

# Observations on the Epidemiology of Bluetongue Virus Infections in the Caribbean and Florida

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## Introduction

The serological recognition of bluetongue virus infections of livestock in Brazil in 1978 (1) was the first published confirmation that the virus infected livestock in the neotropics. The importation of cattle and water buffalo in 1980/81 into the USA via the H.S. Truman Quarantine Station at Fleming Key, Key West, Florida, and a serological survey of cattle in Puerto Rico and the US Virgin Islands, led to the recognition that other countries in the region had infected livestock (2, 3).

Setting aside the attendant problems in regulating international trade and movement of germ plasm of domestic ruminants (4), these events have drawn attention to the limited information available on the epidemiology of bluetongue in the neotropical region of the Western Hemisphere. To our knowledge, however, no clinical disease caused by bluetongue virus has been reported in the region.

This paper reviews recent research on the epidemiology of bluetongue in South Florida and the Caribbean.\*

*Prevalence of Bluetongue Infections in Livestock (as assessed by the bluetongue immunodiffusion (BTID) test (5)).*

As a result of the first regional meeting of the Directors of Animal Health of the Antilles zone (includes Guyana and Surinam) held in Barbados in 1981 under the sponsorship of the InterAmerican Institute for Cooperation in Agriculture (IICA), a serological survey of 9 countries in the zone was completed in 1982. Six thousand two hundred and fifty sera, collected from cattle, sheep and goats, were tested in

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*\*South Florida is ecologically similar to the neotropics and differs significantly from the nearctic ecology of North Florida and the other contiguous states of the USA. Studying bluetongue in Florida offers the opportunity to examine the epidemiology of the virus at the interface of two ecological zones.*

Barbados. A summary of this survey, details of which have been published (6), is presented in Table 1 together with additional data for the Bahamas.

These data indicate that infection with bluetongue virus—or closely related viruses that cross react in the BTID test—is widespread in this region and that the prevalence is similar to that reported previously for Florida, Puerto Rico and the U.S. Virgin Islands (2, 7).

### *Seasonal Incidence of Bluetongue Infections*

In the absence of clinical disease associated with bluetongue virus infections in Florida and the Caribbean, a sentinel system of cattle herds and sheep flocks was established, between 1981 and 1982, to investigate the seasonal transmission of the virus (7-9). This system has been based on 8 cattle herds (Florida-4, Puerto Rico-3, Trinidad-1) and 3 sheep flocks (Barbados-2, Tobago-1). All sentinel animals (20 per location) have been monitored monthly for seroconversion. Only in Florida has it been possible, to date, to examine sentinels for viruses. Some of the herds in Florida, of which the sentinels are a part, have been bled annually since 1980.

This system has identified that livestock in the Caribbean are generally infected between mid-summer and late fall (9). In Florida, it is recognized that most cattle seroconvert also in late summer and fall; however, it now appears though populations of *Culicoides* species, considered vectors or possible vectors, are similar to other years (7).

### *Identification of Bluetongue Virus Serotypes*

There are several methods available for field survey work to establish the identity of bluetongue virus types active in a given area. The most accurate way is to isolate viruses, but there are currently no veterinary laboratories in the anglophone countries of the Caribbean with facilities for isolation of bluetongue viruses, either from ruminants or arthropod vectors.

At the start of these studies it was recognized that in the absence of any perceived clinical problems, it was unreasonable to expect international laboratories to commit

TABLE 1. Serological Survey for Antibody to Bluetongue Virus in Cattle, Sheep and Goats in Caribbean Region\*.

Country	Number with Antibody Number Tested	Percentage with Antibody
1. Jamaica	823/1075	77
2. St. Kitts/Nevis	331/475	70
3. Antigua	326/425	77
4. St. Lucia	161/197	82
5. Barbados	520/831	63
6. Grenada	189/216	88
7. Trinidad and Tobago	850/1071	79
8. Guyana	701/1361	52
9. Surinam	500/596	84
10. Bahamas (Andros, Grand Bahama, New Providence)	66/85	78

\*Modified from Gibbs et al (1983a) by permission of Veterinary Record.

time and expense to look for bluetongue virus in large numbers of routine samples from sentinel animals. Thus, until bluetongue viruses are available from the Caribbean, serological studies involving the detection of neutralizing antibody in the sera of recently infected sentinel animals have been used as an indicator to the serotypes active in this region.

This approach, which has also been broadened to examine sera from populations of yearling animals when sentinels are not available (12). From the examination of 244 sera, most of which were collected in 1982 from cattle, sheep and goats in 7 countries of the Caribbean, it was concluded that bluetongue virus types 6, 14 and 17 were active in the majority of the countries during 1981-82 (Table 2).

TABLE 2. Serological survey of cattle, sheep and goats in the Caribbean Region and countries of South America for antibody to different serotypes of bluetongue virus\*.

Country**	Number of Sera Examined	Antibody Clusters To Bluetongue Virus Types
Jamaica	19	6,14,17
Antigua	26	6,12,14,17
Barbados	35	1,6
Grenada	39	6,14,17
Trinidad and Tobago	73	6,14,17
Guyana	23	14,17
Surinam	29	6,14,17

\*Abstracted from Gumm et al (1984) by permission of Veterinary Record.

\*\*Listed by latitude from north to south.

The difficulties in interpreting the epidemiological significance of data generated by this method have been discussed in detail by others (10, 11). While the conclusions drawn from such surveys should be considered indicative of the serotypes active in an area rather than definitive proof, their predictive value should not be underestimated.

This was illustrated by recent events in Florida. Examination of sera, collected in 1982 from one of the sentinel herds in Florida, against 21 serotypes of bluetongue virus indicated that bluetongue virus type 2 had caused previous infection. Initial attempts, at the time of collection of the samples, to isolate virus had been unsuccessful, but a re-appraisal of the techniques used led to the identification of bluetongue virus type 2—the first time this virus has been recorded in the Western Hemisphere (8).

### Conclusions

The absence of clinical disease, lack of laboratory facilities in the Caribbean, licensing restrictions on the examination of samples for virus isolation in Florida—if they originate from the Caribbean—and limited financial support, have each promoted an increased reliance on serology for investigating the epidemiology of bluetongue in the Caribbean and Florida. By using serology, we consider that it has been demonstrated that bluetongue infection is well established in the neotropics. A foundation has been laid for detailed studies to determine the clinical importance of the virus, the vectors involved in transmission, and other features of the epidemiology. The information obtained to date has been of value to the Directors of Animal Health of several countries in the Antilles in the development of an acceptable policy for the interchange of ruminant livestock and germ plasm.

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