



Performance and Adoptability Biodegradable Mulch

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Summary

Research on the efficacy of biodegradable plastic mulches (BDMs) has focused on its effects in vegetable and fruit crop production systems. This summary of research results provides a quick reference to the scientific literature on the use of BDM for vegetable and fruit crops. For some crops, several studies have been carried out in production systems around the world, and findings may vary.

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Impact of Biodegradable Plastic Mulch on Specialty Crop Production

Research on the efficacy of biodegradable plastic mulches (BDMs) for specialty crop production has been ongoing for nearly two decades. Most of the published research has focused on BDM effects in vegetable production systems, and recently, scientists have been expanding BDM research to fruit crops. As the pace of BDM research and technological development quickens, scientists, growers, and crop advisors will benefit from ready references to the studies evaluating BDM in their systems of interest.

Table 1 presents a summary of research results found in the scientific literature on the use of BDM for crops. Martín-Closas et al. (2017) provide the most comprehensive review of the literature on BDM use in specialty crop production systems. The publications cited in that review and more recently published research are included in Table 1. Where multiple studies have been carried out on the same crop (e.g. BDM use in tomato systems worldwide), some researchers may have found positive impacts of BDM use, while others have found neutral or negative impacts. This information is reflected in Table 1, where “< = >” indicates that, among the studies reviewed, BDM use produced unfavorable “<”, comparable “=”, and favorable “>” results. Variable results occur because agricultural field research presents conditions that scientists are not always able to control. Thus, research results may vary substantially by region, climate, soil type, product formulation, and a host of other



Research has addressed BDM use in field and high-tunnel production systems.

factors. Readers should be aware of these limitations. Many of the factors scientists, growers, and others may be interested in have yet to be systematically studied. Such a condition is noted in Table 1 by the “ ϕ ” symbol.

In some studies, BDM is compared to polyethylene (PE) or paper mulch (a “positive” control), while in other studies BDM is compared to bare ground (a “negative” control), or both. Additionally, studies vary in duration and may not evaluate crop response after multiple years of BDM use. We encourage the reader to review original publications to better understand the factors that may have impacted the results summarized here. Works cited numerically in Table 1 are presented in the Reference List following the table.



Researchers and growers together assess BDM after it has been tilled into the soil.

Table 1. Quick reference to available published research on general impacts of biodegradable plastic mulch (BDM) use in specialty crop production.¹

Crop	Crop yield vs. Paper mulch			Crop quality vs.	Weed control vs.	References
	Bare ground		PE ²	Bare ground	PE	
Broccoli	> ³	ϕ	ϕ	ϕ	ϕ	1-3
Christmas Tree	ϕ	ϕ	ϕ	ϕ	<	4
Cucumber	>	=	=	ϕ	=	5-7
Eggplant	>	ϕ	=	ϕ	<	8
Grape	>	ϕ	=	ϕ	ϕ	4, 9-12
Hazelnut	ϕ	ϕ	ϕ	ϕ	<	4
Lettuce	ϕ	ϕ	<= ⁴	ϕ	ϕ	1, 4, 13
Melon	>	ϕ	=>	ϕ	=	1, 14-24
Pepper	<=	ϕ	=	=	<=	8, 13, 25-27
Pumpkin	>	=>	<=	<>	=	28
Raspberry	=>	ϕ	<=	>	ϕ	29
Strawberry	>	=>	<=>	=>	<=>	4, 30-34
Sweet Corn	>	ϕ	<=	ϕ	<	8, 35
Sweet Potato	>	ϕ	=>	ϕ	>	36-37
Tomato	>	>	=	=	<=	13, 24, 38-54
Zucchini	ϕ	ϕ	=	ϕ	ϕ	4, 8

¹ Most information in this table is based on Martín-Closas et al. (2017), which summarized research results. More information is available in the original papers listed at the end of this fact sheet.

² Polyethylene mulch film.

³ “>” BDM performed better; “=” BDM performed equivalent to; “<” BDM did not perform as well; “ ϕ ” nothing was mentioned.

⁴ Reports that BDM had mixed results for the factor(s) listed. The reader should review the cited paper(s) to evaluate where deviations may have occurred.

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Broccoli (*Brassica oleracea* L. gp. *Italica* L.)

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Christmas Tree (various genera and species)

4. Minuto G, Pisi L, Tinivella F et al (2008) Weed control with biodegradable mulch in vegetable crops. Acta Hortic 801:291–297.

Cucumber (*Cucumis sativus* L.)

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Eggplant (*Solanum melongena* L.)

8. Waterer D (2010) Evaluation of biodegradable mulches for production of warm-season vegetable crops. Can J Plant Sci 90:737–743.

Grape (*Vitis* spp. L.)

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Lettuce (*Lactuca sativa* L.)

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Melon (various genera and species)

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Pumpkin (*Cucurbita* spp. L.)

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Raspberry (*Rubus* spp.)

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