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# Defending The Crops

## Researchers Work To Identify How Crops May Be Vulnerable To Attack

BY HELEN CHAPPELL

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CHAPEL HILL, N.C. — On farmland around the globe, a silent war rages, between crops and the diseases that attack them. Crop diseases cost the world an estimated \$220 billion every year and put millions at risk of starvation.

But with a little help from scientists, crops — and we who depend on them — may soon gain the upper hand.

In two papers published last week in Science, an international consortium of researchers report that even dramatically different diseases attack a small set of targets in plants.

By identifying the ways plants might be most vulnerable to attack, the discovery enables crop researchers to focus on protecting these few targets, potentially speeding up the arduous task of developing disease-resistant crops.

The team sorted through more than 8,000 proteins in a small plant related to cabbage to examine the different ways the proteins interact with each other. The result, a tangled map of the plant's chemical defense mechanisms, is akin to the street map of a city.

Just as a street map allows you to visualize traffic flow through a city, a map of a plant's interacting proteins allows scientists to see how it transmits messages about its health — how it detects the presence of a dangerous disease, for instance.

The researchers discovered that just as in cities, a plant's message traffic tends to pass through major intersections; a wreck at one can

disrupt traffic across an entire city.

In plants, this makes intersections a perfect target for diseases. By causing a wreck at one of a plant's major message intersections, a disease can devastate the plant's ability to fight back.

The international team tested the cabbage relative's reaction to two very different diseases. The bacteria and mildew they studied are separated by more than 2 billion years of evolution — making the diseases more different from each other than humans are from dinosaurs.

Despite their differences, both diseases went for an overlapping set of targets: the plant's major intersections.

"It's the most exciting thing," said Jeff Dangl, a professor of biology at the University of North Carolina, Chapel Hill, and one of the leaders of the project. Since these diseases are so different yet have similar attack strategies, Dangl said, it suggests that many other plant diseases will attack the same intersections.

Though routing so much of its message traffic through these vulnerable points may seem like a disadvantage for a plant, it does have benefits. If most diseases attack the same targets, a plant can conserve resources and watch just a few hubs to look out for many different diseases.

And that means scientists working to develop disease-resistant crops can conserve their resources, too. The intersections attacked in the study's test plant are similar in many types of plants, ranging from crops to trees to grasses.

"We've really allowed people to zoom in," said Dangl. Instead of sifting through tens of thousands of possible ways to protect a plant,

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crop disease researchers can now focus on a few hundred.

"It's a powerful piece of work," said Ralph Dean, a professor of plant pathology at North Carolina State University and director of the Center for Integrated Fungal Research, who was not connected with the study. The team's achievement opens doors for disease research, Dean said.

One of the biggest challenges they faced, Dangl said, was organizational instead of scientific. More than 70 researchers in five different countries collaborated on the project.

When their work was finally accepted for publication after five years of research, they held a "virtual champagne toast," Dangl said. "We had to clink our glasses against the video screen."

Complicated collaborations like this are becoming more common, especially in biomedical research, Dangl said. It can be hard to coordinate, he said, but there's a real advantage in bringing together so many scientists with diverse specialties.

According to Nathan McDonald, a recent UNC biochemistry graduate who worked on the project, the study's scale is one of its biggest strengths.

"You can study away for as long as you want in a little lab on one little problem," he said, "but to really understand the complex systems in biology, I think this kind of study is really necessary."

## Grassland Conference Slated For Sioux Falls

SIoux FALLS — The National Wildlife Federation and South Dakota State University announce the upcoming conference: "America's Grasslands: Status, Threats and Opportunities," to be held in Sioux Falls Aug. 15-17.

The conference brings together biologists, policy experts, ranchers, federal and state agency staff, representatives of elected officials, and conservationists for two days to discuss the latest information on the status, threats and opportunities related to North American grasslands in order to raise the national profile of this endangered ecosystem and inform those interested in developing a roadmap for its conservation.

The event will be immediately followed by a "Grasslands Policy Summit" Aug. 18, sponsored by the National Wildlife Federation, Ducks Unlimited, The Nature Conservancy and World Wildlife Fund.

The conference begins the afternoon of Aug. 15, with an optional field trip to EcoSun Prairie Farm and an evening welcoming reception at the Sheraton Conference Center in Sioux Falls. August 16 and 17 are dedicated to a series of symposia discussing selected topic areas including: grazing and grasslands, grassland restoration and management, energy development, climate change and grasslands and federal policy.

The conference is followed by a policy summit Aug. 18. The goal of the policy summit is to brainstorm strategies to elevate national interest in and conservation of North American grasslands.

Anticipated speakers include:

- Alan Knapp — Knapp is a professor of Biology at Colorado State University. Knapp has

done grassland research at the Konza Prairie Biological Station in Kansas.

- Kevin Doherty — Doherty is the science coordinator for the Prairie Pothole Joint Venture, one of the six priority joint ventures under the North American Waterfowl Management Plan. His discussion will focus on energy development in grasslands

- David Archer — Archer works for the Agriculture Research Service in North Dakota. Archer is continuing his research on the economics of agricultural systems to develop more sustainable integrated crop and livestock production systems.

- Jim Faulstich — Faulstich has played an integral part in making the South Dakota Grassland Coalition (SDGLC) a strong non-profit organization and an active producer-led conservation group focusing on voluntary improvement of privately owned grassland.

- Julie Sibbing and Lynn Tjeerdsma — Sibbing with the National Wildlife Federation and Tjeerdsma with Senator Thune's office will be providing a brief preview to the grassland policy summit, to be held Aug. 18, following the formal grassland conference.

- Bob Budd — Budd will provide the keynote presentation. Budd is the Executive Director of the Wyoming Wildlife and Natural Resource Trust — a program established to enhance wildlife habitats and the natural resource heritage of Wyoming.

To register for the event, visit the conference Web site at <http://www.sdstate.edu/wfs/grasslandconference/index.cfm> or for more information contact Julie Sibbing, [sibbing@nwf.org](mailto:sibbing@nwf.org) or Susan Rupp, [susan.rupp@sdstate.edu](mailto:susan.rupp@sdstate.edu).

## Funding To Preserve, Revitalize Rural Rental Housing Complexes Announced

WASHINGTON — Agriculture Secretary Tom Vilsack has announced that USDA is accepting applications to participate in a demonstration program to preserve and revitalize existing Multi-Family Housing projects financed by Rural Development.

"A top priority of the Obama Administration is to ensure that rural Americans have access to decent, safe and affordable housing," Vilsack said. "Funding from this program will improve conditions of multi-family housing complexes without increasing rent for low-income residents."

The goal of the Multi-Family Housing Revitalization Demonstration Program is to restructure selected loans for rental and farm-labor housing developments to guarantee the long-term quality

of these rental housing units. Among several revitalization financial tools, grants are available to correct health and safety violations to ensure safe and affordable housing for very-low-, low- or moderate-income residents. Properties participating in this program will be revitalized, and the affordable use will be extended without displacing tenants because of increased rents. No additional agency rental assistance units will be made available.

Applications for Multi-Family Housing revitalization loans and grants are due Aug. 22. For additional information, see page 39820 of the July 7, 2011, *Federal Register* or go to <http://www.gpo.gov/fdsys/pkg/FR-2011-07-07/pdf/2011-17107.pdf>.

## Ag Retailers And Farmers Must Comply With Refillable Containers Regulations

PIERRE — On Aug. 16, the Environmental Protection Agency (EPA) will require all portable and refillable pesticide containers to meet the following requirements.

- One way valves or tamper evident device on openings (other than vents) is required. Standard zip-ties are not acceptable for a tamper evident device.
- Containers must have a unique method of identification such as serial number or ID code.
- Must meet DOT design, construction and marking which a minimum of PGIII.
- Must be cleaned between uses unless tamper evident and/or one-way valves are intact and filled with same product.
- Containers must be on an ap-

proved list from the registrant. Containers with the product name molded into the container should remain dedicated to that product.

- Must have registrant's cleaning instructions and repackaging authorization on hand.

- EPA Establishment number and net contents must be on the product label affixed to the tank.

- Container integrity is the responsibility of both the re-filler and registrant.

- Records must be kept for each inspection and fill that includes the pesticide, amount, EPA establishment number and tank serial number or code.

- All DOT tanks must be pressure tested every 2 1/2 years according to DOT re-testing procedures. There is a

month/year date stamped near the UN Marking that indicates the original certification date.

The person who owns the pesticide refillable container must comply with these regulations, whether they are the manufacturer, distributor, retailer or farmer. After Aug. 16, many existing portable refillable containers will be obsolete. If the refillable container cannot meet these requirements it is not to be refilled.

## Dixie Church's 75th Birthday & Retirement Open House!



Please join us  
August 14th  
2:00 - 5:00 pm  
at Riverview  
Reformed Church  
1700 Burleigh Street  
Yankton, SD

Please, no gifts



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## Karen E. Dickes, D.O.

We are pleased to announce the association of Karen E. Dickes, D.O. with our clinics. Dr. Dickes' practice will involve general ophthalmology including complete eye examinations; cataract and implant surgery; laser surgery; glaucoma and diabetes management; and plastic surgery of the eyelids.

Dr. Dickes was born in Norfolk, NE and grew up in Brookings, SD. She graduated with her undergraduate degree from Creighton University in Omaha, NE. Dr. Dickes earned her Doctor of Osteopathy medical degree (D.O.) from the Des Moines University Osteopathic Medical School in Des Moines, IA. She recently completed her residency at Grandview Hospital in Dayton, OH.

We welcome Dr. Dickes, her husband Chris, and their son John to the community and our practice.

Appointments for Dr. Dickes can be made beginning August 8, 2011.

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