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

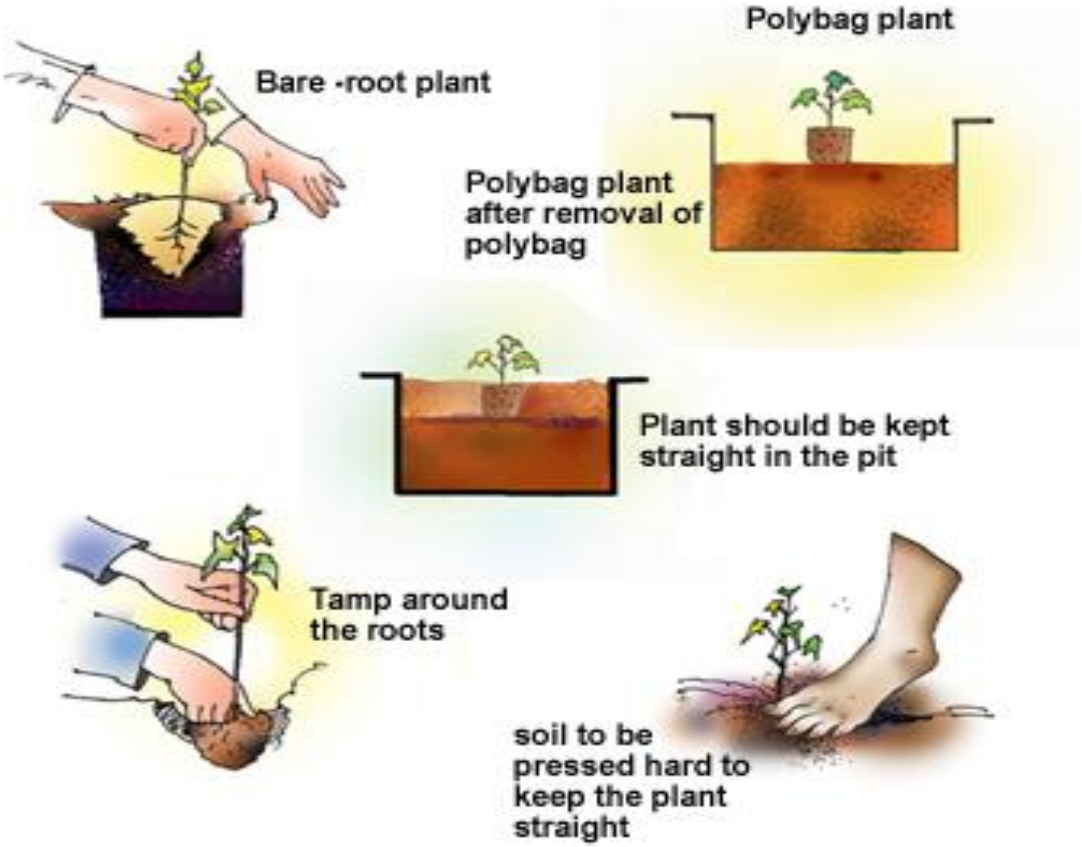
How to Grow Date Palms with Bio-Plant and Pro-Plant

1. Compost and Soil Preparation

- 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**.

1.1 Planting Saplings

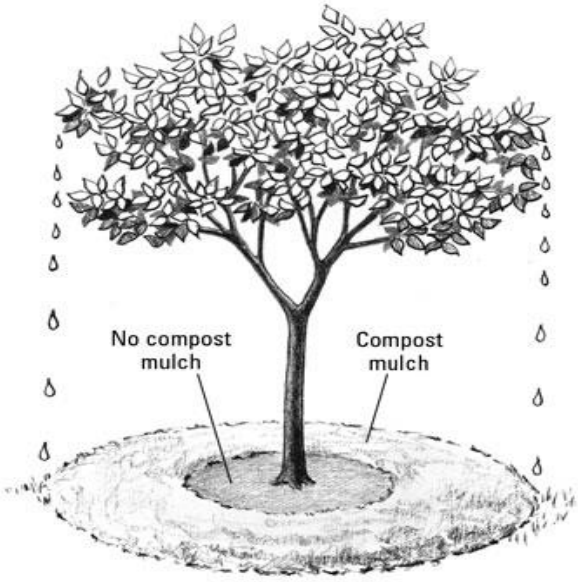
- When planting seedlings in holes, use a 1:1 mixture of bio-compost and soil in the holes. Make the hole about 90 cms. x 90 cms. x 90 cms., and fill the hole halfway up with the mixture. Then spread 5-10 kgs. of bio-compost around the sapling while avoiding placing the bio-compost against the stem of the sapling.



1.2 Applying Bio-Plant During the Growth of the Trees

- Applying compost regularly is key to producing a very good date harvest. Ideally, apply 5-10 kgs. of compost each month around the trees - a minimum of 5 kgs. per tree, if the trees are under 1 metre high, and about 10 kgs. around trees over 1 metre in height. But 10 kgs. can be applied to trees under 1 meter in height as well. Place 15 kgs., if the soil is very poor or there is a problem with disease.

- If the cost is an issue or you cannot provide compost monthly, then choose the application period, which suits you. As a guideline, the more often you can apply compost made with Bio-Plant around the trees, the better it will be for the tree's health and for date production.
- If you do not have any compost, pile up cut up leaves around the base of the tree and spray the leaves once a month with a mixture of 100 cc of Bio-Plant in 100 litres of water. Pour about 2 litres of the water at the base of each tree where the roots are. *(See the diagrams below.)* Apply this mixture to the leaves once a month or with the regularity, which works for you. Add more leaves whenever you spray the mixture. The Bio-Plant provides extra nutrients by breaking down the leaves. We recommend this because often chemical fertilizers have been used for so long that the micro-organisms in the soil have mostly been killed off, and there is a lack of minor minerals. The farmers need to try to restore the soil as quickly as possible.
- The fallen leaves could be raked into a circle around the tree up to the distance shown in the diagram, and the Bio-Plant could be sprayed on the leaves to help them break down. Bio-Plant's micro-organisms will then have organic matter to multiply in. As mentioned above, the farmer should do this once a month, and it is very beneficial to continue to follow this monthly schedule also when the spathes and flowers appear. *(See the diagram and photos below.)*



Palm tree mulched with cut up banana leaves.

Palm tree mulched with cut up maize stalks.

Palm tree mulched with cut up palm leaves.

1.3 Applying Additional Bio-Plant During the Flowering and Fruiting Stages

- If the farmer does not have any compost to place around the trees, and has placed leaves around the base of the trees instead, when the spathes and the flowers start to appear, spray the organic matter around the base of the tree (or soil if there is no organic matter around the tree) with 20 cc of Bio-Plant mixed with 20 litres of water. For a hectare, mix 500 cc of Bio-Plant with 500 litres of water. Ideally, spray all of the trees at their base once every 2 weeks once the spathe and flowers have appeared instead of once a month because this is the main period when the tree needs the nutrients and protection from the micro-organisms in Bio-Plant.
- Spray Bio-Plant around the base of the trees 1 month before the flowers appear. Spray 1-2 times during the flowering stage. Spray at least 3 times during the fruiting stage. Once per month would be ideal. Adjust the applications to the regularity you can manage, but remember that the tree needs a lot of compost mixed with Bio-Plant during this period.

2. 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.

2.1 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 dates, and other organic material.

2.2 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.

2.3 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 saplings 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.

2.4 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.

3. Applying Pro-Plant

3.1 General Guidelines

- Spray 20 cc of Pro-Plant in 20 litres of water.
- For a hectare, mix 500 cc of Pro-Plant with 500 litres of water.
- Date palms have similar fertiliser requirements to other cultivated crops. Nutrient elements necessary for plant growth and production (but not absorbed from the air), i.e.: boron, calcium, chlorine, cobalt, copper, iron, magnesium, manganese, molybdenum, nitrogen, phosphorus, potassium, sodium, sulphur and zinc, are all needed at different rates by the date palm culture. Pro-Plant provides these nutrients, so it is very beneficial to spray Pro-Plant often.
- The main need for Pro-Plant is during the period when the spathe appears, and during the flowering and fruiting. It is beneficial to spray the leaves of the tree as it grows once every month or every two months as well so as to provide nutrients and to keep the trees healthy and free of disease. But if the farmer wants to keep his costs down, then he should decide how often he wants to spray Pro-Plant. But the period when he really should not try to save money is during the period when the spathe appears, and during the flowering and fruiting.
- Spray the leaves of the trees before 9 a.m. when the pores are open most for better results. Use spraying equipment that gives a fine, misty spray, and that the spray is directed diagonally upwards so that it hits the pores of the leaves underneath as well as lands on the leaves. Be generous when you spray a tree. You do not have to spray every leaf though.
- The flower stalks of both male and female date palms are produced inside a spathe. The spathe emerges from the axils of the leaves in early spring in mature date palms. Start to spray Pro-Plant when the spathe appears. Spray the spathes every 14 days.
- During the Flowering Stage and Fruiting Stage the frequency of spraying should increase. The more nutrients the tree receives, the bigger the yield. The date palm flowers form within the long spathe which, on bursting, exposes many thickly crowded floral branchlets inside. We recommend that you spray the branchlets every 10 days during the Flowering Stage and every 7-10 days when the dates start to appear. You might experiment by spraying some trees more frequently than others during the Flowering Stage and Fruiting Stage in order to compare the effects.
- Adult female date palms produce from 5-20 spathes in early spring. The male flowers are borne single and are waxy white, while the female flowers are borne in clusters of three and are yellowish green in colour. Spray all of the flowers.
- A male spathe that is ready to split open changes colour from green to somewhat brownish, and the spathe becomes slightly softer. Spray every 10 days as the colour changes.
- Immediately after the spathe opens and the male inflorescence appears, these male flowers reach their maturity. Again, spray the flowers every 10 days as this happens.
- Continue spraying until 14 days before the dates are harvested.

- If the farmer wishes to spray pesticides, spray them at least 3 days before or after spraying either bio-fertilizer. We encourage farmers not to use chemical sprays, though, as they kill the micro-organisms.

3.2 **If the trees are too tall for spraying the leaves** with Pro-Plant, then mix 100 cc of Pro-Plant with 100 litres of water and pour about 2 litres of the mixture about a metre from the trunk of each tree every month, or according to the schedule, which you can manage.

4. **Applying Bio-Plant as a Fungicide**

- Replace the chemical fungicide you may be using with Bio-Plant mixed with water.

a. **For Prevention:** Dosage: 5-10 cc/20 litres of water. Spray on the tree. Avoid the leaves as much as possible. (This is to prevent fungus, but only apply this mixture, if you think that you might have a problem with fungus. If you are applying compost every month and spraying Pro-Plant regularly your trees should be protected already.)

b. **A Little Fungus:** 10-20 cc/20 litres of water. Spray on the tree, if there is some fungus already. Avoid the leaves as much as possible.

c. **The Whole Tree Has Fungus:**

1. Spray 50 cc/20 litres of water only on the branches. Or:
2. The farmer can scrub or brush on the branches 50 cc/20 litres of water. Avoid the leaves. Spray every 7-10 days for better effect, if the trees have fungus already. When you spray Pro-Plant the leaves get coated with micro-organisms that protect the trees from disease. The Bio-Plant strengthens the immune system so that the trees are less susceptible to disease.

- If there is a need to spray pesticides, please spray them at least 3 days apart from when you apply the bio-fertilizers as the chemicals kill the micro-organisms that will now be multiplying in the soil and being sprayed onto the leaves.