Some Evidence of the Beneficial Effects of Bio-Plant and Pro-Plant 100% Organic, Microbial, Liquid Bio-fertilizers

1. Introduction

- Here is a summary of some field test results carried out in the last few years from Mauritius, Thailand, Vietnam, Benin, Cameroon, Nigeria, Malawi, Namibia, Rwanda, China, Azerbaijan, Bangladesh, Nepal, Malaysia, Philippines, and Indonesia. These are just to give you an idea of the general cost and yield benefits of using the bio-fertilizers.
- We have many, many field test results in Thai and Vietnamese, but we have not translated these because nobody pays much attention to the field tests of other people, including tests carried out by government research centres, and they wish to carry out their own tests.
- Many farmers have been using the bio-fertilizers for up to about 12 years, and we do not keep a record of their results. However, the orders increase continuously because of the beneficial effects, and now already several governments are buying the two bio-fertilizers in order to phase out chemical agriculture.
- The information below is authentic.

2. General Comments

- ***In bio-chemical farming***, as a general rule, by mixing 330 cc of Bio-Plant with each 50 kgs bag of chemical fertilizer in bio-chemical farming enables farmers to halve the amount of chemical fertilizer they use straight away while increasing their yield by about 30% and reducing their costs by roughly 40%.
- If they also prepare the seeds and soil with Bio-Plant and spray Pro-Plant on the leaves, the yield will rise by about 25%-30% while the costs drop by about 30%.
- In Year 2 and Year 3 they can reduce the amount of chemical fertilizer in each year by another 25% until they are farming 100% organically with a higher yield than when they were farming with chemicals, and of course, with much lower costs. We suggest this rate of change because even hardened chemical farmers can accept it.
- The drop in costs depends on the cost of chemical fertilizer in the country.

- ***In 100% organic farming***, the yield increase varies so much with yields even doubling, but an increase of about 30% is most common to begin with. The yield increases each year as the soil is restored to fertility and the bio-fertilizers clean the soil of the unabsorbed chemical NPK deposits left by chemical fertilizers.
- The costs are much lower. Sometimes we meet farmers who have told us that they are making a good profit for the first time as their costs have dropped 60% - 75% since they have stopped using chemical fertilizer.

3. General Benefits of Bio-Plant Reported in Field Tests

- Bio-Plant restores soil fertility, and makes hard chemical fertilizer soil crumbly and rich again. This is because Bio-Plant contains a high concentration of quickly multiplying soil micro-organisms and fungi.
- The micro-organisms produce NPK for plants and stimulate plant growth.
- The micro-organisms make the NPK soil deposits left by chemical fertilizer absorbable by the roots.
- It improves root system development.
- When used with Pro-Plant it increases the fragrance of flowers and sweetness of fruit, rice, and other grains.
- When mixed with chemical fertilizer, it halves the amount of chemical fertilizer farmers need.
- Bio-Plant makes rich bio-compost when mixed with organic matter.
- It strengthens the plant's immune system and resistance to disease and pests.
- It breaks the life cycle of soil pests.

4. General Benefits of Pro-Plant Reported in Field Tests

- Pro-Plant increases the quality and quantity of the crop yield, and thereby increases income.
- Pro-Plant accelerates growth, flowering, and the formation of grain, fruit, etc. The nutrients are useable instantly by the leaves, especially when sprayed in a fine mist onto the leaves before 9 a.m.
- Pro-Plant makes plants much healthier, and more resistant to diseases and pests.
- Increases the fragrance of flowers, the sweetness of fruit and sugarcane, the crispiness of vegetables, and flavour.
- It increases the absorption rate of nutrients.
- Pro-Plant stimulates the respiratory and photosynthesis systems, so that the plant can absorb nutrients as needed.
- It also supplements carbon dioxide fixing.
- It helps to improve the soil structure.

5. Some Field Test Results

5.1 Azerbaijan

Various Kinds of Vegetables: Field tests on ***various kinds of vegetables*** were carried out in 100% organic farming and bio-chemical farming formats, and the results were very good when compared to chemical fertilizers. The average increase in yield was about 25% in 100% organic farming and 35% in bio-chemical farming with much lower costs.

5.2 Bangladesh

Two tests have been carried out with ***tea***.

- ***Tea Test 1:*** The test was carried out in a pretty well dead area of a tea plantation and the tea plants recovered to give a good yield. Continuous use of chemical fertilizers had caused the condition of the tea plantation to deteriorate.

- ***Tea Test 2:*** After spraying Pro-Plant on Day 1, Day 8, and Day 15 the yield was 20% higher than what chemical fertilizers achieved. The leaves grew faster, and were thicker, longer, and greener. This happened again in the next 2 picking periods. The farmer's profit margin was much higher than usual with chemical fertilizers, but the agent could not say how much.
- These results are fairly standard as the same level of results is obtained commonly in Thailand and Vietnam when compared to chemical fertilizers. The increase is usually about 20% more when there is proper soil preparation with Bio-Plant.

- ***Various Crops:*** Other tests have been carried out to show the benefits in bio-chemical farming, leading to a large volume of sales.

5.3 Benin

- ***Carrots:*** In bio-chemical farming the yield of ***carrots*** was about 35% higher with costs down by about 35%.

- ***Various Crops:*** Many bio-chemical farming and 100% organic farming field tests were held in Benin from 2007 - 2009. Once we were able to get the farmers to the follow the guidelines properly, such as by preparing the soil with organic matter mixed with Bio-Plant, and spraying the crops every 10 days or 14 days according to the guidelines, the results were always better than what they had experienced in their chemical farming with regards to yield and costs.

5.4 Cameroon

- ***Tomatoes:*** Bio-chemical farming tests on tomatoes reduced the farmers' costs by around 70%.

5.5 China

- ***Tobacco:*** Field tests on ***tobacco*** in Yunnan province, China, showed a 30% - 40% increase in yield in 100% organic farming compared to chemical fertilizers with much lower costs. The leaves were larger, longer, and fresher-looking.

- ***Rice:*** Field tests on ***rice*** in Harbin, north China, showed a 50% increase in yield in 100% organic farming compared to chemical fertilizers, along with much lower costs.

5.6 Indonesia

- ***Rice:*** The results of government field tests on rice in Indonesia came out as "excellent" in 100% organic farming compared to chemical fertilizers. The quality of the rice was superior to rice grown with Urea & NPK and all of the other organic fertilizers tested, and the production cost was significantly lower than with chemical fertilizer.

5.7 Kenya

- ***Maize and Rice:*** The results of field tests carried out by the K.A.R.I. Research Institute in Kenya in 100% organic farming and bio-chemical farming with ***maize*** *and* ***rice*** were very good compared to chemical fertilizers.

5.8 Malawi

- ***Maize:*** Field tests on maize on soil with a high level of Mn and Fe showed much better growth in terms of yield, colour, and healthiness. The bio-fertilizer maize was free of any signs of soil toxicity or disease.
- In a 100% organic farming field test the increase in the yield of maize was about 30% while the costs were reported as being "significantly less".
- The results of the second round of field tests on maize, which finished in July 2011 were excellent.

- ***2010-2011 Report: Evaluation of Bio-Plant and Pro-Plant Fertilizers for Soil Fertility Improvement and Maize Grain Yield Production. Soil Fertility and Plant Nutrition Section and [1]Plant Pathology Section, Bvumbwe Agricultural Research Station***

Soil Test Results

- The results indicated that there were significant differences (P≥o.5) between bio-organic and bio-chemical farming. The mean of pH, OM, and N were higher in bio-organic than in bio-chemical, while for P it was higher in bio-chemical than in bio-organic treatments. The values were higher in treatments treated with Bio Plant and Pro Plant than the control.
- The results suggest that Bio Plant and PRO Plant enhanced availability of nutrients to the maize plant.

Maize Grain Yield Results

- Results on the effect of bio-organic and bio-chemical farming on maize yields indicated that there were significant (P=0.05) yield differences among the treatments and between the farming types. The grain yields were higher in all the treatments above the control at both sites Bembeke and Bvumbwe.
- The combined use of 30% chemical fertilizer and 660cc of Bio-Plant microbes gave the highest maize grain yields of 5514 kg/ha at Bvumbwe and 4883 kg/ha at Bembeke.
- Bio-organic farming gave the highest grain yields at Bvumbwe (3518 kg/ha) and Bembeke (3667 kg/ha). The significant differences in grain yield were due to the effects of the Bio Plant and Pro Plant in the treatments.
- This means that Bio Plant and Pro Plant microbes mineralized and fixed more soil and atmospheric N respectively and made them available to the crops for uptake.
- The bio-fertilizer further enhanced the availability of soil macro (such as P and K) and micro (such as Mg, Zn etc) nutrients, their uptake and use efficiency by the maize plants as compared to the treatment where 300 kg/ha of chemical fertilizer alone were applied and got slightly lower yields at Bvumbwe.
- This suggests that bio-chemical treatments with the bio-fertilizers were more effective at producing the highest maize grain yields as compared to the rest of the treatments.

Conclusion and Recommendations

- Bio Plant and Pro Plant bio-fertilizers significantly improved soil fertility and available soil nutrients such as N, P, K etc.
- Bio Plant and Pro Plant bio-fertilizers significantly increased maize grain yields and were more effective than chemical fertilizers.
- The rate of 300cc Bio Plant plus 300cc Pro Plant in 420L of water mixed with 3000 kg Organic material per hectare in bio-organic farming and the rate of 990cc Bio Plant plus 150 kg (100 kg 23:21:0+4S; 50 kg Urea) fertilizer gave the optimum maize grain yield production at Bembeke.
- The rate of 660cc Bio Plant plus 100 kg (67 kg 23:21:0+4S; 33 kg Urea) fertilizer in Bio-chemical farming and rate of 300cc Bio Plant plus 300cc Pro Plant in 420L of water mixed with 3000 kg organic material per ha in bio-organic farming gave the optimum maize grain yield production at Bvumbwe.

5.9 Malaysia

- ***Tea, Rice, and Small Vegetables***: Field tests on tea, rice, and small vegetables produced much better results in 100% organic farming and bio-chemical farming than the chemical Control crop. No numerical data was provided; just positive comments and a wish to buy the bio-fertilizers from some farmers.

5.10 Mauritius

- ***Green Beans:*** Field tests on ***green beans*** in Mauritius showed a 30% increase in yield in 100% organic farming compared to chemical fertilizers with much lower costs.

5.11 Myanmar

- ***Various Crops:*** Many field tests have been carried out with very good results.

- ***Cabbages 1:*** In one test carried out with cabbages in soil that had a toxic level of Mn, the Control crop grew poorly and had a lot of brown leaves while the bio-fertilizer crop in 100% organic farming was very green and the growth was far superior.

- ***Cabbages 2:*** In another test on cabbages in the West Bago region in 100% farming 200 cabbages weighed the same as 400 cabbages grown with chemicals. The details are below.

A. Test Area Using Bio-Plant and Pro-Plant over 8 acres.

1. Soil preparation: 25 kgs local organic fertilizer + 125 cc of Bio-Plant mixed and applied to each acre.
2. Then 62.5 cc of Pro-Plant was sprayed mixed with 62.5 gallons of water per acre.
3. Total cost of using the bio-fertilizers:

a. Organic fertilizer + Bio-Plant: 9,000 Kyats = US$9 / acre x 8 acres.
b. For 8 acres: 72,000 Kyats = US$72 / 8 acres.
c. Pro-Plant sprayed: 32,000 Kyats = US$32 / 8 acres.
d. Total cost for 8 acres = 72,000 +32,000 = 104,000 Kyats = US$104.
e. One cabbage weighed 4.8 kilos.
f. No need to use pesticides.

B. Control Area used inorganic, chemical fertilizer over 8 acres.

a. Charcoal: 10,000 Kyats / acre = US$10.
b. Cow dung: 20,000 Kyats / acre = US$20.
c. Pesticide on Ground Carbofuran: 15,000 Kyats / acre = US$15.
d. Local organic Fertilizer (10 bags): 60,000 Kyats / acre = US$60.
e. Urea 46% (2 bags): 40,000 Kyats / acre = US$40.
f. Pesticide sprayed: 30,000 Kyats / acre = US$30.
g. Total cost for acre: 175,000 Kyats / acre = US$175.
h. Total cost for 8 acres: 1,400,000 Kyats / 8 acres = US$1,400
i. One cabbage weighed 2.4 kilos.

5.12 Namibia

- ***Rice and Millet:*** Government field tests on ***rice and millet*** in Namibia showed "very good growth" in 100% organic farming compared to chemical fertilizers. As the agent wrote: "The results couldn't possibly be better!! The tests were conducted over a wide geography of the country and with different patterns of rainfall. In all cases, Pro-Plant and Bio-Plant either proved as efficacious as chemicals alone or superior to chemicals. Of course, over time, chemicals impoverish the soil whereas, over time, bio-fertilizers enrich the soil. …"

5.13 Nepal

- ***Rice:*** 100% organic farming field tests with rice showed an increase in yield of about 30%.

5.14 Nigeria

- ***Rice:*** Tests on ***rice*** at the I.I.T.A. Research Institute in Ibadan have shown that Bio-Plant and Pro-Plant produce a higher quality yield for a lower cost than Urea and NPK. The tests are part of the pre-selection process for tests to be carried out by the Bill Gates Foundation. The institute has indicated that it will recommend the bio-fertilizers to the Foundation.

5.15 Pakistan

- ***Various Vegetable Crops:*** Field tests on ***various vegetable crops*** in Pakistan showed a noticeable increase in yield in 100% organic farming compared to chemical fertilizers ranging from about 20% to 100% with lower costs.

- ***Flowers:*** The 100% increase in yield was for ***flowers*** on an area of half an acre. The farmer had never obtained so many flowers before. Also, they had a better scent than flowers he grew with chemical fertilizers.

- ***Cotton 1:*** Even without soil and seed preparation using Bio-Plant, the performance of Bio-Plant and Pro-Plant with cotton has been satisfactory. At a demonstration plot at the Agriculture Research Institute the yield has been 880 kgs per acre during the first and second pickings, with two more pickings left. Conventional chemical farming has produced 720 kgs per acre. The costs are about 40% lower even with chemical fertilizer being heavily subsidized. With proper seed and soil preparation, the difference would be greater.

- ***Cotton 2:*** At a demonstration plot of Cotton at Matiari the yield was 30% higher than the conventional chemical farming yield of 750 kgs. Again, this was without seed and soil preparation with Bio-Plant.

- ***Cotton 3:*** Cotton Leaf Curl Virus has been creating devastation throughout the Punjab, but the test plot at Bhawalpur has been the least affected by the virus. This is the first application of the bio-fertilizers. Once Bio-Plant and Pro-Plant have been used for a couple of years, the immunity will be much stronger.

5.16 Philippines

- ***Rice:*** Organic farming field tests on rice have shown a 30% and 85% increase in yield. In the second of the tests the farmers prepared the soil according to the guidelines more effectively. We know that the production costs were significantly lower, but we do not know by how much.

5.17 Rwanda

- ***Flowers:*** Tests on roses resulted in fresher-looking and smelling roses. The rose bushes grew more densely, and some of the stems appeared much thicker than the rest of the stems in the control area. The height of the plants had increased as well.

5.18 Thailand

- ***General Results:*** The bio-fertilizers have been used in Thailand for about 10 years already. Bio-chemical farming in Thailand using only Bio-Plant have shown many times that mixing 330 cc of Bio-Plant with a 50 kgs bag of NPK and Urea enables farmers to halve the amount of

chemical fertilizer they use with a small increase in yield of no more than 10% compared to chemical fertilizer. When Pro-Plant is sprayed on the leaves the average increase in yield is about 25%-30%. The percentage drop in costs is usually about 35%. These are common results.

- Farmers growing pineapple and bananas in the North of Thailand report the following general benefits after using Bio-Plant and Pro-Plant to grow their pineapple and bananas.

Pineapple

- The fruit is much sweeter than pineapple grown with chemical fertilizer.
- The pineapples are heavier.
- When you look at the pineapples, there have more eyes (scales) around the fruit.
- The pineapples look fresher and more attractive to eat.
- The pineapples keep longer after harvest.
- There are more suckers so that more pineapple plants can be planted and grown.
- The problems with disease disappear. In the first season the farmers can halve the amount of sprays they use, and in the second crop (second year) they can stop spraying chemical sprays altogether. The reason is that the immune system of the pineapple plants becomes stronger and stronger. Also, when the farmers spray Pro-Plant on the leaves and the fruit, the leaves and fruit get coated with micro-organisms, which protect the plants from disease.
- The cost of growing the pineapples drops significantly. In bio-chemical farming the farmers can halve the amount of chemical fertilizer they use, and if they also prepare the soil with organic matter mixed with Bio-Plant, and spray Pro-Plant over the plants every month (or every 2 weeks for better effects), they get a noticeable increase in yield. Usually the increase in yield, they say, is about 30%. This is standard for bio-chemical farming.
- After 3 years they can sell the pineapples as “100% Organic Pineapples”, and get a higher price.

Bananas

- The weight of bananas per tree is higher. Normally, the farmers spray Pro-Plant every month, but they say that the effects are better if they spray Pro-Plant twice or even three times per month.
- The bananas are sweeter than bananas grown with chemical fertilizer.
- The bananas look more attractive to buy and eat as the skin is shinier.
- The bananas don’t have black spots on them.
- The bananas keep longer after picking.
- The farmers can sell the banana leaves for wrapping food because the leaves have more Cutin and look fresher and shinier.
- The problems with disease disappear. In the first season the farmers can halve the amount of sprays they use, and in the second crop (second year) they can stop spraying chemical sprays altogether. The reason is the same as outlined above with pineapples.
- The cost of growing the bananas drops significantly. As in the case of pineapple, in bio-chemical farming the farmers can halve the amount of chemical fertilizer they use, and if they also prepare the soil with organic matter mixed with Bio-Plant, and spray Pro-Plant over the banana trees every month (or every 10-14 days for better effects), they will get a noticeable increase in yield.
- The farmers stress the importance and benefit of preparing a lot of compost mixed with Bio-Plant and placing this around the banana trees. In the first year they took the recommendation of making up to 20 MT of compost and organic matter for each hectare, and they reaped the benefits of doing this. In the second year they could reduce the amount of organic matter they use as the soil has become rich in micro-organisms.
- After 3 years they can sell the bananas as “100% Organic Bananas”.

Grass

- The effect on a golf course was that the grass and the soil became softer and the growth was better. The same happens on lawns.

Pond Similar to a Golf Course Pond

- We chose a smelly pond in an area of farmland that was full of algae and rotting grass, and into which chemical fertilizer had seeped into. It was in a worse state to what one finds on a golf course in our experience.
- We applied 2 litres of Bio-Plant to the pond according to the volume of water, which we calculated to be about 200 tonnes, and after about 2 weeks when we went back the pond had become much cleaner. The smell had gone and the water was clearer. The chemicals had been consumed by the micro-organisms in Bio-Plant.
- Bio-Plant contains beneficial micro-organisms that clean polluted ponds. The micro-organisms consume the excess chemicals and nutrients that have come from the chemical fertilizers and pesticides used on the grass. They also break down the decaying vegetation and other organic matter that these nutrients are derived from, while at the same time releasing oxygen back into the pond.
- This introduction of increased oxygen levels creates two positive effects. Increased levels of oxygen in the water will cause the decomposition of organic matter to occur faster, thus limiting the amount of nutrients available and creating clearer water. Increased amounts of oxygen also squeeze out other gases like carbon dioxide and ammonia.

Tea

- Many farmers in the hills of North Thailand use the bio-fertilizers to grow tea. After spraying Pro-Plant on Day and Day 8 during a 2-week leaf-picking period they obtain the following standard benefits:
  - The yield is a good 20% higher than with their chemical fertilizer tea, even when they do not prepare the soil with Bio-Plant and only spray Pro-Plant on the leaves. It is standard that the tea bushes produce more leaves and branches.
  - The leaves look fresher and shine more.
  - The tea has less tannin and tastes less bitter.
- Some farmers use bio-chemical fertilizer (NPK and Urea mixed with 330 cc of Bio-Plant) and spray Pro-Plant on Day 1 and Day 8, while others have stopped using chemical fertilizer and grow tea organically by preparing the soil with organic matter mixed with Bio-Plant and spraying Pro-Plant onto the leaves on Day 1 and Day 8.
- Comparing their results, the farmers using bio-chemical fertilizer and also spraying Pro-Plant get a slightly higher (5%) yields, but their costs are higher as they are using chemical fertilizer. Over time the difference in the yield disappears as the condition of the soil improves with continuous 100% organic soil preparation.

5.19 Vietnam

Sugarcane

- In general the farmers have increased their yield by 20% - 30% compared to when they used chemical fertilizers.
- The sugar factories now only almost exclusively from farmers that grow their sugarcane crops with Bio-Plant and Pro-Plant, principally because the sugar from the sugarcane is sweeter than from chemical sugarcane (usually about 20% sweeter on analysis).
- Sugarcane crops grown in wet rice fields increased the yield by 40% - 50%.
- On normal land farmers increased normal yield of 50 tonnes per hectare to 70 tonnes.
- Bio-Plant and organic matter mixed together improve the soil. When flooded with water the sugarcane yield increased up to 100 tonnes. Where farmers use water system the yield increased up to 120 tonnes.
- They reduced their costs 30% - 35% compared to chemical fertilizers.
- Two sugarcane factories mix Bio-Plant with the filter cake waste of sugarcane, and the farmers increase their productivity 5% - 10% by using it to prepare the soil.
- Farmers that mix Bio-Plant with chemical fertilizer halve the chemical fertilizer they use.
- Significant effect on the growth parameter (number of internodes per cane, internodal length, tops weight, trash weight and sucrose contents) and yield components (number of millable canes, cane length, cane diameter, weight per stripped cane and stripped cane yield).

Rubber

- At one Trimber rubber plantation the growth of young trees is 20% - 25% faster than normal, and the saplings can be transplanted a month earlier than normal.
- At another plantation the trees produce more latex than when chemicals were used in the past. The latex is softer and flows easier.

Rice

- Many chemical fertilizer rice farmers have stopped using Urea and NPK. Rice grown with Bio-Plant and Pro-Plant produces 20% - 30% more than with chemicals in 100% organic farming. The rice plants have more roots, more grain on the heads, and very few pest problems. Our agents say they have many more farmers wanting to change from chemicals to Bio-Plant and Pro-Plant next season.

Phasing Out Chemical Agriculture

- Many chemical farmers have gone through the 3-year process of changing from chemical farming to bio-chemical farming and then to 100% organic farming. Their revenue and crop yields are much higher and their costs much lower compared to their past when they were chemical farmers. Also, their soil is no longer hard and weak like it used to be in their chemical days.

Certification About the Accuracy of the Field Test Results

Wednesday, April 22, 2009

The field test and lab analysis report from the Benin National Institute for Agricultural Research, which is attached to the Ministry of Agriculture, Land, and Fisheries of Benin, has been translated from French to English. The company stamp is placed below as a guarantee of the accuracy of the translation.

Peter S. McAlpine
Marketing Manager
Artemis & Angel Ltd.

อาร์ทีมิส
Artemis
& Angel Co.,Ltd.
บริษัท อาร์ทีมิส แอนด์ แอนเจล จำกัด

République du Bénin
Ministère de l'Agriculture, de l'Elevage et de la Pêche
Institut National des Recherches Agricoles du Bénin
Centre de Recherches Agricoles à Vocation Nationale Basée à Agonkanmey (CRA-A)
Laboratoire des Sciences du Sol, Eaux et Environnement (LSSEE) (ex-CENAP)

160 LSSEE/2005

ATTESTATION

Je soussigné AZONTONDE H. Anastase, Docteur ès-Sciences du sol, Spécialiste en fertilité du sol, Chargé de Recherches du CAMES, Responsable du Laboratoire des Sciences du Sol, Eaux et Environnement du Centre de Recherches Agricoles d'Agonkanmey, reconnais avoir fait analyser dans ledit Laboratoire un échantillon d'engrais liquide PRO-PLANT. Les éléments minéraux déterminés sont à des teneurs presque identiques (différence non significative) à celles qui sont marquées sur la boîte d'engrais qui a été remise au laboratoire.

Par ailleurs, un flacon du même engrais PRO-PLANTE et un autre flacon d'engrais BIO-PLANT ont été associés pour des essais sur la production du maïs. Les résultats ont été spectaculaires. Les parcelles traitées avec les deux produits ont eu un rendement de trois (3) tonnes à l'hectare pour le maïs variété DMR. Ce rendement est d'habitude obtenu sur un sol de fertilité moyenne auquel on apporte 200 kg/ha d'engrais NPK.

Les résultats d'analyse de l'engrais liquide PRO-PLANT sont consignés dans le tableau en annexe.

Fait à Agonkanmey , le 14/12/2005

Responsable du LSSEE

LABORATOIRE DES SCIENCES DU SOL, EAUX ET ENVIRONNEMENT
Le Directeur

Dr. AZONTONDE H. Anastase

01 BP 988 Recette Principale, Cotonou Tél.: (229) 35 00 70 E-Mail: cenap@bow.intnet.bj Bureau à Agonkanmey

Republic of Benin

Ministry of Agriculture, Land, and Fisheries

The Benin National Institute for Agricultural Research

160 LSSEE/2005

Certification

I, the undersigned, AZONTONDE H. Anastase, Doctor of Soil Sciences, specialist in soil fertility, in charge of CAMES research, responsible for the Laboratory of Soil Sciences, Water, and the Environment at the Agonkanmey Research Centre, acknowledge having analysed in the aforesaid laboratory a sample of the liquid bio-fertilizer Pro-Plant. The minerals contained are almost identical (insignificant difference) with those indicated on the box submitted to the laboratory.

Moreover, a bottle of the same bio-fertilizer Pro-Plant and another of the bio-fertilizer Bio-Plant have been used in field tests in the production of maize. The results were spectacular. The land treated with the two products produced three (3) tonnes per hectare of the maize variety DMR. This output was achieved on soil of average fertility on which 200 kg of NPK fertilizer is used.

The results of the analysis of the liquid bio-fertilizer Pro-Plant are shown on the table in the Annex.

Made in Agonkanmey on 14/12/2005

Responsible for the LSSEE

(Signature and Stamp)

Dr. AZONTONDEH. Anastase

République du Bénin
Ministère de l'Agriculture, de l'Elevage et de la Pêche
Institut National des Recherches Agricoles du Bénin
Centre de Recherches Agricoles à Vocation Nationale Basée à Agonkanmey (CRA-A)
Laboratoire des Sciences du Sol, Eaux et Environnement (LSSEE) (ex-CENAP)

N° 158 / LSSEE / 2005

Agonkanmey le, 15 Décembre 2005

RESULTAT ANALYTIQUE D'ENGRAIS LIQUIDE DEMANDEUR : ARTEMIS ET ANGELO - BENIN

Répétition	N %	P_2O_5 %	K_2O %	CaO %	MgO %	S %	Cl %	Zn ppm	Fe ppm	Cu ppm	pH	Mm
1	4,928	0,87	1,14	2,20	0,44	0,30	11,2	34,2	180,4	Trace	4,9	Trace
2	5,376	0,86	1,01	2,25	0,44	0,29	11,1	34,0	181,0	Trace	4,9	Trace
3	5,600	0,87	1,01	2,60	0,45	0,30	11,3	33,8	179,0	Trace	4,9	Trace

Le Responsable du Laboratoire

LABORATOIRE DES SCIENCES DU SOL, EAUX ET ENVIRONNEMENT
Le Directeur

Dr.Ir. Anastase H. AZONTONDE

01 BP 988 Recette Principale, Cotonou Tél.: (229) 35 00 70 E-Mail: cenap@bow.intnet.bj Bureau à Agonkanmey

Certification About the Accuracy of the Thailand Field Test Results

Monday, August 16, 2010

The field tests have been translated from Thai to English. Farmers have been using Bio-Plant and Pro-Plant in Thailand for about 10 years, and nobody keeps field test results anymore as there is no need.

We have The translation is accurate according to the results of the field tests, which were issued by the relevant Thai provincial government authorities stated, which collected the field test data. The company stamp is placed below as a guarantee of this.

Peter S. McAlpine
Marketing Manager
Artemis & Angel Ltd.

อาร์ทีมิส
Artemis
& Angel Co.,Ltd.
บริษัท อาร์ทีมิส แอนด์ แอนเจล จำกัด

Summary of the Benefits of Using Bio-Plant and Pro-Plant In Thailand

General Effects

- The bio-fertilizers have been used in Thailand for about 10 years already. Bio-chemical farming in Thailand using only Bio-Plant have shown many times that mixing 330 cc of Bio-Plant with a 50 kgs bag of NPK and Urea enables farmers to halve the amount of chemical fertilizer they use with a small increase in yield of no more than 10% compared to chemical fertilizer. When Pro-Plant is sprayed on the leaves the average increase in yield is about 25%-30%. The percentage drop in costs is usually about 35%. These are common results.

1. Farmers in Chiang Rai Province, Thailand

- While we do not have the data to support this as the farmers growing pineapple and bananas in the North of Thailand do not keep records, but these are the general benefits that they have reported after using Bio-Plant and Pro-Plant to grow pineapple and bananas.

Effect on Pineapple

- The fruit is much sweeter than pineapple grown with chemical fertilizer.
- The pineapples are heavier.
- When you look at the pineapples, there have more eyes (scales) around the fruit.
- The pineapples look fresher and more attractive to eat.
- The pineapples keep longer after harvest.
- There are more suckers so that more pineapple plants can be planted and grown.
- The problems with disease disappear. In the first season the farmers can halve the amount of sprays they use, and in the second crop (second year) they can stop spraying chemical sprays altogether. The reason is that the immune system of the pineapple plants becomes stronger and stronger. Also, when the farmers spray Pro-Plant on the leaves and the fruit, the leaves and fruit get coated with micro-organisms, which protect the plants from disease.
- The cost of growing the pineapples drops significantly. In bio-chemical farming the farmers can halve the amount of chemical fertilizer they use, and if they also prepare the soil with organic matter mixed with Bio-Plant, and spray Pro-Plant over the plants every month (or every 2 weeks for better effects), they get a noticeable increase in yield. Usually the increase in yield, they say, is about 30%. This is standard for bio-chemical farming.
- After 3 years they can sell the pineapples as “100% Organic Pineapples”, and get a higher price.

Effect on Bananas

- The bananas are sweeter than pineapple grown with chemical fertilizer.
- The weight of bananas per tree is higher. Normally, the farmers spray Pro-Plant every month, but they say that the effects are better if they spray Pro-Plant twice or even three times per month.
- The bananas look more attractive to buy and eat as the skin is shinier.
- The bananas don’t have black spots on them.
- The bananas keep longer after picking.
- The farmers can sell the banana leaves for wrapping food because the leaves have more cutin and look fresher and shinier.
- The problems with disease disappear. In the first season the farmers can halve the amount of sprays they use, and in the second crop (second year) they can stop spraying chemical sprays altogether. The reason is the same as outlined above with pineapples.
- The costs of growing the bananas drops significantly. As in the case of pineapple, in bio-chemical farming the farmers can halve the amount of chemical fertilizer they use, and if they also prepare the soil with organic matter mixed with Bio-Plant, and spray Pro-Plant over the banana trees every month (or every 10-14 days for better effects), they will get a noticeable increase in yield.

- The farmers stress the importance and benefit of preparing a lot of compost mixed with Bio-Plant and placing this around the banana trees. In the first year they took the recommendation of making up to 20 MT of compost and organic matter for each hectare, and they reaped the benefits of doing this. In the second year they could reduce the amount of organic matter they use as the soil has become rich in micro-organisms.
- After 3 years they can sell the bananas as "100% Organic Bananas".

2. Other Field Test Results

Effect on Grass

- The effect on a golf course was that the grass and the soil became softer and the growth was better. The same happens on lawns.

Effect on a Pond Similar to a Golf Course Pond

- We chose a smelly pond in an area of farmland that was full of algae and rotting grass, and into which chemical fertilizer had seeped into. It was in a worse state to what one finds on a golf course in our experience. We applied 2 litres of Bio-Plant to the pond according to the volume of water, which we calculated to be about 200 tonnes, and after about 2 weeks when we went back the pond had become much cleaner. The smell had gone and the water was clearer. The chemicals had been consumed by the micro-organisms in Bio-Plant.
- Bio-Plant contains beneficial micro-organisms that clean polluted ponds. The micro-organisms consume the excess chemicals and nutrients that have come from the chemical fertilizers and pesticides used on the grass. They also break down the decaying vegetation and other organic matter that these nutrients are derived from, while at the same time releasing oxygen back into the pond.
- This introduction of increased oxygen levels creates two positive effects. Increased levels of oxygen in the water will cause the decomposition of organic matter to occur faster, thus limiting the amount of nutrients available and creating clearer water. Increased amounts of oxygen also squeeze out other gases like carbon dioxide and ammonia.

Effect on Tea

- Many farmers in the hills of North Thailand have use the bio-fertilizers to grow tea. After spraying Pro-Plant on Day and Day 8 during a 2-week leaf-picking period they obtain the following standard benefits:
  - The yield is a good 20% higher than with their chemical fertilizer tea, even when they do not prepare the soil with Bio-Plant and only spray Pro-Plant on the leaves. It is standard that the tea bushes produce more leaves and branches.
  - The leaves look fresher and shine more.
  - The tea has less tannin and tastes less bitter.
  - Some farmers use bio-chemical fertilizer (NPK and Urea mixed with 330 cc of Bio-Plant) and spray Pro-Plant on Day 1 and Day 8, while others have stopped using chemical fertilizer and grow tea organically by preparing the soil with organic matter mixed with Bio-Plant and spraying Pro-Plant onto the leaves on Day 1 and Day 8. Comparing their results, the farmers using bio-chemical fertilizer and also spraying Pro-Plant get a slightly higher (5%) yields, but their costs are higher as they are using chemical fertilizer. Over time the difference in the yield disappears as the condition of the soil improves with continuous 100% organic soil preparation.

The Testing Result of Bio-Fertilizer, Bio-Plant99 and Pro-Plant99

As the government by Agriculture and Co-operative ministry has the policy to let the farmers using Bio and Organic fertilizers to replace chemical fertilizers more and also like the farmers to produce Bio and Organic fertilizers by their own but some raw materials are rare to find and some locations could not find the materials to produce Bio or Organic fertilizers. Nowadays, there are some factories producing Bio and Organic fertilizers and someone introduced Bio-Plant 99 & Pro-Plant 99 to test. So I suggest my father in law, Mr. Inpol Tariya to use with outseason Logan during Aug.,2002 to Feb., 2003 with not much confident due to never use Bio-Fertilizer before.

The comment to use Bio-Fertilizer after using Potassium Chlorate 30 days by using Pro-Plant99 200cc. With water 200 Litre mixing with fertilizer 13-0-46 and pesticide, spraying every 10 days, for the soil using Bio-Plant99 with fertilizer 15-15-15 with the ratio 100 cc/ water 200 litre, using normal Lotus bucket to pour at the bottom of the Logan and then water again until 1 month before fruiting picking up.

After using Bio-Plant 99 for one month, the soil condition is in much better, Logan creates more roots faster, so recommending to use Bio-Plant 99 together with Dolomight silica.

By the year of 2002, Logan has more fruits but some Logan plants have yellow leaves, so the roots may have problem with Potassium Chlorate, suggesting Bio-Plant99 to pour repeating using the ratio of 200cc./water 200 Litre, after pouring Bio-Plant99 for 1 month, the yellow leaves disappear and becoming green as usual, the fruits of Logan for this year will be much more than last year, also the fruits are bigger, sweeter. The Logan traders at Lumpoon need to buy the Logan from this farm to export abroad.

So after testing Bio-Plant99 and Pro-Plant 99, we are confident that the result is much better than using chemical fertilizers alone, the production of Logan increases 30%, so we are confident to recommend using Bio-Plant99, Pro-Plant 99 for all the Logan farmers.

With Respect,

Mr. Sompong Sarntheunkaew
Agricutural Officer 6
Viengsa Agricultural Office, Nam Province

MEMORANDUM

Govern. Section: Service & Transferring Agriculture Technology Center of Tambol Namsom

At: [illegible]. 0809. 01/1 Date 9 June, 2003

Sub: Inform the result of using Products

To: The Manager of Artemis & Angelio Co.,Ltd.

As the promotion group of producing Logan and Lychee in the Planting Promotion Project, under the control of Service & Transferring Agricultural Technology Center at Namsom, bringing Bio-Fertilizer-Bio-Plant99 and Pro-Plant 99 of Artemis & Angelio Co.Ltd. to alert the Logan, Lychee blooming, fruiting to get better weight, sweeter, more crispy and delicious, it is very suitable to better result of Logan & Lychee and to use it reducing chemical fertilizer.

With Respect,

Sirichai Kampukaew
The service & Transferring Agricultural Technology Center
Director at Namsom District

THE PROJECT OF NON-TOXIN AGRICULTURE AND SUFFICIENT ECONOMY & ECO-FRIENDLY FARMING

14 Moo11, T. Wangnamkhiew, Nakornrajchaseema 30370
Tel: 044- 249 107, 044-249 109, 01-977 8699

At. . 10/2546 6 Jan.,2003

Subject: To inform the result of using the products
To: The Manager of Artemis & Angelio Co.,Ltd.

As the promotion group of Non-Toxin Agriculture "Wang Namkhiew, the king project of sufficient Economy & Eco-Friendly Farming" bringing the Bio-Fertilizer " Bio-Plant 99 and Pro-Plant 99" of Artemis & Angelio Co.,Ltd. to use with demonstrate vegetable farm of our members, the result shows that the vegetables are well growing, strong, a lot of roots, fast growing fruitation, good weight, can resist the plant insects, the most important result is having good weight, sweet, crispy and good taste, it is very suitable for farmers to use Bio-Plant 99 and Pro-Plant 99 instead of chemical fertilizer.

With Respect,

Mr. Amnarj Maiyodkiang
The Chairman of Project Sufficient
Economy & Eco-Friendly Farming

Fruit crop e.g. lychee, longan, orange, pumelo etc.

Fertilizer	Time	Quantity	Water	Crop area	Cost (usd/acre)
microbial liquid fertilizer & bio-liquid fertilizer	accelerate Growth	125 cc 400 cc	400 litre 400 litre	1 acre 1 acre	1.5 4.8
microbial liquid fertilizer & bio-liquid fertilizer	before blooming	125 cc 400 cc	400 litre 400 litre	1 acre 1 acre	1.5 4.8
microbial liquid fertilizer & bio-liquid fertilizer	fruitation	125 cc 400 cc	400 litre 400 litre	1 acre 1 acre	1.5 4.8
				Total	18.9

Chemical fertilizer	Time	Quantity	Water	Crop area	Cost (Baht/rai)
15 – 15 - 15	accelerate vegetative growth	50 kgs	-	1 acre 1 acre	9.6 9.6
15 – 15 – 15	blooming	50 kgs	-	1 acre	9.6
13 – 13 - 21	fruitation	50 kgs	-	1 acre	9.6
				Total	38.4

Conclusion

Cost of chemical fertilizer (9.6usd/bag)	38.4 usd/acre
Cost of bio-fertilizer (12 usd/bottle)	
- Microbial liquid fertilizer (12 usd/bottle)	4.5 usd/acre
- Bio-liquid fertilizer (12 usd/bottle)	14.4 usd/acre
Total	18.9 usd/acre
Save	19.5 usd/acre

Comparison of fertilizer cost between chemical and bio fertilizer

Field crop e.g. paddy field

Cost of liquid microbial and bio liquid fertilizer

Fertilizer	Time	Quantity	Water	Crop area	Cost (usd/acre)
microbial-liquid(soil) liquid fertilizer(plant)	dip seed	50 cc	20 litre	1 acre	0.6
microbial-liquid &	1st	75 cc	400 litre	1 acre	0.9
liquid fertilizer		400 cc	400 litre	1 acre	4.8
microbial-liquid &	2nd	75 cc	400 litre	1 acre	0.9
liquid fertilizer		400 cc	400 litre	1 acre	4.8
microbial liquid &	3rd	75 cc	400 litre	1 acre	0.9
liquid fertilizer		400 cc	400 litre	1 acre	4.8
microbial-liquid &	4th	75 cc	400 litre	1 acre	0.9
liquid fertilizer		400 cc	400 litre	1 acre	4.8
				Total	23.4

Cost of chemical fertilizer

Fertilizer	Time	Quantity	Water	Crop area	Cost (usd/acre)
Chemical fertilizer	1st month	125 kg.	-	1 acre	24
Chemical fertilizer	2nd month	62.5 kg.	-	1 acre	12
Chemical fertilizer	3rd month	62.5 kg.	-	1 acre	12
				Total	48

Conclusion

total cost of chemical fertilizer (9.6 usd/bag) 48 usd/acre

total cost of bio-fertilizer

- microbial liquid fertilizer (12 usd/bottle) 4.2 usd/acre
- Bio-liquid fertilizer (12 usd/bottle) 19.2 usd/acre

(Save 24.6 usd/acre) total 23.4 usd/acre

Analysis of bio-fertilizer cost for 1 acre vegetable crop by micro-springer

Fertilizer application by microspringer

1. preparing plot, mix 100 cc of microbial-liquid fertilizer with 200 litre of water and then pouring into the plot
2. seed dipping, wrap seed with thin cloth and dip in the solution of 5 cc of microbial liquid fertilizer mix with 20 litre of water for 10 – 12 hours, then dry at room temperature and then sow
3. seelling stage, mix 100 cc of bio-liquid fertilizer with 10 litre of water, add into the in pond with 90 litre of water, spray by springer
4. after seedling every 5-7 days, spray the mixture of bio-liquid fertilizer 4-5 times
5. nourish the soil, add the mixture of 25 cc of microbial-liquid fertilizer with 100 litre of water into the plot at least once a month

Cost of microbial liquid fertilizer Bio – Plant 99 per time

1. plot preparation and seed dipping		1.2 usd
2. seedling		1.1 usd
3. after seedling 5 times		5.6 usd
4. nourish the soil		0.56 usd
	total	8.46 usd

Comparing the cost of microbial liquid fertilizer and chemical fertilizer, it is found that microbial liquid fertilizer costs less than chemical fertilizer.