

Small Particles, Big Results

Potato varieties and their need for calcium

Whether it is Norlands and Envolts for the fresh market or Atlantics and Snowdens for the chipping market, the Delmarva Peninsula on the Eastern Shores of Virginia and Maryland is an important and diverse potato-growing region. It is this diversity that makes the region an ideal setting for testing new nutritional products on several potato varieties. During the 2019 season, several Delmarva growers worked with Oro Agri, the developer of NANOCAL, during the second season of on-farm trials to assess the potential of NANOCAL in helping to minimize hollow heart and improve uniformity and overall plant health.

NANOCAL is a liquid, sub-micronized calcium specifically designed to boost calcium availability to potatoes during hook, the critical cell division stage of tuber development. If calcium is unavailable for root uptake during this important growth stage, potatoes often suffer quality issues like poor storability, bruising and hollow heart—all maladies associated with a lack of available calcium.

Two fresh market varieties, Norlands

and Envolts were treated at hook with 1 quart per acre of NANOCAL on April 30, 2019. On May 29, a random sampling of potatoes, both treated and untreated, were dug for evaluation. What the growers found was that the NANOCAL-treated potatoes were harder with multiple stems, a more developed root system and firmer tubers. In addition, the Envolts not treated with NANOCAL were already showing signs of “skinning,” while the treated Envolts displayed intact peels.

The chipping varieties, Atlantics and Snowdens, showed similar results. They were treated with 1 quart per acre of NANOCAL at hook on May 2, and dug for evaluation on May 29. The NANOCAL-treated potatoes consistently had more vigorous growth, greater root mass, and more tubers per plant with better uniformity. Even early in the season, the untreated Atlantics were displaying hollow heart, while treated Atlantics had no symptoms, clearly illustrating the effect a well-timed application of available calcium can have on preventing this condition.

Why NANOCAL is Effective

NANOCAL differs from other supplemental calcium products in several key attributes. First, the calcium carbonate particles in NANOCAL are milled to an average of 0.7 microns compared to a range of 3 to 80 microns for other calcium products. This extremely small size of the NANOCAL particles makes them readily available for root uptake upon application without waiting for the calcium to mineralize.

The extremely small size of the NANOCAL particles also means that an application floods a plant's root zone with significantly more calcium particles than the larger particles of other calcium products. To illustrate, picture the number of marbles in a five-gallon bucket versus the number of tennis balls in the same size bucket. More particles in the soil means more calcium will come in contact with the meristematic region of growing roots for more rapid and efficient calcium uptake.

Calcium also moves primarily through the plant's transpiration system. For effective distribution of calcium in the



Untreated Atlantics (left) displaying hollow heart vs. healthy treated tubers (right)



NANOCAL-treated Snowdens with greater root mass and more uniform tubers



Untreated Snowdens show a smaller root mass, as well as fewer and less uniform tubers

plant, it must be taken up by the roots and translocated throughout the plant, including to the tubers. Since foliar-applied calcium does not move very far in the potato plant, developing tubers are often starved for calcium even with several foliar applications.

NANOCAL, on the other hand, is designed to be soil-applied so that it comes in direct contact with the roots for the most efficient uptake into the plant. It is formulated with Oro Agri's patent-pending TransXylem technology that facilitates easy movement of material upward from the roots to other parts of the plant, including rapidly developing tubers.

Perhaps most importantly, the effectiveness of NANOCAL can be attributed to its application timing. NANOCAL is designed to be applied at

or just prior to hook. This is the growth phase of the tuber when calcium is most needed for healthy tuber development. It is not meant to correct calcium deficiencies in the soil, but rather to be a readily available source of calcium during the critical cell division phase of tubers following hook. Even if gypsum or limestone is applied as part of a soil fertility program, enough calcium may not be available to the potato plant during the high-demand period of tuber formation because of the slow mineralization of those materials. Starving tubers of calcium at this critical point can make them susceptible to physiological effects like pressure bruising and hollow heart. It can also limit the plant's ability to fulfill its genetic potential for yield, specific gravity, marketable tubers and other key results.

The results from these Delmarva trials are part of an ongoing program to test the effectiveness of NANOCAL on a wide variety of potatoes under diverse soil and agronomic conditions from Maine to Washington. These findings from Maryland and Virginia are consistent with the other results from two years of on-farm trials: greater plant vigor; larger, more dense root systems; and less hollow heart. On top of all that, although not measured in these trials, NANOCAL-treated tubers consistently show an increase in specific gravity, better second sets and more marketable tubers.

For more information about NANOCAL, visit www.oroagriusa.com or contact your local Oro Agri area manager. 🍅



NANOCAL-treated Norlands (left) show better root development and plant vigor than non-treated.



NANOCAL-treated Atlantics showing excellent uniformity



Untreated Atlantics with a non-uniform set



Treated Envys showing a firm skin



Untreated Envys showing signs of skinning