

# Poultry HEALTH REPORT

A National Institute for Animal Agriculture Publication

Summer 2003

## California Free of Exotic Newcastle Disease *Statewide quarantine lifted*

The California Department of Food and Agriculture and the U.S. Department of Agriculture have announced an end to the exotic Newcastle disease (END) quarantine. Extensive testing of the regulated area has been completed, with no additional detections of the disease.

The state and federal quarantines originally encompassed 46,000 square miles, which included the following counties: Imperial, Los Angeles, Orange, Riverside, Santa Barbara, San Bernardino, San Diego, Ventura, and a small southeastern corner of Kern County. On August 4, 2003, all but 7,300 square miles of the quarantine was released.

"We have eagerly anticipated this day and are extremely proud of the tireless work of the Exotic

*"We have eagerly anticipated this day and are extremely proud of the tireless work of the Exotic Newcastle Disease Task Force.*

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SECRETARY WILLIAM (BILL) J. LYONS, JR.  
CALIFORNIA DEPARTMENT OF  
FOOD AND AGRICULTURE

Newcastle Disease Task Force," said CDEFA Secretary William (Bill) J. Lyons, Jr. "We relied on the expertise of CDEFA veterinarians and other staff, as well as veterinarians from the USDA and from Baja California. We also greatly appreciate the contributions from other state, federal and local agencies, and the state of the art capabilities of the California Animal Health and Food Safety Lab at the University of California. Many government agencies and thousands of people contributed to an expeditious and successful conclusion of this program."

The initial cases of Exotic

Newcastle Disease were detected in backyard poultry last fall. By winter, the disease had spread to commercial poultry operations in Southern California. In January, California Governor Gray Davis declared a state of emergency. The outbreak cost more than \$160 million to fight and resulted in the depopulation of more than three million birds.

The disease was also diagnosed in Nevada in January, Arizona in February and Texas in April. The disease was rapidly contained in those states preventing massive spread. With the release of the quarantine in California, there are no longer any areas in the United States quarantined because of END.

"This administration is committed to enhancing our pest and disease control and prevention efforts," Veneman said. "I congratulate all the state and federal personnel who have worked tirelessly to eradicate exotic Newcastle disease."

While this is a major milestone in the fight to end what was a very serious avian disease outbreak, U.S. Department of Agriculture (USDA) officials warn that continued precautions should be taken against the reintroduction of END.

To guard against the risk of subsequent outbreaks, especially in the high-risk fall months, CDEFA has activated an ongoing monitoring program. All backyard poultry

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# NPIP Declares Minnesota Mycoplasma Synoviae, Gallisepticum Free

After decades of testing and surveillance to eliminate Mycoplasma Synoviae (MS) and Mycoplasma Gallisepticum (MG) from poultry breeder flocks in Minnesota, the Board of Animal Health (BAH) has announced that the U.S. Department of Agriculture (USDA), National Poultry Improvement Plan (NPIP) has certified the state as an MS Clean

State in turkeys and MG Clean State in meat-type chickens. Minnesota is the first state to receive such classifications.

"Minnesota was the first state to achieve the MG and MS status in the country for good reason," said USDA NPIP Senior Coordinator Andy Rhorer. "Minnesota's poultry industry, producers and state government approach disease eradication as a unified force working together to become Mycoplasma-free. Due to the difficulty of ridding a flock of these diseases, Minnesota will most likely remain the only state with this certification for some time."

MG infection, or chronic respiratory disease (CRD), was first recognized in the 1950s. MG is the most pathogenic and economically significant Mycoplasma pathogen of poultry. Official eradication programs began in Minnesota in the early 1960s. MS test and eradication programs began in the early 1980s. MG and MS have no human health significance.

Classification as MG or MS Clean means the disease has not

existed in Minnesota breeder flocks within the past 12 months. In addition, all breeder flocks and hatcheries in the state must be clean (free from disease), be under official supervision of the BAH and only handle product that is MG or MS clean. This classification is a certification process that ensures disease-free Minnesota poult and chicks.

"The Minnesota BAH has dedicated itself to listening to the poultry industry," said BAH Assistant Director Dale Lauer. "Poultry producers and BAH, along with NPIP have worked for decades to rid poultry breeder flocks of these hatchery-disseminated diseases. With the eradication of MG and MS, producers see healthier poultry, reduced condemnations at the processing plant and a greater economic return."

Lauer said this certification is important for the industry as it helps them remain economically viable. Minnesota's poultry industry continues to be a national leader in turkey production and among the top ten states in broiler production.



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## FSIS Announces New Food Safety and Security Guidelines

The Food Safety and Inspection Service (FSIS) has announced the availability of new food safety and security guidance for transporters and distributors of meat, poultry and egg products as part of its continuing effort to help protect America's food supply from intentional and unintentional contamination.

FSIS Safety and Security Guidelines for the Transportation

and Distribution of Meat, Poultry and Egg Products is designed to help facilities and shippers that handle meat, poultry and egg products strengthen their food safety and security plans. The guidelines provide recommendations to ensure the security of food products through all phases of distribution.

The guidelines are available on the Internet at [www.fsis.usda.gov/oa/topics/biosecurity.htm](http://www.fsis.usda.gov/oa/topics/biosecurity.htm).

# Bacteriophage: Poultry's Welcome Virus

*To knock out the bacteria, bring on the viruses.*

It's an idea that might alarm people who are conditioned to believe that viruses have no redeeming qualities. But Billy Hargis and his Food Safety Consortium research team at the University of Arkansas would remind them that these particular viruses can make poultry a safer commodity for consumers.

The credit goes to bacteriophages, a specific kingdom of viruses that only infects bacteria and that cannot infect plants, animals or humans.

"If you lick your lips, you're probably eating several hundred bacteriophages that are on your skin right now. They're pretty ubiquitous," said Hargis, director of the UA Poultry Health Research Laboratory.

Bacteriophages, which are obtained from natural sources and cloned for use against bacteria, have been used in experiments to kill *Salmonella* bacteria in poultry. Hargis' team used a couple of approaches. One was to rinse broiler

and turkey carcasses with bacteriophage isolates. Two bacteriophage isolates were found to destroy eight *Salmonella* isolates on poultry.

Hargis' group also developed another method. They administered bacteriophages orally to poults to use the poults as a biological filter. They recovered the bacteriophages from the poults' feces, then the recovered bacteriophages were administered to a second group of poults, a procedure which reduced the levels of *Salmonella* that the poults were carrying.

"We found in our early experiments that most of the bacteriophages, when we administered them to baby poultry, died or disappeared as they passed through the part of the gastrointestinal tract that's similar to the human stomach — it's called the proventriculus," Hargis said. Its low acidity was killing most of the bacteriophages.

But some bacteriophages were surviving, so the answer seemed to be in overwhelming the gastrointestinal tract with numbers. Hargis' group took the bacteriophage populations, grew their numbers and administered them to baby poultry

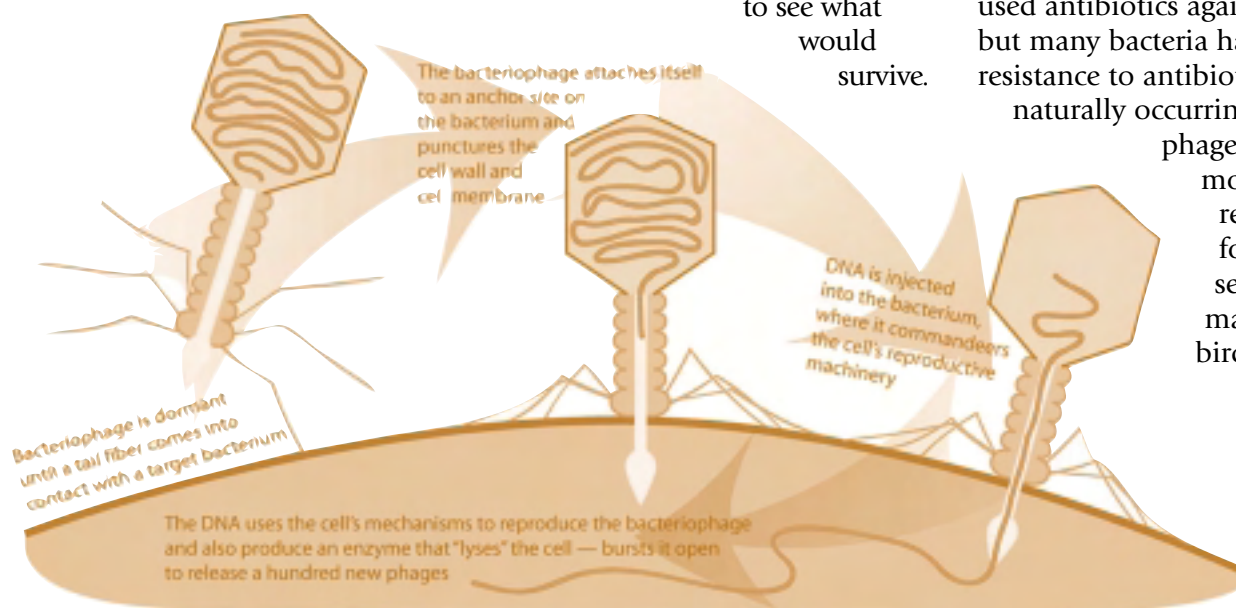
to see what would survive.

The plan worked. The large numbers of bacteriophage were passed through the poultry, separated and re-amplified to pass through them again. The mutations of bacteriophage managed to survive conditions in the poultry's guts well enough to be effective in reducing *Salmonella* by significant numbers.

"As the bacteriophage travels down the gut, when it gets to an appropriate point in the gut where that organism can grow, it actually amplifies the phage," Hargis explained. "And then you can achieve incredibly high numbers of bacteriophage in the lower part of the gut. Once you've got the phage there you just feed them the bacteria so that the bacteriophage population is constantly being fed new hosts. Any bad guys that happen to be in the environment are in trouble."

Pending further development of the patent pending technology jointly owned by the university and the U.S. Department of Agriculture, the research has positive implications for a poultry industry in search of reliable ways of fighting *Salmonella* contamination. Poultry producers have long used antibiotics against pathogens, but many bacteria have developed resistance to antibiotics. The use of naturally occurring bacteriophages could be a

more potent and reliable weapon for producers seeking to maintain healthy birds.



## California Free of END *(continued from page 1)*

owners and commercial operations are being encouraged to practice biosecurity measures to help prevent the introduction of disease when people enter or depart the premises, to routinely check birds for signs of illness, and to report any incidence of suspected END or other bird diseases.

END is one of the most infectious poultry diseases in the world. It is a contagious and fatal viral disease that affects the respiratory, nervous and digestive systems of all species of birds. The virus is spread primarily through direct contact between healthy birds and the bodily discharges of infected birds. The disease is transmitted through infected birds' droppings and secretions from the nares, beak and eyes. END is not considered a public health threat.

## END Program Becomes Model for Cooperation Between U.S. and Mexico

The Border Governors Conference in Chihuahua, Mexico in August honored the veterinary staffs of California and Baja California by adopting its joint response plan against exotic Newcastle disease (END) as a model of cooperation between U.S. and Mexico border states.

The Baja California Fomento Agropecuario (Department of Agriculture) provided teams of veterinarians to assist the Exotic Newcastle Disease Task Force with outreach — including communication at commercial poultry facilities — and with work on epidemiology.

The Border Governors Conference recognized these successes by adopting a regional plan for prevention and mitigation of future END outbreaks based on the cooperative effort between

California and Baja California. A significant component of the plan will be the promotion of biosecurity practices for farm owners and poultry owners in the border region.

"This development is further evidence that the agricultural challenges faced by U.S. and Mexico are regional issues that don't recognize borders," said California Department of Food and Agriculture Secretary William J. Lyons, Jr. "A region-wide biosecurity plan helps to protect both of our countries from future outbreaks of this devastating bird disease."

The Border Governors Conference is an annual meeting of 10 U.S. and Mexican border states: California, Baja California, Arizona, Chihuahua, New Mexico, Coahuila, Texas, Tampico, Sonora and Nuevo Leon.

## State Veterinarian Honored by California Poultry Industry Leadership Cited During Exotic Newcastle Disease Emergency



Dr. Richard Breitmeyer, California State Veterinarian and Director of Animal Health and Food Safety at the California

Department of Food and Agriculture, was named the recipient of the California Poultry Federation's highest honor at the federation's annual conference held recently in San Francisco.

Dr. Breitmeyer was presented with the prestigious award at the poultry federation's annual banquet held at the Sir Francis Drake Hotel. In presenting the award, federation chairman Richard

Zacky acknowledged Breitmeyer's efforts in marshaling the resources of the CDEA, USDA and the state's poultry industry in battling an outbreak of Exotic Newcastle Disease (END) in Southern California during the past year.

"His efforts were exemplary in halting this disease in the south and preventing its movement to Northern California," said Zacky. "Dr. Breitmeyer listened intently to industry's concerns regarding this disease and continues to work closely with all of us as we seek to keep END and other disease from affecting our industry."

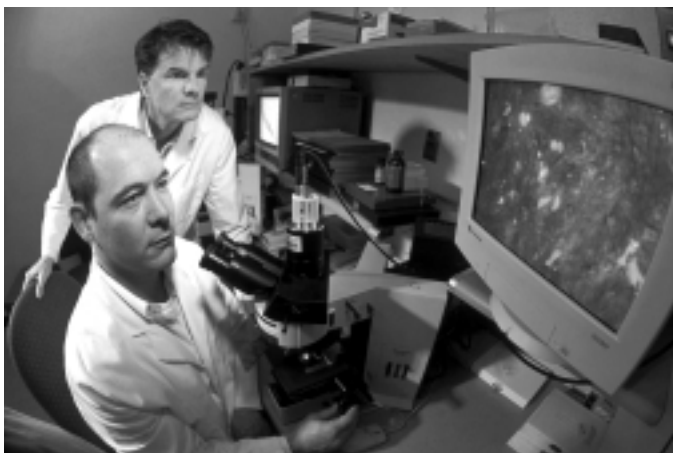
CDEA Secretary William (Bill) J. Lyons, Jr. was among those offering congratulations to Dr.

Breitmeyer.

"Dr. Breitmeyer's handling of the outbreak of exotic Newcastle disease is testament to his superb leadership skills," said Lyons. "His response to and oversight of the emergency was characterized by quick thinking, creative problem solving and total dedication. It is because of these abilities that his expertise is sought after nationally and internationally."

Dr. Breitmeyer, a 19-year veteran of CDEA, oversees an annual budget of \$28 million and 250 employees engaged in programs for animal health, milk and dairy foods control, meat and poultry inspection, and livestock identification.

## An *END* for Exotic Newcastle Disease Virus?



Microbiologist Darrell Kapczynski (foreground) and immunologist Terry Tumpey use ultraviolet microscopy to examine cell monolayers for production of a green fluorescent protein that indicates binding of the vaccine to host cells.

Agricultural Research Service microbiologist Darrell Kapczynski is working on a new type of vaccine to combat exotic Newcastle disease (END), a contagious and fatal viral disease affecting most species of birds. Almost all unvaccinated chickens die within days of being infected with the virus.

The vaccines currently available for Newcastle disease virus are made with either an attenuated (weakened) live virus or a killed virus. Either type stimulates an immune response in the bird, which protects it from future exposure to the virus. While these vaccines are effective, some production losses have been attributed to the live ones, and the inactivated ones are more expensive to administer. To overcome those problems, Kapczynski and his colleagues at the Southeast Poultry Research Laboratory in Athens, Georgia, developed what's known as a nonreplicating virosome vaccine.

"Essentially, the virus is taken apart, the replicating genetic material is removed, and the virus is put back together," explains Kapczynski. "This vaccine induces

protective immunity but does not allow the virus to replicate—copy itself—or pass from bird to bird."

The virosome vaccine is composed of liposomes, water-insoluble spheres encased in lipid layers. The liposomes contain certain viral protein antigens but not the virus replication machinery.

The antigens are

able to bring about a protective immune response in the animal.

In one study, day-old chicks were divided into three groups: a control group, which received saline solution; a group that received live-virus vaccine; and a group that received the virosome vaccine. Two weeks later, birds were challenged with a lethal dose of the virus. All birds were monitored daily for clinical signs of disease and mortality. Birds in the control group did not survive the challenge, but birds that received either the live-virus or virosome vaccine were 100 percent protected from the END virus.

While the cost of virosome technology is currently prohibitive, there are several potential advantages. First, since the vaccine has no replicating genetic material, the virus can't mutate or transfer from bird to bird. Second, since the virosomes are able to attach and fuse with host cells, as would the live virus, a strong immunity is induced. Third, it is possible to differentiate between vaccinated and virus-infected birds. Birds vaccinat-

ed with an attenuated live or a killed virus will produce antibodies against all the virus's proteins. This leaves producers unsure of whether the flock is infected by field (non-vaccine) virus. But virosome vaccines induce antibodies against only two END proteins—the fusion and hemagglutinin-neuraminidase proteins. This allows producers to identify vaccinated flocks by testing for antibodies against these proteins. Birds exposed to field virus can be identified by testing them for antibodies to viral proteins not included in the virosome. Also, production losses attributed to using a live-virus vaccine are not an issue when using virosomes.

Under certain circumstances, vaccinating a flock does not guarantee complete protection. Kapczynski and colleague Daniel (Jack) King studied commercial birds that were vaccinated with a commercial vaccine against Newcastle disease and then exposed to the END virus. Seventy-five percent of the flock died. "It took longer for the birds to get sick and die," says Kapczynski. "It seems that even though the birds had been vaccinated, they were severely weakened by the virus challenge." In the field, weakened birds are much more susceptible to infection by secondary pathogens.

The next step for Kapczynski and his colleagues is to determine whether the virosome vaccine can protect a typical commercial flock, which is exposed to various production and environmental stresses, such as other illnesses and temperature fluctuations. "It's a long way from the lab to the field. The vaccine has to be protective in the field, which is the gold standard of effectiveness," says Kapczynski.

Sharon Durham, ARS

## Prevention Strategies Vital to Counter Bioterror Threats to American Agriculture, Animal Scientists Told

A bioterrorist attack on America's food chain could have huge and far-reaching consequences. The experience of other countries over the last few years has shown the devastating impacts on the farming economy that can be wrought by infectious animal and plant diseases. That was the message of biosecurity expert Dr. Norman Steele speaking at a recent symposium coordinated by the Federation of Animal Science Societies (FASS).

Steele is a senior biologist with Science Applications International Corporation, based in San Diego and the largest employee-owned research and engineering company in the U.S. He was addressing a FASS-organized symposium 'Issues in Animal Agriculture', part of the 2003 Joint American Society of Animal Science—American Dairy Science Association Annual Meeting held in Phoenix, Ariz. in July.

### No single approach

To deal effectively with the bioterror threat, Steele said it was vital to recognize that there could be no single overreaching approach. "The issues important to New Hampshire livestock agriculture are not important in New Mexico," he commented.

Steele reviewed select agent lists for human, animal and plant diseases and listed several plant and animal diseases, which whether introduced by accident or design, represent great threats to US agriculture. Not just foot-and-mouth disease; BSE, anthrax, soybean rust, tularemia, and botulinum toxin are equally threatening.

He also outlined some of the consequences of a bioterrorist attack on agricultural production and the food

chain, including massive trade disruption, closure of international markets, collapse of consumer confidence, business closures and loss of jobs.

### Vulnerability

Steele explained that the U.S. Department of Defense currently defines the threats to the food chain as 'asymmetric' meaning that it is 'a vulnerability not appreciated by the target' and believes terrorists could capitalize on the nation's limited preparation against such threats.

*"Food production and security is fundamental to security of the homeland."*

This vulnerability could be defined as two-fold. The biotechnology revolution has provided terrorists with a whole new set of tools to facilitate their activities. Meanwhile, recent years have seen the emergence of an array of health and welfare threats such as Sudden Acute Respiratory Syndrome (SARS), which show how our internationalized society makes contagious diseases extremely difficult to control. "Emerging infectious diseases are an example of nature behaving like a bioterrorist," Steele commented.

The ramifications of contagious animal diseases can be immense. Pointing to the emergence of foot-and-mouth disease in the UK in the spring of 2001, he explained that the greatest cost to the economy was not in agriculture but in tourism. On the possibility of such an event happening in the U.S., his assessment was that it was a matter of *when* and not

*if*. "I don't for a second believe this is outside the realm of possibility – through USDA we have surveillance measures in place, but we were also lucky we didn't get it [FMD] when it struck U.K.," he added.

### Threat and response

Following raids on an Al Qaeda training camp in Afghanistan, the US Government found detailed descriptions and notes that could be used in development of a biological weapons program. This tallies information that Al Qaeda leaders have a long-standing interest in the development of biological weapons.

A recent experience in New Zealand illustrated how potentially devastating disease could be if deliberately introduced. There, a farmer introduced a viral hemorrhagic disease of rabbits obtained from China and transported materials through what is, arguably, one of the best biosecurity systems in the world. The result was virtually complete extermination of the European white rabbit population of New Zealand.

The response to these challenges should involve a robust series of vulnerability assessments and threat analyses, Steele argued. "Effective deterrent strategies, prevention strategies, domestic preparedness drills and further research all need to be put into place. Within the private agribusiness sector, at the State Agricultural Experiment Stations and at regional levels open discussion, debate and planning will be required. This topic should not be restricted to only a USDA responsibility. Food production and security is fundamental to security of the homeland."

## News Briefs News Briefs News Briefs News Briefs News Briefs

### British Emergency Veterinary Reserve Proposed

A new corps of private sector veterinarians, able to join forces with the British government on short notice to fight outbreaks of animal disease, has been announced by Animal Health Minister Ben Bradshaw.

Members of the group would be contracted to do five days paid training each year. In return, they will commit themselves to be available in an emergency. Initially, the Department of Environment, Food and Rural Affairs (DEFRA) will be looking to recruit around 100 veterinarians to join the veterinary reserve.

"The veterinary profession

responded magnificently to the challenges of the 2001 FMD outbreak," said Bradshaw. "But the episode demonstrated that existing arrangements are not the most efficient way of using veterinary manpower in a crisis."

Bradshaw said the greatest need in an emergency would be for veterinary team leaders, who are familiar with the contingency plans and would understand the role expected of them.

During training, veterinarians would be told their likely role in any outbreak, take part in exercises and learn the management and organizational structures which would apply in times of emergency.

"It is crucial that the State Veterinary Service is able to respond flexibly to any new disease outbreak; it needs to be able to gear up its numbers very quickly," said Bradshaw.

### Research Seeks to Curb Poultry Disease, Mortality

Sygen International, a world leader in applying quantitative genetics and biotechnology to animal breeding, is to receive funding from the BIRD (Binational Industrial Research and Development) Foundation to carry out research into disease resistance and mortality in poultry.

Commencing this month and lasting for around a year and a half, the project will attempt to identify and sequence genes that increase susceptibility to certain diseases, which in turn increase mortality rates in poultry. The initiative is a collaboration between Sygen International and Yissum, a technology transfer company of The Hebrew University Of Jerusalem.

The BIRD Foundation is an Israel-US research and development fund. Its mission is to stimulate, promote and support industrial research and development of mutual benefit to the US and Israel. In July, the BIRD Foundation approved \$9 million in support for 10 development projects valued at a total of \$20 million.

Sygen's technology, products and services enable producers and farmers to enhance meat quality and improve efficiency in the production of meat animals. Sygen applies a unique combination of quantitative genetics and biotechnology to animal breeding, which is applicable across all livestock species.

### APHIS Appoints Associate Deputy Administrator for Emergency Management

APHIS Deputy Administrator for Veterinary Services (VS) Dr. Ron DeHaven has announced the selection of Dr. Larry Granger as the new associate deputy administrator for emergency management, a new senior level position with VS.

"Dr. Granger's background and expertise will help VS and APHIS navigate these challenging times of increased national security, END eradication and other issues yet to emerge," said DeHaven. "I know he is up to the challenge and will be a terrific addition to the APHIS team."

Granger most recently served as TB program coordinator for the Michigan Department of Agriculture, Animal Industry Division, where he coordinated statewide TB eradication efforts in livestock. Granger has been with

MDA since 1990.

Before being assigned to his current position in 2000, Granger worked for the MDA Office of Agriculture Development as a veterinary consultant where he was responsible for macroeconomic issues, department policy and legislative initiatives. Prior to that he served the MDA Animal Industry Division as pseudorabies eradication program coordinator and official pseudorabies epidemiologist.

Granger also worked as a veterinary medical officer with USDA, APHIS, VS in southern Ohio for two years, and owned and managed a mixed animal veterinary practice for nine years. He received his Doctor of Veterinary Medicine from Michigan State University in 1979.

## Egg Industry Unveils New Animal Care Certification Logo



Consumers and retailers concerned about animal welfare can now easily spot eggs produced using the United Egg Producers (UEP) new animal care guidelines. The UEP has unveiled a new certification logo that will appear on egg cartons from farms that adhere to new animal care guidelines that were announced in June. Egg producers representing more than 200 million layers or 80 percent of the industry have already signed on to

participate in the program.

Participating producers will be audited yearly through an independent certification program to ensure the new standards are being met.

"Since June, we have been overwhelmed by calls from consumers, retailers and restaurants wanting to know how they can get eggs from certified farms. This new certification logo makes it easy," said Al Pope, president of the United Egg Producers.

The guidelines place top priority on the comfort, health and safety of the chickens, and include:

- Increased cage space per hen, which is being phased in to avoid market disruptions;
- Standards for molting procedures based on the most current, verified scientific studies;

- Standards for trimming of chicks' beaks, when necessary, to avoid pecking and cannibalism;
- Maintaining constant supply of fresh feed, water and air ventilation throughout the chicken house, and monitoring for ammonia;
- Standards for daily inspection of each bird as well as proper handling and transportation;
- Availability of a new training video to instruct producer staffs on the proper handling of chickens to avoid injury to the animals.

The UEP has also commissioned three scientific studies to identify the safest, most humane and effective practices for induced molting among hens.

The UEP guidelines are available on the Internet at [www.unitedegg.org](http://www.unitedegg.org).

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