

Fertilizer Is Not a Dirty Word

From Your IPNI Regional Director

High crop yields often come under scrutiny because of the need for fertilizers and the perception of their potential environmental impacts. Newspaper articles, letters, and advertisements from well-intended, but poorly informed, citizens seem to perpetuate old myths and clichés about modern fertilization practices.

The fact is, maintaining food production for the growing world population requires the use of new technology and the intensification of management to grow more food on the existing crop land...and fertilizer is essential for accomplishing this.

Sometimes I get tired of hearing about the negative fertilizer issues that are associated with our abundant, affordable, and nutritious food supply...a truly amazing supply of healthy food that is clearly unprecedented in the history of the world! Misapplication and misuse of agricultural fertilizers have undoubtedly occurred and their impact on the environment needs to be minimized. But to fairly judge the use of fertilizers, the risks of their use should be compared with their benefits for food production.

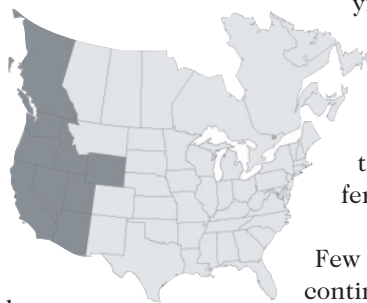
I have had people tell me that raising yields with commercial fertilizer is somehow immoral and dangerous for our soils... that strictly organic or specialty products will meet the demand of global food production. You probably know about the "stink test"... that is, when something smells fishy there is usually a reason why! Many of these ideas and claims just don't pass stink the test.

The time has come for all of us dispel myths about fertilizers and nutrients, and to convey a correct message to a world which is becoming increasingly urbanized and removed from

what agricultural production is all about... providing healthy food.

How Does Fertilizer Contribute to the Food Supply?

A survey of U.S. crop production estimated that average corn yields would decline by 40% without N fertilizer. Even greater declines would occur if regular additions of P and K were also halted. Numerous long-term studies have also demonstrated the contributions of fertilizer to sustaining crop yields. For example, long-term studies in Oklahoma show a 40% wheat yield decline would occur without regular N and P additions. A long-term study in Missouri found that 57% of the grain yield was attributable to fertilizer and lime additions. Similarly, long-term trials from Kansas show that 60% of the corn yield was attributable to fertilizer N and P.

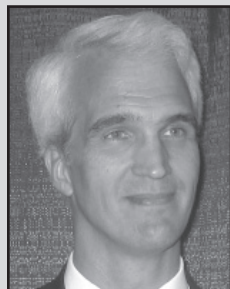


Few people appreciate that corn yields have continued to increase in the Corn Belt of the U.S. without a similar increase in N fertilization. In fact, N use efficiency has increased at least 35% in the past 25 years (where less N fertilizer is now required to produce a bushel of grain). Remarkably, more corn is being harvested without increasing N fertilizer application rates. Some of this improvement has also come from modern genetics and improved agronomic management.

Is Manure the Answer?

Animal manure can provide a useful nutrient supply for growing crops...and it should certainly be used in the most beneficial manner possible. However, many people have the mistaken idea that manure has some special property for building soils. Manures contain no more nutrients than were present in the animal feed. Similarly, manures do not produce any organic matter that was not initially in the animal feed. No nutrients or organic matter are produced during the digestion process!

This means that whatever organic matter or nutrients that are present in manure are simply the result of harvesting crops from somewhere else. The hay, grain, or silage that is harvested to feed animals is simply taken from one field and then applied to another field after passing through an animal... with the inevitable loss of nutrients and C to allow the animal to grow.



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Animal manures rarely contain the essential plant nutrients in the proper ratio required for growing crops. Manure application frequently results in imbalances and accumulation of nutrients in the soil that can pose an environmental risk. Composts and manures can be good nutrient sources, but their mineralization depends on complex interactions of both soil and environmental factors that are difficult to predict, which commonly results in a lower efficiency than fertilizer.

In an on-going study in England (begun in 1840), applications of farmyard manure increased soil C and N to a greater extent than did fertilizer N. However, soil physical properties such as aggregate stability and water infiltration improved the most in the treatments receiving fertilizer N. Nitrogen leaching following the recommended manure application (75 tons/A/yr) was almost twice that from the fertilizer N treatment (250 lb N/A/yr).

There will likely be more livestock and animal manure in the future, and these animals will consume more grass and crops that must be fertilized. But the animals will not provide new nutrients. Expanding urbanization means more organic waste and biosolids to manage. But resistance to application of these materials back on the land seems to be growing and their land application is banned in many countries.

Can Low Analysis Fertilizers Help?

I recently received a testimonial for a special fertilizer where a few pounds of a product with N-P₂O₅-K₂O analysis of 8-2-2 was claimed to meet all the nutritional needs for 10 acres of crops! It bothers me that some educated people continue to believe these claims and provide a market for these products.

Consider for a moment that 2 lb of such a low-analysis fertilizer will provide about 3 oz. of N, and 1 oz. of P₂O₅ and K₂O spread over the entire 10 acres. Then compare this with the removal of over 1,000 lb N, 500 lb P₂O₅, and 400 lb K₂O in corn grain...or a high-yield potato crop on this 10 acres will remove 2,000 lb N, 300 lb P₂O₅, and over 2,000 lb K₂O. Think about the cost of some of these products and the amount of nutrients in a small container and it just does not add up!

It might be great if manure composted in cow horns, home-brewed compost tea, or bat guano could meet the nutritional needs of large-scale food production, but this can never be the case.

Perhaps we are always on the lookout for short cuts or simpler routes to achieve consistently high yields.

Unfortunately, there are no ways to violate the laws of nature and science. You can't grow a successful crop without providing the basic building blocks for the plant. This includes maintaining soil conditions, adequate water, and proper nutrition. When you hear that someone has a totally new concept for providing for the health of your crop, approach it with some initial skepticism and ask for documentation.

I marvel that people will eagerly buy the latest miracle product, but fail to sample the soil and to monitor their fields for fertility levels, pH, or nematodes. But remember the stink test; when something smells bad, there is usually a mess nearby. Proper crop nutrition plays a vital role in maintaining the world's food supply. Use fertilizer appropriately to get the best results and don't be afraid to speak out for farming practices that are such a benefit to humanity. ■



Abbreviations:

N = nitrogen; P = phosphorus; C = carbon.



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