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 Grow Maize with Bio-Plant and Pro-Plant

Note: It's tempting to rush ahead, plough the soil, and plant a monoculture of maize. But the interests of the farmers are not served in this way. The guidelines below will help the farmers to regenerate their soil while producing more nutritious maize with a higher yield and without disease.

1. Soil Preparation

1.1 Plant a Cover Crop

- The best way to prepare the soil is to plant a multi-species (5+ species) cover crop that includes legumes and grasses, such as carrots, peas, sorghum, millet, turnips, Sudan grass, cereal rye, annual ryegrass, clovers, buckwheat, oilseed radish, sunflower, sun hemp, and hairy vetch. Consult with your local agronomy department about which cover crops to plant because the choice depends on the climate, the state of the soil, and your goals. Grow diverse microbial life before you plant the maize.
- **Mow (Flatten) the Cover Crop:** Mow the cover crop down (don't plough it) just before it produces seeds and plant through the bio-mass after having left it for 2 weeks on the soil to decay.
- If you prefer you could let your livestock graze on the cover crop and flatten it while they add urine and manure. Don't let them eat all of it because you want the soil to be covered.
- **Don't Till (Plough) the Soil:** Don't till the soil or plough in the bio-mass because then you will kill the fungi networks in the soil that feed the plants, destroy the soil structure, compact the soil, and loose the soil cover, among other harmful effects, such as the oxidization of organic matter, soil erosion, hot soil temperature, etc.
- Plant the maize plants in the rows and leave the bio-mass on the soil. It will keep the soil covered and prevent weeds while providing food for the soil bacteria and fungi that will provide nutrients to the roots.

Planting into a terminated cover crop.

- Spray Bio-Plant on the planting rows (only) as you plant through the bio-mass. Mix 1 litre with 1,000 litres of water per hectare. 500 litres in 500 litres per acre. It is very beneficial to add the microbial life in Bio-Plant to the planting rows.

1.2 Compost and 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.**
- If you only intend to apply manure, then spray Bio-Plant onto the manure at the rate of 1 litre per 1,000 litres of water. Per acre this would be about 500 cc in 500 litres.

1.3 Plant a Companion Crop (Intercrop)

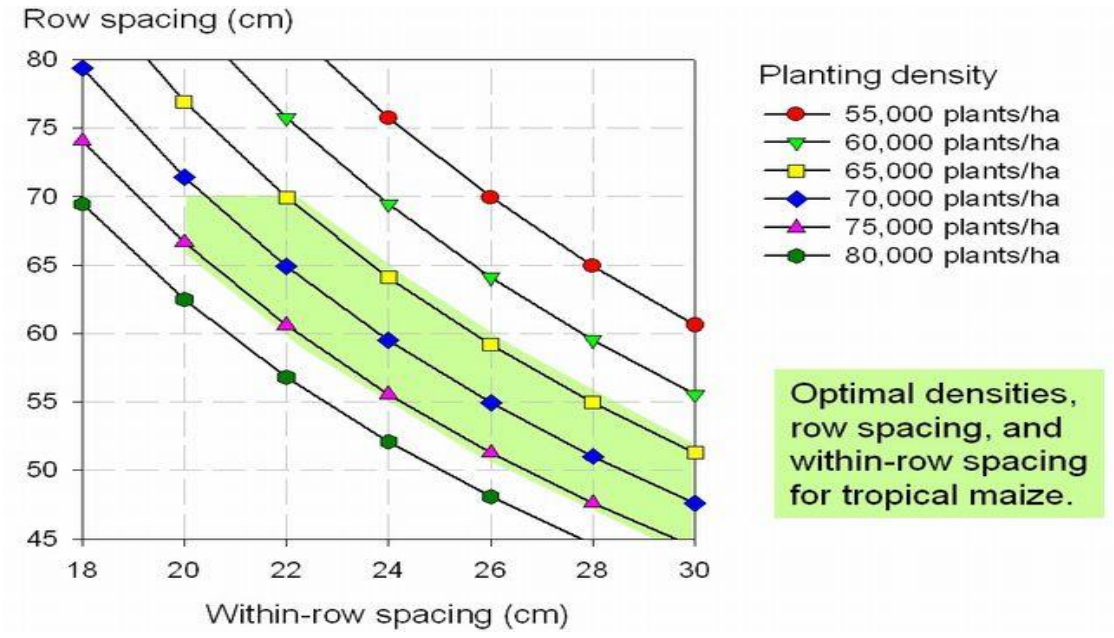
- If you don't want to plant a cover crop in spite of the many benefits of doing so, intercrop the rows of maize with a companion plant. You must have diversity of microbial life in the soil.
- Here is a list of crops that make good companions for maize. Click here.

2. Seed Preparation

- Soak the maize seeds in water that contains 20 cc of Bio-Plant per 20 litres for 12 hours before planting. The ratio is 10 cc of each bio-fertilizer per 10 litres of water. If the amount of seeds is small, then reduce the water to just a few litres.
- As you plant the seeds, dip them in Bio-Plant (100 cc of undiluted Bio-Plant per 1 kg. of the seeds), and then plant them. You should certainly do this, if you did not soak the seeds.
- Plant the seeds very soon after soaking them as they will start to germinate.

3. Spacing of the Rows and Seeds

- A row spacing of 75 cms. and a spacing between plants of 25 cms. is optimum.



4. Applying Pro-Plant

- Spray Pro-Plant generously every 10 days. Spray on Days 30, 40, 50, 60, 70, 80 and every 10 days until 10 days before harvest, if the type of maize takes longer than 90 days.
- Spray 500 cc per 500 litres of water per hectare. For 1 acre 250 cc of Bio-Plant mixed with 250 litres of water should be enough. Spray on the leaves and the cobs.

5. Crop Maintenance and Post-Harvest

- Remove weeds after 20-30 days and then on Day 60. Ideally, mulch the soil to prevent weeds.

An un-mulched maize field with a weed problem.

A weedy maize field.

- After the harvest plough in the crop stubble and plant a cover crop for the next season.
- When you cut down (or plough in) the cover crop, spray it with Bio-Plant (500 cc per 500 litres of water per hectare.) to quicken the break-down of the cover crop into soil nutrients.

6. For Extra Yield - Applying Additional Bio-Plant

- Because maize grows for up to about 3 months, additional micro-organisms should be added to the soil around the plants, ideally once a month (every 30 days) on Day 30 and Day 60. Compost made with Bio-Plant would be very effective way to do this. Provide several kgs. per plant.
- If the farmer does not have any compost, he could apply Bio-Plant by spraying it mixed with water at the base of the plants. Do not spray Bio-Plant on the leaves as this will cause them to turn yellow.
  - Hectare: Spray 500 cc of Bio-Plant mixed with 500 litres of water, or better 1 litre of Bio-Plant mixed with 500-1,000 litres of water.
  - Acre: Spray 250 cc of Bio-Plant mixed with 250 litres of water. You could spray 500 cc in 500 litres of water in order to provide more micro-organisms.

7. Mulching

- It is important to mulch the soil between the maize plants or to grow a legume crop there so as to suppress the growth of weeds.

7.1 What is Mulching?

- Mulching is one of the most important ways to maintain healthy landscape plants and trees. A mulch is any material applied to the soil surface for protection or improvement of the area covered. Mulching is really Nature's idea. Nature produces large quantities of mulch all the time with fallen leaves, needles, twigs, pieces of bark, spent flower blossoms, fallen fruit and other organic material.

7.2 Benefits of Mulching

- When applied correctly, mulching has the following beneficial effects on plants and soil:
  - Mulches prevent loss of water from the soil by evaporation.
  - Mulches reduce the growth of weeds, when the mulch material itself is weed-free and applied deeply enough to prevent weed germination or to smother existing weeds.
  - Mulches keep the soil cooler in the summer and warmer in the winter, thus maintaining a more even soil temperature.
  - Mulches prevent soil splashing, which not only stops erosion but keeps soil-borne diseases from splashing up onto the plants.
  - Organic mulches can improve the soil structure. As the mulch decays, the material becomes topsoil. Decaying mulch also adds nutrients to the soil.
  - Mulches prevent crusting of the soil surface, thus improving the absorption and movement of water into the soil.
  - Mulches prevent the trunks of trees and shrubs from damage by lawn equipment.
  - Mulches help prevent soil compaction.
  - Mulches can add to the beauty of the landscape by providing a cover of uniform colour and interesting texture to the surface.
  - Mulched plants have more roots than plants that are not mulched, because mulched plants will produce additional roots in the mulch that surrounds them.

7.3 How to Apply Mulch

- Before applying any type of mulch to an area, it is best to weed the area. Spread a layer of mulching materials generously around the maize plants. Keep mulch 2 to 3 inches away from the stems of the plants. This will prevent decay caused by wet mulch.

7.4 How Deep to Mulch

- The amount of mulch to apply depends on the texture and density of the mulch material. Many wood and bark mulches are composed of fine particles and should not be more than 2 to 3 inches deep. Excessive amounts of these fine-textured mulches can suffocate plant roots, resulting in yellowing of the leaves and poor growth.
- Coarse-textured mulches such as straw, allow good air movement through them and can be as deep as 4 inches. A depth of 4 inches will stop weeds growing.
- Mulches composed of shredded leaves should never be deeper than 2 inches because they tend to mat together when wet, thereby restricting the water and air supply to the plant roots.