

Crop safety evaluation of pendimethalin formulations and other herbicides in fig. Phoebe Gordon<sup>1</sup>, Drew Wolter<sup>2</sup>, and Brad Hanson<sup>3</sup> (<sup>1</sup>Orchard Systems Advisor, UCCE Madera and Merced Counties; <sup>2</sup>Graduate Student, UC Davis; <sup>3</sup>Weed Science Specialist, UC Davis).

A trial was conducted in a commercial fig orchard in Fresno County to evaluate the crop safety of two pendimethalin formulations, isoxaben, and indaziflam. Indaziflam (Alion) was recently registered on fig, isoxaben (Trellis) has a non-bearing label on fig, and pendimethalin (Prowl H2O and Satellite HydroCap) have been proposed as potential registration targets by the industry.

The trial was initiated February 7, 2020, when second year 'brown turkey' fig trees were still dormant (Table 1). The orchard is located in western Fresno County and soil at the site is a Panoche clay loam, which typically has organic matter less than 1% and a pH close to 8.0. The grower cooperated and applied a mix of Roundup, Chateau, Goal 2XL, Induce, and Grounded in order to kill emerging winter weeds a few weeks before the initiation of the trial.

The crop safety experiment was conducted in a single row of figs and arranged as a randomized complete block design with 4 replications and 10 ft by 10 ft plots (1 tree per plot). Preemergence herbicide treatments included flumioxazin (Chateau, Valent Biosciences) at 12 (1x) and 24 (2x) oz /A; two different pendimethalin products (Satellite HydroCap, UPL; and Prowl H2O, BASF) at 128 fl oz/A (1x) and 256 fl oz/A (2x); indaziflam (Alion, Bayer CropScience) at 3.5 fl oz/A (1x) and 7 fl oz/A (2x); and isoxaben (Trellis, Corteva Agriscience) at 21.3 fl oz/A (1x) and 42.6 fl oz/A (2x) (Table 2). Herbicide treatments (Table 2) were applied to the soil surface in a 5' band on both sides of the tree row using a CO<sub>2</sub> pressurized backpack sprayer calibrated to deliver 30 GPA at 30 PSI through three TeeJet AIXR11003 flat fan nozzles.

*Table 1.* Application data.

Application date	2/7/2020
Air temperature (F)	53
Soil temperature (F)	na
Relative humidity (%)	50
Wind (mph) and direction	0-3 south

Visual crop safety ratings were done blind (Table 2) at approximately one month intervals from March through June. Symptoms were visually rated on a presence/absence of specific herbicide symptoms or any abnormal growth. Fruit yield was not determined due to the young age of the orchard; any fruit that was formed were removed before maturity to prevent them from entering the market.

At the first evaluation (Table 2), budbreak had just initiated and no phytotoxicity symptoms were easily discernable. All trees in the trial and surrounding orchard displayed fig mosaic virus symptoms at leafout (light chlorotic mottling on leaves) and those symptoms persisted until June. Notes from later "blind" observations indicated some apparent phytotoxicity or stunting. However, there was no consistent pattern of injury among replicated plots of the same treatment or a clear dose-response (the low rates or untreated trees had similar levels of abnormal growth as the higher herbicide rates). Upon further evaluation, most of the observed symptoms were likely due to either incidental exposure to the grower's postemergence herbicides (contact herbicide damage or minor glyphosate injury) or random

tree-to-tree variability common in young orchards; similar issues were observed throughout the orchard outside of the plot area.

*Table 2.* Treatment-related injury ratings in a fig crop safety study in western Fresno County, CA in 2020.

Treatment	Rate (product/A)	3/26/20	4/24/20	5/22/20	6/26/20
untreated	0	0	0	0	0
flumioxazin (Chateau)	12 oz	0	0	0	0
flumioxazin (Chateau)	24 oz	0	0	0	0
indaziflam (Alion)	3.5 fl oz	0	0	0	0
indaziflam (Alion)	7 fl oz	0	0	0	0
pendimethalin (Prowl H2O)	128 fl oz	0	0	0	0
pendimethalin (Prowl H2O)	256 fl oz	0	0	0	0
pendimethalin (Satellite HydroCap)	128 fl oz	0	0	0	0
pendimethalin (Satellite HydroCap)	256 fl oz	0	0	0	0

<sup>a</sup>Injury observations were made blind as presence/absence of out of the ordinary growth; observed phyto or stunting of individual trees was subsequently attributed to non-treatment related issues.



Image 1: treated trees (row with pink flags) approximately one month after application.