



Mechanically laying biodegradable plastic mulches in red raspberry planted as tissue culture plugs

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Introduction

Plastic biodegradable mulches (BDMs) are an alternative to polyethylene plastic mulch and can provide weed management, increase soil temperature and moisture, and improve plant growth and crop yield in annual vegetable production systems (e.g., tomato, watermelon and pumpkin). Some farmers growing perennial crops, such as red raspberry, have started to apply BDMs and nondegradable plastic mulches in their fields. Mulch application is a new practice for red raspberry growers in the Pacific Northwest, leaving many to question how to optimally apply mulches on their farms. The objective of this document is to address this knowledge gap by providing a step-by-step overview of mechanical application of BDM in a red raspberry system.



Figure 1. Tissue culture raspberry plants grown on bare ground raised beds.



Figure 2. Tissue culture raspberry plants grown with plastic mulch (biodegradable or nondegradable) applied over raised beds.

1. Mechanically laying plastic mulch by a customized flat-bed layer (bed or broadcast fumigated fields)



Figure 3. Customized flatbed layer used to apply plastic mulch (biodegradable or nondegradable).

- a. Mulch can be applied over a pre-formed raised bed using a flatbed mulch layer (Figure 3). If bed or broadcast fumigation is applied in the field, apply mulch following the restricted entry interval (REI).
- b. Make sure the roll fits on the mulch layer and covers the dimensions of the specific raised bed it is being applied on. Be sure there is enough extra mulch width (minimum 4 inches on each side) for soil coverage on each side of the bed (Figure 4).
- c. Check to ensure that the tractor being used to pull the layer clears the height of the bed (with mulch roll on; Figure 5).
- d. Load the mulch onto the layer; mulch should unroll from the bottom of the roll (Figure 6)
- e. Adjust as needed to make sure a minimum of 4 inches of mulch is maintained on each side of the bed and will be covered with soil to secure it in place (Figure 7). If the end of the roll is damaged, remove the damaged section and discard.
- f. If needed, add some weight to the layer to maintain adequate contact with the unrolling mulch and soil surface.
- g. Center the mulch on the bed.
- h. To start laying mulch, extend the mulch to the end of the row and cover with soil (do not use alley way soil that is not fumigated to cover mulch in order to avoid contamination between fumigated and non-fumigated soil (applicable only to bed fumigated soils).



Figure 4. Ensure the full mulch roll fits the mulch layer and dimensions of the bed.



Figure 5. Tractor must clear the height of the raised bed.



Figure 6. Load the mulch onto the layer and ensure the mulch unrolls from the bottom (photo credit to Chris Benedict).

- i. Place the guide wheels of the layer on top of the mulch and cover the sides with soil to hold it in place (Figure 8).
- j. Start laying the mulch by having the tractor slowly pull the layer, and use shovels to cover the ends (Figure 9).
- k. Slowly lay the first 10-15 feet of mulch and then increase to an optimal speed (1800 ft/hr); do not drive too fast, as this can increase the chances of mulch tearing. Also, be careful while driving because tires and parts of the layer may damage the applied mulch if it becomes off center and/or the machine rubs against the mulch.



Figure 7. Adjust the mulch layer.



Figure 8. Put the mulch under the guide wheels and discs will cover the edges with soil.



Figure 9. Start laying mulch and cover the end (photo credit to Chris Benedict).



Figure 10. Cut the mulch with a knife at the end of a row.

- I. If the sides of the mulch are not staying under the guide wheels, you may need to use a wider mulch. Alternately, place soil on top of the mulch on the side of the bed with a shovel every 10-15 feet to hold the mulch in place. If there is danger of wind blowing the mulch off the bed, use a tractor-mounted disc to throw soil onto the edge of the bed to cover the mulch.

- m. At the end of the row, cut the mulch and drip line (if applicable) with a knife (Figure 10) and cover the mulch with soil (Figure 11). Be careful to not contaminate fumigated and non fumigated soils, which is only applicable to bed fumigated soils.
- n. After mulch application, see planting guide in this document for more information about planting.



Figure 11. Cover the end.

2. Mechanically laying mulch while forming beds (applicable in broadcast fumigated fields)

- a. After broadcast fumigation and the REI has expired, mulch can be applied using a simultaneous bedshaper-mulch layer (e.g., Rain-Flo 2600 Series II Plastic Mulch Layer; Figure 12).



Figure 12. Bed shaper and mulch layer, front (left) and back (right) (photo credit to Lisa DeVetter).

- b. Make sure the roll fits on the mulch layer and covers the dimensions of the specific raised bed it is being applied on. Be sure there is enough extra mulch width (minimum 4 inches on each side) for soil coverage on each side of the bed.
- c. Load the mulch onto the layer and in the correct direction, mulch should unroll from the bottom of the roll.
- d. If the end of the roll is damaged, remove the damaged section and discard.
- e. Center the mulch on the bed.
- f. Adjust as needed to make sure mulch is covered with soil on both sides of the bed.
- g. To start laying, extend the mulch to the end of the row and cover with soil.
- h. Slowly start laying and then adjust to an optimal speed (1800ft/hr).
- i. If the sides of the mulch are not staying under the guide wheel, you likely need a wider mulch.
- j. At the end of the row, cut the mulch and driptape, if used, with a knife and cover the mulch with soil.

3. Mechanical planting of tissue culture plugs

- a. Plants can be planted manually or mechanically. To plant by machine, use a machine that punches holes through the mulch film and plants the plug in one pass (e.g., Rain-Flo Model #1600 Series II Water Wheel; Figure 13).
- b. Make sure the spacing and depth of the planting hole are suitable to your operation.
- c. Start planting: the transplanter will punch planting holes at your specified spacing and drops plugs in the planting holes while delivering a small volume of water; the process allows for substantially faster planting than by hand planting.



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Additional Resources:

WSU Small Fruit Horticulture: <http://smallfruits.wsu.edu/>

Biodegradable mulch: www.biodegradablemulch.org

video 'mechanically planting on mulches':

<https://www.youtube.com/watch?v=k12Rkr6SUKI> (video credit to Dubois Agrinovation)

