

Managing and Utilizing Pasture and Harvested Forages for Sheep

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Future expansion of the sheep industry in the United States will greatly depend on the ability to use both pasture and harvested forages for feed-stuffs. Sheep are 26 percent more efficient than cattle in converting pasture and forages into marketable products. Thus, sheep become more attractive economically as grain production costs rise or grain export pressure increases.

Forages supply approximately 80 percent of the yearly nutritional requirements for sheep. Sheep are especially efficient in converting forages into protein (in both the wool and meat) and compete less with humans for edible grain crops than other livestock species. Because sheep graze, they take less energy to produce than animals that require harvested and stored grains and forages.

Sheep are in an enviable position because they provide two marketable products--lamb and wool. As the manufacturing cost of petroleum-based synthetic fibers increases, wool is in greater demand and more economically rewarding to produce. Since sheep store protein in wool as well as in meat, both can be used for food. Wool may be stored for long periods of time and then hydrolyzed for its food value.

There is much land in Indiana better suited to growing forage crops than grain crops. When properly fertilized, fenced and managed, this land will produce abundant pastures and forages for sheep. Even on grain farms, there is usually some acreage that should be pasture. Adapted forage crops can reduce feed costs and give good economic return on high-priced land.

The purpose of this publication is to help sheep producers maximize the productive potential of their forage land by proper crop selection and management, and by efficient forage utilization. Discussed are the forages best suited to sheep production, the particular advantages of each forage, and recommended procedures for growing, grazing and/ or harvesting them. Also presented are general management practices for sheep on pasture and an example of how 30 acres of land can be utilized to supply the forage needs of a 100-ewe flock.

PASTURE FOR SHEEP

By selecting forages best adapted to your farm's soil and climatic conditions, a year-long pasture calendar can be developed. The following list shows optimum grazing periods for various forage alternatives; Figure 1 illustrates how these crops can be used in a 12-month program and is based on the number of sheep-days. Each forage is then discussed in some detail below, including its management.

- 1. Wheat--early fall and early spring grazing.
- 2. Oats and broadleaf rape--spring grazing prior to turnip seeding.
- 3. Turnips--October to December grazing (seeded in July).
- 4. Kentucky bluegrass--spring and fall grazing (dormant in summer).**
- 5. Tall fescue winter and early spring grazing.**
- 6. Orchardgrass--spring and fall grazing.**
- 7. Bromegrass or timothy--early summer grazing (graze 1 week, rest 3 weeks).**
- 8. Birdsfoot trefoil--mid-summer and early fall grazing in northern Indiana.
- 9. Lespedeza--mid-summer and early fall grazing in southern Indiana.
- 10. Sudangrass--temporary mid-summer grazing (supplements wheat).

Alfalfa and the clovers are not included in the above list because they can cause bloat if used alone; but, in mixtures with the grasses, these legumes make excellent pasture. Their greatest value, however, is as harvested forages.

Grasses and Legumes

Grasses. Kentucky bluegrass, orchardgrass and tall fescue can withstand considerable grazing pressure because new growth arises from the base of the leaf blade.

Bromegrass and timothy, on the other hand, need more careful management. Bromegrass produces new growth from small white shoots, and timothy produces new growth from haplocorms (small bulblike structures); therefore to keep these grasses from jointing, they should be grazed for 1 week and rested for 3 weeks. If allowed to rest more than 3 weeks, the stems elongate; and if grazed while elongating, the stand persistence may be reduced. The grasses can be grazed without detrimental effects after the stems have fully elongated (6-7 weeks).

Legumes. Lespedeza and birdsfoot trefoil grow well in mid-summer and early fall. They may be used alone or mixed with grasses. In a mixture, they will furnish the nitrogen that the grasses need.

Lespedeza grows well in southern Indiana, especially in combination with tall fescue or other grasses recommended for sheep. Birdsfoot trefoil grows best in the northern half of the state and on limestone-influenced soils in southern Indiana. The variety Empire is recommended for grazing with Kentucky bluegrass in permanent pastures, because it is drought resistant, remains palatable at maturity and does not cause bloat. A specific inoculant to induce nitrogen fixation is needed at seeding, and fertilization should be based on a soil test.

Turnip Pasture for Ewes

Purdue University has conducted research to determine the value of purple-top, white-globe turnips (*Brassica rapa*) as a grazing pasture for flushing ewes during the fall breeding season. Turnip pasture has a greater animal carrying capacity than conventional grass pasture. How the crop was grown and pastured in the Purdue study, and the results experienced are discussed here.

In late July or early August, seed was mixed with 12-12-12 fertilizer and broadcast onto a prepared seedbed at the rate of 2.5 pounds of seed and 50 pounds of fertilizer per acre. A chain harrow was used to lightly cover the seeds to help initiate germination and reduce loss to birds. Within 60 days, the field was ready to graze.

Because the upper part of the turnip taproot grows above ground, sheep will eat both foliage and roots. To minimize waste, the turnips were strip-grazed by limiting the grazing area with an electric netting fence to approximately 0.5 acre at a time. When each area was completely grazed, the fence was moved to expose an additional half acre. Water and a salt-mineral mixture were supplied free-choice.

Using this strip-grazing system, the pasture provided 45 days (October 1-November 15) of forage. However, under favorable weather conditions, this could have easily been extended another 15 days to December 1.

From this study, the following management procedures are tentatively recommended for fall-grazing ewes in turnips:

- 1. Maintain the sheep in approximately 0.5-acre paddocks until turnip foliage and roots are completely grazed. An electric fence or sheep netting works well in making the paddocks.
- 2. Provide salt-mineral mix and fresh water at all times. Since turnips have a high moisture content, ewes will usually consume less water than on grass pasture.

- 3. Ewes grazing unsupplemented turnips should gain 0.1-0.2 pound per day, which is adequate for flushing purposes. Therefore, do not feed additional shelled corn.
- 4. Consider using an adjoining grass pasture, especially during wet weather, for ewes to bed down at night. Shade in either the turnip or the adjoining grass pasture should be provided during hot weather.
- 5. For a grazing period of 35-45 days, use a stocking rate of approximately 20 ewes per acre. The grazing period could be considerably longer if weather conditions are favorable.
- 6. To maximize utilization of land intended for turnip pasture, consider seeding oats and broadleaf rape in early spring, grazing until July, then reseeding to the purple-top, white-globe turnips for fall pasture.

A forage turnip called Tyfon, developed by crossing a stubble turnip with the Chinese cabbage, has a leaf-to-root ratio of 95:5. It can be either cut or grazed and will have one or two regrowths during the summer. Tyfon turnips should be seeded in the early spring when soil conditions permit by drilling 5 pounds of seed per acre at a depth of 1 inch in rows 7-14 inches apart.

Wheat and Sudangrass

Wheat can be used as a supplemental pasture for sheep in October, early November, April and early May, when most grasses are not very productive. If the wheat is not grazed beyond the jointing stage, a grain crop may still be harvested after grazing.

Sudangrass (assumed here to include sorghum-sudangrass crosses) will provide pasture during mid-summer when cool-season grasses are less productive. If rotationally grazed or rested after complete grazing, sudangrass will furnish two or three grazings during the summer or early fall. Any excess growth can be harvested for hay or silage. Seeding sudangrass in 14-inch rows permits the sheep to walk between rows, thus reducing trampling loss. Some improved varieties are lower in prussic acid content and can be grazed to shorter heights than some older varieties.

A combination of wheat and sudangrass utilizes the land better than either crop grown alone, since they will provide forage for sheep or lambs from April to November! To realize the full benefits of a wheat-sudangrass doublecrop pasture, follow this schedule for planting and grazing:

- 1. Plow and seed winter wheat in late August or early September. Wheat resistant to the Hessian fly should be sown.

- 2. Graze the wheat in October and early November as a breeding pasture for spring-lambing ewes or as a lactation pasture for fall-lambing ewes.
- 3. Rest the wheat from November 15 to April 1.
- 4. Graze the wheat again in April and early May as a lactation pasture for spring-lambing ewes or as a breeding pasture for fall-lambing ewes.
- 5. Plow or disc the wheat in late May, and seed to sudangrass in 14-inch rows.
- 6. Graze the sudangrass in late June, July and August with spring-born lambs or with ewes.
- 7. Plow or disc the sudangrass and seed to winter wheat in late August or early September.

Tall Fescue for Winter Pasture

Winter pasture reduces the need for more expensive harvested forages and cuts the cost of maintaining ewes over that period. Tall fescue can provide considerable pasture from December through March and is well adapted for winter grazing. Tall fescue develops a sod dense enough to support the weight of the ewe under wet conditions.

In a 2-year Purdue University study, pregnant ewes on tall fescue pasture supplemented with 0.5-0.75 pound of shelled corn daily for 70 and 84 days prior to lambing in March, performed as well as pregnant ewes on alfalfa haylage in dry lot. Their performance also equaled ewes on fescue pasture supplemented with either 1 pound of haylage per day or lick tank containing liquid urea (32% crude protein). Winter feed costs for ewes grazing the supplemented fescue pasture were reduced from 30 to 50 percent.

Here are the management procedures recommended when using tall fescue as a winter pasture.

- 1. Graze the early spring growth with ewes and lambs in May and early June.
- 2. Round-bale or stack the second growth in June and July and store for a reserve source of feed.
- 3. Fertilize the pasture with 50 pounds per acre of nitrogen in late August to stimulate fall growth. Ammonium nitrate is the preferred N fertilizer source for grass pastures. Do not graze until December 1.

- 4. Graze as winter pasture from December 1 to April 1, utilizing the round bales or stacks as needed. Provide during this period a temporary windbreak or shelter against winter storms.
- 5. Inject ewes with vitamins A, D and E as insurance against deficiencies and supply a salt-mineral mixture free choice.
- 6. Give pregnant ewes 0.5-0.75 pound of shelled corn daily during the last month of gestation.

Corn and Other Harvested Crop Residues

Non-pregnant ewes or ewes in the first 15 weeks of gestation can utilize corn stalks, leaves, shucks and other low-quality residues at a savings of 20-50 percent of usual feed costs. Corn residue may be grazed or collected in a stacker for later use. The exercise the ewes get when they glean the field is beneficial during early gestation.

Ewes should be vaccinated with *Clostridium perfringens* type D toxoid 2 weeks before grazing to prevent enterotoxemia (over-eating disease). In some cases, it may be necessary to limit the grazing area or maintain a high stocking rate to prevent diarrhea.

Water and a free choice salt-mineral mixture should always be provided. Having grass pasture next to the cornfield is desirable to help balance nutrient and feed intake. As ewes approach the last 4-6 weeks of gestation, they should be removed from the field and placed on a winter fescue pasture or in dry lot.

HARVESTED FORAGES FOR SHEEP

The most satisfactory harvested forage for ewes is good quality alfalfa hay, although other high-quality legumes are almost as good. Alfalfa hay furnishes adequate protein, necessary vitamins and minerals. Other satisfactory harvested forages include legume-grass silage, corn silage and haylage (low-moisture silage). Three pounds of corn silage or legume-grass silage or 2 pounds of haylage are approximately equivalent in dry matter content to 1 pound of hay.

Legume-grass silage or haylage usually furnishes adequate protein for ewes, but a corn silage ration will require additional protein and minerals. Soybean meal at a rate of 0.2 pound per ewe daily should be added to corn silage, with a mineral-salt mixture available free choice. Another way to supplement corn silage is to add 10 pounds of urea or 10 pounds of limestone per ton of 65 percent moisture silage at the time of ensiling. Uniform mixing is necessary if this supplementation method is to be successful.

MANAGING SHEEP ON PASTURE

Animal performance and enterprise profitability depend, in no small measure, on how well the pasture is managed and utilized. Presented here are nine basic management practices that optimize the productivity of both the animals and the land they graze. How these practices can be applied to meet the forage needs of a 100-ewe flock on 30 acres is then discussed.

Recommended Pasture Management Practices

- 1. Subdivide large pastures into paddocks for rotational grazing at a high stocking rate. An electric fence can be erected at a reasonable cost and easily moved. Rotational grazing reduces internal parasite infestation of sheep.
- 2. Vary the stocking rate to coincide with pasture productivity. This should result in greater plant vigor, more forage production and less weed problems. Too heavy a stocking rate eventually decreases the pasture stand and forage yield, while too low a rate reduces carrying capacity and results in forage waste.
- 3. Reduce the intake of non-lactating ewes by restricting their grazing time. A pasture's carrying capacity can be increased greatly when non-lactating ewes are restricted to 50 percent of the normal grazing time each week. Increasing the stocking rate and rotating pastures during the non-lactating period also reduces intake.
- 4. Adjust the lambing season to coincide with maximum pasture growth periods in the spring or fall. Cool-season perennial grasses reach their maximum growth in May and June and a second but smaller peak period in the fall. Ewes lambing in March or April make better use of spring pasture growth than ewes that lamb in January or February. These winter lambing ewes must be fed harvested feeds during the period of greatest nutritional needs. Ewes that lamb in September or October make good use of fall pasture growth during lactation. After weaning, which is the period of lowest nutritional needs, these ewes can be maintained on winter pasture, reducing the need for harvested forages.
- 5. Regardless of lambing time, provide additional energy in the form of shelled corn to "flush" at breeding, during the last 4-6 weeks of pregnancy, and in the first 8 weeks of lactation. If low-quality forages are used, protein supplements are also recommended.
- 6. Separate ewes with single lambs from those with twin lambs, and creep feed the twin lambs on pasture. To reduce internal parasite infestation in lambs, separate the ewes and lambs daily. Allow the lambs to graze clean pasture while creep feeding.

- 7. If you raise both cattle and sheep, consider grazing them together. Sheep prefer shorter and more tender grasses, while cattle will consume less tender growth. In addition, cattle may help in reducing predator problems. A ratio of 3-5 sheep for each beef animal will insure that the pasture is well utilized. Ewes nursing lambs may graze first and then be followed by cattle.
- 8. Control weeds and thistles. Although sheep will consume 90 percent of the weeds in a pasture, thistles and some other weeds will be left alone. Non-grazed weeds should be mowed when the animals are rotated to another area or controlled with an approved herbicide.
- 9. Fertilize pastures according to soil test. Optimum pasture production can only be attained with a proper fertilization program.

Example Pasture Program for a 100-Ewe Flock

Properly fertilized and managed, 30 acres should adequately supply the pasture and harvested forages to support 100 ewes and 150 lambs during the year. This acreage does not provide the concentrates needed such as shelled corn, which must be produced on other acreage or purchased. Recognizing that the amount of land required for this size flock will vary with climatic conditions, soil type and forage adaptability, the following is a reasonable guide for pasture program planning.

The 30 acres are divided into three fields of 10 acres each (stocking rate of 10 ewes and 15 lambs per acre) and managed as such:

Field A--Temporary pasture crops.

1. Plow and seed to winter wheat in late August.
2. Graze in October and early November as a breeding pasture for spring-lambing ewes or a lactation pasture for fall-lambing ewes. 3. Rest until April 1.
4. Graze in April and early May as a lactation pasture for spring-lambing ewes or a breeding pasture for fall-lambing ewes.
5. Plow in late May and seed to sudangrass in 14-inch rows.
6. Graze in June and July with spring-born lambs.

Field B--Legume-grass mixture for permanent pasture or harvested forages.

1. Harvest early spring growth for hay, haylage or silage in May or early June.

2. Graze the regrowth with non-lactating spring-lambing ewes or with gestating fall-lambing ewes in July and August.

3. Use as an emergency pasture or for additional forage production as needed.

Field C--Tall fescue for winter pasture.

1. Harvest early spring growth for forage, or graze with ewes and lambs in May and June.

2. Round-bale or stack the second growth in July and August and store in the field.

3. Defer fall grazing until December 1.

4. Graze as a winter pasture from December 1 to April 1, utilizing round bales or stacks when needed.

Ewes lambing in January may not need the full 30 acres, since they will be on a maintenance diet during most of the pasture season. In that case, the temporary pasture (Field A) can be eliminated from the program or used to produce additional forages for the confined winterfeeding period. Ewes on the accelerated program can use Field A for two of the three lambing periods in May and September.

SUMMARY

Traditionally, sheep have been raised in Indiana at relatively low stocking rates. In many cases, they are grazed on unimproved pastures or merely serve as "weed killers" or "lawn mowers. Under these conditions, sheep performance and profits are low when compared to other livestock.

To compete economically, sheep operations must be intensified to increase returns per acre. Producers with adequate forage acreage can best do this by adjusting lambing programs with available forage production and by improving pasture utilization. When properly managed and used, improved pastures should support eight to ten ewes and their unweaned lambs or 20-25 weaned lambs per acre. Producers with limited forage acreage should consider a semi-confinement program, where the lambs are fed in confinement while the ewes make maximum use of pastures.

Footnotes

* Sheep-days is the number of sheep per acre that a particular pasture will support for a specified number of days. e.g., 350 sheep-days for wheat means that acre will support 10 sheep for 35 days.

** Harvest the excess growth of tall grasses in May and June for hay, haylage or silage.

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