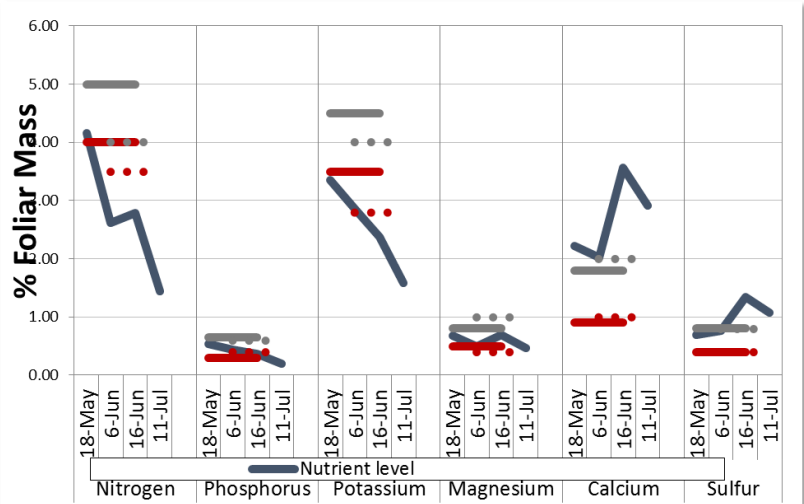


# Nitrogen Fertility Options for Organic High Tunnels

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It is transplant season for high tunnel tomatoes, particularly on farms that have just completed an early spring greens crop. Now is the time to plan for fertility for the longer season tomato crop. Conventional high tunnel growers can rely on soluble fertilizers which are injected through drip irrigation at a precise rate. However, organic tunnel fertility is more challenging, particularly in regards to long season nitrogen delivery. Most organic nitrogen sources are not injectable and must be applied prior to planting. These often come with unbalanced ratios of other nutrients such as phosphorus, calcium and magnesium. Several years of foliar sampling in high tunnel tomatoes throughout NYS has shown that organic high tunnel tomatoes generally start out with sufficient or even excess nitrogen, but go into a mid-season dive in foliar nitrogen levels.

Given the longer season and higher yields of tunnel tomatoes, a nitrogen fertilizer to inject or side-dress will help prevent mid-season deficiencies. We recommend 125-150 pounds of nitrogen per acre per season for high tunnel tomatoes, so a typical 3,000 ft<sup>2</sup> (0.07 acre) high tunnel will need roughly 9-11 pounds of total nitrogen. A foliar test result of 4-5% N during vegetative growth and 3.5-4% N during fruiting is ideal. We have developed the charts below as a resource for growers in need of pre-plant and in-season organic nitrogen sources. This includes traditional organic N sources, as well as some newer products. Regular foliar testing to monitor nutrient levels in the crop will inform how the pre-plant fertility is holding up, and whether additional nitrogen is needed. Prices may vary among vendors of the products listed.



**Figure 1.** Nitrogen (as well as Phosphorus and Potassium) falls below acceptable ranges, decreasing in foliar samples over the season ( horizontal bars represent acceptable levels in vegetative and fruiting stages of tomato crop). In season foliar sampling and fertilizer amendments can prevent these deficiencies.

**Table 1.** Pre-plant organic nitrogen sources.

Name	Analysis (NPK)	\$ per pound of nitrogen (average)	Release Rate	Notes
Alfalfa Meal	3-1-2 (varies)	\$20+	Medium	Incorporate well into the root zone.
Composted plant material	Variable, usually around 2-1-1	Variable	Slow	Need to test for nutrient content. Will help increase organic matter and improve tilth. Don't rely on it alone for nitrogen.
Feather meal	13-0-0 (varies)	\$8	Medium	Can be hot – incorporate well to avoid hotspots.
Soybean meal	7-1-2	\$13	Medium	Apply 2 weeks prior to transplant to avoid burning plants.

**Table 2.** In-season organic nitrogen sources.

Name	Analysis (NPK)	\$ per pound of nitrogen (average)	Release rate	Notes
Blood meal	12-0-0	~\$15	Very Fast	Hot, can burn roots. Not soluble (can side dress)
Chilean nitrate (Sodium nitrate)	16-0-0	\$3	Very fast	High salts. If Certified Organic check with certifier prior to use.
Nature's Source	3-1-1	~\$50	Fast	Soluble. Made from oilseed extracts.
Pure Protein Dry	15-1-1	\$200	Fast	Codfish hydrosolate. Soluble (can be injected)
Verdanta PL-2 (Bioworks Inc)	2-0-6	~80	Fast	New soluble product made of fermented sugar cane. Low salt index. High K.
Ferti-Nitro Plus	13-0-0	\$53	Fast	Soy protein derivative.
Wisgeranic	3-1-1	In development	Fast	Derived from food waste



Same high tunnel tomatoes that were not supplied with sufficient nitrogen at the beginning of the season (left) and about a month later (right).

Photos: Cordelia Machanoff, CCE Cornell Vegetable Program



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