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DIVERSIFIED SPECIE GRAZING FOR BRUSH, RANGE, & PASTURES

Change is stressful and a challenge to your "comfort zone". Accepting that there is something new to learn and interpret can make one uncomfortable but get ready - practice using tools to apply new knowledge and involve support from individuals already doing similar endeavors. The integration of knowledge from separate disciplines (ecology, plant physiology, hydrology, climatology, forestry, soils, economics, animal science, sociology and wildlife) equals the Ecosystem and all factors affect the vegetation distribution making up the various plant communities. But ENERGY (ENERGY FLOW), in pastoral agriculture is universal and can be used, stored, concentrated, or spread with the primary source being the sun. (Reference diagram at end of article).

To obtain efficiency of the natural energy flow - CONTROL - to use energy effectively. Control the time of grazing, the area to be grazed, the specie of livestock grazing, the season of grazing, and the plant specie to be grazed. Understand the basic forces acting on an agricultural enterprise so that small amounts of energy input act as an amplification factor thereby increasing the amount of sunlight harvested and marketed.

The biotic component is that of living organisms, plants and animals. The herbivore, through browsing and grazing affects frequency of plants grazed, the degree of vegetation removal, the plant type grazed, different types of livestock grazing and the quality of vegetation grazed. Other factors include pollination and seed scattering by animals. Decomposition takes place through other organisms which consume dead material and render it useful.

The abiotic component (non-living environment and exchange materials) affects vegetative distribution. These factors include the topography, altitude, exposure/insolation, precipitation, evaporation/evapotranspiration and soil. The water cycle is driven by energy from the sun and its distribution affects vegetation more than any other single environmental factor. There is a continuum between the soil, plants and the atmosphere.

Plant growth requirements are sunlight and the ability of the soil to provide moisture, support, protection and nutrients. Vegetation that develops in an area is determined by soil characteristics such as texture, depth, slope, organic matter, pH and chemical composition. These soil characteristics are determined by soil formation affected by climate, vegetation, parent material, topography, time, and soil organisms.

There are many environmental factors that affect vegetation distribution in relation to rangelands management. To be considered are topography, slope, precipitation, wind erosion and soil mineral content. Many important decisions are influenced by the plant community and the factors that influence those communities.

Soil fertility can be enhanced by grazing management as it increases the amount of organic matter in the soil. If a specific nutrient is lacking, it can be fed to the animals as a mineral supplement and they can deposit it for you. Soil nutrients get into the soil from the weathering of parent material, cropping practices, rain, dust, wind and are recycled by plant roots in the subsoil. Livestock deposit mineral supplements in manure as they eat about 50 pounds of mineral per year with 90% passing through as dung and urine. Livestock redistribute nutrients in a grazing system, therefore use good rotation management.

Manure is great stuff and interesting. Cattle dung (the average cow defecates 53#/da grazing) consists of 29% potassium and 47% nitrogen, with urine (the average cow urinates 23#/day grazing) consisting of 70% potassium and 52% nitrogen. If grazing sheep, dung consists of 83% calcium, 15% potassium and 38% nitrogen with urine adding 16% calcium, 84% potassium and 61% nitrogen. If you have soils with too much calcium, graze hogs as they excrete zero calcium in urine or need higher levels of calcium to change pH, graze horses with 44% excretion of calcium in the urine. The dung, besides being greatly appreciated by dung beetles, helps increase the physical characteristics of the soil (aggregation, friability, tilth, increases water infiltration and retention and decreases root-knot nematodes and other plant root pests). Healthy pastures, healthy soil microorganisms - high quality vegetation.

The quantity and quality of vegetation produced in a given time is dependent upon the amount of sun energy a plant can capture and convert to tissue. Plants need a leaf area to photosynthesize but a canopy cover of more than 30% can decrease vegetation production. As plants are grazed, recovery time is dependent upon soil fertility, season of year, soil moisture content, temperature, degree of defoliation, time of removal, animal specie grazing and residual dry matter.

Residual dry matter is the forage dry matter remaining after a pasture has been grazed. Different plant species vary in recovery time and climate effects recovery time. The correct amount of residual is needed for rapid regrowth yielding higher quality forage so that livestock per acre can be increased as well as animal performance. There is a point of no return, approximately 2000 pounds of residual dry matter per acre. High residual may also slow recovery rate as sunlight is hard to capture, old leaves are less efficient producers than new leaves, the ratio of non-photosynthetic material to green material and the leaf:stem ratio is stressed. In lightly grazed paddocks with a high residual dry matter, a decreased rate of net photosynthesis available for new growth and the old leaves shade the new ones decreasing production. Leaf Area Index (LAI) is a valuable tool for assessing plant health.

The most important concept to remember - BIODIVERSITY must be maintained. Brush, range and pasture management is based on the physiology of the plant and the ability of man to make social, environmental and economically sound decisions.

The livestock used in a grazing regime must be under control - where they need to be, how long they are to be there and the number of animals that need to be there. One does not want to overgraze the plant and deplete root reserves nor overrest the plants and decrease biodiversity. In grazing management, use of animal behavior and herd effect allows concentrated animal energy input into a small area for a short period of time. Animals of the same physiological

condition need to be foraged as a mob and the quality of feed on offer needs to satisfy their physiological requirements. Social dominance, herd leadership, flight distance and species dominance need to be considered in mixed specie grazing as does sex of livestock, age and breed dominance.

Herding a mixed mob of livestock and keeping them from being strung out takes patience and planning. Horses walk 5mph, cows 3mph, sheep stroll, goats are getting into trouble - then depending upon breed of livestock, the British breeds do not like to walk as far as the Continental breeds. And in the middle of the mob are the livestock guardian dogs - Great Pyrenean guards reacting differently than Anatolian. The next factor inflicting itself is the breed of stock dog and the ability of the stockman to utilize that dog(s) ability.

Foraging of a mixed mob is complex. The different species graze at different times during a 24 hour period, each specie selects different plants and plant parts as do the age groups within that specie, they require different amounts of water (size of watering trough), and each specie has a unique mineral requirement.

Diet Preference Differences
(percent of diet)

	Grass	**Weeds**	**Browse**
Horse	**90**	**4**	**6**
Cattle	**70**	**20**	**10**
Sheep	**60**	**30**	**10**
Goats	**20**	**20**	**60**

Genetic heritability of foraging is important in browse, range, and pasture operations. The Brahma does well on low quality feed and traveling to water whereas the Holstein needs high quality forage and approximately 30 gallons of water per day. Know the economical production traits of each specie and its ability to adapt to environmental stress; the goal is to improve herd performance.

An important concept is the animal unit (AU). Know the number of animal units a specific area can accommodate, estimate the amount of forage available by type and allot different species accordingly. Basic routine herd health management practices need to be kept updated. The manager needs to be very conscious of individuals when grazing mixed species.

Fencing. The greatest is portable, solar powered electric fencing. Creativity in fencing allows: 1) maximum utilization of forage, allowing plants to rest before re-grazing; 2) allocation of forage based upon quality or physical condition of the livestock; 3) ability to manage plant species and 4) maintain a healthy environment for diversity of vegetation and livestock – a symbiotic relationship.

As a grazier progresses through management and budgeting of forage and livestock, the unit must be treated as a "whole". All of the pieces need to be considered together - nothing stands nor functions alone - it is one continuous cycle of life.

Resources List

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Holechek. 1998. Range Management: Principles & Practices. Prentice Hall, NJ, 07458.