

PASTURE AND FEED CROPS FOR PLAINS AREA IN COLORADO



When do we eat and what?

COLORADO AGRICULTURAL COLLEGE
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PASTURE AND FEED CROPS FOR PLAINS AREA OF COLORADO

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Successful livestock production on ranch or farm in Colorado depends largely upon the economical production of feed. Grass is the cheapest and most satisfactory feed for cattle and sheep ever discovered, **provided** a sufficiently high yield or carrying capacity is maintained.

The total area of Colorado is 66,341,120 acres. In the 1930 census, 20,836,558 acres were classified as grazing land. This acreage does not include 13,330,832 acres in national forests or 355,192 acres of native hay land. Certainly grass is a major crop in Colorado and grazing a major source of wealth.

The grass crop is taken as a matter of course. In some areas outside of the national forests the grazing privilege is being abused. Desirable native grasses are diminishing on public domain as well as on privately owned or leased land because of overgrazing or continuous early grazing in the spring. Perhaps it is time for a state-wide effort on the part of stockmen to improve range and pasture conditions in the state, because livestock profits depend not only upon quality or breeding and management of the breeding herd or flock but also upon access to **good** grass or pasture and economical winter feed.

The time is right for a program of land classification and grouping of acreages as to use in Colorado, preceding an organized effort toward grass improvement. Such a program should include:

1. Some system of control of unregulated public domain or other lands suitable only for grazing.
2. The adoption of some system of rotation and deferred grazing. (Write the Colorado Agricultural College for rotation and deferred-grazing plans.)
3. Providing supplementary pasture or feeds in order that the range or native pasture may be given a rest and allowed to reestablish itself. (The purpose of this bulletin.)
4. Range improvement by rodent control, reseeding, removal of brush or other growth. (Write the Colorado Agricultural College for suggestions.)

5. Meadow improvement by seeding Alsike or other clovers or grasses, renovation, fertilization or improved irrigation. (Write the Experiment Station, Colorado Agricultural College, for suggestions.)

Pasture Suggestions for Non-Irrigated Plains of Eastern Colorado

Grasses.—It is evident that native grasses are better adapted to the plains growing conditions than any other species of grasses. Because of the difficulty of reseeding fields to grass, farmers or stockmen should carefully consider the value of the grass crop before plowing up the sod. Where native grasses have been severely trampled and grazed and but a few plants remain, it is **more economical** to reestablish the range by **improved grazing systems** than by attempts at reseeding with tame grasses.

Reseeding experiments with grasses on ranges or areas that have been farmed in Eastern Colorado have generally been unsuccessful. In the northern section of Weld, Larimer and Logan counties, crested wheat, slender wheat and brome grass seedings are reported to have been successful on fields that have previously been farmed.

At the Akron, Colorado, Experiment Station, crested wheat grass (*Agropyron crustatum*), slender wheat grass (*Agropyron tenerum*), and brome grass (*Bromus inermis*) are the most reliable of the perennial grasses, but no certain method has been found for establishing stands each and every year, because of the uncertainty of timely rainfall. Further, these grasses do



Would this field be more valuable if it had been left in native sod?



Slender wheat grass is adapted in Eastern Colorado

not seem to furnish any more pasture on a given rainfall than the native sod, and they will not survive as long a period of sustained drouth. One must decide between the annual pastures, or be willing to try, try again in seeding and reseeding the perennials until conditions appear to be best for establishing stands. Then it is necessary to be most careful in pasturing so as not to injure the grasses.

Perhaps there are favored areas that can be successfully seeded with tame grasses, the seed of which is now available at seed markets. Lack of moisture, wind, weeds, grasshoppers and intense sunshine all combine to reduce the chances of success in seeding grasses under non-irrigated conditions. Grass seedlings are very small, delicate and easily destroyed when they first appear.

Experiences of experiment stations and farmers have indicated the following suggestions in attempts to seed grasses in fields that have previously been farmed:

1. The field to be seeded should have a **firm seedbed** and an abundance of stored moisture, such as a cornfield, stubble or fallow that has been kept free of weeds.
2. Soil blowing should be prevented by leaving the corn stalks or stubble standing or leave the surface of fallow rough by planting with furrow drill or by scattering seed after listing.
3. Early seeding (April) has a better chance to become established before hot and perhaps dry weather during summer.
4. Plant only varieties which have the greatest chance to succeed. They are: Slender wheat, brome, meadow fescue and crested wheat (in cooler regions.)
5. Twelve to 15 pounds of grass seed per acre should be sufficient. A mixture of grasses has some advantages over a single grass.
6. The common drill has been used successfully for seeding grasses. Other methods are the furrow drill, lifting the grain spout out of the boot, allowing the seed to fall in front of the press wheel or drag chain. In using either type of drill, difficulty will be experienced in making the seed feed down. Corn chop, winter wheat or a third of a seeding of barley in the drill will help the chaffy grass seed to feed down. The grain-grass mixture in the drill should be mixed at intervals when sowing to prevent the heavy material from settling. The drill set as if to sow one and one-half bushels of oats per acre should drop sufficient grass seed.

Broadcasting seed by hand on land that has previously been listed or blind furrow drilled in the fall or early spring might give good results if lightly harrowed and a lucky rain occurs.

7. By stopping alternate holes in the furrow drill or two or three holes in the common drill, the grass can be planted in rows which will allow one or two cultivations each year to control weeds. Planting in rows would be especially desirable when a grass-seed crop is desired for market or more extensive seeding on the home ranch. When seed is broadcast by drilling, the use of the mower is the only method of holding weeds in check.
8. In any attempt at seeding grasses, it is best to keep livestock off during the first season and until late in the sum-

mer of the second year. Allow the grasses to produce a seed crop during the second year if the stand is thin and moisture conditions favor seed production. Stock should be kept off the seeded area during the fall and winter months to prevent tramping damage and close grazing. Close grazing prevents snow from being caught and held on the land.

Winter Rye—Sudan Grass.—Annual pastures such as the small grains and sudan grass will produce more tonnage per acre under limited rainfall than will tame or native grasses. Winter rye seeded at the rate of 40 pounds per acre as early as August 1, with reasonable moisture, should provide considerable fall and early spring pasture. Stock can be kept on the rye field until



Brome grass may do well under favored conditions

May 25 to June 10, after which the rye will be maturing seed and hence woody. **Spring-seeded** winter rye may bridge the gap from May 25 to June 10 to the time pasture is available in a field that has been seeded to sudan grass.

Barley or oats head at about the same time as the fall-seeded rye, therefore, are not so good to bridge this gap in pasturing. Experiments are being conducted at Akron to determine if late-seeded barley will provide pasture during June. The native-grass pasture may be safely grazed during this period until the sudan pasture is ready.

Sudan grass is a hot-weather crop like corn, therefore, cannot be seeded until after the middle of May and will not furnish pasture until July 1 to July 15. Sudan grass seeded at the rate of 20 pounds per acre with furrow or common drill or planted in rows with a lister, using 4 to 6 pounds of seed, should provide pasture from July 1 to July 10 until frost kills the crop. Then the new seeding of winter rye should be ready.

Sudan is a sorghum and when stunted by drouth or frost, there is some danger of prussic-acid poisoning of stock. Some stockmen seed a field of winter rye in late spring in addition to the August seeding to provide early summer feed in case the sudan is slow to start. Late spring-seeded winter rye or winter wheat will not head, except a few straggling heads some years. Therefore, considerable pasture will be available until late summer.



Sudan grass is excellent for pasture or a good hay crop. If cut as the first heads appear, sudan hay contains 9 to 11 percent protein and two cuttings are possible.

Winter Wheat.—A rest for the native-grass pasture may be provided by planting 45 pounds of winter wheat per acre as early as August 15. This will provide fall grazing until covered by snow, then spring grazing until July. In the meantime, the native grasses may have reached full maturity for late summer and fall pasturing. An additional planting of winter wheat in the spring can be made to provide late-summer grazing in order to further delay grazing the native-grass pasture. Wheat should never be overgrazed at any time and it is best to divide the acreage into two fields so that one area may partially recover while the other is being grazed. Winter rye can be substituted for winter wheat for fall and spring planting.

Sweet Clover.—Farmers in the non-irrigated plains area have been successful in securing stands of sweet clover only in about 50 percent of their trials. Sweet clover will live only 2 years. When seeded in the spring, some pasture should be available under reasonable growing conditions during the late summer. The main growth and seed production occurs the second year. Close pasturing or cutting for hay will generally prevent the production of seed. Therefore, reseeding cannot occur for continuous pasture even tho conditions are favorable for growth of a new stand. Stock, especially sheep, prefer the young growing tips, thereby preventing the production of seed even on lower limbs.

Yellow-blossom sweet clover is best for pasture because of finer stems when compared with the white-blossom variety. The yellow variety is more apt to reseed itself because of the tendency of the lower limbs to escape pasturing. White sweet clover is a more vigorous grower than the yellow clover.

Successful seeding of sweet clover depends upon stored moisture, firmness of seedbed and prevention of wind damage. A cornfield, beanfield, stubble or fallow should be in the best condition for seeding sweet clover. A light disking is sometimes necessary to kill weeds before planting, tho it is believed best to drill in the seed, attempting to kill weed growth with the drill rather than loosen the soil with a disk. Weeds can be kept in check with a mower.

Six pounds of seed distributed in April by seeder attachment on a drill should give best results. Planting in rows by stopping sufficient drill holes may be satisfactory when a seed crop is desired on a small area for more extensive planting.

Sweet clover is adapted to sandy soils tho soil-blowing is apt to be experienced in securing a stand. Seed drilled in corn



A non-irrigated sweet-clover pasture which shows promise

or small-grain stubble without previous preparation will generally give good results.

Alfalfa.—Alfalfa in mixture with brome, slender wheat or other grasses may be successfully grown for permanent pasture on fields favorably located in draws or rainbelts. A mixture of 2 pounds of Grimm alfalfa with 10 pounds of grass seed may be seeded with a fair degree of success as outlined in the directions for seeding grasses. Whenever alfalfa is used in the mixture there will be some danger of bloat in cattle or sheep. Alfalfa alone is excellent pasture for hogs or horses.

Barley and Oats.—A temporary pasture can be provided by seeding barley or oats in the spring. After being rooted sufficiently to prevent pulling up during grazing, the barley or oat field can be pastured until the middle of July with good results, tho the grain will be headed out after June 10 to June 20. Brunker, Kanota or Nebraska 21 oats seeded at the rate of 5 pecks per acre will give best results. Club Mariout or Coast barley, seeded at the rate of 5 pecks, should provide good pasture with reasonable moisture conditions.

Forages for Winter Feed

When blizzards howl in winter or early spring, as they sometimes do in Eastern Colorado, it is comforting to the stockman and farmer to know that he has plenty of feed for his stock. The calf crop or lamb crop is largely dependent upon how the herd

or flock has been wintered thru. Even tho no blizzards occur and the winter is open, damage to pastures by overgrazing and trampling can be prevented by supplying feed for the livestock.

If a good big cow has a mouth that is 4 inches wide and grazing in a short-grass pasture, suppose she could bite off one-half inch of grass, how far would she need to travel to satisfy her needs for food? On a cold, windy day, would the body heat and energy used up in gathering this grass be greater than that supplied by the grass?

Certainly livestock that is worth keeping is worth feeding properly. Since there are some lean crop years on farms or ranches because of drouthy conditions or other difficulty, a reserve supply of feed should be stacked up during good crop years.

Corn is the most important crop grown for livestock feed in non-irrigated Eastern Colorado. With reasonable growing conditions, corn will produce more digestible feed per acre than any other crop.

Locally adapted seed corn is more important than variety in securing a good yield of corn. The general practice is to list in corn at the rate of 4 to 6 pounds per acre. May 1 to 10 has proved to be the best planting date for the production of higher yields and quality in corn.

In an 18-year test at the Akron, Colorado, Experiment Station, on hard land, alternate corn and fallow has given an average yield of 21.2 bushels of grain and 3561 pounds of air-dry cornfodder (stalks with ears attached.) During the 18 years of this test no crop failure was reported, the lowest yield being 1100 pounds of fodder reported in 1919.

Twenty-five different cropping systems, which included corn, were tried for 18 years at the Akron station. A system of oats on spring-plowed corn land followed by barley on spring plowing, which in turn was followed by corn, has given average yields nearest to the alternate fallow-corn system. Yields of corn in this system have averaged 14.1 bushels of grain and 2937 pounds of fodder during the 18-year period. The average yield of oats in this rotation has been 24.9 bushels and barley has averaged 17.5 bushels during the 18 years of test.

Experiments at the Hays, Kansas, Experiment Station, have shown that yields of corn are increased when the stubble land is listed in the early spring, then, before planting time "ridge busters" are used to level down the field. This stirring of the soil provides a warm, mellow seedbed for any spring-planted crop. Planting crosswise to the direction of the first listing will

eliminate trouble from trash on the lister point. Good results have also been secured in planting by "nosing out" fall or spring lister furrows, dropping the kernels of corn in moist, warm soil where immediate germination takes place.

Corn after corn has given good yields at Akron. This practice is not advisable for a long period of years because of the danger of root worms and diseases.

Corn can be cut for forage as the shucks turn brown but leaves are still green. After curing in the shock the entire bundle, with proper supplements, may be shredded for feeding or whole bundles may be thrown out to stock with good results.

The corn crop can be stored in a trench silo and when fed as silage nearly 100 percent of the entire crop will be readily eaten by stock. A trench silo is simply a hole in the ground 6 or 8 feet deep, 8 feet wide at the bottom and 12 feet in width at the top. Sloping walls prevent caving and when smoothed off with a spade, cause the silage to pack tighter as more is added in filling.

The length will be determined by the number of stock to be fed. Construction of the trench silo is largely labor which can be done with a plow and slip scraper or fresno as one end is left open and sloping so that the team or tractor may be driven into the trench.



A trench silo saves 100 percent of the corn crop and silage is the most economical succulent feed in Eastern Colorado.

Corn should be cut for silage when the majority of the ears are just past the roasting-ear stage. The kernels show some glazing but the stalks, leaves and shucks still may be green. The ensilage harvester which cuts the entire corn plant into short pieces in one operation as it moves along the corn row, is the most efficient implement. The silage harvester elevates the cut corn into a truck or wagon which is moved with the cutter. These loads of silage can be dumped into the trench silo and with some packing and addition of water, especially along the sides, the trench can be filled. A few farmers have successfully stored whole green corn in the silo, tho it is difficult to pack and prevent spoilage. Also, difficulty was experienced in feeding the uncut silage.

The filled trench silo should be covered. A layer of hog-millet straw or any chaffy straw about 1 foot in depth can be wet down for the silo cover. Bundle cane or corn can be thrown across the straw covering to hold it down. A Washington County farmer has discovered that there is no objection to putting a whole stack of millet hay or cane on his trench silo.

An ensilage cutter and corn binder may be purchased by a group of neighbors who exchange labor during silage time. A little company formed to purchase the silage machinery, making one man responsible for operating the machines, may prove best. The farmer elected to operate the machines will cut silage for the stockholders as if he owned the machinery and is doing custom work. At the end of the season expenses and acreage can be totaled and settlement can be made among the stockholders according to a prearranged agreement. This plan should eliminate neighborly quarrels which always arise over implements that are passed around and difficult to keep in repair.

Sorghums.—There are forage sorghums and grain sorghums. Both are suitable for wintering livestock with the forage varieties having sweet juice in the stalks and more leaves than the grain varieties.

Red amber, orange and early sumac cane have proved to be the best forage sorghums for Eastern Colorado conditions. Sorghum seed may be drilled with common or furrow drill at the rate of 15 to 20 pounds per acre with good results. Planted in rows with a corn planter at the rate of 4 to 6 pounds of seed per acre allows cultivation to destroy weeds and approximately the same tonnage will be secured as when drilled. Sorghums are a hot-weather crop, therefore should be planted after corn-planting time.

Coes sorgho, a grain-forage sorghum cross, seems to be most useful where grain and forage are desired in regions north of the divide area (Palmer Lake, Limon, Burlington). The average yield at the Akron Experiment Station has been 10.7 bushels of grain and 3310 pounds of air dry forage in a 5-year test.

Dawn kafir, hegari, feterita and locally adapted milo are the varieties of grain sorghums most likely to mature in sections south of the divide country. Grain sorghums are grown and handled with corn equipment. Grain sorghums are excellent for silage if allowed nearly to mature (reach the hard dough stage). Immature grain or forage sorghums in the silo will produce sour silage which is not so well liked by stock.

Grazing a stunted growth or second growth of sorghums is dangerous because of the chance of prussic-acid poisoning. After frost has killed the sorghum growth and it has had time to cure in the field there is very little danger.

Sudan Grass.—Average yields of air-dry sudan hay at the Akron Experiment Station have been 1.4 tons during a 6-year test. Sudan grass can be grown in rows or seeded broadcast in a drill with about the same yield per acre. Finer stems and



A good yield of leafy forage sorghum

better-quality hay will be produced by broadcasting the crop tho the feed will often be weedy. Sudan is apt to be damaged by frost or cool weather if planted before May 15. Two cuttings of hay are possible or a cutting of hay with considerable pasture will be possible during normal years. Sudan hay contains 9 to 11 percent protein if cut and well cured when the **first heads begin** to appear. Palatability and feed value decrease rapidly as the sudan approaches maturity before being cut for hay.

Careful handling to prevent the loss of leaves and stacking in big stacks will improve the quality and feeding value of sudan hay.

Wheat, barley or oats may be cut for hay with good results. For best-quality hay from these crops they should be cut when the grain is in the soft-dough stage. A field of oats cut with a binder as the grain shows signs of ripening would be convenient to handle in stacking and feeding.

Alfalfa.—There are many areas in Eastern Colorado favorably located to produce alfalfa hay. Fields located in draws or along streams usually have underground water within reach of alfalfa roots. Grimm alfalfa is the most hardy variety known and will likely give best hay yields. Seeded at the rate of 6 pounds of seed per acre with seeder attachment for drill as described in seeding sweet clover, should give good results on a well-firmed, moist seedbed. In some districts of Colorado and Montana alfalfa is grown in rows 21 to 42 inches apart with better results than when broadcast. The disk, spring-tooth harrow or row cultivators as a four-row beet cultivator are used to keep down the weeds.

The number of cuttings of alfalfa hay during the season will depend upon the moisture available. A 4 to 6-inch growth should be allowed to remain on the field during the winter to stop drifting snow and prevent soil blowing.

Soybeans generally have not been successful in Eastern Colorado because of small trials being completely eaten by jackrabbits. In areas where jackrabbits have been controlled or if planted in larger fields as a hay or grain crop, soybeans have possibilities. Varieties which will likely give best results are: Minsoy, Wea and Saskatoon yellow-seeded varieties and Soysota or Black Eyebrow dark-seeded varieties. Soybeans are high in protein, the grain containing approximately 36 percent protein.

Soybeans can be grown with corn machinery or in the same manner as a crop of pinto beans. Best yields of soybeans are possible when grown in rows seeded in late April or early May,



Forage and feed crops experiments at the United States Experiment Station, Akron, Colorado.

using 15 to 20 pounds of seed per acre. When a hay crop is desired, soybeans should be cut with bean cutter or mower as the pods begin to turn yellow and before the leaves begin to drop. When grown for a seed crop, the highest yields of soybeans of good quality will be secured if harvested when a majority of the pods have turned brown.

Forage or Hay Millets.—Forage or foxtail-type millets for hay have yielded 2.7 tons per acre on fallow in an 8-year test at the Akron Experiment Station. Varieties proving best are Kursk, Siberian and Goldmine. Millets should be drilled after corn-planting time on a well-firmed, prepared seedbed at the rate of 20 to 25 pounds of seed per acre.

Proso, hog millet or hershey, as it is sometimes called, is not considered to be a hay millet tho farmers report good results from feeding the straw, especially when the crop has been cut just a little green.

The feed value of bean straw or small-grain straw should not be overlooked. Farmers can afford to fence straw stacks and more care in feeding will reduce the amount of waste.

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