Predictive equations of alfalfa quality (PEAQ)

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Predictive equations of alfalfa quality (PEAQ)

From research on the relationships of measurable plant characteristics to forage quality has come a quite simple and relatively accurate estimate of the feeding quality of the standing alfalfa crop.

The method requires:

- The target average forage quality to be stored. (Example 150 RFV [relative feed value])
- A 2-square-foot frame
- A simple definition for alfalfa maturity based on easily identifiable traits.
- An estimate of the approximate percent harvest loss expected (10 percent loss under the best conditions; 15 percent may be average. (Expect higher losses under less than optimal harvest conditions.)

Estimating preharvest alfalfa quality using PEAQ:

STEP 1: Choose a representative 2-square-foot area in the field.

STEP 2: Determine the maturity stage of the most mature stem in that area using the following criteria:

<table>
<thead>
<tr>
<th>Stage</th>
<th>Stage Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetative</td>
<td>Stem over 12 inches tall with no visible buds or flowers.</td>
</tr>
<tr>
<td>Bud</td>
<td>Buds present on stem tip.</td>
</tr>
<tr>
<td>Flower</td>
<td>An open flower anywhere on the stem.</td>
</tr>
</tbody>
</table>

STEP 3: Measure the height (in inches) of the tallest stem in the 2-square-foot area. Measure from the soil surface (at the base of the crown) to the tip of the stem (not the tip of the highest leaf). Note that the tallest stem may not be the most mature stem.

STEP 4: Use a height/stage table or PEAQ stick (square yard stick that has the table information printed on three sides).

STEP 5: Repeat steps 1-4 in five representative areas of the field. Sample more times if the field is larger than 30 acres. Calculate or determine table values for RFV for each sample, then average the values. Tables also are available to estimate neutral detergent fiber (NDF) and acid detergent fiber (ADF).
Note: This procedure estimates quality of the standing alfalfa crop and does not account for changes in quality due to wilting, harvesting, and storage. Harvest and storage losses will raise NDF and ADF and lower RFV values.

**STEP 6:** Adjust the PEAQ estimate for anticipated harvest and storage loss:

**Example:** The average PEAQ estimate for May 15 plants is 190 RFV; subtract about 15-20 RFV units for an adjusted stored quality value; compare this with the stored forage quality target. Repeat this assessment of "adjusted" PEAQ estimates of standing crop quality every few days. Plan for and be ready to harvest when you reach the adjusted quality point.

An example:

Following this set of collection data, RFV of the standing crop is declining at a rate of about 3 to 4 RFV units per day through May, and the producer's goal is to store the crop at an average of 150 RFV. For a producer harvesting a relatively small amount of alfalfa, then the results of the May 20 PEAQ estimate would indicate that harvest should begin on about May 23 or 24 to achieve the stored forage quality target. A producer with several fields might use the data from the May 20 data as a guide to begin harvest and achieve an average stored RFV near the target for all fields.

<table>
<thead>
<tr>
<th>Sample Date</th>
<th>PEAQ Est. RFV (Relative Feed Value Index)</th>
<th>Harvest/Storage &quot;Adjustment&quot;</th>
<th>&quot;Adjusted&quot; RFV of Forage in Storage if Cut on Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 5</td>
<td>230</td>
<td>(230 x 10% = 23 RFV points)</td>
<td>= 207</td>
</tr>
<tr>
<td>May 10</td>
<td>210</td>
<td>(210 x 10% = 21 RFV points)</td>
<td>= 189</td>
</tr>
<tr>
<td>May 15</td>
<td>190</td>
<td>(190 x 10% = 19 RFV points)</td>
<td>= 171</td>
</tr>
<tr>
<td>May 20</td>
<td>175</td>
<td>(175 x 10% = 17 RFV points)</td>
<td>= 158</td>
</tr>
<tr>
<td>May 25</td>
<td>165</td>
<td>(165 x 10% = 16 RFV points)</td>
<td>= 149</td>
</tr>
</tbody>
</table>

If a producer will require 6 to 8 days to harvest all of the first cutting, consider beginning harvest a few days earlier than the exact target quality, so that the average forage quality stored is at the target level.

Other site-related or local conditions that may influence the decision:

- South-facing slopes develop faster than north-facing slopes.
- Stands on lighter textured soils develop faster than on heavier textured soils.
- Winter-injured stands should not be considered for a high-quality harvest and should be allowed to mature into early to mid-bloom stage to recover vigor.
- Newer, high-quality varieties may hold quality 2 to 3 days longer than standard varieties.
The PEAQ procedure is most accurate on good stands of healthy alfalfa and should not replace standard laboratory analysis, hay, or silage for ration balancing.

PEAQ sticks can be purchased from the Midwest Forage Association, using an order form found at [http://www.midwestforage.org/peaq.pdf](http://www.midwestforage.org/peaq.pdf) [1].

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