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## Floating Row Cover: An organic gardening tool that improves plant growth and excludes pests

Floating row cover (FRC) is a white, light-weight, non-woven fabric made from spun-bonded polyester or polypropylene. It has a “gauze-like” appearance and resembles interfacing material used in sewing. Vegetable farmers and gardeners drape it over and enclose plants -- individuals, rows, or groups -- and secure it to the ground with sod pins, boards, bricks, sand bags, rocks, or soil. The cover “floats” directly on top of the crop. The growing plants push the cover up, if you give it enough slack. Alternatively, you can erect simple frames to support FRC above your plants. Air, sunlight, and water can penetrate the material.

### Why use it?

1. Frost protection in the spring and fall due to increased temperature under the cover.
2. More rapid plant establishment and growth in the spring and fall due to increased temperature and humidity under the cover.
3. Creates a shield around your plants keeping insects, rabbits, deer, birds, and groundhogs from feeding on your plants.
4. Relatively inexpensive at 2.5 to 4 cents/sq. ft. Can be re-used two to three years.

### What kind of row cover should I buy?

Floating row cover is available in many widths, lengths, and weights:

- Light-weight FRCs (around .5 oz./sq. yard) are marketed as “insect barriers,” have 90%-95% light transmittance, 2°-6°F. of frost protection, and can be left on many crops (e.g., beets, snap beans, salad greens) from seeding to harvest.
- Heavy-weight FRCs (1.5-2.2 oz./sq. yd.) are usually

used to extend the growing season in spring and fall, allow 50%-70% light transmittance, and 4°-10°F. of frost protection.

FRC can be purchased through mail order seed and garden supply companies and at some local garden centers. Some brand names are Remay and Agribon.



*Closeup of floating row cover*



*Closeup of light and heavy weight floating row covers*



Large quantities come on a bolt; cut to size with scissors. Small quantities can sometimes be found in retail stores

Conducting an internet search on “floating row cover” will yield many suppliers. FRC can be most easily cut to size using sharp scissors.

### How do I use it?

- FRC can be draped directly over plants and held to the ground with rocks, boards, bricks, or sod pins. Leave enough slack in the row cover so that growing plants can push it up. This works well for single rows of plants (e.g., broccoli) or wide rows or beds (e.g., lettuce, spinach, Asian greens).
- Build a re-usable frame from wood, pvc pipe, #9 wire, or other available materials to support FRC. This works well for single rows of tomato, pepper, and eggplant.



Fall greens under FRC

Below is a brief guide for using FRC with specific vegetable crops:

#### Group 1- tomato, pepper, eggplant.

These upright plants require some type of frame to raise the cover above the plants (see “Two Frames for Supporting FRC” below). Cover these warm-season



Nice low tunnel at a Kent Co. school garden protecting spring crops

crops as soon as they are transplanted. Remove the cover when plants begin to flower. You could also simply drape the row cover directly over the plants without any frame. Just leave enough slack for the plants to grow up and remove the cover when it's time to cage or stake your tomato plants. FRC will speed the growth of these plants and protect from damaging flea beetles, cutworms, Colorado potato beetle, and aphids in the spring.



Pepper and eggplant getting a fast, protected start under FRC



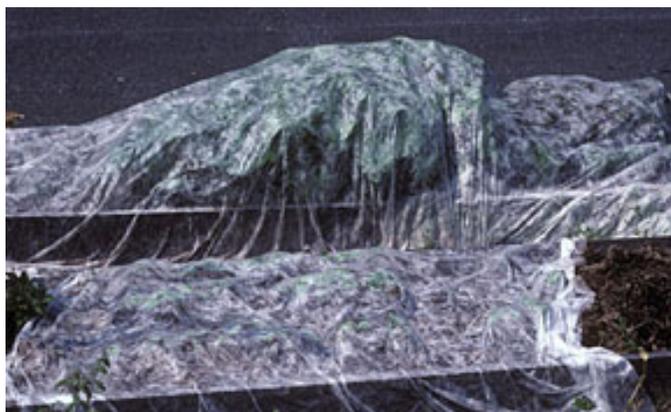
Protecting eggplant under a frame

**Group 2- summer and winter squash, cucumber, pumpkin, watermelon, muskmelon/cantaloupe, lima bean**

Cover these warm-season crops as soon as they are planted or transplanted. FRC must be removed once they start to flower because these plants require insects to pollinate flowers and produce fruits. Some gardeners remove the covers from 8am-noon each day when flowering begins and bees are active, and place the covers back on after noon. FRC will speed growth and protect plants from cucumber beetle, squash bug, squash vine borer, squash beetle, and aphids

**Group 3- lettuce, spinach, arugula, radish, carrot, Asian greens, radish, broccoli, cabbage, cauliflower, snap bean**

Leave FRC on these cool-season crops March-May and mid-September-Thanksgiving. FRC can be used over salad greens from planting through harvest. Check temperatures under the covers if these crops are growing from mid-June-August. FRC significantly speeds the growth and increases the productivity of these crops. It also excludes bunnies, cabbageworm, aphids, harlequin bug, and Mexican bean beetle.



Mature lettuce pushing up FRC

The flowers and fruits of bean, tomato, and pepper will abort to some degree when daytime temperatures top 90° F. because temperatures under the cover may be 5°-15° higher. Reducing the air movement needed for pollination may also contribute to reduced fruit set. Disease problems may be worse under FRC left in place through the summer months because of increased humidity and reduced air movement. Remove FRC from these crops when they start to flower.



Lettuce over-wintering under FRC

**Group 4- mustard, kale, collard, Swiss chard, beet, potato, pole bean**

Cover these crops as soon as they are planted or transplanted. FRC gets these crops off to a strong start and protects against frost and various insects. FRC can become difficult to use when these crops get tall. Also, many of these crops grow through the hottest part of the growing season and it may be necessary to remove the covers by mid-June to prevent heat build-up and disease problems.



Spring greens under FRC

## **Group 5- strawberry**

FRC must be removed once plants start to flower because strawberry requires insects to pollinate flowers and produce fruits. Covering plants in late fall through bloom time will help protect crowns from damaging winter wealth and hasten growth in the spring.

### **Maintenance- water, weed, and harvest**

Weeds grow faster under FRC. Be prepared to pull FRC back to hand-pull or hoe out weeds. Or lay down an organic mulch (e.g., sections of newspaper covered with last fall's shredded leaves) before installing FRC. You can water your plants through FRC if it's laid directly on the crop. If using a frame to support FRC, it's better to lift it to water around plants or use drip irrigation or a soaker hose. Simply lift the cover back to harvest and replace the cover to continue protecting your plants. To re-use FRC next year store it indoors in plastic bags or containers. Mice will nest in stored FRC if left in a shed, barn, or garage.

### **Disadvantages of FRC**

- Pest insects can become trapped under FRC, especially aphid, whitefly, mites, and thrips. Pests that overwinter in the soil near host plants could emerge the following spring under the cover (e.g., root maggots, flea beetle , Colorado potato beetle).
- Can abrade and injure stems and foliage during windy weather.
- Difficult to use on tall plants.
- Temperature under FRC can increase dramatically (5-15°F.) above outside temperature.
- Must be removed from members of the squash family when plants flower.

### **Two tall frames for supporting FRC**



*For a planting bed: 2' wide x 18' long (42" to top of hoops)*

### **1: PVC low tunnel**

Hammer ten, 2 ft. long pieces of 3/8 in. rebar, 10 inches into the ground along each side of the planting row.

The five sets of rebar are there to support five pvc bows. To give the first and last plants a little extra room add one foot to each end of the low tunnel. This gives a 5-ft. space between the 1st and 2nd bows and the 4th



*Drive the rebar 10-12" into the ground, leaving about 14" above ground*



*Sliding the pvc down over the rebar*



and 5th bows, and 4-ft. spacing between the 2nd and 3rd, and 3rd and 4th bows. Cut ten, 10 ft. long pieces of 1/2 in. pvc water pipe into 8 ft. long pieces and insert them over the rebar to make five bows.

Connect the bows at the top with stretchy clothesline and along each side with some nylon twine. Drive one stake next to each tomato or pepper plant for support and cover the tops with duct tape to prevent tearing of the row cover. The stakes should be no more than 40 in. above ground level. Cut and drape a piece of 22 ft. long X 10 ft. wide row cover over the frame, and secure it to the ground with sod pins.

## 2: A-frame



*For a raised bed: 3' wide x 8' long x 4' high*

Drive a 6 ft. metal fence post 2' into the ground at either end of the raised bed and connect the posts with a piece of wire. (We used 17 gauge electric fence wire.) Fasten pieces of wire from the top of each post to the corners of the raised bed to create the "A" and provide

support for the FRC. Cut a 12' x 10' piece of FRC and drape it over the top wire and pull the excess fabric around to close off the ends. The top of the wire is 4 ft. from the ground so you can drive plant support stakes next to each plant directly below the FRC. Secure the FRC with sod pins or boards.

You can alter dimensions and construction techniques to suit your situation. Cut costs by reusing and recycling materials around your home. The useful life of pvc pipe and rebar is at least 10 years. Row covers will need to be replaced every 2 -3 years. We will update this fact sheet periodically with new information. Send us photos and descriptions of your FRC techniques and experiences to [groweat@gmail.com](mailto:groweat@gmail.com).

### References:

[Row Covers for Vegetable Gardens, Washington State U.](#)

[Row Covers for Tomatoes, Iowa State U.](#)

[Row Covers, Kentucky State U.](#)

[Season Extension Techniques for Market Gardeners, ATTRA](#)

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