

**Boxford Fruit Farm,
Suffolk**

BioAg Soil & Seed®

Improves Soil Nutrient Levels

Introduction

BioAg Soil & Seed is a biological liquid culture which delivers essential nutrients and metabolites directly to crops, as well as stimulating microbial activity in the soil. This fermented microbial culture contains a rich source of vitamins, minerals, proteins, enzymes, amino acids, carbohydrates and dormant beneficial organisms.

Soil & Seed is formulated to improve soil microbial activity which is a key component of soil fertility and the ability of soil to supply available nutrients to plants. Its principal features are:

- Balanced food supply for soil microbes
- Stimulates soil microbial population and diversity
- Accelerates conversion of crop residues into humus
- Improves soil moisture and nutrient utilisation

It is this latter claim of improving nutrient utilisation from soil reserves that was the basis of this farm evaluation.

Farm Site: Boxford Fruit Farm, Hill Farm, Boxford, Suffolk.

Evaluation: Four orchard blocks of apples—Beeston, Plough Lane, Old Barnfield (OBF) and Topcroft were each divided into a Control block (no Soil & Seed treatment) and a Treated (Soil & Seed) block. All orchard blocks were supplied with fertiliser nutrients through a fertigation System. The only difference between the Control and Treated blocks was the supply of Soil & Seed.

Soil & Seed Treatment: Soil & Seed was applied via the fertigation system with the liquid fertiliser (8-3-5) over an 18 week period from May to end September 2012 in the treated blocks. The total Soil & Seed application rates are shown below.

Soil & Seed Application Rates

<u>Orchard Block</u>	<u>Soil & Seed (l/ha)</u>
Beeston	12.0
Plough Lane	10.0
Old Barnfield (OBF)	12.0
Topcroft	14.0

Soil Results

A representative soil sample from Control and Treated orchard blocks were analysed in November 2012 (Beeston) and March 2013 (Plough Lane, OBF and Topcroft) using the ADAS Standard Soil Analysis procedures. Soils were analysed for extractable (available) levels of Phosphorus, Potassium, Magnesium and Calcium and the results are presented in Appendices 1-4 respectively. A summary of the soil analyses are shown below:

Soil Available Levels

<u>Nutrient</u>	<u>Control</u>	<u>Treated</u>	<u>Difference (%)</u>
Phosphorus (mg/l)	32 (3)*	56(4)	+75
Potassium (mg/l)	127(-2)	141(2)	+11
Magnesium (mg/l)	59(2)	103(3)	+75
Calcium (mg/l)	1107	1464	+32

*Indices are in parenthesis

Mean soil available levels were 75% higher for Phosphorus and Magnesium, 32% higher for Calcium and 11% higher for Potassium on the Soil & Seed treatment compared to Control. In the case of Phosphorus and Magnesium this was equivalent to increasing the Soil Index by 1.

Soil Structure

Apart from the substantial increase in available soil nutrients a visual effect was observed in soil structure between Control and Treated orchard blocks. The following photographs are taken from a Control and Soil & Seed treated block from Beeston.



Beeston Control



Beeston Treated

It was clearly apparent when soil samples were taken from Control and Treated blocks that a marked difference in soil structure and compaction was apparent. Control soils tended to be solid and compacted whilst treated soils had a distinct structure and "crumbly" appearance. All soils on this farm are "heavy clay" in nature and this was borne out by the difficulty in putting a spade into the ground in Control blocks, whereas this exercise was much easier to carry out with less energy exerted on Treated blocks.

Summary

This farm evaluation of BioAg Soil & Seed has demonstrated the effectiveness of this microbial liquid culture to substantially improve the level of soil available nutrients, particularly Phosphorus, Magnesium and Calcium, and to a lesser extent Potassium.

It is well recognised that biological activity is important to facilitate the release of Phosphorus from soil reserves. Phosphorus is an essential nutrient for energy utilisation in crops to drive vegetative growth and fruiting. Of all the major nutrients Potassium supply from soil reserves into the soil solution is the least sensitive to microbial action. It is interesting to note that Soil & Seed was less effective in increasing the available level of Potassium than for the other nutrients.

In terms of soil structure biological activity is important to the development of stable aggregates. Soil fungi, with their thread-like mycelia, help to bind soil particles together. Bacteria secrete a polysaccharide glue which holds soil particles together, thereby improving soil structure. Air penetration to soils and drainage is very dependent on the establishment of a stable soil structure which enables soil life to flourish and soil fertility to build.

This farm evaluation has demonstrated the benefits of Soil & Seed to improving soil available nutrient levels and soil structure. Future work will focus on the effect of Soil & Seed on crop health and production, as mediated through the positive improvements in soil fertility reported here.









