Bell Pepper Production

In Mississippi

Fig. 1. Temporary bed for growing plants.

Fig. 2. Permanent type plant-growing structure.
BELL PEPPER PRODUCTION IN MISSISSIPPI

By STEVE L. WINDHAM

Bell peppers have been grown in Mississippi for more than 50 years. The bulk of the crop is grown for the mature green fresh market, with smaller acreages for the pickling and the mature red industry. Practices reported in this publication are primarily for production of mature green fruit but most of them are also applicable to other types of production. This material is a summarization of results obtained at the Truck Crops Branch Experiment Station.

Variety Selection

Keystone Resistant Giant is the recommended variety for upland soils similar to those at the Truck Crops Branch Station. This is especially true when earliness is a factor and large, smooth fruit with thick walls are desired. On bottom soils where earliness is the major objective, Early Calwonder should be planted. In both locations if large total yields are more important than earliness, Yolo Wonder L or Yolo Wonder B should be used. Where production has been good during the first part of the season but declined from midseason on, it may be well to plant a combination of one of the early varieties and the later maturing varieties. This provides a more uniform yield throughout the season.

All varieties named produce fruit acceptable to the trade. The fruit wall of Early Calwonder is not as thick as for the other varieties. The fruit of Yolo Wonder B has a greater tendency to be tapered and misshapen when grown under conditions other than ideal. While this detracts from the appearance of the finished pack, the large total yields often offsets this disadvantage. Yolo Wonder L produces the largest fruit but is three to seven days later than varieties named.

Foliage of the Yolo Wonder strains and Keystone Resistant Giant is denser than that of Early Calwonder or California Wonder. This prevents sunscald, but is detrimental during an outbreak of bacterial spot. Keystone Resistant Giant and the Yolo Wonder strains have resistance to tobacco mosaic.

Plant Production

Seed must be sown in a protective cold-frame or hotbed for plants to obtain adequate size and be ready to transplant as soon as the chance of the last killing frost has passed.

The temporary bed in Figure 1 is least expensive and good plants can be produced with proper precautions. However, since it has no supplementary heat, seed must be sown about 12 weeks before transplanting time to insure adequate growth. The chance of damping-off is greater and low outside temperatures (15 to 20° F.) may severely damage plants. This type bed is covered with both a sheet of polyethylene and cloth until the seedlings emerge. The polyethylene is used on sunny days to trap heat and speed germination. When plants have emerged this sheet is removed and only the cloth cover is used. When below freezing temperatures are expected, the use of double cloths and/or supplementary covering such as pine or grass straw is necessary.

The permanent bed (Fig. 2) is more expensive but also more reliable. Heat is supplied by electric heating cable. The cover is 3 by 6 feet glass sash. Plants can be grown to transplanting size within 8 weeks as seed germinate earlier when minimum soil temperatures are maintained at 65 to 70° F. No additional protection is needed except during extremely low temperatures. To reduce initial cost, cloth covering may be substituted for the glass sash and the framework can be made of wood.
Regardless of type of structure used, new leaf mold and/or a sandy loam soil should be used. Soil should be treated with a temporary soil sterilant, such as Vapam, Mylone or Bedrench¹ to prevent weeds and disease problems. Directions on containers should be followed.

Seeds are sown at the rate of 4 ounces per acre to be set and can be sown either broadcast or in rows. The rate for broadcast is 6 ounces per 36 square feet, and 4 ounces when planted in rows spaced 3 inches apart. Either method is satisfactory. A larger number of plants are produced per square foot when seed are broadcast but the chances of loss from damping-off is less and generally sturdier plants are obtained when seed are planted in rows. Seed should be covered with ¼ to ½ inch of treated soil or new leaf mold, then sprinkled lightly until moisture is adequate. Additional water added during mid-morning on a sunny day, helps prevent wide fluctuation in soil temperatures. The beds can remain open until excessive moisture has dried. On warm days when little or no wind is present the cloth covering or sash is removed from the beds. Under less favorable conditions sash are cracked alternately at top or bottom or the ends of the cloth are propped open. On cool windy days ventilation is away from the wind.

Soil Selection and Preparation

The first point is to be sure that good internal and surface drainage are evident. Poorly drained soils are often responsible for crop failure. A good pepper soil should be relatively high in organic matter. A well drained silt loam soil will require less management than a heavier clay soil or a lighter sandy soil. As a sanitary measure in controlling diseases, avoid soils on which peppers, tomatoes, Irish potatoes, beans, cantaloupes, etc., were grown on just prior to this crop.

Proper soil preparation is necessary for all vegetable crops. Once plants are set to the field little can be done to counteract poor soil preparation. The soil should be broken as deep as possible with conventional equipment, without turning up excessive raw subsoil. On a shallow topsoil, subsoil at rate of one-inch or so may be added. Following breaking and bed preparation the surface should be made loose and friable by harrowing. On heavier soils and soils compacted by rain between preparation and transplanting it may be necessary to use a disc harrow.

Fertilization

Soil reaction is not as important for pepper as for certain other crops. However, complete crop failure has been observed where peppers were planted on strongly acid soils (pH 4.6 to 4.8). Soil should be tested and lime added if pH is lower than pH 5.5.

Initial fertilizers should be applied at least two to three weeks prior to transplanting. Apply all pre-transplanting fertilizer in band in the center of row and cover as the row is being prepared.

Experimental results indicate that soils low in phosphorous and potassium require 100 to 160 pounds phosphoric acid (P₂O₅) per acre, 60 to 80 pounds of potash (K₂O) per acre, and 60 to 80 pounds of nitrogen (N) per acre. If ready-mixed fertilizer is preferred, a 1:2:1 ratio at rates to supply these requirements is satisfactory. On soils with higher levels of phosphorous and potassium, rates can be reduced considerably. In some instances rates of one or both of these plant nutrients can be reduced as much as 50 to 75 percent, on the basis of a soil test. Results in Table 1 were obtained on a soil testing extremely high in phosphorous (373 lbs. of P₂O₅ equivalent per acre). This shows that with a high level of phos-

¹Trade names of material manufactured by E. I. DuPont de Nemours and Company, Union Carbide Chemicals Company, and Food Machinery and Chemical Corporation.
phorous in the soil, rates can be reduced to 80 pounds of \( \text{P}_2\text{O}_5 \) per acre and still maintain maximum early yields. No difference in total yields were recorded regardless of treatment.

Additional nitrogen (32 pounds per acre) should be applied as a sidedressing at the time the first fruit are being set. Often following excessive rainfall or frequent irrigations and with a heavy set of fruit, an additional application of 32 pounds nitrogen is necessary after the second or third harvest. Neither early nor total yields have been significantly influenced by a given source of nitrogen.

Transplanting and Cultural Practices

Plants are removed directly from the growing structure to the field. They should be 6 to 8 inches tall. Smaller or larger plants can be used but require greater care at transplanting. Plants are removed from the bed and roots “muddied” with a slurry of soil and water just prior to setting. Weak and leggy plants and those showing abnormality should be discarded.

Plants should be spaced 16 to 20 inches apart on rows 42 inches wide which are approximately 4 to 6 inches high after harrowing. Either hand setting or use of a transplanter may be employed.

After plants have become established, cultivation should be frequent enough to keep them weed free. At the time of sidedressing and with each cultivation thereafter the soil should be worked to the plant to support the main stalk and prevent lodging.

Irrigation

Irrigation is a must for pepper pro-

Table 1.—Influence of phosrous application on U. S. No. 1 Bell Peppers.

<table>
<thead>
<tr>
<th>Materials</th>
<th>Lbs. per acre</th>
<th>\text{N}</th>
<th>\text{P}_2\text{O}_5</th>
<th>\text{K}_2\text{O}</th>
<th>1st. harvest</th>
<th>1st. &amp; 2nd harvest</th>
<th>Total 7 harvests</th>
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<td>60</td>
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<td>142</td>
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<td>423</td>
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Diseases and Insects

No attempt will be made to offer controls for all diseases and insects which occur on peppers in this bulletin. Preventive controls and recommended practices for the major diseases and insects will be listed. For description of diseases and causal organisms use Mississippi Agricultural Experiment Station Bulletin No. 453.

Bacterial spot (\textit{Xanthomonas vesicatoria}) and Tobacco Mosaic (\textit{virus}) are the two diseases which inflict the greatest damage in this State. The use of disease-free seed and soils on which no tomatoes or peppers have been grown for the past three years helps to prevent the incidence of these diseases. A seedbed spray schedule using a mycin preparation such as Agrimycin 100 and/or Agrimycin 500\(^2\) should be used at regular intervals as directed on container. However, once bac-

\(^2\) Trade names for formulations of streptomycin and oxyteracycline manufactured by Charles Pfizer and Company, Inc.
terial spot occurs in the field no spray material at the present writing is effective.

To prevent the spread of mosaic (virus), plants should be sprayed with milk (dry or fresh) 24 to 48 hours before transplanting. All plant handlers should thoroughly wash hands with soap and water between smoking and handling of plants. Resistant varieties are Yolo Wonder B, Yolo Wonder L, and Keystone Resistant Giant. Their use is an effective method in preventing tobacco mosaic. Aphids must be controlled both in plant bed and the field.

The major insect problems are aphids, cutworms and tomato and tobacco hornworms. Aphids and early outbreaks of hornworms can be controlled with para-thion as a one percent dust or spray. After fruit is set the use of malathion is recommended. During harvest season phosdrin should be used. In all instances these materials should be applied when the foliage is dry and according to directions supplied by manufacturers. Cutworms often cause severe damage at transplanting time. Toxaphene as a dust or spray is effective. This material is applied to the soil on top of the row just prior to transplanting at a rate of 10 to 15 pounds of 20 percent dust. If a spray is used, add spray mixture at a rate to apply two pounds of actual material per acre.

Harvesting

An experienced picker recognizes a mature green fruit by its outward appearance. For the less experienced the color, firmness of fruit, and ease with which the fruit snaps from the plant must be considered.

Just prior to reaching the mature green stage the color of the fruit changes from yellowish light green to medium or dark green. The fruit walls are firm and will not give when a slight pressure is applied. The fruit also snaps from the plant readily when pulled. Harvest intervals often depend on weather. However, once the harvest begins, peppers should be picked every five to seven days.

Bushel baskets, hampers, or other convenient containers are used. Care should be taken to prevent damaging of the fruit as it is picked and removed from the field. Defective fruit should be discarded at the field.

Once removed from the plant, peppers are not exposed to the sun for any length of time. If packing is to be done at the farm the fruit is washed to remove any foreign material. Only sound, well-shapen to slightly misshapen fruits are used. No fruits are used where the wall has been penetrated by mechanical, insect, or disease damage. The fruit should be free from sunscald, freezing, or hail damage. Unless otherwise specified no fruit is classified as U.S. No. 1 unless the minimum dimensions are 2½ inches in diameter and 2½ inches in length.

Bushel baskets (30 lb. net) and bound crates (1 1/8 bushel) are normally used for marketing mature green peppers. Fruits are placed at random in containers to give a snug fit up to the top layer. All fruit on the top layer are placed to give a smooth and even fit with the blossom ends up. No fruit are used in this layer that detract in any way from the over-all appearance of the pack.