Weed Management in Fresh Market Spinach (*Spinacia oleracea*) with Phenmedipham and Cycloate

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Fresh market spinach has a limited number of herbicides and the weed management in this crop depends upon hand weeding. Phenmedipham is a post emergence herbicide registered in California for use on processing and seed spinach (at rates ranging between 550 to 1100 g ai ha\(^{-1}\)), but not fresh market spinach. This study evaluates the potential for use of phenmedipham for weed control in fresh spinach in combination with cycloate. Greenhouse and field studies were conducted in 2013 using high and low phenmedipham tolerance spinach varieties. The greenhouse studies showed that phenmedipham at rates of 270 g and 550 g ai ha\(^{-1}\) was safe to spinach when applied at the four leaf stage for the low and high tolerance varieties, respectively. Phenmedipham was evaluated in four field experiments applied to four leaf spinach. It was applied alone at 550 g ai ha\(^{-1}\), and then as a sequential application following cycloate (pre emergence, 1700 g ai ha\(^{-1}\)) at rates ranging from 90 to 270 g ha\(^{-1}\). When applied as a single application, phenmedipham was safe to spinach but the weed control was no better than cycloate alone. When applied as a sequential treatment following cycloate, all phenmedipham rates were safe and significantly reduced the weed biomass compared to cycloate alone. Cycloate Fb phenmedipham at 270 g ha\(^{-1}\) provided 87% weed control relative to cycloate alone. This level of weed control was similar to the cycloate plus hand weeding treatment which provided 98% control. Results here show that of cycloate Fb phenmedipham improves weed control compared to cycloate alone, and has the potential to reduce need for hand weeding in fresh spinach.