

Unexpected observations in catch basins treated with extended release briquettes

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Introduction

Many extended release briquettes are labeled to provide 5–6 months of larval control, which is ideal, considering the thousands of catch basins (CB) that must be treated in a season. However, post-treatment inspections frequently found larvae in treated CB. A study by the North Shore Mosquito Abatement District, IL showed similar findings (Harbison et al. 2017). The aim of our study was to gain insight as to why extended release briquettes were not working for as long as expected and why a high number of CB were found with unacceptable quantities of mosquito larvae.

Methods

The larvicide products that were evaluated, Altosid XR-Briquets, FourStar Briquets, FourStar Bti Briquets, and Natular XRT Tablets, were reported by the manufacturers to control mosquito larvae in CB for 150, 180, 150 and 180 days post treatment, respectively. The primary active ingredient in each larvicide was methoprene, *Bacillus sphaericus*, *Bacillus thuringiensis* subspecies *israelensis*, or spinosad, respectively. Of the four active ingredients in the larvicide products that were evaluated, only methoprene does not kill larvae, and instead prevents larval molting or adult mosquito emergence from pupae. Consequently, to evaluate the efficacy of Altosid XR-Briquets for controlling mosquitoes in CB, mosquito larvae were collected from CB and adult mosquito emergence was recorded. Each larvicide was evaluated separately in a CB that contained mosquito larvae during the year prior to the present study ($n = 20$ CB per larvicide tested). The treated CB were inspected for the presence of mosquito larvae once every two weeks. The average water depth inside basins was 50 cm. Because all the CB in the study contained mosquito larvae during the prior year and preventing the emergence of adult mosquitoes is the primary goal of our District, untreated control CB were not included in the present study. CB that were found to never contain larvae during the study were removed from calculations. The reported error values are standard error of the mean.

Results and Discussion

On average, $55 \pm 14\%$ of the CB contained mosquito larvae two weeks after the product was placed into the CB

(Table 1; range of 10 – 85%). At four weeks post-treatment, $61 \pm 12\%$ of the treated CB contained mosquito larvae (Table 1; range of 25 – 90%). At both time points, CB that were treated with a Natular XRT Tablet were least likely to contain mosquito larvae. As expected, the proportion of CB that contained mosquito larvae was highest for those that were treated with an Altosid XR-Briquet. Although FourStar Briquets and FourStar Bti Briquets contain active ingredients that quickly kill mosquito larvae, over half of the CB that were treated with those products contained mosquito larvae. When mosquito larvae that were collected from the CB two weeks post treatment were reared in the laboratory, we found that adult mosquitoes would have successfully emerged from $41 \pm 14\%$ of the treated CB (Table 2; range of 0 – 78%). For mosquito larvae that were collected from CB four weeks post treatment, $56 \pm 9\%$ of

Table 1.—Proportion of CB that contained larvae two and four weeks after treatment with larvicide. The row that is labeled “# of CB lacking larvae” includes the inspection immediately prior to treatment and two- and four-weeks post treatment.

	Altosid XR	FourStar	FourStar Bti	Natular XRT
2 weeks post treatment				
% CB with larvae	85	60	65	10
# CB with larvae	17/20	12/20	13/20	2/20
4 weeks post treatment				
% CB with larvae	90	55	75	25
# CB with larvae	18/20	11/20	15/20	5/20
# CB lacking larvae	2	3	5	9

Table 2.—Adult mosquito emergence from water samples that were collected from treated CB that contained mosquito larvae.

	Altosid XR	Four Star	FourStar Bti	Natular XRT
2 weeks post treatment				
% CB with emerged adults	35	50	78	0
# CB with emerged adults	6/17	6/12	10/13	0/2
4 weeks post treatment				
% CB with emerged adults	28	64	53	80
# CB with emerged adults	5/18	7/11	8/15	4/5

the treated CB would have allowed adult mosquitoes to emerge (Table 2; range of 28 – 80%). Adult mosquitoes emerged from more than a quarter of the mosquito larva samples that were collected from CB treated with an Altosid XR-Briquet and more than half of those that were treated with a FourStar Briquet or FourStar Bti Briquet. Although relatively few CB that were treated with a Natular XRT Tablet contained mosquito larvae, 80% of those that did would have allowed adult mosquitoes to emerge.

Conclusion

Products that claim to control mosquitoes in CB for several months sounds perfect, but our current results and others have shown that this claim is too good to be true.

Our study emphasized the importance of post-treatment inspections and proper product selection.

Acknowledgements

We thank our colleagues at Alameda County Mosquito Abatement District for impactful discussions that improved the outcome of the work described herein.

References Cited

- Harbison, J.E., M. Henry, R.S. Nasci, and A.B. Runde. 2017. Effectiveness of five products to control *Culex pipiens* larvae in urban stormwater catch basins. *J. Am. Mosq. Control Assoc.* 33:309–317.