BVS POULTRY Talk

Best Veterinary Solutions, Inc.

Fall 2015

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CONTENTS

BVS Private Label Products 2
Biosecurity Update 2
Solutions for Organic Production 5
Merck Animal Health Products 6-7
Dawe's GroGel Plus 8
BioMatrix Int'l 9
ARKO Laboratories 9
Bayer 10
Animal Science Products® 11
BVS Personal Protection 12
BVS Sanitizing/Cleaning Equipment 13
ProOxine® (AH) Disinfecting Solution 14
Biosupreme 15
Virocid & Kenosan 16
Tips on Vehicle Cleaning and Disinfection 17-18
Vaxxitek® 19
Enviro™ and Enviro Supreme™ 20
Gut Start® & Gut Pro™ 21
Effects of pH on Selected Bacterial Pathogens 22
Omegamune-Plus 22
Manage® 23
BioProtexion by CID Lines 24
HPAI Cleanup Program 25-28
Steris Cal Stat® Plus and ALCARE 28
pH Safe 29
AviCare Diamond V 30
Enviro Supreme 31
Poor Air Quality at Brooding Impacts Respiratory Disease and Bird Performance 32-35
Jones Hamilton Ag PLT® Litter Acidifier 36
Lohmann Lovit LC-Energy 37
Gilmer Industries, Inc. 38-39
LiphaTech YETI Giveaway 40
Ceva Poultry Vaccines 41
Facts about Flight Control® Plus and Airepel® HC Bio Security Vent Kits 42-44
Huvepharma® Advent 45

MEETINGS & EVENTS:

North Dakota Poultry Industries Conference
December 16-18, 2015 | Holiday Inn, Fargo, ND

International Poultry & Processing Expo
January 25-28, 2016 | Atlanta, GA

National Turkey Federation Annual Convention
February 17-20, 2015 | Tucson, AZ

Midwest Poultry Federation Convention
March 15-17, 2016 | Saint Paul, MN

ARE YOU RED OR GREEN?

Robert L. Owen, V.M.D., Ph.D., DACPV
Director of Technical Services

According to the experts, the US poultry industry is about to embark on the biggest game of Russian roulette that we have ever seen. A smaller version played out this spring and we all saw how successful we were then. Fortunately, everyone has heeded the advice of experts and has spent the summer preparing for what may be coming. NOT!!!! As I have spent the summer talking to producer groups the two most common feedbacks I have gotten are "Hopefully it won't happen to me because I can't stop it" or "It doesn't matter if it happens because the Government will pay me for my birds". If that is your attitude – Shame on you!!! Experience has shown that if we change our mindset and start practicing the highest standard of biosecurity we can protect our farms and our animals. And since when did the poultry industry start looking to the government for hand-outs. This industry was founded by entrepreneurs who rolled the dice and did not count on the government for any help. Have we become so complacent and lazy that we are unwilling to be responsible for our own fate.

So let's play the newest game to come to animal agriculture – Are you red or green? The game is easy – everything outside the poultry house is red and everything inside the house is green. The objective of the game is to keep the inside of the house green. Rules of the game are as follows:

- Red is the dominant color and trumps Green. In other words if anything red touches anything green the green turns red.

continued on page 3

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has manufactured, branded and private-labled water soluble vitamins and nutritional supplements!

MANAGE®

Get into the Manage Zone
Contains Buffered Acids
Plus Copper.

Omegamune®

Omegamune® Plus

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Water acidifier without copper

Starter Pak
New improved highly concentrated vitamins with citric acid

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Highly concentrated vitamins & electrolytes

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Organic Iodine

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Dry Cider Vinegar

Citric Acid 410

Acidified Copper

Vitamin B Complex

Biosecurity Update

Dr. Dale Lauer, Minnesota Board of Animal Health
Minnesota Poultry Diagnostic Lab
www.mn.gov/bah

BIOSECURITY – now is the time for you and your employees to implement your critical level biosecurity programs. Some important biosecurity practices to consider as part of your programs are:

1. Poultry should be kept away from areas in which they'd have access to or potentially share an environment with wild birds, especially waterfowl or shorebirds. Ideally they should be housed indoors.

2. Barn doors need to be closed at all times.

   a. Consider delaying total cleans of finishing farms during our high risk time period (now-May 15 or ice out). This is to protect you from accidentally dragging something onto your farm/into your barns as well as avoiding damaging thawing driveways which can create watering holes for migrating birds.

   b. Equipment (tillers, mortality carts, etc.) need to be inside barns now and not moved outside until May 15 or until ice out. Avoid moving equipment between barns as tires can't be cleaned well, especially when it's muddy outside.

3. Nothing can enter the barn unless it's been properly cleaned and disinfected. Equipment (spare parts, loading panels, etc.) need to be stored inside so that wild birds can't get to it. Trucks (poult trucks, shavings trucks, etc.) are not to driven into the barn.

4. Use barn specific coveralls and boots. These should be kept in the barn's entryway and changed into prior to entering the flock. Coveralls and boots should be removed and left in the entry. Do not wear them outside.

5. Eliminate standing water to prevent wild waterfowl from gathering on the farm property.

6. Address feed spills immediately to avoid attracting wild birds.

7. Eliminate unnecessary farm visits from anyone not essential.

For the most updated information on highly-pathogenic avian influenza (HPAI) response in Minnesota, please visit www.mnairesponse.info. There you will also find links to additional biosecurity information and USDA updates on HPAI in the U.S.

Red or Green, *continued from cover*

- The only way to turn something green is to disinfect it in the absence of organic material or cover it in the form of clean boots or coveralls.

- Insurance can be purchased in the form of clean well maintained foot pans placed at the proper locations.

Remember everything outside the poultry house is red and if green is touched by red it turns red.

The other thing we need to talk about is levels of redness in people entering the poultry house. The level of biosecurity depends on the amount of risk posed to green areas.

- Level 1 – This level is reserved for the grower and his/her family when they stay on the farm. At this level the hands and feet of the people are red but the rest of the person is green (in other words coveralls are not required)

- Level 2 – This is for all visitors to the farm and the grower if he/she ventures off the farm around other people and/or animals or if HPAI has been diagnosed in the area. For this level the entire outside of the person is red meaning coveralls or change of clothing is required before entering the poultry house.

- Level 3 – This is for someone who has potentially been exposed to infected animals. For this level the entire person is red and is breathing fire. No one at this level should be allowed to enter a green building.

Figure 1 is a drawing of the most common biosecurity procedure practiced in the US today. The red line has been drawn at the sill of the door. This type of program can certainly be made to work but remember that what is needed is a complete change in thinking about how we handle biosecurity because the threat is much more virulent than we have seen before and is expected to last for years in all kinds of weather. So as you are trying to stand on one foot in an icy doorway in the middle of winter and accidently put your foot down in the red area then step into the green area what happens to the green area…..it turns red. And if HPAI has been diagnosed in the area and you are supposed to be putting coveralls on before you enter a green area how are you going to accomplish that. In order to have 100% compliance the procedure has to be easy and simple.

Figure 2 is a drawing of what has come to be called the "Danish Entry System". In this system a physical barrier is constructed in the mechanical room of the poultry house. This can be as simple or elaborate as you want to make it but it must be a barrier so that people entering the house are aware of the line of separation between the red outside the house and in the entry way and the green for the rest of the house. The barrier can be as simple as 6 concrete blocks on each side of the doorway and a board or bench at the front of the entry. That way people entering the house can sit on the bench, slip their red shoes off as they swing their feet over to the green side, and slip on a pair of green boots that are kept in the house. The alternative is to sit on the bench and slip on a pair of green shoe covers or plastic boots as they swing their feet into the green side. Green on green then is no problem. As added insurance to maintain "greenness", foot pans can be located beside the bench and at the entry to the bird space and visitors encouraged to use them frequently. If coveralls are required they can be

Figure 1: Typical US biosecurity system

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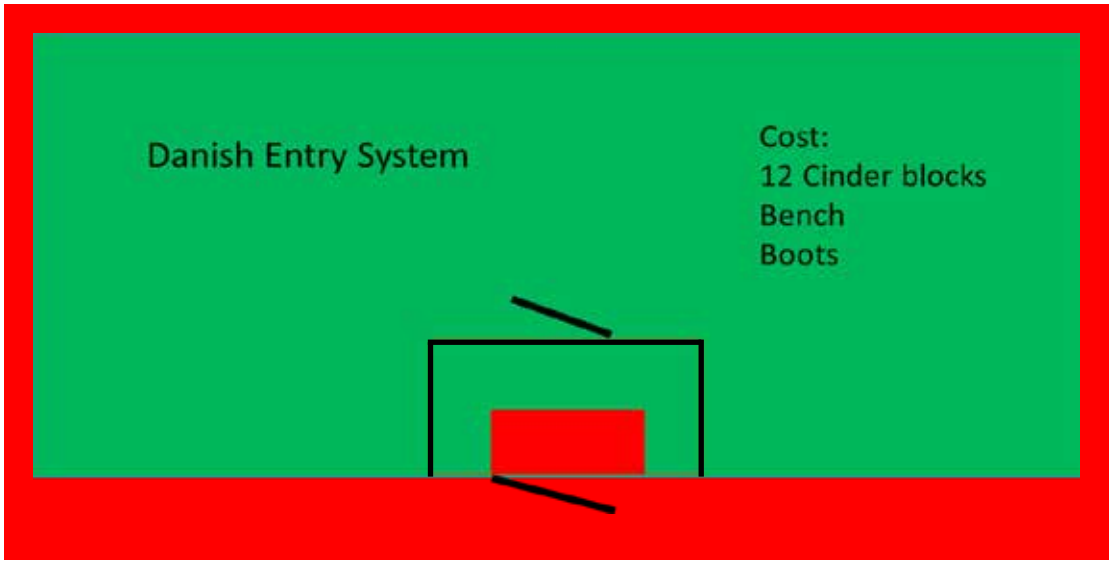

Figure 2: Danish Entry System

donned on the green side after shoes are changed.

The Danish entry system has obviously been used successfully in Denmark for many years and recently has been adopted by the US swine industry to successfully control a viral disease challenging pigs. The system works and is inexpensive and simple to maintain. Materials are less than $50.00 a house and are cheap insurance if they prevent HPAI from affecting your poultry. Figure 3 shows this entry system actually in practice. Using concrete blocks and a board the entry can be configured in any way to make it practical to enter into a red zone and change boots to maintain green.

Figure 3: Practical application of Danish Entry System (Picture courtesy of Michelle Kromm, 2015)

Last but not least don't forget your hands. Remember even at Level 1 of our game your hands are red and notice in the picture that there is a box of gloves on the bench. In the HPAI outbreak Spring of 2015 some of the highest virus levels in infected houses were recorded on door knobs and other equipment frequently touched. Hand sanitizers or gloves are effective tools in trying to maintain a green poultry house.

One question that gets asked frequently is equipment shared between houses. Especially in the turkey industry tillers are commonly moved between houses. Moving equipment between houses is a red behavior and should be treated as such. Ask yourself if it is possible to use our tools to change something from red to green. Small things such as boots and buckets can be effectively cleaned and disinfected between houses, but intricate and large equipment such as a tiller is probably too complicated to insure that it is returned to greenness.

As stated above successfully preventing the challenge that is coming is going to take a significant change in mindset. We have been very lax in our biosecurity procedures in the US because we, fortunately, have been spared from widespread severe disease challenges for many years. Those days are over and the challenge we are facing may be with us for a long time so we might as well hunker down and prepare to meet the challenge. No excuses. The government is not going to help us protect our farms and our animals. We have to do it ourselves and we should not be ignoring a tool as inexpensive and effective as the Danish entry system. As you go through your daily chores try to think of red and green behaviors. You will be surprised how many times you say to yourself that is a red behavior and I will lose. Pretty soon, though, things will start to fall into place and we will all achieve what we want – a green world.

Solutions for Organic Production

Acidifiers:

BVS Citric Acid

BVS Liquid Citric Acid

BVS Acidified Copper Sulfate

Essential Oils:

Biosupreme® L

Biosupreme® Organic Feed Grade

EnviroSupreme Green

By O Reg+

By O Reg Yucca

Cleaners/Disinfectants:

Keno™ X5

Keno™san

Pro Oxine®

Gil-O-Fact II

Supportive Care:

AviCare™

XPC™ Green

CitrisStim®

Hilyses™

Aspirin (Liquid or Dry)

Mucusol®

BVS Vitamin D3 Liquid

BVS Poult Start

BVS Vitamin EKA + D3

BVS Sol-U-K

BVS Solulytes Natural

Insecticides:

Essentria™ All Purpose Consentrate

Poultry Shield FG Sulfer

Yellowjackets Dust Sulfer

Litter Ammendments:

Klasp™

Please contact your BVS Salesman for more information on the products we offer for organic production

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Best Veterinary Solutions

*Not all products mentioned above are OMRI Listed. Approval for use in organic production is subject to approval from company's/grower's organic certifier.

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Animal Science Products Incorporated CID LINES innovative hygiene solutions Lohmann Animal Health envincio

MERCK
Animal Health

INNOVAX®-ND

TSP-V-048278 2000 dose ampules
TSP-V-116951 4000 dose ampules

Marek's Disease - Newcastle Disease Vaccine
(Serotype 3, Live Virus, Live Marek's Disease Vector)

INNOVAX®-ND is a frozen, live, cell-associated Newcastle disease (ND) and Marek's disease (MD) vaccine. It provides proven protection against virulent NDV and MD. It is approved for *in ovo* injection of 18-day embryonated eggs.

Advantages:
- Provides extended protection for virulent ND and MD
- Offers effective protection in the face of NDV maternal antibodies
- Replaces a conventional live ND vaccination program in the absence of exotic ND
- Removes the potential for respiratory reactions due to live ND vaccines
- Allows the use of monovalent infectious bronchitis (IB) vaccines, improving IB protection

NEWCASTLE CLONED N-79

TSP-V-066953 1000 dose units

Newcastle Disease Vaccine (B_1 Type, clone-selected LaSota Strain)
(Live Virus, Chicken Embryo Origin)

Newcastle Cloned N-79 is a live virus vaccine of chicken embryo origin containing a clone-selected B_1 Type, LaSota strain Newcastle disease virus. This virus has the ability to stimulate protection against a wide variety of Newcastle field strains while causing a milder reaction, in healthy chickens and turkeys, than other LaSota strain vaccines.

Advantages:
- Clone-selected LaSota strain stimulates strong immunity against Newcastle disease, while producing only mild reactions
- Product of choice for immunization of turkeys against Newcastle disease
- May be used to revaccinate broilers in areas with strong Newcastle disease

ORALVAX-HE®

TSP-V-065396 5 x 2000 dose vials
TSP-V-065398 5 x 5000 dose vials

Hemorrhagic Enteritis Vaccine (Live Virus)

ORALVAX-HE® vaccine is a high titer vaccine that safely protects turkeys 6 weeks of age or older against the immuno-suppressive effects and death losses caused by hemorragic enteritis.

Advantages:
- Safe and efficacious: produced with a stable and avirulent strain of type II avian adenovirus of pheasant origin
- Produced under federal quality control standards, ensuring purity and sterility
- Consistent high potency titers to en sure protection of every vaccinated bird, flock after flock
- Recommended administration at 6 weeks of age or older helps assure no maternal antibody interference

NEWHATCH-C2®

TSP-V-053805 10,000 dose vials

Newcastle Vaccine
(B_1, Type, C2 Strain, Live Virus)

NEWHATCH-C2® is the patented, virtually nonreactive C2 strain of B_1 Type Newcastle disease (ND) virus. It is a lyophilized vaccine approved for spray vaccination of chickens one day-of-age or older for protection against Newcastle disease.

Advantages:
- Effective against field challenge of Newcastle disease virus
- C2 strain of B_1, Type Newcastle minimizes reaction to one day-of-age vaccination in broiler chicks
- NEWHATCH-C2 eliminates problems with lingering hatchery reaction prior to field boost
- Safe to use for hatchery application

MERCK
Animal Health

MERCK
Animal Health

PM-ONEVAX®-C

TSP-V-065417 1000 dose units

Pasteurella multocida Vaccine
(Avirulent Live Culture, Avian Isolate)

PM-ONEVAX®-C vaccine. The seed culture used to make this vaccine hs been laboratory tested for protection of chickens against challenge with the X-73 (Type 1) strain of *P. multocida* and in turkeys against challenge with the P1059 (Type 3) strain of *P. multocida.*

Advantages:
- A temperature sensitive mutant of the CU strain that produces stronger takes than the M-9 strain, but less than the CU strain
- Offers protection against naturally occuring field strains of *P. multocida*
- Easy wing-web administration in broiler breeders, layers and turkey breeders

ART VAX®

TSP-V-065236 1000 dose units

Bordetella avium Vaccine
(Avirulent Live Culture)

ART VAX® vaccine is a live bacterial vaccine containing a chemically induced mutant of *Bordetella avium* which is immunogenic for turkeys when vaccinated by spray cabinet at day of age; then revaccinated in the drinking water at 2 weeks of age.

Advantages:
- Approved for spray administration at day of age followed by drinking water at 2 weeks of age
- Proven efficacy in preventing coryza in turkeys
- Time proven. This vaccine strain has been used effectively in the field for over twenty years
- Mild reaction
- Freeze dried product of proven quality and stability

M-NINEVAX®-C

TSP-V-065378 1000 dose units with diluent and wing-web stabbers

Pasteurella multocida Vaccine
(Avirulent Live Culture, Avian Isolate)

M-NINEVAX®-C vaccine is a live bacterial vaccine containing the mild avirulent M-9 strain of *Pasteurella multocida*, Heddleston Type 3-4 cross, in a freeze-dried preparation sealed under vacuum.

This vaccine strain has been shown to offer protection against fowl cholera in chickens and turkeys. The seed culture used to make this vaccine has been laboratory tested for protection in chickens against *P. multocida* serotype 1 and in turkeys against challenge with *P. multocida* serotype 3.

Advantages:
- Strong protection against *P. multocida* serotype 1 (chickens) and serotype 3 (turkeys)
- Mild. Less reactive than competitive products
- Safe. Avirulent live culture will not revert to virulence, will not cause mortality
- Specially formulated diluent provides excellent reconstitution stability

BVS is the exclusive distributor and marketer of Merck turkey vaccines in the U.S.

MERCK
Animal Health

GroGel™ Plus

For hatchlings to start off well they need prompt access to water and feed. The earlier access promotes more rapid development of the digestive tract and the immune system. In turn this results in improved livability and as much as 5% to 7% heavier bodyweights.

GroGel Plus provides an easy means by which just-hatched chicks and poults can receive immediate nutrition and hydration. A unique formulation, GroGel Plus is tailored specifically for the limited amount a hatchling can eat, and for the immature nature of its digestive tract.

In a soft palatable gel, GroGel Plus supplies crucial nutrients in the most concentrated, digestible forms:

WATER is the largest single component of the hatchling's body. Normally it is depleted during hatch and transport. Dehydration can lead to increased mortality, loss of bodyweight that is never completely recovered, slower rates of gain and depressed immune response. GroGel Plus supplies a substantial amount of water, giving birds a better chance to thrive.

PROTEINS, PEPTIDES, and AMINO ACIDS are the main "building blocks" of most body tissues. GroGel Plus contains processed, complete proteins purified from several sources to supply a careful balance of peptides and amino acids. A practical amount of these purified proteins also is provided in partially digested form, to facilitate absorption.

CARBOHYDRATES are the primary energy source in all poultry diets. The grains selected for GroGel Plus are processed to remove unnecessary fiber and other poorly digested fractions, and to improve the digestibility and concentration of the carbohydrates.

FATS supply energy, and become parts of membrane and nerve tissue. They must be very digestible due to limited enzyme and bile production in very young birds. The fats in GroGel plus provide high levels of essential fatty acids in digestible form and are specially processed to be water-dispersible.

VITAMINS are the catalysts that facilitate the work of all digestive, growth and immune processes. One dose of GroGel Plus exceeds all necessary vitamins for day-old hatchling. Additional consideration is given to those vitamins most effective at fighting stress and improving immune function.

SUPER HYDRATING GEL provides the framework to carry the nutrients in GroGel Plus. Designed to attract the attention of hatchlings, the gel promotes immediate consumption.

Don't let the critical first hours of life pass by without nourishing each vulnerable and valuable hatchling. GroGel Plus fights the clock, easily and effectively.

THE SOONER THE BETTER!

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bioSecure™ BacTrac™ FB

The consideration to improve your biosecurity protocol

- Drying agent to control odor in livestock facilities
- Contains lactic acid and essential oils
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Manufactured by: **BioMatrix International**
"Applying Science and Technology Naturally"
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Snick Guard (2,000 & 5,000 dose)
Autogenous Vaccines

WWW.ARKOLABS.COM

Brands of a feather flock together

Bayer recently acquired the KMG line of insecticides. So now some of your favorite brands will come from a familiar partner. Once again, Bayer has upped our commitment to bringing you high quality insecticides along with the proprietary research to bring you more.

Included are products from popular brands like:

Tempo® Credo® QuickBayt®
Permectrin™ Proxitane® Rabon™
Ravap® Vapona®

Even better, all these products have the complete support of Bayer Account Services at 1-800-633-3796 or bayerdvm.com.

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Transforming livestock production

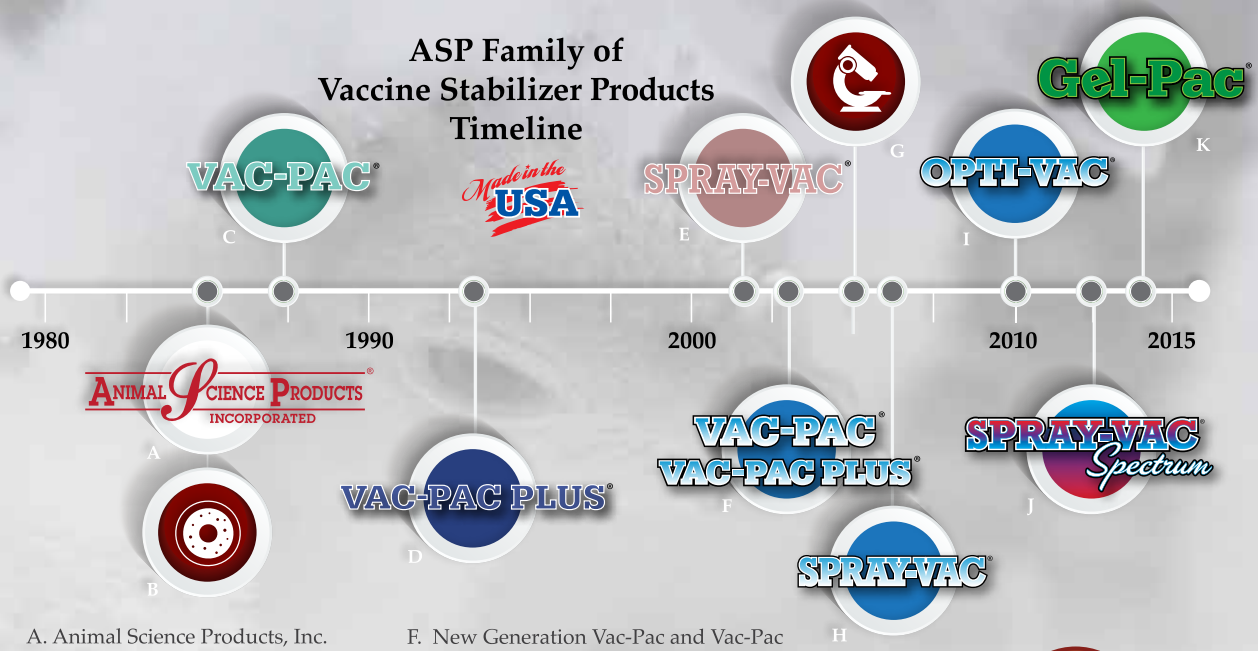
I12879

Vaccine Stabilization and Protection: A History of Innovation

Since its humble beginnings in 1985, Animal Science Products has expanded the boundaries of product development. For nearly twenty years, ASP has established a reputation as an innovator and industry visionary, eventually leading to the 2002 break-through we know today as New Generation vaccine stabilization. Once Spray-Vac, ASP's first New Generation vaccine protection product, was introduced to the market, the race was on to develop even more efficient, reliable, and cost-effective delivery methods for proper vaccination.

In just over 10 years, ASP has introduced five additional vaccine protection products, ranging in delivery methods from drinking water, to eye-drop application, to novel sprays that stimulate preening and feeding behaviors. Together, these products are changing the way poultry producers around the world protect their flocks against disease. Consumer demand for healthy poultry is on the rise globally. This demand calls for better ways to inoculate the entire flock, and is a driving factor behind ASP's commitment to innovation in vaccine protection.

ASP Family of Vaccine Stabilizer Products Timeline



A. Animal Science Products, Inc. chartered and founded as a water soluble packaging company

B. ASP introduces its first powdered milk-based vaccine stabilizer

C. Vac-Pac® vaccine stabilizer first appears, incorporating enhanced solubility and improved dose recommendations

D. Vac-Pac Plus® is introduced with added blue dye for visual vaccine monitoring

E. Introduction of Spray-Vac® – a New Generation vaccine stabilizer that eliminated the need for distilled water

F. New Generation Vac-Pac and Vac-Pac Plus introduced with patent-pending technology that improves solubility and effectiveness

G. Product development laboratory expansion

H. Spray-Vac improved to protect both viral and bacterial vaccines

I. Introduction of Opti-Vac®, a tonically-balanced ocular delivery stabilizer

J. Spray-Vac Spectrum developed with enhanced spectral response and increased preening

K. Introduction of Gel-Pac® new generation gel delivery system of vaccines, probiotics, and nutritional ingredients

Learn more at www.asp-inc.com
or contact your local BVS Sales Representative

ANIMAL SCIENCE PRODUCTS® INCORPORATED

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BVS Personal Protection

Poly-Pro Ez Tie 4 & 6 mil

Elastic Top Boots 3 & 6 mil

Treader Boots XL & Jumbo

Shoe Cover 4 mil Clear

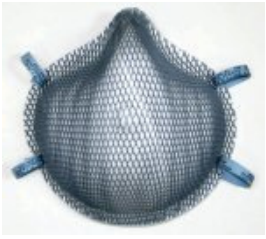
Shoe Cover 6 mil Blue

Latex Powdered Gloves

Latex Powder Free Gloves

Nitrile Powder Free Gloves

Yellow Rubber Boot Cover LG & XL



Moldex 1200N95 Mask

Moldex 2400N95 Mask

Moldex 2200N95 Mask

Nuisance Mask

Moldex Mask 7000 Series

Moldex Cartridges Multi-Gas

Moldex P100 Filter Disk

Moldex Piggyback Adapter

Navy Polypropylene Coveralls

White Micromax Coveralls

White Coveralls with Hood and Boot

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BVS Handy Foamer with Tank

Hydro Foamer 481

0.5 Gallon Foam Unit

1.3 Gallon Foam Unit

15 Gallon Conentrate Foam Unit

Concentrate Foam Unit

Doorway Foam Unit

Footwear Sanitizing Unit with Boot Scrubber

10 Gallon Fog Unit

Wall Mounted Fog Unit

Disinfection Mat

Doorway Foam Unit

0.5 Gallon Foam Unit

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ProOxine®(AH) Disinfecting Solution

For Animal Drinking Water

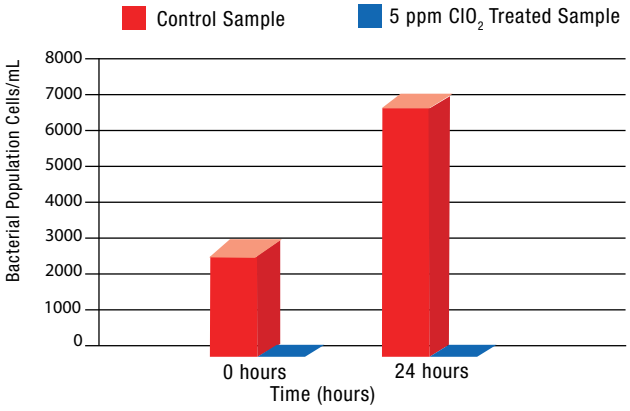
ProOxine® is the most effective tool for water management in animal facilities. ProOxine® keeps the bacteria level down in the water lines, and prevents biofilm from developing thus keeping the animals healthier by keeping down the pathogen level that could potentially travel from one animal to another. ProOxine® makes drinking water more palatable to poultry and livestock and therefore they drink more. Additionally, ProOxine® is highly effective in keeping water systems free of build up.

AANE (Automated Activation Non-Electric) System

Efficacy of ProOxine® against Biofilm

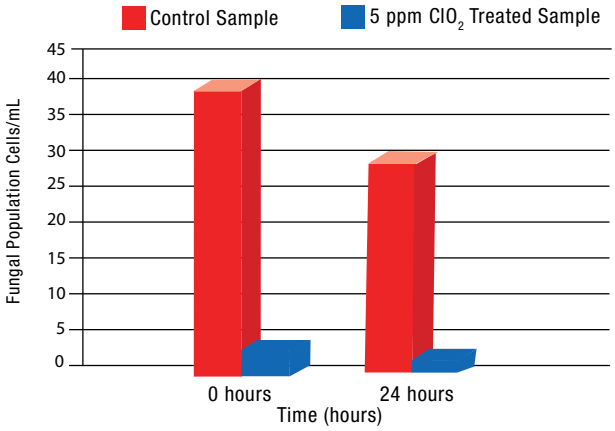
CONTROL EFFECT OF 5 ppm ClO_2 AGAINST BIOFILM BACTERIA

On Bacteria	Control Sample	5 ppm ClO_2 Treated Sample
0 Hour	3000	30
24 Hours	7000	2



CONTROL EFFECT OF 5 ppm ClO_2 AGAINST BIOFILM FUNGI

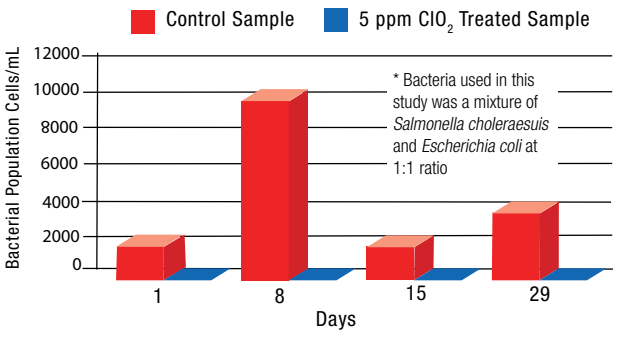
On Fungi	Control Sample	5 ppm ClO_2 Treated Sample
0 Hour	40	4
24 Hours	30	2



Efficacy of ProOxine® against Salmonella and E-coli

REDUCTION OF BACTERIAL POPULATION* IN WATER AFTER CONTACT WITH 5 ppm CHLORINE DIOXIDE

On Bacteria	Control Sample	5 ppm ClO_2 Treated Sample
1 Day	2000	20
8 Days	10000	2
15 Days	2000	2
29 Days	4000	2



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Pure *Yucca schidigera* powder

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ORGANIC FEED INGREDIENT

ENHANCES FEED EFFICIENCY
BIOSUPREME® contains saponins (active ingredient), which have surfactant properties, playing an important role in animal nutrition. The glycocomponents within saponins have a natural affinity to bind ammonia and other noxious gases, therefore improving the environmental air quality within the poultry houses, swine barns, and other livestock commercial facilities.

REDUCES THE NEGATIVE EFFECT OF AMMONIA
BIOSUPREME® is produced under strict certified Food Safety Management System guidelines as well as certified organic manufacturing process. We use only mature and over mature *Yucca schidigera* plant stems obtained under an environmentally conscience sustainable harvesting program, monitored by our own in-house forestry engineers.

BIOSUPREME® L
Available in concentrated liquid, which can be included in drinking water systems.

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BAJ-AN-BSP-EN-01

The world's leading disinfectant Virocid has become even more powerful.

Thanks to the extraordinary cleaning power of **Kenosan**, the world's most powerful disinfectant **Virocid** is able to penetrate deeper and disinfect even more thoroughly than you were used to.

Kenosan combines ultra-strong adhesion power and deep penetrating cleaning action at very low dilutions! The high-level formulation guarantees a unique cleaning result in the most heavy-duty circumstances in the pig, poultry and dairy houses. Even the most thick and dried up dirt (manure, litter, etc.) like in farrowing crates, fattening pens, turkey or broiler rearing houses, milking parlours etc. stands no chance against the penetrating and dissolving power of Kenosan. The cleaning action also gets amplified by extended contact time due to the sticky foam that remains attached upon all types of surface.

CID LINES
innovative hygiene solutions

www.cidlines.com

Tips on Vehicle Cleaning and Disinfection

By Van Harper, BVS Sales Manager, Washington, IN

With high path AI and PEDV prevalent in our worlds of poultry and swine, there has been a major emphasis from both industries on cleanliness and disinfection of vehicles! Vehicles, especially vehicles that travel onto farms, are at a high risk of transmitting and spreading diseases. The importance of having vehicles clean and disinfected certainly cannot be overstated in today's current climate! Listed below are some factors that one should consider as they choose not only which products to use but also how they use them!

Cleaning- As has been demonstrated in several studies, proper and thorough cleaning of any object will remove approximately 80-90% of bacteria, thus cleaning is an extremely important step and cannot be eliminated. When cleaning vehicles, one must evaluate the following questions:

1) Do I foam or simply pressure wash? Foaming reduces labor, water usage, and wastewater volumes. Using foam allows very rapid application of the detergent or soap being used-up to 3 times faster than simple high pressure water. Foaming detergents will "melt" away organic matter allowing for less time spent washing with a pressure washer. Foaming also gives the user a "visual" indication of what has and has not been cleaned. Using foam as a cleaning method is a far superior to using simple high pressure water!!

2) When I select my detergent, how biodegradable is it? Obviously, we must be very cautious when choosing detergents as some will contain high levels of phosphates or may be solvent based which can cause wastewater concerns!

3) What is the pH of the detergent I am going to use? The pH of your detergent will largely determine how much damage is done to your rolling stock from the cleaning process. Every detergent will have the pH of the product listed in SDS. Detergents used in the vehicle cleaning process are mostly basic in nature and will have a higher pH. Keep in mind that a pH of 11 is 10 times less corrosive than a pH of 12 and 100 times less corrosive than a pH of 13!!

4) How can I tell if my product produces a good foam? The best foams produce the most contact time. This means the more gelatinous, the better the foam will clean. A watery and non-adhesive foam will not clean well at all.

5) What about cost, what can I do to keep my cost as low as possible while still obtaining a clean vehicle? Simply looking at the price of detergent per gallon is NOT an accurate method to economically evaluate detergents. The old axiom of, "you get what you pay for" certainly rings true in this market! One should not only look at price per gallon but also at RECOMMENDED DILUTION RATE to evaluate the entire economical picture! An example would be a detergent with a cost of $8.00/gallon with a dilution rate of 4 oz/gal is **twice** as expensive to use than a detergent with a cost of $15.00 and a dilution rate of 1 oz/gal!!

When evaluating all the above criteria, one needs to look at a product that covers all criteria well. A careful and thoughtful process when choosing both the product and the method will go a long ways to

protecting your vehicle stock and your wastewater while still producing a clean vehicle at an economical cost! BVS recommends KENOSAN when choosing a detergent that meets the above criteria. KENOSAN has no harmful wastewater issues, has a pH of 11 (lower than any other detergent I have seen), produces a very adhesive foam in all types of water and is the most economical detergent we sell due to it's 1 oz/ gallon dilution rate! Contact your BVS representative for more information.

Disinfection- Disinfection is the "icing on the cake." If we have done a proper cleaning of our vehicle, then our disinfection becomes immensely easier and more effective. The old saying that you cannot disinfect fecal material is also a very true statement. When disinfecting our vehicles one must consider many of the same items as cleaning with a few other thoughts:

1) Do I foam or spray my disinfect on my vehicle? We also recommend you foam your disinfect on. Foaming will reduce water and wastewater usage in addition to giving the user a "visual" indication of coverage of the disinfection job.

2) Again, is my disinfect biodegradable? For the exact same reasons we want our detergent to be biodegradable are why we want our disinfectant to be biodegradable. There are several disinfectants on the market today which are not very biodegradable, please check ones you are considering carefully!

3) What is the pH of my disinfectant? Again we are looking at damage to vehicles from harsh chemicals. Most disinfectants are acidic (low pH) in nature versus higher pH cleaners. Again, you can find out the pH of these products on the SDS sheets.

4) How well does my disinfectant foam and/or do I need to add a foam enhancer? As opposed to cleaners, foam quality is not as important with disinfectants as we are not counting on the foam to clean but simply to cover. By the same token, the better the foam, the better the coverage, so not as important but still relevant for sure.

5) What about cost? Again, look at both the cost per gallon and the recommended dilution rates to effectively evaluate your cost.

6) How long should I wait after cleaning before I begin disinfecting my vehicle? We recommend that your vehicle be completely dry prior to disinfection. If it is not, you are diluting your disinfectant and may not get the job you want done! If your process does not allow for drying time, then we recommend doubling the recommended disinfecting dilution rate to account for diluting. The other important item to remember about disinfection is that it should NEVER be rinsed after applying. We want as much residual as possible when done!

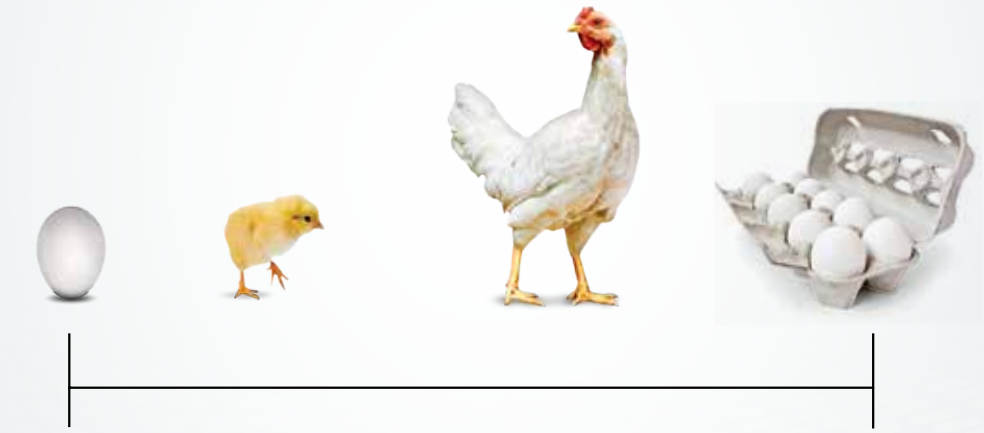
When choosing a disinfectant, we again want a product that covers the above criteria well. BVS recommends VIROCID for vehicle disinfection. VIROCID is biodegradable, has a very neutral pH (5), has foaming enhancers already in the jug and is very economical with the proper dilution. In addition, VIROCID has a comprehensive label that includes bacteria, virus and molds.

Taking the time to evaluate cleaning and disinfection products can pay huge dividends in the future in both terms of economics and bio-secure farms, it is well worth the time and effort! Contact your BVS representative today to discuss in greater detail.

Barnes Paper

- ✓ "A" & "B" Flute Brooder Guard Feed Paper
- ✓ 12" Water Line Paper
- ✓ Jumbo Corrugated Feed Lids
- ✓ Disposable Feed Lids
- ✓ Red & Gray Plastic Feed Lids
- ✓ Egg Cases and Egg Flats

A lifetime of immunity.[1]



from hatch

to harvest

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HVT+IBD

The company you trust

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A SANOFI COMPANY

One single vaccine dose never did so much. Vaxxitek® HVT + IBD provides lifelong immunity[1] which leads to healthy birds, better performance and operational profits.[2] Talk to your local Merial representative for more information.

1 Merial Study 99-0763-R, data on file. Merial, Inc.
2 Merial Study VAX-10-0120-FS, data on file. Merial, Inc.
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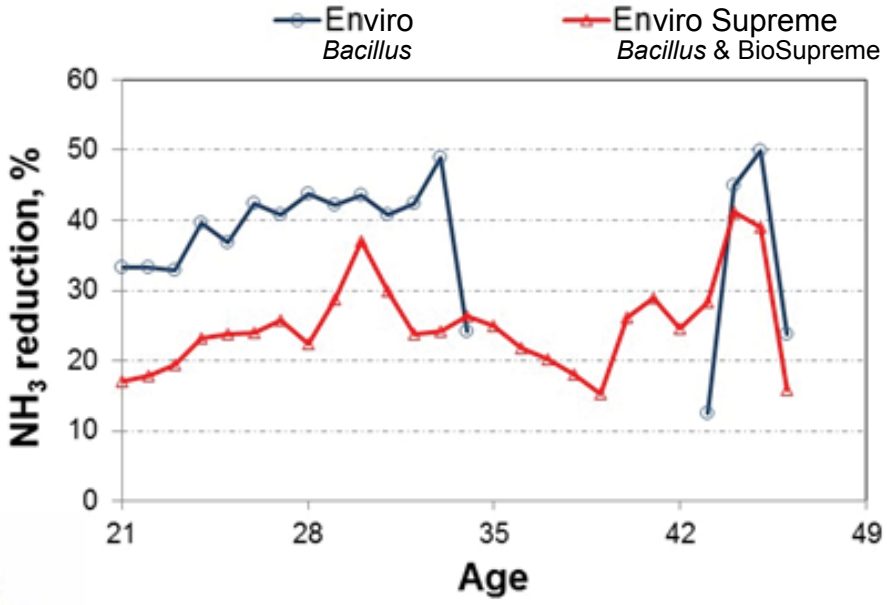
- University Research shows Enviro Supreme reduced NH_3 throughout the flock by 15-40%
- Results indicated that both Enviro and Enviro Supreme reduced NH_3 throughout the 7 week trial period
- This data supports the ammonia reduction seen in commerical production systems

Daily mean ammonia reduction rates of two dietary additives (data points from 35 to 42 for En and 47 to 49 for both are missing due to water leakage and room temperature control malfunction)



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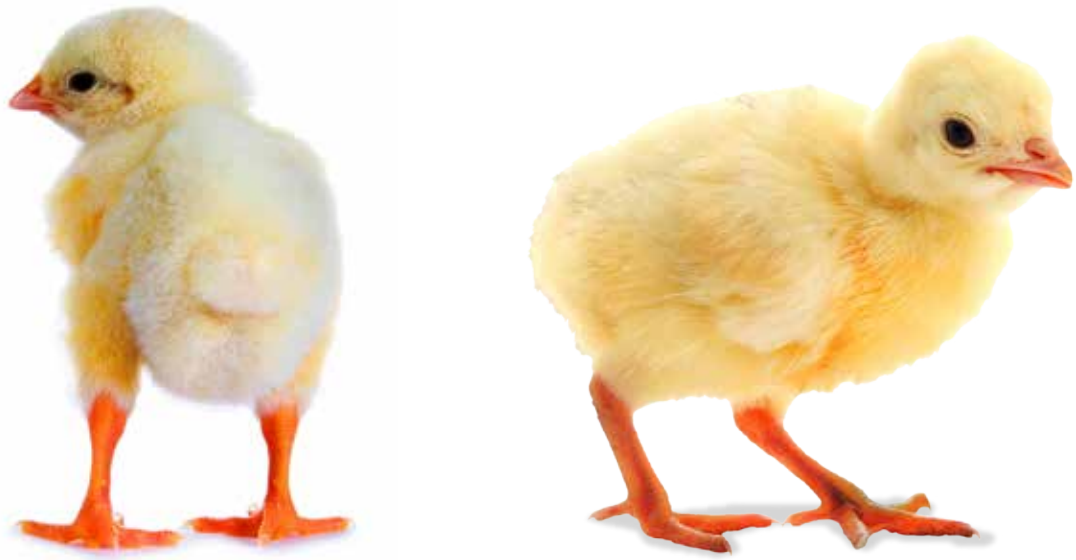

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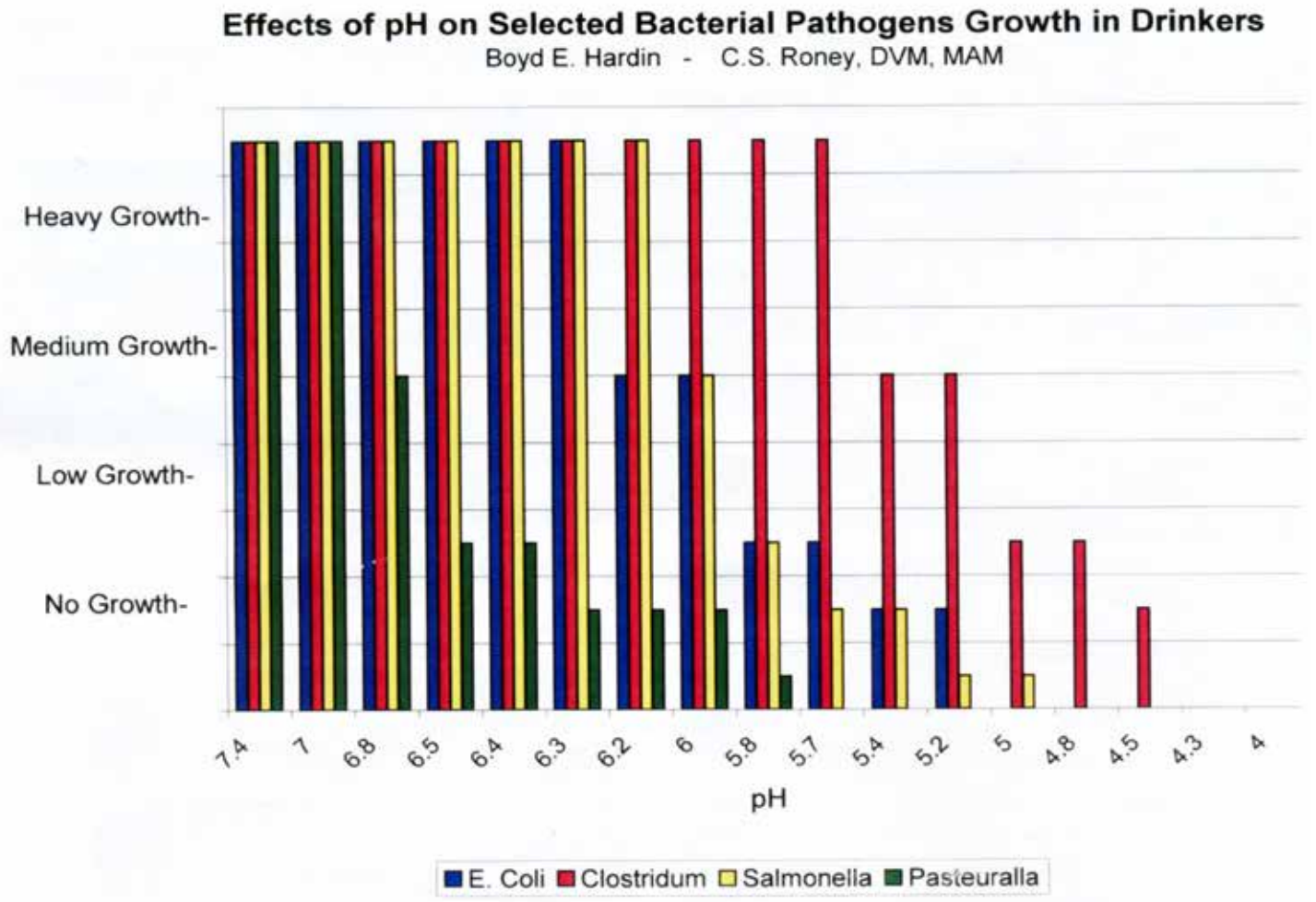

OMEGAMUNE-PLUS®

JUST RECEIVED! Patents #8,298,593 #8,460,719

WITH ANTIOXIDANTS FOR TURKEYS & BROILERS

For Use in Closed Drinking Water Systems for Poultry

GUARANTEED ANALYSIS

$CuSO_4$.....18%

INGREDIENTS: Copper, Organic Acids, BioSupremeL, Buffers, Dye #40, Extract from Essential Oils.

Omegamune-Plus *Precautions*

- Acidic solution
- Corrosive to galvanized and mild steel equipment, piping and/or fittings.
- Wear goggles or full face shield when handling
- For animal use only; not for human consumption
- Keep out of the reach of children

WARNING: ***Follow label directions***

MIXING DIRECTIONS

Standard Dosage - 1:1024 gallons drinking water. Administer 1 part Omegamune-Plus in 1024 parts drinking water. For injectors/proportioners administer 1 oz. stock solution per gallon drinking water. Prepare stock solution by mixing 1 gallon Omegamune-Plus with 7 gallons water.

Optimum Dosage - 1:512 gallons drinking water. Administer 1 part Omegamune-Plus in 512 parts drinking water. For injectors/proportioners administer 1 oz. stock solution per gallon drinking water. Prepare stock solution by mixing 1 gallon Omegamune-Plus with 3 gallons water.

Available in the following packaging:

4 x 1 gallon cases.....(Product # 100801)
5 gallon pails.....(Product # 100810)
55 gallon drums.....(Product # 100820)

Manufactured by: **Best Veterinary Solutions, Inc. • Willmar, MN 56201**

1-800-533-1899 • FAX 320-235-8629

"Marketed Exclusively by Best Veterinary Solutions"

Contact the BVS sales representative or distributor in your area for more details.

Get into the Zone

The Manage® Zone
Dietary Agent for Poultry and Swine

- is considered GRAS (generally recognized as safe).
- has a pH of 1.3.
- when mixed at recommended levels will reduce drinking water to pH 3.5-5.5.
- will hold pH down longer than other commercially available acidifiers.
- contains higher levels of copper than other liquid copper products on the market.
- is a dark purple solution that stays in solution without any settling out like that of competitive products.
- fits well into an antibiotic free program.
- works very well to maintain waterlines. Prevents scale build up.
- is friendly to the environment. 40% less copper excreted by using Manage versus feed grade copper.
- Is the only Patented product of its kind!

The Acid Sol® Zone
Dietary Agent for Poultry and Swine

- is considered GRAS (generally recognized as safe).
- has a pH of 1.3.
- when mixed at recommended levels will reduce drinking water to pH 3.5-5.5.
- will hold pH down longer than other commercially available acidifiers.
- is a red solution that stays in solution without any settling out like that of competitive products.
- fits well into an antibiotic free program.
- works very well to maintain waterlines.
- is a combination of buffered acids.
- contains No copper.

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BioProteXion
by CID LINES

COMPLETE SANITATION PROGRAM FOR FIELD AND HATCHERIES

BIOGEL

- The strongest cleaner
- Gel clings on longer than classical foam = superior cleaning result

KENOSAN

- Deeply penetrating alkaline foam for farms, incubators, trucks, …
- Apply at 1 to 1 ½ oz / gal only with a foam wand.
- Non corrosive in dilution.

VIROCID®

- EPA approved "broad spectrum disinfectant"
- QAC/glutaraldehyde based, dil 1/3 oz – ½ oz/gal
- Non corrosive
- Apply by spray, foam or (thermo) fog
- Maintains pad cooling systems

KENO™ X5

- EPA approved "broad spectrum disinfectant"
- Per Acetic Acid based, dil ½ oz/gal
- 100% biodegradable

CID 2000

- H2O2 removes heavy soils
- Peracetic Acid removes scale / mineral build up
- Equipment friendly
- Proven "greatest reduction in microbial load" by U. of Arkansas

CID CLEAN

- 50% Stabilized Hydrogen Peroxide
- H2O2 removes heavy soils
- Equipment friendly
- NO heavy metals

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Best Veterinary Solutions, Inc.

[HPAI CLEANUP PROGRAM]

In the event your farm gets hit with the Highly Pathogenic Avian Influenza Virus, follow these guidelines to aid in the cleanup process and to help speed up the time between depopulation and repopulation.

Stacked Deck Building

1. Remove any material not readily sanitized (rope or paper products).
2. Remove all feed from feed bins and feed lines. Disinfect inside and outside of feed bins with Virocid or Chlorine Dioxide (Pro Oxine) by fogging.
3. As buildings empty, dispense 2% Cid 2000 into waterlines. Leave in for 24 hours and flush lines. (Sometimes recommended to run through twice for best results).
4. Spray walls with an insecticide using a permethrin when birds are depopulated.
    - Suggestions
        - Permectrin II
        - Tempo SC
        - Permethrin E Pro
        - Perm-X UL 30-30
        - Ravap
5. Foam Kenosan or UFC+ on walls and cages. Let set for approximately 30 minutes and rinse with high pressure. Let dry.
6. Foam Virocid on walls and cages (1/3 to 1/2 oz per gallon). Let dry.
7. Check for darkling beetles. If darkling beetles are present, spray an insecticide.
    a. Suggestions
        - Credo SC
        - Tempo SC
        - Ravap EC
8. At any time in this process spray the outside of the building with Annihilator Polyzone for fly control.
9. Recommended to spray compost piles for additional fly and beetle control.
10. In the event of high infestation of flies, use an IGR (Insect growth regulator) and/or fly bait.
    a. Suggestions
        - Neporex (IGR)
        - Nyguard (IGR)
        - Quickbayt Fly Bait
11. Foam bait stations with Kenosan or UFC+, rinse and let dry. Mist with Pro Oxine to disinfect.
12. Once everything is clean, place bait for rodent control.
    a. Suggestions
        - Gunslinger-(Active: Bromethaline)
        - CyKill-(Active: Bromethaline)
        - Fastdraw -(Active: Difethialone)

        Soft bait may also work well for depopulation situations.
13. Thermal fog building with Virocid before repopulation.

*Fly, beetle and rodent control is very important in this process since all of these may be vectors or carriers of the virus.

High Rise Building

1. Remove any material not readily sanitized (rope or paper products).
2. Remove all feed from feed bins and feed lines. Disinfect inside and outside of feed bins with Virocid or Chlorine Dioxide (Pro Oxine) by fogging.
3. As buildings empty, dispense 2% Cid 2000 into waterlines. Leave in for 24 hours and flush lines. (Sometimes recommended to run through twice for best results).
4. Mist an insecticide on walls if possible before manure comes out of the pit and as soon as the birds are depopulated.
    - Suggestions
        - Permectrin II
        - Perm-X UL 30-30
        - Tempo SC
        - Ravap
        - Permethrin E Pro
5. Start upstairs and foam cages and walls with Kenosan or UFC+. Let set for 30 minutes before rinsing off. Let dry.
6. In pit area foam with Bio Gel on walls and poles (this product does a better job cleaning wood). Once Bio Gel is foamed let set for 30 minutes and rinse. Let dry.
7. Check for darkling beetles. If darkling beetles are present spray an insecticide.
    - Suggestions
        - Credo SC
        - Tempo SC
        - Ravap EC
8. At any time in this process spray the outside of the building with Annihilator Polyzone for fly control.
9. Recommended to spray compost piles for additional fly and beetle control.
10. In the event of high infestation of flies, use an IGR (Insect growth regulator).
    - Suggestions
        - Neporex (IGR)
        - Nyguard (IGR)
        - Quickbayt Fly Bait
11. Foam Virocid in building (1/3 to 1/2 oz per gallon). Let dry.
12. Foam bait stations with Kenosan or UFC+, rinse and let dry. Mist with Pro Oxine to disinfect.
13. Once everything is clean, place bait for rodent control.
    - Suggestions
        - Gunslinger-(Active: Bromethaline)
        - CyKill-(Active: Bromethaline)
        - Fastdraw -(Active: Difethialone)
          Soft bait may also work well for depopulation situations.
14. Thermal fog building with Virocid before repopulation.

*Fly, beetle and rodent control is very important in this process since all of these may be vectors or carriers of the virus.

Manure Storage Building

1. When manure is removed from building, foam walls with Bio Gel.
2. Let sit on wall 20-30 minutes before rinsing (using a turbo nozzle on a high pressure sprayer may help the process in this building). Let dry.
3. Foam Virocid on the walls and let dry.
4. If beetles are seen, spray with Annihilator Polyzone for best residual.

Wastewater Lagoon

1. Remove water and sludge from lagoon.
2. When refilling use activated Pro Oxine at a rate of 13oz per 1,000 gallons (5 ppm).
3. Should be reapplied every two weeks.

Feed Mill and Feed Bins

1. If the feed mill is on site, it is not recommended to blow dust down. If the virus is present this could put it back into the air.
2. Foam Kenosan or UFC+ on the walls. Let set for 15-20 minutes and rinse. Let dry.
3. Foam or fog Virocid on the walls and let dry.
4. Check and re-bait bait stations around the feed mill.
5. Check each feed bin individually. Remove any feed hanging on the sides.
6. Wash the inside the fee bin with Kenosan or UFC+ and let dry.
7. Disinfect inside feed bin with mist or fog using Keno X5 or activated Pro Oxine (for Pro Oxine mix at ratio of 1 ½ ounces per gallon of water).

HPAI Cleanup Program
Equipment Recommendations

BVS Handy Foamer:

- Attaches to high pressure washer
- 5L backpack worn by the operator
- Advantages: Faster and less expensive
- Disadvantage: Need to re-fill backpack with chemical regularly

Cart Foamer:

- 10,15 or 25 gallon cart foamer
- Advantages: High quality foam with more surface area before re-filling
- Disadvantage: More expensive

PPE (Personal Protective Equipment)

Coveralls:

- Tyvek Coveralls with Hood and Boot
- Micromax Coveralls with Hood and Boot

Masks:

- Dust Mask
- Moldex 2200N95 (No exhale valve)
- Moldex 2300N95 (With exhale valve)
- Moldex Half Mask or Full Face Respirator
    - Multi-Gas Cartridge

Gloves:

- Latex (Powdered or Powder Free)
- Nitrile (Powder Free)
- Outer Gloves (Knit with latex palm)

Hairnets (21” or 24”)

Footwear:

- PolyCo Shoe Cover (Regular, Large, 4mL and 6mL options)
- PolyCo Boot Cover (6mL Regular and Large)
- Elastic Top Boot Covers (3mL and 6mL)
- Yellow Rubber Shoe Covers (Large and XL)

Safety Glasses

BVS
Best Veterinary Solutions

Soap/Cleaners

- UFC + (4 x 1.3 gallon, 5.3 gallon and 55 gallon)
- Kenosan (4 x 1.3 gallon, 5.3 gallon and 55 gallon)
- Biogel (4 x 1.3 gallon, 5.3 gallon and 55 gallon)
- BVS Super Barn Cleaner (5 gallon and 55 gallon)

Disinfectants

- Virocid (4 x 1.3 gallon, 5.3 gallon and 55 gallon)
- Keno X5 (2.6 gallon)
- Tek-Trol
  - Aerosal (12 x 20oz can)
  - Liquid (4 x 1 gallon)
- Pheo-Tek II (4x1 gallon)
- Quats
  - Quat Cid (4 x 1.3 gallon)
  - Quatrocid (4 x 1 gallon and 55 gallon)
  - Gil S Quat (4 x gallon)

Insecticides

- Premise Spray
  - Annihilator Polyzone (16 x 1 pint)
- Spray When Depopulated
  - Permectrin II (6 x 1 quart)
  - Perm X UL 30-30 (2 x 2.5 gallon)
  - Tempo SC (12 x 240mL)
  - Ravap (4 x 1 gallon and 5 gallon)
  - Perm E Pro (4 x 1.25 gallon)
- Darkling Beetle Control
  - Credo SC (8 x 30oz)
  - Tempo SC (12 x 240mL)
  - Ravap (4 x 1 gallon and 5 gallon)
- IGR (Insect Growth Regulator)
  - Neporex (4 x 11lb bag)
  - Nyguard (10 x 140mL)
- Fly Bait
  - Quickbayt (4 x 5lb and 35lb)

Rodenticides

- Gunslinger Mini (4 x 4lb)
- Cykill (4 x 9lb)
- Fastdraw Soft Bait (4 x 8lb and 16lb)

CAL STAT® PLUS
ANTISEPTIC HANDRUB WITH ENHANCED EMOLLIENTS

Cal Stat Plus Antiseptic Handrub with Enhanced Emollients is a 63% (v/v) isopropyl alcohol-based handrub designed to effectively decontaminate visibly clean hands of healthcare workers before and after patient contact, and after contact with inanimate objects. In a time kill study, Cal Stat Plus Antiseptic Handrub with Enhanced Emollients demonstrated complete kill in 15 seconds against a broad spectrum of transient microorganisms including methicillin-resistant Staphylococcus aureus (MRSA) and vancomycin-resistant Enterococcus faecium (VREF). The product is formulated with a moisturizing system, adding moisture to the skin after every use. This dermatologist-tested, dye-free isopropyl alcohol-based handrub can be used in all areas of healthcare settings.

PHYSICAL PROPERTIES

Form ..... Liquid
Color ..... Colorless
Fragrance ..... Baby powder
Typical specific gravity 0.891
Antiseptic ingredient ..... Isopropyl alcohol (63% v/v)

DIRECTIONS FOR USE

Wet hands thoroughly with Cal Stat Plus Antiseptic Handrub with Enhanced Emollients and rub until dry.

Storage: Do not store at temperatures below 32° F (0° C).

Flammable, keep away from fire or flame.

ALCARE®
FOAMED ANTISEPTIC HANDRUB

Fast-acting, broad-spectrum antimicrobial action, including MRSA and VRE

Alcare Foamed Antiseptic Handrub is an alcohol-based handrub with fast-acting, broad-spectrum antimicrobial action against pathogenic microorganisms. Alcare Foamed Antiseptic Handrub also has proven activity against multiply resistant microorganisms such as methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant *Enterococci* (VRE). The Alcare Foamed Antiseptic Handrub formulation of 62% ethyl alcohol and emollients provides hand antisepsis and moisturizing at the same time. Alcare Foamed Antiseptic Handrub spreads easily to facilitate even distribution over all skin surfaces for effective disinfection. Alcare Foamed Antiseptic Handrub is convenient to use when there are no handwashing facilities available and hands are physically clean, but in need of degerming and can be used as an adjunct to handwashing when extra protection is desirable.

Storage: Protect product from freezing. Store and use at 55-85˚F (12-29˚C); do not store above 120˚F (49˚C).

PHYSICAL PROPERTIES

Form ..... Foam
Color ..... White
Fragrance ..... Mild alcohol
Antimicrobial ..... 62% (v/v) ethyl alcohol

DIRECTIONS FOR USE

Surgical Scrub

Clean under nails with a pick. Nails should be maintained with a 1 mm free edge. Dispense 5 g (about the size of a tennis ball) onto one hand. Spread on both hands paying particular attention to the nails, cuticles and interdigital spaces and forearms. Rub into skin until dry. Dispense 2.5 g (approximate size of a golf ball) onto one hand and spread over both hands and the wrists and rub into the skin until dry.

Healthcare Personnel Handwash

Apply product to hands and rub until thoroughly dry.

NEEDS NO WATER · CONTAINS EMOLLIENTS

STERIS®

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PWT is now

pH Safe

Same product from Jones-Hamilton Co.
is now available from BVS as **pH Safe**

pH Safe water acidifier is the first FDA-approved feed grade inorganic acid water treatment available to the poultry and livestock industries. Due to the unique chemistry of **pH Safe**, the consumption of treated water does not decrease at higher concentrations, as has been reported for organic acids. **pH Safe** contains the strongest animal feed grade mineral acid available. A much lower addition rate is required to acidify drinking water to biologically effective low pH levels. This lower addition rate provides pH reduction with no bitter taste. Birds won't back off from **pH Safe** treated water, so optimum water consumption is maintained. This advantage gives producers the flexibility for administration in a wide range of application in all livestock and poultry species.

NEW!

AviCare™

PRODUCTION CHALLENGE?

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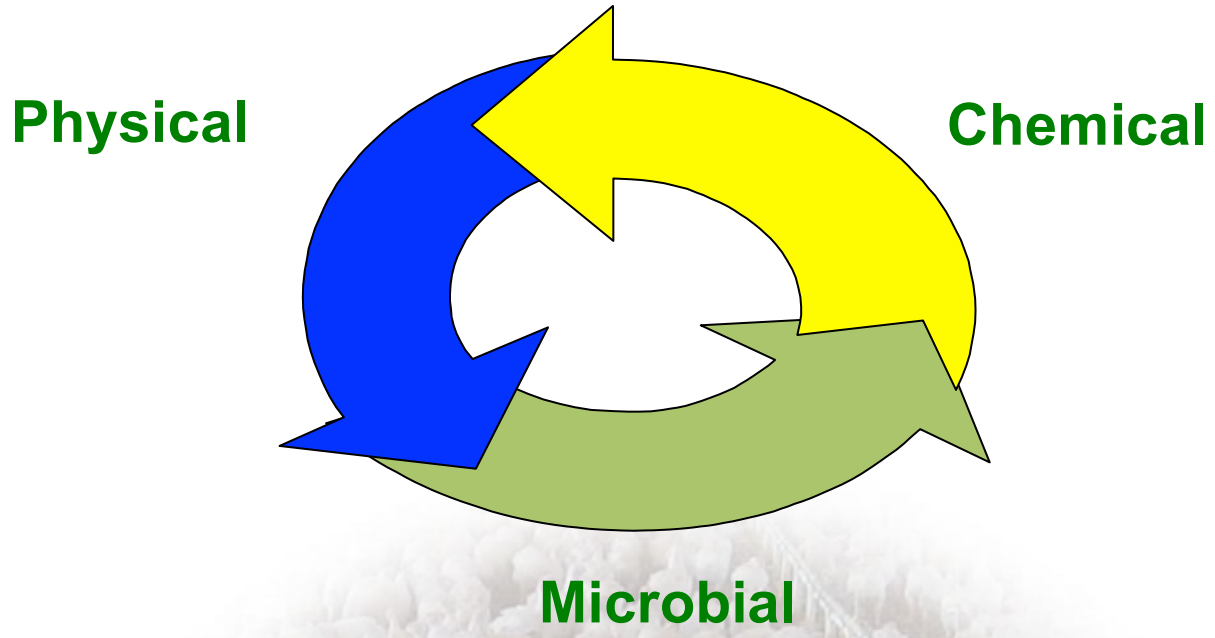
Maintaining Litter Quality Demands a Program Approach



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The Ag forum
by JONES-HAMILTON CO.
The Science of Litter Management®
SUMMER 2015

Poor Air Quality at Brooding Impacts Respiratory Disease and Bird Performance

Even though most poultry producers have specific brooding management programs, many flocks are affected by respiratory problems that can be directly attributed to a failure to follow those guidelines. The results of improper brooding management take the greatest toll later in a flock's life, but early management is often overlooked as the source of later respiratory disease and performance declines.

Three Major Management Factors Contribute to Respiratory Diseases

Respiratory disease in poultry is a much discussed topic. New respiratory virus serotypes occur occasionally and can cause some respiratory disease in specific regions. However, all too often we tend to blame vaccines that may or may not have been applied correctly, say chicks or poults were of poor quality, or blame a host of other factors when really the problem is caused by a failure to follow basic management guidelines.

While there are many factors that will affect respiratory disease incidence and severity, the vast majority of losses are caused by three major management factors that when followed conscientiously will keep respiratory problems to a minimum:

- proper air and litter temperature control
- ammonia levels
- vaccine application

If these three critical factors are not properly managed, even the best quality chicks or poults will have respiratory problems, will not be a profitable flock and will not be successfully protected by the vaccine program.

Only strict adherence to basic proper management techniques will help prevent respiratory diseases and result in birds reaching their maximum genetic potential. Getting a flock off to a good start is vital and brooding management is extremely important in respiratory disease prevention and flock profitability.

1 Proper Temperature Control

With today's broiler and turkey genetics the birds are able to turn feed into meat faster and more efficiently than ever before. This fast-paced, highly demanding feed efficiency is very stressful to birds. To reach their maximum genetic potential and prevent respiratory disease, these birds must be grown in a stress-free environment. Modern high-efficiency birds are acutely sensitive to small temperature fluctuations. If birds are chilled, we quickly see them huddling together to conserve body temperature. Instead of using energy to develop meat, they are using energy inefficiently to maintain body temperature. The result is an unevenly sized flock, birds with greater susceptibility to respiratory diseases and an ultimate loss of revenue.

Poultry house temperature control is still one of the most commonly misunderstood and mismanaged aspects of a successful respiratory disease control program. Proper temperature control means avoiding temperature fluctuations and avoiding brooding birds at temperatures outside their thermoneutral zone. Air temperature is the most commonly monitored area, but it is litter temperature that is most critical. Young birds will lose body temperature if the litter is even one or two degrees too cool.

Litter temperature must be monitored prior to flock placement in the house. If litter temperature is low and air temperature is adequate, then the flock will still suffer from being out of their thermoneutral zone. Houses must be properly preheated prior to bird placement and this cannot be done properly immediately prior to placement. Two days prior to bird placement the air temperature must be brought up so the litter has sufficient time to warm up uniformly both across the house and deep into the litter.

Also, as litter is heated it releases deep moisture and ammonia. The litter should be preheated long enough to allow this process to be completed before bird placement so that the moisture and ammonia are not venting when the flock is in the house. In most farms it takes a minimum of 48 hours for the litter to cure properly. This purge of ammonia from the pre-heating process should be completed prior to bird placement.

Proper temperature control also involves monitoring of constant temperature from day to evening to keep the flock consistently in its thermoneutral zone. Besides chilling of a flock, temperature fluctuations throughout the entire day are a primary cause for greater susceptibility of a flock to respiratory disease.

Numerous scientific research articles have been published linking improper temperature control with respiratory disease and other disease conditions including ascites that are observed later in the flock's life. Remember that improper temperature control is a severe stress to birds and will result in a weakened immune system, higher incidence of respiratory disease, more severe respiratory conditions, harder vaccination reactions and rolling vaccination reactions.

2 Ammonia Levels

Ammonia is an often under estimated stress to birds and both a direct and indirect influence on bird health, performance and profitability. The quality of the air in your chicken or turkey house is directly related to your birds' ability to respond to respiratory disease challenges. Ammonia causes the first breach of your birds' respiratory defenses that will then allow viral and bacterial invaders entrance into your birds' respiratory system.

The first line of defense that birds have against respiratory challenges is the mucociliary elevator of the trachea. As a bird inhales, bacteria, viruses, and other particles become trapped in the mucus that covers the cilia in the bird's trachea. The cilia are small fibers that beat upward, in effect forming an elevator that lifts the trapped particles in the mucus out of the trachea where they can be either coughed out or swallowed by the bird. Proper functioning of this defense mechanism depends on the integrity of this tracheal lining. Any insult to the mucociliary elevator will impair the bird's ability to clear particles and disease organisms from the respiratory tract.

The most common cause of damage to the mucociliary elevator is ammonia. With levels as low as 20 ppm (barely detectable by the human nose), ciliostasis or paralysis of the cilia can be seen. This results in bacteria and viruses being trapped by the mucus and the paralyzed cilia are unable to remove them from the bird. The trapped particles can then fall deeper into the bird's respiratory tract causing disease. Higher levels can cause deciliation or a loss of cilia which allows immediate access to viruses (including vaccine viruses) and bacteria into the bird's respiratory system and bloodstream. Small particles (dust, bacteria and viruses) cannot be cleared adequately from the respiratory system and are able to make their way into the air sacs where airsacculitis will most likely develop.

Chickens and turkeys are most susceptible to ammonia insults during brooding and when boosting respiratory vaccines in the field. Excessive moisture within a house or improper decaking and litter tilling will encourage ammonia production. Proper litter management and ventilation to maintain ammonia levels below 20 ppm should be followed

at all times to ensure that your birds are able to maintain their natural defense mechanisms in order to fight off respiratory disease challenges.

In one study by Terzich et al. looked at the effect of PLT® litter acidifier on the impact of development of respiratory disease lesions in broilers. Birds were raised either on untreated litter or litter that was treated with PLT® and then vaccinated with their normal respiratory disease vaccine program. The ammonia levels ranged from 53-115 PPM in the untreated houses. In the houses treated with the litter acidifier, ammonia levels were reduced to 5 ppm at placement and never rose to more than 20 PPM throughout the four week study (table 1). Because of this reduction in ammonia, body weights and gross airsac lesions were greatly reduced in the birds raised on the PLT®-treated litter. (table 2)

These improvements in respiratory health were also noted at the microscopic level (table 3). The application of live respiratory virus vaccines must cause a mild inflammatory response in the birds in order to be effective. The cilia of the bird must be functioning well at the time of vaccine application in order for the damage from the vaccine to be kept at a healthy minimum. The cilia that make up the mucociliary elevator were more intact and had milder inflammation in the birds raised in the lower ammonia environment compared to the other birds in the study.

Table 1. Mean atmospheric ammonia levels (ppm) in pens where litter was or was not treated with PLT®[a]

Day after Treatment[b]	Ammonia levels following litter treatment	
	None	PLT®
-1	96[c]	88
0	95	5*[d]
7	72	14*
14	115	20*
22	115	22*
48	53	19*

[a] Poultry Litter Treatment®.
[b] Treatment was immediately prior to chick placement at 1-day-old.
[c] Mean ammonia levels are parts per million. In the present study, ammonia levels in excess of 25 ppm were considered to be excessive.
[d] Asterisk indicates a significant (P<0.001) difference between treatments.

Table 2. Mean body weights, thoracic air sac gross lesion scores and lung: body-weight retios in broiler chickens that were raised on litter treated or not treated with PLT®[a]

Day of age	Measured parameter	Treatment	Effect on parameter	P value[e]
23 days	BW[b]	None	712	
		PLT®	767	< 0.0001
	ASLS[c]	None	1.36	
		PLT®	0.12	< 0.0001
	LBWR[d]	None	0.65	
		PLT®	0.69	< 0.001
49 days	BW	None	2204	
		PLT®	2312	< 0.01
	ASLS	None	1.36	
		PLT®	0.36	< 0.0001
	LBWR	None	0.71	
		PLT®	0.75	< 0.05

[a] Poultry Litter Treatment®.
[b] Mean body weight (g).
[c] Mean gross air sac lesion score; scores were 0 = clear, 1 = cloudy, 2 = cloudy with minimal caseous exudate accumulation and 3 = severe caseous exudate accumulation.
[d] Mean lung: body weight ratio (g).
[e] T-test; significance level is shown.

Table 3. Histopathological findings in the mucosa of tracheas of 23-day-old broiler chickens raised in pens that were treated or not treated with PLT®.

Lesion	Litter treatment	Histopathology score[b]	Numbers of chickens with these injury magnitudes[c]				P value[d]
			Minimal	Mild	Moderate	Marked	
Less of cilia	None	4.00*	0	0	0	20	< 0.001
	PLT®	3.25	0	1	13	6	
Hypertrophy	None	6.00*	0	0	0	20	< 0.001
and hyperplasia Inflammation	None	6.00*	0	0	20	0	< 0.001
	PLT®	5.20	0	16	4	0	
Necrosis	None	4.60*	0	8	12	0	< 0.001
	PLT®	3.65	10	8	2	0	

[a] *Poultry Litter Treatment®.*
[b] *See text for scoring method. Numbers are mean scores. A t-test was used to analyse these data, and asterisk indicates a significant (P < 0.0001) difference between treatments.*
[c] *Twenty chickens in each group.*
[d] *A chi-square test was used.*

3 Vaccine Application

A third management factor affecting respiratory disease is vaccine application—not the vaccine program, rather just the application or implementation of the vaccination program. The specific vaccines that are used in a given geographical area are dependent on many factors that are not related to onfarm management. Assuming that the vaccine program is correct for the specific challenges in your area, application of those vaccines in the poultry house is equally important as vaccine choice.

Often, changes are made in the vaccine program when application is really the problem. Application problems may include poor handling of the live virus vaccines prior to application. The vaccine virus will die if the vaccine is kept too warm or not administered quickly. If the vaccine is administered through the water, then water lines must be fully charged with vaccine following bird water deprivation so that when the birds have access to water they drink a full dose of vaccine. If the water lines are not fully charged, then the birds will drink plain water and not vaccine, and therefore not be protected against that specific virus.

Vaccines are not magical. They work with the bird's immune system to protect that bird from later exposure to the same virus with which they were vaccinated. If the vaccine is not applied or handled properly, then the birds will not be protected and respiratory disease will occur. Vaccination teams dedicated solely to administering vaccine are the most effective means of vaccination, and proper spray vaccination is more effective than water vaccination in protecting birds from respiratory diseases. Respiratory disease may start in the flock from wild virus strains or vaccine virus strains if vaccine is improperly applied.

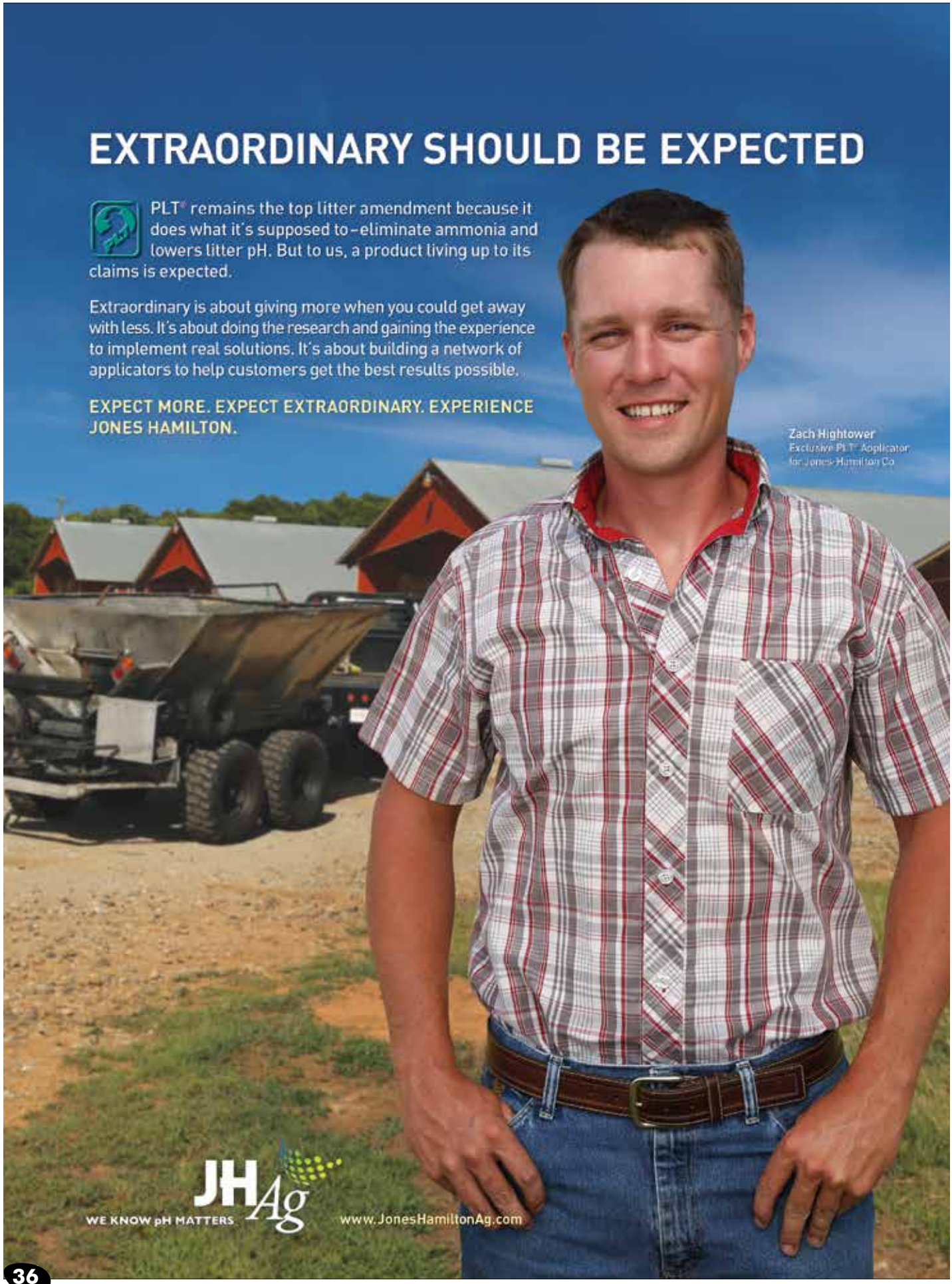
An important thing to remember about vaccines is that they are powerful tools for controlling respiratory disease only if properly used, so consulting with the various vaccine manufacturers for demonstrations of proper vaccination techniques is recommended.

Many factors lead to respiratory disease. However, if these three basic management practices (proper temperature control, ammonia control and vaccine application) are adhered to, then many respiratory disease problems and the subsequent loss in revenue can be avoided.

Reference

Terzich, M., Quarles, C., Goodwin, M. A. and Brown, J. (1998) 'Effect of Poultry Litter Treatment® (PLT®) on the development of respiratory tract lesions in broilers', Avian Pathology, 27: 6, 566 — 569

Trisha Marsh Johnson. DVM. MAM. DACPV, Veterinary & Environmental Technical Solutions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continued on page 45

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5) The December application requires a small amount of sticker to be added to the mix to insure the product stays on the grass throughout the winter.
6) In a full year, it requires 6-7 sprayings to keep the geese away.
7) The goal is to achieve a very fine mist when the product is sprayed on the grass. A number two Tee Jet tip gives the desired mist.
8) When using a boom sprayer of 7 heads or less, add 10 gallons of water per acre plus the amount of Flight Control® Plus necessary to achieve the per gallon rate per acre, i.e., one gallon or ½ gallon.
9) The Tee Jet Company at their website has excellent spray rate guides for other pieces of equipment.

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6) Vents on the houses must be spray washed and CLOSED prior to application.
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