BASIL Grower's Manual

Scientific name: *Ocimum basilicum L.*

1. Introduction

Basil is an annual herb of the mint family (Lamiaceae), grown for its aromatic leaves. It is one of the aromatics, spicy and herbaceous crop grown in both warm and cold regions.

1.1 Uses

Basil is medicinal having anti-inflammatory properties and is known to stimulate circulation, immune response and is full of anti-oxidants. It is used in a variety of dishes, including: salads, soups, pasta dishes, pizza, sandwiches, pesto, and chutneys. It is also used in beverages.

Essential oil can also be extracted from the leaves and used in cosmetics, dental products and perfume.

1.2 Varieties

Basil Variety	**Characteristics**
Sweet basil *(Ocimum basilicum)*  Photo: Dimitris Meletis / Getty Images	Most common variety in Kenya. Has strong and sweet aroma. Has high demand in both local and international markets.
Lemon basil *((Ocimum basilicum citriodorum*)  Photo: Penpak Ngamsathain / Getty Images	It is also known as Thai lemon basil (or amenglak) or hoary basil. Pale green, elongated leaves. Highly aromatic with a citrusy, lemon-like fragrance. Adds a unique flavor to salads, seafood dishes and teas.

Thai sweet basil (*Ocimum basilicum var. thyrsiflora*)  Photo: YinYang / Getty Images	Has deep purple stems and flowers. The leaves are somewhat thicker in texture than sweet basil, and the flavor is mild and complex. A popular herb in South Asian cooking.
Osmin Purple basil (*Ocimum basilicum 'Osmin purple')*  Photo: Natalia Garidueva / Getty Images	Rich, dark purple leaves. Similar flavor to sweet basil. Has a spicy, clove-like flavor, used fresh in salads or for garnish.
Cinnamon Basil *(Ocimum basilicum 'Cinnamon')*  Photo: Nadya So / Getty Images	Also known as Mexican spice basil. Its bright green leaves have subtle purple veining, and the purple stems bear light purple or pink flowers. Has a mild spicy flavor with notes of cinnamon and is popular in Asian cuisine.

The above varieties are the most commonly grown, however, there are other varieties.

1.3 Counties where grown

Basil is can be grown in all parts of Kenya.

1.4 Ecological Requirements

Annual temperature – between 20°C to 30°C.
Basil requires regular watering; however, excess water may cause root rot. It also requires well drained fertile soils rich in organic matter with PH ranging between 6 - 7.5.

2.0 Good Agricultural Practices (GAPs)

Horticulture industry in Kenya is guided by a code of practice KS1758 which is a standard for flowers, vegetable, fruits, herbs and spices for both local and export market. The standard aims at ensuring food safety, environmental sustainability and

social accountability by following good agricultural practices from production, processing, transportation and marketing of fresh produce.
The manual seeks to adopt climate smart technologies aimed at increasing production and productivity, enhancing resilience and reducing GHG emissions.

2.1 Crop establishment

2.1.1 Land preparation

Prepare a planting calendar based on market survey which will guide on when to cultivate, varieties, quality and quantities required.

Site should be flat and where crops of the same family have not been grown in the previous season. Clear the field of any weeds or debris and dig/plough to a fine tilth. The beds should be raised.

2.1.2 Soil and water testing

The testing is recommended before planting to guide on fertilizer and manure application and water suitability for irrigation.

2.1.3 Planting and Spacing

Basil seeds should be certified. The seeds are sown in an enclosed nursery germinating after 5-10 days and transplanted to the field or greenhouse after 6-8 weeks and have developed a strong root system.

The plants should be spaced at 30cm apart within rows and 45cm between rows.

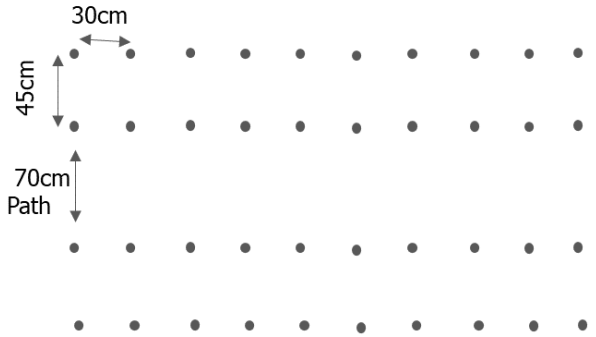

Fig 1: Illustration for spacing of Basil

2.2 Crop Management

2.2.1 Crop water requirement

This depends on crop water requirement which is determined by the stage of the crop, soil type and prevailing climatic conditions.

2.2.2 Crop Nutrition

1 ton of manure is applied during planting for proper root development and improve the soil structure. NPK fertilizer is ideal and should be applied every two weeks during active growth.

2.2.3 Mulching and weeding

Apply a layer of organic mulch around the basil plants to retain soil moisture, suppress weed growth, and maintain more stable soil temperatures.

Weeding is done to prevent weeds from competing with the target crop for growth factors like nutrients, sunlight, space, and water, as well as harbouring pathogens that directly the performance of the crop.

2.2.4 Pruning and training

When seedlings gain their first six leaves, pinching should be done above the second set. Pinching back the growing tip of the plants after transplanting encourages the growth of new shoots.

2.2.5 Pest and Disease Management

Integrated crop management (ICM) is the best option for food safety. These practices include scouting of pests, field hygiene, proper spacing, physical methods, biological methods like use of pheromone traps and others that will only give option of using Pest Protection Products as last option. The products must be registered for use on the crop in Kenya. (www.pcpb.go.ke/list-of-registered-products/

Major pests and diseases

Pest	Symptoms	Control
Aphids *(Aphis spp.)*  Photo: Antonina Lutta	Feed on leaves and suck sap, causing stunted growth and yellowing of leaves.	Use insecticidal soap, neem oil, or ladybugs.
White flies *(Bemisia tabaci)*  Photo: Garden Design	Suck plant sap, leading to yellowing and wilting.	Use yellow sticky traps or insecticidal soap.
Thrips *(Frankliniella occidentalis)*	Feed on leaves, causing distorted growth and silvering.	Use blue sticky traps. Introduce predatory insects (*Amblyseius swirskii, Amblyseius cucumeris,*

 Photo: Protasov AN / Shutterstock		*Hypoaspis miles)* or use neem oil.
Spider Mites (*Tetranychus urticae* Koch)  Photo: shutterstock.com	Feed on plant cells, causing yellow stippling and webbing.	Spray with water or use insecticidal soap.
Slugs and Snails (*Decoratus reticulatum)*  Photo: Plantvillage.psu.edu	Feed on leaves, causing irregular holes and damage.	Handpick or use slug baits (iron phosphate-based).
Leaf Miners *(Liriomyza* spp.)   Photo: Plantvillage.psu.edu	They create tunnels in leaves, affecting plant vigor.	Remove affected leaves or use sticky traps.
Flea Beetle *(Phylotreta spp.)*  Photo: Plantvillage.psu.edu	Small holes or pits in leaves that give the foliage a characteristic "shothole" appearance; young plants and seedlings are particularly susceptible.	Apply neem oil.
Cutworm (*Spodoptera exigua)*	Larvae feeds on the leaves and may cut the seedling stem near the base.	Handpick the larvae and kill them. Remove and destroy weeds and crop residue. Spray biocontrol agent to kill insects. If infestation is

 Photo: Plantvillage.psu.edu		severe, spray suitable insecticide.

Disease	Symptoms	Control
Fusarium Wilt (*Fusarium oxysporum*)  Photo: fusarium in basil - Search Images (bing.com)	Causes yellowing, wilting, and eventual death of the plant.	Use disease-resistant varieties and practice crop rotation.
Bacterial Leaf Spot *(Scolecostigmina mangiferae)*  Photo: Plantvillage.psu.edu	Bacterial infection leading to dark spots with yellow halos on leaves.	Remove infected leaves and use copper-based fungicides.
Root Rot *(Pythium spp.)*  Photo: amazingherbgarden	Fungal disease affecting the roots, causing wilting and poor nutrient uptake.	Ensure well-draining soil and avoid overwatering.
Basil Downy Mildew *(Peronospora belbahrii)*  Photo: Wisconsin Horticulture	Lower leaves begin yellowing later on turn brown. Affected leaves also curl and wilt, and on the undersides of the leaves, a gray-purple fuzzy material will develop.	Remove and bag any symptomatic plant remains and dispose. Plant resistant varieties.

Gray Mold (*Botrytis cinerea)*  Photo: Plantvillage.psu.edu	Fungal disease-causing brown spots on leaves and flowers, leading to decay.	Improve air circulation and remove infected plant parts.

2.3 Harvesting

Maturity period ranges from 60-70 days from planting, depending on variety Basil leaves can begin to be harvested any time after the plants have reached a height of 15–20 cm. Harvesting is done by pinching the leaves from the tips of the stems to encourage the more branching. Leaves should be pinched regularly to keep the plants productive and prevent them from going to seed.

Expected yield

Expected average yield is 3,000-6,000 kilograms per acre/ season achieved with good crop management.

2.4 Postharvest handling practices

Basil is transported in crates in closed trucks as per the Crops (Horticultural crops) Regulation 2020.

2.4.1 Cooling

Harvested basil is kept in cool conditions and avoid direct sunlight exposure. Cooling removes excessive field-heat thus maintaining quality and increasing the shelf-life of basil.

Freezing basil is the best as it prevents the plant from losing any of its flavour. Basil can also be refrigerated for a week or more, but loses flavour over time. It is tastier when fresh.

2.4.2 Sorting

Remove any diseased, deformed and poor-quality shoots.

2.4.3 Grading and bunching

Grading and sizing is done according to the market specifications.

2.4.4 Packaging

The bunches are put in a polythene bag and packed into 1kg boxes for fresh basil but may vary depending on the market specification.

2.4.5 Drying

Leaves can also be sun or oven dried for a longer storage and stored in dry airtight containers for up to 12 months.

3.0 Gross margin Analysis (30m*8m) as at 2024

Estimate Cost for Basil Production from Greenhouse- 30m*8m

Item	**Quantity**	**Cost/Unit**	**Total Amount in (Ksh)**		
			Season 1	**Season 2**	**Season 3**
Gross Income (Ksh)	100	330.00	**297,000.00**	**297,000.00**	**297,000.00**
Production cost					
Constant cost					
Green House	30*8M	150,000.00	150,000.00	-	-
Irrigation system	Tank platform	30,000.00	250,000.00	-	-
	Tank 3,000Lts	25,000.00		-	-
	Plumbing work/ fittings	35,000.00		-	-
	Pump/solar power	100,000.00		-	-
	Drip Irrigation	50,000.00		-	-
	Hose pipe	10,000.00		-	-
Charcoal Cooler	1	100,000.00	100,000.00	-	-
Sub total		500,000.00	**500,000.00**	-	-
Variable cost					
Land prep & bed making			2,000.00	-	-
Soil testing			3,000.00	-	-
Seedlings	7,500 plugs	2	15,000.00	15,000.00	15,000.00
Manure			3,000.00	3,000.00	3,000.00
Fertilizer/ foliar			4,000.00	4,000.00	4,000.00
Fertilizer			9,000.00	9,000.00	9,000.00
Chemicals			4,000.00	4,000.00	4,000.00
Sticky traps			2,000.00	2,000.00	2,000.00
Weeding & management			6,000.00	6,000.00	6,000.00
Labour for pinching, harvesting and grading			9,000.00	9,000.00	9,000.00
Packaging materials			30,000.00	30,000.00	30,000.00
Crates	10	1,000.00	10,000.00		
Sub Total			**97,000.00**	**82,000.00**	**82,000.00**

Total production cost	**597,000.00**	**82,000.00**	**82,000.00**
Gross margin (Gross Income -Total production cost)	**-300,000.00**	**215,000.00**	**215,000.00**

Note

Current price 330/= per kg
Harvest per crop season 9 times
Productivity per Greenhouse range 80-120 kgs =100kgs/ harvest

References

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