

# GET THE FACTS

## ABOUT ORGANICS IN ALBERTA



### HOW DO ORGANIC FARMERS MAINTAIN NITROGEN-RICH SOIL?

Sun and water: that's all you need to grow great plants, right?

If you ask local farmers, they will tell you it takes a lot more than that to keep field crops healthy. Water and sunlight are important, but plants also need a lot of essential nutrients, 17 to be exact. There are a few macronutrients plants need in abundance, but none are more important than nitrogen.

Let's dive into the science behind nitrogen, but first, let's meet a farming specialist who knows a lot about soil health.

#### MEET RYAN OF RECLAIM URBAN FARM

Ryan Mason owns Reclaim Urban Farm, a multi-generational farm in Pigeon Lake, Alberta. He has a strong background in agriculture that extends from his early roots on the family farm to a Master's in Environmental Sociology. For a time, Ryan ran Reclaim Urban Farm in the heart of Old Strathcona, farming in "borrowed" garden beds and empty lots near Whyte Avenue. About a year ago, he was given the chance to take over the family farm, and he jumped at the opportunity.

Ryan's farm grows mostly vegetable crops and microgreens (which are grown indoors in a greenhouse), as well as flowers. He spends a lot of time at local markets in Edmonton, and his produce can be found in popular organic shops like Blush Lane and Planet Organic, as well as the Organic Box. Ryan has a great deal of experience in natural weed and pest control methods, so we asked him how he manages unwanted guests in his vegetables.

#### WHY IS NITROGEN IMPORTANT TO SOIL HEALTH?

Nitrogen is an element found commonly in nature; it lives in our atmosphere, air, water, and soil. In fact, nitrogen makes up 78% of the air we breathe. Unfortunately, plants can't use it in its elemental form. To be used for growing, nitrogen needs to be combined with hydrogen to make ammonia.

When it comes to growing healthy, mature plants, nitrogen is necessary because it's a part of the chlorophyll molecule. Using the process of photosynthesis, chlorophyll helps plants create food they can use to grow. Without a full supply of nitrogen, this process takes much longer. As nitrogen in the soil is used by plants each season, it needs to be replenished. There are several common ways farmers can do this.

#### HOW CONVENTIONAL FARMERS ADD NITROGEN & NUTRIENTS TO THEIR SOIL

Conventional farmers often use a combination of methods, including some of the organic methods for adding nitrogen and nutrients to the soil such as crop rotation, organic fertilizers and cover crops. Additionally, they have access to synthetic fertilizers.

All fertilizers are developed using natural sources since the main elements like nitrogen, phosphorus, and potassium, are found in nature. However, synthetic fertilizer can be created by extracting and combining specific amounts of nutrients. Many synthetic fertilizers



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take nutrients from mined substances like potash or petroleum products. They're typically applied to crops in a granular or spray form that provides nutrients to crops for the year.

#### HOW ORGANIC FARMERS ADD NITROGEN & NUTRIENTS TO THEIR SOIL

Ryan says most of the nitrogen-rich fertilizers allowed in conventional farming are listed on the prohibited substances list for organic farmers. It's not because synthetic fertilizers are unhealthy, but because organic farming takes a more natural and long-term approach to soil nutrition. There are three ways certified organic farmers can help promote healthy soil that regenerates nutrients:

##### Organic Fertilizers

Organic farmers have two options when it comes to finding nitrogen-rich sources of fertilizers for their crops. First, there are a few synthetic alternatives that are not included on the prohibited substances list, like sulphur. Second, they can use natural sources of nitrogen and other nutrients, such as manure, compost, or bone meal/blood meal (animal by-products that have been broken down into basic nutrients).

##### Crop Rotation

All farmers – conventional and organic – make use of crop rotation to promote the long-term health of their soil. Organic farmers tend to rely more heavily on crop rotation due to their fertilizer restrictions. While this practice helps create more nutrients, it also aids in weed and pest control. Crop rotation is highly deliberate, and usually planned by farmers a few seasons in advance.

The rotation of crops allows for more soil stability. Specific crops generate or use nutrients from the soil in different amounts. Here's an example from Dalhousie University:

*"Crop rotations can account for differences in nutrient requirements. For instance, a three year alfalfa crop might be followed by wheat (which will use nitrogen from alfalfa breakdown), a legume (that would not require a high nitrogen level and would fix atmospheric nitrogen more effectively at low soil nitrogen levels), wheat again, and then oats (with a small nutrient requirement)."*

So, by planting a variety of crops in a single field, nutrients can be used and replenished in planned cycles.

##### Cover Crops

According to Ryan, cover crops are beneficial because they have packets of bacteria living on the roots of the plants. These bacteria take nitrogen from the air and transform it into a soil-based form that can be used by plants. Cover crops tend to be legumes such as clover, peas, and beans. These cover crops also have carbon and other nutrients bound up in their foliage and root structure, providing additional soil nutrition.

The importance of nitrogen in the soil is driven home when you consider that many farmers can't profit from cover crops. Despite not making any income from a particular field or plot for a season, farmers understand the importance and it's a sacrifice they're willing to make for better growing.

##### What Are the Environmental Considerations?

One of the main concerns with changing the composition of farmland and soil is the potential for run-off to nearby areas. When water-soluble nutrients are added to the soil, rain could wash them away to other areas like lakes or ditches, which is problematic. Ryan's farm is close to Pigeon Lake, so he has to consider how to prevent run-off that could lead to algae blooms or other effects in the lake.

Manure and other organic sources of nitrogen improve the overall soil structure, which helps reduce run-off. The website of the Ontario Ministry of Agriculture, Food & Rural Affairs (OMAFRA) details a variety of other ways farmers can prevent nitrogen leakage to nearby water supplies.

##### FARMERS WORK HARD TO IMPROVE SOIL STRUCTURE

Ryan says that at the end of the day, all of the neighbouring farms are dedicated to their soil and work hard to increase accessible nitrogen naturally. They use plenty of other techniques to improve soil structure, including limiting tillage and using mulch.

## WAYS TO LEARN MORE

Do you want to learn more about what organically-grown means in Alberta? Would you value monthly updates on Alberta's local organic sector – including legislation, farming practices, GMO regulation, and more? Visit [organicalberta.org/getthefacts](http://organicalberta.org/getthefacts) and:

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