

SAP TESTING TRIAL 2023 - 2025 RESULTS

GRANT OVERVIEW

Palouse Conservation District was awarded a Western Sustainable Agriculture Research and Education (WSARE) Professional + Producer grant in 2023 to evaluate whether plant sap analysis could provide a fast, in-season nutrient check for winter wheat and triticale on the Palouse. While sap testing has been widely researched and used successfully in vegetable production, its effectiveness in Inland Northwest grain production remains largely unstudied. As a result, questions remain about its benefits and viability in our local area as they relate to profitability and time.

HOW DOES IT WORK?

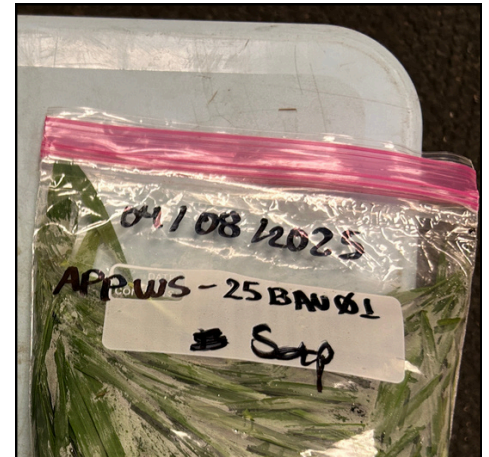
Sap testing offers a short-term way to detect emerging nutrient issues in crops by comparing nutrient concentrations in new and old leaves. This differs from tissue testing, which measures total nutrient content in plant material to show the overall nutrient levels in the plant. Sap analysis is designed to help producers fine-tune fertilizer use by reducing early-season applications and guiding in-season adjustments. The overall goal with sap testing is to improve nutrient use efficiency, lower costs, and reduce the environmental risks associated with fertilizer overapplication.

WHAT DID WE TEST?

Palouse Conservation District partnered with three Whitman County producers to compare grain yield and quality between fields treated with foliar fertilizer guided by periodic sap analysis and those managed with traditional fertilization methods. Foliar application involves spraying fertilizer directly onto plant leaves, allowing the plant to absorb nutrients through the leaf surface. We also tracked costs and overall feasibility to better understand how sap analysis might fit into day-to-day farm operations. Samples were collected during the 2023 - 2025 growing seasons.



Collecting old and new leaves for sap analysis in winter triticale



Sap samples packed and ready for shipping for nutrient analysis



PROJECT SUCCESSES

In the fields involved in this study, plant sap analysis provided a valuable snapshot of current nutrient conditions. One farmer reported that sap testing helped identify nutrient deficiencies in their crops, while another used it to analyze weeds and better understand which nutrients were being taken up across the field. Preliminary results also suggest that sap testing in Inland Northwest grain systems may reduce fertilizer costs without negatively affecting yield, offering both economic benefits and potential environmental improvements.



A researcher hand-harvests grain to compare yield, quality, and nutrient content between test and control plots.

PROJECT CHALLENGES

This project encountered several challenges. Although sap testing is commonly used for vegetable and fruit crops, it remains a relatively new tool in row crops in the Inland Northwest. While this project aimed to evaluate the effectiveness of sap testing in regional grain systems, farmers and researchers quickly recognized a key limitation: established guidelines for “normal” nutrient levels in plant sap are not readily available for row crops. As a result, sap analysis is not yet fully calibrated to local crops or growing conditions. In the project’s final year, researchers addressed this gap by developing preliminary reference ranges, comparing sap and tissue samples from the same plants and identifying baseline values for seven of the fourteen nutrients measured.

In addition to challenges with interpreting sap testing data, farmers also reported a significant delay between collecting samples and receiving lab results. For sap testing to be most effective, results need to be available in near real-time, allowing fertilizer applications to be made as soon as possible.

WHAT’S NEXT?

Plant sap analysis shows promise as a tool to help regional farmers make more informed fertilizer decisions. However, additional research is needed to establish baseline data, improve turnaround times for results, and expand local expertise to support farmers and agronomists in interpreting data and refining their fertilizer management strategies.

For more information on our precision agriculture programs, please visit PalouseCD.org/Precision-Agriculture.

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