The Economic Value of Pelargonic Acid as a Natural Herbicide in Sweet Bell Peppers

Merritt J. Taylor, Charles L. Webber III, and James W. Shrefler

INTRODUCTION

As an important U.S. fresh-market vegetable crop, bell pepper domestic consumption (11 lb/person) continues to increase (Wells et al., 2013). The increasing gap between domestic production and U.S. demand provides an opportunity for increased domestic bell pepper production (Wells et al., 2013). There is also an increasing demand by consumers for more naturally produced vegetable crops. Therefore, producers growing bell peppers for markets that desire the use of more naturally occurring herbicides need alternatives that effectively provide season-long weed control. Previous research with over-the-top applications of potential organic contact herbicides determined that at effective weed control herbicide rates crop injury was detrimental to profitable yields. A potential solution to increase weed control efficacy on larger weeds and decrease pepper injury is the use of sequential post-directed herbicide applications (herbicides sprayed at the base of the crop rather than over-the-top).

OBJECTIVE

Research was conducted to determine the economic value of sequential post-directed applications of pelargonic acid on weed control efficacy, crop injury, and yields in bell pepper.

RESULTS & DISCUSSION

Smooth crabgrass control (56%) and broadleaf weed control (66%) peaked at 1 DAT after treatment (DAT) with the 9% (15 lb/a) application rate (Figure 1 and 2). Yellow nutsedge control (33%) peaked at 3 DAT with the 9% rate and declined to 6% control at 28 DAT (Figure 3).

The lack of weed control for Scythe® application rates of 3, 6, and 9% (5, 10, and 15 lb/a) reduced the number and weight of peppers compared to the weed-free treatment.

The 9% (15 lb/a) application rate did increase the number of peppers produced (peppers/acre) and yield (lb/acre) compared to the weedy-check producing a positive return above costs (Table 1).

CONCLUSIONS

Although weed control and crop yields increased as application rates increased, the less than satisfactory weed control (yellow nutsedge) produced significantly lower pepper yields that the weedy-free treatment. The 9% (15 lb/a) pelargonic acid sequential post-directed applications did significantly control weeds compared to the weedy-control, and resulted in 4 times the fruit production (fruit/acre) and 3 times the yield (lb/acre) than the weedy-control (no weed control). Therefore, the highest level of pelargonic acid 9% v/v (15 lb/a) provided 2.8 times the gross revenue as that of the weedy control. The authors suggest that pelargonic acid be applied to smaller weeds to increase the weed control to acceptable levels (80% to 90%). The use of a hooded sprayer may also reduce crop injury without a significant decrease in weed control. Another option would be the use of a suitable pre-emergence herbicide to reduce the weed population and brighten prior the post-emergence application of pelargonic acid. The high price for the herbicide and the low or average market price for fruit produced a break-even situation regarding cost/benefits. Assuming the farmer would obtain a lower price for the herbicide with a volume discount and an increase in yields due to experience, quality soils, and protected or shielded herbicide application, the data indicate a positive return from use of pelargonic acid as a natural herbicide.

REFERENCES