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Livestock Research

Documenting the Improvement of a Perennial Pasture

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In a Nutshell

- Over time, grazing management is expected to improve forage quality, mass, and diversity.
- Thirty-one acres of perennial pasture in Cherokee County IA were transitioned from continuous to rotational stocking in 2010.
- Field characteristics were monitored at three pasture locations and one hayed location, along permanent transects.
- Several tools were used to quantify information about the pastures.
- Sample calculations are provided.

Project Timeline:

Initiated summer 2010

Planned for 5 year duration

Anderson pasture at a 2010 field day.

Background

The project was taken underway to monitor and help improve a perennial pasture that was transitioned from continuous to rotational grazing. Over time, this management is expected to improve forage quality, mass, and diversity; soil quality; allow for more grazing days on the same acreage; and provide environmental benefits through wildlife habitat and grassland health.

Materials and Methods

Thirty-one acres of perennial pasture in Cherokee County Iowa were transitioned from continuous to rotational stocking in 2010. Ten paddocks were grazed by cow-calf pairs, with rotations occurring every five to seven days. Field characteristics were monitored at three pasture locations and one hayed location, along permanent transects.

- Soil samples to 36 in (0-6, 6-12, 12-24, 24-36 in); analyzed for organic matter, pH, mineral content, and cation exchange capacity (November)
- Animal performance: initial weight of cows, bull, and calves (June); final weight of calves (November); monthly body condition scoring of five randomly-selected cows and bull
- Forage yield and carrying capacity: dates cattle entered and left a paddock; hay yield
- Forage diversity: four 2-ft2 quadrates per paddock were established; plant species identified and counted, litter and bare ground estimated, invertebrate counts (June)
- Birds and large wildlife: sightings of animals or tracks or feces recorded

Data Collection and Analysis

Data collection must be consistent and standardized as much as possible to produce reliable results. Nathan used several tools to quantify information about his pastures.

• In each tested pasture, 100 ft long transects are set up and permanently marked so that the same sites will be tested each time.

• Soil samples should be taken every three years, assoil changes come gradually, and at the same time each year, as weather can transiently effect soil characteristics. Ideally soil samples should be deep (36" used here) but split into smaller segments to differentiate between what might be transient effects on topsoil, and more long-lasting effects deeper in. Samples may be collected either clustered around the transect lines (giving more accurate information, though for a small part of the pasture), or evenly throughout the entire pasture (giving less accurate information but more applicable to the entire pasture). The method that is ultimately chosen should reflect the paddocks' characteristics and must be consistent in all subsequent testing years.

  o Nathan's pastures had different past uses and characteristics (one had been a hayfield, one had summer annuals, one was on a ridgetop, and one was at the bottom of a slope), so he tested using the cluster method.

• Pasture sizes must be known to enable accurate calculation of grazing days, stocking rate or density, and forage yield estimation. The dates that cattle move into and out of pastures, and the weights of the cattle, are also required. Any hay that is harvested and removed from the pasture must be measured – the number of bales produced, as well as an average weight calculated from several representative bales.

• Plant diversity is determined annually, at the same time each year, to avoid differences in forage species by season. Ideally it should also be done before the cattle move onto the tested pasture, to avoid inaccurate counts if the cattle consume some species preferentially. At four locations (every 20 ft) along the established transects, 2-ft2 quadrates were established and permanently marked, so that sampling will be done in the same place the following year. Within the quadrates, all plant species and the number of plants are counted; plant growth stage and spacing, degree of litter cover and bare ground, and worm castings or other invertebrate indicators are also counted.

• Livestock performance is evaluated primarily through weight and body condition scoring. Growing animals must be weighed at the beginning and end of the grazing season; adults may be weighed once yearly as their weight will not fluctuate much, except in pregnancy. Adult animals' body condition scores (on a scale of 1-9, 1 being emaciated and 9 being obese) should be monitored at least monthly, by the same person. At least five animals should be observed; the animals (if not the same ones each time) should be similar in age, weight, and body type.

• The cost of producing hay may be calculated by tracking the number of hours spent working, the cost of renting or fueling equipment, and determining the amount of hay produced.

Sample calculations to demonstrate some of the uses for collected data

Calf average daily gain (lb/d):

$$\frac{\text{Final weight} - \text{initial weight}}{\text{days between weighing}}$$

Forage production: assume cows consume 3% of their bodyweight per day

Total forage consumed (lb): total body weight of livestock x 0.03 *x* days on pasture

Hay production (tons/A):

$$\frac{\text{bales made } x \text{ average weight of bales}}{\frac{2000 \text{ lb}}{\text{ton}}} \; x \text{ acres in field}$$

Dry matter harvested, assuming 85% dry matter (tons/A): hay production *x* 0.85