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

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

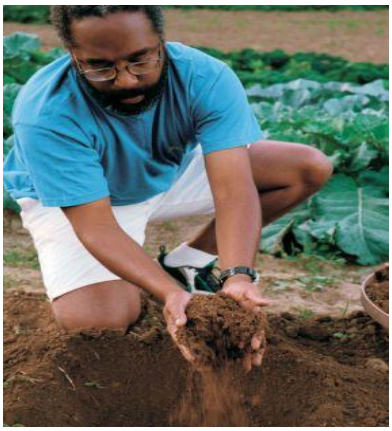
- If you prefer you could make a lot of compost mixed with Bio-Plant and spread it over the planting rows. You will need about 2 months to make the compost and a minimum of 5 MT per hectare (2.5 MT per acre).
- **How to Make Compost:** See the file at ***Section 3.2*** called ***How to Make Rich Compost 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 rows and spread it generously. Add more compost monthly on Day 30 and Day 60. The minimum amount of compost per acre should be 2.5 MT.
- 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 pumpkin 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 pumpkin. Click here.

2. How to Germinate and Plant the Seeds

- See the file ***How to Prepare Seeds with Bio-Plant***.
- Soak the seeds for up to 24 hours in warm water, which has some Bio-Plant and Pro-Plant in it (Ratio 10 cc per 10 litres of water.). Wait until the seeds germinate and plant the seed with the germinated part pointing down.
- You can also use the Baggy Method described in the file above.
- If you have soaked the seeds, plant the seeds 1 - 2 inches deep in compost potting soil, which has been prepared with Bio-Plant (20 cc in 20 litres of water). Your seeds should sprout in 7 - 10 days.
- Plant the seed with the pointed end down because the roots come out of the pointed end. Then fill the pot to within 1 inch of the top with more of the compost potting soil. Water thoroughly, and then move it to a warm and sunny position.
- Transplant the seedlings into potting soil trays or polybags. The soil should have been prepared with compost made with Bio-Plant (20 cc in 20 litres of water). For pumpkins it is beneficial to add Pro-Plant to the potting soil (20 cc in 20 litres of water).



Young Seedlings in Potting Soil Trays

- When seedlings have the fifth leaf, transplant them into a field where the soil has been prepared with compost made with Bio-Plant. Prepare soil, which is rich in compost (made with Bio-Plant), manure, and nutrients, so it would be beneficial to prepare the soil with Pro-Plant as well as Bio-Plant (500 cc mixed with 500 litres of water per hectare).
- Add additional compost around each plant every month. Alternatively, if you have added mulch around each plant to keep weeds down and retain moisture, you could spray Bio-Plant onto the mulch every month to add extra micro-organisms to the roots (20 cc in 20 litres of water or 1 litre in 1,000 litres of water).

3. Mulching

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

A living mulch of winter rye + white clover, maintained by mowing.

3.1 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.

3.2 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.

3.3 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 pumpkin plants. Keep mulch 2 to 3 inches away from the stems of the plants. This will prevent decay caused by wet mulch.

3.4 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.

4. How to Water the Pumpkins

- Pumpkins are about 80% - 90% water, so as you can imagine they use a lot in their growth. The secret is to water the pumpkins only when they need it. Usually once per week is fine. Check the soil with a trowel or a hoe. As long as the moisture is good and your plant looks happy, leave it alone. When the soil is starting to dry out, or the plant starts to look a bit droopy, give it a long deep drink. Deep but infrequent watering results in a healthier plant.
- Pumpkin seedlings will need to be watered every couple of days after planting due to their high rate of growth, but allow the surface to dry off before re-watering as this could cause fungal infections.
- Pumpkins need ample water when pumpkin plants and fruits are forming. It is best to use a drip system or soaker hose to directly water soil at the base of vines so as to avoid wetting foliage. Try to water in the early morning, so that any water that splashes onto leaves can soon dry. Wet foliage is more susceptible to fungus, such as powdery mildew, which can slowly kill all the leaves on a vine. Most vines wilt under the bright, hot afternoon sun, but if you see foliage wilting before 11:00 a.m., that is a sign that they need water.
- When your pumpkin fruit starts to turn orange, gradually decrease the amount of water. Your pumpkins will store longer, if you cut off water 7 - 10 days before you harvest the pumpkins.

5. Looking After the Growth

- Pumpkin vines grow aggressively, covering lots of ground. To keep your rows from being engulfed by vines, direct them in a line outwards from the row.
- Some farmers promote branching to get more pumpkins by pinching the tips out of main vines when they reach about 2 feet long. You can also increase the yield on a vine by removing all female pumpkin plants (these have a small swelling at the base of the bloom) for the first 3 weeks. These practices may produce a sturdier vine that can set more, albeit smaller, pumpkins during the

A pumpkin field in flower.

growing season if you have good soil, sun, and moisture.

- If your goal is fewer, larger pumpkins per vine, once you have 3 to 4 fruits on a vine, pinch off all remaining pumpkin plants as they form.

6. Applying Pro-Plant

- Spray the leaves before 9 a.m. when the pores are open most for better results. Please spray Pro-Plant using spraying equipment that gives a fine, misty spray, and that the spray is directed diagonally upwards as well as downwards so that it hits the pores of the leaves underneath as well as lands on the leaves. Be generous when you spray. You do not have to spray every leaf. Spray 20 cc of Pro-Plant in 20 litres of water.
- You need about 100 to 120 days for most varieties of pumpkins. Giant pumpkins and other giant varieties require 130 to 150 days. Spray on Days 10, 20, 30, 40, 50, 60, 70, 80 until 10 days before you harvest. Alternatively spray every 10 to 15 days, but spray every 7-10 days once the flowers appear. Pumpkins need a lot of nutrients, so spraying Pro-Plant onto the flowers, leaves, and pumpkins every 7 days would be very beneficial to their growth.
- For a hectare, mix 500 cc of Pro-Plant with 500 litres of water.
- 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.
- If there is disease, mix 5 cc - 10 cc of Bio-Plant with 20 cc of Pro-Plant per 20 litres of water. 10 cc is in the case of serious disease. Cut off the affected leaves before spraying.

7. Disease

- An important aspect to watering is not to over-water. Pumpkins are susceptible to a fungal disease called powdery mildew. Powdery mildew looks like your pumpkin leaves were dusted with talcum powder. The leaves will gradually wither and die. Sometimes the whole vine will die as a result.
- A warm moist environment encourages mildew growth. Keeping water off of the leaves, and watering in the morning instead of late in the evening, can help stave off this disease. If you have a bad outbreak of powdery or downy mildew, it can kill your vine and affect crop quality and production.