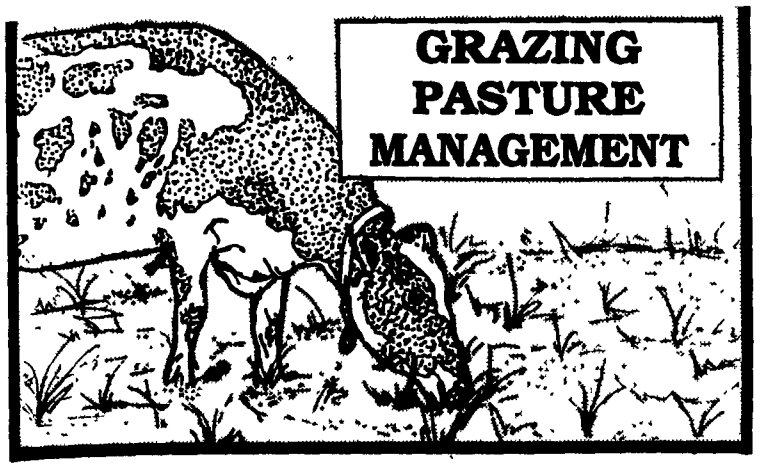

DETERMINING STOCKING RATES BY FEED BUDGETING

W. J. Parker, L. D. Muller
S. L. Fales
Penn State

In a previous article, we discussed why stocking rate is a very important factor in a pasture farming system.

To briefly recap, stocking rate (or the number of animals per unit area — cows/acre) affects livestock herbage intake, the types of pasture species present in the sward, and the amount of herbage utilized. Selecting an appropriate stocking rate is complicated by the large amount of variation in herbage growth between years and between months within years.

Planning is therefore usually based on an average year and other strategies (for example, feeding of additional supplements, changing the herd size, or making less hay/silage) are used to compensate for variation in herbage growth within a season.

A feed budget provides one way to estimate what stocking rate should be adopted. In an earlier article, a feed budget was defined as a numerical description if a grazing system through time. The feed budget describes the balance between feed supply (herbage growth + cut forage + concentrates) and animal feed requirements (number of animals x intake per animal) through time. A feed budget can therefore be likened to a cash flow budget which shows the relationship between income and expenditure over time.

The construction and operation of a feed budget is relatively simple. The data required are:

- Herbage growth rates (lb DM/acre/day).
- Pasture area (acres).
- Livestock numbers by class (milking cows, dry cows etc.).
- Livestock feed intake requirements of pasture, cut forage, and concentrates (lb DM/head day).

The budget can be prepared on a daily, weekly, biweekly, monthly, or seasonal basis. For strategic planning (that is, developing an overall grazing plan), monthly time periods are commonly used.

A simplified example monthly budget for milking cows only for the first 3 months of the grazing season is shown below. It is assuming that April 16 is the turnout date, that the average herbage cover at this time is 1,200 pounds DM/acre and that estimated cows are averaging about 55 pounds of milk per day.

EXAMPLE FEED BUDGET FOR A DAIRY FARM

	April	May	June
Net herbage growth (lb DM acre/day)	30	40	35
Days per month	15	31	30
Pasture area (acres)	50	50	50
TOTAL HERBAGE SUPPLY (lb DM/month)	22500	62000	52500
Milking cows (head)	50	50	50
Herbage intake (lb DM/cow/day)	24	27	27
Concentrate intake (lb DM/month)	18	15	15
TOTAL HERBAGE DEMAND (lb DM/month)	18000	41850	40500
HERBAGE SUPPLY-DEMAND (lb DM/month)	4500	20150	12000
Herbage cover change (lb DM/acre)	90	403	240
END OF MONTH HERBAGE COVER (lb DM/acre)	1290	1693	1933

This shows that 22,500 lb. pasture DM is expected to be produced during the second half of April (30 lb. DM/acre/day x 15 days x 50 acres of pasture). The feed demand for the milking cows is 42 lb. DM/cow/day (24 lb pasture DM + 18 lb. concentrate DM) or a monthly pasture requirement of 18,000 lb. DM (24 lb. DM/day x 50 cows x 15 days). The balance between herbage supply and demand is 22,500 - 18,000 = 4,500 lb. DM. This means that the average pasture cover is expected to increase by 90 lb. DM/acre (2,250 lb. Dm/50 acres) to 1,290 lb. DM/acre by the end of April.

Similar calculations are completed for May and June (except the amount of grain in the ration has been decreased slightly to 15 lb./cow/day as the cows have adapted to grazing). The calculations should be extended through to late October (or the end of the grazing season). A feed budget format for this purpose can easily be set up with a computer spreadsheet or with a calculator and note pad.

While the feed budget makes a lot of assumptions about herbage quality and losses, its main strength is that an overview of the grazing system can be quickly obtained. The accumulating surplus in May indicates that silage/hay should be made, a declining herbage cover in summer indicates that increased supplementation is required and so on. Thus, you can quickly gauge what stocking rate is suited to your pasture conditions (i..e. when herbage growth and animal intake requirements are approximately balanced for the season).

Alternatively the budget shows how much of the daily ration can be provided by pasture. This is an important piece of information, especially where the pasture area is small relative to the number of cows (i.e. the stocking rate is high). On these farms the feed budget may show that it would be more profitable to use pastures to provide nearly all the the ration for the dry cows and replacement heifers.

An immediate limitation of feed budgeting for Pennsylvania dairymen is the lack of herbage growth information in contrast to availability to measure forage production under a stored feeding program. This data is obviously a basic part of a feed budget plan, and is the reason why a lot of emphasis has been given to measurement of herbage growth and quality in the Penn State pasture experiments.

Computer programs are also being developed that will predict how herbage grows from temperature, rainfall, day length, and soil fertility data. This means that herbage growth rates could be predicted for individual farms at a low cost, and will also enable the effect of different climate conditions (for example, a wet spring or dry summer) to be estimated. This type of information is very useful for developing contingency plans (such as, what should I do if the original plan for an average growing season is not working?)

If you are not already collecting rainfall and soil temperature data (at 4-inch depth), then we believe that it would be worth starting. It will prove an excellent investment when the computer models become available (maybe in as little as two years time), but also has very useful applications for other aspects of your farming operation (e.g. corn planting). You can also start to collect herbage growth rate data using one of the techniques that we described in an earlier article, "Techniques For Measuring the Rate of Herbage Growth — Here Are Some Formulas For Planned Grazing."

If you are using intensive grazing, we would recommend that you take the time to construct a feed budget for your farm. You will be pleasantly surprised how much this can contribute to improving your pasture management, getting the stocking rate correct for your farm, and increasing the profitability and profitability of grazing.

Forage Growers Can Direct-Seed With Companion Crop

ST. PAUL, Minn. — Forage growers who demand high-quality alfalfa that results from direct-seeding, yet require a companion crop to control erosion during stand establishment, needn't despair. They can reap the benefits of both practices by "direct-seeding" with a companion crop, said Dr. Roger Becker, extension agronomist from the University of Minnesota.

In research comparing solo and companion alfalfa stand establishment with and without herbicides, Becker evaluated alfalfa yield and quality to determine the most effective stand establishment techniques.

Usually the highest alfalfa yields and highest relative feed values (RFV) were obtained by seeding alfalfa with oats, then removing the oats during early growth with a postemergent grass herbicide — what he calls "direct-seeding" with a companion crop.

Traditional direct-seeded alfalfa treated with a postemergent grass herbicide for weed control also scored high in the yield and quality categories.

"Companion cropping with alfalfa is a traditional practice that has served the Midwest well, with more than 80 percent of farmers using this system," said Becker. However, companion crops, like weeds, compete with the alfalfa for water, sunlight, and space. As that competition continues, alfalfa yields and forage quality decline.

"Direct-seeding" with a companion crop protects soil from erosion, conserves soil moisture, and prevents weed invasion, explained Becker.

To "direct-seed" with a companion crop, Becker suggests planting an economical oat seed and spraying the oats early (when two to six inches tall) with a postemergent herbicide. Because the crop will be removed early, growers can increase the oat seeding rate from the typically recommended 1.5 bushels per acre, to 2 to 2.5 bushels per acre. The oat residue left behind will help protect alfalfa from initial weed invasion and a secondary weed flush.

Becker presented this information in "Weed Control in Alfalfa," a satellite videoconference sponsored by the agricultural products division of BASF Corporation.

See Section B
Pages 22 - 27