

UNIVERSITY OF IDAHO
Agricultural Experiment Station

Department of Agricultural Extension

Grass Pastures For Irrigated Lands



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SUMMARY

Irrigated grass pastures perform an essential and profitable role in southern Idaho agriculture.

Our conditions are well adapted to grass production.

Irrigated grass pastures produce returns that warrant their use even on comparatively high priced land.

Of all the grasses tested, Kentucky Blue Grass, Smooth Brome Grass, Orchard Grass, Timothy, and Meadow Fescue have proved the best.

White, or Alsike Clover, is desirable in a very small proportion. More than three or four pounds per acre may cause bloat.

Mixtures give better results than any variety seeded alone.

Different conditions require different mixtures.

A total of about 28 pounds of seed per acre is necessary.

Seed should never be bought in mixtures.

Thorough seed-bed preparation is absolutely essential.

Grasses can be seeded any time from early spring to the middle of July.

Fall seeding is not advisable.

Broadcasting the different varieties separately is the most satisfactory method of seeding.

The seed should be covered lightly with a spike-tooth harrow or good brush drag.

Under average conditions a nurse crop should not be used.

Irrigation water should be applied by the corrugation method during the first season, thereafter flooding between borders is recommended.

The pasture should have frequent irrigation and during the entire season should receive a total of about two and one-half acre-feet per acre.

Early seeded pastures can be grazed lightly late in the first season.

The pasture should be divided into at least two parts and should not be grazed too closely.

Barneyard manure can be used on the pasture with good results.

Some shade should be provided for the animals.

Grazing tests at the Station indicate that an acre of good mixed grass pasture will maintain two good dairy cows or three medium sized beef steers during May, June, July, August, and part of September.

The sheep grazing tests have not been very conclusive but indicate that an acre will maintain about twelve ewes and their lambs.

The conclusions reached at the Station are being substantiated by the experience of irrigation farmers in different parts of the state.

GRASS PASTURES FOR IRRIGATED LANDS

INTRODUCTION

The old English admonition, "Drive your crop to market" is, with all that it implies, good advice to the farmers of any locality. It is especially appropriate to those on the irrigated lands of southern Idaho. There is little doubt that the permanence and ultimate profits of a system of agriculture depend largely upon livestock production, and that successful livestock production necessarily involves the growing of grass pastures.

In most irrigated sections alfalfa is the great forage plant and for the production of both quality and quantity of cured hay it is unexcelled. But because of its tendency to cause bloat in sheep and cattle it is very unsatisfactory for pasture purposes for these animals. During the summer months cured hay furnishes only a small part of the average livestock ration and hence most farmers will have to look to some source other than alfalfa for their summer feeds.

The growing and feeding of soiling crops or the use of the summer silo is occasionally practiced to very good advantage in dairy farming. These systems, however, find their greatest use only where dairying is the farmer's sole business. On most irrigated farms time and labor must be divided between a diversity of interests. Many good farmers desire to keep in addition to their horses and dairy cows a small flock of sheep or possibly some beef steers. In such cases a good irrigated grass pasture will undoubtedly prove very profitable.

The irrigated land of southern Idaho is peculiarly adapted to the growing of pasture grasses. Ample water which can be applied whenever needed keeps the grass green and succulent during the entire season. The comparatively high lime content of our soils fits them well for grass production. These conditions with almost continuous sunshine insure a rapid, vigorous growth.

Pastures fit well into a system of crop rotation and are very effective in building up and conserving soil fertility. The humus that is so necessary in soil maintenance is furnished in abundance by a decaying grass sod. A good pasture will, of course, be maintained for a number of years but when finally plowed up its beneficial effect upon the soil will be remarkable.

During the past four years the Gooding Sub-Station has conducted a number of experiments with grasses. These have included a comparison of different varieties and mixtures, experiment, seeding-time, and grazing tests with dairy cows, beef steers, and sheep. In the course of this work a great many observations have been made re-grading the various phases of pasture management.

It is the purpose of this bulletin to report these experiments and observations together with other demonstrated facts that have a bearing on the subject and to argue for more grass pastures on our irrigated lands.

LAND FOR THE PASTURE

It is a mistake to assume that the pasture should be located on land that is "good for nothing else." Grasses do fairly well on new soil but will respond as readily as any other crop to increased fertility. Where practicable, it will pay to locate the pasture on land that has grown a leguminous crop or has had an application of manure.

The farm sometimes contains a piece of ground that is rough or stony and on this account hard to work; or there may be a piece of wet, poorly drained land that fails to respond to ordinary cultivation. There are among the cultivated grasses varieties that are fairly well adapted to such conditions. If properly seeded to the right grasses these pieces of land can be made to take their place in the farm economy to much better advantage than if handled in any other way. A question has arisen concerning the advisability of devoting our best and comparatively high-priced irrigated land to grass growing. In the light of the results that are being secured at the station and on many other farms, because of the small outlay of time and labor necessary to produce these results, and, in consideration of its lasting importance to our agriculture generally, we must conclude that the grass pasture deserves a foremost place in the list of very profitable farm crops and that very little of our land is too expensive to be used for pasture.

GRASSES TO USE

While a great many different grasses are used for pasture purposes, the list of really valuable and important ones is not very extensive. The following ten varieties have been tested at the Gooding Station in southern Idaho:

Kentucky Blue Grass is very extensively used and is one of the most valuable pasture grasses. It starts slowly and requires considerable time to form a sod, but when formed the sod is compact and tough. It is not a deep-rooting grass and hence requires frequent irrigation. It grows best on well-drained soils. During the early and late parts of the season it is a good producer but does not grow vigorously during the hottest weather.

Bromus Inermis or *Smooth Brome Grass* is not as well known as some other varieties but is very valuable. It starts growth early in the spring and grows late forming a tough sod. It is one of the deepest rooting grasses and hence a good resister of drouth. It produces a great amount of very palatable feed.

Orchard Grass.—This well-known grass has proved to be one of the very best. It starts early and grows vigorously through the hot weather. It does not form a close, compact sod but grows in bunches. It is comparatively deep rooted.

Timothy is usually grown for hay but is a fairly good pasture grass. It is a medium and late grower forming a sod that is not as close as blue grass nor as open as orchard grass. In pastures it is not quite so permanent as some other varieties.

Meadow Fescue is sometimes called *English Blue Grass*. It forms a sod much like timothy. It is a fairly good producer and is well liked by the animals.

Red Top is shallow rooted and forms a very tough, compact sod.

Because of a smaller production it is not as valuable on good irrigated land as the grasses previously mentioned. It is particularly adapted to low, wet, poorly-drained soils and for such conditions is the best grass we have.

Tall Meadow Oat Grass starts readily, early and late, and produces a great amount of feed. It is comparatively coarse and not as readily eaten as most other grasses.

English or Perennial Rye Grass forms a medium sod and is a fairly good producer during the first season. It is easily choked out by other grasses and after the second or third season is of no value.

Italian Rye Grass forms the same sort of sod as the English but is not as hardy nor as permanent and hence is of little value.

Canada Blue Grass has proved the least valuable of all grasses tested. It produces only a scant, indifferent growth and furnishes very little feed.

ALFALFA AND CLOVERS

Because of the fact that alfalfa often causes bloat in sheep and cattle it is not advisable to sow any at all in the pasture. The following clovers have been tested separately in pasture mixtures.

White Clover. This variety has given very good results. It fills in between the grasses, grows vigorously, and adds to the palatability of the pasture. Through its power to store up atmospheric nitrogen by means of the bacteria on its roots it helps to feed the grasses and increases the fertility of the soil. If the proportion of clover is large it may cause bloat but with only a small amount we have had no trouble.

Alsike Clover. Under ordinary conditions this variety has given much the same results as white clover. It will grow on much wetter land, however, and is admirably adapted to the low, poorly-drained soils.

Red Clover has been the least desirable of the three. It does not fill in among the grasses as well or start as quickly when eaten off as the others, and it is more apt to cause bloat.

MIXTURES

As will be noted in the foregoing discussion the various grasses have different characteristics. There is no single one, however, that furnishes all of the conditions that are desirable in an irrigated pasture. For a number of reasons a mixture of grasses will be found more satisfactory than any one kind seeded alone.

Cultivated grasses may be divided roughly into two classes according to their habits of growth: first, those grasses which spread out by means of creeping root stalks and form a close, compact sod, of which Kentucky Blue Grass and Smooth Brome Grass are good examples; second, those which tend to grow in clumps or tufts as Orchard Grass.

If a pasture is seeded to the first kind alone the sod will soon become so filled with the creeping root stalks that it will be too tough and compact and will fail to produce as much feed as it should. On the other hand it is apparent that if composed of only the tuft-forming grasses the sod will be rough and uneven. The soil between the bunches of such a sod would not be used but would be tramped by the animals and washed by irrigation water.

If a mixture of the two types be used a sod can be secured that will cover the ground completely but still not be so tight and compact as to become sod-bound.

The various grasses show considerable difference in time of growth. Since with the aid of irrigation water we can keep the pasture in good growing condition throughout the entire season it is essential that it contain some early, some medium, and some late-growing varieties.

Loose, sandy soils or lands that have considerable slope will require a large proportion of those grasses which form a tough sod to insure protection against blowing or washing.

Pieces of high or rough land should have more of the deeper rooting varieties since the moisture supply is apt to be deficient.

Low-lying, poorly-drained lands should be seeded to those grasses whose natural characteristics adapt them to excessive moisture.

The following mixture will be found very satisfactory on ordinary loam soils, such as are generally found throughout southern Idaho.

Kentucky Blue Grass.....	8 pounds
Orchard Grass.....	5 pounds
Smooth Brome Grass.....	5 pounds
Meadow Fescue.....	4 pounds
Timothy	4 pounds
White Clover.....	2 pounds
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Total.....	28 pounds

These grasses in nearly these proportions, plus two pounds each of Italian Rye Grass and Red Top have been grown for the past four years at the Station with excellent results. The Italian Rye Grass has disappeared entirely and the Red Top is not as productive as the others and hence these are eliminated from the mixture. The proportions have been changed from the original mixture to the one given above because our observations have indicated that such changes would make profitable pasture. When well started this mixture will produce a sod that will be close enough to prevent blowing or washing of sandy soils.

For the low, poorly-drained lands the following mixture is desirable:

Red Top.....	8 pounds
Timothy	8 pounds
Meadow Fescue.....	6 pounds
Alsike Clover.....	4 pounds
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Total.....	26 pounds

For high lands that are apt to be dry this mixture is recommended:

Smooth Brome Grass.....	18 pounds
Orchard Grass.....	10 pounds
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Total.....	28 pounds

These two grasses can be seeded deeper than most others and hence a stand can often be secured even on land that cannot be irrigated. Of the common cultivated grasses they are the best resisters of drouth because of their deep roots.

In each of the foregoing mixtures the amounts given are for one acre. While it may appear that a great deal of seed is being used there are a number of reasons why such an amount is necessary. Grass seed sometimes contains considerable chaff and other inert matter and too often is rather low in germinative power. An unevenness in the seed-bed or in the moisture supply might result in a low germination. Under the best of conditions it requires practically all of one crop season to get the pasture started. It would be poor economy to run the risk of having to go ahead with a thin, unprofitable stand in order to save a few pounds of seed.

Farmers will do well to avoid "seed house" mixtures. They often contain inferior grasses under fancy names. As will be explained later it is impossible to secure an even distribution of grasses if the seed is mixed before planting. Buy your grass seed separate and insist that it conforms to the State Pure Seed Law.

SEEDING

Thorough preparation of the seed bed is absolutely essential in starting a grass pasture. The great majority of failures to secure a satisfactory stand of grass are due directly to a poor seed bed. Grass seeds are very small and the tiny rootlet that is sent out at germination is not able to reach very far. The new plant must be self supporting at once because these seeds are not supplied with a great store of plant food as are some of the large seeds. If the soil is fine and firm all will be well, but if it is loose and open, or rough and lumpy, the small plants will dry up and die and a thin stand will be the result.

Different types of soils require different methods of handling, so that no exact plan can be outlined for the preparation of a seed bed that will fit all conditions. In general, it is preferable to have the land fall-plowed and left rough through the winter. As early as practicable in the spring it should be double-disked, harrowed, and floated with an ordinary plank float. This should leave most soils in a very good condition. On heavy clay, however, such an amount of tramping would probably result in too much packing and on very sandy soils less would be just as efficient.

There are special cases that require special treatment. For example, in blowsand the amount of work suggested above would be detrimental. Good results are often secured on this type of soil by seeding in an old grain stubble which will help to hold the sand particles down.

Under most southern Idaho conditions grasses can be seeded to advantage any time from early spring to the middle of July. Of course, the later seedings have to be irrigated up as will be explained in the discussion on irrigation. If grasses are not to be irrigated up they should be planted as early in the spring as the land can be worked. A good moisture supply is absolutely necessary and they will survive a light frost better than a dry seed bed.

Where the land can be irrigated readily the seeding can be done to best advantage in the late spring or early summer. This will allow weed seeds to sprout and the young weeds can be killed easily by occasional harrowing. The warm weather with ample moisture which

can be applied as explained later furnishes ideal conditions for rapid, vigorous growth. Grass varieties alone and mixtures have been seeded on the Station farm on May 4th, May 11th, June 22d, July 8th, and July 14th, and in each case have produced excellent, uniform stands.

On October 3d, 1911, a pasture mixture containing Smooth Brome Grass, Meadow Fescue, Italian Rye Grass, and Red Clover was seeded on a carefully prepared seed bed. The weather following this seeding was comparatively cool and none of the grasses came up before winter. In the spring of 1912 none of them appeared.

On September 17, 1912, we seeded a similar mixture on well prepared land. By October 10th, a fair stand of all grasses was secured and all grew well until the opening of winter. In the spring of 1913 the grasses failed to start growth and a close examination showed that they had almost entirely winter-killed.

From these results we conclude that under our conditions fall seeding of pasture grasses is not advisable.

Grass-seeding attachments can be secured for some grain drills but on ordinary soils their use is not recommended. Grass seed should be covered lightly and drilling will almost invariably put it in too deep. In addition, drilling involves a great deal of time and labor, since it will be necessary to go over the ground as many times as there are varieties in the mixtures. It is evident, that if, for example, Timothy and Smooth Brome Grass seed were mixed the feeding mechanism of any drill would not be able to distribute them evenly. The smoother, heavier Timothy would work to the bottom and run out on the first few rods while none of the light, coarse Brome Grass would be seeded until the last.

We have found broadcasting with a hand seeder of a good type to be the most satisfactory method. As with the drill, it will be necessary to go over the land a number of times because an even distribution of the grasses cannot be secured if the various kinds are mixed before planting. One man with a good broadcast seeder can go over an acre in a small fraction of the time that would be required for a man and team with a drill.

The seed can be covered to good advantage with a spike-tooth harrow or a good brush drag, after which it should be corrugated for irrigation.

The foregoing suggestions are for average conditions and may have to be changed somewhat to suit special cases.

In many localities it is the common practice to seed alfalfa and clover with a grain crop. While there is a question as to the advisability of this plan there can be little doubt that grasses will do much better without the so-called nurse crop. The grain starts quicker and grows faster than the grass and is sure to rob it of most of the available moisture. If there is insufficient moisture the grass and not the grain will die. Even if there is plenty of water for both to grow the grain will soon cover the grass completely. Instead of stooling out to form a sod it grows a long slender stalk in its attempt to get a share of the light and sunshine. In the hottest part of the summer when the already weakened grass plant requires plenty of moisture the land is left dry for the grain to ripen and gets no more water until

after harvest. By this time a great deal of the grass is dead. Actual practice has shown that this is the case and that the use of a nurse crop results in half or a third of a stand, in most instances.

With a blowsand soil, however, it may be necessary to use the grain to hold the sand particles. In this case a good deal of water should be applied and the grain should be *clipped for hay early in the summer*.

IRRIGATION

As has been stated we have secured excellent results by planting grasses in a comparatively dry seed bed and irrigating to bring them up. Our experiments have shown conclusively that if any crop is to be irrigated up the water should be applied by the corrugation or furrow method. (See description of corrugation method of irrigation, Idaho Experiment Station Bulletin No. 78, page 7.) This applies especially to pasture grasses. If flooded, most soils wash to some extent and also form a hard crust that the young grass plant cannot penetrate. Even if the grasses are planted early enough in the spring to be sprouted by the winter moisture the first season's irrigation should be applied in corrugations, because a baked surface will interfere seriously with the growth of the young plants.

During its first few weeks the pasture should be irrigated frequently. The time between applications will depend upon the type of soil but the seed bed should be *kept moist* until the grasses are well started. Thereafter the soil should be supplied with sufficient moisture for good growing condition.

After the first season it is not necessary to make fresh corrugations. The old one will not be entirely filled and will help to lead the water. Since the sod will prevent washing or baking the land can be flooded with good results.

For the old pasture we use the border method of flooding and find it very satisfactory. (See Idaho Experiment Station Bulletin No. 78, pages 9 and 10.) When this plan is to be followed the borders or dikes should be made before the pasture is seeded so that the grass can be sown right over them.

Since grasses are comparatively shallow rooted, light, frequent irrigations will give better and more economic results than larger amounts applied at greater intervals. Pasture grasses require more frequent irrigation and a greater total amount than most other farm crops. On the Station farm our grasses require water at least once every ten days and the total amount during the season averages about two and one-half acre-feet per acre.

CARE OF THE PASTURE

Grasses seeded early in the spring should furnish a small amount of feed during the latter part of the first summer. If such is the case, light grazing will not only be profitable but will be beneficial to the pasture. Weeds will be eaten off and prevented from going to seed and the grasses will stool out more extensively than if they are allowed to head and produce seed. Care should be taken, however, that the young sod is not grazed too closely or tramped too severely. If seeded

in the early summer the pasture may not furnish any feed but it should be clipped with a mower in the latter part of the summer.

At the beginning of the next season the pasture should be divided into lots. If it is small two parts will be sufficient, if large and maintaining a great number of animals more divisions will be necessary to prevent herding in one place and excessive tramping. In any case the cross fences will be amply paid for in increased forage production. The use of divisions makes it possible to irrigate one part while the animals are on the other. This will avoid cutting up the sod, tramping the grass into the mud and seriously checking its growth. Alternating from one pasture to another insures fresher, better, and more abundant feed.

The pasture should not be grazed too closely. Plenty of leaf surface is just as important for plant growth as an extensive root system. Grass two inches high will make a great deal more growth in a day than grass one inch high. For this reason a pasture that is grazed off and then allowed to grow unmolested for a couple of weeks by the system of alternating will produce a great deal more feed than if it is kept close to the ground all the time.

If any weeds should appear or if some of the grass is left in clumps and begins to go to seed it is advisable to clip with the mower.

The pasture is possibly not much in need of manure as some other parts of the farm because it receives a considerable amount during the summer. If there is plenty, however, it can be used to very good advantage on the grass. It should be spread evenly and not too heavily in the fall and harrowed thoroughly with a spike-tooth harrow in the spring. Whether any manure is applied or not, a good spike-tooth harrowing in the early spring will be beneficial.

Since the animals spend the hottest part of the year on the pasture it is necessary that some shade be provided for them. Some good willows or Carolina poplars planted along the ditch banks will grow very quickly and add greatly to the value of the pasture.

COW-GRAZING TESTS

In order to demonstrate the value of grass pasture and to furnish accurate information concerning the number of animals that a given area will maintain we have conducted grazing tests with dairy cows, sheep, and steers.

In May, 1911, we seeded an acre of old alfalfa land to a mixture very much the same as that recommended above for ordinary conditions. The same directions that we have outlined for starting a grass pasture were followed and an excellent stand was secured. The pasture afforded a considerable amount of feed late in the summer of 1911 but the actual tests were not started until the spring of 1912.

At this time one half of the acre plat was fenced in three parts for a cow-grazing test. One cow was pastured on these plats and was moved from one to the other as often as was necessary. In a number of instances the cow had to be moved from one plat before the next was ready to receive her. In these cases she was taken to outside pasture but was always returned to the experimental plats as soon as the amount of feed warranted it.

Each plat was irrigated as often as seemed necessary and the water was carefully measured. In no case was a plat irrigated when occupied by the cow.

The experiment began on May 6 and extended to September 6 with the following results:

SUMMARY OF 1912 RESULTS

Total days included in test.....	123
Total days in pasture.....	112
Total days off pasture.....	11
Total number of changes from plat to plat....	19
Average days on each.....	6
Average number of irrigations per plat.....	10
Average water applied per plat.....	2.574 acre-feet

Since the Station owned no cow we were obliged to borrow one and this was the only cow obtainable. She was a mature grade Short-horn and was not in milk when the experiment began. She freshened, however, so as to begin milking on June 1st and from then until the close of the test, 99 days, she gave 2826.5 pounds of milk. At the time she began milking the cow weighed 1290 pounds and at the close of the test, 1260, showing a loss in weight of 30 pounds.

During the summer of 1913 the entire plat (one acre) was used for cow pasture. It was divided into three equal parts and the experiment conducted as in 1912. The spring of 1913 was late and cold and we were unable to begin the grazing test until May 12th. On that date two cows were placed on the first sub-plat.

In this season it was not only unnecessary to seek outside pasture but the two cows were unable to eat all the grass afforded them. The entire pasture was clipped once producing 1043 pounds of cured hay. From June 21st to July 2d, a period of eleven days, three cows were kept on the pasture.

SUMMARY OF 1913 RESULTS

Total days included in test.....	123
Total days two were in pasture.....	123
Total days third cow was in pasture.....	11
Total number of changes from plat to plat.....	14
Average days in each.....	9
Average number of irrigations per plat.....	9
Average water applied per plat.....	2.727 acre-feet

Cow No. 1 was a two-year old high grade Jersey. She weighed 760 pounds at the beginning and 830 at the close of the test, showing a gain of 70 pounds.

Cow No. 2 was a two-year old of ordinary stock. She weighed 1052 pounds at the beginning and 1100 pounds at the close, showing a gain of 48 pounds.

Cow No. 3 was a mature grade Jersey weighing 940 pounds.

The total milk produced on the pasture was 4831.75 pounds.

In the summer of 1914 this test was continued. As in 1913, two cows were unable to eat all of the grass and a third had to be brought in part of the time. It was not necessary, however, to clip the pasture this season.

SUMMARY OF 1914 RESULTS

Total days included in test.....	135
Total days two cows were in pasture.....	135
Total days third cow was in pasture.....	17
Number of changes from plat to plat.....	15
Average days in each.....	9
Average number of irrigations per plat.....	10
Average water applied per plat.....	2,482 acre-feet

Cow No. 1 of the 1913 test was owned by the Station and was used in 1914. She weighed at the beginning of the test 840 pounds and at the close 860.

As in other years we were obliged to borrow cows and the only ones obtainable in 1914 were mature grade Herefords, and were very thin at the beginning of the test, so that they used more food for beef production than for milk.

Cow No. 2 weighed 820 pounds at the beginning of the experiment on May 1st. On August 17th her owner sold her to the butcher. On this date she weighed 1000 pounds, showing a gain of 180 pounds in 109 days.

Cow No. 3 was first placed on the pasture on June 1st at which time she weighed 810 pounds. She remained until June 17th when she weighed 840 pounds. She was brought to the pasture again when No. 2 was sold and at this time she weighed 920 pounds; at the close of the experiment 26 days later she showed the same weight.

A total of 4517.0 pounds of milk was produced during the experiment.

As will be noted from a careful study of these tests we have used average cows throughout this work. After having conducted this experiment we are sure that the farmer will be able to count on maintaining two good dairy cows per acre on irrigated mixed grass pasture.



SHEEP-GRAZING TEST

In the summer of 1912 one half of the experimental pasture was used for a sheep-grazing test. The half acre was divided into three plats by means of movable fences on hurdles.

Since we were unable to secure ewes and lambs the test was conducted with mature Lincoln rams. Five of these were placed on the pasture on May 6th and were moved from plat to plat as often as was necessary. On July 6th it was apparent that the five rams were not able to eat all the grass the pasture afforded and two more were added.

SUMMARY OF THE RESULTS

Total days included in test.....	123
Total days first five rams were in pasture.....	123
Total days last two rams were in pasture.....	62
Total number of changes from plat to plat.....	13
Average days in each.....	9
Average number irrigations per plat.....	11
Average water applied per plat.....	2,549 acre-feet

On June 6th the average weight of the first five rams was 168 pounds. On September 6th they showed an average weight of 161 pounds. On July 6th the last two rams had an average weight of 214 pounds and on September 6th their average weight was 209 pounds. They always had plenty of grass to eat and the fact that very little shade was afforded probably accounts for the loss in flesh. They could hardly have been expected to make any gain, however, since they were full-grown and very fat at the beginning of the test.

In the summer of 1913 one-half acre which had been seeded in 1912 to a mixture of Smooth Brome grass, Italian Rye, Meadow Fescue, and Red Clover was used for a continuation of the sheep-grazing test. The half-acre was divided into three sixth-acre plats with woven-wire fence, the hurdles used in 1912 being very unsatisfactory. This season ewes and lambs were used.

On May 5th six ewes and six lambs were placed on the first sub-plat. The ewes were two-year-old grade Lincolns and had an average weight of 102 pounds. The lambs were about one month old and had an average weight of 21 pounds. They were moved from plat to plat as in the other grazing tests. On May 23d one ewe weighing 100 pounds died, cause unknown, and her lamb weighed 30 pounds had to be removed. On May 31st the five ewes sheared 60 pounds of wool. It was very evident that these sheep were unable to keep the grass down and on June 9th three more were added. These were old ewes, grade Merinos, and their average weight was 80 pounds. On August 14th a 40-pound lamb was accidentally killed. On September 6th the average weight of the ewes was 85 pounds and of the lambs was 38 pounds.

All in all, the results of this experiment were rather unsatisfactory and we are hardly able to say why. The fact that they were range sheep and not contented on the small pasture may be responsible. At all times there was more grass than the sheep could eat. It was

necessary to clip the pasture and 705 pounds of cured hay was taken off.

The test demonstrates, at least, that eight ewes and five lambs are not enough to eat all the grass afforded by a half acre. It was the plan to conduct this experiment on an acre basis with farm-raised sheep of mutton type during 1914 but we were unable to secure the sheep.

STEER-GRAZING TEST

On July 14th, 1913, an acre of old alfalfa land was seeded to a mixture of Kentucky Blue Grass, Perennial Rye, Timothy, Meadow Fescue, and Alsike Clover. An excellent stand was secured and in the spring of 1914 it was fenced in three parts for a steer-grazing test.

The experiment was started on May 1st with four steers of the following descriptions:

Steer No. 1, Grade Shorthorn, age 26 months, weight 1040 pounds.

Steer No. 2, Grade Hereford, age 24 months, weight 730 pounds.

Steer No. 3, Grade Hereford, age 21 months, weight 660 pounds.

Steer No. 4, Grade Shorthorn, age 20 month, weight 600 pounds.

All of the steers were in very good flesh. They were moved from plat to plat as in other grazing tests. It was the plan to weigh the steers each month but this plan had to be abandoned because they were so wild that moving them from pasture to the scales would have resulted in trampling a great many other experimental plats.

On June 1st the pasture was exhausted and it was evident that the four steers were too many to keep on one acre of grass. In order to give the grass a chance to start they were all taken to other grass pasture for twelve days. This allowed sufficient time for the experimental pasture to make a good growth and all four were brought back. Six days later, June 18th, Steer No. 1 was sold to the butcher. He weighed 1130 pounds, showing a gain of 90 pounds in 49 days.

From this time the pasture kept the other three nicely until August 25th, when they were removed to other grass pasture for four days. This would not have been necessary except for the fact that we did not wish to graze the young grass too closely during its first year. On August 29th they were returned and kept until September 5th when they were weighed and the experiment closed.

SUMMARY OF TESTS

Steer No.	Days in Experimental Pasture	Days in Other Pasture	Total Days	Weight at Beginning	Weight at Close	Gain
1	37	12	49	1040	1130	90
2	112	16	128	730	1015	285
3	112	16	128	660	865	205
4	112	16	128	600	820	220

Total Gain.....800

Since the other pasture used was a very similar mixed-grass pasture it is very reasonable to assume that the gains per day were the same in each case. Steer No. 1 spent one-fourth of his time on outside pasture, and each of the others spent just one-eighth. Subtracting

these fractional parts from each steer's gain we find the following gains made on the experimental pasture.

Steer No. 1.....	68 pounds
Steer No. 2.....	249 pounds
Steer No. 3.....	180 pounds
Steer No. 4.....	193 pounds

Total produced on one acre...690 pounds

While this work is to be continued it already indicates strongly that one acre of good mixed grass will maintain three medium sized steers throughout the season.



The pasture does not need reseeding each spring, is one of the easiest crops to irrigate, and the animals do all the harvesting. These facts together with the foregoing results certainly prove that the grass pasture is one of the most profitable ways of cropping the land.

The pasture experiments at Gooding Station have attracted the attention of quite a number of irrigation farmers in different parts of Southern Idaho. These men after having followed the suggestions outlined in this bulletin are getting results equally as good as those secured on the Station Farm.

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