MAKING PASTURES PRODUCE THEIR SHARE OF FOOD

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Pastures are playing an important rôle in the wartime food production program, but they can be made to take an even greater part by increasing the output of livestock products.

During and after the last war, production was measured largely in terms of wheat, corn, and other cultivated crops. Consequently, a high percentage of our pasture land was plowed. Today we recognize much better the production and conservation value of pastures in the farming system.

Illinois has more than 8,000,000 acres of permanent pasture. In addition, several million more acres now being cultivated should be in permanent pasture if they are to be saved from destructive erosion. It is estimated that the production of forage could be doubled on at least 50 per cent, or 4,000,000 acres, of pasture land. A large portion of the land now in grass was cultivated during the last war or at some time during the last 100 years. In many cases, constant farming and soil erosion had severely reduced the productive capacity of the soil before it was "retired" to pasture.

Permanent pastures can be classified into three groups on the basis of their productivity—high, medium, and low. It is recognized that some soil types produce forage crops much better than others. However, the high-producing pastures are found on fertile soils that have been limed, fertilized, and seeded to legumes or have received applications of barnyard manure. These soils are fertile mainly

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because of their inherent productivity or because of the treatment they have received, or both.

Pastures that fall in the low-productivity group have generally received no soil treatment and little, if any, controlled grazing. The grass on these areas is grazed closely the year around. Root reserves cannot be maintained under these conditions and gradually the grasses are killed out. Weeds then grow up to replace the perennial grasses, and forage production goes downward. Such weeds as ragweed (*Ambrosia artemisiifolia L*), blue vervain (*Verbena hastata L*), broad-leaved plantain (*Plantago major L*), crabgrass (*Digitaria sanguinolis* Scop.), daisy fleabane (*Erigeron annua* L), and many others are quite common in pastures of this type. The carrying capacity of highly productive pasture averages 1.5 acres per animal unit for the grazing season, in contrast to 3 to 6 acres per animal on pasture of low productivity.

There is considerable acreage of wooded pasture in the low-productivity group. Experimental records show that it requires 6 acres or more of wooded pasture to furnish sufficient forage for one full-grown cow, or one animal unit. A study made by the Soil Conservation Service in cooperation with the University of Minnesota shows the variation of yields between open pasture and woodland.

TABLE 1.—180-DAY PASTURE PRODUCTION TESTS, SOUTHEASTERN MINNESOTA
(12 plots on each of four farms)

Year	Renovated	Open	Wooded
Tons per acre 15 per cent moisture			
1938....	3.43	2.12	0.31
1939....	1.70	1.03	0.26
1940....	2.05	1.10	0.32
Acre per cow			
1938....	0.7	1.1	7.0
1939....	1.3	2.2	8.5
1940....	1.1	2.1	6.9
Per cent protein			
1938....	—	—	—
1939....	15.0	16.1	12.0
1940....	15.6	15.8	11.0

An analysis of the grasses growing in the timber indicates that they are very low in nutritive value. The leaves of many plants and trees growing in wooded pasture are poisonous to livestock. Every year white snakeroot, alone, kills livestock worth thousands of dollars.

Pastures on which soil treatment, grass-legume mixtures, and grazing control are used will give favorable comparative returns. An Ohio study, the results of which are reported in Ohio Bulletin No. 154, compared the production of improved pastures to the production of corn, wheat, and clover rotated at 34 to 43 locations for 3 years. The following results were obtained:

Three-year rotation
Corn, wheat, clover

It cost $20.68 to produce 5,397 pounds of dry matter per acre containing 408 pounds of protein equal to 11 bags of linseed meal. Total value $27.50.

Improved pasture
Fertilized, reseeded

It cost $11.59 to produce 5,084 pounds of dry matter per acre containing 578 pounds of protein equal to 15.6 bags of linseed meal. Total value $39.00.

The results indicate that we can produce more protein from a well-managed pasture than from a corn-wheat-clover rotation and at approximately one-half the cost of production. There doubtless will be a shortage of protein for the duration of the war, which makes it doubly important that we look to pasture crops to help make up this shortage.

Five simple steps are recommended for the improvement of permanent pastures. They are given in University of Illinois mimeographed circular entitled, "Five Steps in Pasture Improvement" as follows:

1. **Test the soil for acidity and phosphorus and apply the treatment in the amounts indicated by the test.**—Limestone has gradually leached out of our soils making them slightly acid. In order to grow legumes and most grasses successfully we need to apply sufficient limestone to decrease the hydrogen ion concentration of the soil to Ph 6.5 or nearly neutral. Through soil erosion and the production of livestock and crops, phosphorus has been greatly reduced in many areas of pasture. A soil test will indicate the approximate amount of available phosphorus per acre.

2. **Disk the ground thoroughly in the late summer, on the contour, if possible.**—Contour disking on rolling land will help to hold the seed and soil treatment in place. It will also help to conserve moisture which can be used by the new seedlings. The disking should be done sufficiently early to give the limestone time to correct the acidity. Harrowing the field and finally rolling will prepare the seedbed for the new seeding of grasses and will compact the soil to aid the grasses present to reestablish themselves.

Disking for pasture renovation is preferable to plowing because by this method the pasture grasses already present are not destroyed and on rolling land there is much less danger of loss by erosion.

3. **Seed heavily.**—Sweet clover could be used as the main legume. If there is danger of the sweet clover weevil destroying the new seedlings of sweet clover, the addition of alfalfa, alsike clover, lespedeza, or red clover is advisable.

If a fair stand of grass is already present, the sweet clover alone is sufficient if weevil is not present. If the seedbed was prepared the previous fall, the sweet clover can be seeded at the rate of 10 pounds per acre in the late winter or early spring without working the soil further. Freezing and thawing in late winter or early spring will cover the seed. In cases where the stand of grass is thin some grass seed should be sown, preferably when the land is disked in the fall. Where a mixture of grasses and legumes is necessary, it is generally advisable to sow the grasses in August or September and the clover early the following spring. In seeding grasses in southern Illinois, use 4 pounds each of timothy, redtop, and orchard grass. In central or northern Illinois, sow 4 pounds of timothy per acre.

It is desirable to have both first-year and second-year sweet clover growing simultaneously in a pasture. This may be accomplished by making a second seeding of sweet clover a year later than the regular renovation seeding.

4. **Control grazing.**—The newly improved pasture should not be grazed until after July 1 the first year in order to allow the new seedings to become established. Grazing should only be moderate the first year and should be discontinued after September 15 in order to allow the plants to make some reserve growth for winter.

Grazing during the following years should be limited sufficiently so that a reasonable top growth can be maintained throughout the year. If more than one pasture is available, a system of rotation grazing can be used to good advantage. A system of rotated grazing will tend to increase the production of the pasture. It also gives the pasture grasses a chance to recover.

At the Dixon Springs Experiment Station, a fertilized pasture that was moderately grazed returned an average net gain of 144 pounds per acre in sheep for a 4-year period 1939-43, while a similarly treated pasture, which was overgrazed, returned an average net gain of only 12 pounds per acre.

Where sweet clover or some biennial legume is used there is a problem of management in maintaining it year after year. In order to maintain a biennial legume, care must be exercised to allow it to set seed every year. This can generally be accomplished by removing the livestock when the plants begin to bloom and keeping them out until the seed is set and the seed pods begin to turn brown.

Rotation or temporary pastures of clover, sudan grass, small grain, and alfalfa can be used to supplement the permanent pastures to good advantage. Used in the early spring or during drouth periods, these pastures will help to prevent overgrazing on permanent pastures.

5. **Weed control.**—Good growths of legumes and grasses on improved pastures will help to control the weeds. Since animals graze the more desirable plants, however, weeds tend to gain an advantage. Therefore, it is desirable to clip the weeds once or twice a year. It is generally desirable to mow when the largest portion of the weeds are in full bloom.

The grassland should be clipped 8 to 10 inches high so that the maximum use can be made of the grasses and legumes growing there.

If pastures are to be made to contribute their share of food production during and following the war, a program of intensive education of all the people who own or operate land is essential. A pro-

gram of conservation-production will be used on a majority of our farms only when a majority of the people appreciate the extent of the problem and have a knowledge of the necessary procedure in its solution.

In order to accomplish this task there are two necessary major steps that are being taken. The first is general education, and the second is community action. For many years, the Illinois Agricultural Extension Service, through the Farm Advisers and Extension specialists, has taken the leadership in carrying out a general education program in pasture improvement. Pasture management as a part of a course in conservation is being used by some of our colleges and high schools.

Many fine examples of community action can be found in the soil conservation districts organized by farmers in Illinois. Community leaders call together their neighbors for a round-table discussion of their community conservation problems. At these discussions it is generally recognized that a complete farm plan for the entire farm is the ultimate goal. This plan usually includes the crop rotation, the hay and pasture management program, and livestock system, grass waterways, drainage, contour farming, terracing, woodland and wildlife management, or a combination of any of these phases that will fit the farm and its effective operation.

In wartime, however, when labor, equipment, and materials are not plentiful, only those practices requiring the least, if any, additional labor, and that go the farthest toward food production, are started. Of these, contour farming, grass waterways, pasture production, and land drainage are the chief considerations. In the Morgan County Soil Conservation District, community leaders assisted by W. F. Coolidge, Morgan County farm adviser, and C. H. Krusa, assistant soil conservationist from the Soil Conservation Service, have conducted many group discussion meetings this past winter. The members agreed at each meeting as to the approximate amounts of pasture improvement and other production practice work they would try to accomplish this spring. The farmers usually plan to lime and reseed 10 to 20 acres of pasture each year and to practice grazing management on all of it.

In conclusion, I would like to say that the pastures in Illinois can be made to produce a greater share in the food production program than in previous periods.

The program of pasture improvement includes the application of the necessary limestone and plant food materials. This should be followed by the proper seedbed preparation and a heavy seeding of grasses and legumes. The production in the years to follow will largely depend on the grazing management and weed control program.

Rotation supplemental pastures of clover, small grain, or sudan grass can be used to relieve the permanent pastures.

A shortage of protein feeds for the duration of the war makes it highly essential that we depend on improved pasture to increase the production of livestock.