8.1 INTRODUCTION

URS Greiner Woodward Clyde (URSGWC) was tasked under Technical Change Order No. 4 to Monitoring and Reporting Program Order No. 95-76 to create and implement an Insecticide Use Survey and a Telephone Survey for Insecticide Retailers as part of the storm water monitoring program. The objective of the Insecticide Use Survey was to better understand how homeowners in San Diego County select, use, and dispose of insecticides. The insecticide use survey was designed to collect qualitative information about lawn and garden maintenance habits, frequency and method of application, clean up and disposal and purchasing factors. Additionally, the survey was designed to determine demographic characteristics of users and the range of pest species encountered. The objective of the Telephone Survey for Insecticide Retailers was to determine what role insecticide retailers play in the selection, use, and disposal of insecticides. The surveys were designed to collect qualitative information about brands and alternatives, product content, product use, and customer information. The Insecticide Use Survey design is described in more detail below.

8.2 INSECTICIDE USE SURVEY DESIGN

The survey was designed to evaluate the following factors:

- Respondent demographic factors, such as geographic location, age group, and gender of the respondents;
- Whether the respondents have a lawn and/or garden, and if so, the size of the lawn and/or garden;
- Identify the largest problem insect species;
- The percentage of respondents who care for their own lawns or gardens, and for those individuals who do not care for their own lawns or gardens, determine who does;
- Where respondents obtain information on lawn and garden products or other related materials;
- Whether insecticides were applied to the lawn and/or garden within the last 12 months and the time of year that the respondent applies the most insecticides;
- Who applies insecticides to the lawn or garden areas and where on the property insecticides and applied;
- Whether the application of insecticides to a lawn or garden effects the individual's irrigation scheduling and whether forecasted precipitation has an effect on insecticide application;
- Insecticide application practices including the source of information regarding the amount used, procedures used to clean up equipment, and practices pertaining to disposal of excess insecticides;
- If the chemical compound Diazinon was an ingredient in the product applied to the lawn or garden;
- What stores and brand names are most commonly purchased and which factors are most important to the respondents when selecting an insecticide; and
- Whether alternatives to chemical insecticides have been considered or applied and what types of alternative substances are used.

The use survey was mailed to 5,000 homeowners in San Diego County. These homeowners were randomly selected by Modern Printing and Mailing. A letter of purpose and instruction from the co-permittees accompanied the survey. The survey was translated into Spanish by Trini Barajas of Translations and Language Center. English and Spanish versions of the survey and letter were distributed via direct mail. Copies of the letter and survey, in both languages, are provided in Appendix H.

The letter and survey were delivered to the U.S. Postal Service on Friday June 9, 2000. The letter to the property owner requested that the survey be completed and returned to URSGWC by Thursday, July 14, 2000. The surveys were anonymous. Instructions were provided to the recipient that the homeowner should only complete the survey, the homeowner should be over the age of 18, and one survey should be completed per household.

8.3 INSECTICIDE USE SURVEY RESULTS

Of the 5,000 initial insecticide use surveys mailed, 1,158 were received by the July 14, 2000 deadline. Additionally, 421 of the 5,000 surveys, letters, and envelopes were returned for various reasons including incorrect addresses and death of addressed property owners. Of these 1,158 surveys, 10 were returned blank. The number of Spanish language surveys returned was less than 2% of the total number returned (19 of 1,158). Additionally, upon receipt of all surveys, it was noted that 29 of respondents of the 1,158 were individuals living in condominiums and the condominium association took care of lawn and garden areas. Their responses were included in the following results. The results from all responses are summarized. The complete results for each question are included in Appendix H. The questions are not summarized in numeric order.

8.3.1 Demographic Results

Demographic information was assembled from the first three use survey questions. The questions were:

1. What zip code is your home in?
2. Are you male or female? (Respondents were directed to answer with only one choice)
3. What is your age? (Respondents were directed to answer with only one choice)

Zip codes were grouped into well-defined regions of San Diego County, as defined in Appendix H. The results in Table 8-1 show the largest region of response to be San Diego Central (41%), which includes the City of San Diego. Approximately 3% of the total indicated either unmatched zip code, out of the SD area, or non-responsive. The results are summarized below.

The results from Question 2 indicate that 621 of 1,158, or 54%, of the respondents were male. Question 3 indicated the age groupings of the respondents to be significantly skewed towards the older populations. One possible reason for this might be that older, retired persons had more time available to respond to the survey. The results from the age data are presented in Table 8-2.

Table 8-1
REGIONAL RESPONSE RESULTS

San Diego County Region by Zip Code	Number of Responses	Percent
San Diego Central	471	41%
North Coastal	206	18%
North Inland	204	18%
East County	140	12%
San Diego South	102	9%
Unmatched, Out of Area, No Response	35	3%

Table 8-2
AGE GROUP RESULTS

Age Group	Number of Responses	Percent
18-30	21	2%
31-40	150	13%
41-50	270	23%
51-60	214	18%
60+	474	41%
Total Responses	1129	97%
No Response Given	29	3%

8.3.2 Respondent Sources of Information

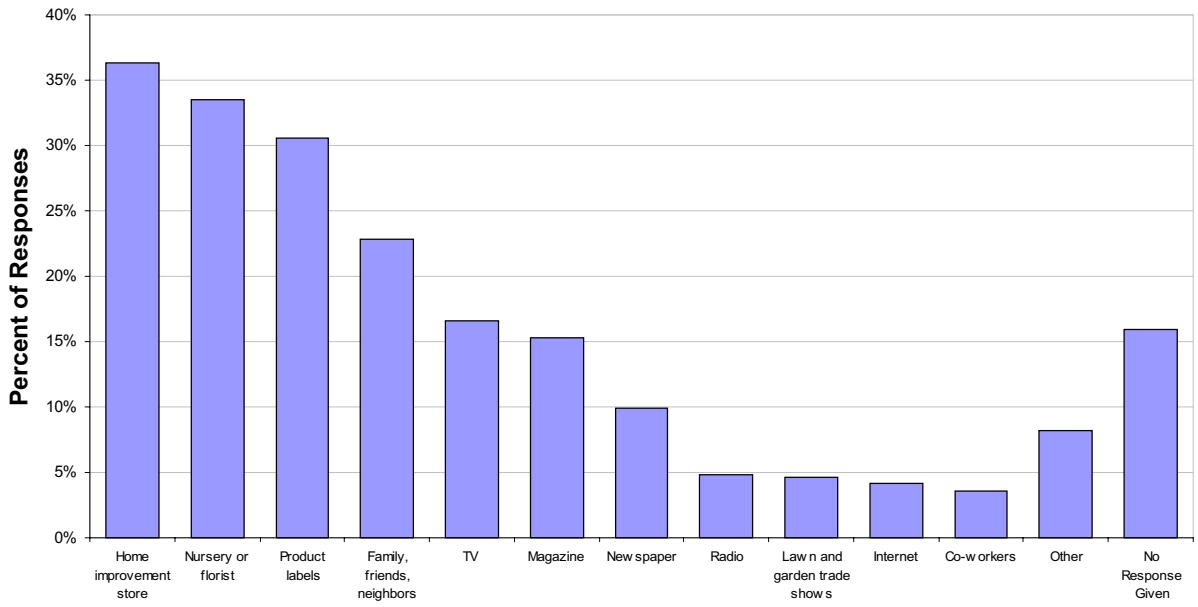
While establishing the demographic information above was important to know who is providing the responses, Question 24 was important to evaluate how this population obtains information on the insecticide products that they are using.

24. Where do you usually obtain information about lawn and garden products? (Respondents were directed to circle as many as apply)

Question 24 provides information regarding both the awareness of the users/consumers of insecticides and possibly which avenues to research in education or marketing programs. A total of 2,204 separate responses were recorded from the 1,158 surveys. The top three sources of information were: home improvement stores (36%), nurseries or florist (34%), and product labels (31%).

Included in the responses to Question 24 were 8.2% for the choice "other" (Figure 8-1). Some of these responses included: pest or garden/lawn professional (10), books (4), all sources (2), experience (2), "We think about a solution and try it." (1), "I am a Biochemist." (1), and scientific studies (1).

Figure 8-1.
LAWN OR GARDEN PRODUCT INFORMATION SOURCES



8.3.3 Existing Conditions

To understand the physical constraints and conditions in the respondent's garden and/or lawn, the following questions were grouped together.

4. Do you have a lawn or garden? (Respondents were directed to answer with only one choice)

6. What is the approximate area of your lawn and/or garden?

16. Which insects are the biggest problems in your yard? (Respondents were directed to circle no more than 3 of the choices)

The majority of respondents indicated that they have a lawn or garden. The number of positive responses to Question 4 was 1,063 (92%), while only 71 individuals (6%) indicated they did not have a lawn or garden. The results from Question 4 shown on Figure 8-2. The median area of the lawn and/or garden was 1,600-square feet.

Question 16 drew a varied reaction from many of the respondents. The largest pest cited in the survey results, by far, was the ant (70%). Slugs and snails (35%), white flies (35%), and aphids (23%), were next in importance (Table 8-3).

Figure 8-2
RESPONDENTS THAT HAD A LAWN OR GARDEN

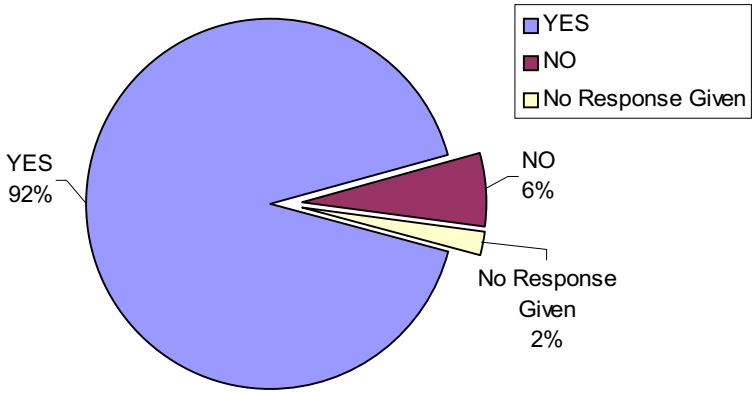


Table 8-3
MOST SIGNIFICANT LAWN OR GARDEN PESTS

Response	Number of Responses	Percent
Ants	812	70%
Slugs/Snails	406	35%
White flies	404	35%
Aphids	269	23%
Spiders	191	16%
Termites	155	13%
Fleas	100	9%
Earwigs	82	7%
Other	62	5%
Flies	60	5%
No specific problems	46	4%
Wasps	41	4%
Tomato worms	22	2%
Bees	19	2%
Total Responses[1]	2669	
No Response Given	86	7%

[1]Indicates multiple responses, however only three were permitted.

Some of the "other" responses to Question 16 included: cockroaches (8), crickets (6), grasshoppers (4), grubs (4), moths (3), sod web worms (2), cut worms (2), scale (2), and psyllids (2). Other insects and pests receiving only one response were Japanese beetles, apple worms, green worms, hookworms, leaf bugs, thrips, rats, gophers, fungus, silverfish, sow bugs, caterpillars, and mosquitoes.

8.3.4 Lawn/Garden Care Provider

Questions 5 and 7 were intended to determine who actually performs lawn or garden care and who is responsible for applying insecticides:

5. Do you take care of your lawn or garden? (Respondents were directed to answer with only one choice)

7. Do you hire a gardener to work on your lawn or garden? (Respondents were directed to answer with only one choice)

The results from Question 5 indicated that 927 of the 1,158 respondents (80%), take care of their own lawn and/or garden (Figure 8-3). However, 407 of 1,158 respondents (35%) also indicated that they hire a gardener (Figure 8-4). When affirmative responses to Question 5 were cross-referenced with positive responses to Question 7, it was found that 269 of 927 responded (29%) that they worked on their own lawns and hired a gardener.

Questions 9, 10, 17, and 18 provided information on the frequency and timing of insecticide application.

9. Have insecticides been applied to your lawn or garden in the past 12 months? (Respondents were directed to answer with only one choice)

10. If so, who applied them?

17. In which months do you apply the most insecticide? (Respondents were directed to answer with only one choice)

18. Where are insecticides usually applied on your property? (Respondents were directed to select as many choices as applied)

The results from Question 9 are presented in Table 8-4. A majority of respondents (55%) indicated that they have applied insecticides in the last 12 months.

For those respondents indicating "don't know" for Question 9, their answers were cross-referenced with those who do not take care of their own lawn or garden, or a negative response to Question 5. The results from this analysis indicated that 41 of the 69 people who answered "don't know" do not provide their own lawn care. Of the same group who answered "don't know" to this question, 53 of the 69 answered that they had hired a gardener to service their lawn or garden. These results indicated that when individuals are responsible for their own lawn care they keep track of the insecticides they are using.

Figure 8-3
RESPONDENTS WHO PERFORM LAWN/GARDEN CARE

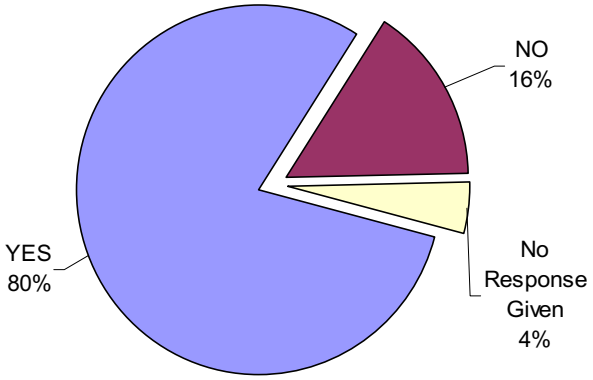


Figure 8-4
RESPONDENTS WHO HIRE LAWN/GARDEN CARE PROFESSIONAL

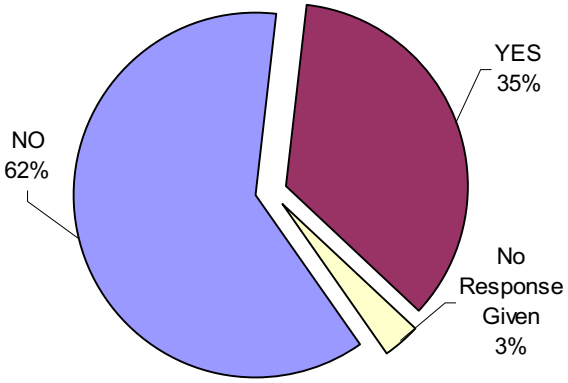


Table 8-4
APPLICATION OF INSECTICIDE IN LAST 12 MONTHS

Response	Number of Responses	Percent
Yes	636	55%
No	400	35%
Don't Know	69	6%
Total Responses	1105	95%
No Response Given	53	5%

Question 10 evaluated who applied the insecticides to the homeowner's lawn or garden. Question 10 was conditional to Question 9. If Question 9 was affirmative, then the respondent was directed to select from the choices: "homeowner", "hired gardener", or "other" as the individual applying insecticides answered Question 10. Many respondents answered Question 10, having given a response of "no" or "don't know" to Question 9. These answers were eliminated and only the "yes" responses to Question 9 were used to perform the data analysis. The results from Question 10 indicated that 83% of the individuals applying insecticides were homeowners. The next most common response was the "hired gardener" (15%) and then "other" (10%). Most of the answers for "other" included hiring various pest control companies such as Lloyd's, Terminex, Corky's, and Hydrex.

The results from Question 17 indicated that the highest frequency of pesticide application occurred in the spring and summer months (Table 8-5). However, from many of the surveys, it was clear that these categories needed to be better delineated. Additionally, a large number of individuals answered "don't know". When the number of individuals answering "don't know" to Question 17 was cross-referenced with those answering "yes" to Question 5, the result was 167 of 244 individuals (68%) providing their own lawn care indicated they did not know when they applied the most insecticides. This indicates either, these individuals did not understand the question, or could not provide an appropriate answer.

The results of Question 18 regarding the location of insecticide application indicate insecticide application may be targeted against both garden and household pests rather than lawn or garden pests alone (Figure 8-5).

A total of 2,183 responses were provided by the 1,158 respondents to Question 18. Some of the 65 responses to the choice "other" include upon the house and other structures (i.e., Shed) (7), on roses (6), don't use (4), directed to ant hills and trails (3), don't know (2), and directly to pets (1).

8.3.5 Consideration of Runoff

The following questions provided an indication of whether the respondent takes into account the potential for insecticides to become mobilized in irrigation or storm water runoff:

12. How soon after insecticides are applied do you irrigate your lawn or garden? (Respondents were directed to answer with only one choice)

13. Is the likelihood of rain a consideration when insecticides are applied on your lawn or in your garden? (Respondents were directed to answer with only one choice)

The results to Question 12 indicated that irrigation and subsequently potential runoff was not a concern for those applying insecticides (Figure 8-6). The results indicated that 638 out of 801 respondents (80%) to Question 12 irrigated their lawn or garden within 1 day of application. Some of the 83 "other" responses included: per directions or instruction (10), three or more days (6), not used (5), and various monthly time periods (4).

The results to Question 13 regarding consideration of the likelihood of precipitation when applying insecticides indicated that the largest group (45%) does take into account potential rainfall (Table 8-6).

Table 8-5
HEAVIEST INSECTICIDE APPLICATION BY TIME OF YEAR

Response	Number of Responses	Percent
January, February, March	50	4%
April, May, June	287	25%
July, August, September	260	22%
October, November, December	10	1%
Never	77	7%
Don't know	244	21%
Total Responses	928	
No Response Given	261	23%

Figure 8-5
LOCATIONS OF APPLICATION OF INSECTICIDES

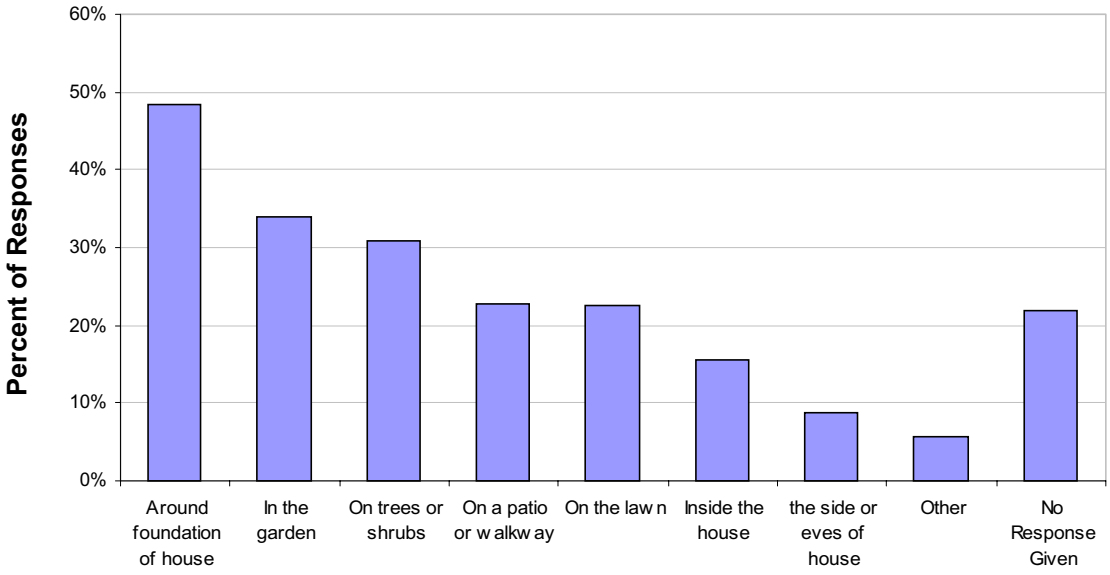


Figure 8-6
TIME PERIOD FOR IRRIGATION AFTER INSECTICIDE APPLICATION

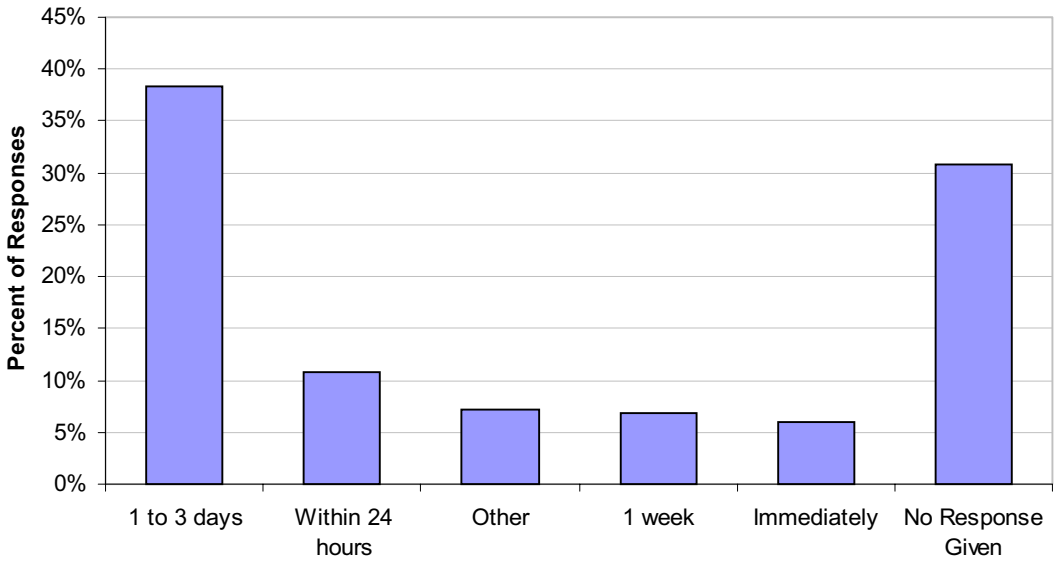


Table 8-6
CONSIDERATION OF PRECIPITATION

Response	Number of Responses	Percent
Yes	523	45%
No	224	19%
Don't Know	124	11%
Sometimes[1]	1	0%
Total Responses	872	75%
No Response Given	286	25%

[1] "Sometimes" represents a choice not provided but written in.

8.3.6 Use, Cleaning, and Disposal

Understanding how respondents apply insecticides and where insecticides are disposed is important for identifying potential storm water pollution issues. The following series of questions provided insight on the amounts of insecticide being introduced into the various watersheds within San Diego County.

11. If insecticides are used on your lawn or garden, how is the excess insecticide normally disposed? (Respondents were directed to answer with only one choice)

14. How do you normally figure out how much of the product to use? (Respondents were directed to answer with only one choice)

15. How do you clean the equipment you use to apply the insecticides you use? (Respondents were directed to select as many choices as applied)

Respondents were asked in Question 14 to select the best answer for how they learn about the amount of insecticide to apply. The results, summarized in Figure 8-7, indicate that the packaging instructions are the primary source for application information. Some of the 80 "other" responses for Question 14 included pest control company's concern (14), do not use (5), and don't know (1).

How respondents clean the equipment used in application was the focus of Question 15. The results from this question indicated varied responses (Table 8-7). Washing the equipment in the garden or on the lawn was the most popular answer, accounting for 34% of the responses. Following this response was, washing with water (15%), don't clean up (9%), use disposable containers and put in trash (9%), and wash in the house/garage in a washbasin/sink (7%).

The results from Question 11 indicated that few users of insecticide appear to be dumping the excess insecticide down the storm drain or on to the street. The two most dominant responses to this question are "use it all up" and "store for future use". The results indicate that 38% of the respondents "use it all up". However, due to the wording of this answer it was not clear as to the time period in which they use it all up. For example, the wording may imply that the respondent applies all the insecticide at once regardless of application directions. Conversely, this response may be interpreted as the respondent eventually uses the balance of the product after storing the product for a short time. Twenty-five percent of respondents indicated they "store for future use". Additionally, 4% of the respondents indicated that they take their excess insecticide to a waste facility. These results suggest that the respondents are generally using and disposing of their insecticide products in a proper manner. Only 4 of the 1,158 respondents indicated that they actually pour their excess insecticide out in the street or gutter.

8.3.7 Purchasing and Type of Insecticides Used

The following section provided results that indicated what types of insecticides are being purchased and used. Question 8, although not structured in the survey as such, is a conditional question that allows for filtering of data in Questions 20, 22, and 23, while Question 19 is a stand-alone question:

8. Do you buy insecticides for use on your lawn or garden? (Respondents were directed to answer with only one choice)

19. In the past 12 months, have the insecticides used on your lawn or in your garden contained the active ingredient Diazinon? (Respondents were directed to answer with only one choice)

20. What are the most common brand name insecticides that are used on your lawn or in your garden?

22. What is most important to you when selecting an insecticide?

23. What are the names of the stores where you usually purchase insecticides?

The results from Question 8 revealed that only 56% of the respondents purchase insecticides for their lawns or gardens. Nearly 40% responded that they did not buy insecticides.

Figure 8-7
INFORMATION SOURCE FOR QUANTITY OF INSECTICIDE APPLICATION

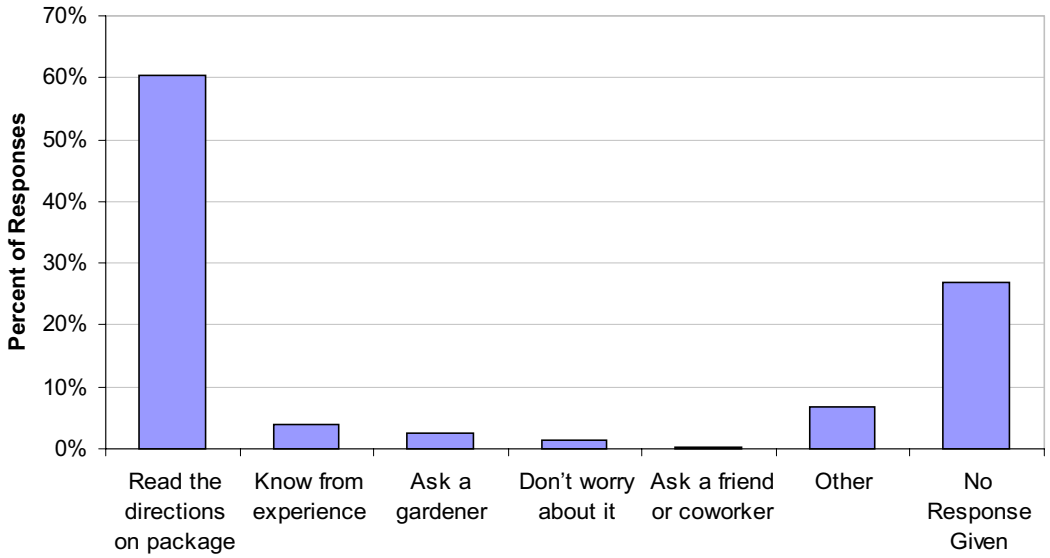


Table 8-7
CLEAN UP PROCEDURES FOR RESPONDENTS

Response	Number of Responses	Percent
a) Wash in the street, sidewalk or driveway	23	2%
b) Wash in the house/garage in a washbasin or sink	85	7%
c) Wash in the garden or on the lawn	394	34%
d) Use a disposable container and put in the trash	104	9%
e) Don't clean up	107	9%
f) Wash with water	177	15%
g) Use soap	55	5%
h) Other	117	10%
Total Responses	1062	
No Response Given	331	29%

The results from Question 19 regarding the presence of Diazinon in insecticides applied to the respondent's lawn or garden showed a decidedly flat response (Figure 8-8). While 32% and 22% answered "yes" and "no", respectively, 47% either did not respond or answered "don't know".

In response to Question 20, the brand names listed were varied. Table 8-8 contains the responses that were mentioned on at least 1% of all surveys returned. The responses included both brand names and primary ingredients. Due to the open-ended nature of the question, many other responses were included in the survey and are included in Appendix H.

Figure 8-8
DIAZINON AN ACTIVE INGREDIENT IN INSECTICIDES APPLIED

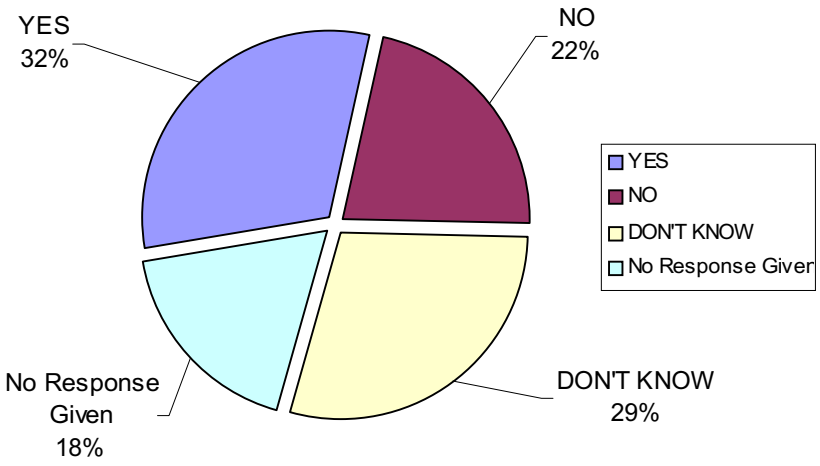


Table 8-8
COMMON BRAND NAMES USED

Brand Name	Number of Responses	Percent
Ortho	239	21%
Diazinon	77	7%
Raid	73	6%
Malathion	50	4%
Dursban	39	3%
Spectracide	33	3%
Safer	24	2%
Black Flag	21	2%
Round Up	18	2%
Scott's	15	1%
Green Light	13	1%
Sevin	12	1%
Other Brands	135	12%
Don't Know	26	2%
Don't Use/None	21	2%
Total Responses	796	
No Response Given	566	49%

The results from Question 22 regarding insecticide selection criteria are presented in Figure 8-9. The most important criteria to the respondents was the products associated "toxicity to the insects" (40%). Following toxicity to insects, whether the product was "environmentally friendly" was next with 33% of the 1,158 surveys. Some of the 89 responses to the choice "other" in Question 22 included: toxicity to pets, wildlife, and other animals (17 responses), toxicity to humans (15), all of the above (9), advice of gardener or other reference (3), do not buy or use (2), cost and effectiveness (1), availability (1), ease of use (1), and reputation (1).

Question 23 requested information about store names. The store of choice was Home Depot (53%), followed by Wal-Mart (6%), Home Base (5%), K-Mart (4%), and the various military exchanges in the area (3%). A complete listing of stores is available in Appendix H.

8.3.8 Alternatives to Chemical Insecticides

Question 21 is a question regarding the use of alternatives to chemical insecticides:

21. Have alternatives to insecticides (e.g., Borax or Integrated Pest Management (IPM)) been used on your lawn or in your garden? (Respondents were directed to answer with only one choice)

    (a) If so, what alternatives to insecticides have been used on your lawn or in your garden?

    (b) If not, would you consider using an alternative to insecticide? (Respondents were directed to answer with only one choice)

The first portion of Question 21 is a conditional question; allowing for parts (a) and (b) to be analyzed. As with other conditional questions in this survey, only appropriate responses to each of the subsequent questions were considered. For example, if the respondent answered "yes" to Question 21, then any response to Question 21(b) would be eliminated during analysis. The results from Question 21 indicated that few individuals (22%) are currently employing insecticide alternatives (Table 8-9).

Question 21(a) was an open-ended question, designed to collect information on the various alternatives applied to lawns or gardens. Respondents were permitted to write in more than one response so that the total number of responses given exceeds the number of "yes" responses in Table 8-9. The collection of substances is varied with the top ten responses listed in Table 8-10. Borax (38%) and soap/detergent (35%) were the most frequently mentioned alternatives.

"Other" alternatives mentioned in response to Question 21 (a) included: predatory snails, alcohol, vinegar, baking soda, banana peels, garlic, Integrated Pest Management, marigolds, salt, ant chalk, traps, or stakes, birds, boiling water, bran, Clorox bleach, coffee grounds, habitat destruction, tobacco extract, tobasco, herbs, iron sulfate, lizards, Sevin, Simple Green, Timbor, ammonia, Sluggo, and hand picking.

Question 21(b) evaluated whether the respondent was willing to try alternatives, given that they have not used them before. Of the 557 respondents who answered "no" to Question 21, 296 answered "yes" (53%) as willing to consider alternatives. Additionally, 29% of the 557 answered "maybe". Only 8% respondents answered "no" to both using and possibly trying alternatives. This number represents less than 4% of the total survey respondents.

Figure 8-9
CRITERIA FOR SELECTING INSECTICIDE

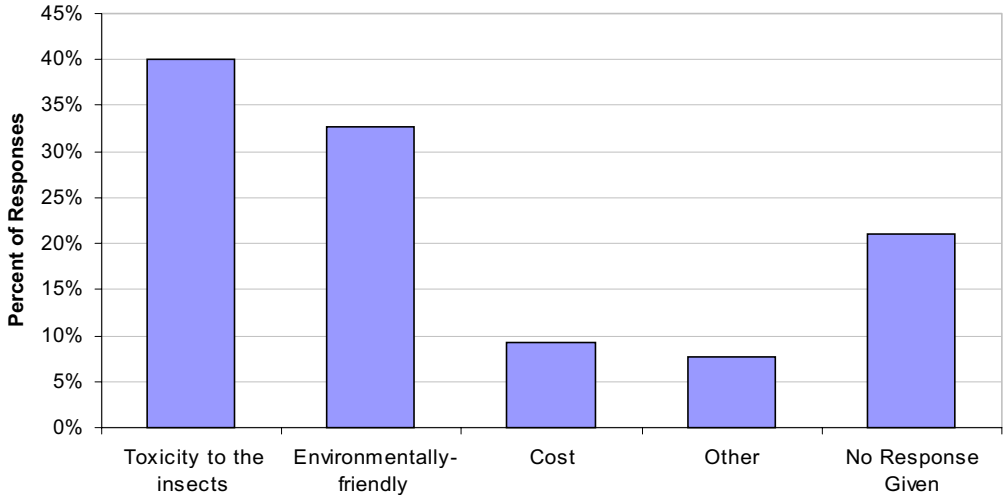


Table 8-9
HAVE ALTERNATIVES BEEN USED ON YOUR LAWN OR GARDEN?

Response	Number of Responses	Percent
Yes	251	22%
No	557	48%
Don't Know	170	15%
Total Responses	978	84%
No Response Given	180	16%

Table 8-10
ALTERNATIVES THAT HAVE BEEN APPLIED

Alternative	Number of Responses	Percent
Borax	96	38%
Soap/Detergent(s) w/ & w/o Water	87	35%
Lady Bugs	15	6%
Oils (Various)	14	6%
Safer Products	12	5%
Beer	11	4%
Water Pressure	10	4%
Boric Acid	9	4%
Diatomaceous Earth	8	3%
Bacillus Thuringienses	7	3%
Other Insects	6	2%
All Other Responses	56	22%
Total Responses	331	
No Response Given	27	11%

8.4 DESIGN OF TELEPHONE SURVEY FOR INSECTICIDE RETAILERS DESIGN

The retail stores surveyed were chosen from the sources that homeowners indicated in their responses to the Insecticide Use Survey. Demographic data such as store location, type of business, and store contact information were collected prior to completion of the survey. The survey was designed to collect information from the manager or assistant manger of the lawn or garden department. Additionally, the telephone survey was designed to determine the following:

- Which brand names are most commonly purchased;
- Which factors are most important to customers when selecting an insecticide;
- Type of information most commonly exchanged when customers are purchasing insecticides, (e.g., product information, use, and type of pest);
- Whether less toxic alternatives are available at their store and, if so, what type and how they are marketed;
- Who are the major purchasers of insecticides;
- What time of the year are insecticide sales the highest; and
- What type of information is available to customers on use and disposal of insecticides and the willingness of stores sampled to provide this information.

A list of selected stores in San Diego County was compiled for the telephone survey. A total of 439 business providing insecticides was obtained from the Pacific Bell Yellow Pages and the World Wide Web on-line at www.bigyellow.com. This list of retailer businesses was not inclusive of all businesses providing insecticides for sale in San Diego County. These stores were first delineated by category then were assigned a random number that determined the calling order within that category. Categories of stores sampled included discount or big box (e.g., Home Depot, Wal Mart and K-Mart), drug, grocery, hardware, and nursery.

When performing the telephone survey, respondents were asked open-ended questions. Questions on the survey (included in Appendix H) reflected choices designed to facilitate the recording of answers during the telephone interview.

8.5 TELEPHONE SURVEY FOR INSECTICIDE RETAILERS RESULTS

8.5.1 Respondent Demographic Information

Of the 439 retail businesses selected, 58 were contacted and completed the telephone survey. The numbers of businesses surveyed by retailer category are included in Table 8-11. Chain or franchise stores were the largest category sampled. For the 11 drug stores surveyed, six were Rite-Aid stores, three were Sav-On locations, and one was a Long's store. The grocery stores surveyed did not carry lawn and/or garden insecticides. Of all stores surveyed, only one Ralphs and one Albertson's were surveyed. Franchise hardware stores included five Ace stores, three Dixieline Lumber stores and two Do It Best branches. The results of the Insecticide Use Survey indicated that discount stores were the largest suppliers of insecticides in San Diego County. Therefore, an effort was made to sample as many of these stores as possible. Discount retailers surveyed included Home Depot (4), Home Base (2), Target (6), Kmart (3), and Wal Mart (2). Nurseries tended to be local or independent rather than associated with chain or franchise establishments. The two largest nurseries mentioned on the Insecticide Use Survey, Armstrong and Walter Andersen Nurseries were surveyed three times and once, respectively. A list of all stores surveyed is included in Appendix H.

Table 8-12 provides the regional distribution of the stores sampled in the telephone business survey. The regions were obtained using the zip codes for each stores address (Appendix H). Zip codes were grouped into well-defined regions of San Diego County. The results in Table 8-12 show that the largest region surveyed was the San Diego Central region (43%), which includes the City of San Diego.

The survey was designed to obtain information from the Manager of Assistant Manager of the department that carried lawn and/or garden insecticides and for each type of store that individual and their respective title varied. Table 8-13 lists the positions of those who were surveyed. For most drug and grocery stores contacted, the individual surveyed was the Store Manager or Assistant Store Manager. Since they did not specialize in garden care they only had a general knowledge of insecticide products and information offered. In the case of the discount and hardware operations contacted, these businesses had individuals who were assigned to the garden section. Many of these managers were familiar with the product lines and customers needs. Of the nurseries surveyed, the individuals contacted were normally the Store or Assistant Managers. These nursery managers were comparable to the garden managers of the discount stores. The individuals surveyed at the nurseries had good knowledge of the insecticide products and customers needs.

Table 8-11
RETAILERS SAMPLED BY CATEGORY

Category	Number Surveyed	Number Obtained
Drug Stores	11	120
Grocery Stores	2	151
Hardware	12	52
Discount	18	29
Nurseries	15	87
Total	58	439

Table 8-12
RETAILERS SAMPLED BY REGION

San Diego County Region by Zip Code	Number of Responses	Percent
San Diego Central	25	43%
North Coastal	12	21%
North Inland	10	17%
East County	4	7%
San Diego South	7	12%
Total	58	100%

Table 8-13
POSITION OF PERSON SURVEYED

Position	Number Surveyed	Percent
Manager	34	59%
Assistant Manager	8	14%
Store Manager or Director	6	10%
Sales	3	5%
Lead Garden Sales	2	3%
Owner	2	3%
General Supervisor	1	2%
Sales Manager	1	2%
Regional Garden Manager	1	2%
Total Responses	58	100%

8.5.2 Product Line Information

The following section includes the results from Questions 1 and 2 of the telephone survey. The information provided is on brand and product content. The questions were:

1) What are your best selling insecticide brand name products?
2) How do sales of those products with Diazinon compare with those without Diazinon?

Figure 8-10 summarizes the results from Question 1. As the figure shows, Ortho is the largest brand name mentioned on 76% of all surveys. The Safer brand was mentioned second (19%) most frequently, followed by Raid (14%) and Green Light (14%). The figure contains all product lines, which were mentioned on two or more telephone surveys. Brands mentioned only once include: Ace, Black Leaf, Makiki, Termout, Purge 2, Rose Defense Oil, Ultrafine, Hot Shot, Eliminator, Cooke, Enforcer, Grant's, and Decon.

The top three Ortho products mentioned contained Diazinon, Malathion, and Dursban (Figure 8-11).

The results from Question 2 are summarized on Figure 8-12. The results show that the insecticides containing Diazinon as the active ingredient sell better than those without Diazinon. General comments received from the business respondents indicate that customers are likely to be looking for an effective insecticide. Some respondents stated that if natural or alternative products worked, then no Diazinon would be necessary. However, these respondents mentioned that Diazinon was an effective ingredient.

8.5.3 Customer Purchasing Habits

The following section contains information on the results from business telephone survey Questions 3 and 4. Coupled with the results from telephone survey Question 2, these results provide information regarding why customers purchase one insecticide over another. The questions were:

3) What effect does price have upon insecticide sales?
4) What types of information do customers request when purchasing insecticides?

The summary of responses to Question 3 show price appears to have little effect on the sales of insecticides (Figure 8-13). Due to the open-ended nature of the question, a wide variety of responses were received. Some of the individuals who responded that price had little to no effect on purchasing, said that brand name, effectiveness, and pest type were among considerations for their customers when purchasing insecticides. Others mentioned convenience, ease of use, and ready mixed application as important selection criteria.

The results from Question 4, regarding information requested when purchasing insecticides, indicated that customers desire information on product use (45%) (Figure 8-14). A significant percentage of respondents (21%) indicated customers had no questions at all. Additionally, 21% of the respondents specified something other than the categories chosen at the outset of the study. Comments that were provided by the respondents for the category "other" included two types of information. These were generally information relating to the toxicity of the product to children, pets, and other environmental concerns (8 responses) and information regarding the product effectiveness against a particular pest problem (8 responses).

Figure 8-10
PERCENT OF BRAND NAMES MENTIONED BY RESPONDENTS

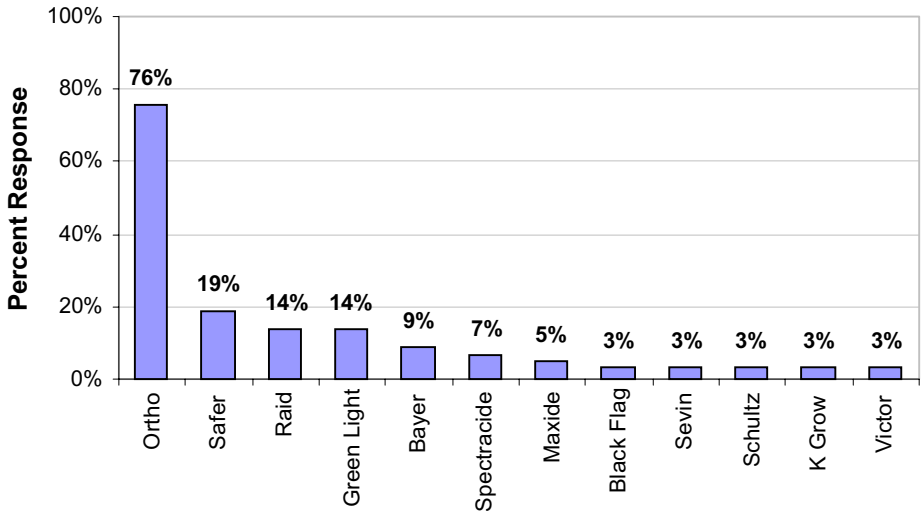


Figure 8-11
FREQUENCY OF ORTHO PRODUCTS MENTIONED BY RESPONDENTS

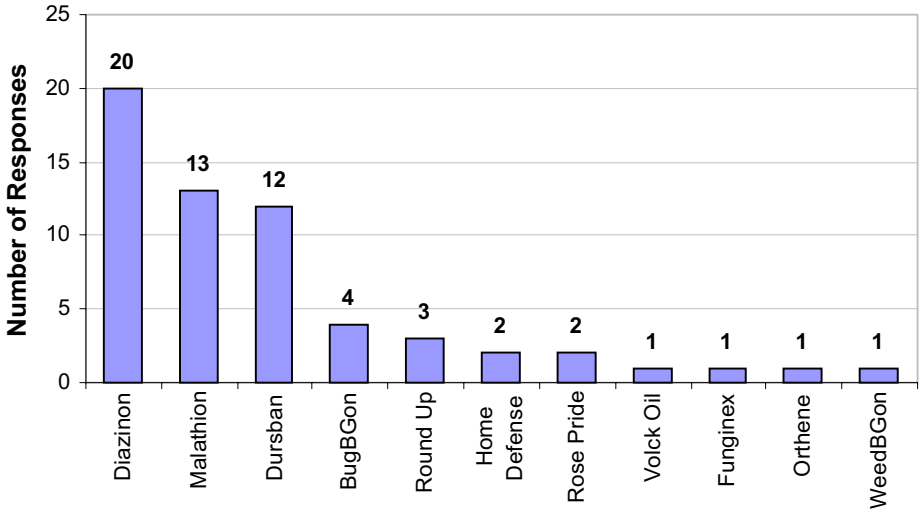


Figure 8-12
PRODUCT SALES WITH AND WITHOUT DIAZINON

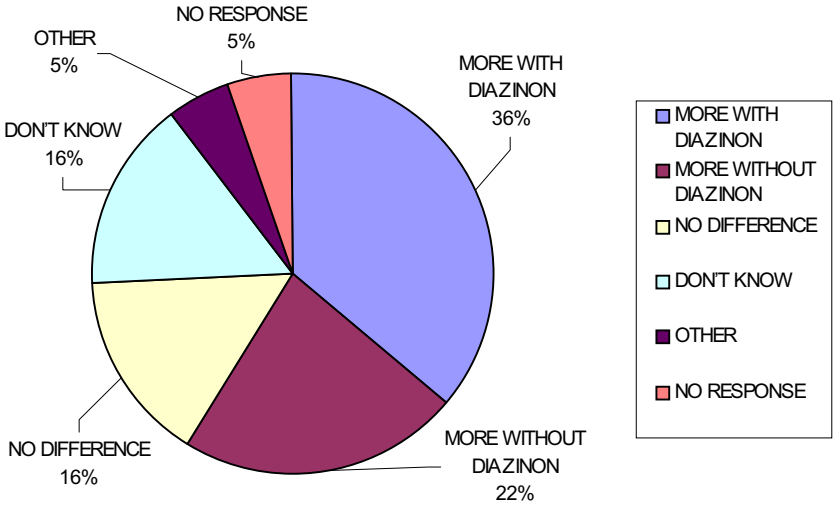


Figure 8-13
PRODUCT SALES EFFECTED BY PRICE

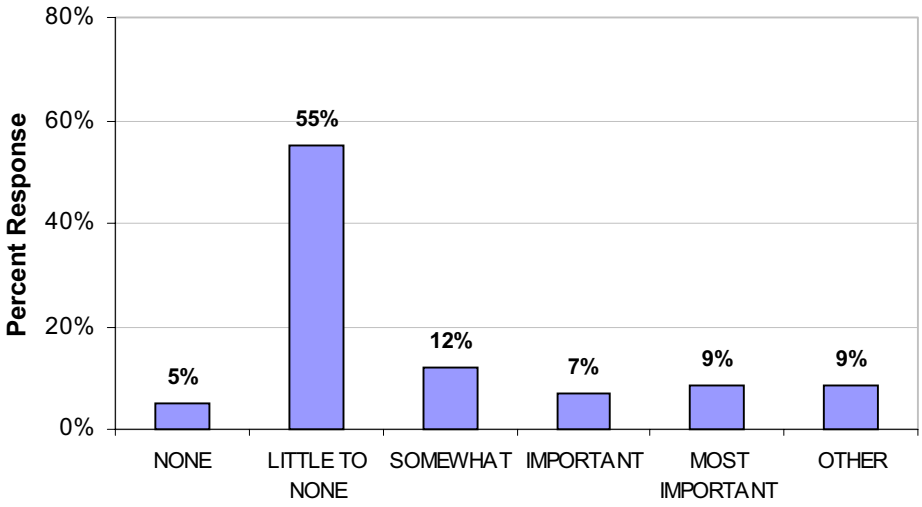
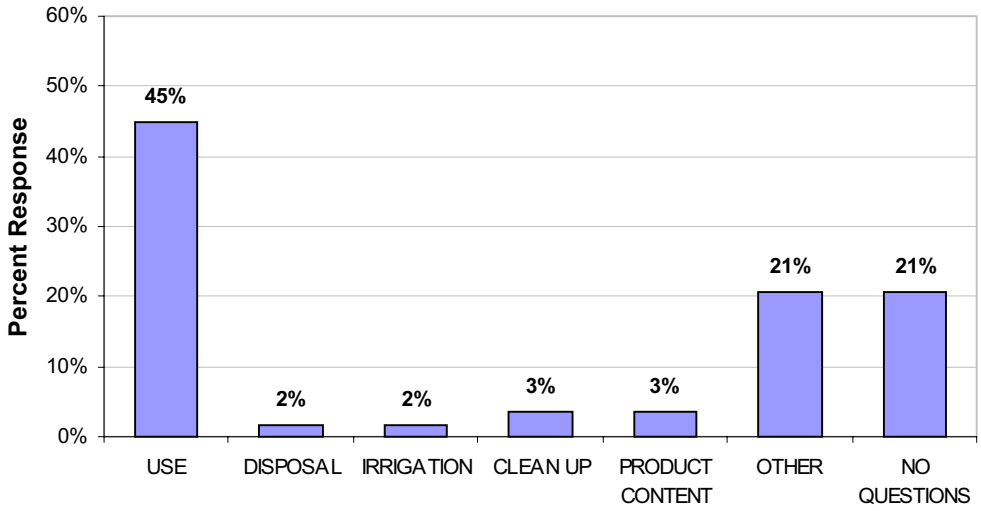


Figure 8-14
INFORMATION REQUEST WHEN PURCHASING INSECTICIDES



8.5.4 Largest Pest Problem by Sales or Customer Questions

The following section contains the results from telephone survey Questions 5 and 6. It was noted during the survey process that Questions 5 and 6 were too similar. The respondents found it difficult to delineate between the two questions. A decision was made to only ask what types of pest they thought was the largest problem by either the product sales or customer questions. The original questions were:

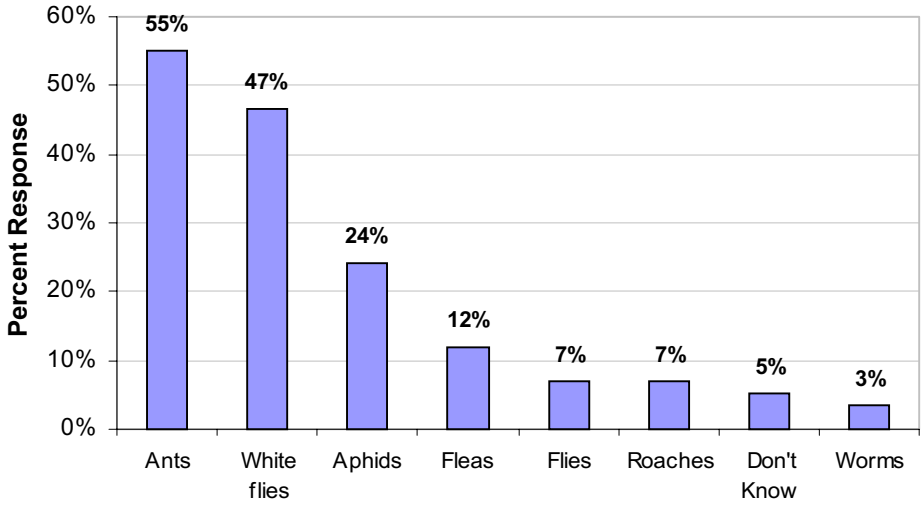
5) By the sales you see, what types of insects appear to be the largest problem?
6) By the customer questions, what types of insects appear to be the largest problem?

As shown by the results the three largest pests cited were: ants (55%), white flies (47%) and aphids (24%) (Figure 8-15). Other pests that received only one response include: earwigs, slugs and snails, spiders, wasps, caterpillars, water bugs, ticks, green worms, bud worms, grub worms, psyllids, gnats, flying and lawn insects.

8.5.5 Less Toxic Alternative Offerings and Information

The following section summarizes the results for telephone survey Questions 7 through 15. These questions were asked to obtain information on which less toxic alternatives are currently being offered (if any) and what efforts are being made to sell these alternatives versus the more toxic chemical insecticides. Furthermore, these questions were asked so that the willingness of retailers to carry and promote such products could be evaluated. Finally, these questions were included in the survey to determine the whether information about alternatives is being distributed, or possibly could be distributed. The questions were:

Figure 8-15
LARGEST PEST BY SALES OR CUSTOMER INFORMATION



7) Does your store offer less toxic alternatives to chemical insecticides?

8) If Yes to 7), are these alternatives highlighted as "Alternatives", "Less Toxic" or other?

9) If Yes to 7), does your store offer Promotions or Discounts on these alternatives?

10) If Yes to 9), what kinds of promotions?

11) If No to 9) would your store consider offering Promotions or Discounts on these alternatives?

12) If Yes to 7), does your store offer information or education on these alternatives?

13) If No to 12), would your store consider offering information on these alternatives?

14) What are your most common alternatives?

15) Would your store consider offering less toxic alternatives to chemical insecticides?

The results from Question 7 show that 71% of the retailers in San Diego County are currently carrying some kind of less toxic alternatives to insecticides (Figure 8-16). Question 7 was a conditional question that allowed for follow up questions, the first two being Questions 8 and 9 on the presentation and promotion of alternatives. The results from Question 8 show that of the 41 retailers who carry alternatives, 59% of those do not highlight them as less toxic (Figure 8-17). Of the positive responses to Question 8 (32%), some indicated that they brought attention to the less toxic alternatives during the sale, by either describing them verbally or pointing to the product label. One retailer provided separate shelf space specifically for alternatives. Another retailer mentioned that "End Caps" were employed seasonally to market live predatory insects. End caps are the shelves at the ends of isles that are generally highly visible and feature products for which increased sales are desired.

Figure 8-16
PERCENT OF STORES OFFERING LESS TOXIC ALTERNATIVES

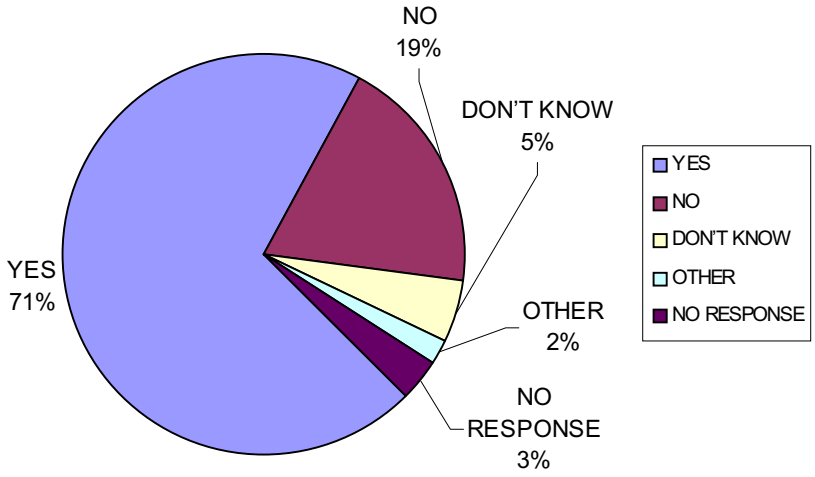
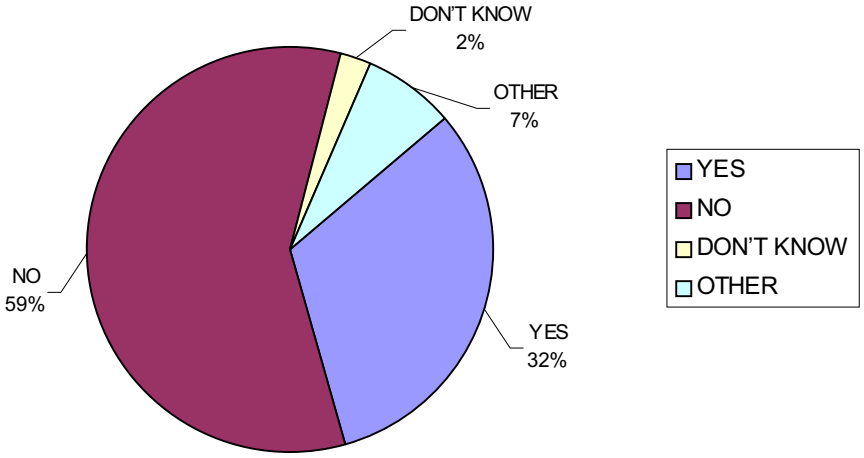


Figure 8-17
PERCENT OF STORES HIGHLIGHTING ALTERNATIVES



The results from Question 9 regarding the promotion of alternatives are shown on Figure 8-18. The figure shows most retailers who carry less toxic insecticide products do not promote them (73%). Question 10 was conditional upon the answer to Question 9. The types of promotions offered by retailers were minimal, only 4 of 41 respondents (4%) carrying alternatives indicated that they promoted their alternatives. Question 10 asked what types of promotions were used. Besides lower prices and sale prices, house brands seemed a way to promote alternatives. A house brand is a firm's own brand name, for example, K-Mart carries K Grow. K Grow was reported by K-Mart's managers to be less toxic than common insecticides. K Grow was also reported to be at a lower price than the brand name products, such as Ortho. In the case of Home Base stores, the alternatives are promoted as Base Buys. One problem mentioned with promoting alternatives was that they were sometimes too perishable to stock or promote. This comment referred to live alternatives such as ladybugs, preying mantises, or other insects that have a limited shelf life. Question 11 explored the willingness of retailers, who carried alternatives, to promote these alternatives if they are not currently doing so. The results from this question show that 40% of retailers would not be willing to promote alternatives (Figure 8-19). During the survey, the word promote was found to be synonymous with discounted price. Multiple comments (5 responses) received from Question 11 indicated that a discount price would be something decided at the corporate level. Another comment received was that discounts could be offered if co-op money was available. (Co-op money is the money available from the manufacturers, related to the quantity of wholesale purchases and provided by the manufacturer for sales or advertising at the retail level).

Questions 12 and 13 were included to determine the current status of information being offered to consumers regarding less toxic alternatives. The results from Question 12 are included in Figure 8-20 and show that 50% of the retailers who offer alternatives do not offer information on alternative methods and products for pest control. However, 41% do provide this information. The type of information offered is included in Figure 8-21. Classes offered periodically at stores and verbal instruction offered at the sale, dominated these responses.

Question 13 was a follow up question to Question 12. The results for Question 13, regarding the willingness to provide information on alternatives, are included in Figure 8-22. The question received an overwhelming positive response (75%) to the willingness of retailers to provide alternative information. A small percentage (10%) indicated that they would; however, the ultimate decision must come from the corporate level.

The results from Question 14, regarding the most common alternatives, are included in Figure 8-23. Those alternatives that received at least two responses (at least 5%) were included in the figure. The largest brand of alternative carried is Safer (78%). Other commonly carried alternatives included: various oils (39%), insecticidal soaps (37%), and boric acid (32%). The reader should note that the Safer product line includes both oils and insecticidal soap, therefore, the results from oils and soaps may be included in the Safer brand category. Additionally, Question 14 received a wide variety of responses. Alternatives mentioned only once included: Bayer, Calex, decollate snails, electronic devices, fly bait, glue traps, hot pepper, Jungle Rain, K Grow, Martha Stewart, nematodes, Next Day, Thoricide, Track, and ant traps.

Figure 8-18
PERCENT OF STORES PROMOTING LESS TOXIC ALTERNATIVES

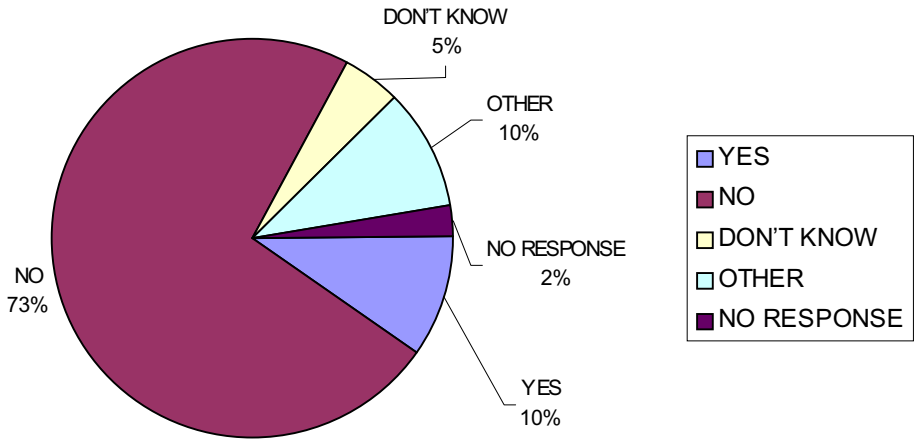


Figure 8-19
PERCENT OF STORES WILLING TO PROMOTE ALTERNATIVES

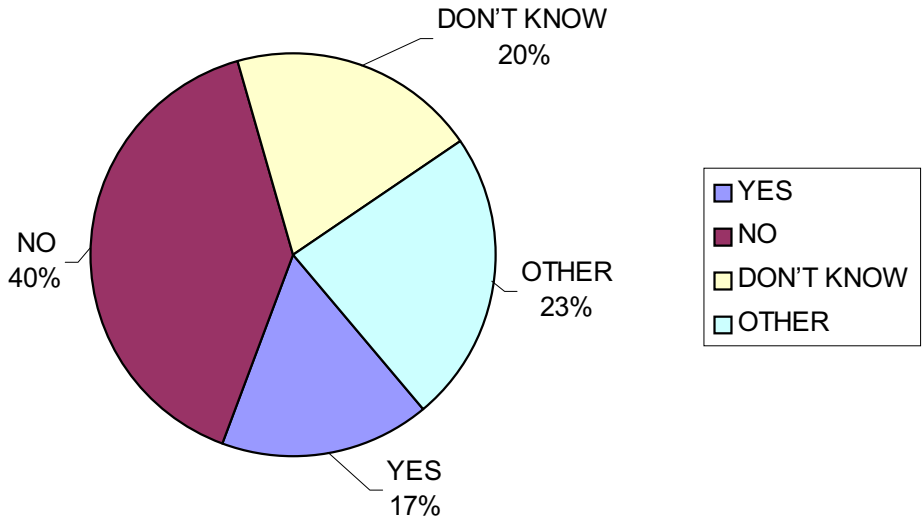


Figure 8-20
PERCENT OF STORES OFFERING INFORMATION ON LESS TOXIC ALTERNATIVES

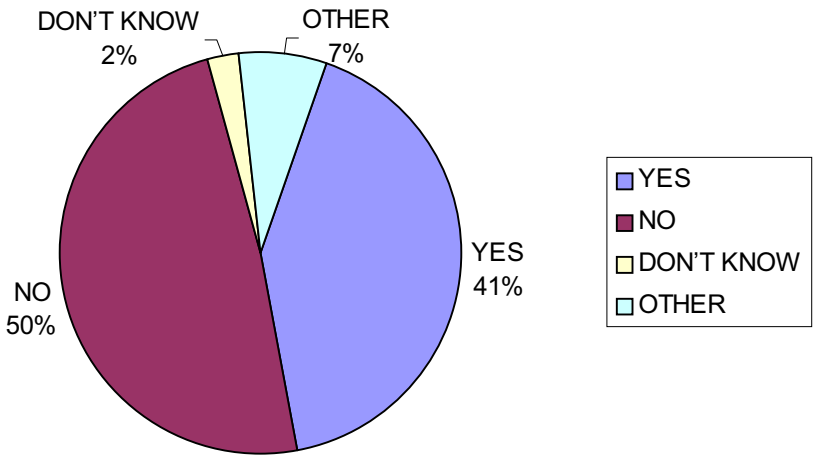


Figure 8-21
TYPE OF INFORMATION OFFERED ON LESS TOXIC ALTERNATIVES

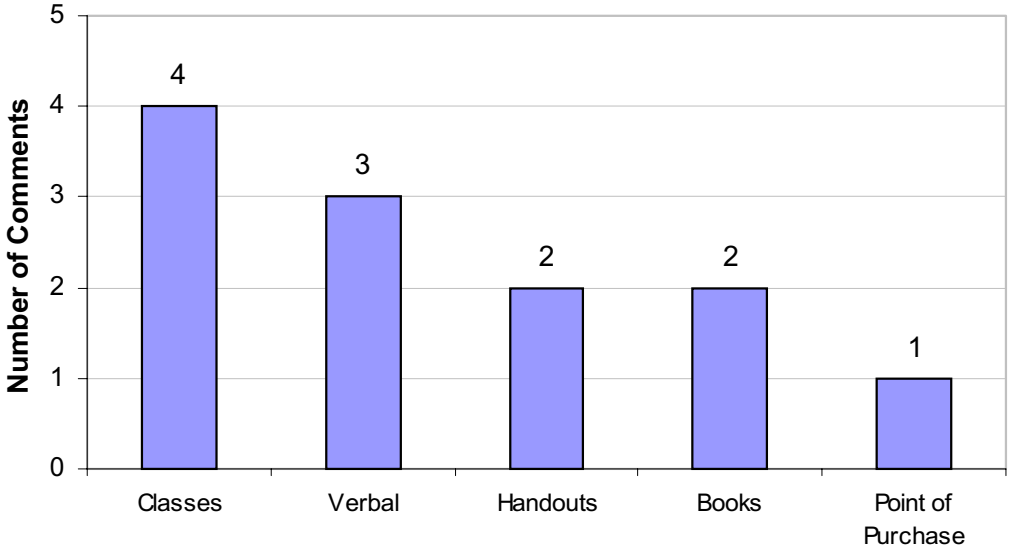


Figure 8-22
RESPONSE TO QUESTION OF WILLINGNESS TO OFFER INFORMATION ON ALTERNATIVES

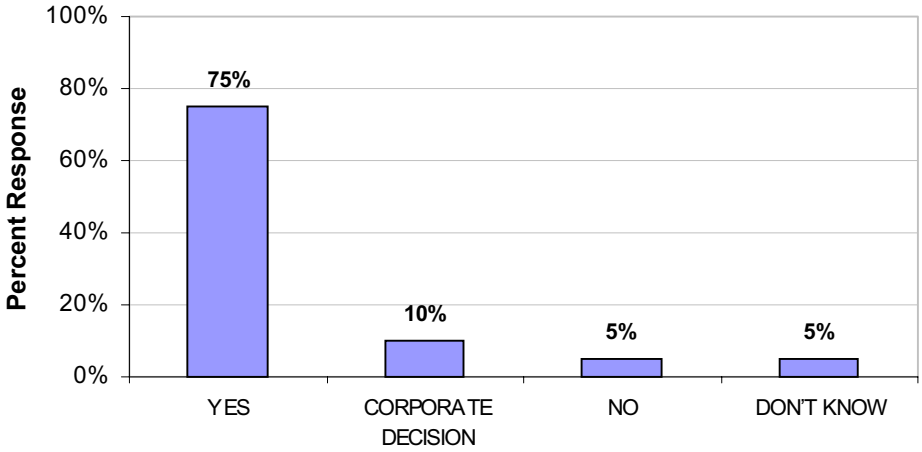
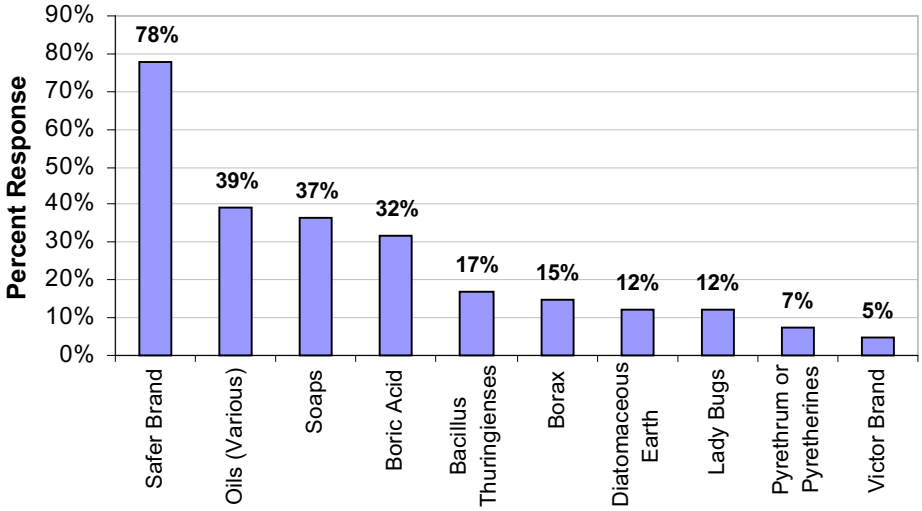


Figure 8-23
MOST COMMON ALTERNATIVES MENTIONED BY RESPONDENTS



Based upon the respondent's answer to Question 7, Question 15 was asked regarding the willingness of the store to carry less toxic alternatives if they currently did not. The results from Question 15 are included in Figure 8-24. Very few (13%) of the respondents indicated they would be willing to carry alternatives. The bulk of the responses fell into either "don't know" or an answer other than "yes" or "no". Of the comments from the respondents (41%) in the "other" category, 5 individuals mentioned that the decision to carry alternatives rested in the hands of either corporate of management decision-makers. One respondent, who answered "yes" to this question, qualified their response, stating that they were willing to carry alternatives but ultimately the decision was a corporate one.

8.5.6 Insecticide Sales Information

Information relating to customer base and sales volume collected here was taken primarily from the opinions of the person being surveyed. Questions 16 and 17 provide market and sales information. Collection of sales information might be more accurately completed if collected at the regional or district level. The questions are:

16) Regarding sales of insecticides, who tends to be your customer base?
17) In which months are insecticides sales the highest?

The results from Question 16 regarding the customer base are included in Figure 8-25. The results clearly indicated that the primary customer of retail insecticides is the resident or homeowner customer (90%). Following the resident/homeowner is the gardener/lawn care professional (22%).

The months cited as the highest for insecticide sales are June (71%), July (60%), and May (52%) (Figure 8-26). The open ended nature of the question led to some varied responses. For example, some respondents only cited the spring, summer, or fall.

8.5.7 Public Education Materials

Telephone survey Questions 18 and 19 were intended to determine what type of information is available to customers on the use and disposal of insecticides and the willingness of stores to provide this information. The questions were:

18) Do you offer public education materials for your customers regarding proper use and disposal of insecticides?

19) If "no" to Question 18), would your store be willing to offer these education materials?

The results from Question 18 indicated that the majority do not distribute materials on use and disposal (70%) (Figure 8-27). Of those responding that did distribute these materials (22%), the type and form of this information varied. Some of these responses included: Ortho or other pesticide company information (books or pamphlets) (7), Material Safety Data Sheets (MSDS) (2), on the label (1), and on-line (1). When those responding negatively to Question 18 were asked if they would be willing to distribute use and disposal information (Question 19), 83% stated they would. The results from Question 19 are summarized in Figure 8-28. As was the

Figure 8-24
WILLINGNESS TO CARRY ALTERNATIVES FOR THOSE NOT CURRENTLY CARRYING

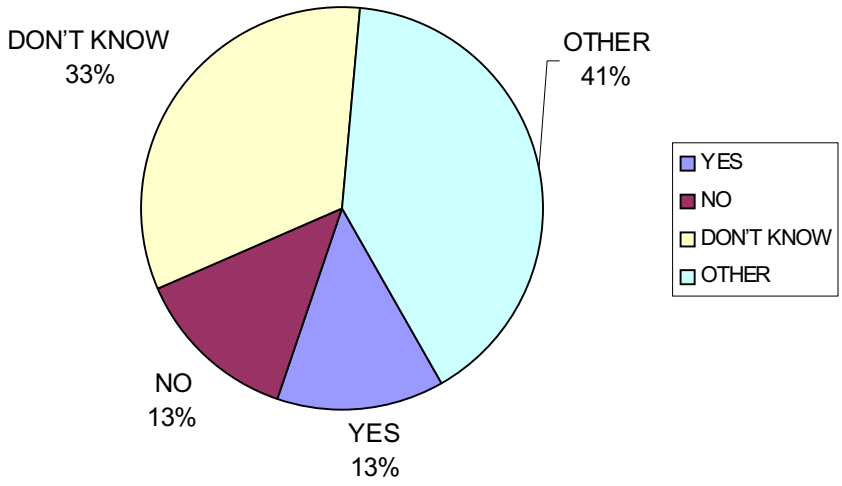


Figure 8-25
PERCENT RESPONSE TO QUESTION OF CUSTOMER BASE

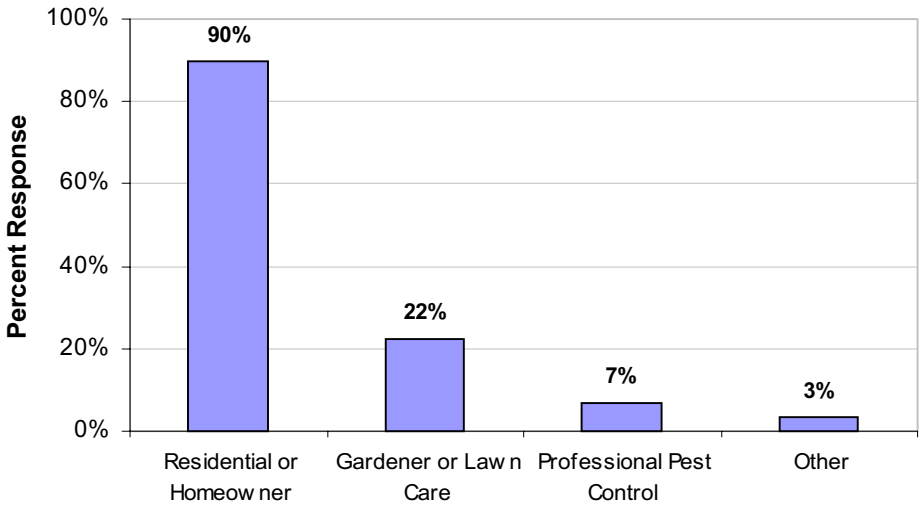


Figure 8-26
PERCENT RESPONSE FOR PEAK MONTHS OF INSECTICIDE SALES

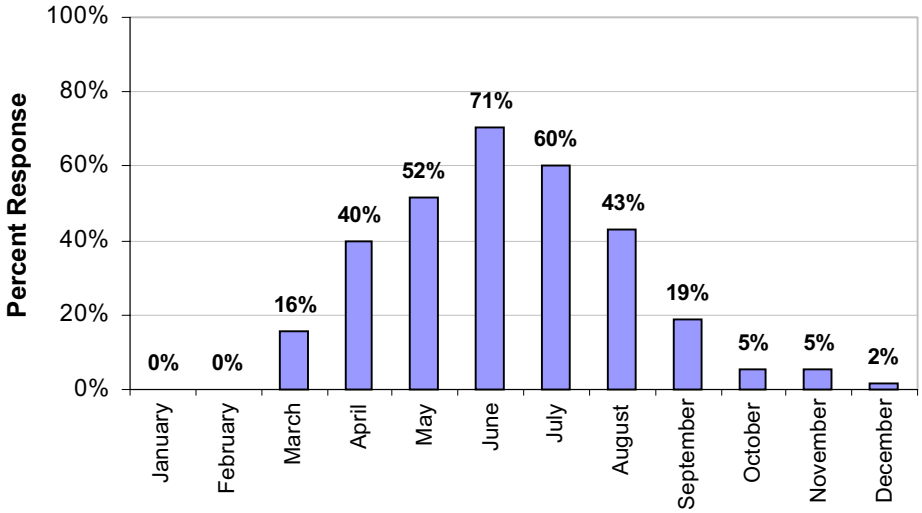


Figure 8-27
STORES OFFERING INFORMATION ON USE AND DISPOSAL OF INSECTICIDES

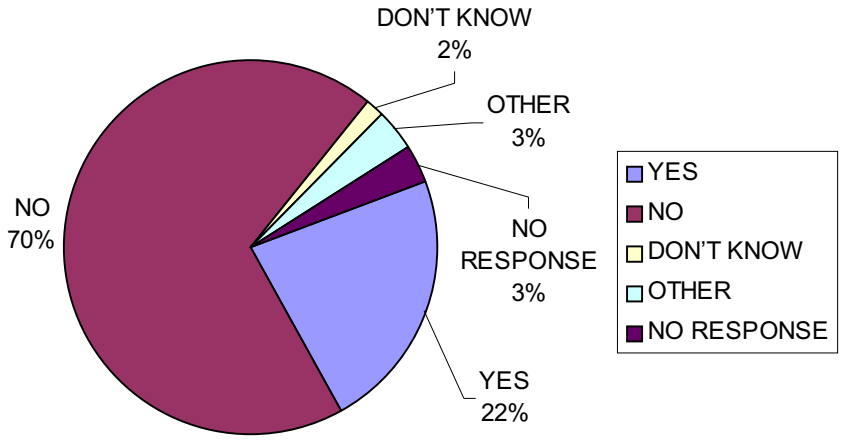
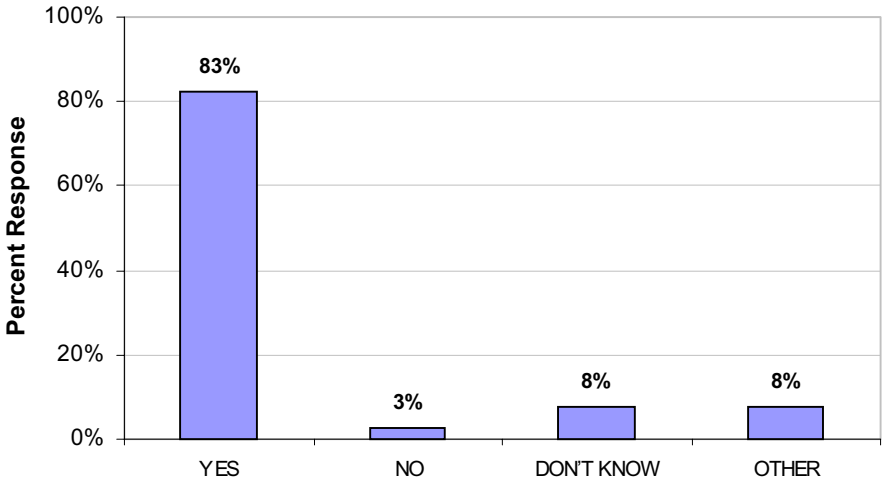


Figure 8-28
STORES WILLING TO OFFER INFORMATION ON USE AND DISPOSAL



case with other questions of willingness to make store level changes, some of the respondents indicated that the decision to provide these materials would have to made at the corporate level. One retailer indicated that the information would only be effective if it was provided in the primary languages of the customers(e.g., Vietnamese).

8.6 DISCUSSION

The insecticide use demographic data indicated that the majority of respondents were homeowners in the central and northern regions of San Diego County. The majority of respondents were above 50 years of age, while genders were equally represented. The responses showed that stores and products themselves provide the greatest source of information. The information gained from stores during the telephone survey validates this observation. By random chance the distribution of residences and businesses surveyed was roughly similar (Tables 8-1 and 8-10). The telephone survey indicated that 90% of insecticide customers were reported to be residential/homeowners. Limited comments from managers indicated that these customers were middle age or older.

The results from the Insecticide Use Survey indicated that a large percentage of homeowners in the County have lawns and/or gardens and take care of their own property. The principal pests common to most of these respondents are ants, snails, slugs, and white flies. The telephone survey of businesses showed the largest pests problems to be ants, white flies, and aphids. Since most of the homeowners stated they take care of their own lawns and gardens, information regarding pests and their abatement should be distributed to them. However, since the number of respondents hiring gardeners or pest control personal is high and the number of gardener/lawn care customers of stores is also high, information may be distributed through this channel as well.

The knowledge the Insecticide Use Survey respondents demonstrated regarding the history of insecticide application shows that San Diego County homeowners are generally aware of the products being used on their lawns or gardens. Ninety percent of the respondents knew whether insecticide had been applied to their property in the past 12 months. The level of knowledge retail staff demonstrated about insecticide products varied from store to store. Personnel who are actively in charge of a garden department or ran a specialized nursery were more knowledgeable about their product lines and the customers that shopped there.

The products that respondents use are varied, although there are some large brand names and stores that provide the bulk of insecticides to San Diego County. The largest purveyor for insecticides in the County is Home Depot. Discount stores, such as Home Depot, Wal Mart, K-Mart, Target, and Home Base, were the most commonly named suppliers. From the results of both the use and telephone surveys, the largest merchandise supplier in San Diego County is Ortho (Table 8-8 and Figure 8-10). The ingredient Diazinon was only listed 32% of the time as being applied; however 47% of respondents either did not respond or did not know if Diazinon was applied. Diazinon, Malathion, and Dursban were listed as principle ingredients in sales reported by the telephone survey. When selecting an insecticide, respondents listed the toxicity of the substance to insects as being of primary concern. Businesses reported the same, as concerns over effectiveness were commonly reported questions of customers to retail managers and sales personnel. Of lesser importance was the product toxicity to the environment, humans and others. Of least importance regarding product sales appears to be price. Businesses cited that customers were usually faced with a particular insect problem and were in their stores to buy a product that worked.

While only 22% of respondents indicated they have tried alternative or less toxic substances against insects, most indicated they would try or at least consider trying alternatives. This willingness to try alternatives is balanced by most stores (71%) supplying some type of alternative product. The challenge for increasing sales of alternatives appears to be effectiveness, marketing and education. Since few stores indicated that they currently highlight or promote alternatives, few products are being presented to consumers as less toxic. Few stores who offer information regarding these alternatives however most are willing to offer educational material on alternatives (75%). Managers of larger chain stores stated that the decision to offer alternatives or information about them would ultimately be made at the corporate level.

The contribution of insecticides in urban runoff is not a primary concern for individuals in San Diego County. Responses to questions regarding irrigation and precipitation indicated low consideration for the potential of runoff. Individuals indicated that they irrigate their lawns and/or gardens almost immediately after application. With respect to precipitation, 45% indicated they would consider potential rainfall prior to applying insecticides.

The results from questions regarding use, cleaning and disposal indicate that most respondents are careful with the products they use. The largest number of questions (45%) that retailers receive from customers are in regards to product use. Most responses from the use survey showed that consumers were inclined to read and follow package directions above all other application information resources. When cleaning up, homeowners cited responsible methods for cleaning and disposal. Few homeowners (11%) listed questionable practices such as “don’t

clean up" or "wash on the sidewalk, driveway or street." When stores were asked about providing information of the proper use and disposal of insecticides, most (70%) said they did not supply this information. The personnel at the stores were willing to distribute the information however as with other questions of this nature, the final decision must be made at the corporate level. Concerning the timing of the distribution of information, the best time of year appears to be during the spring and summer. Both the use and telephone survey provided the same results, as the bulk of purchases and applications are made from March through September with the largest months being May, June, and July.

8.7 CONCLUSIONS

The following conclusions can be drawn regarding the information provided by the Insecticide Use Survey and business telephone responses:

- Homeowner respondents generally have care and understanding of the products they are applying but require more information regarding product content.
- Few homeowner respondents used less toxic alternatives to insecticides; however, most were willing to try alternatives.
- Products supplied by retailers are mostly chemical insecticides, and some alternatives.
- To increase less toxic alternative use, communication with regional or corporate level decision-makers is critical so that alternative product lines may be expanded and information can be distributed.
- It is recommended that future research regarding less toxic alternatives focus on products for ants, white flies, aphids, slugs, and snails.
- Success of alternative products may depend on the methods that product and use information is disseminated to sales personnel and customers.