

Study finds 2 biodegradable mulches to be suitable polyethylene alternatives

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Polyethylene plastic mulch offers a range of benefits and has become standard for growers of a variety of agricultural and horticultural crops. Despite the recognized benefits, the plastic mulches have serious drawbacks. For example, plastic mulches can typically be used for only one cropping season, after which they must be removed and disposed of, creating expensive and time-consuming processes for growers. The challenges and costs associated with recycling mean that plastic mulches often end up in landfills, buried, or burned on-site—practices that have grave environmental consequences. To mitigate these and other environmental and economic issues, professional growers are increasingly interested in the use of biodegradable plastic mulches as alternatives to traditional plastic mulches.

Studies have shown that biodegradable plastic mulch can perform comparably to polyethylene mulch in crop yield and quality, weed suppression, and overall function. Though most of the studies report satisfactory deterioration of biodegradable plastic mulch, both in-season and postharvest results show that deterioration varies depending on mulch material tested, cropping system, and climate. "Despite the positive results shown through research, the successful transition from nondegradable plastic mulch to biodegradable plastic mulch use in agriculture, ultimately, will be grower driven," said Jeremy Cowan, lead author of a study appearing in *HortTechnology*.

Cowan and colleagues Debra Inglis and Carol Miles evaluated three [biodegradable plastic](#) mulch products using subjective visual assessments

of deterioration during the cropping season and a photographic method to monitor deterioration after the mulches were incorporated into the soil. The study was conducted at Washington State University's Northwestern Washington Research and Extension Center during two growing seasons.

The experiments were designed using randomized whole-plot treatments with three biodegradable mulch products: BioAgri, Crown 1, and SB-PLA-11. Two subplot soil treatments—mulched and bare ground—were applied in the second growing season over half of each plot where mulch had been previously incorporated into the soil. 'Castle Dome' broccoli was grown in for the study as a late summer-fall crop. The researchers performed in-season visual assessments on each mulched subplot to evaluate visible signs of deterioration.

"As measured by percent visual deterioration (PVD), deterioration of the plastic films BioAgri and Crown 1 occurred more rapidly during the growing season than SB-PLA-11," the authors noted. "Holes began to appear in Crown 1 within 2 weeks of installation in both years. Within 4 to 6 weeks, Crown 1 had split down the center. Once the splits began to expand laterally, primarily due to wind action, PVD increased notably."

Like Crown 1, BioAgri also began to display holes 2 to 3 weeks after installation and BioAgri® split down the center, typically between transplant holes, but not until 8 to 12 weeks after installation. "It is important to note that when splits expanded, the mulch bunched at the edges of the split," Cowan said. "Although this is not deterioration per se, this bunching formed creases which later split, effectively accelerating actual [deterioration](#)."

The team concluded that two of the mulches evaluated in the study—BioAgri and Crown 1—deteriorated to a sufficient extent that they could meet National Organic Standards Board recommendations

regarding biodegradation for certified organic production. "Both mulches retained enough integrity throughout the growing season to inhibit weed growth. Thus, both mulches could be a suitable alternative to polyethylene mulch for broccoli production in the Pacific Northwest," the researchers said.

More information: *HortTechnology* December 2013 vol. 23 no. 6 849-858 [horttech.ashspublications.org/ ... nt/23/6/849.abstract](http://horttech.ashspublications.org/...nt/23/6/849.abstract)

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