Artemis & Angel Co. Ltd.
99/296 President Park, Sukhumvit 24, Klongtoey,
Bangkok 10110, Thailand
Tel.: (President) +66-86-329-6038; (Sales): +66-993377866
E-mail: artemisandangelcoltd@gmail.com **Website:** www.artemisthai.com

How to Use the Bio-fertilizers for Growing Sugarcane

Note: These guidelines are meant to be used in a workshop situation together with videos and discussion.

1. Soil Preparation

- If you prefer you could make a lot of compost mixed with Bio-Plant and spread it over the planting rows. You will need about 2 months to make the compost and a minimum of 5 MT per hectare (2.5 MT per acre).
- See the file called ***How to Make Rich Compost with Bio-Plant – Handouts*** for how to make rich compost with Bio-Plant. **Click here** for the file.
- Soil preparation with a lot of compost made with Bio-Plant will be invaluable in increasing growth. Add compost to the planting holes and spread it generously around each tree after planting. Add more compost around each tree monthly.
- If you cannot make any compost, read the file ***How to Prepare the Soil with and Without Compost***. **Click here**.
- **Scenario 1: There is Not Enough Compost.** In the event that a sugarcane farm is very large, and not enough organic matter can be obtained to make enough compost, then the solution to the soil preparation would be to grow a cover crop mixture of various legumes and pulses so as to provide Carbon and Nitrogen to the soil, and to terminate the cover crop about 2 weeks before the sugarcane crop is planted. The cover crop could be sprayed with Bio-Plant and water (1 litre in 500-1,000 litres of water per hectare) as it is ploughed into the soil when the furrows are made to speed up the breakdown of the cover crop and to increase the microbial life of the soil.
- **Scenario 2: You Have No Compost or Organic Matter.** Mix 1 litre of Bio-Plant with 1,000 litres of water. Pour this along the planting trenches, and place the bud setts on top. Then cover over the trenches with soil. This should be enough for one hectare.
- **Scenario 3: Leave the Sugarcane Trash on the Ground.** After harvest, leave the sugarcane leaf trash on the ground. Do not burn it or throw it away. Leave the leaf trash on the soil surface to break down until the next planting period, and then plough it into the soil during the next soil preparation period. If you plant a cover crop, plant the cover crop seeds into the soil through the leaf trash without tilling the soil.
- **Scenario 4: You Plough in the Leaf Trash Immediately.** If you plough in the sugarcane leaves immediately after harvest, then the soil will be left bare until the next planting time. To avoid leaving the soil bare, plant a cover crop and plough it into the soil at the next planting period. Spray water mixed with Bio-Plant (1 litre in 500-1,000 litres of water per hectare) on the cover crop as it is ploughed in.

- **Scenario 5: You Use Compost.** Cover with compost the bottom of the planting trenches, and place the bud setts on top. Then cover over the trenches with soil. If you wish, you could place cut up or ground organic matter, such as sugarcane leaf trash *(see the photograph below)*, mixed with manure in the planting trenches instead.
- **Note:** Leave the field for 14 days before planting sugarcane so that the micro-organisms can multiply.

2. The Benefit of 3-Bud Setts *(Conventional Method)*

- Cut the sugarcane poles into sections with three buds on each sett. *(See photo below.)* The middle bud of a 3-bud sett has the highest germinating capacity followed by the top end bud and the bottom end bud respectively. The middle bud has an advantage in germination because, as a non-terminal bud having nodes on either side, its moisture resources are better protected than those of the terminal buds.

The middle bud has the highest germinating capacity in a 3-Bud Sett.

3. Soak the Sugarcane Setts

- If you soak the setts in water before planting, soak them in sacks in water mixed with Bio-Plant (20 cc in 20 litres of water) for up to an hour, and then leave the sacks covered with branches so that they are warm for 6 days before planting so that they germinate and roots form. Water the sacks in the morning and evening. The Bio-Plant will provide anti-fungal protection and help the sugarcane to sprout roots.
- To save the sugarcane setts from the attack of termites and ants, the following practice may be adopted. Prepare neem cake slurry by mixing 1 kg. of neem cake in 5 litres of water. Leave the setts in it for a period of 18-24 hours.

4. Making and Planting One-Bud Setts *(New Approach)*

- Many farmers nowadays are planting single-bud setts instead of three-bud setts because of the financial savings and higher yield with one-bud setts.
- Soak the one-bud setts as explained above. Plant them in potting trays in a mixture of coconut coir, soil, and compost made with Bio-Plant. Cover over the setts with the soil and compost mixture.
- Keep the germinating setts in the shade. Water them daily until they have sprouted several roots and leaves appear. Then transfer the setts to larger trays. Water them twice a day.

- Once the leaves have appeared and have grown a few inches, spray them every 10 days with Pro-Plant mixed in water (20 cc in 20 litres of water).
- Transplant the setts from the potting trays into the field after about 30 days. Plant them 2 feet apart in the trenches where compost has been laid already. Space the rows 90 cms apart.

5. Leaf Trash Mulching to Keep the Weeds Down

- Mulch the ridges uniformly with cane trash to a thickness of 10 cm within a week after planting. This helps to conserve moisture, reduce weed population, and minimise shoot borer incidence.
- Mulch the inter-row area of the sugarcane field with 10 cms. deep of leaf trash after 21 – 25 days of planting to keep down weeds; to add additional nutrients; and to conserve soil moisture
- The farmer can strip the dried lower leaves of the standing sugarcane crop and spread it as mulch in the inter-row spaces.
- Mulching helps:
  1. To release nutrients from the waste foliage slowly over a few months. As sugarcane is a long-term crop mulching is suitable.
  2. To protect soil from sunburn and to reduce evaporation directly from the soil. It keeps soils damp and warm, which is the best condition for root development.

6. Intercropping

- Alternatively, the farmer could plant an intercrop in the open space between rows in order to smother the weeds.
- Mung beans could be intercropped as the photograph on the right shows.
- Pulses, such as soya beans grow well without affecting the sugarcane yield.

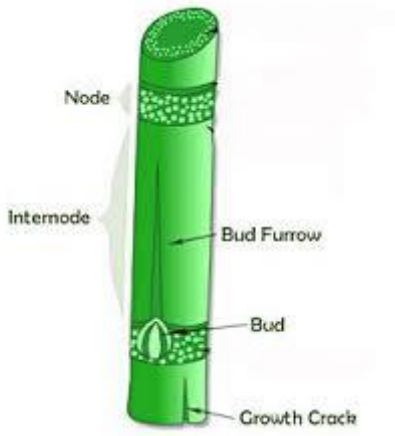
Sugarcane intercropped with mung beans.

7. Applying Pro-Plant

7.1 Normal Procedure

- Spray the leaves with water that contains a ratio of 20 cc of Pro-Plant per 20 litres of water.
- For a hectare, mix 500 cc of Pro-Plant with 500 litres of water. For an acre, mix 250 cc of Pro-Plant with 250 litres of water. For half an acre, mix 125 cc of Pro-Plant with 125 litres of water. For 200 sq.m. mix 35 cc with 35 litres of water.

- Spray the leaves before 9 a.m. when the stomata pores are open most. Direct the spray onto the leaves as well as diagonally upwards so that the spray hits the underside of the leaves because this is where the pores (stomata) are. Make sure that the spray is a very fine, misty, foggy kind of spray. Be thorough and generous when you spray.
- Spray on top of the leaves as well because the micro-organisms in Pro-Plant will coat the leaves and protect the plant from fungal diseases.
- By spraying Pro-Plant, the nutrients will be available immediately and much more quickly by means of solid fertilizer through the roots, which takes at least a week.
- Spray the sugarcane plants with Pro-Plant once a month in months 2, 3, 4, 5, and again in month 7 when the farmers thin out the sugarcane. The application in month 7 will increase the yield.
- If you want to increase the yield, spray every two weeks or every month. You will need to be able to spray over the tops of the sugarcane plants, if they are planted densely, though.
- If you cannot spray Pro-Plant at all during the crop, then apply it mixed in water by drip-feed through a pipe at the base of the sugarcane plants. Or spray the mixture from a pipe raised 2-3 metres above the ground, and which extends along and between the rows.
- Pro-Plant can also be mixed with Bio-Plant and applied to the base of the sugarcane plants.
- Spraying Pro-Plant will increase the length of the internodes. As a result, the plants will become taller and the yield will increase. Consequently, spraying Pro-Plant more often than 5 times during the crop duration is advantageous.



7.2 How Much to Spray per Plant

- When the sugarcane is very small and in the Nursery you do not need to spray much of the Pro-Plant / water mixture. But as the sugarcane grows taller, spray a bit more. The key point is to cover as many of the leaves as possible with the spray without trying to drench them.

Sugarcane after the leaves have been thinned out in Month 7.

8. <u>Applying Extra Bio-Plant</u>

- Add another litre of Bio-Plant to the soil during the crop. This should be in Month 3; and ideally also in Month 7 when the leaves are being cut.

- This could be done either by applying compost mixed with Bio-Plant around the sugarcane plants or by spraying Bio-Plant on the soil around the sugarcane plants at the usual ratio of 500 cc in 500 litres of water.

9. Effects of Using the Bio-fertilisers to Grow Sugarcane

- When sugarcane is grown with the bio-fertilisers there is a significant effect on the growth parameters:
  - The number of internodes per cane.
  - The inter-nodal length.
  - The tops weight.
  - The trash weight.
  - The sucrose content, which is usually around 20% higher.
  - The yield components (number of millable canes, cane length, cane diameter, weight per stripped cane and stripped cane yield).
- Sugarcane farmers increase their yield significantly compared to when they used chemicals.
- Most sugar factories in Vietnam only want to buy sugarcane from farmers who grow their sugarcane crops with Bio-Plant and Pro-Plant, principally because the sugar from the sugarcane is sweeter than chemical sugarcane - usually about 20% sweeter on analysis.
- When sugarcane (or indeed any crop) is grown with Bio-Plant and Pro-Plant, the DNA changes each year and the quality improves. Because of this, a lot of sugarcane is grown in N.E. Thailand and terminated during the crop so that it can be exported to Vietnam and planted there. There is a very strong demand for this sugarcane. Please see the photographs at http://artemisthai.com/frontpage/we-are-also-on-the-social-networks/thailand/
- Some sugarcane factories mix Bio-Plant with the filter cake sugarcane waste, and the farmers increase their productivity 5% - 10% by using it to prepare the soil instead of urea.