School IPM Outreach and Research Activities, NYS IPM Program, 2004

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Locations: Broome, Jefferson, Lewis, Onondaga, Orange, Steuben, Suffolk, Tompkins, Ulster, and Westchester Counties

Abstract: Integrated pest management in schools is needed to reduce risks to children and others from both pests and the overuse of pesticides. The NYS IPM Program was involved in several extension and applied research activities at schools in 2004. In the lower Hudson River Valley, we initiated a "learning community" approach. Four school districts are working with extension and school peers to assist each other in the development of model IPM programs. This was the last year of a three year "systems" project where comprehensive and innovative approaches to grounds IPM were implemented at a cooperating school district. The first year of a study of the application of compost tea to an athletic field suggested that the application may improve plant vigor. However, the standard rate of application may give weeds a competitive edge. On-site interviews of schools on their pest management policies and practices brought the total number of interviews to 32. We organized a meeting of the Statewide School IPM Committee and attended a meeting of private school administrators. We worked with a BOCES district to hold a school IPM workshop in Watertown. On Long Island, we worked with a tick problem at a school .

Background and Justification: Pest management in schools has received increased attention in New York State and nation-wide. This is due to the critical need to decrease pesticide use to protect our children, who, by nature of their size and developmental stage, are at greater risk than adults. Yet, at the same time, we cannot compromise the quality of pest control because pests represent an equally important health hazard. Schools are especially challenging to manage because they include such varied settings as classrooms, cafeterias, laboratories, auditoriums, theaters, playing fields, playgrounds, and gardens. These areas are heavily used for a variety of purposes, including after-hours public meetings. Visitors, staff, and students are frequently in direct contact with the lawns, athletic fields, flowers, trees, playgrounds, and buildings on the school grounds. Recent passage of a New York State (NYS) pesticide notification law has resulted in additional pressure on schools to reduce pesticide use.

Learning Community Project: Great strides have been made by NYS school pest managers within the past decade in reducing risks associated with "conventional" pest control. However, much work needs to be done. Persistent challenges to IPM programs in schools include the need for written pest management policies, classroom sanitation,

pest proofing buildings, and heavy use of facilities. School pest managers stress the need to improve communication concerning safe and effective pest control with their diverse constituencies, from school administrators to community sports programs. At least 30% of NYS public school districts are applying pesticides in school buildings and on school grounds on a regular, prescheduled basis – a practice that is antithetical to IPM.

School decision-makers often look to other schools for insights on successful programs. This underlines the importance of establishing model IPM programs at schools. Even schools that are practicing IPM need assistance to further develop their programs. With this project, we are utilizing a "learning community" of school district personnel, peer mentors, and cooperative extension educators to develop four district-level model school IPM programs.

The geographical target region for the project is the lower Hudson River Valley immediately north of New York City. This region was chosen because of the high human population density, strong community concerns about pesticide use, and the availability of extension IPM specialists and peer mentors to help facilitate the project.

The project is funded by a Northeast IPM Partnership Grant and has the following objectives.

1) Organize the "learning community" team that will develop the four model programs.

2) Utilize the IPM Institute's "IPM Standards for Schools" to assess the current status of the pest management programs of the cooperating schools.

3) Develop and pursue individualized IPM improvement plans via collaborative interaction among the four cooperating school districts, extension IPM specialists, and peer mentors. The goal will be qualification for the IPM Institute's STAR school certification.

4) Evaluate the success of the cooperating districts' IPM development plans.

5) Communicate the results of the four model programs locally, statewide, and throughout the Northeast.

In 2004, we organized the "learning community" team, established a listserv for the team, and conducted the initial assessment of the four school districts. The team includes NYS IPM Program staff (Lynn Braband, Gary Couch, Jody Gangloff-Kaufmann), Cornell Cooperative Extension staff from Orange County(Rose Baglia), Ulster County (Teresa Rusinek), and Westchester County (Rick Harper), two "peer mentors" (Dan Dickerson, New York City Board of Education, and Kevin Trotta, North Rockland School District), and four schools districts (Minisink Valley, Monroe-Woodbury, New Paltz, and Scarsdale).

The one-day organizational meeting was held in Middletown, NY on June 17. Presentations were made on the basics concepts of school IPM and the IPM Institute's STAR certification program. The general format, including bench marks, of the project were discussed. Subsequent to the meeting, a project listserv was established. This is the major means of communication within the team.

In October, comprehensive, day-long on-site assessments were made of the pest management programs of the four cooperating school districts. The IPM Institute's format associated with their STAR certification program was utilized as the guide for these assessments.

Currently (January 2005), the school districts are developing their draft IPM improvement plans. These plans will be based, to a large extent, on the results of the

initial assessments. After a collaborative "refining" of the plans, the districts will begin implementation. In July, we will have a project "mid-point" meeting to evaluate progress. The project continues through June 2006.

North Syracuse Grounds Project: A three-year project at the North Syracuse Central School District is complete. As part of a Northeast IPM Grant to Paula Shrewsbury at the University of Maryland, we conducted systems comparisons to determine the efficacy and cost effectiveness of low risk treatments to manage weed, insect and disease pests on public school grounds. To reduce reliance on chemical applications, we chose alternative pest management practices that integrate cultural and biological treatments and emphasize use of low risk products. While the use of pesticides can provide timely, effective reduction of pest problems, they may also have a negative impact on the environment and the health of humans and other non-target organisms. School districts throughout the northeast are reluctant to use pesticides and, in New York State, the neighbor notification act seems to have played a part in this. However, pesticide alternatives often require increased labor. We are in the process of assessing the success and actual costs -- labor, equipment and low risk or alternative products--involved in the reduction of chemical use.

We examined pest management and resulting quality on athletic fields, fencelines, lawns, curbs and sidewalks, ornamental beds and trees, and along building edges. In each of these settings, site areas were paired - one received conventional treatments (current standard practices at the discretion of staff) and the other received alternative treatments incorporating low-risk pest management methods. We selected areas that tended to become damaged or unsightly with weeds, disease or insects.

Like many public grounds settings, a major pest problem at North Syracuse was weed growth. Beyond being untidy along sidewalks and fences, weeds provide unsuitable, unsafe footing in athletic field turf. In the past, weed control was generally maintained by a combination of weed trimming, and chemical application. While less pesticide use reduces risk, the weeds still need to be managed. Mechanical weed removal along building edges, fences and curbs is labor-intensive, prompting schools to find new weed controls that are both effective and economical. The school district has a very large athletic complex with multiple fencelines, and previously used considerable labor hours for mechanical weed trimming. One of our alternative treatment options, the use of a 'hot water' machine to target weeds showed great success early in the project. Prior to the fall of 2003 when the North Syracuse Central School District purchased their own Aquacide machine, we were limited by availability of a machine on loan. In the spring of 2004, despite consistent availability of the machine, use was regulated by heavy rainfalls and overly wet grounds.

We found that athletic fields receiving herbicide treatments (conventional) continued to have fewer weeds than the alternative fields. However, we are confident alternative methods can show benefits when implemented consistently. Studies have shown weekly overseeding in damaged areas results in better turf coverage, fewer weeds, and provides safer footing. Unfortunately, this was not practiced consistently by staff during this project.

Other practices which improve turf's ability to out-compete weeds is aeration and the movement of field lines and goalmouths to reduce focused impact. Both practices have proved successful. Soccer and lacrosse goals were moved, resulting in less damage and no need for re-sodding as in previous years.

In ornamental beds we rated the aesthetics and health of the plant material as well as the percentage of area covered by weeds. Each site had two conventional beds and two alternative beds that varied in size and plant material. The use of hot water was an effective weed deterrent in mulched beds, when used optimally. Three instances of insect damage were treated; plants with severe infestations were removed and replaced with resistant varieties or treated with least-toxic methods.

Weed encroachment was monitored along chain-link fencelines. Without herbicides, staff must use a mechanical weed trimmer or hand-weed. The school district has a very large athletic complex with multiple fencelines, and previously used considerable labor hours for mechanical removal. Our experience showed better weed control and less labor hours with the hot water treatment, Aquacide.

In the maintenance of curbs and sidewalks, the failure of seams between sidewalks allows turf and weeds to take hold. Newer portions were less likely to have this problem, so older sidewalk sections were renovated with caulk. The use of hot water is an excellent choice to reduce or remove weeds from curbs and sidewalks.

Education of staff has been integral to our project. We held one formal workshop for building and grounds maintenance personnel in April of 2003, as well as many one-on-one discussions of turf, plant and tree health and maintenance. This type of learning increases awareness and curiosity about turf and plant health, pest management and environmental impact, as evidenced by the increasing amount of questions posed by staff throughout the length of our project.

In conclusion, the goals of the original School IPM project were adjusted as we learned more about their actual use of pesticides and what treatments were practical in a school setting. It is not only important to find ways to reduce pesticide use and keep pest management costs down, but to raise the awareness of school employees. Alternative practices, and most importantly why we choose to use them, is a long-term benefit when IPM is practiced on school campuses.

At North Syracuse, hot water weed control was an effective alternative treatment. There was less need of hand weeding and mechanical trimmer use. Because of problems with availability and function of the Aquacide machine, it was not used at all sites, or at the most suitable times in 2002 and 2003, yet its favorable results prompted the district to purchase its one machine. Although Aquacide use takes time, we believe that repeated applications reduced labor hours in the long run because of the pronounced reduction of weeds. Due to the extensive rains we encountered throughout the 2004 season, grasses were especially aggressive to return compared to our previous, drier summers. Broad-leaved weeds also flourished but did show considerable knock-back in vitality along side those removed by weed trimmers. There is great opportunity to study the effectiveness on hot water treatment against specific weeds and grasses in the future.

Besides the success with hot water weed control, another benefit of this project was heightened awareness of alternative practices and some basic knowledge of the needs of turf, trees and ornamental plants. The building and grounds personnel participated in workshops and one-on-one discussions on plant and turf health, cultural practices and new ideas for management. Increased knowledge is a major component of an Integrated Pest Management system; scouting for disease and insects leads to early intervention and therefore less plant loss, turf injury and ultimately less need for pesticides. Proper pruning reduces plant injury and will prolong the life of many ornamentals. Healthy

plants are less susceptible to insects and pathogens, and NSCSD personnel have learned new "tools" for treatments.

These interactions are invaluable. NSCSD staff have assisted in the application of horticultural oil on a Scale infested Ash tree, thereby learning an alternative and less toxic method of treatment other than chemical insecticide. They have learned to watch for evidence of Viburnum Leaf Beetle, a recent invader to the Syracuse area. After a recent "how to prune" day, staff members agreed they looked at trees and shrubs with a more critical eye. Their increased knowledge is an asset to the school and will affect their day-to-day decision-making and value to the school for years to come. (grub scouting)

As all the weed data, labor hours and treatment costs are analyzed, the project will provide information on the efficacy and cost effectiveness of both alternative and conventional treatments. This, combined with information from the Maryland sites, will be useful to school districts throughout the Northeast in determining their pest management strategies.

Compost Tea Project: Compost tea has gained popularity in recent years as an amendment to be used in the growth and management of all types of horticultural and agricultural plants. Compost tea is a compost extract brewed with a microbial food source. The compost-tea brewing technique is an aerobic process that encourages the growth of populations of beneficial microorganisms. Claims by tea producers include significant fertilizing effects, disease management, and overall increased plant vigor with the regular use of compost teas.

In an effort to find ways to improve the health and quality of athletic field turfgrass, this study was designed to compare compost tea application to no application in IPM-managed turfgrass. The compost tea used is commercially available from Earthworks Natural Organic Products (Martins Creek, PA) and brewed and applied by the distributor/collaborator, Maxwell Turf (Jericho, NY).

The objective of our project was to observe and record the effects of compost tea application to athletic field turfgrass managed under best management conditions, with no pesticides used for insect, disease or weed control.

The athletic field chosen for this project was a moderate use playing and practice field that is equipped with irrigation. Best management practices were used over the entire field and included monthly aeration and overseeding with a standard mix of 30% Kentucky bluegrass and 70% perennial ryegrass (85% endophyte enhanced). The field was mowed weekly to a height of 2.5 inches in spring and fall and 3 inches during the hot summer months. An all purpose organic fertilizer (Replenish 5-4-5) was applied at a rate of 10lbs/1000sq ft. The field was divided into 12 equal-sized plots to incorporate four replications of three treatments. Compost tea treatments were applied at a standard rate in four plots and at a double rate in four plots. Four plots received no compost tea. Tea applications were made on the following dates: 6/11, 7/9, 7/22, 8/18, 9/9, and 9/24. Plots were evaluated before compost tea and control treatments as well as bi-monthly during the growing season and into late fall. A visual estimate of the percent weed coverage was made in each plot using a 3'x3' square divided into 12 equal sections that was randomly tossed inside the plot. An estimate of percent weed coverage was made for each of the 12 squares in the 3'x3' sampling square and averaged. This was done three times for each plot. Notes were made about the species of weeds present in all plots. Measurement of plant root depth was done using a soil core tool and a ruler.

Each plot was randomly sampled three times for turfgrass root depth. Attempts were made to record disease incidence.

Comparisons made in 2004 included turfgrass root depth and turfgrass vigor, measured by percent weed coverage by area. Disease incidence was to be recorded, however no disease was ever widespread enough in this field to be recorded and compared. Results are based on root depths and weed counts only.

Measurements of root depth were taken on July 23. The average root depth of both the 1x and 2x compost tea treatments were greater than that of the control, but results were not statistically significant at the 95% confidence level.

Date	Mean root depth ± std. dev.			P value
	1x compost tea	2x compost tea	Control (no tea)	
7/23/04	2.6450 (0.5730)	2.6875 (1.0946)	2.2100 (0.2511)	0.607
9/13/04	3.1225 (0.5467)	3.1250 (0.5355)	2.5400 (0.3770)	0.209
11/11/04	2.1250 (0.2933)	2.4600 (0.3748)	2.1850 (0.2397)	0.307

There appears to be a trend of increased root depth in compost tea treatments in July and September but the differences between compost tea treatments and the control were not statistically significant. By November only the 2x treatment was higher on average, but again, the differences were not statistically significant.

Date	Mean weed density ± std. dev.			P value
	1x compost tea	2x compost tea	Control (no tea)	
7/23/04	23.055 (3.993)	19.445 (10.641)	15.373 (6.148)	0.386
9/13/04	22.963 (4.157)	19.628 (10.492)	15.373 (6.148)	0.389
11/11/04	22.868 (8.447)	13.798 (4.765)	13.890 (6.170)	0.140

It appears that where no compost tea was applied, weed numbers were lower, however this trend is not statistically significant. The standard 1x compost tea application rate had a higher weed density on average than the 2x rate, but this effect was not statistically significant.

Some trends were observed with the application of compost tea to the athletic field, however no statistically significant results were shown this year. Trends suggest that compost tea may improve plant vigor by encouraging deeper root growth. Trends also suggest that the standard rate of tea application may not be the best for turfgrass, since weed numbers may be higher where compost tea was used at the standard rate. This may be due to the fertilization effects of compost tea giving weeds a competitive edge. However other factors that make turfgrass more vigorous, combined with compost tea application, may be a better approach for best turfgrass management. It is unknown what the effect of compost tea is on high traffic versus low traffic turfgrass, particularly when each is overseeded. Each plot in this experiment appears to have high traffic and low traffic areas. This introduces variability into the results. Teasing out the effect of wear on the turfgrass plants may lead to stronger conclusions.

In 2005, we plan continue this project. We may subdivide the plots into high, medium, and low traffic areas and do the same amount of sampling in 36, rather than 12, plots. This would allow us to tease out the effects of compost tea on wear and reestablishment

of turfgrass. We will also seek to measure turfgrass density in addition to weed cover percent and root depth.

School Interviews: To supplement a 2001 statewide survey of NYS public school pest management policies and practices, we initiated on-site school interviews in 2002. In 2004, five school districts from Broome, Steuben, and Tompkins counties were interviewed. This brings the total to 32 school districts. Future efforts will focus on the "North Country" region of the state. This area is currently underrepresented in the interview coverage. Combined with the statewide survey, the results of these interviews are providing valuable input for school IPM research and extension activities.

Some highlights of the interview results follow. Most of the districts considered their pest management programs successful. The most common reasons given were fewer pest problems and pesticide reductions. When asked why their district was practicing IPM, the most frequent responses included better pest management, meeting legal requirements, health concerns, environmental concerns, and good citizenship. When asked about the impact of the state notification law on their pest management, the most frequent responses were little or no impact, costly increase in paperwork, and reduced pesticide applications. District 48-hour notification lists ranged from 0 to thousands of people. The respondents listed 21 different obstacles to practicing IPM in schools. The most frequent responses were funds, food in classrooms, constituency apathy/resistance, and heavy use of facilities. Several questions were asked concerning assessing needs. The most frequent responses indicated the need for improving communication and education among all of schools' diverse constituencies.

General Outreach: The NYS IPM Program organized a Statewide School IPM Committee in 2002. In October, 2004, we held a third meeting of the committee. In addition to the diverse membership updating each other on their school IPM activities, we had a special presentation by an invited BOCES representative on IPM record keeping and discussed visions for school IPM in the state. The Committee envisioned the following:

Where would we like our schools to be in 5 years?

- Effective record keeping.
- IPM curriculum initiated within schools.
- Meaningful evaluation of the efficacy and economics of school IPM.
- Increased cooperation among facilities staff, teachers, students, and administrators.
- Increased outreach to various school professional organizations.
- Pest proofing initiated in construction planning.

Where would we like our schools to be in 10 years?

- Regular input on pest prevention into new facility construction.
- IPM curriculum required.
- IPM in teacher training as part of a Health and Safety approach.
- Schools are on the cutting edge of proactive IPM.

For the second year, the NYS IPM Program had a booth at a two-day conference for private school administrators. Held in Albany, this meeting was organized by the State Education Department.

In January, we partnered with the Jefferson-Lewis BOCES to host a school IPM workshop in Watertown, NY. Funded by a NYS DEC Non-Toxic Pest Management Grant, this workshop was the last of a three-workshop series. The first two were held in autumn of 2003. Attended primarily by school facilities staff, the January workshop had

presentations on turf IPM, effects of soil types, implementing structural pest management in schools, ants, geese, bats, pest proofing, landscaping IPM, and classroom sanitation.

In May of 2004, Jody Gangloff-Kaufmann was called to visit an elementary school of the South Huntington School District to investigate several reported tick problems at the school. Several students, parents and staff had discovered ticks on their clothing or belongings while on school grounds. All ticks were keyed to species and identified as American dog ticks. A total of four ticks were collected for identification. Due to concerns of parents, staff and the school principal a tick drag mat was fashioned out of cloth and used at the wooded perimeter of the school grounds and in high traffic areas in an attempt to locate a source of ticks. No ticks were ever collected from the drag mat on the grounds of the school. Since no source was located, it could not be concluded that ticks originated on school grounds and no treatment was ever made for management of ticks. The principal was informed that parents, staff and students should take precautions both on and off school grounds to avoid tick-infested areas. It was made clear that the species of tick found on several individuals was not the Lyme disease vector, and general precautions should be taken to reduce the chances of being bitten by a tick, including inspection of children's clothes and bodies for ticks by parents at the end of the day.

In September 2003, we initiated IPM curricula development projects. During 2004, these efforts continued and are described in a separate report. In January 2005, the NYS IPM Program staff submitted a grant proposal that will build collaborative teams of school facilities staff, teachers, and students to address specific pest management challenges.