

**CHOOSING MULCH COLORS FOR VEGETABLE PRODUCTION**

Which color mulch should you use for vegetable production on your farm? The answer to that question is — it depends.

Color choice depends upon the crop you are growing and the season you are growing it. Mulch color choice can also depend upon whether you are seeking insect or disease control effects from the mulch.

In this article I will report on some of the papers presented by researchers from around the world at the International Congress For Plastics In Agriculture conducted late September in Hershey.

Let's start by reviewing a little of the history of plastic mulches and vegetable production.

Plastic mulches were first developed back in the 1960s. The early plastic mulch colors were black, white, or clear. Black was used for early crop production, especially in areas with cool spring temperatures. White was used in areas with hot summers since black and clear would cause soil temperatures to become excessive.

Another limitation in the use of clear mulch for vegetable production is weed growth under the mulch. However numerous benefits from plastic mulches were found in vegetable production. Plastic mulches increased yields and vegetable quality by conserving moisture, keeping soil from splashing on the crop, increasing or decreasing soil temperatures (depending on mulch color), reducing the leaching of nutrients, and preventing weed competition.

Then, in the mid-'80s, the development of colored mulches arose. Dr. Dennis Decoteau, chair of the horticulture department at Penn State (but then a researcher at Clemson University) wondered if light reflected by a mulch would affect plant growth. Building upon work observing the effects of various colors of light on the growth of ornamental plants, Decoteau collaborated with a researcher from the USDA and developed the first colored mulch. This now famous red mulch resulted in higher early-season yields of tomatoes. By the 1990s, numerous colored mulches were developed and marketed.

A recurring problem with colored mulches has been

variable effects on vegetable production. One cause of this problem is the result of the lack of "standards" for these colored mulches. The first red mulch was developed specifically for its light-reflecting properties. Unfortunately, other colored mulches have generally not been developed with this specific quality in mind. Additional red mulches have even been marketed with different light-reflecting properties than the original. This inconsistency is part of the problem facing you, the grower, when trying to choose a mulch color for vegetable production.

Another problem you face is that even the specific light-reflecting mulches may not show any advantage over black mulch under ideal growing conditions. Still another problem with colored mulches is that once the crop develops and covers the mulch, any benefits from reflected light are lost. So should you abandon the idea of colored mulches and just use black? I would discourage you from this choice based on some of the presentations I heard at Hershey.

Let's first discuss the use of red mulch. Tomatoes are generally regarded as the crop most likely to respond to this color mulch. Studies from Pennsylvania showed increased yields in tomatoes in 2 of 3 years with red mulch while red increased yields in 3 of 5 sites in Iowa over a 2-year study. Variable weather conditions between seasons

and locations was cited as a cause of the variation in response seen in both states.

Additional mulches giving higher yields in tomatoes were silver and IRT 100. Another potential benefit from red mulch that was observed in Pennsylvania was a reduction in the occurrence of early blight, but we'll talk more on this later.

Peppers responded best to nonreflective silver mulch in two separate studies in Pennsylvania. Green IRT and red UV mulch also increased yields for one year and blue mulch was beneficial one year but not the next. In New Jersey, pepper yields were also highest both for early harvest and total harvest on flat-reflective silver. Other types of silver mulches also gave higher yields in the New Jersey study compared to black.

A Virginia researcher reported that there were no differences in yield between watermelons grown on red or black mulches but both mulches were better than bare soil. Research in Pennsylvania has shown higher yields in cucurbits from blue mulches, so if you would want to try an alternate mulch color, I would start with blue.

Bill Lamont from Penn State reported that all mulches combined with trickle irrigation were better for potatoes than bare soil. Highest marketable yields were obtained with red and silver mulch for Dark Red Norland and similar results were seen with NY 101 (Keuka Gold).

Researchers working with

leek in Belgium found that the best crop (10 percent weight increase) was produced using white mulch. They noted more even soil temperatures than with bare soil as well as more even moisture under all mulches.

Another cool season crop — radicchio — was grown on white, silver, red, black, clear, and blue mulch in New York. Heads were smallest on blue and bare soil and overall yields were best on white and silver, especially compared to bare soil. Since both of these cool-season crops responded best to mulches that tend to lower soil temperatures, I would suggest that you try these colors of mulch on other cool-season vegetables.

Researchers in Georgia reported that all mulches, even white on black, decreased growth and yield of tomato during the summer. Mulches resulted in soil temperatures that were harmful to root growth under Georgia's summer conditions. While we generally do not have the extremely high summer temperatures in Pennsylvania that they experience in the south, I advise you to be cautious using dark mulch during plant establishment in the summer months. You could increase soil temperatures too much for root growth even here.

The use of black mulch, however, is beneficial in the early production of warm-season crops. Researchers in Mexico reported that the highest yields of muskmelon established early in the season were found on black plastic. Most growers have al-

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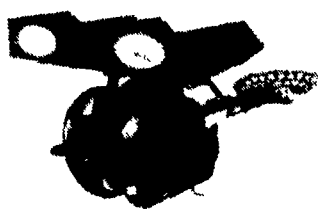
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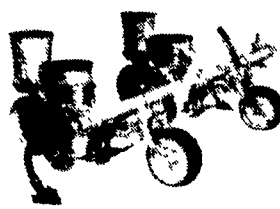
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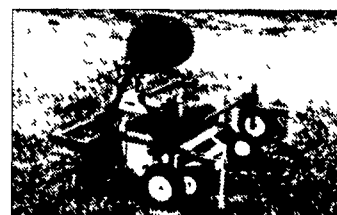
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