Bluetongue in Israel – a brief historical overview

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Summary

Bluetongue (BT) was first observed in Israel in 1944. The author presents a brief history of BT in Israel and of selected topics which might be useful for the planning of control and prevention policies in newly affected areas within the Mediterranean Basin. Systematic epidemiological, virological and entomological monitoring has been ongoing in Israel since 1964. BT virus serotypes 2, 4, 6, 10 and 16 have been identified. The seasonality of the disease, susceptibility of selected sheep breeds, resistance of goats and of native sheep breeds, high seroconversion rate (combined with the absence of clinical signs or affected fertility) in bovines and the impact of vaccination with live-attenuated vaccines on pregnant sheep are presented and discussed.

Keywords

Bluetongue – Culicoides – History – Israel– Virus.

History

Some authors believe that bluetongue (BT) existed in the Middle East as early as 1924 (5, 9). Initially, the disease was clinically suspected in sheep in Israel in 1943/1944, affecting some 20 flocks in northern districts, with morbidity ranging from 2-55% (mean <10%) and mortality 1-8%. At about the same time, cases were reportedly suspected in Cyprus (severe), Turkey and Syria. There was no laboratory involvement in the said suspected outbreak in Israel (8). Between September and November 1950, sporadic, moderate clinical cases were reported in northern Israel by Komarov-Kimron and Goldsmit (10) in cattle (68 foci); they reported more severe cases in sheep (16 foci). A BT virus (BTV) was isolated by them and later identified at Onderstepoort by Howell as BTV-4. The affected cattle were reportedly of European and North American origin, imported several months previously. The sheep most severely affected were Sardinian, imported into Israel in October 1949. Local sheep breeds were much less affected (10).

In the summer of 1963, BT was suspected, in two sites (north and south Israel), in German mutton Merino sheep, imported into Israel one to two years previously. No virological laboratory investigations were conducted but, based upon detailed recorded clinical and post-mortem observations, these outbreaks may, with certainty, be retrospectively attributed to BTV. The following year, 1964, a major outbreak, characterised by typical BT symptoms, was recorded in northern Israel, affecting a population of approximately 12,000 sheep of the exotic (European) breeds and their crosses, in 47 villages. The reported morbidity was 20.5% and the case-fatality rate 31.4%. The outbreak began at the end of June and died out in December. The highest losses were encountered in the Taanach area (Valley of Yezreel), where – in 7 villages with 134 small flocks of German mutton Merino sheep, imported two to three years previously from Germany – a morbidity rate of 39.5% and case-fatality rate of 45.6% were recorded (11). Typically, no cases in lambs younger than four months and no clinical cases in cattle were recorded. BTV-4 was isolated and identified by the Kimron Veterinary Institute (KVI), and later confirmed by the Onderstepoort Laboratory. The KVI developed the intravenous embryonated egg technique for BTV isolation and identification (6, 7) later to become the international method of choice.

Since 1964, BT has been identified and reported in Israel each year, either following virus isolations from sampled clinical cases in unvaccinated sheep of susceptible breeds, or by serological tests in cattle without clinical signs of disease. Only laboratory-confirmed cases are published.

Brief summary of selected observations, 1964-1998

BTV appears throughout Israel each year, from July to December, except in the southern Arava (arid)
region. Single exceptional cases have been recorded in January and June.

The geographical distribution has been investigated, based mainly on serological surveillance in young sentinel cattle in various regions, sampled in June and December. This surveillance had been operational since 1980 but was discontinued after 1995.

The incidence of clinical disease depends also upon man-related factors such as vaccination rates and the presence of susceptible breeds. Therefore, the incidence of clinical cases in sheep is unrelated to the prevalence of the virus in a given year. It varies from year to year, averaging 13 to 14 cases per annum. Throughout the period from 1968 to 1998, a total of 413 (laboratory confirmed) outbreaks were reported. Only in 1980 and 1981 was not a single clinical case reported in sheep (though bovines did seroconvert during these years).

Observations from 1980 to 1985 showed a good correlation between the BTV serotypes from cattle (serology), sheep (isolations from clinical cases) and Culicoides (isolation) (13).

The disease may be observed in cattle. Such cases seem to be extremely rare, involving 6- to 12-month-old dairy animals but with very mild symptoms (elevated temperature, hyperaemia with slight necrosis of the oral papillae, coronitis).

Five serotypes of BTV have been identified to occur in Israel (first year of identification in brackets): BTV-4 (1950), BTV-10 (1965), BTV-16 (1966), BTV-6 (1972), and BTV-2 (1973). Since 1973, no new serotypes have been added to the list. The most prevalent is BTV-4 (13).

Typically, in most years only one serotype has been encountered in clinically affected sheep and in seroconverted cattle, although there have been years when several or all five serotypes were identified in field samples. This has led to the view that new introductions of infected vectors from elsewhere might be involved in the epidemiology of the disease in Israel in certain years.

Regular vaccination against BT was not practised in Israel until 1964, when a polyvalent (serotypes 1 to 14) South African live-attenuated vaccine was applied. Over 50% of the vaccine was used in infected flocks; it was claimed that the spread of the disease was generally halted eight days post vaccination.

In May 1965, a monovalent, live-attenuated BTV-4 vaccine (prepared in liquid form from seed material obtained from Onderstepoort) was used. Some months later, cases in unvaccinated sheep were observed, from which BTV-10 was isolated and identified. Consequently, the use of the polyvalent Onderstepoort vaccine was resumed; this was discontinued in 1974. Since then, a quadrivalent, live-attenuated vaccine (serotypes 2, 4, 6, 10), obtained from Onderstepoort has been in use annually to vaccinate sheep of exotic, susceptible breeds. No local Awassi sheep, goats or cattle have been included in the vaccination scheme.

In 1965/1966, pregnant Merino sheep imported from Germany were vaccinated upon arrival with the polyvalent vaccine. Breeders of the imported sheep complained about their reduced lambing rate. Based upon the results of an experimental vaccination trial in 1968/1969 (in susceptible young Merino ewe-lambs imported for this purpose from Germany), it was concluded that primary vaccinations of susceptible sheep during the first half of pregnancy could cause foetal death (up to 40%), though no central nervous system damage or malformations were observed in their offspring. No such deleterious effect was observed following revaccination of the same animals during the same stages (6th week) of their subsequent pregnancy. Consequently, primiparous are not vaccinated in Israel during pregnancy (12).

In another observation, it was concluded that (naturally acquired) viraemia of pregnant young dairy cattle, caused by BTV-4 and/or BTV-16, did not affect their foetuses. It should be said that in spite of a seroconversion rate, which may exceed 80% in the cattle of certain districts during certain years, BTV has never been correlated with fertility problems in Israeli cattle (4).

Although identified in Israel since 1966, BTV-16 was initially not included in the vaccine, because an attenuation of this serotype was not performed at Onderstepoort at the time. In addition, no involvement of this serotype was recorded in sheep between 1974 and 1992 (though it was identified serologically in healthy, seroconverted cattle in central-southern Israel, e.g. in 1982). However, during 1993, BTV-16 was found to be involved in serious outbreaks in sheep, including, in several cases, local Awassi sheep, usually regarded as refractile to clinical BT. During 1994, this phenomenon was repeated, with a larger number of outbreaks, some of them involving sheep vaccinated with the standard quadrivalent vaccine. Subsequently, the Onderstepoort laboratory kindly agreed to attenuate BTV-16 in order to include it in the vaccine. The attenuated vaccine strain was initially put to use in 1995. At present, a pentavalent

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(serotypes 2, 4, 6, 10 and 16) vaccine is applied annually on a voluntary basis in susceptible, non-pregnant sheep but the number of vaccinated animals is rather small: between 2000 and 2002, only 4 000-5 000 per year. As previously stated, other species have never been vaccinated in Israel.

Experimental infection trials have been performed in Israel in goats and gazelles, in addition to serological/virological surveillance in the said animals and in ibex (2, 3). Entomological surveillance is in progress.

References


