

The Evaluation of Insecticides for Control of the Hairy Chinch Bug in Ohio Lawns

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Introduction

The hairy chinch bug, *Blissus leucopterus hirtus* Montandon (HCB), is one of the top five pests of cool-season turfgrasses (Potter, 1998; Vittum *et al.*, 1999; Niemczyk and Shetlar, 2000). HCB has been a periodic pest, especially in lawns, since the rise of commercial lawn care in the 1970s. Research on its biology indicates that two generations per year are the norm over most of its range (Mailloux and Streu, 1981; Niemczyk, 1982; and Niemczyk *et al.*, 1992), though a single generation is often seen in Canadian Provinces (Shetlar, personal observations).

Some books and Extension fact sheets state that HCB is rarely a problem during wet seasons or in regularly irrigated turf. Over the last few years, we have been alerted by lawn-care specialists that they are seeing HCB infestations in high-quality lawns that are often irrigated. We have seen such infestations in the Dayton and Columbus, Ohio, areas. During the last four years, we have also seen a general increase in HCB activity in Ohio lawns, so we were presented with the opportunity to evaluate

new control materials. This is especially important as the Food Quality Protection Act has restricted from residential use the primary chinch-bug-control insecticides, chlorpyrifos (Dursban™) and diazinon.

Materials and Methods

In general, we perform HCB control trials on lawns that have been found to be infested with chinch bugs in June through September. Test areas are usually divided into 5' x 5' treatment plots, and the slate of treatments is replicated four times in a randomized complete block design.

Liquid treatments are usually applied with a four-foot-wide spray boom using a CO₂ pressure tank. Sprays are usually applied at 1.5 gallons of mix per 1,000 ft² followed with a light irrigation (see individual table notes for variations from this general protocol). Granular (dry) products are generally applied by shaker jars followed with a light irrigation, depending on the protocols.

Populations are sampled after treatments by twisting 4.5-inch diameter stainless steel cylinders (actually restaurant condiment containers with the bottom cut off) through the turf into the top inch of soil. These cylinders are then filled with water, and the chinch bugs are collected into alcohol as they float to the surface. Sampling locations are determined using

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a “biased” technique (*i.e.*, the turf within the center 4’ x 4’ area is spread to look for active chinch bugs in the thatch). If no chinch bugs are found after five attempts, the cylinder is placed in a spot that looks like it may have been damaged by chinch bugs.

Cylinders are kept filled until no chinch bugs float to the surface in a two-minute period. The chinch bugs are then sorted into groups — small nymphs (1 to 3 instar), large nymphs (4 to 5 instar) and adults — and recorded for statistical analysis. For rapidity-of-kill, samples are taken at three to seven days after treatment (DAT), at 10 to 14 DAT for maximum knock down, and at 21 to 28 DAT to determine residual effects.

In 2001, two studies were undertaken in early September in Springboro, Ohio (south of Dayton), when the second generation of HCB was ending its development. In 2002, two studies were undertaken in late August and early September in a home lawn in Dublin, Ohio (northwestern Columbus area). In 2003, three studies were undertaken in late

September into early October in a home lawn in Pickerington, Ohio (southeastern Columbus area). In 2004, three studies were undertaken in late August into early September in home lawns in Pickerington, Ohio.

Results

In 2001, the neonicotinoids, Merit™ (imidacloprid) and Arena™ (clothianidin), were found to be effective for control of HCB (Table 1). Tempo™ (cyfluthrin) was not effective, but Tempo Ultra™ (beta-cyfluthrin) and Talstar™ (bifenthrin) were effective pyrethroids. Testing of permethrin granulars (another pyrethroid) showed that it was not effective, even at very high rates (Table 2).

Studies in 2002 showed that Merit and Meridian™ (thiamethoxam, another neonicotinoid) were effective, but Arena yielded mixed results (Table 3). Scimitar™ (lambda-cyhalothrin) granular formulations (many were experimental) generally yielded satisfactory control of HCB when compared to a Talstar granular standard (Table 4).

Table 1. Efficacy of Insecticides Applied for Control of Hairy Chinch Bugs in a Home Lawn on August 30, 2001, Springboro, Ohio.

Treatment	Rate lb. ai./A	HCB/ft ² @ 7 DAT	% Control	HCB/ft ² @ 14 DAT	% Control
Merit 75WP	0.3	72.40	92 a	18.10	96 a
Arena 50WP	0.3	95.03	90 a	54.30	87 a
Arena 50WP	0.4	203.63	78 a	79.19	81 a
Tempo Ultra SC	0.1	165.16	83 a	156.11	63 ab
Tempo 20WP	0.2	735.31	22 b	597.30	0 c
Talstar 0.67SC	0.1	18.10	98 a	9.05	98 a
Check	—	943.46	— b	418.56	— bc

Plots 5’ x 5’ replicated 4 Xs. Application volume 1.5 gal./1,000ft². Averages are based on one 4.5” flotation area within each plot (raw totals were multiplied by 9.05 to get average per ft²). HCB population structure was: 515.85 1 to 3 instar, 332.59 4 to 5 instar, 95.03 adult @ 7 DAT; 162.9 1 to 3 instar, 165.16 4 to 5 instar, 90.5 adult @ 14 DAT. Percent controls followed by the same letter are not significantly different using LSD @ ≤ 0.05. Post-treatment irrigation: ~1/4” after 24 hr.

Table 2. Influence of Permethrin Insecticide Applied for Control of Hairy Chinch Bugs in a Home Lawn on August 30, 2001, Springboro, Ohio.

Treatment	Rate lb. ai./A	HCB/ft ² @ 7 DAT	% Control
Permethrin 0.5G	0.25	909.53	14 a
Permethrin 0.5G	0.5	816.76	23 a
Permethrin 0.5G	1.0	823.55	22 a
Permethrin 0.5F	0.43	721.74	32 a
Check	—	1,058.85	— a

Plots 5' x 5' replicated 4 Xs.
Averages are based on one 4.5" flotation area within each plot (raw totals were multiplied by 9.05 to get average per ft²). At 14 DAT an average of 373.3 HCB/ft² were found in the Permethrin 0.5G @ 1.0 lb.ai/ A plots, so no further sampling was undertaken. Percent controls followed by the same letter are not significantly different using LSD @ ≤ = 0.05.
Post-treatment irrigation: ~1/4" after 24 hr.

Table 3. Efficacy of Insecticides Applied for Control of Hairy Chinch Bugs in a Home Lawn on August 27, 2002, Dublin, Ohio.

Treatment	Rate lb. ai./A	HCB/ft ² @ 3 DAT	% Control	HCB/ft ² @ 15 DAT	% Control
Arena 50WP	0.3	47.5	32 a	221.9	29 abc
Arena 50WP	0.3	50.9	27 a	65.7	79 c
Confidential DP	0.25	29.4	58 a	142.6	54 bc
Confidential DP	0.125	55.5	21 a	332.8	00 a
Merit 75WP	0.3	24.9	65 a	63.4	80 c
Meridian 25WG	0.2	63.4	10 a	58.8	81 c
Talstar EZ 0.2G	0.1	34.0	52 a	98.5	69 c
Check	—	70.2	— a	312.5	— ab

Plots 5' x 5' replicated 4 Xs. Application volume 1.5 gal./1,000ft².
Averages are based on two 4.5" flotation areas within each plot (raw totals were multiplied by 9.05 to get average per ft²). Percent controls followed by the same letter are not significantly different using LSD @ ≤ = 0.05.
Post-treatment irrigation: ~1/4".

Table 4. Efficacy of Various Lambda-Cyhalothrin (Scimitar™) Granules for Control of Hairy Chinch Bugs in a Home Lawn on August 27, 2002, Dublin, Ohio.

Treatment	Rate lb. ai./A	HCB/ft ² @ 8 DAT	% Control	HCB/ft ² @ 16 DAT	% Control
lambda-c (1118)G	0.035	71.3	70 bc	45.3	80 b
lambda-c (1125)G	0.035	53.2	78 bc	49.8	78 b
lambda-c (1126)G	0.035	67.9	72 bc	82.6	63 b
lambda-c (1127)G	0.035	148.3	38 ab	63.4	72 b
lambda-c (1128)G	0.035	107.5	55 bc	38.5	83 b
lambda-c (1129)G	0.035	60.0	75 bc	36.2	84 b
Talstar EZ 0.2G	0.1	14.7	94 c	6.8	97 b
Check	—	240.0	— a	224.2	— a

Plots 5' x 5' ft replicated 4 Xs. Application volume 1.5 gal./1,000 ft².
Averages are based on two 4.5" flotation areas within each plot (raw totals were multiplied by 9.05 to get average per ft²). Percent controls followed by the same letter are not significantly different using LSD @ ≤ = 0.05.
Post-treatment irrigation: ~1/4".

In 2003, Merit and Arena produced satisfactory HCB control by 13 DAT, being slower to act than the standard, Talstar (Table 5). Spinosad (Conserve™, a microbial insecticide) formulations showed some suppression of HCB populations, suggesting that two applications may be necessary to achieve desired control.

An evaluation of acetamiprid (another neonicotinoid) showed that it has good potential as a HCB control product (Table 6). In the evaluation of combinations of Merit plus Talstar (Table 7), such combinations appeared to produce better results than Merit alone, but not better than Talstar alone.

In 2004, Arena and acetamiprid again showed that they are excellent neonicotinoid candidates for HCB control (Tables 8 and 9). The Merit and Talstar combinations continued to show excellent control (Table 9). In a search for alternate products that are botanical or biologically based, Spinosad and azadirachtin (Azatin™) formulations were evaluated as well as a new botanical essential oil (FACIN™, Tables 9 and 10). Azatin shows good promise, but Spinosad will likely

need sequential applications (possibly at 10 to 14 days) to achieve acceptable control. The botanical, FACIN, also shows good promise, but it may also need sequential applications to achieve high levels of HCB control.

Literature Cited

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Table 5. Efficacy of Insecticides Applied for Control of Hairy Chinch Bugs in a Home Lawn on September 18, 2003, Pickerington, Ohio.

Treatment	Rate lb. ai./A	HCB/ft ² @ 6 DAT	% Control	HCB/ft ² @ 13 DAT	% Control
Merit 75WP	0.3	246.5	58 bc	122.8	67 bc
Merit 75WP	0.4	223.6	62 bcd	83.4	78 cd
Arena 50WP	0.3	203.4	66 bcd	50.4	87 cd
Arena 50WP	0.4	173.2	71 cd	51.3	86 cd
Spinosad GR	0.4	189.7	68 bcd	194.2	49 b
Spinosad NAP	0.4	350.9	41 b	127.4	66 bc
Talstar EZ 0.2G	0.1	82.5	90 d	17.4	95 d
Check	—	592.8	— a	377.5	— a

Plots 5' x 5' replicated 4 Xs. Application volume 2.0 gal./1,000 ft². Averages are based on two 4.5" flotation areas within each plot (raw totals were multiplied by 9.05 to get average per ft²). Percent controls followed by the same letter are not significantly different using LSD @ ≤ 0.05. Post-treatment irrigation: none, but 1/4" rain occurred within 48 hours.

Table 6. Efficacy of Acetamiprid Insecticide Applied for Control of Hairy Chinch Bugs in a Home Lawn on September 18, 2003, Pickerington, Ohio.

Treatment	Rate lb. ai./A	HCB/ft ² @ 6 DAT	% Control	HCB/ft ² @ 13 DAT	% Control
Acetamiprid G	0.15	170.4	61 b	13.7	96 b
Acetamiprid G	0.30	109.0	75 b	16.5	96 b
Acetamiprid G	0.45	84.3	81 b	2.7	99 b
Acetamiprid G	0.60	82.5	81 b	2.7	99 b
Talstar EZ 0.2G	0.1	115.4	73 b	8.2	98 b
Check	—	432.5	— a	374.7	— a

Plots 5' x 5' ft replicated 4 Xs. Application volume 2.0 gal./1,000ft².
Averages are based on two 4.5" flotation areas within each plot (raw totals were multiplied by 9.05 to get average per ft²). Percent controls followed by the same letter are not significantly different using LSD @ ≤ 0.05.
Post-treatment irrigation: none, but 1/4" rain occurred within 48 hours.

Table 7. Efficacy of Talstar, Merit, and Combinations Applied for Control of Hairy Chinch Bugs in a Home Lawn on September 25, 2003, Pickerington, Ohio.

Treatment	Rate lb. ai./A	HCB/ft ² @ 6 DAT	% Control	HCB/ft ² @ 14 DAT	% Control
Talstar EZ 0.2G	0.1	25.7	86 b	4.6	98 c
Talstar EZ 0.2G	0.2	25.7	86 b	1.8	99 c
Merit 0.5G	0.3	88.0	52 b	66.0	72 b
Talstar F + Merit 2	0.15+ 0.15	20.2	89 b	3.7	99 c
Talstar F + Merit 2	0.2+ 0.2	36.7	80 b	1.8	99 c
Check	—	183.3	— a	232.7	— a

Plots 5' x 5' ft replicated 4 Xs. Application volume 2.0 gal./1,000ft².
Averages are based on two 4.5" flotation areas within each plot (raw totals were multiplied by 9.05 to get average per ft²). Percent controls followed by the same letter are not significantly different using LSD @ ≤ 0.05.
Post-treatment irrigation: none, but 3/8" rain occurred within 72 hours.

Table 8. Efficacy of Arena Formulations and FACIN Insecticide Applied for Control of Hairy Chinch Bugs in a Home Lawn on August 25, 2004, Pickerington, Ohio.

Treatment	Rate lb. ai./A	HCB/ft ² @ 7 DAT	% Control	HCB/ft ² @ 14 DAT	% Control	HCB/ft ² @ 28 DAT	% Control
Arena 50WP	0.2	6.4	95 b	0.0	100 c	0.9	100 b
Arena 50WP	0.3	0.0	100 b	7.3	97 c	0.0	100 b
Arena 50WP	0.4	2.8	98 b	0.0	100 c	0.0	100 b
Arena 0.5G	0.2	7.3	94 b	4.6	98 c	0.0	100 b
Arena 0.5G	0.3	5.5	96 b	0.9	100 c	0.0	100 b
Arena 0.5G	0.4	0.0	100 b	3.7	99 c	0.0	100 b
FACIN	8.5oz/M ^a	13.8	90 b	38.5	85 bc	1.8	99 b
FACIN	10oz/M ^a	25.7	81 b	94.4	64 b	76.1	71 b
Talstar F	0.2	2.8	98 b	5.5	98 c	0.9	100 b
Check	—	132.9	— a	260.4	— a	263.1	— a

Plots 5' x 5' replicated 4 Xs. Application volume 1.5 gal./1,000 ft² except FACIN was applied in 2.0 gal water per plot followed by another 2.0 gal water per plot.
Averages are based on two 4.5" flotation areas within each plot (raw totals were multiplied by 9.05 to get average per ft²). Percent controls followed by the same letter are not significantly different using LSD @ ≤ 0.05.
Post-treatment irrigation: none.
^a M = 1,000 ft²

Table 9. Efficacy of Acetamiprid and Merit/Talstar Combos Applied for Control of Hairy Chinch Bugs in a Home Lawn on August 25, 2004, Pickerington, Ohio.

Treatment	Rate lb. ai./A	HCB/ft ² @ 7 DAT	% Control	HCB/ft ² @ 14 DAT	% Control	HCB/ft ² @ 21 DAT	% Control
Acetamiprid	0.18	10.1	95 b	2.8	99 b	2.8	99 b
Acetamiprid	0.28	9.2	96 b	0.9	100 b	0.0	100 b
Acetamiprid	0.36	3.7	98 b	0.9	100 b	0.9	100 b
Acetamiprid	0.45	11.9	94 b	0.0	100 b	0.0	100 b
Talstar One	0.1	2.8	99 b	3.7	98 b	1.8	99 b
Talstar One	0.2	1.8	99 b	0.9	100 b	0.0	100 b
Merit 2 + Talstar One	0.2+0.16	1.8	99 b	0.9	100 b	0.0	100 b
Merit 2	0.3	19.3	90 b	10.1	95 b	0.9	100 b
Check	—	212.8	— a	212.8	— a	274.1	— a

Plots 5' x 5' ft replicated 4 Xs. Application volume 1.5 gal./1,000 ft².
Averages are based on two 4.5" flotation areas within each plot (raw totals were multiplied by 9.05 to get average per ft²). Percent controls followed by the same letter are not significantly different using LSD @ ≤ 0.05.
Post-treatment irrigation: none, but a significant rainfall event occurred within 24 hours.

Table 10. Efficacy of Alternate Products (Botanical and Biobased) Applied for Control of Hairy Chinch Bugs in a Home Lawn on August 10, 2004, Pickerington, Ohio.

Treatment	Rate lb. ai./A	HCB/ft² @ 5 DAT	% Control	HCB/ft² @ 14 DAT	% Control	HCB/ft² @ 28 DAT	% Control
Spinosad G	0.4	41.3	6 a	12.8	71 bcd	65.1	12 a
Spinosad G	0.6	24.8	44 ab	17.4	60 ab	61.5	17 ab
Azatin G	0.05	19.3	56 bc	16.5	63 abc	46.8	37 ab
Azatin G	0.1	6.4	85 bc	31.1	52 abc	32.1	57 bc
Bug-B-Gon Max (bifenthrin G)	0.2	2.8	94 c	4.6	90 cd	0.9	99 c
FACIN	8.5oz/M ^a	19.3	56 bc	6.4	85 bcd	33.0	56 bc
FACIN	10oz/M ^a	18.3	58 bc	3.7	92 d	24.8	67 bc
Check	—	44.0	— a	44.0	— a	74.3	— a

Plots 5' x 5' replicated 4 Xs. Application volume 1.5 gal./1,000 ft² except FACIN was applied in 2.0 gal water per plot followed by another 2.0 gal water per plot.

Averages are based on two 4.5" flotation areas within each plot (raw totals were multiplied by 9.05 to get average per ft²). Percent controls followed by the same letter are not significantly different using LSD @ \leq 0.05.

Post-treatment irrigation: none but rain came the night after the applications.

^a M = 1,000 ft²

