

Advancing Corn Productivity

Objective is to increase yields and profits while protecting environment



A team of Canadian researchers is working to determine how best to apply nitrogen fertilizer in corn crops in ways that not only increase yields and economic benefit for farmers but lower environmental losses and greenhouse gases.

Soil scientist Mario Tenuta from the University of Manitoba (U of M) is leading a team of Canadian researchers to determine how best to apply nitrogen fertilizer in corn crops in ways that not only increase yields and economic benefit for farmers but lower environmental losses and greenhouse gases.

The Cross-Canada Agronomic and Environmental Benefit of Advanced 4R Nitrogen Management of Corn research project, part of the larger program led by the Canadian Field Crop Research Alliance, brings together Tenuta, U of M colleague Don Flaten, and researchers from multiple Agriculture and Agri-Food Canada centers, McGill University, and the University of Guelph.

“The project will help corn growers to maximize profitability and lower environmental impact through use of 4R Nitrogen practices” says Tenuta (Mario.Tenuta@umanitoba.ca), a soil science professor in the Faculty of Agricultural and Food Sciences at the University of Manitoba.

The 4R Practices

The four Rs refer to applying fertilizer at the Right Source, Rate, Time, and Placement.

“If investment into 4R practices by growers is to pay in the short term, there must be compelling evidence that they can get more yield from the amount of nitrogen used,” said Tenuta. “We seek to determine what it pays to use 4R practices.”

Through three years of replicated plot trials at locations in Manitoba, Quebec, and Ontario, the team will examine increasingly sophisticated 4R practices, including using a novel approach of layering rates of N application with combinations of enhanced efficiency fertilizers, application timings, and placement methods.

Over the course of the project, they will be looking at adjusting N rates for profitability and environmental stewardship.

“The effect of 4R practices on the best economical rates of fertilizer N is often overlooked but it should change if we are

using N fertilizer much more efficiently,” Tenuta says.

Second Objective

An important second objective will be the development of tools for growers to determine in-season application rate recommendations, using hand-held spectrometers and aerial drones to estimate corn N uptake in season and response to top- and side-dressing fertilizer sources.

“Corn is a long-season crop with most of its N uptake being later than that of other grain crops,” Tenuta says. “This is an opportunity to monitor the crop in-season and better match demand and added fertilizer N.”

Funding for the Cross-Canada Agronomic and Environmental Benefit of Advanced 4R Nitrogen Management of Corn was announced by the Government of Canada in January as part of a \$4.1 million investment over five years to the Canadian Field Crop Research Alliance (CFCRA) under the Canadian Agricultural Partnership’s AgriScience Program (Projects). ■

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