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How to Grow Papaya with Bio-Plant and Pro-Plant

Note: It's tempting to rush ahead, plough the soil, and plant a monoculture of papaya. 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 papaya 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 papaya.
- **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 carrot 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 Planting the Trees

- See the file at **Section 3.2** called [How to Make Rich Compost with Bio-Plant – Handouts](#). [Click here](#) for how to make rich compost with Bio-Plant. Scroll down to **Section 3.2**. 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 do not make compost, refer to the file at **Section 3.7** called: **How to Prepare the Soil with and Without Compost**. Scroll down to **Section 3.7**. [Click here](#).
- Prepare the land by mixing in 5 MT of organic matter and the land for a week to dry and to kill off the weeds.
- Raise the soil 60 cms. Each row of raised soil should be 1.5 metres wide. The trees should be 3 m x 3 m apart, and no less than 2.5 m x 2.5 m.
- Dig holes 50 cms. deep. Separate the top soil from the lower level soil.
- Place 5 kgs of organic matter mixed with Bio-Plant in the hole. Take a young tree from its bag and plant it in the hole. Cover this with the lower level soil from the hole and then put the top soil on top.
- Place 5 kgs or more of compost around the tree. Do not let the compost touch the tree. Add more compost each month.
- Remove the weeds regularly or mulch the trees to prevent weeds growing. 4 inches will suppress weeds.
- Plant banana trees around the papaya field to attract insects away from the papaya trees. They also help to increase the humidity of the papaya field. This helps flowering. Also plant lemongrass between the trees to keep insects away.

2. Preparing the Seeds

- Soak the seeds from a papaya for 24 hours in water mixed with Bio-Plant (20 cc per 20 litres of water).
- Then soak them for a day or two in the fridge. Afterwards, put them in a plastic bag. Take them out one day before planting. Soak them in warm water overnight. Then you will have hermaphrodite seeds (male and female together).
- Put 3-5 seeds in each potting soil bag. Water the bags 2-3 times per day. Keep them in the shade. The seeds will germinate within 15 days. Spray them with Pro-Plant every 7 days during this period.



The flowers and fruits of male, female, and hermaphrodite papaya. (A) Female flowers; (B) hermaphrodite flowers; (C) male flowers; (D) female fruit; (E) hermaphrodite fruit; (F) male tree

- Then remove the shade cover. Spray them with Pro-Plant every 7 days. Transplant them when they have 5-6 leaves, which will be between 30-60 days.

3. Applying the Bio-fertilisers After Planting

- After about 4-5 months flowers will appear. Inspect the 3 or 4 trees growing together. Remove the male and female trees. Keep the hermaphrodite tree.
- Place 5 kgs or more of compost around the tree each month. Spray Bio-Plant over the compost, if it has not been made with Bio-Plant already.
- You can water the trees for 15-30 minutes every day under the leaves or for an hour every 2 days. Sprinklers are best. If the leaves are pointing upwards, it means that they are receiving enough water, so you can judge how often to water the trees.
- Mix liquid pig dung with the water. Together with the Bio-Plant mixed compost this will ensure that there are lots of leaves and that the fruit is sweet.
- As the papaya trees grow spray Pro-Plant every 15 days on the leaves. Spray every 7-10 days once you have cut down the male and female trees, which you do not want. As the fruit appears and grows spray the fruit and leaves with Pro-Plant every 7-10 days.
- If you provide the trees with lots of food, there is an 80% chance that the trees will become bisexual.
- If disease appears spray the tree with Bio-Plant (5 cc) and Pro-Plant (20 cc) mixed with 20 litres of water.
- Remove the weeds from around the trees with a hoe. You could mulch the trees by covering the compost with 4 inches of straw in order to prevent weeds growing.
- Provide a support for the trees as they produce fruit.

4. Grafting

- Cut a 5 cms. slit upwards on the thicker part of the trunk, place a small twig at the top of the slit, and place a bag with coconut coir soaked in water mixed with Bio-Plant over the slit. After 20 days roots will appear. After 34 days cut the grafted tree just below the roots in the coconut coir. You can then plant or sell the bisexual graft.
- The fruit will appear after 1 month on the grafted trees as opposed to 4-5 months. You can harvest the fruit after 4 months instead of 8 months.
- Instead of cutting down and throwing away the rejected trees at flowering, graft them, and then plant or sell the grafted trees.

4. For Extra Yield – Applying Additional Bio-Plant

- Because papaya trees grows over many 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.

5. Mulching

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

5.1 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.

5.2 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.

5.3 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 trees. Keep mulch 2 to 3 inches away from the stems of the plants and trees. This will prevent decay caused by wet mulch.
- Newly planted trees require a circle of mulch 3 to 4 feet in diameter. Maintain this for at least three years. Do not pile mulch against the trunk.
- In the case of established trees try to apply the mulch from close to the trunk of the trees to at least 6 to 12 inches beyond the drip-line of the tree. Because the root system can extend 2-3 times the crown spread of the tree, mulch as large an area as possible.

5.4 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.