Impacts of K-12 IPM Curriculum Demonstration and Teacher Training Project.

Teachers' Attitudes About Integrated Pest Management (IPM) Education in K-12 Classrooms: Survey Findings

Northeast School Integrated Pest Management Working Group

7/31/2013

Summary

This report summarizes the results of two on-line surveys conducted by the Northeast School IPM Working Group with funding from the Northeastern Integrated Pest Management Center. A survey instrument (Appendix A), was used to survey K-12 teachers in November/December 2009 and again in January/February 2013. The survey was designed to measure knowledge of, views on, and teaching experience with integrated pest management (IPM) among K-12 educators in the northeastern United States. Specifically, questions were aimed at 1) assessing teachers' familiarity with IPM, 2) measuring teachers' attitudes about the relevance of IPM concepts to their student's education, 3) determining impacts of teacher training on IPM education, and 4) learning how teachers incorporate IPM education into their curricula. Participants were recruited by announcements on educator listservs and through partnerships with education organizations and state agencies. This report compares the results of the two surveys, focusing on the three collaborating states, Connecticut, Maine and Pennsylvania, to assess the impact of our three-year IPM curriculum development, demonstration and teacher training project.

Survey Findings

Who Took the Survey?

In both years, the majority of respondents were public school classroom educators (Table 1), primarily teaching science (Table 2). A total of 387 (2009) and 168 (2013) educators, largely from CT, ME and PA, participated (Figure 1). While almost half of the 2009 survey respondents were from PA, the only state mandating IPM education, we had poor participation from PA in 2013 due to personnel changes at the PA Department of Education. At the same time, participation from NY teachers increased from a single response in 2009 to 44 participants in 2013.

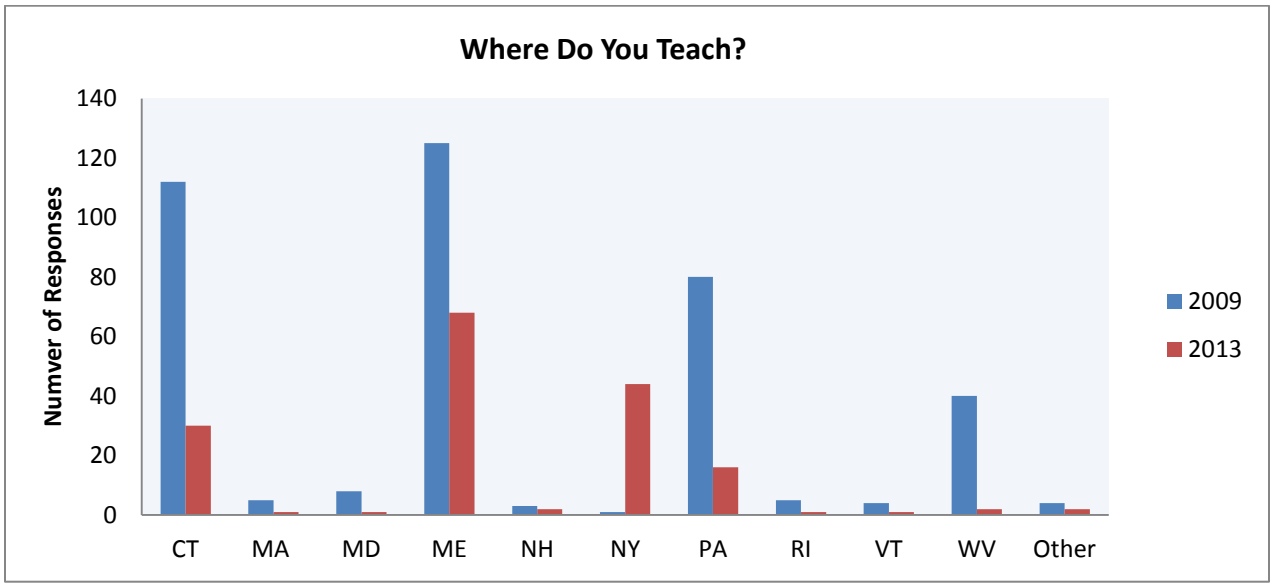
Table 1.

In what type of school do you teach?		
Answer Options	**2009 %**	**2013 %**
private elementary, middle or high school	4.7	4.8
public elementary, middle or high school	76.0	72.0
environmental or outdoor education school or center	4.9	6.0
technical education school	2.1	3.0
other	12.4	14.3
Number of responses	**387**	**168**

Table 2.

What subjects do you teach? (check all that apply)		
Answer Options	**2009 %**	**2013 %**
Science	78.9*	74.7*
Math	24.5	30.7
Social studies	20.3	31.3
Horticulture/agriculture	8.1	13.9
Environmental science	28.9	32.5
Language arts	24.0	32.5
Other	22.1	21.1
Number of responses	***384***	**166**
*Percentages add up to more than 100% because multiple answers were permitted		

Figure 1.



Teachers' Familiarity with IPM

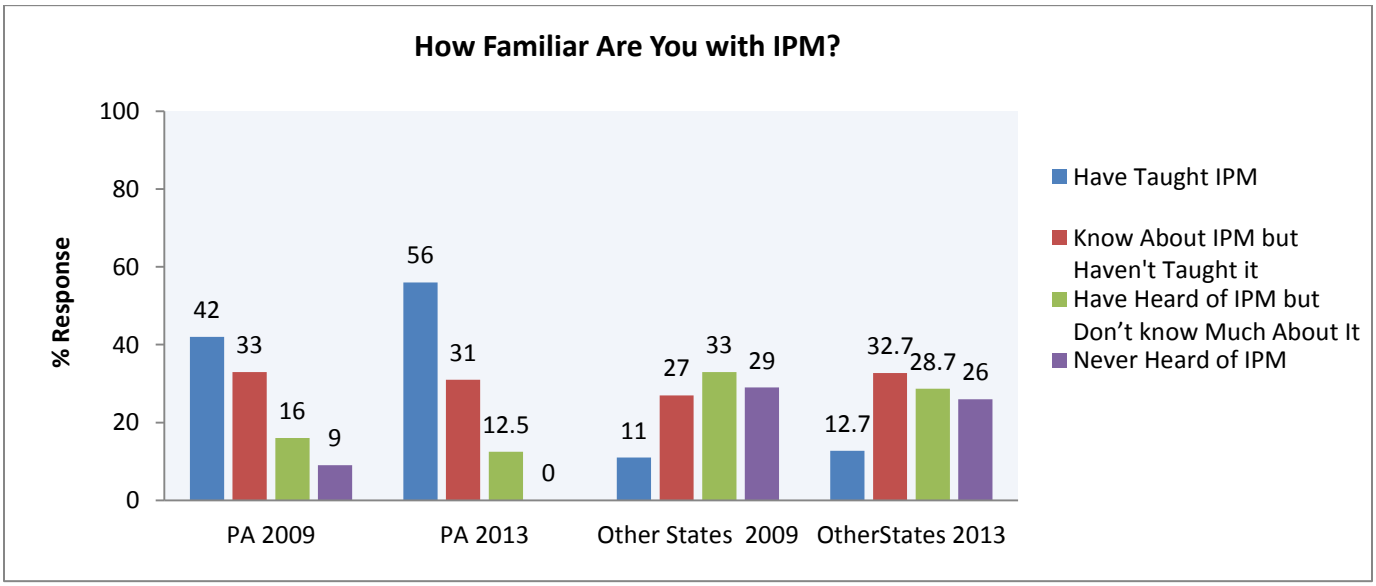
IPM was described as 'a science-based system used to control insects, weeds, microbes and other pests while protecting people and our environment from pesticides. IPM relies on understanding pest life cycles and habits so that safer combinations of ecological and biological methods and other tactics can be used to control pests.' Then we asked, 'How familiar are you with Integrated Pest Management (IPM)?' Because Pennsylvania's academic standards include IPM, and teacher training for IPM education is offered in that state, we compared the responses among Pennsylvania-based teachers with those of all other teachers in the region.

What we found: Given requirements for teaching IPM in Pennsylvania it was not surprising that PA teachers are more familiar with IPM compared with teachers from other northeast states. The percentage of PA teachers who have taught IPM (42% in 2009, 56% in 2013) was about four times greater than those in other states (11% in 2009, 12.7% in 2013) (Figure 2). Conversely, the percentage of PA

teachers who said they had never heard of IPM (9% in 2009, 0% in 2013) was more than three times smaller than other states (29% in 2009, 26% in 2013). Similarly, the percentage of teachers that 'had heard of IPM but didn't know much about it' was about half as much among PA teachers (15%) compared others (33%).

Project Impact: There was a slight shift toward increasing familiarity with IPM from 2009 to 2013 among both PA and non-PA teachers.

Figure 2.



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Is IPM Relevant to K-12 Education?

We asked teachers' opinions on two statements about pest and pesticide risks. We also asked three questions to measure how important teachers feel it is to teach students about pests and IPM.

What we found: When asked if pests pose a threat to people, our food supply, and other resources, we found most agreed (2009: 68%; 2013: 71%), or agreed somewhat (2009: 28%; 2013: 28%). We also found strong agreement that 'people are at risk of pesticide exposure' (2009: 86%; 2013: 90%). When asked if 'students should understand the role of insects, weeds and diseases so they can make knowledgeable decisions about pest management and protecting the environment' 90% (2009) to 94% (2013) of teachers agreed (Figure 3).

Project Impact: The percentage of teachers who feel that all students should learn about IPM increased from 65% to 78% (Figure 4). When we included teachers indicating that IPM education should be reserved for older students, we saw a 10% increase from 81% (2009) to 91% (2013) of teachers indicating that IPM should be part of K-12 education. We also saw an approximate 6% increase in the amount of time teachers said they were willing to spend on teaching IPM (Figure 5). For example, those willing to teach 1-2 lessons rose from 20% (2009) to 26% (2013) and those who said they would teach more increased from 56% (2009) to 63% (2013). Conversely, while only 5% of teachers said they were not interested in teaching IPM in 2009, that number dropped to just 2% in 2013.

Figure 3.

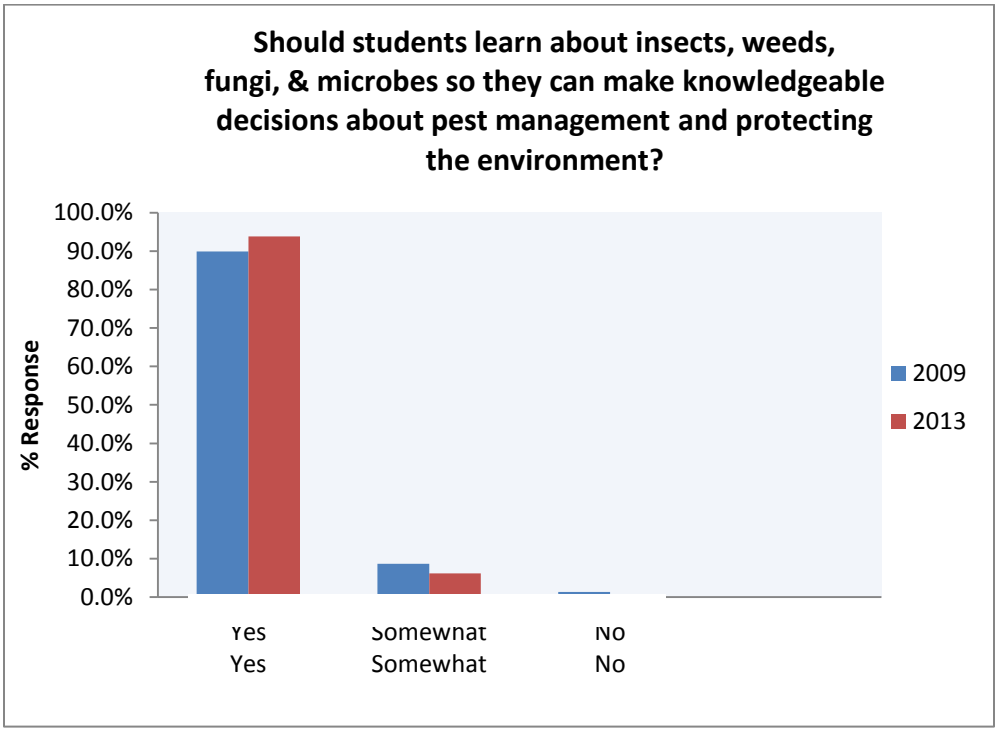


Figure 4.

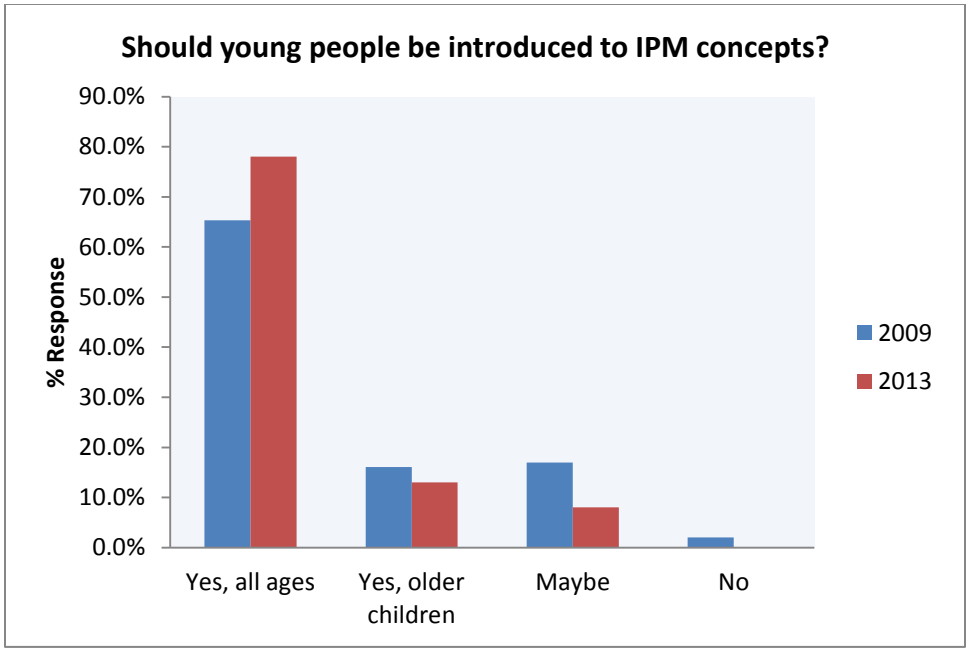
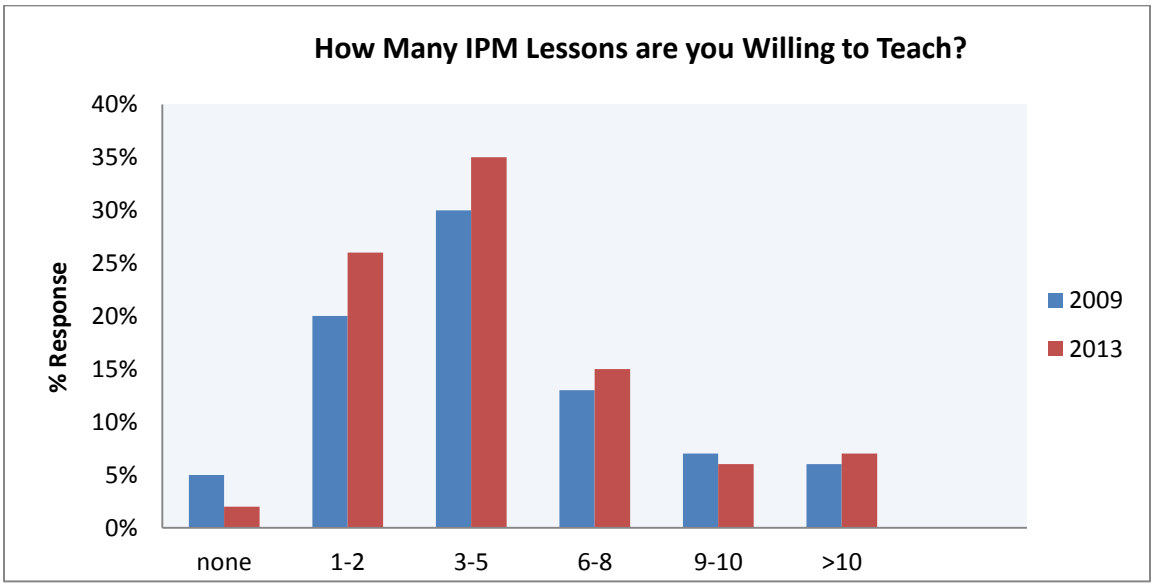


Figure 5.



How Much IPM is Being Taught in Northeastern Schools?
We asked if and how much IPM has recently been taught and what curricula are used. To measure impact of the teacher training and curricula demonstrations conducted in PA, CT, and MD during the course of this project, we compared responses in 2009 with those in 2013 in each of these states, and with the average response among all respondents in both years.

What we found: Only 18% (2013) to 20% (2009) teachers reported that they have recently taught IPM. We found a small increase in the amount of IPM taught in PA, CT, and ME (Table 3) compared with 2009. In PA, the percentage indicating they had taught IPM the previous year increased from 44% in 2009 to 53% in 2013. In CT, the percentage of teachers who taught IPM increased from 14% in 2009 to 23% in 2013, while Maine teachers reported a 3% increase from 12% to 15%. On average, PA teachers taught about two 30-minute IPM lessons in 2009, increasing to 2.5 lessons in 2013, which is 3-5 times greater than that found in other states (Table 3). Northeast teachers spent less than 30 minutes per year on IPM education, except in PA where IPM education is required.

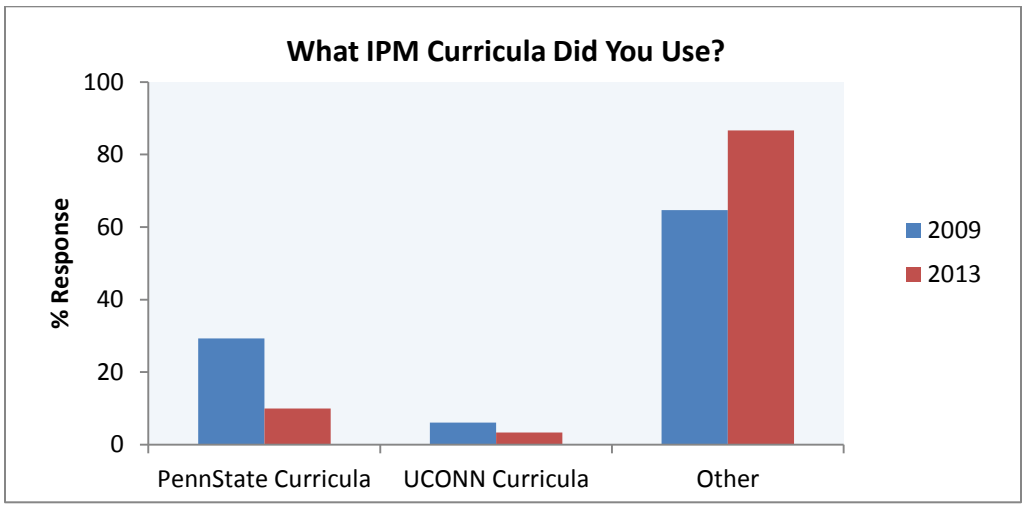
Despite the availability of comprehensive IPM curricula available from University of Connecticut and Pennsylvania State University, these appear to be underutilized (Figure 6). Some teachers said they modified these curricula or incorporated them into units on invasive species, gardening or botany. The majority of those who have recently taught IPM said that they used a variety of materials to develop their own lessons.

Project Impact: We saw an increase in the percentage of teachers teaching IPM in the three demonstration states and a decrease in the other states. The number of IPM lessons taught doubled in CT and increased by 19% in PA and 20% in ME. These findings are in contrast to other states where we saw an 8% decline in the number of teachers teaching IPM and a three-fold decline in the number of lessons taught. However, it should be noted that this regional decline was at least partly due to increased survey participation by NY teachers in 2013, most of whom did not teach any IPM. There appeared to be little impact on the utilization of existing IPM curricula available from the University of Connecticut and Pennsylvania State University.

Table 3.

How much time did you spend teaching IPM last year?								
Answer Options	**PA**		**CT**		**ME**		**Other States**	
	2009	**2013**	**2009**	**2013**	**2009**	**2013**	**2009**	**2013**
0 lessons	56%	47%	86%	77%	88%	85%	83%	91%
1 or 2 lessons (.5 – 1.5 hours)	18%	12%	9%	13%	8%	10%	7%	7%
3 to 5 lessons (1.5 – 3 hours)	10%	29%	2%	7%	2%	1%	7%	2%
6 to 8 lessons (3 – 4.5 hours)	6%	0%	1%	0%	1%	0%	1%	0%
9 to 10 lessons (4.5 – 5 hours)	4%	6%	0%	3%	1%	0%	1%	0%
10+ lessons (5+ hours)	5%	6%	0%	0%	1%	3%	0%	0%
Weighted Avg. No. Lessons Taught	2.1	2.6	0.4	0.8	0.4	0.5	0.6	0.2
Number of responses	**78**	**17**	**114**	**30**	**125**	**68**	**69**	**54**

Figure 6.



Why Isn't More IPM Being Taught to K-12 Students?

We asked 'Why haven't you taught IPM in recent years?'

What we found: Teachers most often cited unawareness of any IPM curricula as a reason they did not teach it (Table 4). Lack of knowledge as a barrier to teaching IPM was the second most often cited reason and this was more important for middle and high school teachers. For instance, in 2013, 26% of elementary teachers, 32% of middle school teachers and 43% of high school teachers felt they lacked enough knowledge to teach IPM. It should be noted that the number of middle school teachers indicating that IPM does not fit their teaching scope and sequence rose from 20% in 2009 to 29% in 2013, while that same measure dropped from 22% to 7% among elementary teachers. In 2013, middle school teachers were more likely to say IPM curricula do not match state standards (18%), compared with high school teachers (10%) and elementary teachers (4%). Lack of time was also important, especially for high school teachers (31%) but also for elementary (18%) and middle school teachers (16%).

Project Impact: Among elementary teachers there was a 16% reduction in the number of saying they didn't know enough about IPM to teach it and a 15% reduction in the number saying it didn't fit their

current scope and sequence. There was a 13% reduction in the number of middle school teachers citing unawareness of IPM curricula.

Table 4.

Why haven't you taught IPM in recent years?								
Answer Options	Grades PreK-5		Grades 6-8		Grades 9-12		All Grades	
	2009	2013	2009	2013	2009	2013	2009	2013
Unaware of IPM curricula	72%	74%	66%	53%	58%	52%	63%	58%
Not enough time in schedule	22%	18%	21%	16%	21%	31%	22%	23%
Did not have enough knowledge about IPM to teach it	42%	26%	28%	32%	43%	43%	37%	32%
Didn't fit scope and sequence	22%	7%	20%	29%	20%	26%	21%	21%
Not a good match with state standards	8%	4%	13%	18%	17%	10%	13%	10%
No follow-up support	10%	11%	8%	5%	9%	12%	10%	6%
Number of responses	**60**	**30**	**93**	**38**	**117**	**60**	**270**	**128**
Note: Percentages within each column add up to more than 100% because multiple answers were permitted								

Impact of Teacher Training

To determine the impact of training we examined the amount IPM teaching done by trained versus untrained teachers. We also asked several questions about the amount and type of IPM training teachers have received and what components of training teachers feel is most important.

What we found: We found that IPM-trained teachers are three to six times more likely to teach IPM than untrained teachers (Figure 7). Our results also showed that the amount of training may be important. For example, 50% of teachers receiving four hours or less of training had recently taught IPM, compared with 83% of teachers with eight or more hours of training. However, we found less than 20% of teachers had participated in training, though in some states that rate was much higher, notably PA (62%) and MD (62% in 2009) (Table 5). Only 17% (2013) to 22% (2009) of all trained teachers received follow-up support.

The components of IPM training teachers found most important are hands-on demonstration of lessons and availability of resource materials (Table 6). An introduction to IPM, alignments with state standards and an internet link or other form of assistance were also important. Although a workshop would be a way to get the necessary training, participants were clear that it should be one-day or less in duration. Some suggestions made by teachers included: training during summer or over several sessions during the year, games and activities for younger grades, service learning activities, and opportunities to participate in research. Several teachers noted the need for compensation or a substitute to enable their participation in training during the school year.

Project Impact: We found an increase in the percentage of teachers trained for IPM education in CT (5% improvement) and Maine (12% improvement). We also saw a decline in the number of teachers citing impediments to teaching IPM including 'lack of understanding about IPM' (5% decline), 'no assistance available' (6% decline), 'unawareness of IPM curricula' (4% decline) and 'doesn't fit teaching scope and sequence' (8% decline) (Table 4).

Figure 7.

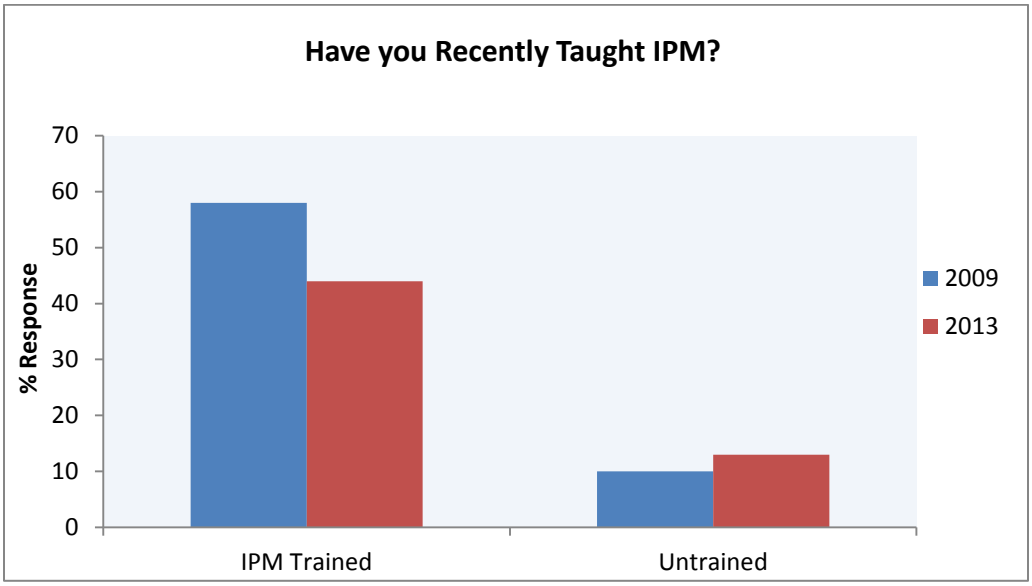


Table 5.

Percentage (and number) of respondents within each state indicating they had received IPM education training.		
	2009	**2013**
CT	7% (112)	13% (30)
MD	62% (8)	<1% (1)
ME	9% (125)	21% (68)
NY	-	0% (44)
PA	62% (80)	56% (16)
WV	5% (40)	<1% (2)
Other	5% (18)	14% (7)
All States	19% (387)	17% (162)

Table 6.

What components of training are important to you?		
Answer Options	**2009 %**	**2013 %**
Introduction to IPM	61	65
Hands-on demonstrations of lessons within the curriculum	82	83
Resource materials, books, videos and CDs supporting the curriculum	79	75

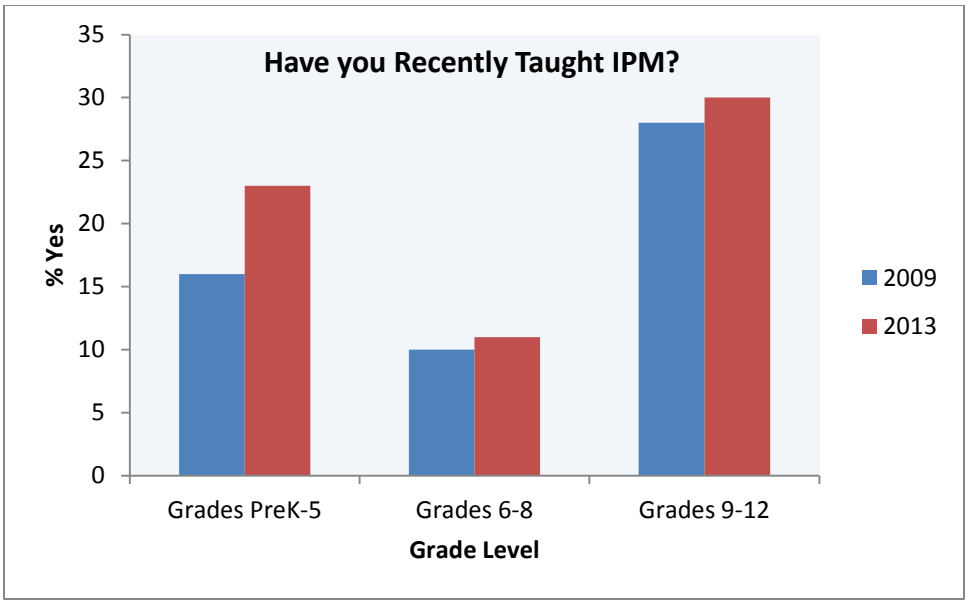
Curriculum alignment to the state/national standards	60	60
Internet links and other forms of assistance for background information or lesson implementation	56	56
Ideas of how to integrate IPM across multiple subject areas	51	55
Follow up contact person(s)	30	32
Goal setting for implementing the curriculum	20	21
Workshop one day or less in duration	47	48
Multi-day workshop	12	7
Other (please specify)	8	7
Number of Responses	**358**	**155**

Who are IPM Teachers?
We separated teachers according to grades and subjects taught and then calculated the percentages within each group who had recently taught IPM, to determine which classes and grades are currently being exposed to IPM education.

What we found: A greater percentage of high school teachers (grades 9-12) teach IPM compared with elementary (grades preK-5) and middle school level (grades 6-8) teachers (Figure 8). In 2013, nearly one-third of high school teachers and nearly one-quarter of elementary teachers reported teaching IPM compared with only 11% of middle school-level teachers. Among those teaching IPM, 30% (2013) to 51% (2009) teach environmental science, while 20% (2013) to 21% (2009) they teach horticulture or agriculture.

Project Impact: The greatest gain in IPM teachers was at the elementary level which increased from 16% (2009) to 23% (2013) of those surveyed.

Figure 8.



Conclusion

Teachers surveyed overwhelmingly agreed that students should understand the role of insects, weeds and diseases so they can make knowledgeable decisions about pest management and protecting the environment. In addition, the majority of those surveyed thought it is important to teach about IPM as a means of protecting people, crops and the environment. Furthermore, 98% of teachers surveyed in 2013 indicated they are willing to teach IPM. However, less than 20% of teachers surveyed have taught IPM in the classroom largely because they were unaware of IPM curricula and they lacked training and knowledge about IPM. The vast majority of teachers who teach IPM indicated they teach science, but significant numbers specified environmental science or agriculture suggesting that IPM fits well within these disciplines. Most IPM teachers are elementary or high school teachers. Middle school teachers were more likely to say IPM does not match state standards and does not fit within the scope and sequence of their instruction.

Our surveys clearly show teacher training is critical to IPM education in the classroom. We found up to six times more trained teachers teach IPM compared with untrained teachers. Our post-project survey in 2013 showed an increase in IPM instruction in the three states where teacher-training and classroom demonstrations were conducted (ME, PA, CT) while IPM education in the other northeastern states declined. A full-day workshop may produce more IPM teachers (86% of full-day workshop participants taught IPM in the classroom), however, less intensive training is also helpful and possibly more accessible. For example, although all Maine workshops and lesson demonstrations were one hour or less (done as part of a teacher conference or an in-classroom lesson demonstration done with the teacher and his/her students), we saw a 12% increase in the number of Maine teachers teaching IPM in the classroom.

Another way to increase IPM education is insertion of IPM into state and national academic standards. We found that far more educators teach IPM when it is mandated, as it is in Pennsylvania. More than half of Pennsylvania respondents reported teaching IPM. By contrast, only 7% of Connecticut teachers

indicated they teach IPM, despite the availability of well-developed curricula kits and teacher training offered by the University of Connecticut.

These results show that there is a clear need to improve the availability of training and support for teachers in order to improve IPM literacy in K-12 classrooms. We found that teachers need and want more training, lesson demonstrations, and supporting resources such as videos and books. Teacher training can be enhanced by offering additional workshops, webinars, professional development programs, undergraduate and graduate education classes, summer institutes, self-paced modules and other training resources. In addition, teachers with IPM education experience can be identified to provide support for new K-12 classroom IPM educators. IPM education can be incorporated in higher education through instruction to pre-service teachers in IPM teaching methods, which could be included in science methods classes. It is likely that this increased support for teacher training will require additional funding and staffing. A cost-benefit analysis that includes financial, social and environmental benefits of enhanced K-12 IPM education may be needed.

There is also a need to further identify effective avenues for outreach, teacher training, curricula and other resources and to identify specific steps for increasing IPM education in the classroom. Our results suggest that IPM education fits well with science, environmental, and agricultural education. A road map is needed to identify potential partners and opportunities for teacher training, outline strategies to align new and existing IPM lessons with academic standards in each state, improve accessibility of teaching resources, and promote awareness of IPM resources among K-12 teachers. The Integrated Pest Management Literacy Plan for K-12 Education (http://www.northeastipm.org/neipm/assets/File/School-WG-IPM-Literacy-Plan.pdf) developed by the Northeastern School IPM Working Group may serve as a foundation for enhancing K-12 IPM education in the northeast. to increase awareness among the next generation of policy makers, scientists, agriculturists, environmentalists, and citizens about IPM as an effective approach to protecting people and the environment while meeting growing needs for food production.

Appendix A. On-line survey instrument used to assess northeastern K-12 teacher attitudes about and experiences with IPM education. Survey conducted November-December, 2009 and January-March 2013.

Teacher IPM Curriculum Survey

Teacher Interest Survey: Pests, Pesticides, Environmental Health

The Northeastern Integrated Pest Management Center's School Working Group is conducting this survey to assess interest in curricula focusing on concepts and examples of integrated pest management (IPM), a science-based way of managaing insects, weeds, and other pests. Using IPM, we learn to make knowledgeable pest management decisions to protect people and our environment.

This survey will take about 5 minutes to complete. Your responses will be kept confidential. Take the survey by November 30, 2009 for a chance to win an IPM curriculum kit ($300 value)!

Where and what do you teach?

1. Where do you teach?

City/Town:

State:

2. In what type of school?

- ◯ private elementary, middle or high school
- ◯ public elementary, middle or high school
- ◯ environmental or outdoor education school or center
- ◯ technical education school
- ◯ Other (please specify)

Teacher IPM Curriculum Survey

3. What grades do you teach? (check all that apply)

- [ ] K
- [ ] 1
- [ ] 2
- [ ] 3
- [ ] 4
- [ ] 5
- [ ] 6
- [ ] 7
- [ ] 8
- [ ] 9
- [ ] 10
- [ ] 11
- [ ] 12
- [ ] Other (please specify)

4. What subjects do you teach? (check all that apply)

- [ ] science
- [ ] math
- [ ] social studies
- [ ] horticulture/agriculture
- [ ] environmental science
- [ ] language arts
- [ ] Other (please specify)

5. About how many students will you have this year?

Are you familiar with integrated pest management concepts and practices?

Integrated Pest Management (IPM) is a science-based system used to control insects, weeds, microbes and other pests while protecting people and our environment from pesticides. IPM relies on

Teacher IPM Curriculum Survey

understanding pest life cycles and habits so that safer combinations of ecological and biological methods and other tactics can be used to control pests.

6. Do you think students should understand the roles, both positive and negative, of insects, weeds, and diseases in our environment?

- ◯ Yes
- ◯ Somewhat
- ◯ No
- ◯ Not Sure

7. How familiar are you with Integrated Pest Management (IPM)?

- ◯ I've taught IPM in my classroom
- ◯ I know about IPM but have not taught it
- ◯ I've heard of IPM before but don't know much about it
- ◯ I've never heard of IPM before

8. Do you feel young people should be introduced to the concepts of IPM?

- ◯ Yes, all ages
- ◯ Yes, but only older children
- ◯ No, it is not appropriate in the curriculum
- ◯ Maybe (please explain)

Is IPM relevant to your teaching program?

Please indicate your level of agreement with each of the following statements

9. Pests pose a significant threat to people, the world food supply and other resources.

- ◯ Agree
- ◯ Somewhat agree
- ◯ Disagree

Teacher IPM Curriculum Survey

10. People are at risk to pesticide exposure through food and the environment.

- ◯ Agree
- ◯ Somewhat agree
- ◯ Disagree

11. Students should learn about insects, weeds, fungi, and microbes so they can make knowledgeable decisions about pest management and protecting the environment.

- ◯ Agree
- ◯ Somewhat agree
- ◯ Disagree

12. How much time would you be willing to spend in your classroom teaching an IPM curriculum program?

- ◯ Not interested in teaching IPM curriculum
- ◯ 1 or 2 lessons (.5 – 1.5 hours)
- ◯ 3 to 5 lessons (1.5 – 3 hours)
- ◯ 6 to 8 lessons (3 – 4.5 hours)
- ◯ 9 to 10 lessons (4.5 – 5 hours)
- ◯ 10+ lessons (5+ hours)
- ◯ Other (please specify)

13. Have you received training (eg. workshop) in IPM [concepts/teaching methodology]?

- ◯ Yes
- ◯ No
- ◯ Not sure

Tell us about your IPM education training.

Teacher IPM Curriculum Survey

14. What organization sponsored your training?

- [ ] University (including Cooperative Extension)
- [ ] State Agency
- [ ] Agriculture in the Classroom Program
- [ ] School district
- [ ] Science Teachers Association
- [ ] Agricultural Teachers Association
- [ ] Don't know
- [ ] Other (please specify)

15. How long was the training?

- ◯ 1 hour
- ◯ 2-4 hours
- ◯ 5-8 hours
- ◯ more than 8 hours

16. Was there any follow-up to the training?

- ◯ Yes
- ◯ No

If yes, how often and by who?

Teacher IPM Curriculum Survey

17. The training included (check all that apply):

- [ ] Introduction to IPM
- [ ] Hands-on demonstrations of lessons within the curriculum
- [ ] Resource materials, books, videos and CDs supporting the curriculum
- [ ] Curriculum alignment to the state/national standards
- [ ] Internet links and other forms of assistance for background information or lesson implementation
- [ ] Ideas of how to integrate IPM across multiple subject areas
- [ ] Follow up contact person(s)
- [ ] Goal setting for implementing the curriculum
- [ ] One day or less in duration
- [ ] Multi-day workshop
- [ ] Other (please specify)

Do you teach IPM?

18. Have you taught any IPM lessons in your classes in recent years?

- ◯ Yes
- ◯ No

Tell us about how you teach IPM

19. What IPM curriculum did you use? (mark all that apply)

- [ ] University of Connecticut IPM Curriculum
- [ ] Pennsylvania IPM Program Curriculum
- [ ] Other (please specify)

Teacher IPM Curriculum Survey

20. How much time did you spend last year teaching IPM?

- ◯ 1 or 2 lessons (.5 – 1.5 hours)
- ◯ 3 to 5 lessons (1.5 – 3 hours)
- ◯ 6 to 8 lessons (3 – 4.5 hours)
- ◯ 9 to 10 lessons (4.5 – 5 hours)
- ◯ 10+ lessons (5+ hours)

21. Did you modify the curriculum when you taught it?

- ◯ Yes
- ◯ No

If yes, why and how did you modify it?

22. How well did you think the curriculum was matched to state or national standards?

- ◯ Don't know
- ◯ Not a good match
- ◯ Fair match
- ◯ Good match
- ◯ Very good match
- ◯ Excellent match

Teacher IPM Curriculum Survey

23. Why haven't you taught IPM in recent years? (please check all that apply)

- [ ] Was unaware of any IPM curricula
- [ ] Not a good match with state standards
- [ ] Not enough time in schedule
- [ ] Did not work into current scope and sequence
- [ ] Not an engaging curriculum
- [ ] Did not have enough knowledge about IPM to teach the curriculum
- [ ] Not enough follow up to training or assistance available with the curriculum
- [ ] Other (please specify)

Want IPM teaching tools and training?

24. Would you be interested in attending an IPM curriculum training workshop?

- ◯ Yes.
- ◯ Yes, though I have previously attended IPM curriculum training and would like to go more in depth.
- ◯ No, I have already been through IPM curriculum training.
- ◯ No, I am not interested in including IPM curriculum in my classroom.
- ◯ Maybe, depending on

Teacher IPM Curriculum Survey

25. What components of an IPM curriculum training are important to you? (Check all that apply).

- [ ] Introduction to IPM
- [ ] Hands-on demonstrations of lessons within the curriculum
- [ ] Resource materials, books, videos and CDs supporting the curriculum
- [ ] Curriculum alignment to the state/national standards
- [ ] Internet links and other forms of assistance for background information or lesson implementation
- [ ] Ideas of how to integrate IPM across multiple subject areas
- [ ] Follow up contact person(s)
- [ ] Goal setting for implementing the curriculum
- [ ] One day or less in duration
- [ ] Multi-day workshop
- [ ] Other (please specify)

For a chance to win an IPM Curriculum kit ($300 value), please tell us how ...

Complete this survey by November 30th. Prize drawing to be held December 01, 2009.

26. Please give us your contact information for a chance to win!

Your Name:

Email Address:

Phone Number:

Thank you!

Thank you for taking out survey! If you would like more information and/or a summary of the results of this survey, please contact Kathy Murray, Maine Department of Agricululture, kathy.murray@maine.gov, 207-287-7616.