

# Sudan Grass, Soybeans

## And Other Supplementary Hay and Pasture Crops

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**D**ROUGHTS often make it necessary to plant emergency hay and pasture crops during the season in which they occur. Also they often so seriously damage new meadow seedings that emergency crops must be grown the next season to furnish the hay and pasture which normally would have come from the new meadows. Bluegrass pastures tend to be rather unproductive during the latter part of June and through July and August, and there is widespread need for supplementary pasture during this period.

The need for emergency hay and pasture crops is less when there are meadows of alfalfa or alfalfa mixtures. The livestock farmer is justified in going to the expense necessary to start and maintain such meadows.

### ROTATION MEADOWS

When new seedings fail, it is often advisable to keep the old meadows in hay or pasture through another year. The yield of hay from timothy or mixed meadows may be noticeably increased by top-dressing with manure or fertilizers, but even then early harvesting is necessary for high quality hay.

1. *Manure*.—An application of six to eight loads per acre, made during the *fall and early winter*, is suggested.

2. *Fertilizer*.—On meadows that are largely timothy, 150 to 200 pounds per acre of sulfate of ammonia, or the equivalent of another nitrogenous fertilizer, may be broadcast about April 1. Cyanamid should be applied by March 1 to 15. With normal rainfall in April and May, increased yields of 1200 to 2000 pounds of hay per acre may be expected at a cost of about \$4 for fertilizer per ton of increase in hay. This is an economical method of buying needed hay.

Annual applications of nitrogenous fertilizers alone will not maintain a stand of timothy over a period of years. Therefore, every two years, an application of 200 pounds per acre of 10-6-4 or a similar analysis is recommended.

#### WHEAT, OATS, AND RYE

The cereal crops, wheat, oats, and rye, provide the cheapest and most easily produced emergency hay or pasture. Harvesting these crops for hay or pasture rather than allowing them to mature grain may benefit the new seedings. This is of especial importance in dry seasons or when lodging due to excessive straw growth is likely to damage the new seeding.

Oats hay is the most nutritious of the cereal hays, and it is harvested during the most favorable weather. Harvested in the milk stage, oats makes a hay nearly equal to mixed clover and timothy in feeding value. Winter wheat makes hay about equal to good timothy hay when harvested in the fully headed to early milk stage.

Wheat and rye may be pastured for two or three weeks in late April and then allowed to mature grain. This is especially important when they are likely to make excessive straw growth. The grain yields may be reduced, but pasturing with sheep or cattle has benefited the new seedings. If they are not to be harvested for grain, wheat may be pastured from mid-April until June and oats from early June until late July.

#### SUDAN GRASS FOR PASTURE AND HAY

Sudan grass is a vigorous growing, dependable annual summer pasture and emergency hay crop. The acreage has steadily increased since its introduction to this country in 1909. The difficulties of getting good stands are largely corrected by the use of good seed, good seedbed preparation, and shallow covering of the seed. It makes a fair growth on thin or acid soil but does not do well on cold, wet soils or on soils that dry out quickly. It does well in dry seasons if the plants once become established.

On productive soils and under favorable weather conditions one acre of Sudan grass will provide pasture for two or more cows during the time it is available. All or part of the field may be harvested for hay at the heading-out stage, and the second growth pastured, *after it has again reached a height of at least one foot.*

It will probably prove most valuable in Ohio as a summer pasture for cattle and sheep. It is available from early July until frost comes, the period when permanent pastures are least productive. It grows again immediately after being pastured down.

*Culture.*—A good seedbed is essential and in its preparation several crops of weeds are killed. Seedings are best made May 20 to June 10 (about two weeks after corn planting). *Earlier seeding is not advisable.* Later seedings may be made until July 15 or even August 1, but the pasture season and hay yields are greatly reduced. Since too deep covering is a common cause of thin stands, the *seed should be covered lightly*, not over  $\frac{1}{2}$  inch.

The recommended 20 to 30 pounds of seed per acre will ordinarily be sown from the wheat side of a grain drill set at 2 pecks. Some drills will not seed

such a small amount, in which case the Sudan grass seed should be mixed with an equal quantity of cracked corn. Ordinarily, the grass and clover seed attachment of the grain drill will not sow the required amount of seed.

Where a drill is not available, the seed may be broadcast on a well prepared seedbed that has just been cultipacked. This is covered with a weeder, rotary hoe, or harrow, going crosswise of the cultipacking. The seed falling in the firm, cultipacked furrows is covered to a uniform shallow depth. Good quality seed, of high germination, weighing 35 to 40 pounds per bushel, should be used.

Sudan grass grows during the season when nitrate nitrogen is being formed in quantity in productive soils. On fairly productive land 150 to 200 pounds of 0-14-6 (20 per cent superphosphate on recently manured land) may be used at planting time; a 2-12-6 or 4-10-6 analysis may be more satisfactory for less productive soils.

*Pasturing Sudan Grass.*—On productive lands, Sudan grass should be 12 to 15 inches high five to six weeks after planting. Pasturing should be avoided prior to that time, for the young, short plants *may* contain sufficient cyanide to be poisonous. To guard against such possibilities, Sudan grass should not be pastured until it has reached a height of at least 12 to 15 inches.

It is well to have two fields or to divide the one field of Sudan grass by a temporary or electric fence, so that the livestock may be rotated from one to the other. As soon as the large growth has been grazed off, with the exception of a few stalks, the livestock may be turned into the second area.

Sudan grass may be pastured until killed by frost. Even after frosts, Sudan grass that is over a foot tall may be safely pastured, since frosting does not increase the cyanide content.

It is suggested that when animals are first turned into a Sudan grass pasture, they be observed for an hour. Healthy, vigorous, well-fed animals usually stop eating within a short time and look around for other grass to eat if there is sufficient poison present to be dangerous. The precautions are simply to have vigorous growing Sudan grass and avoid pasturing any short young growth unless it be mixed with older, taller, plants.

*Future Use of Field.*—Under some conditions the yields of crops following Sudan grass are less than they are following other common farm crops. This effect on the soil is temporary and most noticeable on nitrogen deficient soils. Less injury may be expected when Sudan grass stubble is fall plowed rather than spring plowed. A liberal application of manure is suggested before another crop is planted, and the next crop should be well fertilized. The same precautions are advisable for the crop that follows sorghums.

Some farmers wish to grow Sudan grass on the same field year after year. In such cases the area should be liberally manured and fertilized each year. Where rye or wheat is grown as an early spring pasture between the crops of Sudan grass, the pastured rye or wheat should be plowed as early as possible to prepare a good seedbed for the Sudan grass.

*Hay.*—Sudan grass is slow to cure because of the large stems with a high moisture content. Poor curing weather that may occur with late harvesting means greater difficulty. The other emergency hay crops mentioned in this bulletin generally make more satisfactory hay than does Sudan grass.

Harvested *in the heading-out stage* and well cured, the hay is palatable and considered at least equal to good timothy hay. Two to three tons per acre may be expected on productive soils.

#### SOYBEANS FOR HAY

Soybeans are the best annual legume hay crop. The feeding value of the hay compares favorably with that of alfalfa. Livestock eat it readily and thrive upon it.

*Plow Early and Plant Shallow.*—Maximum yields of soybeans on weed-free seedbeds come from plantings made at the normal time for planting corn, though near-maximum yields may be obtained from seedings made as late as the first week of June. Fair yields of hay may come from seedings up to July 1.

Early plowing or disking, followed by repeated cultivations, will kill many of the weeds before planting. Certainly on weed-infested soils the time of seeding may profitably be delayed in order to kill weeds. The seedbed should be firm, and the seed covered shallow, not over one inch deep.

*Soybean Varieties for Hay.*—The earlier maturing varieties, such as the yellow seeded varieties commonly grown for commercial beans, make the best quality of forage by the time soybeans should be harvested for hay (see page 5). Manchu and the slightly later Scioto are recommended for Central and Northern Ohio and Scioto for Southern Ohio. Later varieties make a larger yield only when they have a longer growing season. For Central and Southern Ohio the black-seeded Kingwa and brown-seeded Virginia are recommended for hay—but not for the production of commercial beans.

*Vigorous Germination Essential.*—The germination of soybean seed should be checked before planting. Soybean seeds more than one year old, or with cracked seed coats, are apt to show a low percentage of strong sprouts. Thin stands often result when such seed is used.

*Thick Seeding and Drilling Solid Preferable.*—Solid seeding with a grain drill, as wheat and oats are sown, is preferable except on fields likely to become very weedy. In the latter case, planting in rows 21 to 28 inches apart, either by covering part of the holes in the seed box of a grain drill, or with a beet drill, is advisable, provided narrow-row cultivation equipment is available.

Seeding rates will vary with the size of the seed and should allow for the loss of some plants during cultivation. A thick stand means hay with fine stems and less trouble in curing. For solid drilled seedings, 7 to 8 pecks per acre of Manchu and Scioto are required, while 5 to 6 pecks of Kingwa or Virginia will give about the same stands. For row plantings, 2 to 3 pecks of the small seeded varieties and 3 to 4 pecks of the larger seeded varieties are required.

*Cultivation of Soybeans.*—Two facts should regulate cultivation of soybeans: (1) The seedlings cannot easily break through crusts; and (2) the time to kill weeds is when the weed seeds are germinating.

The spike-tooth harrow, weeder, or rotary hoe may be used to break the crusts before the young plants appear, and to kill weeds while they are “in the white.” If cultivations start early, the use of these implements until the beans

are 6 inches high will practically control weeds. While 5 to 20 per cent of the young bean plants may be killed by cultivating soybeans just as they are coming through the ground, the elimination of the weeds may more than offset the loss. On badly weed-infested fields the rates of seeding should be heavier to permit cultivation when the weed seeds are germinating.

The teeth of the spike-tooth harrow should be slanted backwards and cultivations made across the rows. Less injury results if soybeans are cultivated during the heat of the day when the plants are tough. Row planted soybeans may be cultivated similarly in the early stages, and thereafter tilled with corn or beet cultivators.

*Fertilizers and Liming.*—Where other crops in the rotation are fertilized, soybeans seldom respond to additional fertilizer. Hence, fertilization of soybeans should be omitted on productive soils. Soybeans on light-colored soils of less than average productive ability may be fertilized with 150 to 200 pounds of 0-14-6. Even in such cases the fertilizer should be drilled in before the seed is sown, as the germination of the soybeans is affected when they are sown in direct contact with fertilizers.

Soybeans will do better than other common legumes on moderately acid soils. However, as maximum yields are obtained on well limed soils, it may be advisable to apply 1 ton or more per acre of ground limestone, or equivalent amounts of other liming materials, to strongly acid soils.

*Inoculation.*—Inoculation is recommended when an inoculated soybean crop has not been grown on the field within the past 3 or 4 years. Two methods may be used:

1. *Commercial Cultures.*—Reliable cultures are offered by manufacturers at a low cost per acre, and each brand is accompanied by specific directions for its use. As the bacteria may be killed by drying, pre-inoculation of the seed by seedsmen is not safe. The seed should be inoculated within a very few hours of seeding time and preferably in the drill box just before seeding. Drilling slightly moist inoculated seed insures maximum nodule formation.

2. *Inoculated Soil.*—Soil taken from around well inoculated plants in last year's soybean field provides effective and cheap inoculation. The soil may be dug in fall, winter, or early spring, air dried and pulverized. After *slightly moistening* the beans with water or skimmilk, 1 to 2 pints of the inoculating soil per bushel of seed may be sifted over the seed, the seed stirred, and additional soil added until the beans are dirty. They should be sown at once.

*Harvesting Soybeans for Hay.*—Soybean hay cures slowly. Hence, soybeans should be harvested for hay by late August or early September. Drying becomes more difficult as September advances.

The greatest combined dry weight of hay (leaves, stems, pods, and seed) and the greatest acre yield of protein are not reached until the seeds in the pods are three-fourths full size and the leaves are starting to brown or yellow. However, the larger the seeds, and the later the cutting, the longer it takes to cure the hay. Therefore, when the stage of greatest yields of hay and protein would be reached much after September 1, the harvest should be made at a less mature

stage because of the difficulties of curing late harvested soybean hay. Early varieties and early planting will make it possible for soybeans to reach at least the "beans starting to fill" stage before September 1.

After wilting in the swath for one or two days, the soybeans should, while still tough, be raked into small windrows. These may be turned, if necessary for drying, but they should be handled as little as possible. If the weather is threatening and help is available, the soybeans may be put in tall shocks, with or without supporting stakes or poles. This is especially advisable with late harvesting. After heavy rains turn the windrows or shocks.

Soybean hay is readily consumed by cattle and sheep even after it has been discolored by rains. Soybeans have been fed from the shock during the fall or early winter with good results, when late harvesting and rainy weather made curing difficult or impossible. If carefully capped with straw or hay, soybeans will keep well in stacks.

Soybeans furnish good pasture for a short period, but they will not recover after once being grazed.

#### MIXTURES OF SOYBEANS AND SUDAN GRASS

Growing mixtures of soybeans and Sudan grass has been tried to some extent, but is not generally recommended. It is difficult to sow the mixture properly. The crops do not mature together, and the mixed hay does not cure as readily as soybeans alone. If the Sudan grass gets well started the beans may make up only a small part of the mixture. The mixture is "intermediate" in yield and feeding value.

Where the mixture is tried, the soybeans should be sown with a grain drill at or near the usual rate, and not over 10 pounds per acre of Sudan grass seed sown at the same time from the grass seed box of the grain drill, or broadcast with a grass seeder.

#### MILLETS

Millets provide quick-growing annual non-legume hay crops. The Siberian, Common, and Hungarian varieties can be harvested for hay in from 60 to 70 days after seeding. German or Golden Millet, the best producing variety, requires about two weeks longer.

Japanese millet does well in Ohio only under the cooler, more moist conditions. Proso, broom corn, or hog millet is grown primarily for grain, and produces such low quality hay that it is not recommended for Ohio.

Seedbeds, depth of seeding, and fertilization should be as for Sudan grass. Thirty to forty pounds of seed per acre are sown broadcast and covered lightly. The seed is best broadcast on a well prepared and cultipacked seedbed, and covered by going crosswise of the cultipacking with a weeder, rotary hoe, or harrow.

Millets should be harvested for hay as soon as well headed out, before much seed forms, since feeding values decrease after this period. Fed as the sole roughage, hay of the foxtail millets is injurious to horses, but no injuries to sheep and cattle have been reported.

## DWARF ESSEX RAPE

Dwarf Essex rape provides an annual pasture of high carrying capacity for hogs and sheep. An acre of good rape will furnish pasture for 15 to 20 pigs. It may be seeded from early April to as late as July. In 7 to 8 weeks after seeding, it will be 8 to 10 inches high and ready for pasturing. The field may be subdivided by temporary fences so that the rape in one area may be recovering while the other is being pastured. Unless attacked by plant lice, rape will provide grazing until late in the fall.

Rape requires a productive soil and a well prepared seedbed. It responds well to the use of fertilizer, and to lime on strongly acid soils. An application of 200 to 250 pounds per acre of 2-12-6 or 4-10-6 fertilizer is recommended.

The cost of seeding rape is low. Sown broadcast or from the clover seed box of the grain drill, 5 to 8 pounds of seed are required per acre. A light harrowing to cover the seed should follow broadcasting. When sown in narrow rows (24 inches or less apart), 3 to 4 pounds of seed per acre are sufficient. Cultivation for control of weeds is then possible, and higher yields are often obtained.

## OTHER SUPPLEMENTARY PASTURE CROPS

A number of farmers have successfully pastured the second and third crop of alfalfa. The stand of alfalfa will be maintained if the alfalfa is pastured down and then allowed to grow up as it does after a hay harvest, or if light grazing is practiced so that several inches growth are left at all times. Pasturing should cease by September 10 or thereabouts, if the field is to be kept in hay the next year.

The usual precautions to prevent and care for cases of bloat must be taken, since animals occasionally suffer from bloat when they begin pasturing alfalfa. The precautions against bloat are simple: First, the animals should be full of feed—not hungry—when first “turned in” the pasture; second, once grazing has started, keep the animals on the alfalfa constantly so that they will never eat too much at any one time; third, ready access to a constant supply of water and salt is advisable.

Mixed alfalfa and grass pastures are less apt to induce bloating than pure alfalfa or pure clover.

The second growth of timothy and clover may be pastured, but the amount of grazing is less than with alfalfa meadows and more uncertain in dry seasons. New seedings may be pastured during late July and August. We know that this will injure the next year’s crop of sweet clover. Tests suggest that pasturing of new seedings of alfalfa and red clover should cease about the first of September.

A carefully constructed electric fence makes possible the controlled grazing of portions of meadows or other crops whenever such crops can be effectively utilized as pasture.

## CORN AND SORGHUMS AS EMERGENCY FORAGE CROPS

Corn may be used for feeding green or for rough forage, and sorghum for dry forage when other crops are not available. These crops may be planted during June or early July. The corn may be drilled solid at the rate of 4 to 5 pecks per acre, or planted in rows 20 to 42 inches apart, seeding 1 to 2 pecks per acre. Forty to 50 pounds of sorghum seed are required for solid drilling, and 6 to 8 pounds when planted in rows.

Early kinds of corn are preferable because they have smaller stalks. Black or Early Amber and the later-maturing Orange are satisfactory varieties of sorghum.

These crops should be fertilized at planting time, using 150 to 200 pounds per acre in the row or hill. Twenty per cent superphosphate may be used on manured land and 0-14-6 or 2-12-6 on unmanured or unproductive soils.

Both corn and sorghum are difficult to cure for hay. They can probably be most satisfactorily handled by shocking in the field and feeding during the fall or early winter. For fields drilled solid, partial curing in the swath and windrow is recommended before shocking. Because of its high sugar content, sorghum, harvested not later than the soft dough stage, makes a more palatable feed than corn, but seed corn is generally available on the farm or on a neighboring farm.

Neither corn nor sorghum makes satisfactory pasture. Corn grows very slowly after being pastured down. There is considerable danger of cyanide poisoning when immature sorghum plants are fed as pasture or as hay.



### *Other Bulletins Referring to Hay and Pasture Problems*

Ohio Agricultural Extension Service Publications:

- Bulletin 136—Fertilizing Field Crops in Ohio.
- Bulletin 137—Alfalfa in Ohio Farming.
- Bulletin 154—Better Pastures for Ohio Livestock.
- Bulletin 160—“When” and “How” in Haymaking.
- Bulletin 177—Liming Ohio Soils.
- Bulletin 190—Soil Testing

Ohio Agricultural Experiment Station Publications:

- Bulletin 543—Cereal Hays for Ohio.
- Bulletin 552—Feeding Pigs on Forage
- Bulletin 588—Better Methods of Seeding Meadows.
- Bimonthly Bulletin 175 (1935) pg. 148-154, Harvesting Soybeans for Hay.