

## **“USDA NRCS Technology News” ~ July/August 2001**

United States Department of Agriculture  
Natural Resources Conservation Service  
Science and Technology

**“USDA NRCS *Technology News*”** is an electronic information piece provided by Science and Technology. It is designed to deliver pertinent information to our customers about new technology, products, and services available from the Soil Survey and Resource Assessment and the Science and Technology deputy areas. **“USDA NRCS *Technology News*”** is in a format that is available to all NRCS field staff.

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### **Features in this issue include:**

#### **MESSAGE FROM THE DEPUTY CHIEFS**

Lawrence E. Clark and Maurice J. Mausbach

#### **CONSERVATIONIST’S CORNER**

M. Denise Doetzer, State Conservationist, Virginia

#### **NEW PRODUCTS AND SERVICES**

Access More Information Through PLANTS Site  
Arizona Cottontop Released for Commercial Production  
Landscape Ecology Technical Series Announced  
Versatile Native Plant Serves Hawaii’s Restoration Needs

#### **TECHNOLOGICAL ADVANCES**

Cover Crop Seeding Possible at Corn Planting  
New Laboratory Information Management System Implemented

#### **TECHNOLOGY TRANSFER**

News for Your Home Page or Local and State Newsletters  
On-line Drought Monitor Updated Weekly  
Soils Maintains Strong On-line Presence

#### **TRAINING**

Water Quality Curriculum Now Ready for Field Staff Training

#### **HONORS**

SSI Presents “Locally Led” Award to Michigan Districts  
VanKlaveren Selected to Hall of Fame

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## MESSAGE FROM THE DEPUTY CHIEFS

Lawrence E. Clark and Maurice J. Mausbach

The dramatic specter of burning carcasses in the bucolic British countryside has been a sobering sight for everyone, particularly for those of us who are closely involved with agriculture. We wonder how such a thing could happen. We search for explanations—not only to help us cope with the tragedy, but also to avoid the same experience in the United States. Possible causes of the epidemic have been the topic of numerous newspaper and magazine articles, television programs, and Internet debates. Foot and mouth disease has been linked to high-technology farming practices, changes in the structure of agriculture, and global marketing of agricultural products. In many of these discussions, technology is viewed as the offender.

Foot and mouth disease, or FMD as it is known in Britain, is not a new disease. It first appeared in Britain in 1839, but it was largely ignored because of its mild symptoms. Since then scientists have developed a greater understanding of the nature and movement of the disease, as well as a vaccine for treating it. The history of the disease has shown that treatment approaches--vaccination, quarantine, or destruction of animals--can be extremely controversial, affecting politicians, scientists, farmers, veterinarians, and the consumer.(1)

Possible causes have been proposed by Tim Lang, professor of food and policy at Thames Valley University in Great Britain. Commenting in the British periodical, *Financial Times* (2), he states, "I believe we're seeing the downside of the intensification of the food supply chain over the last 18 to 20 years. It didn't cause the foot and mouth virus, but it has increased the conditions under which it is likely to spread." He continues, "The fact that animals and food are often transported long distances across a border-free European Union means any problems can spread rapidly."

The same *Financial Times* article reports that the new German minister for food, farming, and consumer protection has suggested moving away from mass factory farming to encouraging smaller-scale organic farming. Currently, the Common Agricultural Policy, supported by Germany and France, offers farmers subsidies that support intensive farms and agricultural enterprises. The assumption is that, with smaller, organic farms rather than large, high technology farms, FMD would not have become a problem.

On the other hand, a *Washington Post* writer warns against using the FMD epidemic as a means of attacking modern agricultural practices. Stephen Budiansky, a correspondent for the *Atlantic Monthly*, agrees, "There is some truth to the notion that the demands of globally oriented agriculture have hastened the spread of foot and mouth disease."(3) He maintains, however, that modern agriculture has benefited greatly from new technologies and warns against assuming that a return to small-scale agriculture will solve all of our problems. Mr. Budiansky cites such new technologies as the chemical herbicides that facilitate no-till farming and the resulting benefits to water quality, as well as the advent of high-intensity, high-yield agriculture that preserves open space for alternative uses such as wildlife and open space. He concludes, "The idea that whatever is 'natural' is also

automatically healthy for people and the environment is a seductive one, but farmers have always known that nature is both good and bad. There are undeniable reasons to be careful and judicious about the adoption of new technologies. But a purely natural alternative would not have prevented the foot and mouth outbreak in Britain, nor will it achieve the utopia that is claimed for it." (4)

Dennis Avery of the Hudson Institute reminds us that FMD has been known in Europe for centuries, during the time when all farming was organic, and that the first farm to which the current outbreak was traced was a small pig farm in Northumberland. (5) Dr. Avery maintains, "Our few victories to date against viruses (annual flu vaccines, virus-resistant crops) have come with the aid of biotechnology." (6) The FMD catastrophe exemplifies the emerging upheaval in agriculture posed by the advent of new technologies. Will they be helpful or harmful? Will they benefit certain groups of farmers at the expense of others? Will they be harmful to the environment? The cause and effect relationships are complex and they do not necessarily apply to all technologies or even categories of technologies. Technology has been referred to as a "double-edged sword" that is capable of both doing and undoing damage to environmental quality. (7) For example, the use of antibiotics in animal feed has a positive effect on animal growth and feed efficiency but may, in the long term, impact resistance of animals to certain diseases. Therefore, it is important for us to continually evaluate and monitor the environmental impacts of new technologies.

Just as the various arguments that attempt to explain the spread of FMD must be carefully weighed, arguments supporting or criticizing new agricultural technologies for their potential impacts on animals, the environment, farmers, ranchers, and others must also be thoroughly analyzed. We can be sure that the analyses will not be simple, nor will they be without controversy. Our primary concern is to do our part to assure that American agriculture remains free of FMD and other serious diseases.

The Natural Resources Conservation Service response to the current FMD crisis is to implement measures that will assure the biosecurity of American agriculture. In a forthcoming National Bulletin, we will be issuing technical and procedural guidance to field staffs regarding field clothing, disinfection methods, contact with farm buildings and equipment, and communication with farmers and ranchers. Our goal is to assure that we do not inadvertently carry disease organisms from one farm to another. It is clear that a disaster occurring thousands of miles away in Great Britain has had its impacts, not only on world agricultural markets, but also on the way we operate in the field to provide technical assistance to farmers and ranchers.

1. Woods, Abigail, "Foot and Mouth Disease in Britain: The History," The University of Manchester, Press Release, February 22, 2001
2. Mann, Michael, "A Sick Industry," Financial Times, February 27, 2001
3. Budiansky, Stephen, "They're Serving up a Pastoral Fantasy," Washington Post, April 15, 2001
4. Ibid.

5. Avery, Dennis, "Opinion: the Politics of Foot and Mouth Disease in Europe," The Bridge News Forum, March 9, 2001
  6. Ibid.
  7. Austin, David, and Molly K. Macauley, "Cutting Through Environmental Issues: Technology as a Double-Edged Sword," The Brookings Review, Winter 2001
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## **CONSERVATIONIST'S CORNER**

M. Denise Doetzer, State Conservationist, Virginia

Our resource issues are becoming more complex in Virginia. Decision-makers need sound scientific data for making wise land use decisions. By working with the Centers and Institutes we have strengthened our partnerships with research institutions and universities. Issues on which we have been able to provide better information range from grazing lands to soils to cultural resources. Here are a few examples of innovative activities.

An important endeavor underway is the development of a phosphorus index for the state. Growing numbers of confined-animal operations (poultry and swine) are increasing the amount of animal manure applied on the land. For years, scientists have known that nitrogen runoff affects water quality. Recent studies now indicate that phosphorus is a concern as well. In response to public concerns over phosphorus loading, the National Soil Survey Center (NSSC) is coordinating a collaboration of NRCS, Virginia Tech, the Agricultural Research Service, and Environmental Protection Agency (EPA) on a project to evaluate phosphorus runoff and to establish thresholds for the amount of phosphorus that each soil can safely retain. NSSC personnel and NRCS Virginia field staff are selecting sites in the Shenandoah Valley and collecting samples in the benchmark soil series. The National Soils Lab will then analyze the samples to develop the phosphorus index.

Virginia is also working with the NSSC on a unique historic preservation project. The Soil Survey Investigations section is using ground penetrating radar to assist with an archeological study by James Madison University. A resource soil scientist from the NSSC will help identify historically significant areas within the National Battleground Park located in Fredericksburg, Virginia, the site of major battles during the Civil War.

For the past 2 years, NRCS Virginia and staff of the Grazing Lands Technology Institute have been working with Virginia Tech and West Virginia University to develop the "Pasture Land Management System" (PLMS), a new software program designed to help livestock producers better manage pasture land resources. NRCS, Cooperative Extension, and SWCD technical specialists can use PLMS to graphically show beef and dairy farmers how they can improve the efficiency of ruminant livestock production systems and at the same time reduce greenhouse gas emissions.

The EPA selected Virginia as one of three pilot states for a greenhouse gas management project, along with Montana and Nebraska. Virginia is working with Dr. Joel Brown,

cooperating scientist and National Global Change Issues leader, to implement the project. The purpose is to bring together new public and private partners to design and implement a demonstration project to show how greenhouse gases can be reduced using conservation practices. In January, Dr. Brown assisted NRCS in conducting a global change workshop for interested public and private groups in Virginia. A paper documenting the project, entitled "Greenhouse Gases, Global Change and Natural Resource Conservation," is on the NRCS Virginia homepage at <http://www.va.nrcs.usda.gov>. under the "Technical Resources" section.

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## **NEW PRODUCTS AND SERVICES**

### **Access More Information Through PLANTS Site**

Access to additional high quality information is "one click" away through the Plant Profile. Connections to various key web sites are being "hard wired" within PLANTS <<http://plants.usda.gov>>. In addition to the Calflora and CalPhotos (accessing 20,000 images) site links currently available, other site links under development include the Native Plant Journal (integrating 2,000+ propagation protocols), Atlas of Florida Vascular Plants, and the Wisconsin Vascular Plants databases.

After selecting a particular plant on the PLANTS web page, scroll down the Plant Profile page and look for a box titled "Other Species Accounts and Images." If the box is present, it will contain the appropriate "one-click" link(s). For example, search for "hairy manzanita" (*Arctostaphylos columbiana*). At the Plant Profile page, scroll down to quickly access images and a species account for California. If you click on California in the distribution map box, another browser window will pop up and provide you with county distribution data from the CalFlora database.

As site features continue to be enhanced, user statistics show increased activity. PLANTS passed the three million mark with 3.6 million hits from 155,000 visitor sessions recorded for May 2001. This is 35,000 more sessions than for April 2001.

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### **Arizona Cottontop Released for Commercial Production**

Arizona cottontop (*Digitaria californica*) is a native, perennial bunchgrass that contributes considerable range forage in the Southwest. It can be found in the oak woodland, chaparral, and semi-desert grassland vegetation types in Arizona elevations between 300 and 1,800 meters. 'Loetta' was selected for release by the Plant Materials

Center (PMC) in Tucson because of its overall vigor, seed production, and forage production.

Arizona cottontop can be successfully reseeded in upland areas receiving at least 28 centimeters of annual precipitation; it is moderately affected by fires; and it is highly flexible in its adaptability to management strategies, provided grazing intensity is held below 60 percent. Light summer use 2 years out of 3 is recommended to maintain optimum vigor while, at the same time, it stimulates axillary sprouting to increase productivity.

The PMC recommends that 'Loetta' be used as part of a seeding mixture, comprising approximately 15 to 30 percent of the total seed mix. However, the percent composition may vary depending on the seeding objective. A higher percentage, such as 30 percent, is useful for grazing applications, whereas a lower percentage is suggested for restoration mixes. For example, if cottontop comprises 10 to 15 percent of a plant community then it is appropriate to use the same amount in a restoration seed mix for that community.

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### **Landscape Ecology Technical Series Announced**

The use of landscape ecology in watershed planning and management is the subject of a technical series now under development by the Watershed Science Institute. The series, in the form of technical notes, technical papers, and literature reviews, will provide information on landscape ecology and new technology approaches to support multiscale watershed conservation and natural resource management.

Landscape ecology offers opportunities to integrate data from multiple spatial and temporal scales, as well as from different natural science disciplines. Its ecosystem approach provides the conceptual framework, scientific approaches, and modern analysis tools necessary to address complex, multiscale conservation issues, especially useful when combined with other traditional specialties in an interdisciplinary team environment. When applied to conservation work, landscape ecology can explain and illustrate the problem of habitat fragmentation in agricultural habitats, relate landscape pattern to the probability of survival of species populations, and help produce guidelines and standards for conservation planning to promote the conservation of natural resources. Using GIS-based tools, a landscape ecology approach can aid in the integration of ecological research with conservation and watershed planning, and in the analysis of a variety of data to predict the impacts of landscape change and restoration.

Technical notes will include: “Landscape Ecology and Watershed Analysis Technical Series”, “GIS in Watershed Conservation and Analysis—What do you really need?,” “Techniques for Monitoring Landscape Change Over Time,” “Techniques for Determining What Scale is Best—A Multiscale Approach,” and “A Landscape Ecology Strategy for Monitoring and Controlling Invasive Weeds.” Literature reviews will include “Detecting Landscape and Vegetation Change” and “Use of Multiscale Data in Natural Resources.” And finally, technical papers include “A Question of Scale: Watershed Analysis Using the Tri-Scale Convergent Hierarchy Approach” and “Monitoring Vegetation by Spectral Signatures from the Ground and the Air.”

All topics are currently under review. It is anticipated the series will be available in the fall.

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### **Versatile Native Plant Serves Hawaii’s Restoration Needs**

The need for native Hawaiian plants for conservation efforts is being addressed by the Plant Materials Center (PMC) in Hoolehua. Kamiloloa Germplasm ‘a’ali’i (*Dodonaea viscosa*) is a native species recently released by the PMC to meet restoration needs. It has potential for ecosystem restoration projects, stabilization of highly eroded sites, wildlife habitat improvement, and landscape and windbreak plantings.

‘A’ali’i grows in open lava fields as well as semi-arid to wet forests throughout the tropics. It is extremely drought and wind resistant and can grow at elevations from sea level to over 7,000 feet. ‘A’ali’i grows as a shrub or small tree, from 3 to 11 feet tall and from 2 to 18 feet wide. Its long, slender leaves are usually dark green and waxy or crinkled. The flowers are very small, but female flowers develop into attractive paper lantern-like capsules (dark maroon, red, pink, and green in color) that are widely used for making haku leis.

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**TECHNOLOGICAL ADVANCES**

## **Cover Crop Seeding Possible at Corn Planting**

In the Northeast, cover crops are difficult to establish following silage corn because of late harvest and short growing seasons. Seeding cover crops at corn planting has not been feasible because residual pre-emergence herbicides are commonly used.

A method for establishing cover crops in the spring is under investigation by the Plant Materials Center (PMC) in Big Flats, New York. With the use of post-emergence imazethapyr herbicides and corn hybrids that are resistant to them, the option of seeding cover crops at corn planting is now possible. A farmer will be able to seed a cover crop under silage corn quite easily in the spring and have cover crops well established by fall. The PMC study is finding that this cover crop system works well with red clover, alfalfa and birdsfoot trefoil.

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## **New Laboratory Information Management System Implemented**

SSL-LIMS, a laboratory information management system, was implemented by the Soil Survey Laboratory in April 2001. This system replaces the mainframe-based information system that has been in use since 1976. The features of SSL-LIMS are uniform data entry, integrated data management, accommodation of multiple preparations for analysis, ability to quickly add procedures and instruments, simplified project management, generation of work lists for preparation and analyses, synchronized results and calculations, and integration with the National Soil Information System (NASIS).

The SSL-LIMS is part of the NASIS architecture, and common data elements are shared. Currently, a combination of the two systems is being used. Data are entered into the SSL-LIMS and transmitted to the mainframe database. The mainframe database is used to provide Web access. It will be used until a replacement is created. The client-server application operates within the Microsoft Windows environment and utilizes a relational database for data storage. Internal reports are viewed with a Web browser.

Laboratory personnel use the SSL-LIMS to log samples, create projects, request preparations and analyses, manage laboratory work lists, collect raw data, and calculate and report results.

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## **TECHNOLOGY TRANSFER**

### **News for Your Home Page or Local and State Newsletters**

Are you looking for information about new science and technology for your state home page or for your local or state newsletter? NRCS Technology News is a source of information about new products and services from which you may copy articles directly because it is all public information. Of course, we would be grateful if you credit NRCS Technology News as the source of the article. A “hats off” to NRCS South Carolina for including several articles from NRCS Technology News on their "What's New" web page and for featuring information from the National Plant Data Center.

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### **On-line Drought Monitor Updated Weekly**

The Drought Monitor, <<http://enso.unl.edu/monitor/index.html>>, provides the public with real-time drought information. The product is updated every Thursday morning.

The Water Supply Forecast information required by the multiagency Drought Monitor is provided by the National Water and Climate Center (NWCC). NWCC also provides access to a wide variety of water and climate information and technology at <<http://www.wcc.nrcs.usda.gov>>.

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### **Soils Maintains Strong On-line Presence**

Soil survey sites maintain a strong presence on the web. Recent usage statistics indicate that over 957,000 accesses occurred during April 2001. Since October 1, 2000, over 5.8 million hits have been received through the soils web sites for the National Soil Survey Center, Soil Survey Division, and Soil Quality Institute. The soil science education topic

area alone receives about 22,000 hits a month. User statistics reveal that those with the domain of .com access soil web sites most frequently, followed by unknowns, .net, .edu, and .gov, respectively. This information demonstrates that soil survey web sites are delivering information to the public through their home and office systems, their search routines, and educational institutions. These statistics do not include the World Soil Resources site <[www.nhq.nrcs.usda.gov/WSR](http://www.nhq.nrcs.usda.gov/WSR)>, which delivers world-based soil information, nor does it include the National Cartography and Geospatial Center, which delivers detailed and general soil map geographic data. The soil survey sites provide links to these information sources, but do not include their statistics.

The sites began with delivery of standards for soil survey including the National Soil Survey Handbook, the Soil Survey Manual, Soil Taxonomy, official series descriptions, and Laboratory Methods. Services have been expanded to include soil management information, soil survey publications, laboratory data, geographical information, Agriculture Handbook 296 on MLRAs, hydric soils, soil educational materials for teachers and students, and a large amount of other soil information. The photo gallery, for example, includes the state soil of every state with images of the landscape and soil profile. In addition, many sites that provide state emblems, flowers, and flags link to the soils sites. Staff of universities and other scientists accesses the posters that NRCS scientists presented at various scientific meetings.

The National Soil Survey Center web site is at <[www.nssc.nrcs.usda.gov](http://www.nssc.nrcs.usda.gov)>.

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## **TRAINING**

### **Water Quality Curriculum Now Ready for Field Staff Training**

Providing assistance to private landowners to meet their local and state water quality standards has been a high priority for the Natural Resources Conservation Service (NRCS) since the late 1980's. NRCS and The Conservation Partnership need to continually increase their knowledge of water quality science, issues, and policies to deal with the complexities of water quality. This need has been addressed through the collaborative efforts of a few dedicated specialists from NRCS, partnering agencies, and land grant universities. Their efforts have yielded a series of courses developed to provide field conservationists with the knowledge, skills, and abilities for agricultural pollutants reduction.

The first course in this series, "Introduction to Water Quality," has been accepted by the American Society of Agronomy to fulfill 12 of 20 continuing education units (CEU's)

that certified crop advisors need to maintain their certification. It is also a prerequisite for the next course, “Nutrient and Pest Management in Conservation Planning.” Indications are that the nutrient and pest management tracks in this course will each count for 25 CEU’s. These two courses are foundation blocks for “Agricultural Waste Management Systems – Primer and Level II.” For those that will be involved in or using data from monitoring activities, “Water Quality Monitoring” is a must. These four courses can be accessed at: <<http://www.ftw.nrcs.usda.gov/nedc/homepage.html>>. They were developed for delivery using a combination of self-study and locally facilitated sessions.

Three important classroom-delivered courses offered by the National Employee Development Center are: “Water Quality – Resource Assessment”, “Forest Water Quality,” and “Stream Corridor Restoration.” These courses are in the process of or are scheduled for conversion to the self-study/workshop format.

Study materials available on CD-ROM are “Core 4 Conservation Practices” and “Nutrient Management.”

The curriculum is primarily sponsored by the NRCS Ecological Sciences and Conservation Engineering Divisions and the National Water and Climate Center and implemented by the National Employee Development Center. Employees completing this water quality curriculum will have improved their knowledge base for certification and their ability to provide better science-based technical assistance to Agency customers.

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## HONORS

### SSI Presents “Locally Led” Award to Michigan Districts

The Michigan Association of Conservation Districts (MACD) was presented with a leadership award on June 27 at the Social Science Institute’s (SSI) national “Locally Led Conservation” Train the Trainer conference in Grand Rapids, Michigan. MACD was recognized by the SSI as the first state-wide organization in the National Association of

Conservation Districts to complete and implement all nine training modules in the Institute's "Developing Your Skills to INVOLVE COMMUNITIES in Implementing Locally Led Conservation." "As a result of the SSI training and implementing the locally led process, the districts doubled their allocation from the Michigan legislature this year," stated Marilyn Shy, executive director, as she accepted the award on behalf of the districts in Michigan.

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### **VanKlaveren Selected to Hall of Fame**

Richard VanKlaveren, recent Director of the NRCS Conservation Engineering Division and now Regional Conservationist, Northern Plains Region, has been selected as one of three inductees in 2001 for the University of Wyoming (UW) College of Engineering Hall of Fame. The primary goal of the Engineering Hall of Fame is to honor graduates who, through their professional contributions, have brought distinction to themselves, the college, and the extended family of the university. As a Hall of Fame member, VanKlaveren will join such notables as Thomas E. Osborne, whose invention of the Hewlett-Packard hand-held scientific calculator replaced the slide rule, and General Samuel C. Phillips, former director of the Apollo Program for NASA.

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