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Feasibility of using polypropylene ground cover upon consideration of long-term responses of sweet cherry nutrition and profitability

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ABSTRACT

The impacts of synthetic polypropylene ground cover in the row area of sweet cherry (*Prunus avium* L.) trees ('Regina'/'Gisela 6') on soil nutrient availability, tree mineral nutrition and productivity, and economic returns were investigated on a Van Horn fine sandy loam soil at Hood River OR, from 2000 to 2007. Treatments included 2.44-m wide synthetic fabric ground cover made of black, woven poly-propylene over the row area of cherry trees (woven fabric), and no ground cover but with herbicide applications in the row area with the same width as the polypropylene ground cover (herbicide strip) – standard industry practice. This article reports the plant nutrition and soil fertility results of 2006 and 2007 and profitability and feasibility results of 2000 to 2007. Tree leaf nitrogen (N) concentrations were significantly higher with 9 to 14% increases using woven fabric compared with herbicide strip in 2006 and 2007. However, leaf sulfur (S) concentrations were significantly lowered with woven fabric in the two seasons. Woven fabric resulted in fruit with comparable quality and possible greater storability under enhanced fruit yields than herbicide strip in both years. Woven fabric was more profitable than herbicide strip based on an additional net present value of \$2,606 ha^{-1} by the end of this study. Woven fabric had annual gross returns greater than annual costs in the fourth year after planting by \$8,181 ha^{-1} relative to herbicide strip, and had cumulative net returns greater than total costs of all previous years in the sixth year after planting by \$17,796 ha^{-1} over herbicide strip. However, to establish a sweet cherry orchard with woven fabric, the grower would spend an additional \$4,332 ha^{-1} over herbicide strip. In conclusion, woven fabric is a profitable and sustainable in-row ground management alternative to herbicide strip for orchards from a long-term perspective.

KEYWORDS

Polypropylene Ground Cover; Sweet Cherry; Leaf Nutrition; Fruit Storability; Annual Gross Returns; Annual Cost; Annual Net Returns; Cumulative Net Returns; Present Value

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