Optimizing Forage Production During the Growing Season

Robert Kallenbach
Professor
University of Missouri

Cow/calf producers rely on forage to supply more than 85% of all feed units to the herd. Yet, many beef producers do not think critically about the contribution of forages to the profitability of their beef operations. They should. As far as forages go, pasture is a far more economical way to deliver feed to cattle than is hay or other stored forages. Recent analyses show that forage from pasture costs 40 to 60% less than stored forage (hay, silage) per pound of beef produced. That is substantial. And records supplied by IRM-SPA from real beef operations show that the most profitable producers feed the least stored forage, relying on pasture more days of the year.

That sounds great. But you might ask, "How can I reasonably get more from my pasture?" And the frequent follow up statement is "You know, there are limits to what I can do." Good points.

So, let's tackle this in several phases.

Perhaps nothing has more influence on the output from forage-based systems than does stocking rate. Often producers ask me "What stocking rate should I use?" It is a difficult question to answer without knowing more. Optimal stocking rate (animals per acre) varies both with livestock requirements (animal size, stage of lactation, etc.) and forage production. For a typical cow-calf operation, we might reasonably assume that each pair consumes 6 to 7 tons of feed annually. On highly productive soils and under good management, we can produce over 7 tons of forage per acre. On lesser sites (and these are more common) 2.5 tons per acre is common. Assuming forage utilization (I'll get to that in a minute) is 60% over the course of the year (and this would be pretty good), the optimum stocking rate from these two examples varies from 1.5 acres per cow-calf pair to over 4.3 acres per pair. That's a pretty big difference.

The implications from this example are twofold (Fig. 1). If we are under stocked (that is too few cows for the forage available), individual animal performance is usually acceptable, but overall profitability falls because we have limited the number of animals we can sell. On the other hand, if too many animals are introduced to the system, then gain per unit area can be high, but output per animal suffers along with profitability in many cases. Many folks starting a "new grazing system" often think that stocking rate can be increased. This may be true, but only if either forage production or forage utilization increase. Otherwise, increasing stocking rate would likely lead to more problems than it would solve.

Prepared for the Cornbelt Cow Calf Conference, Ottumwa, Iowa February 27, 2010

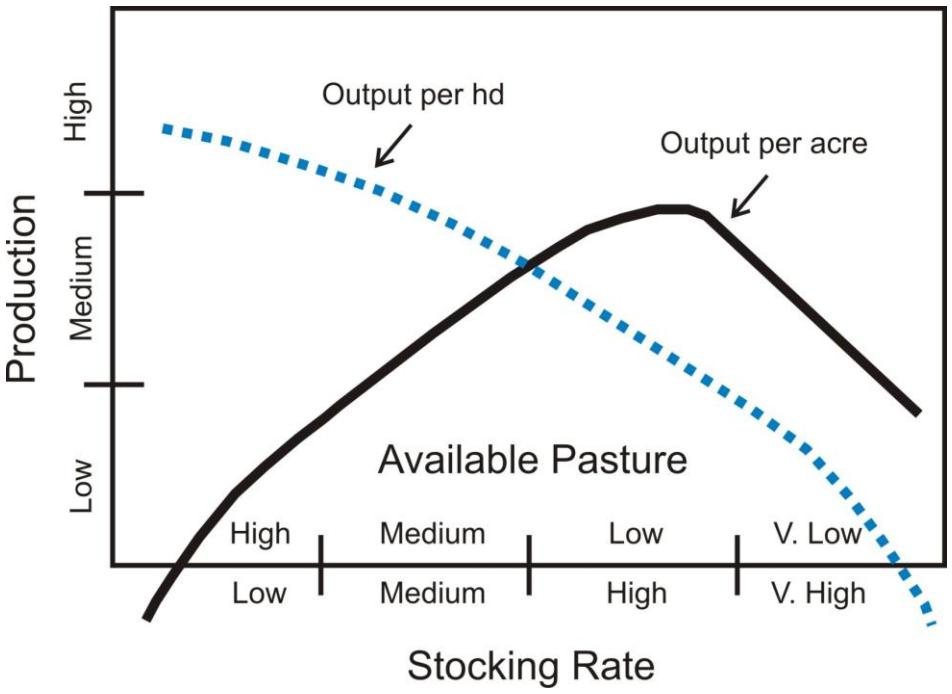

Figure 1. How stocking rate influences animal production in relation to forage production.

I have mentioned a few times the term "forage utilization". Forage utilization is simply the amount of forage animals consume compared to what is available. For instance, if there is 3,000 lb/acre of forage in a pasture when animals are first introduced to it but they are able to eat only 2,000 lb/acre, then forage utilization for that period would be 66%. Season-long forage utilization rates of 65% or greater can be achieved with good management. Many folks find rotational stocking as one way to do that, but other methods such as strip grazing, creep grazing, first-last grazing, and other methods can be as efficient. Almost all of these are better than season-long set stocking at improving forage utilization. The point is that increasing forage utilization is about the fastest way to increase beef output without altering forage growth rates.

Another option to optimizing forage production is to simply grow more forage. Commonly, we think of changing forage species or using fertilizers to improve forage production. That often works, but in a grazing system it does not always lead to profitability. In grazing systems it is the "seasonality" of forage production that matters as much or more than total annual tonnage produced.

As an example, let's consider the two forages in Fig.2. Notice that forage "A" and forage "B" have the same annual yield. However, forage "A" produces 80% of its growth in May where forage "B" has a more even distribution of yield throughout the growing season. Forage "A" might be great for hay production, but forage "B" would be far superior for season-long grazing.

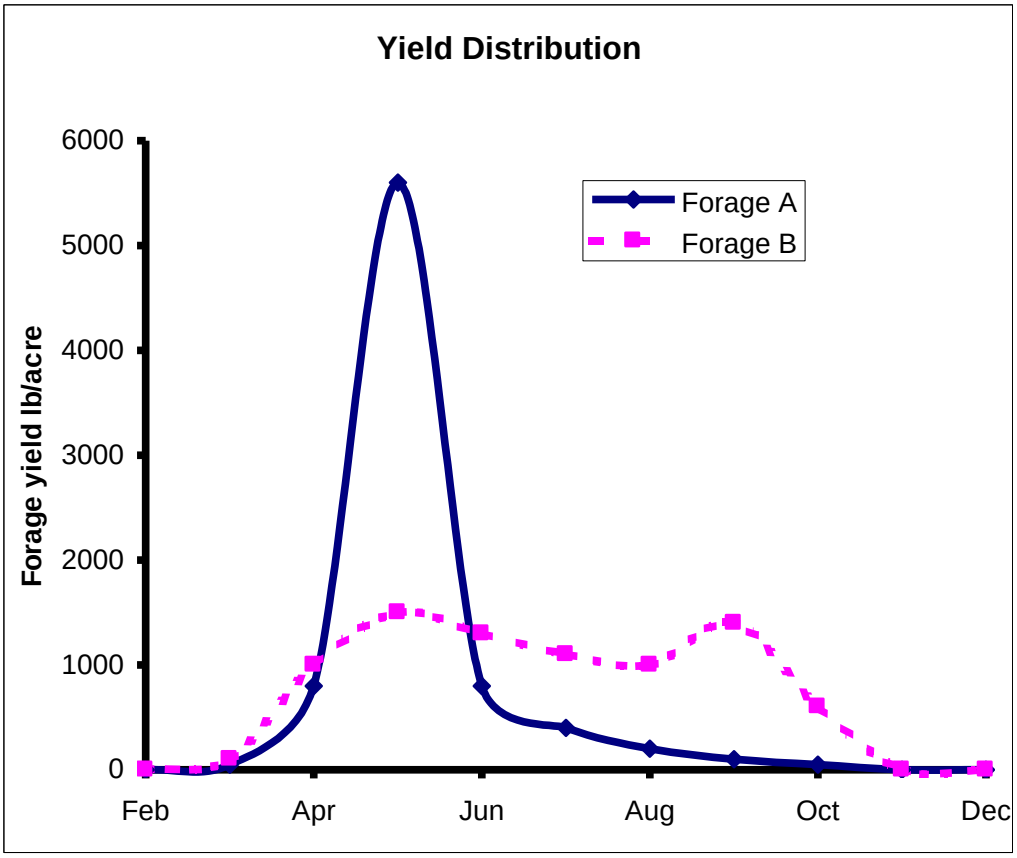

Fig. 2. Yield distribution of two unique forages.

Alternatively, we could use an application of fertilizer to increase forage production. Commonly, N fertilizer is applied in early spring, when cool-season grasses begin their first growth. This almost always increases forage production, but it only rarely pays off in cow-calf operations in the Midwest. You might wonder why. The reason is that forage production in spring almost always exceeds the animal's ability to consume it in a timely manner. Rather a better approach is to use N fertilizer in either late spring to extend grazing into summer, and/or in late-summer to maximize fall growth.

Adding legumes to pastures is another practice with little cost and big dividends. Legumes - primarily red and white clover, birdsfoot trefoil, and/or alfalfa - should be a part of every cool-season based pasture in Iowa. Legumes are typically of higher quality and are more palatable than are grasses. The downside is that grasses tend to persist longer. So legumes have to be reseeded or allowed to reseed to keep them in the stand. In short, your goal is to have pastures that are about 30% legumes and 70% grass.

While there are several factors that influence forage production during the growing season, getting the right stocking rate for your land, optimizing forage utilization, and keeping legumes in the stand are those with the largest payoffs.