

Recommendations for Using ESN on Potatoes in the Pacific Northwest, Mountain States and Central Great Plains

ESN technology protects your nitrogen investment from loss mechanisms, ensuring your potato crop gets N when it needs it most. ESN goes beyond traditional nitrogen by providing you:

- **Maximum Yield** – ESN has proven to increase yields by providing a continuous N supply when potatoes need it most.
- **Maximum Flexibility** – ESN can be blended with other dry fertilizers and reduce the number of required applications.
- **Maximum Safety** – ESN won't burn your crop like urea or ammonium nitrate.
- **Convenient Application Window** – ESN can allow more flexibility in nitrogen application timing.
- **Protection for the environment and qualification for US Government Incentive Payments.**

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

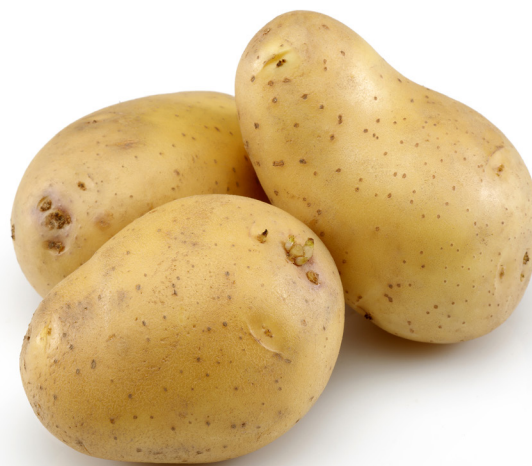
Proper nitrogen (N) nutrition of potatoes is essential to high yields, optimum crop quality, and maximum profitability. Nitrogen is essential for vegetative growth and protein synthesis. Nitrogen is essential to the photosynthetic factory that converts solar energy to carbohydrates that are stored in 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.

Pacific Northwest (Oregon, Washington)

General Conditions:

- Arid, intermountain basins
- Potatoes grown under irrigation
- 150-180 day growing season
- Yields 700-1000 cwt/acre (35-50 tons/acre)

Common N Management Practices:

- 25-50% of N pre-plant + banded at planting
- Remainder as fertigation based on petiole and/or soil tests

Recommended ESN Use:

Full-season, indeterminate varieties (ie Russet Burbank)
Apply 70-100% of N requirement as ESN at emergence. For very long growing seasons, ESN's release timing may require some mid- to late-season supplementation. Monitor crop for potential N needs and fertigate as needed. Applying all N from any N source at planting may result in excessive early N supply, delayed tuber initiation, and reduced yields.

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.

Mountain States and Central Great Plains (Idaho, Utah, Wyoming, Colorado, Nebraska)

General Conditions:

- Arid to semi-arid intermountain basins and river valleys
- Potatoes grown under irrigation
- 130-150 day growing season
- Yields 300-700 cwt/acre (15-35 tons/acre)

Common N Management Practices:

- 25-50% of N pre-plant + banded at planting
- Side-dress at emergence/hilling
- remainder as fertigation or side-dress based on petiole and/or soil tests

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.

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.

ESN Marketing Representative:

