SAULT STE. MARIE INNOVATION CENTRE

Northern Ontario Research, Development, Ideas and Knowledge NORDIK INSTITUTE

RAIN

RURAL AGRI-INNOVATION NETWORK

Sulphur in Algoma – Research Project

Christine O'Reilly, RAIN Research Technician

Growing Forward 2

AAC agricultural adaptation council

Ontario

FedNor

Canada

Overview

- S in plant nutrition
- Historical S applications
- Recent work on S in Ontario
- RAIN's S project

Why do plants need sulphur (S)?

- form amino acids
- develop enzymes and vitamins
- produce seeds
- make chlorophyll
- legumes need sulphur for nitrogen fixation

Why talk about S now?

In the past, enough S was added to fields without farmers needing to manage it:

- through acid rain caused by industrial air pollution
- as an unlisted nutrient in older fertilizer blends

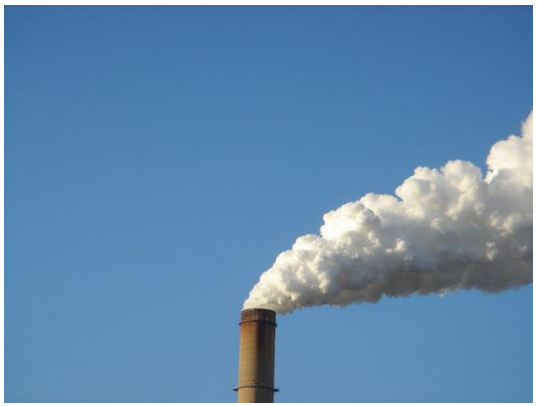

Photo credit: joelbeeb

Environmental measures, recession, and refined fertilizer blends have reduced the amount of incidental sulphur being deposited on fields.

Historic sulphur applications in Ontario

Ontario has no sulphur fertilizer recommendations.

There are three ways crop nutrient requirements are assessed/recommended in Ontario:

1. Soil nutrient test
2. Plant tissue analysis
3. Crop removal values

OMAFRA put out an interim recommendation in 2012 that canola growers apply 15 – 25 lb/ac S to prevent deficiencies.

Recent S research in Ontario

In most trials, responses to S fertilizer are inconsistent.

Results from recent work make it difficult to predict how future S recommendations will be made:

1. Soil nutrient test levels are not a reliable indicator of plant response to fertilizer.
2. Ontario doesn't have critical S tissue levels for crops at different stages of development.
3. While S crop removal values are known for some common field crops, until response is consistent this is not the most economic method.

Recent S research in Ontario

Brassica spp. are known to have a high sulphur requirement than other types of crops.

McKeown and Bakker (2003) found that a late season cabbage responded to sulphur applications when the soil test was between 13 and 19 ppm, but broccoli did not.

Lauzon and Haupt (unpublished) found that alfalfa – a legume, not a brassica – responded to S applications after 2nd and 3rd cut when canola did not.

These results suggest biennials/perennials have higher S requirements than annuals.

RAIN's Agricultural Research Projects

Economics of sulphur fertilizer on brassica crops (funded by Growing Forward 2/FedNor)

- *Research priorities: forage improvement, crop portfolio diversification, storage*

Should Algoma farmers be applying sulphur to their crops?
If so, what is the most economic rate of application (MERS)?

Economic Impact of S Fertilization on Brassica Crops

RAIN will be starting a project in 2017 to assess whether Algoma farmers would benefit from applying S.

Focus around brassica crops because:

- Brassicas have a higher S demand than other non-leguminous crops
- Brassicas are grown in Algoma's three key agricultural sectors:
  - Market gardens: broccoli, cauliflower, cabbage, Brussels sprouts
  - Cash crops: canola
  - Beef production: forage radish, turnips, kale

RAIN's sulphur project

Three field trials in 2017:

- Comparing annual and biennial/perennial brassica **vegetables**' responses to various rates of sulphur fertilizer
- Determining **canola** responses to different types and various rates of sulphur fertilizer
- Investigating the economics of applying sulphur fertilizer to a **forage brassica** crop

RAIN's sulphur project

Comparing annual and biennial/perennial brassica vegetables' responses to various rates of sulphur fertilizer

- Broccoli, cabbage, cauliflower, Brussels sprouts
- Apply S at rates of 0, 12, 24, 36, and 48 kg/ha
- MERS for each crop, and if they are different between annuals and biennial/perennials

Section A: Brassica Vegetables

Comparing annual and biennial/perennial brassica vegetables' responses to various rates of sulphur fertilizer

- Total yield
- Marketable yield
- Shelf life

RAIN's sulphur project

We are looking for two farmers to help us with this trial.

These farmers will:

- Be growing at least one annual and one biennial/perennial
- Communicate with RAIN researchers so data collection and harvest run smoothly for both parties

Outcomes of this project

- Ensure farmers are not spending money on unnecessary fertilizer while not missing out on yield/quality potential
- Provide interim recommendations until provincial ones are developed
- Support development of provincial recommendations for sulphur

2018 Project Ideas

We need your input!

RAIN is conducting a survey to identify topics of interest for future projects.

Survey is available online at rainalgoma.ca/research

Paper copies are available from Christine today.

Thank you for supporting RAIN's activities!

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