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HAY AND PASTURE SEEDINGS

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AGRONOMY SECTION

Farm Crops



Ames, Iowa



Fig. 1—A good growth of white clover like this is easily maintained.

HAY AND PASTURE SEEDINGS

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Forage crops need much more attention in Iowa than they have been receiving. Larger acreages of hay and pasture can be grown to advantage thruout the state, but the best yields are necessary to make high priced land produce the largest returns. The most profitable systems of livestock management demand increased crops of grasses and legumes, and grain farming likewise requires that forage crops be grown to maintain the yielding power of the soil.*

SEED AND SEEDING.

Good seed is relatively large, plump, has strong vitality and is free from noxious weeds. Buying cheap seed is false economy, because it is usually inferior in quality and will not only germinate poorly, but also bring serious weed pests to the farm. Since it is often difficult to determine the genuineness, purity and germination of seed, samples may be sent to the Iowa Agricultural Experiment station for free examination. To make a complete seed report will require about ten days from the time the sample is sent.

GERMINATION TEST.

A germination test can be made easily and accurately. A practical method for testing seed the size of timothy, clover and millet is as follows:

- (1). Fill a dinner plate almost level full with thoroly moistened sand, soil or sawdust.
- (2). Mix the seed sample to be tested and count out two lots of 100 pure seed.
- (3). Scatter each of these lots of seed on moist blotting paper and place it in the plate.
- (4.) Invert a second plate over the first to prevent drying.
- (5). Place the tester in a room which can be kept warm at all times. A temperature of 70° to 85° is best.
- (6.) Examine the seed every few days until they are sprouted sufficiently to read the test. Do not allow the seed to become dry, but keep the sand or sawdust well saturated. The germination of the grasses require at least a ten-day test.
- (7.) Record the number of germinated and dead seed. The two lots of 100 seed should show approximately the same germination. Clovers and alfalfa frequently have hard-coated seed which do not grow, because they cannot absorb water. These "hard" seed retain their original size, shape and color, and will not sprout until the seed coat has been softened by scarifying or freezing.

*This publication discusses some of the more important seeding questions and offers brief suggestions relative to the production of different hay and pasture plants. Special circulars dealing with a number of these crops are available and detailed information regarding any of them may be obtained from the Farm Crops department.

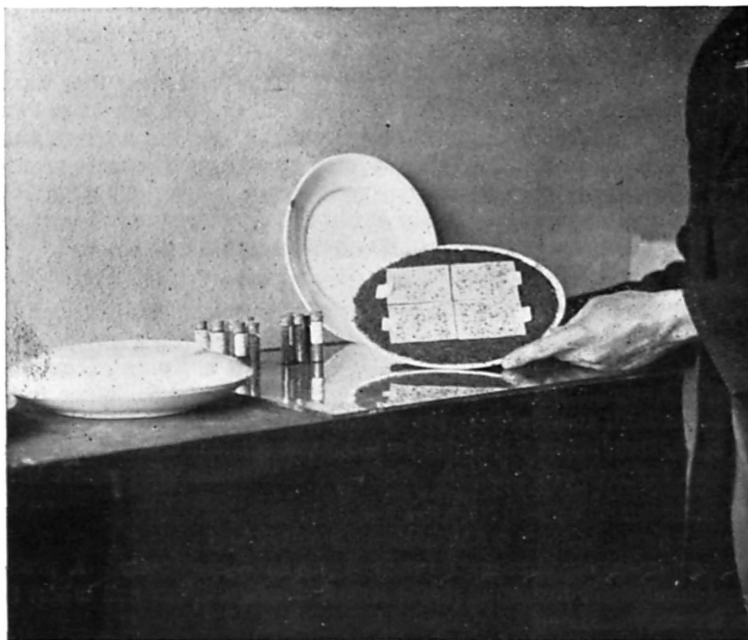


Fig. 2—Dinner plate tester.

Large forage seeds, such as peas and beans, can be tested either by pushing them into moist, but not wet sand, or by putting them between layers of moist cloth and covering with wet cloth or paper to prevent drying. It is important to keep the test well moistened.

THE SEED-BED.

For forage crops, soils should be well drained, fertile, and in good physical condition. An abundant supply of lime* and the proper inoculating bacteria* are essential for legumes. A good seed bed has a well pulverized surface, a firm sub-surface, is free of weeds and amply supplied with moisture and available plant food. Since most forage seed is comparatively small, thoro preparation of the seed bed is urged.

SEEDING WITH SMALL GRAIN.

Hay and pasture seedings are usually made with a small grain nurse crop which checks the growth of weeds and gives a return from the land for that season. Altho the nurse crop tends to smother the young forage plants, the growth of the grain can be controlled considerably and is not so likely to kill the grass and

*For information regarding liming and inoculating soil, write to the Soils department, Ames, Iowa.

legume plants as would weeds. Early maturing grains with light foliage are best for nurse crops, because they shade the forage seeding less, require less moisture and are cut earlier than others. Reducing the ordinary seeding rate of the small grain from a third to a half will provide more favorable conditions for the grass and clover to "catch" and will not decrease materially the yield of grain. A fall sown small grain nurse crop usually matures earlier, and therefore, offers less competition for sunlight, moisture and plant food than the same kind of grain sown in the spring.

SEEDING WITHOUT SMALL GRAIN.

Seeding hay and pasture without a nurse crop is feasible in the spring on land exceptionally clean of weeds, or in late summer and early fall when there is less danger of weeds growing so luxuriantly as to crowd out the young plants. With the majority of spring seedings nurse crops should be used; but later in the season seeding alone is preferred.

SEEDING BETWEEN STANDING CORN.

A number of forage crops are sometimes sown between the rows of corn at the last cultivation. A thoroly cultivated cornfield offers an excellent seedbed and this method is reasonably sure, providing there is sufficient moisture to germinate the seed. If the field is seeded for a meadow, its uneven surface will interfere somewhat with haying machinery.

TIME, RATE AND DEPTH OF SEEDING.

Grasses thrive best during cool weather and are therefore usually sown in early fall or spring. Most legumes give best results when seeded in the spring. All the clovers can be seeded satisfactorily in the summer and under favorable growing conditions alfalfa and sweet clover may be put in with reasonable safety as late as September 1. Clovers seeded in the fall do not make enough growth before cold weather to enable them to withstand the average winter.

Thick seedings of grass and legume seed are surer of producing good stands than are thin seedings. Weeds will easily choke out light seedings during the first season, but are less likely to injure heavy stands. It pays to use plenty of seed.

The depth of planting varies with kind of seed, the fineness of the seed bed, and the moisture content of the soil. There is more danger of sowing too deeply rather than too shallow. The object is to sow deep enough to have moisture for germination but not so deeply that the young plants cannot reach the surface. A covering of $\frac{1}{8}$ to $\frac{1}{2}$ inch is sufficient for small forage seed, while 1 or 2 inches is recommended for larger seed, as soybeans and field peas.

METHODS OF SEEDING

One of the best methods of seeding with a nurse crop is to use the grass seeder attachment on the grain drill and permit the grass and clover seed to fall either in front or behind the small grain spouts. Seeding in the main drill rows with the small grain and covering to the same depth is poor practice, because there is danger of covering the small seed too deeply, and the young plants must compete for moisture and plant food with the coarser and more rapidly growing grain plants. If the seed is dropped in front of the drill, the disks or shoes will cover it; but if sown behind the drill, it is usually considered good practice to follow with a harrow. Grass and clover is often sown broadcast with small grain and disked in at the same time; or it is seeded after disking and covered with a harrow. Disking is likely to cover much of the seed too deeply.

Seedings without nurse crops are made much as the above.

Hay and pasture crops can be seeded on fall sown small grain the following spring. The seed is sown preferably with a disk drill by passing it thru the main grain spouts and covering lightly. This practice does not injure the growing grain appreciably and in some seasons may be beneficial. Another method of sowing is to broadcast the seed and cover with a light harrowing. Scattering the seed on a late winter snow or on the "honey-combed" ground during early spring is also common practice, but is not considered a very careful method. Alternate freezing and thawing of the ground together with the spring rains will usually cover the seed sufficiently when sown by the last method, but a large number of the plants may be killed by the freezing.

When sowing between standing corn, the most convenient method is to broadcast with a hand seeder immediately preceding the last corn cultivation. Seeding immediately afterwards and covering with a one-horse cultivator, harrow or drag is a better way because the seed is more evenly distributed and not covered so deeply.

CARE DURING FIRST SEASON

Cutting the grain for hay in the early dough stage aids materially in securing a good stand of the hay or pasture seeding. It is especially desirable where small grain has made an exceedingly heavy growth, or has lodged; and is recommended when such hay can be utilized to advantage. It is ordinarily not a safe practice to cut a crop of hay the first fall. Clipping in late summer, so as to leave a high stubble, may be necessary to prevent weeds from seeding. It is not advisable to remove the growth from the ground except when it is so heavy that there is danger of smothering the young plants. Moderate pasturing of a heavy growth during the first season usually does little damage; but close pasturing and heavy tramping are likely to weaken or kill many of the plants. Under average con-

ditions the most desirable plan is to leave the first year's crop stand for winter protection.

CROPS FOR HAY AND PASTURE.

The most common Iowa hay and pasture seedings consist of grasses and legumes which are seeded either alone or in mixtures. Legumes should always be included because they are more valuable for feeding and are better soil improvers than the grasses. All of the grasses described herewith are perennial and usually live more than two years from the time of seeding. The majority of the legumes mentioned die at the end of the first or second year.

LEGUMES

Medium Red Clover grows well on good corn soil. It is the general purpose legume of this state and ranks high for hay and pasture. Most medium red clover plants live only two years. Two cuttings of hay can be made the second season or the second crop may be used for seed purposes.

Mammoth Red Clover is a tall, coarse growing variety of red clover. It has a deeper and more branching root system, and grows better on slightly drier and poorer soil. The crop blooms about two weeks later than medium red clover, but only one cutting of hay a season can be harvested. Many of the plants live three years and some of them even longer.

Alsike Clover is intermediate in growth between medium red and white clover. It thrives better than red clover on poorly drained or slightly acid soil and survives more rigid winter weather. Alsike lives from two to four years and is well adapted for hay or pasture mixtures. When seeded alone it usually yields less forage than red clover and has a tendency to lodge badly.

Sweet Clover is not a weed but a valuable hay, pasture and seed plant. It will grow on poorer, drier or wetter soils than red clover or alfalfa. Sweet clover makes more growth than other clovers during the first season and hence is extremely valuable to plow under for soil improvement. The white biennial is usually preferred, altho the yellow biennial is also satisfactory. The annual yellow is worthless. When the white sweet clover is spring sown with small grain, a fair crop of hay can frequently be harvested late the first fall after the removal of the nurse crop. Under average growing conditions two hay cuttings, or a hay and seed crop, can be obtained the second year. Harvesting the hay before blooming, when the plants are from 2 to 2½ feet high, will give the most palatable and nutritious feed.

White Clover is shallow rooted and has a small, creeping top growth. It is suitable for pasture and lawn purposes. Only a few pounds of white clover seed are generally included in pasture mixtures because it is two or three times as expensive as other clover

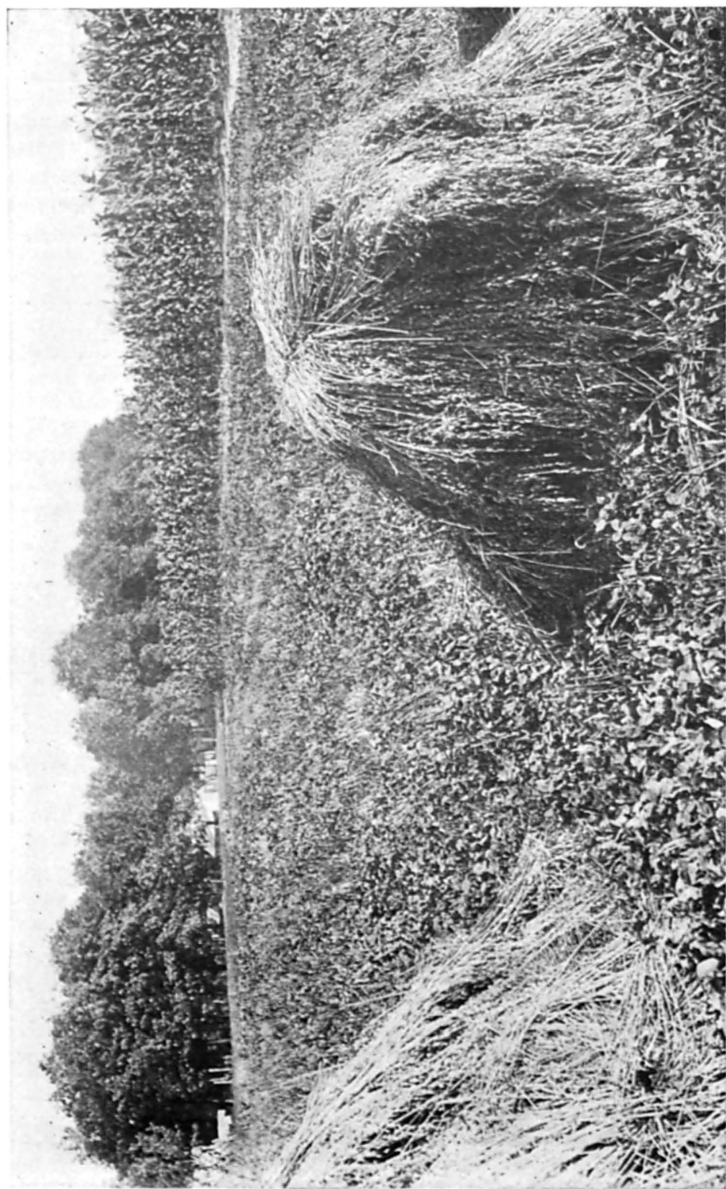


Fig. 3—Good stand of clover in stubble.

seed and also because it appears without seeding. When once established, the crop maintains itself from year to year.

Crimson Clover has no value under Iowa conditions because it is not sufficiently hardy to survive the winters and does not produce profitable returns when seeded in the spring or summer. Other crops are preferable to crimson clover.

Alfalfa can be grown successfully on nearly all Iowa farms. Well drained, fertile and sweet soils are more essential than for other forages. Alfalfa lives longer, withstands drought better and yields a larger amount of more nutritious hay than the clover. The hay is ready to harvest when the young shoots at the base of the plant are about an inch long. Three cuttings can be made in an average season. (For a complete discussion of alfalfa growing write to the Iowa Agricultural Experiment station for Bulletin 137.)

GRASSES

Timothy is the standard hay grass of the state. The seed is comparatively cheap, usually of strong vitality and it is ordinarily easy to get a stand. The plant is used both for hay and pasture but is not particularly desirable for pasture purposes, because it has few basal leaves and does not make a sod.

Blue-Grass is the best permanent pasture grass for Iowa. Since the plant grows rather slowly and does not make a heavy sod for a number of years, other grasses and the clovers are usually grown while the blue-grass is getting established. It appears in most meadows and pastures without seeding but its growth can be hastened by sowing 6 to 10 pounds of seed per acre. A better plan is to cut blue-grass hay when the seed has matured and scatter it on the field. Two common varieties are the Kentucky and Canadian. The Kentucky is generally sown, altho the Canadian will grow better on poor, gravelly soil and in a hot, dry climate.

Orchard-Grass grows best on fertile, well drained soil, but thrives better than timothy under dry, hot growing conditions, and in wooded pastures. Orchard grass is especially desirable for pasture mixtures because it begins growth early in the spring, grows better than blue-grass during the dry summer months, and produces feed until late in the fall.

Smooth Brome-Grass is a tall, leafy, and dense sod-forming grass. The plant is extremely drought resistant and grows well in Iowa on thin sandy land where timothy does not flourish. The crop is better adapted for pasture than for hay, but may be used for either. Cattle are exceedingly fond of this grass and in pasture mixtures tend to kill it out by grazing too closely. It is one of the most satisfactory plants to prevent washing of embankments and hilly land.

Redtop is more cold resistant than most other grasses and will thrive on wet or slightly sour land on which timothy does not grow

well. It produces a dense sod, a large number of basal leaves and a medium amount of stem growth. This grass may be used in pasture or hay mixtures, but on account of its unpalatability is not recommended where more valuable grasses can be grown. It is the best soil binding grass for wet land.

CHOICE OF CROPS

Factors which determine the crops chosen are soil conditions, purpose for which grown, cost and availability of the seed, amount and quality of the feed produced, kind of livestock to be fed and personal preferences of the grower. Mixtures are desirable for most hay and practically all pasture seedings. Carefully chosen mixtures generally yield more hay than would one of the crops seeded alone. Mixtures also give the largest amounts of palatable and nutritious grazing from early spring until late fall. In establishing permanent pastures quick growing crops are necessary to supply forage during the first few years while the slower growing, sod-producing plants are getting well established.

HAY AND PASTURE SEEDINGS

The hay and pasture seedings given below include the more common plants suitable for this state. The crops and relative amounts per acre are merely suggestive, and may be varied to suit individual needs. Where pastures are to be left down, a number of years, the addition of 6 pounds of blue-grass and 2 pounds of white clover per acre to the suggested mixtures is recommended.

On well drained clay loam, loam or slightly sandy loam soils, the following seedings may be used:

- (1) Medium red clover, 8 to 10 pounds.
- (2) Timothy, 12 to 15 pounds.
- (3) Timothy, 9 pounds; medium red clover, 6 pounds.
- (4) Timothy, 9 pounds; alsike clover, 4 pounds.
- (5) Timothy, 9 pounds; medium red clover, 4 pounds; alsike clover, 2 pounds.
- (6) Timothy, 6 pounds; orchard-grass, 4 pounds; medium red clover, 4 pounds; alsike clover, 2 pounds.
- (7) Alfalfa, 15 to 20 pounds.
- (8) Sweet clover, 10 to 15 pounds.

For flat, poorly drained land where red clover is uncertain, use:

- (1) Timothy, 9 pounds; alsike clover, 4 pounds.
- (2) Timothy, 6 pounds; redtop (recleaned) 6 pounds; alsike clover, 4 pounds.
- (3) Redtop (recleaned), 10 pounds; alsike clover, 4 pounds.

Seedings satisfactory for dry, sandy soils where it is impossible to maintain a satisfactory stand and growth of timothy, are:

- (1) Brome-grass, 14 pounds.
- (2) Brome-grass, 10 pounds; sweet clover, 8 pounds.

- (3) Brome-grass, 10 pounds; mammoth clover, 4 pounds; medium red clover, 2 pounds.
- (4) Brome-grass, 6 pounds; orchard-grass, 3 pounds; timothy, 3 pounds sweet clover, 6 pounds; medium red clover, 2 pounds; mammoth clover, 2 pounds.
- (5) Alfalfa, 15 to 20 pounds.
- (6) Sweet clover, 10 to 15 pounds.

THICKENING THE STAND OF HAY AND PASTURE

The stand of hay and pasture may be thickened by seeding a mixture of grasses and clovers in early spring, using from $\frac{1}{2}$ to $\frac{1}{2}$ the amount recommended for new seedings. A disk drill is satisfactory for this purpose, permitting the seed to fall into the gashes made by the disks. If a drill is not available, disk the ground, broadcast the seed and then harrow. In reseeding fields which have an exceedingly thin stand, adding 1 bushel per acre of oats will increase the forage and aid in checking weed growth. A top dressing of well rotted barnyard manure is of the greatest importance in improving pastures and meadows.

ANNUAL HAY AND PASTURE CROPS

When permanent seedings fail or the stand is seriously injured by winter weather, additional forage can be provided satisfactorily by growing short-season, annual crops. These make a rapid growth which can be used for pasture, hay or green feed.

Canadian Field Peas grow best during cool and moist weather. Use a mixture of 1 to $1\frac{1}{2}$ bushels of peas with $2\frac{1}{2}$ bushels of oats, and sow early in the spring. The crop is ready to harvest for hay when the oats are in the early dough stage. It can also be pastured or cut and fed green.

Soybeans are well adapted to Iowa soil and climate. Sow at corn planting time in rows 36 inches apart, dropping the seed at intervals of not more than 1 or 2 inches. With this method 25 to 40 pounds of seed per acre will be required. Medium early maturing varieties such as the Ito San, Medium Early Yellow, and Medium Early Green are recommended for Iowa. Mow for hay when pods begin to ripen.

Cowpeas are not well adapted to Iowa and produce less profitable yields than soybeans and field peas. The Whippoorwill variety drilled at the rate of 1 bushel per acre the latter part of May is one of the best for hay purposes.

Vetch is not a profitable field crop in this state because the seed is expensive and other forages can be grown to better advantage. A mixture of 1 bushel of oats and 30 pounds of hairy vetch is sometimes used.

Peanuts do not thrive under average Iowa conditions. They are adapted to long, hot summers and to warm type soils. The Spanish variety planted the latter part of May in 30 inch rows and 10 to 12 inches apart in the row should mature reasonably well on sandy loam soils.

NON-LEGUMES

Millet is a warm weather crop which matures in 7 to 9 weeks. Three pecks per acre are sown like small grain between May 1 and July 15. The varieties recommended for early summer seeding are the German and Hungarian, and for later sowing the common variety. Harvest for hay before the seed is fully formed.

Sorghum is one of the highest yielding emergency forages. Seed the Early Amber variety from May 1 to July 15, using 40 to 70 pounds per acre. Livestock poisoning sometimes occurs when second growth sorghum is pastured after a severe frost; altho ill effects are occasionally noticed when grazing a rapid growth following extremely dry weather. Kafirs, milos, durras, kowliang and shallu are grown primarily for grain in the drier sections of the west; but are not recommended for Iowa.

Sudan Grass was introduced a few years ago for dry regions, but is also a satisfactory forage for this state. It will yield more than millet and produce a better quality of more easily cured hay than sorghum. In Iowa, drill in rows 30 to 36 inches apart at corn planting time or a little later, using 10 pounds of seed per acre. The hay is ready to harvest when in full bloom. Where one expects to harvest a second crop mow the first as soon as the heads appear.

Rape grows best under cool and moist conditions, but can be seeded from early spring until the middle of July. From 4 to 5 pounds per acre of the Dwarf Essex variety, sown like small grain, is recommended. Under favorable growing conditions rape is ready to pasture in 6 to 8 weeks after seeding, altho it is preferably not grazed until the plants are 10 to 14 inches high. It can be pastured thruout the summer and until frost kills the plants in the fall. Rape is the most profitable annual hog pasture plant which can be grown. Sheep and cattle can also be pastured successfully providing proper precautions are taken to avoid bloating.

Where corn is to be hogged down or pastured with sheep, rape is the most satisfactory crop which can be sown between the rows. It may be added to oats at seeding time or two weeks later.

Succotash—or a mixture of small grains—makes a satisfactory pasture for all kinds of livestock. A mixture of 3 bushels of oats with $\frac{1}{2}$ bushel of one or two of the other small grains provides the most pasture. Small grain seeded as early in the spring as the land can be cultivated should be ready to pasture in 4 to 6 weeks and supply feed until the middle of the summer.

Adding 3 pounds of Dwarf Essex rape and 20 pounds of Early Amber sorghum per acre to the above mixture will supply grazing until late in the fall. Ten pounds of sudan grass may be substituted satisfactorily for the sorghum. With such a mixture the oats are at their best during the spring and early summer months, the sorghum or sudan-grass makes the most growth during late summer and early fall, and the rape adds to the forage thruout the entire season. There is apparently little danger of livestock poisoning where sorghum makes up such a small part of the mixture as in the above combination. The addition of 6 to 8 pounds of red or sweet clover per acre will increase the feed for fall pasture, but it will be difficult to obtain a stand of clover if the rate of seeding the other crops is as heavy as suggested above.

SOURCE OF SEED

Where it is impossible to purchase high quality seed locally, it may be ordered from a reliable seed house. Samples and prices may be obtained from more than one firm before purchasing.