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ALASKA AGRICULTURAL EXPERIMENT STATIONS
JUNEAU, ALASKA

Under the supervision of the
UNITED STATES DEPARTMENT OF AGRICULTURE

BULLETIN No. 11

FORAGE CROPS IN THE
MATANUSKA REGION, ALASKA

BY

H. W. ALBERTS

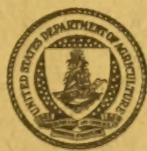
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**ALASKA AGRICULTURAL EXPERIMENT STATIONS, JUNEAU, SITKA,
AND MATANUSKA**

[Under the supervision of the Office of Experiment Stations, United States Department of Agriculture]

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ALASKA

By H. W. ALBERTS, *Director*

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INTRODUCTION

The principal crops on which the development of agriculture in the Matanuska region¹ depends are grown primarily as a feed for livestock. So far as is known, Fred Herning in 1906 was the first person to grow forage crops in the region. Mr. Herning operated a trading post at Knik and for many years grew oats on 2 acres as a feed for his horse. The first farmers did not grow forage crops because they had no barns or other buildings in which to care for livestock, and their areas of cleared ground were not sufficient for the raising of feed for horses and cows. Teams were scarce in the Matanuska Valley in those days, and only small parcels of land could be cleared at a time. Potatoes constituted the chief money crop of the region, and they therefore were grown on nearly all the cleared land. Potato growing required only small capital and yielded immediate returns in cash. However, diseases attacked the crop after it had been continuously grown on the same areas, and the yield of marketable potatoes was greatly reduced in consequence. The farmers then sought for other crops with which to grow their potatoes in rotation.

Cereal crops, such as oats, barley, and wheat, were tested for grain and found to make vigorous growth. At Matanuska these crops are grown during the warmest part of the summer and harvested with the coming of cool weather. Frequent slow, drizzling rains coming shortly after cutting may make difficult the work of curing

¹ This area embraces the Matanuska and the Susitna Valleys.

the crop in bundles in the field when it is grown for grain, but curing can be economically done when the crop is grown for forage.

Since the establishment of the Matanuska Agricultural Experiment Station in 1917, an endeavor has been made to determine the grain and forage crops best adapted to the region. Inasmuch as legumes had not been grown, such perennial legumes as clovers and alfalfa were introduced for trial. These grew vigorously during the summer and went into the winter in fine condition, but many of the plants were eventually heaved out of the ground by frost. Attention was then turned to field peas and to spring vetch (*Vicia sativa*), which are now among the more important legumes grown by farmers in the Matanuska Valley.

In the first trials field peas and vetch were seeded separately and grew luxuriantly. However, they lodged so badly as to be difficult to harvest and to cure. Thereafter peas and oats or vetch and oats were sown in mixture, the oats to provide support for the recumbent plants. Only enough oats were seeded in the mixture to keep the peas or the vetch from lodging. Sown together, field peas and oats gave a high yield of silage, and vetch and oats made the most desirable of the hay crops. The peas and the oats grew luxuriantly and were readily harvested and cured for winter use. The vetch and the oats for hay, however, required special treatment since they did not cure satisfactorily on the ground. Attempts were next made to cure the crops on racks built in the field, as is done in Norway (fig. 1). This method, although effective, was too expensive for use in Alaska, on account of the high cost of the labor involved. After unsuccessfully trying various other methods of curing, the station devised a simple inexpensive method in which the material is piled on thin peeled stakes driven into the ground (fig. 2). This method is now satisfactorily used by the more progressive farmers of the region.

SILAGE PRODUCTION

PEAS AND OATS

Experience has shown that peas sown mixed with oats are the most desirable of the crops for silage, although vetch and oats also may be successfully used for the purpose. For best results the farmer should adopt the cultural practices adapted to the region in which he lives.

PREPARATION OF THE SEED BED

The land should be plowed 4 to 6 inches deep in the fall, and should be given no further treatment until spring. The snowfall for the winter usually averages between 1 and 2 feet. The snow may drift in places, but as a rule a considerable portion remains where it fell. The snow thaws so gradually as to cause little surface washing, and the snow water is largely absorbed by the soil. During some parts of the winter when there is little or no snow on the ground the comparatively loose soil may be blown about by strong winds. During the spring there is little or no rain. As soon as the ground is workable in the spring, about late April or early May, it should be double disked (fig. 3) and harrowed, after which it should be seeded. The ground is cold in the spring, and newly planted crops cannot be expected to make much progress until the weather warms up, in June.

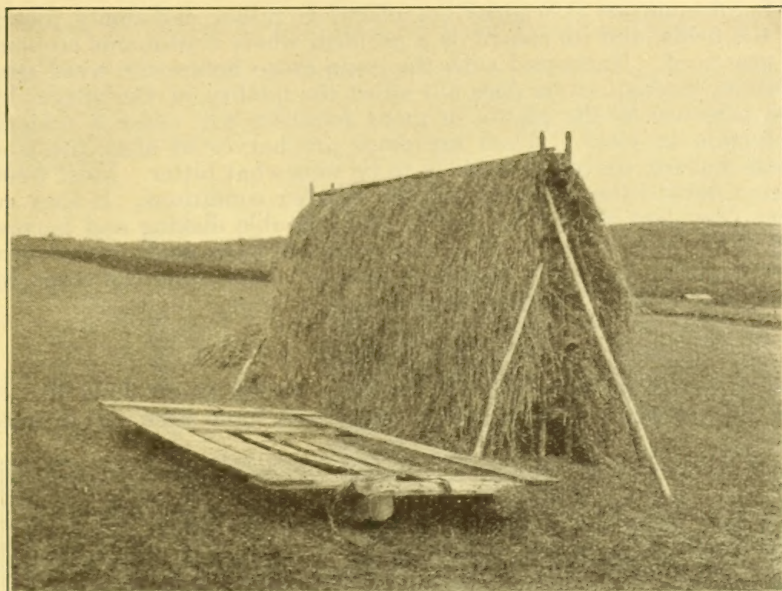


FIGURE 1.—Rack used in curing hay.

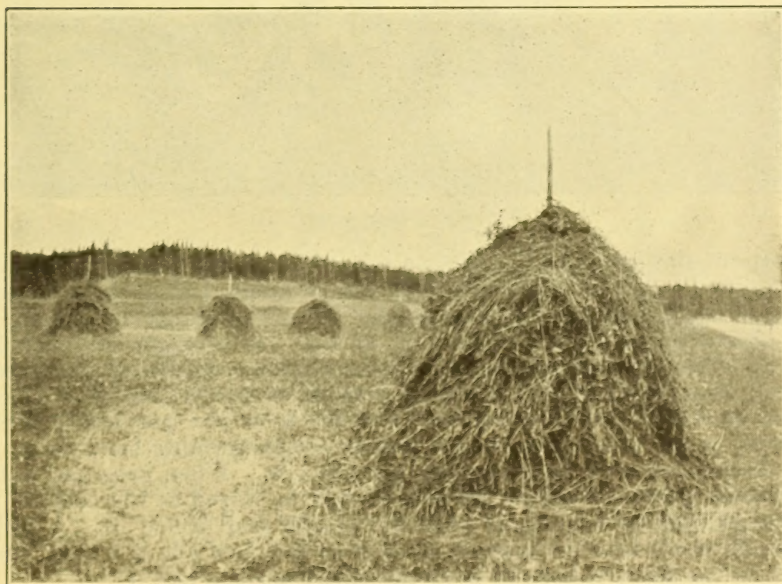


FIGURE 2.—Curing oats and vetch hay on thin peeled stakes.

WEED CONTROL

Lambsquarters (*Chenopodium album*) is rather commonly present in the fields, and its control is a problem where continuous cropping is practiced. Harvested with the grain crops before the weed seeds mature, lambsquarters does not affect the quality of the silage, but the presence of the plants in great numbers will cause a material reduction in yield. When the crops are harvested after the weed seeds mature, the silage is likely to be somewhat bitter. Most weeds thrive notwithstanding unfavorable weather conditions. If they are very prevalent it may be well to delay double disking and harrowing until about June 15, when the pests will have made considerable growth and can readily be exterminated. After June the crops will be able to smother out weed growth.

SEEDING

Oats and Canada field peas should be seeded about June 20. At the station where vigorous varieties of oats have been given prece-

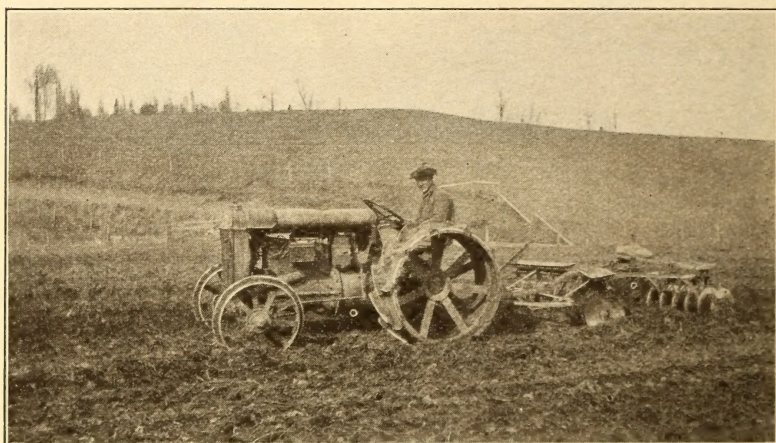


FIGURE 3.—Double disking land.

dence for this purpose, Leader has proved to be the best of the many sorts tried. Any other variety with heavy stems and profuse foliage may be used if adapted to the region. The seeds should occasionally be stirred in the hopper of the drill so that the resultant stands will be uniform. Pea seeds should be treated with a culture of nitrogen-fixing bacteria when they are to be planted on newly cleared or other land on which peas bearing root nodules have not previously been grown, or soil taken from a field rich in nodule-forming bacteria may be distributed over land needing the bacteria. When peas and oats are to be grown for silage the seed should be mixed in the ratio of 3 parts of oats to 2 parts of peas by weight and drilled in. A drill puts the seeds into the ground at an even depth of about 1 inch, and distributes them uniformly over the entire surface (fig. 4).

After seeding has been done the loose soil should be firmed with a cultipacker to conserve moisture (fig. 5). All the soils of the region

are loose and porous. According to Landes,² practically all the fertile surface soils have been formed by the action of strong down-valley winds, which pick up sand from the Knik River flood plain. These

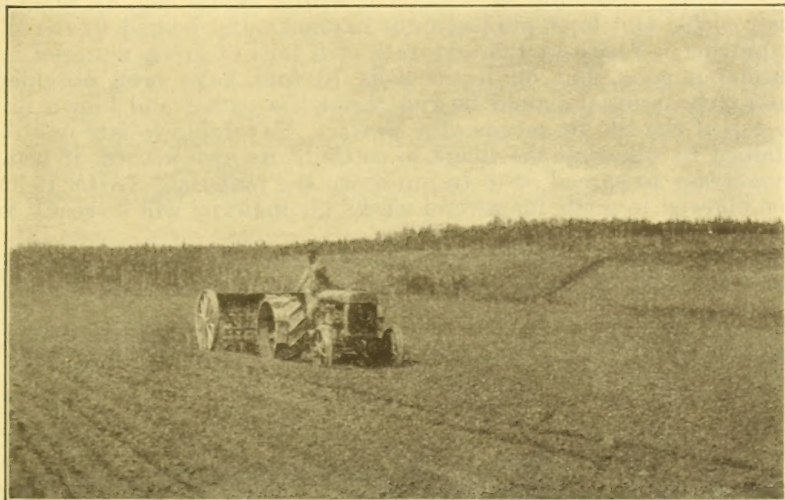


FIGURE 4.—Seeding crops for silage.

particles settle on gravels deposited by the previously existing glacier. Post-glacial deposition, amounting to about one-tenth inch in some seasons, continues in the forest region. This soil when brought under



FIGURE 5.—Cultipacker in operation.

cultivation becomes loose, almost like ashes, and, after being seeded, should be cultipacked to improve capillarity. Cultipacking hastens germination by supplying the seeds with moisture from the snow water that soaked into the lower strata earlier in the spring.

² LANDES, K. K. GEOLOGY OF THE KNIK-MATANUSKA DISTRICT. U. S. Geol. Survey Bul. 792B: 51-72. 1927.

HARVESTING, YIELDS, AND STORAGE

The silage crops should be harvested in early September, when the pods on the pea plants are well filled and the oats are in the early-dough stage. The crop should be cut with a mower (fig. 6), piled in small cocks, and later pitched onto haystacks and hauled to the silo for cutting. Yields at the acre rate of 8 tons of green material are considered good, but on fertile soils 10 tons have been obtained. The green material should be run through a cutter and blown into the top of the silo by means of a blower. Favorable results may be obtained by allowing the silage to settle of its own accord, it being unnecessary to spread or to tramp down the material.³ After it has been allowed to settle for several weeks the material will be ready for feeding.

To determine the right proportion of green oats to use with green peas for silage, the crops in varying proportions were seeded and it

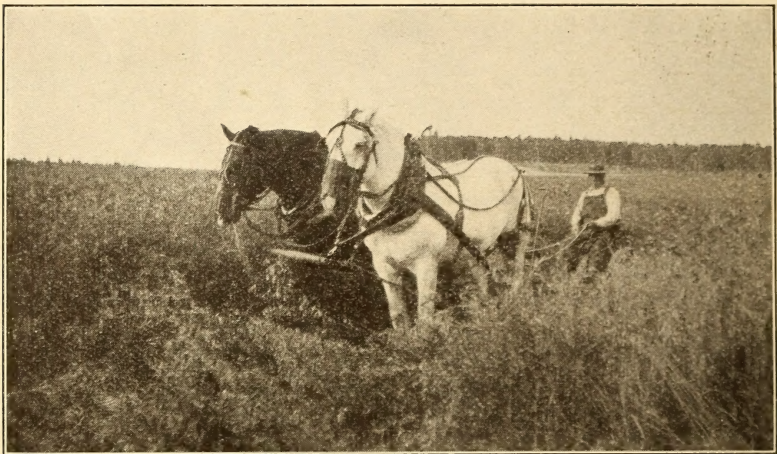


FIGURE 6.—Cutting peas and oats with a mower.

was found that the most favorable ratio was 90 pounds of oats to 40 pounds of peas per acre. The oats produced 45.3 percent, and the peas 54.7 percent, of the green silage. The green oats had a moisture content of 65.1 percent and the peas a moisture content of 54.7 percent. When planted in these proportions, the peas and the oats produced an almost equal amount of dry matter.

HAY PRODUCTION

VETCH AND OATS

The most important crops for hay are vetch and oats. The seed bed for them should be prepared as for peas and oats, and the seed should be sown about June 20. Vetch seed becomes inoculated with nitrogen-fixing bacteria when it is sown on land on which vetch has not previously been grown. The crops should be seeded at the acre rate of 90 pounds of oats to 30 pounds of spring vetch, and cut with

³ ALBERTS, H. W. REPORT OF THE ALASKA AGRICULTURAL EXPERIMENT STATIONS. Alaska Agr. Expt. Stas. Rpt. 1930: 13, illus. 1931.

a mower between August 15 and August 30, or when the oats are just past the full-bloom stage and the vetch is in full bloom (fig. 7).

The harvested material should be piled on peeled, double-pointed vertical stakes to cure. The stakes should be about $1\frac{1}{2}$ to 2 inches in diameter, and should be driven approximately 12 inches into the ground. A tenpenny nail should be driven partly into each stake about 18 inches above the ground. This method prevents the cock from settling on the ground, causes the outside to hang so as to shed the rain readily, and lets the air circulate freely around the bottom of the cock. The method may be modified by boring a hole through the stake about 16 inches from the top, building the cock as high as the hole, inserting in the hole a peg about the size of a twenty penny



FIGURE 7.—Vetch and oats at the harvesting stage.

spike, and placing green oats and vetch on the peg to the top of the stake. The material above the peg will settle into a cap and thus serve to protect the lower part of the cock from rain. A simple device, somewhat like a wagon jack, with forked arrangement to grip the stakes at the surface of the ground, may be used for lifting and turning over the cock. The peg near the top should then be removed from the stake and the latter pulled from the cock.

Cured vetch plants had a moisture content of 79.5 percent and oat plants a moisture content of 71.3 percent. Sown in the ratio of 3 pounds of oats to 1 pound of vetch, the oats from a unit area constituted 67.1 percent of the total crop harvested, whereas the vetch constituted 32.9 percent. The moisture content should be reduced to approximately 17 percent before the crop is hauled to the shed. An open shed (fig. 8) may be satisfactorily used for curing and for storing the hay. Such a shed may be built by setting firmly in the ground a spruce pole at each of the four corners to support the roof.

The poles should be about 1 foot in diameter and 16 feet long. The north and the east sides from which the prevailing winds blow should



FIGURE 8.—Hay shed, Matanuska station.

be boarded to keep out rain and snow. The south and the west sides should be left open.

GRAINS

Hay is sometimes made from such cereal grains as oats and barley. The crop is seeded as for grain and is cut with a mower or with a



FIGURE 9.—Cutting oats for hay.

binder. When cut with a mower the forage is allowed to cure on the ground unless unfavorable weather follows, when it is coked on stakes (fig. 2). Oats or barley for hay should be cut about the second week of August for maximum yields of feed per unit area (fig. 9). The

crops are then in the late-milk or early-dough stage, relatively low in fiber content, and high in nutritive value. Table 1 gives the composition of oats and barley which were cut at weekly intervals at the Matanuska station in 1928.

TABLE 1.—Composition of locally grown oats and barley, cut weekly at the Matanuska station in 1928

| Sample no. | Date of harvesting | Height of plants | Description of sample | Water | Fat | Crude fiber | Protein N x 6.25 | Ash | Nitrogen-free extract |
|-------------------------------------|--------------------|------------------|--|-------|------|-------------|------------------|-------|-----------------------|
| | | Inches | | Per- | Per- | Per- | Per- | Per- | Per- |
| | | | | cent | cent | cent | cent | cent | cent |
| Barley (Hybrid no. 19b): | | | | | | | | | |
| 1 | June 28 | 3-6 | 50 percent plants starting to joint | 6.75 | 3.00 | 25.97 | 19.60 | 10.72 | 34.24 |
| 2 | July 5 | 8-12 | 50 percent showing heads in boot | 5.83 | 2.30 | 27.33 | 13.80 | 8.75 | 40.79 |
| 3 | July 12 | 12-15 | 25 percent heads formed; 25 percent in boot. | 6.31 | 1.27 | 26.01 | 9.37 | 6.74 | 37.04 |
| 4 | July 19 | 15-30 | All heads out of boot; 50 percent in bloom. | 6.37 | 1.48 | 24.65 | 7.38 | 5.70 | 54.42 |
| 5 | July 25 | 30-40 | 75 percent reaching milk stage... | 6.16 | 1.62 | 25.22 | 6.62 | 5.45 | 54.93 |
| 6 | Aug. 2 | 30-40 | Late-milk stage. | 5.79 | 1.98 | 23.76 | 6.09 | 5.00 | 57.38 |
| 7 | Aug. 9 | 30-40 | Early-dough stage. | 5.98 | 1.80 | 14.72 | 5.63 | 5.19 | 66.68 |
| 8 | Aug. 16 | 30-40 | Late-dough stage; heads dropping, some leaves dropped. | 6.26 | 1.75 | 20.51 | 6.74 | 5.00 | 59.74 |
| 9 | Aug. 23 | (1) | Lower third leaves dropped; leaves green at top. | 6.17 | 1.89 | 20.16 | 5.94 | 6.01 | 59.83 |
| 10 | Aug. 30 | (1) | 50 percent of leaves dropped. | 6.27 | 1.78 | 20.12 | 5.78 | 5.22 | 60.83 |
| 11 | Sept. 6 | (1) | 75 percent of leaves dropped. | 5.89 | 1.71 | 21.97 | 5.44 | 5.63 | 59.36 |
| 12 | Sept. 13 | (1) | 90 percent of leaves dropped. | 6.17 | 1.46 | 21.77 | 5.69 | 5.13 | 59.78 |
| 13 | Sept. 21 | (1) | 5 percent of heads dropped, owing to heavy frost. | 6.22 | 1.46 | 25.38 | 5.94 | 5.09 | 55.91 |
| 14 | Sept. 27 | (1) | All leaves and 5 percent of heads dropped. | 6.29 | 1.37 | 19.61 | 6.40 | 4.91 | 61.42 |
| Oats (Swedish Select): ² | | | | | | | | | |
| 1 | June 28 | 4-6 | Growth retarded by lack of moisture. | 6.68 | 2.90 | 20.33 | 14.20 | 10.11 | 45.78 |
| 2 | July 5 | 8-12 | Growth increasing; heads in boot. | 6.46 | 2.03 | 23.77 | 8.56 | 7.92 | 51.26 |
| 3 | July 12 | 15-20 | 50 percent of heads breaking from boot. | 6.04 | 1.70 | 27.43 | 8.25 | 7.08 | 49.50 |
| 4 | July 19 | 15-25 | 95 percent of heads breaking from boot. | 5.77 | 1.48 | 28.70 | 6.72 | 5.82 | 51.51 |
| 5 | July 26 | 25-40 | All heads out of boot and in bloom | 5.34 | 1.41 | 27.89 | 5.63 | 5.10 | 54.60 |
| 6 | Aug. 2 | 35-40 | Early-dough, late-milk stage | 5.55 | 1.86 | 26.52 | 5.40 | 5.03 | 55.64 |
| 7 | Aug. 9 | 36-44 | Stiff-dough stage | 4.41 | 1.38 | 23.57 | 4.10 | 4.38 | 61.16 |
| 8 | Aug. 16 | 36-44 | Grain beginning to harden. | 5.16 | 2.36 | 25.50 | 4.00 | 5.09 | 57.95 |

¹ Ripe.

² Plat inadvertently cut for silage Aug. 20.

NATIVE GRASSES

The first hay in the region was made from native grasses, which consist principally of bluetop (*Calamagrostis* sp.) (fig. 10). When cut about June 25, or when the heads are approximately half out of the boot, these grasses make a hay of fair quality for horses. The hay may also be fed to cattle, but it is not recommended for such use. When cut at a late stage, the grasses are woody and low in palatability. Table 2 gives the composition of native bluetop grasses cut at weekly intervals at the Matanuska station in 1927.

FIGURE 10.—Native bluetop grass (*Calamagrostis* sp.).TABLE 2.—Composition of native bluetop grass, *Calamagrostis* sp., cut at different stages of growth at the Matanuska station in 1927

| Sample No. | Date of harvesting | Height of plants | Description of sample | Loss of weight in air-drying | Air-dried samples | | | | |
|------------|--------------------|------------------|---|------------------------------|-------------------|-----------------|-----------------|-----------------|-----------------|
| | | | | | Water | Fat | Crude fiber | Protein N×6.25 | Ash |
| | | <i>Inches</i> | | <i>Per-cent</i> | <i>Per-cent</i> | <i>Per-cent</i> | <i>Per-cent</i> | <i>Per-cent</i> | <i>Per-cent</i> |
| 1 | May 21 | 4-10 | Practically all leaves..... | 72.7 | 5.2 | 3.9 | 20.0 | 27.20 | 10.0 |
| 2 | May 28 | 10-14 | Stems 4 to 10 inches long..... | 77.5 | 5.3 | 3.4 | 25.0 | 21.05 | 9.3 |
| 3 | June 4 | 10-16 | Stems 5 to 12 inches long..... | 71.0 | 5.4 | 3.1 | 26.1 | 18.56 | 9.5 |
| 4 | June 11 | 12-24 | Stems 10 to 20 inches long..... | 79.1 | 5.3 | 2.1 | 29.1 | 18.75 | 9.1 |
| 5 | June 18 | 18-26 | Stems 10 to 24 inches long; heads breaking from boot..... | 69.2 | 5.1 | 1.9 | 34.2 | 11.25 | 6.9 |
| 6 | June 25 | 24-36 | About half of heads out of boot..... | 72.2 | 4.9 | 1.7 | 36.4 | 10.69 | 6.1 |
| 7 | July 2 | 30-38 | Half of heads purple; 90 percent headed..... | 74.1 | 4.8 | 1.6 | 38.8 | 9.26 | 5.6 |
| 8 | July 9 | 30-48 | Fully headed, pollen dropping..... | 57.4 | 4.9 | 1.8 | 36.2 | 6.94 | 5.0 |
| 9 | July 17 | (1) | Advanced blooming stage; lower stems woody..... | 52.3 | 5.0 | 1.6 | 38.4 | 5.37 | 4.4 |
| 10 | July 23 | ----- | Seeds forming; few heads in bloom; lower stems woody..... | 56.2 | 4.8 | 1.7 | 35.6 | 7.31 | 5.9 |
| 11 | July 30 | ----- | Half of heads formed seeds..... | 48.6 | 4.8 | 2.2 | 35.7 | 5.50 | 4.8 |
| 12 | Aug. 6 | ----- | All seeds formed; 5 percent of heads dropped seeds..... | 41.8 | 5.0 | 1.6 | 35.9 | 5.18 | 4.1 |
| 13 | Aug. 13 | ----- | Seed shattering; lower leaves drying and dropping..... | 39.5 | 4.8 | 1.3 | 35.7 | 4.37 | 4.2 |
| 14 | Aug. 20 | ----- | 75 percent of seed dropped; many heads broken..... | (2) | 5.1 | 1.5 | 34.1 | 3.93 | 4.0 |

¹ Plants after this date were of mature size.

² Rainy weather made it impracticable to determine water loss in drying.

TABLE 2.—*Com position of native bluetop grass, Calamagrostis sp., cut at different stages of growth at the Matanuska station in 1927—Continued*

| Sample No. | Date of harvesting | Height of plants | Description of sample | Loss of weight in air-drying | Air-dried samples | | | | |
|------------|--------------------|------------------|--|------------------------------|-------------------|----------|-------------|----------------|----------|
| | | | | | Water | Fat | Crude fiber | Protein N×6.25 | Ash |
| 15 | Aug. 27 | Inches | Seed practically all shattered; many heads dropped | Per-cent | Per-cent | Per-cent | Per-cent | Per-cent | Per-cent |
| 16 | Sept. 3 | | All seed dropped; lower leaves off; lower stem woody | (²) | 5.0 | 1.8 | 36.8 | 4.18 | 3.7 |
| 17 | Sept. 10 | | 10 percent of stalks broken | (²) | 5.0 | 1.8 | 38.8 | 2.62 | 4.9 |
| 18 | Sept. 17 | | Grass dead from frost; many heads whipped off by wind; stalks broken | (¹) | 4.8 | 1.8 | 40.8 | 1.93 | 5.3 |
| 19 | Oct. 1 | | Grass brittle; leaves frosted, ready to fall | (²) | 5.1 | 1.6 | 44.5 | 1.37 | 5.6 |
| 20 | Oct. 15 | | Grass heavily frosted; brittle leaves dropping rapidly; stalks woody and stiff | (²) | 4.9 | 1.7 | 41.7 | 1.50 | 6.1 |
| 21 | Oct. 29 | | Heavy freeze; grass breaking; seed all dropped | (²) | 4.8 | 1.9 | 42.3 | 1.81 | 5.3 |
| 22 | Nov. 12 | | Leaves practically gone from lower 3/4 of stalk | (²) | 4.6 | 1.5 | 41.9 | 1.25 | 5.3 |

² Rainy weather made it impracticable to determine water loss in drying.

Native bluetop grass yields approximately 1 ton of dry matter per acre at its first cutting. The yield generally decreases considerably the second year, and in succeeding years is too low to be cut profitably. The native grasses are not a dependable source for hay.

SLENDER WHEATGRASS

Slender wheatgrass (*Agropyron tenerum*) and bromegrass (*Bromus inermis*) are the most desirable of the cultivated grasses for hay. Slender wheatgrass is seeded in the spring, either alone or with a nurse crop. If the grass is to be grown with a nurse crop, the oats, wheat, or barley should be seeded first, and the slender wheatgrass next. Seeding should be followed by a light harrowing. Slender wheatgrass is seeded at the rate of 8 to 12 pounds per acre. After the cereal crop is harvested, the grass will occupy the ground. The next season the crop should be harvested for hay. During the first year the stand will not be heavy and may yield less than 1 ton per acre. The heaviest yield, about 1 ton of hay per acre, may be expected the second season, after tillering. Slender wheatgrass makes a desirable hay crop in the Matanuska Valley. It is hardy, palatable, drought resistant, and ready to be harvested before the rainy season begins.

BROMEGRASS

Next to slender wheatgrass, bromegrass has proved to be well adapted to the region. Cultural practices for bromegrass are similar to those for slender wheatgrass. Bromegrass is hardy and grows rapidly early in the spring. It is not as drought resistant as is slender wheatgrass and may suffer from lack of moisture early in the summer. It yields from 1 to 2½ tons of hay the second year after it is seeded. The hay equals that of slender wheatgrass in feeding value.

MISCELLANEOUS GRASSES

Other grasses that have been sown for hay at the station are timothy, Kentucky bluegrass, meadow fescue, orchard grass, crested dogstail,

redtop, Italian ryegrass, and English ryegrass.⁴ All but the first three winter-killed. Timothy overwinters well, but does not make a satisfactory hay crop. Kentucky bluegrass makes such poor yields as to be unprofitable for hay production.

PASTURE

Native grasses constitute a large portion of the local pastures. Livestock may be pastured on native grasses from about June 15 to September 15. Some pasture is available before June 15 and some after September 15, but pastures for full feed are dependable only within the limits of these dates. Because there are no warm spring rains to thaw the ground, the native grasses make comparatively slow growth early in the spring. The grasses grow rapidly after the ice leaves the ground, sending forth stools and panicles in 2 to 3 weeks. During the period of rapid growth the grasses are highly nutritious and make an excellent feed for livestock. After attaining the boot stage, the grasses rapidly decline in digestible nutrients and palatability, and cattle do not relish them nearly so much as some of the cultivated sorts. If the fields are not grazed continuously or are properly rotated, new shoots will form and supply nutritive feed throughout the season. Continuous grazing, however, may cause the stand to diminish gradually.

Cultivated grass pastures usually are seeded either with slender wheatgrass or with bromegrass, and probably with a mixture of the two. Slender wheatgrass grows slowly in the spring and does not form an early pasture. Being drought resistant, slender wheatgrass will continue to grow in dry weather when other grasses make retarded growth. Slender wheatgrass forms a good sod. It is not difficult to subdue on land that is plowed and seeded with crops.

Bromegrass ranks second as a cultivated pasture grass. It is hardy and grows rapidly earlier in the spring than does slender wheatgrass. In favorable seasons bromegrass can be pastured as early as June 1. It is not as drought resistant as is slender wheatgrass, and its yields are greatly reduced by dry weather. In 1917 bromegrass was sown near the Matanuska station on about 1½ acres of steep south-slope land.⁵ It survived the winter in fine condition even on a partly exposed hilltop. It made fine early pasture, but turned brown during the dry weather. After the rains came, the grass returned to its normal green color and furnished pasturage for the rest of the season. The following year it made little growth.⁶

In 1920 bromegrass started to grow as early as May 1, being ahead of the native grasses, and by May 15 it was tall enough to pasture.⁷ It grew to a height of 3 feet and produced some seed.

Field peas, oats, and rape seeded in a mixture at the rate of 4 pounds of rape, 1 bushel of peas, and 1 bushel of oats per acre make a good pasture for hogs. Such a pasture can be used all summer unless it is grazed too closely (fig. 11). The pasture should be of sufficient size to enable the animals to obtain plenty of feed. If the pasture is

⁴ RADER, F. E. REPORT OF WORK AT THE MATANUSKA STATION. Alaska Agr. Expt. Stas. Rpt. 1920: 55. illus. 1921.

⁵ RADER, F. E. REPORT OF WORK AT MATANUSKA STATION. Alaska Agr. Expt. Stas. Rpt. 1918: 71-84, illus. 1920.

⁶ RADER, F. E. REPORT OF WORK AT MATANUSKA STATION. Alaska Agr. Expt. Stas. Rpt. 1919: 65-78. 1920.

⁷ RADER, F. E. REPORT OF WORK AT MATANUSKA STATION. Alaska Agr. Expt. Stas. Rpt. 1920: 48-58, illus. 1921.

large enough, close grazing is not necessary and the crops are allowed to set seed. Sown for hog pasture May 15, 1930, oats, peas, and rape stood 6 inches high by July 1. At the time the pigs were turned on this pasture the field was overrun with lambsquarters (*Chenopodium album*), which stood as high as the oats. The weed was relished by the pigs and soon was grazed to the ground. Daily observations showed that after they had completely grazed the weeds, the animals preferred the young peas and the rape to the oats. The peas and the



FIGURE 11.—Hogs on pasture.

rape had been closely grazed by September 15, and the oats were maturing.⁸

SUMMARY

A mixture of field peas, 2 parts, and oats, 3 parts, by weight, was found to be the most desirable of the crops tried for silage.

Spring vetch and oats sown in a mixture of 1 part of vetch and 3 parts of oats by weight proved to be the most desirable of the crops tried for hay.

Hay may be satisfactorily cured by cocking it on stakes into which tenpenny nails have been partly driven about 18 inches above the surface of the ground. This method lets the air circulate freely around the bottom of the cocks.

Hay is successfully made from cereal crops like oats and barley, but the hay is not so desirable as is that produced from a mixture of vetch and oats.

Native grasses for hay should be cut when the heads are 50 percent out of the boot. Earlier cutting results in lower yields. When cut later, the grasses will be high in percentage of crude fiber and low in percentage of digestible nutrients.

⁸ ALBERTS, H. W. REPORT OF THE ALASKA AGRICULTURAL EXPERIMENT STATIONS. Alaska Agr. Expt. Stas. Rpt. 1930: 19. 1931.

Slender wheatgrass makes a desirable hay crop for the Matanuska Valley. It is well adapted to the region and produces a fair yield of hay of good quality.

Bromegrass is also used for hay. In favorable seasons it yields more heavily than does slender wheatgrass, and in dry seasons it is not so drought resistant as is the wheatgrass.

Of the cultivated pasture grasses, slender wheatgrass and brome-grass make a satisfactory mixture for hay. Slender wheatgrass continues to grow during drought, whereas brome-grass grows very slowly and turns brown. Brome-grass, on the other hand, begins to grow earlier in the spring and therefore can be pastured sooner than slender wheatgrass.

A mixture of field peas, oats, and rape, seeded at the rate of 1 bushel of field peas, 1 bushel of oats, and 4 pounds of rape, will furnish pasture for hogs throughout the summer, provided the area is not overgrazed.

