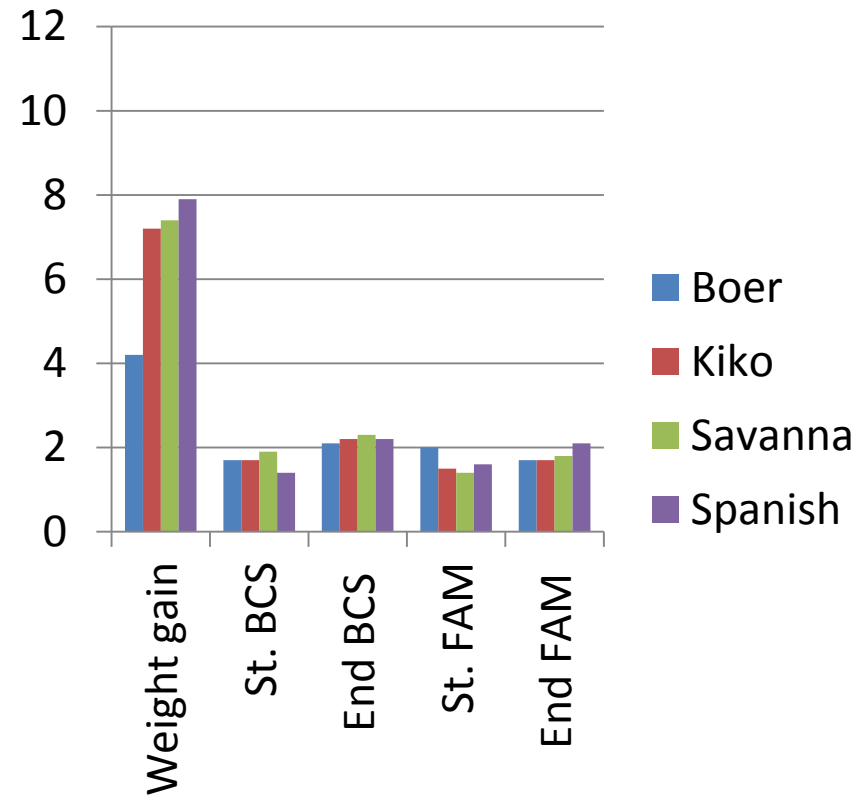


Evaluating Meat Goats on Browse (Busby Farm)

1st year results

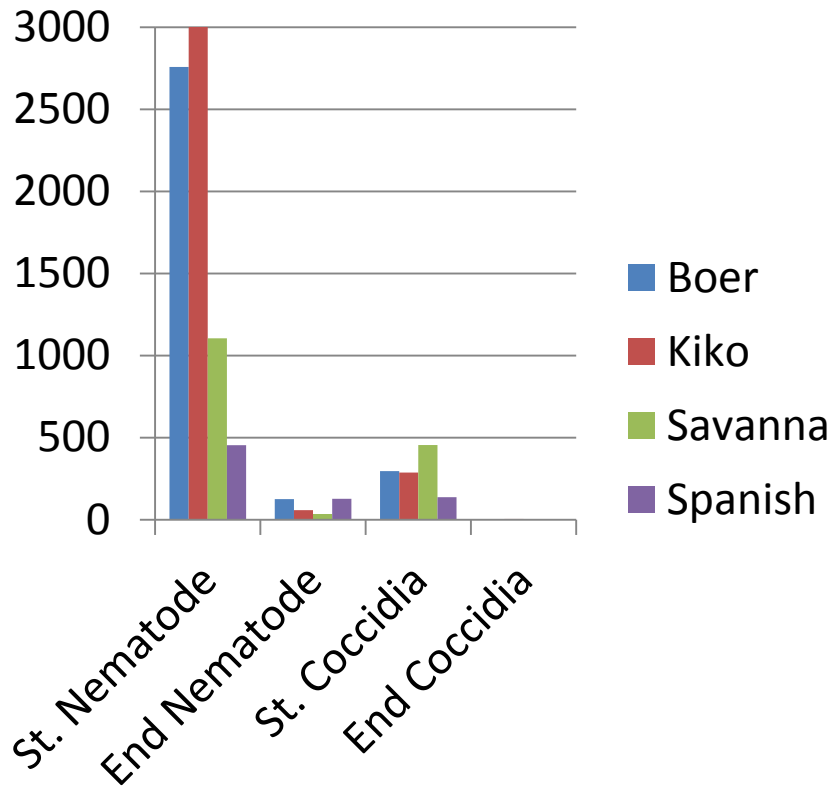


2nd year results

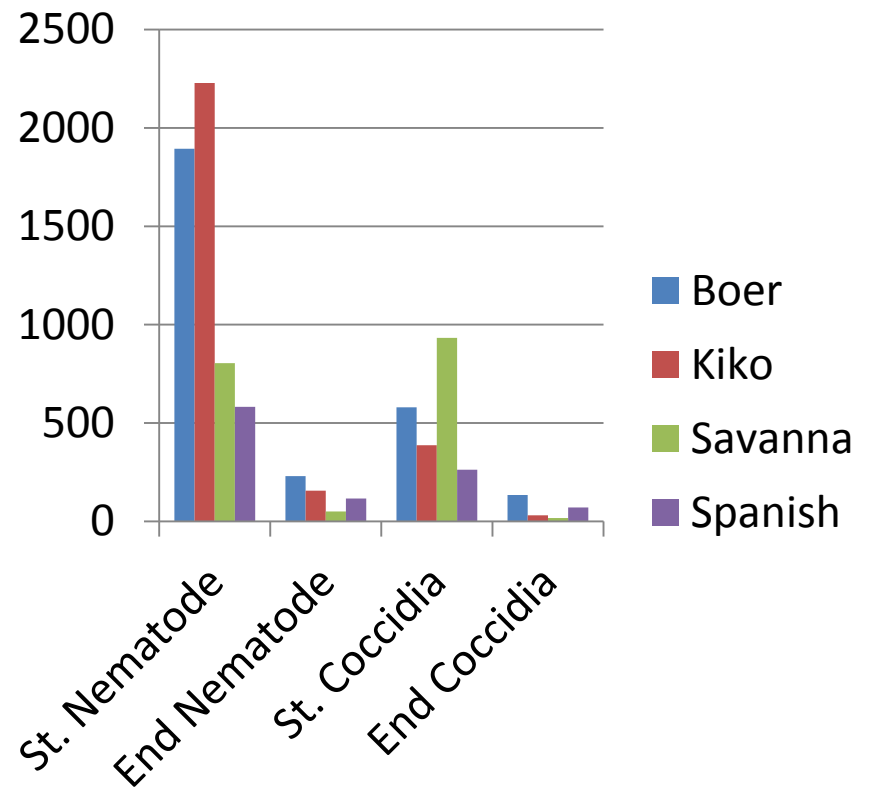


GI Parasite Control (Busby Farm)

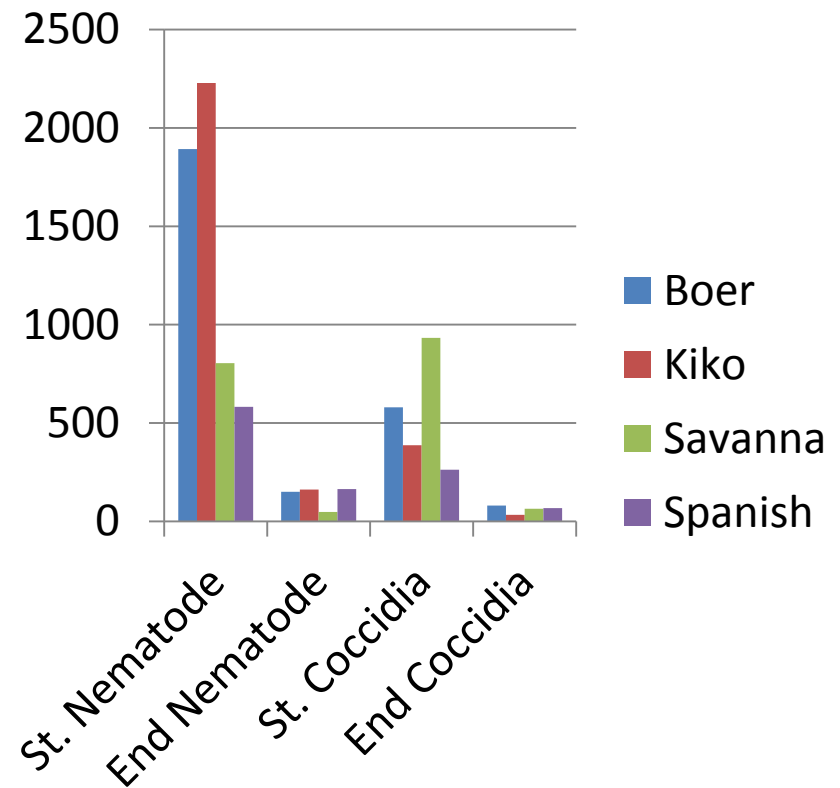
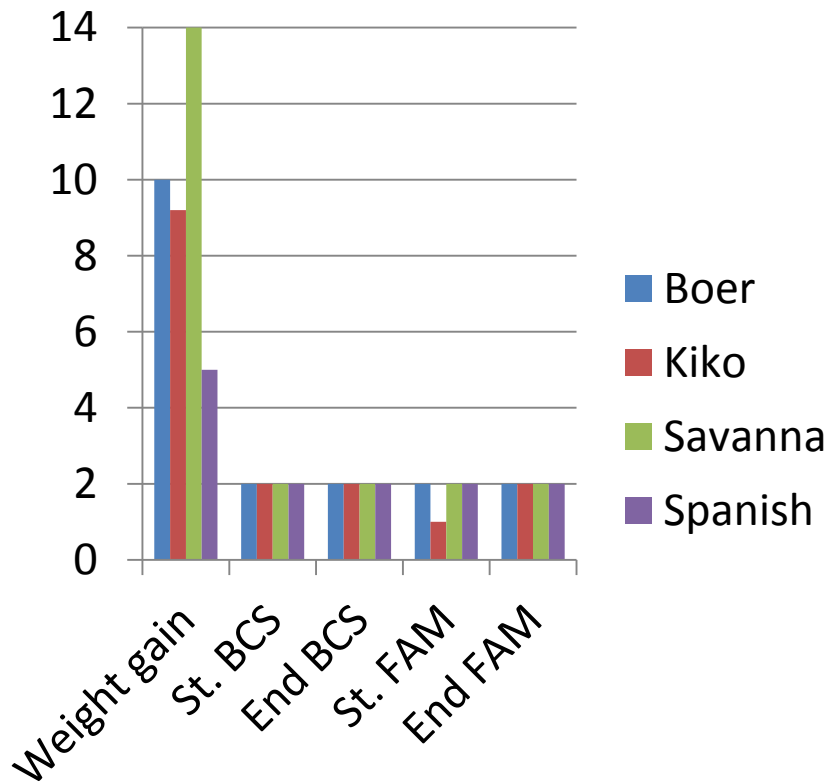
1st year results



2nd year results



Managing Meat Goats on Browse year 3 Year Avg (Busby Farm)



Impacts..

- Managed timber production – value added product
- Healthier livestock & woodland
- Improved wildlife habitat
- Improved native plant population
- Increased native grass pasture

Goals

- To provide an opportunity to develop an Extension/Research demonstration site
- To showcase an ecologically sound and economically friendly means to manage heavy vegetative growth like that found on many Missouri farms
- While at the same time converting vegetative browse into meat, milk, and fiber.
- Develop management technology for less drug use to control internal parasites in small ruminant production

Questions?

