Chemical Weed Control in Berry Crops. Steven A. Fennimore, University of California, Davis, at Salinas, CA, *Corresponding author email safennimore@ucdavis.edu

Strawberry has a very robust weed control system with several layers including: fumigants, colored mulches, herbicides, hand weeding and cultivation. Cultural practices like crop rotation and prevention of weed seed set in roadsides and ditches around the field are also important aspects of the weed control program. Strawberry is a very valuable crop and significant resources are spent to protect strawberry from weed loss, reduction in quality and weed interference with hand harvesting. While there are many aspects to weed control in strawberry, today we will focus on fumigants and herbicides.

Soil fumigants are volatile compounds that once injected into the soil disperse creating a temporary lethal condition to kill soilborne diseases, nematodes and weed propagules. While the main objective of the fumigants is to control soilborne diseases, weed control has been considered an important benefit of fumigation since the 1960s when methyl bromide fumigation came into widespread use (Wilhelm and Paulus 1980). The use of methyl bromide has been phased out in fruiting fields, but is still applied in strawberry runner plant fields where use is allowed because sanitation and plant quality are essential. Primary fumigants used now in California fruiting fields are chloropicrin (Pic), 1,3-dicloropropene (1,3-D), and metam potassium/sodium. Fumigants likely have multiple sites of action, but the primary mechanism is respiration inhibition. Weed seeds, and nutsedge tubers can be killed whether germinating or not, providing moisture conditions are adequate and fumigants are applied uniformly. The primary means of fumigant application are broadcast shank to treat the entire field, i.e., flat fumigation, where the soil is immediately covered behind the applicator and glued together in a solid sheet with each subsequent pass. Drip application of fumigants through the irrigation system is also a very common method of fumigant application. Weed seed of species like common chickweed are fairly susceptible to control with most fumigants, while hard coated weed seed like California burclover are very difficult to control with fumigants. Perennial weeds like yellow nutsedge are difficult to control with fumigants for several reasons such as the multiple growing points per tuber all of which must be killed, and the fact that nutsedge tubers can emerge from 8 to 12 inches deep which requires effective fumigant concentrations dispersed throughout a large volume of soil. Fumigant efficacy on weeds is improved though use of barrier films like TIF (totally impermeable film) which are designed to prevent fumigant emissions. TIF keeps fumigant concentrations in the soil at higher levels than standard plastic films, and weed control tends to improve with use of TIF.

Primary herbicides used in California strawberry are flumioxazin and oxyfluorfen. These products are applied across the entire field after bed formation 30 days before transplanting. Generally the herbicides are applied just before the plastic mulch is installed. It is important to have plastic mulch installed before transplanting to protect the strawberry leaves from the herbicide treated soil. Other soil applied herbicides include napropamide, and pendimethalin. Paraquat is useful in strawberry before transplanting to kill emerged weeds, and as a directed

spray to kill weeds in the furrows either alone or in combination with other herbicides. Grass specific herbicides include clethodim and sethoxydim which are quite safe for use around strawberry, but are seldom used in California due to the fact that most of the weeds in strawberry are broadleaf weeds.

References

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