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Nutrient Management Challenges

Water is the first limiting factor in desert crop production systems, followed closely by bio-available nitrogen (N). Nitrogen fertilizer application rates for desert vegetable crops typically range from ~ 150-300 lbs. N/acre. This variation can be due to a lot of factors, including the residual soil N levels, crop rotations, length of the production cycle for the crop, etc.

Due to the critical nature of N availability for the growth of a healthy and marketable crop with good yields in a timely manner, growers are alert to preventing a N deficiency in desert vegetable crop production. Prices for fertilizer N are always a major factor in the crop production budget for any field and that is certainly turning out to be an important issue this year with higher fertilizer N prices.

Figure 1 shows the average North American fertilizer price gauge pattern from 2007-2021 with a distinct surge in 2021. This surge in fertilizer prices is reminiscent of a similar pattern in 2008 and quite an increase in relation to average prices experienced in the past five years. More specific to N fertilizer costs, Figure 2 shows the average weekly retail anhydrous prices in the U.S. 2019-2021 with a five-year average.

The primary driving force in a higher average North American fertilizer price gauge is associated with N fertilizers. Anhydrous ammonia is a good gauge for overall N fertilizer price since so many N fertilizers utilize anhydrous ammonia in the manufacturing process. Nitrogen fertilizer price increases are being driven by the following major factors:

- Anhydrous ammonia plants in Louisiana were closed in September with Hurricane Ida's landfall. This resulted in supply disruptions.

- Natural gas prices have been increasing in recent months. This is important because high demand of natural gas in the production of N fertilizers and it represents a major cost in manufacturing process
- On a national level, fertilizer prices are positively correlated with corn prices. The use of corn in ethanol production has served to tighten the relationship between corn prices and fertilizer prices.
- Similar to many other products in the U.S. and abroad, general supply chain problems and labor issues associated with the COVID-19 has had a strong impact on all industries, including the fertilizer industry.

Collectively, this all translates to a more costly and perhaps challenging year for nutrient management in desert vegetable production systems. These challenges can be dealt with by consideration of the 4R approach to plant nutrient application, consisting of:

1. **Right** fertilizer source at the
2. **Right** rate, at the
3. **Right** time and in the
4. **Right** place

The 4R nutrient stewardship approach utilizes the implementation of best management practices (BMPs) that optimize the fertilizer use efficiency by the crop. The primary objective of the 4R approach and BMPs is to match nutrient supply with crop requirements and to minimize nutrient losses from fields. With higher fertilizer prices, this can be more important in crop production management for this year.



Figure 1. North American fertilizer prices.

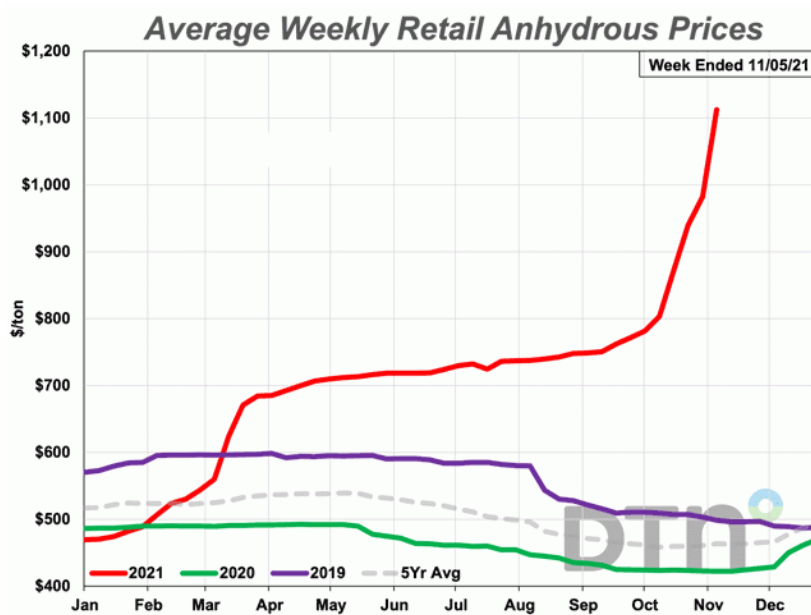


Figure 2. Average weekly retail anhydrous prices. Source: Progressive Farmer, 10 November 2021.