

G. MULTI-STATE RESEARCH

In 1977, Norman H. Dill and Arthur O. Tucker established a herbarium at Delaware State University (then College). In 1980, the University of Delaware's Department of Plant Science formally transferred the herbarium of the Society of Natural History of Delaware to Delaware State University. On June 12, 1982, the Delaware State University herbarium was formally dedicated to Claude E. Phillips (1900-1981). Claude was the most active and best known field botanist on the Delmarva Peninsula for much of the latter half of the twentieth century. He authored 8 books on plant identification and conservation, including *Wildflowers of Delaware and the Eastern Shore* (1978).

In 1996-1997, Kenneth Bell, Dean of the School of Agriculture and Related Sciences of Delaware State University, and William DeLauder, President of DSU, obtained funding from the U.S.D.A. and the Longwood Foundation to construct a new herbarium building and equip it with many new cabinets. The new herbarium was dedicated on May 11, 2000. On May 13, 2000, a formal symposium was held with speakers, musical presentations, gourmet herb luncheon, and exhibits. With its bright, pleasing, and inviting interior, the new herbarium building successfully achieves budgetary, aesthetic, and utilitarian balance. It is a place where both the public and research scientists feel welcome.

Funding for personnel and equipment awaited the encouragement and expertise of Dean Bell, who procured support from the Natural Resources Conservation Service of U.S.D.A. This funding allowed the search and hiring of a curator and educator (who began work in mid-June 2001 and mid-February 2001, respectively), as well as the employment of students and contractual workers. Funding also provided for the ordering of essential equipment, supplies, and books.

The Claude E. Phillips Herbarium contains specimens of vascular plants, mosses, lichens, fungi, algae, and fossil plants. The vascular plant collection is the most extensive, with about 110,000 specimens from around the world that date back to 1799. The collection of books (about 2500 volumes dating back to 1737), periodicals (numerous issues of 73 different serials), and photographic slides covers a diversity of botanical subjects. Not only is it the only public herbarium on the Delmarva Peninsula, it is the largest herbarium at a Historically Black College or University by at least 10-fold. It is the only cooperative herbarium with signed memoranda of understanding with various federal, state, and private institutions (Natural Resources Conservation Service of U.S.D.A., Delaware Dept. of Natural Resources & Environmental Control, Delaware Dept. of Agriculture, Delaware Nature Society, Mt. Cuba Center for the Study of Piedmont Flora, University of Delaware, and Wesley College). Formal and informal links also exist with The Society of Natural History of Delaware, The Herb Society of America, International Herb Association, and Delaware Herb Growers & Marketers Association. The staff of the Claude E. Phillips herbarium consists of Co-director Arthur O. Tucker, Co-director Thompson D. Pizzolato (University of Delaware), Curator Robert F. C. Naczi, and Educator Susan E. Yost.

The mission of the Claude E. Phillips Herbarium is documentation, research, and education on wild and cultivated flora, particularly of the Delmarva Peninsula. The herbarium seeks to

maintain, provide access to, and augment its extensive collection of vascular plants, mosses, lichens, fungi, algae, and fossil plants. In addition, the herbarium supports research, teaching, and extension activities in such fields as systematics, economic botany, conservation, and biodiversity studies.

The staff of the herbarium has served the public, DSU community, and scientific community in many ways. In 2001 alone, 27 groups and 466 individuals learned about our facilities and programs by participating in tours of the Claude E. Phillips Herbarium. Six students received in-herbarium employment and training in herbarium practices and techniques (over 2,000 hours worked in 2001). Herbarium staff taught 5 classes or workshops using herbarium resources. Fifteen scientists and members of the public from near (e.g. Natural Resources Conservation Service office in Dover, Delaware Geologic Survey office in Newark) and far (e.g. U. S. Geologic Survey office in Florida, editorial office of Australian Wild Herb Bulletin) visited to consult herbarium specimens and literature. Botanical identification, through the Claude E. Phillips Herbarium and The Herb Research Center, and essential oil analyses by gas-chromatography/mass-spectroscopy are provided as support for the public, herb farmers, and members of the scientific community. In 2000, herbarium staff received and answered 23 requests from the public, personnel at state agencies (e.g. Delaware Dept. of Agriculture, Delaware Dept. of Transportation), and members of the larger scientific community for identification of 27 specimens of plants. In 2001, herbarium staff received and answered 21 requests for identification of 69 specimens. Seven individuals ranging from members of the public to U.S.D.A. personnel requested and received information from labels of herbarium specimens during 2000-2001. During 2000-2001, botanists from 5 different universities requested and received loans of 44 specimens from the herbarium for use in various research projects.

The University of Delaware participates in numerous multi-state research projects in support of our State Plan of Work. Highlighted here is the impact of one of these projects: NE 138, Epidemiology and Control of Emerging Strains of Poultry Respiratory Disease Agents.

NE 138 addresses respiratory diseases that have historically caused major economic losses in the poultry industry. Recent restrictions on the poultry industry limiting the use of antibiotics to control these diseases has led to increased pressure on producers to rely more heavily on other methods of disease control, such as the use of vaccines and the emerging technology of antivirals. To support this transition, molecular and conventional research is needed to develop technologies to help identify, diagnose, and control emerging respiratory pathogens.

This multi-state research project has perfected molecular techniques (PCR) for immediate identification and quantification for six respiratory disease agents in poultry. Scientists have sorted out the strain relationships for the Infectious Bursal Disease virus, and in the process, identified heretofore unknown reservoirs of infection that are bringing about epidemics in flocks. The project has also constructed a recombinant DNA vaccine for the fowl poxvirus, giving mild symptoms and protection from other strains of this virus. Finally, through the project's research activities, the poultry industry benefits directly from the monitoring of respiratory pathogen outbreaks.

The bottom line impact of this NE-138 includes:

- Diminished production losses from poultry respiratory diseases, and increased profits for the poultry industry.
- Reduced consumer risks through poultry products free of otherwise necessary antibiotics.

Participants in NE-138 represent experiment stations in CT-S, DE, MD, NY-C, AL, GA, IL, NC, OH, and TX, as well as scientist from USDA-ARS, St. Jude Children's Research Hospital, and Department of Virology and Molecular Biology, TN.

In existence for only two years, the plum pox NE-501 group has done a great deal to blunt the impact of a very damaging disease of stone fruits, and the group still holds strong prospects of eliminating the disease from the U.S. Their strategy began early (November, '99) with an inclusive team-building effort uniting LGUs (research and extension), State Depts. of Agriculture, APHIS, ARS, and Industry. By December of 1999, this group had brought together experts from Europe (sources of the virus were earlier identified to be Europe, Chile or Canada), with representatives of all of the above-mentioned organizations to develop an eradication strategy for the Plum Pox virus. They shared all available information, and planned a strategy for future efforts. That meeting had more than 100 attendees. The meeting was filmed, and tapes were made available on VHS and web-based video. By January, PSU and APHIS had both published informative brochures on the subject, and web pages were on line (<http://sharka.cas.psu.edu/>). In April, 2000 a workshop was held that brought together the key regulatory, research, and extension personnel that were being deployed to manage the disease. Agricultural economists met with government regulators and OMB staff and the Pennsylvania Department of Agriculture to begin the development of what was to become the first-ever indemnification plan that included comprehensive reimbursement for current and future losses (It could be a model for future invasive pests).

During the summer, they monitored for spread, perfected sampling and detection techniques, and monitored for presence in indigenous species other than *Prunus*. The education programs conducted in December and April and continuing through the present, enlightened the Canadians to the possibility of plum pox (sharka) and they (the Canadians) found extensive infestations on the Niagara peninsula.

In October, the NE-501 group held a Plum Pox forum attended by about 120 registrants. This group included registrants from 18 states and Canada. These people represented all of the U.S. participants defined earlier, plus at least three Canadian organizations. Since the fall meeting, the group has continued to augment the above-mentioned web page with new publications, film clips, Canadian information, indemnification information, etc. The page averages a little less than 1,000 page views per month since it has been up. An additional on-line tool has been developed for diagnosis of plum pox and other diseases of stone fruits. It is available (pre release) by visiting: <http://www.cas.psu.edu/docs/Publications/ppvbooklet/default.htm>. Plum pox information has also been incorporated into the tree fruit production guide: <http://tfpg.cas.psu.edu/>. The continuing education through print media as well as web-based information is a lynchpin in the protection and early recognition of new entries of this virus into

the U.S. from Europe, Chile, or Canada. Further, NE-501 is an example for combating other viruses that may enter our perennial crops.

NE-501 is a multi-functional group that is exemplary in its scope, encompassing governmental, industry, and international organizations, as well as both research and extension. It is accomplishing a strong educational role as well. Even though it is destined for replacement at the end of this fiscal year to a multi-state project, and has only been in existence for 14 months, it has had a huge impact, and demonstrates what can be done in a rapid response mode, to bring together multiple organizations to solve a problem.

The Bottom Line Impacts of NE-501 include:

- Meetings and information sharing with international scientists have helped develop a strategy to eradicate PPV in the affected areas. GIS mapping techniques helped track the exact locations of infected trees and gave insight to researches on how the virus spread through the orchard.
- Fruit growers all over the country are becoming educated about and trained on identification and control of PPV in orchards and nurseries.
- 850 acres of infected peaches, plums, and nectarines were eradicated. The project has effectively contained the PPV from spreading into other counties and neighboring states.
- The USDA has created the first indemnification program for reimbursing fruit growers of their losses, current and future, due to PPV eradication program. The project gathered the information that USDA accountants reviewed and presented to the Office of Budget and Management.
- NE-501 set a good example on how a rapid response project could be an effective vehicle in addressing an emergency. This project also serves as a lesson on how to deal with invasive pests in the future.

Participants in NE-501 represent experiment stations in DE, MA, MD, NJ, NYC, NYG, PA, AL, AR, CA, FL, GA, MI, MO, NC, OH, SC, TN, and WA, and scientists from USDA-ARS/Maryland and USDA-ARS/West Virginia.