



MINISTRY OF
FOOD & AGRICULTURE
REPUBLIC OF GHANA



REPUBLIC OF GHANA

**DIRECTORATE OF AGRICULTURAL
EXTENSION SERVICES (DAES)**

Lettuce

PRODUCTION GUIDE
2021



LETTUCE PRODUCTION GUIDE

This production guide was developed to complement existing Information, Education and Communication (IEC) materials available on the Agronomy of selected commodities under the “Planting for Food and Jobs” campaign. It is designed for use by Agricultural Extension Agents and other farmers who can equally use to train their colleague farmers.

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1.0 INTRODUCTION

Botanical name: *Lactuca sativa*

Lettuce is a native crop of Europe, Asia and Northern Africa and has been cultivated for over 5000 years. Lettuce is an annual plant of the aster or sunflower family Asteraceae. Lettuce can be grown under protected cultivation in the green house or the open field. Lettuce is a rich source of antioxidants, Vitamin A and C and phytochemicals which are anti-carcinogenic. It also provides some dietary fibre, carbohydrates, protein and a small amount of fat. Lettuce also provides calcium, iron and copper. These vitamins and minerals largely found in the leaf. Lettuce is usually consumed as a salad or shredded in a salad mix of onion, tomato, cheese and basil.



A typical lettuce field

2.0 SITE SELECTION/CLIMATIC REQUIREMENTS

Lettuce is a cool-season crop and thrives best in temperatures of 12°C - 20°C temperatures above 30°C will affect the lettuce head development and quality of leaves. High temperatures affect low percentage seed germination. Humid, hot and rainy conditions will result in head rot. Lettuce can be grown in wide variety of soils rich in organic matter and good moisture holding capacity. This is because it has a very shallow root system. Lettuce cannot tolerate high acidic conditions with a pH range of 5.8-6.5. On commercial farms soil testing is very important in order to know the fertility status and other characteristics of the soil.

3.0 SEED/VARIETAL SELECTION

Buy and use certified seeds from recognized and certified agro-input dealers, MoFA, CSIR-Crops Research Institute. Some of the cultivars are Eden, Trinity and Great Lake all belonging to the Crisp/Iceberg family. Eden has bright green wavy leaves, big and dense head; Trinity has shining green leaves, early maturing and tolerant to bolting and tip burn while Great Lakes produce large, crinkled leaves which form a dense head in the center. The seeding rate is 0.8kg/ha (800g/ha)

3.1 Germination Test

Conduct a germination test before planting to be sure of the viability of your seedlot.

- Pick 100 seeds from the lot
- Sow in a seed box or bed.
- Count number of seeds germinated after 5-7days
- 85%-95% means seeds are very good but below 85% increase seed rate to make up for the losses.
- Discard seeds with germination rate below 60%.

4.0 LAND PREPARATION

As lettuce seeds are small in nature, they require fine tilth. Plough and harrow to ensure clod-free soil. Clear the land and prepare the field beds by incorporating well-decomposed organic manure before planting. The soil must be prepared thoroughly and carefully to a fine tilth removing obstructions such as stones or undecomposed organic matter. Levelling should be done for uniform emergence of crop. In case of seed wastage, conduct a germination test.

5.0 PLANTING

Lettuce is propagated through seeds. Seeds can be sown directly in fields or raised in the nursery and transplanted to the main field. Seed rate depends on variety, sowing method and soil type. Seed rates will be lower when seeds are raised on nursery beds. Lettuce seeds are sown in nursery beds and transplanted when the seedlings are 6 weeks old. Seeds are sown in rows 25cm x 25cm apart directly in the field. Later they can be thinned out to desired spacing.



A farmer watering seedlings



Seedlings at the nursery

5.1 Irrigation

Maintaining uniform moist conditions are very important in lettuce farming due to its shallow root system. The frequency of irrigation can be carried out 4 to 5 days interval. The number of irrigations depends on soil moisture holding capacity and climate. The field should be well-drained in case of excess water or flooding .

6.0 FERTILIZER APPLICATION

Use soil test a guide to fertilizer application. Lettuce responds well to manures and fertilizers. Apply 15-20 tonnes of well-decomposed organic matter or compost during land preparation. Apply 15-15-15 NPK 250kg/ha (50kg bags) and top up with 100kg/ha of Urea, 2 weeks after first application

7.0 WEED CONTROL

A regular weeding and hoeing should be done for good aeration and controlling the weeds. Care must be taken to prevent any root damage in this process as lettuce has a shallow root system

8.0 PESTS AND DISEASES MANAGEMENT

8.1 PESTS

(I) Cutworms (Agrotis segetum, A. ipsilon)

- Dry wilted lettuce, discoloured plants or cut or fallen seedlings in a small zone
- Soft-bodied, green to dark brown caterpillars at the base of plants and on the underside of leaves
- Whitening or chlorotic lesions on leaves and dried leaves



Damages caused by Cutworms

Management

- Keep the nursery and field free of weeds that may act as alternate hosts to cutworms
- Plough the field before transplanting during the dry spells to expose the cutworm to natural enemies and extreme heat
- Remove or burn crop debris before planting
- Start monitoring for cutworms at seedling stage i.e. soon after germination
- Check and remove egg masses and caterpillars from plants and crush them
- Dig around the damaged plant to get the cutworms and mechanically kill them
- Flood the area to suffocate the larvae in the soil if you are growing lettuce in deep soils
- Mix equal quantities of sawdust, bran and molasses with enough water to make mixture sticky and spread around the base of plants to attract and kill caterpillars
- Drench at seedling stage with Azadirachtin 0.03% (e.g Nimbedicine EC, Nematech WG) at a rate of 35ml/L of water to reduce infestation drastically

(ii) Root knot nematodes

Symptoms

- Roots become stunted and swollen, mild to extreme deformation
- Leaves turn greyish green with chlorotic outer margins. Wilting and slow recovery when watered.
- Leaves transplanted may be stunted or die if infestation is high
- If nematode infestation is low, symptoms may not be apparent until later in the crop season when nematode numbers have increased
- Symptoms are usually seen throughout the entire field rather than in patches
- Symptoms can look similar to that of nutrient deficiency (stunting, leaf discoloration) However, it does not result in root galls caused by nematodes



Management

- Before planting, sample for nematodes at the end of growing season when crop residues remain (when nematode populations are high)
- Adjust planting dates to cooler times in the season when nematodes are less active
- Plant disease free seeds from certified sources.
- Plant transplants rather than seeds if possible as they can be more resistant to nematodes
- Encourage healthy plant growth by obtaining optimal irrigation and fertilization levels. Healthier plants are more resistant to nematode damage
- Do not introduce soil from an infested field into one which is not infested. Avoid cross soil contamination.
- Rotate every season with groundnuts, cereals (maize, sorghum, millet) nappier grass onions or garlic as these crops are less susceptible to nematodes
- Plant marigolds as cover crops before planting
- After harvest, solarize soil by ploughing fields, moistening the soil and covering using plastic sheet for 4-6 weeks during the hottest part of the year
- Alternatively, plough infested fields deeply to expose soil to sunshine for a month during the hot season before planting the next crop.
- Leave the field fallow for 1-2 years to lower nematode populations. During this time, keep the soil moist but remove weeds.
- Practice Crop rotation

8.2 DISEASES

(i) Alternaria leaf spot (*Alternariabrassicae* and *A. brassicicola*)

Symptoms

- Alternaria leaf spot is a seed-borne disease (meaning the fungi that causes the disease is in the seed)
- Dark brown to black lesions with yellow halos on leaf surfaces
- Wilting and leaf drop
- Spots affect the quality of leaves



Damages causes the leaf Spot fungi

Management

- Plant certified disease-free seeds
- Transplant only healthy seedlings
- Mulch plants with straw soon after transplanting to reduce spread of spores already in the soil through rain splash
- Practice crop rotation after two seasons of lettuce with crops such as sorghum, millet or cassava
- Bury old plant debris after harvest to reduce inoculum level available in the next season
- Monitor field weekly looking for dark brown to black lesions with yellowish halos on leaf surfaces
- Apply Mancozeb at a rate of 75g/15L of water
- Treat seeds with Mancozeb at 3-4g /kg of seed and Folpet (Folpan 50 WP) before sowing at 3-4g/kg of seed

(ii) Collar rot

Symptoms

- Brown lesions followed by cottony growth with hard black irregularly shaped structures (sclerotia) on the collar region close to the soil
- Sign of rot at the collar region as plants begin to grow
- Wilting or death of foliage



Colour rot damage

Management

- Collect debris and burn or remove from field. Do not plough back into soil
- Solarize soil with plastic sheets for 4-6 weeks before planting
- Plant lettuce on raised beds with water spacing (15cm x 15cm) to give good aeration
- Ensure good drainage and avoid using sprinkler irrigation and water each plant individually to avoid disease spread
- Ensure good farm sanitation. Keep fields free of weeds
- Practice long periods of crop rotations (5 years +) by planting potato and maize in between.
- Treat seeds with a fungicide before sowing to prevent early infections
- At early stage rogue out infected plants before sclerotia are formed to prevent further soil contamination
- Treat seeds with Mancozeb at 3-4g /kg of seed and Folpet (Folpan 50 WP) before sowing at 3-4g/kg of seed

(iii) Downey Mildew

Symptoms

- Downey mildew infects seedlings and mature plants
- Light green / yellow round /angular spots on top of leaves particularly on older leaves
- Spots merge and turn brown, sometimes becoming soft and slimy
- White cotton-like growth develops on the underside of leaves in cool and humid conditions



Downey mildew damage

Management

- Do not plant crop next to or downwind of infected fields since downy mildew spores spread via wind
- Keep fields free from weeds, particularly those in daisy or sunflower family as these species are hosts of downey mildew. Removing weeds improves aeration
- Space plants far way enough apart that leaves can dry quickly after watering or rains. Spacing should be 30-40cm between rows, 15-20cm between seedlings, depending on the variety
- Disinfect farm implements /tools with household bleach (1-part bleach to 1-part water) to avoid spreading the disease
- Rotate with crops not susceptible to the disease for 2-3 years. The spores of the pathogen can survive in the soil for this long
- During crop growth remove any infected plants immediately and destroy by burning or burying them deeply (at least 1m)

(iv) Septoria leaf spot

Symptoms

- Small irregular yellow spots which turn brown and dry on lower leaves
- The centre of the spots may split and fall out
- Old lesions turn necrotic and sunken
- Lower leaves progressively die and drop off
- Leaf spots contain brown/black dots which are fungal reproductive structures



Management

- Remove plant debris from the soil or plough into the soil after harvest to hasten decomposition
- Control weeds, volunteer crops and wild lettuce crops
- Avoid using the same location for the nursery year after year
- Select healthy plants from nursery for transplanting, remove any seedling showing symptoms
- Mulch with straw or other available materials after transplanting to reduce rain splash
- Avoid working in fields when plants are wet
- Rotate with non-host crops for 3 years such as maize, millet, sorghum, cowpea and cassava
- Rogue out infected plants immediately when they are observed at very low disease density and destroy by burying
- Apply Mancozeb at 3-4g /kg of seed and Folpet (Folpan 50 WP and Shavit F) before sowing at 3-4g/kg of seed and top cop (Sulphur 50% + copper 80%) at the rate of 150-300mls/ 15L.

9.0 HARVESTING

Leaf varieties can be harvested when the leaves are tender and immature for table purposes. First harvesting should be done 20 – 30 days after sowing depending on the variety. Incase of head varieties, crop should be harvested when it has attained a good size and solid head. The harvesting time depends on group or class of lettuce it falls under.

9.1 Yields

Yields of any lettuce depends on many factors such as soil type, variety, climate and other management practices in lettuce farming a potential yield of 5.0 – 15.0mt/ha, can be realized in case of head lettuce. Open leaf varieties give comparatively higher yields.

