

What's Holding Us Back? Raising the Alfalfa Yield Bar

Michael Russelle, Deborah Samac, USDA-ARS-St. Paul

Measuring yield of commodity crops is easy – weight and moisture content are determined on delivery. Consequently, yield reports can be made reliably to the agencies that track crop production, such as the USDA-National Agricultural Statistics Service (NASS). With forages, it is not as simple.

Commercial hay growers know the weight and moisture content of the loads they sell. They also may weigh loads transported from the field to storage, and with representative sampling for moisture content, have a good idea of total crop dry matter. Like grain growers, they can report yield with reasonable accuracy.

But for those who feed forages to livestock directly, how many weigh hay or determine moisture content? It is even less likely yields of haylage are known, since rough estimates of volume stored in the silo, bunker, or bag often suffice.

Based on these situations alone, it is not surprising that questionable results in reports of hay and haylage production are found in the 5-year Census of Agriculture and the annual Agricultural Yield Survey.

So, why is it believed there is a problem? NASS provided a breakdown of dry hay yield by state, and examples are shown for two regions (Figure 1). Non-irrigated dry hay production in the Lake States show nearly 40% of farms reported whole-farm yields of less than 1.5 tons/ac. This implies many of those acres must have been newly established fields contributing only one or two harvests. More than 75% of farms reported yields of less than 3 tons/ac. It is less typical to harvest alfalfa during establishment year in the irrigated Pacific States, so the lack of low whole-farm yields is not surprising.

At the other end of the spectrum, however, there were farms in each region reporting whole-farm yields of more than 12 tons dry hay/ac. These are not obvious in the figure because they represent less than 0.1% of Lake State farms and about 0.5% of Pacific State farms. Such yields have not been achieved, to our knowledge, except in small plot trials.

How can these figures be explained? The problem may lie in the questions growers have been asked about alfalfa production. For example, in the 2007 Census, they were asked the number of acres harvested and the total tons harvested for both dry hay and haylage or greenchop. Census directions were: "...when both dry hay and haylage were cut from the same acres, report acres for each type. If two or more cuttings were made from the same acres, report acres for that item only once, but report total quantity harvested from all cuttings."

Some growers may have added haylage production to dry hay production, without adjusting for moisture. Haylage is assumed to be reported at 65% moisture and dry hay at 13% moisture. *If you have other ideas about high reported yields, please contact Michael Russelle or Deb Samac.*

But, even with these questions about the actual size of reported yields, these graphs tell an important story. The average yields were 2.7 tons/ac for non-irrigated alfalfa in the Lake States and 6.2 tons/ac for the irrigated Pacific States.

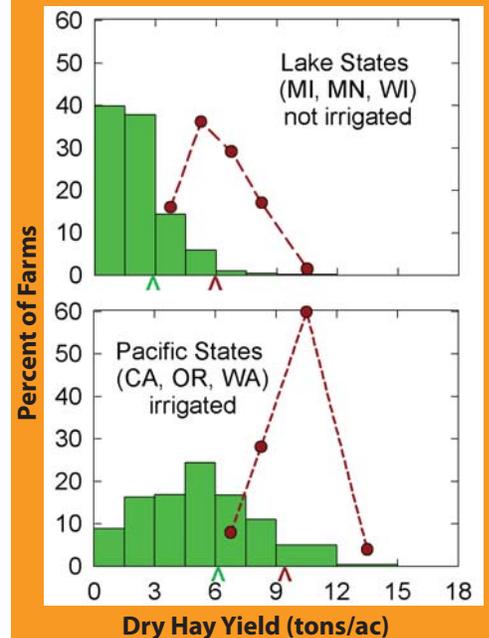
Accurate Census data is critically important as it is used to make decisions about many things including availability of operational loans and other funding, location and staffing of service centers, and farm policy. Additionally, participation in the Census is required by law and the same law protects the confidentiality of individual responses.

Watch your mail ... the Census will arrive late December.

Does cultivar trial information represent what can be achieved at a field scale? Although there is not a lot of data, Mike Rankin's field-scale research in Wisconsin has shown yields of at least 6 tons/ac each year. *Do you have measured yields and moisture content for your fields? If so, contact Michael Russelle or Deb Samac.*

Thus, both the Census of Agriculture and cultivar trials provide evidence that alfalfa production is not as high as it can be on most farms. Why does accurate yield information matter? If yield expectations (and net profit expectations) are low, farmers may be less willing to grow alfalfa or make investments to obtain higher yields. Also, national policies may not give sufficient credit to the contributions of alfalfa to the farm and national economy.

Figure 1. Yields of dry hay in the Lake States and Pacific States. The green bars are yields reported in the 2007 Census of Agriculture, with the average indicated by the green arrow. The red dots are yields reported from cultivar trials in the same states, with the average indicated by the red arrow.



Average state yields clearly do not indicate what yield levels are being achieved by many growers.

University cultivar trials give another view of what alfalfa yields can be achieved. A summary of the most recent cultivar trials is shown in Figure 1 (red dotted lines). Although these are small plot trials, they have been done at many locations across each region and represent most of the newest alfalfa cultivars. Average yields in the Lake States are 6 tons/ac and 9.5 tons/ac in the Pacific States.

How can more farmers become top producers? Field condition (drainage, pH, fertility, compaction, etc.), cultivar selection, harvest management, and pest control all affect crop yield. Plant diseases are clearly reducing yields. Crown rot diseases cause yield loss due to stand thinning and increased winterkill. Root rotting diseases, in particular *Aphanomyces* root rot, are having an increasing toll both during establishment and on crop losses in mature stands. Research with foliar fungicides points to the potential for leaf diseases to reduce yield and quality when environmental conditions are ripe for outbreaks. However, information on which factors are affecting yields within a field and between neighboring farms is lacking.

In summary, there is a large yield gap between what 'average' producers report and what is achievable, and it is not known which factors are limiting yields in specific areas. A new research initiative is needed to determine: 1) actual on-farm alfalfa yields; 2) what factors are limiting alfalfa yields; and 3) educational and economic approaches to reducing the yield gap.

Contact information: Michael.Russelle@ars.usda.gov; Debby.Samac@ars.usda.gov