Agronomic Spotlight

Seminis grow forward

Production Practices for Pole Cucumbers

» Trellising can be an economically viable practice for cucumber production in both field and protected culture systems.

» Yields tend to be higher and disease levels tend to be lower in pole cucumbers as compared to ground-grown cucumbers.

» Hand harvesting is easier and less vine damage usually occurs during harvest with pole-grown cucumbers. This helps extend the harvest season.

For field production, most cucumbers are grown on the ground, meaning that their vines spread across the soil or mulched bed surface without any trellising or vertical support. Pickling cucumbers for processing are always grown on the ground to allow for mechanical harvesting. Trellising systems are frequently used in greenhouse and high-tunnel production; however, many growers are starting to use various trellising (or pole) systems to produce fresh market, slicing cucumbers in the field.[1]

Advantages of Pole Systems

There are additional expenses associated with pole systems, including the costs of the materials used for the trellis system. The need for labor and the associated costs are also substantially higher with pole systems. In addition, pole systems often use monoecious cucumber varieties, while ground-grown systems use primarily gynoecious varieties. The seed of monoecious varieties are typically more expensive than gynoecious seed, which is an additional expense. The higher costs associated with pole systems are often offset by the increased yields seen with these systems. The yields of pole-grown cucumbers can be two to three times the yields seen with ground-grown cucumbers.[2,3] Research trials have shown that both total and marketable yields increase with trellising, although the average marketable fruit weight is not usually affected.[4]

The fruit quality of pole cucumbers is usually higher, in part because the fruit do not sit on the ground or come into contact with the soil (Figure 1). The fruit of pole cucumbers are usually cleaner, have a straighter shape, are more uniform in color, and do not develop a yellow belly (yellow ground spot). Pole cucumber fruit are usually more consistent in size and quality with fewer jumbos and culls.[1,2,3] Pole cucumbers are usually easier to harvest by hand, and there is often less damage to the vines during the harvest of pole cucumbers.[2,4]

One reason for the higher yield is a general reduction in diseases on foliage and fruit of pole cucumbers as compared to ground-grown cucumbers.[3] Trellising results in more effective disease and insect management as the vertical growth allows for better penetration of the canopy by fungicides and insecticides and for better distribution of pesticides on leaves, fruit, and stems. The increased air

Figure 1. Cucumber fruit hanging from trellis netting.

circulation and lower humidity levels within the canopy are also less favorable for disease development. Studies have shown lower levels of Phytophthora fruit rot on pole cucumbers as compared to ground grown cucumbers. The incidence and severity of other foliar diseases and Rhizoctonia rot have also been shown to be lower on pole cucumbers.[2,5]

Production Systems

A common trellising system for field-grown cucumbers involves installing posts or poles no more than 15 feet apart along each row of cucumber plants (Figure 2). The poles are usually 6 feet high with a No. 8 wire running along the top of the poles and a No. 12 wire running along the bottom of the poles. Plastic twine or netting is tied between the two wires at each plant.[1,2] The top wire can get hot when exposed to the sun, and this can burn the cucumber vines that are in contact with the wire. For this reason, some growers opt to use woven nylon mesh instead of wire to run along the tops of the poles.[4]

These types of trellising are used with both bare-ground and plasticulture production systems. Bare-ground systems

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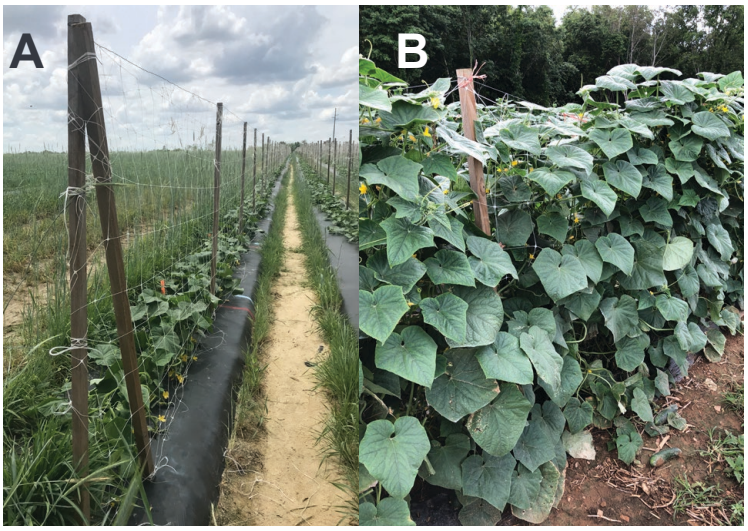

Figure 2. (A) A cucumber trellis system using a net suspended between regularly spaced poles. (B) Vines cover the trellis later in the season.

are often direct-seeded with between-row spacings of 30 to 72 inches, and within-row plant spacings of 5 to 12 inches. Within-row plant spacings of 6 to 8 inches are most commonly used.[2,4,6,7] In plasticulture systems (plastic mulch over raised beds and drip irrigation), seedlings are typically transplanted into holes cut into the plastic mulch. However, cucumbers can be direct-seeded through the holes as well. The beds are usually spaced 5 to 8 feet apart. Within-row plant spacings of 9 to 14 inches are commonly used with plasticulture systems.[2,7]

Training, Pruning, and Harvest

When the cucumber plants start to vine, the vines are guided to the twine or net and trained to grow onto the trellis. Clips or ties can be used to secure the vines to the support system as they grow upward. The clips and ties should be removed if they become binding on the vines.[1,2] The vines can also be woven into the netting without using clips or ties. Several passes to train the vines onto the trellis may be needed over a period of weeks. Some growers trim-off the first four to six lateral vines near the base of the plant to promote better airflow and better pesticide penetration within the canopy. Above this level, the lateral vines are allowed to develop and trained to grow on the trellis.[2]

The monoecious varieties, commonly used in pole cucumber systems, flower and fruit over a longer period of time than do gynoecious varieties. Because of this, monoecious varieties require a greater number of harvests. The extended fruiting period is advantageous for growers who desire sustained production over a long period of time.

Protected Culture Systems

Cucumbers grown in greenhouses and high tunnel systems are almost always grown on vertical trellis systems. In some high tunnel systems, vines are pruned to a single stem with the

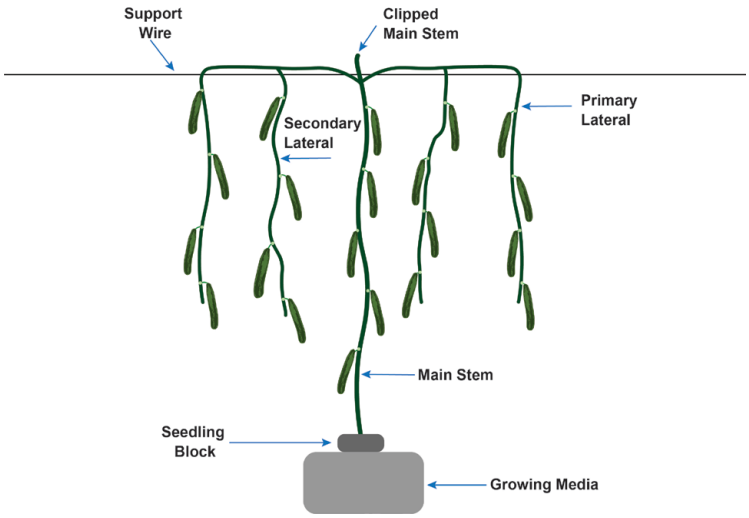

Figure 3. An umbrella system commonly used for the production of greenhouse-grown cucumbers.

lateral vines removed. Many greenhouse operations use an umbrella system, where the lateral vines are removed until the main vine reaches the top support wire, at which point two or more lateral vines are allowed to develop and grow along and then hang down from the top wire. In some cases, the main vine is clipped once it reaches the top wire and the lateral vines are trained to grow along and then hang down from the support wires, creating an umbrella structure (Figure 3). Plant spacings in greenhouse and high tunnel systems can vary, but common spacings include beds that are spaced 42 to 48 inches apart and in-row plant spacings of 12 to 18 inches.

Sources:

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[2] Commodity recommendations: Cucumbers. Mid-Atlantic Commercial Vegetable Production Recommendations, 2020/2021.

[3] Konsler, T. R., and Strider, D. L. 1973. The response of cucumber to trellis vs. Ground culture. Hortscience 8:220-221.

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[5] Ando, K., and Grumet, R. 2006. Evaluation of altered cucumber plant architecture as a means to reduce Phytophthora capsici disease incidence on cucumber fruit. Journal of the American Society for Horticultural Science 131:491-498.

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[7] Averre, C., Boyette, M., Estes, E., Holmes, G., Monks, D., and Sorensen, K. 2016. Commercial production of pickling and slicing cucumbers in North Carolina. NC State Cooperative Extension.

Websites verified 7/20/2020.

For additional agronomic information, please contact your local seed representative.

Performance may vary from location to location and from year to year, as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible and should consider the impacts of these conditions on the grower's fields. The recommendations in this article are based upon information obtained from the cited sources and should be used as a quick reference for information about cucumber production. The content of this article should not be substituted for the professional opinion of a producer, grower, agronomist, pathologist and similar professional dealing with this specific crop.

9057_SE_S2 Published 08-04-2020