

ORBIVIRAL DISEASES OF RUMINANTS IN ISRAEL - 2006 TO 2009

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Epizootic Hemorrhagic Disease (EHD) was recorded for the first time in Israeli cattle on 29 September, 2006 (1). EHD virus is a member of the *Orbivirus* family which is transmitted in this part of the Middle East by *Culicoides* spp midges. The second incident occurred in 2007 when several animals were identified as infected with EHDV. In October 2007, bluetongue virus (BTV) type 4 was isolated from clinically affected dairy cow on kibbutz Sde Eliyahu. The isolate was identified retrospectively at an OIE reference laboratory (authors' communication). This represented the first laboratory evidence for the presence of BTV in Israeli cattle presenting clinical signs. The current outbreak of BTV has affected many species of ruminants native to Israel with the exception of camelidae (no reports)

The object of this communication is to resolve the present epidemiological dilemma based on our experience of BTV up to November 2008. The situation is confused by the multiplicity of research workers and field veterinarians (see list of signatories of this letter), and who assisted in unraveling the new epidemiological situation that arose when BT was diagnosed in the dairy herd of the kibbutz Kfar Rosh Hanikra (2). The outbreak had started at the end of August 2008 and was paralleled by outbreaks of BT in sheep flocks throughout Israel. At the time of writing a total of 17 BTV isolates have been made from sheep and 17 from dairy herds.

Our epidemiological approach to BT, its causal agent, and the principal vector was based on the following considerations:

Cattle

1. Most Israeli cattle have been exposed to five endemic BTV types: 2,4,6,10,16 (1).
2. The possibility of clinical BT affecting Israeli cattle is low.
3. Absence of BT disease is a consequence of item 1, including the assumption that Israeli cattle are BTV-resistant.

1. Sheep

1. Most Israeli flocks are exposed to endemic BTV types: 2,4,6,10,16 (1).
2. BTV type 4 is not pathogenic for sheep.
3. Breeds of sheep in Israel are generally resistant to most BTV types.
4. Based on item 3, the low number of sporadic outbreaks in sheep supports the proposition that BT is not an economic problem for this species.

Other considerations

1. The Negev and the Arava regions are arboviral disease-free
2. BT occurs seasonally with a peak at end of summer and in the fall (3).
3. The present logistic deployment (Israel Veterinary Services- IVS) is sufficient to deal with any possible outbreak of BT.
4. The stocks of vaccine held by IVS are no more than 5,000 doses against BTV types 10 and 14. The vaccine is supplied to stock owners on request. These stocks are regarded as sufficient in an emergency.
5. In the past, a veterinary officer of the IVS specialized in sheep diseases.

Recent changes and lessons learnt

Cattle

1. Even if the cattle were exposed to endemic types 2,4,6,10,16, there are still animals that become sick with types 4 and 16. It is not known whether these animals were previously uninfected.
2. In the light of recent events in Israel and Europe, the scenario of the low chances of cattle becoming infected clinically with BTV is no longer relevant. In Israel the cattle are now exposed to "classic" strains 4 and 16, and the "new" strains, 8 and 24 (2).

Sheep

1. The epidemiological picture has changed with the emergence of three new types: 15 (appeared in 2006), 8 and 24 (1,2).
2. BTV type 4 is pathogenic for sheep and at least one flock has experienced high morbidity and mortality (2).
3. Apparently most of the local breeds are susceptible to BTV strains 8, 15 and 24 that are highly pathogenic for flocks (2).
4. Epidemiological surveys show that the attack rate reaches 40-50% with a case mortality rate of 30% and more. These figures represent an economic danger for the intensively farmed Jewish-owned flocks, and are paralleled by the emerging epizootic in some European countries.

Other considerations

1. In Europe new diagnostic tests and preventive measures have been adopted on a continental basis (4,5,6,7,8).
2. The Negev is no longer considered free of arboviral diseases. For example, in 2002/3, an outbreak of

blindness in calves caused by Akabane virus occurred in the southern Arava. The virus is transmitted by *Culicoides* spp. midges which can also transmit BTV. Thus the appearance of BTV in sheep at Ein Hatzevah (ongoing outbreak) and the Hai Bar Nature Reserve at Yotvetah (12.08) is evidence of the change in disease-free status.

3. The new situation needs to be evaluated by the IVS and particularly by the clinicians working with the animal population.
4. 5,000 doses of vaccine for types 4 and 14 would not appear to be insufficient. The reserves should be increased and the new types must be taken in consideration. The entire population of ruminants in Israel is now at risk.
5. One sheep veterinarian working for the IVS *ex officio* is not enough in the new situation
6. Arboviral diseases are seasonal because of their hematophagous vectors (3); thus, the global warming trend needs to be considered. Each month of 2008/9 has yielded a new viral isolate, and the new situation is taking on an "emerging disease" presentation.

We admit at not being responsive enough to the BTV-like syndrome of ruminants that was present in 2000 through 2007 with the exception of one costly outbreak at Yahini village in sheep in 2006 (1). The clinical signs were "typical" and the outbreak was attributed to type 15 which was previously unrecognized in Israel. Clinical outbreaks **in cattle** associated with BTV were never associated with BTV before 2007.

The new strategy for BTV control should consider a number of the biological properties of the virus that affect its epidemiology such as:

1. Type 8 isolates are unlikely to cause pathological changes in the fetus. This developmental form can develop immunological tolerance to the virus which may not be detected serologically for lack of an immune response (9,10,11,12). This phenomenon is encountered in embryos exposed *in utero* to Pestiviruses.
2. In exposed animals BTV colonizes the $\gamma\delta$ T cells of the dermis of hosts that are convalescent and not viremic. In such animals BT cannot be detected by conventional means. This may be the form by which the virus over-winters and is inter-epizootic (12).

There is no consensus of opinion on these topics among the signatories of this communication. But because of the gravity of the situation, a new approach should be adopted without delay; many of these observations require experimental support, changes in regulatory and statutory requirements and the need for new vaccines. The list of signatories represents an imbalance between the number of laboratory/research personnel and the number of clinicians (only three signatories). This implies that more field staff should be involved directly which is

not an easy task. There is some distrust stemming from the inability to recognize the clinical syndrome and to diagnose the disease in cattle and to some extent in sheep on the farm. Surprisingly, not all the clinical signs of disease are recorded, especially for the bovine. This should not prevent us for making a concerted effort to combat emerging BTV disease.

All this holds true for other arboviral diseases that appear in Israel, e.g., bovine ephemeral fever, Simbu (Akabane and Aino viruses) in ruminants. For instance, Akabane virus has been diagnosed in sheep, a situation unknown since the 1969/70 outbreak and both Akabane and BTV are now recognized in the same host (authors' communication).

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