

Recommendations for Using ESN on Potatoes in the Northeast US and Eastern Canada

Every type of nitrogen fertilizer is applied and handled differently. These general use recommendations for ESN are based on optimal growing conditions. Your specific conditions and goals should be considered to achieve best results.

Potato Use Recommendations

Proper nitrogen (N) nutrition of potatoes is essential to high yields, optimum crop quality, and maximum profitability. Nitrogen is essential for vegetative growth and protein synthesis. Nitrogen is essential to the photosynthetic factory that converts solar energy to carbohydrates that are stored in the tuber. Potatoes require high N rates, but N timing is a critical factor in potato yield and quality. Potato N need is closely synchronized with specific growth stages. Five general stages are commonly used to describe potato growth and development. The growth stages are: I) sprout development, II) vegetative growth, III) tuber initiation, IV) tuber bulking, and V) maturation. Sufficient N is needed in the initial stages to stimulate leaf growth, but too much N early can cause excessive vegetative growth and delay tuber initiation. Potatoes take up little N in the first month after planting (Growth Stage I), but take up about 60-80% of the total N needs during tuber initiation and tuber bulking (Stages III & IV) when most of the total dry matter is accumulated. Nitrogen uptake is nearly complete by the end of Stage IV. Timing of specific growth stages is approximate and varies with variety and environmental conditions.

ESN can improve the profitability of potato production by supplying the right amount of N at the right time. ESN is designed to release the bulk of its N during the period of greatest crop demand. Controlled N release simplifies N management by replacing the common practice of multiple N applications with one simple application.

Nitrogen and Potato Production

Nitrogen management in potato production presents

numerous challenges. Most potatoes are grown on sandy soils under irrigation or in humid regions where rainfall is supplemented by irrigation. In addition to delaying tuber initiation, excess N early in the season is prone to greater losses because of limited plant uptake and greater potential for excess precipitation. ESN is a tool that can help overcome these losses if used properly. ESN increases N-use efficiency by protecting most of the N from loss until the period of rapid crop uptake.

Interactions of weather, timing of N demand, and potential for N loss should be considered in determining the most appropriate ESN application. The following recommendations are the result of field-testing in key potato-producing areas. Actual results may vary depending on weather and soil conditions.

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Northeast US and Eastern Canada (Michigan, New York, Pennsylvania, Mid-Atlantic States, New England, Eastern Ontario, Quebec, Maritime Provinces)

General Conditions:

- Humid, high rainfall
- Almost all dryland/rainfed production
- 120-140 day growing season
- Yields 300-500 cwt/acre (15-25 tons/acre)

Common N Management Practices:

- 100% of the N banded at planting or split between preplant and hilling
- Foliar N based on petiole analysis

Recommended ESN Use:

Full-season, indeterminate varieties (ie Russet Burbank) Best results have been observed by applying 80-100% of the N requirement as ESN at emergence. Research indicates applying 80-100% of the crop N need as ESN at emergence can replace conventional multiple side-dress/fertigation applications. Applying 80-100% of recommended N as ESN at planting has often been as good as conventional programs, but generally not as good as applying ESN at emergence. Excessive early N from any N source can result in excessive vegetative growth, delayed tuber initiation, lower yields and greater potential for N loss.

Alternatively, apply 70-80% of recommended total N rate as ESN at emergence, monitor the crop for potential supplemental N needs, and side-dress or fertigate as needed. Research indicates 70-80% of total N as ESN at emergence is often sufficient for the entire growing season with no supplemental N application needed.

For shorter growing seasons and varieties less sensitive to excess early N supply, ESN may be applied at planting.

Short-season determinate varieties (ie. Norkotah, Shepody)

Apply 80-100% of N requirement as ESN at planting. For most situations, additional in-season N should not be needed, but, as always, crop should be monitored for proper N nutrition. For shorter growing seasons, apply 80-100% of recommended N as a blend with 50-60% of the total N as ESN.

Other Areas

Consult your ESN representative for recommendations in this region.

ESN Marketing Representative:

