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EC102 Revised 1933 Permanent and Temporary Pastures for Nebraska

P. H. Stewart
D. L. Gross

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P. H. STEWART AND D. L. GROSS

About 25 million acres of land in Nebraska are used for pasture. This is approximately 50 per cent of the area of the state. Although pastures are a very important source of income, they have not received the attention and study that they deserve. Good pastures produce meat and milk at a lower cost than grains. There is an opportunity to increase the returns from pasture lands by managing them in a more systematic and thoughtful way.

KINDS OF PASTURES

Nebraska’s pastures may be divided into three types:

(1) Permanent pastures of tame grasses and legumes.
(2) Permanent pastures of native grasses.
(3) Temporary pastures of such crops as rye, sudan, sweet clover and rape.

The choice between these three types of pasture for any particular farm depends on the location in the state, the kind of soil, and the type of farming being carried on. This circular will discuss briefly the different types of pasture and their value and management in different parts of Nebraska.

PERMANENT PASTURES

There are certain conditions under which the use of permanent pasture mixtures are practical and profitable.

Some fields in eastern Nebraska now being used for permanent pasture are weedy and the growth of grass is thin and unsatisfactory. Where such fields are satisfactory for cultivation, it would seem advisable to break them out and use other fields for either permanent or temporary pasture. On many farms there are lowlands subject to flooding, or thin, eroding, or sandy areas now under cultivation that might better be seeded down. Low priced grain crops may make it more profitable to seed down a higher percentage of the land, using it for pasture and in the meantime rebuild its fertility for later cropping.

Figure 1 shows the state of Nebraska divided into four areas on the basis of the suitability of the region for certain pasture crops.

AREA I

Area I, or the eastern Nebraska section, is the most favorable part of the state and in this area permanent pastures of tame grasses and legumes may be expected to prove very satisfactory. This area has more available moisture due to more rainfall and less evaporation. The
soil for the most part is loess in origin which is very favorable for the production of grasses and legumes.

Due to relatively favorable climatic and soil conditions in Area I, a nurse crop can be used with reasonable safety when seeding pasture mixtures. Hot winds are less prevalent in Area I than in the rest of Nebraska. Area I as a whole gets more precipitation than the rest of the state.

Mixture for average eastern Nebraska conditions and for particularly favorable irrigated or subirrigated lands in Areas II and IV:

- Brome grass: 7 pounds
- Orchard grass: 4 pounds
- Timothy: 3 pounds
- Red clover: 4 pounds
- Sweet clover: 4 pounds
- Meadow fescue: 3 pounds
- Total: 25 pounds

Approximate cost per acre for mixture, $2.00 to $3.00.

**Special Conditions in Area I.**—Where the land is wet and more or less swampy, 4 pounds of red top and 4 pounds of alsike clover should be substituted for the red clover, the meadow fescue and a part of the brome grass. If the land is covered more or less with timber, the percentage of orchard grass in the mixture should be increased with a proportionate decrease in each of the other kinds of seed, except meadow fescue.

**AREA II**

Area II is less favorable for pastures and general crop production than Area I due to lower rainfall, more prevalent hot winds, and, in certain parts of the area, a some-
what more drouthy soil. Permanent pastures of cultivated grasses and legumes can be used with fair success in Area II altho, on the whole, native pastures may be expected to more nearly equal the tame mixtures than in Area I.

A permanent pasture mixture suggested for average land in Area II is as follows:

- Brome grass: 8 pounds
- Orchard grass: 6 pounds
- Sweet clover: 5 pounds
- Meadow fescue: 3 pounds
- Timothy: 3 pounds

Total: 25 pounds

Approximate cost for mixture per acre, $1.80 to $2.80.

**Special Conditions in Area II.**—Should the land be wet and rather swampy, substitute 4 pounds of alsike clover for the sweet clover and 4 pounds of red top for the brome grass. In case the land is timbered sufficiently to be shaded, increase the amount of orchard grass in the mixture and reduce the others except meadow fescue accordingly.

**AREA III**

**Area III** is the sandhill area where, due to the generally prevailing light sandy soil, it is, for the most part, not advisable to attempt to replace native with tame grasses. However, there are excellent possibilities of using tame grass and legume mixtures on some of the flats where the water table is at a satisfactory depth. The seeding of red and alsike clover has greatly increased the yield of such grasses.

Fig. 2.—The sandhill area of the state is largely a pasture section.
areas. Timothy and red top may be used also. Legume crops have not only increased the yield from sandhill areas to which they are adapted but due to their protein content they have also increased the value of the feed. Red and alsike clover can be satisfactorily grown where the water table is not lower than 3 feet during the growing season.

**AREA IV**

**Area IV** represents the hard land areas of southwestern and western Nebraska. On the uplands of southwestern Nebraska, the hot summer weather coupled with hot winds and the resulting lower effective rainfall, makes the use of cultivated grasses for permanent pastures less satisfactory than native grasses. On certain unusually favorable valley lands, tame grass mixtures may be used with fair to good success. Under irrigation, excellent results may be had from the use of permanent pasture mixtures and under such conditions their use should be increased. For such unusually favorable irrigated or subirrigated areas in Area IV, the mixtures suggested for Area I or Area II should be satisfactory.

Crested wheat grass is the most promising tame grass for Area IV. This grass is being used to some extent in the Northern Great Plains area although definite information as to its exact use and value is not yet at hand. It should be drilled into a well prepared, well packed, seedbed in the early spring. Eight to ten pounds of seed per acre is suggested. Seeding on clean corn land or if spring blowing is not too serious a problem, putting it on land which was summer fallowed the previous year, offers the most promise. Western wheat grass and slender wheat grass probably rank next to crested wheat grass for the panhandle area of Area IV.

**Some Characteristics of Grasses and Legumes Suggested for Nebraska Mixtures**

**Brome Grass** (Bromus inermis). Brome grass is also known as “smooth brome”, “Hungarian brome”. It is almost impossible to sow seed of brome grass thru a mechanical seeder of any kind. Hand seeding is therefore usually necessary. Brome grass, like blue grass, starts growing very early in the spring and grows very late in the fall. Of all our cultivated grasses, it comes the nearest to growing through our hot, dry, trying summers. It is very palatable, its roots are very abundant and deep. It is highly stoloniferous and makes a thick, tough sod. While not a very quick starter from seed, especially under drouthy con-
ditions, it, like blue grass, is very aggressive. When left for several years, it leaves the soil full of humus when the field is broken up. It will grow on somewhat sandy soil, but is inferior in this respect to red top. In buying brome grass, look out for the seed of cheat, quack grass, and soft brome, also known as military grass or downy brome. Quack grass is an exceedingly dangerous weed and is very often present in northern grown brome seed.

**Orchard Grass** (*Dactylis glomerata*) is a bunch grass and for this reason is not well adapted for pastures unless used in mixtures with sod forming grasses. It is not adapted to sandy soils. It will grow better in shaded areas than any other grass and for this reason should be used to a greater extent in timbered pastures. Orchard grass is inclined to become somewhat unpalatable when it heads out. It is a long-lived, deep-rooted grass and is quite drouth and heat resistant. The seed is of medium size and will flow through a drill in a reasonably free way when used in a mixture.

**Timothy** (*Phleum pratense*) is so well known that it needs little description. It is best adapted to eastern Nebraska although it will grow in unusually favorable areas in western Nebraska. It comes on the most rapidly from seed of any of the cultivated grasses and because of this habit and the cheapness of the seed, it should be used freely in pasture mixtures wherever it is adapted. It is a perennial, that is, plants live for several years.

**Kentucky Blue Grass** (*Poa pratensis*) is the slowest of the common grasses in starting from the seed. While slow to start, it is the surest to crowd out all other grasses and get final possession of the field in regions where it is adapted. It is, therefore, sown sparingly in mixtures and is seldom sown alone. In eastern Nebraska it will usually work into pastures even though it is not sown, providing conditions are favorable for it. The seed is rather expensive and usually of poor germinating power. It shares with brome grass the distinction of beginning growth the earliest in the spring and keeping it up the latest in the fall. It, however, differs greatly from brome in that it is the poorest grass we have to grow in July and August. It, like brome grass, is very palatable. While the root system is shallow, the plant is extremely stoloniferous and makes a well-nigh perfect sod, especially on lawns. It tends strongly to pair with white clover and like this plant invades pastures and meadows of other plants and takes possession. Kentucky blue grass now makes up most of
the pastures in Area I. Many of these can be improved by following out the suggestions given on the last pages of this circular relative to improving thin weedy pastures.

**Meadow Fescue** (*Festuca elatior*) is often incorrectly known as English blue grass. It is fairly resistant to drouth and heat, but does well where there is plenty of water. It starts rapidly from seed, ranking next to timothy in this regard. It is not adapted to sandy soils. Meadow Fescue will grow where there is considerable shade. It is not long lived and usually disappears in mixtures in four or five years.

![Pasture grasses of Nebraska](image)

**FIG. 3.**—Pasture grasses of Nebraska. (1) Brome grass. (2) Orchard grass. (3) Meadow fescue. (4) Timothy. (5) Kentucky blue grass. (6) Tall meadow oat grass. (7) Redtop. (8) Western wheat grass. (9) Slender wheat grass.
Red Top (Agrostis alba) is well adapted to wet lands but will also do relatively well on poor thin soils. It is used chiefly where more palatable and otherwise more desirable grasses will not do well. It becomes rather unpalatable as it reaches maturity. This grass pairs well with alsike clover for swampy wet fields. Seed is small and usually not expensive.

Red Clover (Trifolium pratense) is the great biennial pasture and hay legume of eastern United States. During the plant’s natural life time (two years) it stands pasturing better than does alfalfa. It reseeds itself somewhat and so tends to persist indefinitely in a not too closely grazed pasture. It is a rapid starter from the seed and furnishes much food to stock and nitrogen to the soil in a very short time. It is hence popular in eastern Nebraska mixtures and helps the mixtures to gain and hold possession until other plants in the mixture, like blue grass and white clover, can get a firm foothold. When pastured, in pure stands, red clover may cause bloat but there is little danger of this when used in mixtures.

White (Dutch) Clover (Trifolium repens) is a justly famous perennial, leguminous pasture plant. It is of little value for hay but is very persistent and valuable as a pasture ingredient. It is the only common forage legume which is stoloniferous. It strongly tends to pair with blue grass. Like blue grass, it starts from the seed somewhat slowly but when once started shows remarkable persistence. If moisture is present it is aggressive in pastures. Its roots are very shallow and its stems are prostrate. In series of wet years, it sometimes gains so much on the blue grass that it may cause trouble from bloating and slabbars. In the area where it is adapted, white clover usually comes in without being seeded.

Alsike Clover (Trifolium hybridum). This legume is almost intermediate in all particulars between red and white clover. It is good either as a hay or pasture crop. It is especially adapted to low, wet, over-flowed soil. It seems to do rather well on somewhat thin soil. It thrives on almost exactly the same situations to which red top is adapted, so the two plants tend to pair. If used alone for pasture (unmixed) it may cause slabbars in horses and in rare cases severe skin troubles. In mixtures it is usually entirely safe. It is a perennial crop enduring five to six years under favorable conditions.

Alfalfa (Medicago sativa) is Nebraska’s outstanding hog pasture. It is a common opinion that due to the danger of bloat, alfalfa is dangerous to use for cattle and sheep. A
few Nebraska farmers are using alfalfa pasture for cattle, this usually being in conjunction with a full feed of grain and hay. Results at the North Platte Station, where full fed heifers were pastured on alfalfa, have been satisfactory. (See Nebraska Bulletin 281.) Some authorities have suggested that alfalfa may be safely used as a dry season pasture if the second crop is pastured. There is a possibility that under proper management alfalfa can be used much more extensively as a cattle pasture in Nebraska.

Crested Wheat Grass (Agropyron cristatum) was brought in from the dry cold plains of Russia and Siberia. It is closely related to slender wheat grass (agropyron tenerum) and western wheat grass (Agropyron smithii) which are common wild grasses of western Nebraska. The seed of slender wheat grass can be purchased commercially but seed of western wheat grass (go-back grass) is not available commercially. In tests at Great Plains experiment stations, crested wheat grass has shown some promise as a pasture grass and seed producer compared to other cultivated grasses. It starts to grow very early in the spring and grows until very late in the fall. It tends to become somewhat dormant during hot dry weather at which time sudan grass or native pasture should be used to supplement it. Seed of crested wheat grass is now available in considerable quantities. It is worthy of further testing, particularly in the panhandle area of Nebraska.

TEMPORARY PASTURES

Temporary pastures consisting of one or more of such crops as sudan grass, sweet clover, fall rye, and rape can be used throughout the state. Due to the relatively more favorable conditions in Region I, such crops can be expected to have a greater carrying capacity in that area than in the rest of the state. However, except in Region III, where it is not advisable to plow the land, due to the danger of the sandy soil blowing, temporary pasture crops can be used with good results, and, on the whole, may be expected to supply pasture at least equal to that secured from permanent pastures under similar conditions.

On farms where the entire area is suitable for cultivation, some use of temporary pasture crops is more practical than the use of only permanent pastures. Usually, however, nearly every farm has certain fields which are suitable only for permanent pastures. These should be supplemented by temporary pastures.
It is possible to use a combination of temporary crops in such a way as to have excellent pasture for about seven months of the year. Figure 3 shows the relative amount and period of pasturage supplied by the common temporary pasture crops for a season under average eastern Nebraska conditions.

It is possible to use a combination of fall rye, sudan grass and sweet clover in such a way as to have a fairly uniform amount of good pasture available from late April until early October. In order to do this, however, it is necessary to use second year sweet clover to which some farmers, particularly those in northeastern Nebraska, object because of the danger of losses from bloat. Unless sweet clover is used, the only other alternative is to have sufficient permanent pasture available to fill in the June gap between

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**Fig. 4.—Eastern Nebraska's pasture calendar.** The height of the line indicates the relative amount of pasturage while the length shows the period of pasturing.
fall rye and sudan grass. A great many farmers, however, use sweet clover pasture successfully. In order to carry out the rye, sudan, sweet clover combination, it is necessary to have three fields and to follow a rotation as suggested in Table 1.

**TABLE 1.—Plan for temporary pasture combination of fall rye, sweet clover, and sudan.**

<table>
<thead>
<tr>
<th>FIELD I</th>
<th>FIELD II</th>
<th>FIELD III</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Year</strong></td>
<td><strong>First Year</strong></td>
<td><strong>First Year</strong></td>
</tr>
<tr>
<td>Fall rye, plow July 1st and seed to sudan.</td>
<td>First year sweet clover. (In Area I, use nurse crop.)</td>
<td>Second year sweet clover. (In Area I, use nurse crop.)</td>
</tr>
<tr>
<td><strong>Second Year</strong></td>
<td><strong>Second Year</strong></td>
<td><strong>Second Year</strong></td>
</tr>
<tr>
<td>First year sweet clover. (In Area I, use nurse crop.)</td>
<td>Second year sweet clover. Plow in August and seed fall rye.</td>
<td>Second year sweet clover. Plow in August and seed fall rye.</td>
</tr>
<tr>
<td><strong>Third Year</strong></td>
<td><strong>Third Year</strong></td>
<td><strong>Third Year</strong></td>
</tr>
<tr>
<td>Second year sweet clover. Plow in August and seed fall rye.</td>
<td>Fall rye, plow July 1st and seed to sudan.</td>
<td>Fall rye, plow July 1st and seed to sudan.</td>
</tr>
</tbody>
</table>

**SUGGESTED RATES OF SEEDING FOR TEMPORARY PASTURE CROPS**

<table>
<thead>
<tr>
<th></th>
<th>Eastern Nebraska</th>
<th>Central Nebraska</th>
<th>Western Nebraska</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rye</td>
<td>1½–2 bu.</td>
<td>1 bu.</td>
<td>1 bu.</td>
</tr>
<tr>
<td>Sweet clover</td>
<td>15 lbs.</td>
<td>12 lbs.</td>
<td>12 lbs.</td>
</tr>
<tr>
<td>and oats</td>
<td>1½ bu.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sudan</td>
<td>25–30 lbs.</td>
<td>25 lbs.</td>
<td>20 lbs.</td>
</tr>
</tbody>
</table>

Where sweet clover is objected to and only fall rye and sudan are used, it is possible, in Area I, to use but one field growing both fall rye and sudan on the land the same season. However, in all other areas of the state and even in Area I in dry years, it is advisable to use two fields growing sudan on one field and fall rye on the other. Earlier pasture can be secured from both crops when they are handled in this way since seeding need not be delayed on account of the previous crop on the field.

In that part of Area I north of the Platte river and particularly north of the Elkhorn river, rape seeded with small grain usually makes considerable excellent fall pasture for hogs, sheep, and cattle. It has a tendency to taint the milk if used for dairy cows. Rape does best in rather cool moist weather.
It is a common observation that pigs, calves, and milk cows do very well when grazing good rye pasture. Investigational work shows that rye when 10 to 16 inches high, on the basis of dry weight, contains from 28 to 30 per cent protein. Other grasses when immature are likewise relatively high in protein content. The proper management of live stock so as to make the greatest use of grasses when they have a high feeding and palatability value is worth careful consideration by the live stock farmer.

SUGGESTIONS FOR SEEDING PASTURES

All small seeded crops require carefully prepared, well-pulverized, well packed, moist seedbeds. When seeding pasture mixtures, it is often advisable to sow on land plowed the previous fall, wherever fall plowing is practical. Otherwise the land should be plowed early in the spring and the mixture seeded at spring wheat or oat seeding time. Drilling is preferable to broadcasting if a drill which will handle the seed is available. Mixtures can be hand seeded in which case it is usually advisable to broadcast one-half of the seed and then sow the remainder by crossing the field at right angles to the first seeding, thereby avoiding skips. The large light seed, like brome grass, which does not feed through a drill or seeder well, may be sown by hand.

A roller or land packer is an excellent tool to use just before and again after seeding, thereby helping to pack the seedbed.

In Area I, particularly north of the Platte river, a nurse crop of early oats or barley can be used. It is often a good plan to reduce the rate of seeding of the nurse crop to about one-half that used for ordinary grain production.
In other areas of Nebraska, except under irrigation, it is ordinarily better to sow without a nurse crop of any kind.

In Area I, seeding pasture mixtures in the fall, if properly done, is, on the whole, more satisfactory than spring seeding. Fall seeded fields are less likely to be smothered out by weeds. Where fall seeding is contemplated, it is suggested that the land be plowed immediately after harvest in July. It should then be worked as may be necessary to prevent weed growth and to prepare a well-pulverized, well-packed seedbed. Seeding should be done from August 15th to 25th if moisture conditions are suitable, although it may be delayed until September 1st if necessary, and even somewhat later in the southern part of Area I. It is sometimes advisable, particularly if the land is somewhat sandy, to seed oats or barley with the mixture. These spring grains, of course, winter-kill but they afford considerable protection from blowing.

In buying seed, it is advisable to purchase a good grade of seed and to beware of getting noxious weeds. The seed analyst at the Capitol Building will test seeds free of charge.

**IMPROVING THIN WEEDY PASTURES**

Too early and too close grazing which reduces the food reserves normally stored in the roots of grasses has in many cases weakened the pasture plants, allowing weeds to come in. Such over-grazed pastures can be benefited by:

1. Allowing the grasses to make a considerable growth before live stock is turned on them and then grazing them more lightly for a season or two.
2. Disking the land early in the spring as soon as the weather permits and drilling or broadcasting and harrowing in a pasture mixture.
3. Mowing the weeds at the proper time to kill or to weaken them to the greatest extent.

In order to allow permanent pastures to “rest up” and rebuild their root food reserves, it is usually necessary to make use of some of the temporary pastures such as fall rye, sweet clover or sudan as has already been discussed. This is an essential factor if weedy pastures are to be improved.

If seed is put onto a thin pasture, it is not likely to “catch” unless covered by drilling or by first disk ing the land, then broadcasting and harrowing the seed. Even then results are very likely to be disappointing unless live stock are kept off the pasture until the young plants get established. This again calls for some supplementary pasture.
FIG. 6.—Thin, weedy pasture often may be improved by drilling sweet clover in them in the early spring.

The best time to mow weeds in order to kill them varies with the different species. Usually weeds will be most seriously injured if they are cut at about the time the first flower buds appear. Buckbrush, according to Kansas investigators, can be best eradicated by mowing in the early part of May at Manhattan which would probably mean about May 20th to 25th in eastern Nebraska. Such common pasture weeds as iron weed and blue vervain should be cut about July 1st at Lincoln. In general, the reserve food in the roots of plants is lowest at about the time perennial weeds reach the full leaf stage. This is a good time to cut them.