A Brief History of Rinderpest in Palestine-Israel

Friedgut, O.
Virology Department, Kimron Veterinary Institute. Beit Dagan, 50250 Israel

ABSTRACT

This review presents a brief history of rinderpest in Palestine-Israel from 1894 to 1983. The first available reports of rinderpest outbreaks in Palestine-Israel date back to 1894 in Rishon LeZion and 1895 in Mikveh Yisrael. Subsequent outbreaks occurred in 1903, 1913, 1915, and 1926-27. The wide-spread outbreak of 1926-27 occurred first in the Tiberias, Nablus and Ramleh Districts, attributed to the introduction of cattle from the Damascus area. Fifty-five years later, a limited and last outbreak started during the first week of 1983 near the Lebanese border, northern Israel, followed by 8 additional outbreaks in grazing beef-cattle herds in northern Israel and one in the West Bank. The eradication of the epizootic, by stamping-out, animal movement restrictions and general vaccination was accomplished by August 1983. Vaccination of cattle with a rinderpest vaccine was discontinued in Israel in 1989 and of sheep/goats (vaccinated to prevent Peste des Petits Ruminants (PPR) in 2006. Following the accomplishment of a methodical serosurvey of cattle in 2009-2010, Israel was officially listed by OIE (World Organization of Animal Health) in 2010 as rinderpest-free. A collective FAO-OIE declaration on the global eradication of rinderpest was adopted by both organizations on 25 May and 28 June 2011, respectively.

INTRODUCTION

Rinderpest also known as cattle plague is an acute, highly contagious, viral disease of cattle, domesticated buffalo and some species of wildlife. The classical form of rinderpest is one of the most lethal diseases of cattle, and can have a catastrophic effect on naïve herds. Rinderpest results from infection by rinderpest virus, a member of the genus Morbillivirus of the family *Paramyxoviridae*. There is just one serotype of this virus, but three genetically distinct lineages have been identified. In the past, these lineages were found associated with different geographic areas.

Based upon recent molecular investigations, it has been concluded that the rinderpest virus has been in existence since about 1000 CE (AD), probably originating in the Indian sub-continent. At one time, epidemics of rinderpest occurred regularly in Eurasia. Its devastating impact in Europe was one of the main reasons for the establishment of the first veterinary schools in Europe during the 18th century.

In 1889, cattle shipped from India carried the rinderpest virus to Africa, causing an epidemic that established the virus on the continent. Initially approximately 90% of the cattle in sub-Saharan Africa, wild buffalo, giraffe and wildebeest populations were decimated. The loss of plow animals, herds and hunting resulted in mass starvation, killing a third of the human population in Ethiopia and two-thirds of the Maasai people of Tanzania. The reduction in the number of grazing animals also allowed thickets to form in grasslands. These thickets provided breeding grounds for tsetse flies, resulting in an outbreak of sleeping sickness in humans. Some consider this epidemic to have been the most catastrophic natural disaster ever to have affected Africa.

Although the rinderpest virus was eradicated from Europe early in the 20th century, epidemics continued to occur in sub-Saharan Africa and many parts of Asia, including the Middle-East, where the last epizootics were recorded during the last decade of the 20th century (Iran, 1994; UAE & Yemen, 1995; Turkey, 1996; Saudi Arabia, 1997). In areas where it persisted, rinderpest became the main constraint to livestock production.

OUTBREAKS OF RINDERPEST IN PALESTINE/ISRAEL FROM OTTOMAN TIMES

There are reports of rinderpest outbreaks in 1894 in Rishon LeZion and in 1895 in Mikveh Yisrael. Subsequent outbreaks occurred in 1903, 1913, 1915, and 1926-27. The last occurrence of rinderpest in Israel was documented in 1983.

Veterinarians were sparse in Palestine and the Turkish authorities did not appear to be concerned by the disease until the herds of Sultan Abdul El Hamid were infected. Dr. Tufek Bey, a Turkish veterinarian, was sent to Palestine following the outbreak of 1903. Efforts to contain the epizootic, apparently introduced from Damascus or Turkey, had to be enhanced. To do that, Dr. Yosef Shem-Tov (a graduate of Istanbul Veterinary Medical School) was recruited in 1904 to investigate and control the disease. The measures, available at that time to control rinderpest, were a combination of animal movement restrictions (quarantine) and the application of rinderpest immune serum (based upon the discovery of Semmer in Russia that serum taken from a recovered animal had protective powers; it was also realized that the serum had also curative potential). Between 1904 and 1915 the application of the immune serum was taken care of by a few government and private veterinarians present during this period in Palestine (see also the historical review elsewhere in this issue).

The following are abstracts from the annual reports of the Palestine Department of Agriculture, Forests and Fisheries. In 1925, E.R. Sawer stated that the prevalence of rinderpest or cattle plague in Syria, Asia Minor and Southern Russia led to the prohibition of the importation of cattle from all ports of Asia Minor and Syria, except Beirut, in March and from Russian ports in September 1925, while restrictions were still in force. In view of the occurrence of this disease in Iraq, and as an additional precaution to enforce veterinary examinations, all cattle entering Palestine were examined by inland quarantine stations and registered in order to facilitate the establishment of their origin should a local outbreak occur.

On 29th July 1926 an outbreak of rinderpest was recorded simultaneously in villages in the Tiberias, Nablus and Ramleh Districts. The infection was attributed to an epidemic of rinderpest in the Damascus area of which no report had been received in time to permit precautionary measures. From these first widely distributed foci of infection the disease spread to 39 villages before measures of control could become completely effective. In the Nablus district only, where 15 villages were infected, the disease assumed an epidemic proportion and at only one centre, Arah in the Haifa District, mortality assumed a serious extent. Out of a herd of 682 animals, 22 died and 73 were destroyed as a preventive measure. The total number of cattle subjected to infection in the 39 villages was 8,382 of these 113 (1.35%) died, and 226 (2.69%) were destroyed all showing symptoms before inoculation of the herds with serum could be completed. The total initial loss was consequently 339 head, 4% of the population.

After a first application of immune serum to the surviving 8,034 head, 40 additional deaths and 40 preventive destructions were reported, making additional mortality of 80 head, or 0.98%. A second application was completely effective and was followed by no further deaths or euthanasias. In the absence of further outbreaks, the final loss was 419 head, or 5% of the cattle subjected to infection. No further centers of infection and no additional cases were reported since the 15th of September 1926, when notices declaring areas to be infected had been withdrawn. It was possible to state at the time that the disease had been, at least temporarily, controlled.

The situation, however, in Syria and the Lebanon where the disease was still spreading constituted a grave threat of re-introduction from the north. Control in these countries has not been effective to the extent that even the use of serum was prohibited by the Government of the Lebanon. Special measures on the northern frontier were consequently taken to minimize the evasion of quarantine regulations and to ensure immediate reports of new outbreaks on the border. The co-operation of Syria and Lebanon in a general campaign for the suppression of plague was invited.

Palestine Department of Agriculture, Forests and Fisheries annual report for 1926 reported that the epidemic of rinderpest which broke out on the 29th of July, had ended on the 15th of September, 1926. A fresh outbreak, however, occurred towards the end of that year as a result of illicit introductions of infected cattle from Syria. The disease reappeared simultaneously on the 20th of December, 1926, in the villages of Bath-Shlomo in the Haifa Sub-District, and Abadiyeh and Samakh in the Tiberias Sub-District, and was later confirmed at Yavniel on the 28th of January 1927.

The procedure for dealing with the fresh outbreaks was the same as that adopted after the original outbreak: All severely affected cattle were slaughtered while those exhibiting a temperature exceeding 39.5°C were inoculated with rinderpest serum. The four infected centers and adjacent villages within a radius of 15 kilometers were declared infected area and placed under strict supervision and control. No fresh outbreaks were reported from other parts of the country and the general restrictions were withdrawn on the 18th of January 1927. No further cases occurred at Yavniel, the remaining affected centre and this village was declared to be no longer infected on the 16th of March 1927. The total number of cattle involved in these outbreaks was 1,491; there were 19 deaths and 66 preventive destructions, representing a mortality of 5.7%.

Outbreaks of rinderpest were reported in neighboring countries in 1969-1970. As a result preventive vaccination was carried out of animals along the northern frontier of Israel, which was discontinued in 1975. The vaccine applied was the live attenuated rinderpest tissue-culture vaccine based upon the Plowright vaccine strain (RBOK), initially introduced by Plowright and Ferris in 1962 (Plowright vaccine).

In March 1982, there were reports from Iran and Saudi-Arabia (KSA) concerning outbreaks of rinderpest. When this information was received in Israel, it was decided to prophylactically vaccinate cattle along northern and eastern borders (Golan, Upper Galilee, West Bank), applying the successful Plowright vaccine. During later months, the disease was reported to have spread to other countries within the region, including Egypt, Oman, Kuwait, Yemen, United Arab Emirates and Sudan.

During the first week of the 'Lebanese war' which started 6 June 1982, Israeli army officers were told by Lebanese farmers near the Qaraoun lake (part of the Litani river system, south Al Biqa valley) about suspected cases of rinderpest (the Arab vernacular term is 'Taoun'). This was clinically confirmed by Israeli State veterinarians who were sent to check the complaint. They were told by the local population that the disease arrived with buffaloes transported by land (trucks) from Pakistan. Obviously this piece of information could not be verified; in the absence of an alternative one, and in view of the fact that local importers were indeed known to seek economically-attractive sources wherever available, without veterinary restrictions during this politically unstable period, the said information on the Pakistani source of infection remained 'suspected but unconfirmed'. It was decided to carry out general preventive rinderpest vaccination throughout Israel and to supply vaccine to the veterinary services in the "South Lebanon Region" (at that time under Israeli control). During the following months, the disease continued its spread in Lebanon.

On Monday, 30 August 1982, authorized representatives of Israel's veterinary services met their Lebanese counterparts, discussed the situation and coordinated control measures. Following a formal request, the Israeli Veterinary Services agreed to contribute to their Lebanese counterparts, who were at that time technically qualified in their international contacts and air transport, a considerable quantity of rinderpest vaccine. This was applied by the Lebanese in the region situated north to the "South Lebanon Region" where vaccinations had already been carried out (A. Shimshony, personal communication).

In November 1982, the Lebanese State Veterinary Services officially notified the presence of rinderpest in the Al Biqa area and the districts of Sayda and Sur (Tyre) on the Mediterranean coast, reporting about 2000 dead cattle. In December 1982, 13 outbreaks were reported from 9 villages in south Lebanon, bordering Israel. Though general vaccination of cattle had already been applied in Israel by then (including Golan and the West Bank), during the first semester of 1983 the disease penetrated northern Israel by direct contacts with Lebanese cattle (in two unfenced/open locations along the frontier), affecting a total of 9 herds of which 6 were found not to had been vaccinated (with 70-95% mortality) and 3 with partial vaccination (of which 2 herds had 6% mortality and one herd had 16% mortality). All affected units were grazing beef herds; no case was seen in dairy cattle. There was also one outbreak in the West Bank. The last outbreak occurred in August 1983. The disease was eventually eradicated by stamping out, modified stamping out, animal movement restrictions and general vaccination and applying the Plowright vaccine.

During the years 1984-1988, limited numbers of grazing beef cattle herds along the frontiers were re-vaccinated. Cattle vaccination in Israel was eventually totally discontinued since 1989.

In January 1993, Peste des Petits Ruminants (PPR), a

disease in sheep and goats caused by a morbillivirus closely related to rinderpest, was diagnosed in Israel for the first time. It affected 4 dairy sheep operations in one village in the north, (Tiberias district), and was probably introduced by illegal movement of infected animals from Lebanon. The disease spread to a second location in northern Israel and to flocks in the West Bank. It was decided to carry out mass vaccinations of small ruminants in Israel and the West Bank. Between 1993 and 2005, the vaccine applied for this vaccination was the live attenuated tissue-culture ("Plowright") rinderpest vaccine. According to OIE Animal Health Code requirements, the application of such vaccine did not allow declaring Israel as officially free of rinderpest, in spite the fact that the vaccine was applied in small ruminants and not in cattle.

Since March 2006, Israel replaced the heterologous rinderpest tissue culture vaccine (Plowright rinderpest vaccine), applied since 1993 for the mass vaccination of small ruminants against PPR, by the live attenuated homologous PPR virus vaccine, which had become commercially available during the late 1990's. This change was followed immediately by a significant improvement of the PPR situation, expressed in the absence of clinical PPR in Israel since February 2006. In addition, the change facilitated the conditions allowing completing the steps needed for the recognition of Israel as rinderpest-free.

Following the accomplishment of a methodical serosurvey of cattle during 2009-2010, in line with OIE's detailed requirements, in 2010 Israel was eventually listed as officially rinderpest-free.

A common OIE-FAO declaration on the finally accomplished global eradication of Rinderpest was adopted by both organizations on 25 May and 28 June 2011, respectively. Rinderpest has become the world's first animal disease officially declared eradicated from earth (Smallpox, a human viral disease, had been declared as eradicated in 1979 by the World Health Organization, WHO). Both diseases were mainly eradicated following successful mass vaccinations and coordinated international efforts.

REFERENCES

1. Abraham, A., Lebel, E. and Davidson, M.: Virological and serological investigations of rinderpest in Israel. Refuah Vet., 41, 112-121, 1984.
2. Gray Book, APHIS, USDA.
3. Israel Animal Health Services – Annual reports 1982, 1983.
4. Meltzer, D.: The History of Veterinary Medicine in Israel during the Last Phase of Ottoman Period (1870-1917). Dissertation for the degree of Doctor of Veterinary Medicine. Koret School of Veterinary Medicine. The Hebrew University of Jerusalem, 1995.
5. Neriah, A.: Veterinary Medicine in Eretz-Israel – Fifty years of veterinary Medicine (1917-1967). Published by the Cattle Breeders Association, 2001.
6. OIE and FAO publications.
7. Palestine Department of Agriculture Forests and Fisheries – annual reports 1925, 1926, 1927-1930.
8. Veterinary Medicine – An Illustrated History, Dunlop and Williams, 1996.