

## **The Role of Corn**

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Corn is a major crop for organic farmers as well as conventional farmers. Corn breeding has become dominated by a few mega-companies and less and less is done by public entities. This is because there is little or no funding for public breeding; in fact, in many cases public breeders are in danger of becoming anachronisms.

In the face of that, with support from an appropriation, we (USDA-ARS, Michael Fields Agricultural Institute, and Practical Farmers of Iowa) are running a public corn breeding and farmer outreach program for sustainable agriculture in the Midwest. Our strategy is new because we involve farmers, Universities, small seed companies, and the organic livestock industry. Our goal is to breed high-yielding corn hybrids with enhanced nutritional value. In particular we are increasing the content of the amino acids lysine and methionine in the grain of many of our corn cultivars. These amino acids are limiting for hogs, poultry, cattle, and humans. Organic farmers need crops with enhanced nutritional value. In many crops, such as corn, conventional breeding has taken the crop in the opposite direction.

The issue of synthetic methionine has been a perennial problem for the organic community. Organic poultry has a high demand for the amino acid methionine and its availability in feed strongly affects overall production, health, and profitability. It is difficult to obtain sufficient amounts of methionine from natural sources available to organic farmers. The organic poultry industry has petitioned the National Organic Standards Board several times to continue using synthetic methionine. The NOSB has granted continued allowances because it has proven difficult to find alternatives. The current ban date is October, 2010. It has been argued that synthetic methionine does not fit with the idea of organic because it is an environmentally damaging product to produce, and its use encourages simplified feeding programs and confinement operations. However, nutrient deficiencies also do not fit with the idea of organic.

In May, we presented the NOSB our results with the high methionine corn we have developed. Initial feeding trials by Organic Valley with broilers and by University of Minnesota with layers suggest that it will replace the need for synthetic methionine.

In short: 1) developing high methionine and lysine corn appears to be the most practical solution at this time to the poultry feed problem; 2) such corn will benefit both small, pasture-based operations and larger scale operations; and 3) high methionine and lysine corn will provide the opportunity for a home-grown, and sustainable solution to the methionine problem. Theoretical budgeting suggests it also may reduce the need for organic soybean meal supplementation by as much as half.

The NOSB considered high methionine corn to be the most practical solution to the problem and it intends to resolve the problem by 2010. They encourage our work and are asking for detailed reports on our progress at every meeting.

If high methionine corn is to be a practical solution we need to quickly develop and phase in reliable, high yielding cultivars. The plants need to be reliably resistant to stress, insects and disease. The cultivars we have now generally have a yield drag

of about 20-33%, but higher quantities of protein and essential amino acids. There is a trade off between quality and yield, with less soybean meal needed in feed when our corn is fed. At present we estimate that we need to bring yields up to at least 80-85% the level of those obtained with conventional hybrids in order to keep the price of feed the same.

High methionine corn would help chicken producers whether they are pastured or not. The access to pasture by organic poultry should be defined by NOSB regulation and not by diet. The methionine problem will not be resolved simply by access to pasture if standard production levels (almost one egg a day for layers) are to be attained. Chickens are not ruminants and they simply need a lot of high quality protein if they are to produce at economically feasible levels. Relative to corn, wheat is much lower in methionine and overall protein quality and is not a good option to pursue for replacing synthetic methionine. For various practical, biological, and environmental reasons, sesame meal, sunflower meal, soybean meal, and slow growing breeds will not resolve the methionine/production issue (see attachment).

Corn is not an inherently bad crop to be shunned by the organic community. Rather it is a great boon to all of humanity including organic farmers. Aside from it being a native heritage crop, corn is not only the most productive cereal crop that we can grow in North America, it also potentially has the most antioxidants, pre-vitamin A, and best protein quality of any cereal we can grow. In short, the enhancement of corn as a part of the methionine solution is in the interest of organic farmers.