Insect Frass
Current Research in Fertilization and Soil Amendment
From an Active Ontario Cricket Farm
Ryan Goldin - Entomo Farms
ENTOMOPHAGY
WHAT GOT US STARTED:

• Mark Cubin Invests on Shark Tank

• Clinton Global Initiative Awards a $1 million prize

• Brother’s Darren and Ryan farm insects for Reptile Feeders
EAT INSECTS
HEALTHY YOU, HEALTHY EARTH

Eating Insects Can
Save Our Planet
From Devastation

INSECTS ARE A TRUE SUPERFOOD
Low in CALORIES
Almost 3x MORE PROTEIN
than beef
Low in FAT
More IRON than spinach
More CALCIUM than milk
20x MORE B12 than beef
All 9 Essential AMINO ACIDS
Perfect OMEGA 3:6 Ratio
High in PREBIOTICS for Gut Biome Health

ENTOMOFARMS.COM
Complete Protein:
All essential amino acids

Nutrients:
Zinc, B-12, iron, copper, etc.

Gut Microbiome:
10% chitin (prebiotic fibre)

Immunity Boost:
Antibacterial and antimicrobial peptides

Minimal Resources:
Efficient feed conversion ratio means fewer land and water resources are used for production

Low Carbon:
Crickets do not produce methane and have a carbon footprint better than chicken.
If a family of 4 eats cricket protein one day a week for 1 year, they would save the planet 650,000 litres of water.

ENTOMOFARMS.COM
Academics around the world are launching research on the health benefits of entomophagy.
60,000 square feet
100 million crickets
Open concept, “free range”
SERVE THE WORLD

Turn the table. Eat sustainable.
Canada is ramping up fast
What is FRASS?

Frass Forward is made of insect manure, a unique fertilizer that is an organic, sustainable and natural food for plants.
IS FRASS ORGANIC?

• Approved for Organic Agriculture programs, it is safe for the environment around ponds and waterways, pets and people.

• Frass is slow release and will not wash away like chemical fertilizers do.
THE CHEMISTRY OF FRASS

<table>
<thead>
<tr>
<th>Guaranteed Analysis</th>
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<tbody>
<tr>
<td>Total Nitrogen (N)</td>
<td>6.97%</td>
</tr>
<tr>
<td>Nitrogen (Insoluble)</td>
<td>4.27%</td>
</tr>
<tr>
<td>Available Phosphorus (P2O5)</td>
<td>4%</td>
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<tr>
<td>Soluble Potassium (K2O)</td>
<td>3.2%</td>
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<tr>
<td>Calcium</td>
<td>3.55%</td>
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<tr>
<td>Iron</td>
<td>0.12%</td>
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<tr>
<td>Magnesium</td>
<td>0.66%</td>
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<tr>
<td>Manganese</td>
<td>0.01%</td>
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<tr>
<td>Molybdenum</td>
<td>0.0003%</td>
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<tr>
<td>Sodium</td>
<td>0.15%</td>
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<tr>
<td>Sulphur</td>
<td>0.53%</td>
</tr>
<tr>
<td>Zinc</td>
<td>0.013%</td>
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TRIALS OF CRICKET FRASS AS AN EFFECTIVE FERTILIZER
Report on the results of experiments in 2018 on the effects of Frass additions to hay fields on yields and chemical composition of the hay and soils

Research done by Professor Tom Hutchinson
Professor Emeritus, Trent University

with assistance from Yeukai Katanda
Doctoral Candidate at Trent University
The response to the Frass amendments was large and striking as the plots produced dark green, very healthy-looking vegetation in comparison to the controls.

In terms of yield measured as fresh cut weight, the highest positive response was at the 1.25 kg per plot with an increase over control of 548% or a yield per plot 5.5 times that of the control. Even at the lowest Frass application rate of 0.31 kg per plot, the yield increase was 219%, i.e. 2.2 times as much hay. These are spectacular results.
RESPONSE OF SIX VEGETABLES TO FRASS AMENMENTS

Prepared from research by Professor Tom Hutchinson, Professor Emeritus, Trent University School of the Environment

with assistance from Willow Denis, MA Candidate at Trent University
RESULTS:

For the tomatoes, differences in appearance occurred from 2-3 weeks from planting onward. There were darker, shorter, bushier plants in the higher Frass treatment. This persisted pretty much to the final planting, where these higher Frass treated plants flowered in general some days earlier than the controls.

By July 15th, the green beans treated with both Frass application rates were growing slightly taller than the controls and were sending out larger runners.
Figure 3. Mean weight per plant in grams for three Frass treatments of potatoes.
RESULTS:

• In many cases, quite large differences could be seen between replicate plots of the same treatment.

• From a consumer perspective, all the varieties except for corn produced good and acceptable harvests and the edible product was deemed excellent by the consumer.
RETAIL BRANDS
Thank You!

Ryan Goldin

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