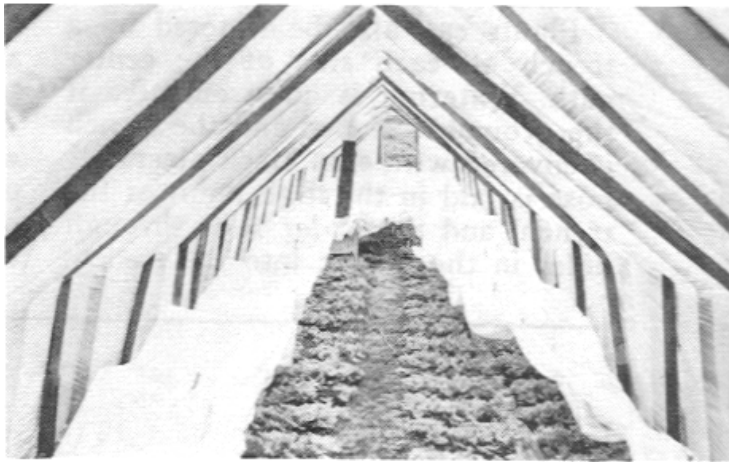


# *New Look in* **FIELD GREENHOUSES**

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At Kentucky Agricultural Experiment Station, they have found a way to build cheap, low, unheated houses in the field for forcing crops early and late in the season. Polyethylene, in thin grades, is used on wood frames. Though short-lived, it will last for one season and is easy to replace. The framing should last for five or



**Figure 1 Interior of field house shows plastic stretched over**

more years if properly treated against ground rot.

Field houses have been used successfully for forcing crops such as tomatoes and lettuce; production costs are less than a conventional greenhouse. Plastic houses also keep excess rain from lowering the quality of the crop. In a winter climate similar to Kentucky, lettuce can be forced in plastic houses. Light freezing occurs when outside temperatures fall below 10°F, but it will not hurt cool-season crops such as lettuce.

Frames of the field greenhouses are made of 1-inch x 1 ½ inch x 6-foot pieces for rafters and 1 inch x 1 ½ inch x 3 ½ foot pieces for side posts. The posts are placed every 2 to 4 feet according to the thickness of the plastic. The posts should be driven into the soil about 1 foot. If the soil is loose, longer posts should be used.

No center posts are used except at ends of the field house.

If a heavy snow is likely to be a problem, 1-inch x ½ -inch x 6-foot pieces should be temporarily placed in center every 10 feet and slanted to the edge of the center walk so the walk is not obstructed.

A No. 11 gauge wire is pulled tightly from the ridge of the first set of wood rafters along each ridge and stapled. The first and last sets of rafters are supported by braces from each 6-foot rafter to the soil. Make two braces, one on each side of the center walk at each end of the house.

The house can be 30 to 150 feet long. Shorter or longer houses are not as practical. Lower houses save heat but are harder to work in.

A support is driven in the soil and fastened to the end rafters on each side of the center walk to make a door at each end of the house. A frame door can be made to swing on hinges, but a roll-type door without hinges is adequate. The plastic forms a continuous hinge. A 1-inch x 2-inch stake should be fastened to the edge of the plastic. The door then can be opened by rolling it on the stake. Rafters should be

placed 2 feet apart for 2-mil plastic, 3 or 4 feet apart for 4-mil thickness. A 10-foot wide sheet of plastic is stretched tightly to each side and fastened by 3/8-inch x 1-inch laths. If an inner layer is to be applied, it will have to be done before the outside layer is put on. To securely fasten the plastic, nails should be placed every 2 to 3 feet along the rafters. Nails should be placed closer together on plastic that "runs." The top 1½

The field house crops can be watered with inexpensive traveling sprinklers, such as Rain King (Model K20), manufactured by Sunbeam Corp., 5600 Roosevelt Rd., Chicago 50, IL. These distribute water evenly and can be set to water as wide an area as desired. A small water motor winds up a steel tape and causes it to move at the correct rate for the width being watered. Plants can also be watered by a trench on each side of



**Figure 2** These plastic field greenhouses near Lexington KY have been used successfully to force crops.

feet of plastic on the south or east side is not nailed; plastic on the north or west side is nailed to the top. The plastic should project a few inches above the rafters on each side.

To make a dead air space, a ¾ mil 10-foot wide layer of plastic is woven under two rafters, 2 feet apart, or one rafter 4 feet apart, and over one rafter. If this plastic is stretched tightly, the top lath on the rafter over which the lining is placed will hold it taut. The inner layer should be pinned to the outside layer at the top. At the bottom the thin inside plastic should be placed in a shallow ditch and covered with soil. This makes a dead air insulation at the soil level as well. Leaving the plastic unfastened on the south or east side provides ventilation when necessary. When 2-foot rafter spacing is used, the loose plastic is not fastened; when wider rafter spacing is used, the plastic can be nailed and the end doors used for ventilation. About 6 inches of plastic should lie in a shallow trench along the edges of the field house. This is covered with soil 3 inches deep in cold weather. Narrow strips of black plastic should be used to keep down weeds along the edges. If self-watering is to be done, the trench should not be completely filled with soil.

the center path. Watering is quite effective if the ground is sloped and the trench is covered with thin black plastic. A hose is laid in the high point of the trench, and the water runs through holes in the plastic into the trench. A system of trenches can be used to run rainwater back into the house.

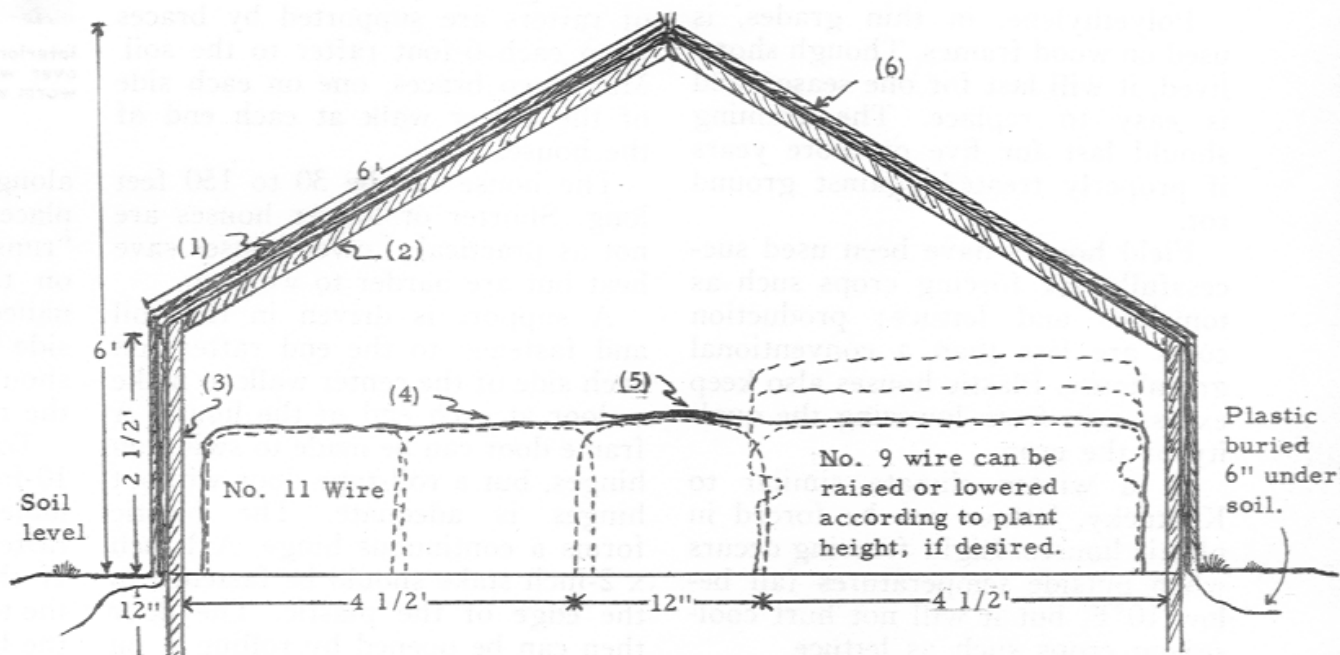
A second dead air space is necessary to protect plants where near zero temperature occurs. The plastic is put on wire, No. 9 is stiff and resists water pocketing well. Some water accumulates on the plastic in cold, damp weather even if no leaks are present. The wire wickets, about 2 ½ to 3 feet high, are placed every 3 to 4 feet. Two 8-foot sheets of ¾ mil polyethylene are used for low crops or two 10-foot sheets for high crops. The first layer is placed loosely over the wires. The second layer is pulled tight and pinned to the wires. The front sides should not be pinned so the layers can be laid back in mild weather. The edge of the plastic should touch the soil on both sides of the wickets in cold weather. These inner layers should last several years with proper care.

About 30 field houses are in operation outside Lexington, Ky. Bibb and leaf lettuce has produced well and has brought good prices. The

first lettuce, ready about the end of March, brought \$3 for 10 pounds of leaf and \$2.50 for 5 pounds of Bibb. Bibb stayed about the same price in April but leaf used brought \$3.50. This income was about 50 cents a square foot for the field houses.

In June, tomatoes brought 30 cents a pound. While only a few pounds per plant were

sold for this price, the income was also about .50 cents a square foot. The framing, including labor, was about 7 cents a square foot. Plastic for all layers was about 5 cents a square foot. The crop paid for plastic, framing, and labor and left 82 cents a square foot for other costs which were only a small fraction of the total, thus providing a wide margin of profit.



### FIELD GREENHOUSE

Legend:

- (1) 2 mil plastic
- (2) 1" x 2" x 6' rafters or sashbars
- (3) 1" x 2" x 3 1/2" side posts driven in ground 1"
- (4) Wire support for 3/4 mil polyethylene
- (5) Small wicket over path to hold up plastic lapped at middle of wicket over path.
- (6) No nails are used for 2 1/2' from top on south or east exposure to allow the pulling down of plastic for ventilation.

Trials on heat conservation show that when the plastic is lapped over the walk the temperature inside is kept several degrees warmer due to the heat given off by the packed walk. Temporary wickets support the plastic well, but if a spring-type clothes pin is used, the plastic can be pinned together without wickets, if one desires to keep the path free, especially if the wickets must be high. On low crops, the wickets can be readily stepped over. A fan in the middle of the house, drawing air from the outside and blowing it under the inner cover, is highly desirable. This lessens the need of opening and closing the inner dead-air space. The fan should be run at all times except on very cold nights.

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