

Establishment and Maintenance  
of a Pest Management  
Communication and Information  
Network in North Carolina

Final Report

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## **Introduction**

In 1999, funding for a network of Regional Pest Management Centers was authorized by Section 406 of the Agricultural Research, Extension, and Education Reform Act of 1998. As the result of a competitive process, four Regional Pest Management Centers (North Central, Northeast, Southern and Western) were created. The United States Department of Agriculture (USDA) placed a high priority on the establishment of Regional Pest Management Centers as a means of strengthening its connection with production agriculture, research and extension programs, and agricultural stakeholders throughout the United States. The USDA and United States Environmental Protection Agency (EPA) recognized the need for a pest management information network that could quickly respond to information needs resulting from the implementation of the Food Quality Protection Act of 1996.

In 2001, the North Carolina Pest Management Program at North Carolina State University was funded by the Southern Region Pest Management Center (SRPMC), located at the University of Florida in Gainesville, to establish, coordinate and provide a pest management information program in North Carolina to function as the state contact for the pest management information network established by the SRPMC. Activities of the newly-established North Carolina Pest Management Information Program included the development and maintenance of linkages with pest management stakeholder groups in North Carolina and Southeastern United States. Pertinent information on pest management issues was provided to program stakeholders in a timely manner; these stakeholders provided input into the program through their participation on an advisory committee. The North Carolina Pest Management Information Program facilitated and supported the production of crop profiles, pest management strategic plans and other pest management documents for important North Carolina agricultural commodities as identified by federal regulatory agencies for the implementation of the Food Quality Protection Act of 1996. The connection between pest management programs (i.e., Pest Management Information, Integrated Pest Management, Interregional Project 4, Pesticide Applicator Training) and agricultural and other private stakeholders within North Carolina was strengthened during the project period. The North Carolina Pest Management Information Program served as an information resource for the Southern Region Pest Management Center and the public and private sectors on current pest management practices, problems and issues affecting agricultural commodities produced in North Carolina. Finally, the North Carolina Pest Management Information Program served as a contact point for the resources and expertise available through the on-campus (Extension specialists and researchers) and field faculty (i.e., county Extension agents) at North Carolina State University.

This report outlines the objectives, procedures, activities and accomplishments of the North Carolina Pest Management Information from 2001 through July 31, 2005.

## Objectives

1. To establish, coordinate and provide a pest management information program in North Carolina to function as the state contact for the pest management information network established by the Southern Region Pest Management Center located at the University of Florida in Gainesville.
2. To establish an *Advisory Committee* for the North Carolina Pest Management Information Program (PMIP) composed of pest managers, producers, commodity groups and other stakeholders representative of the diversity of capabilities, institutions and pest management issues found in North Carolina.
3. To facilitate and support the production of crop profiles, pest management strategic plans and similar pest management documents for important North Carolina agricultural commodities as identified by federal regulatory agencies for the implementation of the Food Quality Protection Act of 1996.
4. To strengthen the connection between pest management programs (i.e., Pest Management Information, Integrated Pest Management, Interregional Project 4, Pesticide Applicator Training) and agricultural and other private stakeholders within North Carolina.
5. To serve as an information resource for the Southern Region Pest Management Center and the public and private sectors on current pest management practices, problems and issues affecting agricultural commodities produced in North Carolina.

## Procedures

1. A pest management information program will be established in North Carolina to function as the state contact for the pest management information network established by the Southern Region Pest Management Center located at the University of Florida. Leadership for the North Carolina Pest Management Information (PMIP) will be provided by the Principal Investigator who will serve as the contact person for the Southern Region Pest Management Center and coordinate the informational and communication activities of the North Carolina PMIP.

Linkages with pest management stakeholder groups in North Carolina and the Southeast U. S. region will be developed and maintained. A mailing list of commodity organizations, growers, and other stakeholders within the State will be created and maintained by the Principal Investigator. Pertinent information on pest management issues will be provided to program stakeholders in a timely manner. The participation of Extension specialists and researchers in North Carolina in pest management information-gathering activities on a state, regional and national level will be encouraged and facilitated. University scientists will be assisted in securing grant funding for projects within North Carolina and networking with colleagues in other states on regional and national projects. The Principal Investigator will identify and solicit the participation of university scientists in the review of technical documents relating to current and future pest management practices in North Carolina and the Southeast U. S.

The production of crop profiles, pest management strategic plans, and similar pest management documents in North Carolina will be facilitated through the North Carolina PMIP. The network of stakeholder groups in the state will be used to identify and include stakeholders in the initiation, development and review of these pest management documents. The North Carolina PMIP will also support the communication and publication of pest management documents generated in North Carolina and the Southeast U. S. These materials will be made available through a variety of media (i.e., publications, Internet-based databases) from North Carolina State University, and submitted to a proposed Internet-based National Pest Management Information System at North Carolina State University (which will provide access to such information from all of the U. S. states/territories and regional Pest Management Centers). Pertinent and timely pest management information will be provided to commodity organizations, growers, county Extension personnel, university Extension specialists and researchers, North Carolina Department of Agriculture & Consumer Services personnel, pesticide dealers and industry representatives, agricultural consultants, and other stakeholders via newsletters, fact sheets, news releases, electronic mail, and the Internet.

2. An *Advisory Committee* will be established that is composed of pest managers, growers, commodity groups, university scientists and other stakeholders interested in the pest management issues addressed through the North Carolina PMIP. The model for the advisory committee will follow those successfully established at North Carolina State University for a number of program areas such as Integrated Pest Management (IPM), Pesticide Applicator Training, Pesticide Impact Assessment, and Horticultural Crop Production. This advisory committee will be formed within the first year of the project and meet at least one time each

year. Additional meetings and correspondence with members of the advisory committee will be conducted as needed or desired by the Principal Investigator and/or committee members.

3. The North Carolina PMIP will facilitate and support the production of crop profiles, pest management strategic plans and similar pest management documents for important North Carolina agricultural commodities as identified and needed by federal regulatory agencies for the implementation of the Food Quality Protection Act of 1996. Currently, crop profiles for North Carolina apples, blueberries, cabbage, Christmas trees, corn (field and sweet), cotton, cucumbers, grapes, peaches, pecans, peppers, potatoes, poultry, residential and structural pests, sorghum, sweetpotatoes, tobacco (flue-cured and burley), tomatoes, and watermelons have been completed and submitted to the USDA's Office of Pest Management Programs for inclusion in the crop profile database maintained at North Carolina State University (located on the Internet at: <http://www.ipmcenters.org/cropprofiles/cropprofiles.cfm>). These completed crop profiles have also been published in a notebook (Toth et al.1999) that was distributed to stakeholders. The information in the completed crop profiles will be maintained and information in the profiles updated on an annual basis under the direction of the North Carolina PMIP. Other crop profiles are under development for the following agricultural commodities in North Carolina: leafy greens (collards, kale, mustard greens and turnip greens), nursery and greenhouse ornamental plants, public health pest control, small grains (rye, winter wheat and barley), soybeans, strawberries, swine and cattle, and turf. Completion of these crop profiles and crop profiles for additional agricultural commodities in the state will be facilitated and supported by the North Carolina PMIP.

Continued development of pest management strategic plans for important agricultural commodities in North Carolina will be facilitated and supported by the North Carolina PMIP. These pest management strategic plans, developed through working groups composed of university scientists, commodity groups, growers, environmental organizations and other stakeholders, identify the key pests, current pest management practices, possible new alternative practices, and regulatory, research and education priorities for transition into a new pest management system resulting from implementation of the Food Quality Protection Act of 1996 and other regulatory activities. To date, Extension specialists and researchers at North Carolina State University and growers and commodity groups from North Carolina have participated in the development of pest management strategic plans for the following agricultural commodities: apples in the Appalachian Mountain states, peaches in the Southeast U. S., strawberries in the Southeast U. S., sweetpotatoes in the Southeast U. S., and brambles, blueberries and grapes in the Southeast U. S. Completed pest management strategic plans are accessible through a computerized database at North Carolina State University (available on the Internet at: <http://www.ipmcenters.org/pmsp/index.cfm>).

Data on the use of pesticides and other pest management practices in the production of important agricultural commodities in North Carolina have been collected from a series of mail surveys of growers conducted through the North Carolina Pesticide Impact Assessment Program since 1989 (Toth 1991, 1992, 1993, 1995, 1996a, 1996b, 1997a, 1997b, 1998). These data have been extremely valuable in the preparation of crop profiles and pest management strategic plans for North Carolina commodities. Available project funds and/or funds from other sources will be used to conduct grower surveys, which provide essential pest management data needed for the maintenance and further development of crop profiles and pest management strategic plans for agricultural commodities in the state.

4. The Principal Investigator will further strengthen the connection between pest management programs (i.e., Pest Management Information, Integrated Pest Management, Interregional Project 4, Pesticide Applicator Training) in North Carolina through continued service on the North Carolina Cooperative Extension Service's Integrated Pest Management Committee and Pesticide Education Advisory Committee. These committees serve an advisory function to the Integrated Pest Management and Pesticide Applicator Training Programs at North Carolina State University. To promote two-way communication and further enhance the connection with these programs, the Extension Integrated Pest Management Specialist and Pesticide Education Specialist at North Carolina State University will be invited to serve on the advisory committee for the North Carolina Pest Management Information Network. A representative of the IR-4 Program in North Carolina will also be invited to serve on the advisory committee to the North Carolina PMIP.

The Principal Investigator will promote a strong connection between the North Carolina PMIP and agricultural groups and other private stakeholders in North Carolina through participation in meetings, field days, news conferences, etc. within the state and region. Further connections will be fostered by providing pest management information upon request from stakeholders or through publications, electronic mail, web sites, etc. Representatives from many of the agricultural groups and other private stakeholders will be invited to serve on the advisory committee for the North Carolina PMIP. The Principal Investigator currently has connections with many of these stakeholders in North Carolina through activities of the former Pesticide Impact Assessment Program. Many more of these stakeholders are available to the North Carolina PMIP through the existing network between stakeholders and the North Carolina Cooperative Extension Service.

5. The North Carolina PMIP and Principal Investigator will serve as an information resource for the Southern Region Pest Management Center and the public and private sectors on current pest management practices, problems and issues affecting agricultural commodities produced in North Carolina. The North Carolina PMIP will serve as a contact point for the resources and expertise available through the on-campus faculty (Extension specialists and researchers) and field faculty (i.e., county Extension agents) at North Carolina State University. These pest management information resources will be identified in response to specific requests from the Southern Region Pest Management Center and other stakeholders, or communicated directly through publications, newsletters, the Internet, and other media.

## **Activities and Accomplishments**

### **Maintenance of a Pest Management Information Program**

The North Carolina Pest Management Information Program (PMIP) was established in North Carolina in 2001 with competitive grant funds from the Southern Region Pest Management Center and has been maintained through the project period. Leadership for the North Carolina PMIP was provided by the Principal Investigator (Stephen J. Toth, Jr.), who served as the contact person for the Southern Region Pest Management Center and coordinated the informational and communication activities. The Principal Investigator attended meetings of the Southern Region Pest Management Center in Orlando, Florida on November 6-8, 2001 and on May 15, 2002.

Linkages with pest management stakeholder groups in North Carolina were developed in 2001 and have been maintained through the present date. A mailing list of approximately 90 commodity organizations, growers, and other stakeholders was created and maintained by the Principal Investigator (the mailing list from the Pesticide Impact Assessment Program was modified and updated). The mailing list was originally used to provide pertinent information on pest management issues to stakeholders; however, it was replaced with e-mail lists and web-based newsletters (e.g., Pesticide Broadcast) due to cost efficiency, timeliness and stakeholder preference.

### **Pest Management Information Gathering**

The participation of Extension specialists and researchers in North Carolina in pest management information-gathering activities on a state, regional and national level was encouraged and facilitated by the North Carolina PMIP. The Principal Investigator identified and solicited the participation of research and Extension scientists from North Carolina State University in the development of a pest management strategic plans for peanuts (North Carolina and Virginia), Christmas trees (North Carolina, Tennessee and Virginia), sweetpotatoes (Southeastern U. S.), peaches (Eastern U. S.) and tomatoes (Delaware, North Carolina and Virginia).

Supported by the Principal Investigator, Extension specialists and researchers have been active in securing USDA grants for addressing the pest management needs of growers in North Carolina and the Southeastern U. S. The following grants involved personnel of the North Carolina Pest Management Information Program:

USDA/CSREES Pest Management Alternatives Program. \$60,129. Reduction and Replacement of Acifluorfen in Peanuts. J. W. Wilcut and S. J. Toth, Jr. January 1, 2002 - December 31, 2003.

USDA/CSREES Risk Avoidance and Mitigation for Major Food Crop Systems Program. \$2,000,000. Development of Grower Decision-Making Tools to Reduce Risk and Enhance Sustainability of Southern Sweetpotato Pest Management Systems. G. G. Kennedy, J. Schultheis, G. Holmes, D. Monks, K. Sorensen, and C. Brownie. September 1, 2003 - August 31, 2007.

*(S. J. Toth, Jr. is listed as a collaborator; assisting the principal investigators with a mail survey of sweetpotato growers in Southeastern states in the second and fourth year of the grant.)*

## **Communication of Pest Management Information**

The North Carolina PMIP supported the communication of pest management information generated in North Carolina. Pertinent and timely pest management information was provided to commodity organizations, growers, county Extension personnel, university Extension specialists and researchers, North Carolina Department of Agriculture and Consumer Services personnel, pesticide dealers and industry representatives, agricultural consultants, and other stakeholders via newsletters, fact sheets, news releases, electronic mail, and the Internet. This information is available through an Internet site (<http://ipm.ncsu.edu/ncpmip/>) developed for the North Carolina PMIP (Appendix A). Pest management materials produced by the North Carolina PMIP include:

### Newsletters:

Toth, S. J., Jr. and W. G. Buhler (eds.). Pesticide Broadcast, Departments of Entomology and Horticultural Science, North Carolina State University, Raleigh. Volume 12, Numbers 1-8 (2002); Volume 13, Numbers 1-5 (2003); Volume 14, Numbers 1-8 (2004); Volume 15, Numbers 1-3 (2005). ([http://ipm.ncsu.edu/current\\_ipm/broadcast.html](http://ipm.ncsu.edu/current_ipm/broadcast.html))

Toth, S. J., Jr. and T. A. Melton (eds.). North Carolina Pest News, Departments of Entomology and Plant Pathology, North Carolina State University, Raleigh. Volume 16, Numbers 1-22 (2001); Volume 17, Numbers 1-22 (2002); Volume 18, Numbers 1-22 (2003); Volume 19, Numbers 1-22 (2004); Volume 20, Numbers 1-16 (2005). ([http://ipm.ncsu.edu/current\\_ipm/pest\\_news.html](http://ipm.ncsu.edu/current_ipm/pest_news.html))

### Reports:

Toth, S. J., Jr., S. M. Stringham and D. W. Watson. 2002. Poultry Pesticide Use Survey in North Carolina. Data report submitted to Southern Region Pest Management Center, February 15, 2002. North Carolina Cooperative Extension Service, Raleigh. 80 pp.

Toth, S. J., Jr. 2003. Survey of Pest Management Practices Used By North Carolina Leafy Green Growers. Data report submitted to the Southern Region Pest Management Center, May 16, 2003. North Carolina Cooperative Extension Service, Raleigh. 77 pp.

### Presentations:

Toth, S. J., Jr. New Partnerships and Technologies for Delivering Pest Management Information. Departmental Seminar, Department of Entomology and Plant Pathology, Oklahoma State University, Stillwater, OK, April 4, 2001.

Toth, S. J., Jr. New Partnerships and Technologies for Delivering Pest Management Information. Departmental Seminar, Department of Entomology, Kansas State University, Manhattan, KS, April 6, 2001.

Toth, S. J., Jr., R. E. Stinner, W. F. Burr, and Kent L. Smith. Crop Profiles of Pest Management for U. S. Agriculture: A Searchable Database on the World Wide Web. Display presented at the Joint Meeting of the American Phytopathological Society, Mycological Society of America, and Society of Nematologists, Salt Lake City, UT, August 26-27, 2001. (<http://ipm.ncsu.edu/ncpmip/apsposter01.ppt>)

Toth, S. J., Jr. and K. A. Sorensen. Insect Management by North Carolina Leafy Green Growers. Display presented at Annual Meeting of the Entomological Society of America, San Diego, CA, December 11, 2001. (<http://ipm.ncsu.edu/ncpmip/esapost01.ppt>)

Toth, S. J., Jr., R. E. Stinner, W. F. Burr, and K. L. Smith. 2002. Crop Profiles for U. S. Agriculture: A Searchable Database on the World Wide Web. Display presented International Integrated Pest Management (IPM) Conference, Toronto, Canada, March 25-26, 2002. (<http://ipm.ncsu.edu/ncpmip/posteripm02.ppt>)

Toth, S. J., Jr. Electronic Transfer of IPM Information: Pest News, Alerts and Crop Profiles. Presentation at the annual meeting of the Entomological Society of America, Fort Lauderdale, Florida, November 20, 2002. (<http://ipm.ncsu.edu/ncpmip/esameet02.PDF>)

Toth, S. J., Jr. The North Carolina Pest Management Information Program: Providing Diverse Audiences With Timely Pest Management Information. Display presented Southeastern Branch of the Entomological Society of America annual meeting, Baton Rouge, Louisiana, March 11, 2003. (<http://ipm.ncsu.edu/ncpmip/sebesa03poster.ppt>)

Stinner, R. E. and Toth, S. J., Jr. The Southern Region Integrated Pest Management Center at North Carolina State University. Departmental Seminar, Department of Entomology, North Carolina State University, Raleigh, NC, September 8, 2003.

Buhler, W. G. and S. J. Toth, Jr. Dealer Day 2003: Training for Agricultural Chemical Dealers to Enhance Regulatory Compliance, Pesticide Safety, and Integrated Pest Management in North Carolina. Display presented at the Entomological Society of America annual meeting, Cincinnati, Ohio, October 29, 2003. (<http://ipm.ncsu.edu/ncpmip/esaposter03.ppt>)

R. E. Stinner, S. J. Toth, Jr. and S. L. File. The Southern Region Integrated Pest Management Center. Display presented at the Southeastern Branch of the Entomological Society of America annual meeting, Charleston, South Carolina, February 16-18, 2004. (<http://ipm.ncsu.edu/ncpmip/sebesa04poster.ppt>)

R. E. Stinner and S. J. Toth, Jr. Regional Integrated Pest Management Centers in the United States. Display presented at the XXII International Congress of Entomology, Brisbane, Queensland, Australia, August 19-21, 2004. (<http://ipm.ncsu.edu/ncpmip/ICE2004poster.ppt>)

### Slide Sets:

Toth, S. J., Jr. and W. G. Buhler. 2001. Environmental Effects of Pesticides. North Carolina State University, Raleigh. 36 slides. (<http://ipm.ncsu.edu/ncpmip/pp4.ppt>)

Toth, S. J., Jr. and W. G. Buhler. 2001. Federal Pesticide Laws and Regulations. North Carolina State University, Raleigh. 33 slides. (<http://ipm.ncsu.edu/srpsec/pp6.ppt>)

Toth, S. J., Jr. and W. G. Buhler. 2001. Fungicides and Nematicides. North Carolina State University, Raleigh. 22 slides. (<http://ipm.ncsu.edu/srpsec/pp11.ppt>)

Toth, S. J., Jr. and W. G. Buhler. 2001. Herbicides. North Carolina State University, Raleigh. 24 slides. (<http://ipm.ncsu.edu/srpsec/pp12.ppt>)

Toth, S. J., Jr. and W. G. Buhler. 2001. Insecticides. North Carolina State University, Raleigh. 22 slides. (<http://ipm.ncsu.edu/srpsec/pp10.ppt>)

Toth, S. J., Jr. and W. G. Buhler. 2001. Personal Safety and Protective Clothing. North Carolina State University, Raleigh. 25 slides. (<http://ipm.ncsu.edu/srpsec/pp14.ppt>)

Toth, S. J., Jr. and W. G. Buhler. 2001. Pesticide Decontamination, Disposal and Spills. North Carolina State University, Raleigh. 30 slides. (<http://ipm.ncsu.edu/srpsec/pp20.ppt>)

Toth, S. J., Jr. and W. G. Buhler. 2001. Pesticide Formulations. North Carolina State University, Raleigh. 25 slides. (<http://ipm.ncsu.edu/srpsec/pp9.ppt>)

Toth, S. J., Jr. and W. G. Buhler. 2001. Pesticide Labels and Labeling. North Carolina State University, Raleigh. 22 slides. (<http://ipm.ncsu.edu/srpsec/pp8.ppt>)

Toth, S. J., Jr. and W. G. Buhler. 2001. Pesticide Transportation and Storage. North Carolina State University, Raleigh. 22 slides. (<http://ipm.ncsu.edu/srpsec/pp19.ppt>)

Toth, S. J., Jr. and W. G. Buhler. 2001. What are Pesticides? Why Use Pesticides?. North Carolina State University, Raleigh. 22 slides. (<http://ipm.ncsu.edu/srpsec/pp1.ppt>)

Toth, S. J., Jr. and W. G. Buhler. 2002. Pesticide Drift and Phytotoxicity. North Carolina State University, Raleigh. 23 slides. (<http://ipm.ncsu.edu/ncpmip/driftphyto.ppt>)

Toth, S. J., Jr. and W. G. Buhler. 2002. Pesticide Resistance. North Carolina State University, Raleigh. 12 slides. (<http://ipm.ncsu.edu/ncpmip/resist.ppt>)

Toth, S. J., Jr. and W. G. Buhler. 2002. Pesticide Recordkeeping. North Carolina State University, Raleigh. 10 slides. (<http://ipm.ncsu.edu/ncpmip/recordkeep.ppt>)

### Web Sites Developed and Maintained:

North Carolina Pest Management Information Program (<http://ipm.ncsu.edu/ncpmip>)

North Carolina Pesticide Safety Education Program (<http://ipm.ncsu.edu/pesticidesafety/>)

Pesticide Programs and Educational Resources, College of Agriculture and Life Sciences, North Carolina State University (<http://ipm.ncsu.edu/pesticides/>)

Southern Region Pesticide Safety Education Center (<http://ipm.ncsu.edu/srpsec/>)

Agricultural Crops Pest Management Information (<http://ipm.ncsu.edu/agdealers/>)

### **Establishment of an Advisory Committee**

An *Advisory Committee* for the North Carolina PMIP, composed of pest managers, producers, commodity groups and other stakeholders in North Carolina, was established in late 2002. The model for the advisory committee followed those successfully established at North Carolina State University for program areas such as Integrated Pest Management (IPM), Pesticide Safety Education, Pesticide Impact Assessment, and Horticultural Crop Production. The Principal Investigator communicated with Advisory Committee members (Appendix B) by electronic mail, telephone and surface mail to deliver information and receive feedback on issues related to pest management, pesticide regulation and the direction of the North Carolina Pest Management Information Program. These means of communication was chosen as members of the Advisory Committee generally prefer to avoid regularly-scheduled meetings. However, a meeting of the newly-created North Carolina Pest Management Information Program Advisory Committee was held in Raleigh on February 24, 2003 (Appendix C).

### **Production of Crop Profiles and Pest Management Strategic Plans**

The North Carolina PMIP facilitated and supported the production of crop profiles and pest management strategic plans for North Carolina agricultural commodities. At the beginning of the project, crop profiles for North Carolina apples, blueberries, cabbage, Christmas trees, corn (field and sweet), cotton, cucumbers, grapes, peaches, pecans, peppers, potatoes, poultry, residential and structural pests, sorghum, sweetpotatoes, tobacco (flue-cured and burley), tomatoes, and watermelons had been developed and were available on a searchable database at North Carolina State University (located on the Internet at: <http://pestdata.ncsu.edu/cropprofiles/cropprofiles.cfm>). Most of these crop profiles were published in a notebook in 1999 and distributed to stakeholders. However, these crop profiles were dated and in need of revision. During the project, these older crop profiles were revised and submitted to the Southern Region Pest Management Center (SRPMC) for approval and inclusion in the crop profile database. To date, the following North Carolina crop profiles have been revised and submitted to the SRPMC:

Sidebottom, J. R. 2003. Crop Profile for Christmas Trees in North Carolina (Mountains). North Carolina Cooperative Extension Service, North Carolina State University, Raleigh. 22 pp. Revised. (<http://www.ipmcenters.org/cropprofiles/docs/NCchristmastrees.html>)

Sutton, T. B., J. F. Walgenbach, W. E. Mitchem, J. G. Vandenberg, M. L. Parker, and S. J. Toth, Jr. (ed.). 2004. Crop Profile for Apples in North Carolina. North Carolina Cooperative Extension Service, North Carolina State University., Raleigh. 41 pp. Revised.

*(<http://www.ipmcenters.org/cropprofiles/docs/NCapples.html>)*

Cline, W. O., J. R. Meyer, D. W. Monks, K. A. Sorensen, K. M. Jennings, J. R. Ballington, S. Rooks, and S. J. Toth, Jr. (ed.). 2005. Crop Profile for Blueberries in North Carolina. North Carolina Cooperative Extension Service, North Carolina State University, Raleigh. 14 pp. Revised. *(<http://www.ipmcenters.org/cropprofiles/docs/NCblueberries.html>)*

Sorensen, K. A., D. W. Monks, M. A. Cubeta, and S. J. Toth, Jr. (ed.). 2005. Crop Profile for Cabbage in North Carolina. North Carolina Cooperative Extension Service, North Carolina State University, Raleigh. 14 pp. Revised. *(<http://www.ipmcenters.org/cropprofiles/docs/NCcabbage.html>)*

Van Duyn, J. W., R. W. Heiniger, S. R. Koenning, A. C. York, and S. J. Toth, Jr. (ed.). 2005. Crop Profile for Field Corn in North Carolina. North Carolina Cooperative Extension Service, North Carolina State University, Raleigh. 26 pp. Revised. *(<http://www.ipmcenters.org/cropprofiles/docs/NCfieldcorn.html>)*

Bachelor, J. S., K. L. Edmisten, S. R. Koenning, A. C. York, and S. J. Toth, Jr. (ed.). 2005. Crop Profile for Cotton in North Carolina. North Carolina Cooperative Extension Service, North Carolina State University, Raleigh. 28 pp. Revised. *(<http://www.ipmcenters.org/cropprofiles/docs/NCcotton.html>)*

Holmes, G. J., D. W. Monks, J. R. Schultheis, K. A. Sorensen, A. C. Thornton, and S. J. Toth, Jr. (ed.). 2005. Crop Profile for Cucumbers in North Carolina. North Carolina Cooperative Extension Service, North Carolina State University, Raleigh. 13 pp. Revised. *(<http://www.ipmcenters.org/cropprofiles/docs/NCcucumbers.html>)*

Cline, W. O., J. R. Meyer, D. W. Monks, W. E. Mitchem, E. B. Poling, K. A. Sorensen, T. B. Sutton and S. J. Toth, Jr. (ed.). 2005. Crop Profile for Grapes in North Carolina. North Carolina Cooperative Extension Service, North Carolina State University, Raleigh. 13 pp. Revised. *(<http://www.ipmcenters.org/cropprofiles/docs/NCgrapes.html>)*

Ritchie, D. F., M. L. Parker, K. A. Sorensen, J. R. Meyer, W. E. Mitchem and S. J. Toth, Jr. (ed.). 2005. Crop Profile for Peaches in North Carolina. North Carolina Cooperative Extension Service, North Carolina State University, Raleigh. 14 pp. Revised. *(<http://www.ipmcenters.org/cropprofiles/docs/NCpeaches.html>)*

Brandenburg, R. L., D. L. Jordan, B. B. Shew, J. W. Wilcut, and S. J. Toth, Jr. (ed.). 2005. Crop Profile for Peanuts in North Carolina. North Carolina Cooperative Extension Service, North Carolina State University, Raleigh. 33 pp. Revised. *(<http://www.ipmcenters.org/cropprofiles/docs/NCpeanuts.html>)*

Parker, M. L., W. E. Mitchem, K. A. Sorensen, B. Bunn, and S. J. Toth, Jr. (ed.). 2005. Crop Profile for Pecans in North Carolina. North Carolina Cooperative Extension Service, North Carolina State University, Raleigh. 11 pp. Revised. *(<http://www.ipmcenters.org/cropprofiles/docs/NCpecans.html>)*

Louws, F. J., D. W. Monks, K. A. Sorensen, D. C. Sanders, W. R. Jester, and S. J. Toth, Jr. (ed.). 2005. Crop Profile for Peppers in North Carolina. North Carolina Cooperative Extension Service, North Carolina State University, Raleigh. 14 pp. Revised.  
(<http://www.ipmcenters.org/cropprofiles/docs/NCpeppers.html>)

Stringham, S. M., D. W. Watson, D. K. Carver and S. J. Toth, Jr. (ed.). 2005. Crop Profile for Poultry in North Carolina. North Carolina Cooperative Extension Service, North Carolina State University, Raleigh. 12 pp. Revised.  
(<http://www.ipmcenters.org/cropprofiles/docs/NCpoultry.html>)

Waldvogel, M. G., C. Falco, and S. J. Toth, Jr. (ed.). 2005. Crop Profile for Residential and Industrial Pests in North Carolina. North Carolina Cooperative Extension Service, North Carolina State University, Raleigh. 9 pp. Revised.  
(<http://www.ipmcenters.org/cropprofiles/docs/NCresidentialandindustrial.html>)

Schultheis, J. R., K. A. Sorensen, D. W. Monks, G. J. Holmes, A. C. Thornton, and S. J. Toth, Jr. (ed.). 2005. Crop Profile for Sweetpotatoes in North Carolina. North Carolina Cooperative Extension Service, North Carolina State University, Raleigh. 14 pp. Revised.  
(<http://www.ipmcenters.org/cropprofiles/docs/NCsweetpotatoes.html>)

Walgenbach, J. F., K. L. Ivors, J. M. Davis, D. W. Monks, and S. J. Toth, Jr. (ed.). 2005. Crop Profile for Tomatoes in North Carolina. North Carolina Cooperative Extension Service, North Carolina State University, Raleigh. 25 pp. Revised.  
(<http://www.ipmcenters.org/cropprofiles/docs/NCtomatoes.html>)

Holmes, G. J., D. W. Monks, J. R. Schultheis, K. A. Sorensen, A. C. Thornton, and S. J. Toth, Jr. (ed.). 2005. Crop Profile for Watermelons in North Carolina. North Carolina Cooperative Extension Service, North Carolina State University, Raleigh. 12 pp. Revised.  
(<http://www.ipmcenters.org/cropprofiles/docs/NCwatermelons.html>)

New crop profiles for the following agricultural commodities in North Carolina were developed through this project:

Louws, F. J., J. Harrison, D. W. Monks, K. A. Sorensen, E. B. Poling, and S. J. Toth, Jr. (ed.). 2003. Crop Profile for Strawberries in North Carolina. North Carolina Cooperative Extension Service, North Carolina State University, Raleigh. 25 pp.  
(<http://www.ipmcenters.org/cropprofiles/docs/NCstrawberries.html>)

Toth, S. J., Jr., D. C. Sanders, K. A. Sorensen, D. W. Monks, and M. A. Cubeta. 2003. Crop Profile for Leafy Greens in North Carolina. North Carolina Cooperative Extension Service, North Carolina State University, Raleigh. 25 pp.  
(<http://www.ipmcenters.org/cropprofiles/docs/NCLeafyGreens.html>)

Stringham, S. M., D. W. Watson, and S. J. Toth, Jr. 2004. Crop Profile for Livestock in North Carolina. North Carolina Cooperative Extension Service, North Carolina State University, Raleigh. 17 pp. (<http://www.ipmcenters.org/cropprofiles/docs/NClivestock.html>)

Apperson, C. S., B. Engber, B. A. Harrison, N. H. Newton and S. J. Toth, Jr. (ed.). 2004. Crop Profile for Public Health in North Carolina. North Carolina Cooperative Extension Service, North Carolina State University, Raleigh. 9 pp.

(<http://www.ipmcenters.org/cropprofiles/docs/NCpublichealth.html>)

Bambara, S. B., R. Weisz, and S. J. Toth, Jr. (ed.). 2004. Crop Profile for Small Grains in North Carolina. North Carolina Cooperative Extension Service, North Carolina State University, Raleigh. 25 pp.

(<http://www.ipmcenters.org/cropprofiles/docs/NCsmallgrains.html>)

Brandenburg, R. L., L. P. Tredway, F. H. Yelverton, D. C. Bowman, A. H. Bruneau, R. J. Cooper, S. C. Hodges, L. T. Lucas, C. H. Peacock, and S. J. Toth, Jr. (ed.). 2004. Crop Profile for Turfgrass in North Carolina. North Carolina Cooperative Extension Service, North Carolina State University, Raleigh. 25 pp.

(<http://www.ipmcenters.org/cropprofiles/docs/NCturfgrass.html>)

Baker, J. R. S. B. Bambara, D. M. Benson, T. E. Bilderback, S. J. Toth, Jr., C. Y. Warfield, and B. E. Whipker. 2004. Crop Profile for Ornamentals in North Carolina. North Carolina Cooperative Extension Service, North Carolina State University, Raleigh. 30 pp.

(<http://www.ipmcenters.org/cropprofiles/docs/NCornamentals.html>)

Baker, J. R., S. R. Koenning, J. W. Van Duyn, A. C. York, and S. J. Toth, Jr. (ed.). 2005. Crop Profile for Soybeans in North Carolina. North Carolina Cooperative Extension Service, North Carolina State University, Raleigh. 37 pp.

(<http://www.ipmcenters.org/cropprofiles/docs/NCsoybeans.html>)

Development of pest management strategic plans for important agricultural commodities in North Carolina was a priority for the North Carolina PMIP. Pest management strategic plans were developed through working groups composed of university scientists, commodity groups, growers, environmental organizations and other stakeholders in North Carolina and the Southeastern U. S. Prior to 2002, Extension specialists and researchers at North Carolina State University and growers and commodity groups from North Carolina have participated in the development of pest management strategic plans for the following agricultural commodities: peaches, strawberries, sweetpotatoes, and brambles, blueberries and grapes. Completed pest management strategic plans are accessible through a searchable database at North Carolina State University (available on the Internet at: <http://pestdata.ncsu.edu/pmsp/index.cfm>). A North Carolina/Virginia Peanut Pest Management Strategic Plan Workshop was held on April 4, 2002 at the Tidewater Agricultural Research and Extension Center in Suffolk, Virginia, and was attended by Extension specialists, county agents, growers, commodity organization representatives, and other stakeholders from North Carolina and Virginia. A pest management strategic plan document was developed by the program leaders from the North Carolina and Virginia Pest Management Information Programs and was included in the pest management strategic plan database at North Carolina State University. Similarly, a North Carolina/Tennessee/Virginia Christmas Tree Pest Management Strategic Plan Workshop was held on June 17, 2003 at the Watauga County Extension Center in Boone, North Carolina, and was attended by Extension specialists, county agents, growers, commodity organization representatives, and other stakeholders from North Carolina, Tennessee and Virginia. A pest management strategic plan document was developed by the program leaders from the North Carolina, Tennessee and

Virginia Pest Management Information Programs and was included in the pest management strategic plan database. Finally, a Delaware/ North Carolina/Virginia Tomato Pest Management Strategic Plan Workshop was held on April 5, 2005 in Exmore, Virginia, and was attended by Extension specialists, county agents, growers, commodity organization representatives, and other stakeholders from Delaware, North Carolina and Virginia. A pest management strategic plan document is currently under development by the program leaders from the three states.

The following documents were published in the pest management strategic plan database:

Toth, S. J., Jr. and D. W. Monks, eds. 2001. Pest Management Strategic Plan for Sweetpotatoes in Alabama, Louisiana, Mississippi, New Jersey, North Carolina, and South Carolina. Summary of a Workshop held on May 23, 2000 in Raleigh, North Carolina 45 pp. (*This document has been replaced by a revised pest management strategic plan for sweetpotatoes in Alabama, Louisiana, Mississippi and North Carolina. It is available on the web at: <http://www.ipmcenters.org/pmsp/pdf/sesweetpotato.pdf>.*)

Toth, S. J., Jr., M. J. Weaver and T. N. Schooley. eds. 2002. Pest Management Strategic Plan for North Carolina/Virginia Peanuts. Summary of Workshop held on April 4, 2002 in Suffolk, Virginia. 69 pp. (<http://pestdata.ncsu.edu/pmsp/pdf/NCVApeanutpmsp.pdf>)

Toth, S. J., Jr., M. J. Weaver, J. R. Sidebottom, J. H. Owen, T. N. Schooley, and D. D. Hensley. eds. 2004. Pest Management Strategic Plan for Christmas Tree Production in North Carolina, Tennessee and Virginia. Summary of Workshop held on June 17, 2003 in Boone, North Carolina. 81 pp. (<http://pestdata.ncsu.edu/pmsp/pdf/NCTNVAChristmasTree.pdf>)

### **Strengthening Connections With Pest Management Programs & Stakeholders**

The Principal Investigator has worked to strengthen the connection between pest management programs (i.e., Pest Management Information, Integrated Pest Management, Interregional Project 4, Pesticide Safety Education Program) in North Carolina through continued service on the North Carolina Cooperative Extension Service's Integrated Pest Management Committee and Pesticide Education Advisory Committee. These committees serve an advisory function to the Integrated Pest Management and Pesticide Safety Education Programs at the University.

The Principal Investigator participated in the Pesticide Safety Education Program during the project period by: 1) providing instruction and developing materials for training commercial pesticide applicators seeking licensing/certification in the *Agricultural Pest Control - Plant* category in North Carolina; and 2) maintaining a web site for the North Carolina Pesticide Safety Education Program (<http://ipm.ncsu.edu/pesticidesafety/>) (Appendix D). The Principal Investigator also participated in the following commercial applicator/dealer training schools held in North Carolina: Elizabeth City (January 21, 2001), Newton (February 15, 2001), Kinston (April 11, 2001), Fletcher (May 3, 2001), Raleigh (May 29, 2001), Statesville (July 11, 2001), Raleigh (October 23, 2001), and Greenville (December 5, 2001), Newton (February 14, 2002), Plymouth (March 6, 2002), Kinston (April 9-10, 2002), Winston-Salem (April 24, 2002), Fletcher (May 9, 2002), Raleigh (June 4, 2002), Statesville (July 10, 2002), Raleigh (October 29, 2002), Greenville (December 4, 2002), Fletcher (May 8, 2003), Raleigh (June 24, 2003), Newton

(February 4, 2004), Kinston (April 6-7, 2004), Fletcher (May 6, 2004), Raleigh (June 28, 2004), and Raleigh (June 7, 2005).

The Principal Investigator participated in the Southern Region Pesticide Safety Education Center housed at North Carolina State University by: 1) assisting in the development and maintenance of a web site for the program (<http://ipm.ncsu.edu/srpsec/>) (Appendix E); and 2) attending training workshops conducted in Raleigh, North Carolina on March 19-21, 2001, October 8-10, 2001, March 18-19, 2002, October 7-8, 2002, September 29, 2003, and September 20, 2004.

The Principal Investigator promoted strong connections between the North Carolina PMIP and agricultural groups and other private stakeholders in North Carolina through participation in the following meetings, field days, news conferences, etc. within the state and region:

#### 2001:

- ☺ North Carolina Crop Protection School, Raleigh, January 4-5, 2001 (presented four displays).
- ☺ North Carolina Sweetpotato Commission Meeting, Wilson, January 18, 2001 (presented display).
- ☺ Stokes County Tobacco Growers Meeting, Danbury, February 8, 2001.
- ☺ Sandhills Turf and Ornamentals Conference, Troy, February 20, 2001 (45-minute presentation).
- ☺ Sampson County Cotton Growers Meeting, Clinton, February 22, 2001.
- ☺ Historic Oak View County Park Agricultural Museum, Raleigh, March 23, 2001 (presented display).
- ☺ Center for Integrated Pest Management Symposium, Raleigh, April 24-25, 2001.
- ☺ Plant Disease and Insect Clinic Teleconference, Raleigh, May 8, 2001.
- ☺ Tour of Produce Packing Facility for Israeli Arab Growers, Nash County, August 18, 2001 (arranged tour with staff of the USDA's Agricultural Research Service and Nash County Extension Service).
- ☺ Center for Integrated Pest Management Meeting, Raleigh, November 27-28, 2001.
- ☺ Joint Meeting of the American Phytopathological Society, Mycological Society of America, and Society of Nematologists, Salt Lake City, UT, August 26-27, 2001.
- ☺ Annual Meeting of the Entomological Society of America, San Diego, CA, December 9-11, 2001.

#### 2002:

- ☺ North Carolina Peach Grower's Meeting, Southern Pines, January 22, 2002.
- ☺ Sandhills Turf and Ornamentals Conference, Troy, February 13, 2002 (45-minute presentation).
- ☺ Center for Integrated Pest Management Meeting, Raleigh, May 10, 2002 (15-minute presentation).
- ☺ Plant Disease and Insect Clinic Teleconference, Raleigh, June 11, 2002.
- ☺ North Carolina Cooperative Extension Service's Future's Summit, Rocky Mount, June 25-27, 2002.
- ☺ International Integrated Pest Management (IPM) Conference, Toronto, Canada, March 25-26, 2002.
- ☺ Annual Meeting of the Entomological Society of America, Fort Lauderdale, Florida, Nov. 20, 2002.

2003:

- © North Carolina Blueberry Grower's Meeting, Clinton January 13, 2003.
- © Dealer Day 2003 (Agricultural Chemical Dealer Recertification Training) in Statesville on January 28, Fletcher on January 29, Plymouth on February 11, Smithfield on February 12, and Lumberton on February 13, 2003 (30-minute presentation).
- © North Carolina Cooperative Extension Service Annual Conference, Raleigh, March 3-5, 2003
- © Fourth National Integrated Pest Management Symposium/Workshop, Indianapolis, Indiana, April 8-10, 2003
- © Center for Integrated Pest Management Meeting, Raleigh, May 6-7, 2003 (20-minute presentation).
- © Strawberry Field Day at the Clayton Research Station, May 14, 2003 (15-minute presentation).
- © Plant Disease and Insect Clinic Teleconference, Raleigh, May 20, 2003.
- © Southern Crop Production Association State Issues Summit, Raleigh, October 14, 2003.
- © Southeast Strawberry Expo and Agent Training, Research Triangle Park, November 11, 2003.
- © Center for Integrated Pest Management Meeting, Raleigh, November 17-18, 2003.
- © North Carolina Crop Protection School, Raleigh, December 9, 2003 (presented two displays).
- © Southeastern Branch of the Entomological Society of America Annual Meeting, Baton Rouge, Louisiana, March 11, 2003 (presented display).
- © Annual Meeting of the Entomological Society of America, Cincinnati, Ohio, October 29, 2003 (presented display).

2004:

- © North Carolina Sweetpotato Commission Meeting, Wilson, January 15, 2004.
- © Chatham County Landscape Professionals Meeting, Pittsboro, March 2, 2004 (30-minute presentation).
- © Northeast District Extension Conference, Plymouth, March 29, 2004.
- © Cotton Incorporated Crop Management Seminar 2004, Robinsonville, Mississippi, November 9-10, 2004 (20-minute presentation).
- © North Carolina Vegetable Expo, Greenville, December 1, 2004 (15-minute presentation).
- © Southeastern Branch of the Entomological Society of America Annual Meeting, Charleston, South Carolina, February 16-18, 2004.
- © XXII International Congress of Entomology, Brisbane, Queensland, Australia, August 19-21, 2004.

2005:

- © Davie County Landscapers Meeting, Mocksville, February 11, 2005 (one-hour presentation).
- © Southeastern Methyl Bromide Alternatives Agent Training, Raleigh, February 23-24, 2005 (45-minute presentation).
- © North Carolina Cooperative Extension Service Annual Conference, Raleigh, February 28 - March 2, 2005.
- © Davidson County Landscapers Meeting, Lexington, March 10, 2005 (one-hour presentation).

## **Serving as Resource for Pest Management Information**

The North Carolina PMIP and Principal Investigator served as an information resource for the Southern Region Pest Management Center and the public and private sectors on current pest management practices, problems and issues affecting agricultural commodities produced in North Carolina. The North Carolina PMIP served as a contact point for the resources and expertise available through the on-campus faculty (Extension specialists and researchers) and field faculty (i.e., county Extension agents) at North Carolina State University. Since 2001, North Carolina State University research and Extension faculty were identified by the Principal Investigator in response to specific information requests from the Southern Region Pest Management Center (University of Florida), Southern Region Integrated Pest Management Center (North Carolina State University), USDA's Office of Pest Management Policy, and the U. S. Environmental Protection Agency. These scientists responded to the requests by providing timely pest management information.

In 2001, North Carolina State University research and Extension scientists responded to information requests from the USDA Office of Pest Management Policy, including Dr. Jill Sidebottom (Di-Syston use on Christmas trees) and Drs. David Ritchie, William Cline and Jack Bailey (thiophanate-methyl use on peaches, blueberries and peanuts). Pest management information requested by the Biological and Economic Analysis Division, Office of Pesticide Programs, U. S. Environmental Protection Agency was provided by Dr. Sterling Southern (tobacco pest management and a list of tobacco seed producers) and Dr. Wes Watson (insecticide use on poultry).

North Carolina State University research and Extension scientists responded to a number of information requests in 2002 and 2003, including carbaryl, dimethoate and ziram. In 2003, they also provided information for methyl bromide critical use exemption requests for cucurbits, peppers, strawberries (field, nursery) and tomatoes in North Carolina and other Southeastern states.

In 2004, North Carolina State University research and Extension scientists responded to information requests regarding pyrethrins, piperonyl butoxide, MGK-264, cycloate, malathion, ferbam, dicofol, captan, simazine and worker exposure as a result of cabbage thinning and harvesting. They also provided information for methyl bromide critical use exemption requests for cucurbits, peppers, strawberries (field, nursery) and tomatoes in North Carolina and other Southeastern states.

In 2005, North Carolina State University research and Extension scientists responded to information requests regarding 2,4-D, PCNB, propanil, napropamide, malathion, azinphos-methyl, EBDC fungicides, chlorsulfuron, dimethipin, streptomycin, oxytetracycline, ferbam, and mancozeb. Records of the responses are on the Southern Region Integrated Pest Management Center web site (<http://www.sripmc.org/requests/index.cfm?strUSDARegion=Southern>). They also provided information for methyl bromide critical use exemption requests for cucurbits, peppers, strawberries (field, nursery) and tomatoes in North Carolina and other Southeastern states.

## **Methyl Bromide Critical Use Exemptions**

In May 2002, the U. S. Environmental Protection Agency (EPA) solicited applications for critical use exemptions from the phase-out of methyl bromide in the United States. The exemptions permit the continued production and import of methyl bromide for use in agricultural production after the January 1, 2005 phase-out date established under an international agreement (*Montreal Protocol on Substances that Deplete the Ozone Layer*) and the Federal Clean Air Act. Exemptions are allowed only for those methyl bromide uses that have no technically or economically feasible alternatives. Applicants for these critical use exemptions were required to provide information for the EPA, U. S. Department of Agriculture (USDA) and other Federal agencies to determine whether specific uses of methyl bromide are *critical* and *no suitable alternatives exist*. The deadline for submitting the first round of critical use exemption applications to the EPA was September 9, 2002.

In June and July 2002, the Principal Investigator worked with Land-grant university scientists and State Department of Agriculture personnel in the Southeastern U. S. (except Florida where similar efforts were underway) to contact grower groups to identify the critical uses of methyl bromide. Methyl bromide uses that were identified as critical in Southeastern U. S. included strawberry fruit, strawberry nursery, tomato, pepper, melon, cucumber, and squash production.

A workshop was held in Raleigh, North Carolina on August 7-8, 2002 to complete and submit multi-state applications for strawberry fruit, strawberry nursery, tomato, pepper, melon, cucumber and squash production. Extension and research scientists, county Extension agents, state regulatory personnel, commodity organization representatives, growers and other interested parties from Alabama, Arkansas, Georgia, North Carolina, South Carolina, Tennessee and Virginia were invited to the workshop, and more than 25 individuals participated. Representatives from the major fumigant companies were invited and provided information on methyl bromide usage in the respective states. Christine Augustyniak, Office of Pesticide Programs, EPA, and Bureson Smith, Special Assistant, Pest Management Policy, USDA, attended the workshop and provided valuable direction and advice on the completion of the critical use exemption applications. Nancy Kokalis-Burelle, USDA/ARS, U. S. Horticultural Research Laboratory, Fort Pierce, Florida, also provided input at the workshop. Barclay Poling, Department of Horticultural Science, and Steve Toth, Department of Entomology, North Carolina State University, served as facilitators for the workshop. Significant progress toward the completion of the multi-state applications was achieved at the workshop; however, much work remained following the workshop. Barclay Poling and Steve Toth worked with workshop participants in the cooperating states to gather research data from university scientists in participating states, complete the application forms, and submit the applications to the EPA by the September 9 deadline. Barclay Poling, David Monks, Doug Sanders, Jonathan Schultheis, Gina Fernandez and Bill Jester, Department of Horticultural Science, and Frank Louws and Gerald Holmes, Department of Plant Pathology, North Carolina State University, provided much of the research data included in the multi-state applications. Methyl bromide critical use exemption applications from the Southeastern Strawberry Consortium (representing over 700 farmers and 4,040 acres of strawberry fruit production in Alabama, Arkansas, Georgia, North Carolina, South Carolina, Texas and Virginia, and representing 7 farmers and 156 acres of strawberry nursery production in North Carolina and Tennessee), the Southeastern Tomato

Consortium (representing over 100 farmers and 15,000 acres of tomatoes in Alabama, Arkansas, North Carolina, South Carolina and Tennessee), the Southeastern Pepper Consortium (representing 15 farmers and 1,850 acres of tomatoes in Alabama, Arkansas, North Carolina, South Carolina, Tennessee and Virginia), and the Southeastern Cucurbit Consortium (representing over 300 farmers and 12,500 acres of melons, cucumbers and squash production in Alabama, Arkansas, North Carolina, South Carolina, Tennessee and Virginia) were completed and submitted to the EPA by the September 9, 2002 deadline.

The USDA, EPA, and U. S. State Department collectively submitted a request to the International Committee for exemption of the critical uses of methyl bromide in the U. S. This request included the methyl bromide critical use exemptions for strawberry, pepper, tomato, melon, cucumber and squash production in the Southeastern U. S. Applications for methyl bromide critical use exemptions for 2006 and 2007 were completed and submitted by the Southeastern Consortia (which grew to include Kentucky, Louisiana and additional states) in 2003 and 2004 for inclusion in ongoing U. S. requests to the International Committee. Applications for 2007 through 2009 are currently being completed and will be submitted by the August 8, 2005 deadline. Mississippi will be added to the Southeastern Consortia in the current year's application.

The first round of requests by the U. S. resulted in 19.7 million pounds of methyl bromide allowed for critical uses in 2005, including for strawberry, pepper, tomato, melon, cucumber and squash production in the Southeast. Additional methyl bromide has been authorized for these critical uses in the 2006 calendar year (EPA 2005).

These and future decisions regarding methyl bromide critical use exemptions represent a balance of the needs of agricultural producers to manage damaging pests and the need to reduce the potential environmentally-damaging effects of methyl bromide.

Considerable research into alternatives to methyl bromide in managing weeds and plant diseases in agricultural crops has been accomplished in the past ten years. The need for and subsequent usage of methyl bromide on agricultural crops has dramatically declined over the ten-year period. However, economically and technically-feasible alternatives for methyl bromide have not been developed and/or successfully transferred to growers of certain small fruit and vegetables in the Southeastern U. S. Therefore, it is imperative that methyl bromide continues to be available to these growers until suitable alternatives are available and successfully implemented by the growers.

## Literature Cited

- Toth, S. J., Jr. 1991. A Survey of Pesticide Use on Apples, Cucumbers and Peanuts in North Carolina. Data Report to the USDA National Agricultural Pesticide Impact Assessment Program. N. C. Cooperative Extension Service, Raleigh. 256 pp. June 1991.
- Toth, S. J., Jr. 1992. A Survey of Pesticide Use on Sweetpotatoes and Irish Potatoes in North Carolina. Data Report to the USDA National Agricultural Pesticide Impact Assessment Program. N. C. Cooperative Extension Service, Raleigh. 136 pp. July 1992.
- Toth, S. J., Jr. 1993. A Survey of Pesticide Use on Cotton in North Carolina. Data Report to the USDA National Agricultural Pesticide Impact Assessment Program. N. C. Cooperative Extension Service, Raleigh. 48 pp. October 1993.
- Toth, S. J., Jr. 1995. A Survey of Pesticide Use on Poultry and Tomatoes in North Carolina. Part I: Tomatoes. Data Report to the USDA National Agricultural Pesticide Impact Assessment Program. N. C. Cooperative Extension Service, Raleigh. 42 pp. March 1995.
- Toth, S. J., Jr. 1996a. A Survey of Pesticide Use on Poultry and Tomatoes in North Carolina. Part II: Poultry. Data Report to the USDA National Agricultural Pesticide Impact Assessment Program. N. C. Cooperative Extension Service, Raleigh. 54 pp. June 1996.
- Toth, S. J., Jr. 1996b. A Survey of Pesticide Use on Potatoes and Christmas Trees in North Carolina. Part I: Potatoes. Data Report to the USDA National Agricultural Pesticide Impact Assessment Program. N. C. Cooperative Extension Service, Raleigh. 38 pp. June 1996.
- Toth, S. J., Jr. 1997a. A Survey of Pesticide Use on Potatoes and Christmas Trees in North Carolina. Part II. Christmas Trees. Data Report to the USDA National Agricultural Pesticide Impact Assessment Program. N. C. Cooperative Extension Service. 102 pp. June 1997.
- Toth, S. J., Jr. 1997b. Sweetpotato Pesticide Use Survey in North Carolina. Data Report to the Southern Region Pesticide Impact Assessment Program. N. C. Cooperative Extension Service, Raleigh. 92 pp. December 1997.
- Toth, S. J., Jr. 1998. Peanut Pesticide Use Survey in North Carolina. Data Report to the USDA National Agricultural Pesticide Impact Assessment Program. North Carolina Cooperative Extension Service, Raleigh. 83 pp. March 1998.
- Toth, S. J., Jr., P. S. Southern and T. B. Sutton, eds. 1999. Crop Profiles for North Carolina Agriculture: Management of Insects, Diseases, Weeds, and Other Crop Pests. AG-598. North Carolina Cooperative Extension Service, Raleigh. November 1999.
- U. S. Environmental Protection Agency. 2005. U.S. Growers Granted Methyl Bromide for 2006 Critical Uses As Annual Requests Decline. EPA News Advisory. July 2005.

# Appendix A

## North Carolina Pest Management Information Program Web Site (<http://ipm.ncsu.edu/ncpmip/>)

The screenshot shows a Netscape browser window displaying the North Carolina Pest Management Information Program website. The browser's address bar shows the URL <http://ipm.ncsu.edu/ncpmip/>. The website has a red header with the text "North Carolina Pest Management Information Program" and "NC STATE UNIVERSITY". Below the header, there is a navigation menu on the left with links such as "Home", "About Us", "Services", "Publications", "IPM Newsletters", and "Contact Us". The main content area features a section titled "The North Carolina Component of the Southern Region IPM Center" with a logo for the Southern IPM Center and a paragraph of text. Below this, there are two columns of links: "What's New" and "Pest Management / Pesticide Links". The "What's New" column lists several recent updates, including new crop profiles for Landscapes, Grapes, and Tomatoes, and new issues of North Carolina Pest News. The "Pest Management / Pesticide Links" column lists various resources, including Agricultural Crops Pest Management Information, North Carolina Agricultural Statistics, and the National Pesticide Information Center. At the bottom of the page, there is a footer with the address "North Carolina Pest Management Information Program, Box 2613, North Carolina State University, Raleigh, NC 27695" and a small disclaimer about funding and the date of the page last modified (July 28, 2003).



## Appendix B

### Members of Advisory Committee

Name of Committee Member	Area(s) Representing
Rick Brandenburg	insect management, peanuts, turf
Turner Sutton	disease management, tree fruits
David Monks	weed management, vegetables/small fruits, IR-4 Program
Wayne Buhler	North Carolina Pesticide Safety Education Program
Mike Linker	North Carolina Integrated Pest Management Program
Ron Stinner	Center for Integrated Pest Management
Lee Davis	North Carolina Dept. of Agriculture & Consumer Services (Pesticide Section)
Jimo Ibrahim	North Carolina A&T State University, minority farmers
Stan Winslow	agricultural consultant
Mitch Peele	North Carolina Farm Bureau (Public Policy Group)
Sam Uzzell	Pitt County Extension Agent, field crops
Al Cooke	Chatham County Extension Agent, horticultural crops
Randall Patterson	tomato grower; past president of N. C. Tomato Growers Association
Mitchell Wrenn	strawberry and vegetable grower; past president of N. C. Strawberry Association
Nolan Newton	North Carolina Department of Environment & Natural Resources (Public Health Pest Management)
Nancy Creamer	Director of Environmental Farming Systems (NC State University, NC A&T State University and NCDA&CS); sustainable agriculture, organic production
Tom Hunt	Crop Protection Association of North Carolina
Helmuth Rogg	international agriculture, pest management
Roger Crickenberger	Administration, N. C. Cooperative Extension Service



## Appendix C

### Agenda of Advisory Committee Meeting on February 24, 2003

Partners I Building, Centennial Campus,  
North Carolina State University, Raleigh, North Carolina

- 10:00 a.m. Coffee, Introductions, Purpose of Committee and Agenda *Steve Toth*
- 10:30 a.m. Comments from Southern Region Pest Management Center Coordinator  
Questions and Discussion *Norm Nesheim*
- Introduction of North Carolina Pest Management Information Program
- 10:45 a.m. The North Carolina Pest Management Information Program: History, Objectives and Activities  
Questions and Discussion *Steve Toth*
- Accomplishments of North Carolina Pest Management Information Program
- 11:30 a.m. Methyl Bromide Critical Use Exemptions for Small Fruit and Vegetable Crops in the Southeastern U. S.  
Questions and Discussion *Barclay Poling*
- 12:00 noon LUNCH
- 1:00 p.m. Ag Dealers Survey, Dealer Day & Ag Dealers Web Page (Cooperation with Pesticide Safety Education Program)  
Questions and Discussion *Wayne Buhler*
- 1:30 p.m. Crop Profiles and Pest Management Strategic Plans (Cooperation with Center for IPM)  
Questions and Discussion *Ron Stinner*
- Future Activities of North Carolina Pest Management Information Program
- 2:00 p.m. Plans for the Program in the Third Year of Funding  
Questions and Discussion *Steve Toth*
- 2:15 p.m. Advisory Committee Perspectives of Current and Future Activities, Issues, and Priorities of the Program *Steve Toth (Facilitator)*
- 3:00 p.m. Adjourn

### Members Attending Advisory Committee Meeting on February 24, 2003

<u>Name</u>	<u>Affiliation</u>
Wayne Buhler	Department of Horticultural Science, North Carolina State University
Al Cooke	Chatham County Extension Agent
Roger Crickenberger	Administration, North Carolina Cooperative Extension Service
Lee Davis	North Carolina Department of Agriculture and Consumer Services
Tom Hunt	Crop Protection Association of North Carolina
Jimo Ibrahim	North Carolina A&T State University
Mike Linker	Department of Crop Science, North Carolina State University
David Monks	Department of Horticultural Science, North Carolina State University
Norn Nesheim	Southern Region Pest Management Center, University of Florida
Nolan Newton	North Carolina Department of Environment and Natural Resources
Randall Patterson	Tomato Grower, China Grove, North Carolina
Ron Stinner	Center for Integrated Pest Management, North Carolina State University
Turner Sutton	Department of Plant Pathology, North Carolina State University
Steve Toth	Department of Entomology, North Carolina State University
Sam Uzzell	Pitt County Extension Agent
Stan Winslow	Agricultural Consultant, Camden, North Carolina

# Appendix D

## North Carolina Pesticide Safety Education Program Web Site (<http://ipm.ncsu.edu/pesticidesafety/>)

The screenshot shows a Netscape browser window displaying the website for the North Carolina Pesticide Safety Education Program. The browser's address bar shows the URL <http://ipm.ncsu.edu/pesticidesafety/>. The website has a red header with the text "North Carolina Pesticide Safety Education Program" and the NC State University logo. Below the header, there is a navigation menu with "Main Menu" and "Program Personnel" sections. The "Main Menu" section includes links for "Training Schools (Fall 2002)", "Coordinator's Corner", and "Contact Us". The "Program Personnel" section lists "Seminarians", "Integrated Pest Management", "Pest Management Information Program", "NSF Center for IPM", "Southern Region IPM Center", and "Southern Region Pesticide Safety Education Center". The main content area features a paragraph about the program's mission and a photograph of a person in a field. Below this, there are two columns of links: "Information for Pesticide Applicators/Dealers" and "Pesticide Post Management Information". The footer contains the address "North Carolina Pesticide Safety Education Program, Box 7605, North Carolina State University, Raleigh, NC 27695" and a small text "Web page last modified by [unreadable] on July 10, 2002".

North Carolina Pesticide Safety Education Program Home Page - Netscape

http://ipm.ncsu.edu/pesticidesafety/

NC STATE UNIVERSITY

### North Carolina Pesticide Safety Education Program

College of Agriculture & Life Sciences | NC Cooperative Extension Service | Department of Horticultural Science


#### Main Menu

- Program Personnel
- Training Schools (Fall 2002)
- Coordinator's Corner
- Contact Us

#### Related Programs at NC State

- Seminarians
- Integrated Pest Management
- Pest Management Information Program
- NSF Center for IPM
- Southern Region IPM Center
- Southern Region Pesticide Safety Education Center

The North Carolina Pesticide Safety Education Program's mission is to promote the responsible use of pesticides through educational resources and training. The program is supported by North Carolina Cooperative Extension Service Specialists and Agents. Training covers a broad range of human safety and environmental issues for a state-wide target audience of approximately 21,000 private applicators, 14,000 commercial applicators, and 700 pesticide dealers. Cooperating State and Federal Agencies include the North Carolina Department of Agriculture & Consumer Services, the United States Department of Agriculture, and the United States Environmental Protection Agency.



#### Information for Pesticide Applicators/Dealers

- [Licensing & Certification](#)
- [Training Schools \(Fall 2002\)](#)
- [License Exam Schedule](#)
- [Recertification Opportunities](#)
- [Pesticide Container Recycling](#)
- [Pesticide Disposal](#)
- [Recordkeeping Forms](#)
- [Structural Pest Control](#)
- [Pesticide Dealer Survey Results](#)

#### Pesticide Post Management Information

- [Carolina Pesticide Center](#)
- [Extension Toxicology Network \(ExtToxNet\)](#)
- [National Pesticide Information Center](#)
- [NC/RI CAUS Pesticide Programs & Educational Resources](#)
- [Pesticide Roadmap \(newsletter\)](#)
- [Agricultural Crops Pest Management Information](#)
- [North Carolina Integrated Pest Management Information](#)
- [North Carolina Pest News \(newsletter\)](#)
- [Pest Management Profiles \(Crop Profiles\)](#)

North Carolina Pesticide Safety Education Program, Box 7605, North Carolina State University, Raleigh, NC 27695

Web page last modified by [unreadable] on July 10, 2002



# Appendix E

## Southern Region Pesticide Safety Education Center Web Site (<http://ipm.ncsu.edu/srpsec/>)

