Pre-Plant Injection of Steam for Controlling Soilborne Pathogens and In-Row Weeds:

Summary of Trial Results

Mark C. Siemens

Vol. 13, Issue 05, Published 3/09/2022

A couple of weeks ago, I presented summarized results of our multi-year trials examining the use of band-steam to control sclerotinia lettuce drop, Fusarium wilt of lettuce and in-row weeds at the 2022 Southwest Ag Summit. Band-steam has been described in previous UA Veg IPM articles (Vol. 12 (5), Vol. 11 (15). Briefly, the concept behind band-steam is to disinfest narrow bands of soil centered on the seedline using high temperature steam prior to planting.

Results varied as you might expect depending on field conditions, but in general, injecting steam pre-plant was found to provide very good on weed control (85-100%), and reasonable control of sclerotinia (up to 70%) and Fusarium (>40% when initial inoculum levels were moderate). Crop yield increases of 24% to more 40% were found in trials (5) conducted in fields with varying levels of disease history. Energy requirements and fuel costs were high (~$900/acre) when initial soil temperatures were low (50°F, winter), but much more reasonable (~178/acre) when initial soil temperatures were high (110°F, winter).

We concluded that band-steam may be a viable technique for controlling soilborne pests in high value conventional and organic vegetable crops, particularly if steam is applied when initial soil temperatures are high and the significant yield increases found in our studies can be realized at the field scale level. The presentation was uploaded to YouTube where you can find more specific details and to see the band-steam applicator in action. To see the presentation, click here or on the link below.

Acknowledgements

This work is partially funded by the Arizona Iceberg Lettuce Research Council, Arizona Specialty Crop Block Grant Program and USDA-NIFA Crop Protection and Pest Management Program.

Fig. 1. Image from "Novel Band-Steam Applicator for Controlling Soilborne Pathogens and Weeds" presentation given at the 2022 Southwest Ag Summit.