BIOSOIL ENHANCERS

SUMAGROW INSIDE™

Tea Field Results from China

The following written report was prepared by a Chinese government agency in cooperation with a Chinese university. The conclusion in the report stated, "...all parameters related to plant growth vigor increased by more than 25% as compared with those of untreated tea trees" and the product "produces positive effect on the soil."

While the report presents raw data, it does not calculate the yield increase. The yield increase calculations below are Bio Soil's interpretation of the numbers.

The harvest-able parts of a tea tree are the leaves and buds. The report did not give enough detail on the leaves, but yield increase can be inferred by the increase in growth of the trees as measured by the tree height and crown. Moreover, the buds become leaves, so given time; the bud count is the leaf count.

The correct formula is pi times radius squared times length, but length times width is very close to the correct answer and length and width are the numbers provided in the report so they are easily compared for accuracy.

Plot A

Untreated -- 57.3 (height) x 62.5 (width) = 3581.25 (plant mass)

Treated -- 71.3 (height) x 74.5 (width) = 5311.85 (plant mass), an increase of 48.3%

Plot B

Untreated - 56.8 x 50 = 2840

Treated - 72.8 x 70.3 = 5117.84, an increase of 80.2%, and average, with Plot A, of 64.3% increase for the plant mass

It is assumed the leaves per square centimeter would be equal; however, this is unlikely as other crops grown with SumaGrow products have denser plant mass so the number of leaves in the treated trees should be greater, and therefore, the yield increase even higher. This is confirmed by the number of buds per plant increasing by an average of 83.8% while the plant mass averaged an increase of 64.3%.

There was adequate data for calculating an exact increase in the extra weight of the buds on the tea trees:

Plot A

Untreated 34 (average buds per plant) x 0.14 (average weight of buds) = 0.476 (total bud weight per plant)

Treated 48 x 0.022 = 1.056, an increase of 121.8% in bud weight

Plot B –

Untreated 44 x 0.014 = 0.616

Treated 77 x 0.015 = 1.155, an increase of 87.5%, and average, with Plot A, of 104.7% increase for the bud weight per plant

It is interesting to note the average weight of untreated buds was exactly the same (0.014) for both plots.

Assuming a 50/50 mix of leaves and buds, the average yield increase for the treated trees is 84.4%.

CAUTION: The report is silent on fertilizer. If the control would normally be fertilized, and have a higher yield, then the increase would not be as sizable.

Some interesting data applicable to ALL crops grown with SumaGrow products include the soil analysis which shows the available nutrient content increasing significantly -- Phosphorous - 31.9%, carbon 27.2% and sulfur 14.6%. Apparently, nitrogen and potassium were also measured but no data is listed.

The carbon increase in the soil could be extremely significant in determining carbon credits.

Additionally, there was a wide variation in the pH of the soil between the test plots; Plot A was 4.64 while Plot B was 7.63

And finally, the leaves being "shiny" are probably an indication of higher nutrient value. Other crops grown with SumaGrow products have shown higher protein levels, higher brix levels, and higher chlorophyll levels, so we should expect a higher nutrient value in the tea, but no quality testing is presented in the report.

BIOLOGICAL SOIL AMENDMENT STUDY

Effects of Microorganism Fertilizer on Growth of Tea Trees

(A report on the small-scale field test)

1. Background of the Field Trials

The tea tree is one of the most popular woody crops in China, particularly in Suzhou city. The purpose of the field trial was to provide information on feasibility of applying BioSoil's SumaGrow in tea tree garden to improve the yield and quality of tea leaves. In this field trial, the BioSoil's SumaGrow agent was applied in two plots in Sanshan island in Taihu Lake, one of the largest lakes in China. After applying SumaGrow in the tea garden, we tested the changes of soil physico-chemical properties and examined the effects on the growth of tea trees and their yield and quality. Based on this, we will obtain reliable information about the practical growth-promoting effects, and potential economic benefits, and therefore provide scientific support for the application and extension of SumaGrow as a new environment-friendly product in agriculture.

2. Trial design and methods

2.1 Crop species tested and test plots

Two plots were established in a tea tree field in Sanshan island of Wuzhong District, Suzhou city. One plot (Plot A, thereafter) locates at the top of the hill, and the other (Plot B, thereafter) at the foot.

Each plot was divided into two belts, one of which was treated with recommended rates of BioSoil's SumaGrow biological soil amendment and the other was sprayed with water as control.

2.2 Spraying methods

BioSoil's SumaGrow agent was sprayed on surface soil under tea trees late in November after the buds were harvested. The SumaGrow agent was diluted with water at a ratio of 1: 200, and sprayed around trees with a radius two times larger than the canopy radius.

2.3 Sampling methods and measurements

After a period of time when Bio Soil agent was sprayed, the plots were investigated.

2.3.1 Plot status: Basic data about row to row distance was determined.

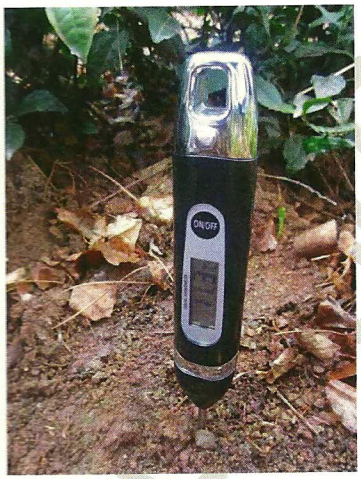
Plot A

Plot B

2.3.2 Soil sampling: Three sites from each plot (treatment or control) were randomly selected (12 sites in total), 200~300 g surface soils (0-10 cm in depth) were sampled and sealed into polythene bags for the quantitative analysis of physico-chemical properties.

Collecting soil samples

2.3.3 Measurement of soil respiration and soil temperature: The soil respiration and soil temperature near the sampling sites were measured by using L-6400(?) and soil thermometer, respectively.



Measurement of soil temperature

Measurement of soil respiration

2.3.3 Measurement of growth vigor of tea trees

Four tea plants were randomly selected from each belt (treatment and/or control) of each test plot (at the top and/or foot of the hill) and to measure the plant height

and crown width, and to count the buds per plant. Some tea leaves were harvested to measure the length and fresh weight of buds.

Measurement of height of tea trees (left)

Measurement of crown width of tea trees (right)

Sampling buds of tea trees

Checking the number of buds

2.4 Items of Laboratory test

2.4.1 Physico-chemical properties of soil: moisture content, soil bulk density, soil pH;

2.4.2 Soil nutrients: contents of nitrogen (N), phosphorus (P) and potassium (K);

2.4.3 Soil microbial biomass: Fumigation-extraction method.

3. Results and analysis

3.1 General conditions

Date: March 20, 2011;

Location: Sanshan Island, Wuzhong District in Suzhou City;

Weather conditions: cloudy, 10 oC in the open air

3.2 Basic situations of test plots

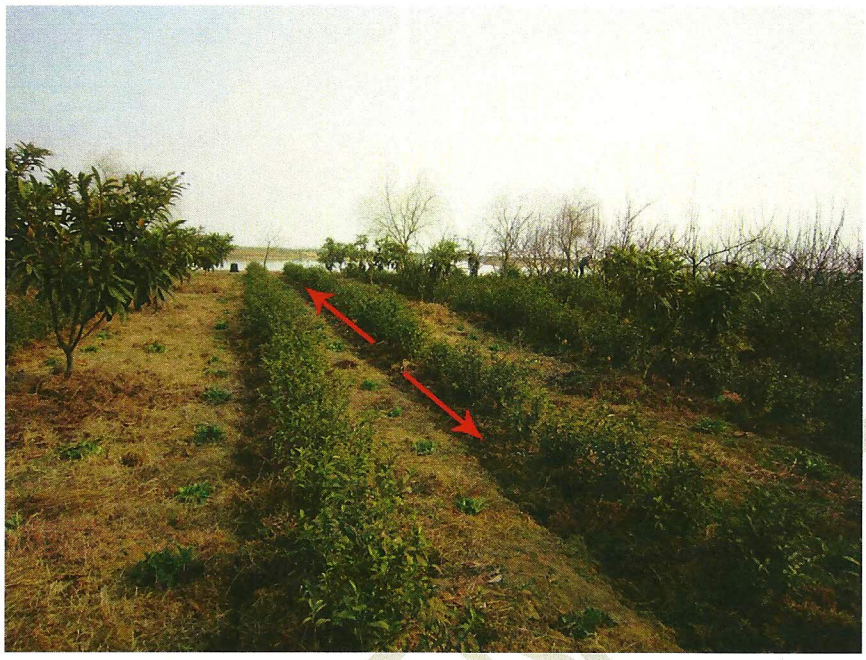
	Plant age（years）	row spacing (cm)	line spacing (cm)
Plot A (at the top of hill)	3	135	50
Plot B (at the foot of hill)	5	135	50

3.3 Differences of growth vigor between treatment and control

3.3.1 Apparent comparison

Tea trees treated with BioSoil's SumaGrow

Unfertilized/Untreated control tea trees



At the far end of the belt, the tea trees treated with BioSoil's SumaGrow grew uniformly and densely.

The tea leaves (right) appeared shiny after treament with SumaGrow

Longer buds (treatment with SumaGrow)

Shorter buds (untreated control group)

3.3.2 The comparison of tea tree growth between treated and untreated groups (see Table below)

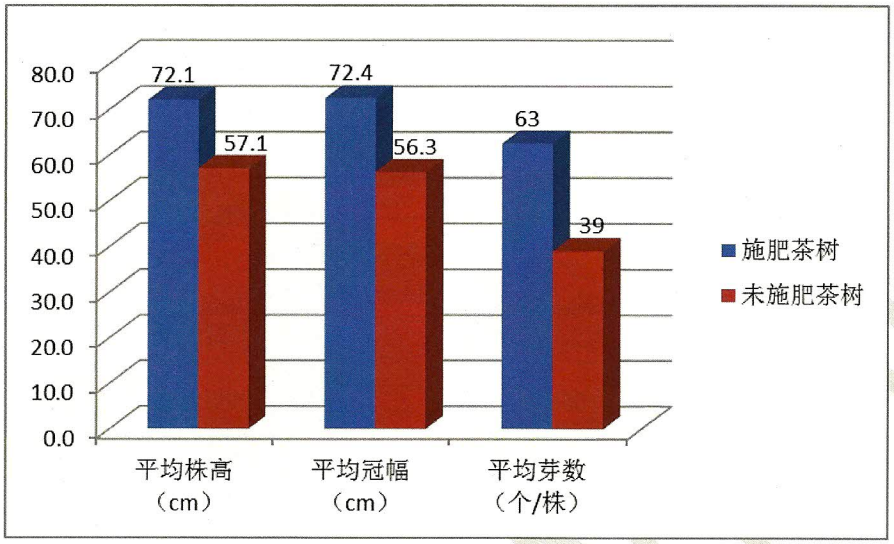
	average plant height (cm)	average crown width (cm)	Average bud number (per plant)	average bud length (cm)	average fresh weight of buds (g)
Treatment (Plot A)	71.3	74.5	48	1.39	0.022
Control (Plot A)	57.3	62.5	34	0.97	0.014
Treatment (Plot B)	72.8	70.3	77	1.05	0.015
Control (Plot B)	56.8	50.0	44	0.83	0.014

The general growth properties of tea trees treated with SumaGrow were shown in the following figure as compared with those untreated trees.

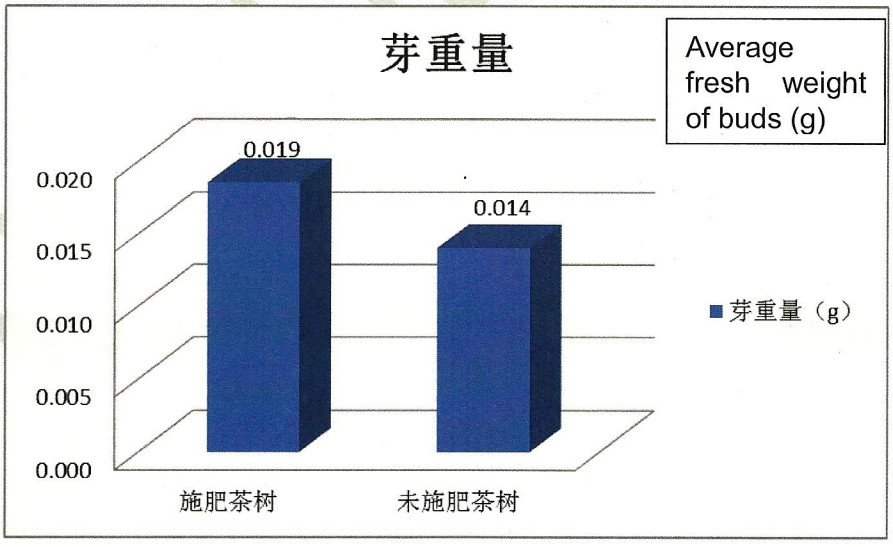
Average plant height (cm)

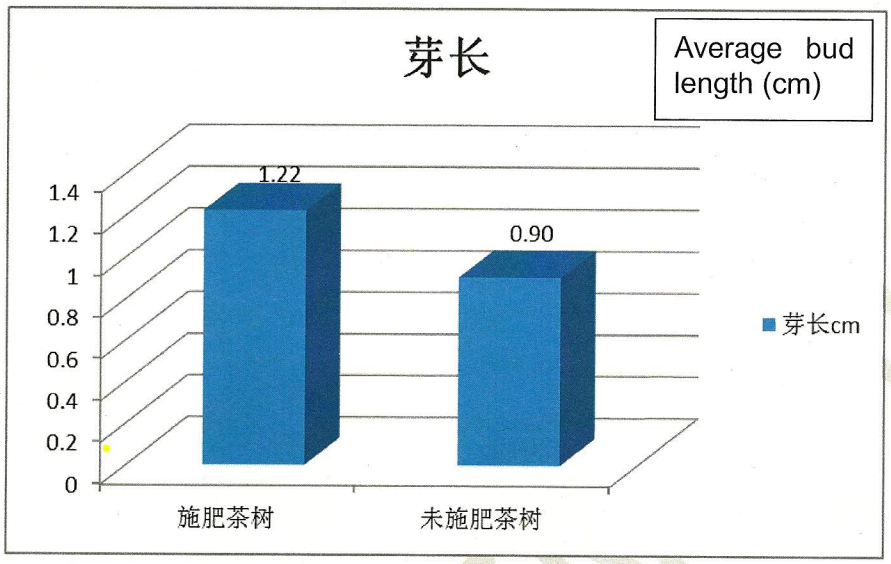
Average crown width (cm)

Average bud number (per plant)



Average plant height (cm)
Average crown width (cm)
Average bud number (per plant)





Thus, it can be seen that tea trees grew more vigorously after sprayed with SumaGrow that of control, all the five growth parameters increased obviously, and on the average, plant height, crown width, bud number, fresh bud weight, and bud length increased by 26.3%, 28.7%, 60.3%, 32.2%, and 35.3%, respectively.

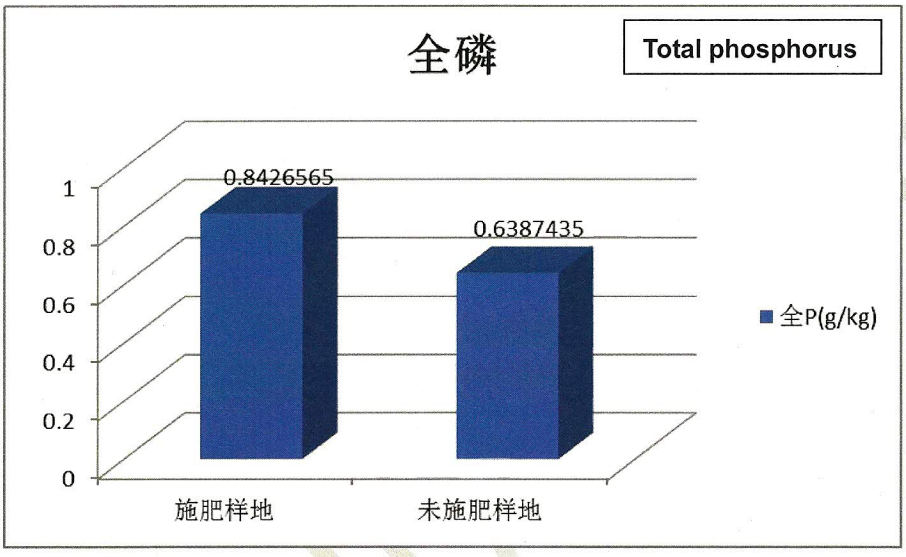
4 Comparisons of physico-chemical properties of soil samples

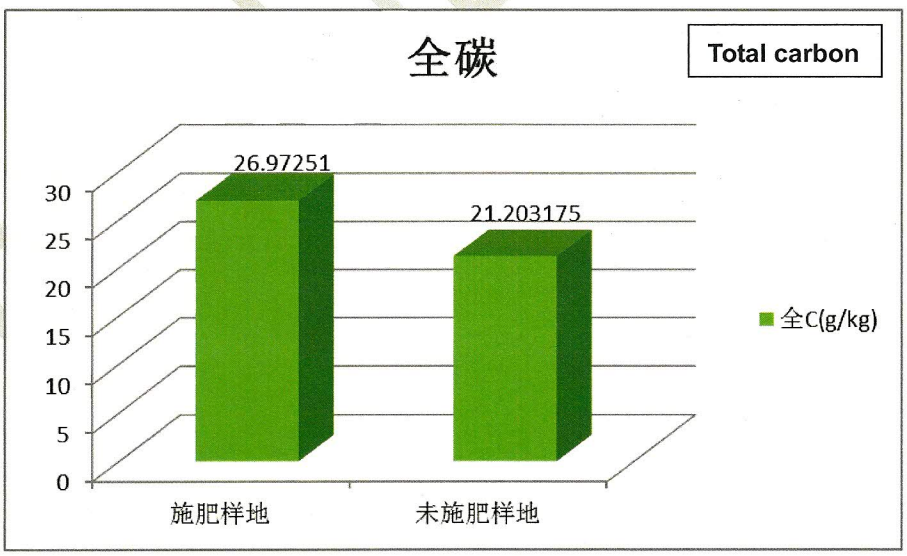
4.1 Statistical Results

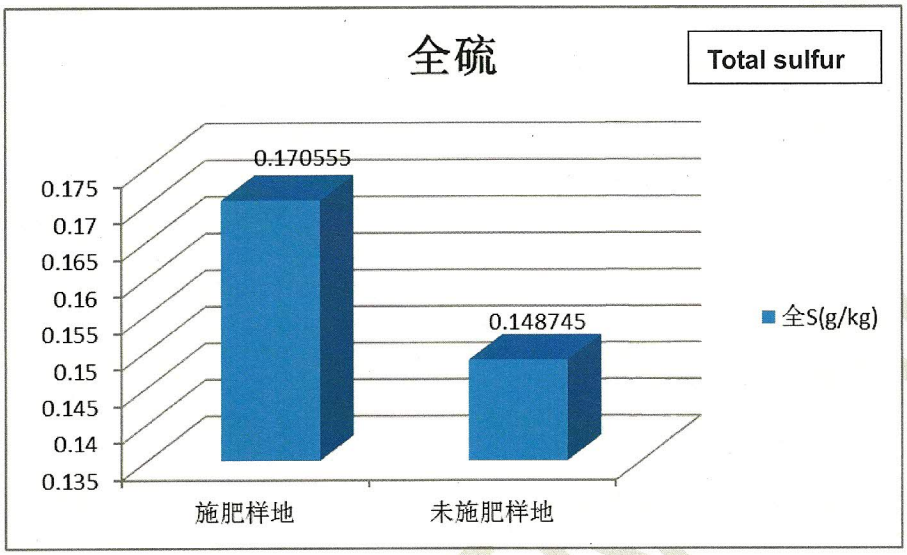
	Soil temperature °C	moisture content (%)	Soil pH	Soil microbial biomass	Total nitrogen (g/kg)	Total phosphorus (g/kg)	Total carbon (g/kg)	Total sulfur (g/kg)
Plot A (treated)	11.5		4.64			0.88399	48.70634	0.15365
Plot A (untreated)	11.6		4.74			0.492698	38.46355	0.13698
Plot B (treated)	12.2		7.63			0.801323	5.23868	0.18746
Plot B (untreated)	12.4		7.73			0.784789	3.9428	0.16051

4.2 Analysis of results

The average values for parameters of physico-chemical properties of soils in trial plots (treated and/or untreated) in tea tree garden were summarized as follows:







Results showed that the soil available nutrient contents increased significantly, and total nitrogen, phosphorus, potassium, carbon, and sulfur increased by ?%, 31.92%, ?%, 27.21%, and 14.66%, respectively, which suggest that the microorganisms play important role in fixing nitrogen and carbon, and in preventing run-off of beneficial ions, therefore, improve soil environments and soil fertility, and crop yield and quality.

4. Conclusions

4.1 Application of new microorganism fertilizer (biological soil amendment) results in obvious effects on the growth of tea trees, after treated with Bio Soil's SumaGrow, tea trees grow better than that of untreated, and all parameters related to plant growth vigor increased by more than 25% as compared with those of untreated tea trees.

4.2 Application of new microorganism fertilizer produces positive effects on soil…… (Some items have been measuring in Nanjing Forestry University)

J&Y World Solutions

Jiang Su Province
People's Republic of China