

REPORT OF THE COMMITTEE ON IMPORT-EXPORT

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Vice Chair: George O. Winegar, Howell, MI

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The Committee met on Wednesday, October 18, 2006 at the Minneapolis Hilton Hotel, Minneapolis, Minnesota. The Committee was called to order at 8:00 a.m. by Chair Charles Brown. Forty seven members and visitors were present.

Dr. Arnaldo Vaquer, National Center for Import and Export (NCIE), Veterinary Services (VS) presented the NCIE Annual Report. The complete text of this report is included in these proceedings.

Dr. Larry White, Center for Epidemiology and Animal Health (CEAH), Veterinary Services (VS) presented a statistical report of the import and export activities for the past year this complete report is included as part of these proceedings.

Dr. Kristin Schmitz, NCIE-VS, reported as follow that the Export Animal Products Staff has had a very active year once again as efforts continue to regain or expand markets lost or diminished due to bovine spongiform encephalopathy (BSE) and notifiable avian influenza (NAI). Although a second indigenous case of BSE was detected in the United States (US) during 2006, US trading partners did not, for the most part, react with additional bans or restrictions. United States Department of Agriculture (USDA) negotiations have actually been positively impacted by Animal and Plant Health Inspection Service (APHIS)-VS completion of the enhanced BSE surveillance program - the peer-reviewed results of which clearly show that the prevalence of BSE in the US is extremely low. APHIS VS is hopeful that the positive trend will continue after official BSE classification of the US by the World Organization for Animal Health (OIE), which is expected by May 2007 following the US request for classification and official submission of the requisite data in October 2006. Many countries, however, continue to maintain BSE prohibitions on the US which include both ruminant and non-ruminant products and clearly exceed OIE guidelines.

Trade in US poultry products continues to be impacted by the 2004 highly pathogenic avian influenza (HPAI) outbreak in Texas which was eradicated over 2 years ago. Worldwide occurrences of the highly pathogenic AI due to H5N1, which has not been detected in the US, has also negatively impacted trade, as has the detection of low pathogenic notifiable avian influenza (LPNAI) in live bird markets and wild birds. The worldwide fear of H5N1 AI has led many countries to pass new laws or regulations

that severely restrict the importation of poultry and poultry products – regardless of the AI status of the exporting country.

During 2006, the Animal Products Exports Team continued to negotiate with many countries to remove restrictions on US animal products due to BSE and AI, as well as other animal diseases, such as vesicular stomatitis. These negotiations were, and continue to be, conducted in collaboration with other governmental agencies, including the USDA, Food Safety and Inspection Service (FSIS) and the Agricultural Marketing Service (AMS) Dairy and Egg Divisions.

Listed below are some of the negotiations or related activities that were either successfully completed during 2006 or are ongoing:

- Poultry cartilage (pharmaceutical use) to Argentina
- Salted bovine hides to Argentina
- Pet food to Australia (successful audit)
- Poultry meat and meat products to Australia (comments on 700 page risk assessment)
- Ruminant Meat and Bone Meal (MBM) to Bangladesh
- Beef meat and meat products to Barbados
- Dairy products to Brazil
- Raw materials for pet food production or pharmaceutical use to Canada
- Beef meat and meat products to Canada (removal of age restrictions)
- Fresh (chilled or frozen) poultry meat and meat products to Chile
- Beef meat and meat products to China (ongoing)
- Poultry meat to China (and AI protocol – ongoing)
- Pet food, feed ingredients, and non-ruminant fats to China
- Tallow to China (ongoing)
- Blood and rendered products to China (ongoing)
- Fresh (chilled or frozen) poultry meat and meat byproducts to Colombia
- Beef meat and meat products to Costa Rica
- Pet food (3 protocols) to Croatia
- Pork meat to Croatia (ongoing)
- Beef meat and meat products to Cuba (no age restrictions)
- Pet food to Dominican Republic (counterproposal)
- Shell eggs to Dubai
- Shell eggs to El Salvador (proposal developed)
- Protein free tallow to European Union (EU) (ongoing)
- Beef meat and meat products to Guatemala (no age restrictions)
- Beef meat and meat products to Honduras (no age restrictions)
- Dairy products to India (ongoing – Food and Drug Administration (FDA) involved)
- Poultry meat/meat products and pet food to India
- Dry or wet salted hides (various species) to Israel
- Beef meat to Japan
- Fishmeal and tallow to Japan (ongoing)
- Heat treated poultry products to Japan (regardless of AI status of State – ongoing)

- Artificial bovine casings to Japan
- Non-ruminant origin processed animal proteins to Japan (ongoing)
- Poultry meat to Korea (to remove 2 year HPAI freedom requirement – ongoing)
- Pet food with ruminant ingredients to Korea (ongoing)
- Medical devices (with bovine bone) to Korea
- Poultry meat and meat products to Kuwait
- Milk/dairy products for human or animal consumption to Mexico
- Fetal bovine serum (FBS) to Mexico
- Poultry meat and meat products to Morocco
- Poultry meat and meat products to New Caledonia
- Dairy products to New Zealand
- Beef meat and meat products to Oman (no age restrictions – successfully averted additional restrictions following detection of 2nd indigenous case of BSE in US)
- Beef meat and meat products to Panama (no age restrictions)
- Blood and blood products (pharmaceutical use in humans) to Republic of South Africa
- Milk/dairy products for human or animal consumption to Republic of South Africa
- Various animal products to Romania
- Fresh poultry meat and meat products to Russia (new protocol)
- Beef meat and meat products to Russia (ongoing)
- Pork meat/products to Russia (ongoing – trichinae issue)
- Shell eggs to Russia (ongoing)
- Shell eggs to Singapore (limited access – first time US eggs accepted by Singapore)
- Poultry meat and meat products to St. Lucia
- Spray dried porcine blood to Taiwan through “porcine origin verification program (POVP)”
- Table eggs to Taiwan
- Pet food to Turkey (dioxin issue)
- Beef and pork meat and meat products to Ukraine
- Poultry meat and meat products to United Arab Emirates (UAE)
- Beef meat and meat products to Vietnam

Dr. Masoud A. Malik, NCIE, VS, reported on the permits activities of NCIE for FY 06 The Center issued: 2,735 New Permits - 2,735, Amended permits - 1,065, and Renewed - 3,410 Permits.

Dr. Malik reported that NCIE was using a web based system for processing permits on line. EPermits streamlines the permitting process and improves customer service for applicants.

USDA has banned poultry products from the following regions during FY 06: Afghanistan, Hungary (Bacs-Kiskun and Csongrad counties only), Albania, Azerbaijan, India, Burkina Faso, Indonesia, Cambodia, Israel, Cameroon, Ivory Coast (Côte d'Ivoire), China, Japan, Denmark (Funen county only), Jordan, Djibouti, Kazakhstan, Egypt, Laos, France (VS defined restricted zone only), Malaysia, Myanmar, Germany

(Kreis of Muldenthal, Kreis of Döbeln , Kreis of Torgue-Oschatz) Niger, Nigeria, Pakistan, Palestinian Autonomous Territories, Romania, Russia, South Korea, Sudan, Sweden (Kalmar county only), Thailand, Turkey, Ukraine, Vietnam

Poultry products from regions that USDA recognizes as having HPAI H5N1 can only be imported into the United States with an import permit. The import permit will give specific treatments that the product must be certified as having been exposed to that will mitigate the H5N1 virus. Poultry products that permits have been issued for include:

- Mooncakes containing duck egg yolks, preserved duck eggs, cooked salted duck eggs, foods containing poultry extracts and feathers.

USDA published the Minimal Risk Rule in January 3, 2005 to be implemented March 7, 2005. The District Court of the District of Montana issued a temporary preliminary injunction on March 3, 2005 preventing the rule from being implemented. On March 7, 2005 USDA published a partial Delay of Applicability calling for only Canadian Bovine products from animal under 30 months of age to be eligible for import into the US. On July 18, 2005 the Minimal Risk Rule was implemented after the Ninth Circuit Court of Appeals issued a ruling overturning the temporary preliminary injunction.

The Minimal Risk Rule allows for the following ruminant commodities to be imported from Canada without an import permit:

- Bovine meat and meat products from animals under 30 months of age, Ovine and caprine meat and meat products from animals under 12 months of age, Tallow containing less than 0.15 percent insoluble impurities from animals under 30 months of age, Bone derived gelatin from animals under 30 months of age still requires an import permit.
- The Minimal Risk Rule allows for the following ruminant commodities to be imported from Canada without an import permit:
- Bovine liver from any age animal, Bovine offal from animals under 30 months of age, Ovine and caprine offal from animals under 12 months of age, There are no BSE restrictions on cervid meat, Pet food and hide derived gelatin still require an import permit,
- On December 14, 2005 USDA published a final rule to allow for the importation, under specified conditions, of whole cuts of boneless beef from Japan, Cattle have to be born, raised, & slaughtered in Japan, Cattle were not subjected to a pithing process or an air-injected stunning device, specified risk materials (SRM) were removed

Nov. 28, 2005, USDA allowed transloading at the U.S./Mexican border from the means of conveyance that carried ruminant products from Canada through the United States, directly into a waiting means of conveyance for delivery to Mexico, under certain conditions.

March 14, 2006, USDA clarified that gelatin and inedible offal that is eligible under MMR can be used in petfood and other animal products.

William W. Buisch, gave a presentation on Export Certificate Data Entry Security.

“If we value the pursuit of knowledge, we must be free to follow wherever that search may lead. The free mind is not a barking dog, to be tethered on a ten foot chain.” This is a quote from Adlai E. Stevenson who lived between 1900 and 1965. This is a very wise statement for each of us to consider especially as we look at how fast computer

technology has changed in the last ten years. As a result, we all need to reconsider how the latest technology can best serve our needs and how we can better adapt to these changes today.

In regard to the Export of animals and animal products, these changes are so important to improving our ability to communicate effectively, in a timelier manner. To the exporter, a monumental gain or loss of income can often be based on the coordination and timing of the export as well as the timing of the arrival in the country of destination. Often delays in inspections, testing schedules and/or time involved in the Export Certificate review can have a major impact on the success of the transaction from the exporter's point of view.

For example in the export of horses, reservations may need to be made weeks in advance. Then if the export certificate is not available at the scheduled time for departure, the exporter may have to pay major penalties to the airline for missing the flight and/or for scheduling another flight on short notice.

Therefore, the current information technology available for the completion of Export Certificates can be most helpful. While some individuals, may indicate that: Many countries have their own certificates that must be used. It will take years of negotiation before these countries will trust an electronic Export Certificate. These countries still insist on receiving a hand sealed original signature on an Approved Paper Export Certificate. This is interesting in that we are now able to have the electronic capability to secure the information entered on the document at three levels of security. At the first level, only a signature is required and the information on the document is sealed. At the second level of security, when the Accredited Veterinarian signs the Export Certificate, that signature can be compared with a signature of the Accredited Veterinarian filed electronically in a data base secured by the Federal Government. At the third and highest level of security, the document can be signed by the Accredited Veterinarian and the information secured by the international standards for encryption.

One way of introducing the electronic transmission of Export Certificates would be to electronically send the Certificate to the country of destination prior to the departure of the animals being shipped. In addition, the original paper Export Certificate would be sent along with the animals, as it has in the past. When the country of destination sees the advantages of having this information available ahead of time, it will not be long before they will consider that to be the only information needed. By receiving the electronic form of the Certificate, the receiving country will have the opportunity to reassure themselves that the animals have met all of their requirements and that the proper signature of the accredited and official federal government veterinarians were applied. Should they have any questions, they can ask, in sufficient time through official channels, thereby freeing the arriving animals up for movement immediately after they arrive and meet any post entry requirements that may be required.

Now the time has come when most forms (health certificates) can be developed in very short order. In most cases this can be done within 30 minutes to an hour by someone who takes about a two to three day training course in Forms Development, utilizing the new software technology available.

It is also refreshing to know that information/data can now be captured by the use of a pencil or a pen on Anoto Patterned Paper printed with a data entry form they are familiar with. This paper is coded with a series of dots in different varied positions so

that when the form is scanned into the computer, the computer will recognize what form it is and will transform the person's printed handwriting into typed letters and numbers. If the computer using this software is not 98.6 % sure it has printed the right letter or number, that letter or number will appear on the computer in a red color. This alerts the user that there may be an error. They can then type over the letter in red with the correct letter or use a stylus on a tablet personal computer (PC) with hand printing to correct the error. Also, software can have business rules available to help verify and validate the information provided. For instance, if one of the spaces should have been filled out and instead is left blank, the computer will drop a box asking you to fill in that information. Or if the date filled in is not within the prescribed period, it may ask you if the date is correct.

Now let's discuss a hypothetical preparation of an animal for export. Let us consider that an Accredited Veterinarian will need to inspect the animals being exported two weeks in a row. On the first trip to the farm he/she completely fills out the inspection report and seals the information on the form with his/her signature. On the next visit, he/she writes on the form the premise ID or the owner's name. Immediately the general information (Address, Phone number, etc,) is automatically added to this new blank form by the computer software. On this visit he also decides to take the blood samples needed to complete the tests required. He is able to quickly scan the animal's identification by an optical pen, bar code reader or electronic implant identification (ID) reader. He can also scan in the corresponding tube number for the blood sample drawn from this animal. He then secures the document with his signature and electronically sends this information to his database and to the processing laboratory's data base. If he has Bluetooth technology, he can send the info from the farm through a cell phone or handheld PDA.

In the laboratory, the shipping and receiving section is able to scan the bar code or ID number on the specimen shipping container and know without opening the box to which laboratory unit the box should go and/ or whether the box needs to go directly to a higher level of biocontainment.

Once the samples arrive in the proper laboratory unit for testing, the technician can enter the accession number, the premise ID or the Owner's name. At that point in the process, the laboratory form, even though it is different from the field form, will enter the correct information needed from the owner's premise including the tube ID number and/or animal ID. Once this information has been added to the Laboratory's form for the specific test requested, it will have a space for the entrance of test results, after each blood tube identified. At that point the technician only needs to enter the test results and secure the document with their signature. Immediately the results can automatically be sent to the Accredited Veterinarian and or others who may need the info. These results and all of the other information needed can then be automatically entered into the Export Certificate and the Accredited Veterinarian can secure the document with his/her signature. The Certificate is then sent electronically to the Federal Government official for final review and signature.

This process can save 60 to 67% of the time currently spent on data entry alone not considering all the time currently taken for getting the certificate to and from the Federal Office. All of this technology is focused on facilitating the entry of data on the forms you currently use and is not used as a data base application. It is strictly for mobile data

entry to a form and the transmission of data on the form to various data bases, even if they are considered incompatible by some. In addition, this technology can be used to take data from a data base, entering the information from those data points to the data points on a different form used by another department, laboratory or user. I am sure that new computer technologies will continue to be developed at an ever increasing rate. To each of us, such improvements in technology will be welcomed and as a result many new opportunities will be made available that will greatly increase our ability to better serve the animal industries we so value today.

Dr. Julie Gard, Departments of Pathobiology and Clinical Sciences, Auburn University, presented two time-specific papers entitled. Update of Bovine Viral Diarrhea Virus (BVDV) and Assisted Reproductive Technologies and Current Understanding of the Epidemiology of Prolonged Testicular Infections with Bovine Viral Diarrhea Virus. These papers are included elsewhere in these Proceedings.

Resolutions 13,14, 15, 16 from the 109th Annual Meeting were reviewed and responses from the Resolutions were discussed. Resolution 13, passed in 2004 regarding Bovine Fetal Serum was again discussed. The Committee passed a motion directing the Chair to write a letter to the National Center for Import-Export asking for a report on the status of action regarding this resolution.

The Committee approved a Resolution that was forwarded to the Committee on Nominations and Resolutions.

Import and Export and Related Activities of the National Center for Import and Export
FY 2006

Dr. Arnaldo Vaquer
National Center for Import and Export (NCIE)
Veterinary Services (VS)
Animal and Plant Health Inspection Service (APHIS)
United States Department of Agriculture (USDA)

- SECTION I
- I/E activities related to live animals, semen, embryos, poultry and aquaculture,
- Section II
- I/E activities related to animal products
- Section III
- Statistics of I/E

SECTION I

I/E activities related to live animals, semen, embryos, poultry and aquaculture

I Export of live animals, semen and embryos.

A. The Americas

1) Mexico, Chile, Peru, Guatemala, El Salvador, Dominican Republic, Venezuela, Paraguay, Surinam, Cuba, Barbados, Antigua, Bahamas, Cayman Islands, Santa Lucia, Nicaragua, Belice

NCIE Main Accomplishments of the Animal Export Section to the Americas

During the year of 2006 the most impacting accomplishment of the Animal Export Section of the Americas was the reopening of the live animal ruminant exports to some of the countries of the Americas that had been closed since December 2003.

To accomplish this, intensive negotiations were undertaken with a number of countries. These activities included visits to the countries to make presentations about the intensive testing for BSE, sending of BSE surveillance reports, and providing the epidemiological reports of the two indigenous cases of BSE detected in the U. S.

Protocols successfully negotiated

Mexico

a) The protocol for dairy heifers

The most outstanding accomplishment was the successful negotiation of the protocol for dairy heifers exported to Mexico. As it was announced by Agriculture Secretary Mike Johanns, Mexico will resume importation of dairy animals. Under this protocol U.S. producers will be able to export dairy heifers to Mexico that are under 24 months of age and registered with a purebred dairy breed association or the Dairy Herd Improvement Association. Shipments to Mexico were ready to begin on Oct. 4. The dairy heifers will be individually identified as they depart the United States. Their identification information will be entered into the Mexican animal identification system for purposes of maintaining these animals under bovine spongiform encephalopathy (BSE) surveillance. Conservative estimates set at 10,000 the number of dairy heifers that will be exported to Mexico during the first year with a value of \$ 20 million.

Other protocols successfully negotiated with Mexico include the:

b) Temporary Exportation of Rodeo Bulls which allows bulls from the U. S. to go to rodeo shows and come back.

c) The Non-captive wild ruminants' protocol which includes cervids.

Dominican Republic

a) Swine protocol for the Dominican Republic.

This protocol will allow reopening trade that has been suspended since October of 2005. An audit of inspection and certification process of APHIS was undertaken by a mission from the Dominican Republic headed by their CVO. The outcome of the audit was positive.

2) Canada, Brazil, Argentina, Honduras, Costa Rica, Panama, Bolivia, Uruguay, Guyana, Jamaica, Trinidad-Tobago, Aruba, British Virgin Islands, Haiti, St. Vincent-Grenadines, Colombia, Ecuador.

- Protocol to reopen the export of live cattle to Guatemala* and Honduras

On April 27, 2006 Guatemala finally approves a protocol for the exportation from United States of bovines under 30 month of age. This protocol was negotiated on March 2005. On July 7 a shipment of 64 cattle went to Santo Tomas, Guatemala. This represents the first shipment of American cattle to Guatemala since December 2003. The market was closed since the United States announced its first case of BSE

The cattle which originally came from a ranch in Madisonville, Texas, were sent to ranches in Guatemala for breeding purposes. They consisted of five different breeds just under 30 months of age: Brahman, Angus, Brangus (a crossbreed between Brahman and Angus), Herefords, and Simmentals.

On May 24, 2006, Honduras officially notified United States the approval of a protocol that allows for the importation from United States of bovines under 30 months of age. The protocol that was negotiated on April 2005.

* Guatemala belongs in the other part of the America's but this was negotiated before the division of countries as they are divided now.

- Protocol to reopen the export of live breeding cattle and bison to Canada

As of July of 2006, Canada is allowing for import from U.S. Bovines (cattle and bison) born after January 1, 1999. Canada has anticipated that the BT requirements will be eliminated. The new regulations for BT are going to be placed on the Canadian web site by the end of this year. No modifications for Anaplasmosis were considered by Canada.

B. European Union

In the last 12 months, APHIS participated in three Animal Health Technical Health Working Group (AHTWG) meetings with the European Commission, held in December 2005, March 2006, and October 2006. Protocols for import of equine embryos and bovine semen were successfully negotiated. The protocol for import of bovine embryos is near completion. Protocols for import of porcine semen and sheep/goat semen are currently under negotiation. Discussions were also held concerning certification requirements for export of day-old chicks. APHIS is in the process of submitting a formal request to the European Commission to approve the United States to export live pigs to the European Union.

An equine AHTWG meeting was held in March 2006. Issues discussed included certification, testing, and inspection requirements for CEM, EVA, WNV, and VSV.

A follow-up equine meeting is scheduled for November 2006.

Other discussions included regionalization of the European Union for CSF and END.

In October 2005, APHIS facilitated an audit of U.S. exports of bovine semen and embryos to the EU conducted by the European Commission's Food and Veterinary Office. The successful outcome of the audit allows exports of these commodities to continue. In October 2006, in cooperation with the National Association of Animal Breeders

(NAAB) and the American Embryo Transfer Association (AETA), APHIS is conducting a training course for APHIS veterinary medical officers involved in bovine semen collection center and embryo collection team inspections and approvals.

APHIS submitted information to the European Commission regarding the U.S. control program for *Salmonella*. This information will support continued exports of breeding poultry to the European Union.

C. European Countries not in the EU

Ease trade restrictions and facilitate the opening of new markets.

Foreign import protocols under negotiation for:

- Bovine semen to Belarus
- Swine to the Ukraine
- Horses to the Ukraine
- Hatching eggs to Turkey
-

Continue to work with Russia on issues on: bovine embryos, bovine semen, porcine semen, equine semen, horses, swine, mink, cattle, day-old chicks and hatching eggs.

D. Africa

Foreign import protocol under negotiation for hatching eggs and day-old chicks for export to the Republic of South Africa

E. Australia and New Zealand

Facilitate trade by requesting exceptions and clarifying policies on animal export.

We continue to approve and inspect germplasm collection centers.

F. Asia

The following protocols were successfully negotiated

- Live cattle to the Philippines, December 2005
- Live Cattle to Saudi Arabia, March 2006
- New protocol for live swine and swine semen to Malaysia, 2006

II Import of live animals, semen and embryos.

A. Latin America

There was one Final Rule and one Proposed Rule that were published during this FY that were significant.

- “Standards for Privately Owned Quarantine Facilities for Ruminants,” Final Rule was published on May 24, 2006. This rule allows for the operation of privately owned facilities for the importation of all ruminants into the United States.
- “Importation of Sheep and Goat Semen,” Proposed Rule was published on August 9, 2006 with a comment period until October 10, 2006. There were at least 7 comments to this proposed rule received and they have not been reviewed yet. This rule will simplify the importation of this semen into the United States.

There were several special projects that NCIE participated during FY 06.

- Trip to Trinidad & Tobago on June, 2006 to inspect a vector free facility built by the government of Tobago to house rams to be protected from *Colicoides* attack to mitigate against bluetongue disease of sheep. There are other testing requirements such as brucellosis and tuberculosis. This facility will allow many small producers in Tobago and Trinidad to export sheep semen from Barbados Black Belly and West African breed of sheep that are in high demand in the United States. There are approximately 630 small producers with a total sheep population of about 7,000 sheep.
- Bovine semen from Brazil. Several representatives from the Brazilian Association of Zebu Breeders and the Ministry of Agriculture and Food Supply met in Riverdale on March 23, 2006 with NCIE representatives to work on the technical details of this project. There are two ways to do the importation. One, as a special project under the supervision of Veterinary Services, APHIS. Two, under a Regionalization program to isolate those areas affected with Foot and Mouth Disease from the free areas where they can export to the United States. We are waiting for the proposal from Brazil.
- We have also been asked to look at the possibility to import Camelid embryos (without an intact zona pellucida) now that is technically feasible to freeze these embryos.

NCIE is working on several other projects which will help the United States import some valuable genetics from areas that could not export before and to facilitate the importation process through our land border ports.

- Developing two Import Protocols for bovine semen and embryos from Mexico, Central America, and the Caribbean. These two protocols will allow many countries in that geographical area, which is free of FMD to export bovine semen and embryos to the United States, if certain testing requirements are met. These

requirements include testing for tuberculosis and brucellosis, officially free herds for both diseases, approved semen and embryo collection centers, and approved laboratories to do the requires diagnostic testing of the donor animals.

- Veterinary Services is working on two Standard Operating Procedures to standardize the training of all land border ports (Canada and Mexico borders) and the operation of these ports. This will be a long term project which will be completed as budgetary issues are resolved and approved.

B. Canada, Australia, New Zealand, European Union

During the past year the Import staff has been very active in revising or creating new import protocols for:

1. Canada
 - Swine semen , Swine,Cervids ,Farm Raised boars, CamelidsAlso a proposal to transit cattle between Alaska and the lower 48 States is under review.
2. Australia
 - Water buffalo, Feeder cattle, Camelids, Swine, Porcine semen, Bovine, Sheep and Goats, Cervids
3. New Zealand
 - Sheep and Goat Semen, Camelids, Bovine embryos, Bovine Semen, Sheep and Goats
4. European Union
 - Bovine semen, Bovine embryos pending finalization by EU
5. Special Projects under review:
 1. Gerenuk semen from Kenya, Bovine embryos from Brazil, Bovine embryos from South Africa
6. There is a need to develop guidelines for blue tongue test requirements for ruminant semen and embryos.

C. Rest of the World

- Bovine embryos from South Africa. This will be accomplished under VS, APHIS direct supervision, as the facilities and other technical issues are resolved and approved. This will also necessitate prior planning for the commitment of our veterinary personnel for details of at least several weeks' duration.

III Poultry and Zoo Animals

- Veterinary Services Memorandum No. 591.55, Procedures for Handling Pet and Performing Bird Importations was completed. This memorandum outlines the procedures and responsibilities of Animal and Plant Health Inspection Service's (APHIS) Veterinary Services (VS) and Customs and Border Protection (CBP) personnel for handling legally and illegally imported pet and performing birds arriving as passenger baggage. This memorandum covers the responsibilities of (1) determining entry eligibility, (2) transferring birds to a quarantine station, and (3) obtaining bird-handling supplies.
- Pronghorn Importation to the Los Angeles Zoo-4 juvenile pronghorns were imported into the LA Zoo from Mexico to be quarantined at the zoo for one year. The importation was this summer.

IV Aquaculture

Infectious Salmon Anemia (ISA)

The ISA Program is continuing through fiscal 2007 with reduced funding and staffing, but monthly surveillance will remain an important component of the program. ISA-infected salmon cages have decreased in frequency during 2006. More than 11,000 fish have been tested since the surveillance program began in late 2001. In 2006 (through September) only one diseased cage was removed for immediate harvest in Maine waters.

By providing for early detection and early removal of infected or diseased cages, the USDA ISA program has had continued success with ISA disease control measures. The New Brunswick, Canada ISA program has also continued to be coordinated with US efforts, in part because the Maine farmed salmon industry went through additional consolidation in 2006, with all production facilities in Maine now under the ownership of a New Brunswick-based company.

U.S. and Canadian regulators meet biannually to discuss respective ISA programs, and local ISA program managers in Maine and New Brunswick meet frequently. A recent meeting occurred to discuss some potential changes to the Program Standards using additional science-based information for particular assays and management strategies. Additionally, USDA APHIS VS has been instrumental in conducting a number of important ISA epizootiological studies in Maine during the past two years.

A risk assessment, combined with a simultaneous environmental assessment, has been commissioned by APHIS in support of a potential import protocol restricting live fish and products originating from ISA-positive countries. These assessments will also examine interstate movement risks associated with ISA.

Spring Viremia of Carp (SVC)

APHIS published an interim rule on August 30, 2006 that sets new requirements for the importation of eight species of carp-like SVC-susceptible fish, including koi carp and goldfish. The rule will be implemented on October 30,

2006, which is also the date that the public comment period closes for the rule. Beginning on Oct. 30, 2006, importations of live SVC-susceptible species will be limited to 18 designated ports of entry, and consignments of these fish will require import permits and export health certificates to that demonstrate SVC-freedom. Importers and other regulatory support personnel have been notified of the expected impacts from these regulations.

VHS

In 2005 and 2006, a number of outbreaks of Viral Hemorrhagic Septicemia, an important disease affecting fish worldwide, were reported from the Canadian and US sides of the lower Great Lakes area. Although another North American strain of VHS was known to occur on the east and west coasts of the US and Canada, the virus has apparently mutated into a newly pathogenic strain that is affecting new hosts in new environments (freshwater) in both Canada and the US. Beginning in the fall of 2005 and continuing to date, VHS has been found to affect approximately 16 freshwater fish species previously not known to be susceptible to infection or disease. The list of known or presumed VHS-susceptible species includes baitfish, recreationally important fish, and food fish such as salmonids and catfish. The extent of VHS viral distribution is not known at this time; however, reported epizootics have been limited to the Lakes Ontario, Erie and St. Clair; and the St. Lawrence river. One additional outbreak was reported in a NY lake without direct connection to the Great Lakes.

The existing US regulatory authority for fish movement into and through the US is very probably not sufficient to prevent the further introduction or spread of VHS from affected to non-affected areas. The continued introduction or spread of VHS could have devastating economic effects on the aquaculture industry and recreational fisheries should no action be taken. A number of conference calls and meetings have taken place with a large and varied group of federal, state and private industry stakeholders who could be potentially affected by VHS. Additional meetings are being planned for late October 2006 to review the most recent information and strategic options.

Other Import/Export Issues: APHIS, through its National Center for Import and Export, has been actively involved in developing export certificate endorsement guidance for VS field staff to expedite US exports of farmed aquatic animals of many types. Because of the complexity of the existing international regulatory framework, and the lack of a unified national or international policy for imports and exports of these commodities, a large number of scientific, regulatory and political factors must be dealt with for these issues. Good progress has been made with Canada and many Central and South American trading partners for specific trade-related issues, and significant developments in the potential for exporting to the EU have occurred in 2006. A number of importation issues have been successfully resolved for specific aquaculture commodities, including shellfish, ornamental fish, food fish and fish eggs; and more are under development.

In conjunction with the Department of Commerce (NOAA-Fisheries) and Department of the Interior (US Fish & Wildlife Service), APHIS has developed a model export certificate that may be used for many types of aquaculture commodities originating from US producers. This certificate is currently being printed and will be available in late 2006.

National Aquatic Animal Health Plan

The National Aquatic Animal Health Task Force (comprised of members from APHIS, USFWS and NOAA-Fisheries) continued its work throughout 2006 in drafting chapters of the plan. A total of 4 draft chapters have been completed, along with 11 Working Group reports, which are available on the APHIS website at:

http://www.aphis.usda.gov/vs/aqua/naah_plan.html. The plan is on track for substantial completion by mid-2007.

ADDENDUM

Key Points to consider for Privately Owned Ruminant Quarantine Facilities.

93.412) were published in May 2006. The regulations allow for the approval of privately owned ruminant quarantine facilities (medium or minimum security quarantine facility) that may be capable of holding large numbers of animals.

The new regulations for the approval of ruminant quarantine facilities, (9 CFR e facility would have to satisfy the conditions that the Administrator believes are necessary to ensure that adequate safeguards are in place to monitor the health status of the cattle in quarantine as well as prevent the transmission of animal disease or disease agents into, within, or from the medium or minimum security quarantine facility.

- A. Persons seeking approval of privately owned quarantine facilities for ruminants must submit a written application to the Administrator ^C/_O National Center for Import and Export, Veterinary Services, APHIS, 4700 River Road, Unit 39, Riverdale, MD 20737-1231.
- B. Requests for approval must be submitted at least 120 days prior to the date for local building permits
- C. Key points of the application:
 - i. Blueprints of the facility

- ii. A description of the financial resources available for the construction, operation, and maintenance of the quarantine facility.
- iii. Copies of all approved State permits for construction and operation of the quarantine facility.
- vi. Copies of all approved Federal, State and Local environmental permits for the quarantine facility.
- vii. The origin of ruminants to be quarantined.
- viii. A contingency plan for the possible destruction and disposal of all ruminants capable of being held in the facility.

D. Physical plant requirements.

i. Location.

- a. The medium or minimum security facility must be located at a site approved by the Administrator and the specific routes for the movement of ruminants must be approved in advance by the Administrator.
- b. If the medium or minimum security facility is more than 1 mile from the port of entry, as listed in 9 CFR Section 93.403, the operator must make arrangements for the imported ruminants to be held in a temporary inspection facility to allow for the inspection of the imported ruminants prior to movement to the quarantine facility.

ii. The medium or minimum quarantine facility must be maintained in good repair and be properly designed to prevent the escape of quarantined animals.

- a. Loading docks. The facility must have separate loading docks for receiving and releasing animals and for general use or the docks must be cleaned and disinfected after each use.
- b. Perimeter fencing. The facility must be surrounded by double-security fencing separated by at least 30 feet and be of sufficient height to prevent unauthorized persons or animals entry or the escape of quarantined ruminants.
- c. Means of isolation.
 - (1) A minimum security may only hold one lot (importation) at a time.
 - (2) A medium security may hold more than one lot of ruminants as long as the lots are separated by physical barriers that will prevent contact with another lot of ruminants or their excrement or discharges.
- d. A medium security facility must be constructed so that the quarantine area is located in a secure self-contained building.

E. *Sanitation.* Both the medium and minimum security quarantine facilities must meet the following sanitation guidelines for animal health and biological security.

- i. The capability to dispose of wastes, including manure, urine, and bedding by incineration or public sewer must be present during quarantine.
 - a. The waste materials must be handled in such a way to minimize spoilage and attraction of pests.
 - b. EPA standards for waste disposal must be met.
 - c. Disposal of wastes during quarantine is under the direct oversight of an APHIS representative.
 - d. Incineration may also take place at a local site away from the facility premises under the direct oversight of an APHIS representative.
- ii. The capability to dispose of ruminant carcasses during quarantine to prevent disease spread must be approved by the Administrator.

F. If APHIS determines that the facility does not meet local, State or Federal Environmental regulations, APHIS may deny, or suspend approval until appropriate remedial measures have been applied.

G. A privately owned medium or minimum security quarantine facility must comply with other applicable Federal laws and regulations, as well as all applicable State and local codes and regulations

H. The Administrator may grant variances to existing requirements relating to location, construction, and other design features and operational procedures for privately owned medium or minimum security quarantine facilities if the Administrator determines that the variance causes no

detrimental impact to the health of the ruminants or to the overall biological security of the quarantine operation

Import And Export Statistics For The Past Year

Larry White
Center for Epidemiology and Animal Health
Veterinary Services
Animal and Plant Health Inspection Service

Aquaculture Exports FY 2004 - 2006

| | FY04 | FY05 | FY06 |
|----------------------|--------------------|--------------------|--------------------|
| Fish Eggs | 154,718,512 | 145,906,179 | 195,117,836 |
| Fish Live | 32,726,500 | 15,427,862 | 15,068,897 |



Poultry Exports FY 2004 - 2006

| | FY04 | FY05 | FY06 |
|----------------|------------|------------|------------|
| Live Poultry | 43,364,010 | 37,276,029 | 30,817,881 |
| Hatching Eggs | 65,452,462 | 70,800,222 | 71,298,721 |
| Day-old Chicks | 38,677,805 | 37,911,553 | 29,703,249 |



Poultry Imports FY 2004 - 2006

| | FY04 | FY05 | FY06 |
|------------------|------------|------------|------------|
| Live Poultry | 17,742,984 | 17,595,266 | 15,106,633 |
| Hatching Eggs | 14,993,440 | 15,759,279 | 17,514,916 |
| Commercial Birds | 234,856 | 186,605 | 172,429 |



Bison Exports

| | FY04 | FY05 | FY06 |
|--------|------|------|------|
| Canada | 0 | 0 | 0 |
| Mexico | 84 | 0 | 7 |
| Total | 84 | 0 | 7 |



Source: CEAH:CADIA: Fort Collins, CO

Bison Imports From Canada

| | FY04 | FY05 | FY06 |
|---------------------------------|------|------|--------|
| Feeder then direct to Slaughter | 0 | 56 | 3,565 |
| Immediate Slaughter | 0 | 850 | 8,460 |
| Total | 0 | 906 | 12,025 |



Source: CEAH:CADIA: Fort Collins, CO

Cervine Exports FY 2004 - 2006

| | FY04 | FY05 | FY06 |
|-------------------------|------|------|------|
| Mexico (Elk and Deer) | 241 | 290 | 176 |
| Honduras (Elk and Deer) | 18 | 0 | 3 |
| Canada (Elk and Deer) | 0 | 0 | 0 |
| Total | 259 | 290 | 179 |



Source: CEAH:CADIA: Fort Collins, CO

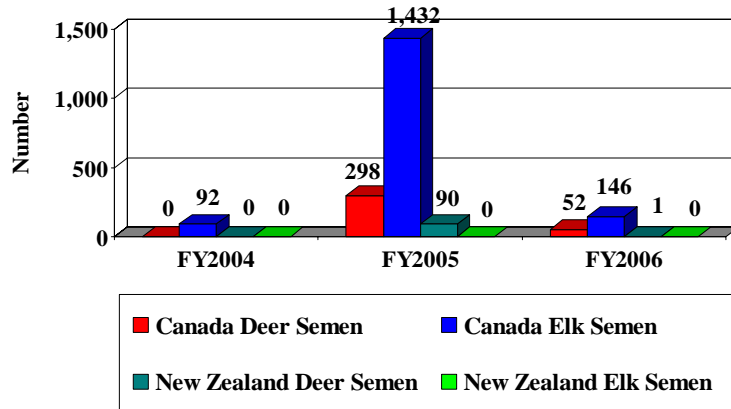
Cervine Imports from Canada FY06

| | |
|--------------|-------|
| Deer - Live | 272 |
| Deer - Semen | 52 |
| Elk - Live | 1,144 |
| Elk - Semen | 146 |



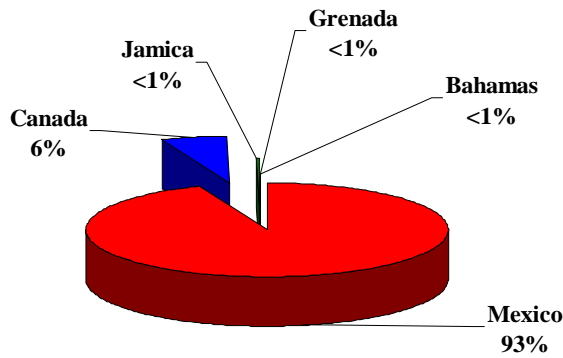
Source: CEAH:CADIA: Fort Collins, CO

Cervine Semen Import FY 2004 - 2006



Source: CEAH:CADIA: Fort Collins, CO

Ovine Exports Top 5 Countries-FY 2006



Source: CEAH:CADIA: Fort Collins, CO



Ovine Exports Top 5 Countries of FY2006

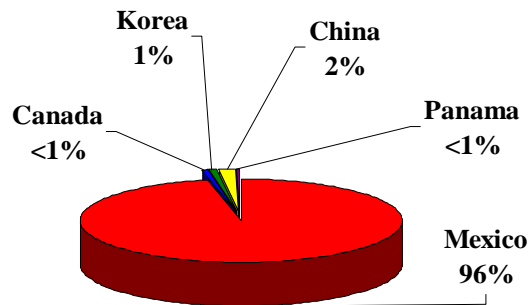
| Country | FY 2006 |
|---------|---------|
| Mexico | 66,931 |
| Canada | 4,170 |
| Jamaica | 79 |
| Bahamas | 63 |
| Grenada | 22 |

USDA

Import-Export Animals Staff

Source: CEAH/CADIA: Fort Collins, CO

Porcine Exports Top 5 Countries-FY 2006



USDA

Import-Export Animals Staff

Source: CEAH/CADIA: Fort Collins, CO



Porcine Exports Top 5 Countries of FY2006

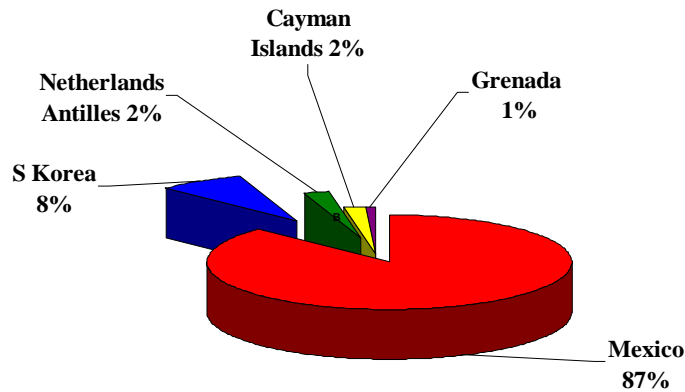
| Country | FY 2006 |
|----------------------------|---------|
| Mexico | 118,110 |
| People's Republic of China | 1,921 |
| South Korea | 1,227 |
| Canada | 583 |
| Panama | 311 |

USDA

Import-Export Animals Staff

Source: CEAH/CADIA: Fort Collins, CO

Caprine Exports Top 5 Countries-FY 2006



USDA

Import-Export Animals Staff

Source: CEAH/CADIA: Fort Collins, CO



Caprine Exports Top 5 Countries of FY2006

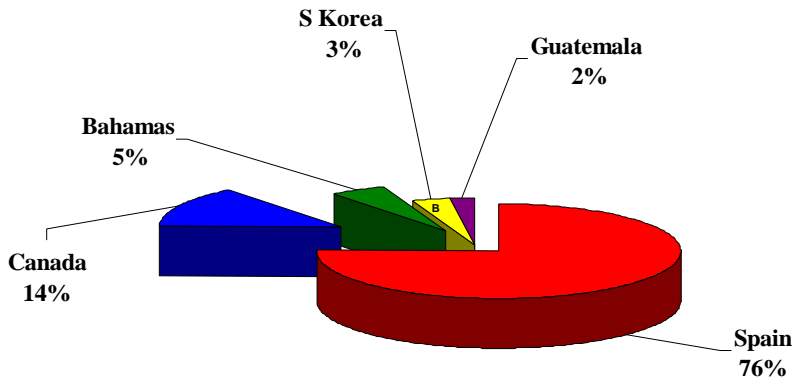
| Country | FY 2006 |
|----------------------|---------|
| Mexico | 4,261 |
| South Korea | 370 |
| Netherlands Antilles | 116 |
| Cayman Islands | 92 |
| Grenada | 42 |

USDA

Import-Export Animals Staff

Source: CEAH/CADIA: Fort Collins, CO

Zoo Animal Exports Top 5 Countries-FY 2006



USDA

Import-Export Animals Staff

Source: CEAH/CADIA: Fort Collins, CO



Zoo Animal Exports Top 5 Countries-FY 2006

| Country | FY 2006 |
|-----------|---------|
| Spain | 195 |
| Canada | 36 |
| Bahamas | 13 |
| S Korea | 8 |
| Guatemala | 6 |



Source: CEAH:CADIA: Fort Collins, CO

EXPORT SEMEN & EMBRYOS FY 2006

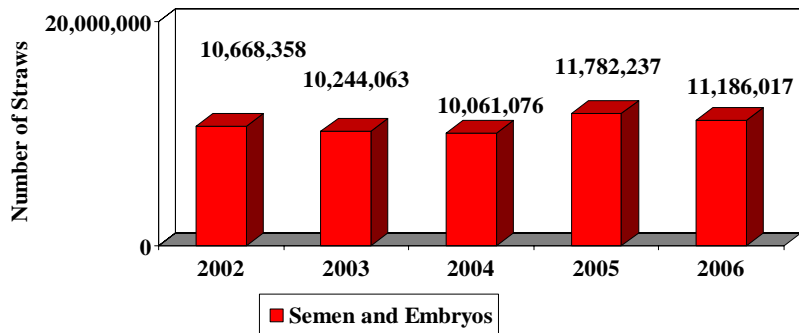
| SPECIES | EMBRYO | SEMEN | TOTAL |
|---------------|---------------|-------------------|-------------------|
| Bovine | 32,150 | 11,153,867 | 11,186,017 |
| Caprine | 0 | 206 | 206 |
| Cervine | 0 | 0 | 0 |
| Equine | 12 | 37,270 | 37,282 |
| Ovine | 0 | 251 | 251 |
| Porcine | 1,178 | 18,420 | 19,598 |
| Totals | 33,340 | 11,210,014 | 11,243,354 |



Source: CEAH:CADIA: Fort Collins, CO



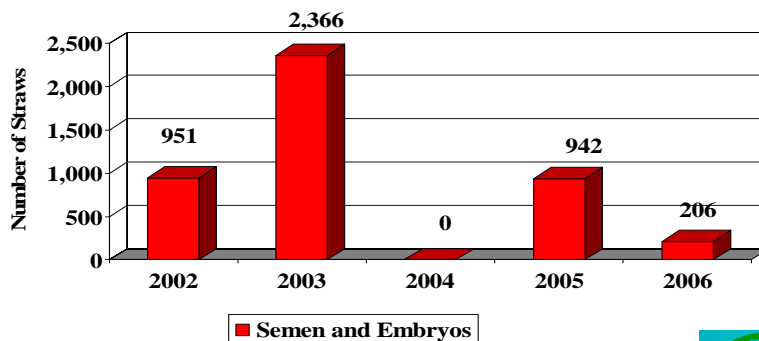
Bovine Semen and Embryo Exports FY 2002-2006



Source: CEAH:CADIA: Fort Collins, CO



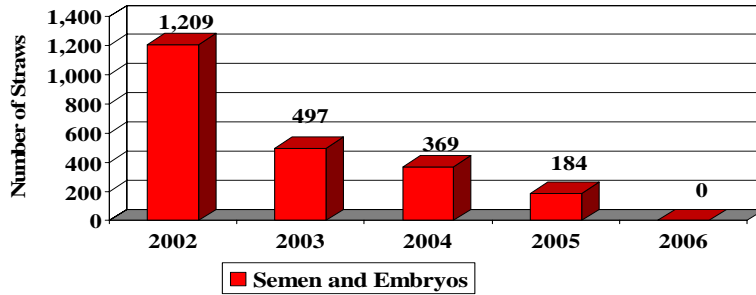
Caprine Semen and Embryo Exports FY 2002-2006



Source: CEAH:CADIA: Fort Collins, CO



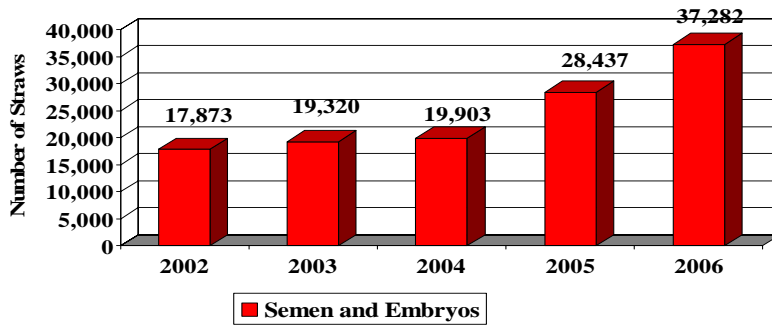
Cervine Semen and Embryo Exports FY 2002-2006



Source: CEAH/CADIA: Fort Collins, CO



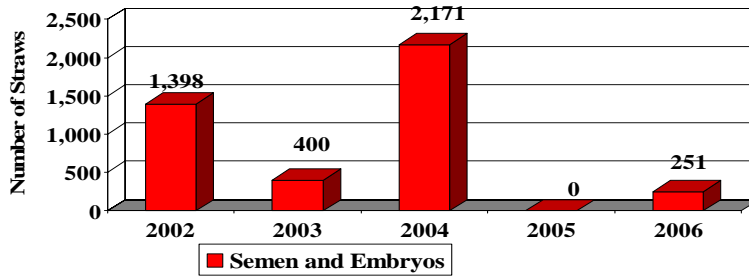
Equine Semen and Embryo Exports FY 2002-2006



Source: CEAH/CADIA: Fort Collins, CO



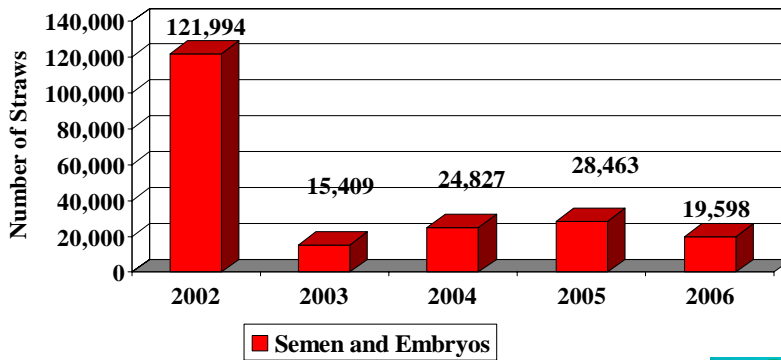
Ovine Semen and Embryo Exports FY 2002-2006



Source: CEAH:CADIA: Fort Collins, CO



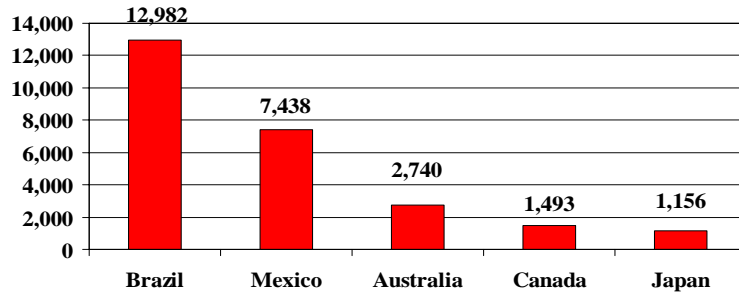
Porcine Semen and Embryo Exports FY 2002-2006



Source: CEAH:CADIA: Fort Collins, CO



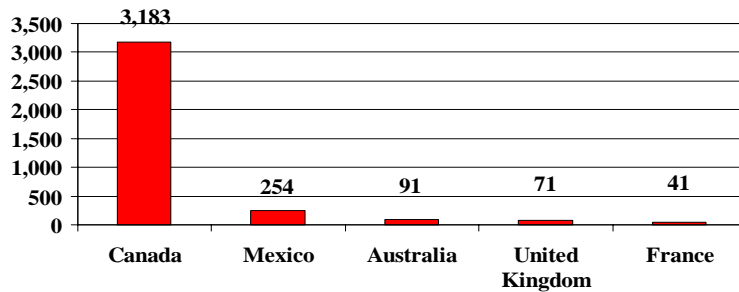
Bovine Embryos Exported FY 2006



Source: CEAH:CADIA: Fort Collins, CO



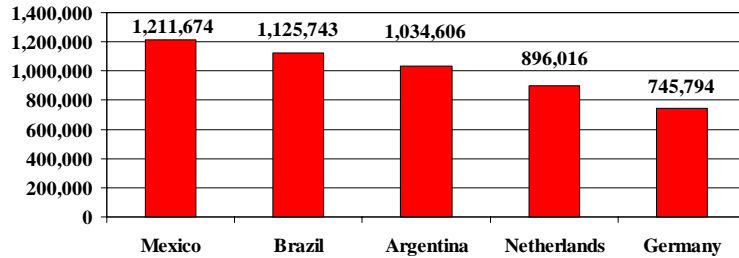
Bovine Embryos Imported FY 2006



Source: CEAH:CADIA: Fort Collins, CO



Bovine Semen Exported FY 2006



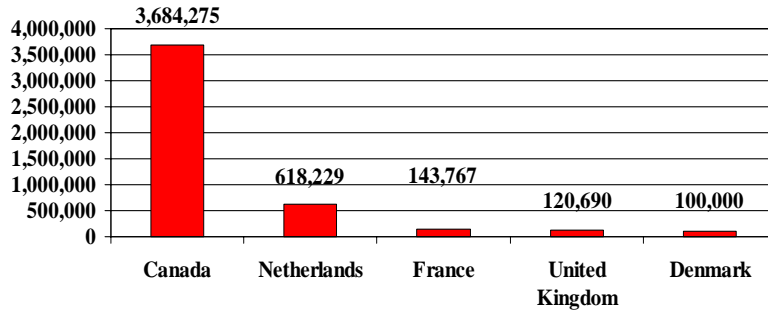
USDA

Import-Export Animals Staff

Source: CEAH:CADIA: Fort Collins, CO



Bovine Semen Imported FY 2006



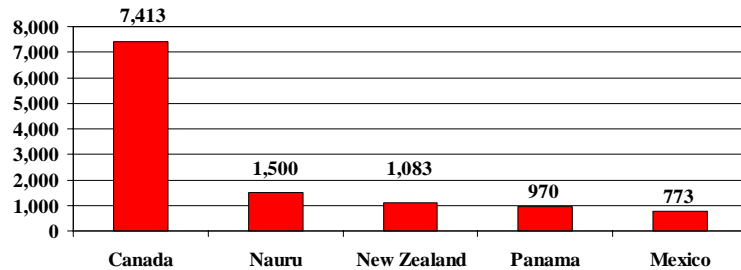
USDA

Import-Export Animals Staff

Source: CEAH:CADIA: Fort Collins, CO



Bovine Live Animals Exported FY 2006



Source: CEAH:CADIA: Fort Collins, CO



Mexico Feeder Cattle Imported by Port - FY 2006

| Port | 2006 |
|------------|---------|
| Columbus | 37,834 |
| Del Rio | 138,011 |
| Douglas | 115,943 |
| Eagle Pass | 134,156 |
| El Paso | 298,222 |

| Port | 2006 |
|----------|-----------|
| Laredo | 64,627 |
| Nogales | 181,868 |
| Presidio | 150,339 |
| San Luis | 13,244 |
| TOTAL | 1,228,698 |



Source: CEAH:CADIA: Fort Collins, CO



Canada Feeder Cattle Imported by Port - FY 2006

| Port | 2006 | Port | 2006 |
|--------------------|--------|----------------|---------|
| Alexandria Bay, NY | 187 | Port Huron, MI | 2,859 |
| Dunseith, ND | 80,526 | Portal, ND | 126,013 |
| Eastport, ID | 20,972 | Raymond, MT | 25,762 |
| Niagara Falls, NY | 5,293 | Sumas, WA | 10,071 |
| Oroville, WA | 18,272 | Sweetgrass, MT | 28,673 |
| Pembina, ND | 40,488 | TOTAL | 359,116 |

USDA

Import-Export Animals Staff

Source: CEAH:CADIA: Fort Collins,
CO



Canada Slaughter Cattle Imported by Port - FY 2006

| Port | 2006 | Port | 2006 |
|----------------------|---------|----------------|---------|
| Alexandria Bay, NY | 29,072 | Oroville, WA | 19,732 |
| Champlain, NY | 2,166 | Pembina, ND | 31,215 |
| Detroit, MI | 10,880 | Port Huron, MI | 70 |
| Dunseith, ND | 34,819 | Portal, ND | 25,238 |
| Eastport, ID | 324,673 | Raymond, MT | 1,498 |
| Highgate Springs, VT | 4,670 | Sumas, WA | 1,347 |
| Houlton, ME | 34 | Sweetgrass, MT | 199,750 |
| Niagara Falls, NY | 27,029 | Total | 712,193 |

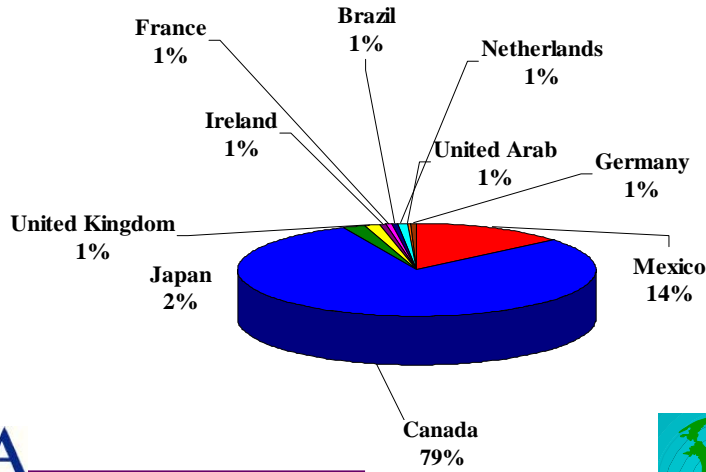
USDA

Import-Export Animals Staff

Source: CEAH:CADIA: Fort Collins,
CO



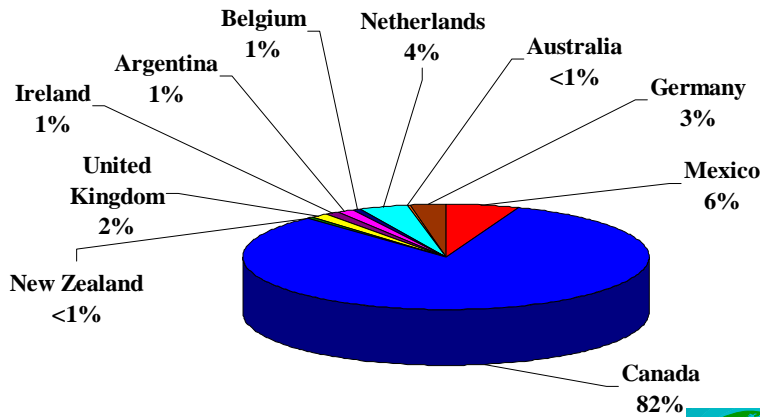
Equine Exports Top 10 Countries-FY 2004



Source: CEAH:CADIA: Fort Collins, CO



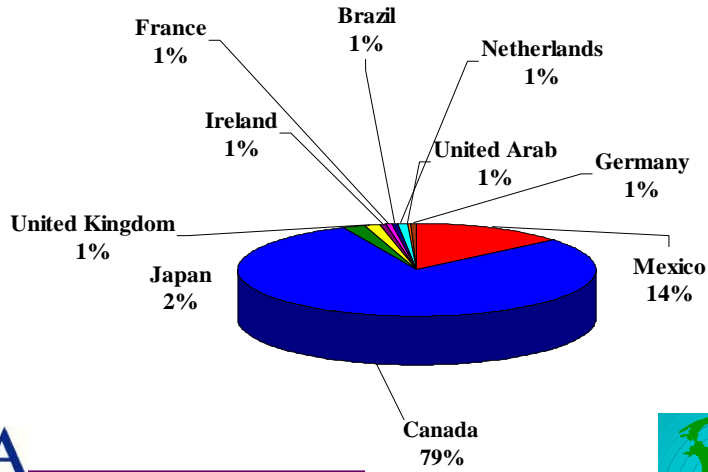
Equine Imports Top 10 Countries-FY 2004



Source: CEAH:CADIA: Fort Collins, CO



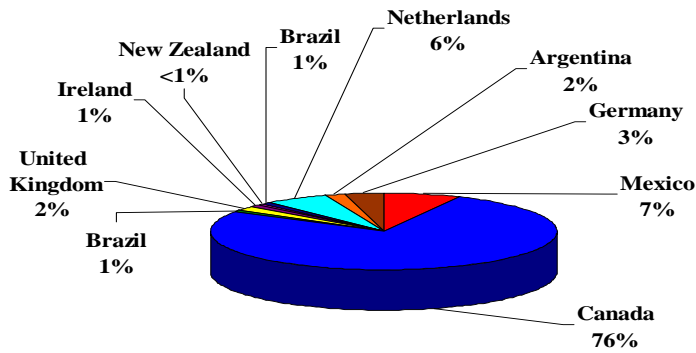
Equine Exports Top 10 Countries-FY 2005



Source: CEAH:CADIA: Fort Collins, CO



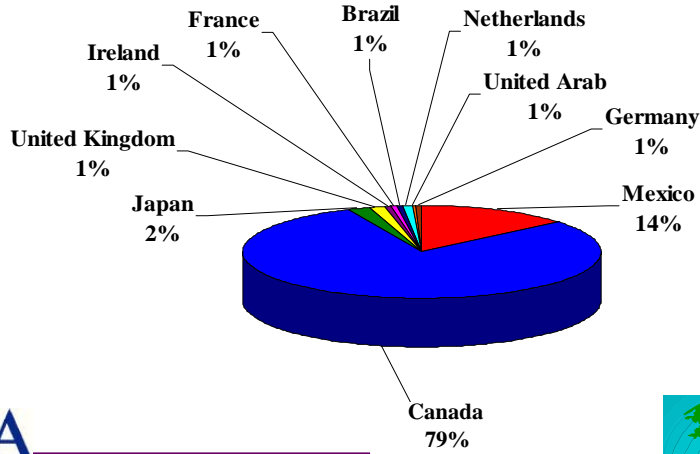
Equine Imports Top 10 Countries-FY 2005



Source: CEAH:CADIA: Fort Collins, CO



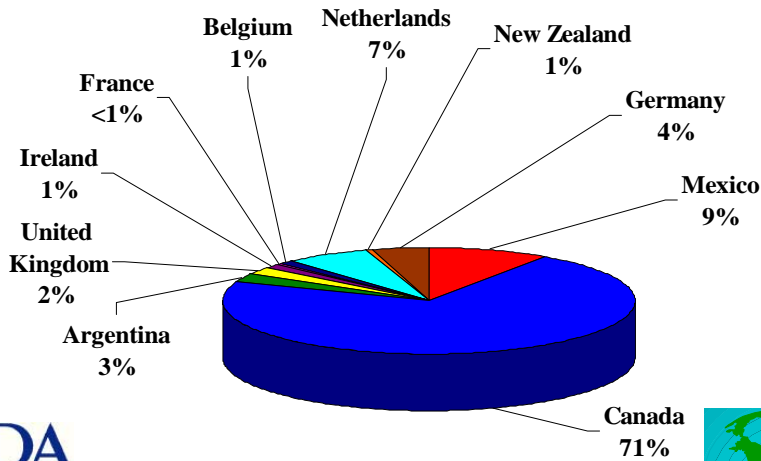
Equine Exports Top 10 Countries-FY 2006



Source: CEAH:CADIA: Fort Collins, CO



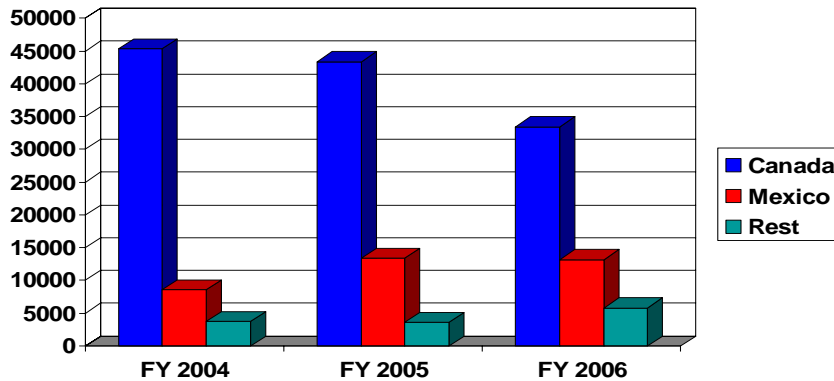
Equine Imports Top 10 Countries-FY 2006



Source: CEAH:CADIA: Fort Collins, CO



Equine Exports Top 10 FY 2004, 2005, 2006



Source: CEAH:CADIA: Fort Collins, CO



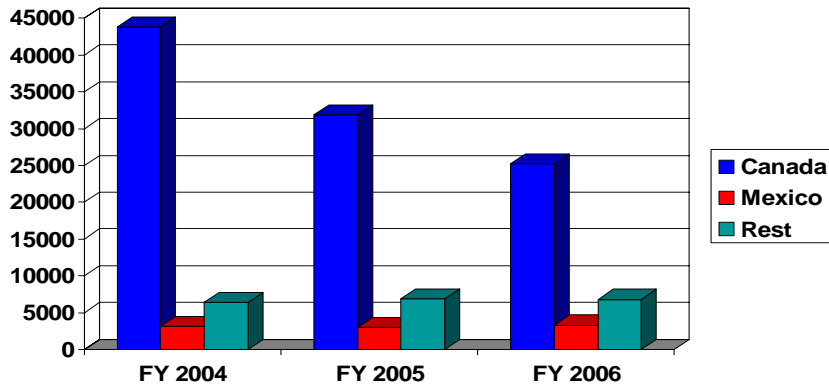
Equine Exports Top 10 FY 2004, 2005, 2006

| | FY 04 | FY 05 | FY 06 |
|----------|--------|--------|--------|
| Canada | 45,354 | 43,366 | 33,438 |
| Mexico | 8,588 | 13,388 | 12,206 |
| Rest (8) | 3,753 | 3,558 | 5,831 |
| Totals | 57,695 | 60,312 | 51,475 |



Source: CEAH:CADIA: Fort Collins, CO

Equine Imports Top 10 FY 2004, 2005, 2006



Source: CEAH:CADIA: Fort Collins, CO



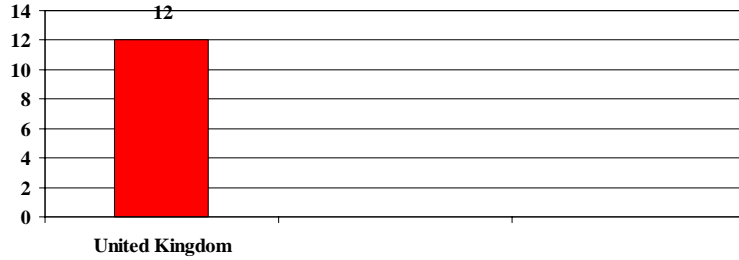
Equine Imports Top 10 FY 2004, 2005, 2006

| | FY 04 | FY 05 | FY 06 |
|----------|--------|--------|--------|
| Canada | 43,779 | 31,882 | 25,234 |
| Mexico | 3,117 | 3,013 | 3,293 |
| Rest (8) | 6,360 | 6,872 | 6,816 |
| Totals | 53,256 | 41,767 | 35,343 |



Source: CEAH:CADIA: Fort Collins, CO

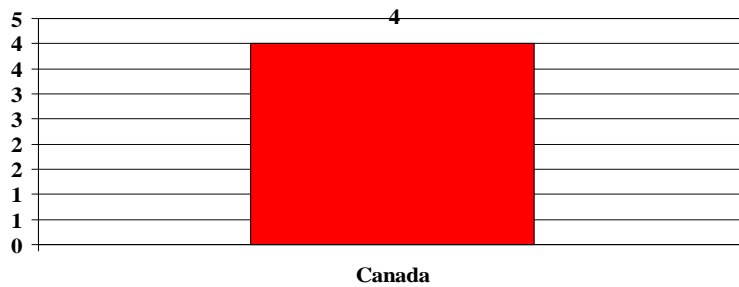
Equine Embryos Exported FY 2006



Source: CEAH:CADIA: Fort Collins, CO



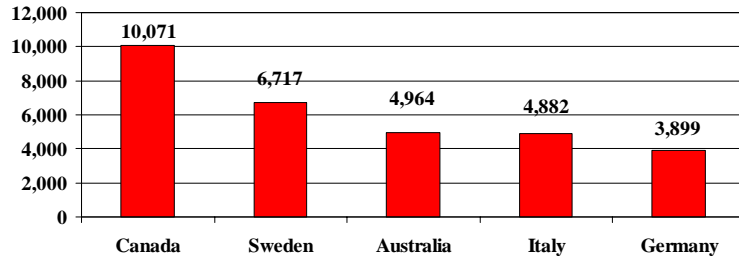
Equine Embryos Imported FY 2006



Source: CEAH:CADIA: Fort Collins, CO



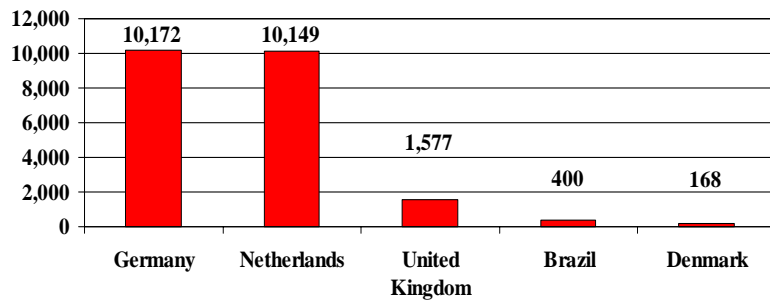
Equine Semen Exported FY 2006



Source: CEAH:CADIA: Fort Collins, CO



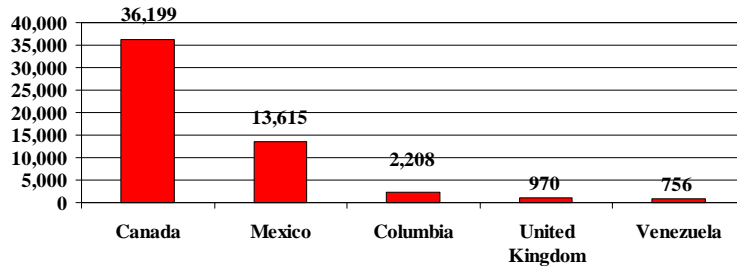
Equine Semen Imported FY 2006



Source: CEAH:CADIA: Fort Collins, CO



Equine Live Animals Exported FY 2006



Source: CEAH/CADIA: Fort Collins, CO



Exposure to a Persistently Infected Heifer Can Cause Persistent Testicular Infection with Bovine Viral Diarrhea Virus*

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Auburn University

Y. Zhang
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B.W. Brodersen
University of Nebraska Veterinary Diagnostic Center
Institute of Agriculture and Natural Resources

Persistent testicular infections with bovine viral diarrhea virus (BVDV) have been reported after intranasal inoculation of post pubertal bulls with a BVDV-1 strain of the virus. However, the potential for development of persistent testicular infections after natural exposure to persistently infected animals has not been examined. Thus, the objective of this research was to evaluate the potential for production of persistent testicular infections after natural exposure of naïve bulls to heifers persistently infected with a BVDV-1 or BVDV-2 strain.

In the first trial, 4 seronegative 10-month-old bulls were exposed for 28 days in a pasture environment to a mature heifer persistently infected (PI) with a BVDV-1 strain. In the second trial, 4 seronegative 10-month-old bulls were exposed for 28 days in a

pasture environment to a mature heifer PI with a BVDV-2 strain. In the third trial, 2 seronegative 20-month-old bulls were individually exposed for 2 days in a pen breeding situation to the BVDV-1 PI heifer during estrus. In the fourth trial, 2 seronegative 19-month-old bulls were individually exposed for 2 days in a pen breeding situation to the BVDV-2 PI heifer during estrus. Semen was obtained from the 8 young bulls at 59, 90, 120 and 150 days after initial exposure. Testicular biopsies were obtained at 28, 90 and 178 days. Semen was obtained from the 4 older bulls at 59, 90, 120, 150 and 181 days after initial exposure. Testicular biopsies were obtained after 181 days. Semen samples were assayed for BVDV using virus isolation and reverse transcription-nested PCR (RT-nPCR). Testicular biopsies were assayed for BVDV using virus isolation, RT-nPCR and immunohistochemistry.

The first trial resulted in 2 bulls with BVDV persisting in semen and testicular tissue. One bull produced semen positive for BVDV only by RT-nPCR at 90 days after initial exposure and testicular biopsies positive only by RT-nPCR at 90 and 178 days after initial exposure. One bull produced semen positive for BVDV only by RT-nPCR at 59, 120 and 150 days after initial exposure and a testicular biopsy positive only by RT-nPCR at 90 days after initial exposure. The second trial resulted in 1 bull with BVDV persisting in testicular biopsies as detected only by RT-nPCR at 28 and 90 days after initial exposure. The third trial resulted in 1 bull with BVDV persisting in semen and testicular tissue. Semen was positive for BVDV only by RT-nPCR at 90, 120, 150 and 181 days after initial exposure. The testicular biopsy taken from this bull 183 days after initial exposure was positive for BVDV by virus isolation, RT-nPCR and immunohistochemistry. The fourth trial resulted in no persistence of BVDV in testicular tissue or semen.

This research demonstrates that natural exposure of seronegative bulls to a PI heifer can cause persistent infection of testicular tissue with BVDV. The risk of these persistent testicular infections causing subfertility or venereal transmission of virus remains to be elucidated.

*Research supported by a grant from the United States Department of Agriculture, Cooperative State Research, Education, and Extension Service, National Research Initiative Competitive Grants Program.

Update of Bovine Viral Diarrhea Virus in Assisted Reproductive Techniques

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Bovine viral diarrhea virus (BVDV) is a single-stranded RNA virus that is broadly distributed in most cattle populations throughout the world. This virus is economically significant in both beef and dairy industries due to its ability to affect multiple systems resulting in a variety of enteric, reproductive and respiratory disease states. Also, it is known that fluids, gametes and somatic cells collected from BVDV infected cattle are likely to be contaminated with a non-cytopathic strain of BVDV which can be a challenging contaminant when these 'materials of animal origin' are used in embryo production and transfer. Therefore, BVDV has emerged as a potential problem in

existing and emerging assisted reproductive technologies. There are 3 generations of embryo technologies with the first generation considered to be in vivo embryo production and the second being synonymous with in vitro embryo production and finally the third generation to include somatic cell nuclear transfer (cloning) and transgenics. Research involving BVDV and these three generations of reproductive technologies has shown BVDV to have the ability to be associated with in vivo-derived and in vitro-produced embryos as well as significantly affecting cell lines involved in cloning and transgenics. Studies have shown that BVDV remains associated with in vivo-derived and in vitro-produced bovine embryos following standard washing procedures and that this embryo associated virus can be infective. However, the question of what constitutes an intrauterine infective dose needs to be determined.

Recently a real time quantitative polymerase chain reaction (PCR) was developed which can quantify the amount of BVDV associated with single transferable embryos. This assay provides the foundation to complete the thorough risk assessment of the potential for transmission of BVDV via embryo transfer. The average amount of BVDV associated with in vivo-derived embryos exposed to a high affinity isolate has been determined to be ≤ 6.62 copies per 5 μL of 99 % of contaminated embryos and 90 % of contaminated embryos will be associated with ≤ 4.64 viral copies per 5 μL using a tolerance intervals ($p = 0.05$). These findings seem to indicate that there is a minimal risk of transmitting BVDV via embryo transfer due to the small quantity of virus which may be associated with individual in vivo-derived embryos. Although, the average amount of virus associated with in vivo-derived embryo has been determined further studies involving in vitro-produced and uterine infectious dose are necessary to determine the amount of infectious virus necessary to result in an intrauterine infection. Finally, studies involving all 3 generations of assisted reproductive technologies are needed to determine what additional precautions are necessary to provide insurance that introduction of new germplasm will not provide a route for BVDV transmission.