

MULCH CORNER

PLASTIC MULCHES

By John Ferguson

Last week we looked at gravel and stone mulches. This week we are going to look at the second largest class of inorganic mulch, plastic.

Clear or black plastic can be used to warm the soil in spring but should be removed to prevent the growth of fungus and other pathogens in the soil. Methane and other gases produced by the anaerobic conditions can build up damaging plant roots. The better the soil (more fertile) or the higher the clay content, the greater the problems become with plastic mulches.

There are many variations of plastic mulches, black plastic, clear plastic, colored plastic, micro pore plastic, Infrared Plastic (IRT), pelletized plastic, etc. Plastic mulches are generally applied as a one layer mulch. Plastic is available in different thicknesses, widths, and lengths. Some plastic mulches are produced with special properties like resistance to biodegradation from ultra violet light, or even to biodegrade faster (new research).

Black plastic is the most commonly used for many reasons. First let's look at the positive aspects of black plastic. It warms the soil in the spring encouraging many species of plants (primarily vegetables) to grow faster and earlier so they produce their crops before insect populations become a problem. Black plastic reduces weeds, some plants will have higher yields than with clear plastic. It reduces fertilizer leaching preventing contamination of runoff (however it also leaves the salts behind). Results in cleaner crop (less dirt and dust splashed onto leaves). Lends itself to mechanized application which is economical for large scale operations. Most effective in specialized applications.

The negative effects of black plastic include:

- 1) An increase of the heat index around plants that leads to insect and disease problems.
- 2) Pathogens growing better when black plastic is used since air flow is reduced, often the cause of root dieback and other fungal disease.



- 3) It breaks down (becomes brittle) when exposed to ultra violet radiation in sunlight.
- 4) The plastic fragments can create a mess when it starts to break down.
- 5) It is difficult and expensive to dispose of and generally unsightly.
- 6) Shallow root systems are often created by plastic and during drought periods the plants may not survive the stress.
- 7) It lowers crop yields on some species compared to other types of mulch and crops often require more water.
- 8) Solid plastic films prevent CO₂ from escaping the soil (and oxygen from entering), reducing the benefit from localized concentration of CO₂ to plants.
- 9) Requires frequent monitoring for best performance and requires the use of a costly drip irrigation system for best performance.
- 10) It increases soil erosion in areas between the plastic covered rows.

Best success with plastic mulches requires chemical fumigation (costly and dangerous) to keep pathogens in check. This practice is reported to increase the bad or problem nematode populations. It kills earthworms by preventing them from reaching the surface to feed. Since plant parts often stick to the plastic, reuse of the plastic tends to spread plant diseases unless the plastic is cleaned and sterilized. Plastic films tend to breakdown in the second and subsequent years allowing cracks to form that weeds can grow through. To be economical, specialized tractor drawn equipment is required to apply mulch. For effective weed control, smoother seedbed is required than with organic mulches, which requires additional labor (i.e. costs). Plastic mulches often heat the soil too much for some cool season crops like lettuce, thus reducing yields. Over time leftover salts from synthetic fertilizer build up creating hardpan and stunted growth.

If used in early spring, plastic mulches should be removed after air temperatures warm up to prevent many of the above problems.

Black plastic is most effective with toxic chemical programs on poor abused soil that is chemically and biologically out of balance.