Animal Science and Livestock Production

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Agenda

- What is Animal Science
- Livestock Selection
- Livestock Management
  - Nutrition
  - Health
- Facilities
- Pastures
- Activity
What is Animal Science?

- Refers to the total store of knowledge relative to the breeding, feeding, care and management of animals and the marketing and processing of animals and their products as gained through practical experience and research methods.

Ensminger
Animal Use as Food

- Meat – Beef, Pork, Lamb, Goat Poultry
- Milk – Cheese, Ice Cream, Yogurt
- Eggs – Pastries, Mayonnaise, Custards
Animal By-Products

- Bones – Button, glue, mineral supplement for livestock feed (Ca)
- Fat – Chemicals, salves, creams, dressings, lubricants, soaps, food
- Glands – Medicines, food additives
- Collagen – Glue, Gelatin
- Intestinal & Stomach tissue – lunch meats, surgical sutures, strings for musical and sports instruments
- Fertilizer
Animal Use as Work

- Cultivate land
- Transportation
- Control other animals (herding)
- Assist physically & Medically handicapped
  - Blind
  - Epileptic & Diabetic
Other Animal Uses

- Hides – Leather
- Hair – Wool, mohair, fiber
- Lab Animals – Mice, rats, guinea pigs etc.
- Pets
Future of Animal Science

- Embryo Transplant – can produce 20 calves from one cow per year
- Cloning – using an animal cell to grow an identical duplicate animal
Livestock Enterprises and Management

- Numerous livestock enterprises
  - Traditional
  - Exotic
  - Purebred/Crossbred
  - Recreational
Species

- Cattle, Horses
- Sheep, Goats, Swine
- Poultry, Rabbits

- Different Space Requirements
- Different Nutrition and Management
- Many co-exist well
Beef

- Great for the Part-time
- Labor and facilities can be low cost
- Land is required 1-5 acres per animal
- Returns can be low and seasonal
- Enterprises
  - Freezer beef, feeders, purebred, contract heifers
Sheep

- Low initial investment
- Low labor – expect when lambing
- Little investment
- Meat/Wool
- Not a huge market
Rabbits

- Small acreage requirements
- Minimal cash outlay
- Small market – mostly pets and show
Poultry

- Small land requirements
- Meat/Eggs
- Small amount of labor
- Enterprises – Pastured poultry, specialty birds
Goats

- Projects, Milk, Meat, Fiber
- Ethnic Populations
- Dairy – High labor
- Should explore markets
Swine

- Low acreage – Higher maintenance
- More management than – sheep, cattle or goats
- More investment in housing, shelter and fencing
- Do not utilize forage
Horse

- Facility and acreage requirements
- Higher acreage – higher maintenance
- Expense to purchase
- Enterprises – training, boarding, lessons, breeding
Livestock Selection

- Profitability of any individual animal or of a herd or flock of animals is determined by:
  - Type or individuality based on the ability to produce high-quality products for a tough market
  - Performance or efficiency of production which is the ability to utilize feed efficiently, in producing meat, milk, wool or power.
Bases of Selection

- Selection based on
  - Type and individuality
  - Pedigree
  - Show-ring winnings
  - Production testing
Bases of Selection

- **Type or individuality**
  - Selecting those animals that most closely approach an ideal or standard of perfection and culling out those that fall short.

- **Pedigree**
  - Used in most purebred operations
  - Based on performance of ancestors
Bases of Selection

- Show ring winnings
  - Implies the animals that have placed well in one or more shows are superior.

- Production
  - Generally look at economics such as body type and feed utilization
  - Performance testing, progeny testing
Feeding Livestock

Relative Importance of Principle Livestock Feeds

- Pasture & Grazing
- Corn
- Hay
- High-Protein Feeds
- Other Grains
- Silage
- Other Grains

0 10 20 30 40 50
Feed Quality

- Quality of feed affects its value for animal nutrition.

- Quality factors include palatability and nutrient content.

- Palatability refers to how well the animal will accept feed.

- Improper harvesting or handling will reduce quality.
Feed Quality

- If an animal does not find a feed palatable it will not eat enough, make good gains, grow properly or produce meat, milk or eggs.

- Feeds on produced on well fertilized soils will produce feed, especially roughages, that is of a higher quality.

- Vitamins, amino acid content and minerals will also be affected by soil type.
Digestion

- Monogastric (simple stomach)
  - Pig, Dog, Human
- Avain (poultry) – Gizard
  - Chicken, Turkey, Duck
- Polygastric (ruminants)
  - Cow, Sheep, Goat
- Pseudo-ruminants (cecum)
  - Horse, Rabbits, Hamster
Feeding Goals

- Maintenance
- Growth
- Finishing
- Reproduction
- Work
- Age
Nutritive Needs

- Energy
  - Carbohydrates, Fats
- Protein
- Mineral
  - Macro
    - Salt, Calcium, Phosphorous, Magnesium, Potassium, Sulfur
  - Micro
    - Chromium, Cobalt, Copper, Fluorine, Iodine, Iron, Manganese etc
- Vitamin
Nutritive Needs

- Most Important
  - WATER

- Roughages (Forages)
  - Bulk feeds that are low in weight per unit of volume, >18% crude fiber, low energy
  - Hay
  - Pasture
  - Silage
  - Crop Residues
What is forage?

- Vegetable matter in a fresh, dried, or ensiled state.
- What can you do with forage?
  - graze it
  - machine harvest and store it
  - it’s animal feed
- Forage allows you to raise an agricultural crop on land where other crops cannot be produced.
Grasses

- Timothy
- Orchard Grass
- Kentucky Blue
- Fescue (endophyte free)
Legumes

- White Clover
- Alfalfa
- Ladino Clover
- Red Clover
Mixing Forage Species

Consider the traits of each species.

Aggressive vs Passive

Maturity dates: early vs late

Other traits that can be utilized:

- N fixation
- fast germination
- sod formation
- summer dormancy
- life span
- heat tolerance
- wet tolerance
- palatability
- hay or grazing
- fertility needs
Forage Establishment

- Plan at least 1-year ahead.
- Planning includes soil testing.
- Don’t be cheap with fertilizer, limestone, and seed.
- Do proper field preparation.
- Select the right forage species and best available varieties of forage.
- Need good seed/soil contact.
- Don’t bury seed too deep.
Harvesting Forages

Making quality forage is an art.
- need to know your forage species
- keep on top of the weather
- have flexible production options
- have timely access to equipment
- have equipment in good working order
- have healthy forage and few weeds
- have some luck!
Forage Storage Losses

- Uncovered bales stored outside
- Hay baled too wet
- Bales stacked in contact with the ground
- Holes in plastic bags and tubes, or leaky silos
- Poorly packed and uncovered trenches
Evaluating Hay Quality

- Leafiness
- Color
- Foreign Material
- Odor and Condition

ACTIVITY
Hay Quality is Important
Why Manage Pastures?

- Pastures are profitable
  - grazed forage is good, cheap feed

- pastures are inexpensive to develop and maintain

- animals do the harvesting, therefore there is a reduction in the need for machine harvesting and forage handling

- while on pasture, animals spread manure in the field, reducing hauling
Why Manage Pastures?

- Protects surface and groundwater from nutrient pollution
  - acts as a filler to screen out and traps soil particles which contain nutrients such as N and P
  - the nutrients are then utilized by the pasture plants once these nutrients have moved into the root zone of the soil
Why Manage Pastures?

- Reduces soil erosion
  - the top growth of pasture plants lessons the impact of rain drops on the soil surface and also slows down the surface runoff of water across the field
  - pasture plant root systems bind the soil together, thereby holding it in place
  - most pastures keep the soil covered year around, unlike annual crops
Why Manage Pastures?

- Improves forage yield and quality
  - plants that are maintained at the optimum fertility level and are not stressed by pests or by poor grazing management will be more productive

- healthy, productive plants will provide a quality product

- healthy plants will have a higher nutritional value
Why Manage Pastures?

- Reduces weeds and improves esthetics
  - weeds are opportunistic; they will move rapidly into an open area or an area occupied by a weak plant

- weeds cannot gain a foothold in a field with vigorously growing plants

- a clean, weed free pasture reflects well on your farm manage and how people passing by view your farm
Maintaining Pastures

- Rotate
- Clip
- Irrigate
- Drag Manure
Grazing Management

- Protecting pasture plant root reserves and maintaining plants in a vegetative state are keys to a good pasture.
- Overgrazing reduces root reserves which shrinks the root system and leads to fewer leaves being produced; plants also take longer to recover from grazing.
- Under grazing reduces quality and yield as over-mature plants become less vigorous and more fibrous.
Forage Re-Growth

- Slow to recover at first
- Rapid growth after recovery
- Slow after rapid growth period
How Grazing Affects Root Growth

<table>
<thead>
<tr>
<th>% Leaf Vol. Removed</th>
<th>% Root Growth Stoppage</th>
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<tbody>
<tr>
<td>10%</td>
<td>0%</td>
</tr>
<tr>
<td>20%</td>
<td>0%</td>
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<td>30%</td>
<td>0%</td>
</tr>
<tr>
<td>40%</td>
<td>0%</td>
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<td>60%</td>
<td>50%</td>
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<tr>
<td>70%</td>
<td>78%</td>
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<tr>
<td>80%</td>
<td>80%</td>
</tr>
<tr>
<td>90%</td>
<td>100%</td>
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All root growth stops for 12 days with 80% removal & 18 days with 90% removal. When 60% is removed, only half of the roots stop growing.
A Good Grazing Rule of Thumb

Take half -----------------------------Leave half

- In the long run, the animals will have more forage to graze.
Why Timely Mowing?

- Mowing prevents plants from becoming over mature.
- Vegetative plants are more palatable and more nutritious.
- Mowing helps to control weeds.
- Flash grazing can work in place of mowing to help reduce excess forage in paddocks.
- Harvesting excess forage for hay is a good way to fully utilize forage resources.
Why Control Weeds?

- Some weeds have been declared illegal noxious weeds by the State.

- Weeds look bad, they reflect poorly on your management.
Why Control Weeds?

Weeds will:

- Reduce the stand of desirable plants.
- Reduce overall quality and yield.
- Reduce overall animal yield.
- Some are poisonous, or can affect the animal product.
- Seeds are spread through manure.
Weed Management

- Cultural Control
  - mowing
  - grazing
  - over seeding
  - improved fertility
Chemical Weed Control
Grazing Restrictions

- Ally........................none
- 2,4-D........................milk cows, 7 days+
- Crossbow..................milk cows, 14 days+
- Banvel......................milk cows, 7 days+
- Roundup....................livestock, 8 weeks
- Spike.......................none
- Stinger.....................none
We all want to have lush, green pastures.
Planning A Pasture System
Sources of Info and Help

- **Resources**
  - soil survey map
  - soil capability assessment
  - aerial farm map
  - walking the farm

- **Assistance**
  - Cooperative Extension
  - N.R.C.S
  - F.S.A.
  - Farming Supply Companies
Basic Types of Pastures

- **Continuous**
  - animals are allowed to graze in the pasture for extended periods of time
  - animals often do well in this system since they are allowed to choose the plants they eat
  - plants are often overgrazed and undergrazed in this system
Continuous Grazing
Basic Types of Pastures

- **Rotational**
  - animals are allowed to graze for only a limited period of time and animals are moved when existing forage has been removed
  
  - intensive rotational grazing systems subdivide pastures into paddocks and use high stocking rates where animals are forced to eat all forages
  
  - this system is most efficient
Rotational Grazing
Intensive Rotational Grazing
Basic Types of Pastures

- **Deferred Grazing**
  - forage is allowed to accumulate in a pasture for grazing at a later date
    - stockpiled tall fescue is an example

- **Strip Grazing**
  - high stocking rate of animals are put into a pasture for a limited period
  - usually involves a specially planted crop typically an annual species i.e. rape, turnips, or summer grasses
Strip Grazing

previously grazed paddock
Co-grazing
Rotating Pastures

Benefits

- Feeding less grain and hay
- Reduce pest populations
- Slow soil erosion
- Allow daily exercise

BE OBSERVANT and watch your pastures
Setting Up A Pasture System

Recommendations

- Develop a 5 year farm/business plan
- You need to plan ahead
  - plan for when fields need to be renovated
- Use existing resources whenever possible (fences, water, forage crops)
- Establish crops according to your plan
- Existing pastures can be renovated later if needed now for grazing
Setting Up A Pasture System

Recommendations

- Put your money into good perimeter fence.
  - this will help to keep predators out and your animals in.

- Map out farm, give each field own identity

- Soil test fields individually
  - each has its own personality, so treat it accordingly

- Develop a practical watering system
  - common problem for many
  - there are many factors to consider (costs, environmental, system)
Setting Up A Pasture System
Recommendations

- Create a sacrificial area
  - this will protect your pastures
- Estimate the carrying capacity of your pastures
  - impacts on the number of animals and paddocks (rotational)
- Calculate number of paddocks needed and days/paddock (rotational)
- Temporary fence works well to form paddocks
Sacrifice Area

- This is a part of your pasture system that, just as it sounds, is permitted to become trashed.

- What is important here is that the trashing is confined to one small area where the mess can be controlled.

- Animals are kept in here during periods (i.e. wet) when it is not fit to put animals in the pasture.
Paddocks

- Sacrifice area
- Turn out lots
Paddocks

- In a rotational grazing system pastures are divided up into smaller units within the pasture
  - these smaller units are called paddocks.

- In some smaller operations, permanent fencing is used to divide up the pasture.

- Temporary electric fence is a low cost, effective method of creating paddocks.
Fencing

Considerations
- Safety
- Efficiency
- Cost
- Aesthetics

Fence height should be a minimum of 5 feet.
Fencing Materials

- Wood Fencing
  - Different types (3 rail, split rail)
  - Low Maintenance
  - Expensive (@ $5 per linear foot)
  - 20-25 years life expectancy
Fencing Materials

- Wire Fencing
  - Different Types (board and wire, high tensile, electric, V-mesh)
  - Less expensive
  - Maintenance is low to medium
  - Extended life expectancy
Fencing Materials

- Other
  - PVC
  - Plastic grid/mesh
  - Electric Tape
Facility Requirements

- Things to think about
  - Water
  - Air/Ventilation
  - Space Requirements
  - Shelter
Animal Behavior

- Causes
  - Genetic
  - Simple learning (training or experience)
    - Habituation
    - Conditioning
    - Reasoning, Insight
    - Imprinting, Socialization
  - Complex learning (intelligence)
Animal Health and Disease Prevention

- Signs of Good Health
  - Contentment
  - Alertness
  - Eating
  - Sleek Coat
  - Bright eyes and pink eye membranes
  - Normal feces and urine
  - Normal Temperature, pulse and breathing
Health Considerations

- Infectious
- Communicability or Contagiousness
- Parasites
- Poisonous plants
- Livestock species
- Etc.
First Aid Kit

- Gauze pads
- Cotton Roll
- Cling Wrap (vet wrap)
- Adhesive Wrap
- Sharp Scissors

- Thermometer
- Surgical Scrub
- Gloves
- Flashlight
- Stethoscope
- Syringe
Thank You!

See you next week
References

- Animal Science by Ensminger
- Terry Poole, Extension Educator Fredrick County