Fatty Acid Decline Due to Pseudostem Increase in Maturing Pearl Millet

Maximizing grazing is important to producers seeking desirable fatty acid profiles for ruminant animal products, which has spurred on an increased consumer demand for grass-fed milk and meat. There is an increasing interest in utilizing warm-season annual grasses for supplemental summer grazing; however, little research has been conducted on the fatty acid composition of these species or how plant maturity affects their content.

In an article recently published in Agricultural & Environmental Letters, researchers evaluated pearl millet as a supplemental forage on an organic dairy in northwestern Vermont. They found that alpha-linolenic acid and overall fatty acid content decreased substantially on a whole-plant basis as plants matured; however, fatty acids declined minimally within laminae and pseudostem components. Lamina mass ratio was found to be a strong correlate of alpha-linolenic acid and total fatty acid content. The overall fatty acid decreases were largely due to a relative increase of pseudostem material, which had far lower fatty acid compared with the lamina.

These findings suggest that management practices that maximize the intake of laminae relative to pseudostem, especially in later maturity warm-season annual grasses, may help to alleviate the decline of fatty acid content and maximize fatty acid intake.

Adapted from Goossen, C.P., J. Kraft, and S.C. Bosworth. 2018. Fatty acids decrease in pearl millet forage from relative increases of pseudostem. Agric. Environ. Lett. 3:180016. View the open access article online at http://dx.doi.org/doi:10.2134/ael2018.03.0016

Cows grazing pearl millet—grazing management that optimizes lamina intake maximizes fatty acid intake. Photo courtesy of S.C. Bosworth.

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Corn Residue More Important than Cover Crops for Soil Carbon

Using cover crops with maize in the Upper Midwest has been shown to reduce nitrate loss and erosion, but it’s not clear whether cover crops contribute enough C in above- and belowground residue to increase soil C stocks. Planting different species of cover crops, as well as whether maize is harvested for silage or grain, lead to differences in the amount of residue C returned to the soil.

In an article recently published in Agronomy Journal, researchers report on a three-year field trial of rye and bluegrass cover crops under continuous grain or silage maize in southern Wisconsin. The net ecosystem C balance, or the difference between C inputs to the soil in the form of maize and cover crop residue and the C exported as harvested yield and soil respiration, was neutral in grain maize and negative in silage maize. Cover crops did not change the net ecosystem C balance compared with no-cover plots.

Even when cover crops are productive, maize residues are the dominant C input for the soil, so maintaining and increasing soil C is highly dependent on good residue management. Early seeding and increased belowground productivity of cover crops may make them more effective at increasing soil C over time as well as enhancing soil and nutrient retention.


Net ecosystem C balance (NECB) of maize/cover crop systems at Arlington, WI. Note that a positive NECB is a net increase in C for the soil system while a negative NECB indicates a net loss of C.

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