Summary and Recommendations for the Use of Mulch Color in Vegetable Production

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When purchasing polyethylene film for use in the production of vegetables in the field, there are several characteristics of the polyethylene that users must consider for specific applications. Film thickness spans the entire range from 0.015 mil to 1.5 mil; the thinner films requiring specific applicators to place the film in the field, to the thicker films which would last for 2 years or a triple cropping sequence. Opacity of the film (how much light will pass through the plastic) will govern both the amount of radiation which will heat the soil and the growth of weeds under the film. The last characteristic which growers have to decide is mulch color: black, white, silver, red, blue, brown, IRT (infrared thermal), green IRT and yellow. Each of the colors will produce specific temperature (both soil and ambient) and light modifications within the micro-environment of the raise-bed/plant canopy.

Over the last 10 years, we have conducted extensive testing of the affect of mulch color and various vegetable crops. Some generalities that can be made regarding color are: 1) silver repels aphids, 2) blue attracts thrips - has been very effective in greenhouse tomato production and 3) yellow attracts insects. There also appears to be some reduction in disease pressure with crops grown on specific colors. Based on years of field research at the Horticulture Research Farm, Rock Springs, PA, the following colors are recommended for specific crops.

**Tomato** - this crop appears to respond more to red mulch compared to black with an average 12% increase in marketable fruit yield over a 3 year period. There appears to be a reduction in the incidence of early blight in plants grown on red mulch compared to plants grown on black mulch. When environmental conditions for plant growth are ideal, tomato response to red mulch is minimal.

**Pepper** - this crop appears to respond more to silver mulch compared to black with an average 20% increase in marketable fruit yield and fruit size over a 3 year period. Lowest yield of marketable pepper were harvested from plants grown on either white or light blue mulch at this location. In more southern climates, below North Carolina, pepper response to white mulch would be entirely different. Pepper plants grown on green IRT had similar marketable fruit yields compared to plants grown on black.

**Eggplant** - this crop appears to respond more to red mulch compared to black with an average 12% increase in marketable fruit yield over a 2 year period. Greatest response of eggplant to red mulch observed when plants were growing under stress conditions (temperature and water). There may be a varietal response of eggplant to the use of plastic mulch.

**Cantaloupe** - this crop appears to respond more to green IRT or dark blue mulch compared to black with an average 35% increase in marketable fruit yield over a 3 year period. Lowest yield of marketable cantaloupe were harvested from plants grown on either white or black mulch at this location. In more southern climates, below North Carolina, cantaloupe response to white or black mulch would be entirely different.

**Cucumber** - this crop appears to respond more to dark blue mulch compared to black with an average 30% increase in marketable fruit yield over a 3 year period. There was a difference in yield response between an open-pollinated and hybrid variety. Lowest yield of marketable cucumber were harvested from plants grown on yellow mulch at this location. In more southern climates, below North Carolina, cucumber response to yellow mulch may be entirely different.

**Summer Squash** - this crop appears to respond more to dark blue mulch compared to black with an average 20% increase in marketable fruit
yield over a 2 year period. Lowest yield of marketable zucchini squash was harvested from plants grown on yellow mulch at this location. In more southern climates, below North Carolina, cucumber response to yellow mulch may be entirely different.

**Onion** - this crop appears to respond more to several different mulch colors including red, metalized silver and black compared to no plastic mulch with an average 24% increase in marketable bulb yield over 8 varieties. There was a significant difference in yield response between specific onion varieties and mulch color. This trial evaluated red onions, but other onion types should respond similar to the red onion varieties grown in this mulch trial.

**Potato** - this crop appears to respond more to several different mulch colors including red, metalized silver and black compared to no plastic mulch with an average 24% increase in marketable tuber yield. While there was no significant difference in yield response between the mulch colors, potatoes grown on the metalized silver mulch can have the highest marketable tuber yields, coolest soil temperature and least number of Colorado Potato beetle adults. However, the metalized silver mulch can be difficult to lay in the field and obtain a tight fit over the raised bed. Compared to black or red plastic mulch, the metalized silver mulch in cool years may also have the lowest plant population of potatoes because of poor plant emergence. There was a significant difference in yield response between specific potato varieties and mulch color. Use of black or possibly red plastic mulch will produce the highest yield of quality potatoes.

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[http://www.plasticulture.org](http://www.plasticulture.org) - American Society for Plasticulture

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