

Holistic Livestock Healthcare

A report for Nuffield Canada



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2007 Nuffield Scholar

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Executive Summary

Conventional or common practices of livestock healthcare are very focussed on disease causing organisms and how best to kill them. The holistic approach is about taking a broader view of disease and health. It looks for the deeper more fundamental causes of disease, the very rational cause and effect relationships between an animal's entire body and the complete environment. The animal is seen as being part of the complete farm ecosystem. A treatment of disease in the holistic approach will often focus on the overall health and immune system function of an animal rather than one specific bacteria, virus, or disorder.

The foundation of the farm is the soil. Testing is essential to know where you are starting from and how to improve. Re-mineralization and biological activation are the key strategies used to improve and balance soil fertility. With better soils comes higher quality, nutrient dense feed, which provide livestock with more of the nutrients required for optimal health. Water is the forgotten basic building block of animal health. It needs to be easily accessed and clean. Removing pathogens and contaminants is easy with available products and technology.

Housing or shelter needs to be designed with animal comfort as the guiding principle. Less stress results in less disease, and is the beginning of a lower cost, higher production system. The choice of animal genetics must fit the production system and local environment, for optimal health and productivity. Crossbreeding and dual purpose animals need to be considered, with long term economic success being the criteria not show ring prizes.

Once these basics are in place livestock health can be maintained, improved, and repaired with a variety of products and treatments. By using high quality vitamins, minerals, and supplements much disease can be avoided. There are many herbal and homeopathic remedies effective for disease treatment. It does require a new set of knowledge for farmers and on farm experimentation. However, the results can be greater animal health, more economical production, and safer higher quality food.

Introduction

Since being awarded my scholarship in 2007 I have had the privilege of visiting eight countries, flying around the world, meeting the best and brightest farmers and agriculture leaders, as well as making many new friends. With 88 days of travel, more time away from the farm than the average dairyman gets in a lifetime I still did not reach every country I originally hoped too. I did travel in Australia, New Zealand, Ireland, France, Germany, The Netherlands, USA, and China. While I gained many valuable insights and strategies from each country, most of the companies and products I will mention are US based.

My hope is that my research and report may prove insightful and practical at the farm level. It should encourage on farm experimentation and improvement in the art and science of animal husbandry. As public concerns over food safety increase, and government restriction of antibiotic therapies continues, farmers will need more knowledge and better alternatives.

This leads to the concept of holistic livestock healthcare. Conventional or common practices of livestock healthcare are very focussed on disease causing organisms and how best to kill them. The emphasis is placed on the nature of the bacteria or virus when making a treatment decision, which is assumed to be the primary cause. Using the appropriate antibiotic for the specified time frame should kill enough of the undesired organism for the animal to be 'cured'. The holistic approach is about taking a broader view of disease and health. It looks for the deeper more fundamental cause of disease, the very rational cause and effect relationships between an animal's entire body and the complete environment. The animal is seen as being part of the complete farm ecosystem. A treatment of disease in the holistic approach will often focus on the overall health and immune system function of an animal rather than one specific bacteria, virus, or disorder.

Soil

Soil is the foundation of a farm both economically and nutritionally. It is no accident that the most profitable and successful farms are in areas with the best soil. It is also the basis of civilization as we know it. As the soil goes, so does the wealth and health of a country. It is the productive capacity of soil that underpins a nation's strength, as can be seen in the history of powers such as Egypt, Greece, and the USA.

Proper soil fertility management and cropping plans are the starting point of animal health. Not just NPK fertilizer recommendations but in most cases re-mineralization, biological activation, and micro nutrient supplementation is required to produce a nutrient dense crop that will provide what they need in its most appropriate form. Soil testing is essential to determine where the soil is at currently, so short and long term strategies can be developed.

So what does an ideal soil contain?

Organic Matter- above 2%, higher levels increase water and nutrient holding

C.E.C.-Cation exchange capacity, this will depend mostly on soil type sandy soils the lowest and heavy clay soils the highest. It is a measure of the soils ability to hold and release nutrients. 5 – 25 would be a normal range.

Potassium(K), Magnesium(Mg), Calcium(Ca)- the % base saturation of these nutrients is a major determinant of soil structure and fertility. Ideal levels are K=3-5%, Mg=12-15% Ca=70-80%

pH- 6.5-7 is the best range for nutrient release

Phosphorus- P1 available: 25-50ppm, P2 reserve: 50-100ppm

Sulphur- 50ppm or 100 lbs/acre

Zinc- 5+ppm or 10 lbs/acre

Manganese- 20ppm or 40 lbs/acre

Iron- 20ppm or 40 lbs/acre

Copper- 2+ppm or 4 lbs/acre

Boron- 2+ppm or 4 lbs/acre

These soil test goals are from Gary Zimmer and his company Midwestern Bio Ag, and are similar to other soil balancing goals I have seen. It is usually a long term project to re-mineralize a soil to these levels but improvements can be made if you know your starting point and what direction you are aiming.

Soil microbiology is the most important and least understood management criteria for farmers. A biologically active soil helps release nutrients to the plants in the form most available and useful for becoming nutrient dense feed. Bruce Tainio and his company Tainio Technology, specialize in soil microorganism inoculants and specialized enzymes to assist soil biology. He has achieved remarkable yield and quality results using bacteria to unlock soil nutrients, which also allows more efficient use of applied fertilizers.



A biologically active, mineralized soil, growing nutrient dense grass. Australia

Feed

Quality of feed is possibly the most important factor in determining overall animal health. It is also the most important requirement for an animal to reach its genetic potential in growth and production. The modern nutritional practice of looking at individual nutrients regardless of their source or availability to an animal is misguided, and similar to viewing organisms in isolation from their environment. We need to start with the basic question of what is the animal designed to eat. If we stray too far from an animal's natural, biologically compatible diet, we are already setting the stage for metabolic disorders and disease.

This leads to the ongoing debate between pasture vs. grain feeding. Most of our modern livestock evolved in pasture based or scavenging type environments. This meant that our cows, chickens, or pigs were left to roam around eating what they could find. This offered them a variety of food sources but not necessarily what they needed to produce to their genetic potential. As farmers we found we could add certain feeds to their diet that would help them grow faster or produce more. There are many New Zealand and a segment of organic farmers

that religiously believe grass or pasture based systems are the only way to raise livestock, especially cattle and sheep. Others believe you can supplement pasture and forage to the benefit of the animal and production. Still others, especially in North America believe that you can achieve better results with complete control and consistency, feeding complete total mixed rations.



Intensive rotational grazing. New Zealand

What I have seen indicates that the middle ground is usually the best course. A variety of high quality forages, grains, pasture, and supplements is ideal, both for the farm and the animal. The dogma of grass is best does not hold up, when animal health can be improved by adding some protein and grain. Likewise, high grain and by-product feeding is not economical when livestock health and longevity are considered.



High forage total mixed ration feeding. Germany

Feed source variety and nutrient density should be primary considerations. Again testing is essential to understand what it is you are feeding. Variety is relatively easy to achieve, just add more forages, grasses, grains, and protein sources. This insures a wide range of amino acids and micro nutrients will be available. Nutrient density is more difficult to achieve because it relies mostly on having mineralized, biologically active soils, so the plants can uptake more nutrients. Another example of nutrient density is with sugar in forages, it can be more easily manipulated by harvesting crops during peak photosynthesis to capture the highest sugar levels. This can be measured in field with a refractometer, which gives a brix level, which corresponds closely to sugar content.

The following are optimal test results for forage quality and nutrient density from Jerry Brunetti of Agri-Dynamics:

Nitrogen- 3.2-3.5% (20-22% CP)

Protein Solubility- 50-60%

ADF- 28-30%

NDF- 38-43%

Lignin- 5-10%

Wet Chemistry results:	Legumes	Grasses
Ca	1.5-2%	1.2-2%
P	.35-.5%	.25-.4%
Mg	.35-.5%	.3-.5%
K	2%(1:1with Ca)	2-3%
S	.32-.35%	.32-.35%
Cl	.3-.4%	.3-.4%
Na	.15-.2%	.15-.2%
Si	.5-1.5%	1.0-3%
Trace minerals:	Legumes	Grasses

Boron	40ppm+	25ppm+
Cu	15ppm+	15ppm
Mn	35ppm+	55ppm
Zn	30ppm+	45ppm
Fe	<200ppm	<100ppm
Al	<100ppm	<100ppm

Sugar is also essential and should be in the 5-10% range.

There are many considerations when harvesting and storing forages and grains. Forage is the most difficult to control. As a general rule fast even drying is the best. Dry hay bales usually have a better sugar content than silage, and need to be kept covered and dry to avoid spoilage and mold growth. Silage should be harvested as dry as possible while still allowing adequate packing density in a bunker or pile, this is usually between 50-60% moisture. No matter how well this process goes unwanted acids can be formed, and mold growth resulting in mycotoxins. Both are common and harmful to animal health. Using lactic acid producing bacteria inoculants can help in the fermentation process and reduce the chances of high butyric acid levels in silage. Rapid fermentation and stabilization of any silage is critical to reduce the growth of molds and associated toxins. Unfortunately molds and mycotoxins are inevitable in silage, dry hay, grain, and protein sources. How to reduce their impact on your livestock will be covered in the supplement section.

Another aspect of feeding livestock involves adding certain plants or nutrients that affect the final consumer product, whether it is, eggs, meat, or milk. There is a lot of experimentation with flax and fish oils in diets to produce omega-3 fatty acid enriched eggs and milk. High forage and grass based diets are being shown to increase the beneficial fatty acid CLA in both meat and milk. More experimentation and product development are needed in this area.

Water

Other than outright scarcity water is often the most overlooked essential in an animal's diet and proper functioning. Livestock production is completely dependent on water availability, and the health of our livestock is completely dependent on water quality. While availability is location dependant, quality is something we can manage and control.

That being said, accessibility is another point we can control. This is the first limiting factor in livestock productivity. If animals are not given easy, consistent, access to water their growth, production, and health will be limited. Considerations would include distance to a water source, number of animals per water source (competition), and of course quality of the water. It is my observation that with both housed and pastured livestock the number of water sources is too few. For the small additional investment in water sources, the animals will be healthier and more productive given easy access to water.

Water quality is a more difficult and expensive problem to solve. Depending on the source, water improvement can be as simple as a filter, or require more complex systems to remove or kill pathogens. Drinking water is often the most likely source for the introduction of disease organisms. Removing pathogens providing animals with clean, pure water is the focus of the following treatments.

Hydrogen Peroxide is commonly used as a disinfectant in water systems. I found this most often used on organic dairy and beef farms. 35% food grade peroxide is diluted down to 3.5% and then added with some dosing meter to the livestock water system at 2-3%. This kills bacteria in the water and also helps keep water lines and bowls free of algae and other bio films. It is also supposed to have animal health benefits by adding oxygen to the stomach or blood of the animal, encouraging growth of beneficial bacteria. The additional health benefits are questionable, but the disinfection of the water and bowls is verifiable and can increase water consumption.



Envirolyte water treatment system. Canada

The Enviolyte water conditioning unit is a more complex procedure that uses an electrolyser (cell) to electrically activate a solution of common salt. Using two chambers, anode and cathode, a DC current passes through the solution producing a neutral Anolyte out of the positive chamber. This results in the Anolyte water being a pH of 7-8.5, with an ORP or redox-potential of >700mV and an active chlorine concentration of 450-550mg/L. The resulting anolyte has a variety of uses including water disinfection when injected at a rate of 1-4%. It is very effective at eliminating bacteria and bio films from water lines and bowls and may have additional health benefits in the animal.

Anolyte has a neutral pH and so is very safe to use a general disinfectant in animal housing and on the skin. It is even used as a teat dip in its pure form with no skin irritation. Anolyte can replace chlorine nearly all applications, and is simple and cheap to produce on farm once the necessary equipment is purchased.

A water treatment method for larger bodies like ponds or lagoons was developed by Bruce Tainio of Tainio Technology. It uses low frequency, long wavelength, sound to alter the chemical bonds in the water. This results in an increased oxygen level in the water which inhibits bacteria and algae growth. I have no direct experience of this method; however it warrants further research as it has large scale water reclamation potential.

De-salinization is another procedure I encountered, most notably in Australia where water resources were extremely limited, and highly saline. There are numerous companies making farm scale de-sal plants available. These may become increasingly important as many river and lake systems are increasing in salinity and are no longer suitable for crop or livestock use. Using water that is unsuitable for human use will become increasingly important as criticisms of intensive water use in livestock raising are sure to increase.

Shelter

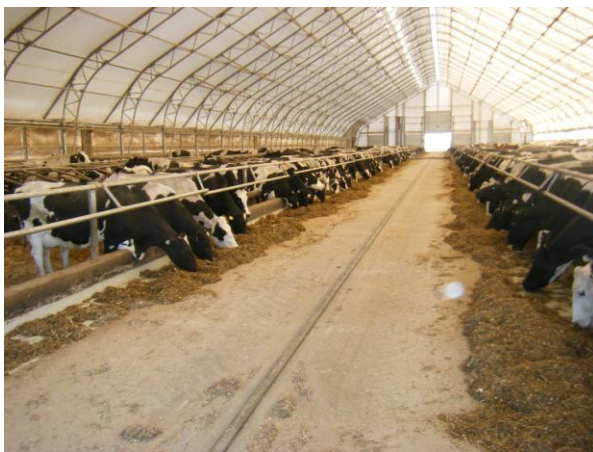
Most of the world's food animals are raised with some kind of shelter. Shelter can range from woodland wind breaks, to completely climate controlled barns. Depending on the external environment, shelters can reduce the stress on an animal leading to greater health and productivity, or they can be the cause and a source of stress leading to increased disease issues. It all comes down to design and suitability for the animal and environment.

Space is the primary concern when housing any livestock. As a general rule more is always better, but economics is usually what dictates the space per animal and not what is best for the animal. Overcrowding always adds stress and disease pressure leading to higher treatment

costs and lost productivity, so money invested in more space will usually pay for itself over time. It has been demonstrated with dairy cows that pre calving metabolic disorders are almost completely eliminated, when feed bunk space and lying area are doubled from industry standard.

Along with space comes comfort. Again any increase in animal comfort is a decrease in stress, which results in better immune system function, disease resistance, and productivity. Comfort has become a primary objective in the dairy industry as cow production and longevity, respond quickly and are easily measured. It is more difficult with other livestock species to define comfort and to evaluate production responses. For most livestock there are well defined parameters for comfortable temperature. This can be easily manipulated with heating and cooling systems, depending on climate.

Air quality in livestock housing can also be controlled. Dry, fresh air is the least likely to carry airborne pathogens. This is more difficult to achieve as stocking rates get high, and while trying to control temperature. For cattle I believe that air quality is more important than temperature control, so the more stale, humid air you can move away from the cows the better.



Bright, Dry, Fresh air. Canada



Shade, Fans and Misting. China

Adequate lighting is also important. Full daylight strength lighting can boost animal's immune system function, increase fertility, and result in higher production. Extended lighting is used to keep production up at peak levels in all seasons. It has been found with cattle that a period of darkness is also needed for proper hormone production, with six hours seeming to be the minimum.

A final consideration in livestock shelter especially in confined housing is social interaction. Are the animals free to move and interact with each other in their natural unconfined manner? This I feel is more of an animal welfare issue, and is species dependant, as it is often not healthy or desirable for animals to freely bully and abuse each other. Other livestock such as cattle, sheep, and goats settle into a fairly stable social group, and are more comfortable if their group can remain constant.

Genetics

As farmers we have been selectively breeding and altering livestock genetics since the domestication of the first animals. The two main drivers for selection have been production and suitability to the environment. Over time selection for production traits have come to dominate livestock breeding. Over that same time the environment we raise livestock has also changed dramatically, with much greater use of total confinement systems. We have reached a point where we must ask if we have the right animal for its environment and our purpose.

The modern Holstein cow is a good example of genetic selection based almost entirely on production traits. It can produce an enormous quantity of milk, but what environment is it suited. Pasture based systems do not provide the consistent high energy diet it needs, and its frame size does not make it an efficient grazing animal. Intensively managed, free stall, confinement operations can feed the cow adequately to high production, however the competition and walking on concrete, leads to premature death or culling due to disease. The modern high production Holstein is really best suited for a tie stall environment, where it can be individually fed based on its production level, it does not have to walk to eat or drink, and is not in competition with other animals. In this environment it can produce high yields and survive year after year.

In most livestock farming crossbreds, hybrids, and composite breeds have become the norm in an attempt to fit the genetics to the system. In dairy and somewhat in beef there is still an unreasonable and uneconomical attraction to pure breeds. Part of the problem is the timeframe required to experiment with cross breeding in cattle, it takes a long time to see your mistakes and correct them. There is also very little information available to farmers on how to cross breed, and with what breeds, to suit a particular environment. The other problem is the show ring. Pure bred cattle have a long history of being shown in competition, with the best being selected on mostly subjective criteria. These winners get promoted as the best cows regardless of environment, and often after a less than honest presentation, and so their

genetics get used more and more. This is not the way to select an animal that will be healthy and productive in your specific environment.

In Australia and New Zealand I saw many cross bred herds using Holstein and Jersey. They produced a smaller frame animal capable of grazing and producing a reasonable amount of milk mostly from grass. In Germany I saw what could be an ideal pure breed, Bavarian Fleckvieh. They are well suited to their environment, being grazed while young and in conventional free stall barns as milk producers. Eating high forage diets they were able to produce 8-11000 kg of milk while also maintaining good muscle mass, adding beef value when they were sold. The Fleckvieh were also being used in crossbreeding with Holsteins and Jerseys with outstanding results, adding strength, health, and longevity.

In the future I see the beef and dairy industries becoming one. There will be new found interest in dual purpose breeds like Fleckvieh and crossbreeding to add beef value to existing dairy herds. Milk and meat can come from the same herd with an improvement in genetics suitable to modern housing; it will also bring better health, and improved economics.



Purebred Fleckvieh cow: 10+ lactations, 100000+L milk, healthy. Germany

Vitamins and Minerals

Vitamin and mineral supplementation is essential for all livestock, to achieve optimum health and productivity. There is just not enough or the right combinations in the regular rations to meet the needs of high production animals. The need for additional supplementation does decrease as soil health and feed quality increases. As always quality should be considered before quantity and price. It is often cheaper to feed a lower rate of high quality, biologically available vitamin and minerals, than the cheap stuff.

Availability is the key consideration. If the animal cannot absorb the nutrients you are giving it is a waste of money. Chelating is a process by which raw minerals are altered chemically or biologically to a form more easily assimilated into an animal. These minerals are often bound to other compounds like yeast or sugars that make them easier for absorption in the stomach or intestine. Selenium and Zinc are two of the most common chelated minerals that have a direct impact on the immune system of an animal. Crystal Creek is a company that provides a wide range of the highest possible quality vitamins and minerals for livestock.

Many farmers supply their animals with free choice minerals. Usually a combination of vitamins and minerals are left out for animals to lick at. This assumes the animal has some instinctive knowledge of what it needs, and can be unpredictable as to what levels the animal is eating. It is better to provide a consistent, known amount of minerals either in the feed or water, and allow for free choice feeding above this. It is often seen that animals will aggressively feed on free choice mineral for some time when it is first introduced then reach a steady state of minimal intake. This may be from a genuine need in the animal for higher mineral levels or due to the novelty of a new taste. Always have salt available free choice, separately, so they don't over eat the mineral just for the salt.

High doses of vitamins and minerals can be used as treatments or to support the immune system during periods of stress like before calving.

Vaccinations

The list of possible vaccinations for livestock is almost as long as the list of diseases they can get. While I do see them as a component of a disease prevention program, they do not address the fundamental causes of disease, only specific disease organisms. Vaccines lead to a false sense of security when it comes to disease prevention, instead of making the environmental or nutritional changes to support better animal health, farmers assume that a vaccinated animal will be immune from disease threats.

In many cases the disease organism is not what causes the damage to an animal, but the body's own immune response, as in the case of an excessive or prolonged fever. Vaccination can reduce some of these extreme responses that are seen with acute illness. They may however produce a longer more chronic response due to repeated immune system activation.

That being said vaccines do offer an economical way to reduce the occurrence and severity of many common livestock diseases. Often adult animals are vaccinated to provide passive transfer of immunity to the offspring. Scour Guard is good example with pre calving cows vaccinated in order to protect their calves from rota and corona virus which are a major cause of scours and death.

It is not necessary to vaccinate for every disease imaginable. Evaluate what are the catastrophic disease risks and also the most common clinical diseases on your farm and develop a vaccination schedule that fits your farm.

Supplements

There are many companies offering a wide variety of dietary supplements to improve animal health, increase feed intake, and treat specific metabolic disorders. Alltech and Crystal Creek are two companies with quality products, based on solid research.

There are two main types of yeast products available. One is whole yeast, sometimes live, that is used to increase feed intake in cattle. It is mostly used for pre calving cows, because their feed intake declines before calving setting them up for metabolic disorders after calving. This yeast is primarily a source of food for rumen bacteria, which encourages their growth, allowing them to help the cow better utilize its ration.

The second yeast product is usually made up of specific components of the yeast especially the cell wall. This is used as a mycotoxin binder to help absorb and remove toxins inside the animal. These mold by-products can be extremely harmful to many species of livestock at very low levels, and are common in most grains, protein meals, and forages. Special clays are also used alone or in combination with yeast to attract and tie up these toxins. The negative effect on animal health of these toxins is slowly being accepted and binders such as yeast and clay will become essential components of livestock rations.

Probiotics are another common supplement that is used to introduce beneficial bacteria to aid digestion. These products are most useful with sick animals, especially after antibiotic therapy,

as the animals natural internal biology has been suppressed or disrupted. Probiotics help re-colonize the beneficial microbes, reducing the opportunity for pathogens to proliferate.

Kelp is often given free choice as a source of naturally chelated, colloidal minerals and micronutrients. These nutrients are easily absorbed by the animal. It is only a supplement and may be most beneficial in times of stress, as it is too expensive to be used as a primary source of minerals.

Specific Amino Acids can also be supplemented to correct deficiencies in feed. Choline as an example is also used to support liver function, by helping in fat metabolism. It can be very helpful in treating cows with ketosis.

Buffers such as sodium bicarbonate are commonly used to adjust rumen pH in cattle. It is used to counteract the acidity cause by feeding too much starch. It is better to feed a better, less acidic ration than to rely on buffers which can have a negative effect on rumen bacteria growth.

Herbal Remedies

There are an almost endless number of herbal remedies for livestock. Most are focussed on supporting certain organ functions, detoxification, or immune system stimulation. Many herbal remedies were commonly used before modern veterinary medicine, and while not having clinical trials to support their claims, they do have a long history of on farm success. I don't know many farmers that wish to become trained herbalists, but many products are available that use the medicinal properties of herbs in a ready to use on farm treatment. Crystal Creek and Agri-Dynamics are two good companies with easy to use herbal products.

For those wishing to experiment with individual herbs the following is a list of recommended botanicals for farm use by Hubert J. Karreman V.M.D. from his book *Treating Dairy Cows Naturally*:

Aconitum napellus, Aconite, dried root

Allium sativum, Garlic, fresh bulb

Atropa belladonna, Belladonna, dried herb

Baptisia tinctoria, Wild Indigo, fresh or dried root

Berberis vulgaris, Barberry, dried root

Bryonia dioica, White bryony, dried root
Calendula officinalis, Wild Marigold, fresh flower
Ceanothus americanus, Red root, fresh root
Chelidonium majus, Celandine, fresh whole plant
Convallaria majalis, Lilly of the Valley, dried herb
Echinacea angustifolia, Cone flower, fresh root
Foeniculum vulgare, Fennel, mature seed
Gelsemium sempervirens, Yellow jasmine, dried root
Gentiana lutea, Gentian yellow, dried root
Glycyrrhiza glabra, Licorice, dried root
Mahonia aquifolium, Oregon grape, fresh root
Mentha piperita, Peppermint, fresh leaf
Phytolacca Americana, Poke weed, fresh root
Silybum marianum, Milk thistle, mature seed
Strychnos nux vomica, Quaker buttons, mature seed
Taraxacum officinale, Dandelion, fresh root
Veratrum viride, White hellebore, fresh rhizome
Zingiber officinalis, Ginger, fresh rhizome

Tinctures are concentrated herbal extracts used instead of dry herbs. These are made with plants that have useful essential oils or other soluble nutrients. A tincture made from garlic is one of the most commonly used antimicrobial treatments used on farms using alternative treatments. Pure essential oils can also be useful, oregano oil being a good example with anti microbial function. Mixed with a carrier such as olive oil it can be used as a mastitis treatment in the udder, or used to clean up an infected uterus.

Colloidal silver while not an herb is also used as an anti microbial. It can be used in the same way as garlic tincture and oregano oil, both internally and externally.

Aloe vera in liquid or dry pellet form is a widely used plant. It can be used externally for healing skin and wounds, or internally as a digestive aid and immune system stimulant.

Homeopathy

The following therapies and practices involve manipulating subtle energies in environment and within the animal. While the scientific basis for them is not firmly established they do seem to produce practical verifiable results.

Homeopathy stimulates the immune system using substances in a highly diluted state, to produce the same symptoms as the disease being treated. It is based on the concept of like treats like. It is meant to encourage the response of the animal to a disease in order to overcome it. There are over 3000 homeopathic medicines, each designed to produce certain responses that match disease symptoms. The preparation of these medicines involve making a solution with a herb or mineral, then making dilutions by ten times accompanied with vigorous shaking. This is meant to leave the energetic imprint of the substance on the water. The final medicine may not have any detectable amount of the original substance, but is considered to contain effective energy, the more the dilution the stronger the effect.

This is hard to accept rationally, however these treatments are quite commonly used and do seem to have an effect on farm animals. It is worth experimenting on farm to see what results can be achieved.

A suggested starter kit of remedies by Christopher Day, (The Homeopathic Treatment of Beef and Dairy Cattle) in 6c or 30c potencies.

Aconitum	Mercurius solubilis
Antimonium tartaricum	Mercurius cyanatus
Apis	Nux vomica
Arnica	Phosphoric acid
Arsenicum	Phosphorus
Belladonna	Phytolacca
Bryonia	Pulsatilla

Calcarea carbonica	Pyrogenium
Calcarea phosphoric	Rhus toxicodendron
Carbo vegetabilis	Ruta
Caulophyllum	Sabina
Colocynthis	Sepia
Hepar sulphuris	Silica
Hypericum	Thuja
Lycopodium	Urtica urens

Biodynamics is a farming system developed by Austrian scientist/philosopher Rudolf Steiner. It is based mostly on using herbal and homeopathic soil and compost preparations that attract and balance 'subtle energies'. They also use homeopathic medicine for treating animals. If homeopathy can produce results then biodynamic preparations should as well. It is challenging to adapt some of their practices to a large modern farm however.

Radionics is closely related to dowsing and kinesiology. It usually uses an electrical instrument, combined with the human body's subtle reactions to diagnose illness and imbalance in animals, crops, and soil. It can also be used to influence these same subtle energy patterns with 'intent'. This one is far out there from a conventional scientific viewpoint. I did meet several very practical, rational, farmers and consultants that were using radionics in addition to more conventional treatments and testing. Again it is something worth experimenting with on farm.



Radionics Scanner

Conclusions

Many of our current animal health issues are due to a compromise between what is needed by our livestock for optimal health and what we as farmers can afford to give them. This is a direct result of the price we receive for our products by the end user, the food consumer. There are however management, design, and product options available to farmers that can prevent disease, with its associated costs and lost production. These improvements can lead to a greater overall farm profitability and long term sustainability.

Animal husbandry is a lost art. It has been replaced by emergency veterinary care, and pharmaceutical company consultants. The knowledge and skills required to raise livestock in a healthful and efficient manner is available. It requires looking at the whole farm as an ecosystem, then making improvements at all levels. The animal must also be viewed as part of a complete system and not only as a unit of production. Caring for the animal first can lead to higher productivity, less disease focus, and more profit.

Food safety is becoming a major priority for both governments and consumers. Governments will increasingly dictate what products we can use on our livestock. Consumers will also be buying more on what they feel is safe, by whom they trust. By reducing antibiotic dependence in animal food production we stay a step ahead of government regulation, foster a better public image of our industry, provide safer higher quality products, and hopefully maintain and improve our market price.

Farmers need better information about alternative treatments and management. Relying on government, pharmaceutical company, and veterinary advice over the last 30 years has increased disease risk for our animals, and economic risk for our farms. Accessibility to natural animal health products needs to be improved dramatically, so farmers can experiment and choose the best therapies. Government bodies need to facilitate this or get out of the way.

Sponsors

Thank you for your financial support of my project.

Nuffield Canada

Cover-All Building Systems

Bavarian Fleckvieh Genetics

Big Bear Genetics

Alltech

Appendix A: Conditions and Treatments

Note: This list is meant to provide a basis for further research and experimentation; it is not a complete or recommended protocol.

Abortion:	Caulophyllum
Abscesses:	Hepar Sulph
Acetonemia (Ketosis):	Lycopodium, Vitamin B complex 25cc, Dextrose IV 250ml Opti-Peak(CC) Crystal Pellets(CC), Ketonic(AD), Dyna-vites(AD)
Bloat:	Colchicum
Bloody Milk:	Ipecac
Calving:	Bellis Perennis, Ruta Grav
Circulation:	Carbo-Veg
Coccidiosis:	Merc-Cor, Calf Shield(CC), Primary Care(CC)
Cystic Ovaries:	Apis
Detoxifier:	Humates, Kelp Meal
Diarrhoea:	Colchicum, Colocynthus, China, Merc-Cor, Bio-Lac(BA), Protein Feed(BA), Biocel Cbt(AD), Super Start Calf Bullets(AD), Calf Shield(CC), Primary Care(CC), Calf 180(CC)
Feed Utilization:	Kelp Meal, Bio-Lac(BA), Redmond conditioner
Fertility:	Cal-Phos, Hemocel 100(AD), Biocel Cbt(AD)
Fevers:	Aconite, Protein Feed(BA)
Foot rot:	Cuprum Acidum, Hepar Sulph, Dyna-min(AD), hydrated lime bath
Lice:	Sulphur 1/3 and Diatomaceous earth 2/3 in feed or 50/50 as duster
Fatty Liver:	Chelidonium, Opti-peak(CC)

Mastitis:	Protein Feed(BA), Apple Cider Vinegar, Vitamin C, Thiamine, Belladonna, Bryonia, Urtica Urens, Phytolacca, Biocel Cbt(AD), Oxy-phyte(AD), Dyna-vites(AD), Hemocel bullets(AD)
Milk Fever:	Cal Phos/ Mag Phos, Protein Feed(BA), Vitamin C IV, Calcium IV, Ultra cal drench(AD), Power fresh rockets(AD), Ketonic(AD)
Cystic ovaries:	Apis
Pain:	Arnica, Belladonna
Parasites:	Dyna-Min(AD) + Diatomaceous earth, Pivot(CC)
Pneumonia:	Bio-Lac(BA), Protein Feed(BA)in IV with B complex, Vitamin C, Aqua-flow(AD), Biocel Cbt(AD), Aloe, Power bolus(CC), Pul-Mate(CC)
Reproduction:	Folliculinum, Sepia, Pulsatilla, Silicea, Kelp meal
Respiratory:	Bryonia, Carbo-Veg, Aloe, Power Bolus(CC), Pul-mate(CC)
Retained Placenta:	Caulophyllum, Pulsatilla, Sabina, First Step(CC)
Ringworm:	Bacillinum
Scours:	Cal-Phos, Metallicum Album, Colocynthis, China
Shipping Fever:	Bio-Lac(BA), Vitamin C, Crystal Pellets(CC)
Silent Heats:	Sepia, Pulsatilla
Somatic Cell Count:	Hemocel 100(AD), Biocel Cbt(AD), Oxy-phyte(AD), Crystal Pellets(CC),
Udder edema:	Apis, Belladonna, Bryonia, Urtica Urens, Biocel Cbt(AD), Aqua-flo(AD), Oxy-phyte(AD)

(AD)= product of Agri-Dynamics

(BA)=product of Bio-Ag Consultants and Distributors

(CC)=product of Crystal Creek

Appendix B: Resources

Acres USA	1-800-355-5313	acresusa.com
Agri-Dynamics/ Jerry Brunetti	1-610-250-9280	agri-dynamics.com
Alltech Canada	1-403-735-3281	alltech.com
American Holistic Veterinary Medical Assoc.		ahvma.org
Bavarian Fleckvieh Genetics		fleckvieh.de
Bio-Ag Consultants & Distributors	1-800-363-5278	bio-ag.com
Bio-Dynamic Farming and Gardening Assoc.		biodynamics.com
Bio Tracking	1-208-882-9736	biotracking.com
Big Bear Genetics	1-204-636-2387	fleckvieh.de
Canadian Organic Growers	1-613-231-9047	cog.ca
Cover-All Building Systems	1-800-268-3768	coverall.net
Crystal Creek	1-888-376-6777	crystalcreeknatural.com
Crop Services International	1-800-260-7933	cropservicesintl.com
Enviolyte Canada	1-204-669-6058	enviolytecanam.com
Envirocleanse		eco-enviro.com
Farming		farmingmagazine.net
Graze		grazeonline.com
IMPRO Products	1-800-626-5536	
Integrity Ag systems	1-717-261-5711	integrityagsystems.com
Midwestern Bio-ag	1-800-327-6012	midwesternbioag.com
Nutriad	1-847-214-4860	nutriad.net
Organic Ag Info		organicaginfo.org

Pike Agri-Lab Supplies	1-207-897-9267	pikeagri.com
Van Beek Natural Science	1-800-346-5311	vanbeeknaturalscience.com
VET HON Veterinary Medicine		cowmastitis.com
Vi-cor	1-641-423-1460	vi-cor.com
Virtus Nutrition	1-800-225-4519	virtusnutrition.com
Washington Homeopathic Products		homeopathyworks.com

Books

The Non-Toxic Farming Handbook	Phillip A. Wheeler & Ronald B. Ward
The Biological Farmer	Gary F. Zimmer
The Homeopathic Treatment of Beef & Dairy Cattle	Christopher Day
The Treatment of Cattle by Homeopathy	George Macleod
Alternative Treatments for Ruminant Animals	Paul Dettloff
The Complete Herbal Handbook for Farm & Stable	Juliette de Bairacli Levy
Treating Dairy Cows Naturally	Hubert J. Karreman

