



## ORGANIC PRODUCTION OF WATERMELONS

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Seedless and seeded watermelons can be grown without the use of agricultural chemicals, for organic markets. Compared to many other fruit and vegetable crops, watermelons are not heavily attacked by either insects or diseases. Natural controls can be used to protect watermelons from pests, especially if the field is less than ten acres in size. In organic production systems, weeds can be controlled by mechanical cultivation, by the use of natural mulches or by the use of biodegradable plastic mulch. Soil fertility for watermelon crops can be increased by additions of compost, animal manure, green manure cover crops and other natural fertilizers. Growers often receive premium prices for both seedless and seeded watermelons if they are certified as being organically grown.

The first step in production of organically grown watermelons is finding seed that is not treated with fungicides. Most commercial seed companies coat watermelon seeds with thiram, and other fungicides to prevent damping off and other seedling diseases. If the seed is pink, red, green or blue, it has been treated with fungicides and cannot be used for organic production.



Organic watermelons in tobacco greenhouse, near Lebanon, VA. (photo courtesy Scott Jessee)

### Natural insect control:

The single greatest natural control of watermelon pests is reduction of stress on the plants. Insects and diseases are most likely to attack watermelon plants that are stressed by being planted too early in cold, wet soil. Wait until the soil has warmed up to 70 degrees F before setting transplants out in the field. Other factors that cause stress for watermelon plants include acid soil, infertile soil, heat, drought, competition from weeds and mechanical injury. Once insect feeding begins, disease often follows.

A common problem in production of watermelons is early season infestation by green peach aphids. These aphids can transmit mosaic virus to the plants. They are most likely to be a problem in cool weather. An excellent natural control for both the aphids and the cool temperature is the use of floating row covers. The row cover serves as a physical barrier to the aphids and also provides a warm climate for the seedlings to get started growing. Watermelon growers will probably only want to use floating row covers just for the first 3 weeks after seedling transplants are set out in the field. The covers must be removed to allow pollination of the flowers by bees.

Other natural controls for aphids include insecticidal soap, hot pepper wax, garlic sprays, horticultural oil, rotenone, pyrethrum, ladybugs and lacewings.

The next insect pest that is most likely to be seen on watermelons is the cucumber beetle. These insects do not cause very much damage in watermelons. Cucumber beetles can transmit a disease called bacterial wilt to cantaloupes. Watermelons are generally resistant to bacterial wilt. If they show up early in the season, they can cause injury to young seedlings. If two beetles per plant are found on young watermelon seedlings, a spray application of pyrethrum or spinosad is advised. Growers are advised to follow label directions with caution when using them. The floating row covers can also block cucumber beetles from young seedlings. There is evidence that both aluminum mulch and red plastic mulch repel cucumber beetles. These materials are most useful in keeping down cucumber beetle populations when the plants are blooming and attempting to set fruit. Cucumber beetles interfere with fruit set because they actually eat the stamens and pistils of the flowers.

If the weather conditions become hot and dry, spider mites may infest watermelon fields. They can cause severe reduction of yields. Predator mites can be released in the field at the first sign of infestation to control spider mites. This is a relatively expensive treatment. Most organic growers attempt to control spider mites with spray applications of horticultural oil, insecticidal soap or hot pepper wax. A heavy rain controls them better than any human intervention.

### **Natural disease control:**

Organic growers should not have to worry about disease control in watermelon fields. The following conditions lead to disease problems:

- The fertility of the soil is out of balance and there are either too many or too few nutrients available to the plants. The soil pH is below 6.0 or above 7.0.
- Mechanical injury has occurred due to hail or reckless cultivation.
- Heavy rains fall throughout the growing season or the crop is grown under an overhead irrigation system.
- Uncontrolled populations of aphids are present in the field.
- Watermelon varieties are planted that do not have disease resistance.
- The field is poorly drained and the watermelon plant roots stay wet for extended periods of time.
- Watermelons are grown in the same field year after year.

The most common controls used against diseases in organic watermelon fields are mineral fungicides like copper and sulfur. A few biological fungicides have been developed in recent years but the cost of these materials can be relatively high. Sprays of copper and sulfur are effective in preventing disease but they are not effective in clearing up a disease once it becomes established in the field. If the grower plants disease resistant varieties, practices crop rotation, maintains balanced soil fertility and uses a trickle irrigation system rather than overhead irrigation he should be able to grow watermelons organically without using a preventive spray program. It is not a good idea to spray copper materials on any fields year after year because it can accumulate in the soil and cause harm to beneficial microbial populations.

## **Natural weed control:**

Common weeds constantly become resistant to chemical herbicides but no weed has ever become resistant to steel. Mechanical cultivation has been practiced in watermelon fields in the South for many generations with excellent results. This weed control method is most effective when one-month old transplants are set out to establish the stand. Mechanical cultivation can only be done two times before the vines begin to run. In this system, it is also necessary to use a hoe to control the weeds in the rows between the plants. After the vines run across the rows, organic growers just let the weeds grow. They often hand pull noxious weeds like jimsonweed or cocklebur to prevent them from going to seed. Most organic growers, who use hand hoeing and cultivation in growing watermelons, have many weeds in the field when the crop is ready to harvest. That doesn't matter if they also have many marketable watermelons in the field. Trickle irrigation systems can easily be used to provide water to the plants in this hoe and cultivate system. The irrigation tape or tubes should be laid down right up close to the plants, when they are set out in the field.

Many organic watermelon growers apply natural mulches such as straw, leaves or compost around the plants, after they become established, to control weeds. This practice is labor intensive but it conserves soil moisture, attracts earthworms and eventually enriches the field with organic matter and nutrients.

To control weeds all season with a natural mulch like straw, growers need to apply a heavy layer, about six inches thick. If the straw mulch is much less than six inches in depth, weeds will soon grow right through it. The weed control effectiveness of natural mulch can be increased dramatically through the use of paper. Roll out a four-foot-wide strip of paper over the bare soil where the watermelon row will be planted. Apply a four-inch layer of straw on top of the paper. Set watermelon transplants, right down through the straw, in a hole made through the paper.

Another way of controlling noxious weeds such as Johnsongrass, wiregrass and field bindweed without using Roundup is heat. Weed flaming, with a propane burner, is cost effective, labor effective and does not bring dormant weed seeds to the surface. Flaming does not set weeds on fire. It uses the searing heat of ignited propane gas to "boil" the water in the cells of the plant. This causes the cell walls to burst. Several backpack and hand-held flamers are available for sale from organic farming supply catalogs.

## **Fertilization:**

Watermelons, like all of the cucurbits, grow best in soils that have a high organic matter content. The ideal organic fertilizer for watermelons is cow manure which has been composted with straw. Certain organic certification agencies do not allow applications of animal manures onto fields, right out of the barn. This makes sense. Applying poultry litter in the field beside growing crops is about the same as an application of ammonium nitrate fertilizer. It is a hot, strong fertilizer. There is some danger of salmonella food poisoning from fresh vegetables grown in fields where fresh "straight" chicken litter has been applied. That chicken manure can also be washed out of the field by rainwater and pollute streams. Whenever possible animal manures should be composted with a carbonaceous material, before it is applied to land, for production of watermelons. Application rates should be based on soil test results.

Soil fertility for seedless and seeded watermelon crops can be increased, very economically,

Cover crop	Seeding Rate lbs/acre	Planting Date
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through the use of green manure cover crops. Winter annual legumes such as Hairy Vetch and

Crimson Clover should be planted in September. In temperature zones 7-9, another good winter annual is Austrian Winter Pea. This cover crop is not winter hardy in zones 3-6. These legumes, if inoculated with the appropriate strain of Rhizobia bacteria, may fix from 60 to 120 pounds of actual nitrogen per acre, over the course of an eight-month growing period. These cover crops should be mowed down when they start to bloom in April. It is especially important to kill the vetch, either by mowing or by disking, before the plants set seeds. Hairy vetch produces hard seed that can become a pernicious weed problem in subsequent crops, if it is left unattended.

Another way to increase the fertility of the soil is to grow organic watermelon crops in rotation with legume field crops. The farmer can grow the forage type of soybeans for hay or grazing one year and follow up the next year with watermelons. Those soybeans will smother weeds all during the growing season and leave nearly 200 lbs. of nitrogen in the soil, fixed in nodules on the roots. Some of this nitrogen will mineralize and leach out of the soil during the winter months but plenty enough will still be available the next year for the watermelons. Watermelon crops grow very well in fields that have been taken out of alfalfa or red clover/orchard grass hay crops. Even crops of peas or snap beans, grown the previous year, contribute to melon crops that follow.

Table 1.

Partial list of winter annual legume cover crops.

Cover Crop	Seeding Rate (lbs./acre)	Planting Date
Hairy Vetch	35-45	9/10 - 10/10
Crimson Clover	20-30	9/1 - 9/20
Austrian Winter Pea	60-90	9/10 - 10/10

A vast array of organic fertilizers, are sold through farm supply catalogs and over the counter at farm supply stores. Guano, worm castings, fish fertilizers, kelp meal, blood meal, bone meal, and gypsum are just a few of the most credible ones. All decisions about organic fertilization should be based on soil test results and should be heavily influenced by economic analysis. Growers can ask themselves, "How much does a pound of nitrogen or potash or phosphorus cost when I buy this bag of material? Is there a cheaper source available to me?" Two products that are used heavily in organic farming are Greensand for potassium and Rock phosphate for phosphorus. Both are mined right out of the earth. Many of the more expensive other fertilizers are useful in growing transplants. They are also often used to correct deficiencies of minor elements in the field. Some growers may want to buy these products to reduce diseases or nematodes in the soil.

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