

SCIENCE & EDUCATION Impact

Benefits from USDA/Land-Grant Partnership

Outbreak!

Emerging diseases endanger people, plants and animals.

West Nile virus, exotic Newcastle disease and other disease invasions over the past year have killed hundreds of people, resulted in the deaths of millions of animals and exacted severe economic damage. USDA and the Land-Grant universities are well-positioned to protect the nation against such outbreaks and respond quickly when they develop.

Payoff

- **West Nile nails the nation.** Last year, 274 people died and more than 4,000 were sickened by West Nile virus. Horses also succumbed to the mosquito-borne disease. **Kansas State, Louisiana State, Ohio State, Penn State, Purdue, Rutgers, Tennessee and Wyoming** were among the Land-Grant universities that launched campaigns to educate the public about the disease, precautions to take and more. Increased awareness in Louisiana was evident as more horse owners began vaccinating their animals for West Nile virus, resulting in less disease and fewer horse deaths. **Kentucky and Delaware** scientists have identified mosquito species that are at high risk for transmitting the virus. **Florida A&M** research helped local agencies determine the most effective products for mosquito control, target insecticide applications to protect non-target species, minimize worker exposure and reduce pesticides in the environment. **Arizona, California, Kansas State, Nebraska, South Dakota State, Wyoming** and others are monitoring horses and wildlife, testing dead birds as possible reservoirs of West Nile virus.
- **Give peanuts a chance.** To notify growers about potential hours of peanut leafspot infection, **Oklahoma State** Extension faxes out an advisory. During 2001, peanut producers saved over \$194,400 in fungicide and application costs. The environment benefited from growers reducing the average number of fungicide applications from seven to three. From 1999 through 2001, growers saved an estimated \$625,000 in production expenses.
- **The END is here.** Southern California's poultry industry is fighting a very costly epidemic: exotic Newcastle disease (END) virus. In 2002, the highly contagious and fatal avian virus appeared in egg-laying hens after a 30-year absence, resulting in the destruction of nearly 3 million of the 13 million commercial hens and disruption of

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- international trade. Isolated cases have been found in Arizona and Nevada. Through leaflets, Web sites and training workshops, the **USDA, Arizona, California, Colorado State** and **Utah State** educated industry and the public about END and its prevention. Most California processing plants participated in California's biosecurity evaluations and can obtain state permits to transport processed and sanitized eggs from the quarantine zone to markets, thus reducing economic losses. California's recommendation to cover bird carcasses with landfill trash, instead of the required three feet of compacted soil, speeds disposal and reduces chances of wildlife from coming in contact with contaminated carcasses. **Minnesota** researchers have developed a single vaccine that protects unhatched chicks against Newcastle, Marek's and bursal diseases.
- **Coccidia fight.** Coccidiosis accounts for 6 percent to 10 percent of chicken deaths. A treatment of yeast culture and its residues has been developed by **Prairie View A&M** to prevent the parasite that causes coccidiosis from making itself at home in chickens. The treatment successfully eliminated 70 percent of the parasite from intestinal tracts. With improved effectiveness, the yeast treatment would reduce the need for expensive antibiotics and require no withdrawal period before processing the poultry.
 - **Affairs of the heartwater.** A deadly disease that has spread from Africa to the Caribbean now threatens to invade the United States. As a preemptive measure, **Florida** researchers have developed two safe and affordable vaccines to protect livestock and wildlife against heartwater disease. The tick-borne disease attacks blood vessels, killing up to 90 percent of infected animals.
 - **What a waste!** Chronic wasting disease is a contagious neurological disease of deer and elk similar to scrapies in sheep, "mad cow" in cattle and new variant Creutzfeldt-Jakob in humans. **Colorado State** scientists have found chronic wasting disease in the tonsils and lymph nodes of wildlife months before it reaches the brain. This finding may enable researchers to develop a vaccine to intervene before the condition becomes fatal.
 - **Vanquishing a virus.** Spring viremia of carp is a disease lethal to many fish species including carp, minnows and ornamental species that contribute more than \$90 million to U.S. aquaculture. **Arkansas-Pine Bluff Fish Disease Laboratories** routinely test fish for exotic viruses. The virus had never been detected in North America until last summer, when the lab detected it in fish samples from North Carolina and Wisconsin. Arkansas-Pine Bluff researchers worked with **USDA** and the U.S. Fish and Wildlife Service to determine the distribution of the virus and to prevent its spread. Following the timely quarantine of infected regions, the virus has not been discovered elsewhere.
 - **Conquering a tomato killer.** In the early 1990s, Dominican Republic farmers noticed some tomato plants were suffering from disease. By 1994, their entire tomato crop had been destroyed, creating economic hardship for the farmers and their workers. A **Wisconsin** scientist examined the DNA and identified the culprit as tomato yellow leaf curl virus from the eastern Mediterranean and spread by whiteflies. **California** researchers worked with Dominican Republic agriculture officials and the tomato industry to develop an integrated pest management plan. By spraying insecticides and removing all crops that whiteflies live on, they dropped the number of virus-carrying whiteflies to almost nil. Researchers also identified early-maturing hybrid tomatoes that produced good yields before the virus built up again. By 1999, the nation no longer had to import tomato paste, and the 2000 tomato yield was the largest on record.



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