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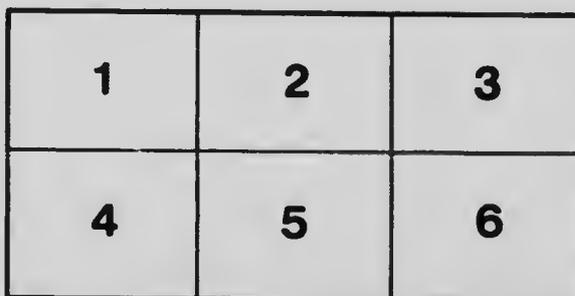
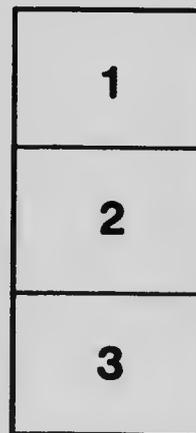
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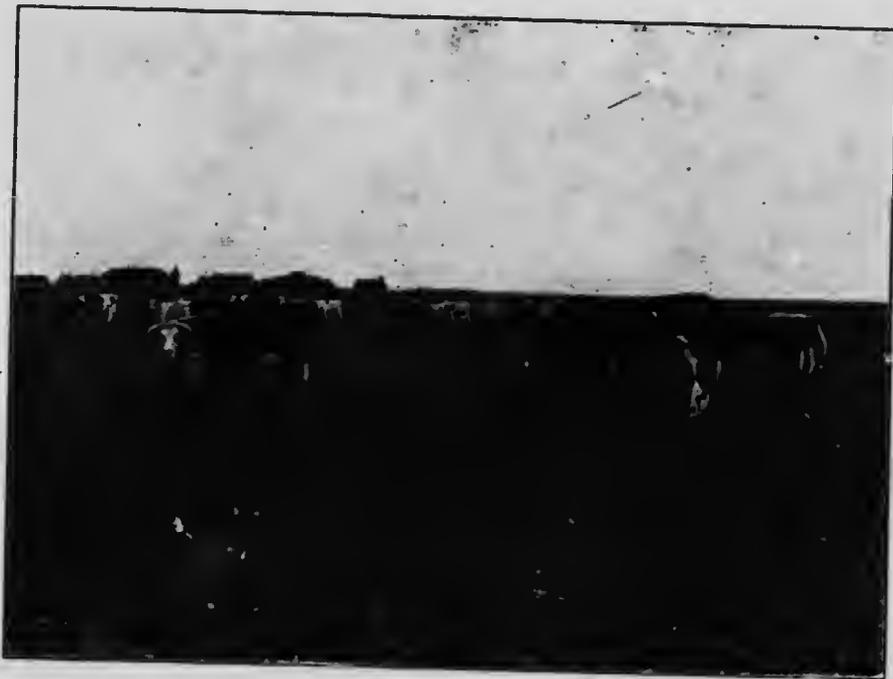
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Field Herb. Circ. 14



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COLLEGE OF AGRICULTURE

HAY and PASTURE CROPS FOR SASKATCHEWAN



College Herd on Mixed Pasture.

By

JOHN BRACKEN, B.S.A.
Professor of Field Husbandry

SASKATOON, SASKATCHEWAN 1916

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HAY AND PASTURE CROPS FOR SASKATCHEWAN

Field Husbandry Circular No. 14

By

JOHN BRACKEN, B.S.A.
Professor of Field Husbandry
College of Agriculture
Saskatoon

INTRODUCTORY

There is every evidence that the increase of soil "drifting", the spread of weeds, and the injury to crops from drought and frost, are not only lowering the acre yield on our Western soils, but are at the same time seriously increasing the cost of crop production.

To offset or remedy the first two conditions and to lessen the risk of danger from the last two, it seems essential that in many parts of the province two things must be done, (1) replace our one crop system of farming by a more diversified one, and (2) introduce more live stock. Diversification in cropping and the use of live stock on farms aid very materially in controlling weeds and drifting soils and in lessening the danger from drought and frost. They do these at a very small maintenance cost to the farmer. Of course an initial capital expenditure for fences, buildings and stock is necessary. Tillage, on the other hand, while it helps to control these conditions, does so at a heavy and ever increasing annual cost.

If we are to grow crops at a profit when "war" prices are a thing of the past we must lower the cost of producing them.

If we are to continue growing profitable crops we must take steps to maintain soil productiveness—in other words, at this time, to control weeds and to prevent soil "drifting."

We can lower the cost of production and control weeds and soil drifting and at the same time build up a safe, sane and permanent agriculture by diversification of crops and the more general use of live stock on our farms.

The best crops to use, the order they should follow and the specific details of the management of a "mixed farm" vary under different conditions and must, therefore, be determined by the man on the land. At this time in our agricultural history no perfect plans that have

stood the test of time are available. They have yet, very largely, to be developed. The farmer and the Experiment Station must work them out.

The purpose of this circular is to present some information concerning the suitability of the different hay, pasture and soiling crops to Saskatchewan conditions, in the hope that our experience may be found useful to men who realize the short comings of our present system and are seeking to build up a better one.

FORAGE CROPS

In its broadest sense "forage crops" include all crops any portion of which may be used as food for animals. As generally used, however, it does not include the "concentrates" or threshed grains. Forage crops may be subdivided into:

- (1) Hay crops—the small strawed crops that are cured by drying.
- (2) Pasture crops—those harvested by the animals themselves.
- (3) Soiling crops or "green feed"—crops cut green and fed to animals in the fresh succulent condition.
- (4) Root crops—those crops the roots of which are used for animal food.
- (5) Ensilage crops—those preserved in a succulent condition by the exclusion of air, and
- (6) Fodder crops—the roughage from threshed grains, grasses and legumes, and from dry cured corn stalks.

These notes will refer in some detail to the hay and pasture crops and but very briefly to soiling crops.

Perennials, Biennials or Annuals?

Under semi-arid conditions long-lived or perennial crops do not yield as well as the shorter lived annuals and biennials. This is explained by the fact that much more frequent opportunity to store moisture and develop plant food is given in the case of annuals and biennials than with a crop which lives several years. At the same time we must keep in mind that perennial crops cost less to produce, since there is no charge for soil preparation, seed or seeding, after the first year.

It is our opinion that in the drier portions of the province greater reliance must be placed on the short lived crops than on the long lived ones. Yet the latter are essential for such permanent or semi-permanent pastures as it may be found advisable to use. We have insufficient data to determine which is the more profitable, even under our own conditions. It would seem, however, that we should plan to get the bulk of our hay from annual crops and depend upon the perennials for some early spring pasturage, some hay, and a reserve pasture for horses or other stock when the annual crops may not be ready for pasturing. Where weeds or drifting soils are serious a larger proportion of perennials is desirable. The more humid the district the more successful perennials will be, the drier the area the more annuals must be depended upon. The proportion of each must be determined by the climatic conditions and the system of farming followed.

CULTURE UNDER DRY CONDITIONS

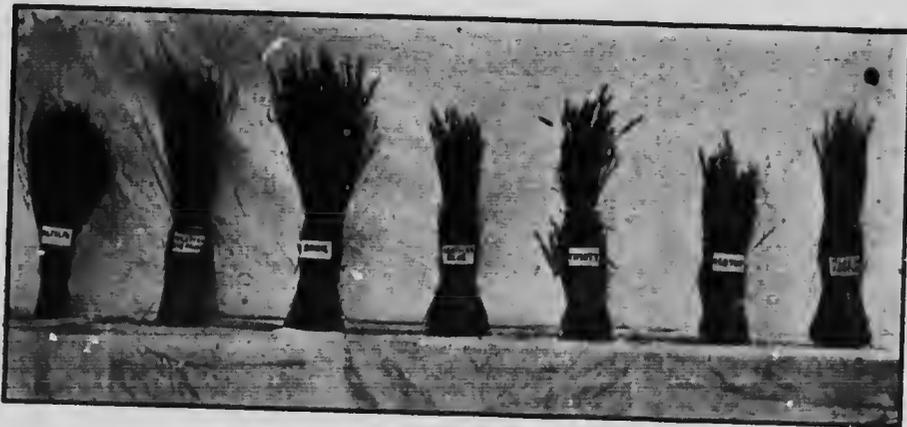
In growing grasses, clovers and alfalfa, there are several practices now quite firmly established in Saskatchewan that differ somewhat from those in vogue in more humid areas. We look upon sowing these small seeds with a nurse crop as precarious in most places having less than 18 inches of precipitation. Yet a thinly seeded nurse crop has considerable value in that it helps to lessen soil drifting and to smother weeds which may develop before the small plants of the slow starting forage crops get established. But when moisture is the limiting factor in crop yields, a heavy "nurse crop" instead of being a protection, actually robs the young plants of the moisture necessary for their growth and often leaves them in such a condition that a severe winter may cause their death. The use of a thin "nurse crop" to be cut early for hay, has in many parts proven a desirable practice when seeding down to grass, but alfalfa should always be sown alone.

Fall sowing is not followed, for the reason that the autumn months are usually quite dry and poor germination is probable. In addition, the plants have not time to make sufficient growth to thoroughly establish themselves before winter sets in. As a consequence, there is less likelihood of their living over this season of the year. Seeding in June, preferably in the early part, has been found most satisfactory.

Drilling, rather than broadcasting the seed, is the general rule. The surface soil is often too dry for good germination and not infrequently high winds are apt to blow away many of the lighter seeds if sown by the "broadcast" method. In a dry climate the moisture conditions necessary for germination are controlled much better by drilling.

PERENNIAL CROPS

The hay and pasture crops that live longer than two years and that are best suited to Saskatchewan conditions are of two kinds—grasses and legumes. The best grasses are Western Rye Grass, Bromegrass, Kentucky Blue, Timothy, Red Top and Meadow Fescue. The best legume is Alfalfa.



Leading Perennial Crops for Hay and Pasture.

The yields of these at Saskatoon during each of the past four years have been as follows:—

Perennial Hay Crops

| <i>Variety</i> | 1912 | 1913 | 1914 | 1915 | (Lbs. per acre) <i>Average</i> |
|--------------------------|------|------|------|------|-----------------------------------|
| Alfalfa..... | 5847 | 3037 | 2985 | 2384 | 3563 |
| Western Rye Grass..... | 6300 | 2595 | 2283 | 2025 | 3301 |
| Brome Grass..... | 7400 | 2032 | 1733 | 1733 | 3234 |
| Kentucky Blue Grass..... | 3150 | 2867 | 390* | 1658 | 2016 |
| Timothy..... | 2800 | 1669 | 1930 | 1225 | 1906 |
| Red Top..... | 3700 | 1766 | 936 | 1158 | 1890 |
| Meadow Fescue..... | 3660 | 1391 | 726 | 858 | 1659 |

*Poor Stand.

From these figures it is very apparent that our best perennial crops are Western Rye Grass, Brome grass and Alfalfa.

Western Rye Grass (*Agropyron tenerum*), is a hardy, perennial, drought resistant, native grass. Owing to its short root stocks and more or less bunchy growth it is known locally as one of the "bunch" grasses. It is a strong, upright grower, having relatively few leaves and a rather stiff, straight stem. The seed is carried in the form of a spike or head.

Western Rye is one of the best grasses for general use in the Province. It is essentially a hay grass, but is often used for pasture. For the latter purpose, the quality of the pasture is much improved by



Field of Western Rye Grass

mixing with the rye grass a small quantity of alfalfa, Kentucky blue grass, or both.

If used for hay, rye grass should be cut as soon as the plants start to bloom, otherwise the forage will be found to be coarse and woody. It equals the yield of Brome grass in the drier parts. On the heavier soils of the more humid regions, it is approached in yield by Timothy. Seed forms readily on Western Rye grass and can be easily saved. The straw from the mature threshed hay is, however, of little value.

In sowing, 12 to 16 pounds of seed is used per acre. On account of the loose, bulky character of the seed, it is difficult to sow with the ordinary drill unless a small amount of some heavier seed, such as oats, is used to make it run out evenly. This difficulty causes many to sow it broadcast when otherwise drilling, the more desired method of sowing, would be followed. It produces from 300 to 500 pounds of seed per acre under favorable conditions.

Brome Grass (*Bromus Inermis*), is a hardy, drought resistant perennial grass that was introduced here from West Central Europe in the late nineties. It has a creeping root stock which sends up new shoots from its joints, thus forming a thick, even growth of grass and a dense mat of roots. It is this character which makes it at once drought resistant and hard to control. It is a strong, upright grower, having many leaves and a long, slender stem. The seeds are carried in the form of a loose, open panicle.

In the drier areas it vies with Western Rye for first place, usually yielding as much hay and more and better pasture. In many places it is considered a pest, owing to its persistence and the difficulty experienced in eradicating it. Its use is not recommended in the more moist areas, and only in the drier parts after its objectionable characteristic has been made known. The hay being more leafy is more difficult to cure than Western Rye grass, and it is looked upon with less favor by horsemen.

Brome Grass is sometimes sown in a mixture with alfalfa, either for hay or pasture. Used in this way it gives large yields, but on account of its tendency to become "sod bound" after being down two or three years, most men prefer to sow the more expensive alfalfa seed by itself. It is an excellent pasture grass, starting early and giving a good aftermath. Even when "sod bound" it produces a thick, though short, growth of leaves. The first crop is usually the best, and each succeeding one is lighter.

It can be "renewed" by ploughing shallow in the rainy season and cultivating lightly through the summer. The succeeding crop is generally a heavy one. The sod is broken up, or the grass eradicated, by plowing and "backsetting" or by plowing in the dry season after the grass has been pastured off or cut for hay. It forms seed freely, often producing 300 to 500 pounds per acre. The straw from the threshed hay is of fair feeding value. The same difficulties are experienced in seeding Brome as Western Rye and the same amount of seed is used per acre.

Kentucky Blue Grass (*Poa pratensis*), is, next to Brome grass,

one of the best to use in mixtures where pasture is desired. It has creeping root stocks and forms a close, dense mat on the surface of the soil. Ordinarily it does not grow high enough to give a good yield of hay. It should seldom be sown alone, even for pasture. When sown with Western Rye or Timothy, it increases the pasture value of these crops. It starts earlier than most of our other grasses, and continues to grow as long as the moisture in the soil permits. Being shallow-rooted, its growth is seriously checked by prolonged periods of drought. It is eagerly sought for by animals and is of high feeding value. When sown alone, 18 to 20 pounds of seed are used per acre.

Timothy (*Phleum pratense*), is a hardy perennial grass, but one that is unsuited for dry areas. It is a "bunch" grass, having a shallow root system, and does best on heavy soils in humid regions. It makes excellent hay for driving horses, but is not a good pasture grass except for use in mixtures. It is grown in parts of northern and eastern Saskatchewan, but there are few places where Western Rye does not surpass it in yield. The most favorable reports concerning this grass come from the Kerrobert and Moose Mountain districts and from North Western Saskatchewan.

The ease with which seed can be secured, its relative cheapness, the reputation of the hay for feeding to driving horses, and the adaptability of the crop to the heavy soils of the moist areas, are reasons for its popularity. In its favored climate it is often sown with Red Clover and Alsike for hay, the fields to be used later for pasture. The clovers have not demonstrated their usefulness here yet but alfalfa might very well replace them in this mixture in Saskatchewan. A small amount of timothy seed is often added to the hay or pasture mixture even in the drier parts. When sown alone 6 to 10 pounds of seed are used per acre.

Red Top (*Agrostis Vulgaris*), is essentially a low land pasture grass. It is suited to wet acid soils and to low lying valley lands. It is a hardy perennial having a creeping root. It, too, forms a close sod which stands tramping well. The growth is generally short and thick. The pasture is liked by all kinds of stock, but is not so palatable or so nutritious as Kentucky Blue. Alsike and White Clover are sometimes used with it for pasture. Western Rye and Timothy are also often mixed with it to give bulk to the pasture or for hay. Red Top should seldom be sown alone but if this is done 15 pounds or more of seed should be used per acre.

Meadow Fescue (*Festuca pratensis*), is used both for hay and pasture. In the drier parts it does not yield well. In moist seasons it compares favorably as a pasture grass with Western Rye but in dry ones it is not productive. It is very much inferior to Brome for pasture. It is a hardy perennial, but not drought resistant, and produces a fair yield the first year, but succeeding crops are often disappointing. For this reason it is not popular and when used it is in mixtures with other standard sorts. When sown alone, 20 to 30 pounds of seed are required to sow an acre.

Alfalfa (*Medicago Sativa*), is better suited to the climatic and soil conditions of Western Canada than any of the other legumes. Recent experimental work has demonstrated that it can be grown on almost any soil and in practically every part of the present settled portion of the West. It is a drought resistant perennial and certain varieties are very hardy. It gives good yields when properly cared for and the quality of the forage is unsurpassed. It makes an excellent soiling crop and furnishes good pasture for all classes of stock. It is, however, in common with clover and rape, apt to cause bloating, unless pastured with care. Animals should not be allowed on it when hungry nor when it is damp or frosted. Serious losses have occurred with cattle and sheep from this practice. The greatest value of alfalfa is in its use as dry cured fodder or hay.

The type that has been found most satisfactory is that having variegated blossoms. The best variety of this type is Grimm. Other good ones are Cossack, Baltic and Ontario Variegated. The yellow flowered type recently introduced is very hardy and may yet be found to have a place here. Most of the purple blossomed sorts are too tender for our winters.

Land intended for alfalfa should be free from all creeping rooted grasses, since these are among the crop's worst enemies. A stand of alfalfa can best be secured by sowing it after a hoed crop or on summer-fallow, but fall or spring plowing well worked down is quite satisfactory on all except very light soils and in very dry areas. Under these conditions it is desirable that alfalfa be seeded after a fallow or hoed crop.

The seed should be sown early in June, at from 2 to 15 pounds per acre, without a nurse crop, Inoculation is generally necessary and always advisable. A crop is seldom taken the first year, but the plants are usually clipped back in order to destroy the weed growth.

No cultivation should be given after seeding the first year. It is desirable that a growth of 10 to 15 inches be left to hold the snow and protect the young plants during their first winter. In the following and succeeding springs, surface cultivation with disc and harrows is commonly practised, the purpose being to form a mulch to conserve moisture and to aid in keeping down grasses and weeds.

The first crop should be cut when about 5 to 10 per cent. of the plants are in blossom, or immediately after the new sprouts appear at the base of the plant. Two crops are often taken in one year and occasionally three have been secured. In the drier areas it is probable that one crop is all that should be taken, since it is advisable to leave a considerable growth for winter protection, and this cannot be expected from a second crop. In the more humid sections of the West, two crops are generally taken from "dry lands" and three from irrigated lands each year.

Alfalfa is not suited to short rotations because of the high cost of the seed and the difficulty of plowing the alfalfa sod.

Native Grasses.—The native grasses are largely used for hay and pasture in all new districts. "Prairie wool" and "Slough hay" constitute the greater part of the forage used in the early history of



Championship Field of Alfalfa, On Farm of Nicholl Bros., at Sintaluta

prairie farms. When cut before it is ripe, this native vegetation makes very nutritious hay, but when allowed to become dead ripe, and particularly after slough hay has been frozen, the quality is very poor. The native hay usually includes, in addition to numerous grasses, a number of native legumes which increases the protein content of the whole, thus greatly improving it in quality. As long as the supply of native hay is abundant there is usually little need for sowing cultivated perennials. When cut at the right time and properly cured this hay does not differ essentially in feeding value from that produced from the cultivated grasses.

Mixtures for Hay and Pasture—Under some conditions mixtures of grasses, or of grasses and legumes, produce larger returns than any one of the constituent crops grown singly. Our experience at Saskatoon has not borne out this contention when the crop has been cut for hay. It is our opinion that where pasture is desired or even where both hay and pasture is expected that mixtures will give rather better satisfaction than single crops.

The following are among the mixtures that are likely to be found satisfactory in different portions of Saskatchewan:—

1. Western Rye 8 lbs. Brome 6 lbs.
2. Western Rye 10 lbs. Kentucky Blue 6 lbs.
3. Western Rye 10 lbs. Timothy 3 lbs.
4. Western Rye 10 lbs. Alfalfa 3 lbs.
5. Brome 8 lbs. Alfalfa 5 lbs.
6. Timothy 5 lbs. Alfalfa 5 lbs.

7. Western Rye 8 lbs. Kentucky Blue 4 lbs., Alfalfa 3 lbs.
8. Western Rye 5 lbs., Brome 3 lbs., Timothy 2 lbs., Alfalfa 3 lbs.
9. Western Rye or Brome 8 lbs., Red Top 4 lbs., Alsike Clover 3 lbs.

Those containing Alfalfa will be found most productive, but when used for hay two cuttings may be necessary in order to secure the greatest yield. The mixture containing Brome grass or Brome and Alfalfa are likely to give the best pasturage.

For northern and eastern Saskatchewan the mixture in which Western Rye predominates will be found best for hay, while those containing Western Rye and either alfalfa or Kentucky blue grass will be found best for pasture. On some suitable soils in this area Timothy may replace a part or all of the Western Rye.

Mixture No. 9 is recommended for low lying soils that are subject to flooding. It should also be found useful for slightly alkaline areas. Where the alsike is found to kill out the amount of the other crops should be increased and the alsike omitted.

Under favored conditions 1-2 lb. each of red clover, alsike, alfalfa, and perhaps white clover might replace an equal weight of the other seeds. While the clovers mentioned are not considered commercially successful here, it is probable that some of them may find a suitable environment on parts of the province where they have not yet been tried. They are likely to do best on heavy soils and in northern and eastern Saskatchewan.

BIENNIAL CROPS

The Biennial crops live two years or parts of each of two years and then die. To this class belong Red Clover, Alsike clover, White or Dutch Clover, Sweet Clover, Winter Rye and Rape. A discussion of Winter Rye and Rape will be found under "Annual Crops."

The True Clovers—Red, Alsike and White or Dutch—are very little grown in Saskatchewan. They are not well suited to our climate. None of them are drought resistant, and most strains of red and alsike are not hardy enough to live through our winters. Their best use at the present time is to form a small proportion of mixtures for hay and pasture in the more moist parts of the province. White or Dutch clover is hardier and is much used for lawn grass purposes in a mixture with Kentucky Blue grass. Alsike has seemed rather hardier than Red Clover with us. It is rather better, also, for low lying soils. Some strains of Red Clover recently introduced from Siberia promise greater hardiness than any heretofore tried. White clover is so short that it is unsuitable for hay purposes. It is, however, sometimes used with standard grasses to form permanent pastures. These crops should never be sown alone in Saskatchewan except for experimental purposes. Under these conditions 10 to 12 pounds of red clover, 7 to 10 of alsike and 6 to 8 of white clover per acre is sufficient to sow.

Sweet Clover (*melilotus Alba*), is a tall growing, biennial plant, having coarse branching stems which bear white blossoms, and except when young, carry relatively few leaves. It is a "legume," but not a real clover. Nevertheless it has the power, in common with clover, alfalfa and other legumes, when inoculated with suitable bacteria, to gather nitrogen from the air.



Sheaves of Alsike Clover and Sweet Clover, and Single Plants of Red Clover and Alfalfa

Sweet clover has several very undesirable qualities. It is bitter, coarse, hard to cure, of doubtful value as hay, apt to become an impurity in Alfalfa seed, and in waste places may become a weed.

Among the redeeming qualities of Sweet clover are, first, its suitability to the climate; second, its high productivity; third, its biennial character; fourth, it is a "legume," fifth, it may be grown as an intertilled crop, and sixth, it does well on light soils that are inclined to drift and where other forage crops often do very poorly.

Sweet clover grows nearly a month before corn is up and generally remains green for a month after corn freezes in the fall. It is seldom seriously injured by spring or fall frosts. It is a crop peculiarly suited to the short growing season and the severe temperature conditions of Western Canada. At Saskatoon, Sweet clover, when sown in rows, has yielded more than any other forage crop, and rather more than corn during the last two seasons.

In most seasons the crop will grow from 1 to 3 feet high the first year. This may be either pastured off or cut for hay as desired. The following year the first crop is generally ready to cut the latter part of June, and the second crop the latter part of July. From 4 to 15 pounds of seed, depending upon the width apart of the rows, should be used per acre.

At present the probable usefulness of Sweet Clover in Western agriculture seems to lie in its value as: first, a two season pasture crop; second, a possible hay crop if cut early; third, a possible silage crop, which, either alone or mixed with Winter Rye or Corn, may be found of value. If use can be made of the coarser growth from the wide rows intertilled, this method of growing will probably be found the best under semi-arid conditions. It will at the same time produce some of the desirable effects of an intertilled crop.

It should not be forgotten, however, (1) that Sweet Clover is bitter, particularly in the later stage of its development, (2) that it is coarse in texture and therefore unpalatable, and in the mature condition relatively indigestible, (3) that it is hard to cure on account of its large moisture content, (4) that it may become an undesirable plant in alfalfa seed growing centres, and (5) that much more information must be obtained concerning it before it can be either rejected as being worthless or as being more harmful than beneficial, or accepted as a forage crop suitable for general use.

Sweet clover has many good qualities and some very bad ones. If the latter can be overcome the crop will have a very important place in our agriculture. If they cannot be overcome it will occupy only a very limited sphere of usefulness. Investigations now under way should give such added information as is necessary to determine the relative value of Sweet Clover among our cultivated crops.

ANNUAL CROPS

The best annuals for hay, pasture or "green feed" are Oats, Pease and Oats mixed, Barley, Winter Rye. The millets, Corn and Rape.

Oats in Saskatchewan are used for hay to a greater extent than any of the other cereals. On many wheat farms where native hay is not available, oat hay or oat sheaves and straw furnish the only roughage the working horses receive. For oat hay for horses the crop should be cut in the early dough stage. If to be used for cattle, cutting in the early milk stage is preferable. This hay is found to be quite satisfactory, although when exclusively fed and particularly if it is quite mature, digestion troubles are sometimes experienced with horses. For cattle and sheep oat hay is an excellent forage. An average yield of 2 1-2 to 3 tons of dried forage may be expected from fallowed land of normal productiveness. Lower yields than this of course will be gotten from second and third crops after fallow. The standard grain varieties are the most productive of forage.

Pease and Oats—the earlier varieties of pease, mixed with the late or standard varieties of oats, produce a richer and often a heavier crop than oats alone. This mixture is one of the most valuable for soiling purposes, and it has been ensiled with considerable success at Lacombe, Alberta. It is also used for both hay and pasture. Arthur peas and Banner, Victory and Abundance oats mix well together. The amount of peas used varies from 1-2 to 1 bushel mixed with 2 bushels of oats. The heavier and richer the land the less peas should be used. The larger proportion of peas is preferred if the price is not too high. This mixture is more popular with dairymen than with any other class of stock men.

Barley as a hay crop is not so popular as oats, but in areas where weeds, such as wild oats, are troublesome, this crop is often used. It ripens earlier than oats and is, therefore, of more value as a cleaning crop. The early varieties can often be cut before wild oats mature enough to drop off. It yields rather less than oats. For forage the early maturing, beardless varieties, such as "Success," which is hulled

but beardless, and "White Hulless," which is both hulless and beardless, are best.

Winter Rye is but little used as a forage crop, although it furnishes earlier pasture and soilage than any other crop. It is used to a small extent for hay. Its greatest value as forage is in its earliness. It yields about as much as oats. Many other crops yield a better quality of hay but none are ready for use as early in the spring. When used for hay, rye must be cut early or the stems become stiff and unpalatable. Western strains of this crop as perfectly hardy if given a reasonable chance. N. D. No. 959 is one of the hardiest varieties. When sown early enough rye can be pastured lightly in the fall as well as in the spring. When green it will taint the milk of dairy cattle unless fed only immediately after milking time. It should be sown as soon as possible after the second week in August at the rate of 1 bushel per acre. Spring rye is not as productive or as good a hay crop as oats, except on light soils. On these it may be found useful for hay.



Leading Annual Crops for Hay and Pasture

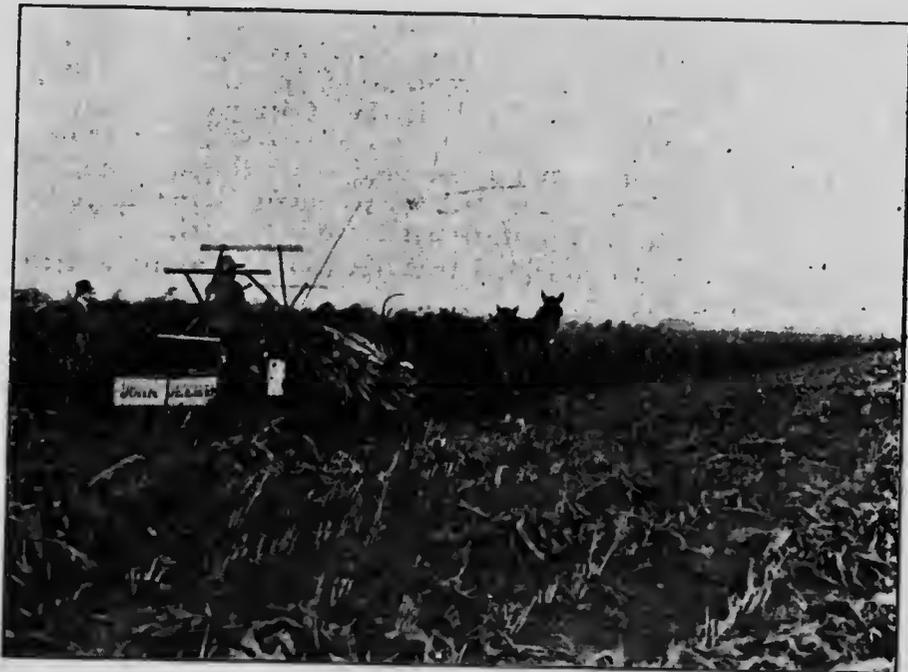
The Millets are annual grasses that in Western Canada are used only for forage purposes. They are quick growers, large yielders, drought resistant, and very sensitive to low temperatures. They grow slowly in the cool soil of early spring and are easily killed by fall frosts. They are not popular, for the reason that they are annuals and "warm climate" crops. They are used as "catch crops" or crops to substitute for other forage that promises partial failure. The annual yield on fallowed land at Saskatoon is about equal to that of oats.

There are three types commonly grown—the foxtail millets, the Barnyard millets and the Broom corn or Proso millets. The first is earlier and therefore better suited to Western conditions. The leading varieties of foxtail millet are Hungarian, Siberian and Kursk. The seed is usually sown with a grain drill at from 20 to 30 pounds per acre

late in May or early in June. The crop may either be pastured off or cured as hay. Being very leafy, curing is sometimes difficult. The hay is quite suitable for all classes of stock, but is fed mostly to cattle. If left too long before cutting, the forage is said to have an undesirable action on the kidneys of horses. When well cured it is rich in feeding value and nutritious.

Corn (*Zea Mays*) is very little grown for forage and even less for grain in Western Canada, although for the former purpose it is one of the most important crops we have. Under good management it yields from 8 to 20 tons or more per acre, green weight. It is an excellent soiling crop, is our best silage crop and even its dry cured fodder makes good stock food. The varieties used are chiefly of the flint type, although "North Western Dent" is a favorite and very worthily so. Of the flints, "Compton's Early," "Dakota White flint" and "Longfellow" are among the heaviest yields. "Free Press," "Gehu" and "Quebec Eight Rowed" are earlier but yield less forage.

In Saskatchewan corn is usually planted about the last ten days in May. Since the young plants are very tender and suffer severely from the lightest frost, the aim is to sow it as soon as possible after danger from spring frosts is past. Rich, warm, loamy soils should be chosen for corn.



Corn Harvesting on University Farm

When planted for forage corn is usually planted in drills, although hill planting is not uncommon. The former method gives more forage

but does not control weeds so well. When sown in drills 36 to 42 inches apart, 20 to 30 pounds of seed is necessary. If planted in hills, 15 to 20 pounds is sufficient.

Until the plants are 6 to 8 inches high, surface cultivation with light drag harrows should be practised in order to keep down weeds and maintain a soil mulch. Intertillage either with the one or two horse cultivator is, of course, necessary thereafter until the plants are high enough to thoroughly shade the ground. Such tillage serves to maintain a good mulch after rains and to lessen evaporation during the warm dry season.

If the crop is to be used for silage it is usually harvested with a corn harvester and drawn as soon as possible to the ensilage cutter; if used for dry fodder, it is usually stooked in the field or near the buildings; when used for soiling it is, of course, cut green and fed in the green state.

In any case it is desirable that the crop be harvested before it is frosted. Very green corn should be allowed to wilt before being hauled to the silo, since an excess of water in the silage tends to make it sour. The harvesting is usually done the last few days of August or the first week of September.

Rape (*Brassica Napus*) is a biennial crop that for forage purposes is used as an annual. It is a vigorous grower and gives a large yield of green forage, which is used altogether for soiling or pasture. Yields as low as 10 and as high as 30 tons, green weight, have been secured from fallow land. The leaves contain so much moisture that they cannot be satisfactorily cured. It is used principally as late summer and early fall pasture for cattle, sheep and hogs. Like turnips, it will taint the milk of dairy cattle unless used in small quantity and immediately after milking. Rape will stand quite heavy frost without injury, often giving good pasture until late in the fall.

It is usually sown in drills 2 to 3 feet apart on well prepared land. The stock pasturing on the field will return considerable fertility to the soil and pack it as well. When sown in drills, intertillage is necessary.

There is some danger to sheep and cattle from bloat unless they are gradually accustomed to the rape pasture. This danger is greatest when there is dew on the plants and after it is frozen. Three to four pounds of seed is ample for an acre.

SOILING CROPS

The soiling crops that are best suited to the climate and soil of Saskatchewan are, in order of their availability for use, Winter Rye, Alfalfa (first cutting), Oats or other grain crops, or Peas and oats, Alfalfa second cutting, Corn and Rape. These crops can be made to produce a succession of either green feed or pasture from May 1st to November. The oats, or peas and oats, and rape, may be sown as needed and can be made to provide feed at times when the other crops are not at their best.

Mixtures of Annual Crops for Hay and Pasture—The most commonly used mixture is peas and oats, but barley and oats, and barley, oats and spring rye, are sometimes grown. The two last mentioned are usually used for pasture purposes only. A very heavy yielding pasture mixture is made up of peas 60, Oats 34, Millet 2 and Rape 2. The rape should be omitted if the pasturage is desired for dairy cattle.

SUMMARY

1. The best perennial hay crops for general use in Saskatchewan are Western Rye Grass, Brome grass and Alfalfa, either singly or in combination. The best annual hay crops are Oats, Peas and Oats, Beardless Barley and Winter Rye.
 2. Crops that are of secondary importance for hay are Timothy, Meadow Fescue and the Millets. Some that may later become useful are the clovers—Red and alsike, and possibly Sweet Clover.
 3. The best crops for permanent pasture are Brome grass, or Brome grass and Alfalfa mixed. Less productive though useful pasture mixtures are Kentucky Blue grass or Red Top mixed with Timothy and Alfalfa.
 4. The best crops for annual pasture are Winter Rye, Oats, or Peas and Oats, or Oats and Barley and Rape. Sweet clover, a biennial, *may become* a useful pasture plant, particularly on light soils.
 5. The best soiling crops in the order of their possible readiness for use are Winter Rye, Alfalfa, Peas and Oats, Corn and Rape.
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FORAGE CROPS IN SASKATCHEWAN

Table Giving General Information Regarding Those Commonly Used

| Crop | Time of Planting | Approximate Cost of Seed | Acres Rate of Seeding | APPROXIMATE YIELD PER ACRE ON NORMALLY FERTILE SOIL | | |
|--------------------------|-----------------------------|--------------------------|-----------------------|---|-----------------|------------------|
| | | | | Air Dry Weight | Green Weight | Dry Matter |
| Alfalfa (Grimm).. | Early June | Per Lb. 20c to 60c | Lb. 2 to 15 | 1 1-4 to 1 5-8 tons | 5 to 6 1-2 tons | 2,200-2,800 lbs. |
| Western Rye Grass..... | Early June | 10c to 15c | 12 to 16 | 1 1-2 tons | | 2,400-2,800 lbs. |
| Brome Grass..... | Early June | 10c to 15c | 12 to 16 | 1 1-2 tons | | 2,400-2,700 lbs. |
| Kentucky Blue Grass..... | Early June | 15c to 20c | 18 to 20 | 1 ton | | 1,500-1,800 lbs. |
| Timothy..... | Early June | 7c to 11c | 6 to 10 | 1 ton | | 1,700-1,800 lbs. |
| Red Top..... | Early June | 25c to 35c | 15 to 20 | 1 ton | | 1,800-1,900 lbs. |
| Meadow Fescue..... | Early June | 20c to 25c | 20 to 30 | 1 ton | | 1,700-1,800 lbs. |
| Oats..... | Last half May or as needed | 1c and up | 1 1-2 to 2 1-2 bus. | 2 1-4 to 2 3-4 tons | 9 to 12 tons | 3,800-4,800 lbs. |
| Peas and Oats..... | Last half May or as needed | Peas 2c and up | 100 to 125 | 2 1-4 to 2 3-4 tons | 9 to 12 tons | 3,800-4,800 lbs. |
| Beardless Barley.. | Last half May or as needed | 1 1-2c and up | 70 to 90 | 2 to 2 1-2 tons | 8 to 10 tons | 3,300-4,300 lbs. |
| Winter Rye..... | Last half Aug. or as needed | 1 1-2c and up | 1 bushel | 2 1-4 to 2 3-4 tons | 8 to 11 tons | 3,800-4,800 lbs. |
| Hungarian Millet. | Late May or early June | 3c to 6c | 20 to 30 | 2 to 2 3-4 tons | 7 to 11 tons | 3,000-4,500 lbs. |
| Corn..... | May 20 to 30 | 4c to 10c | 12 to 30 | 3 to 4 1-2 tons | 10 to 15 tons | 3,600-5,000 lbs. |
| Rape..... | May 20 to June 20 | 8c to 15c | 4 to 5 | 2 1-2 to 3 1-4 tons | 12 to 18 tons | 4,000-5,000 lbs. |
| Sweet Clover..... | June | 20c to 30c | 4 to 15 | | 8 to 14 tons | |

x Yields for annuals are from fallowed lands.

