SUSTAINABLE FARMING AWA NEWSLETER

EGG PLANT THE BASICS OF KEEPING LAYING HENS

PLU AGW IN INDIA SNAKES ON FARMS VACCINATIONS: A VITAL TOOL



A TIME FOR HOPE



With COVID-19 vaccination options now being deployed, there is at last some light at the end of the tunnel. But as cases continue to rise across the U.S. and other nations, it's vitally important

we don't drop our guard over the coming months.

In light of rising COVID cases, the safety of AGW staff and faming families in the program continues to be paramount. Members of our Outreach and Certification teams would normally have attended countless farming and consumerfocused conferences and events across the globe last year to promote AGW certification and certified products. Instead, we have focused our attention on providing online information and support for consumers and farmers, most recently through webinars and our YouTube channel.

We've hosted a number of online video chats with farmers and ranchers in the program, including Rinkse de Jong at Working Cows Dairy in Alabama, Ronald Simmons at Master Blend Family Farms in North Carolina, Rob Braun at Pigeon River Farms in Wisconsin and many more. It's a great way to learn about their businesses and experiences, particularly in current circumstances. (Huge thanks to them all for their time.)

In November, we hosted an informative webinar about regenerative farming. We've posted a recording to our YouTube channel: it's a great tool to share with customers—and anyone wanting

to learn about the benefits of regenerative agriculture and our new Certified Regenerative by AGW standards.

We're adding new content all the time, so search for "A Greener World Organization" on YouTube—and please share links with customers and farming neighbors on your social media. The more we all help spread the message, the louder our collective voice becomes.

Speaking of voices, many of us in the rural community feel like our voices are never heard. We are small in numbers but massive in terms of impact: we look after the lungs of our planet and represent the very backbone of every nation. We hope the new U.S. administration will bridge the divide and bring sustainable farmers to the table-not just the industry shills we all too often see. When it comes to food and farming, 'business as usual' is no longer an option.

Finally, after a year that most of us will be only too glad to forget, I wanted to take this opportunity to express my gratitude to all of you who have continued to produce food for families, customers and communities throughout 2020. If there is any positive to come from this pandemic, it's that more people now recognize the importance of what you all do. From everyone on the AGW team, we wish you a safe, peaceful and prosperous 2021.

Andrew Aunother

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AGW INDIA

New partner program project in India

A Greener World is establishing program operations in India to serve the growing market for ethical foods and beverages. The move follows significant local interest and demand for verified sustainability labels in the country.

In spring of 2020, natural foods industry veteran Richard Louis approached AGW to explore the possibility of introducing its labels to serve a rapidly growing segment of shoppers in India who care about sustainability and farmers who want to differentiate themselves in that market. Louis has lived in India for the past four and a half years and has over 20 years of experience working in the natural foods industry.

"There is a growing demand for meaningful certification programs in India and I am confident it can really help make a positive difference for eaters, farmers, animals and the environment," says AGW India Lead, Richard Louis. "With a background in retail in both the United States and



IN THE NEWS....

GLYPHOSATE RESIDUES

Poultry manure can accumulate high residues of glyphosate-based herbicides, decreasing plant growth and reproduction, according to a new study.

Published in the journal Science of The Total Environment, researchers from the University of Turku in Finland found that residues from the heavy use of glyphosate herbicides as a desiccant on feed crops, such as soy, corn and canola, readily pass through the digestive process of birds and "persist in the manure fertilizer over long periods."

BIRD DECLINE

The rapid decline in U.S. bird biodiversity since the 1970s can be directly related to neonicotinoids pesticides, according to new research.

Published in Nature Sustainability, scientists from University of Illinois examined data from hundreds of bird species over a seven-year period. "We found robust evidence of the negative impact of neonicotinoids, in particular on grassland birds, and to some extent on insectivore birds after controlling for the effects of changes in land use," said co-author Professor Madhu Khanna.



HONORARY AWARD

Dr. Pieter Prinsloo (left) of AGW-certified Langside Meats in Queenstown, South Africa received an honorary award for his contribution to South African agriculture at the 2020 Agri SA annual conference in October.

Established in 1904, Agri SA is the biggest federation of agricultural organizations in South Africa. Jolanda Andrag, Agri SA's current head, described Prinsloo as incredibly innovative and "a genuine people's person with a passion for the industry." (See Opinion, page 7.)



India, as well as a family rooted in this country, I am excited to use my skills to support the growing opportunities for farmers and consumers seeking transparent, sustainable food and farming."

The developments in India follow the establishment of A Greener World South Africa in 2017 and A Greener World UK and Europe in summer 2018, and build on the success and reputation of programs in North America.

"We're incredibly excited that the program is being seen globally as part of a broader solution to intensive, destructive agriculture," says Andrew Gunther, AGW Executive Director.

"We are thrilled to be working with someone with deep retail experience and a drive to supply consumers in India with healthy food, supporting immunity by eating well and supporting farms in the process, all of which will have long-term benefits for society and the environment. We are honored to partner in driving this change."

ROCK ON

Applying rock dust to croplands could absorb up to 2 billion tons of CO₂ from the atmosphere and help meet key global climate targets.

Published in *Nature*, scientists from the UK's University of Sheffield suggest unused materials from mining and construction could be used to boost soil heath and help remove CO₂ from the atmosphere. The technique, known as enhanced rock weathering, involves spreading finely crushed basalt, a natural volcanic rock, on fields to boost the soil's ability to extract CO₂ from the air.

IN THE NEWS...





TAX MEAT OR RISK FURTHER PANDEMICS?

Policy makers should tax meat production and consumption to reduce the risk of future deadly pandemics, according to a new report calling for the better protection of nature. The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) report points to direct links between the global degradation of nature-including deforestation for beef cattle production-and increasing pandemic risks.

As reported by the Thomson Reuters Foundation, Dr. Peter Daszak of the IPBES said that beef production is a well-known cause of deforestation and ecosystem destruction in Latin America, disrupting nature and increasing contact between wildlife, livestock, pathogens and people, while outbreaks of influenza viruses and new pandemic

strains have emerged largely because of "incredibly dense production of poultry and pigs in some parts of the world, driven by our global consumption patterns." Daszak acknowledged the idea of a livestock levy or meat tax was controversial but said it was a way to encourage the industry towards ways of operating that do less harm to the planet and people.

"We agree the excessive global production and consumption of industrial-scale grainfed beef, pork and poultry meat is simply unsustainable," says Emily Moose, AGW's Director of Communications and Outreach. "But a broad meat tax which fails to differentiate between production systems-and real-world impactshurts the very farms we need most if we're going to feed ourselves sustainably."

LOOKING BACK

AGW's annual review highlights the major activities of AGW, its programs and staff in the previous year, as well as the successes of more than 6,000 sustainable farmers and ranchers with whom we work, responsible for managing more than 3 million acres across the world.

Download your free copy at agreenerworld.org/ library

A GREENER WORLD



BIG WINS AT FOOD OSCARS

Certified AWA Big Picture Farm in Townshend, VT, has won Gold and Silver at the 48th Annual 2020 sofi™ Awards in recognition of their high-quality, delicious and innovative products.

Known as 'The Food Oscars,' sofi™ Awards honorees are selected through a blind tasting process with 49 categories and entries from around the world.

Lucas and Louisa Farrell of Big Picture Farm in Townshend, VT, won both Gold and Silver awards in the Confectionary category for their Maple Cream Farmstead Goat Milk Caramels and Rasberry Rhubarb Farmstead Goat Milk Caramels, Animal Welfare Approved by AGW dairy goats. "When you spend so much time and labor and effort and love moving your goats from pasture to pasture to ensure that they get the best food, that their diet is super diverse, and that the land is properly managed, it sure is nice for that to be recognized," says Lucas Farrell of Big Picture Farm. "Not only for being sustainable and raising happy goats, but also for producing the most delicious confections in America. We are super proud of our goats and our team that make this possible."



NON-GMO CONDIMENT FIRST!



BaBa Foods Co. is the world's first brand to use Certified Non-GMO by AGW ingredients to create their famous tomato chutney.

Based in Seattle, BaBa Foods Co. sources fresh, certified non-GMO ingredients from farmers in the Pacific Northwest to produce its chutney, which is created using a family recipe has been passed down for multiple generations.

The company supplies select grocery stores and retailers in Seattle and across Washington.

"We are incredibly proud that BaBa Foods Co. tomato chutney is made with Certified Non-GMO by AGW ingredients," says Jasdeep Saran, BaBa Food's owner. "It's our highest priority to provide the very best product to our customers, and so certifying our quality ingredients with AGW verifies supply chain compliance with the most rigorous best practices for GMO avoidance in the industry."

Visit babafoodsco.com

MEAT FREE DIETS RISK BONE FRACTURES



Vegetarians, vegans and pescatarians may be at higher risk of bone fractures compared to meat eaters, according to a new study.

Published in BMC Medicine journal, researchers at the University of Oxford and University of Bristol followed the diet, health and behavioral patterns of 54,858 participants over an average 18-year period up to 2016.

The researchers found that vegetarians had a 9% higher risk of fractures anywhere in the body (total fractures) compared to meat eaters, while vegans

made using milk from their pasture-raised Certified

Visit **bigpicturefarm.com**



As a benefit of certification all AGW-certified farmers and ranchers continue to receive printed editions of Sustainable Farming.

However, as of 2021, all other subscriptions will transition to our online digital format. If you would prefer a paper copy, you can subscribe for \$36/year at agreenerworld. org/product/ sustainable farming-magazinesubscription

had a 43% higher risk of total fractures. Non-meat eaters—but particularly vegans—also had a much higher risk of site-specific fractures of the hips, legs and vertebrae. For example, the risk of leg fractures was 81% higher in vegans compared to meat eaters.

"Individuals should take into account the benefits and risks of their diet, and ensure that they have adequate levels of calcium and protein and also maintain a healthy BMI," said lead report author, Dr. Tammy Tong.



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Opinion



Oxen at Dr. Pieter Prinsloo's farm in Queenstown

AT THE CROSSROADS

Farmers in South Africa face huge challenges, warns Dr. Pieter Prinsloo

Dr. Pieter Prinsloo

and family raise

Certified Grassfed

by AGW beef cattle

at Langside Meats

in Queenstown,

South Africa

The COVID lockdown and movement restrictions in South Africa have undoubtedly hastened the evolution of consumers reconnecting with the origin of their food-and those who produce it. Throughout 2020, more and more people began using online food platforms, choosing to source food directly from farmers and growers. Unfortunately, once the movement restrictions were eased, most people soon returned to the old habits of 'convenience' shopping at the supermarkets. I say 'most', because the seeds of change were undoubtedly sown.

New possibilities

During the lockdown, people had a taste of a different future: a post-COVID-19 scenario where food-and farmers-really matter, and where farm certifications like A Greener World could ensure the production and consumption of nutrient dense, sustainably produced foods, and without political, socioeconomic and environmental restrictions.

COVID-19 forced many consumers to take stock and ask guestions about where their food comes from and how it is produced, and if it has the nutritional value to contribute positively to their immunity and overall health. At the same time, farmers and food businesses across South Africa were awakened to opportunities to meet this new demand.

Food inequalities

Clem Sunter, the internationally acclaimed authority on management strategy, scenario planning, and corporate social responsibility,

has been warning for a long time about the world of "haves and have nots," the urgent need to reconnect producers and consumers of food, and our reckless association with food production that leads to huge amounts of food waste.

Certifications like those offered by A Greener World build relationships of trust between producers and consumers, and can help to fix this disconnect.

At the crossroads

In South Africa, we are rapidly approaching a crossroads in farming and food production. South African farmers face numerous off-farm threats, including development funding and government policies that massively favor 'volume' production and chemical-based intensive farming systems; farm attacks and murders, leading to a very insecure rural farming environment; impeding legislation that threatens traditional commercial farmers and dampens their ability to produce sustainably; poorly maintained local infrastructure; and the impacts of climate change, such as intermittent drought periods, which all make the matter of food and commodity production even more challenging. These issues must be resolved.

Of course, not all farmers are capable and willing to integrate with food value chains. But many are open to regenerative production principles. A Greener World is ideally placed to play an important role in integrating value chains and building local food supply chains, supporting the production of food with integrity using regenerative production principles.

LAYING HENS 101

Thinking of setting up a new AGW-certified laying hen operation? Frank Morison looks at the basics

Pasture-raised eggs can provide a useful income stream to an existing farming business. But as with any new venture, it is essential to ask yourself some important questions before buying in your first chicks.

Do I have the time and additional resources to accomplish this task? Can I afford the initial outlay? What are my costs of production? Do I have a viable local market, such as a major metropolitan area or popular farmers' market? Will local stores or restaurants take my eggs? What makes my farm and eggs different from local competition?

Only you can answer these questions. Do not rush: think it through carefully, as these questions may lead to other issues you might not have considered.

Remember: the number of birds you plan to keep will not only dictate the number of eggs you will have to sell, but also things like space requirements for brooding, housing and range area, perch provision, feed supplies and so on. Make sure you do your homework first!

Choosing the breed

Most small-scale farmers choose traditional-type breeds for their good ranging and foraging abilities. Here are some commonly used breeds for pasture-based production:

- Araucana: 250 eggs of blue or green shell color per cycle. Can be flighty. Some farmers add the colored eggs of these birds into a carton to make them stand out from competition.
- **Barred Rock**: 250–260 eggs of brown shell color per cycle. Calm bird, great disposition.
- Delaware: 250-260 eggs of brown shell color per cycle. Calm bird, hardy for cold regions. The Delaware breed was used to start the modern broiler industry.
- Rhode Island Red: 250-260 eggs of brown shell color per cycle. Friendly and calm.
- White Leghorn: 280 eggs of white shell color per cycle. Nervous and flighty.

Note: AGW does not endorse any specific breed. Lay rates will vary depending on strain and hatchery.

Sourcing birds

AGW standards require you to source chicks or point-of-lay (POL) pullets from an AGW-certified

laying hen/breeder farm. If there is no suitable supplier near you, you can order chicks from any hatchery or farm as long as the birds are placed on your farm by 36 hours of age. Note: you can only source POL pullets from AGW-certified laying hen/breeder farms.

If your hatchery is within driving distance it's well worth picking up the chicks instead of having them mailed. The faster you get the chicks on the ground eating and drinking, the better overall results you will have.

Speak with a local veterinarian or extension agent to discuss potential vaccination against diseases in your area. Some hatcheries offer vaccinations when you order.

Brooding

It is possible to brood and raise a small number of chicks in a garage or a spare outbuilding. But brooding is a critical time for the young chick and any brooding area must be predator proof with access to water, electricity and a heat source to keep chicks warm. You will need to provide a minimum of 0.25 sq. ft. brooding space per chick, increasing the area appropriately as the birds grow. You will also need to provide training perches made from natural tree limbs or lumber for young pullets from 10 days of age through to point of lay. Remember that AGW's laying hen standards require chicks "to have access to forage by seven days of age." Some farmers place a piece of sod in the brood chamber to help the chicks become more accustomed to foraging.

Housing

After brooding, chicks will need suitable housing with access to pasture. There are many different types of stationary and mobile housing kits available to purchase. If you're looking to save costs, you can build your own coop from scratch (plenty of designs are available), while it is certainly possible to modify an old farm wagon, camper or mobile home into a mobile coop or roost, and construct your own nesting and perching systems. Likewise, an existing barn with extra space will work well. Just like the brooding area, you will need water and electricity and possibly a heat source, depending on where you farm.

There are pros and cons to using mobile and stationary structures.



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The largest drawback for stationary housing is ensuring continuous access to fresh pasture, as AGW standards state that pasture must not become more than 20% denuded or void of grass at any time. Rotating pasture access from the house is the ideal, moving birds between different paddocks around the house.

While mobile units mean you can move to new pasture as needed, supplying water for drinking systems, keeping birds warm in colder climates, transporting feed to the birds and moving coops in hilly fields are all things to consider.

Make sure you understand the AGW standards on housing from the very outset. To qualify as a roost, the structure needs a minimum of 7 in. perch space per bird and the birds will have to be released from the structure within 1 hour of sunrise. If the doors are opened within two hours of sunrise the structure is not classified as a roost and must meet the 1.8 sq. ft. per bird space requirement. If the doors are not opened within 2 hours of sunrise then structures must meet the 1.8 sq. ft. per bird space requirement plus the additional 4 sq. ft. loafing requirement, requiring a total of 5.8 sq. ft. per bird.

Entry/exit pop-holes or doors are essential. The number required under AGW standards will depend on your flock size. Minimum door width is 18" wide for a flock of 75 birds or less, while a flock of 75-140 birds will need two 18" doors or one door of at least 36" wide. (The height of any entry/exit must be at least 1 in. higher than the tallest bird in the flock when upright.)

If you farm in a colder climate your birds will need a warm structure to reside in. Some farmers pull mobile roosts into the barn or tunnel building for the winter, giving the birds at least 4 sq. ft. per bird for a ranging area and using the mobile roost with doors open so they have a roosting area. Other farms utilize a stationary structure with pasture access year-round.

The range

When birds reach four weeks of age, AGW standards require continuous access to pasture (except in extreme weather) with a minimum of 4 sq. ft. of range per bird. The minimum range area is 10' X 18'. So, if you had a 180 sq. ft. ranging area, the maximum number of birds allowed would be 45 hens. If you plan to have 500 hens, for example, you will need a fenced pasture area of at least 2,000 sq. ft. to comply with the standards. But remember that any fixed area will most likely become over 20% denuded if hens are not rotated to new areas to allow the previous section to regenerate.

Hens need to feel safe in order to range and planting bushes, shrubs or a few rows of tall crops like corn, sunflower or sorghum will definitely help.



Brooding is a critical time for chicks



Buying feed in bulk will save you money



Quality electric fencing is extremely important

> Bedding is another area where bulk purchasing can reduce costs. During the brooding phase most farmers use pine shavings or coarse cut sawdust. Make sure the material is dry, as too or sawdust from local farm stores is kiln dried. standards if it does not injure the hens' feet. These products can be used in nest boxes.



A common egg candler

Simple wooden structures, tarp or an old farm trailer will also give the birds cover in the pasture. Using multiple water founts and feeding areas will also encourage hens to range. Running a couple of roosters will also help move the hens along in the pasture.

Feed

Feed is the highest cost item in production, so it is important to plan what you are going to feed -and find ways to reduce costs.

Commercial poultry feed is usually available in three stages—starter, grower and layer. Buying bulk feed is the best way to save costs. Will you have enough hens to buy a pallet at a time? Or do you have a bulk storage bin? Maybe you have a large tote that will hold a ton or more and drive to the mill to pick it up.

Can you grow your own crops? If so, it is possible to grind and mix your own rations, although you will need to work with a nutritionist to ensure the diet will satisfy the birds' nutritional requirements.

Some feed mills add grit to the feed mix during the manufacturing process, but if you live in an area with a lot of natural grit your hens will consume it. Hens also need a source of calcium for the shell-creating process. Most commercial layer feeds have a calcium range of 3-5%, which is adequate for egg production, although some farmers like to offer grit and oyster shells.

Do you intend to pursue Certified Non-GMO by AGW or organic certification? Certifications can enhance your product and increase profit margins, but you will need to secure suitable feed supplies.

Bedding

much moisture in fresh cut timber products can cause respiratory issues, although most shavings For adult birds, farmers use shavings, sawdust or straw as bedding. Mobile roosts may have mesh or slatted flooring, which is compliant with AGW

Key equipment



automatic feeders.

Individual or communal nests are available. If you decide on individual nest boxes you will need a minimum of 1 nest box per 5 hens, while a communal system requires a minimum of 20 sq. in. per hen.

Most farmers use electro-net style fencing with a good charger, as it is light, portable and effective. Solar, battery and electric chargers are widely available. Buy the best you can afford.

While it is worth looking out for used equipment, make sure you power wash and disinfect anything you buy to prevent disease transmission.

Preventing predators

Good fencing is extremely important to protect hens from terrestrial predators. Check electric fencing regularly to make sure it is properly grounded. (It might be necessary to have two or more grounding points to provide the proper current.) When hens migrate back to their structure at dusk it is essential to shut them in until sunrise. Aerial predators can also be troublesome. However, providing cover in the range will reduce the chances of a hawk picking off a bird. Some farmers place scarers in their pasture to deter aerial predators. Another option is to place poles around your structure and tie fishing line between the poles, as the aerial predator is afraid of getting tangled. Trained guardian dogs that live with the birds can be highly effective.

Egg handling equipment

The scale and complexity of your egg handling set up will depend on the number of hens. Your system could be simple as a couple of egg baskets for egg collection, a double sink to wash eggs, a low-cost candler to inspect the eggs, a simple set of scales for grading, and refrigerator to store eggs. Specialist machinery is available to wash, weigh and grade eggs for larger operations.

Note: Every state has its own regulations on selling farm eggs and it is important to take the time to examine your state's requirements before you start. Some states have exemptions for smaller flocks.

Egg price

Don't just copy your competitor's egg price! Costs of production will vary from flock to flock and it is essential to do the math to ensure you will not lose money.

When calculating production costs for a dozen eggs, make sure you factor in electricity, fuel, labor, feed, water, chick costs, lay rate, egg breakage, mortality, bedding, egg cartons and other miscellaneous supplies. Remember to depreciate major equipment costs like fencing and brooding

AGW's low-cost branded eggs cartons cost \$36 for 200 (plus \$14 shipping). An informative insert is also available to help tell your story. Find out more at agreenerworld.org/ shop-agw



Most farmers use straw or sawdust for bedding



The basics: a double sink to wash eggs

lights over several flocks. Online laying hen calculators can help you to estimate costs and egg price. Marketing is far too big a topic to cover here, but let's just say every farm has a story to tell -and your customers need to feel part of it. Make the most of your AGW certification and explain why it matters. Social media is a cost-effective way to share information about your day-to-day farm activities and where people can buy your eggs.

Spent hens

AGW standards require that hens go through at least two laying cycles before removal from the flock. Some farmers give away spent hens to local farmers or hobbyists, while others process spent hens for meat to sell as stew birds. Remember: if you decide to sell the meat under the AGW label your farm or processing facility will need an annual slaughter review.

Useful resources

- farmhealthonline.com: With information on over 100 common diseases, plus nutrition, housing and husbandry, Farm Health Online offers free and immediate access to practical, science-based advice on positive livestock management.
- agreenerworld.org/farmer-services/ **technical-support**: AGW's free technical advice fact sheets cover the most commonly asked questions about high-welfare farming-from range management to feather pecking.
- attra.ncat.org/topics/poultry: ATTRA's 'Sustainable Agriculture Program's Pastured Poultry: Egg Production' guide is an excellent (and free) introduction to integrating egg production into an existing farm operation.
- Storey's Guide to Raising Chickens: While focused on backyard flocks, this book by Gail Damerow is a useful for the beginner. But always cross-reference any advice with the AGW standards
- poultry.extension.org: World of Poultry is part of the online U.S. Cooperative Extension System, known as eXtension, and offers useful content for the small-scale producer.

Frank Morison is Lead Auditor with A Greener World



STAYING SAFE

Vaccination can play a vital role in managing animal health and preventing disease, says Jen Gravley, DVM

An invader is detected and deemed dangerous. Evidence is delivered to multiple locations,

where it will first be used to identify the foreign agent's unique weaknesses; then to design and manufacture special weapons to exploit those weaknesses. The weapons are designed to work within the particular conditions and constraints of the location being infiltrated, effectively targeting the invader while avoiding collateral damage. As supplies increase and weapons are deployed, the invader is disabled, captured and finally removed. But the story doesn't end there. A surveillance and rapid-response network is created so that, should this intruder ever come again, they will be rapidly identified and neutralized before any significant damage can be done ...

A thrilling spy novel? No-this is your animal's adaptive immune system at work. From invasion to surveillance, this entire process can take a few weeks, and begins anew every time an unrecognized disease agent enters the body. The 'surveillance and rapid-response network' is what we often call 'immunity' and it is the ultimate goal of vaccination. Let's take a closer look at what it does, what it can't do, and considerations for creating that network through vaccination.

Immune memory

'Immune memory' or 'immunity'* exists when the body has made some effort to investigate a particular enemy and has figured out how to make an effective weapon against it. That custom-made weapon is known as an antibody. The body has taken a fingerprint, of sorts, so it can recognize the disease agent in the future. And it has saved a blueprint for the antibody design. If the same pathogen returns the body won't have to repeat the design process from scratch, but can quickly manufacture and deploy antibodies that are specific to the disease agent and designed to work well in whatever tissue the pathogen targets-for example in the lung, the gut or the bloodstream.

Although it's still not clear why, the body seems to carve some of these blueprints onto metaphorical stone tablets, well preserved and readily available decades later. This is the case for measles in humans and for pox viruses such as fowl pox. The blueprints for fighting influenza, Lyme disease and leptospirosis, on the other hand, seem to be scrawled on post-it notes, hastily stuck on the fridge, and soon lost. Immune memory for these diseases fades in a matter of months, so fighting them is a new project every season.

For as long as an immune memory lasts, it ensures that if that disease agent enters the body again, the outcome won't be as bad as it would be without immune memory cells. While this is truly an impressive effect, it is also crucial to recognize



"Vaccination reduces severity and spread of disease, but doesn't completely prevent infection"

*For a more detailed understanding of immunity, see Sustainable Farming, vol. 5, no. 2, pp. 20-21

what immune memory cannot do: immune memory cannot guarantee complete protection from the infectious agent entering the body, or even from clinical disease.

Immune memory reduces the severity and spread of an infection, but it does not prevent infection. In some cases, that protection is good enough to effectively prevent symptoms and spread of disease. But 'immune' individuals can still be re-invaded by the same pathogen and experience clinical illness, although it's usually mild or undetectable. Most importantly, 'immune' individuals can sometimes transmit small amounts of infectious disease agent to other individuals. Because of this, 'herd immunity' is required to effectively control infectious agents, keep exposure to a minimum and prevent significant outbreaks in your animals.

Factors in vaccine effectiveness

Exposure and immune memory are not the only factors in whether or not your animals get sick.

Nutrition and stress: Low-stress husbandry and good nutrition play vital roles in ensuring the immune system can do its job. Lifestage is also a factor: the immune systems of very young animals are not fully developed; older animals may lose some immune function; and immune activity is suppressed during late pregnancy. Poor nutrition can rob the immune system of the energy and minerals it needs to function fully. And, of course, if the animal is already combating other disease, the system will have less resource available to respond to additional disease challenges or vaccination. If the body's resources are spread too thin due to stress, poor nutrition, multiple disease challenges or other reasons, the animal may have limited ability to fight disease or they may be unable to create immune memory. What a waste of the time and effort you spent on vaccination!

Genetics: Immune response uses resources. Energy, protein, trace minerals, antioxidants and more are required to manufacture antibodies, neutralize a disease agent and clean up the mess. Yet when a new disease challenge sweeps through the herd, we are often glad to see some animals holding on to high production for a few extra days-and sometimes shake our heads at those that show the first signs of slowing down. This is backwards. While it's true that we should select the most disease-resistant animals, this needs to be done in the context of the big picture. Which animals are demonstrating immune competence: the ones that ignore an invading pathogen, or the ones that stop what they're doing and turn their attention and resources toward getting rid of it? Some production-oriented genetics focus so much on growth and productivity that they deprive the



Bovine Viral Diarrhoea (BVD) is a serious viral disease which infects mainly cattle, causing lowered milk production, reproductive losses, an increase in general disease and reduced growth rates

"The cow that slows down early and recovers well is a better breeding choice than the one who maintains exceptional production until the moment she crashes" immune system of the resources it needs to do its job. The cow that slows down early and recovers well is a better breeding choice than the one who maintains exceptional production until the moment she crashes.

Herd immunity: Even with excellent nutrition, exemplary handling and judicious genetic selection, it is unreasonable to expect every animal to be at the top of its immunological game at all times. You will probably always have some young, some older and some immune-compromised individuals in the herd. Vaccination simply cannot protect these animals directly, because they are unable to create proper immune memory. How can you control disease risk for these animals? Your most vulnerable animals are safest when the healthy individuals surrounding them have immune memory. When an infectious disease shows up in the herd, prior vaccination will allow those with robust immune systems to minimize their contribution to spread, which lowers the risk of exposure for those that cannot fight the disease. This is herd immunity.

Vaccines

Vaccines use altered versions of the disease agent to develop immune memory without the undesirable consequences of disease. Modifiedlive or attenuated vaccines are most similar to natural infection. They tend to inspire a strong immune response, but can also carry some of the risks or side effects of disease. Killed or inactivated vaccines carry less risk of vaccine-induced disease, but may also invoke a weaker immune response. When needed, immune stimulants called adjuvants may be added to bolster vaccine response.

Subunit, polysaccharide, conjugate and recombinant vaccines attempt to deliver the best of both worlds. Made from pieces of the original disease agent or its associated toxins, these formulations strive to promote effective, long-lasting immune memory with minimal side effects. Pay attention to the indications and

IDENTIFY THE RISK

If the best defense is a good offense, then the lung's 'mucociliary apparatus' just might be an MVP. Pneumonia causing pathogens are everywhere. But mucus traps pathogens and particles entering the lungs, as tiny fingers called cilia cause the mucus to 'flow' against gravity. Water, sodium and other minerals are needed to get the consistency of the mucus just right. But when the air temperature and relative humidity change, the mucus must be adjusted. Dehydration and seasonal weather changes handicap the mucociliary apparatus, placing animals at elevated risk for pneumonia. If utilizing respiratory vaccines, make sure they are timed appropriately, and ensure that your animals always have ready access to clean drinking water.

Tetanus and many other clostridial disease spores such as blackleg can live for decades in soil. These diseases sometimes surface after new building or excavation projects, or when playful young animals rough themselves up a bit. Even if you have never seen these diseases on your farm, consider vaccinating if your animals will spend time horsing around on newly broken ground.

Many transmissible diseases can be brought in when new animals are introduced to your flock. Others may be ever-present, harbored by local wildlife. Check with your veterinarian to learn which diseases are present in your region and how those pathogens could reach your animals, and for help determining whether vaccination would be a useful or even necessary step to protect productivity and ensure animal well-being.



Tetanus and many other clostridial disease spores such as blackleg can live for decades in soil

warnings given for each vaccine type, as some are not safe for all lifestages. For example, some modified-live vaccines can cause abortion when administered to pregnant animals.

Immune responses are tissue-specific. A bacterial infection in the nasal cavity is met with antibodies that work best in respiratory tissue, while a parasite in the small intestine is attacked by a gut-specific antibody of a different type. Some vaccines are designed to be administered directly into their target tissues—for example, some respiratory vaccines are given as a squirt up the nose. Many vaccines are designed to be injected into the fluid between cells, where the lymphatic system routes them to the proper tissues for processing. Because immune response is tissue-specific, it is important to administer vaccines exactly as directed.

Timing

The initial response to an unrecognized pathogen can take a few weeks and vaccination is effective only *after* that process is complete. If your animals are going to travel, or if a new animal or other risk will be introduced to your farm, allow at least four weeks for vaccination to take effect. If animals arrive at your ranch unprotected and are vaccinated upon arrival, it is best to quarantine for four weeks, if feasible.

Vaccination four weeks prior to birthing can help enrich colostrum with antibodies that will protect the newborn from disease. Those antibodies also prevent effective vaccination. Colostral antibodies wane over time, so be sure to follow age recommendations for vaccinating young animals to ensure that they are vaccinated as soon as they are unprotected and able to create immune memory.

Good timing is crucial for effective vaccines, but timing is useless if other factors render your vaccinations ineffective. If your animals are ill, malnourished or highly stressed, your vaccination results may be poor. If you are not sure whether



Serum titers are blood tests that can assess whether an animal is primed with immune memory for a particular pathogen

SERUM TITERS

Is your vaccination program providing protection all season long? Serum titers are blood tests that assess whether an animal is primed with immune memory for a particular pathogen. Titers can indicate whether revaccination may be warranted. When bringing a new group onto the farm, serum titers can also help you decide whether

vaccination is warranted upon arrival. Speak to your vet for more information. an animal should be vaccinated, consult your veterinarian. After a vaccination program, monitor animals for signs of illness and provide additional health support, as needed.

Tailoring your program

Vaccination may not be beneficial if *all* of the following apply:

- > You maintain a closed herd
- > You never move animals off the farm
- > You prevent interaction with wildlife
- You have been on your farm for some time and have not had disease problems in the past.

Consider vaccination if you:

- Show, or regularly move animals off the farm
- Bring in seasonal breeders from other farms
- Add feeder or hatchery animals to existing groups
- Have had disease problems in the past
- Are aware of disease problems in your neighborhood.

Summary

Vaccination reduces severity and spread of disease, but doesn't completely prevent infection. Herd immunity is important for protecting animals whose immune systems are less effective due to age, pregnancy, poor nutrition, genetics or disease.

While vaccination can be a vital tool to manage health and prevent disease, it must be considered within the larger context of risks, costs, animal health and wellbeing. Maximize your investment by providing excellent nutrition and low-stress husbandry, selecting disease-resistant genetics, and by timing and administering vaccines correctly.

Jennifer Gravley DVM is a veterinarian and educator with a special interest in the intersection of food animal medicine and public health



Having snakes on your land can offer a beneficial partnership, says Johnathan David

From a young age, we are often taught to fear snakes. What these animals need is not fear but respect. With a little research, snakes can be easily understood and tolerated with minimal anxiety. Seeing a snake on your farm or ranch can be a frightening experience-particularly if you cannot identify the species and therefore do not know if the snake is going to harm you or your family. That being said, the vast majority of snakes in North America are not venomous. (Out of the 150 or so species of snakes in North America, only 20 species are venomous and most are rarely sighted.) While some snake species can be harmful, most are highly beneficial to have on your farm or ranch. Provided these animals can be respected, they act as another member of the team, often helping to control rodent pests-and even other more harmful snake species.

Why be more snake-friendly?

Many species of snake act as a natural pest control. Different species of snake will have different natural diets, and so promoting snakes living on your land can provide a free pest-control service. For example, the common garter snake, one of the most common species in America, lives on a diet of flies and other insects. The corn snake will feed voraciously on mice and rats, while the common milk snake (like other species of kingsnake) will not only eat plenty of mice and rates, but other snakes, too—including venomous snakes. All the above species of snake are non-venomous and therefore present no significant danger to humans or livestock.

Tolerating snake species on your land can also help to deter larger predators around your livestock. Many American snakes, such as the bull snake and gopher snake, have evolved to mimic the skin patterns of the rattlesnake and so may discourage animals from coming closer.

Of course, this is not to say you should welcome snakes onto your property and let them run (or slither) wild! It is unwise to allow them free access to livestock housing, for example, so it is important to take steps to snake-proof key livestock areas particularly when raising poultry or rabbits.

Snake behavior

To live safely alongside snakes we first need to understand basic snake behavior.

Snakes are ectotherms, meaning they cannot regulate their own body heat. As a result, they often spend large portions of time basking, either in trees, on rocks, on sand banks or even on the roofs of houses/barns.

As a species, snakes are generally quite rational. They expend most of their energy on hunting purposes; as a result, they are very unlikely to attack a person unless they feel they have no other choice. Snakes generally only bite people

Snakes generally only bite people when they are picked up, cornered or stood on

when they are picked up, cornered or stood on. Provided space and respect, the chances are the snake in question will leave you alone.

Snake-proof housing

While snakes perform an important role in controlling pests, we don't necessarily want to invite them into all areas of the farm! The objective is therefore to deter snakes from key areas of the farm and make these locations as undesirable and inhospitable as possible for any snakes.

Many non-venomous snakes, like the scarlet kingsnake, rat snake and gopher snake, are extremely useful in preying on rodents—and even venomous snakes. But they will also happily feed on chicks, eggs and rabbit kids, too. So it is important not to give snakes an easy meal or they may become habitual predators.

It is impossible to prevent snakes from entering every livestock building but you should take steps to snake-proof housing and brooding areas where snakes are a known problem—particularly if you farm poultry or rabbits. While adult chickens can attack and even kill snakes, chicks and rabbit kids are highly vulnerable, as are fresh eggs. So take particular care to snake-proof brooding areas, nesting boxes and egg collection areas.

If possible, plan to build any new housing on a hard standing or raised off the ground. Snakes can enter any hole the diameter of its head, so cover all possible openings with ¼" hardware cloth and caulk all smaller holes. Don't forget that some snake species are excellent climbers, so take time to locate any possible access points higher up.

Regularly clear areas around housing of tall grass and brush. Remove all debris located around or near housing that snakes can use as cover.

Remember: most snakes are usually first attracted by an abundance of small rodents, which in turn are likely to be feeding on livestock feed. So it is important to take steps to prevent rodents from accessing grain storage areas and minimize grain spillages around the farm, clearing up any excess feed waste on a daily basis. Likewise, collect eggs daily and clear up all breakages.

Where snakes are a known problem, wear gloves, long-sleeves, long pants and high boots when walking or working in tall grass. Take extra care when moving wood piles, mobile housing or anything on the ground (think rock piles, straw bales, feed bags, old corrugated roofing, general debris and so on) that could provide cover.

What to do if you see a snake

Generally speaking, most snake species will not attack unless they feel provoked or unable to easily escape, so giving any snake a wide berth is absolutely essential.

If you are walking through long grass or moving livestock to areas with long grass, think about

Common species encountered

Some species that are common in different regions may not be listed here. Please take time to learn to identify the key snakes in your area, their behavior and favorite habitats-especially any venomous species.

		Description	Where are they found?
Black rat snake Pantherophis obsoletus		Averaging 3-6 ft. in length, these snakes have black scales, white lips and a pale belly. Not venomous.	Excellent climber, often found high in the rafters of buildings or branches on a tree.
Common garter snake Thamnophis sirtalis		Averaging 16-32in. long. Generally black or brown, except for their belly which is usually yellow, blue or green. Their identifying feature is their three yellow stripes along their spine. Not venomous.	The most common snake in America. Often found in wet, grassy areas in most states.
Milk snake Lampropeltis triangulum	Contraction of the second	Usually between 2-4 ft., though can grow up to 7 ft. Easily recognizable by their red to reddish brown patches outlined in black. Not venomous.	On farms, often found in grass fields or hidden in the foundations of old stone buildings.
Corn snake Pantherophis guttatus		Usually 3-6 ft in length; easy to spot with their distinctive orange and red patterning. Unfortunately, often confused with the venomous copperhead and killed. Not venomous.	When not in grassland, they hide under rocks, logs and debris. Excellent climbers, you may also find them in the rafters of a barn.
Eastern copperhead Agkistrodon contortrix	and the second	The most common venomous snake in the U.S. and responsible for most venomous bites. Averaging 1-3 ft long, they have a very distinct "hourglass" pattern in olive and black along their body, with a very pale belly/lips.	Mostly found in woodlands but also muddy areas or near water sources. Like all snakes, they like tall grass. Perfectly camoflaged.

sweeping the area with a walking stick to clear out any snakes. Be particularly alert when walking through sandy or rocky areas where snakes may bask or when moving wood piles, mobile housing or anything that could provide cover.

If you do see any snake, **staying at least three** feet away will give you protection. Snakes cannot strike at a distance of more than half their body length; as the longest snake found in North America are around six feet, staying over three feet away will provide some safety.

If you do surprise a snake, stay calm and still, before backing away very slowly. The snake is likely to be more scared than you and, in most cases, it will be only too pleased to move away of its own accord.

If the worst happens and a snake bite occurs, go to your local emergency room as soon as **possible**. The doctors will need to administer the correct antivenom before the venom can show symptoms. Calling in advance will give the doctors the opportunity to ensure they have the correct antivenom at the facility or to direct you to another hospital.

Previous advice was to cut the snake bite to suck out venom or tie a tourniquet. This is no longer advised, as you may end up doing more damage than good.

lf you any snake, staying at least three feet away will give you protection

Do not waste time trying to capture or kill the snake for identification. After a bite, the snake will likely retreat and be impossible to find. Instead, try to make a note of colors/markings that may help medics administer the correct antivenom. Take note of the time of the bite to help medics understand the progression of symptoms.

Finally, it is important to try to **remain as calm** as possible. Although sometimes easier said than done, remaining calm and still will help to slow the spread of the venom.

Summary

Having snakes on your land can offer a beneficial partnership, encouraging the natural regulation of vermin on the farm. Although the idea of encountering a venomous snake may be a worry, many species of venomous snake have not been seen in the country for many years. With regular work to minimize potentially snake-friendly habitats around barns and livestock housing and snake-proof any at-risk areas, it is possible to deter snakes from seeking a comfortable resting placeor coming back for an easy meal.

Johnathan David is Editor in Chief at Everything Reptiles, the authoritative reptile magazine. Visit everythingreptiles.com

© Certification news **A NEW YEAR**

Tim Holmes looks back at 2020and how we can all move forward

Tim Holmes is

Director of Compliance

with A Greener World

When asked why they like working in agriculture, many people will tell you that it is challenging and rarely boring. There is always something to learn, improve upon and test your skills. Well, 2020 has certainly proved that to be true!

A year to forget?

This past year has bought us COVID-19, numerous severe weather/climate events and terrible wildfires. It has also highlighted some major flaws in the production, processing and distribution of agricultural products due to consolidation that has taken place over the last 40-plus years. We are now presented with an excellent opportunity to learn and move forward with better ideas.

Here at A Greener World, we've been forced to take a hard look at our policies, procedures and plans. When the severity of the COVID-19 outbreak became clear, every AGW staff member was asked to perform tasks that were far outside of their normal expertise and comfort zone to help farms in the program any way we could. Things that had been simple became almost impossible, while others took twice the effort to achieve. Like the farms that we certify, everyone pulled together and we continue to do all we can to work through the current times and to face the next challenges.

Like the farming and ranching businesses in our program, we try to plan for emergency situations. Current events have certainly shown us the importance of planning but also that any plan must be regularly revisited and updated according to new knowledge. It is not something to be written and placed in a drawer to gather dusk.

A good result

We made significant changes to our auditing policies and procedures to adapt, implementing

remote or 'desktop' auditing for existing farms and a different procedure for reviewing slaughter facilities. Overall, the new procedures have gone much better than we could have anticipated and we have learned valuable lessons that will help the program when things get back to whatever the new normal is.

More recently, we have been able to audit some new farms onsite, working through the procedures and policies to make this as safe as possible. Unfortunately, travel and safety concerns mean some will not yet qualify for an onsite audit; and we are a long way from being back to 'business as usual.' This is the challenge of operating a program that now covers over 10 countries.

Be ready to adapt

Finally, the events of the past year have certainly proved that we all take so many things for granted. The loss of free movement and transportation has made auditing a huge challenge. The sudden closure of countless restaurants and the restrictions at many farmers' markets have greatly impacted the farms so dependent on them, while farms that already had direct delivery or an on-farm store generally saw a surge in demand. But if you asked those farms with existing direct delivery or on-farm stores why they first developed these outlets, not one would say it was due to customers being unable to attend farmers' markets or eat at their favorite restaurants.

My point is that all events offer the opportunity to learn something new and we need to be ready to adapt. The end of 2020 is a good time to take a deep breath and reflect and review your status, and revisit your plans for your operation for the future. (For further planning advice, see Sustainable Farming, vol. 5, no. 2, pp. 10-13.)

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Meet the farmer

BISON NATUREL

Pierre Bélanger (pictured right) and family raise Certified Animal Welfare Approved by AGW bison at Bison Du Nord in Earlton, Ontario. The 570-acre ranch is located in northeast Ontario, right on the border with Quebec. The rugged landscape of fertile soil produces excellent grass, making the property's pastures a natural fit for bison.

Tell us about your farm

We became bison ranchers in 1972, initially for the pleasure of owning and raising North America's iconic animal. Over time, the ranch has become a full-time business. Our tendency to ranch in a natural way has become an intentional holistic enterprise. We've always been grassfed and animal welfare-oriented, but we were dismayed with the multiple claims of virtue springing up everywhere. We wanted a credible, recognized certification-A Greener World filled that void! Today, we raise around 300 Certified Grassfed by AGW bison on 600 acres of forested and open rangeland.

Describe a typical day

In winter, we feed the herd early every morning. This involves laying out large 4' x 5' haylage bales on clean snow or in feeders. June to October is grazing time on our pastures—we move the herd every 5-6 days through a succession of 80 acres of biodiverse pastures. Days are also taken up by maintenance, new fencing chores and marketing.

What do you love most about what you do?

The amazing combination of a peaceful natural environment and the constant challenge of implementing novel ranching practices. And doing it all with family

Sustainable farming: why does it matter?

We are surrounded by intensive dairy farms and cash-crop operations. We know this is a catastrophe in the making for the animals, land, farmers and communities. We want to be part of the greener solution.

What's the benefit of being certified by AGW? Being certified by AGW creates strong discipline on ranching practices and makes us part of a like-minded community.

What are your business plans for the future? We hope to stabilize our herd at 125 breeding cows, so approximately 300 animals on our land base. We also intend on being a multi-generational farm -we are now going into the third generation and have structured our business so that it can sustain our family in the future.

Who are your customers?

Our customers are retail butchers and farm gating bison ranchers. We also love to meet curious and informed consumers at food fairs and festivals.

Can we improve the market for sustainable food? The challenge is to inform consumer values, attitudes and behavior and encourage them to adopt and support the greener way.

If I was Canada's Prime Minister I would ... Use legislation to compel, motivate and reward consumers to support sustainable farming practices and know their food and their farmers.

Is there an important lesson life has taught you? Pessimism is a self-fulfilling prophecy. So is optimism!

AT A GLANCE

Farm: Bison du Nord, Ontario Certification date: October 2019 Size: 600 acres Soil type: Clay loam Altitude: 830 feet **Annual rainfall** 32 inches Enterprises: 300 certified grassfed bison

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"We are very transparent to our customers about how we raise our animals but felt that a third-party audit and certification would be a valuable asset for consumer confidence." JAMES AND CHELSEA KEENAN, Keenan Family Farms, Salmon Arm, British Columbia



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