Form S-21
200 12/42 AGRICULTURAL EXTENSION SERVICE
UNIVERSITY OF MINNESOTA - U. S. DEPARTMENT OF AGRICULTURE
UNIVERSITY FARM ST. PAUL MINNESOTA

MINNESOTA PASTURE PROGRAM

Although pasture contributes much of the feed of most livestock on the average Minnesota farm, the amount of feed thus provided is often much less than it should be if the livestock is to be maintained in the most healthy condition and maximum farm profits are to be realized. The margin of profit in most phases of livestock production is largely dependent upon the extent to which good pasture is utilized in its production. The returns above feed costs are much greater during the productive pasture months than during the remainder of the year.

There are great differences in Minnesota pastures. Many have become so unproductive due to overgrazing, declining soil fertility, drought conditions and the general lack of proper management that little or no profit results from their grazing. There are pastures in Minnesota that do not return nearly as much milk, beef, pork and mutton as they should; while on the other hand, there are pastures produced under good pasture programs that are producing sufficient quantities of palatable nutritious vegetation, that production of livestock and livestock products results in profits as great or greater than those ordinarily returned by harvested crops. Numerous investigations have shown that livestock and livestock products can be produced on pasture at anywhere from one-fourth to one-half the cost of barn feeding. It has also been shown that in years when prices of livestock and livestock products are low, profitable production was possible only when an abundance of high-quality pasture was available throughout the entire grazing season.

There are probably no other means of so greatly reducing the cost of producing livestock and livestock products, as thru the improvement in the production, grazing and management practices of farm pastures. Pasture is a crop the same as grain or hay and as a crop it responds to good management and proper soil treatments the same as other crops.

A good pasture program is the best insurance against the menace of soil erosion. The heavy fibrous root systems of legumes and perennial pasture grasses, with proper grazing management practices, are the most effective means known of holding soil in place.

Productive, well-managed pastures will (1) improve the soil, (2) increase productivity, (3) prevent erosion, (4) stabilize production, and (5) over a period of years will improve the farm income and family living.

The important pasture problems now facing Minnesota farmers are:

1. How to provide sufficient quantity of pasture.
2. How to provide high-quality pasture.
3. How to maintain a uniform supply of pasture throughout the season.
4. How to improve the pastures and maintain them so they will remain productive from year to year.

I. Responsibilities:

Different divisions will be responsible for the subject matter of the Minnesota pasture program.

A. The Divisions of Animal Husbandry, Dairy Husbandry and Veterinary Medicine, dealing with all phases of livestock production, will be specifically responsible for the proper methods of utilization as related to all types of livestock, while the Divisions of Soils, Agronomy, Plant Pathology, and

Entomology will be specifically responsible for the production of good pastures as they relate to the problems of soils types, soil treatments, seeding selections, crop adaptations and insect damage and control. The Farm Management Division may also be called on to lend assistance.

B. Thru the Extension pasture committee, all subject-matter divisions will pool their pasture information in research and extension as they relate to the state pasture program.

C. The committee will serve as a clearing house thru which new research data, information and recommendations will be made available to extension specialists and county agents thru publication or by agreement prior to official publication. This information to be considered by the pasture committee and prepared for use of the county extension agents with proper interpretation and application to the various pasture problems as related to all parts of Minnesota.

D. The committee will furnish suggestions and recommendations to the Agricultural Experiment Station on pertinent research studies that seem desirable as based on the needs arising from problems in the field.

E. Thru the committee, county extension agents representing their county project committees will present their local pasture problems and make recommendations and suggestions concerning the type of information needed from the Extension Division and the type of research studies that may be conducted by the Experiment Station.

F. The county agent supervisors will coordinate the pasture program thru the county extension agents and the county project committees in organizing district and local pasture programs.

II. Cooperative Relationships with:

A. Agricultural Experiment Station and related subject-matter divisions.

B. State Department of Agriculture.

C. State agencies and organizations such as:

Minnesota Crop Improvement Association, County Agricultural Associations, seed dealers, fertilizer dealers, machinery dealers, creameries, breed associations, C.T.A., milk producers associations, and others.

D. Federal agencies such as:

T.V.A., A.A.A., and S.C.S.

E. Definite cooperative relationships and agreements on responsibilities have been established by the Extension Division with the various federal agencies. These agreements define the responsibilities for cooperative relationships on various projects which may include the pasture improvement and management program.

III. Objectives (Immediate and Long-time):

The purposes of the Minnesota pasture program are to demonstrate that pastures can be made more productive, that definite pasture programs can be developed to provide abundant feed throughout the grazing season, that pastures can be improved and made to produce satisfactory yields of high-quality feed at low cost.

To develop a coordinated program by bringing together experimental results, information on production and utilization from various subject-matter divisions and the experience of farmers in the development of a balanced pasture improvement and management program that will better meet the needs of the Minnesota farmers.

A. Immediate Objectives:

1. To help farmers appreciate the value of good pastures and the need for pasture improvement, in meeting the wartime goals in dairy and meat production and to help alleviate the farm-labor shortage.

2. To supply information in the development of an all-season pasture program by utilizing rotation, supplementary, emergency and permanent pasture crops.

3. To demonstrate the best methods of improving old permanent pastures and establishing of new pastures.

4. To encourage the selection of legumes and grasses adapted to soil types, soil treatments, crop rotations and general farming practices in the production of better-quality pasture and meadow crops.

B. Long-time Objectives:

1. To develop an appreciation of the returns from different pasture crops and their importance in a program of soil fertility and management and of soil conservation.

2. To promote better land use by supplying information as to where and how good permanent pastures can be established and maintained.

3. To develop and encourage the adoption of the principles of pasture program planning in connection with crop rotation land to meet the livestock needs of the farm which will increase the returns from all pastures, meadows and cropland.

IV. Procedure:

A. Guided by requests and recommendations coming from the county agents and their local county project committees, the extension pasture committee will determine the phases on which state assistance will be given in the various areas.

B. Each district supervisor will be responsible for the organization and coordination of the activities of the program in his respective district.

C. Each district supervisor will acquaint the county agent, local leaders, and committees with the general plans of the program.

D. Extension specialists will:

1. Assist in planning and helping establish the demonstrations.

2. Assist in conducting winter meetings, tours, field days and observing and checking results.

3. Assist in furnishing publicity material which may include news stories, circular letters, posters, exhibits, etc.

4. Prepare and arrange visual aids such as photographs, slides, chart material, etc.

5. Prepare uniform demonstration plans, inspection report forms, and a summary of yearly results.

6. Supply bulletins, leaflets and material needed for the project.

E. The county agents and their local county extension project committees will plan and initiate the program in their respective counties. The county program may be developed as follows:

1. Secure community leaders and community committee assistance.
2. Secure cooperators and assist in establishing demonstrations.
3. Establish a limited number of a uniform type of demonstrations each year.
4. Follow up on each demonstration from year to year to determine if it is worthy of continuation.
5. Assist in harvesting and checking results and making reports.
6. Arrange for materials needed for demonstrations such as fertilizer, lime, seed, equipment and other materials necessary to carry on the pasture program.
7. Arrange for suitable places to hold meetings, field days, and outline tours.
8. Give adequate newspaper publicity and otherwise inform people regarding tours, field days, and results.

V. Demonstrational Phases Offered:

Uniform demonstration plans, procedures and methods for reporting progress will be available for the different types of demonstrations and phases outlined below. The detailed demonstration outlines and procedures will supplement the general over-all Minnesota pasture program. Additional demonstrations may be developed when the need becomes apparent.

A. Renovation of Old Permanent Pastures
   1. With soil treatments
   2. Without soil treatments

B. Brush Eradication

C. Renovation of Boggy Pastures

D. Establishing New Pasture Seedings (with and without soil treatments)
   1. Permanent
   2. Rotation

E. Grass Varieties and Legume Combination

F. Development of All-Season Pasture Programs

G. Erosion Control Practices

H. Management Practices
   1. Controlled grazing
   2. Mowing pasture weeds
   3. Spreading of droppings

VI. Publication Material:

A. Leaflets or mimeographed material on pastures for different types of livestock in cooperation with related subject-matter divisions.

B. Leaflets or mimeographed material giving the latest recommendations of the Experiment Station and Extension Service on renovation, seeding mixtures, fertilizing, management and methods of seedbed preparation as related to soil and climatic conditions.

C. Annual summary of results obtained from various demonstrations conducted in each county. These county summaries to be the basis for a state-wide summary for the current year.

D. A state-wide pasture bulletin or a series of district bulletins bringing up to date all the latest information and recommendations on the various phases of pasture improvement and management.

VII. Informational Material:

A. News releases and farm paper articles including pictures and mats

B. Radio broadcasts

C. Visual Aids

1. Colored slides illustrating specific pasture problems, the results of demonstrations and the organization of special pasture programs developed on individual farms.
2. A series of pasture charts showing the seasonal production of types of pastures for different districts.
3. Rotation and supplementary pasture program chart to illustrate an all-season pasture program.
4. Local pasture exhibits for institutes, fairs and other events. Illustrate different phases of a pasture program. Automatic slide machines with colored slides may be used.
5. Pasture posters to be used in county agents' offices, creameries, banks and A.A.A. offices to illustrate specific principles of pasture improvement and management.

D. Circular letters

VIII. Measurement of Results:

A. Make ratings between different pasture conditions as excellent, good, medium, fair, and poor.

B. Determine vegetative yields on different phases of pasture improvement and management.

C. Determine carrying capacity with various phases of pasture improvement and management on the basis of animal pasture days.

D. Determine results on the basis of production of beef, pork, milk, etc., produced per acre.

E. Send questionnaires to cooperators to determine pasture results and differences.

F. Determine the spread or adoption of recommended pasture improvement and management practices.

G. Make surveys in communities at the beginning of the program and then again 2 or 3 years later.

PASTURE IMPROVEMENT DEMONSTRATIONS

These uniform demonstration plans and procedures for the different phases and types of pasture improvement demonstrations are to supplement Sections V-A, V-D, and V-H of the Minnesota Pasture Program. Those phases are as follows:

1. Renovation of old permanent pastures (with and without soil treatments).
2. Establishment of new pasture seedings (permanent and rotation).
3. Management practices.

I. Selection of the Demonstrational Areas:

A. The areas selected should be:

1. Typical permanent pasture conditions representative of the pasture land in the county and community which are usually overgrazed.
2. Hillside areas with thin, weedy, low-producing sod.
3. Areas where it is desirable to establish new permanent pastures.
4. Areas where it is desirable to establish rotation pastures with different legume and grass mixtures.

B. The areas should be selected during the summer and fall with all plots staked out; and if the soil is acid, apply the lime or marl in preparation for the other soil treatments and seeding the following spring.

C. Each area should have uniform soil conditions and pasture vegetation. At least there should be a similar area or condition on a portion of each plot.

D. Each area should be located on farms of suitable cooperators who are willing and able to carry forward the desired program, including the necessary expenses for seed, lime, fertilizer, fencing and controlled grazing.

E. All demonstrational areas should be accessible to the public for field days. Whenever possible, a location on an all-weather road is desirable.

II. Demonstration Plans:

A plan including a diagram of the area with information and instructions on treatments, seeding mixtures, seedbed preparation, fencing, management, procedure, etc., should be definitely outlined for each of the different types of demonstrations. This plan is to be prepared for each demonstration when it is staked out in the fall. The cooperator, county agent, and the Extension Service are each to receive a copy of this plan.

III. Number of Demonstrations:

It is suggested that from 1 to 3 demonstrations be started each year in a county selecting the project. As farmers adopt the improvement program, more emphasis may be placed on other phases of a complete farm-sized pasture program.

IV. General Plans for Pasture Improvement Demonstrations:

Diagrams and procedures for 4 types of demonstrations are outlined below to illustrate how each will lay out to cover certain demonstrational phases of the Minnesota Pasture Program.

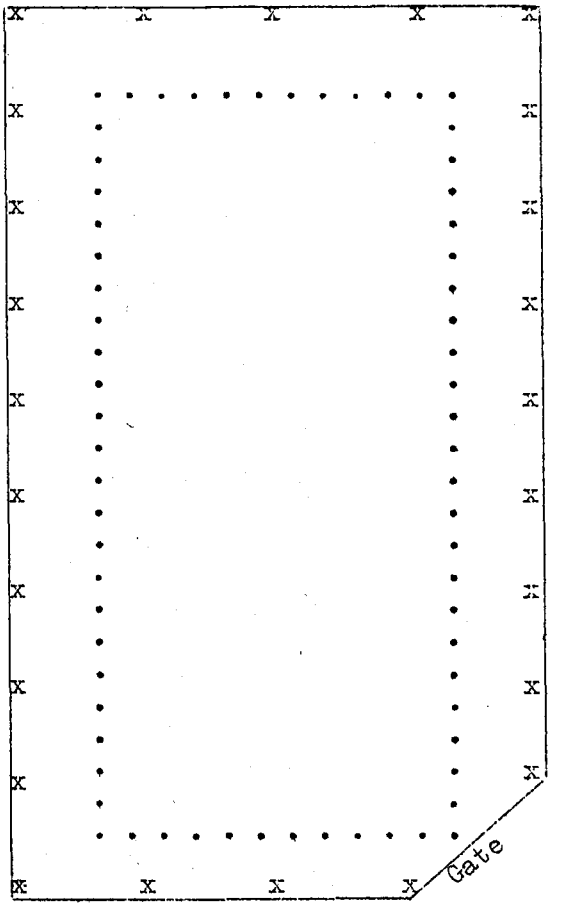
Demonstration No. 1 - Renovation of Permanent Pastures By Reseeding Without Soil Treatments

1. Object: When stands of desirable pasture plants have been killed by white grubs, preparation of a seedbed and reseeding is necessary. Thin, weak stands due to overgrazing for a long period of years, may be improved materially and yields increased by preparing a seedbed and sowing sweet clover, alfalfa or red clover. These legumes grow better than bluegrass during dry weather. Also, these legumes are able to utilize the free nitrogen of the air in their growth and they share part of this with the bluegrass that is growing with them. The bluegrass shows the effect of these legumes for a year or two after they have disappeared.

2. Plan of demonstration:

   a. Select a representative acre or more of the pasture, preferably not too far from the farmstead so that the gate to the enclosure may be opened and closed without much expenditure of time. An acre 20 rods long and 8 rods wide makes a convenient shape. Mark the corners temporarily until the fence can be put up.

   b. Your county agent can determine whether or not your pasture needs lime for growing sweet clover or alfalfa. If your pasture needs lime for these crops, apply ground limestone at the rate recommended per acre and disk it in thoroughly in the fall preceding the spring when the seeding is to be done. Lime is not needed when red clover is to be sown.



Outline of demonstration area. Reseeded portion within fenced area indicated by dotted lines.

   c. Early in spring, as soon as the frost is out of the top 3 to 4 inches of the soil, disk the land until it is black. Late spring seedings have not proven nearly as successful as those made very early. Therefore, unless the seedings can be made before regular spring work begins, it is best to not make them. Preparation of a good seedbed is the first essential of success with this demonstration. Complete the preparation by using a packer, if available, or a smoothing harrow.

   d. Broadcast in the spring 12 pounds scarified inoculated sweet clover or 10 pounds inoculated alfalfa seed or 10 pounds red clover seed, or in the fall, 15 to 20 pounds of unscarified sweet clover seed per acre. Where the pasture plants have been largely killed by white grubs, broadcast 8 pounds of brome grass seed in addition to that of the legume. Cover the seed by using a packer or a smoothing harrow with the teeth slanting backward. Ordinarily no grain should be sown with the legumes and grasses.

e. Build a good fence at least 10 to 12 feet wider and longer than the area that has been renovated. The untreated area fenced in makes it possible to compare the growth made on the treated and untreated areas and keeps the attractive legume growth out of the reach of the cows. The gate should be as good on the fence. A good electric fence might serve the purpose.

f. Keep the gate closed and all animals out until the legume crop sown has reached a height of 16 to 18 inches. Then open the gate and permit the animals to graze the growth down to a height of about 4 inches after which the animals should be kept out altogether until November first. Keeping the animals out during this period is necessary in order that the legume plants may make good root growth and store necessary reserves. After November first the growth may be grazed down to a height of about 6 inches after which the gate should be closed.

g. The next and following years control the grazing so as to keep the legumes growing. Each time the growth gets to be 8 to 10 inches high, open the gate and close it as soon as the crop has been grazed off. Three to four grazings per season may be obtained. Each year, as long as a fairly good stand of sweet clover or alfalfa remains, there should be no grazing between October first and November first.

Demonstration No. 2 - To Improve Permanent Pastures By Controlled Grazing and Manuring

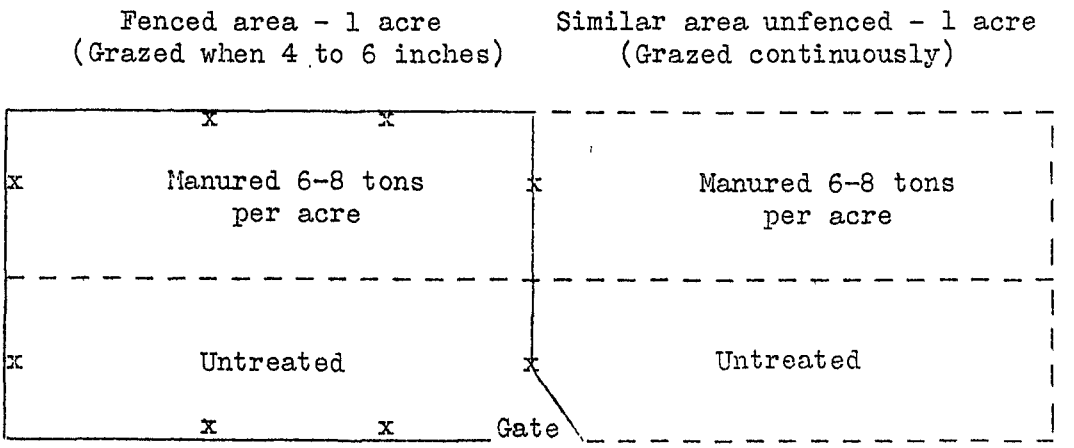
1. Object: A demonstration to show the effect of controlled grazing and the application of manure on yield and stand. Overgrazing is a very common practice, generally. Overgrazing results in low yields; weak, unthrifty plants; depleted stands; and a greater growth of weeds.

2. Procedure:

   a. Fence off a representative area of a permanent pasture with a gate or opening to admit and shut out animals when desired. The size of the area should be at least one acre. It may be larger if desired. The fence should be strong and well constructed, so as to turn animals for more than one season. An application of 6 to 8 tons per acre of barnyard manure should be made on one half of the fenced-in area, and also on an equal area which is unfenced. The other half of the fenced-in area should remain untreated. Both the manured and untreated areas should be pastured alike, allowing the animals free choice within the manured and untreated area.

   b. Animals should be kept off the fenced-in area until the grass has made a good growth of 6 to 8 inches, and then should be removed as soon as the grass has been grazed off to 1½ to 2 inches in height. As soon as the grass has been grazed off, the animals should be taken out and the area allowed to grow up. The time between grazing and turning out will depend on growing conditions. Two weeks should be about right during the early growing season, and more time during the summer when rainfall is light and the weather hot. Animals should be kept out until a growth of 4 to 6 inches in height is made.

   c. Diagram:



The fenced-in area should be relatively near the farm buildings, so as to be convenient when turning in and shutting out.

Demonstration No. 3 - To Improve Permanent Pastures By Applying Manure

Results from applying manure to permanent pastures show that ordinarily yields may be doubled the year the application is made and considerably increased the next year. The increases in yield from applying manure to pastures appear to be as great or greater than those obtained from applying manure to corn.

The increases in yields are brought about mainly by (1) the fertilizer contained in the manure; (2) the resting period of from a few weeks to most of the season brought about by the refusal of animals to graze freshly manured areas. The indications are that manuring tends to favor the growth of white clover in permanent pastures. The growth on the manured areas is consumed later in the season when the unmanured areas have been grazed close and do not provide much feed.

Lay off an area at least 4 acres in size (see plan 1 below) if manure is to be applied every fourth year or an area at least 3 acres in size (see plan 2 below) if manure is to be applied every third year. The 4-acre area might be 20 rods by 32 rods and the 3-acre area 20 rods by 24 rods. Each acre would then be 20 rods by 8 rods.

Plan 1. Application every 4th year

1. Apply manure 6-8 tons per A. in 1943 and again in 1947 and 1951.
2. Apply manure 6-8 tons per A. in 1944 and again in 1948 and 1952.
3. Apply manure 6-8 tons per A. in 1945 and again in 1949 and 1953.
4. Apply manure 6-8 tons per A. in 1946 and again in 1950 and 1954.

Plan 2. Application every 3rd year

1. Apply manure 6-8 tons per acre in 1943 and again in 1946 and 1949.
2. Apply manure 6-8 tons per acre in 1944 and again in 1947 and 1950.
3. Apply manure 6-8 tons per acre in 1945 and again in 1948 and 1951.

No fencing is necessary. The four corners of each acre should be plainly and permanently marked. The year to apply manure on each area is indicated on the plan.

An occasional farmer might want to apply manure to his entire pasture in accordance with one or the other of the above plans.

Demonstration No. 4 - Renovating Old Permanent Pastures and Seeding New Permanent and Rotation Pastures With Soil Treatments

The soil treatments for this demonstration are to be based on the soil requirements in the various parts of the state and may include manure, lime and commercial fertilizers.

1. Plan of demonstrations:

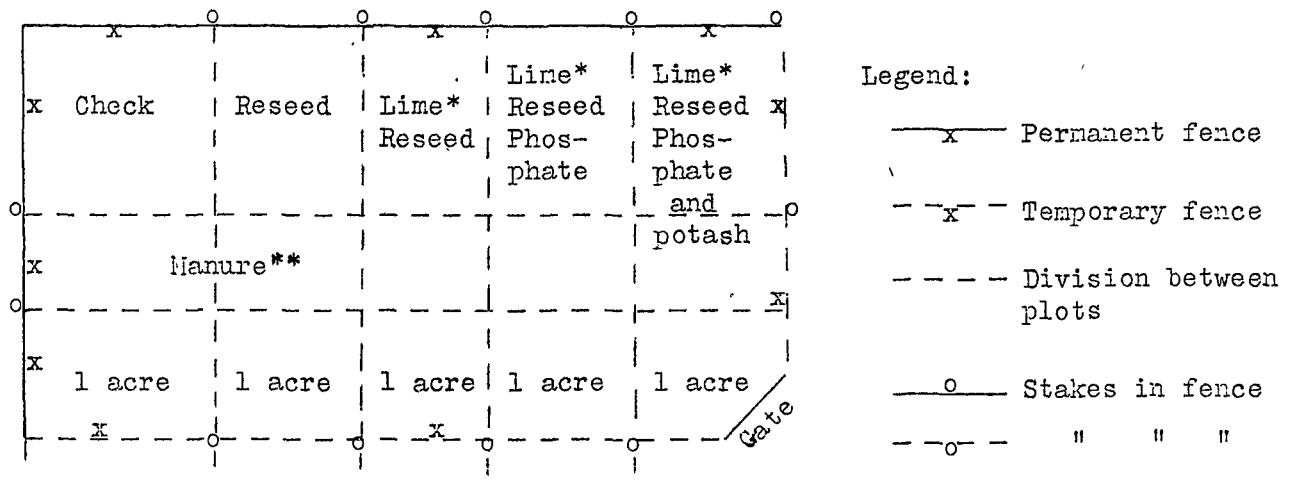
In all demonstrations at least a considerable portion across all plots should have uniform soil conditions and pasture vegetation.

The plots do not need to be square nor do they need to be the same size but may be made to fit any location or condition. The size of each treatment plot may be varied from one acre (20 rods by 8 rods) upward, depending on the location and general situation on the farm. The type of demonstration should be adjusted to fit the situation and need.

In most plans only three treatments will need to be used such as check, reseed, and reseed and superphosphate.

If a larger demonstration is used, such as an entire pasture area, it is desirable to treat and seed the larger portion of the area.

Diagram of a Complete Demonstration Plan



*The lime plot and all lime treatments should be left out if soils are not acid.

**Manure may be added to the demonstration in a strip across each treatment plot at the rate of 6-8 tons per acre.

2. Marking demonstration plots:

Every treatment plot in the demonstration should be plainly staked. Iron or wood stakes placed in the fence are more permanent and easier to locate in later years.

3. Soil samples:

Soil samples should be taken to represent the top 4 to 6 inches from several representative places in the demonstration where there is a difference in soil conditions, such as on a hillside as compared to a hilltop. Samples of each condition should be taken.

4. Soil treatments:

The various treatments should be made as follows and arranged in the order as shown in the diagram.

a. Lime or marl - This treatment applies to the sections of Minnesota where liming materials are generally necessary and are being used. The samples taken above can be tested for acidity by the county agent. Lime or marl should be applied, according to the degree of acidity. Disk it in thoroughly in the fall preceding the spring when seeding is to be done. Note: Do not apply lime or marl until a soil test has been made to determine the need. This step is very important to the success of the demonstration.

b. Phosphate - Apply 250 to 300 pounds per acre of 20% superphosphate or its equivalent, at the time of seedbed preparation and thoroughly work into the soil.

c. Potash - Potash in combination with phosphate should be compared with phosphate alone in those areas in the state where there is a probability of a potash deficiency. The phosphate-potash combination should be applied on a phosphate equivalent basis at the same rate as indicated above for the phosphate.

d. Manure - Apply at the rate of 6 to 8 tons per acre at the time of seedbed preparation and thoroughly work into the soil.

5. Seed early:

Seedings must be made early. If seedings cannot be made early, they should not be made at all. To renovate and reseed an old pasture, disk and seed when the frost is out of the surface soil to a sufficient depth to prepare a seedbed. This work should be completed before small grains are seeded.

6. Seedbed preparation:

If the land is rolling, the seedbed preparation and seeding operations should be made on the contour of the hill rather than up and down the slope. Heavy sod disked and spring-toothed until it is black is generally the most satisfactory method. Heavy disking and spring-toothing are essential on dense sods and on those areas more completely taken by weeds. The lime and fertilizer treatments should be thoroughly worked into the soil in order to be more effective. Heavy disking and spring-toothing will provide a better seedbed and will retard the growth of the old sod sufficiently to give the new seeding a chance to get established. On new pasture seedings, the seedbed may be prepared as on regular cropland.

7. Seeding mixtures recommended*:

a. Renovation of permanent pastures (rate per acre):

Seeding No.	1 -	12# scarified biennial sweet clover
" "	2 -	10# alfalfa
" "	3 -	10# medium red clover
Mixture "	4 -	5# scarified sweet clover
		3# medium red clover
		2# alsike clover

*Reference: Extension Bulletin 197, "Pasture Plants and Combination."
Extension Folder 62, "Legume and Grass Mixtures."

b. New permanent pasture (rate per acre):

Mixture No. 1 - 6# timothy**
2# Kentucky bluegrass
4# medium red clover
2# alsike clover
1# white clover

Mixture No. 2 - 2# timothy**
6# brome grass
2# Kentucky bluegrass
4# medium red clover
2# alsike clover
1# white clover

Mixture No. 3 - 6# brome grass
4# timothy**
5# alfalfa
4# biennial sweet clover

c. Rotation pasture (rate per acre):

Mixture No. 1 - 8# alfalfa
8# brome grass

Mixture No. 2 - 8# timothy**
4# medium red clover
2# alsike clover

Mixture No. 3 -12# biennial white sweet clover
6# timothy**

**Meadow fescue may be substituted for timothy in the Red River Valley.

8. Inoculation:

Alfalfa and sweet clover should be inoculated before seeding in a renovated pasture or where new pastures are to be established.

9. Companion crop:

This should be used as follows:

a. New pasture seedings - The use of a one-half seeding rate of a small grain crop is desirable where there is little or no sod and where weeds may be a problem. (Refer to "grazing management" below.)

On areas relatively free from weeds or low in fertility, seeding alone may be preferable to using a companion crop.

b. Renovated pasture seedings - No companion crop is recommended where there is a fair stand of permanent sod present.

10. Method of seeding:

Drilling is preferable. If a drill is not available, broadcast the seed and cover by harrowing or rolling. The use of a cultipacker has proven valuable in obtaining stands of legumes and grasses as well as re-establishing the permanent sod torn up in preparing the seedbed. Rolling after seeding is especially valuable when the soil is relatively dry.

11. Fencing the demonstrations:

An unfenced demonstration in a large pasture has little chance for success. It is necessary to fence the demonstrational area to properly control the grazing. Do not fence each treatment plot. As suggested in the diagram, it is desirable to have a small portion of each treatment plot extend beyond the fence and permit continuous grazing. This will demonstrate the difference in grazing management. The fence with a good gate must be put up immediately after the seeding is made in the spring.

12. Grazing management:

Controlled grazing is essential to the successful establishment of a new pasture seeding or on renovated pasture seedings.

a. New pasture seedings - When a companion crop is used, it should be grazed off starting when it is 6 to 8 inches in height. Livestock should not be allowed to pasture the new seeding too closely, yet the companion crop should be kept grazed to prevent it from furnishing completion to the new seeding.

b. Renovated pasture seedings - Where no companion crop is used, livestock should be kept from grazing the demonstration until the legumes are well established, which is usually about the last of July or the first of August. Generally, some grazing may be expected during the remainder of the season, but at no time should the new seeding be grazed down less than 4 inches in height. Grazing must be discontinued from late August on throughout the fall to enable the young legumes and grasses to build up root reserves. After the first year, the next and following years control the grazing so as to keep the legumes growing and to permit reseeding as is the case of sweet clover. No grazing should be allowed after October first.

13. Weed control:

Weeds should be kept under control if a productive pasture is to be maintained. Weeds may occur during the season regardless if the demonstration is on new pasture seedings or on renovation seedings. The best control is to clip 5 or 6 inches high with a mower. Pasture weeds may have to be clipped in June and again in August.

Perennial weeds should be cut when they start to bud and before they bloom to do the most effective job.

Annual weeds should be cut before seed is formed.

More than one clipping per year may be necessary. It may take 3 to 4 years of proper mowing to completely kill out most pasture weeds.

V. Modifications:

A. Adjust the demonstrations to area conditions and to individual farm circumstances, but maintain the basic treatments adaptable to the soil conditions, demonstration arrangement and comparisons as suggested in the diagrams given above.

B. Circumstances permitting, certain demonstrations may be selected where cages may be used and clippings may be taken to determine actual yields per acre.

C. Where a field-sized demonstration may be established, one pasture may be divided into two parts with a temporary fence, the one part to be treated and improved, as outlined in the demonstration plans, and the other to be pastured as it is at the present time. When this arrangement is possible and water is available to both areas, a comparison of actual "animal pasture days" per acre can be obtained from the two areas.

D. On farms that have two different kinds of pastures, a comparison of the two may be made on the basis of "animal pasture days" by keeping a record on Form S-15 as to the length of time and number of livestock grazed.

E. Rotate the grazing of livestock between 2 or 3 different pastures or divide the same pasture area, regardless of the kind, into 2 or 3 areas. Graze down one pasture area and then move the livestock to the next area and continue this rotation procedure throughout the grazing season. The temporary fencing of the pasture areas may be accomplished at a minimum labor cost by using an electric fence. Arrange to keep an "animal pasture day" record on Form S-15 for each pasture area during the grazing season.

F. Seeding mixtures may be adjusted to areas of the state and according to the soil and weather conditions.

VI. Demonstration Plans and Report Forms:

The following forms should be used with each of the various pasture improvement demonstrations as outlined:

A. Demonstration Plan, Form No. S-22

This plan should be prepared in the fall when the demonstration you select is staked out. It should outline for the cooperator, all of the steps and recommendations necessary for him to follow in establishing a demonstration. A copy should be prepared for the cooperator, one for the county agent and one sent to the Extension Service. The plan outlines the steps to be followed during the first year.

B. Demonstration Report, Form No. S-23

This report should be made out in late summer or early fall and should give a comparison and rating between the different soil treatments and management practices. This report should be made out each year during the life of the demonstration.

C. Carrying Capacity Report, Form No. S-15

This report may be used where field-sized demonstrations are set up as indicated under section V above. One sheet will be used for each month of the grazing season. Sufficient space is provided on each sheet for 4 different pastures. At the end of the season the monthly reports can be summarized and the "animal pasture days" determined. A statement as to the kind of management practices followed on each pasture may accompany this report.

Form S-22
200 12/42

AGRICULTURAL EXTENSION SERVICE
UNIVERSITY OF MINNESOTA - U. S. DEPARTMENT OF AGRICULTURE
UNIVERSITY FARM ST. PAUL MINNESOTA

MINNESOTA PASTURE PROGRAM

Pasture Improvement Demonstration Plan

Demonstration Number_____ County_____

I. Cooperator_____ Address_____

II. Township_____ Section_____ Date_____

III. Basic Information:

A. Kind of pasture_____ Age of pasture_____

B. Past grazing management (light, medium, heavy)_____

C. Farmer's rating of pasture (poor, fair, medium, good)_____

D. Manure, lime and fertilizer used in past (kind, amount, date)_____

_____

E. Vegetative composition of pasture (estimate percentages)_____

Desirable Species	Per Cent	Undesirable Species and Bare Space	Per Cent
Kentucky bluegrass			
Canadian bluegrass			
Redtop			
White clover			

F. Soil and topography (type and slope)_____

_____

G. Fertility (low, medium, high)_____

H. Erosion (slight, medium, excessive)_____

I. Lime requirement_____tons per acre. Tested by:_____

J. Rainfall (inches)_____

K. Remarks:_____

_____

IV. Recommended Plan for Demonstration:

A. Soil treatments (state rate and amount of each treatment)

Material	Rate per Acre	Time to Be Applied

(Over)

B. Seeding mixture:

Kind of Seed	Rate per Acre

C. Are legumes to be inoculated? (Yes or no)_____

D. Time of seedbed preparation_____

E. Time of seeding_____

V. Companion Crop (kind, rate, management):_____

VI. Seedbed Preparation and Method of Seeding (outline steps):_____

VII. Fencing (needs and time to be completed):_____

VIII. Grazing Management (outline steps):_____

IX. Weed Control (outline steps):_____

X. Diagram of Demonstration (show fences, plot stakes, soil treatments, etc.)

Plan prepared by:_____

Prepare copies of this plan for the cooperator, county agent, and the Extension Service.

Form S-23
200 12/42

AGRICULTURAL EXTENSION SERVICE
UNIVERSITY OF MINNESOTA - U. S. DEPARTMENT OF AGRICULTURE
UNIVERSITY FARM ST. PAUL MINNESOTA

MINNESOTA PASTURE PROGRAM

Pasture Improvement Report

Kind of Pasture (permanent or rotation, indicate species)_____

Cooperator_____ Address_____ County_____

Demonstration Number_____ Date of Inspection_____

I. Review of Demonstration:

A. Status:

1. Year started or seeded and fertilized_____

2. If reseeded, when?_____

3. Do you and cooperator both have a copy of the original plan used?_____

B. Observations and results;

Soil Treatments	Clovers*		Grasses*		Weeds*	
	Rating	Species	Rating	Species	Rating	Species

*Rate each group - clovers, grasses and weeds - on stand and growth as follows: E - excellent; G - good; F - fair; P - poor; N - none. List dominant species in each group in order of importance.

C. Method of establishment:

1. If method of establishment was not satisfactory, comment on the following: Time of applying lime, crop or mixture sown, lack of use of phosphate or lime, time of seeding, seedbed preparation, etc._____

2. What other reasons may have caused the demonstration to fail?_____

(Over)

3. What has been the grazing management? (None, light, medium, heavy - give time if known and effect on demonstration):_____

4. Does the demonstration need clipping now?_____

II. Review of Cooperator's Reaction:

A. Is he satisfied with the demonstration (if not, why not)?_____

B. If it failed, does he plan to try again?_____

C. Does he have any suggestions?_____

D. Does he plan to continue an improvement program on other pasture areas? (List approximate acreage and plan)_____

III. Miscellaneous Notes:_____

Reported by:_____

(Send one copy to Extension Service)

Form S-15
200 12/42

AGRICULTURAL EXTENSION SERVICE
UNIVERSITY OF MINNESOTA - U. S. DEPARTMENT OF AGRICULTURE
UNIVERSITY FARM ST. PAUL MINNESOTA

County_____

Dem. No._____

MINNESOTA PASTURE PROGRAM

Animal Pasture Day Record

Monthly Report Sheet

Name_____ Address_____ Grazing record for month of_____ 194__

Note: Fill out one sheet for each month during the grazing season. If more than four fields are pastured during the month, use an additional sheet.

Livestock		*Field No._____ Kind of pasture_____ Acres_____		Field No._____ Kind of pasture_____ Acres_____		Field No._____ Kind of pasture_____ Acres_____		Field No._____ Kind of pasture_____ Acres_____	
		No. of livestock on pasture	Days grazed this month	No. of livestock on pasture	Days grazed this month	No. of livestock on pasture	Days grazed this month	No. of livestock on pasture	Days grazed this month
Dairy	Over** 2 years								
	1 to 2 years								
	Under 1 year								
Beef Cattle	Over 2 years								
	1 to 2 years								
	Under 1 year								
Horses & Mules (2-4) colts = 1 horse									
Sheep	Mature								
	Lambs								
Hogs	Over 6 months								
	Under 6 months								
Other									

*Example - Field No. 1. Kind of pasture: Old bluegrass.

**Example - If 15 dairy cows were pastured for 25 days during the month, write 15 in the first column opposite "Cattle over 2 years" and 25 in the second column, "Days grazed this month."