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flock with chemotherapeutic drugs, it means that first-line prevention did not work. Other considerations such as benefit/cost ratios, antibiotic withdrawal times, and microbial antibiotic resistance are important issues in this area. Limiting exposure to pathogens is accomplished by following the rules of biosecurity about which much has been written. Cleaning and disinfection of the house and equipment, and adequate down-time between all in-all out flocks are the adjuncts to biosecurity in this control category. The general method of "decreasing stress" refers to all of the good management practices aimed at providing the best quality environment, feed and water that the grower and flock supervisor can provide to the flock. On a day-to-day basis, these items are the ones that the grower can impact the most. Lapses in those areas cannot be overcome by any of the other control methods. Vaccination of broilers for specific diseases is also an extremely important, although often poorly understood method of control. Following are basic principles that apply to vaccination of broilers.

#### Vaccination of broilers

Vaccination is a planned and controlled exposure to an antigen (infectious agent in some form) in order to stimulate proactive immunity against the particular antigen. In broilers, most of the very early protection comes from the parent flock in the form of maternal antibody passed to them in the egg. An important goal of the broiler breeder vaccination program is to develop sufficient levels of antibodies to particular disease agents that you want the progeny to be protected against early in life. This is referred to as "passive" immunity, because the broiler chick receives protection via the hen without encountering the pathogen and mounting an active antibody response of its own. While extremely important to the health of the young chick, passive immunity lasts a very short time and has poor cross protective effects on pathogens of multiple serotypes. To continue protection for the rest of the life of the flock, vaccination of broilers with live vaccines is necessary to cause an active immune response to the pathogens of concern. Timing of these vaccinations is in part based on predicted maternal antibody levels. At this point, proper handling, dosing and application of the vaccine also becomes important so that each broiler receives an effective dose in a short period of time.

In broilers, we want to induce a sufficient amount of immune response (usually measured by antibody titer), and we want it to last as long as the life of the broiler. Insufficient response is undesirable because the bird won't have adequate protection for an adequate period of time. Over-immunization (excessive field boosting) is wasteful because the bird develops more protection than will need in its short life span. Quality of response refers to the fact that some disease agents have multiple strains or serotypes. The type of vaccine used should con-

tain the appropriate strain or serotype that matches the field challenge strains or the bird may not be protected adequately.

Broilers in our region are typically vaccinated for at least three viral diseases, Marek's disease, Newcastle disease (NDV), and infectious bronchitis (IBV). Some broilers are also vaccinated for infectious bursal disease. Live Marek's disease vaccine is injected into the incubating egg or into the newly hatched chick at the hatchery. This should protect the bird for life against tumor formation and immunosuppressive effects. Live vaccines for NDV and IBV are given once or twice by mass application (spray or drinking water) to protect against respiratory disease. They are generally applied together. Infectious bursal disease vaccines can be given once or several times, depending on maternal antibody status and local challenge. The goal is to preserve the integrity and function of the bursa of Fabricius, a critical part of the bird's immune system.

Let's take a closer look at the two respiratory viruses for which we vaccinate, IBV and NDV, and why they are so important. IBV and NDV can cause significant damage to the upper respiratory tract. They usually do not kill the birds, but they do allow secondary bacterial infections, especially *E. coli*, to flourish and cause significant sickness, increased mortality, and/or condemnations, especially due to air sacculitis. In addition, certain strains of IBV damage the kidneys and can cause morbidity and mortality due to renal failure. Both IBV and NDV are highly contagious and ubiquitous enough that vaccination is necessary to control them. Many broilers receive their first vaccination for IBV and NDV by spray cabinet at the hatchery. This vaccination can induce a good immune response, even in the presence of significant maternal antibody. However, protection will not last throughout the growing cycle from this day-old vaccination. Therefore, if any level of challenge is present, a second application using IBV/NDV vaccine by spray or water is necessary during the growing cycle, usually between 12-20 days of age. Immunity from this field boost should last another 5 weeks. A noticeable respiratory reaction is expected to develop a few days after vaccination, which should peak by 5 days and be gone by 8-10 days post vaccination.

IBV and NDV live attenuated vaccines have the potential to cause "rolling reactions" that may be severe. A rolling reaction means that excessive and prolonged respiratory symptoms persist in the flock, often accompanied by air sacculitis. There are multiple reasons for a rolling reaction to occur, but often improper vaccination technique is involved. To prevent these reactions, all broilers in the house should receive an effective dose of vaccine in a short period of time. If some birds, but not all, drink the vaccine water or inhale the vaccine spray, they then propagate and shed viruses which pass to the next subset of birds, which in turn, shed to other birds, etc. There is evidence that these attenuated live vaccine viruses may

become more virulent upon repeated passage in the flock, and may then cause a degree of disease that the vaccine was designed to protect against. Therefore, ensuring adequate exposure of every bird to the fresh vaccine is paramount when vaccinating for these respiratory viruses.

Strict attention to the details of biosecurity, environment and feed and water management, and vaccination will pay dividends to the broiler grower. Quality care is the key to protecting broiler health and turning out a quality product.

Speakers at the event included Jack Tarburton, Delaware secretary of agriculture, Dr. Pam Plotkin, assistant professor of wildlife conservation, University of Dela-

ware, Department of Entomology, Newark, Del.; Susan George, Esq., Defenders of Wildlife, Albuquerque, N.M.; Rick Giovenca, U.S. Fish and Wildlife special agent, Bombay Hook, Del.; Charles Poukish, Maryland Department of Environment, Annapolis, Md.; and staff from various units in the Delaware Department of Agriculture and the Delaware Department of Natural Resources and Environmental Control.

All certified pesticide applicators in Delaware who attended will receive five recertification units for attending the conference. In Delaware, commercial pesticide applicators must be certified every year, and private applicators must receive certification every

three years. Training and certification dates for 1998 follow:

- March 2-3, New Castle County Cooperative Extension Office, S. Chapel St., Newark, Del.
- March 10-11, Sussex County Cooperative Extension Office, Rt. 9, Georgetown, Del.

- March 24-25, Kent County Cooperative Extension Office, S. DuPont Highway, Dover, Del.

- June 23-24, Kent County Cooperative Extension Office, S. DuPont Highway, Dover, Del.

For more information on the conference or training and certification, call Grier Stayton toll-free in Delaware at (800) 282-8685 or (302) 739-4811 or e-mail, grier@smtp.dda.state.de.us.

## Cattle Sale At Beef Expo

STATE COLLEGE (Centre Co.) — The Pennsylvania Cattlemen's Association will host a commercial heifer (non-registered cattle) and a special purebred breeding cattle sale here at the 1998 Pennsylvania Beef Expo on March 28.

In an effort to help all cattlemen in Pennsylvania and surrounding states, the Beef Expo committee will be holding a sale of commercial breeding prospects. The committee seeks producers who have open or bred heifers that are not registered with a purebred breed association. All beef breeds and their crossbreeds are welcome.

The committee will also offer a sale of purebred or registered cattle that will be managed by the Beef Expo committee. The Angus and Simmental breeds will have their own breed sales. For cattle producers with breeds that are less numerous, a separate sale will be held during the Expo.

Cattle producers who have quality females to sell should contact one of the sale managers by Feb. 14.

For more information, contact sale managers John Myers at (717) 428-2309 or Dave Semans at (814) 238-8909.

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# CLASSIFIED ADS

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Mon., Tues., Wed., Fri. 8 AM to 5 PM; Thurs. 7 AM to 5 PM

### 1a CONSTRUCTION EQUIPMENT

10' snow plow w/frame and electric hydraulic pump. \$1,100 OBO. (215)654-9237.

1970 Case 680E backhoe, extend-a-hoe, new tires, full cab, good condition, \$11,800 OBO. (610)847-8704.

1976 380 Timber Jack log skidder, also 1989 Morbark 12" hand fed chipper, both in VG condition. (717)769-7603.

1980 Gradall type excavator, Detroit diesel up and down, 2-buckets, good condition, \$11,000. 610-562-5186

1983 Case 580 SE backhoe, good tires, has plumbing for braker, \$13,500. (717)274-3305.

1984 JD 544C, cab, bucket/forks, excellent condition, \$32,000. (301)371-5500.

1990 Gehl 4610 skidloader w/attachments, 46Hp Perkins diesel. Good condition, must sell. Call Matt, 410/838-4270.

1992 Mobark 290 disc chipper, Cummins diesel, 890 hrs., \$9500. 1988 Eager Beaver, 9DOW trailer, new tires and deck, \$3500. 609-589-3418

1993 JD 310D 4WD, cab, E-stick, VG condition, \$35,000. (301)371-5500.

2 big Michigan loaders, 4WD, 3yd & 2yd buckets, need motors. 610/298-2486 evenings.

Alphalt roller, 3 ton, 2 cyl. Wisconsin engine, low/high transmission, good shape, \$2750 OBO. 717-229-2333

Bobcat 763 skid loader, 927 hours, 66" C&I type bucket, front hydraulics, w/backhoe mounts, as is, \$17,500. (717)374-3753.

Bridgewood moulder, 1992, model BW462M, 4 sided, 4 spindle, heavy cast iron construction, excellent condition, \$8,000. Call (301)791-7880.

Case 580E w/enclosed cab, 4x4, extend-a-hoe, works great, \$20,250 OBO. 410-452-5537 after 6pm

Cat 944 rubber tire loader, side dump, good condition, good tires, asking \$10,000. 908-236-2969

Century Migwelder, 225 amp., 220 volt w/ accessories, like new, \$950. (717)528-7702

Commercial air compressor, 15hp electric, \$1000 OBO. 410/239-0579.

D4D caterpillar, power shift w/C-frame blade. (607)243-8151.

DISTANTLING FOR PARTS: AC HD-7GB loader, good engine, fair w/c, open ROPS. Call for parts prices.

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36" Stow cement trowler, Honda motor, excellent condition w/original blades, \$900. (610)593-6265.

AC tri-axle trailer, 20' deck, 4' ramp, 18,000 GVW, good paint, \$2,100. Huber grader M650 front blade, Ford diesel motor, good condition, \$10,000. Mauldin 1 ton roller, rebuilt 14hp Kohler, new paint, \$1,800. Eager-beaver 1 ton roller. Make offer. (717)575-1519. (717)627-4298 evs.

Airflow hooper 5-7 yards, sander, 18hp engine, 8 months old, \$6,900. (609)296-6752.

All Terrain Pettibone, 15 ton crane, diesel, good condition, \$9800. 717/435-2468.

Diesel generator Sullair 35 KW portable unit, excellent condition, \$6,000. Englishtown, New Jersey. (732)390-8200.

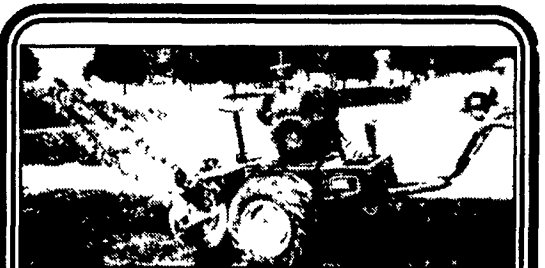
580 Super E, extend-a-hoe, cab, rebuilt engine, must sell, \$15,000. 717-292-3030

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743 Bobcat, 907 backhoe, 2 buckets, new tires, enclosure, heater, manual and more. 2777 hrs. Very good cond. \$14,000/obo. (610)524-2397

8' snow plow blade, \$200 OBO. (215)654-9237.

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