virginia home food production

FACT SHEET

DEPARTMENT OF HORTICULTURE

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GREENHOUSE VEGETABLE SCHEDULES FOR VIRGINIA WITH ARTIFICIAL SOIL MIXES
(Includes possible vegetables-bedding plant combinations)

(1) Fall Greenhouse Tomatoes followed by spring tomatoes. Seeds planted June 30, transplanted into greenhouse beds August 1. Later crops give very low yields in Virginia due to slower maturity rate under short days and lower light intensity of mid-winter. Also, the mid-winter heat costs often equal the income from mid-winter tomatoes.

Plants are topped around Thanksgiving, all marble size fruit removed and the remaining fruit is forced to mature, usually by December 20. Plants are removed from the greenhouse in late December. Beds are dried down, and revitalized by the addition of recommended nutrients and left in preparation for the spring tomato crop. Seeds for the spring tomato crop are planted the first week of December and, due to short days and low light levels, will be large enough for transplanting March 1.

Do not force young transplants by overwatering or by keeping temperatures above 70° (day) or 60° (night). Give maximum light intensity. Remove spring tomato crops from the greenhouse in June or July whenever price of local field tomatoes becomes highly competitive bringing low prices.

(2) Fall greenhouse Tomatoes Followed by Mid-Winter-Early Spring Bedding Plants
Fall tomato crop handled as above and must be in the greenhouse bed August 1 to attain sufficient yields by late December. Old tomato plants removed in late December, beds revitalized by addition of recommended nutrients. Pansy seed planted December 10, transplanted into market packs by January 1 using 3" deep pansy till with spacing of app. 2 inches in all directions. Many pansy tills hold 6 plants well spaced. Transplanting is usually done immediately after removing tomato plants from bed, using the revitalized peat-vermiculite that was used for the tomato crop. The addition of about 5 lb. slow release fertilizer per cubic yard of peat-like mix is recommended plus occasional feeding of the pansy plants with water soluble fertilizer such as 20-20-20 at about 2 lb. per 100 gal. of water. Soon after transplanting greenhouse temperatures are dropped to 50° (day), 45° (night) or they may be carried at 45° (day and night).

Water only sparingly allowing plants to dry down near wilting point between waterings. Do not force pansies or soft, spindling growth will result. Plants are removed for sale in early April and house is readied for bedding plant

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production (petunias, marigolds, salvia, tomatoes, peppers, etc.)

To provide earlier greenhouse space than April 1, such as for early petunias, pansies may be removed in March to cold frames, well constructed to protect plants from direct wind.

(3) Short Fall Greenhouse Tomatoes, Followed by English Forcing Cucumbers, Followed by Spring Tomatoes. This system requires very good management ability, timing is critical, and this schedule should be attempted only by the experienced grower. Tomatoes are seeded June 15, transplanted into the greenhouse beds July 20. A high density spacing is used with plants spaced one foot apart in the beds, trained to a single stem, and topped immediately after the fourth cluster of fruit is visible. Plants are removed on December 1, beds revitalized, and the English cucumbers, suggested variety Toska, transplanted on December 5. Cucumber seed may be planted directly into jiffy pellets or peat-lite mix, 1 seed per pellet, on November 1. Greenhouse forcing cucumbers require special trellising, require no insect pollination, and must have night temperature of 60° and day temperature of 70° to realize a good yield and growth rate. This means a high mid-winter heat bill and this crop is not recommended for much of western Virginia or for sites receiving direct northerly winds which increase heat costs. The crop is removed in early March and the house is prepared for the main spring bedding plant business. For a spring tomato crop, cucumber plants are removed from the house in late February and tomatoes are transplanted into the beds, after revitalization of beds, on March 1. Tomato seeds for the spring crop must be planted in early December.

(4) Fall Greenhouse Forcing Cucumbers Followed by Spring Tomatoes or Bedding Plants (better in western Virginia than schedule No. 3). Cucumber seeds are started in jiffy pellets or peat cups filled with peat-lite mix on September 1 and transplanted into the beds on October 1 and house is covered immediately. Tight screens must be used on doors, over exhaust fan openings, over ventilating shutters, and any place where insects might enter. Bees or other insects must not be allowed in the greenhouse. They may pollinate the English forcing cucumbers resulting in unsalable gourd-like fruits. Day temperatures are kept in the 70's and night temperature in the 60's. The crop is removed from the greenhouse in late January or early February and the beds revitalized for the spring tomato crop or for the main spring bedding plant business. Tomatoes should be seeded in early December and placed in the greenhouse beds on March 1 for the spring crop. This system is highly recommended for the colder winter climates of western Virginia and may be terminated earlier in the winter if desired.

(5) Suggested Fertilization Rates for Peat-lite Soilless Culture of Greenhouse Tomatoes and for Forcing Cucumbers. To 1 cu. yard of 1/2 premium grade of Canadian peat moss and 1/2 mix of #2 vermiculite add the following: (eleven bushels peat plus eleven bushels vermiculite)

10 lbs. of 5-10-5 fertilizer
10 lbs. of dolomitic limestone
2 lbs. of 20% super phosphate. Also 1½ tablespoons of chelated iron and 6 oz. fritted trace elements, FTE 503.

After plants are transplanted into the beds, a regular fertilization program must be started. Generally, water soluble fertilizers such as 20-20-20 with

minor elements, at the rate of 1 lb. per 100 gal. of water, are used on a weekly basis. After the first crop of tomatoes and cucumbers has been completely harvested and the plants removed from the mix, it may be recharged or revitalized as follows:

Per cu. yard of mix in the bed, add the following and mix well with hoe, a small tiller, or by hand: 1 lb. of 0-20-0 super phosphate, 2 lb. K-Mag, of Sul-po-mag, 1 oz. of chelated iron such as FE 330, 6 oz. of fritted trace elements or FTE 503.

The use of 5 lb. of slow release fertilizer per cu. yard such as 3-4 month 14-14-14 Osmocote on the second crop is highly recommended. For the spring crop delay application until first fruit is visible on the vines. Only two complete crops should generally be grown in this mix unless it can be steam sterilized after the second crop. Proper sterilization is achieved only with steam and it must be heated to 180°F. for a full hour. If no soil borne diseases are present, some growers have been getting 3-4 crops from the initial mix before steaming.

Several greenhouse vegetable growers in Virginia have successfully used the Cornell University slow release formula developed by Dr. Ray Sheldrake in which all nutrients are added before the crop is planted and only water is used from then on. Quite often two complete crops can be grown from this initial fertilization. For growers interested in trying this method add the following materials to the 50-50 peat-lite mix per cu. yard:

12 lb.	domomitic limestone	
1 lb.	0-20-0 super phosphate	
1½ lb.	calcium nitrate	
5 lb.	7-40-6 mag. amp med. grade	
10 lb.	18-6-12 Osmocote - for spring crop, delay	½ Osmocote application until
1 oz.	chelated iron such as NAFE 330	fruit are visibly set on vines
6 oz.	FTE 503 (Fritted Trace Elements)	
5 lb.	calcium sulfate or Gypsum	

For forcing cucumbers it is recommended that potassium nitrate (13-0-44) be substituted for calcium nitrate. Cucumbers are heavy feeders of potash, requiring somewhat higher levels than tomatoes for best results.

Varieties and Yield of Greenhouse Tomatoes in Virginia

Michigan-Ohio Hybrid
Manapal
Tropic
Floradel
Tuckcross 533
Ohio W-R Strains

Grower experience in Virginia has shown that tomato plants seeded in late June and transplanted into the greenhouse no later than August 1 will often attain marketable yields of 8-10 pounds of fruit per plant by the end of the profitable season ending in mid-December. Later planted crops are generally near failures,

seldom yielding above 4-5 pounds of marketable fruit per plant, and may not pay the heating costs.

The spring crop transplanted to the greenhouse on March 1 will often go 14-16 pounds of marketable fruit per plant. Longer days, higher light intensity, and higher temperatures all favor the spring crop. Yield of greenhouse forcing cucumbers will often run 10-15 lbs. marketable fruit per plant or more, depending on management ability and length of season.

Read pesticide labels. Follow directions for proper use, storage and disposal. Trade and brand names are used only for the purpose of information and the Virginia Cooperative Extension Service does not guarantee nor warrant the standard of the product, nor does it imply approval of the product to the exclusion of others which may also be suitable.

Practices to Conserve Fuel in the Production of Greenhouse Vegetables

With rapidly rising fuel costs, shortage of fuels, and with possible allocations and rationing, greenhouse vegetable growers are in for hard times. Some potential new growers are unable to find a source of fuel, since most suppliers are not able to take on new customers with present supplies.

Growers generally realize that site selection for the greenhouse can greatly affect use of fuel. Placing the greenhouse on a site sheltered from prevailing winter winds greatly reduces the wind chill factor on the surface of the greenhouse covering, and will markedly reduce heating costs. If your greenhouse does receive winter winds, the creation of a windbreak (which does not shade the house) is helpful in reducing heating bills. While living windbreaks, such as pines, are growing into effective wind control size, a temporary windbreak behind the trees may be built of scrap wood slabs, 8 feet in length, put up vertically with 2 inch air spaces between slabs, to reduce wind blasts down to breezes. If the wooden slab "fence" is constructed tightly without air spaces, it will likely be blown down in heavy wind storms. It is also advisable to construct the windbreak 10-15 feet or so away from greenhouse to allow snow to settle out of the air coming through the 2 inch spaces between slabs, since your windbreak also becomes an effective snow fence. Also, should an occasional slab blow down it will not fall onto the greenhouse nor will the fence shade the greenhouse. Using locust posts about every 7 feet apart with two treated 2" x 4"'s running horizontally between posts, gives the framework on which the slabs are vertically nailed.

Other special energy crisis measures also include:

Using 2 layers of film on polyhouses separated by air inflation, using a very small, constantly-running blower fan. This can save 30% to 40% heat costs.

When possible especially on sunny days, do not raise your thermostats from night temperature up to day temperature. Let the rising sun bring up temperature naturally. Some crops, such as lettuce, are actually improved by this measure. Facing the greenhouse north-south will give it maximum exposure to sun-giving heat. Using an anti-fog, anti-drip spray coating on the innerside of the greenhouse covering will improve sunlight transmission and can improve plant growth at lower temperatures.

Keep houses as tight as possible - make certain all doors and ventilators fit tightly and do not allow cold air to seep in. However, do retain fresh air ven-

tilation for your furnace.

Consider using an overhead polytube ventilation system to circulate inside air, especially at the top of each furnace heating cycle to prevent hot air collection at the top of the greenhouse (where plants cannot use it).

Now more important than ever, have some emergency heat system ready on a standby basis. Some growers keep a wood burning stove ready, with vent-pipe-smokestack that will fit the present furnace outlet; others keep Salamander oil heaters handy, which also require no electricity. Either way, emergency heaters could keep you from short periods of otherwise freezing or below-freezing greenhouse temperatures. Use a thermalarm system wired to your home which is battery powered and will sound the alarm if temperatures fall low when power is off or fuel is gone.

Prepared by: C. O'Dell