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A crossroads for strawberries

Seven articles in this issue speak to a longstanding question: What will the California strawberry industry look like without methyl bromide?

2016 marks the last year in which California growers will use methyl bromide, a highly effective soil fumigant that kills a wide range of pests, from fungi to insects to weeds. First identified as an ozone-depleting compound in 1991, methyl bromide was scheduled for phaseout in the United States by 2005 under the Montreal Protocol, an international agreement to protect the stratospheric ozone layer. While methyl bromide was used on many crops, it was perhaps most irreplaceable for California strawberries, which helped the industry win exemptions that have allowed a significant, though declining, quantity of the chemical to be used through 2016. Despite years of research into alternatives, no equally effective replacement has emerged.

Strawberries are California's third-largest crop, behind only almonds and grapes, with annual farmgate sales of \$2.5 billion (2014). In our first research article (page 107), Laura Tourte et al. review economic data on the berry sector — blackberries and raspberries as well as strawberries — in Santa Cruz and Monterey counties, and look ahead to factors, including the phaseout of methyl bromide, that are likely to shape future growth.

In a paper chronicling events leading up to the 2012 withdrawal of methyl iodide, once promoted as a viable methyl bromide substitute, Julie Guthman

(page 124) reports survey findings that point to a variety of reasons why strawberry growers did not move quickly to adopt the chemical after it was approved by state regulators. Concerns about public opposition topped the list, followed by a variety of other factors, including concern about methyl iodide's toxicity, and a lack of strong incentive to switch to the new chemical because of the availability of other fumigants, including methyl bromide.

Three articles look at new approaches to managing soilborne pests without methyl bromide. In this issue's Outlook (page 101), Margaret Lloyd and Tom Gordon make the case for using a suite of strategies to manage soilborne pathogens — including collective action among growers to help limit the spread of pathogens between fields. A news item (page 104) on research at the UC ANR Hansen Agricultural Research and Extension Center covers ongoing research on anaerobic soil disinfestation, a chemical-free technique that is being used in a growing number of commercial fields. And a paper by Amanda Hodson and Edwin Lewis (page 137) reviews a variety of approaches to managing for soil health — in strawberries and other crops — as a pest suppression strategy.

Fumigants other than methyl bromide, such as chloropicrin, remain widely used in California strawberry production. Rachael Goodhue et al. (page 116) examine how increasingly stringent buffer zone requirements for chloropicrin application impact growers differently depending on their proximity to developed land. Shachaf Triky-Dotan et al. (page 130) report on the effectiveness of several fumigants at dosages lower than the maximum label rate.

The issue also includes two research papers not focused on strawberries. Patrick Baur et al. (page 142) report results from a survey of produce growers regarding on-farm food safety practices. They found that practices that may negatively impact wildlife, such as exclusion fencing and vegetation clearing, remain widespread, despite a lack of clear evidence that they have a food safety benefit. Finally, Daniel Geisseler and Gene Miyao (page 152) review the use of soil testing to guide the management of soil phosphorus and potassium in California cropping systems.

Note: The research papers on strawberries in this issue were assembled through the journal's normal submission and peer-review process. That is, by coincidence, the journal accepted a number of strawberry-related papers at roughly the same time; there was no special solicitation of papers about strawberries. **CA**

—Jim Downing, Executive Editor



Elena Zhukova