



SPICE CROP WORKSHOP



FIELD TRIAL RECAPS & UPDATES





Garlic Production in Hawaii

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STATE OF HAWAII



SUSTAINABLE AND ORGANIC
AGRICULTURE PROGRAM
COOPERATIVE EXTENSION, UNIVERSITY OF HAWAII AT MĀNOA,
COLLEGE OF TROPICAL AGRICULTURE AND HUMAN RESOURCES



Challenges

- Climate
- Daylength
- Access to seed material
- Pest and Diseases
- Import/market competition





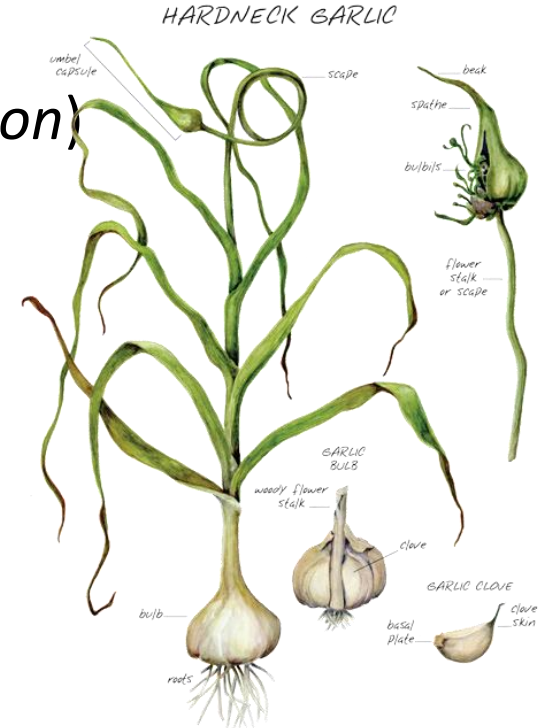
Garlic Types

- Garlic (*Allium Sativum*)
 - Hardnecks (*A. sativum ssp. Ophoscorodon*)
 - Rocamboles
 - Purple Stripe
 - Porcelain
 - Asiatic/Turban
 - Creole
 - Softnecks (*A. sativum ssp sativum*)
 - Artichoke
 - Silverskin
- Elephant Garlic (*Allium ampeloprasum*)
 - Leek produces cloves



Hardnecks

- Hardnecks (*A. sativum* ssp. *Ophoscorodon*)
- Groups
 - Rocamboles
 - Purple Stripe
 - **Porcelain**
 - Asiatic/Turban
 - Creole





Porcelain

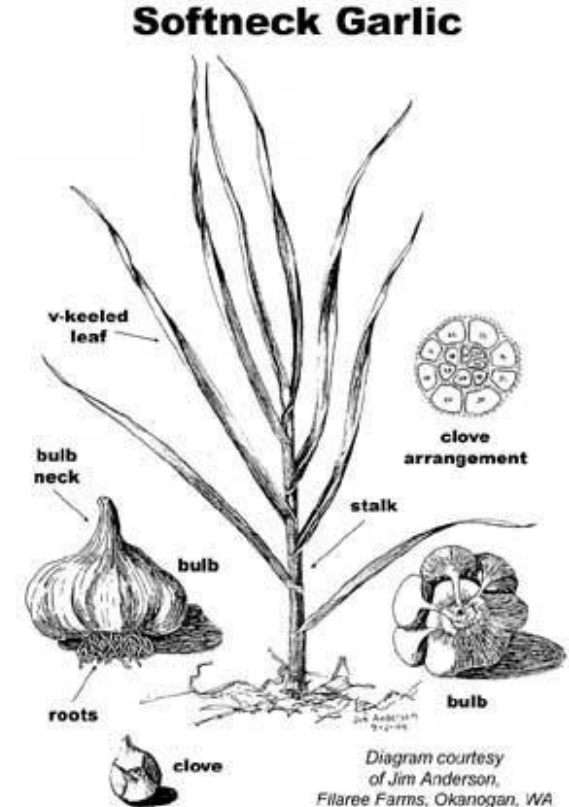
- Satin white wrappers
- 4-6 cloves
- Mistaken for elephant garlic
- Stores 6 months
- 1lb of seed = 40 plants
- German (White) Extra Hardy





Garlic Types

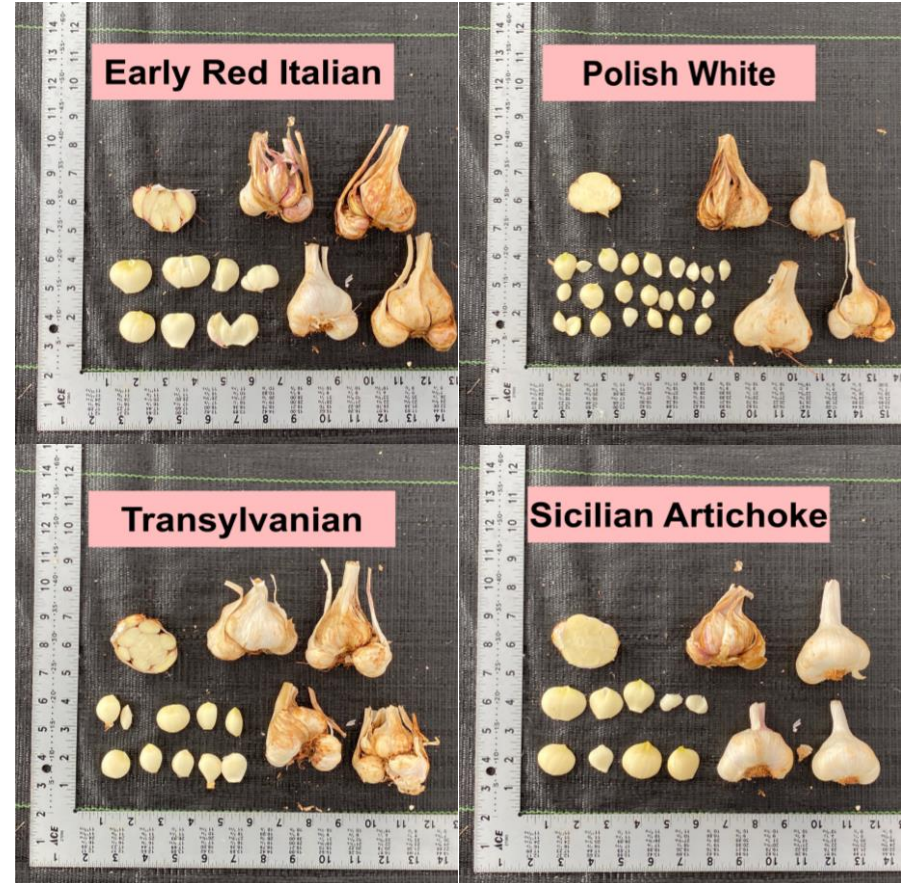
- Softnecks (*A. sativum ssp sativum*)
- Groups
 - Artichoke
 - Silverskin
- Most common in markets
- Mild flavor
- Stores long (10-12 months)
- Early to harvest





Artichoke

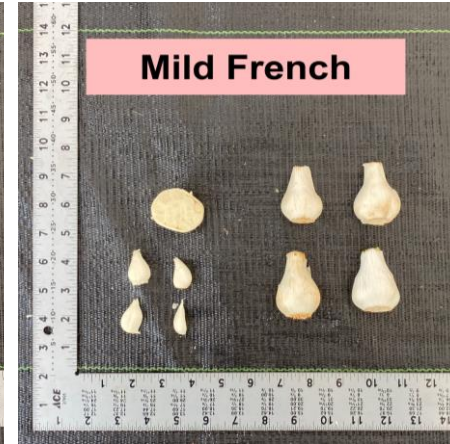
- Very vigorous and large bulbed
- May form seed heads under stress
- Named for overlapping layers of cloves
 - 3-5 clove layers containing 12-20 cloves
 - Outer cloves are fat and round
 - Inner cloves vary in shape
- Storage of 10 months
- 1lb of seed = 65 plants
- Inchelium





Silverskin

- Most commonly found in markets
Usually all white wrapper
- Three clove layers
- 12-20 cloves per bulb
- Popular for braiding
- Latest harvested
- Stores 10-12 months
- 1lb of seed = 70 plants
- Silver White





Selecting Planting Material

- Filaree Garlic Farm
- Southern Exposure Seed
- Save Seed Pieces
 - Well cured
 - Adequate wrapper leaves

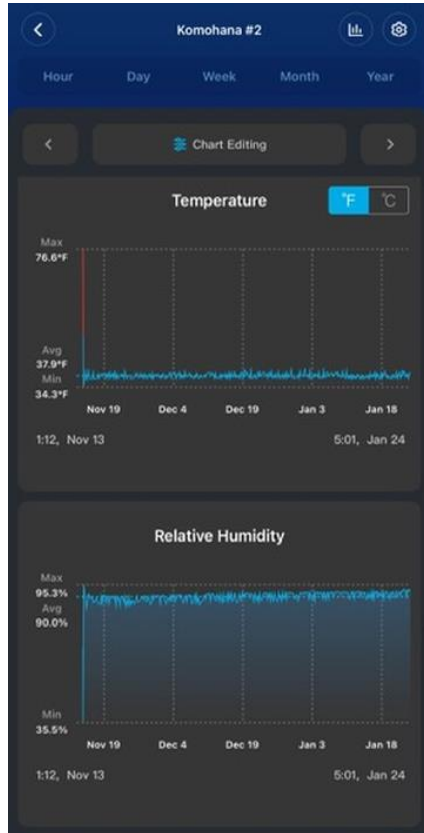




Vernalization



- The induction of a plant's flowering process by exposure to the prolonged cold of winter, or by an artificial equivalent
- Refrigeration for 3-4 months (Oct-Dec)
 - 40F
 - Higher humidity helps prevent drying out (65-75%)





Planting (Nov-Feb)



- Single or double-row plantings per bed
- Rows 6-12' apart
- Cloves spaced 4-6 inches apart
- 1-1.5" deep



Weed Control



- Cover cropping
- Solarization
- Cultivation
- Sterile Seed Bed
- Pre-emergent herbicides (Goal)
- Mulches
 - Plastic or organic



Irrigation/Fertilization



- Irrigation
 - 1 inch of water during dry months (27,000gal/acre/week)
 - Cut water about a month prior to harvest
 - Minimize splitting and forces bulb formation
- Fertilization
 - Based on soil sampling
 - Preplant phosphorus and calcium requirements
 - Medium to high nitrogen demand (200-300 lb/A)
 - 150lbs of potassium per acre
 - Stop nitrogen applications after 6 or 7 weekly applications



Pest/Diseases

- Insect
 - Onion Thrips
 - Leek Moth
- Diseases
 - Fusarium Basal Rot
 - White rot
 - Downy Mildew
 - Purple Blotch
 - Garlic Mosaic Virus
 - Rust
 - Pink Root





Garlic Scapes



- Flowering portion of most hard necks and some soft neck varieties
- Can be eaten like asparagus when harvested young.
- Removal is required to maximize bulb growth



Monitoring Growth





Harvest/Storage

- Harvest
 - Most varieties harvest 40—60% of leaves yellow
 - Generally, have 6 leaves
 - Early harvest results in poor storage
 - Late harvest results in splitting
- Storage
 - 40F is not ideal for vernalization, not storage
 - 60F in a well-ventilated container can last 3-5 months
 - Moderate humidity (65-75%)
 - Paper or mesh bag
 - Long-term storage (9 months)
 - 32F at 60-70% humidity
 - Seed storage
 - 50F at 65-70% humidity
 - Temp below 40 can lead to side shoots





Curing



- Important for storage
- Bunch 10-12 freshly harvest plants using string or twine
- Suspend bunches using a single wire in a shady cool and dry area.
- About 3 weeks or outer two leaves are dry.
- Once dry trim shoots and roots and clean off remaining soil



Lab Curing (A/C)



Komohana, Big Island



Field Curing



Poamoho, Oahu

- In areas where rainfall is not common bulbs can be harvested and left on the soil surface to dry.
- Bunched and hung on nearby fences



Shed Curing



Lalamilo, Big Island



Field Office Curing

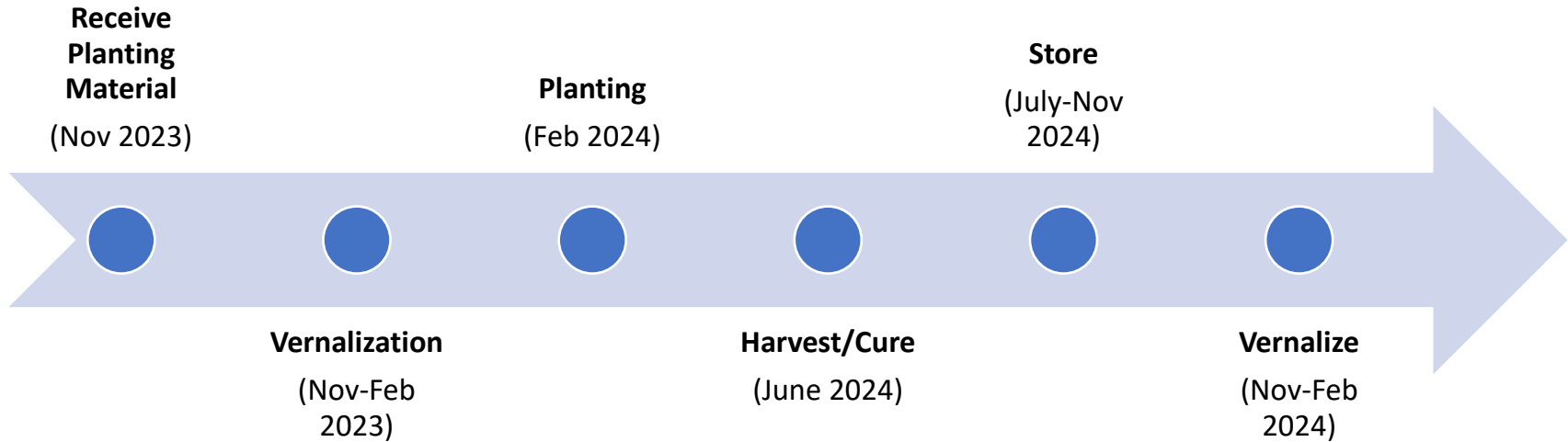


Poamoho, Oahu



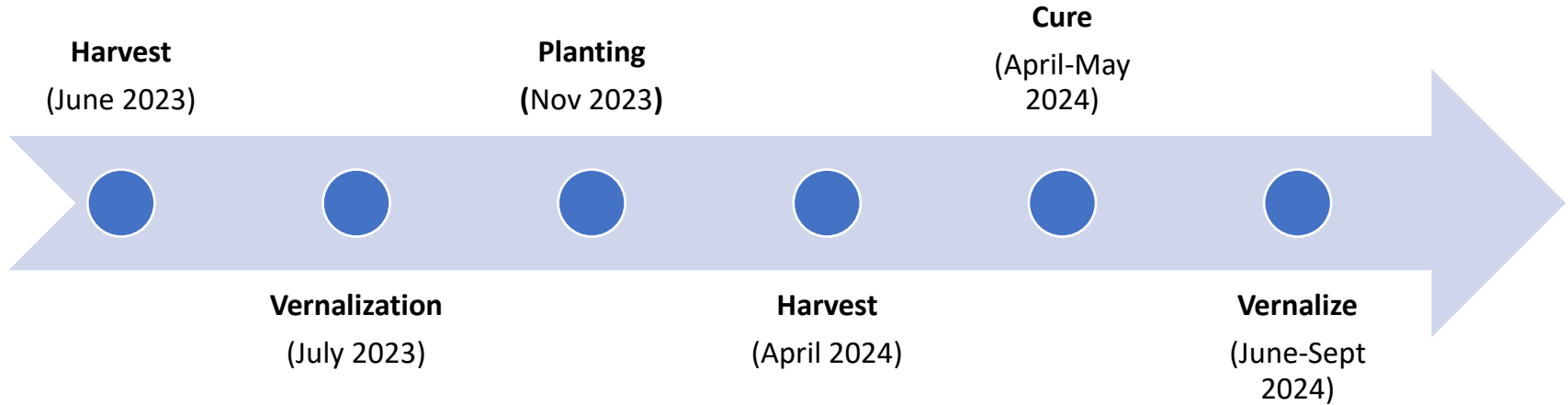


Garlic Season (Year 1)





Saved Seed Alternative Garlic Season





Mahalo!