Efficacy and Residual of BAS 3201 (Metaflumizone) Granular Bait for Red Imported Fire Ant Control Using Broadcast Application in Urban Settings in Texas

Molly Keck, Program Specialist–Urban IPM, Texas Cooperative Extension
Robert Davis, BASF-Market Development Specialist

In the fall of 2006, a research trial was developed to determine the efficacy of Metaflumizone granular bait treatments (BASF Corp.) in the control of red imported fire ants using an area broadcast technique. Several research trails evaluating Metaflumizone have been initiated in the past, however, the objective of this trail was to determine the efficacy of Metaflumizone specifically in an urban setting. An urban area in this trail was defined as any area associated with a man-made structure. The areas chosen were a residential neighborhood and a business park composed of old homes developed into shops.

Materials

Urban areas associated with man-made structures were required for this experiment. Two sites were chosen based on these criteria. One site was located in Comal County, TX at a business park of approximately 10 acres (Site 1) (**Figures 1 & 2**). This business park was composed of old homes that had been developed into businesses. Each business or shop had a yard separated from other shops by a fence, resembling a residential neighborhood. The second site was located in Guadalupe County, TX in a residential neighborhood established approximately 3 years prior to the initiation of the experiment (Site 2) (**Figure 3**).

Figures 1 & 2. Examples of business shop at Site 1, Comal County, TX.

Figure 3. Example of residence at Site 2, Guadalupe County, TX.

It was necessary to use two separate sites for the experiment due to lack of adequate numbers of fire ant mounds found at each site. The sites were 2 miles away from one another, therefore soil type and rainfall was similar at each location.

Prior to treatments, mounds were counted and marked and the activity of each mound was recorded. Three treatment groups were designated: (1) untreated control, (2) the test product, Metaflumizone (0.063%), and (3) an industry standard, Ascend™. As per protocol developed by BASF Corp, treatment groups consisted of: one control, four Ascend™, and four Metaflumizone replications. Each replication consisted of at least 10 active fire ant mounds. Treatment groups were not adjacent to one another, and were separated by at least 50 yards.

Application of Ascend™ and Metaflumizone occurred mid morning, after dew had evaporated, while fire ants were actively foraging. To ensure fire ants were foraging, each plot was divided into a 4 part grid, and four hotdogs were placed in the grass each of each grid. Hotdogs were left out for at least 10 minutes before accessing fire ant activity. The presence of fire ants at hotdogs indicated active fire ant foraging (Figure 4). Application of Ascend™ and Metaflumizone only occurred when fire ants were actively foraging in at least one of the four grids within each plot. This ensured that the bait would be picked up and taken back into the fire ant nest.

Figure 4. Fire ants attracted to hotdog bait, indicating active fire ant foraging.

Ascend™ and Metaflumizone were applied with a handheld broadcast spreader, at the recommended labeled rate of 1.5 pounds per acre. Each plot size was measured, and square footage was determined in order to apply bait at the correct bait.

The untreated control group took place at Site 1, Comal County. All four plots in the Metaflumizone treated group occurred at Site 1, Comal County, and applications occurred 10/17/2007. Three Ascend™ treated plots occurred at Site 2, Guadalupe County, which were treated 10/18/2007, and one plot occurred at Site 1, Comal County, treated 10/21/2007. Variances in dates of application occurred due to fire activity and weather conditions.

Mound activity was measured pre-treatment and 3, 10, 30 and 60 days post-treatment. Mounds were measured for activity using a Lickert scale: mounds were disturbed by placing a metal flag into the center of the mound, vibrating the flag and estimating the number of ants that emerged. A rating of 0 indicated that no ants emerged within 10 seconds, at rating of 1 was assigned when 1-25 ants emerged, 2 meant 26-50 ants emerged, 3 meant 51-100 emerged, and 4 meant over 100 emerged when disturbed.

Foraging activity of fire ants was also evaluated pretreatment and 3, 10, 30, and 60 days post treatment. Four hotdogs were placed in each plot, allowed to remain for at least 10 minutes, and the presence or absence of fire ants was recorded. Foraging activity was measured using a Lickert scale in which a score of 0 indicated no ants were present at hotdogs, 1 meant 1-5 ants were present, 2 meant 6-10 ants were present, 3 meant 11-15 ants were present, and 4 meant 16 or more ants were present at a hotdog bait. The presence of fire ants indicated active fire ant foraging.

Statistical analysis was performed using Analysis of Variance, with means separated using the Tukey's HSD trail as $p<0.05$, SPSS 15.0.

Results and Discussion

Prior to treatment of Ascend™ and Metaflumizone, the mean activity of mounds was not significantly different between control and treated groups. However, Ascend™ and Metaflumizone treated groups were significantly different from one another at a 0.05 confidence interval. The Ascend™ treated group had low mound activity (mean of 3.55), whereas the Metaflumizone treated group had a higher mound activity (mean of 4.0). In addition, metaflumizone plots contained more active mound (n=44) than Ascend™ (n=58), which may have skewed data and caused the difference in mean mound activity between Ascend™ and Metaflumizone treated groups. (**Table 1)**

Three and 10 days post treatment, all treatment group mound activity were significantly different from one another: 3.91 in untreated control, Metaflumizone treated group mean mound activity decreased to 1.53, and Ascend™ treated group mean mound activity decreased to 2.30. Three and 10 days post treatment, Ascend™ treated group mound activity was also significantly different than Metaflumizone treated groups, indicating that Metaflumizone reduced mound activity significantly faster than Ascend™. (**Table 1)**

Thirty and 60 days post-treatment, Ascend™ and Metaflumizone had similarly decreased mound activity (0.59/0.61 and 0.27/0.12, respectively), and were both significantly different than untreated controls. (**Table 1).**

Table 1. Mean activity of fire ant mounds.

Treatment	Pretreatment	3 Days Post Treatment	10 Days Post Treatment	30 Days Post Treatment	60 Days Post Treatment
Untreated Control	3.91ab	3.91a	3.64a	3.00a	3.00a
Ascend™	3.55a	2.30b	1.39b	0.59b	0.61b
Metaflumizone	4.00b	1.53c	0.31c	0.27b	0.12b

Means in a column followed by the same letter are not significantly different at 0.5 level of confidence.

Means determined by Lickert Scale of estimated number of ants emerging to defend nest: 0 = 0 ants; 1 = 1-25 ants; 2 = 26-50 ants; 3 = 51- 100 ants; 4 = more than 100 ants.

An observation was made in Ascend™ and Metaflumizone treated groups that mounds relocated within at least one foot of the original mound. However, this was an observation made in both treated groups and was not limited to one specific treated group (**Appendices A & B**). Relocation was believed to have occurred when a mound marked pretreatment became inactive after treatment, and another active mound became present in the 60 day period of the experiment and was within one foot of the original mound. The Ascend™ treated group had an 11% relocation rate and Metaflumizone had a 8% relocation rate, both rates were very similar (**Appendices A & B**).

Pretreatment, fire ants were actively foraging, and there was no significant difference in the mean foraging activity between treatment groups. Three and 10 days post-treatment, there was a significant difference between untreated control and both treated groups. This indicates that both Ascend™ and Metaflumizone were effective in decreasing fire ant foraging activity. However, untreated control mean foraging activity also decreased from 2.50 to 0.75 and 0.50 (**Table 2)**. Untreated control group had only one plot as compared to 4 plots in both treated groups, which may have skewed the data. Thirty days post-treatment there was no foraging activity in any treatment group. Sixty days post treatment there was a significant difference in the mean foraging activity between untreated control and treated groups.

Overall, the mean foraging activity in all treatment groups was relatively low after treatments by Ascend™ and Metaflumizone. It is not believed that untreated control was accidentally affected by treatment of Ascend™ and Metaflumizone because the untreated control was approximately 200 yards from any treated group and separated by a concrete parking lot. The likelihood that fire ants may have foraged into treated plots is very low. The low foraging activity may be explained by weather or the times of day when plots were evaluated. (**Table 2) (Appendix D).**

Table 2. Mean foraging activity of fire ants at treatment group plots.

Treatment	Pretreatment	3 Days Post Treatment	10 Days Post Treatment	30 Days Post Treatment	60 Days Post Treatment
Untreated Control	2.50a	0.75a	0.50a	0.00a	0.50a
Ascend™	2.31a	0.19b	0.00b	0.00a	0.00b
Metaflumizone	2.31a	0.13b	0.00b	0.00a	0.00b

Means in a column followed by the same letter are not significantly different at 0.5 level of confidence.

Means determined by Lickert Scale of estimated number of ants attracted to hot dog bait: 0 = 0 ants; 1 = 1-5 ants; 2 = 6-10 ants; 3 = 11-15 ants; 4 = more than 16 ants.

These findings indicate that Metaflumizone is as affective against reducing mound activity as Ascend™, and acts significantly faster in reducing mound activity when compared to Ascend™. Broadcast applications of Metaflumizone significantly reduce mound activity 3 days after treatment, and mound activity remains significantly decreased throughout 60 days post-treatment.

Appendix A. Fire ant mound activity data in untreated control group.

Site	Mound #	Pretreat	4 day	10 day	30 day	60 day
Control	1	4	4	4	4	4
Control	2	4	4	4	4	4
Control	3	3	3	4	4	4
Control	4	4	4	4	1	4
Control	5	4	4	4	4	4
Control	6	4	4	4	4	4
Control	7	4	4	4	0	0
Control	8	4	4	0	0	0
Control	9	4	4	4	4	1
Control	10	4	4	4	4	4
Control	11	4	4	4	4	4

Appendix B. Fire ant mound activity data in Metaflumizone treated groups.

Site	Mound #	Pretreat 10/17	4 day 10/21	10 day 10/27	30 day	60 day
1- Front	1	4	4	4	3	0
1- Front	2	4	0	0	0	0
1- Front	3	4	1	0	0	0
1- Front	4	4	4	2	0	0
1- Front	5	4	4	4	0	0
1- Front	6	4	1	0	0	0
1- Front	7	4	4	4	0	0
1- Front	8	4	3	0	0	0
1- Front	9	4	1	0	0	0
1- Front	10	4	0	0	0	0
1- Front	11	4	1	0	0*	0
1- Front	12	4	1	0	0	0
1- Front	13	4	0	0	0	0
1- Front	14	4	0	0	0	0
2- Cur Nat	1	4	0	0	0	0
2- Cur Nat	2	4	0	0	0	0
2- Cur Nat	3	4	0	0	0	0
2- Cur Nat	4	4	0	0	0	0
2- Cur Nat	5	4	4	0	0	0
2- Cur Nat	6	4	2	0	0	0
2- Cur Nat	7	4	0	0	0	0
2- Cur Nat	8	4	1	0	0	0
2- Cur Nat	9	4	1	0	0	0
2- Cur Nat	10	4	4	3	0	0
2- Cur Nat	11	4	4	0	0	0
2- Cur Nat	12	4	4	4	0	0
2- Cur Nat	13	4	1	0	0	0
2- Cur Nat	14	4	4	0	0	0
2- Cur Nat	15	4	0	0	0	0
2- Cur Nat	16	4	0	0	0	0

*- New mound next to old marked mound – activity of 4 (30 and 60 day)

Site	Mound #	Pretreat 10/17	4 day 10/21	10 day 10/27	30 day	60 day
3- Curves	1	4	0	0	0	0
3- Curves	2	4	1*	0	0	0
3- Curves	3	4	0	0	0	0
3- Curves	4	4	0	0	0	0
3- Curves	5	4	1	0	0	0
3- Curves	6	4	4	0	0	0
3- Curves	7	4	3	0	0	0
3- Curves	8	4	0	0	0	0
3- Curves	9	4	0	0	0	0
3- Curves	10	4	2	0	0	0
3- Curves	11	4	0	2	0	0
3- Curves	12	4	0	0	0	0
3- Curves	13	4	3	0	1	4
3- Curves	14	4	0	0	0	0
3- Curves	15	4	0	0	0	0
3- Curves	16	4	0	0	0	0
3- Curves	17	4	1	0	0	0
3- Curves	18	4	0	0	3	0

*New mound, 4 activity near 2 of site 3, day 60 0 activity

Site	Mound #	Pretreat 10/17	4 day 10/21	10 day 10/27	30 day	60 day
4 - Office	1	4	0	0	0	0
4 - Office	2	4	4	0	0	0
4 - Office	3	4	4	0	0	0
4 - Office	4	4	0	0	4	1
4 - Office	5	4	0	0	0	0
4 - Office	6	4	3	0**	0	0
4 - Office	7	4	0	0	0	0
4 - Office	8	4	0	0	0	0
4 - Office	9	4	4	0	0	0
4 - Office	10	4	0	0	0	0
4 - Office	11	4	3	0	0	0
4 - Office	12	4	1	0	0	0
4 - Office	13	4	1	0	0	0
4 - Office	14	4	3	0	0	0
4 - Office	15	4	4	0	0	0
4 - Office	16	4	4	0	4	0
4 - Office	17	4	0	0***	0	0
4 - Office	18	4	0	0	0	0
4 - Office	19	4	0	0	4	4
4 - Office	20	4	4	0	0	0
4 - Office	21	4	4	0	0	0
4 - Office	22	4	4	0	0	0
4 - Office	23	4	0	4	0	0
4 - Office	24	4	4	0	0	0
4 - Office	25	4	4*	0	0	0
4 - Office	26	4	0	0****	1	0
4 - Office	27	4	0	0	0	0

* New mound between after 26, near tree, 4 activity

** New mound between 6 and 12, site 4, 4 activity

*** New mound between 17 and 16, site 4 – 4 activity, day 60 no activity

**** New mound along edge of sidewalk, day 60 no activity

Appendix C. Fire ant mound activity data in Ascend™ treated groups.

Site	Mound	Pretreat (10/18)	3 days (10/21)	9 days (10/27)	33 days (11/20)	60 days
1 – 161	1	4	1	0	0	0
1 – 161	2	4	1	4	0	0
1 – 161	3	5	1	0	0	0
1 – 161	4	4	0	4	0	0
1 – 161	5	2	0	0	0	0
1 – 161	6	1	0	0	0	0
1 – 161	7	4	4	0	0	0
1 – 161	8	4	1	0	0	0
1 – 161	9	3	3	0	0	0
1 – 161	10	3	3	0	0	0
1 – 161	11	3	3	0	0	0
2 - 157	1	4	2	0	0	0
2 - 157	2	4	4	4	0	0
2 - 157	3	4	4	0	0	0
2 - 157	4	4	4	4	4	4
2 - 157	5	4	0	0	0	0
2 - 157	6	2	0	0	0	0
2 - 157	7	2	0	0	0	0
2 - 157	8	4	4	4	0	0
2 - 157	9	4	4	4	0	0
2 - 157	10	4	3	4	4	3
3 - 153	1	4	4	4	0	0
3 - 153	2	4	4	4 *	4	4
3 - 153	3	3	0	0	0	0
3 - 153	4	4	2	4	3	4
3 - 153	5	2	0	0	0	0
3 - 153	6	2	0	0	0	0
3 - 153	7	4	0	0	0	0
3 - 153	8	4	1	4	3	4
3 - 153	9	2	1	0	0	0
3 - 153	10	4	3	0	0	0
3 - 153	11	4	3	0	0	0

* New mound next to 2 at Site 3, along edge of pool

Site	Mound	Pretreat (10/21)	3 days (10/24)	7 days (10/27)	28 days (11/20)	60 days
4- Vacant	1	4	4	0*	0	0
4- Vacant	2	4	3	0	0	0
4- Vacant	3	4	1	2	0	0***
4- Vacant	4	4	4	4	0	0
4- Vacant	5	3	1	0	0	4
4- Vacant	6	4	4	3	0	0
4- Vacant	7	4	4	0	0	0
4- Vacant	8	4	4	4	4	4
4- Vacant	9	4	4	9	0	0
4- Vacant	10	4	4	0	0	0
4- Vacant	11	4	4	4	0	0
4- Vacant	12	4	4	0**	4	0

* New mound outside yard, by tree, close to 1 – 4 activity

** New mound inside L shape of house – 4 activity

*** New mound near 3 (probably relocated) –4 activity

Appendix D. Mean foraging activity of fire ants

Treatment Group	Pretreat	3 days post	10 days post	30 days post	60 days post
Control	3	1	2	0	2
Control	3	0	1	0	0
Control	2	1	0	0	0
Control	2	1	0	0	0
Metaflumizone	2	0	0	0	0
Metaflumizone	3	0	0	0	0
Metaflumizone	3	0	0	0	0
Metaflumizone	1	0	0	0	0
Metaflumizone	2	0	0	0	0
Metaflumizone	4	0	0	0	0
Metaflumizone	3	0	0	0	0
Metaflumizone	1	0	0	0	0
Metaflumizone	1	0	0	0	0
Metaflumizone	3	0	0	0	0
Metaflumizone	3	1	0	0	0
Metaflumizone	2	0	0	0	0
Metaflumizone	3	0	0	0	0
Metaflumizone	3	0	0	0	0
Metaflumizone	2	0	0	0	0
Metaflumizone	1	1	0	0	0
Ascend™	3	0	0	0	0
Ascend™	4	1	0	0	0
Ascend™	4	1	0	0	0
Ascend™	1	0	0	0	0
Ascend™	1	0	0	0	0
Ascend™	3	0	0	0	0
Ascend™	2	0	0	0	0
Ascend™	2	0	0	0	0
Ascend™	2	0	0	0	0
Ascend™	3	0	0	0	0
Ascend™	3	1	0	0	0
Ascend™	1	0	0	0	0
Ascend™	2	0	0	0	0
Ascend™	4	0	0	0	0
Ascend™	4	0	0	0	0
Ascend™	2	0	0	0	0

Appendix E. Descriptive Statistics for mean fire ant mound activity.

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Pretreat	1.00	11	3.9091	.30151	.09091	3.7065	4.1116	3.00	4.00
	2.00	44	3.5455	.81994	.12361	3.2962	3.7947	1.00	4.00
	3.00	58	4.0000	.00000	.00000	4.0000	4.0000	4.00	4.00
	Total	113	3.8142	.55979	.05266	3.7098	3.9185	1.00	4.00
threeday	1.00	11	3.9091	.30151	.09091	3.7065	4.1116	3.00	4.00
	2.00	44	2.2955	1.66467	.25096	1.7893	2.8016	.00	4.00
	3.00	58	1.3621	1.65114	.21680	.9279	1.7962	.00	4.00
	Total	113	1.9735	1.74980	.16461	1.6473	2.2996	.00	4.00
tenday	1.00	11	3.6364	1.20605	.36364	2.8261	4.4466	.00	4.00
	2.00	44	1.3864	1.88280	.28384	.8139	1.9588	.00	4.00
	3.00	58	.3966	1.12296	.14745	.1013	.6918	.00	4.00
	Total	113	1.0973	1.74727	.16437	.7717	1.4230	.00	4.00
month	1.00	11	3.0000	1.73205	.52223	1.8364	4.1636	.00	4.00
	2.00	44	.5909	1.38628	.20899	.1694	1.0124	.00	4.00
	3.00	58	.1897	.75989	.09978	-.0101	.3895	.00	4.00
	Total	113	.6195	1.39718	.13144	.3590	.8799	.00	4.00
twomonth	1.00	11	3.0000	1.73205	.52223	1.8364	4.1636	.00	4.00
	2.00	44	.6136	1.43407	.21619	.1776	1.0496	.00	4.00
	3.00	58	.0862	.53915	.07079	-.0556	.2280	.00	4.00
	Total	113	.5752	1.38103	.12992	.3178	.8326	.00	4.00

Group 1 = Untreated control
Group 2 = Ascend™
Group 3 = Metaflumizone

Appendix F. SPSS data for Tukey HSD post hoc test for mean fire ant mound activity.

Multiple Comparisons

Tukey HSD

Dependent Variable	(I) Treatment	(J) Treatment	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Pretreat	1.00	2.00	.36364	.17551	.100	-.0534	.7806
		3.00	-.09091	.17122	.856	-.4977	.3159
	2.00	1.00	-.36364	.17551	.100	-.7806	.0534
		3.00	-.45455*	.10409	.000	-.7018	-.2072
	3.00	1.00	.09091	.17122	.856	-.3159	.4977
		2.00	.45455*	.10409	.000	.2072	.7018
threeday	1.00	2.00	1.61364*	.53345	.009	.3462	2.8810
		3.00	2.54702*	.52042	.000	1.3106	3.7835
	2.00	1.00	-1.61364*	.53345	.009	-2.8810	-.3462
		3.00	.93339*	.31637	.011	.1817	1.6850
	3.00	1.00	-2.54702*	.52042	.000	-3.7835	-1.3106
		2.00	-.93339*	.31637	.011	-1.6850	-.1817
tenday	1.00	2.00	2.25000*	.49674	.000	1.0698	3.4302
		3.00	3.23981*	.48460	.000	2.0885	4.3912
	2.00	1.00	-2.25000*	.49674	.000	-3.4302	-1.0698
		3.00	.98981*	.29460	.003	.2899	1.6897
	3.00	1.00	-3.23981*	.48460	.000	-4.3912	-2.0885
		2.00	-.98981*	.29460	.003	-1.6897	-.2899
month	1.00	2.00	2.40909*	.38777	.000	1.4878	3.3304
		3.00	2.81034*	.37829	.000	1.9116	3.7091
	2.00	1.00	-2.40909*	.38777	.000	-3.3304	-1.4878
		3.00	.40125	.22997	.193	-.1451	.9476
	3.00	1.00	-2.81034*	.37829	.000	-3.7091	-1.9116
		2.00	-.40125	.22997	.193	-.9476	.1451
twomonth	1.00	2.00	2.38636*	.37345	.000	1.4991	3.2736
		3.00	2.91379*	.36432	.000	2.0482	3.7794
	2.00	1.00	-2.38636*	.37345	.000	-3.2736	-1.4991
		3.00	.52743*	.22148	.049	.0012	1.0536
	3.00	1.00	-2.91379*	.36432	.000	-3.7794	-2.0482
		2.00	-.52743*	.22148	.049	-1.0536	-.0012

*. The mean difference is significant at the .05 level.

Group 1 = Untreated control
Group 2 = Ascend™
Group 3 = Metaflumizone

Appendix G. Descriptive statistics for fire ant foraging activity.

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Pretreat	1.00	4	2.5000	.57735	.28868	1.5813	3.4187	2.00	3.00
	2.00	16	2.3125	.94648	.23662	1.8082	2.8168	1.00	4.00
	3.00	16	2.5625	1.09354	.27339	1.9798	3.1452	1.00	4.00
	Total	36	2.4444	.96937	.16156	2.1165	2.7724	1.00	4.00
threedays	1.00	4	.7500	.50000	.25000	-.0456	1.5456	.00	1.00
	2.00	16	.1250	.34157	.08539	-.0570	.3070	.00	1.00
	3.00	16	.1875	.40311	.10078	-.0273	.4023	.00	1.00
	Total	36	.2222	.42164	.07027	.0796	.3649	.00	1.00
tendays	1.00	4	.7500	.95743	.47871	-.7735	2.2735	.00	2.00
	2.00	16	.0000	.00000	.00000	.0000	.0000	.00	.00
	3.00	16	.0000	.00000	.00000	.0000	.0000	.00	.00
	Total	36	.0833	.36839	.06140	-.0413	.2080	.00	2.00
month	1.00	4	.0000	.00000	.00000	.0000	.0000	.00	.00
	2.00	16	.0000	.00000	.00000	.0000	.0000	.00	.00
	3.00	16	.0000	.00000	.00000	.0000	.0000	.00	.00
	Total	36	.0000	.00000	.00000	.0000	.0000	.00	.00
twomonths	1.00	4	.5000	1.00000	.50000	-1.0912	2.0912	.00	2.00
	2.00	16	.0000	.00000	.00000	.0000	.0000	.00	.00
	3.00	16	.0000	.00000	.00000	.0000	.0000	.00	.00
	Total	36	.0556	.33333	.05556	-.0572	.1683	.00	2.00

Group 1 = Untreated control
Group 2 = Metaflumizone
Group 3 = Ascend™

Appendix H. SPSS data for Tukey HSD post hoc test for mean fire ant mound activity.

Multiple Comparisons

Tukey HSD

Dependent Variable	(I) Treatment	(J) Treatment	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Pretreat	1.00	2.00	.18750	.55370	.939	-1.1712	1.5462
		3.00	-.06250	.55370	.993	-1.4212	1.2962
	2.00	1.00	-.18750	.55370	.939	-1.5462	1.1712
		3.00	-.25000	.35019	.757	-1.1093	.6093
	3.00	1.00	.06250	.55370	.993	-1.2962	1.4212
		2.00	.25000	.35019	.757	-.6093	1.1093
threedays	1.00	2.00	.62500*	.21623	.018	.0944	1.1556
		3.00	.56250*	.21623	.036	.0319	1.0931
	2.00	1.00	-.62500*	.21623	.018	-1.1556	-.0944
		3.00	-.06250	.13676	.892	-.3981	.2731
	3.00	1.00	-.56250*	.21623	.036	-1.0931	-.0319
		2.00	.06250	.13676	.892	-.2731	.3981
tendays	1.00	2.00	.75000*	.16137	.000	.3540	1.1460
		3.00	.75000*	.16137	.000	.3540	1.1460
	2.00	1.00	-.75000*	.16137	.000	-1.1460	-.3540
		3.00	.00000	.10206	1.000	-.2504	.2504
	3.00	1.00	-.75000*	.16137	.000	-1.1460	-.3540
		2.00	.00000	.10206	1.000	-.2504	.2504
twomonths	1.00	2.00	.50000*	.16855	.015	.0864	.9136
		3.00	.50000*	.16855	.015	.0864	.9136
	2.00	1.00	-.50000*	.16855	.015	-.9136	-.0864
		3.00	.00000	.10660	1.000	-.2616	.2616
	3.00	1.00	-.50000*	.16855	.015	-.9136	-.0864
		2.00	.00000	.10660	1.000	-.2616	.2616

*. The mean difference is significant at the .05 level.

Group 1 = Untreated control
Group 2 = Metaflumizone
Group 3 = Ascend™