

Using Research to Design and Evaluate Pesticide Dealer Training

Wayne G. Buhler, Assistant Professor and Pesticide Education Specialist, Department of Horticultural Science, North Carolina State University, Raleigh, NC (wayne_buhler@ncsu.edu)

Linda D. Whipker, Marketing Consultant, Raleigh, NC (lwhipker@earthlink.net)

Abstract

Using Research to Design and Evaluate Pesticide Dealer Training

Wayne G. Buhler, Assistant Professor and Pesticide Education Specialist, Department of Horticultural Science, North Carolina State University, Raleigh, NC (wayne_buhler@ncsu.edu)

Linda D. Whipker, Marketing Consultant, Raleigh, NC (lwhipker@earthlink.net)

More than 700 dealers are licensed to sell restricted-use pesticides in North Carolina. Although their primary activity is commerce, dealers often serve as a source of information on pesticide use to their clientele. In order to provide reliable information to their clientele, dealers must have access to unbiased, science-based information on pest management. A mail-in survey of pesticide dealers in North Carolina was conducted in 2001. Based on survey results, a Dealer Day training program was developed and conducted in 2003. Selected responses to the survey and pre- and post-evaluations of the training program are presented.

Keywords: dealer, training, pesticide, safety, education, research, evaluate, design, survey

Introduction

Pesticide buyers often rely on pesticide dealers for product recommendations. Studies have shown that crop producers regard local agricultural pesticide dealers as their principal source of pesticide management information (Alston and Reding 1998; Chambers 1983; Funk and Downey 1981; Wolf 1995). Dealers are readily accessible to pesticide users and are perceived as being familiar with their products, their customers, and local production practices.

This situation means that pesticide dealers have a continuing need to update their knowledge of pesticide use, safety, and regulations. This need provides an important opportunity for Extension pesticide safety educators to impact dealer

information levels and, indirectly, the information imparted to purchasers.

Successful Extension programs are based on a solid understanding of the educational needs of the targeted audience and the use of appropriate methods to disseminate the needed information (Alston and Reding 1998; Caffarella 1982; Gamon et al. 1993). A number of surveys have assessed characteristics and training needs of pesticide dealers. Some of these surveys focused on post-program evaluation. For example, Schmitt (1988a, 1988b) and Wintersteen et al. (1999) surveyed dealers to determine the perceived value or level of satisfaction with past Extension programs or industry-affiliated resources. Spandl et al. (1998)

reported on participants' assessment of an in-field, hands-on educational program for dealers, crop consultants, and county Extension personnel. Other surveys have focused on pre-program diagnostics. Kalnay et al. (2002) used results from a survey conducted by Czapar et al. (1998) to develop pilot training programs in pest management and proper pesticide use for retail garden center employees who sell general-use pesticides to homeowners.

This paper describes a more extensive program-development process that was undertaken for a training program directed at North Carolina restricted-use pesticide dealers.

Overview of the Process

In an approach modeled after Kirkpatrick (1998), the following steps were taken over a two-year period:

- * Define the key audience for the training program.
- * Organize an advisory committee familiar with the defined audience and the potential topics to be covered by the pesticide training program.
- * Design and conduct a needs assessment survey.
- * Analyze results of the needs assessment.
- * Develop a training program based on the results.
- * Conduct pre- and post-evaluations at the training program.
- * Evaluate the effectiveness of the training program by

comparing the results of the needs assessment to the audiences' evaluation of the training program.

Defining the Key Audience

The North Carolina Pesticide Law of 1971 defines a pesticide dealer as any person who is engaged in the business of distributing, selling, or offering for sale restricted-use pesticides directly to end users. In order to conduct this type of business, a pesticide dealer must be certified and licensed with the North Carolina Department of Agriculture and Consumer Services (NCDA&CS). Certification is required before a dealer can purchase a license (which is renewable annually). The license is personal. It is possessed by an individual, not by the dealership. Each pesticide dealership in North Carolina must employ, or be owned by, a licensed dealer.

Certification is earned by passing a written examination and is valid for a five-year period. Within this period, a dealer may attend any of a number of pre-approved classes or workshops to obtain the 5 hours of recertification credit required for certification renewal.

Although the NCDA&CS knows the number of licensed dealers in the state, it collects no information about them or about firm-level characteristics such as markets served, organizations represented, and availability of in-house training. Collecting such information was a key objective of the needs assessment survey

conducted prior to the pesticide dealer training.

The Advisory Committee

The survey was organized and sponsored by the North Carolina Cooperative Extension Service (NCCES) with assistance from the NCDA&CS. The senior author, who was project team leader, selected 11 advisory committee members from North Carolina State University and NCDA&CS. All of them were familiar with the laws and regulations surrounding dealer licensing and commerce in the state.

Designing the Needs Assessment Survey

The advisory committee developed the needs assessment survey to collect three types of information:

- 1) characteristics of the pesticide dealer population in North Carolina,
- 2) dealer needs for pesticide training and information, and
- 3) ways in which the NCCES and NCDA&CS might develop an agenda for meeting these needs effectively.

Following development of question areas, the advisory committee constructed a draft questionnaire and pre-tested it with several dealers, pesticide inspectors, and county Extension agents. The questionnaire was revised as the result of this pre-testing and a final version was used as the survey instrument.

Primary survey question areas included:

- 1) description of the dealership's overall scope of business,
- 2) participant demographics,
- 3) attendance at past training programs,
- 4) preferences for content, format, and timing for future training programs,
- 5) preferences for use of technology in training, and
- 6) value placed on various information sources.

Participants were also asked to rate their current knowledge level on specific pesticide topics and whether they would prefer to receive information about those topics through written materials or through a training program. It was expected that most respondents could complete the eight-page questionnaire in 20 to 25 minutes.

Conducting the Needs Assessment

At the end of 2000, NCDA&CS generated a list of all 794 holders of current North Carolina Dealer's Licenses. In addition to the questionnaire, these individuals received a letter explaining the project and assuring them that their responses would be confidential. A postcard informed them they would be entitled to one half hour of continuing certification credit for completing the survey. They were supplied with preaddressed return envelopes to ensure confidentiality.

The questionnaires were mailed January 22, 2001. A follow-up postcard was sent 10 days later to remind participants to fill out the

questionnaire and return it. Of the 794 questionnaires, 400 were returned. Of these, 21 indicated that they had moved away from North Carolina or that they were no longer North Carolina pesticide dealers. This resulted in 379 usable questionnaires, for a response rate of 48.2 percent. Of those, 374 participants received the half-hour continuing certification credit by returning the postcard with the completed questionnaire.

Results of the Needs Assessment

The survey respondents represented a broad range of organizational types, experience levels, markets, and geographic areas (92 of North Carolina's 100 counties). In general, respondents were retailers rather than distributors, wholesalers, or manufacturers, with 94 percent indicating that the end user was their primary market.

Some of the key findings are presented below. A copy of the questionnaire and a summary of the survey results can be found at: <http://ipm.ncsu.edu/pesticidesafety/dealerreport.pdf>.

Dealer Characteristics

Respondents held a variety of positions within their organizations: 62 percent were owners or managers; 18 percent were department managers; and the remaining 20 percent were in sales or marketing or were applicators or technicians.

Overall, respondents were a mature and experienced group of dealers: 51 percent had more than 20 years of experience in a pesticide dealership; 28 percent had between 11 and 20 years of experience; only 10 percent had fewer than 5 years of experience. Only 7 percent of the respondents were 30 or younger, while 47 percent were over 50.

Respondents were also well educated: 39 percent had at least a 4-year college degree and another 37 percent had some college or technical education. There was no statistical difference in education levels among different organizational positions. However, as might be expected, the younger respondents were more likely to have a greater amount of formal education. These results are similar to those of Schmitt et al. 2000 and, when compared with Schmitt 1988b, indicate a positive trend toward more dealers having 4-year degrees than was the case over a decade ago.

Dealership Characteristics

One of the key questions concerned markets served, since this information is needed to determine the focus of future training programs so that examples will be meaningful to attendees. The responding dealers represented a wide range of markets and reflected the diversity of the pesticide industry in North Carolina. Respondents were asked to list all markets to which they sold pesticides, as well as to

identify their primary markets (Table 1). Almost 9 out of 10 respondents (87 percent) reported selling pesticides to the agricultural industry (row/forage crops); 58 percent reported selling to the horticulture market (vegetables, fruits, and nuts); and approximately half reported selling to homeowners, half to turf

managers and landscapers, and half to greenhouse/ornamental applicators. When asked about their primary business, however, 75 percent selected the agriculture market (row/forage crop) and 10 percent selected the homeowner market as the primary target; all other markets represented less than 5 percent of primary markets.

Table 1. Markets Where Dealerships Sold Pesticides.

Market	Markets Served (Could check more than one market) % of participants (n=373)	Primary Market (One market only) % of participants (n=347)
Agriculture: Row/forage crops	87.1	74.9
Horticulture: Vegetable/fruit/nuts	58.2	3.7
Homeowners: Home/landscaping/pets	53.3	10.1
Horticulture: Turf grass/landscape	51.2	4.6
Horticulture: Greenhouse/nursery/ornamental	50.0	3.5
Fumigation: Agriculture/structural/landscape	33.0	1.4
Livestock/poultry	29.2	0.3
Aquatics	18.2	0.0
Forest	11.3	0.6
Structural	8.8	0.0
Other		0.9

A successful training program for dealers must be grounded in an understanding of their businesses and the types of services they offer. In this case, 97 percent of the respondents reported selling general-use pesticides; 90 percent also sold restricted-use pesticides. Half of the respondents (51 percent) sold personal protective equipment, while 38 percent sold pesticide application equipment. Ten percent of the respondents reported selling monitoring devices and traps for pests and biological controls. In addition, 88 percent

sold fertilizer and 87 percent sold seed.

As expected from previous studies of dealer roles in advising end users about pesticides, 66 percent of the respondents said that their organizations offered pesticide recommendations; 33 percent of the respondents' dealerships offered pesticide application services; and 23 percent offered pest monitoring and scouting.

Dealership Size

In terms of both number of outlets and sales dollars, most of the

dealerships were small. Half of the respondents reported that their dealerships had only one outlet; 19 percent had 2 to 10 outlets in their organization; 6 percent had 11 to 20 outlets; 27 percent indicated that their dealerships had more than 20 outlets in North Carolina.

Local independent dealerships accounted for 57 percent of the respondents; 15 percent were part of large national organizations; 13 percent were from regional organizations; and 12 percent were from cooperatives. (Three percent did not fit into any of those categories).

In terms of sales dollars within the outlet (not necessarily the dealership as a whole), the median sales range was \$2.1 million to \$5 million annual gross in 2000, with 29 percent of the respondents falling in that range. Because the survey focused on holders of North Carolina Dealers Licenses instead of dealerships within North Carolina, the larger outlets were

likely over-represented in this sample as larger dealerships had more employees with a dealer license in their outlet.

When dealerships were sorted by the type of primary markets served, those targeting homeowners proved significantly smaller than those targeting agricultural and horticultural pesticide markets, both in terms of the size of the parent organization (number of outlets) and in terms of gross sales dollars at the outlet.

Sources of Pesticide Information and Training

A series of questions was designed to assess dealers' current sources of pesticide information and the usefulness of each source. Ratings for written information sources, information provided by North Carolina State University (NCSU) and NCDA&CS, Websites, and manufacturers or other sources of information are shown in Table 2.

Table 2. Usefulness of Various Information Sources for Pesticides

Source	Usefulness of the Information 1=not useful; 5 = very useful % of respondents					Mean
	Rating					
	1	2	3	4	5	
Written material						
NC Agricultural Chemicals Manual	0.8	0.5	5.1	10.2	83.3	4.75
Farm Chemical Handbook	2.4	2.4	34.7	23.9	36.6	3.90
C & P Press Agricultural Labels (Green book)	4.3	4.6	35.8	18.8	36.6	3.79
Commodity newsletters	4.3	9.7	61.0	14.8	10.2	3.17
General chemical/applicator magazines	4.3	11.6	55.6	19.9	8.6	3.17
C&P Press Ornamental/Turf Labels (Blue book)	7.5	6.2	64.8	8.9	12.6	3.13
NCSU and NCDA&CS						
Extension agents/specialists	1.6	2.7	24.5	31.7	39.5	4.05
Fact sheets, newsletters	1.1	2.4	43.0	31.7	21.8	3.71
Pesticide Update (newsletter)	0.5	4.3	44.6	29.8	20.7	3.66
Pest News (newsletter)	1.6	1.9	46.8	30.4	19.4	3.64
NCDA&CS personnel	1.6	5.6	44.4	26.3	22.0	3.62
Crop Protection School	5.1	4.6	47.6	20.7	22.0	3.50
Websites						
NC Agricultural Chemicals Manual	9.7	7.8	59.7	10.8	12.1	3.08
C&P Press (Green/Blue book)	11.3	7.0	64.2	6.7	10.8	2.99
Crop Data Management Systems	11.0	9.7	71.2	4.6	3.5	2.80
Manufacturer and Other Resources						
Company-specific label guides	2.7	3.5	36.8	24.2	32.8	3.81
Sales/technical representatives	3.0	5.4	41.9	24.5	25.3	3.64
Your parent organization (if applicable)	5.4	5.1	63.7	12.4	13.4	3.23
Other dealers	7.8	12.4	63.7	10.8	5.4	2.94
Crop consultant	9.7	9.4	64.5	10.2	6.2	2.94
Out-of-state resources (University of TN, Clemson University, VA Tech, etc.)	13.4	10.5	58.1	12.1	5.9	2.87

The top-rated source for pesticide information was the print version of the annual NCSU *North Carolina Agricultural Chemicals Manual*, which provides recommendations for agricultural, livestock, landscape, and household pests. The mean rating for this information source was 4.75 out of 5, on a scale of 1 to 5. With a mean rating of 4.05, NCSU Cooperative Extension Service agents and specialists were the only other information source rated over 4.0. Overall, items provided by NCSU and NCDA&CS were the highest rated sources of information, especially for pesticide

dealers selling to agricultural and homeowner markets. Extension publications also were rated highly by dealers in surveys conducted by Schmitt (1988b), Durgan et al. (1991), and Wintersteen (1999).

Respondents were also asked how they obtained information about changes in pesticide labeling and use restrictions. Almost three-quarters of the respondents (73 percent) said manufacturers were their source of information; 55 percent cited distributors; 48 percent listed regulatory agencies such as NCDA&CS. Results varied by primary markets served. Manufacturers were the source of

information for 76 percent of the dealers in the horticultural and agricultural markets, compared with 56 percent of the dealers selling primarily to the homeowner market. In looking at satisfaction levels, the dealers in the homeowner market were significantly less satisfied with the information they were getting about changes in pesticide labeling and use restrictions, indicating a need for these dealers to be better informed.

Knowledge of Pesticide Topics

To get a better understanding of the level of dealer knowledge about several pesticide-specific topics deemed to be important by the advisory committee, respondents were asked to rate

their current knowledge level of 15 pesticide topics and to compare that with the knowledge level they felt was important for their job (Table 3). In addition, they were asked if they would like to see more information on these topics and if it would be helpful to have it in written form and/or through a training program.

Overall, respondents were most confident about their knowledge of the Worker Protection Standards (WPS), with half rating their knowledge level 4 or 5. Storage was another area in which respondents were fairly confident about their knowledge, with 53 percent rating their knowledge 4 or 5 out of 5.

Table 3. Knowledge Level of Pesticide Topics

Topic	Current knowledge level 1=no knowledge; 5 = well informed % of respondents					Mean
	1	2	3	4	5	
Worker Protection Standards (WPS)	0.8	4.8	44.1	38.7	11.6	3.55
Storage: (bulk storage, pre-fire plans, monthly updated inventory list, storage tanks, construction of storage facilities, contingency plans, etc.)	2.7	6.2	38.4	39.0	13.7	3.55
Helping your clientele with pest management questions, biological control, etc.	1.3	9.9	40.3	37.1	11.3	3.47
Expectations inspectors have when they do inspections	2.4	9.4	37.9	39.5	10.8	3.47
Emergency response	2.2	9.4	43.5	33.6	11.3	3.42
Plastic Pesticide Container Recycling Program (NCDA&CS)	3.5	11.6	42.7	30.1	12.1	3.36
Pesticide use regulations: (FIFRA, FQPA [Food Quality Protection Act], NC Pesticide Law, Clean Water Act, Clean Air Act, RCRA)	1.1	8.6	51.1	32.5	6.7	3.35
Record keeping/reporting (restricted-use products, hazardous materials, record keeping, restrictions, how long to keep records, who needs to fill out forms, electronic vs. paper format of forms)	1.9	10.5	46.0	34.4	7.3	3.35
Occupational safety (OSHA regulations, MSDS, etc.)	3.0	13.2	39.8	35.5	8.6	3.34
Pesticide Disposal Assistance Program (NCDA&CS)	2.2	16.7	45.4	27.4	8.3	3.23
Transportation regulations (Department of Transportation)	7.5	14.5	43.8	28.8	5.4	3.10
Containment pad – mixing/loading	8.9	13.2	43.3	28.5	6.2	3.10
Supplemental labeling: Section 18/24c	9.7	21.0	40.6	23.4	5.4	2.94
National Fire Protection Act	10.5	26.1	36.8	20.7	5.9	2.85
Repackaging/custom blending	19.6	22.0	33.9	19.1	5.4	2.69

In comparing knowledge level by the type of primary market served, agricultural pesticide dealers rated their knowledge level highest on 7 of the 15 topics. Homeowner pesticide dealers rated their knowledge level significantly lower than other dealers; they had the lowest rating on 9 of the 15 topics. This response would be expected. Although licensed to sell restricted-use pesticides, a dealer who serves the homeowner would not be exposed to most of the 15 survey topics to the same degree as would agricultural or horticultural dealers. When asked how they would like to get more information about these topics, dealer responses varied. Table 4 shows the percentage of respondents indicating they wanted more information through a

training program and/or through written material. In addition, the t-test results are shown to indicate whether or not there was a significant difference between the percentages of respondents preferring each format. Using a cut-off level of significance of $p < .05$, ten of the 15 topics were significantly different. In most cases, written material was preferred. Dealers surveyed by Durgan et al. (1991), Czapar et al. (1998), and Wintersteen (1999) also preferred printed sources of information. However, for the topic of "Helping your clientele with pest management questions, biological control, etc." respondents preferred a training program over written material.

Table 4. Format Preferred For Obtaining Pesticide Information

Topic	Preference for Training Program % of respondents	Preference for Written Material % of respondents	t-test	Signif.
Pesticide use regulations	57.0	52.2	1.14	.254
Worker Protection Standards (WPS)	37.4	56.7	4.60	.000
Storage	43.8	50.0	1.48	.139
Helping your clientele with pest management questions, biological control, etc.	54.8	41.4	3.26	.001
Expectations inspectors have when they do inspections	44.6	48.1	0.844	.399
Emergency response	44.4	45.4	0.260	.795
Plastic Pesticide Container Recycling Program	33.3	53.5	5.121	.000
Record keeping/reporting	45.2	53.0	1.82	.070
Occupational safety (OSHA regulations, MSDA, etc)	42.5	51.3	2.15	.032
Pesticide Disposal Assistance Program	41.4	53.8	2.99	.003
Transportation regulations (Dept. of Transportation)	36.8	49.7	3.14	.002
Containment pad – mixing/loading	29.8	48.9	4.65	.000
Supplemental labeling: Section 18/24c	31.2	54.3	5.82	.000
National Fire Protection Act	34.1	55.1	5.23	.000
Repackaging/custom blending	32.8	41.4	2.23	.026

Training Issues

Respondents were asked several questions about types of training currently available to them and about what format they would prefer for future training programs.

When asked how many days they spent in pesticide and other training the previous year, 87 percent of the respondents indicated they had attended some type of training, most of which was pesticide-specific. The median level of pesticide training was 1 to 3 days in the previous year, with 38 percent of the respondents falling into that range. Another 25 percent had attended 4 to 6 days of training in the previous year. Agricultural pesticide dealers had attended significantly more training days than either horticultural dealers or homeowner dealers. The two most often mentioned pesticide-specific training topics were pesticide product information (79 percent of respondents) and chemical applicator safety (68 percent of respondents). Most training costs were paid by the dealerships; only 8 percent of respondents spent more than \$50

of their own money for their annual training.

In-house pesticide training was accessible to 46 percent of the dealers. This was most common for cooperative dealerships (76 percent), but was also available to two thirds of the national and regional organizations. Only 29 percent of the local independents had this option. Two thirds of the dealers were satisfied with their in-house training.

When asked about preferences for training format, 79 percent said that hands-on demonstrations were effective (Table 5). The second-highest rated format was video, followed by outside speakers. Only 51 percent said that lecture—a format commonly used by Extension training programs—was an effective format for them; 41 percent were neutral about lectures. With regard to communication technologies, 57 percent rated video as effective. Ratings for other communication technologies were lower, and the World Wide Web was rated as effective by only 36 percent of the respondents.

Table 5. Effectiveness of Various Training Formats and Media

Topic	Effectiveness of Training Format and Media Preferences 1=not effective; 5 = very effective % of respondents					Mean Rating
	1	2	3	4	5	
Training Formats						
Hands-on demonstrations	1.3	2.4	16.9	36.0	43.3	4.17
Video	2.4	5.4	23.7	40.9	27.7	3.86
Outside speakers	0.8	5.4	34.1	42.5	17.2	3.70
Lecture	2.2	5.9	40.9	35.8	15.3	3.56
Group activities	2.7	9.9	41.4	33.9	12.1	3.43
Computer	9.1	17.7	38.7	22.3	12.1	3.10
Self-directed/self-study	4.8	16.9	48.7	22.6	7.0	3.10
Training Technologies						
Video	3.5	5.4	34.1	31.5	25.5	3.70
Internet	13.2	12.4	38.2	23.1	13.2	3.11
Email	15.9	13.4	35.8	21.5	13.4	3.03
CD-ROM	14.0	15.9	41.4	18.8	9.9	2.95
Satellite TV	15.1	16.4	46.0	16.4	6.2	2.82
Audio cassette	16.1	17.5	47.6	12.1	6.7	2.76
DVD	22.0	16.4	45.7	10.8	5.1	2.60

Respondents preferred short (1 to 2-hour) training programs held in the morning or evening (44 percent). Travel time to training was also an issue, with most respondents preferring to travel no more than one hour. They also expressed a preference for training in midweek and in midwinter — January (74 percent) or February (59 percent).

Respondents were reluctant to invest time in preparation for training programs (32 percent said they did not want to do any preparation, while 48 percent said they would invest from 30 to 60 minutes in preparation). However, take-home reference materials were extremely important to the respondents, with 51 percent indicating it was “very important” and another 33 indicating it was “important.”

Developing a Training Program

Based on the results of the survey, the advisory committee planned a series of five regional, one-day training programs on Tuesdays, Wednesdays, and Thursdays in late January and early February. Attendees qualified for 5 hours of Pesticide Dealer License Credits, 3.0 CEUs in Pest Management, and 0.5 CEUs in Soil and Water Management for Certified Crop Advisors. The registration fee was \$20 per person and included a take-home Dealer Resources Manual, catered lunch, and snacks. Topics and formats (Table 6) were based on results of the needs assessment while the additional topic of Pesticide Security was added post-September 11, 2001.

When the needs assessment survey was conducted in early

2001, Websites received the lowest ratings of any information sources listed. This low ranking called attention to the need to alert dealers to the amount of relevant information available to them on the World Wide Web, particularly because Extension and state agencies are likely to make increasing use of this communication channel as personnel, printing, and travel resources continue to be limited by budget constraints.

To facilitate dealer access to pesticide-related information from NCCES and NCDA&CS, Buhler and Steve Toth, Pesticide Information Specialist, NCSU, created a Website designed specifically for agricultural pesticide dealers (<http://ipm.ncsu.edu/agdealers>). This site consolidated previously decentralized, difficult to locate, or little-known NCSU Extension resources embedded in departmental home pages (e.g., Crop Science, Horticultural Science, Entomology). The new Website allows dealers to search for pest management information by type of pest (insect, weed, or disease) or by crop/site (field crops, fruits, livestock, ornamentals, Christmas

trees, turfgrass, and vegetables). The site also contains links to the *North Carolina Agricultural Chemicals Manual* and the NCDA&CS Pesticide Section home page, which provides updates on pesticide regulations and a directory of pesticide applicators licensed in the state.

Demonstrations in the use of the new Website were added to the agenda for the Dealer Day programs to familiarize dealers with its contents and facilitate its use as a problem-solving resource for dealers and their clientele.

A 6" X 11" postcard announcing Dealer Day 2003 was mailed to all NC licensed pesticide dealers two months before the meetings. The postcard described the program, benefits of attending, credits available, meeting dates, locations, and agenda. A registration form was included on the postcard and a Website was listed for on-line registration.

Table 6. Training Session Agenda

Session Title	Topic Covered	Format	Speaker
Navigating the Dealer Website	On-line resources including: Helping your clientele with pest management questions.	On-line display	NC State University
What Inspectors Expect	Expectations inspectors have when they do inspections; Recordkeeping/reporting; Storage	Role-playing demonstration	Local Pesticide Inspectors with NCDA&CS
Preventing the Indoor Use of Agricultural Pesticides		Video about the misuse of methyl parathion	CNN 'Impact' Taped segment of televised program
Labeling (Sec. 18 and 24c, MSDS)	Supplemental labeling: Section 18/24c; Occupational safety	PowerPoint Presentation and Quiz	NCDA&CS
Environmental Stewardship for Dealers	Containment pad – mixing/loading	PowerPoint Presentation	NC State University
Transporting Pesticides	Transportation of pesticides	PowerPoint Presentation	NC Dept. of Motor Vehicles
Pesticide Security	Topic added after 9/11/01	PowerPoint Presentation	NCDA&CS
The Pesticide Container Recycling Program	Pesticide Container Recycling Program	PowerPoint Presentation and Panel*	NCDA&CS and Industry
Packaging and Labeling	Supplemental labeling: Section 18/24c;	PowerPoint Presentation	Industry (Syngenta)

*Following a description of the recycling program, a licensed dealer from Eastern North Carolina described his experience with establishing a recycling site at his dealerships.

In response to the strong preference for take-home reference material, each attendee received a three-part Dealer Day manual consisting of Speaker Notes, Forms, and an Addendum of publications. In the needs assessment survey, dealers mentioned 15 topics they would prefer to have addressed in written form. Of those, 13 were covered in the take-home reference manual:

- * Pesticide use regulations: regulations from the North Carolina Pesticide Board of particular interest to dealers and a fact sheet entitled "FQPA: The Food Quality Protection Act" (Addendum).
- * Worker Protection Standards: fact sheet entitled "The Worker Protection Standard for the Use of Agricultural Pesticides on the Farm" (Addendum).

- * Storage: *North Carolina Pesticide Storage Regulations* brochure (Addendum). "Contingency Plan for Commercial Pesticide Storage" form, "Monthly Inventory" form," and a sample letter to the local Fire Marshall (Forms).
- * Inspection expectations: "Restricted-use Pesticide Sales Record Form" (Forms).
- * Emergency response: *Fire and Spill Emergency Pre-Plan for Handling Agricultural Chemicals and On-Farm Pesticide Spills and Fires* brochures and a fact sheet entitled "Responding to HazMat Emergencies" (Addendum).
- * *Plastic Pesticide Container Recycling Program: Rinse NOW! and Recycle* brochure (Addendum). PowerPoint presentation (Speaker Notes).
- * Occupational safety: *The MSDS: Your Guide to Chemical Safety*

brochure, and "Signs and Symptoms of Pesticide Poisoning," a fact sheet adapted from University of Nebraska Cooperative Extension Publication #EC97-2505-A (Addendum).

- * Pesticide Disposal Assistance Program description (Addendum).
- * Transportation regulations: MSDS example, PowerPoint presentation, and *Hazardous Materials Marking, Labeling and Placarding Guide* from the U.S. Department of Transportation (Speaker Notes).
- * Containment pad: PowerPoint presentation on mixing/loading and copies of two chapters from the *Environmental Handbook for Fertilizer and Agrichemical Dealers, Second Edition*, used by permission from the TVA Environmental Research Center (Speaker Notes).
- * Supplemental labeling, Section 18/24c: copies of labels and PowerPoint presentation (Speaker Notes).
- * National Fire Protection Act: description of the NFPA 704 sign (Addendum).
- * Repackaging/custom blending: NCDA&CS regulations regarding repackaging and custom blending (Addendum).

The Pre- and Post-Training Evaluation

Evaluations of the training program were conducted several times throughout the day. General information about the attendee and ratings of session topics were solicited at the beginning of the day. Morning sessions were rated just before lunch; afternoon sessions were rated at the end of the day. Because the speaker can

strongly influence the post-training ratings, evaluating prior to the session allowed a more accurate evaluation of how the topics met the needs of the attendees. The ratings given after the session additionally reflected both the skill of the speaker and the value of the information provided by the speaker.

The evaluation was designed with three objectives:

- * To compare the characteristics of the dealers attending Dealer Days to those who responded to the needs assessment.
- * To evaluate how well session topics met attendees' needs.
- * To evaluate the usefulness of the information provided in the training sessions.

A total of 151 attendees participated in the five Dealer Day 2003 programs. Because the training was open to both licensed dealers and their employees, attendees were asked if they held a Dealer License. For the purpose of evaluating the training program, only those with a current NC dealer license (81 percent) were included in the analysis so the group would be similar to those who responded to the needs assessment.

Collecting information about those who actually attended the seminar was necessary in order to compare training participants with the dealers who had responded to the assessment. Table 7 compares the primary markets targeted by respondents in the initial needs assessment with the markets targeted by attendees. The largest

groups were statistically different, with dealers in the agricultural markets even more heavily represented and those dealers in the homeowner markets and vegetable/fruit/nut markets less represented. Based on results from the needs assessment, most of the focus of the training

program was on the row/forage crop market because that accounted for the majority of the dealers in the state. Low attendance by the other types of dealers may indicate that dealers in the other markets did not feel that the agenda topics pertained to them.

Table 7. Primary Markets Represented

Primary Market	Needs Assessment % of respondents (n=347)	Training Participants % of respondents (n=115)	t-test	Signif.
Agriculture: Row/forage crops	74.9	84.4	2.09	.037
Homeowners: Home, landscaping, pets	10.1	2.6	2.54	.011
Horticulture: Turf grass/landscape	4.6	3.5	0.52	.606
Horticulture: Vegetable, fruit, nuts	3.7	0.0	2.11	.035
Horticulture: Greenhouse, nursery, ornamental	3.5	4.3	0.44	.661
Forest	0.6	0.0	0.82	.416
Livestock/poultry	0.3	0.9	0.82	.412
Fumigation: agriculture, structural, landscape	1.4	0.0	1.29	.196
Other	0.9	4.3	2.49	.013

The types of organizations represented by training participants differed from those represented in the initial survey (Table 8). In general, twice as many attendees of the training program were from regional organizations and cooperatives compared with the initial survey. Correspondingly, far fewer dealers

from local independents attended the training program. This could be due to several factors, one of which is that dealers selling to the homeowner market are more likely to be local independents, which are typically smaller businesses that may not have the staffing flexibility to send an attendee to an all-day training program.

Table 8. Types of Organizations Represented

Organization Type	Needs Assessment % of respondents (n=369)	Training Participants % of respondents (n=120)
Local independent	57.5	37.5
National organization	15.4	14.2
Cooperative	12.2	21.7
Regional organization	12.5	25.0
Other	2.4	1.7
Pearson Chi-Square Test (to check for overall differences in distribution across organization types between the needs assessment and training evaluation)	21.95	
Significance	0.000	
df	4	

There were no significant differences between the survey respondents and the training attendees in terms of years of experience, job title, or days spent the previous year in pesticide training.

Two questions pertaining specifically to the training program were asked prior to any of the sessions. Attendees were first asked to rank several reasons for attending the program (Table 9). The top reason for attending the training program was to earn

Pesticide Dealer License credits (rated "very important" by almost two-thirds of the dealers). Topics on the agenda ranked second, indicating a fairly high interest level. Similar results were obtained in a survey of Midwestern agrichemical dealers by Schmitt (1988a). His results indicated that, in planning for successful training programs, the most important factor was topics, followed by speakers, time of year, location, and registration cost.

Table 9. Reasons for Attending the Training Program

Topic	Reasons for Attending Dealer Day Training 1=not important; 5= very important % of respondents					Mean
	1	2	3	4	5	
Pesticide Dealer License credits	1.7	2.5	13.2	19.8	62.8	4.40
Topics covered by the conference	3.5	0.0	24.8	39.8	31.9	3.96
Convenience of the location	4.2	7.5	18.3	35.0	35.0	3.89
Dealer's Resource Manual	5.9	8.5	30.5	32.2	22.9	3.58
Interaction with other dealers	12.5	15.0	35.0	25.8	11.7	3.09
CEU's in Pest Management for Certified Crop Advisors	37.0	4.2	16.8	14.3	27.7	2.92
CEU's in Water Management for Certified Crop Advisors	39.5	5.9	15.1	12.6	26.9	2.82
Encouraged to attend by someone else	41.5	12.7	24.6	13.6	7.6	2.33

Table 10 shows the pre- and post-training evaluations. Prior to each session, attendees were asked to rate how useful they thought the training session would be for their business. After the session, they were asked how useful the training session actually was. In general, attendees were pleased with the program, with an overall rating of 4.29 out of 5. Both before and after the program, the session on "What Inspectors Expect" received the top rating. This topic rated

high in the needs assessment as well. During the training sessions, this information was presented in a role-acting format by inspectors, providing a "face" and personality to inspectors that dealers typically meet in more adversarial circumstances. The session that proved to be statistically more useful to the dealers than they expected was "Navigating the Dealer Website," which was rated as the third most useful. This shift was perhaps the most gratifying

result of the training, since needs assessment respondents had given low ratings to Websites as sources of information while Extension has dedicated considerable effort to its Web-based communications. Sessions that were rated as less useful than expected were

“Environmental Stewardship for Dealers,” “Transporting Pesticides,” and “Labeling.” This could have been due to the speakers or presentations employed, the topics covered in the session, or differing expectations.

Table 10. Pre- and Post-Training Evaluation

Session Title	Training Pre-Evaluation Mean Rating (1=not useful, 5=very useful)	Training Post-Evaluation Mean Rating (1=not useful, 5=very useful)	n	t-test	Signif.
What Inspectors Expect	4.42	4.35	116	1.06	.292
Environmental Stewardship for Dealers	4.39	4.16	114	3.57	.001
Transporting Pesticides	4.26	4.04	119	2.38	.019
Pesticide Security	4.23	4.32	116	1.03	.304
Labeling (Sec. 18 and 24c, MSDS)	4.18	3.88	120	3.46	.001
Packaging and Labeling	4.13	3.79	102	4.02	.000
Navigating the Dealer Website	3.92	4.19	119	3.589	.000
Preventing the Indoor Use of Agricultural Pesticides	3.92	3.97	115	0.40	.690
The Pesticide Container Recycling Program	3.99	3.86	110	1.56	.123
Manual					
Section I: Speaker Notes	--	4.04			
Section II: Forms	--	4.16			
Section III: Addendum	--	4.05			
OVERALL RATING	--	4.29			

Conclusions

Attendees of Dealer Day 2003 found this training program to be a valuable use of their time. Although we could not provide all desired subject matter in a one-day program, the investment in the needs assessment survey helped identify topics and delivery methods that made the program agenda more interesting to the target audience. Prominent among many positive comments was the expressed desire to attend recurring programs like Dealer Day every two to three years.

The process also revealed that the information needs of some dealers still were not being met. For example,

dealers who serve homeowners and the greenhouse industry were underrepresented at Dealer Day, as were local independent firms. To meet their needs, training programs might be targeted toward these segments if the costs are not prohibitive for such a small group. We believe that the success of Dealer Day 2003 is an indication that the Extension Service can enhance the safe and effective use of pesticides with well-planned programs to reach these key information disseminators.

Acknowledgements

The authors express their appreciation to Lynn Padgett for her help in editing the text.

References

- Alston, D.G. and M.E. Reding. 1998. Factors influencing adoption and educational outreach of Integrated Pest Management. *J. Extension* [On-line] 36(3). Available: <http://www.joe.org/joe/1998june/a3.html>.
- Cafferella, R.S. 1982. Identifying client needs. *J. Extension* 20(4): 5-11.
- Chambers, M.A. 1983. What farmers say they want from dealers. Pp. 138-139. *In* K. A. Kelling (ed.) 1983 Fertilizer, Aglime and Pest Management Conference Proceedings. Dept. of Soil Sci., Univ. of Wisconsin, Madison WI.
- Czapar, G.F., M. P. Curry, and J. E. Lloyd. 1998. Survey of Integrated Pest Management training needs among retail store employees in Illinois. *J. Soil and Water Cons.* 53 (1): 31-33.
- Durgan, B.R., M. A. Schmitt, and B.J. Holder. 1991. A multidisciplinary, hands-on crop management educational program. *J. Agron. Educ.* 20(2): 126-131.
- Funk, T.F. and W.D. Downey. 1981. What influences the farmer's buying decisions? *Fertilizer Progress* 12(6): 24-27, 60.
- Gamon, J.A., R.G. Roe, and N.E. Christians. 1993. Assessing clientele needs: Designing an extension ornamental grass bulletin. *J. Nat. Resour. Life Sci. Educ.* 22:155-157.
- Kalnay, P.A., G.F. Czapar, and R. Cloyd. 2002. Pesticide safety training for sales personnel. *In* 2002 Conference Papers and Proceedings of the National Pesticide Stewardship Alliance Meeting, August 25-28, Seattle, WA. [On-line] Available: <http://www.npsalliance.org/Conf2002/PDF2002/PabloKalnay.pdf>
- Kirkpatrick, Donald L. 1998. Evaluating training programs, 2nd Edition. Berrett-Koehler Publishers, Inc. San Fransisco.
- Schmitt, M.A. 1988a. A survey of fertilizer dealers: I. Sources of agronomic training. *J. Agron. Educ.* 17(1): 17-20.
- Schmitt, M.A. 1988b. A survey of fertilizer dealers: II. Sources of agronomic information. *J. Agron. Educ.* 17(1): 21-24.
- Schmitt, M.A., B.R. Durgan, and S. M. Iverson. 2000. Impact assessment and participant profiles of extension's education programs for agricultural chemical/seed retailers and crop advisors. *J. Extension* [On-line] 38(6). Available: <http://www.joe.org/joe/2000december/a2.html>.
- Spandl, E., M. A. Schmitt, and B.R. Durgan. 1998. The development process and multiyear program assessment of a field school for agricultural professionals. *J. Nat. Resour. Life Sci. Educ.* 27: 131-133.
- Wintersteen, W., S. Padgitt, and P. Petzelka. 1999. Evaluation of extension's importance to agribusinesses: A case study in Iowa. *American Entomologist* 45(1): 6-9.
- Wolf, S. 1995. Cropping systems and conservation policy: The roles of agrichemical dealers and independent crop consultants. *J. Soil and Water Cons.* 50: 263-269.