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Population Densities of Lepidopteran Pests in Selected Cranberry Cultivars in Wisconsin

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Evaluation of Lepidopteran Population Densities in Selected Cranberry Varieties



Selected Cranberry Varieties



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INTRODUCTION

- Host resistance can be an important part of an IPM strategy.
- The most important pests of Wisconsin cranberry production are cranberry fruitworm, sparganothis fruitworm, and blackheaded fireworm.
- The objective of this experiment was to measure adult and larval population levels of these pests in five varieties of cranberry grown in Wisconsin.
- Differing population levels may indicate some host resistance.



Figure 1: P2 trap with pheromone lure.

MATERIALS & METHODS

- Population density assessments were conducted in commercial cranberry marshes in central Wisconsin near Wisconsin Rapids, Necedah and Warrens.
- The varieties assessed were Stevens, Ben Lear GH-1, Mullica Queen, and HyRed.
- 3 – 5 replicate beds were evaluated for each variety.
- Adult population assessment (2013 and 2014): One P2 trap (figure 1) baited with female sex pheromone per pest moth species plus one control unbaited trap was placed in one of two adjacent beds (figure 2) of each variety for season long monitoring of male moths.
- Fruit damage and larval population assessment (2014 and 2015): Infested berries and webbed uprights were collected along a 100 meter transect (figure 3) once per week for 3 weeks. Larvae were identified.

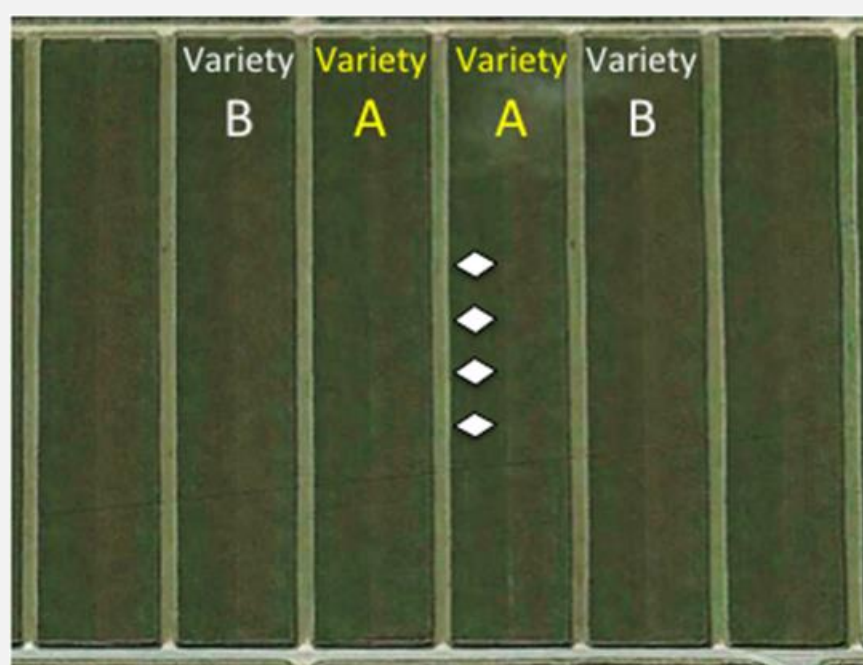


Figure 2: Trap placement diagram. Adjacent beds of the same variety (A).

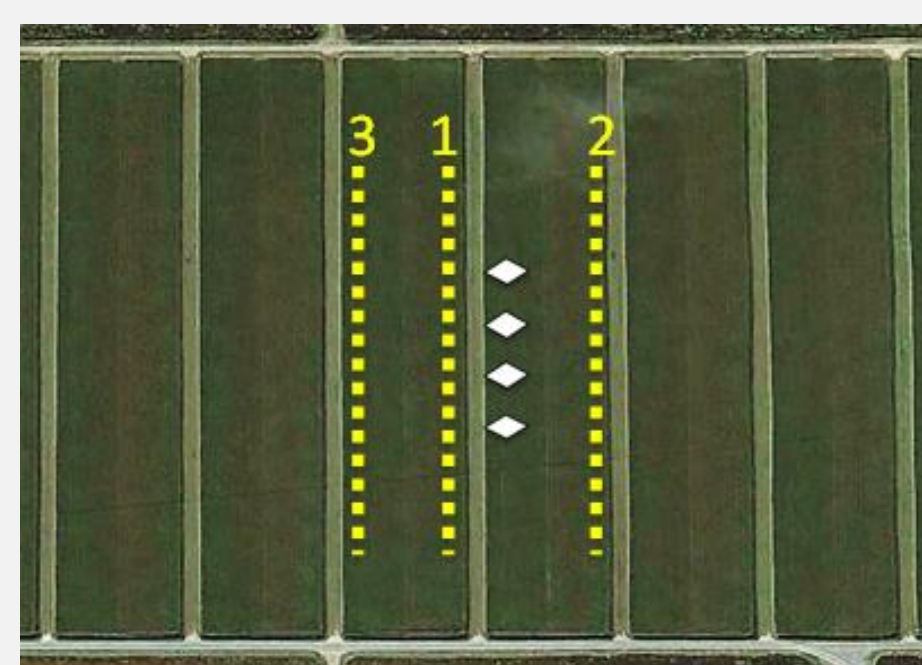


Figure 3: Larvae sampling transects.

ABSTRACT

Host plant resistance, an important strategy of Integrated Pest Management, was examined in the American Cranberry. This study assessed field population densities of the three most economically important pest insects in Wisconsin: *Rhopobota naevana*, *Sparganothis sulfureana*, and *Acrobasis vaccinii* in five different cranberry cultivars, i.e. Stevens, Ben Lear, GH-1, Mullica Queen, and HyRed. Adult populations were monitored using pheromone traps, and larval damage was assessed along transects in commercial cranberry beds. More than 99% of larvae collected were cranberry fruitworm. Mullica Queen and Ben Lear had more damaged berries than Stevens or GH1, and had more larvae than GH1. Conversely, fewer adult male sparganothis fruitworm were found in Ben Lear and Mullica Queen beds than in beds of Stevens or GH1. Adult populations of cranberry fruitworm and blackheaded fireworm were not different among cultivars.

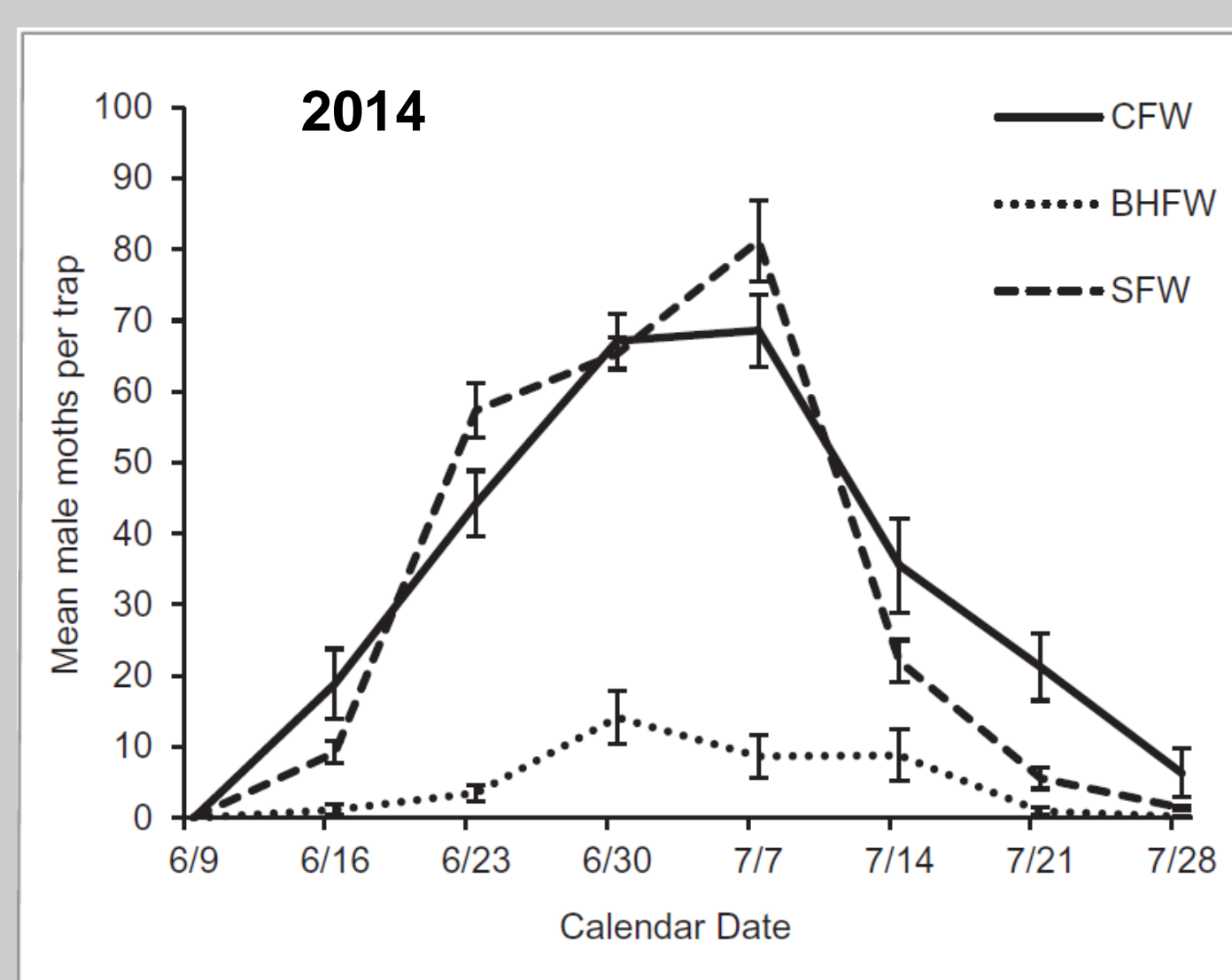


Figure 4: Mean number of male moths captured in baited traps per week in 2014

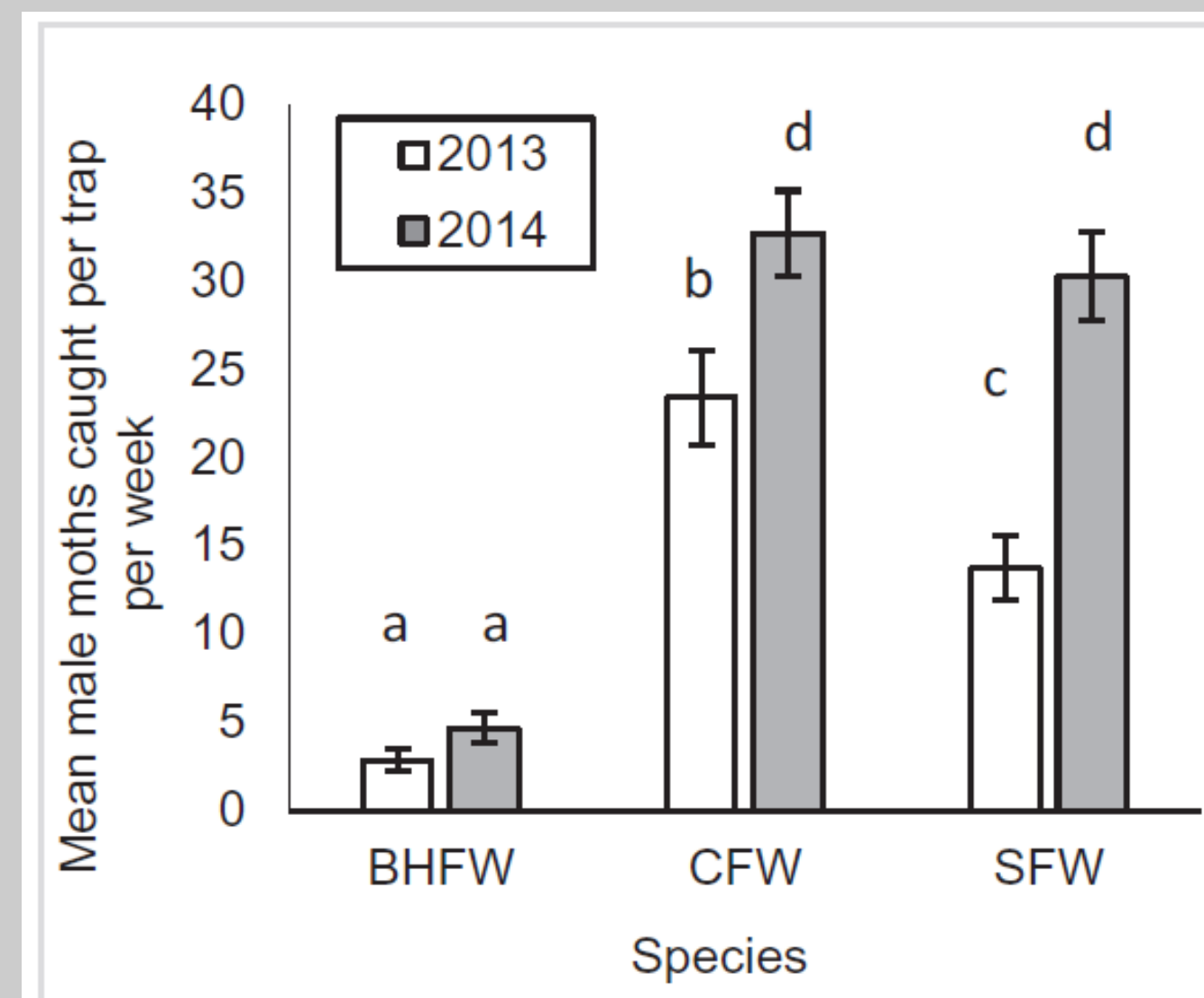


Figure 5: Mean number of male moths captured in baited traps per week

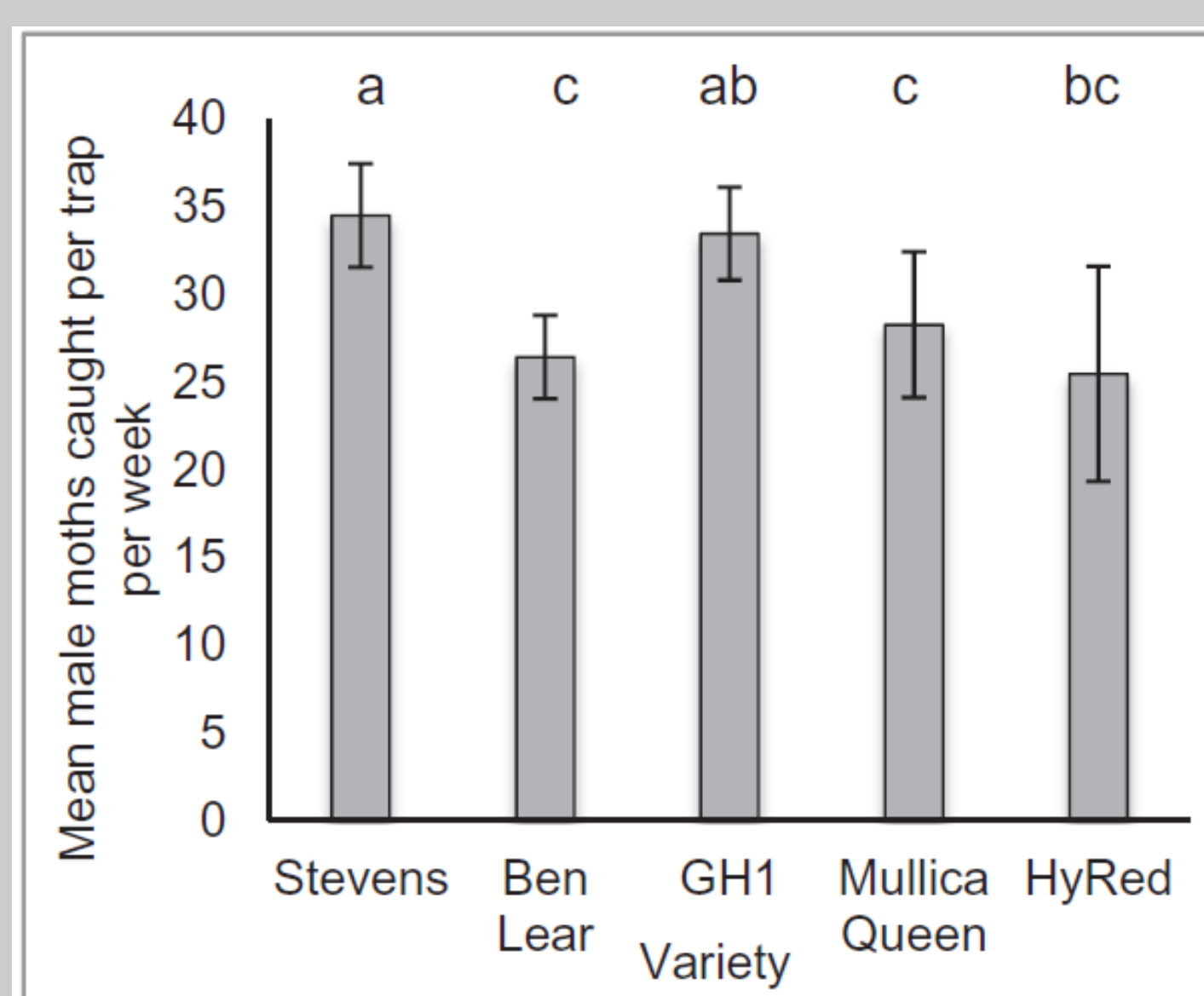


Figure 6: Mean number of sparganothis fruitworm moths captured in each cultivar per week.

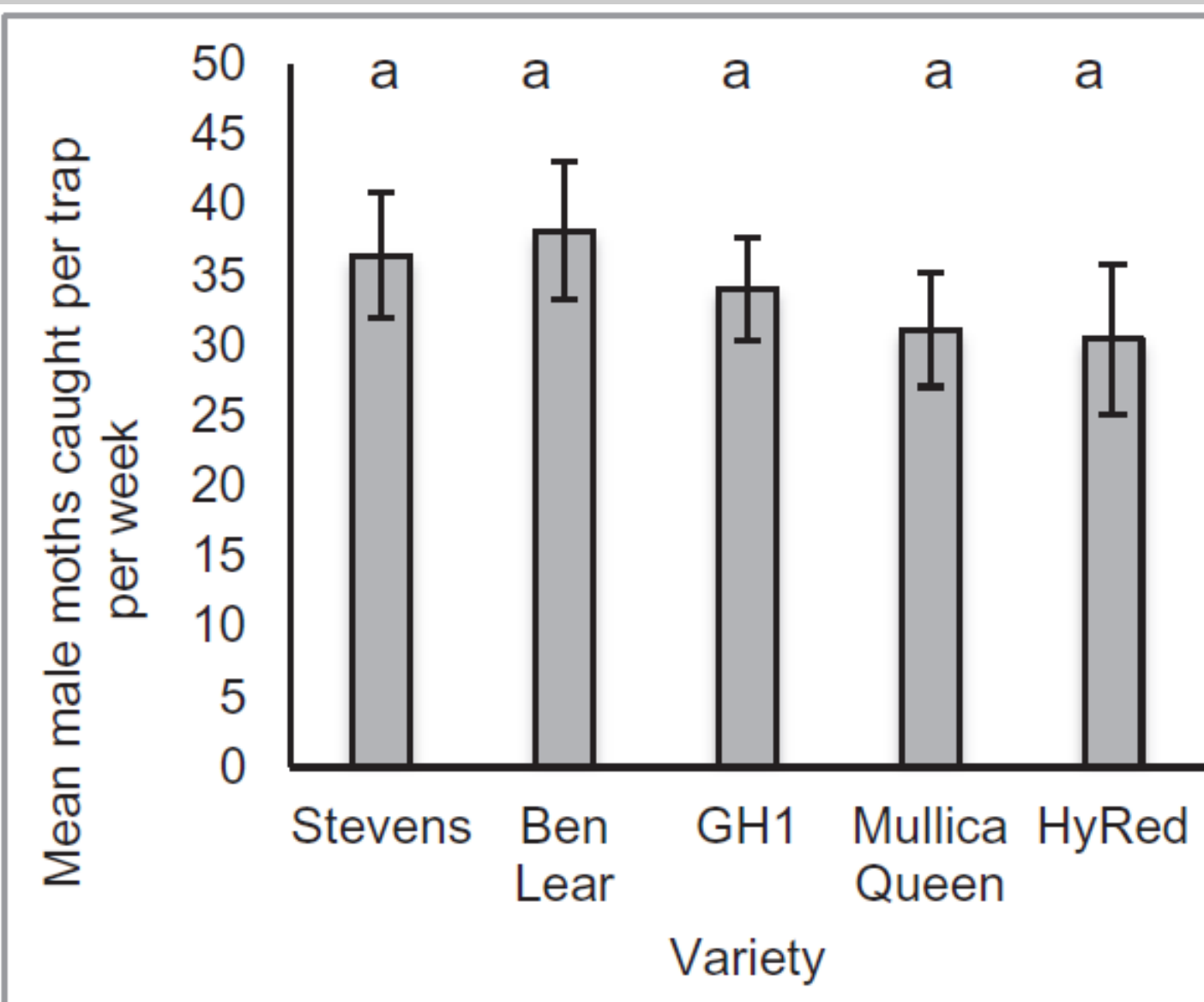


Figure 8: Mean number of cranberry fruitworm moths captured in each cultivar per week.

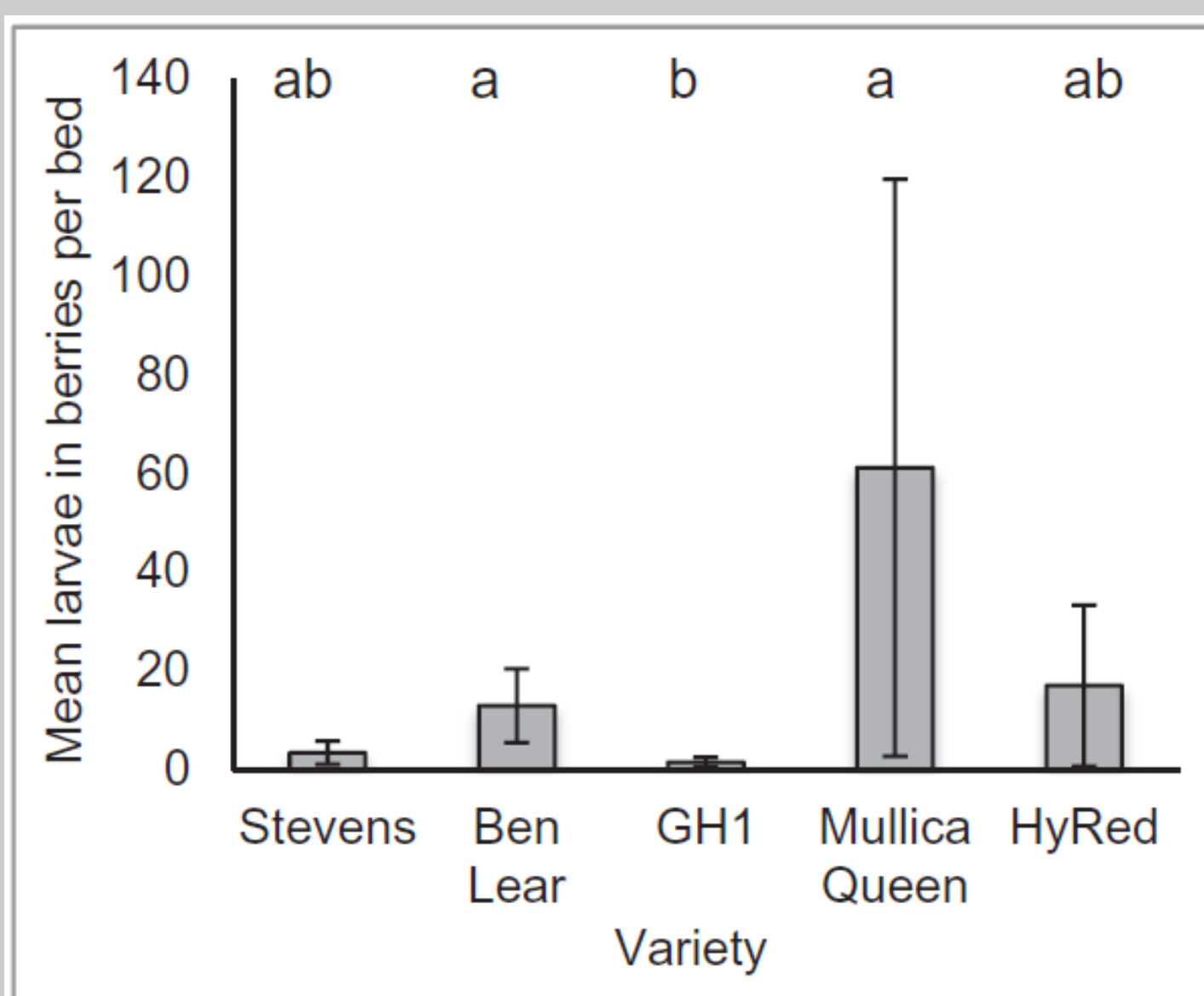


Figure 10: Mean number of larvae collected per bed per week for each cultivar.

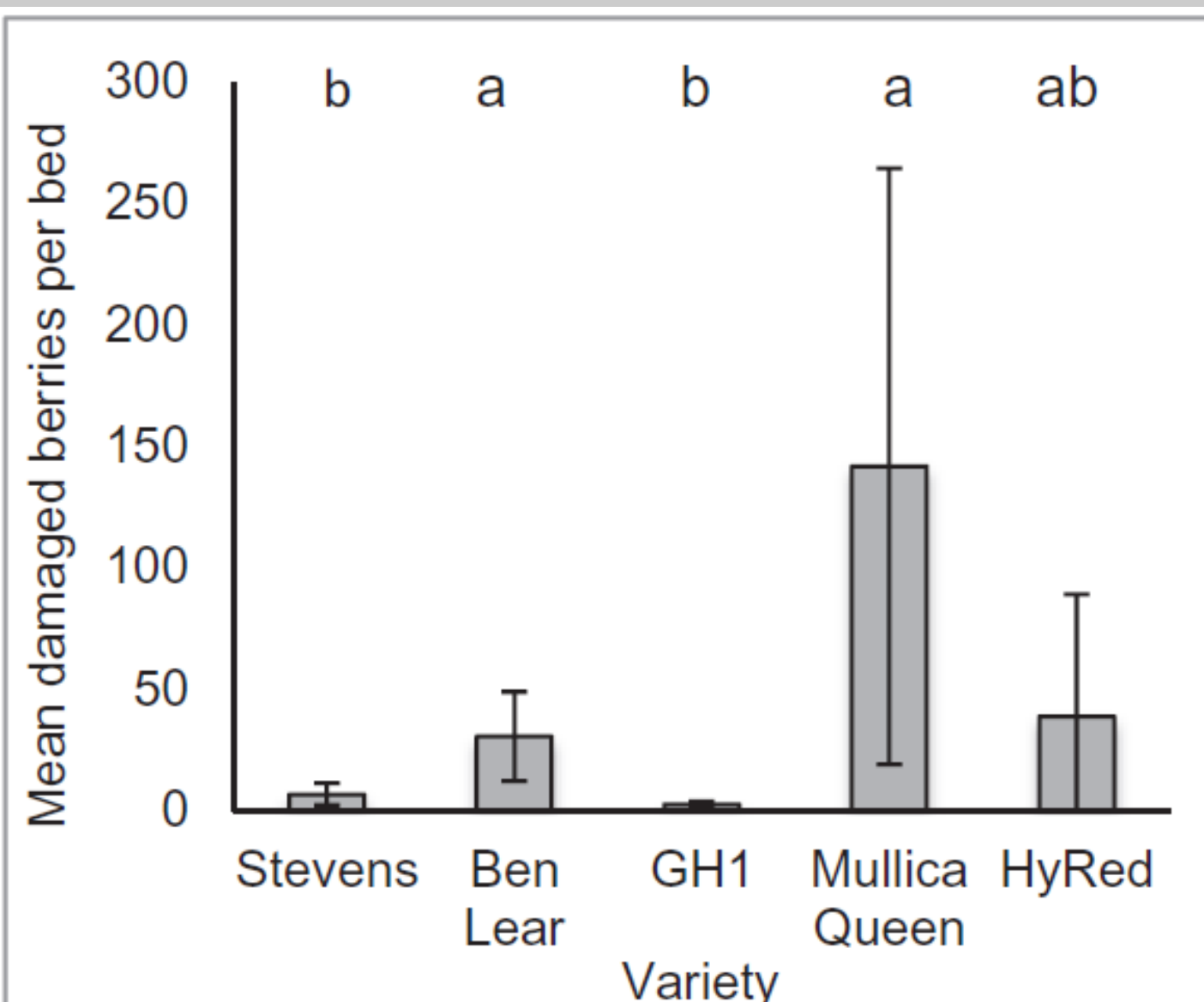


Figure 9: Mean number of damaged berries collected per bed per week for each cultivar.

RESULTS

- More adult male cranberry fruitworm and sparganothis fruitworm moths were captured in 2014 than 2013 (figure 5).
- Only sparganothis fruitworm adult populations were significantly different between varieties ($F_{4,31} = 3.57$, $P = 0.009$) (figures 6-8), with Ben Lear and Mullica Queen being significantly lower than Stevens and GH1 and HyRed being lower than Stevens (figure 6).
- Significant differences were found in the number of damaged berries ($F_{4,29} = 4.16$, $P = 0.009$; figure 9) and larvae ($F_{4,20} = 3.30$, $P = 0.042$; figure 10) found per bed among varieties. Mullica Queen and Ben Lear had the most damaged berries found, significantly higher than Stevens and GH-1. Similarly Mullica Queen and Ben Lear had the most larvae, significantly higher than GH-1. There was a large range in number of damaged berries between individual beds (0 – 1926 berries).

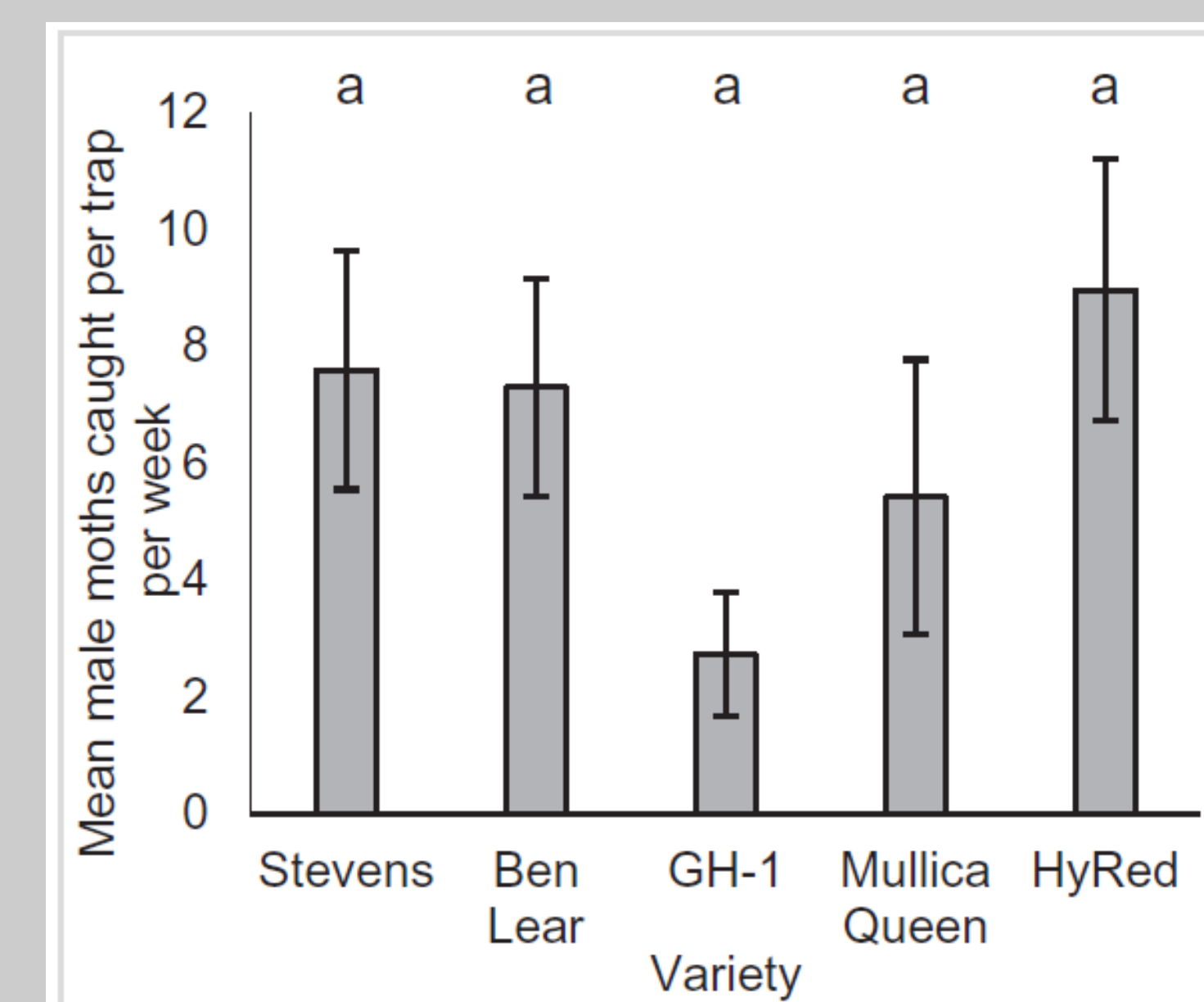


Figure 7: Blackheaded fireworm moths captured in each variety.

DISCUSSION

These results showed that fruit infestation and larval densities of cranberry fruitworm were significantly lower in some cranberry cultivars, indicating that certain varieties may be less susceptible to cranberry fruitworm, the number one pest of cranberry in Wisconsin. Specifically, Stevens and GH-1 hosted significantly fewer larvae than Ben Lear and Mullica Queen. Conversely, this study showed that male sparganothis fruitworm moths were less abundant in Ben Lear and Mullica Queen beds than in others suggesting that these varieties may exhibit a degree of host plant resistance.

Acknowledgments

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