

UNIVERSITY OF IDAHO

# Agricultural Experiment Station

Department of Agriculture

## Some Grasses and Clovers and How to

### Grow Them in Idaho.

By HIRAM T. FRENCH.

**"The term grass is only another name  
for beef, mutton, bread and clothing."**

DEMOCRATIC TIMES' JOB ROOM  
MOSCOW, IDAHO.

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## BULLETINS

The regular Bulletins of the Station are sent free to all citizens of Idaho who request them.  
Late Bulletins are:

28. Some Idaho Soils.
29. (1) Annual Report of Director, (2) Meteorological Records.
30. The Service of Soils.
31. Some Spraying Experiments for 1901.
32. Feeding Steers and Lambs and Analysis of Stock Foods.

## GRASSES AND CLOVERS.

By HIRAM T. FRENCH.

In response to a rapidly increasing demand for information regarding the growing of grasses and forage plants in the state, the following report is made covering work on the Station farm, during the past three years, and facts regarding this subject gained from work and observations by the writer elsewhere.

There is no subject relating to the farm, regarding which there is such a demand for information just now, as that covering the varieties of grasses and clover best adapted to the various sections of Idaho, and how to grow them. It is not the purpose of this report to cover any considerable number of varieties; but to give some practical information to the farmer who wishes to establish a seeding for hay or pasture.

As stated many times at Farmers' Institutes, and through the columns of the agricultural papers, the growing of grasses and forage plants lays the very foundation for success in growing other crops; and in caring for livestock, an important factor in any system of agriculture. Where grass is not grown, or cannot be grown, there is little hope for permanent agricultural operations. In speaking of grass we use the term in its broadest sense including hay and some forage plants.

Over large areas in this state, the native or wild grasses have vanished never to appear again. They have gone out as civilization has come in; and like the red man, they can never occupy

the land again. These valuable grasses must, in many cases, be replaced by other domesticated varieties which will give better returns, under modern methods of cultivation, than the native species. The history of agriculture in this and other countries proves, that, like other plants, and animals, grasses coming from foreign soil are often more productive, consequently better ones to grow for practical results, than those already introduced, or those indigenous to the locality. Thus, while recognizing the merits of the native grasses which once grew so luxuriantly on the hills and in the valleys of this western country, we must not forget that there are other grasses which will take the place of these grasses with a new vigor, and produce a many-fold more abundant yield of pasture and forage.

“There are localities where natural pastures must be maintained, for the land is only fit for pasture. There are other places where pastures must be made in arable land, for nothing will take the place of the pasture in this western country for many years to come. The time is not here for the more intensive system of soiling stock, practiced in the more densely populated portions of the world.

Many inquiries come to us from the irrigated portions of the state, asking for information regarding grasses for pasture in these regions. Alfalfa alone is not desirable for several reasons, hence the inquiry for grasses to mix with the alfalfa for pasture and for hay.

In a state, with such widely different climatic and soil conditions, it is not easy to prescribe the required kinds of grasses and clovers to meet the needs of each particular locality; but if the suggestions in this report are not sufficient we shall be glad to correspond with any one, who will take the trouble to write us, stating the soil and climatic conditions which prevail.

#### VARIETIES.

ORCHARD GRASS.—First, last, and all the time, orchard grass stands at the head for an “all round” grass. It grows under irrigation and in quite-dry soil, although it is not a dry land

grass. It thrives best in a rich loamy soil with plenty of moisture. It starts early in the spring and grows until quite severe, frosty weather prevails. It gives the best results, however, when mixed with other finer grasses. It will grow in moist, woodland pastures, in out-of-the-way places, better than most any other grass known to the writer. It will grow on the hill lands about Moscow, where the soil retains moisture and is not too shallow. It will withstand severe pasturing, and produce a good quality of hay when cut early. There is no better grass to mix with clover for pasture. It lessens the danger from bloat when stock is pastured on clover, by furnishing a variety of food. As a hay for cows it far excels timothy and is readily eaten by all kinds of stock.

When sown alone fifteen to twenty pounds of seed should be sown per acre. The reader is referred to "Remarks on mixtures of grasses for pasture and hay," for further facts regarding orchard grass.

**TALL MEADOW OAT GRASS.**—This is another early grass well adapted to many portions of Idaho. So far as we know it has not been tested on the irrigated lands, but on the moist hill lands it has been grown successfully, and is increasing in popularity. It starts early in the spring and grows late in the fall. It withstands dry weather and does well in light sandy soil. The seed of this grass germinates readily, making it one of the easiest grasses to grow. Like many others it should not be sown alone. It does not make good hay, when sown alone, from the fact that stock will not eat it readily; but when mixed with other grasses it is not refused by horses, cattle or sheep. This grass matures with orchard grass and red clover, making a good mixture with these varieties. On account of withstanding extreme dry weather this grass was grown in the east for several years under the name of "Evergreen Grass."

**ENGLISH RYE GRASS.**—For early pasture on moist land, and even on the hill land, where there is plenty of rain fall, this grass is one of the best. For summer pasture, after July, it is not equal to many of the coarser and stronger varieties. This is a perennial grass, but after two years, on the hill land, it does not make

a very vigorous growth. There are few grasses, if any, that will give as quick returns in pasture as this grass. When sown in early spring it will furnish a good bite during the summer and fall. Hay made from this grass is light and matures very early. This is a good grass to sow in a mixture, and especially for low land.

ITALIAN RYE GRASS.—This grass makes a strong growth the first year in this section; but that is practically the end of it. There are varieties of this grass which it is claimed will live for several years and make a good growth; but we have never succeeded in securing one that will make a respectable showing after the second season, and most of them fail to produce a good crop even the second year.

This is not a grass we would recommend for more than a catch-crop, and not for pasture at all.

MEADOW FESCUE.—Among the grasses which promise good results on the hill lands, and the low lands as well, in the section about Moscow; and wherever there is plenty of moisture, this is one worthy of extended trial. This grass has been growing on the Station farm for three years and has produced very good results. It should not be sown alone and is best adapted for pasture. It does not start quite as early in the spring as the Rye Grasses or Orchard Grass; but it is a strong grower and keeps green when some other less hardy varieties are overcome by the dry weather. Stock of all kinds do well on this grass both as a pasture grass and when made into hay. This grass must not be confused with Tall Meadow Fescue which is a coarser, less desirable species.

CANADIAN BLUE GRASS.—Of the *poas*, to which genus this grass belongs, this one seems to be best adapted to our soil and climate. Kentucky blue grass, a closely related species, does well also; but the one mentioned above seems to be more hardy and more easily started on the hills and low lands as well. It is not generally recommended for hay; but we have seen small areas of this grass that would yield two tons or more of hay per acre. This is a finer grass than Kentucky blue grass and makes a more

dense sod. All of the grasses mentioned have a tendency to grow in bunches or tussocks, but this one spreads by underground stems making a sod. While in Canada, this grass occupies the drier lands, and is spoken of as a dry land grass. In the west, it is found growing along the river bottom lands, where it often makes a good yield for hay. For pasture purposes this grass is worthy of trial for the lands near Moscow, and still nearer the mountains where there is a greater precipitation.

RED TOP.—There are several species of this grass which do well in Northern Idaho. The common Red Top (*Agrostis vulgaris*) grows well, even on the hills; but for general seeding we would not recommend it. It starts slowly and makes very little if any fall pasture. For permanent pasture where dense sod is desired, the Creeping Bent Grass (*A. stolonifera*) is better than the (*A. vulgaris*.) This one continues green and fresh longer than the common red top, but it does not grow tall enough for hay.

TIMOTHY.—Everyone is familiar with this grass and knows of its commercial value when made into hay; but many farmers make the mistake of sowing this grass for pasture and hence a word of caution may not be out of place.

Timothy does not make as good hay for cattle and sheep as many other grasses. It does not make much pasture except in very moist, peaty or alluvial soil. For the hill lands it is one of the poorest grasses we have, where pasture and hay for cattle and sheep are desired. It is exhaustive on land taking away the natural fertility of the soil, rather than restoring it in a measure, as many of the grasses and clovers will do. In a mixture with alsike clover for low lands, timothy is of some value; but even then there are other grasses we would prefer.

The question will occur, no doubt, why is this grass so widely sown? The best answer we can give is by asking another question, viz: why is the Burbank potato so popular? It is no better than a dozen other varieties; but the market, very often, has room for nothing else. It can only be answered by saying that this variety, like timothy hay, has won its popularity on account of

its uniform quality, which may not be high however, and its well known characteristics. Everybody knows timothy hay and cannot be easily misled in judging of its quality; while Orchard Grass, Brome Grass, Oat Grass, Rye Grass and many others, are little known, although they may possess greater feeding value than the timothy. \*The following statement is made by Wm. Crozier of New York, who says, "Heretofore the base grass in all the northern states has been timothy, but experiments that have been carried on for a period of twenty years have led me to believe that Orchard Grass is much better fitted to be the leading kind in mixtures, whether for pasture or for hay, or used alone or otherwise, and I place it far in advance not only of timothy, but of any other grass we have thus far in cultivation."

There is one fertile reason, it seems to me, why timothy is so generally grown; and that is its adaptability to new land and the comparative ease with which a stand can be secured. The seed is easy to obtain and it grows readily, many times under adverse conditions.

**BROME GRASS.**—*Bromus inermis*, called Austrian, Hungarian and Russian brome grass, has been tested quite thoroughly on the Station farm, and on neighboring farms near Moscow.

Brome Grass was introduced into this country from Europe where it is indigenous to many sections. It is also found in parts of Asia. In some parts of Europe it is said to withstand droughts "so severe as to destroy all other fodder plants." Cold does not injure the grass except to kill the stems and leaves. It does not do well in shaded places. The best results with this grass are obtained when it is sown on warm sunny exposures. On the Station farm it does not grow as rapidly on the north hill sides as on the south. The warmer the exposure the better the grass seems to grow. While the grass is a native of the semi-arid regions of Europe, we have seen it produce excellent results in this country where the annual rainfall is at least thirty inches. This would place it in the list with other grasses as far as growing

\*Grasses of North America by Dr. Beal. Vol. 1.



in moist land is concerned. In Europe it is found growing wild on uncultivated areas, and out-of-the-way places.

It is safe to say that this grass has found congenial conditions over large areas in the northwest, and will prove of inestimable value in sections where it is not easy to grow other grasses. It is better adapted to pasture than hay; and yet it makes very good hay, and yields well. Yields of two to four tons per acre are not uncommon reports in this section. The following report is made by Mr. A. C. Rubeck of Freeman, Wash. He says: "Bromus inermis is the coming grass for either hay or pasture. Everything will eat it, in its green state, that eats grass, and for hay, if cut in the proper time, before it forms seed and gets hard, horses or cattle will leave clover or timothy hay and go to Bromus." That is his experience and he further states that "in ordinary wheat land it will cut two to four tons per acre."

Last year the yield of brome grass, on the Station farm for hay, was about the same as that of the Tall Meadow Oat Grass; and better than any other grass, as the reader will find under the head of "yield of hay" in plat experiment reported in this bulletin. For dry hill lands, and for pasture, we would recommend the brome grass as one worthy of extended trial.

It has not proved a success when mixed with other grasses. At the Nebraska Station, brome grass crowded out all the other grasses by the end of the second year. The grass spreads by means of underground stems, thus enabling it to make a dense sod after a few years. On this account there is no cause for alarm if the seeding is rather thin the first year. It will thicken up very rapidly the second and third years. The surest method of getting a good stand is to seed in the spring, on land prepared as for other grasses; and sow 15 to 20 pounds of seed per acre. It will not injure the brome grass to pasture in fall, when seeded the spring before.

At the Washington Experiment Station, located at Pullman, over two cows per acre were pastured on brome grass from April

to October. We shall conduct some pasture tests with cows this season.

#### SEEDING UNCULTIVATED LANDS.

There is considerable inquiry regarding the use of brome grass for the range lands, where the native grasses have disappeared. Not much has been reported so far in this direction; but some work has been done, and it seems to be very promising. It takes longer to get a good stand under such conditions, and it is better to sow seed in the early fall; and especially where there is not much rain during spring and summer. A good many farmers in Eastern Washington, and Northern Idaho, are testing this matter; but so far we have no definite data regarding the work. It is the opinion of the writer that much of the range in this part of the state, can be reseeded to brome grass when the habits of the grass are well understood, and careful attention is given to the matter of seeding.

In Southern Idaho, there are large areas of land, just about the irrigation ditch, which we believe can be seeded to brome grass. This is especially true if the lands are located near the foothills where there is a greater precipitation than on the open plain. In some sections brome grass is being tested under irrigation; but it is too early to give results of this work.

Present indications would point to wonderfully beneficial results from the introduction of this grass throughout the northwest.

## SOME PRACTICAL RESULTS WITH GRASSES ON THE EXPERIMENT STATION FARM.

#### FIELD EXPERIMENTS.

In the spring of 1899 a field of six acres on the farm was seeded to a mixture of grasses and clover. The land had borne wheat the year before, and was plowed eight inches deep in

spring preparatory to seeding with the grasses. Here is where a serious mistake was made, as the reader will see under head of "Preparing soil for grasses." By this deep plowing the land was made too loose for the best results.

The mixture consisted of 40 lbs. common Red clover: 6 lbs. alsike clover: 25 lbs. Orchard Grass: 6 lbs. Meadow Fescue: 5 lbs. English Rye Grass: 10 lbs. Timothy and 4 lbs. Tall Meadow Oat Grass, making 96 lbs. in all, or at the rate of 16 lbs. per acre. This is a good liberal seeding, considering the amount of clover seed in the mixture.

The ground was harrowed and clod-mashed before sowing the grass seed, and again after sowing. The seed was sown on April 24th. It came up rapidly and made a good stand. The wild oats came very thickly and were allowed to grow large enough to make hay. These were cut with a mowing machine the last of June. The stand of clover was good until the middle of July, when it began to die from drought; and before the rains came in September, considerable of it disappeared. This was due to the condition of the soil which we have learned to overcome by keeping the soil more compact. The timothy did not do well for the same reason, and some of the grasses suffered very materially. This meadow still remains and has yielded good crops of hay. The hay is largely Orchard Grass, Tall Meadow Oat Grass, English Rye Grass and Meadow Fescue with some clover. The second growth has been pastured each year, and the pasturing seems to benefit the meadow rather than injure it.

Another field of six or eight acres was seeded in 1890, in a similar way except that it was plowed in the fall. The results are more satisfactory and all the grasses and clovers seem to thrive. The yield of hay from this field last season—1901—was over two and one-half tons per acre. This year—1902—the yield promises to be still heavier.

#### PLAT EXPERIMENTS.

The last of May, 1901, five,  $\frac{1}{4}$  acre plats were sown to Orchard Grass, Tall Meadow Oat Grass, Meadow Fescue, English Rye

Grass and Brome Grass (*Bromus inermis*.) Seed was sown at the rate of 20 pounds per acre.

The ground was prepared by plowing 4 inches deep, and harrowing thoroughly with a light smoothing harrow. No fertilizer was used, and none had ever been put on the land so far as known. Rape was grown on the land the previous year; but it was cut off and not pastured. It was not a specially favorable piece of land for grasses. It was too wet to plow until the 15th of May. Parts of the land were very hard and compact.

#### RESULTS.

The grass seed germinated readily, making a good stand. It grew rapidly, soon covering the ground, and by September, the Orchard Grass, Oat Grass and English Rye Grass were six inches high. Nothing was done with the plats that fall. They withstood the winter perfectly and started early in the spring. The English Rye Grass, Oat Grass and Orchard Grass, started to grow in the order named, but all three of these made an early growth.

#### PASTURE EXPERIMENT.

Ten sheep were confined by a hurdle fence on a portion of the plats April 27th. The fence ran across the ends of the plats taking in a portion of each. We wished to determine which was eaten first, and which would be first to recover from severe pasturing. The sheep were confined on the plats until the grass was eaten very closely, so that there was little, if any, grass in sight. The Orchard Grass was first taken by the sheep and Meadow Fescue next in order. The English Rye Grass and Tall Oat Grass were eaten last. The Brome Grass was next, after the Meadow Fescue, in order of palatability. After these grasses were cropped quite short the sheep began on the Rye Grass and the Tall Oat Grass. The Orchard Grass was first to start after the sheep were removed and the Oat Grass next, and Meadow Fescue third in order. The Brome Grass was also very quick to make a second growth. The English Rye was a little slower than any of these in starting after severe pasturing.

**YIELD IN HAY.**

The remainder of the plats were permitted to make a growth for a hay test.

A portion of the plats, representing an average stand, was measured off on June 19th, and the grass was cut for hay. The grass was spread evenly over the ground and allowed to lie until June 21st, three days from cutting. The weather was very favorable and the grass became thoroughly dry. Some of it was really too dry for good hay.

The hay was weighed as soon as it was raked up, and made the following yields per acre: Orchard Grass 5280 lbs; Tall Meadow Oat Grass 5760 lbs.; Meadow Fescue 5280 lbs.; English Rye Grass 4000 lbs. and the Brome Grass 5600. This is a very good showing when we consider that it is practically one year from date of seeding. There are few localities where grass will make a better showing than this in so short a time; and that without any special care as to condition of soil, etc. It must prove to the most skeptical that grass can be made to yield profitable returns in this section.

**CLOVER.**

The merits of clover are well known to most agriculturists. The student of agriculture knows that the introduction of clover, in this and other countries, has marked a step in the advancement of agricultural pursuits. Clover is easily "King of forage plants," when we consider its power to restore fertility, as well as furnish one of the most nutritious foods for stock, that is within the reach of the farmer. In many sections of the United States, clover has come in to make amends for the prodigality of the wheat farmer, and it promises an equally "good turn" to the farmers of the wheat growing sections of Idaho. While it will grow, and is grown in its greatest perfection, in the irrigated sections of the state, it will also produce wonderful results in the unirrigated sections of Northern Idaho.

Clover thrives in a heavy tenacious soil, such as that found in the partially worn out wheat fields of the Palouse country.

New land is not always, and very frequently is not at all, adapted to the growing of clover. If too rich in humus, and too loose in its physical properties, it will not grow clover as well as land more compact, and not so well supplied with decaying vegetable matter.

Some farmers in this section of the state are skeptical about the success of the clover crop on the hill land. From experiments tried, and from observations where clover is now growing on the hills, we are convinced that the best of results will follow seeding to clover on the hill lands, where the soil is reasonably deep as it is in this section on nearly all high farm lands. Some of the best stands of clover coming under our observation are on the highest hills where grain can be grown and harvested. Near Moscow, in an orchard sloping to the south, we cut over twelve tons of green clover to the acre at one cutting; and lower down on the hill, but not in the valley, the yield was a little over eighteen tons per acre. This is indeed a heavy yield at a single cutting; but not larger than we have seen over quite large areas in this vicinity.

#### VARIETIES.

Common Red Clover, (*Trifolium pratense*), is the one best adapted to our soil and conditions for general sowing. That others will thrive there is no doubt; but this one possesses the larger number of desirable characteristics. The Mammoth Red Clover (*T. medium*), is recommended for pasture on account of the fact that it is often a perennial; but the Common Red Clover comes near enough to becoming a perennial in this section of the country. There is a plat on the Experiment grounds which has stood five or six years, and is apparently as vigorous as ever. In a field a short distance from the University, clover is still growing where none has been sowed for twenty-seven years. The field has not been plowed during this time. The clover may have reseeded itself; but an examination of the roots does not show any indication of a new seeding. The clover is nearly crowded out with other grasses; but to all appearances the scattering bunches left are of the original seeding. This would

indicate that Common Red clover has a long lease of life in this section; and that there is no need of substituting the Mammoth clover on account of a longer period of growth. The Mammoth clover is later to mature and makes very little if any second crop. It should be pastured quite closely to get the best results. Seed of the Mammoth clover is produced in the first crop; hence if seed is desired it is best to pasture the clover quite late before it is permitted to head out.

Mammoth Red clover, made into hay, is more dusty than the Common Red clover, on account of a wooly covering carried on the leaves and stems. For this section of the state, we would make Common Red clover the basis of all seedings; and add to this the varieties of grasses which will mature at the same time as clover, and such as will increase its value for hay and for pasture.

ALSIKE CLOVER.—Many questions are asked regarding the value of this clover for pasture and hay. Alsike is intermediate between the Common Red, and White or Dutch clover,—hence its name *Trifolium hybridum*. For certain lands the Alsike clover will give better results than any other. It is better adapted to low lands where water is likely to stand for a few weeks or perhaps for a month in certain seasons. This clover will thrive wherever timothy will grow successfully. It does not stand up as well as Red Clover, and starts a little later in spring. It matures later than Common Red clover, and makes very little if any second crop. It is a good clover for pasture when kept eaten down and mixes well with timothy for hay. Many of the timothy meadows might be much improved, for cattle and sheep, by cutting them up with a sharp harrow and seeding to Alsike clover. Very good seedings can be obtained in this way, especially when the ground is moist.

ALFALFA.—Of all the forage plants this is the most wonderful when grown under certain conditions. As a crop for irrigated sections it stands at the head. The yield of hay from this crop, under irrigation, in the warm sage brush lands of the West, is beyond the comprehension of those who are not familiar with its

growth. While this is true there is something for the farmer to learn in combining other crops with alfalfa to get the best results for pasture and for hay. Orchard Grass and Tall Meadow Oat Grass will grow with alfalfa, and we have seen some good results from this mixture. Rye is also grown with alfalfa in some parts of Idaho, and adds to the feeding value of alfalfa, especially for cows. This is done by cutting up the alfalfa meadow with a disc harrow, and sowing the rye on the stubble thus prepared. The rye will come up for the first cutting, and if cut early, will make a second growth in time for the second cutting of alfalfa. How extensively this has been tested we are not informed, and simply mention it as worthy of further trial by those who are feeding alfalfa to cows.

The growing of alfalfa is not confined to the irrigated sections of the state. It is fast becoming a useful crop in Northern Idaho, where a few years ago it was given no attention whatever. It is being tested on the Station farm; and there are several quite large areas seeded in the vicinity of Moscow. It seems to do well on the hill land where one would least expect it to thrive. Two cuttings can be secured on these lands without irrigation. The second cutting will not be heavy; but the quality of the alfalfa is superior to the first cutting.

Alfalfa makes a splendid hog pasture in this section; better than red clover, if possible, on account of a more succulent growth, and a quicker growth in the spring. From our present knowledge of alfalfa, we feel safe in recommending it for more general seeding, believing that it will be found well adapted to the conditions of soil and climate in many parts of the unirrigated sections of Northern Idaho.

CRIMSON CLOVER.—(*Trifolium incarnatum*). A large portion of Idaho is not well adapted to growing this clover. The winters are too cold without enough protection by the snow to prevent injury. There may be locations where, for a catch crop in orchards, to increase the supply of humus, this clover is worthy of trial; but aside from this we have little faith in its becoming of much importance.



#### PREPARING LAND FOR GRASSES AND CLOVERS.

More failures in growing grasses and clovers can be traced to improper methods in seeding than to any other cause. This we know from our own experience, and from observations extending over a period of twenty years.

It is not so often the climate, and natural soil conditions, that are at fault, as it is the faulty preparation of the land.

One very common error made in this section of the state, is to make the land too loose. The rain fall, during the months of July, August and September, is not sufficient to prevent the young grass and clover from burning up, unless the lower layers of the soil are compact enough to hold moisture. Land sowed to grass and clover in the spring should be plowed the spring before, or early fall before, and in that case not more than six inches deep. If a crop of grain is raised on the land, the year previous, then work the surface to a depth of two or three inches only; and in this shallow seed-bed sow the grass and clover, covering the seed with a smoothing harrow. In soil inclined to be too loose use the roller, after seeding, to compact the surface. There is little danger of getting the soil too compact, providing a crust does not form on the surface before the seed germinates.

Some of the best results, seen in this section, have been secured by discing the stubble ground, to a depth of three inches; using the harrow to fine the seed bed; and then cover seed with smoothing harrow. If the stubble is too heavy it should be burned off. Quite heavy stubble may be plowed under in the fall, and the ground settle during the winter sufficient to retain moisture. In this way the stubble will be made to contribute to the fertility of the soil more than it would if burned.

Where land is planted to corn or potatoes, the season before,

it should not be plowed for grass seed the following spring. The surface will work up sufficiently mellow for a seed-bed.

#### NURSE CROPS.

It is not safe to sow grass or clover with a nurse crop under the prevailing conditions in this section. While some have succeeded fairly well it is not generally successful. The ground is so full of wild oats and very often volunteer grain, that to sow a crop on the land at the time of seeding to grasses is simply to make failure doubly sure. Yes, but will not the grain crop shade the young grass and clover? is asked by many. That is true, and a condition which we very much wish to avoid. Young grass and clover plants are not injured by sunshine, providing there is enough moisture in the soil. Where grain is sown with the grass and clover the moisture is exhausted by the more rapidly growing cereal, and thus the clover and grass plants are cut short in their growth. The shading makes the plants sickly and weak, so that, when the grain is cut, they cannot withstand the hot sun to which they are exposed for the first time.

In this section, where grain makes such a rank growth of leaf and stem, the injury from shading the plants and sapping the moisture is very apparent. There may be moist lands where grasses and clovers may be successfully sown with grain crops; but it is not a safe plan to follow.

#### WILD OATS.

It will be found necessary in most cases to mow off the wild oats and volunteer grain several times during the season. In some instances one mowing will be sufficient; and especially is this true if stock can be turned onto the new seeding after the first mowing. It will be found a good plan to pasture the young seeding after about the first of July. The tramping of the stock firms the soil and keeps down the weeds and wild oats. On Mr. Byrns' farm near Moscow, the best seeding is found where stock

tramped the ground most thoroughly during the dry season.

If it is not too dry weather the wild oats may be allowed to grow large enough to make into hay; but if the young seeding is threatened it is better to sacrifice the oat crop to save the grass and clover.

If cut early it will not be necessary to rake the ground; for the material cut off will serve as a mulch and thus conserve more moisture.

#### TIME TO SEED.

Our experience here is that the most certain time to seed is in the spring. While this is true, we have seen some very good results from early fall seeding. Late fall seeding is not at all safe, especially with clover. If clover can be sown on well prepared lands, before the September rains come, there is an even chance for its becoming strong enough to withstand the winter; but if this cannot be done we would recommend spring seeding. Some advocate early spring seeding, but our experience is, that not too early seeding is better. If clover sprouts or gets the first two leaves only, which are not really leaves, it is quite easily killed by frost. Young grass will grow very slowly, when cool frosty weather prevails, consequently we recommend sowing this not too early.

On the other hand seeding must not be delayed until there is not sufficient moisture to sprout the seed. The conditions of the season will have much to do with the time of seeding, hence we cannot give definite instructions on this point.

#### MIXTURES OF GRASSES AND CLOVERS FOR PASTURAGE AND FOR HAY.

No. 1. Uplands. Common Red Clover 4 lbs.; Orchard Grass 8 lbs.; Tall Meadow Oat Grass 4 lbs.; English Rye Grass 4 lbs.

No. 2. Common Red Clover 4 lbs.; Orchard Grass 6 lbs.; Tall Meadow Oat Grass 4 lbs.; Meadow Fescue 6 lbs.

No. 3. For pasture more especially. Common Red Clover 2 lbs.; Alsike Clover 2 lbs.; Orchard Grass 6 lbs.; Meadow Fescue 6 lbs.; Canadian Blue Grass 3 lbs.

No. 4. Common Red Clover 2 lbs.; Alsike Clover 2 lbs.; Orchard Grass 6 lbs.; Tall Oat Grass 4 lbs.; Meadow Fescue 2 lbs.; English Rye Grass 2 lbs.; Canadian Blue Grass 2 lbs.

No. 5. Low lands. Alsike Clover 4 lbs.; English Rye Grass 6 lbs.; Orchard Grass 6 lbs.; Meadow Fescue 4 lbs.

No. 6. Timothy 4 lbs.; Alsike Clover 4 lbs.; Meadow Fescue 4 lbs.

Kentucky Blue Grass, Hard Fescue, Creeping Bent Grass and Common Red Top might be added to some of these mixtures for permanent pastures. A simple mixture of Orchard Grass 10 lbs., and clover 6 lbs. makes a good seeding for hay, and will supply considerable pasture. If Red Clover is sown alone we would recommend 10 lbs. per acre.

#### ADVANTAGE OF MIXTURE.

In sowing several grasses in a mixture, instead of a single variety, a better stand is obtained and the seeding will hold longer.

Most of the grasses have a tendency to grow in bunches or tussocks, thus if sown alone a portion of the ground becomes bare. Again the grasses root at different depths and consequently draw their food supplies from different layers of soil. In the decaying clover roots food for the grasses is set free, thus the clovers become the "handmaids" of the grasses.

Stock will do better on a scanty supply of a variety of grasses, than upon an abundance of any one kind. This is true of pasture grasses and of hay. A mixture is always better in the

form of hay. It is not so easy to err on the side of getting too many varieties of grasses as it is in getting too few.

#### WHAT SOME OTHERS ARE DOING NEAR MOSCOW.

Three years ago it was not easy to find anyone who had attempted to grow tame grasses and clovers in this portion of the state. Some were planning to do so, and had faith in their success, but men of such faith were not common. A large majority then, and many even now, would say "it can not be done." Fortunately the number of "doubting Thomases" is rapidly growing less.

It may be of interest to some, and serve to encourage others, to learn of the results gained by a few farmers who had the courage to undertake the growing of grasses in this vicinity.

Lack of space will prevent our mentioning all those who have experimented more or less in growing grasses in this locality; but we shall mention a few who are well known to the writer and whose farms have been visited.

Mr. B. T. Byrns of Moscow, beginning three years ago, has sown very extensively of the grasses and clovers mentioned in this Bulletin; and has now over four hundred acres well seeded. A portion of the seeding has yielded one crop of hay, while a large part of the area seeded is only one year old.

The yield of hay on Mr. Byrns' farm last season, from tame grasses and clovers, was very satisfactory; and the out-look this season is still more favorable, if possible. A portion of the land is used for pasture this season. A recent examination of the premises shows that the tame grasses and clovers furnish a good pasturage earlier than the native grasses growing in adjoining fields and on the range.

This is a point often questioned by those who are not familiar with the domesticated varieties of grasses and clovers.

Mr. Theo. Reed, whose farm is one mile south of Moscow, has quite a large area seeded to grasses and clover. Mr. Reed is one of the first to grow alfalfa in this section. He has a considerable area seeded to alfalfa on his farm, and considers it a valuable forage plant for this section. While the yield is not equal to that secured under irrigation, it yields two cuttings and considerable pasturage from the third crop.

Mr. M. J. Shields of Moscow, is engaged very extensively in growing grass for seed as well as for stock feeding. It has been demonstrated that our soil and climate are well adapted to the production of seed in the grasses. This was first demonstrated with timothy and brome grass, and has since been found true of other varieties. Mr. Shields has over a thousand acres of land devoted to growing grasses for seed. This is a new enterprise for this section of the state, a knowledge of which may encourage others to grow seed for their own use at least.

The late Dr. W. W. Watkins succeeded in establishing a fine stand of clover in his orchard near Moscow. This was done to increase the fertility of the soil, and was only allowed to stand two years. Dr. Watkins secured a fine meadow by mixing clover and timothy. This is in a field joining the orchard. Both of those seedings are located on the high lands where it was thought grass and clover would not grow successfully.

Mr. Willian Taylor, a pioneer farmer in this section, early demonstrated the possibility of growing clover. He established a good seeding of clover some thirty years ago, and harvested a very heavy yield of seed from the second crop at that time.

These references are made to show that the soil and climate of this section are adapted to the growing of grasses and clovers, and that they have been, and are now being grown by men engaged in practical farming. Not all the farmers who have made a success in growing grasses here are mentioned; but enough perhaps to show what can be done when proper care and attention are given to the work.

#### MAKING CLOVER HAY.

In curing clover for hay the same principles will apply here

as elsewhere, hence the following extract is made from Bulletin No. 35, Oregon Experiment Station, published in 1895 by the writer of this Bulletin:

In making clover hay some pains must be taken to prevent a serious loss. The leaves of the clover will dry much quicker than the stems; and if the hay lies spread on the ground until the stem is dry, the leaves will be lost. The best plan is to rake it up just as soon as it is thoroughly wilted, and put it up in not too large piles, where it will cure in good weather, in from 24 to 36 hours. It is not a good plan to let it stand too long before hauling it into the barn. It may be a little tough, and apparently too wet to keep in the mow; but if there is no rain or dew on it, it will suffer no harm if packed closely in the hay mow. Do not throw open the barn doors to let in air. Keep the air away from it, and there will be no white mould or musty hay when removed. The theory of throwing open the barn doors, to admit air to the hay has long since been exploded. It is no longer practiced by modern hay makers. Some farmers salt the hay in the mow. We do not, we prefer to salt the stock by hand as often as desirable.