
Zytonic-M
Restoring Soil Health

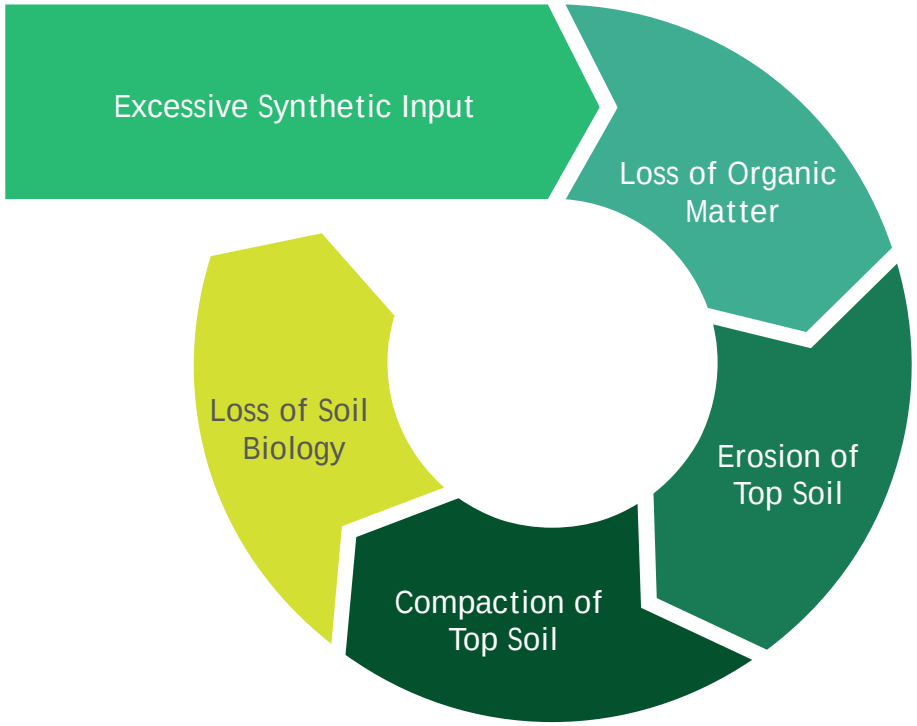
- Focused on Sustainable Polymer Technologies
- Textiles, Pavements, Paints & Agriculture Divisions
- Headquartered in India and US Presence in North Carolina

Zydex
Innovating for Sustainability

Intensive Farming Practices

“While agriculture based on the intensive use of inputs has increased global food production over the last half century, it has in the process, depleted the natural resources of many agri-ecosystems, jeopardizing future productivity”

Consequences of Intensive Farming



Loss of Organic Matter

Plants downregulate root exudate production and the natural nutrient uptake pathway. Over time the huge buffer capacity of the soils organic mater reserve is mineralized without replenishment.

Erosion of Top Soil

Depletion of organic matter causes a loss in the cohesivity of the top soil. The soil becomes susceptible to wind and water erosion.

Compaction of Top Soil

Loss of organic matter causes the soil to lose structure, aeration and water holding capacity. All together contribute to the formation of compacted top soil

Loss of Soil Biology

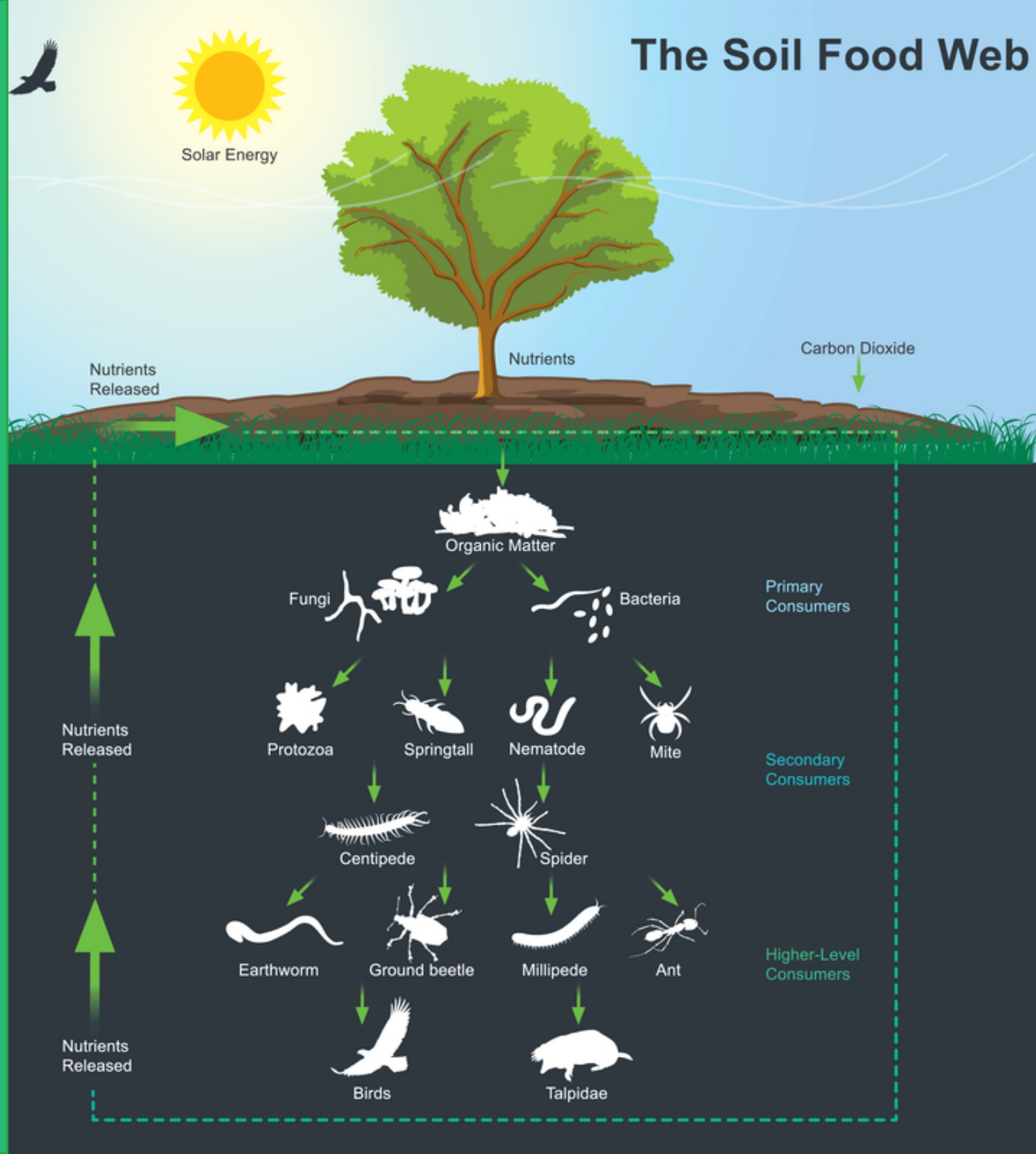
Due to poor soil structure and low organic matter content, the natural soil biology slows down and limits natural nutrient cycling

Chemical Dependence

Due to the loss of organic matter and soil biology, natural nutrient uptake slows down and dependence on synthetically fixed nutrients increases.

Soil Food Web

The soil food web is the community of organisms living all or part of their lives in the soil. It describes a complex living system in the soil and how it interacts with the environment, plants, and animals.



Soil, not dirt.

We are losing from the soil the organic carbon and this undermines agricultural productivity and contributes to climate change. We absolutely have to restore the degraded soil we've got.

Why is Organic Matter Important ?

1. Builds cation exchange capacity
2. Serves as food for microbes
3. Helps build soil Structure
4. Helps provide water retention capacity
5. Helps provide aeration & porosity
6. Serves as a nutrient source

Think like a Root

If you were a root, what would *you* like from an ideal soil? Surely you'd want the soil to provide adequate nutrients and to be porous with good tilth, so that you could easily grow and explore the soil and so that soil could store large quantities of water for you to use when needed.

Think like a Root

But you'd also like a very biologically active soil, with many beneficial organisms nearby to provide you with nutrients and growth-promoting chemicals,

Think like a Root

You would not want the soil to have any chemicals, such as soluble aluminum or heavy metals, that might harm you; therefore, you'd like the pH to be in a proper range for you to grow.

Various Aspects of Soil Health

Physical

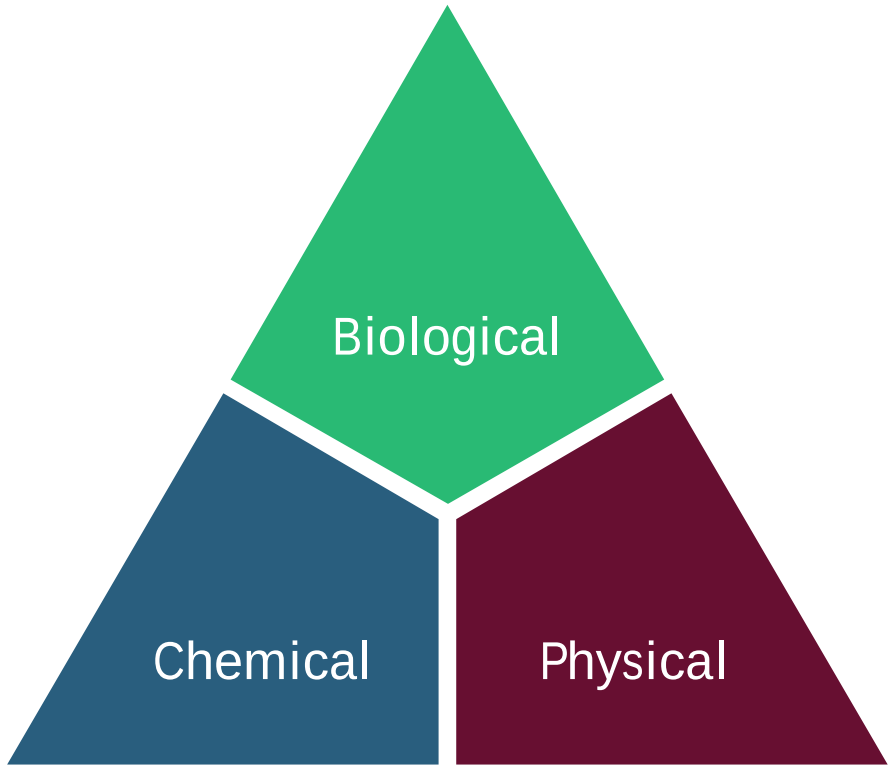
- Porosity & Aeration of the Soil
- Water Infiltration Rate & Water Retention Capacity

Biological

- Nutrient Cycling and Plant/Soil Symbiosis
- Species Population & Diversity
- Low Pest Numbers

Chemical

- pH of the Soil
- Cation Exchange Capacity of the Soil



Chemical Aspect of Soil Health

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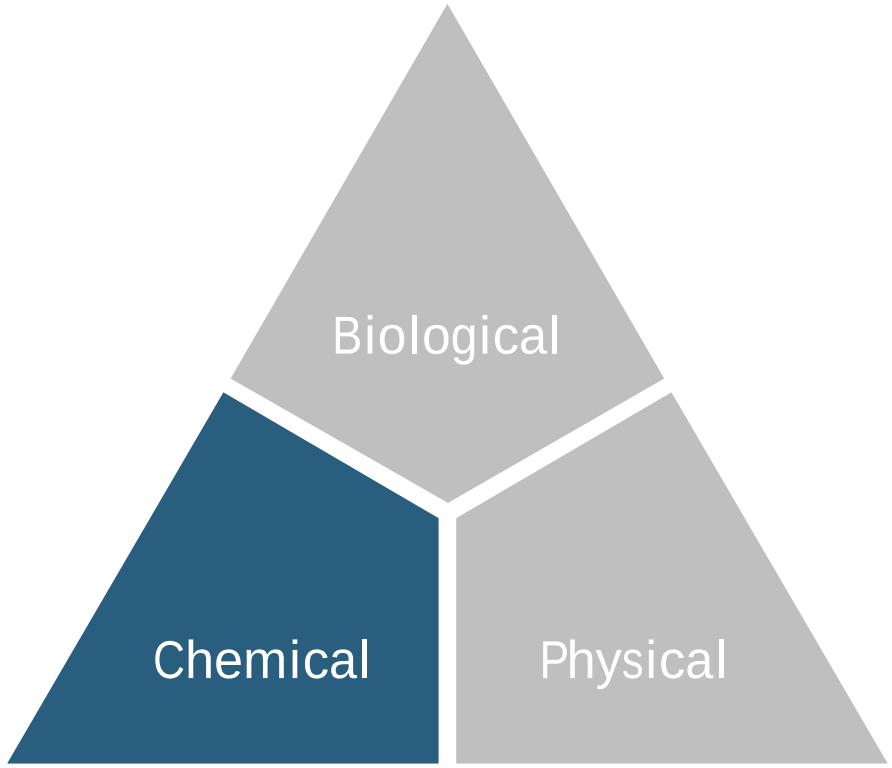

Biologics focus on the biological aspects of soil health

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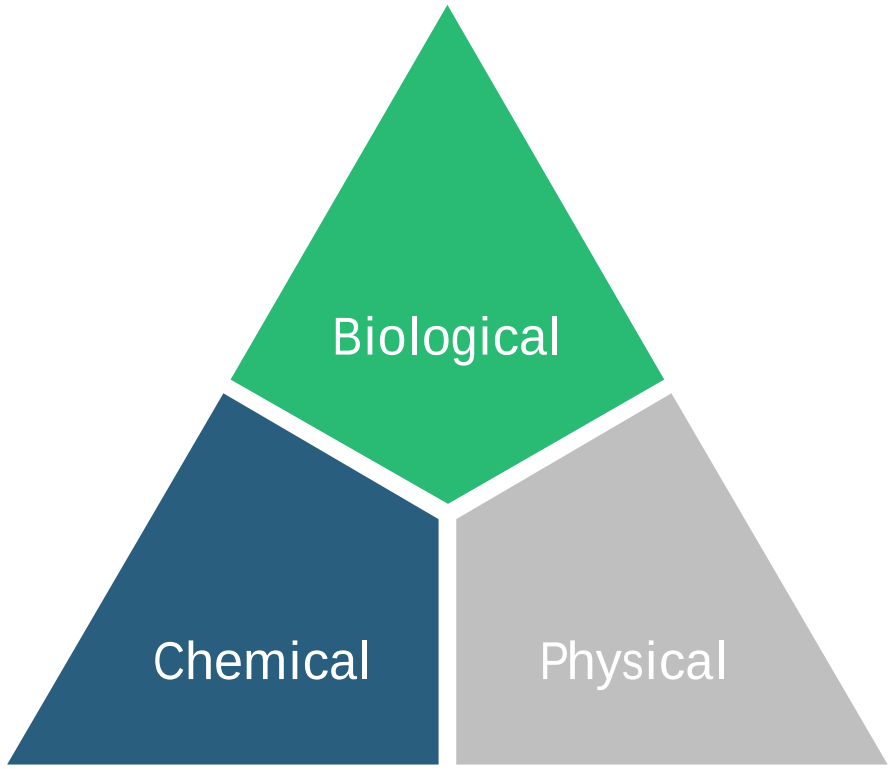

Zytonic addresses chemical, physical and biological aspects of soil and maximizes performance

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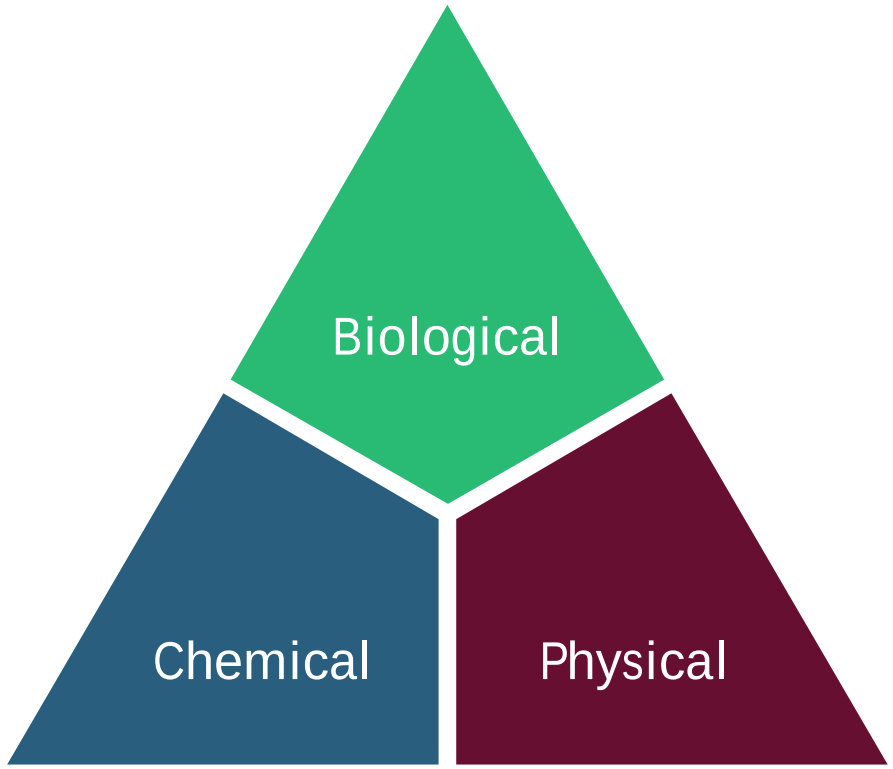
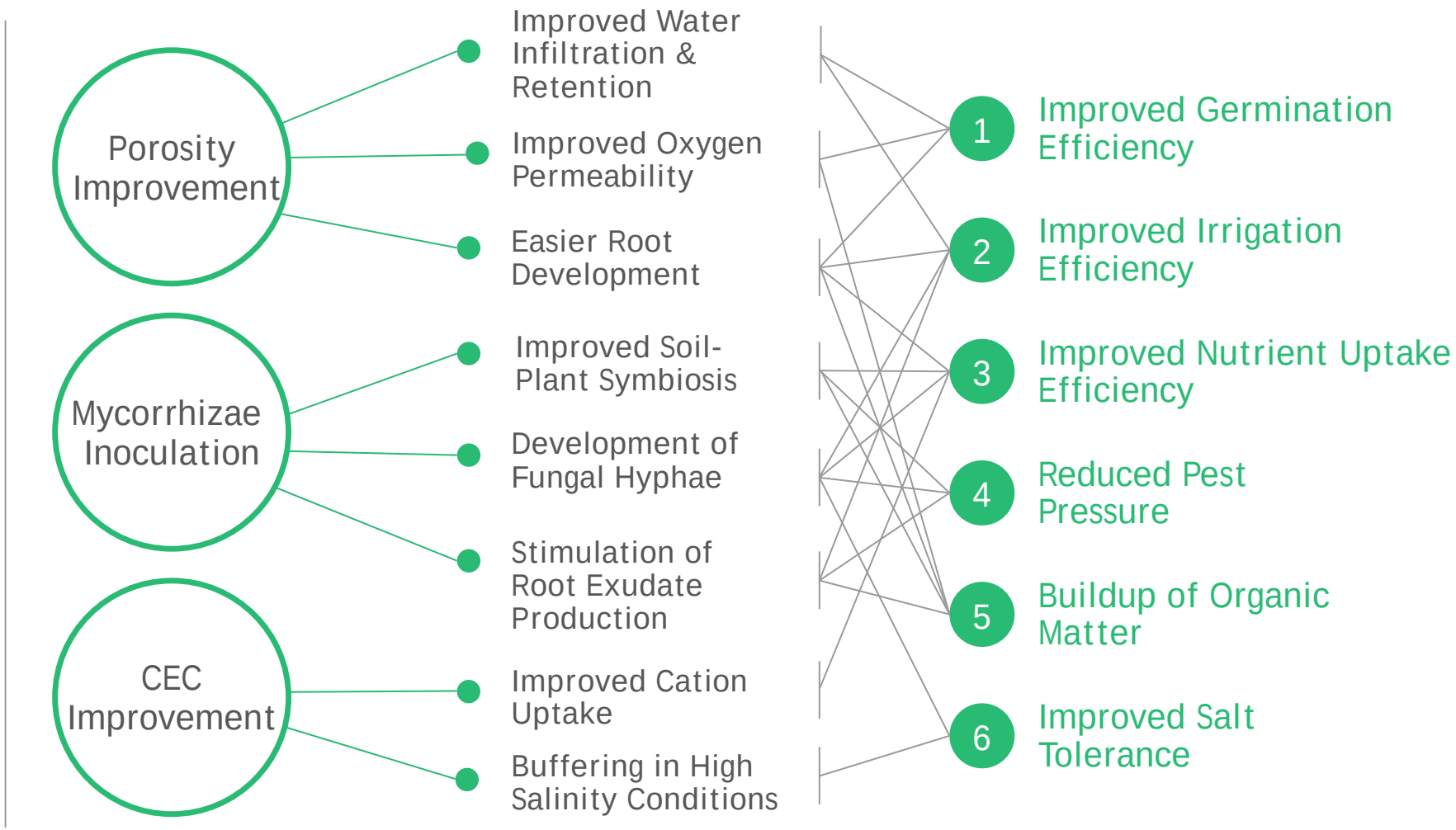


Consistent Performance is Key

Farmers are business owners who went to minimize risk and maximize profitability. Risk mitigation is a primary driver in adoption of land management practices, including soil health-promoting technologies.

How does Zytonic-M work and why does it offer consistent performance ?

Zytonic-M



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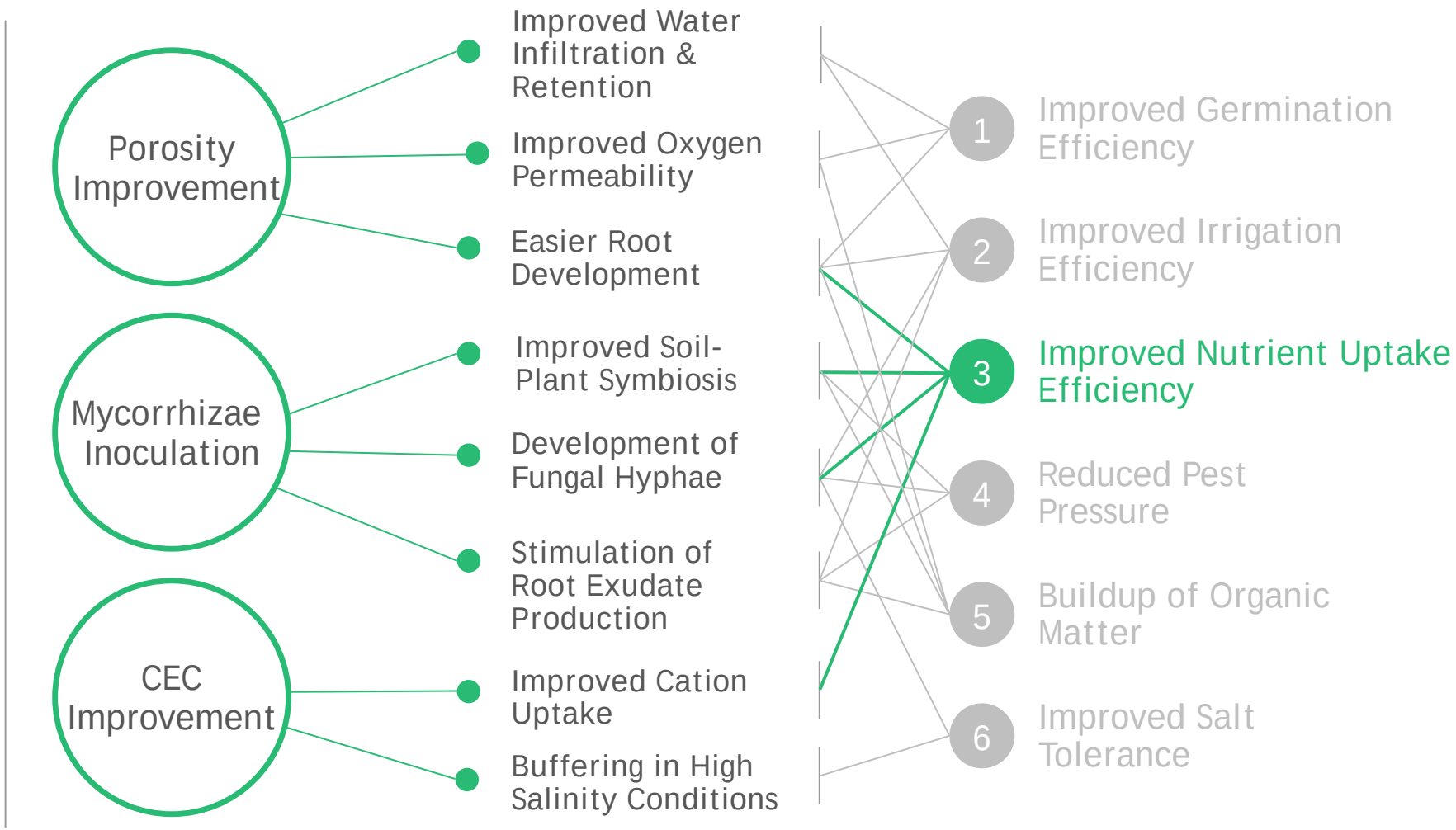

What does Zytonic-M do for porous and compact soils ?

Porous soils are easier for roots to penetrate, and typically have higher water infiltration and water retention capacities. They are also more conducive to soil biology due to their aerated nature.

What does Zytonic-M do for the biology of the soil ?

Inoculation with Mycorrhizae:
Mycorrhizal fungi connect with the root hairs of the plant and extend their hyphae through the soil, thus “extending” the root surface area.

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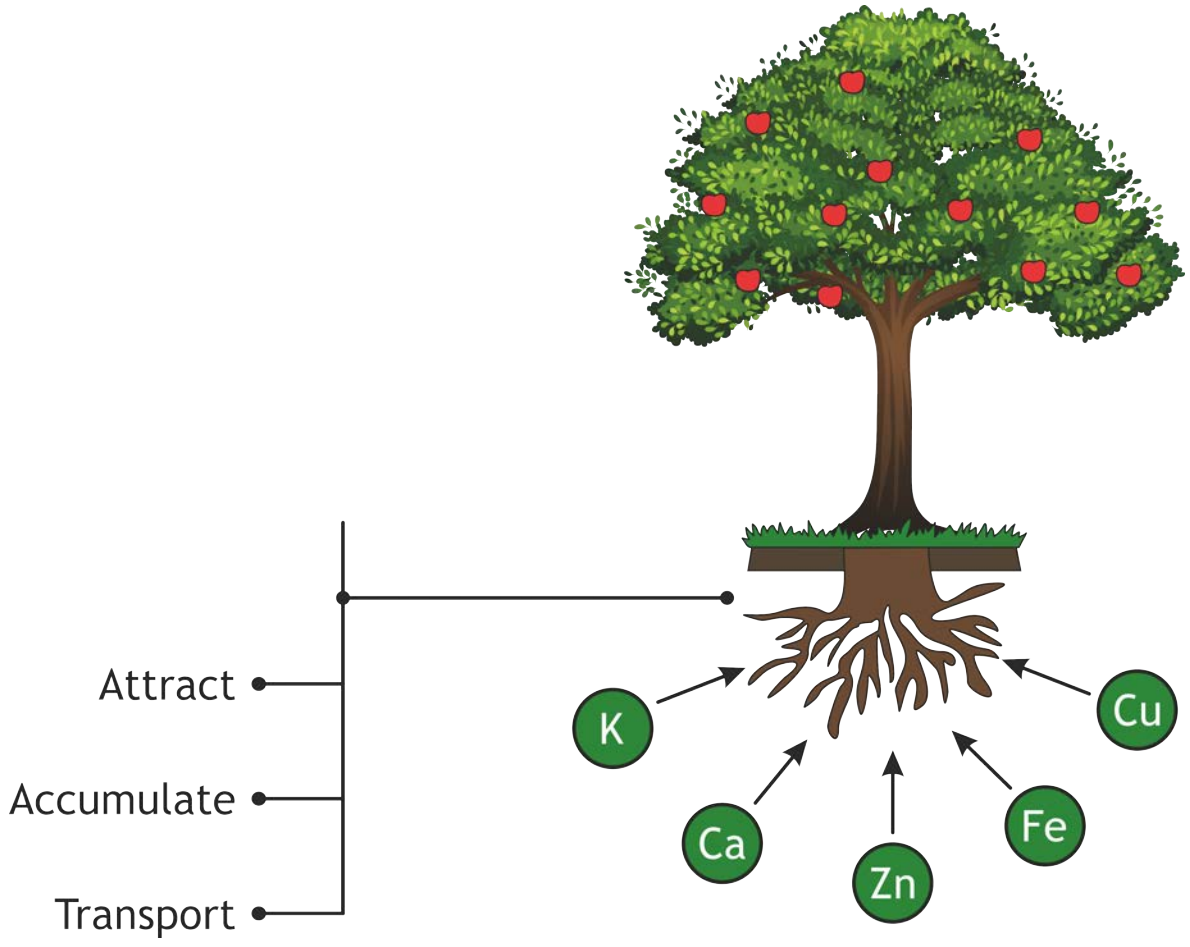
What does Zytonic-M do for Cation Exchange Capacity ?

Zytonic-M contains ***proprietary polymers*** with a CEC in the range of 800-1000 milliequivalents (me) per 100 grams. This is about five times greater than the CEC of good quality peat moss and three times as high as the CEC of humus naturally found in soil.



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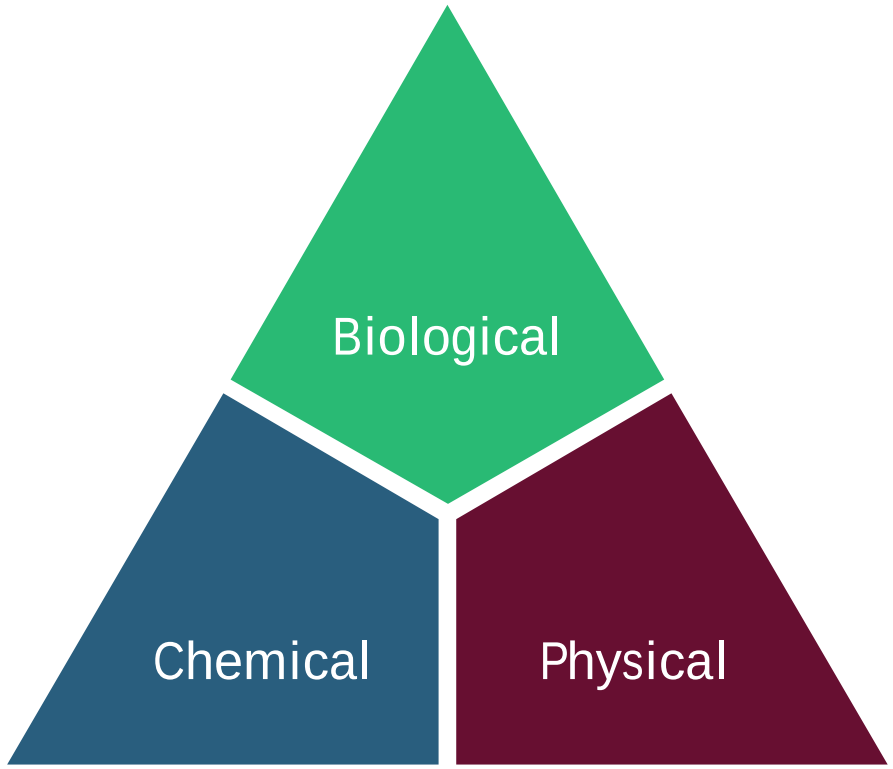

Field Trial Data

ZYTONIC-M TRIAL RESULTS IN CHILI

ZM Control

Observed Benefits

- 100% RDF Reduction
- Enhanced Flowering & Fruiting
- Bigger sized Fruits
- Improved Quality

RDF = Regular Fertilizer Dose
ZM = Zytonic-M

ZYTONIC-M TRIAL RESULTS IN ONION

ZM Control

Observed Benefits

- 25 % RDF Reduction
- Increased Yield and Bulb size
- Higher SOC
- Improved Quality

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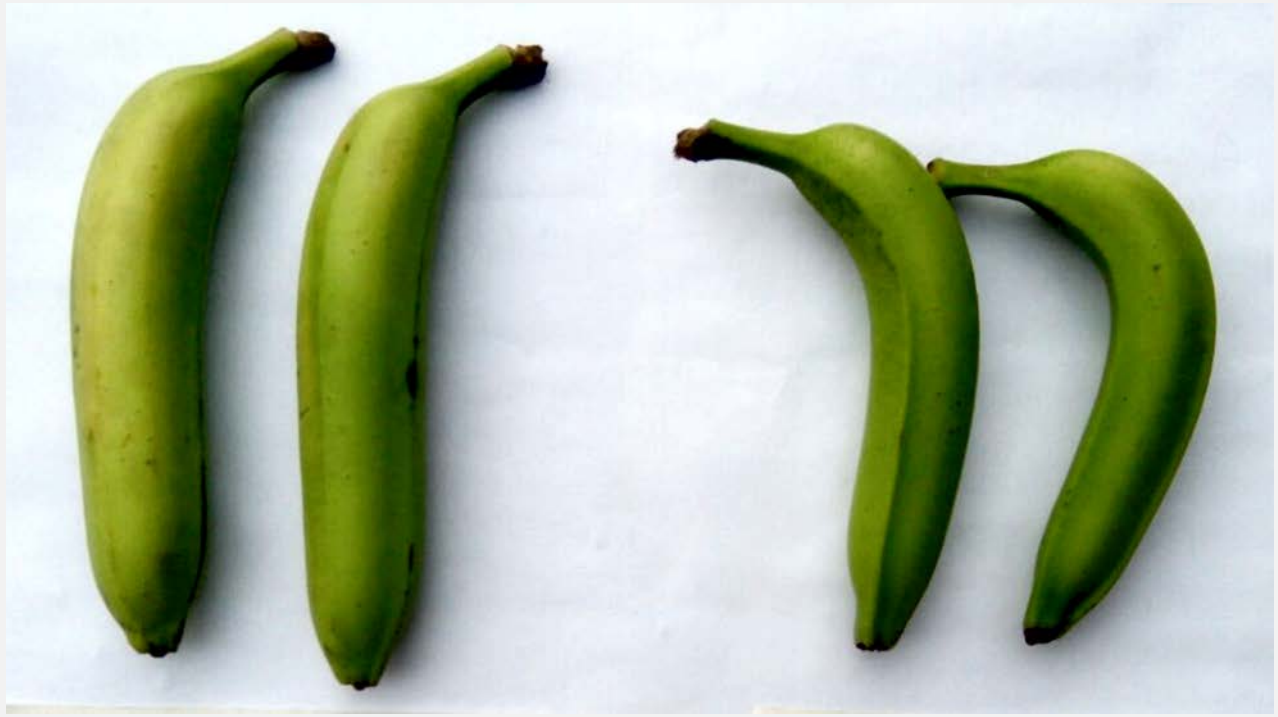
ZYTONIC-M TRIAL RESULTS IN BANANA



ZM

Control

Observed Benefits

- 75% RDF Reduction
- Higher Yield and Quality
- Longer Shelf life
- Reduction in Crop Care Chemicals

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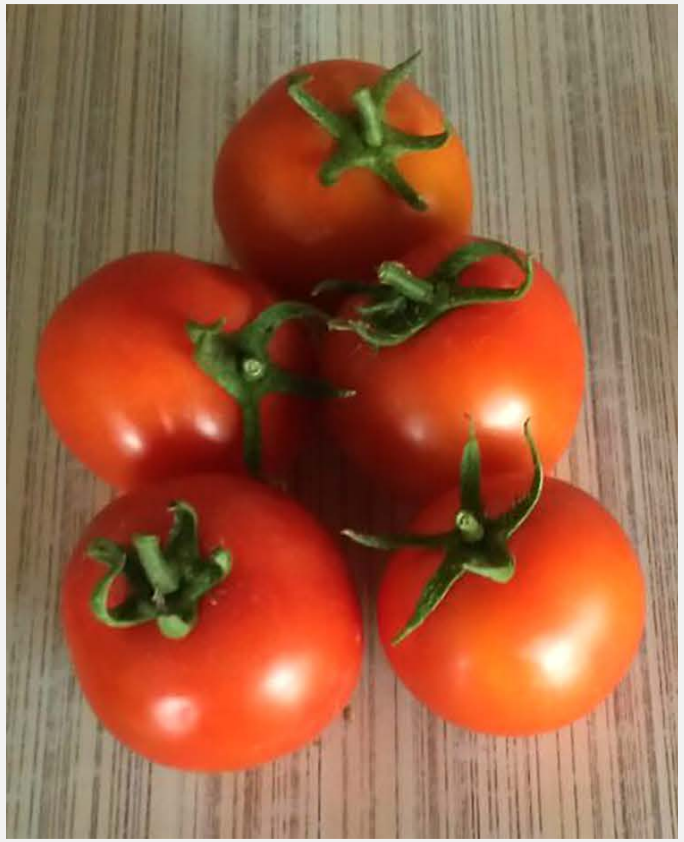
ZYTONIC-M TRIAL RESULTS IN TOMATO



ZM

Control

Observed Benefits

- 50% RDF Reduction
- Increased Yield
- Improved Fruit size & Quality

RDF = Regular Fertilizer Dose
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ZYTONIC-M TRIAL RESULTS IN GRAPES

ZM Control

Observed Benefits

- 50% RDF Reduction
- Higher bunch count per plant
- Higher TSS
- Improved Quality

RDF = Regular Fertilizer Dose
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ZYTONIC-M TRIAL RESULTS IN LEMON

ZM

Control

Observed Benefits

- Improved quality
- Bigger Fruit size
- Improved nutritional content

RDF = Regular Fertilizer Dose
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ZYTONIC-M TRIAL RESULTS IN CARROT

ZM Control

Observed Benefits

- 50% RDF Reduction
- Higher Yield and Quality
- Longer Shelf life (40%)
- Reduction in Crop Care Chemicals
- Reduction in irrigation
- Improved nutritional content

RDF = Regular Fertilizer Dose
ZM = Zytonic-M

ZYTONIC-M TRIAL RESULTS IN SUGARCANE

Zytonic-M Control

Observed Benefits

- 50% RDF Reduction
- Thicker Cane Girth & Quality
- Increased Yield
- Higher Sugar Recovery

RDF = Regular Fertilizer Dose
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Conclusions

1. There are chemical, physical and biological aspects to soil health, which all must be addressed together for consistent performance.
2. Technologies that address soil health must ultimately focus on reviving the soil food web and nutrient cycling in the soil.
3. Reviving the soil food web and nutrient cycling will automatically make farming more sustainable.