ENVIRONMENTAL SOLUTIONS GROUP, LLC

1415 L STREET, SUITE 460
SACRAMENTO, CALIFORNIA 95814-3964
TELEPHONE (916) 443-2793
FAX (916) 443-3071

JAMES W WELLS
PRESIDENT
E-Mail: jwells@esgllc.net

December 2, 2010

Ms. Denise Alder
Program Specialist
Department of Pesticide Regulation
Pesticide Registration Branch
1001 I Street, P.O. Box 4015
Sacramento, CA 95814-2828

RE: California 2009 Urban Pesticide Use Pattern Study

Dear Denise,

On behalf of my client, the Pyrethroid Working Group (PWG), I am submitting the attached California 2009 Urban Pesticide Use Pattern Study. This document is the result of an on-line survey that was conducted among professional pest management companies. The primary objective was to obtain a better understanding of use patterns, i.e. how these companies use and apply chemicals.

This study is being submitted in response to the pyrethroid re-evaluation, which is being conducted by the California Department of Pesticide Regulation (DPR) under California Notice 2006-13. This study partially satisfies the requirement for registrants, of products containing active ingredients in Group III, to submit environmental fate data, sediment data, and data/information relating to the reduction of offsite movement of pyrethroid residues.

If you have any questions, please contact me at (916) 443-2793.

Sincerely,

James W. Wells, President
Environmental Solutions Group, LLC

California 2009 Urban Pesticide Use Pattern Study

Conducted by the Pyrethroid Working Group & Meta Research, Inc.

INTRODUCTION

An on-line survey was conducted in 2010 to collect information about pyrethroid use patterns to ensure that decisions about the future of these products by the California Department of Pesticide Regulation and U.S. Environmental Protection Agency are based on actual market usage data and not on default assumptions. The survey was sponsored by the Pyrethroid Working Group (PWG), an industry task force whose members are AMVAC, Bayer, Cheminova, DuPont, FMC Corporation, Syngenta and Valent. Data collection was conducted by Meta Research, Inc., an independent market research firm.

HISTORY

The California Department of Pesticide regulation (DPR) asked the PWG to conduct a survey among professional pest management companies. The primary objective was to understand use patterns; that is, how a Pest Management Professional (PMP) uses and applies chemicals. The survey included questions designed to identify:

1. The specific use patterns in which pyrethroids are applied
2. The percentage of pyrethroid use associated with each use pattern
3. The pyrethroid active ingredients and product formulations associated with each use pattern
4. The percentage of pyrethroids applied to residential properties versus commercial properties
5. Seasonal (winter, spring, summer, and fall) timing of applications for each use pattern
6. Application equipment used
7. Identification of targeted pests for each use pattern

In September 2009, PWG partnered with Meta Research, Inc. to begin planning for the Use Pattern Survey. Because PWG was trying to document the critical use patterns and treatments made by PMPs, the survey was not limited to pyrethroids. Therefore, whereas pyrethroids make up the bulk of the responses in the findings, the survey asked PMPs to report **any** product used for general pest control.

In addition, because PWG wanted to collect quantitative data, a **web based survey** approach was selected to build in quality checks, mathematical calculations, and branching to ease participant fatigue. This method also has been proven historically to result in higher completion rates. The goal was to obtain approximately a 5-8% response rate. In the end, with strong industry support and outreach thru the Pest Control Operators of California (PCOC), a 6% response rate was attained. This response rate is very typical for the market research industry and is considered to be a good result by commercial standards.

SURVEY SAMPLE & METHODOLOGY

Initial conversations regarding the participants for this survey yielded a few key characteristics that would be necessary to garner the highest quality of data. The participants should have a high level/advanced Structural Control Board (SPCB) license and fit within these guidelines:

- Experienced/knowledgeable enough to know product names, rates, equipment used, etc.
- May be manager or supervisor; but if not a technician, should be close enough to the technician to know what is actually being applied
- Should have access to purchase data to accurately report on volumes of product used by his/her team

The original plan also included **both** pest control and lawn care professionals holding an Operator's license, which provided a combined sample of 7,802 unique names. However, in February 2010, a conference call was held with DPR to review stakeholder comments on the draft survey. Those stakeholders included EPA, Sacramento County and PCOC. There were concerns by all that the survey was too long and would thus reduce the final response rate. The decision was made to drop lawn care, indoor uses and termite specific sections, leaving the focus on outdoor general pest control services. The revised sample was 3,315 SPCB Operators. Upon requesting an updated list from SPCB a final 3,364 SPCB Operators were identified to receive the final survey invitation.

The Survey Team (PWG and Meta) started with the Structural Pest Control Board (SPCB) list of license holders. This list only provided mailing addresses (no phone numbers or email addresses.) While this was a good source of potentially qualified respondents, the fact that there were no phone numbers or email addresses meant the request to participate in the survey had to be sent via hard copy/paper mail. The introductory letter included detailed instructions and screen shots, but it still required the respondent to logon to his computer and enter the survey URL and password etc. This "paper to web" divide created a barrier and reduced participation rates significantly. The initial response to the survey was less than 3%, but was doubled to the current 6% with additional efforts described below.

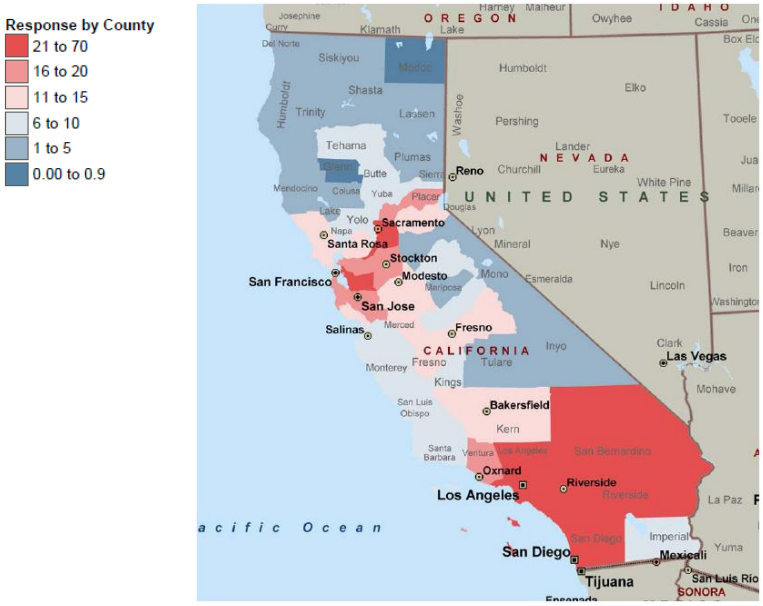
After the initial mailing and a subsequent reminder mailing, Meta had logged 78 responses by June of 2010. Of these, 64 participants qualified to complete the survey. The remainders of the responses were screened out for various reasons, such as the PMP not providing general pest control services. That same month, to expand the respondent pool and work around some of the limitations of the "paper to web" divide, the Survey Team worked with the Pest Control Operators of California (PCOC) and the National Pest Management Association (NPMA) to send an email invitation with a link embedded in the message allowing participants to easily "click-through" to the online survey. The email invitation was expanded to include SPCB Operators as well as Field Representatives on the PCOC/NPMA email list resulting in 1,139 additional invites.

On July 15, 2010 the survey was closed with a final count of 191 responses (6% response rate) and 145 Qualified Completes across California. Again, a 6% response rate is very typical for this type of social research.

As was mentioned by PWG when presenting the plan for this study, 5% is standard in the market research industry.

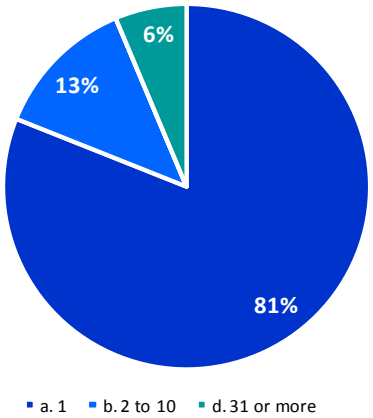
DEMOGRAPHICS

The red shaded areas indicate the heaviest concentration of respondents indicating that they serviced those counties. Those areas also correlate with the most populated areas, thus a good geographic sample.

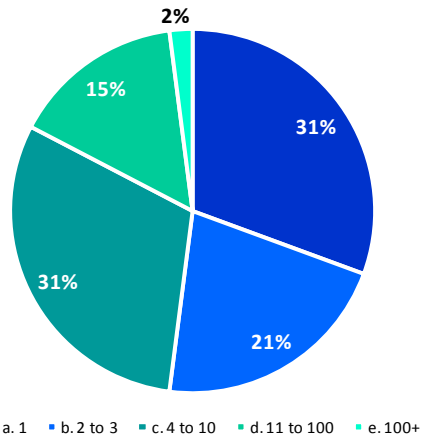


In general, the demographics of this survey sample are very similar to other large national industry studies. Close to 80% of pest control businesses responding to this survey operate their business from a single location, 13% have between 2 and 10 branches and only 6% of companies operated more than 30 branches. No companies reported operating 11-30 branches. Another good estimate of the size of a company is the number of trucks operated. Less than 10% of our respondents operate more than 10 trucks, and 31% operate with a single truck

4. Approximately how many branches or locations does your company have?

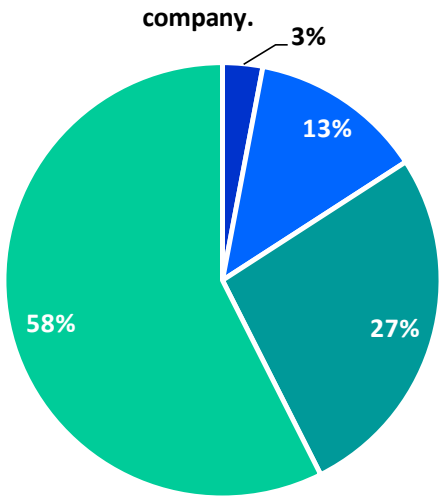


8. Approximately how many trucks does your branch operate?



Respondents were asked to identify which description best matched their company role. The goal in selecting respondents was to have respondents close enough to the application to genuinely understand and report on what is actually happening in the applications, yet at the same time have enough knowledge of the branch or company purchase data to give accurate reports on which products and volumes were used in 2009. Owner/Operators are ideal on both accounts (see definitions in blue box below). They do tend to represent smaller operations, but that too mirrors what is seen in the industry. The survey also includes general managers and supervisors from larger companies.

1. Thank you. Now please indicate the position you hold with your company.



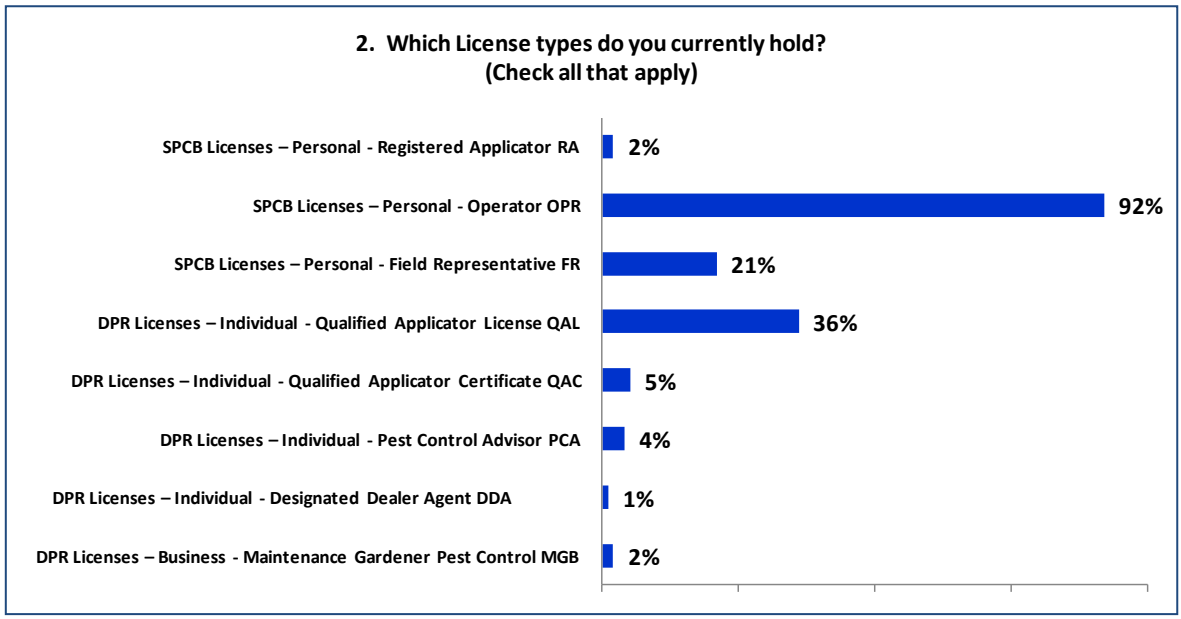
▪ Technician ▪ Supervisor ▪ General Management ▪ Owner/Operator

- **Technician** (My day to day job responsibilities are, for the most part, servicing accounts)
- **Supervisor** (I train or oversee others who directly service accounts. However I may also service accounts myself on a given day.)
- **General Management** (Most of my day to day responsibilities are related to managing our overall business. I rarely, if ever, directly service accounts.)
- **Owner/Operator** (I service accounts and manage the entire business.)

In cross-tabulations of the data, half of the respondents who identified themselves as **owner/operators** are 1-truck (small) operations; three-quarters have less than 3 trucks(still basically small operations); and almost 10% have 11 trucks or more, so there are **some** larger operations included in the owner/operator segment. **General Managers,** on the other hand, are predominately from large operations with 11 to 100+ trucks (60%+).

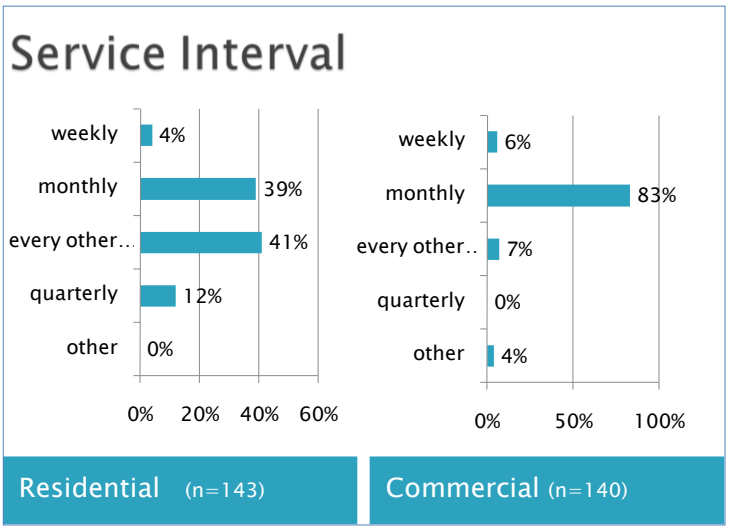
It was also found that the Pareto Principle (the 80-20 Rule) applies here, as 20% of the respondents reported 80% of the pounds.

While the SPCB list was the target audience for this survey, many of the Operators held additional licenses as well.

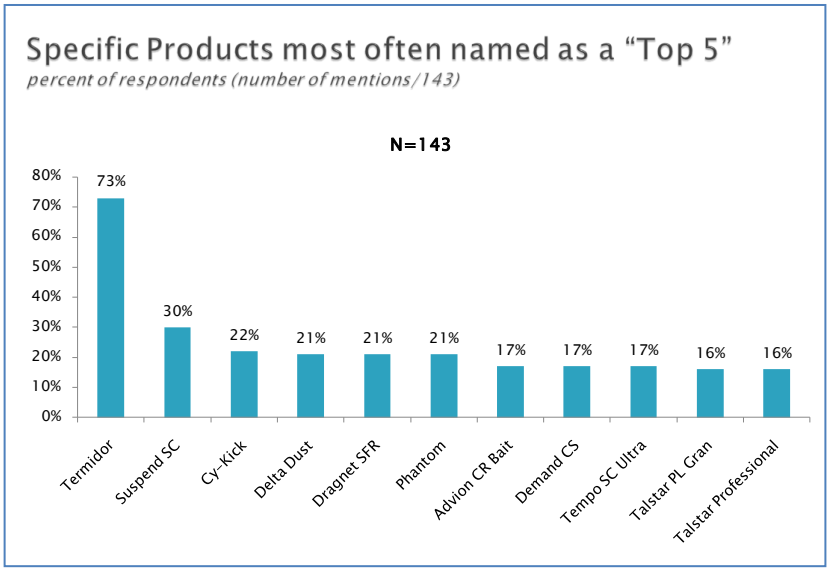


USE PATTERNS

The service intervals reported by this sample are very typical; again, matching what is reported in other larger national market research studies. Residential accounts are most often serviced monthly or every other month. Commercial accounts are almost always serviced monthly.

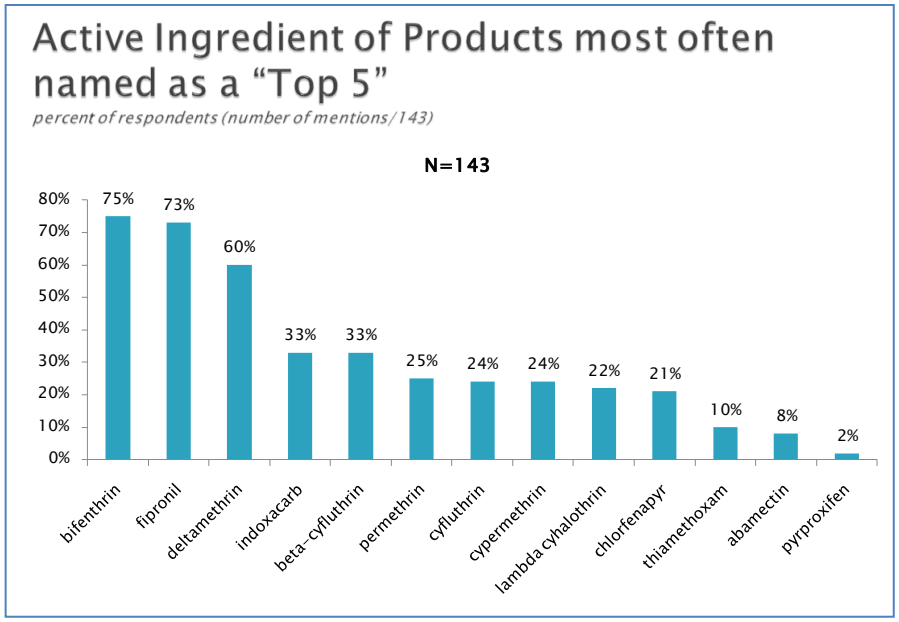


One of the pivotal questions for the entire study asked: *"Let's talk about the types of general pest control products your branch used in the 2009 calendar year. Of the following, which are the top 5 products, based on volume, your branch used in 2009 for your general pest control operations?"*



Eighty different products were listed with the option to write in other products not shown. The single most commonly used product was Termidor (fipronil); three out of four respondents mentioned Termidor as one of their top five products. Eight of the top eleven were pyrethroids, and the other two were Phantom (chlorfenapyr) and Advion Cockroach bait (indoxacarb).

When the specific products were cross referenced by active ingredient, 75% of the respondents used a product containing bifenthrin in their top five, followed by fipronil and deltamethrin.



Products containing permethrin were only mentioned by 21% of respondents, but generated 59% of all pounds of active ingredient reported. Note that permethrin products like Dragnet have higher use rates, so reporting will show permethrin generating a large number of pounds.

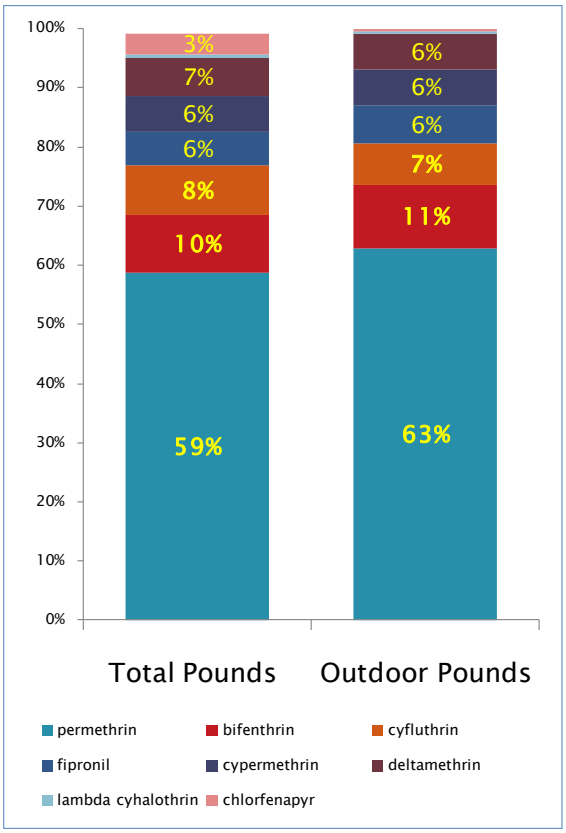
Overall Active Ingredient (ai) by Annual Usage –
Note: Pounds of annual ai calculated from the number of product units each respondent used in 2009. Pounds of ai per unit were derived from label specifications.

*Pounds are calculated from units as reported by respondents; they are **not** projected to represent a total number of pounds in CA due to sample size.*

On a percentage basis, share of pounds should be directionally correct and thus representative of the larger population.

Row Labels	# of AI Total	# of AI Outdoors
permethrin	21904	19563
bifenthrin	3584	3317
cyfluthrin	3122	2163
fipronil	2133	1987
cypermethrin	2247	1898
deltamethrin	2450	1860
lambda cyhalothrin	171	125
chlorfenapyr	1299	122
betacyfluthrin	176	40
thiamethoxam	11	9
indoxacarb	154	1
pyrproxifen	1	0
Abamectin B1	0	0
Grand Total	**37253**	**31086**

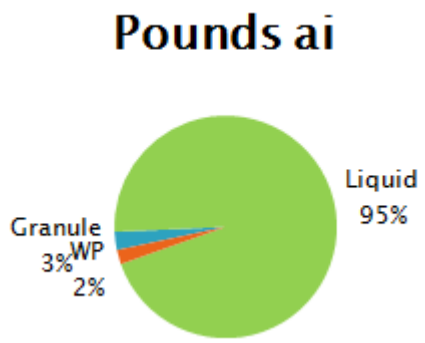
Here we have consolidated the products by ai and summarized findings by reported pounds. In total, our respondents reported use of 37,253 pounds. The vast majority of the pounds (83%) were applied outdoors. **That outside use is the focus of the remaining report.**



Row Labels	# of AI Total	# of AI Outdoors
permethrin	**21904**	**19563**
liquid	21904	19563
bifenthrin	**3584**	**3317**
liquid	2731	2469
granule	762	762
WP	92	86
cyfluthrin	**3122**	**2163**
liquid	3109	2152
WP	13	11
fipronil	**2133**	**1987**
liquid	2133	1987
cypermethrin	**2247**	**1898**
liquid	1379	1352
WP	868	546
deltamethrin	**2450**	**1860**
liquid	2392	1803
granule	58	58
lambda cyhalothrin	**171**	**125**
liquid	167	122
granule	3	3
chlorfenapyr	**1299**	**122**
liquid	1299	122
betacyfluthrin	**176**	**40**
liquid	144	35
WP	32	5
thiamethoxam	**11**	**9**
liquid	11	9
bait	0	0
indoxacarb	**154**	**1**
bait	154	1
granule	0	0
pyrproxifen	**1**	**0**
Abamectin B1	**0**	**0**
Grand Total	**37253**	**31086**

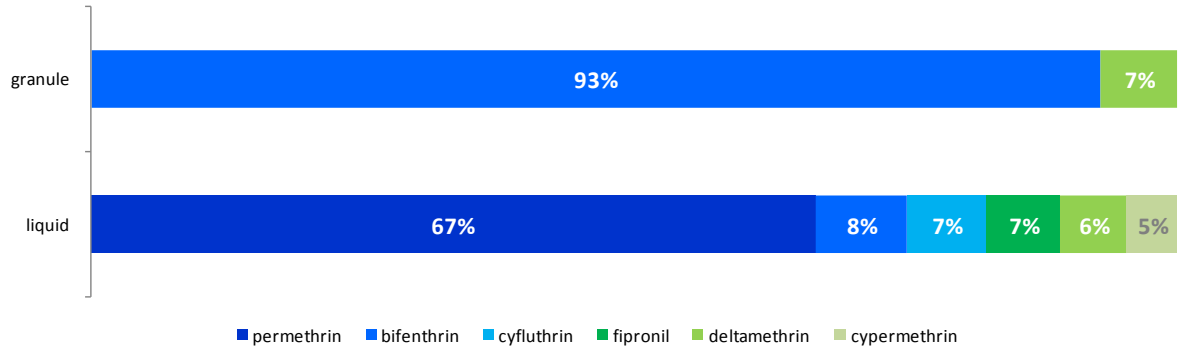
Ai by Formulation Type –

The pounds of AI OUTDOORS was calculated by using the annual pounds of AI multiplied by the percentage the respondent indicated for outdoor use of products. 95% of the pounds of outdoor ai used were liquids, while 2% were WP and only 3% granules. Very small amounts of pounds were reported in other formulations such as baits.



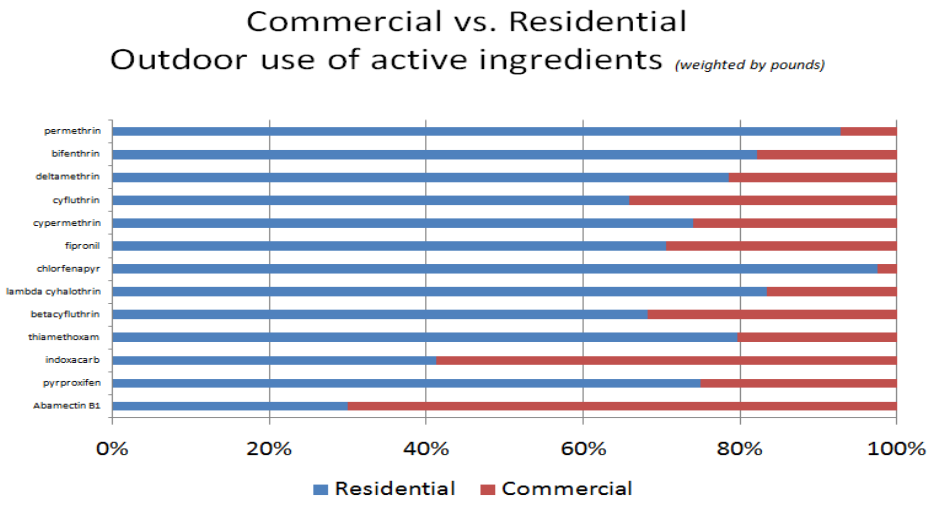
Row Labels	Sum of # of AI Total	# of AI Outdoors
liquid	35271	29614
granule	824	823
WP	1004	648
bait	154	1
Grand Total	**37253**	**31086**

Granules represent only 3% of the total pounds, the bar chart below shows that most are bifenthrin, with some deltamethrin. The liquids, which represent 95% of the total pounds, are composed of a variety of active ingredients, with 67% of the pounds being permethrin.

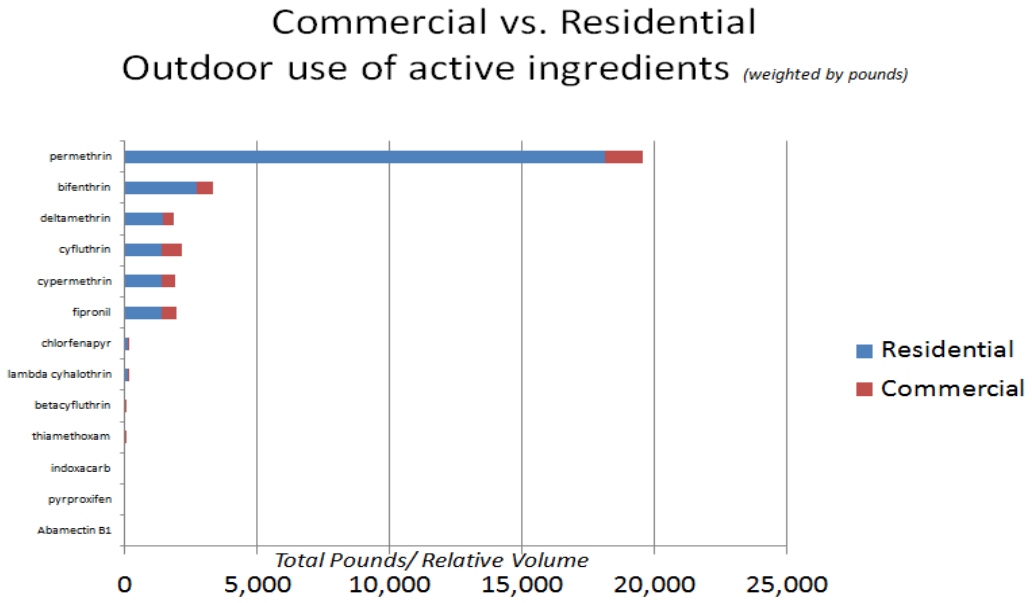


Residential vs. Commercial –

One of the other questions asked was whether this product was applied in a residential or commercial setting. As shown below, abamectin and indoxacarb are mostly applied in a commercial setting. They represent very few pounds and are bait products. All of the other ai's are primarily used in residential settings.



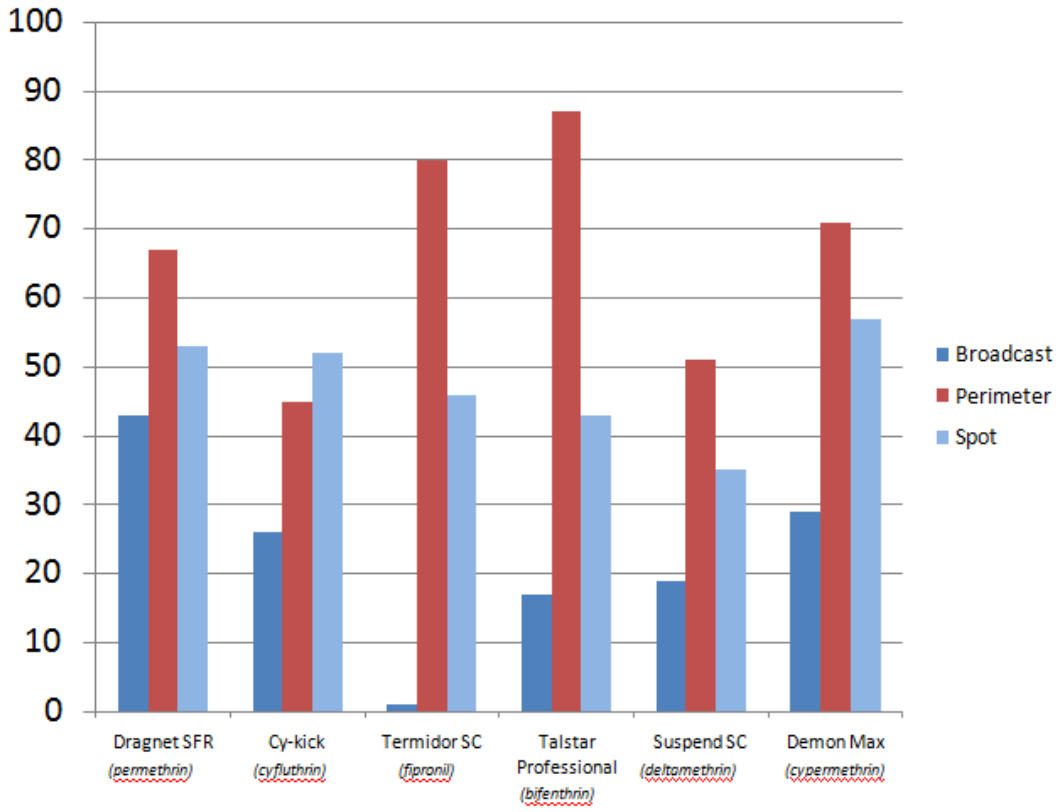
Another look at the same data, below, shows that the vast majority of pounds applied are to residential settings. Again, permethrin pounds dominate because the typical use rate is 10x that of other pyrethroids.



KEY OUTDOOR USES

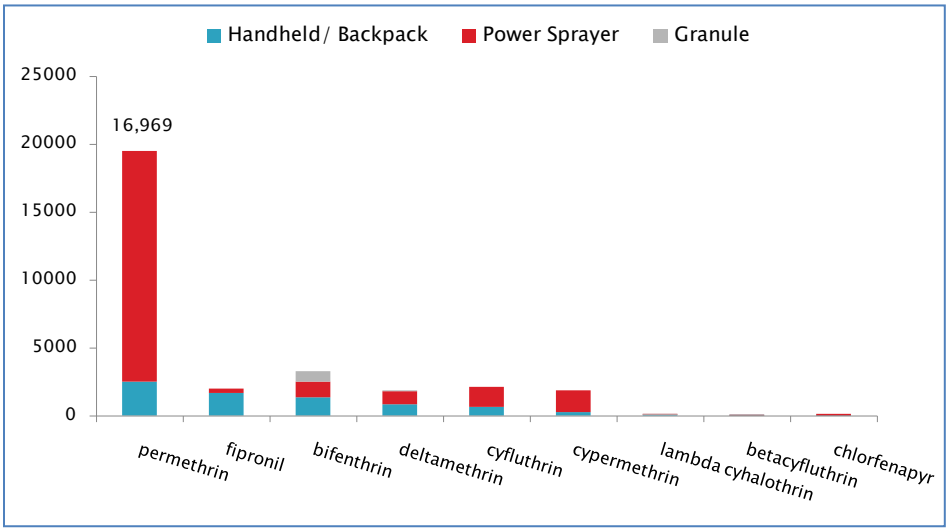
As mentioned earlier, 83% of pounds reported were applied outdoors. The top six products, shown in the chart below, account for 90% of the total outdoor pounds. The numbers on the Y-axis indicate the % of respondents using a product for that type of application. Multiple responses (application types) were allowed.

Most products used outdoors were applied as perimeter treatments and/or spot treatments. Broadcast treatments were less common. Dragnet (permethrin) reported the most broadcast applications, and Termidor (fipronil) the fewest.

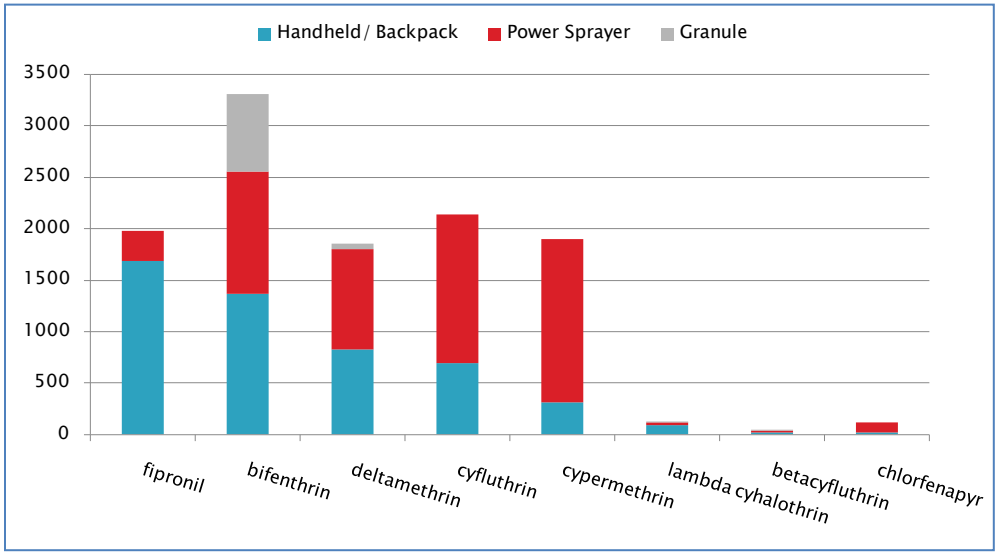


- Broadcast Applications (i.e., the entire yard or very large sections)
- Perimeter Application (i.e., around the structure or fence line)
- Spot Treatments (i.e., Targeted areas such as ant trails)

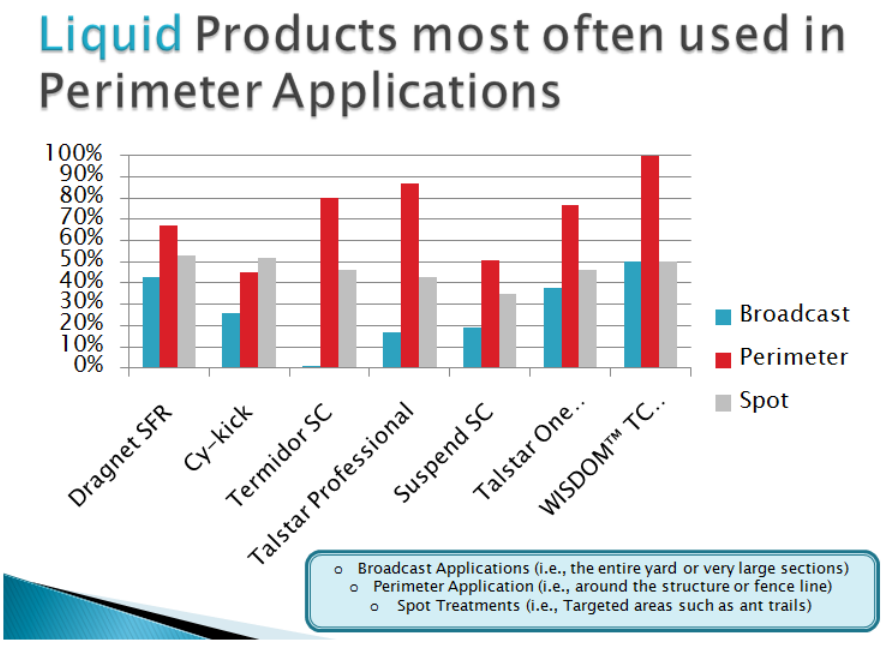
Respondents were asked which type of application tool was used and the percentage of pounds applied by each type. (A hand held or backpack sprayer typically holds from 1 to 5 gallons of finished spray solution; a power spray tank typically holds 25 to 50 gallons of finished solution.)

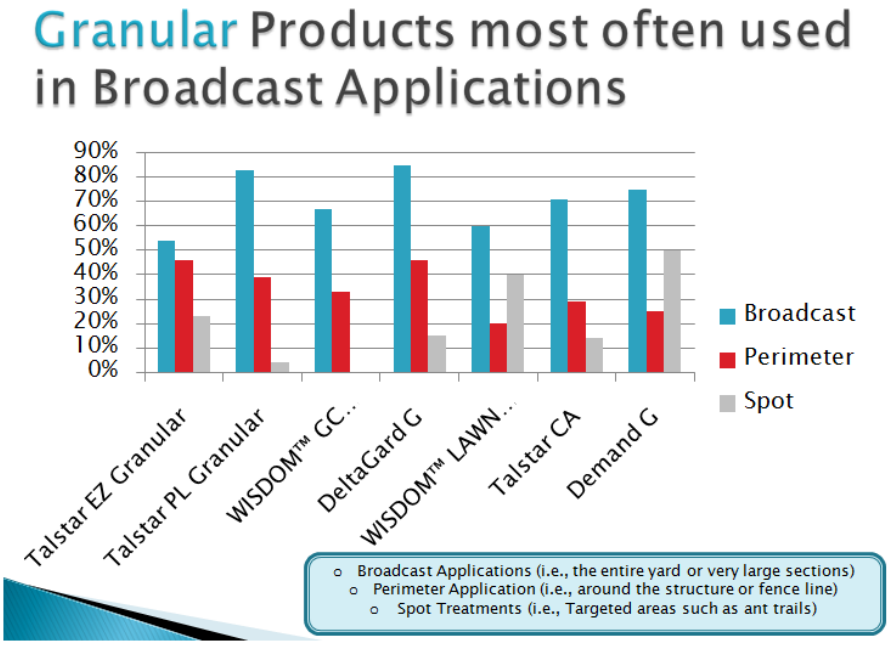


Below is the same data as above with permethrin omitted so the detail on other products is easier to see. Most pounds of fipronil and lambda cyhalothrin are applied via handheld or back pack sprayer; but for most other compounds, the majority of pounds are applied via power sprayer.



Looking at all liquid products, the most common application type is perimeter treatment (i.e., around the structure or fence line). Granular products were most often used in broadcast application





Outdoor Treatment by Pest –

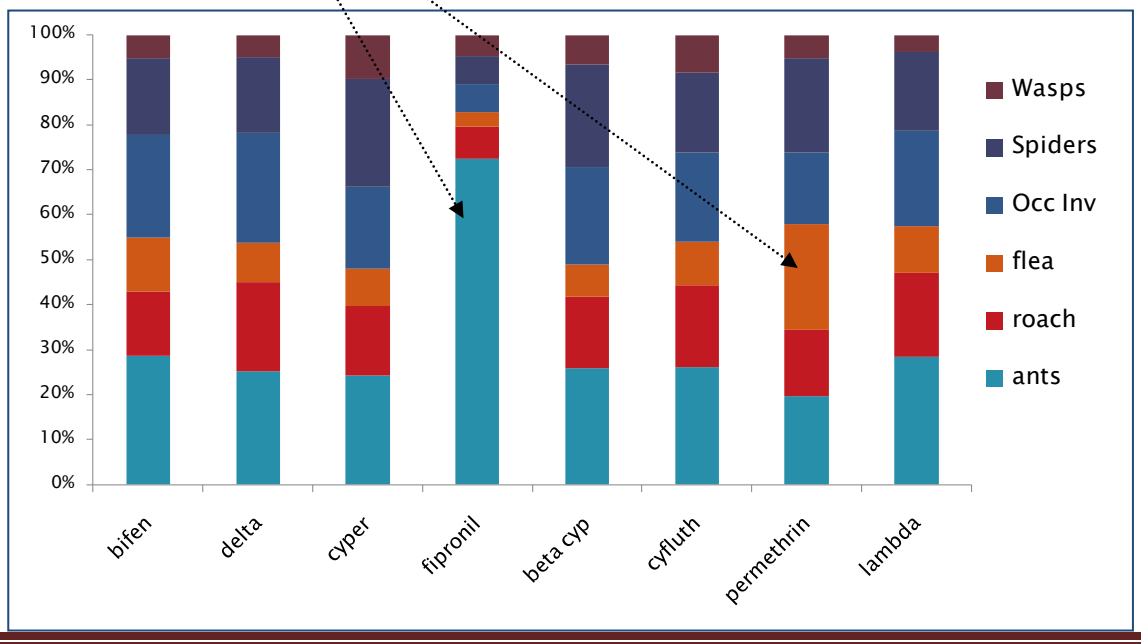
Ants were the most frequently mentioned target pest (619 out of 1953 or 32% of total mentions). Pest data is reported as percent of total mentions, with multiple mentions allowed. This is not weighted by pounds of ai.

Like most pests, ants were treated via perimeter and/or spot treatments. The two exceptions were fleas, which were often treated with broadcast applications, and wasps, which were almost always treated via spot treatment.

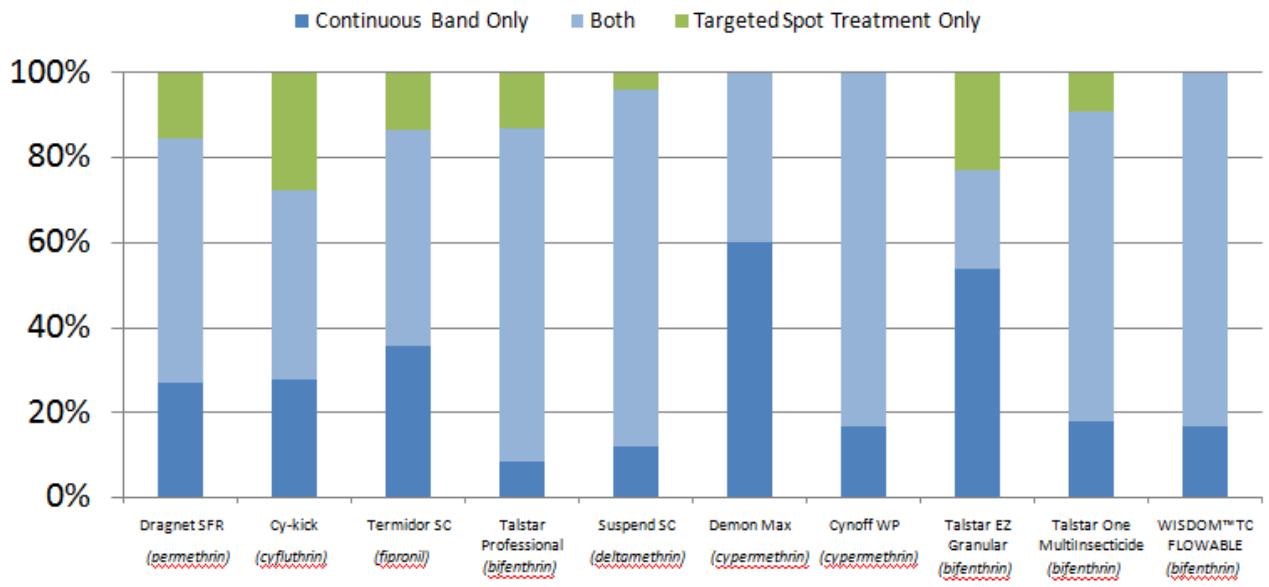
Please identify which pests you are targeting with this product.
Next, please indicate your typical treatment areas for each pest, please check all that apply.

Row Labels	% of Mentions: Broadcast	% of Mentions: Perimeter	% of Mentions: Spot	Total Mentions
Ants	17%	46%	37%	619
Cockroaches	17%	39%	43%	300
Fleas	52%	27%	22%	200
Occasional invaders	24%	45%	31%	381
Spiders	16%	46%	37%	340
Wasps	3%	27%	71%	113
Grand Total	**21%**	**42%**	**37%**	**1953**

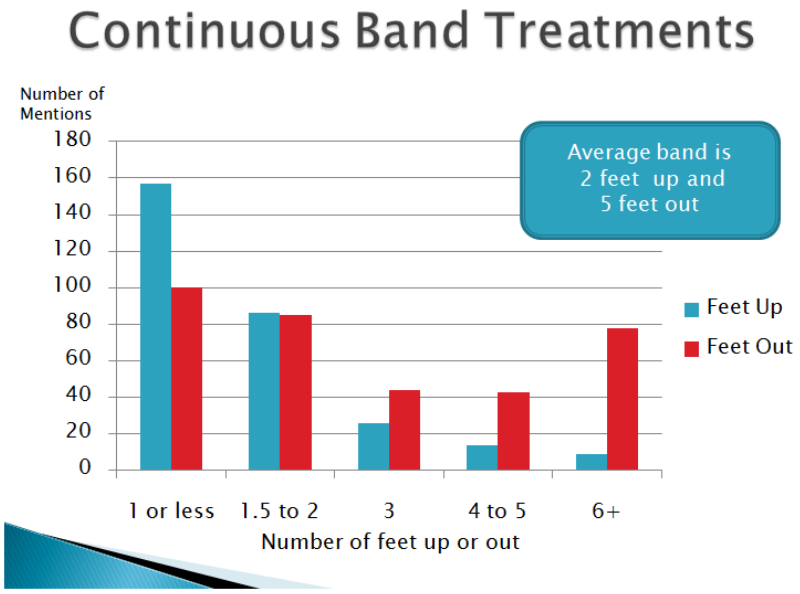
Fipronil is targeted largely at **ants**, and for that use it is applied most often as a perimeter treatment. Permethrin is used more often for **fleas** than other compounds. The pyrethroids tend to have a similar broad pest spectrum and thus reported target pests are also surprisingly similar.



So what exactly is meant by **"perimeter application"?** Meta asked PMPs whether those perimeter treatments were typically a continuous band, a targeted spot application or both. Few PMPs performed perimeter treatments solely via spot treatment. Most used a combination of spot and continuous band applications.



The average continuous band application, **combining all products** mentioned, came in at 2 feet up and 5 feet out.



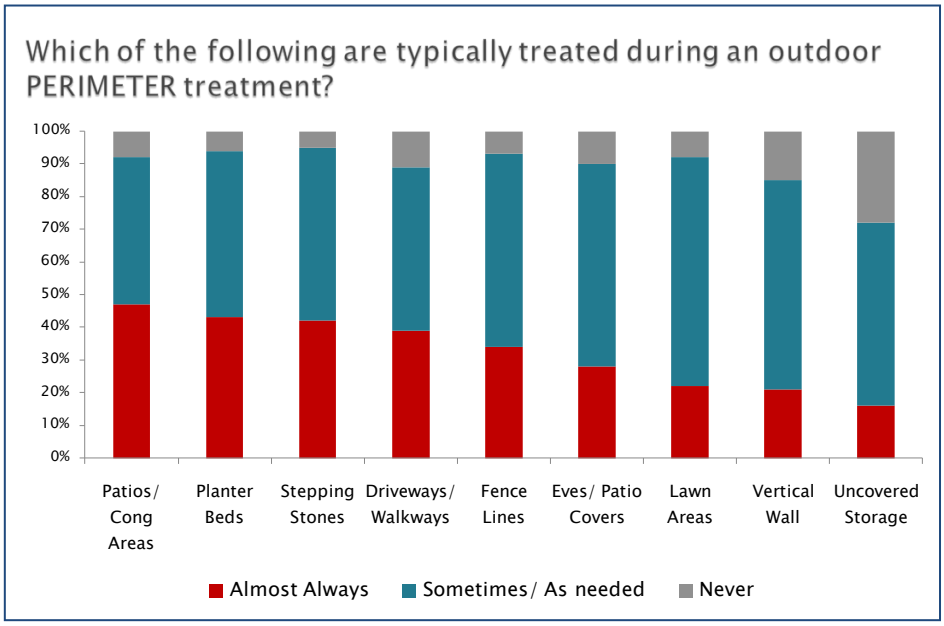
This is the one use pattern where some chemical specific differences were seen. While the average band treatment was 2 feet up and 5 feet out, the single most common treatment was a one foot (or less) up and one foot (or less) out application of Termidor (fipronil). Almost two-thirds (61%) of respondents applied fipronil is this fashion. Looking at just pyrethroids, 64% were applied in bands of 2 feet (or less) up, and 5 feet (or less) out. Only 19% reported applying pyrethroids one up and one out. The percentages in the table below represent straight frequencies (percent of mentions) and are not weighted by pounds of active ingredient.

Fipronil		feet up					
		0-1	1+ - 2	2+ - 3	3+ - 4	4+ - 5	5+
feet out	0-1	61%	0%	0%	0%	0%	1%
	1+ - 2	7%	15%	0%	0%	0%	0%
	2+ - 3	2%	1%	4%	0%	0%	1%
	3+ - 4	0%	0%	1%	0%	0%	0%
	4+ - 5	0%	0%	0%	0%	0%	1%
	5+	2%	1%	0%	0%	0%	1%

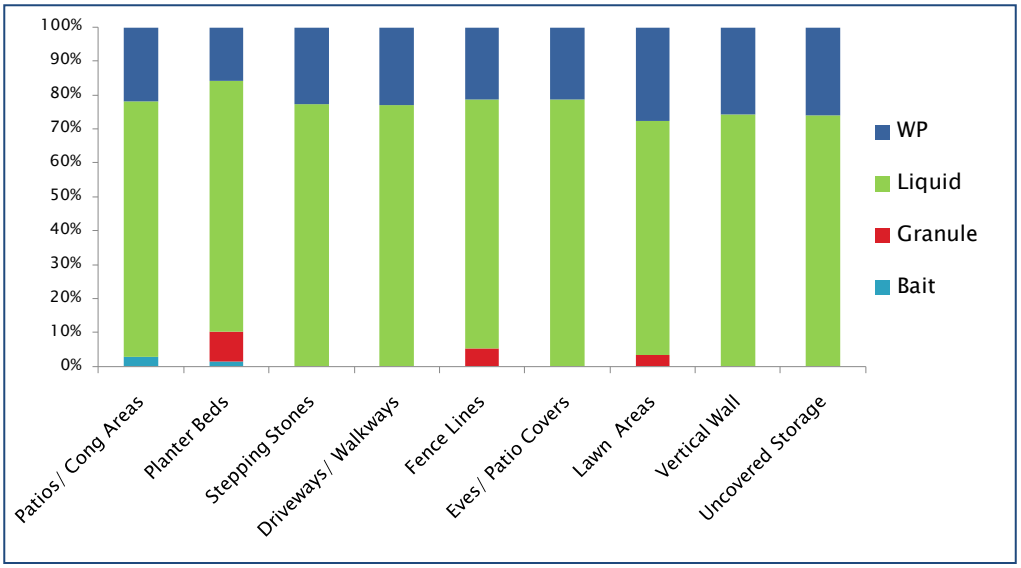
Pyrethroids		feet up					
		0-1	1+ - 2	2+ - 3	3+ - 4	4+ - 5	5+
feet out	0-1	19%	2%	0%	0%	1%	1%
	1+ - 2	8%	13%	1%	0%	0%	0%
	2+ - 3	8%	2%	4%	0%	0%	0%
	3+ - 4	2%	2%	1%	0%	0%	0%
	4+ - 5	6%	2%	1%	0%	1%	0%
	5+	16%	6%	2%	2%	0%	2%

Total		feet up					
		0-1	1+ - 2	2+ - 3	3+ - 4	4+ - 5	5+
feet out	0-1	30%	1%	0%	0%	1%	1%
	1+ - 2	8%	13%	1%	0%	0%	0%
	2+ - 3	7%	2%	4%	0%	0%	0%
	3+ - 4	1%	1%	1%	0%	0%	0%
	4+ - 5	4%	1%	1%	0%	1%	0%
	5+	13%	4%	1%	1%	0%	1%

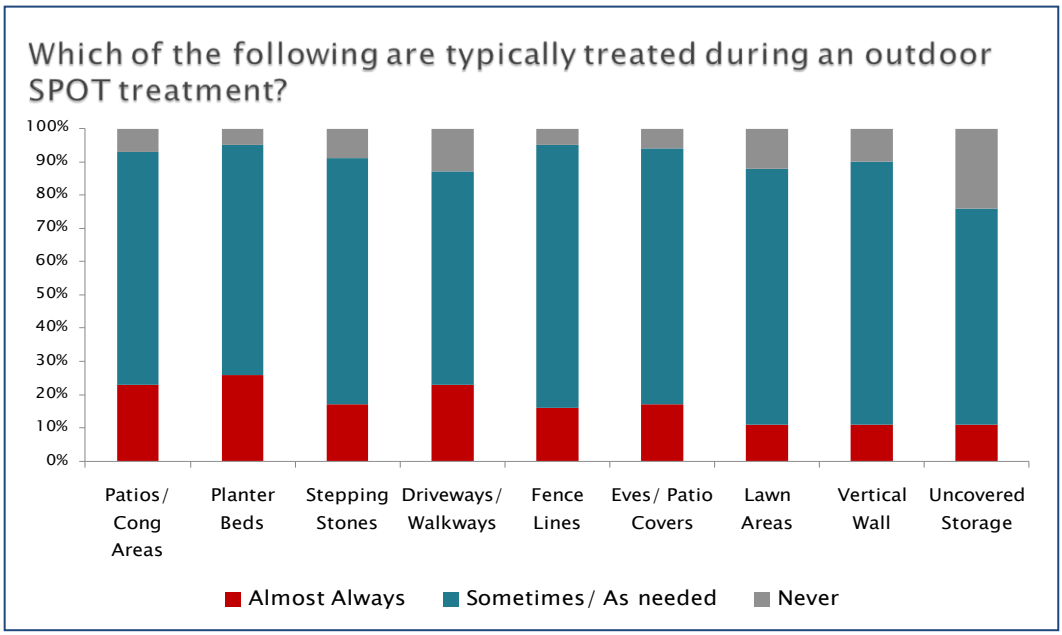
Hard surfaces such as Patios/Outdoor congregation areas were almost always treated during perimeter applications. Almost half(47%) reported treating Patios "almost always", while " sometimes or as needed " was reported by 45% and "never" by 8%. Similarly, for driveways 39% treat almost always, 50% treat as needed, and 11% never.



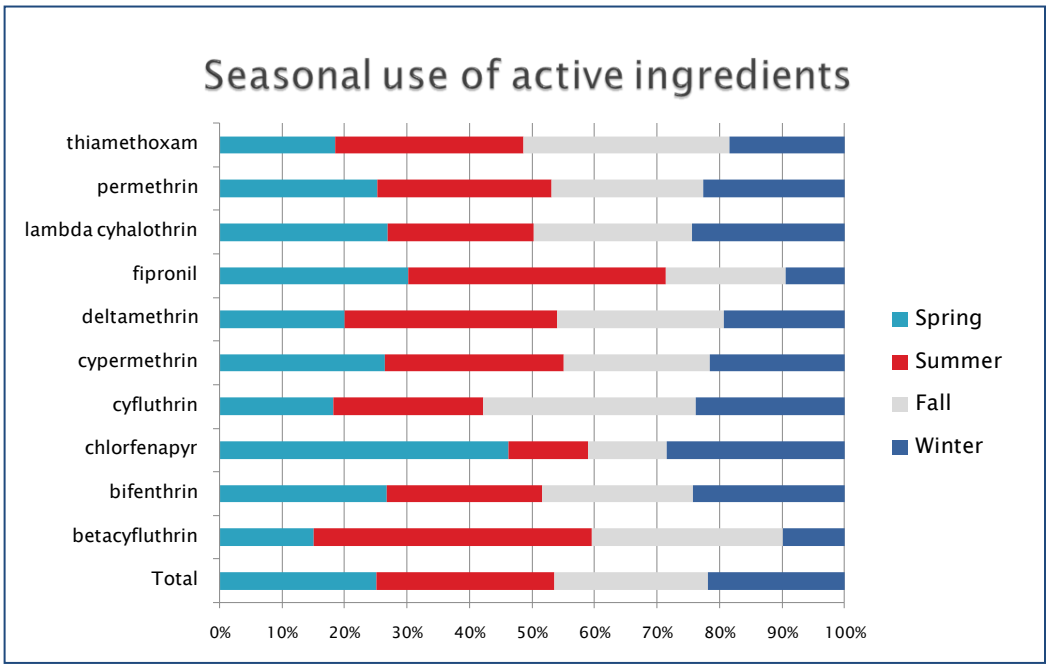
When analyzing areas indicated as "Always Treated", most hard surfaces were treated with sprayable products (liquids or WPs). Planter beds, fence lines and lawns also received a few granule applications. No chemical specific differences in use sites treated were found.



Spot treatments by definition are most often done "as needed", though some are routine preventive applications. The "Almost Always" category was similar to what we saw with perimeter treatments; hard surfaces such as driveways are "almost always" spot treated by 23% and "sometimes/as needed" by 64%. Again, no chemical specific differences were found.



The final subject studied was seasonal use for each product. Most products are used all year with chlorfenapyr used more often in spring in winter. Fipronil and betacyfluthrin uses are a little heavier in the summer.



SUMMARY OF KEY FINDINGS HIGHLIGHTED IN REPORT

- Overall, the final respondent sample was very representative. Key demographics such as size of operation, type of operation, service interval etc. all tied to figures reported in other large national surveys. Geographically, counties serviced correlated with the major metropolitan areas.
- More **pounds** of permethrin were reported than any other single active ingredient. The most frequently mentioned/commonly applied **products** contained fipronil or bifenthrin. Three-quarters (75%) of respondents mentioned a product containing bifenthrin and 73% mentioned Termidor (fipronil) as one of their top 5 (in terms of pounds used) products for 2009.
- Liquid formulations applied via power spray is the use pattern that distributes most pounds of pyrethroids. This is true for all products other than fipronil and lamba-cyhalothrin for which most pounds were applied via hand-held sprayer. Bifenthrin also had 22% of pounds applied in the form of granules.
- Liquid products which generate 95% of total outdoor pounds are typically used as **perimeter or spot** treatment. While granules generate fewer total pounds (3%) than liquids, when they are used, they are typically applied in a **broadcast** treatment.
- Driveways/concrete walkways often treated with perimeter applications. These uses are allowed by the labels on most products currently available in the channels of trade. The latest EPA restrictions[1] to these uses were not physically on commercial product in 2009 and for the most part are only now beginning to work their way into commercial inventories.
- Owner/Operators appear to use fewer different products than larger operations

CONCLUSIONS

- Few use patterns are chemical specific
- Size and type of organization generates greatest differences in product choice and use pattern
- The single use pattern delivering the largest number of pounds is outdoor, residential perimeter treatments made via power spray equipment
- Few perimeter applications are limited to spot treatments; most include use of continuous band applications
- Perimeter treatments typically include application to hard surfaces such as driveways and walkways
- New Federal labels are just beginning to cycle into production and make their way onto commercially available products. It will take some time before any environmental impact can be seen from these changes.

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[1]Federal EPA label changes, such as "Other than applications to building foundations, all outdoor applications to impervious surfaces such as sidewalks, driveways patios, porches and structural surfaces (such as windows, doors and eaves) are limited to spot and crack-and crevice applications, only."

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