

www.agproud.com/articles/61019-tools-for-a-successful-forage-crop



Yellowing of plant leaves indicates a potassium (K) deficiency. *Image provided by Dr. Nicolas Cafaro La Menza.*

Tools for a successful forage crop

[Rebecca Kern-Lunbery \(/authors/1636-rebecca-kern-lunbery\)](#) and [Nick Ward \(/authors/7198-nick-ward\)](#)

February 12, 2025

Recently, the University of Nebraska and Arrow Seed put on a forage production and quality clinic. Dr. Nicolas Cafaro La Menza presented data comparing summer forage quality – yield, protein, total digestible nutrients (TDN) and relative forage quality (RFQ) – on several forage varieties and mixes provided by Arrow Seed company, and the varieties and mixes were ranked by cost of the seed per acre.

The comparison was done on plots at six locations in north-central Nebraska. Cafaro La Menza also presented data to show the characteristics of the soil across and within those six field locations. These experiments are part of a ranchers-led project sponsored by the North Central Sustainable Agriculture Research and Education program.

Here are the key takeaways from Cafaro La Menza's presentation:

- Soil pH was variable both across the fields as well as within the fields. Most places had a pH between 5 and 6 with the lower-end pH affecting soil nutrient availability.
- Soil organic matter (SOM) was low in these locations (less than 1.5% with cases lower than 1%), mostly sandy soils, but was also variable across and within fields. Soil conservation practices are encouraged and grazing forages over haying or silage can help. Also, minimum soil disturbance or no-till, when possible, will help to increase levels of SOM, especially in soil with values lower than 1%.
- Key nutrients (nitrogen [N], phosphorus [P], potassium [K], sulfur [S]) for the plants were variable both across and within fields. Soil tests indicated K and P needs in most cases and some S needs. However, S from irrigation water may cover up to one-half of the S requirements.
- There was no significant difference in forage quality across how these varieties performed. There were two exceptions. The first being one forage soybean that was planted only on one field that had higher protein and lower yield. The second being a mix that had a higher relative forage quality (RFQ) than the other varieties and mixes and a slightly higher TDN. No other forage quality data was presented.
- There were major differences in how much of the forage harvested were weeds and not the intended forage variety. A range of 10% to 35% of weed weight per ton was shown across fields sampled and forage types.

So with few differences in how the forage varieties performed, what does this mean for forage producers? It means forage quality and nutritional value truly hinge on good production management. Here are seven key points to quality forage production pre-planting and in the growing season.

1. Ask which varieties compete well with weeds

Find out if your seed dealer knows which varieties compete well with the weeds in your area. Cafaro La Menza's presentation showed the composition of forage as weeds ranging from 10% to 35% depending on the forage variety. Weeds are often nitrate accumulators and sometimes can contain other compounds that are toxic to livestock.

2. Soil fertility testing

Soil sampling plans can vary from composite to zone or intense grid sampling, but getting baseline data is key to making informed decisions on fertilizer use. Proper soil fertility levels will drive forage yield in both quantity and quality, all while making sure dollars are not wasted on unneeded fertilizer applications. In the case of nitrate-accumulating annuals such as sorghums and millets, overapplication of fertilizer is also a common cause of high-nitrate forages.

The variability of soil nutrients within the field presented by Cafaro La Menza indicates, if possible, these areas should receive different management responses. If precision fertilization is something you can do, then it would be of value to ensure optimal forage performance without excess fertilizer input.



Purple coloring on the edge of the plant indicates phosphorus (P) deficiency. *Image provided by Dr. Nicolas Cafaro La Menza.*

3. Adjusting soil pH

It is well understood that soil pH drives many functions in our soils. When soil pH is low, we can apply lime to ensure maximum plant health and soil nutrient availability. Conversely, high pH is a challenge to change from a practical and economic standpoint, so choosing forage varieties becomes our best tool to ensure stout forage production.

4. Test irrigation water

Not all irrigation water is equal; in fact, mineral content can vary widely in small areas. Having an irrigation water quality test can help inform the grower of potential salt issues or discover that you might have fertilizer value in nitrate, sulfur and potash content of the water.

5. Monitor plants through the growing season

Of course, we would recommend tissue testing to ensure proper plant nutrition, but visual evaluation of the forage crop is also key. Two deficiencies Cafaro La Menza touched on were phosphorus deficiency, noting that plants would have a purple color on the edges of their leaves, and potassium deficiency, in which plants have leaves turning yellowish-green, with brown around the margin and between veins and sometimes on tips.

6. Weed control

In addition to Cafaro La Menza, Dr. Milos Zarc presented herbicide options for the varieties in this study. He stressed that there are few approved options for millet. It is important to know what weeds are in the field throughout the growing season, and removing them may be more important depending on the weed. Common weeds such as pigweed contribute to a higher fiber and nitrate potential. Other weeds such as nightshade may result in a hay crop that cannot be fed out due to toxicity risk.

7. Timing of harvest or grazing

Something that comes to us every year as we consult and engage with producers about their forage analysis is why forage samples are lower quality than expected. Often when dealing with annual forages, producers are so afraid of nitrates and the animal health risks that go along with them, that they wait too long to cut their forage for hay. Cutting hay in the vegetative state and in the late afternoon to early evening will produce the best-quality hay. Similarly, grazing in the vegetative state will ensure animals are on a high level of nutrition and consuming high-quality forage.

In conclusion, while choosing the best forage variety for your geography, soil type and production goals is important, the lack of variation in the results presented at the clinic stresses the importance of production management. Decisions made today and during the growing season have a significant impact on forage quality. But producers have tools including soil sampling, water monitoring and tissue testing available to help them make the best possible decisions for their specific operation and goals.