

Recognition of Israel by the Office International des Epizooties (OIE) “Negligible” BSE Status under the Provisions of the *Terrestrial Animal Health Code* (2011)

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ABSTRACT

Bovine spongiform encephalopathy (BSE) and the variant Creutzfelt-Jakob disease was first recognized internationally as a growing public and animal health burden in the late eighties of the twentieth century. Israel undertook a proactive policy to prevent BSE introduction since the early stages of the UK event. One case of BSE has been diagnosed in Israel in 2002, in a dairy cow born in Israel in 1992. The control measures according to OIE recommendations and EU regulations were applied. The World Organization for Animal Health (OIE) has collected scientific data and drawn up a simplified scheme for assessing risk category by country or zone. In order to apply for recognition for the classification of the BSE status of Israel as “Negligible” it was necessary to respond to a questionnaire of the OIE. This review article documents the answers to the questionnaire presented to OIE Scientific Committee and briefly discusses the measures which prevented significant introduction of BSE from Europe to Israel. During the 82nd General Session of the OIE, May 2013, the status of “Negligible risk” was granted to the State of Israel, cancelling restrictions upon export of relevant animal products to countries with similar or higher risk level. The BSE “Negligible” status allowed Israel to discontinue the application of control measures with annual expenditure of about two million US Dollars and cut the losses associated with the destruction of Specified Risk Material (SRM).

Keywords: Bovine Spongiform Encephalopathy; Risk Assessment; Status Recognition; Negligible Risk.

INTRODUCTION

Transmissible spongiform encephalopathies (1) are a group of diseases caused by prions resulting in progressive degenerative brain disorders characterized by microscopic vacuolization of the neurons of the central nervous system (1). The disease was first recognized in the United Kingdom (UK) in 1986 (2) and the report was published 31 October 1987.

In animals this group of diseases causes “scrapie” in sheep and goats, “transmissible mink encephalopathy” in mink, “wasting disease” in white tailed deer, elk, mule deer and

moose, “feline spongiform encephalitis” in cats, “exotic encephalopathy” in nyala and oryx and “bovine spongiform encephalopathy” (BSE) in domestic cattle and also known as “mad cow disease” (1). The latter is a disease of cattle which may present clinically in bovines as apprehension, hyper-reactivity and ataxia (3). This group of diseases may also affect humans through dietary exposure (3, 4, 5).

BSE and the variant Creutzfelt-Jakob disease were first recognized internationally as a growing public and animal health burden in late eighties of the twentieth century (6).

In order to protect public and animal health, the World Organization for Animal Health (OIE) added BSE to the list of reportable animal diseases and subsequently collected scientific data with the aim of updating the international standards. A standardization of risk categories by country or zone was updated and simplified (9).

Israel responded to the initial information on BSE in the UK by several precautionary measures. Following the first publication of the "scrapie-like" syndrome in the UK (2), Israel banned imports of live cattle from the UK in April-May 1988 (7). Following the UK ban upon the sale, supply and feeding

to ruminants of foodstuffs containing animal protein and the UK's declaring BSE notifiable (June 1988), Israel banned in December 1988 the import from the UK of mammalian meat and bone meal (MMBM) for any use; this ban was extended in July 1990 to all countries worldwide (8) (Table 1).

Domestic production of MMBM continued until August 1996 when the feeding of all food animals (including poultry and fish) with bovine-derived MBMs was banned by law and recycling of mammal-origin material discontinued. From then on, mammal waste has been destroyed by incineration (6,7,11).

Table 1: Special Governmental Decisions on Activities with Respect to BSE Control, 2002-2011

Date of decision	Total budget	Activities
31.01.2010 for the years 2010-2011	6.3 million NIS	Same as 2007-2009 (below)
10.08.2007 for the years 2007-2009	7.148 million NIS	2.513 million NIS*: manpower and purchase of materials for BSE detection in cattle over 30 months old designated for slaughter 2.080 million NIS: specified risk material collection and incineration (including costs of slaughter and dissection). 0.700 million NIS: maintenance of computerized system and tracing cattle, including equipment. 1.000 million NIS: control and enforcement in order to prevent unsupervised cattle marketing.
19.03.2006 for the years 2006-2008	8.624 million NIS	2.764 million NIS: purchase of material and equipment for BSE detection in cattle over 30 months old designated for slaughter 1.115 million NIS: manpower in order to implement the program in the labs, slaughterhouses and provinces. 2.545 million NIS: specified risk material collection and incineration (including costs of slaughter and dissection). 1.200 million NIS: maintenance of computerized system and tracing cattle, including equipment. 1.000 million NIS: control and enforcement in order to prevent unsupervised cattle marketing.
13.05.2004 for the years 2004-2005	10.785 million NIS	1.345 million NIS: manpower in order to implement the program in the labs, slaughterhouses and provinces. 4.540 million NIS: purchase of material and equipment for BSE detection in cattle over 30 months old designated for slaughter 3.600 million NIS: specified risk material collection and incineration (including costs of slaughter and dissection). 0.700 million NIS: maintenance of computerized system and tracing cattle, including equipment. 0.600 million NIS: control and enforcement in order to prevent unsupervised cattle marketing.
19.12.2002 for the year 2003	17.6 million NIS	5.800 million NIS: equipment, materials, personnel, and computerized system maintenance in order to enable BSE tests. 4.000 million NIS (0.560 in reserve): specified risk material collection and incineration (cattle over 15 months old). 7.200 million NIS: transition of cows' carcasses from the fresh market to the frozen one (compensation for price losses). 0.6 million NIS: control and enforcement in order to prevent unsupervised cattle marketing.
16.06.2002 for the year 2002	19 million NIS	6.9 million NIS: purchase of equipment, materials, and maintenance of computerized system and tracing cattle, including equipment (also in order to enable BSE tests and manpower). 10.15 million NIS: specified risk material collection and incineration (including costs of slaughter and dissection). 1.000 million NIS: control and enforcement in order to prevent unsupervised cattle marketing. 0.950 million NIS for slaughterhouse refrigeration equipment.

*The rate of 1 NIS has varied from 3.3 to 4.5 / \$US

Passive histopathological surveillance for BSE was introduced in Israel in 1993 (10).

In 2001, the feeding ban, concerning mammal food-animals, was extended to include MBM produced from poultry and fish (6).

BSE was first diagnosed in Israel in a 10 year old dairy cow from a kibbutz herd located on the Golan Heights (8,11). The cow died on May 20th 2002. According to the opinion of the Scientific Steering Committee (SSC) of the EU, the plausible source for the BSE case was the importation of bovine meat and bone meal (MBM) from 1986-1990 from five continental European countries, which were regarded in retrospect to have been "risk countries" during this period.

In order to apply for recognition for the classification of the bovine spongiform encephalopathy (BSE) status of Israel as "Negligible" it was necessary to respond to a questionnaire of the OIE, the organization of which Israel is a member. This review article documents the activities of Israel Veterinary Services and Animal Health (IVSAH) with respect to BSE control presented in the application made by the State of Israel Ministry of Agriculture and Rural Development Veterinary Services and Animal Health in September 2012 for recognition of the BSE status in Israel as "Negligible".

During the May 2014 at the 82nd General Session of the OIE and according to recommendation of the Scientific Committee, the status of "Negligible risk" regarding BSE was granted to the State of Israel which was admitted to the exclusive list of 36 countries with the similar status.

QUESTIONNAIRE

1. Has meat-and-bone meal, greaves, or feedstuffs containing either, been imported within the past eight years (2004-2011)? If so, where from and in what quantities?

Rationale: Knowledge of the origin of meat-and-bone meal, greaves or feedstuffs containing either meat-and-bone meal or greaves, is necessary to assess the risk of release of BSE agent. Meat-and-bone meal and greaves originating in countries of high BSE risk pose a higher release risk than that from low risk countries. Meat-and-bone meal and greaves originating in countries of unknown BSE risk pose an unknown release risk.

Response: The Israel Ministry of Agriculture and Rural Development Veterinary Services and Animal Health provided a detailed list of imports of Poultry and Fish MBM from 2004 to 2011. In total 92,300 tons of poultry MBM; 46,000 tons of poultry feathers; 93,900 tons of poultry blood and 35,200 tons of fish MBM were imported.

Israel neither imports nor produces any mammalian meat-and-bone meal, greaves, or feedstuff containing either of these products. The import of MBM of mammalian origin from the UK and all other countries was prohibited in 1988 and 1990, respectively. The import of poultry MBM (including feather meal) is permitted only from plants authorized by the competent Veterinary Authority of the country of origin.

In order to legalize the prohibition of the use of MBM, the appropriate legal framework, the "Animal Diseases Regulations (Feeding of Animals), 1996" was amended in 2001. The amendment also included the prohibition on the use of poultry meals in mammalian rations. Due to this measure, there has been no use of mammalian MBM and poultry MBM for ruminant feeding since 1996 and 2001, respectively.

Imported poultry and fish MBM are used in the manufacture of poultry feed, fish feed and pet (dog and cat) food. All animal feeds (imported, produced and traded) in Israel require an official permit issued by the competent authority. Each and every consignment of MBM is delivered only to feed mills, which are under the routine supervision of the official competent authorities.

Reinforcement of feed regulations and the verification of health certificates are applied by the IVSAH Import and Export Division, the Plant Protection Inspection Services, and by inspectors at the two sea ports of Israel, Ashdod and Haifa. This unit is responsible for border control and for prevention of smuggling of live animals or their products into Israel.

Each imported consignment of MBM and greaves is checked at the IVSAH Border Inspection Posts and must be accompanied by a Health Certificate signed by the Competent Veterinary Authority of the country of origin, assuring that the product has been subjected to the relevant processing standards, which give enough guarantees as regards to the prevention of BSE (e.g. produced in establishments where only poultry is processed and cross contamination is completely prevented).

Pet foods for dogs and cats are imported into Israel. However, its importation does not pose any risk, since it is pre-packed, ready for animal consumption and properly labelled in the country of origin. Pet Food Health Certificates derived from the mentioned regulations ("Animal Diseases Regulations (Feeding of Animals) 2001" and the BSE Policy Documents), prevent the endangerment from the BSE agent.

In addition to the above, veterinarians, farmers and others involved in the animal products industry have been informed and trained regarding the implementation of the regulations on the feeding ban, in order to prevent the distribution of the BSE agent, as part of the awareness program.

2. Have live cattle been imported within the past seven years (2005-2011)?

Rationale: The release risks are dependent on country, zone or compartment of origin and its BSE status, this may result from the detection of clinical disease, or following active surveillance, or assessment of geographical BSE risk; feeding and management of the imported cattle; use to which the commodity has been put; dairy versus meat breeds, where there are differences in exposure and age at slaughter.

Response: The Israel Ministry of Agriculture and Rural Development Veterinary Services and Animal Health provided a detailed list of imports of cattle into Israel between 2005 to 2011. In total 567,100 live cattle were imported during these years. With the exception of Serbia where the BSE status was still undetermined, all countries from which cattle had been imported were either "negligible" or "controlled" in regard to their BSE status. Furthermore, the BSE risk related to the source of live cattle import is being continuously revised, taking into account the evolution of the epidemiological evidence of this disease in the exporting countries.

Imported cattle originating from countries which are

Table 2: Number of cattle clinically-suspect for BSE, by year

Year	Number of clinically suspect cattle
2005	48
2006	33
2007	30
2008	30
2009	24
2010	17
2011	24
Total	206

considered "negligible" or "controlled" regarding their BSE status according to the OIE are placed in quarantine stations for at least 8-10 days, where they are ear tagged, receive an Israeli identity document and are vaccinated against foot and mouth disease. The data are recorded into an IVSAH central computerized database. From thereon, all information regarding that animal (movements, vaccinations, date of death/slaughter, BSE testing, etc.) is computerized, recorded and monitored. All cattle movements in Israel have to be approved by the Regional Veterinary Officer prior to their movement. As a rule, imported cattle are kept on well-monitored, zero-grazing feedlots, and are sold to be slaughtered by the farmer without auction or appearing in sale yards.

About 50% of the imported calves are exported to the Palestinian Authority; some are transferred directly from the quarantine station for either fattening or immediate slaughter, others are transferred after fattening in Israel, for slaughter in the Palestinian Authority.

Only tens to a few hundred head of cattle are imported for breeding each year, from Australia, which is considered as "negligible" with regard to its BSE status. These are used solely in mother-calf beef herds on pasture, and not in dairy herds or feedlots. Imported cattle for breeding are under close supervision of the Regional Veterinary Officers.

3. What products of bovine origin have been imported within the past seven years (2005-2011)?

Rationale: The release risks are dependent on the origin of the cattle products and whether these products contain tissues known to contain BSE infectivity.

Response: The Israel Ministry of Agriculture and Rural Development Veterinary Services and Animal Health provided a detailed list of the total amount of meat and offal imported into Israel (kg), 2005-2011. During this period 68,668,099 kg of meat was imported and 4,475,906 kg of offal.

The BSE risk related to the import of products of cattle origin has been continuously revised by the Israel Ministry of Agriculture and Rural Development Veterinary Services and Animal Health in light of the evolution of the epidemiological evidence of this disease in the exporting countries.

4. The origin of bovine carcasses, by-products and slaughterhouse waste, the parameters of the rendering processes and the methods of cattle feed production. How have bovine carcasses, by-products and slaughterhouse waste been processed over the past eight years (2004-2011)?

Rationale: The overall risk of BSE in the cattle population of a country is proportional to the level of known or potential exposure to BSE infectivity and the potential for recycling and amplification of the infectivity through livestock feeding practices.

Response:

1) Almost all fallen stock are incinerated and a few are buried at IVSAH-approved landfills. The owner notifies an IVSAH Veterinary Officer according to the "Animal Diseases Ordinance, 1985". The operation of the incineration plant is under the constant supervision of a full-time IVSAH veterinarian present on site, who is responsible for the inspection, sampling, recording, monitoring and reporting procedures. The costs of the collection and the incineration or burial of fallen stock are fully covered by a state-subsidized insurance plan.

All fallen stock collected and brought to the incineration plant aged greater than 24 months are sampled for BSE testing at the Pathology Department in the Kimron Veterinary Institute (KVI).

2) Due to local market trends and demands, the age at slaughter of fattened calves is up to 15 months with rare exceptions. Therefore these calves are not tested for BSE, nor are their Specified Risk Material (SRM) removed from the carcass (unless clinical signs are manifested or the animal is slaughtered at an older age).

3) Following the only case of BSE in Israel, on May 20th 2002 (diagnosed in a dairy cow), an administrative directive referring to cattle above the age of 12 months was issued by the IVSAH regarding SRM. The definition of organs considered to be SRM in Israel was:

- (a) Head as a whole (excluding edible parts like the masseter muscles and the tongue);
- (b) Spinal cord;
- (c) Small intestines.

The directive also included protocols for the disposal of SRM:

- (i) Immediate disposal of SRM during slaughter into specific containers;
- (ii) Daily transfer of these containers from the slaughterhouse to the incineration plant.

As of January 1st 2003, the IVSAH, with the cooperation of the Ministry of Health, raised the age of the relevant cattle from 12 months to 15 months. A reminder in the form of an official letter of this directive is sent to the veterinary inspectors in slaughterhouses annually).

4) Documentation describing the rendering process and parameters used to produce meat-and-bone meal and greaves was presented. In Israel there is no collection of mammalian waste for further processing nor are there rendering plants, except for fat (used for biodiesel production), hides and skins. However, there are five rendering plants exclusively for the manufacturing of poultry meal, regulated and inspected by the IVSAH, the Division for the Control of Animal Products.

Almost all Israeli dairy cows are fed total mixed ration (TMR) *ad libitum*. Feedlot calves are fed a high concentrate diet consisting of grains (corn, wheat, barley) and a small amount of wheat straw or hay.

The use of mammalian MBM in cattle feed or in monogastric feed is forbidden. Mammalian MBM is not available in Israel; it is neither produced nor imported. The feeding of poultry concentrates to cattle is prohibited, since it may include poultry-derived MBM. In addition, poultry concentrates are not suitable for cattle feeding since it may contain compounds, such as coccidiostats, some of which are toxic to cattle.

5. Documentation describing monitoring and enforcement of the above.

Monitoring and enforcement of processing of bovine carcasses, by-products and slaughterhouse waste is carried out by the inspectors of the production site, supervised by the responsible officer in the veterinary headquarters.

6. The potential for the exposure of cattle to the BSE agent through consumption of meat-and-bone meal or greaves of bovine origin

Question: Has meat-and-bone meal or greaves of bovine origin been fed to cattle within the past eight years (2004-2011).

Rationale: If cattle have not been fed products of bovine

origin (other than milk or blood) potentially containing meat-and-bone meal or greaves of bovine origin within the past eight years, meat-and-bone meal and greaves can be dismissed as a risk. In the case of countries applying for negligible risk status, it will be required to demonstrate that the ruminant feed ban has been effective for at least eight years following the birth of the youngest case.

Response: MMBM has not been fed since 1996. There has been no use of imported bovine MBM or greaves in the feeding of any animal species, according to the "Animal Diseases Regulations (Feeding of Animals), 2001.

In Israel there are five poultry rendering plants and 32 feed mills. Two rendering plants that used to manufacture mammalian MBM were closed down in 1995 and 1996. Poultry rendering plants are under comprehensive (visual) daily inspection by the plants' inspectors, and twice a week by a public (regional) veterinarian, who also monitors regulations' enforcement, including the regulation regarding the ban on mammalian MBM and greaves. Feed mills also go through a comprehensive inspection according to a yearly inspection plan by the Plant Protection and Inspection Services (PPIS).

All imported feed ingredients of plant origin require a primary permit issued and renewed annually by the PPIS, Feed Division. Each shipment of such imported feedstuff is examined by inspectors of the PPIS, Quarantine Division, at the port of entry.

Animal feed that contains ingredients from either terrestrial or aquatic animals requires a permit from the IVSAH, Import and Export Division. All import permits are issued according to the requirements of the BSE Policy Document.

Each consignment of imported animal feed containing poultry or fish MBM is regularly checked by the IVSAH Border Inspection Posts and must be accompanied by a Health Certificate signed by the Competent Veterinary Authority of the country of origin assuring that the product has been subjected to the processing standards which give sufficient guarantees with regard to the prevention of BSE.

The questionnaire required documentation of husbandry practices (multiple species farms) which could lend themselves to cross-contamination of cattle feed with meat-and-bone meal and greaves destined for other species. The response was that Israeli animal husbandry systems are comprised of one species per production unit.

Most dairy farms raise their own replacement heifers, and most cows spend their entire life on the same farm. Cows that are sold are done so directly between farms managers without the intervention of dealers. There are no cattle auctions in Israel except for some breeding bulls for beef herds. Ninety nine per cent of breeding on dairy farms is carried out by artificial insemination. The average age of culling is 5 years, and one third of the herd is first-lactation-heifers.

Some farmers may raise more than one species, but these are not kept in the same holding pen or barn. Farms are large and tend to specialize. There are no small multi-species backyard dairy farms. Feed for poultry is not prepared on the farm but is only bought ready-to-use from feed mills. All ruminant concentrate feed (containing grains and additives) is bought from commercial feed mills and is not prepared on the farm. MBM's used for the production of feed, such as poultry and fish meal, are only used in feed mills (central production of feed) and not at the farm level. The complete production process (storage, mixing and distribution) in all feed mills is computerised, planned, executed and monitored, allowing full traceability of ingredients used.

Feedstuff containing poultry, feather, blood and fish meal are transported by means of vehicles which do not at the same time transport feedstuffs for ruminants. If the vehicle is subsequently used for the transport of feedstuffs intended for ruminants, it shall be thoroughly cleaned in accordance with a procedure approved by the competent authority to avoid cross-contamination.

Moreover, cross-contamination is not possible in the light of the absence of mammalian MBM in Israel for more than 15 years. As mentioned in previous answers, there is no use of mammalians MBM, either locally produced or imported.

7. The questionnaire required information regarding an awareness programme

Rationale: An awareness programme is essential to ensure detection and reporting of BSE, especially in countries of low prevalence and competing differential diagnoses.

In light of the BSE situation in Europe, general awareness and training activities for IVSAH veterinarians and other personnel, bovine practitioners and farmers have taken place since 1987, and from 1989, BSE for both pathological and clinical aspects has been presented in official publications and on-line gazettes, seminars, courses and conferences. Israeli cattle breeders are organized in three large cooperatives,

the Israel Cattle Breeders Association (ICBA), the Israel Beef Feedlot Association and Israel Beef Herds Association. These organizations have held periodic regional and national meetings, distributed weekly to bi-monthly farmers' magazines to members and conducted other continuing education activities. These tools have been used by the IVSAH to communicate and spread information regarding BSE. In addition, a BSE website hosted by the Faculty of Agriculture of the Hebrew University was established: <http://agri3.huji.ac.il/~yakobson/bseEN/>. Later on the website moved to the official website of the IVSAH: http://www.moag.gov.il/Vet/noseim/Prevention_animal_diseases_Zoaonotiot/bsp/default.htm.

Awareness of veterinarians and farmers regarding cattle presenting neurological clinical manifestations is very high in Israel, as rabies is endemic and the disease is diagnosed in cattle several times a year. Each rabies case is reported to all the veterinarians in Israel and therefore farmers and veterinarians report suspicious neurological cases to the Regional Veterinary Officers of the IVSAH. All suspected animals which test negative for rabies are consequently tested for BSE.

In Israel 90% of the cattle practitioners are employed by "Hachaklait", a cooperative of 50 veterinarians led by a Chief Veterinarian, supported by an epidemiological unit and consultants, supplying clinical veterinary services to ruminant farms throughout Israel. "Hachaklait" carries out monthly continuing education seminars regarding different subjects, including clinical reviews on cattle diseases and has a website and an e-mail forum (<http://www.hachaklait.org.il/english.asp>).

Since 1989 the CVO of the IVSAH requested the Chief Veterinarian of the "Hachaklait" to transmit the BSE situation in the world on an annual basis to its practitioners, and to emphasize the need for reporting and submission of neurological cases for BSE testing. During continuing education sessions, veterinarians were requested to emphasize to their clients (the farmers) the importance of early reporting regarding any cattle with neurological clinical signs. Clinicians visit each dairy farm at least once a week, and beef and feedlot herds about once a month, allowing for a close and valid farmer-veterinarian relationship. "Hachaklait" veterinarians are motivated to submit samples of sick or dead cattle to the KVI laboratories free of charge per submission, as the farmers pay a small all-inclusive Laboratory Insurance an-

nual fee. The single BSE case in Israel was submitted by a "Hachaklait" veterinarian subsequent to the appearance of neurological signs.

There is only one school for Veterinary Medicine in Israel, the Koret School in the Hebrew University of Jerusalem, and it holds close working relationships with the IVSAH, the KVI and the "Hachaklait". Various aspects of BSE are taught as part of the curriculum of the pathology and epidemiology regulatory medicine courses.

Articles on BSE were published in the local journals of the dairy cattle and beef cattle associations in Hebrew. Cattle practitioners as well as all slaughterhouse veterinarians have participated in BSE diagnostic workshops and are aware of transmissible spongiform encephalopathies, their epidemiology and symptomatology.

State and slaughterhouse veterinarians, cattle practitioners and members of cattle breeders associations were notified and updated by means of:

- 1) Articles and updates in the monthly Veterinary Bulletins (more than 400 items since December 1987);
- 2) Workshops and lectures, some of them with the participation of UK experts. In addition to these training sessions, several British video-taped clinical BSE cases were shown;
- 3) Circulars were distributed to the farmers through the cattle associations containing detailed descriptions of the epidemiology and signs of BSE. The circulars were published on the association websites to ensure that clinical cases could be recognized and reported;
- 4) During the reporting period (2004 – 2011), several articles on the BSE epidemiological situation in the world were published in the professional and farming press.

In addition to the above, in order to increase professional capability, two veterinary pathologists of the KVI were trained in diagnostic methods (histopathology and immunohistochemistry) for BSE in the early 1990's in the Central Veterinary Laboratory (CVL), Weybridge, UK. Technician in charge of the immunological laboratory for the examination of BSE attended a training course on 'Western blotting' in Switzerland. In 2011 an IVSAH veterinarian attended a BSE training course in the framework of European Commission "Better Training for Safer Food".

As a consequence of these activities, there is a widespread knowledge on BSE recognition, prophylaxis and monitoring in the veterinary and farming communities although the disease has been absent in Israel for the last 10 years.

The following persons have received training on a regular basis in the framework of the awareness programme through workshops, seminars and materials distributed.

- 1,000 managers of dairy farms
- 80 beef cattle farmers
- 200 feedlot farmers
- 65 cattle veterinary practitioners
- 70 governmental veterinarians and stock inspectors
- 18 veterinary inspectors at slaughterhouses

8. The questionnaire required information regarding a contingency plan.

Response: In 2001, the Contingency Plan was prepared by the Chief Veterinary Officer (CVO) of the IVSAH for operation in case of BSE detection and was successfully implemented in May 2002 when the first and only case was confirmed. Operation of the contingency plan is described below (see Section 10, BSE History of the Country).

9. Examination in an approved laboratory of brain or other tissues collected within the framework of the aforementioned surveillance system

Rationale: The OIE only recognizes for the purpose of this submission samples that have been tested in accordance with the Terrestrial Manual.

Response: Samples of cattle tissues from slaughterhouses all over the country have been examined for BSE by the approved laboratory in the KVI, the National Laboratory for BSE. The confirmatory methods used in the KVI are the histopathological, immunohistochemical and Western blot methods which are annually monitored by quality assessment laboratory inspections. In instances where inconclusive results are obtained in the rapid test, the brain sample is examined by the previously described confirmatory methods.

The diagnostic procedures and methods that have been used in previous years as follows:

1991-1996: Obex samples were examined for BSE histologically.

1997-2001: Obex samples were examined for BSE histologically and by immunohistochemistry.

2001-2003: Obex samples were examined for BSE using the Prionics Immunoblot.

2004-2006: Obex samples were examined for BSE using the Bio Rad rapid ELISA test.

2007-2012: Obex samples were examined for BSE by the rapid Prionics-Check PrioSTRIP test. The confirmatory method used is the Immuno-Blot Method (IBM).

From May 1st 2006 the Pathology and the BSE unit of the Virology Laboratory in the KVI work according to ISO/IEC 17025:2005 and according to SOPs accredited by an independent external body, the Israel Laboratory Accreditation Authority (ISRAC), which carries out audits annually.

10. Does the BSE surveillance program comply with the guidelines in Articles 11.5.20 to 11.5.22. of the Terrestrial Code? What were the results of the investigations?

Rationale: Point 4 of Article 11.5.2. and Articles 11.5.20. to 11.5.22. prescribes the number of cattle, by subpopulation, that need to be tested in order to ensure the detection of BSE at or above a minimal threshold prevalence.

Response: BSE surveillance in Israel involved all cattle over predefined age limits and not only subsets of the population. Since 1992 all clinical suspected cattle have been tested histologically, and from 1997 were confirmed by immunohistochemistry. Using this surveillance system, the sole case of BSE was diagnosed in May 2002. Since May 2002, fallen stock and cattle displaying behavioral or clinical neurological signs consistent with BSE (clinically suspect), and aged more than 24 months, have been tested for BSE using rapid tests, and if inconclusive, were subjected to additional testing by histology, immunohistochemistry and Western blotting.

According to the IVSAH CVO directive, since July 1st, 2002 and until March 2010, all cattle slaughtered above the age of 30 months were tested for BSE before being released for human consumption. From March 1st 2010, and in the light of scientific opinion and the European Commission Directives, all cattle slaughtered above the age of 48 months are tested for BSE.

The National Cattle Registration Database allows traceability of all cattle from date of birth, through the registration of any movement, slaughter or death. The age of each animal sampled is assessed by individual identification, as registered in the National Database, with a unique number, which is depicted on the metal ear tag and on an identification document for each head of cattle. All cattle sent to the slaughterhouse, categorized by age to be sampled, must have a permit to be transported to the slaughterhouse, issued,

before any movement, by the Regional Veterinary Officer. This permit indicates the need for BSE testing, so that the veterinary inspector at the slaughterhouse is informed about the mandatory sampling needed, before arrival of the animal. These permits are sent to the slaughterhouse through a shared computer network and software and are supported by a hard-copy permit. All cattle arriving at the slaughterhouse must be accompanied with their individual identification document, indicating their demographic data. In addition, at slaughterhouses a routine random check of dentition is performed by the veterinary inspector, and brains are sampled if needed.

In the event of suspect clinical cases, the farmer and the veterinarian are obliged to notify the Regional Veterinary Officer. After euthanasia or natural death, the head or the brainstem (obex) is sent to the KVI for examination. All animals are tested for rabies and those that are negative and older than 24 months are tested for BSE. All dead cattle (from day old to mature cows) are collected free of charge from the farm to a single incineration plant within 24 hours. In the early years farmers were motivated to send dead cattle to the incineration plant with compensation. Today they are still not charged for the incineration but are scrutinized and penalized if animals are buried on farm.

11. BSE History of the Country, Zone or Compartment

Rationale: The categorization of a country, zone or compartment in either “negligible” or “controlled” risk is dependent upon, the outcome of a risk assessment, compliance with the provisions described, the results of surveillance, and the history of BSE in the country, zone or compartment. This section provides the opportunity to describe the BSE history in the country, zone or compartment.

One case of BSE has been diagnosed in Israel. A 10 year old dairy cow (Delhi) from a kibbutz herd located on the Golan Heights, died on May 20th 2002 following a 2 day illness. The case report was published in the Israel Journal of Veterinary Medicine (11).

A 10 year old dairy cow from a kibbutz herd located on the Golan Heights, died on May 20th 2002. The cow had calved twins on May 15th 2002 that were subsequently euthanized. The cow, born on September 19th 1992, belonged to a dairy herd of 1,300 heifers and cows. The cow had been bought at the age of two years from another kibbutz

in the Jordan Valley (11). According to the opinion of the Scientific Steering Committee (SSC) of the EU, the plausible source for the BSE case was the importation of bovine MBM from 1986-1990, from five continental European countries, which are regarded in retrospect to have been “risk countries” during this period. This is the only case of BSE diagnosed in Israel.

An emergency report was sent to the Director General of the OIE on June 6th 2002, describing details of the case, and the measures taken to deal with it:

As a result the following steps were taken:

- An immediate ban was placed on both herds related to the affected cow (the original herd in a kibbutz in the Jordan Valley from which the cow was bought and the destination herd in a kibbutz in the Golan Heights).
- The cow had three living cohort mates (born within twelve months of the affected cow) in the herd of origin. They were euthanized and incinerated in 2002.
- The affected cow calved 8 times. All of her offspring either died or were euthanized:
 - (1) Male calf – born on September 7th, 1994 – died;
 - (2) Female calf – born on September 7th, 1995 – slaughtered before reproductive age;
 - (3) Female calf – born on December 26th, 1996, died on July 12th, 1997. the cow calved two male calves (on December 26th 1998 and on February 2nd 2000 respectively), and one female calf (born on March 10th 2001) – all died or were euthanized before reproductive age;
 - (4) Male calf – born on December 24th, 1997 – died ;
 - (5) Female calf – born on March 9th, 1999 – died before reproductive age;
 - (6) Female calf – born on April 28th, 2000 – euthanized after calving a stillborn male calf on April 16th, 2002;
 - (7) Female calf – born on May 30th, 2001 – died before reproductive age;
 - (8) Male and female twin calves – born on May 15th, 2002 – euthanized in 2002.

CONCLUSIONS AND FOLLOWUP

During the May 2014 at the 82nd General Session of the OIE and according to recommendation of the Scientific Committee, the status of “Negligible risk” was granted to

the State of Israel (Resolution No. 18). The list of 36 countries with the status of “reliable risk” also includes: Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Chile, Columbia, Croatia, Denmark, Estonia, Hungary, Iceland, India, Italy, Japan, Republic of Korea, Latvia, Luxembourg, Malta, Netherlands, Norway, Panama, Paraguay, Peru, Portugal, Romania, Singapore, Slovakia, Swede and the United States of America.

Seventeen countries have been recognized as having a “controlled BSE risk”: Canada, Chinese Taipei, Costa Rica, Cyprus, Czech Republic France, Germany, Greece, Ireland, Lichtenstein, Lithuania, Mexico, Nicaragua, Poland, Spain, Switzerland and the United Kingdom.

The “Negligible” status released Israel from export constraints applied to countries with a higher risk level. The importance of recognition of the BSE status in Israel as “Negligible” allowed release of control measures regarding testing healthy slaughtered animals, SRM removal, collecting and destruction as introduced in 2002. This lowered the annual direct spending of the IVSAH for BSE control by about two million USD, minimized operation cost of slaughter houses and losses to farmers associated with SRM destruction.

In retrospect, and in view of the increased BSE contamination of MMBM recorded in Europe during the 90's, the early discontinued imports of this commodity and of domestic recycling appear to have been crucial in protecting Israel's national cattle herd and minimizing BSE infection to a single elderly cow.

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REFERENCES

1. Londhe, M.S., Mahajan, N.K., Gupta, R.P. and Londhe, R.M.: Review on prion disease in animals with emphasis to bovine spongiform encephalopathy. *Vet. World.* 5:443-448.
2. Wells, G.A., Scott, A.C., Johnson, C.T., Gunning, R.F., Hancock, R.D., Jeffrey M., Dawson, M. and Bradley, R.: A novel progressive spongiform encephalopathy in cattle. *Vet. Rec.* 121: 419-420, 1987.
3. Phillips Report (2000). The BSE Inquiry: The Report. The inquiry into BSE and variant CJD in the United Kingdom, London: UK government. Volume 3 (6:18), URL: <http://collections.europarchive.org/tna/20090505194948/http://bseinquiry.gov.uk/report/volume3/chaptee5.htm#6745> (accessed 10 Sep 2014).
4. Chen, C.C., Wand, Y.H. and Wu, K.Y.: Consumption of bovine spongiform contaminated beef and the risk of variant Creutzfeldt-Jakob disease. *Risk Analysis.* 13, 1985-1968.
5. Leibovitz, D., Zamir, I., Polychuck, and Kahana, E.: Human Transmissible Spongiform Encephalopathies. *Harefuah.* 142:70-73, 2003.
6. Nitzan-Kaluski, D. and Leventhal, A.: Bovine spongiform encephalopathy in Israel: implications for human health. *Isr. Med. Assoc. J.* 5:662-665, 2003.
7. Shimshony, A.: Epidemiology of Emerging Zoonoses in Israel: Israel's Measures to Prevent the Introduction of BSE. *Emerg. Infect. Dis.* 3: 236-237, 1997. Available from <<http://wwwnc.cdc.gov/eid/article/3/2/97-0221>> (accessed 11 Sep 2014)
8. Shimshony, A.: BSE in Israel: A retrospective appraisal. *Isr. J. Vet. Med.* 59: 5-6. 2004.
9. OIE Terrestrial Animal Health Code. Bovine Spongiform Encephalopathy. Article 11.4.1. Chapter 2.4.6. 7th Edition, 2012.
10. Perl, S., Zacharin, I., Shicaht, N., Lichawski, D., Israeli, O., Ben Said, S. and Orgad, U.: BSE survey in Israel and the current status in Western Europe. *Isr. J. Vet. Med.* 55: 55-58, 2000.
11. Perl, S., Edery, N., Shichat, N., Meirom, R., Lubashevsky, G., Lahav, D., Hammerschlag, J., Alpert, N. and Yakobson, B.: BSE – first documented case in Israel and current status in other countries. *Isr. J. Vet. Med.* 58: 62-67, 2003.