

In The Vegetable Garden: Melons, Squash & Gourds

Origins

Melons- Africa & southern Asia

Cucumis- all other melons

Citrullus- watermelon

Squash & pumpkins- Americas

Cucurbita

Gourds

Cucurbita, ornamental gourds (Americas)

Lagenaria, large utilitarian gourds (Peru)

Luffa, vegetable sponge (old world tropics)

Length of Growing Season

Approximate time from planting to harvest

Cucumber, pickling	45 days
Cucumber, slicing	55-65 days
Gourds	100-180 days
Muskmelon	80-90 days
Pumpkin	80-120 days
Squash, summer	50-65 days
Squash, winter, Acorn	70-100 days
Squash, winter, Hubbard	90-115 days
Watermelon	75-95 days

Warm Season Vegetables

Plant outdoors after danger of frost is past and temperatures have warmed

Soil (ideally 65-70° F or above)

Air (above 60° F)

Seeds may rot if planted in cold, wet soils

Transplants

Start indoors 4 weeks prior to transplanting

Use individual containers, i.e. peat pots

Older plants that have hardened off and stopped growing will not transplant well and should be discarded

Scarify luffa seeds, then soak for 24 hours

Basic Growing Techniques

Select a sunny, well drained site that did not have cucurbits on it the year previous

Soil must be well drained

If necessary to improve soil drainage, amend the soil with compost or composted manure

Soil pH 6.5-6.8 (6.0-7.5)

Apply lime only if a need is indicated by soil testing

Cucurbits are well adapted to planting on plastic, either clear or black

Sow seed 1\2-1" deep

Fertilization

Pre-plant

Apply 1-2 lbs. 1:2:2 or 1:1:1 ratio fertilizer / 100 sq.ft. (such as 5-10-10 or 10-10-10)

Incorporate fertilizer into soil before planting

Use the lower rate on sandy soils or with plastic mulch

Use the higher rate on heavier soils

Sidedress application when plants begin to "run" or vine

1-2 lbs. ammonium nitrate per 100' of row

Apply fertilizer to the soil surface along the plant rows. Rake it lightly.

Spacing

Summer Squash

Rows 4-5', plant spacing 8-12"

Gourds

Rows 5', plant spacing 2'

Hills 4-5', rows 7'

Muskmelon

Hills 2', rows 5-6'

Watermelon

Hills 2-3', rows 5-6' (compact plants)

Winter Squash

Hills 2-3', rows 4-5' (Semi-vining plants)

Hills 5', rows 7'

Irrigation

Dry conditions during germination result in poor and uneven emergence
Critical time in determining yield potential is when first blossoms appear, so adequate moisture at this time is important
Dry conditions at bloom results in poor fruit set and misshapen fruit
Moisture stress close to harvest greatly reduced melon size

Cucurbit Pollination

Flowers open in the morning and are only open for 1 day
Male flowers attract bees and alerts them to the location of blooming vines
Cucurbits must be visited several times to fully pollinate

Male Flowers Predominate...

Early season development
Under certain kinds of stress
Drought stress in the 2-3 leaf development stage
Too much shade
Dense spacing
High fertilization
Weed growth
High night temperatures, above 80° F

Fruit Development

Approximate time from pollination to market maturity under warm growing conditions

Cucumber, pickling	4-5 days
Cucumber, slicing	15-18 days
Muskmelon	42-46 days
Squash, summer	5-7 days
Squash, summer, scallop	4-5 days
Squash, summer, zucchini	3-4 days
Squash, winter, Acorn	55-60 days
Squash, winter, Hubbard	80-90 days
Watermelon	42-45 days

Weed Control Techniques

Cucurbits are planted late –early May to early June- all weed species germinate rapidly and well at this time
Wide row spacings- lots of bare ground
Sensitive plant to many herbicides
Sandy, light soils often used

Weed Control Techniques

In-row spacing
Use a close spacing to encourage faster cover in the row
Suggested 18 inches - 2 feet
Between-row spacing
A wide range of 'vine sizes' now available
Compact: 6-9' between rows
Semi-vining: 9-12' between rows
Vining: 12-15' between rows
Reach full vine cover as soon as possible to prevent weed invasion

Weed Control Techniques

Avoid using manure
Clean equipment
Avoid using weed infested soil
Avoid buying weed infested transplants or seed
Do not use mulch containing grass or weed seeds
Prevent weeds from going to seed

Melon Flavor

Poor Flavor

Poor fertility- including low potassium, magnesium or boron
Cool temperatures
Wet weather- watering during the ripening period may delay harvest, cause splitting and reduce sweetness
Poorly adapted variety
Loss of leaves from disease
Picking unripe fruits

Good Flavor

Best flavor develops under hot, dry conditions with good fertility on healthy plants

Melon Harvesting

Muskmelons

Harvest at full "slip"
Melon color changes from green to yellow

Watermelons

Harvest when the tendril closest to the fruit turns brown and dry
Skin becomes resistant to thumbnail
Surface color turns dull
Bottom of melon turns from light green to yellowish
Cut from vine leaving 1" of stem attached

Summer Squash

6-8" long, 2" or less diameter
Patty pan types- 3-4" diameter
Harvest every 3 or 4 days
Store at 40-50° F, 90% RH, for 5-14 days

Winter Squash

Harvest when rind begins to harden, but before frost
Leave a section of stem attached
Cured for 10 days at 80-85°F
Store at 50-55° F, 50-75% RH, for 2-6 months

Gourds

Harvest when stems dry and turn brown
Cut gourds from vine with a few inches of stem attached
Discard rotten, bruised or immature gourds
Clean harvested gourds with soap and water. Dry them, then apply rubbing alcohol to the surface.
Curing
Dark, warm, well ventilated location
Step #1 (approx. 1 week), skin hardens and exterior color sets
Step #2 (minimum 4 weeks), internal drying

Luffa Gourds

Harvest when outer shell is dry, gourd is lightweight and seeds rattle inside
Remove stem end and shake out seeds
Soak in warm water until outer skin softens and can be easily removed
Soak fibrous sponge in 10% bleach solution (1 part bleach, 9 parts water)
Rinse in clear water and allow to dry before using

Cucurbit Fruit & Foliage Diseases

Downy Mildew

Most serious on cucumber & muskmelon
Fungus overwinters in Mexico and southern U.S.
Spores are blown north each season or
Introduced on infected seedlings
Thrives in cool or warm weather, given sufficient moisture and high relative humidity
Infection requires a thin layer of water on the leaf surface
Ideal infection temperature- 60 ° to 72 °F
Several days of ideal conditions are required before infection takes place
Symptoms appear 4-12 days after infection
Infection usually begins at the crown and moves rapidly outward
Small, irregularly-shaped yellow lesions appear on upper leaf surface
Under moist conditions, a white/gray/purplish mold develops on the lower leaf surface
Lesions expand, becoming brown in the center, and grow together
Entire leaves wilt & die

Anthracnose

Affects watermelon, cucumber & muskmelon
Squash & pumpkin rarely, if ever, infected
Fungal spores overwinter on infected plant debris
Can also be spread on infected seed
Favored by warm, moist conditions
75 °F optimum
Inactive below 40 °F and above 86 °F
Required leaf wetness from rain or heavy dew to release fungal spores
Muskmelon and cucumber
Yellowish or watersoaked areas
Spots enlarge rapidly and turn brown
Dead areas dry out and shatter, leaving a ragged hole
Watermelon
Black leaf spots develop
Elongated dark spots develop on petioles and stems
Fruits develop sunken, dark-bordered spots that extend into the fruit
Usually a crack develops across the spot

Use a 3-4 year garden rotation schedule
Remove or bury all garden debris in fall
Choose disease resistant cultivars
Buy disease-free plant material
Begin a preventative fungal spray program at bloom
Begin sprays when vines start to run
Every 7-14 days
Copper fungicides, Mancozeb, Maneb, Neem oil
Do not wet foliage during irrigation

Baking Soda

'Use of Baking Soda as a Fungicide', <http://attra.ncat.org/attra-pub/bakingsoda.html>

P.Allen Smith Gardens

www.pallensmith.com

Baking Soda Fungicide

1 heaping teaspoon baking soda
1 tablespoon dormant oil
½ teaspoon insecticidal soap or dish soap
Mix in one gallon of water as a powdery mildew spray.
Plants must be well hydrated before spraying.

Armcarb 100®- Downy mildew

Arm & Hammer

Helena Chemical Co.

www.helenachemical.com/sales.html

FirstStep®

W.A. Cleary Chemical Co.

800. 524.1662

Kaligreen®

Monterey Chemical Co.

www.montereychemical.com

Remedy®- Anthracnose

Bonide

Gardener's Supply

www.gardeners.com

Bacterial Wilt

Vectored by

Striped cucumber beetle

AKA Southern corn rootworm

Spotted cucumber beetle

Disease susceptibility

Cucumber and muskmelon: highly

Pumpkin and squash: moderately

Watermelon: not affected

Cucumber Beetles- Adults feed on stems & cotyledons of emerging plants, often killing them
Severe adult feeding may cause defoliation
Transmits bacterial wilt pathogen

Beetle Management

Protect plants with row covers

Make a chemical insecticide application on 5-day intervals

Carbaryl (Sevin)

Permethrin (Eight)

Rotenone

Resistance to carbaryl is increasing

Plants can be infected at any stage during the growing season

Symptoms may appear worst early in the season when plants are growing rapidly

Individual vines or whole plants wilt and die rapidly

At first, vines may recover at night

Interveinal chlorosis followed by necrosis

Bacterial Ooze

Identification

String test

Water test

Cut a wilted runner close to the crown of the plant

Place stem in a glass of water

Bacterial ooze will stream from the cut surface of infected plants within 5-10 minutes

Bacterial Wilt Management

Insect Control

Caution on the use of Sevin- Carbaryl is very hazardous to honeybees which are effective pollinators of cucurbits

Pesticide applications made at dusk may also be more effective at controlling the beetles

Sanitation

Use resistant varieties

Country Fair- pickling cucumber

Fusarium Wilt

Seed and soil borne fungus

Separate races are responsible for Fusarium wilts in different vegetables

Fusarium oxysporum f. sp. *melonis* (Fom)- melon

f.sp. *niveum*- watermelon

f.sp. *cucumerinum*- cucumber

Fom Fusarium Race 2 is the most widespread

Race 1, Maryland (1985)

Race 0, Texas (1987)

Highest infection rates at soil temperatures of 64-77° F

Dramatically declines above 86° F

Factors favoring infection

Low soil moisture

High soil nitrogen, especially NH₄ (ammonium)

Light, sandy, slightly acidic soil, pH 5-5.5

Young plants- damping off

Mature plants

Marginal yellowing, progressing to general yellowing of the older leaves

Temporary wilt which appears repeatedly in the middle of the day, initially, plants recover at night

Gradual or sudden collapse of the plant

Gummy, red exudate from stem lesions

Necrotic lesion developing at the crown of the vines

Vascular discoloration

Fusarium Wilt Management

Resistant varieties

Cucumber- ???

Melon- Angel (02), Apollo (123), All Star (123),

Earlisweet (2)

Watermelon- Crimson Sweet (0), Sangria, Sweet Favorite

<http://vegetablemndonline.ppath.cornell.edu/Tables/TableList.htm>

Crop rotation, 4 to 6 Years

Garden sanitation

Weed control

Cucurbit Virus Diseases

Squash mosaic

Cucumber mosaic

Watermelon mosaic 1 & 2

Zucchini yellow mosaic

Squash Mosaic Virus

Integrated Pest Management (IPM)

Biological

Mechanical

Cultural

Chemical

General Guidelines for Insect Control

Encourage strong, swift growth in new plants

Maintain plant vigor with proper irrigation and soil fertility

Preserve beneficial insect populations

Regularly inspect plants for potential problems

Identify the insects before trying to control

Remember- young insects are easier to kill than mature insects

Squash Vine Borer

1 generation per year

Overwinters as pupae in soil

Adults

Clearwing moth

Black body, marked with orange-red

Metallic green front wings

1 to 1.5 inch wingspan

Adults emerge from June through August to lay eggs on the underside of vines

May cause some rasping injury to stems

Primarily squash and gourds but cucumbers and melons also possible hosts

Larva is a wrinkled, white caterpillar with a brown head up to 1 inch long

Larva tunneling causes wilting

Hosts, in order of preference

Winter Squash

Hubbard

Marrow

Acorn

Butternut squash

Summer Squash

Pumpkin

Melon

Cucumber

Squash Vine Borer Management

Preventative treatments are best

Till soil in spring to kill overwintering pupae

Plant a very early crop of Hubbard squash as a trap crop

Split infested vines and remove the larvae

Destroy vines soon after harvest to kill remaining larvae

Apply an insecticide when vines begin to run

Re-apply every 7 to 10 days for 3 to 5 weeks

Spray the base of plants, at crowns and runners

Insecticides, dust or spray

Pyrethum

Rotenone

Sevin

Squash Bug

Adults are about 5/8" long, brownish black and winged

Usually 1 generation per year

Unmated adults overwinter in sheltered areas and fly to cucurbits when vines start to run

Dead leaves

Vines

Boards

Buildings

Hosts include squash, pumpkin, gourds and melons

Eggs

Yellowish-brown to brick red

Laid in groups or clusters in the angles between veins on underside of leaves

Hatch in 7-14 days

Nymphs are whitish to greenish-gray with red legs and antennae

and a green abdomen. A few hours later, red parts become black

Squash Bug Damage

Nymphs and adults suck sap from the leaves

Anasa Wilt of Cucurbits

Toxic saliva causes death of cells, browning of leaves and wilting of the plant

Vines turn black, crisp and brittle

Large populations can kill small plants or inhibit fruit production on large plants

Squash Bug Management

Sanitation

Remove all cucurbit plant debris from the garden in fall

Handpick adults and leaves bearing eggs when seen

Cover plants with floating row covers until blooming begins

Apply chemical control when insects first appear

Carbaryl

Rotenone is effective against young bugs, but not adults

Repeat applications are needed for best control

General Guidelines for Chemical Insect Control

Use the least toxic product that will give good control

Horticultural oils

Insecticidal soaps

Pyrethrins

Bacillus thurengiensis

Thorough plant coverage with the insecticide is essential

Higher water volumes help increase coverage

Use wetting agents or spreader/stickers if needed

Reapply as directed on the label

Resources

2007 Insect, Disease and Nematode Control for Commercial Vegetables, Extension Bulletin 312

2007 Weed control Guide for Vegetable Crops, Extension Bulletin 433

<http://web2.msue.msu.edu/bulletins/newpubs.cfm>

