

Proper Plant Clip Positioning Prevents Flower and Fruit Injury in High-Wire Crops



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Correct placement of plant clips and support strings is a simple, repeatable practice that prevents costly fruit damage or scarring high-wire greenhouse tomato, pepper, eggplant, cucumber, and melon crops.

Greenhouse high-wire or trellis cropping systems rely on clips and support strings to train and keep plants vertically to maximize crop production (Fig. 1). However, clips and support string can quickly damage flowers and fruit when positioned in the wrong place or when it shifts during crop growth and development. The most common issues include pinching or kinking flower clusters and trusses, rubbing that scars fruit, and constriction injuries when ties or clips are accidentally placed on developing fruits. These problems are preventable when crews follow one guiding principle: clips and fasteners should support the stem and leader, not the flower cluster, peduncle, or fruit. When supporting hardware contacts, a developing fruit or a flower cluster, plant growth and fruit enlargement can quickly turn into scarring, constriction, or misshapen fruit.



Figure 1. Greenhouse tomatoes clipped to support strings to keep the crop vertical. Photo by: Dr. W. Garrett Owen, OSU.

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Across tomato, pepper, eggplant, cucumber, and melon crops, proper clip placement begins at transplant by securing the support string to the main stem below a healthy, fully expanded leaf, with the string firmly captured in the clip hinge. As plants grow, the support string can be wrapped clockwise around the stem or the leader can be clipped to the string, with additional clips placed under leaf petioles as needed to maintain continuous vertical training. The key to proper clip placement is to keep clips away or off reproductive nodes where flowers or fruit are attached and instead clip at nodes where thinning has occurred. When attaching the clip to the support line, ensure it fully closed and the string properly seated



Figure 2. Example of two high-wire cucumber fruits were accidentally clipped during routine plant support maintenance. The clips constrict the developing fruit, leaving a permanent indentation and resulting in unmarketable fruit. Photos by: Dr. W. Garrett Owen, OSU.



Figure 3. Example of a high-wire cucumber fruit trapped between the support string and stem causing fruit curvature. This fruit was deemed non-marketable. Rerouting the fruit or reposition the clip could have mitigated the issue. Photo by: Dr. W. Garrett Owen, OSU.



Figure 4. Example of a high-wire tomato where the clip was originally placed too close to the flower cluster and the string pulled across the truss. The clip was readjusted to prevent additional damage to the flowers and developing fruits. Photo by: Dr. W. Garrett Owen, OSU.



Figure 5. Example of a truss support used in a high-wire tomato crop. The truss support lifts the truss without pinching the stem of the tomato cluster. Photo by: Dr. W. Garrett Owen, OSU.

so, the line cannot slip and migrate into a fruiting zone. Clips should also be placed before the plant leans or twists and reposition any clip that is approaching a flower cluster or fruiting node. Crews should strive to maintain enough string tension to keep the leader upright but avoid routing twine where it can rub fruit shoulders or press fruit against the stem. The goal is to keep flowers and fruit unobstructed and prevent contact that can lead to scarring, constriction, or misshapen fruit.

In cucumbers, injury most often occurs when a flower or developing fruit is accidentally clipped or pressed against the support string. Figure 2 shows a common, avoidable error where a clip was placed directly around a young cucumber fruit. As the fruit enlarges, the clip constricts the tissue, leaving a permanent indentation and resulting in unmarketable fruit. Therefore, cucumbers should never be clipped, tied, or fastened by the fruit. Instead, the leader should be clipped to the support string at regular intervals, such as every other node, while fruit are allowed to hang freely. If a fruit is being pushed into the string or trapped



Figure 6. Example of clips placed below branch junctions to provide branch-support in high-wire pepper production. Photo by: Dr. W. Garrett Owen, OSU.



Figure 7. Example of a support string and clip placed below a node yet has come close to an eggplant thereby increasing the risk of abrasion and scarring. Photo by: Dr. W. Garrett Owen, OSU.

between the string and stem (Fig. 3), correct the issue by rerouting the twine and repositioning clips so the fruit is not in contact with twine or plastic hardware.

In tomatoes, flower and fruit injury is most often related to clipping too close to the flower cluster or allowing the string to pull across a truss (Fig. 4). Clips should be placed on the stem at nodes below fully expanded leaves, with enough support points that the leader does not sag and force clips into truss positions later. Crews should avoid placing a clip at the same node as a flower cluster, and they should not use the stem clip as a substitute for truss support when fruit load is high. When additional support is needed, use a truss support that lifts the truss without pinching the cluster stem, and keep the support point off the fruit (Fig. 5).

In peppers and eggplant, fruit injury frequently results from two issues: clips placed where they compress a branch junction that is carrying fruit, and support strings that rub fruit surfaces. A branch-support approach works well when clips are positioned directly below branch junctions (Fig. 6) to stabilize the canopy while keeping flowers and fruit unobstructed. Figure 7 shows how a support string held close to an eggplant fruit, increasing the risk of abrasion and scarring as the fruit enlarges and moves with air flow and harvest activity. When fruit is near a string, reposition the clip so the string runs clear of the fruit shoulder and does not press fruit against the stem. If fruits require added support, use a sling or support system designed to cradle fruit without constriction. I have observed netting material and hanging baskets used to cradle melons grown using high-wire systems.

Overall, the best way to prevent these problems is to train crews on correct clip placement and incorporate a brief, routine quality check into regular crop walks. During training and weekly walk-throughs, have crew leads flag any instance where a clip is placed on a fruit, where a clip sits at a flowering node, where a truss or peduncle is pressed into plastic, or where twine is rubbing fruit shoulders. Corrections are typically quick: move the clip to a safe vegetative node, reseal or adjust the twine, add an additional clip point to prevent sliding, and reroute twine away from flowers and fruit clusters. Consistent clip placement, combined with keeping strings and hardware off reproductive tissue, protects fruit quality and reduces avoidable losses during periods of rapid growth and increasing fruit load.

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