

# **Garlic Production**



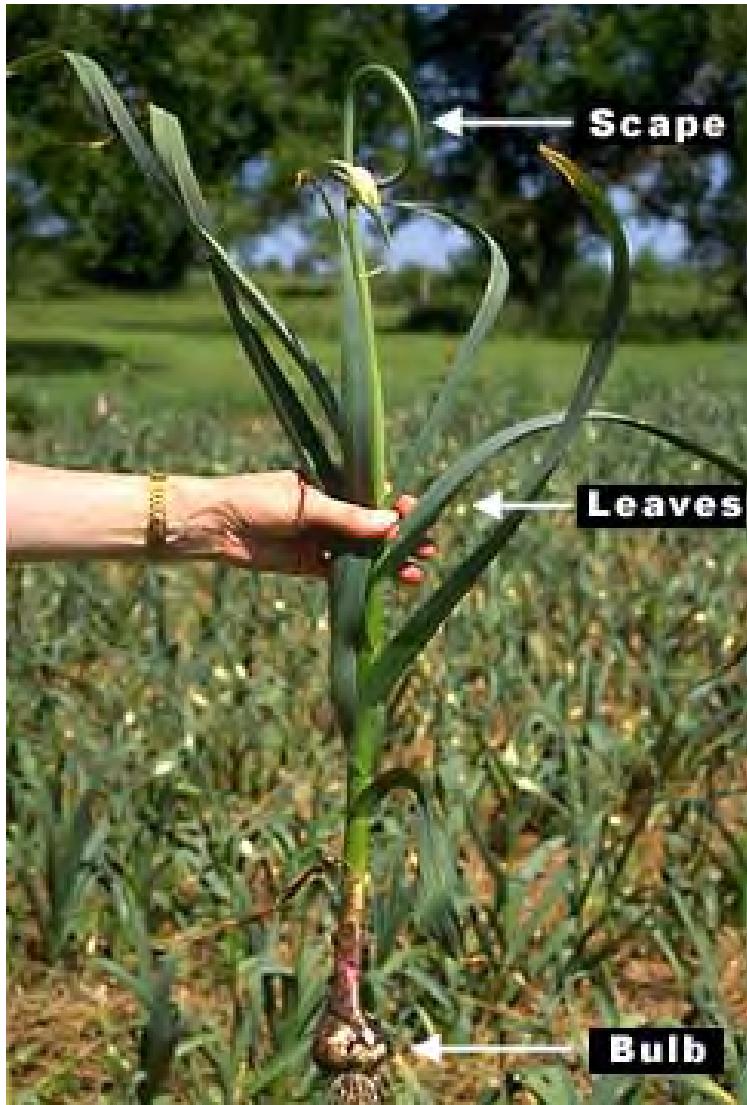
---

**IDEA-NEW**

# **Garlic (*Allium sativum* L.)**

## ■ Garlic

- Member of the onion family, cultivated for thousands of years and is used for its culinary and medicinal attributes.
- Garlic does not produce fertile seeds, cloves are used for propagation.
- Varieties
  - Hard neck varieties, produce a flower stalk or scape, often termed “bolting varieties”
  - Soft neck varieties, do not produce a seed stalk, these are varieties for commercial mass production



## ■ Hard neck varieties

- Most closely related to “wild garlic”
- Produce “bulbils” or small aerial cloves that can be used for propagation
- Produce four to 12 cloves
- Difficult to braid
- Do not store well or start to form roots or dry out in a few months after harvest

# **Garlic (*Allium sativum* L.)**

## **■ Soft neck varieties**

- Considered to be the most domesticated varieties due to minimal flower stalk and bulbil production.
- More productive than hard-necks varieties. Each bulb of a soft neck variety generally contains between 10 to 40 cloves.
- Long shelf life, six to eight months.

# **Garlic (*Allium sativum* L.)**

## ■ Soil

- Well-drained soils high in organic matter. Sandy loam or loam soils have the most ideal texture for garlic.
- Drought or excessively wet conditions will reduce yields and marketable bulbs.
- Well-composted manure provide good results (10-15 tons/jerib)
- The optimum soil pH is between 6 and 7.

# **GARLIC**

## **Production Principles and Tips**

### **■ Planting**

- Earlier planting means higher yield potential.
  - September to November planting is optimum.
- Size of cloves planted is directly related to the size of the bulbs harvested.
- If saving your own seed, save the largest, "best" bulbs and cloves. If you are buying seed, learn the cultural history of the garlic and the field in which it was grown. Use "Virus-Free" seed, if possible.

# **GARLIC**

## **Production Principles and Tips**

### **■ Planting**

- Plant immediately after "cracking." Individual cloves do not keep long, due to disease susceptibility and desiccation.
- Cover the top of each clove with  $\frac{1}{2}$  to 2 inches of soil, depending on winter temperatures (colder winter requires deeper planting).

# GARLIC, Planting Material



# GARLIC, Planting



# GARLIC, Planting & Spacing

- 7 -12 cm between plants
- No less than 20 cm between rows
- 140 – 200 kg/jerib is needed, depending of the weight of individual cloves
- Average number cloves/bulb 8 -15 cloves



# **GARLIC**

## **Production Principles and Tips**

### **■ Culture**

- Weeds are frequently the worst problem. Avoid, prevent and control them.
- Garlic is a moderate user of nitrogen; it may or may not require phosphorus, depending on the soil; it rarely responds to potassium; and, it rarely requires micronutrients.
- Apply small amount up to one-half of the nitrogen at planting time, and the remainder in two or three later side dressings as soon the garlic begins to grow in early spring (at three weeks interval). Do not apply nitrogen during the last 60 days before harvest.

# Garlic Field, Batikot district



# Garlic (*Allium sativum L.*)



14 – 25 kg N/ jerib

Broadcast P and K before fall planting



# GARLIC

## ■ Insects

- Do not appear to be a major problem for Garlic production
- Some potential insect pests are:
  - Onion trips
  - Onion maggots
  - Armyworms
  - Wireworms



UC Statewide IPM Program  
© 2007 Regents, University of California

UC Statewide IPM Project  
© 2000 Regents, University of California

# Onion & Garlic

## Basal Rot, pathogen *Fusarium oxysporum*

### Symptoms

- Progressive yellowing and dieback from the tips of leaves
- Affected roots are dark brown to dark pink
- A brown discoloration of the plate stem tissue is observed when infected bulb is cut vertically

# Onion & Garlic

## Basal Rot, pathogen *Fusarium oxysporum*

### ■ Comments

- The fungus survive indefinitely in the soil
- Infection occurs through wounds or old roots scars at the base of the bulb
- Avoid fields with a history of basal rot problems, 3 to 4 years rotation out of onion, garlic and leeks
- Control soil insects and foliage diseases
- Cure bulbs properly before storage



## Basal Rot in Garlic



# Onion & Garlic

- White Rot, pathogen *Sclerotium cepivorum*
  - Leaves of plants infected with the white rot pathogen show yellowing, leaf dieback, and wilting.
  - Leaf decay begins at the base, with older leaves being the first to collapse. A semi-watery decay of the bulb scales results. Roots also rot, and the plant can be easily pulled from the ground.

# Onion & Garlic

## ■ White Rot, pathogen *Sclerotium cepivorum*

### Comments

- Disease severity depends on sclerotia levels in the soil at planting.
- Sclerotia can be spread throughout a field or from field to field by flood water, equipment, or on plant material.
- Sclerotia remain dormant in the absence of onion or other *Allium* crops. Their germination is stimulated by *Allium* root extracts and exudates that extend into the soil about 0.5 inch from the root.



UC Statewide IPM Project  
© 2000 Regents, University of California

**Onion bulbs showing the fluffy white mycelium and black sclerotia associated with white rot.**

# Onion & Garlic

## White Rot, pathogen *Sclerotium cepivorum*

### Comments

- Disease development is favored by cool, moist soil conditions. Soil moisture conditions that are favorable for onion and garlic growth are also ideal for white rot development.

# Onion & Garlic

## White Rot, pathogen *Sclerotium cepivorum* Management

- On garlic, the disease is commonly introduced into the field on seed cloves. Plant only clean stock from known origins that have no history of white rot.
- Follow a long-term rotation schedule and do not follow *Allium* crops with other *Allium* crops.
- Garlic extract treatment

# Onion & Garlic



**Healthy bulb onion (right) and bulb infested by stem and bulb nematode**

# Onion & Garlic

## Nematodes

- Scientific names:  
Stem and bulb nematode: *Ditylenchus dipsaci*  
Root knot nematode: *Meloidogyne hapla*, *M. incognita*, *M. javanica*, and *M. chitwoodi*  
Stubby root nematode: *Paratrichodorus* sp.

# Onion & Garlic

## Nematodes

- The stem and bulb nematode penetrates the germinating clove and destroys tissue as it moves through seeking food. Nematodes sucking the cell contents and salivary secretions cause the cells to collapse. Root knot nematodes can cause stunting and reduce a stand. Stubby root nematode causes stunting of plants.

# Onion & Garlic

## Nematodes

- There are currently no resistant cultivars available.
- **Treatment decision.** Treating bulbs with hot water has been shown to eradicate nematodes from garlic cloves.

# GARLIC

## ■ Harvest, When ?

- 1) Harvest is usually optimum when half or slightly more than half of the leaves remain green,  
2) pull a few bulbs and cut them in half; if the cloves fill the skins, then the bulbs are ready to harvest.
- To harvest, the bulbs should be dug with the shoots and roots still attached.
- If braiding, do so while tops still have moisture and are flexible.



**Garlic braids**

# Garlic approaching harvest



# GARLIC

## ■ Curing and Grading

- Plants should be tied in bundles of 10 to 15 and allowed to dry in a well-ventilated room for 3 or 4 weeks. Bulb skin turns papery.
- Cut tops one-half to one inch above main bulb, and trim roots when they are dry.
- Bulbs can be graded into the following diameter sizes: <2 inches, 2 to 2.5 inches, 2.5 to 3 inches, and >3 inches. Premium bulbs are those 2.5 inches and larger.

# Curing Garlic



# **GARLIC**

## **Production Principles and Tips**

### **■ Storage**

- Store as cool and dry as possible. Relative humidity must be below 70% to prevent mold and/or root sprouting. The lower the temperature, the longer the storage life. Storage at high temperatures (e.g. room temperature) is satisfactory, but for shorter periods.

# Manana !!!

