1965

4-H Range Management Project--Unit 1, grades 4-6 : Extension Circular 1-31-65

John F. Valentine

E.C.1-31-65

4-H RANGE MANAGEMENT project....

Grass, Cattle, Land, and Water

UNIT 1
Grades 4-6

EXTENSION SERVICE
UNIVERSITY OF NEBRASKA COLLEGE OF AGRICULTURE AND HOME ECONOMICS
AND U. S. DEPARTMENT OF AGRICULTURE COOPERATING
E. F. FROLIK, DEAN E. W. JANIKE, DIRECTOR

4-H RANGE MANAGEMENT PROJECT

CONTENTS

The American Society of Range Management was created in 1947 to foster advancement in the science of Range Management. Under its direction, a basic youth manual, "Range, Its Nature and Use" was developed in 1957. Considerable material presented in this 4-H circular was taken from this youth manual as well as from "The Nebraska Handbook of Range Management", E.C. 60-131, by D. F. Burzlaff. Cover photo courtesy of S.C.S.

By JOHN F. VALLENTINE
Range Management Specialist

Lesson 1. Your Range Management Project

The day has passed when a man could take a horse, rope, and branding iron and start in the ranching business. To buy a ranch today and stock it with cattle may cost several hundred thousand dollars. Yet there are still ways for a young man to get started in ranching.

To operate a large ranch takes "know how" and experience. How to manage both the range land and the range livestock must be learned and practiced. A 4-H range management project with the ranch work it requires is a good place to get started. Such a project may lead to actual operation of a ranch.

In addition to ranch management, many young men trained in range management become range researchers and teachers. Others find jobs with the Soil Conservation Service, the Forest Service, or banks. Western colleges and universities offer special training for young range managers after high school graduation.

Why Take a Range Management Project?

1. It is an outdoor project dealing with plants and animals.

2. It will help you train for a range management job.

3. It will give you experience and training in handling livestock range and range livestock.

4. It will help you prepare to operate a ranch of your own someday or manage one for someone else.

5. It will teach you how livestock harvest range plants and how the rancher should graze his range to get the greatest return from it.

6. It will show you how ranges are important to everyone.

A good ranch manager must know many things. He must be trained to meet the problems of managing a ranch. Do you have a beef or sheep project to take along with your range management project? This will help you to learn more about ranching.

Have you heard of the Junior Rancher 4-H Project? This is a combined range management and beef breeding project you can take when you start senior high school. However, to qualify to take the Junior Rancher Project, you must first take projects in 4-H range management and 4-H beef breeding. Now is the time to start preparing to become a "Junior Rancher."

Lesson 2. What Is Range and Range Management ?

Range--means large blocks of level, rolling, broken or mountainous land not suited to farming. These lands are covered with grasses and other plants best suited for grazing by livestock and wild game. Range may be privately or publicly owned, fenced or unfenced, and may support native or seeded vegetation.

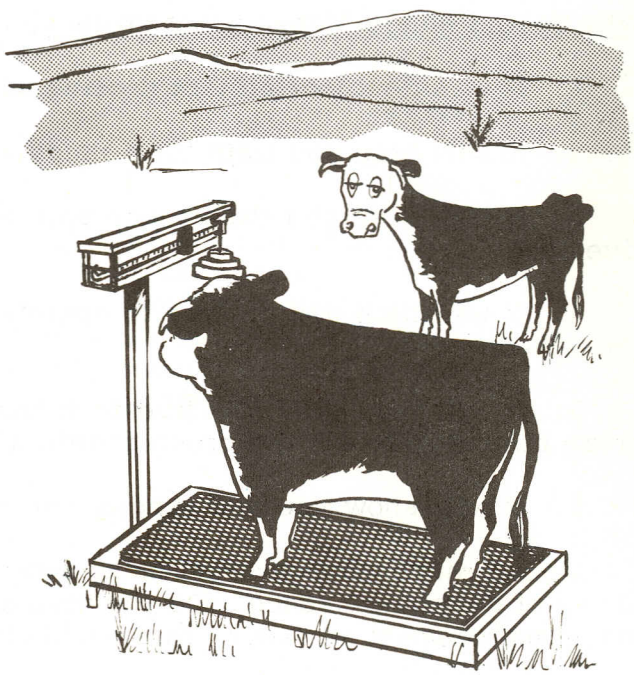
Range management--means using range to get highest continuous production from grazing animals over many years. It deals with producing a range forage crop and changing this crop into livestock which can be sold. However, this must be done so that soil erosion does not take place and so that the range forage plants remain healthy and productive.

Forage--means plant material harvested directly by grazing animals. Forage may come from native range or meadows or from temporary or irrigated pastures.

Feed--means harvested roughage such as hay, fodder or silage or concentrates such as grain or cottonseed cake.

When stockmen sell their products, they are paid for the pounds of beef, lamb or wool--not for the number of head sold. Pounds of products are the best measure of a range management plan.

It's pounds that count.



Key principles by which rangeland should be managed are:

1. Graze at the proper season or combination of seasons of the year.

2. Graze the kind or class of livestock that can make best use of the forage supply and be the most profitable.

3. Use every possible method to keep grazing animals spread out over the range.

4. Balance the number of animals with the forage supply--do not overstock.

5. Make range improvements such as seeding, brush or weed control, and stock-water developments where needed.

The basic resource of the rancher is his soil, which must be kept productive and in place on his range. But the crop the rancher produces is grass. This he markets through the cattle or sheep he raises. The rancher must use both science and "know-how" in deciding the best method of combining livestock, plants, and soil for successful range livestock production.

Several uses may be made of a range at the same time. This is called multiple use and is important on public lands. A range can be grazed by livestock to harvest the forage and at the same time be yielding water, producing game animals and tree products, and providing recreation. However, these uses sometimes compete with one another. This requires that the stockman and the other users of the range, work and plan together.

Everyone in Nebraska should be interested in range. Each of us has a "steak" in the range. We all depend upon the range whether we:

1. Run livestock on the range

2. Raise grain or hay for fattening or wintering range livestock

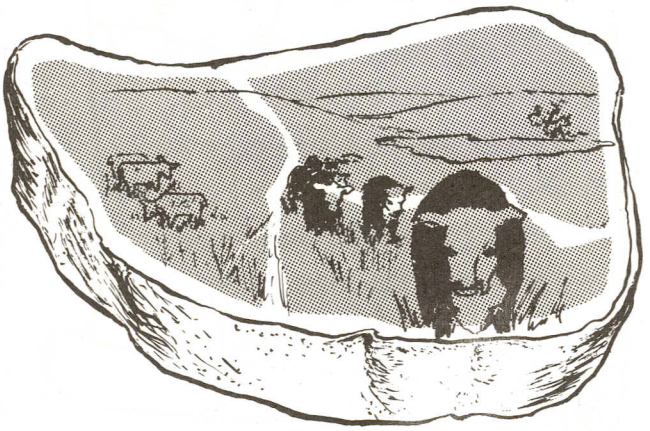
3. Enjoy beef or mutton or wear wool clothes

4. Operate irrigated land

5. Use water for drinking or in the home

6. Enjoy hunting, camping or fishing

7. Operate a store that sells goods to those who directly use the range or who sell products produced by the rancher



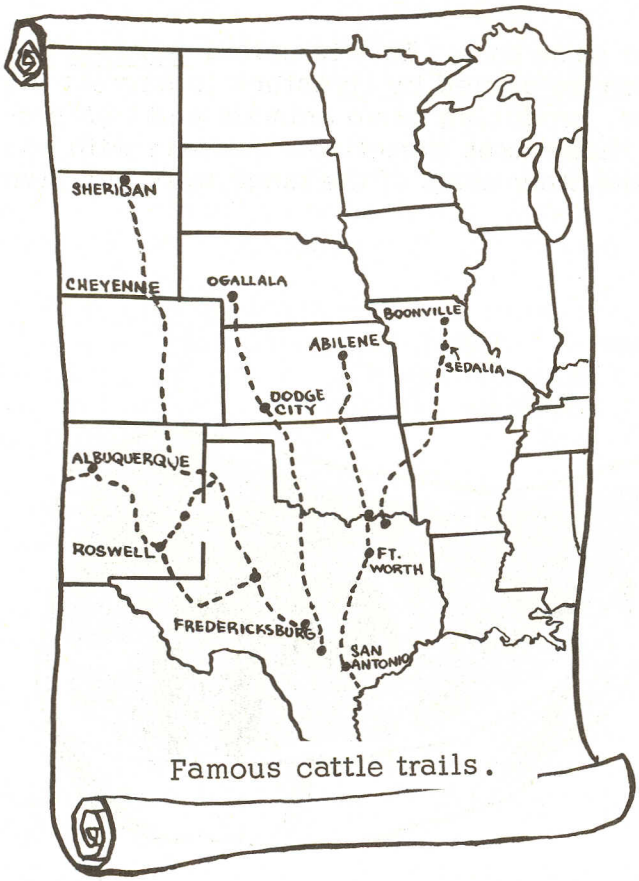
A "steak" in the range.

Lesson 3. How the Range Livestock Industry Began

Range is one of our most valuable natural resources. Before white men came to this country, the ranges were used only by buffalo, deer, elk, and antelope. These animals were used for food by the Indians and later by trappers and settlers. Today these same ranges produce beef, mutton, and wool for America.

No story of range is complete without a review of the range livestock industry. The first cattle were brought into the United States by the Spanish explorer, Coronado, in 1540. As missionaries and Spanish explorers moved north into the Indian country from Mexico, they took livestock with them. Grazing of livestock became important in Texas and California.

In the eastern states large herds of cattle were grazing in Virginia and North Carolina by the time of the Revolutionary War. Did you know that one famous battle in this war was called the Battle of the Cowpens? Cattlemen were often close behind the fur trappers in moving west. By Civil War times cattle moving west from the eastern states and cattle coming north from Mexico met in Texas. Before long there was not room for all of them on the range lands of Texas. New markets were needed.



Famous cattle trails.

The northern railroads offered outlets for cattle, and large trail drives began heading north from Texas about 1866. Cattle on trail drives averaged 15 to 20 miles per day and gained weight from eating the abundant grasses along the trail. Some of the most famous trails were the Chisholm, Shawnee, Ft. Griffin and Dodge City, Sedalia, and Goodnight Trails.

Nebraska contributed its share to the history of the range industry. The Ft. Griffin and Dodge City Trail ended at Ogallala. Cattle moved from Ogallala by rail to markets in eastern United States. Many of the cattle were kept in Nebraska or trailed on to Montana and the Dakotas. Other cattle were brought to Nebraska from the East by settlers and by the "Forty Niners."

Stockmen coming to Nebraska first settled on "hardland" range along the Platte River. However, they soon learned that the Nebraska Sandhills could be an important cattle-producing area. Livestock lost or left in the Sandhills were often found fat and sleek the following spring. Trail herds held over for shipment at a later date gained well on the tall grasses of the rolling sandhills. Settlement of the area by cattlemen began and Nebraska ranges were quickly filled up with cattle.

Trouble was ahead for the cattlemen. During the severe winter of 1885-6, thousands of cattle died on the range from exposure and starvation. The next year the Great Plains had a severe drought, again reducing cattle numbers. This was followed by one of the severest winters yet recorded. High winds, snow, and bitter cold combined to nearly wipe out many range herds.

Other factors besides severe weather caused the heavy cattle losses in the 1880's. For example, many ranges had been carelessly overstocked and ranches were poorly run. No range was saved for winter grazing and no preparation was made to insure that cattle had forage and water during winter emergencies. Little use was made of fencing, salting, and new stockwatering places to spread out the grazing.

Only stockmen with a true regard for cattle raising survived the 1880's. These were the pioneers of the present cattle industry in Nebraska. They saw the need for following better grazing practices, for providing for their stock in the winter, and for improving their business by starting permanent ranches.

As hard times reduced cattle numbers in the 1880's the sheep-raising industry grew rapidly. The presence of the sheepman, with his large flocks and habits of wandering from place to place, was resented by the cattlemen. Many range wars were fought between cattlemen and sheepmen. But finally sheepmen and cattlemen learned to live in peace, and sheep production was accepted as an important part of the livestock industry in the West.

The stock grower, then, was among the early frontiersmen of western America. Grazing was the primary use made of public lands for many years. With the increase in western population after the turn of the century, timber became an important use. Recreational uses, and more recently, water production, became important on rangeland. Settlers plowed many acres of grassland and planted field crops. Many of the grasslands in central and western Nebraska were too sandy or too rough or too dry for crops and should never have been plowed.

Settlers were encouraged by several government land settlement laws. The first Homestead Act was passed in 1862. This law gave land in 160-acre tracts to settlers after they had lived five years on the land. Most productive lands of the Middle West were in private ownership by 1870.

At home in the "soddy."

It was quickly learned that the 160 acres allowed by the Homestead Act was not enough to support a family in the West. So the Enlarged Homestead Act was passed in 1909 which gave 320 acres to settlers. Also, the homesteader now had to live on the land only three years to "prove up."

The Stock-Raising Homestead Act of 1916 was designed to settle far-western lands not suited to farming. Stockmen were given 640 acres of land under this act. This square mile, or "section", was supposed to furnish forage enough to carry 50 head of cattle. This, too, proved to be too small for a ranch and less than half of the people stayed long enough to own their own land during the first 12 years of the act.

None of the Homestead Acts allowed a man to homestead enough land for a ranch. Much land good only for grazing was plowed up. Many settlers went broke. Most Nebraska ranches of today were made by buying out other homesteaders and by buying railroad lands.

Although improper grazing and serious erosion still occurs on some Nebraska ranges today, ranching has improved. Many ranchers know the importance of careful range management and are practicing it. Many rundown ranges are being restored to high production by range seeding, improved grazing practices, and stocking at capacity while providing emergency feed sources. These ranchers are working together with range researchers to find new and better ways of producing livestock from range forage.

Lesson 4. Nebraska--A Range State

Nebraska ranks third only to Texas and Oklahoma in number of beef breeding cows among the 50 states of the U.S. In 1963 there were about 1 1/2 million beef cows two years of age or older in Nebraska. The total number of beef cattle in Nebraska amounts to about 5 1/2 million. Most of these cattle get all or part of their forage from the grazing lands of the state.

There are nearly one billion acres of rangeland in the United States. Most of it is in the 17 western range states, which include Nebraska. The western range area contains more than 700 million acres. Rangelands in western U.S. are important because of the huge amount of land area used for grazing.

In Nebraska there are about 24 million acres of grassland devoted to the production of forage for grazing animals. Thus, about 50% of the land in farms and ranches in Nebraska is grassland. The larger blocks of range lie in the north-central and western parts of the state.

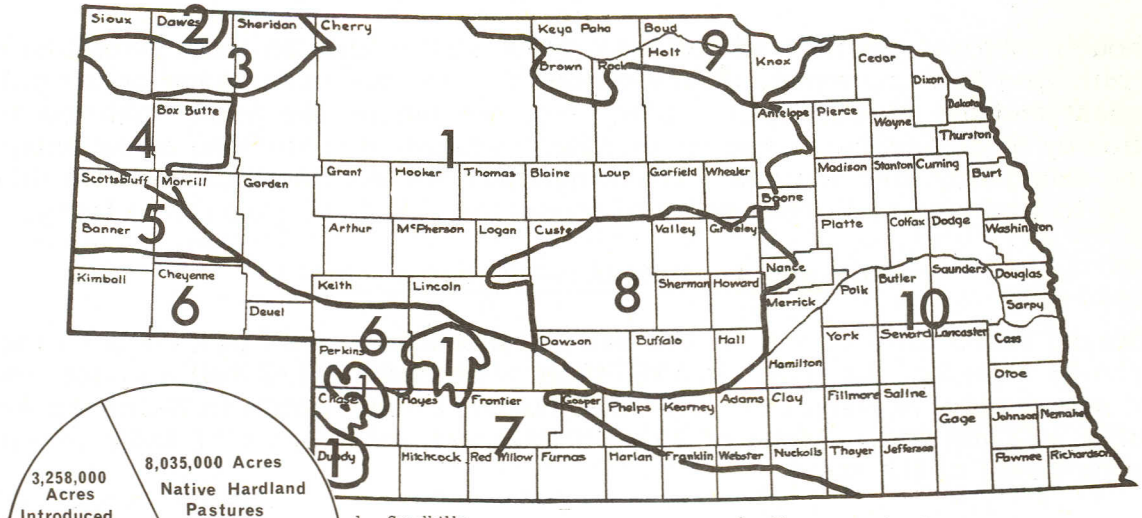
The sandhills of north-central Nebraska represent the largest undivided expanse of grassland in the United States. About half of all the grassland in Nebraska is in the Sandhills. Because of the sandy soil, the Sandhills are better suited for grazing than for crop production even though the rainfall is high enough to produce field crops.

The Sandhills are known for their abundance of mid and tall grasses and for high quality beef cattle. Here are found many of the larger beef breeding herds in Nebraska. One large Sandhills County, Cherry County, has more cattle and calves than any other county in the U.S. Cattle are marketed as calves or yearlings and occasionally even as two-year-old steers. Most go to Corn Belt farms for fattening.

Wild hay is cut from about 1/5 of the Sandhills ranges, particularly from the highly productive wet land and subirrigated meadows. Some Sandhills ranchers winter cattle on hay and by pasturing regrowth on hay meadows. Other ranchers winter cattle on uncut forage and cottonseed cake or other high protein supplement. Hay is fed only in stormy weather on this kind of ranch.

Range livestock is also the main agricultural industry in the Pierre Plains and Badlands, the Pine Ridge, and the Box Butte Tableland in Sioux County. Shortgrasses such as buffalo grass and blue grama and a few taller grasses provide a major part of the range forage. Several bands of range sheep are run in this area.

In other sections of the Nebraska panhandle, range livestock production is in the rougher lands and river breaks. Only on wheatlands in central Box Butte Co. and on the Cheyenne and Perkins Tablelands, and in irrigated sections along the Platte and White River Valleys is cash grain production more important than range livestock production.



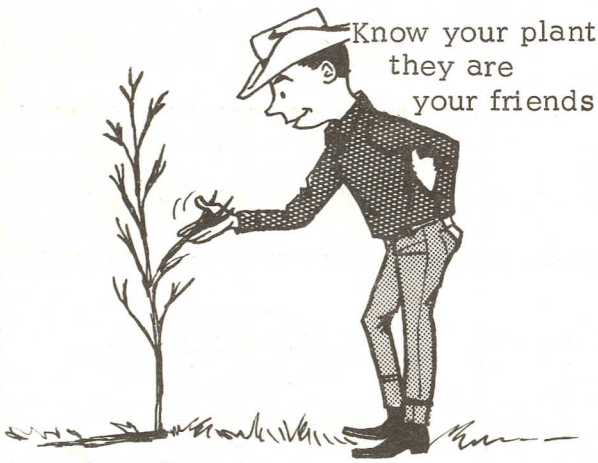
Nebraska's range resource and range areas.

About half of the land is grassland (1) along the breaks of the Republican River in southern Nebraska, (2) in the Loess Hills along the forks of the Loup River in central Nebraska, and (3) on the Dakota plains and breaks. Grassland pastures in these areas are usually smaller than farther west and are mixed with cultivated lands. Cattle are commonly grazed on these pastures in the summer and wintered on fodder, hay, silage, or crop stubble. Poor management of grazing lands is more common under these conditions than in areas of straight range livestock production.

Range is much less important in the eastern Nebraska loess plains and hills. Small, scattered pastures are found here. However, each county has some range.

Lesson 5. Kinds of Range Plants

It is important that the rancher become familiar with the plants growing on his ranges. He should know them by name, and recognize their importance as forage producing plants.



Plants tell you what kind of range you have. The presence or absence of certain plants tells how the range has been used and what should be done to improve or maintain it.

There are hundreds of different plants on Nebraska ranges. Each kind is a different species, like western wheatgrass or blue grama. You need not know all of them. You should be familiar with species that furnish the most forage for livestock as well as those that are pests or even poisonous. As a general rule, there will be 25 to 30 species in any one range area that will be of outstanding importance.

If you watch your cattle and sheep graze, they will show you which ones they like best. To be important, a range plant must be liked by grazing animals and there must be enough of it present to produce plenty of feed.

Since there are so many different kinds of plants that grow on the range, it helps to group them by their looks and growth habits. The four main kinds of range plants are grasses, grasslike plants, forbs, and shrubs.

Grasses. These are plants with jointed stems. The stems are hollow between the joints. Leaves are in two rows on the stem. Veins in the leaves are parallel. These are "true grasses." Examples are:

Western wheatgrass and sand bluestem.

Little bluestem and blue grama.

Cheatgrass brome and six-weeks fescue.

Grass-like plants. These look like grasses but have solid (not hollow) stems which are often triangular. The stems have no joints. However, the veins are parallel as in the true grasses. These are the sedges and rushes found in wet meadows but sometimes on uplands also. Examples are:

Threadleaf sedge

Baltic rush

Forbs. Forbs (weeds and range flowers) have annual stems and tops. They are not grass-like but have net-like veins in the leaves and the leaves are often broad. The word "forb" is better than "weed" because weeds are usually thought of as pests. Many of the range forbs are not pests for they are valuable as forage. Examples are:

Purple prairieclover

Perennial sunflower

Bush morningglory

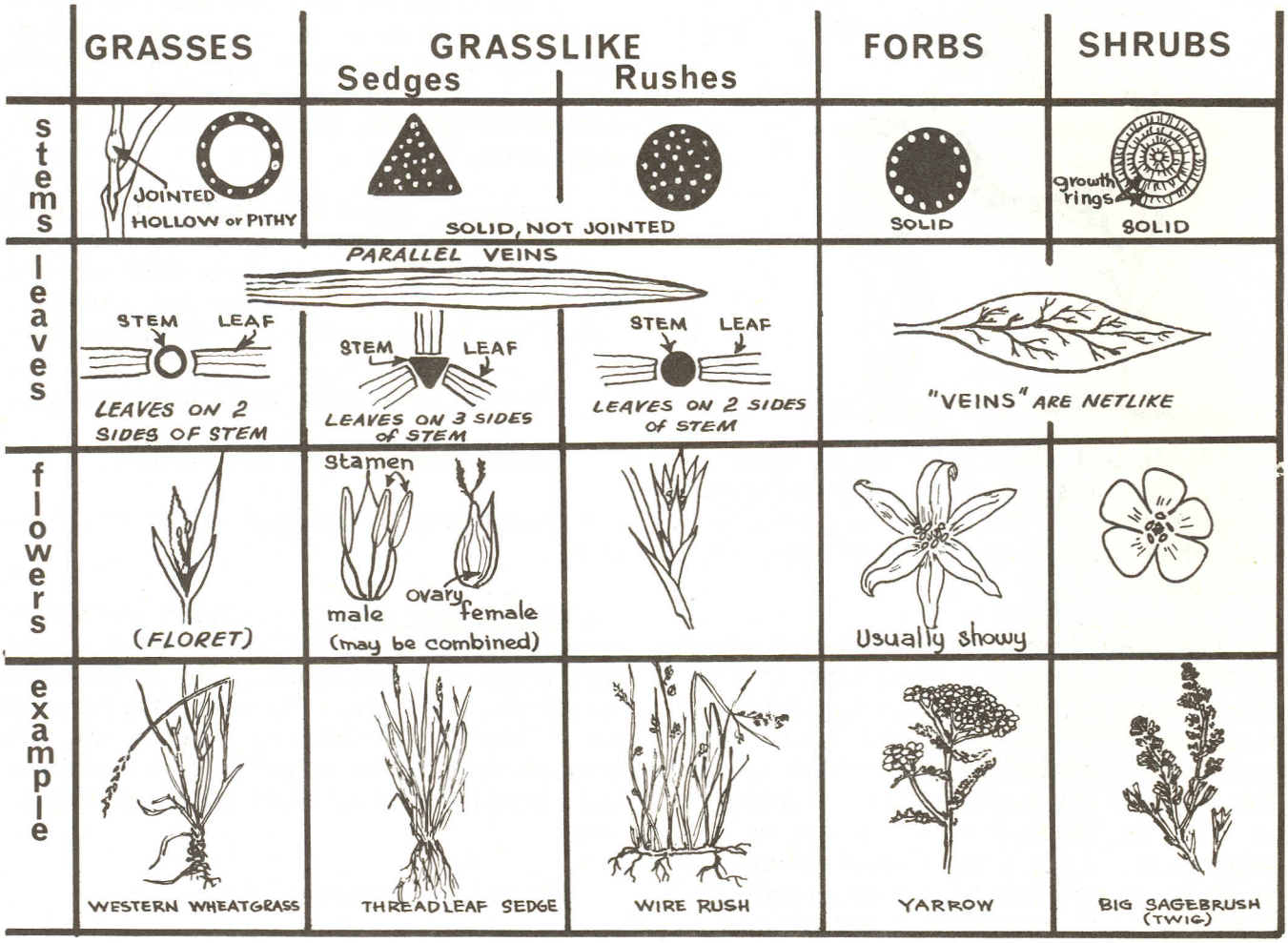
Shrubs. These are plants with woody stems which live over from one year to the next. New growth starts each spring from points above ground along the stem. Many shrubs do not have trunks but branch out from near the base of the plant. Examples of shrubs are:

Sand sagebrush

Yucca

Leadplant

IMPORTANT RANGE PLANT GROUPS



Important kinds of range plants.

In addition to being classified on the basis of their life form or growth habits, range plants are also grouped in other ways:

Life span

Annual plants live only one season. They do not grow a second year from roots or crowns.

Biennial plants live two years.

Perennial plants live over from year to year. They produce leaves and stems for more than two years from the same crown.

Origin

Native plants are those which have always grown or have originated within the United States.

Introduced plants are those which have been brought in from outside the United States.

Growth season

Cool-season plants make their principal growth during the cool weather in spring and fall.

Warm-season plants generally make their principal growth during the frost-free period and develop seed in the late summer or early fall.

Scientific and Common Names

Each plant has two names: its scientific and its common name. Some plants have several common names. The weedy grass commonly called cheatgrass brome in Nebraska is also called Junegrass, bronco grass, and downy brome. So it is necessary to choose one common name as the standard name so that everyone will know what plant you are talking about.

The scientific name always has two parts. The scientific name for cheatgrass is Bromus tectorum. Bromus tells us what genus the plant belongs to and tectorum tells us what particular species within the genus this plant is. Each plant can have only one scientific name.

Since the scientific name is harder to learn you will be required to learn only the standard common name. As you go on in range management you may want to learn the scientific names of your range plants, too.

Lesson 6. The Parts of a Plant

Plants are like people--each is an individual. Some of these individuals may be similar in appearance; some will be different. Even those that are similar in appearance have some characteristics by which we recognize them as individuals. Each plant species has some part or characteristic which makes it different from all other plants.

The Range Plant

Each range plant has vegetative parts--leaves, roots, and stems--and flowering or reproductive parts. The flowering parts of a plant are called the inflorescence.

Roots. Unlike most stems, roots do not have joints, leaves, or flowers. The root's growing point is at the tip. The main functions of the roots are to take water and minerals from the soil, to store food, and to anchor the plants to the soil.

Stems. Stems are important in holding leaves and seedheads above the ground for more sunlight. The stem transports water and minerals from the roots to the leaves and carries manufactured foods from the leaves to the roots.

Rhizomes (rye-zoms). These are actually creeping underground stems since they have joints and leaf-like scales. Western wheatgrass, sand bluestem and prairie sandreed all produce large rhizomes. Stolons are like rhizomes except that they grow

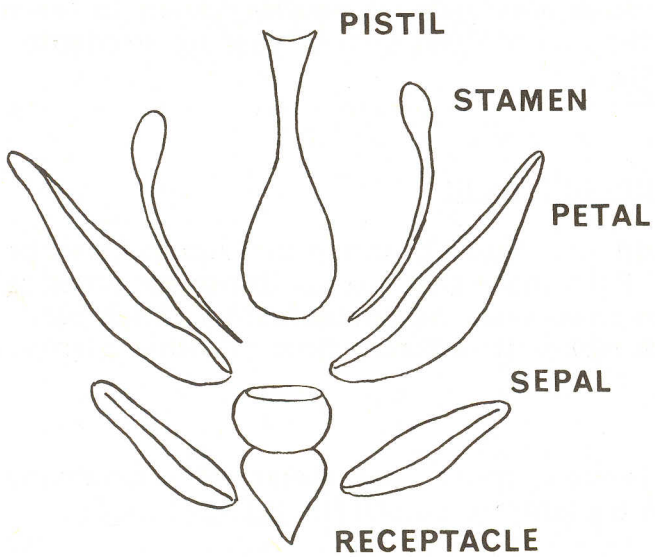
above the ground. Buffalo-grass is a common Nebraska grass that has stolons. They, like rhizomes, store food and reproduce new plants.

Flowers of forbs and shrubs. The flowers of most forbs and shrubs include five basic parts: receptacle, petals, sepals, stamens, and pistil (often more than one).

The receptacle is the broadened support or base of the flower. The reproductive organs are the stamens which produce the pollen, and the pistils which bear the seeds.

The reproductive organs are generally enclosed by two kinds of leaf-like structures--the petals and the sepals. The petals make up the inner-most and upper-most series and are usually brightly colored. They are often irregular in shape such as in alfalfa and larkspur.

The sepals form the lowermost series and are generally green and much less conspicuous than the petals. This series is generally quite regular. See if you can locate all these parts on a flower.



Parts of forb and shrub flowers.

The Grass Plant

You should know the parts of a grass plant. In learning these parts, look at the diagram on grass plant parts. Then learn to recognize these parts on live grass plants. Notice how these parts differ slightly between different grasses.

The grass stem is made up of nodes (joints) and internodes (between the joints), and is usually hollow except at the nodes.

The grass leaf is made up of two parts: the sheath which fits closely around the stem and the broad expanded portion known as the blade. The region where the sheath and blade join is called the collar. On the inside of the collar, and sticking up above the sheath is a thin lining called the ligule. The ligule may also appear as a ring of hairs or be entirely absent. Two ear-like tips which often grow from the collar, one on each side, are the auricles.

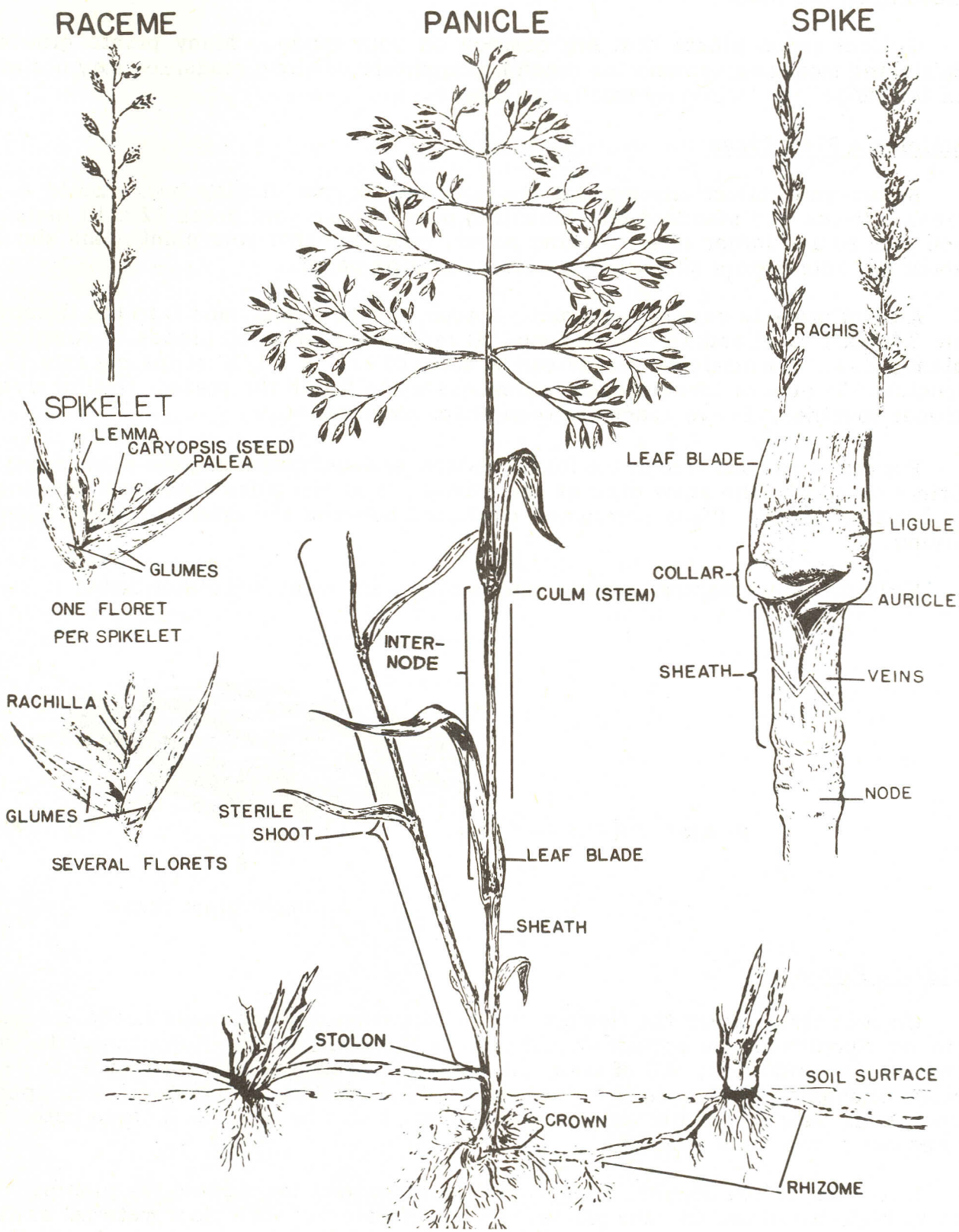
The grass head or inflorescence is composed of the axis or "backbone" called the rachis (ray-kiss) and specialized units called spikelets. A normal spikelet is composed of (1) two glumes, (2) the rachilla, and (3) one to several florets.

Three types of grass seedheads are the spike, the raceme, and the panicle. In a spike the spikelets attach directly to the seedstalk. In the raceme, each spikelet is placed on the end of a short, slender branch. The spikelets in a panicle are connected to the seedstalk by a branch which is branched two or more times.

The two glumes are the chaffy or leaf-like bracts at the base of the spikelet. The rachilla (ray-kill-eh) is the shortened axis of the spikelet upon which are borne the florets. The floret is the grass "flower." Each grass flower has one pistil and 3 stamens.

Each fertile floret at maturity produces a seed. The seed is enclosed by two chaffy, leaf-like bracts known as the lemma and palea (pay-lee-a). In many grasses such as the wheatgrasses, the lemma and palea remain with the seed after they ripen and fall. Others (like wheat and switchgrass) shell out.

THE GRASS PLANT



Parts of a grass plant.

Lesson 7. Your Plant Collection

As a beginning range manager, you will need to make a collection of plants you find growing on the range.

Collect range plants that are common on your range. Many plants growing in cultivated meadows, around the ranch headquarters or along roadsides may not appear on the range. Collect only true range plants.

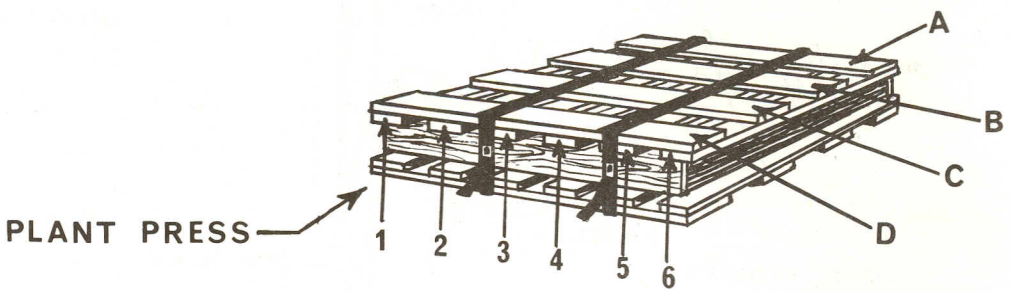
Building a Plant Press

Before you collect any grasses for mounting in your display book, build a plant press. If you use standard size mounting paper, make your press 12 x 18 inches. If you plan to use larger size mounting paper, remember that your plant press should be about 1/2 inch longer and wider than the mounting paper.

A plant press is easy to construct. Pieces labeled A,B,C, and D in the illustration are 3/4" x 1 1/2" and 18 inches long. It requires eight such pieces to complete the plant press. The numbered pieces can be made of 1/2" x 1 1/2" strips cut into 12 inch lengths. Twelve of these pieces are necessary to finish the press. Nail or rivet the pieces together. Leave space between strips for ventilation.

Put driers on each side of the folded newspaper sheet containing the plant specimen. Driers should be the same size as the frames. You can make them from building felt or blotting paper. Place corrugated cardboard between the driers to further improve drying.

Hold the press tightly together with two canvas, web, or leather belts.



A simple plant press.

Digging Plants

Collect plants when the flowers are the showiest or when grass heads are out and green. Specimens you collect should include the entire plant--flowering parts, stems and leaves, and roots. All of these are used for identification. Collect 6- to 8- inch twigs of shrubs with flowers or fruit when possible. Collect two plants of each species. One can be used for identification and the other for your herbarium. Be sure both specimens are of the same species.

Use a dandelion digger, a small pick, or a shovel for digging the plants. Use a sharp knife to cut and trim the plants. Do not include too much plant material as it will not press well and is apt to mold. Remove soil and litter from the plant when it is collected and before placing it in the plant press.

Whenever you collect a plant, record in a notebook where collected, the date, the kind of place it was growing, and how common it was at that place. Note what other plants were growing beside it.

Pressing Plants

Take your plant press with you on collecting trips. As you collect your plants, put them in the plant press for drying and pressing before they begin to wilt.

Place your specimen inside a folded, double thickness of newspaper. If the plant is too large to fit on your mounting sheets, it should be folded. If the grass or forb is extremely large, cut off a sample of each plant part--stem, leaves, roots, and head or flower.

Arrange the stems, leaves, roots, and flowering parts in the newspaper exactly as you want them to appear on the mounting sheets. Pressing gives a plant a convenient shape for mounting and preserves its natural color. After each new plant is placed in the plant press, replace the top portion of the plant press, tighten the belts firmly, and look for another specimen.

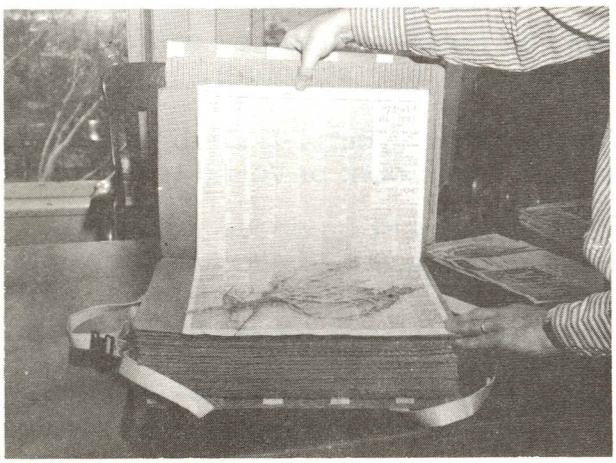
Press the plants for a week or 10 days. Change newspapers and driers between the plants every two days until dry. Keep the dried plants in the folded newspaper until mounted on herbarium mounting sheets.

Mounting A Plant

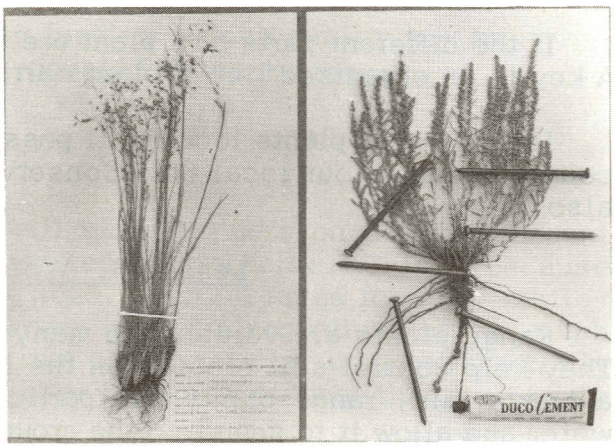
Mount the specimens to be kept in your herbarium on herbarium mounting sheets. Standard size sheets are 11 1/2 x 16 1/2 inches. Larger herbarium sheets up to 16 x 24 inches are permissable. You may have these sheets made at your local print shop out of medium weight, white placard or buy them from an agricultural supplies company.

Mount plants by using narrow strips of white gummed cloth mending tape, or airplane glue. Do not cover important plant parts in the process. Weight the plants with nails while attaching them to the sheet.

Cover completed mounts with cellophane or other heavy plastic materials for display purposes. Place your mounts in a display book for safekeeping. When storing, use mothballs to repel insects.

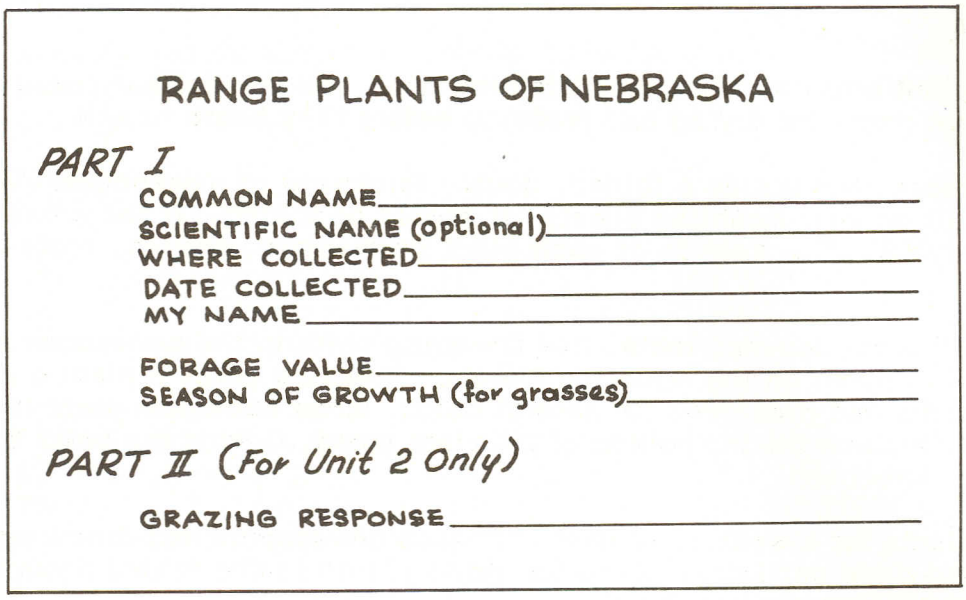


Pressing Plants



Mounting Plants

Each completed mount must have a plant specimen label about 3 x 5 inches glued in the lower right-hand corner of the sheet.


RANGE PLANTS OF NEBRASKA

PART I

COMMON NAME_____

SCIENTIFIC NAME (optional)_____

WHERE COLLECTED_____

DATE COLLECTED_____

MY NAME_____

FORAGE VALUE_____

SEASON OF GROWTH (for grasses)_____

PART II (For Unit 2 Only)

GRAZING RESPONSE_____

A Good Specimen Label

Identifying Range Plants

You are now ready to identify the range plants you have collected.

The first step in identification is to group your plants into grasses, grass-like plants, forbs, and shrubs. You already know how to do this, (Lesson 5). Determine a plant's name by comparing the plant you have collected with word descriptions, drawings, and photographs. Such things as flower color, shape of the plant, and leaf peculiarities can be described. Ask your 4-H club leader to obtain some booklets helpful in identifying plants.

If the different parts of a plant are well known, an identification key can be used. A key is an organized list of plants arranged according to their structure.

Identify your plants locally, if possible, with the help of your 4-H Club leader and county agent. Your local Soil Conservation Service technician or Vo-Ag teacher will also help you.

Lesson 8. What Range Plants Provide

Range plants are valuable in many ways. They provide feed for grazing animals. They help control soil erosion on the land surface and maintain soil structure. After a heavy rain, range plants and particularly perennial grasses slow down the runoff water and allow it to seep into the ground. Much of this water later appears as springs and streams. The water falling on range is a source of water for irrigation, livestock, home use, recreation and industry. Range plants prevent snow from blowing off the land. Range plants add organic matter to the soil.

The Advantage A Ruminant Has

Cattle, sheep and goats, as well as deer and elk, are ruminants. These animals differ from other animals such as man, dog and swine because they have a stomach divided into four major parts. Because of this special construction of the stomach, ruminants are able to use coarse roughages such as hay, range grass, browse, and silage.

However, ruminants are not able to digest the coarse materials by themselves. This is broken down by bacteria and other micro-organisms which live in the rumen or paunch. Thus, a ruminant is dependent upon the micro-organisms which live in its paunch.

Horses do not have a rumen, but do have a large paunch or caecum (see-kum) in the intestines where millions of bacteria can do their work. The hog has only a simple stomach with one compartment. It provides no special place for bacteria to live and help "digest" forage and feed.

People gain more weight by drinking malted milk than by drinking skim milk. Livestock gain better on some forages and feeds than on others. This is due to: (1) the amount of plant material an animal eats, and (2) the nutritive value. Animals eat less and thus gain less on ranges which have only unpalatable plants. Animals also eat less on heavily grazed range. A range plant may be highly nutritious during one season of the year, but have a very low feed value at another.

Winter feeding of high quality hay on snow-covered Nebraska ranges.

You have observed that cattle and sheep will gain far more on a given amount of alfalfa than on the same amount of straw when fed nothing else. This is because straw is lacking in certain nutrients that animals need. Certain range forages, particularly in the winter, will not supply enough of certain nutrients regardless of how much the animals eat. However, these range plants, like straw, may be used satisfactorily when supplemented by other feeds. But, first we have to know just what these nutrients are and why they are needed.

The Nutrients Ruminants Need

A nutrient is any food that is needed to support life. Our range livestock need five classes of nutrients! (1) protein, (2) nutrients such as carbohydrates and fats which supply nutrients, (3) minerals, (4) vitamins, and (5) water. Each of these nutrients supplies a special need in the animal's body. Since one nutrient will seldom substitute for another, we must know what is in our range forage.

Protein. Proteins make up the greater part of muscles, internal organs, hair, wool, and horns. Proteins are also of major importance in blood and other body fluids. When the body has enough protein, any surplus protein can be used for energy.

Carbohydrates. Carbohydrates make up about three-fourths of the dry matter of range plants. Much of the energy and heat an animal needs comes from this source. Sugars, starches, and cellulose are carbohydrates.

Fats. Fat is also a source of energy. It furnishes two times as much energy per pound as carbohydrates. Although the fat content is generally low in range forage, it may be quite high in supplemental feeds such as cottonseed meal.

Minerals. Minerals are important in all animal tissues. Calcium and phosphorus make up the major portion of bones and teeth. Iron is a vital part of the blood. Other minerals needed are copper and cobalt.

Vitamins. Although vitamins are needed in very small amounts, they must be present for animals to live and produce. Vitamin A is important in keeping body membranes healthy, in fighting off disease, and for reproduction and growth in our farm animals. Vitamin A appears in forage as carotene which is converted in the animal's body to Vitamin A. Vitamin D is required in bone formation and in the proper use of calcium and phosphorus. Other vitamins are also needed by ruminants, but these are generally present in sufficient amounts in the forage or can be manufactured by the rumen bacteria.

Water. Water is an important substance because about 75 percent of animals and growing plants are composed of water. Water carries nutrients from one part to another in plants and animals. Water is also important to digestion, in controlling body temperatures, and in eliminating waste products.

Lesson 9. Nutrient Content--Basis For Supplemental Feeding

Nutrient Content Changes

The nutrient content of range forage depends largely upon the season of the year. During rapid spring growth, range forage is high in nutrient content. Grazing animals generally need no supplements at this time except salt. As the forage plants begin to mature and dry, the content of many important nutrients goes down and supplemental feeding is needed.

Throughout the year, the protein, phosphorus, and carotene (vitamin A) contents in range grasses follow similar patterns. All three are high in fast growing grass, but are low in matured grass. As plants mature, they increase in crude fiber content. Heavy rainfall in the fall and winter may wash out many of the carbohydrates.

Great differences in nutrient content may also be found between different plants. Grasses such as the wheatgrasses grow early in the spring and sometimes again in the fall. They are higher at these times in protein, phosphorus, and carotene than warm season grasses such as bluestems. Shrubs maintain higher levels of protein, carotene and phosphorus than grasses during the winter.

During drought there is generally a decrease in phosphorus, protein and carotene, but an increase in calcium. When rainfall is plentiful and the weather is warm, the opposite is true. Soil fertility also affects the nutritive content of range and pasture forage. When soils are low in phosphorus the plants may also be low.

Supplementing The Diet

Four nutrients which may be low in range forage on winter range are protein, phosphorus, vitamin A, and substances such as carbohydrates that provide energy. Energy is often critical with range breeding stock. Do not forget that water and common salt are nutrients also. Common salt and fresh water must be supplied range livestock during the winter and throughout the entire year as well.

How do you know what to supplement range cattle and sheep during the winter? Supplements should be based on what range plants are being grazed. Remember that to supplement means to supply nutrients missing or low in the range forage. These supplements are fed to "fill up a gap" in the range forage rather than to replace it.

Diets high in matured grass are high in energy, but low in protein, phosphorus and carotene (vitamin A). If a moderate part of the diet consists of browse, less protein and phosphorus should be supplied through supplemental feeds. Diets containing larger amounts of browse have enough vitamin A, but may be low in energy.

During drought years, vitamin A supplements may be needed by range livestock during the winter. Cattle can store enough vitamin A in the liver to last three to six months on diets lacking this vitamin. However, this may not last through late winter until green grass comes.

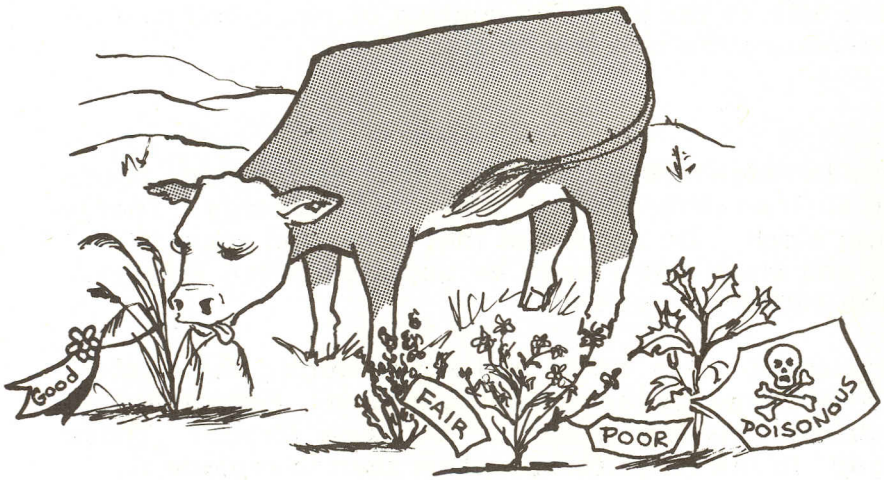
Supplemental feeds high in phosphorus commonly fed to range cattle are bone meal, dicalcium phosphate, cottonseed meal and leafy alfalfa. Those high in protein include cottonseed meal, soybean meal, and alfalfa. Supplemental feeds which are high in energy include oats, corn and barley, and various milling by-products. All fresh, green, leafy forages are high in carotene.

Lesson 10. Forage Values of Range Plants

The forage value of any range plant depends on (1) how well it is liked, (2) how much it produces, and (3) its nutritive content.

Our range plants are not all of equal value. A rancher must know not only the names of the plants on his range, but whether or not they are desirable or undesirable for grazing. Some range plants are valuable for grazing, but others may be worthless or even highly poisonous. Not all grasses are good for grazing. Examples of grasses almost worthless for grazing are threeawns, windmill grass, and stinkgrass. Neither are all shrubs poor for grazing. Shrubs such as leadplant and sand cherry are desirable range plants.

Livestock usually like range plants best when they are green and tender and are growing fast. However, grasses such as blue grama and buffalo cure well on the ground for winter grazing. Annual plants on the range are not as good because they are nutritious and liked only for a very short time. In drought years, when forage is badly needed, they may not appear at all. All of these factors must be considered in determining the forage value of each range plant on the range.



STEER WITH SPECIAL SURGICAL OPENING INTO THROAT FROM OUTSIDE. CAP WILL LATER BE REMOVED AND A BAG WILL BE TIED AROUND THE NECK. FORAGE IT EATS WILL DROP INTO BAG AND BE ANALYZED IN LABORATORY.

Range livestock are similar to humans in that they like certain foods better than others. The palatability (or forage preference) of a particular range plant is how well it is liked. How readily range animals eat a given plant species depends upon what other plants are available. Cattle normally eat very small amounts of sand sagebrush but may eat considerable amounts if starved to it. This we speak of as relative palatability--relative to what else is present.

Some plants are liked much better by one kind of livestock than another. Cattle, sheep, goats, horses, and deer prefer different plants. Sheep and goats eat forage produced from browse plants more than cattle and horses. Thus, browse ranges are best adapted to sheep and goats. Forbs are probably better utilized by sheep than any other kind of livestock. Deer eat primarily forbs and browse plants, but also eat grasses in the spring. Considerable quantities of introduced cool season grasses may be used by deer in the spring.

Horses are primarily grass eaters. Both horses and cattle prefer grass over most shrubs and forbs. Although sheep may eat grass in large quantities, this is largely limited to the more tender and finer grasses. Range areas such as sandhills and wet meadows with large amounts of tall, coarse grasses are normally better grazed by cattle than sheep.

How rough and how hilly the range is, as well as the type of forage, suggests whether it should be grazed by cattle or sheep. If the range is rough or hilly, sheep may be better. Where sheep are handled by herders, they can be herded into the less accessible areas and those areas at greater distances from water.

Some ranges include large amounts of grass, forbs, and shrubs and both flat and steep lands. Most efficient use in these cases can probably be obtained by common use--grazing more than one kind of livestock and even deer on the same range. Common use is often practiced on the Edwards Plateau of Texas and on mountain brush ranges.

To make it easier to compare the forage values of different range plants, we classify each species as GOOD, FAIR, or POOR. In arriving at forage value in Nebraska, first consideration is given to the palatability for the plant to cattle during the growing season of the plant. The forage value of about 100 important range plants is given in "Common Range Plants in Nebraska", published by the Nebraska Agricultural Extension Service. Ask your club leader or county agent to get a copy for you.

You also need to know how each plant responds to grazing since heavy grazing increases many undesirable plants and kills out desirable plants. This will be taken up in Unit II of Range Management.

Lesson 11. Poisonous Plant Problems

Some range livestock are lost each year in Nebraska from such plants as arrowgrass, locoweed, water hemlock, chokecherry, milkweeds, and groundsels. However, livestock losses in Nebraska from poisonous plants are much lighter than on ranges further west.

Palatability is important in livestock poisoning. Many plants are poisonous only when eaten in large amounts and may be good, nutritious forage when eaten in smaller amounts. Generally, animals do not graze large amounts of highly poisonous plants when they have an abundance of other forage. Thus, it is very important that we graze our ranges so that they are kept in good condition and contain large amounts of palatable, non-poisonous forage.

Prevent losses from poisonous plants by good range and livestock management.

Ways to Prevent Losses from Plants

1. Do not turn range stock out in the spring before good forage plants are well developed.

2. Graze moderately so that plenty of good range forage is available.

3. Use plenty of salt and phosphorus supplements when needed to guard against depraved appetite.

4. Feed roughages when range forage is in short supply as in drought or when trailing.

5. Graze the kind of stock not poisoned by the plant in question.

6. Graze during the season of the year when plants in question are least poisonous or are not eaten.

7. Eradicate or fence off local patches of poisonous plants.*

8. Remove animals when poisoning first becomes evident. Put sick animals in corral, if possible, and feed laxative feed.

9. Avoid areas infected with poisonous plants when bunching, trailing, bedding down, or watering.

* Obtain a copy of "Sixteen Plants Poisonous to Livestock in the Western States", U.S.D.A. Farmers Bulletin 2106, from your County Agent. It has pictures of most of the poisonous plants in Nebraska and gives further details on management to recognize and avoid poisonous plant losses.

SAVE THIS MANUAL FOR LATER USE