

## U.S.- MEXICO FREE TRADE: ANIMAL HEALTH ISSUES

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Successful free trade between the U.S. and Mexico requires judgments about the hazards posed by infectious disease agents and ectoparasites from Mexico to the livestock and poultry industries in the U.S. Tuberculosis, classical swine fever (hog cholera), Newcastle disease of poultry, and babesiosis are examples of diseases which are serious threats. Ectoparasites such as ticks seriously affect the livestock industry by the diseases they transmit and the debility caused by their infestation.

The diseases and ectoparasites of most concern at present are:

Tuberculosis -- affecting cattle and deer

Brucellosis -- in cattle, goats and wild ungulates

Velogenic Viscerotropic Newcastle Disease (VVND) -- in fowl

Cholera -- affecting pigs

Babesiosis -- cattle, horses, deer

*Boophilus* spp. ticks

Epidemic Venezuelan equine encephalomyelitis -- horses

Vesicular stomatitis -- in cattle, horses and pigs

Fowl typhoid

Pseudorabies -- especially in feral pigs

Ehrlichiosis -- affecting cattle, sheep and goats

The risk to U.S. agriculture posed by the agents of each of the above diseases in Mexico should be assessed by a systematic and objective procedure. It should also be evident that animal diseases endemic to the U.S. (avian influenza, bluetongue, and scrapie are examples) could do

immense damage in Mexico. Finally, several dangerous diseases and ectoparasites have been excluded from Mexico and the U.S., but are present in Central or South America. These include aftosa (foot and mouth disease), screwworm and trypanosomiasis. Both the U.S. and Mexico have a major interest in keeping these agents at bay. Thus, risk assessment and planning toward disease control and elimination should include our counterparts in Mexico.

Studies of the economics of animal diseases are limited. Estimating losses by calculating the market value of severely ill or dead animals is misleading; there are far more biologic and economic interactions in the system. A better procedure is to develop models of disease and ectoparasite behavior based on field observations, which assess the risk of disease introduction and the relative susceptibility of the U.S. livestock and poultry populations. With such information, economic models can then predict the impact of a disease outbreak, giving more realistic costs that reflect the effects of supply changes on consumer price. With such models, the economic benefit of targeted research on disease and ectoparasite control (and perhaps elimination) measures can be predicted.

The relationship between U.S. veterinary regulatory authorities and their Mexican counterparts has focused on 3 areas: trade policy, regulatory issues and research collaboration. Animal health authorities from both countries meet quarterly to discuss mutual concerns. Their goal for food animal trade is not only free trade but safe trade. Neither country has any intent to ignore risks or to lift restrictions which have a valid biologic basis.

The current goal in strategic planning for the binational committee is twofold; first, to encourage Mexico to design a national plan of infectious disease and ectoparasite control and eradication that will compliment similar efforts in the U.S., and, second, to work together to provide the scientific knowledge needed to eliminate the threat that infectious diseases and ectoparasites pose to the livestock industries in both countries. Issues of equivalent export certifications, harmonized test protocols, designated disease-free zones, environmental protection, etc. all are integral to the combined planning effort. A good example of a binational program is the bovine TB/brucellosis program.

A critically important role is played by outside groups, including state agencies, the food animal and food animal product industries, and universities. There is the sense that U.S./Mexico binational committee is addressing specific, high priority emerging disease issues relative to trade agreements. Clearly, the universities are expected to be involved as centers of excellence to identify animal health investigative, diagnostic and research issues and needs.

Risk Assessment starts with an evaluation of the risk of introduction. We need to know where and when a particular disease is active and how often an effective link exists between the disease location and susceptible animals in Mexico and the U.S. Within disease enzootic regions in Mexico, for example, disease agents such as vesicular stomatitis are sometimes active, sometimes quiescent. However, the larger the region and the closer it is to Texas, the greater the chance that a diseased animal (asymptomatic reservoir), vector (such as a mosquito), contaminated product (meat carcass) or object (such as tick-infested wood shavings) will complete the linkage. The 1971 outbreak of Venezuelan equine encephalomyelitis (VEE), for instance, occurred as a result of infected mosquitoes carrying the virus from Mexico into Texas.

The epidemiologic factors that facilitate transmission and establishment of most infectious diseases are well known. Using babesiosis (Texas cattle fever) as an example, the factors include the *Boophilus* tick vector, an infected cow as a reservoir of the *Babesia* parasite, and the susceptible host. Recent collaborative research in Mexico gives added understanding to the relative risk. We now know that we need to be especially concerned about the relative ability of ticks from various parts of Mexico to transmit the parasite, as well as the effect of stress such as shipping on an infected animal (disease reservoir if ticks are present).

The presence of vectors and other facilitators required to sustain disease transmission need to be analyzed. Disease transmission depends on a series of events occurring in proper sequence and within certain time constraints, bringing the susceptible population of either livestock or poultry into contact either with the potential disease reservoir or the disease vector or both. The probability that

these events might occur is often remote, and surely this is true or many more diseases would be introduced.

We need to be confident about our ability to recognize and contain a disease outbreak. Tests for early recognition and diagnosis of livestock and poultry diseases are effective and in place at the veterinary medical diagnostic laboratories in Mexico and the U.S. But, timely diagnosis depends on the specimen getting to the laboratory quickly, and the appropriate tests being completed quickly and efficiently. This is not difficult if the animals in question come through an import facility, as most do. However, cattle, horses and birds are smuggled in by road, by air, and by individuals walking across the border. Such animals can carry diseases and ectoparasites transmissible to livestock.

Science, social change, management practices, and transportation have affected the selection of disease and ectoparasite control strategies. A good example is the situation with *Boophilus* ticks. Only one pesticide of one chemical group, organophosphate, is licensed for use directly on animals in the in the U.S. By contrast, in Mexico, several formulations of pesticides of three chemical groups, organophosphates, amidines and pyrethroids, are available to control ticks on animals. As a result, tick populations that are resistant to the pesticides are prevalent in Mexico. Several small “pockets” of resistant ticks have been found in Texas, usually on smuggled cattle. A major concern are the white-tailed and exotic deer which are numerous in Texas and the rest of the U.S. and represent economic benefit to landowners. In certain locations, however, these deer present a substantial risk as they are alternate hosts to ticks and cannot be effectively treated with pesticides. They are also known to be carriers of disease agents (often without showing symptoms themselves) such as the bacterium causing tuberculosis in cattle.

As suggested above, evaluating the significance of a potential disease outbreak, especially in economic terms, is problematic for the bi-national commission. As an example, there is no consensus on the status of Newcastle disease in poultry, known to be regularly present in Mexico. The occasional appearance of Newcastle in the U.S. has been assumed to have been be the result smuggling of infected parrots. However, the disease could cause the demise of the commercial

poultry industry in a state or region or region of either country. Another example would be hog cholera, which has been eradicated from the U.S. but remains enzootic in certain areas of Mexico. If the disease appeared in feral swine in the Gulf coast states of the U.S., the implications relative to control and elimination are grave.

There are many strategic opportunities for ensuring safe trade. Conventional methods of disease control, for instance, are based on data often obtained from studies in temperate climates and ecology. These methods generally do not work in the long term in relatively well managed tropical and sub-tropical areas such as Mexico. It is obvious, therefore, that they are not going to work in those areas of Mexico with poorer management. Recent experience has shown that an integrated approach is essential because management, and concepts of disease control are often misleading. The first surprise, for example, when farmers gather with disease investigators to discuss problems, is when the farmers begin to understand that infections with multiple disease agents, for example babesia and tuberculosis, are more often the rule than the exception.

A comprehensive multidisciplinary approach is needed to utilize the advances in the genetics of resistance and transgenic animals, the strategic use of chemicals and biologics, and integrated methods for the control of disease vectors. Also, tropical animal health has become a significant element in developing strategies for increased food production with conservation of renewable natural resources.

The science that uses the new and highly useful biotechnology-based methods for the detection and prevention of infectious livestock diseases and ectoparasites has also provided major opportunities for marketing animals of high potential production and performance in areas of endemic or epidemic disease, while preserving biological resources by minimizing the use of chemicals.

Additional research needed to reduce the risk posed by disease agents and ectoparasites in Mexico and, at the same time, increase the export marketability of livestock includes:

! Studies on the genetics of natural disease resistance in all animal species that are key to increased meat, milk and agricultural production in tropical Mexico. Such studies would include brucellosis and tuberculosis in cattle, ascites in chickens, helminths in goats and reproductive diseases in mules and burros.

! Collaborative studies on the integrated control of diseases such as tuberculosis, brucellosis, babesiosis, hog cholera, and VVND, especially in disease-free zones in both countries.

! Emphasis on developing a geographic information system (GIS) based decision support system for surveillance, control and elimination of disease vectors such as ticks.