

# Balancing Act

If you've been disappointed with calf gains from a ration you thought would produce top performers, take a look at information RFQ provides.

by *Corinne Blender*

**Y**ou spent time with your nutritionist; the ration was balanced.

The relative feed value (RFV) index was high; you paid a premium for your forage.

You crawled out of bed before sunrise; the feed was delivered on time.

So why didn't the calves perform as expected?

"In the United States for the last 35 years or so we have used acid detergent fiber (ADF) to estimate the energy content of a forage, and then we balanced rations accordingly. Many nutritionists, particularly those working with high-performance animals, have been disappointed every once in awhile that when they balanced that ration the animals didn't gain weight as we would have expected," says Dan Undersander, University of Wisconsin (UW) Extension forage specialist.

A beef producer who feeds a high-forage diet or purchases hay may be familiar with the term RFV. RFV has been widely used to assign forage lots to animal groups according to their quality need. It has also been used to rank forage for sale and for inventorying.

RFV measures two different types of fiber — neutral detergent fiber (NDF) and ADF. Testing for RFV is based on the concept of digestible dry matter (DDM) intake relative to a standard forage, that being full-bloom alfalfa.

Dry-matter intake (DMI) was estimated from NDF, and DDM from ADF. The constant, 1.29, was chosen so that RFV equals 100 for full-bloom alfalfa. The constant was the expected digestible DMI, as a percent of body weight, for full-bloom alfalfa based on animal data, according to a paper co-authored by Undersander and John Moore, professor emeritus, University of Florida (UF).

"It's important to remember that acid detergent fiber was an estimate of the

digestibility," Undersander points out. "The concept always was that the less acid detergent fiber, the more digestible the forage was."

Undersander and Moore say the problem with this approach is that it assumes ADF has a constant relationship to digestibility, since digestibility is calculated from ADF. But research has shown considerable variation in the digestibility of the dry matter (DM), relative to the ADF content.

A few years ago, the National Research Council (NRC) recognized this difference and came out with a new recommendation when considering forages in rations, Undersander says. "The National Research Council recommended that we start using digestible fiber as an estimate of energy content, and then calculate what we would call a TDN, or total digestible nutrients," he adds.

TDN, a concept actually developed in the early 1900s, requires that each nutrient type in a forage have a separate estimated digestibility,

and then those outcomes are summed together. "We backed away from it from 1970 on and used ADF to estimate that sum simply because it was a quick, cheap, simple, easy task. It put us in the right ballpark; it was just not as accurate as we need to be for this day," Undersander says.

Nutrition specialists found, however, that a high RFV index didn't necessarily mean the cattle would perform well on that forage.

"The problem is the assumption that all fiber has the same digestibility," Undersander says. "We know that's not true, and, in particular, we know that grasses have a higher proportion of their fiber that is digestible than legumes. When we used relative feed value, grasses always came out looking very poor and much lower than

**RFQ takes into account digestibility, which can improve ration formulations.**

what animal performance would have justified.”

### Beyond RFV to RFQ

Undersander and a team of researchers began looking four or five years ago for a way to incorporate the new understanding of the role of digestibility. The researchers proposed a new index, called relative forage quality (RFQ). It uses the same concept behind the outdated RFV index, except TDN is used rather than DDM. RFQ will require that TDN and intake be calculated using an *in vitro*, or “in test tube,” estimate of digestible fiber.

“The most accurate method to determine forage quality is to feed the forage directly to a group of animals and see how they perform. Since this is neither logistically nor financially feasible as a method to quickly and economically determine forage quality, we can only estimate potential animal performance using laboratory methods that correlate to animal performance,”

Undersander says in a report on the UW Web site ([www.progressivedairy-hay.com/pub/hay%20archive/July-August%202002/Relative%20Forage%20Quality.htm](http://www.progressivedairy-hay.com/pub/hay%20archive/July-August%202002/Relative%20Forage%20Quality.htm)). “While RFV has been very valuable for marketing alfalfa hay, it has not been as useful or reliable as would be desirable in predicting livestock performance and/or building rations, especially for grasses and corn silage.”

By working with the forage-testing labs to develop the near infrared equations, Undersander says, the tests have been made available to cattlemen and growers.

### What does RFQ tell us?

That’s a tough question, says Russ Fisher, a dairy nutritionist at Klaphake Feed Mill Inc. of Melrose, Minn. RFQ is new to the hay market — it was just introduced mainstream at the beginning of the 2003 hay season.

Fisher says limited information in a limited amount of time doesn’t provide a lot of facts about how RFQ may be used in the future, but there are certain things a nutritionist can gather from the test.

“I’m looking for digestible fiber,” Fisher says. “We know that indigestible fiber is going to create gut fill on these animals.” The end result is less available dietary energy, reduced performance and poorer feed efficiency.

Because RFQ uses actual NDF digestibility, nutritionists and beef producers will have a better idea of how the forage will allow the animal to perform.

“Most people are using NDF digestibility as a problem solver. When they are balancing rations and they’ve put the ration

out there and something isn’t happening, then they might run an NDF digestibility on it,” says Mark Heidegerken, Stearns DHIA (Dairy Herd Improvement Association) Central Lab, Sauk Centre, Minn. Heidegerken says if they do an NDF digestibility on a hay or haylage, then they do get the RFQ. But he says it’s more of a byproduct because the nutritionists with whom his lab works aren’t plugging the RFQ value into an equation to balance a ration.

“I’ve used RFQ strictly from a standpoint of evaluating a quality of forage that I have,” Fisher says. RFQ tells him if he can get by with a higher percentage of forages in a ration vs. having to come in with more byproducts, such as cottonseed, wheat midds, soy hulls or beet pulp, to get the desired performance.

While RFQ isn’t a magic number, Fisher says, it will help producers in terms of what forages to plant, as well as during what times of the year they should be able to feed forages of different qualities.

“The bottom line is,” he says, “the more digestible a feedstuff is, and in this case, the more digestible the fiber, the higher energy value that that feedstuff is going to have. That means they are going to be able to buy that much less grain supplement to supplement that forage with and so forth.”

While Fisher does specialize in dairy nutrition, he says beef producers seek high performance from their cattle just as dairymen do. He points out, however, that he has found that the ration isn’t always the top factor limiting performance.

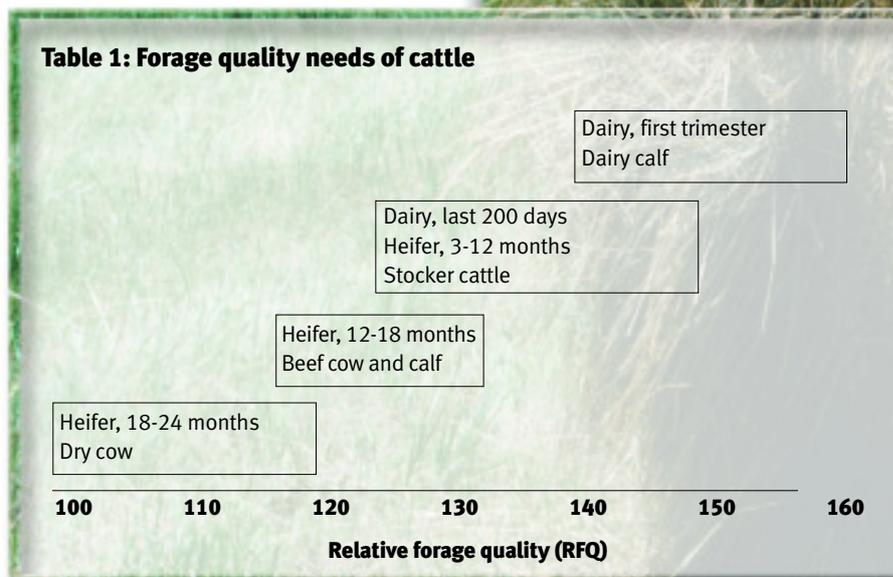
“Management has got to be up to par; otherwise, digestibility is not your limiting issue,” Fisher states. “If you have a well-managed farm, digestibility does come into play. I think what you need to do is to run your forages with the NDF digestibility assay

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— Dan Undersander

**Table 1: Forage quality needs of cattle**



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and create somewhat of a baseline to find out where your particular situation or farm is at. As you proceed forward, whether your animals become more productive or less productive, you always have that baseline to fall back on.

“I think it could be very, very dangerous to compare to your neighbors what that digestibility is and so forth. So you need to create baseline for your own given farm at this point and then go from there,” Fisher says.

### Added costs

There is an added cost to testing for the RFQ index.

“The difference is that you need to run the NDF digestibly in addition to your regular NIR (near-infrared reflectance) test,” Heidgerken says. To run a forage through the equation developed by Undersander, the UW and other researchers, he says his lab charges an extra \$8. The total cost for the RFQ test is \$18, but he says other labs may be charging more.

The added cost may provide greater returns for sellers and allow hay buyers to

purchase the quality of hay they need for their operations. Each test index, whether it be RFV or RFQ (see Table 1 on page 207 for RFQ value requirements), provides a point value, which is then how hay is marketed.

“The overall average, for example on a hay sample, comes out relatively the same for RFV and RFQ. But on some hay samples we have seen 20 to 30 points difference,” Heidgerken says. He hasn’t had any clear results that offer him insight as to what percentage of samples would be better represented through an RFQ test vs. the RFV, but there is still more to learn about this new index.

“The RFQ is really for the purpose of ranking hays for buying or selling. So if there is some purchasing involved, if there is some selling involved, then that’s where RFQ would come in,” Undersander says.

### Not all fiber is created equal

“By using RFQ, which responds more the way the animal does, you aren’t going to be surprised by paying a certain amount of money and expecting a certain quality of hay, and then finding your animals don’t perform

as you expect,” Undersander says.

But because RFQ is still new, there will be a learning curve, and producers may run into differences in lab testing, he cautions.

“Some labs are still estimating TDN just from ADF, so you have to be sure that the TDN is truly a summative equation or that it is the sum of four components rather than just estimated from ADF,” Undersander warns.

The nice thing about the NDF digestibility, a part of the RFQ value, is that it actually provides a quantifiable number that can be applied to a forage to provide a sense of direction.

“One of the things that RFQ does give you, or part of the equation for calculating relative feed quality, is digestibility,” Fisher says. “And that’s the number that I’m interested in. I do plug that into my computer — the digestibility. If I know the digestibility of the feedstuffs I’m using, then I can determine digestibility in my overall ration, and you can certainly correlate that to animal productivity.”

