

Home Gardeners' Criteria for Selecting Pest Control Measures

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Although the benefits of pesticide use in the home and in agriculture are indisputable, the associated social costs and hazards are now frequent topics of debate. An Environmental Protection Agency study reported that 91 percent of all U.S. households use pesticides, and 84 percent of the time the chemicals are applied indoors. An estimated 42 million kilograms of pesticides are sprayed, dusted, injected or placed in and around American homes each year. This translates into \$18 billion dollars in retail sales for home and lawn products in this country, more than \$2 billion of which occurs in California.

In the search for a reduction in the reliance on chemicals in both agriculture and around the home, use of nonchemical pest control alternatives has become commonplace. And, as environmental and health issues gain more prominence, additional attention can be expected to be focused on the utility, effectiveness, and consequences associated with the use of nonchemical alternatives.

We examined the issues of how home gardeners choose pesticides versus nonchemical alternatives. Our focus was on user decision processes rather than on specific pests and pest problems, and particularly on what influences their decision behaviors when selecting outdoor pest control methods, their use patterns and their self-protective behaviors.

The study involved 71 Sacramento-area home gardeners who were to take part in a two-stage research project: completion of a 120-item mail questionnaire and a six-month home garden observation phase. This report addresses findings from the mail survey phase only. The sample was drawn from a larger group of home gardeners who participated in a 1987 University of California study, and of the 71, there were 41 males and 30 females. Most respondents maintained flowers (97 percent), shrubs (94 percent) and lawns (92 percent). Ornamentals (86 percent), vegetable gardens (73 percent), and fruit trees (68 percent) were also common among respondents' gardening interests. Results of the study describe patterns of use of pesticides and alternatives, precautionary behaviors, and attributes that respondents associated with selection of pesticides and alternatives.



The two top reasons that home gardeners use pesticides are that they work quickly and are widely available.

Frequently Used Substances & Patterns of Use

In reporting the use of pesticides, the study participants listed as examples snail/slug pellets, weed killers, malathion, diazinon, and carbaryl among others, and some brand names they cited were Deadline, Roundup and Weed-B-Gone. Frequently used alternatives listed were soap solutions, handpicking of bugs and weeds, water, beer, newspapers, salt, bacterial spray and beneficial insects.

Respondents had employed pesticides twice as long (14 years) as alternatives (7 years). Almost a quarter of the respondents had never tried alternatives, and far fewer (3 percent) had never tried pesticides. Alternatives were used more often than pesticides: 29 percent used alternatives once a week or more, whereas only 14 percent used pesticides once a week or more. Most (83 percent) used pesticides monthly or less often. Those who frequently turned to alternatives also tended to experiment with more types of alternative pest control substances than infrequent users.

We found that gender was associated with gardening experience and use of pesticides. Males had gardened longer, used pesticides longer, and used more of them than females. Women were more inclined than men to seek alternatives. Although more women than men felt it was best to use no pesticides at all, 85 percent of the

males and 80 percent of the females agreed that they would pay more for alternatives if it meant using fewer pesticides.

Precautionary Behaviors

Respondents were given a list of standard precautions as presented on product labels and in safety publications. As would be expected, far fewer protective measures were taken when using alternatives than pesticides. Protection included wearing long pants (19 percent with alternatives vs. 74 percent with pesticides), long sleeves (17 percent vs. 66 percent), gloves (19 percent vs. 50 percent) and goggles (17 percent vs. 40 percent), washing oneself (51 percent vs. 91 percent) and laundering clothing (25 percent vs. 75 percent). Sixty-eight percent of respondents felt that reading labels on alternative products before application was unnecessary, whereas 90 percent indicated reading pesticide labels was important. These results are not surprising considering the nature of alternatives used by participants.

Even though these reported behaviors indicate caution, a greater proportion of males than females denied there was danger in their *personal* use of pesticides. In addition, those who had more years of gardening experience tended to deny the personal risk of pesticides more than did the less experienced home gardeners.

Attributes of Pesticides and Alternatives

We presented the questionnaire respondents with a list of 24 attributes related to pesticides and nonchemical alternatives. The chart below compares the values participants assigned to each attribute.

Alternatives ranked high on all safety and ease-of-use attributes (low toxicity to humans, children and pets, personal safety, and no need for precautions), whereas pesticides received much lower rankings in those regards. Ease of cleanup, disposal and application, and easy-to-read and easy-to-follow directions were important ease-of-use characteristics for alternative products.

On the other hand pesticides received the highest marks on effectiveness attributes (speed and duration of effect, fewer applications needed) and coverage (coverage of pests, area and hosts). Respondents also appreciated the wide availability and number of product choices of pesticides attributes. Alternatives were ranked much lower on those same characteristics. In general, attributes on which pesticides ranked highly tended to be those for which alternatives scored lower and vice versa.

Through the use of factor analysis, eight separate factors—or choice criteria—were identified. Such factors do not represent absolute values, rather they represent constructs underlying each set of variables, and factor labels are based on the nature of the combination of items/attributes. Pesticide choice criteria were: *degree of safety* described by low toxicity and safe disposal attributes; *degree of effectiveness* characterized by range of pests, plants and area covered, and instructions; *degree of efficacy* which included fast and effective results and few applications; and *degree of economy* described by low costs, lasting effects, and easy application. That degree of safety correlated with pesticides means that even though pesticides were not viewed as safe, there was a larger group of respondents who saw them as “less risky” and whose scores clustered around the mean than others who saw them as “more risky.”

Choice criteria associated with alternatives were: *degree of convenience* described by easy application, directions, cost, availability, and no need for protection; *degree of efficiency* which included effectiveness, availability, number of applications, speed of effectiveness, and safety; *degree of competency* characterized by coverage of pests,

HOW 71 GARDENERS RANKED PESTICIDES & NONCHEMICAL ALTERNATIVES

Most to least Important	What gardeners seek in pesticides	what gardeners seek in alternatives
1	works fast	low toxicity to humans
2	widely available	low toxicity to pets
3	needs few applications	low toxicity to children
4	most effective way	safe disposal
5	many product choices	safer to use
6	personal experience	easy cleanup
7	kills many pests at once	easy disposal
7		no protective clothes
8	covers large area	easy-to-read directions
9	covers many plant hosts	covers specific pests
10	long-lasting effects	easy-to-follow directions
11	easy-to-follow directions	long shelf life
12	covers specific pests	personal experience
12	long shelf life	
13	easy-to-read directions	easy to apply
14	easy to apply	low cost
15	safe to use	covers many plant hosts
16	easy cleanup	widely available
16		needs few applications
17	safe disposal	works fast
18	low cost	most effective way
19	low toxicity to pets	covers large area
20	easy disposal	many product choices
21	low toxicity to children	long-lasting effects
22	low toxicity to humans	kills many pests at once
23	no protective clothes needed	

area, and plants, and length of effects; and *degree of handiness* represented by shelf life and product choice.

Although no statistically significant gender-related differences were reported, females gave alternatives significantly higher scores on all four alternative factors than did males. This trend suggests that the choice criteria for selecting alternatives were more important and/or useful to women than to men.

Other significant correlations were between age and the safety and efficacy choice criteria for pesticides. Older gardeners considered degrees of safety and efficacy as the most salient choice factors when selecting a pesticide product. Additional positive relationships were found between years of pesticide experience and the effectiveness and efficacy pesticide factors. Those with more pesticide experience saw these as major considerations in choosing pesticides. Efficacy was also a more important pesticide characteristic for the many infrequent users (monthly or less) than for the small number of frequent users (weekly or more).

The more experienced alternative users tended to stress convenience and competency in choosing the nonchemical products. In addition, frequent users of alternatives used the convenience and competency factors in their selection processes more than did infrequent users.

Rules of Thumb in Choosing Pesticides and Alternatives

Consumer choices between pesticides and alternatives, and within either type, are achieved through rules of thumb, also called heuristics. Comparing and selecting between such products potentially involves receiving and processing an almost infinite amount of information. The use of heuristics offsets the home gardener's limited capacity to process *all* available information and provides a shortcut, simplifying decision tasks. As discussed above, each choice criterion is comprised of unique combinations of attributes that form constructs or factors salient to consumers evaluating pesticide and alternative options.

Algorithmic decision processes, as distinct from heuristic ones, involve detailed, quantifiable methods to assist the gardener/decision maker to arrive at an optimal decision where problems and solutions are clearly defined. Heuristics, on the other hand, are less detailed and utilize past experiences or situations representative of the problem at hand. A rule of thumb, such as always buying the same brand of pesticide or nonchemical, or purchasing the cheapest product or the one that lasts the longest, reduces

the necessity of comparing across hundreds of product labels. Thus, over time, habitual choice situations are created in which decisions can be made quickly and with little or no need for additional information searches and acquisitions.

Sacramento-area gardeners in this study used pesticides successfully and regularly for many years and most had also tried alternatives. However, this group viewed and used alternative pest control measures in a much different fashion than they viewed and used pesticides. This finding suggests distinct rules of thumb for distinct pest control methods.

In selecting pesticide products, our sample was concerned with safety (toxicity) and effectiveness (ability to do the job), as well as with efficacy (how well and how long it would do the job) and economy (time and money). Even though pesticides were viewed as more hazardous and expensive than alternatives, qualities other than safety and economics were more salient in the decision process. The benefits of thoroughness of action and efficacy outweighed what can be considered the costs of the safety and economics traits. It appears that consumers are willing to accept reduced safety and pay more as tradeoffs to enjoy a highly effective and efficacious means of dealing with home garden pests by using pesticides.

For alternatives the absence of a *safety* factor may suggest that safety is an implicit characteristic, thus eliminating the need for safety as a conscious choice criteria or rule of thumb. The *convenience* factor (not having to wear protective clothing) and product *handiness* (the option to use a readily on hand household product, such as soap, to control pests) were also positive traits of nonchemicals.

Alternatives, too, have trade-offs. Even though they are safe, convenient and handy, choosing them also reduces speed and immediacy of effect. Economy of time is also sacrificed as alternatives are applied with more frequency and are less trusted as a means of eliminating, as opposed to controlling, home garden pests.

Marketplace Implications

Home gardeners do not choose one product over the other. Rather they opt to use both pesticides and alternative methods, recognizing costs and benefits of each. This finding is significant for those who deal with the consuming public. When preparing educational, informational or marketing materials for gardening use (as well as for other household pest problems), understanding the reasons why

people make choices is invaluable. If one claims awareness of the safety differential between pesticides and alternatives while at the same time acknowledging using no precautions, marketers, manufacturers and extension educators may consider modifying label contents to stress safe use, informing vendors to explicitly advise on precautions, and preparing information leaflets for general use.

As more sophisticated pest control technologies enter the market, the rules of thumb can be expected to change. As the demand for safer products increases and as safer substances are marketed, consumer expectations and the criteria of choice will change.

In this study, respondents reported willingness to reduce pesticide use, to pay more, and to spend more application time for alternatives that are more effective. The safety criterion may be a short-lived sacrifice in using the chemicals. Effectiveness will always be a major choice criterion, and doing the job will likely always be the objective. And, as safety and health concerns intensify, the potential for mitigating harmful exposure may take place at the point of purchase.

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