

## **Mulching and Weed Management**

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Mulching is a cornerstone weed management strategy for many diversified vegetable farmers, and its widespread application is testimony to its importance. Many crops are amenable to growing in mulch systems. Mulching is particularly useful for full-season crops, e.g., Alliums, Curcurbits, pepper, tomato, eggplant, cabbage, and cut-flowers, which otherwise would require season-long cultivation and/or hand weeding. Some growers also find benefits from mulching short-season crops, e.g., head lettuce, basil, and broccoli.

### **Mulching options**

Farmers employ a wide array of mulching strategies, each with a suite of potential benefits *and* problems. Organic mulches may be living or dead, the latter grown in-place or added to fields. Common living mulches include ryegrass and Dutch white clover, or various cereals with crimson clover, generally sown in paths between plastic-mulched beds. Competition from the living mulch can be intense, managed somewhat by timely mowing and drip-line irrigation and fertilization, but many growers ultimately prefer a dead organic mulch between beds. Cardboard, newsprint, and rolled paper mulch are sometimes used under other organic mulches in an effort to improve long-term weed control, with variable efficacy. Synthetic mulches include plastic films that are clear, black or colored, or infra-red-transmitting or “IRT,” as well as a wide array of woven geotextile or so-called landscaping fabrics. Some growers promote use of heavier silage tarps as a temporary mulch to create a stale seedbed. Specific practices are influenced by soil and site conditions, local availability of organic mulch materials, as well as aesthetic and economic priorities.

### **Multiple benefits**

Tom Roberts, an icon in the Maine organic farming community, tells prospective young farmers: “If you are doing something on the farm for only one reason...STOP!...do something else that solves several problems.” Tom is a dedicated mulcher. Each fall, Pittsfield, Maine, community members drop off their bagged leaves at Tom’s Snakeroot Farm where he stockpiles them in orderly piles based on their quality. Some are spread

into windrows and shredded with a mulching mower to prepare a fine mulch to top garlic or onions, while others are spread intact to create more of a leaf mat to suppress weeds in paths. For Tom, the leaf mulch is helping to manage weeds, it is adding carbon and building soil quality, and helps to conserve soil moisture.

Workload-spreading is a key benefit of mulching for many farmers. Many crops require frequent, timely weeding to maximize yield and quality, e.g., carrot, beet, salad greens, and extensive mulching of other crops ensures that labor can be focused on these particularly sensitive crops. Soil-warming is critical for heat-loving crops grown in northern New England; black plastic, and particularly IRT films, provide soil-warming, conservation of soil moisture and weed control. A benefit unique to organic mulching is their contribution to building soil quality. Some plastic mulching strategies help to deplete the weed seedbank. Specifically, they encourage weeds to germinate, while high temperature or darkness subsequently kills small seedlings. Mulching generally helps to manage plant diseases that are spread by rain/soil splashing, and specific strategies may contribute to the management of particular insect pests, e.g., use of sliver films to help manage aphids. Aesthetics and employee moral are also improved by mulching, leading to a more pleasing and desirable field environment.

### **Multiple problems**

Problems with various mulching practices should be carefully considered. Foremost is the additional expense, both added labor and input cost of purchased mulch hay or straw and any synthetic mulch. Transplanting labor costs are also greater, and there is added expenses associated with the removal and disposal of plastic mulches at the end of the season. Organic mulches may be difficult to obtain locally, and prices for straw or even mulch hay can be relatively high. Organic mulches prevent soil warming, a problem for some crops, they attract slugs and rodents, and thick layers of partially decomposed mulch can be difficult to incorporate into the soil. Purchased hay may contain weed seeds, but forage weeds are generally not a problem in annual vegetable systems. Cereal straw often contains remnant grain seed resulting in volunteer crop plants coming through the mulch. The grain also attracts wild turkeys which can make a mess of plastic-mulched beds and distributed straw. Several of these problems may be overcome by using fresh-cut grass or forages, harvested before weeds set seed, although material handling becomes more difficult. Lastly, some weeds will get through even the best mulch system. Weeds must be removed from the holes in plastic or the edges of plastic-mulched beds. If weed pressure is high, it is likely that any areas where organic mulches are not sufficiently thick will be challenged by underlying weeds with some probability of success. These weeds must be controlled by hand pulling. The mulches largely prevent the use of more efficient weeding tools or flaming.

### **Mulch or cultivate?**

We recently completed field experiments in organic onions managed by cultivation until the crop had a suitable size advantage over weeds, a season-long weed

management strategy that completely prevented weed seed rain, and several mulch-based strategies. As we expected, the “zero seed rain” and mulched systems required considerably more labor, and the latter had greater input costs. We considered these to be strategies with a longer-term perspective, reducing the weed seedbank and improving soil quality. Surprisingly, zero seed rain and the mulch-based treatments were the most profitable even in the short term, with the added costs compensated by improved yield. Soil quality parameters, including greater earthworm abundance and water infiltration, reduced compaction, and greater carbon inputs demonstrated further benefits of the mulched systems. For more information on this, and our other weed management research, see: <https://gallandt.wordpress.com>.