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Control of Brown Marmorated Stink Bug with Insecticide-Treated Window Screens

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Introduction

In Virginia and other Mid-Atlantic states, the invasive brown marmorated stink bug (BMSB) has become a serious nuisance pest (Rice et al. 2014). Each fall, these insects aggregate on buildings seeking shelters in which to spend the winter months (Fig. 1). A licensed pest control professional can treat buildings for stink bugs in the late summer or fall just prior to bug congregation. A number of insecticides are registered for structural pest control, but the relative effectiveness of these products is not completely known.

Figure 1. Adult BMSB aggregating on a building exterior.

It is also not known how long these chemicals remain effective after application. We conducted an experiment to evaluate the residual efficacy of several commercial pesticides registered for use on buildings (Table 1).

Experiment

Materials and Methods: In order to hold stink bugs on the treated surface long enough to assess insecticide toxicity, we made mesh bags (8 in x 16 in) from polyethylene window screen with three sides sewn together. On 24 September 2014, we treated bags with each of the nine currently labeled insecticide products by mixing each in a gallon of water according to the highest labeled rate (Table 1). Four bags were then dipped for five seconds into each of the insecticide solutions placed in a pan and all were allowed to dry approximately 1 hour. There were also four bags dipped into a water control. The experiment consisted of total of 40 treated screen bags that were arranged in a completely randomized design hung on a nylon clothesline that was placed in an area to allow exposure to ambient weather conditions, including temperature, wind, rainfall, and sunlight. This was to simulate typical degradation of each insecticide under normal conditions outside. Starting at one hour after treatment, 10 BMSB adults were placed in each bag, which was then fastened closed with a clothespin (Fig. 2.). After 48 hrs., mortality of the bugs was assessed by categorizing bugs as live, dead, or moribund (intoxicated and unable to right themselves when on their dorsal side). This process was repeated each week until none of the treated bags were killing bugs anymore. The bags remained in the field for the duration of the experiment.

Figure 2. Insecticide treated window screens with adult BMSB.

Table 1. Commercial insecticide treatments used in our experiments for BMSB control

Trade Name	Manufacturer	A.I.	Concentration of A.I.	Rate to Mix
Demand	Syngenta	lambda cyhalothrin	9.70%	24mL/gal
Tandem	Syngenta	thiamethoxam + lambda cyhalothrin	11.6% + 3.5%	32mL/gal
Tempo	Bayer	betacyfluthrin	20%	16mL/gal
Temprid	Bayer	imidacloprid + cyfluthrin	21% + 10.5%	16mL/gal
Fenvastar Plus	Rockwell Labs	esfenvalerate	8.40%	24.5mL/gal
Termidor	BASF	fipronil	9.10%	47.3mL/gal
Premise 2	Bayer	imidacloprid	75%	17.7mL/gal
Alpine	BASF	dinotefuran	40%	30g/gal
Arilon	DuPont	indoxacarb	20%	18.71g/gal

Results: Window screens dipped into an insecticide solution seemed to be an effective delivery method for this experiment. After two days in the field, all of the insecticide products except Arilon (indoxacarb) resulted in >80% mortality of bugs (Fig. 3). After 10 days in the field, Demand, Tandem, Tempo, Temprid, Premise 2, and Alpine provided effective control (mortality >80%). The aforementioned insecticide products contain either a pyrethroid (i.e., Demand and Tempo), a neonicotinoid (i.e., Premise 2 and Alpine), or both (i.e., Tandem and Temprid). After 22 days in the field, only Tandem, Tempo, and Temprid provided mortality above 80%. Demand, Tempo, and Temprid still showed some level of activity even after 40 days in the field. All of the other insecticides lost all of their efficacy by 29 days. We were able to show with this study that several commercial products containing pyrethroids alone and in combination with a neonicotinoid have the greatest residual activity for control of BMSB.

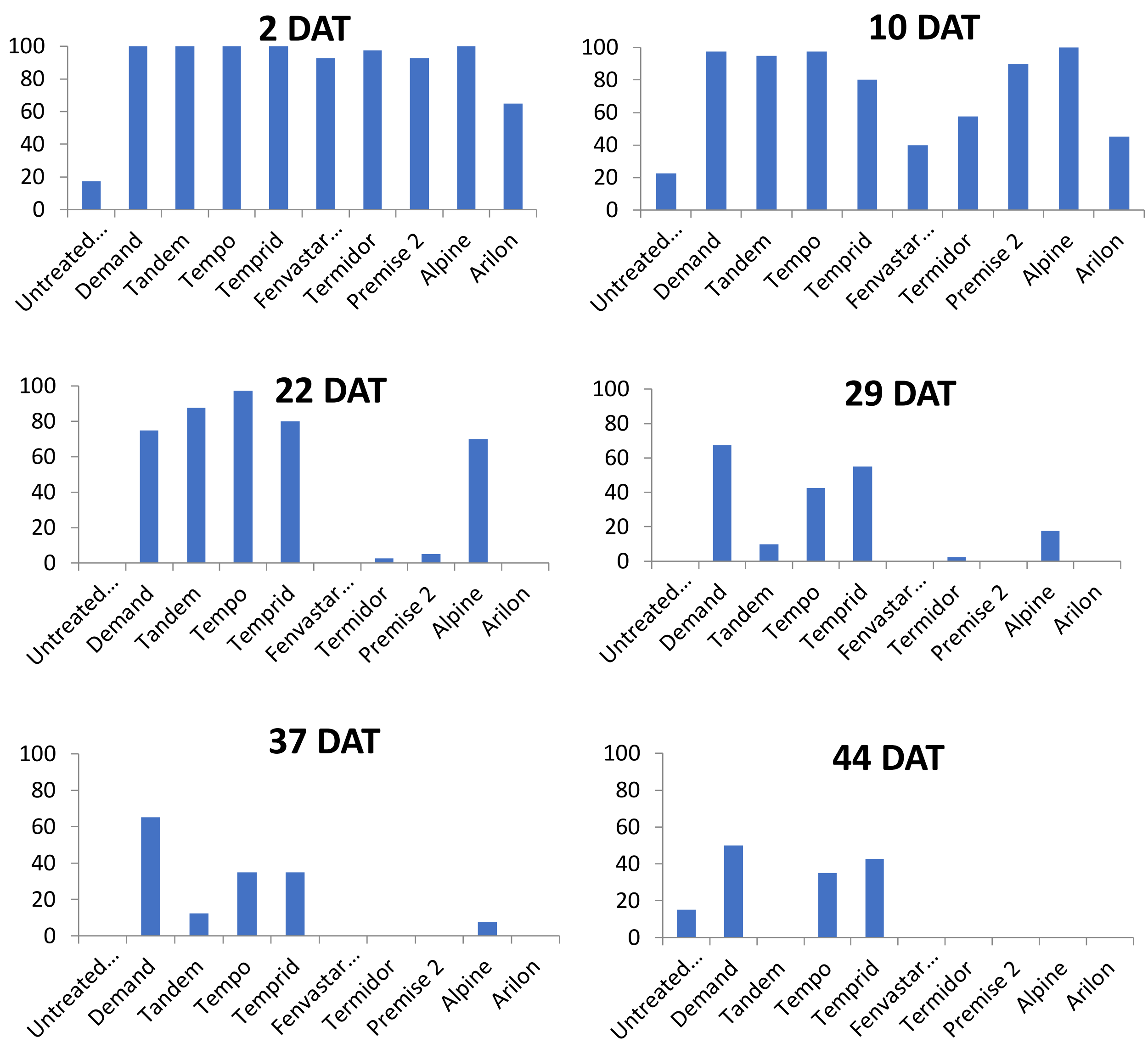

Figure 3. Percent mortality of BMSB after 2, 10, 22, 29, 37, and 44 days after exposure to insecticide treatments.

References

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