

Project Director

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BLACK PEPPER CULTIVATION: USEFUL FACTS



Black Pepper Cultivation: Useful Facts

Climatic Conditions

Black pepper (*Piper nigrum* L.) originates from tropical, warm, humid latitudes, where temperatures of 77°F and 80-120 inches annual rainfall predominate. Evenly distributed rainfall is ideal. Supplemental irrigation is necessary in dry, low-rainfall areas. Due to its tropical climate and adequate rainfall, pepper can be grown throughout the year in Micronesia.

Soil Characteristics

Black pepper can be grown on a wide range of soil types, but best results are obtained on deep, well drained soils with good water holding capacity. The best soil characteristics are sandy loam clay to clay loam with adequate essential plant nutrients and high organic content. Suitable soil pH is between 5.0 to 6.5. A slope not exceeding 10-15° is recommended for better soil conservation, easier harvesting and farm management.

Field Preparation

Existing vegetation is turned under with a moldboard or disc plow, or by spading. Most soils benefit from adding compost at this stage. During cultivation, phosphate fertilizer can also be added if required. After turning, leave the soil for a few days to allow for decomposition, and then break soil clods by harrowing or rotovating, or with a hoe or rake in small gardens. After the soil has been pulverized, the surface should be smoothed in preparation for black pepper planting. Black pepper can be planted on ridges, in furrows, or on flat ground.

Preparation of Planting Materials

Traditionally black pepper has been propagated through cuttings that are prepared from main plants. The cuttings consist of the upper 5-7 nodes segments. Selected planting materials should come from varieties that are disease and pest resistant, vigorous and high yielding, with good productivity with respect to the final product. In the recent years, owing to the advantages of disease free planting material along with uniformity in growth and higher yields, the use of tissue cultured plantlets as the planting material for black pepper has become increasingly popular among the farmers.

Standards and Planting

Traditionally in Micronesia, the trunks of the tree fern (*Cyathea nigricans*) are used as living supports for commercial black pepper vines. Considering the extremely limited availability of traditional tree fern supports and their very short lifespan, non-living supports such as reinforced cement-concrete standards are a good alternative. Standards should be planted well before planting black pepper at a depth of 2.0-3.0 feet. The planting pits should have a depth of 1.5 feet and a radius of at least 1.5 feet from the standard. Prior to planting, the soil should be amended adequately with organic fertilizers such as compost. Disease-free seedlings should be planted in prepared pits at the onset of a rainy day or in the evening. Young vines should be tied loosely to the support and shaded with suitable plant material.

Considering the frequent and heavy rains, and poor drainage in the Micronesian region, the black pepper seedlings are recommended to be planted in rows on raised beds. The plants should be spaced in the rows at 8.0 feet apart and a 10 feet wide alley is to be maintained between rows.

Pruning

A couple of rounds of pruning should be carried out during the vegetative phase of vine growth. Initial pruning of terminal shoots is done 4-6 months after planting. The next pruning is done when the vines are about a year old, and the last pruning when the terminal shoots have reached the top of the standards.

Irrigation

Often grown in areas with high rainfall, black pepper is generally a rain fed crop. Black pepper plantations do not require irrigation under normal conditions, except perhaps during the initial establishment period or in drought prone areas. The plantations should not be allowed to become waterlogged for any extended length of time. For best results, maintain soil moisture at or near field capacity (moist but fully drained) throughout the growing period.

Fertilizer Application

Soils should be analyzed for nutrition status to determine nutrient requirements for growth and productivity of black pepper vines. In a tropical climate, it is better to apply small quantities of fertilizer often, rather than to add a large quantity in one treatment. This makes the fertilizer application more profitable and prevents too rapid growth. Black pepper requires good soil fertility.

Weed Control

Black pepper is susceptible to weed competition, especially during the first 8-12 months after planting, when the leaf canopy is being formed. During this time, control weeds by hand pulling or cultivating with a hoe.

Insect-Pests and Diseases

Nematode infestation by *Meloidogyne* spp. causes the main problem on conventional pepper cultivations. Soil-borne fungi are the most significant cause of disease to black pepper. They possess a wide spectrum of hosts and can affect practically all of the crop types. Therefore, constant and frequent scrutiny is necessary to identify any incidence of disease or pest at an early stage, and to take immediate action to control them. Integrated pest and disease management principles need to be applied at all stages to maximize productivity and minimize crop loss. Phytosanitary measures, such as physical removal of pests, affected plant parts, infected plants (virus-infected plants, severely disease-infected or pest-infested plants, including plants affected by *Phytophthora* spp. or slow decline or yellow wilt) are important to control the incidents.

Harvesting

Drupelets that are almost mature with all green berries can be picked to process as green pepper. Drupes with one or two berries beginning to turn yellow can be picked to process into black pepper. To process into white pepper, drupes should be fully mature, with one or two ripe yellow-orange berries on each drupe. Drupes should be picked selectively and harvesting rounds should be carried out frequently throughout the year. Harvested drupes of pepper should be handled hygienically, collected and transported in clean and closed baskets for the processing in peppercorns (International Pepper Community, 2008).

Processing, Drying and Storage

Separated green pepper should be washed in clean water and should be soaked for 1 to 2 minutes in water of 194°F temperature to eliminate contaminants. Soaking in hot water would also facilitate drying and improve the appearance of the dried peppercorns. Black peppercorns should be dried to a moisture level of 10% for long storage.

Texture and Color

Different harvesting times and processing techniques could result in various colors and textures of peppercorns such as green, black or white peppercorns.

(References: Naturland. (2001). Organic Farming in the Tropics and Subtropics - Pepper. Naturland e.V., Grafelfing, Germany.; and International Pepper Community. (2008). Report of the Meeting of Experts' Group on Good Agricultural Practices for Pepper (*Piper nigrum* L.). Institute of Agricultural Sciences for Southern Vietnam, HCM City)

