Plastic Mulches: Benefits, Types, and Sources

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Since the early establishment of black plastic mulch as an effective tool in the cultivation of many fruits and vegetables, the more recent innovations in plastic mulch technology have given producers an even larger line of products to choose from. Understanding all of the properties of plastic mulches and how they interact with traditional cultivation methods is the key to maximizing the benefits that mulch has to offer.

Principle Benefits of Mulch

Perhaps the most significant benefit from using plastic mulch is soil warming that significantly improves germination and stand establishment of many vegetable crops, particularly warm season vegetables.

Another significant benefit is weed suppression. Weed competition in both the garden and commercial field can effectively strip the yield potential from many fruits and vegetables. Clear plastic mulch can offer greater soil warming capabilities over black plastic, however clear plastic promotes weed growth that in turn robs both soil moisture and nutrients from the crop. The adverse effects from this are very significant during stand establishment early in the season. If clear plastic mulch is used, it is critical to provide chemical pre-emergent weed control.

In addition to the primary benefits mentioned above, plastic mulch is also very effective in conserving soil moisture and fertilizer due to reduced leaching from normal rainfall events. This is a particularly significant benefit on light textured soils that are low in organic matter and naturally, very well drained (ie. Sandy and sandy loam soils). Mulches also provide an effective barrier between the soil surface and the crop that often results in clean, disease free produce.

Types of Plastic Mulch

Black plastic mulch continues to be the most widely used mulch; and for two main reasons - early season soil warming and weed control. This mulch alone has enabled producers in northern states to extend their growing season and grow many warm season vegetables that would not ordinarily mature and/or yield sustainable, positive, economic returns. Black plastic mulch is available in various widths and thickness (mils).

Clear plastic mulch can provide greater warming benefits but offers no protection from weed growth (see above). Like black mulch it is available in various widths and thickness and is more economical than the more technologically advanced mulches.
Selective Light Transmittance (SLT) or Infrared Radiation Transmitting (IRT)

Although these new types of mulches have been available for quite a few years now, understanding the unique properties they offer a producer has probably been a primary limiting factor to more widespread use. This new technology effectively allows infrared energy from the sun to penetrate the plastic and warm the soil. However, visible light that promotes weed growth is blocked.

A variety of colored mulches

Some of the most common SLT or IRT mulches currently available are either a translucent green or brown color. These types of mulches can also be co-extruded (top layer and a bottom layer with different colors) to provide an added benefit for crop growth. Different colors on the upper surface of the mulch change the quality of light that is reflected back in and around the crop canopy.

Depending on the quality of the light reflected, crop growth can be altered. An example of such an application is the use of red IRT mulch on tomatoes. The mulch can increase fruit yield by as much as 20% as well as improved fruit color and taste. Since the light needs to be reflected back into the crop canopy to have the effect, the plants need to be vertically staked or trellised to maximize the benefit. Any prostrate crop growth habit that will prevent light from being reflected will prevent the colored mulches from doing their job. Other colors continue to be developed.

Why Use Raised Beds with Plastic Mulch?

Benefits from using plastic mulch are maximized by installing them over a substantial and firm raised bed. These beds can be formed by hand on a small scale, however sled type raised bed forms are used commercially. Raised beds are particularly beneficial when using plastic mulches because they can enhance early season drainage, expose more surface area under the mulch for more uniform warming, and help to keep produce clean. Raised beds also facilitate a tight fit of the much during installation which ensures maximum heat transfer through to the soil. A loosely installed much will lead to loss of heat transfer, tearing of the mulch during windy conditions, and possible crop damage.

Is Trickle Irrigation Necessary When Using Plastic Mulch?

Although plastic mulches help to retain soil moisture, they can also prevent normal precipitation from penetrating through to the crop where it may be needed most. This can be especially critical when plastic mulch is used on a very light textured (sandy) soil that has very little water holding capacity. Trickle irrigation will ensure that the crop will get the needed moisture at critical periods (ie. flowering, fruit set and maturity) and maximize the benefits from plastic mulch. The use of plastic mulch without trickle irrigation is not recommended.
Other Mulches

Photodegradable, biodegradable, and paper mulches may offer additional options in the future, however further development and calibration of these materials with specific crops in northern climates are critical to their success. Both photodegradable and biodegradable mulches promote the desirable characteristics of self-destruction in the field, however performance has been inconsistent. Paper mulches are another alternative but they can also prematurely deteriorate at the point where it is buried in the soil (see photo). This makes the mulch susceptible to wind and puts the crop at risk. Areas not susceptible to wind may be appropriate for those who prefer to use paper based products. Of course, a broad array of organic plant material can be used as mulch. Some mulches offer allelopathic protection from weed growth and can effectively reduce soil moisture loss. However, many of these types of mulches serve us poorly if the prime objectives is to warm the soil.

Sources of Plastic Mulches

Jordan Seeds, Inc.
6400 Upper Afton Road
Woodbury, MN 55125
Phone: 651-738-3422
Mulches: red, black, clear, blue, white, green IRT, photodegradable
http://www.jordanseeds.com/

Ken Bar, Inc.
25 Walkers Brook Dr.
Reading, MA 01867-0704
Phone: 781-944-0003
Mulches: red, black, silver

Agway
North Collins, NY
Phone: 800-337-3156
Mulches: green IRT and photodegradable

Clarke Ag Plastics
P.O. Box 238, Rte. 691
Greenwood, VA 22943
Phone: 540-456-4578
Mulches: many colors

Ginegar Plastic Products, LTD
Kibbutz Ginegar 30053
ISRAEL
Mulches: yellow