Animal Diseases Caused by Orbiviruses, Algeria

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Antibodies against bluetongue virus were detected in cattle, sheep, goats, and camels in Algeria in 2008. Antibodies against epizootic hemorrhagic disease virus were detected in cattle, but antibodies against African horse sickness virus were not detected in horses and mules. Epizootic hemorrhagic disease in northern Africa poses a major risk for the European Union.

The genus *Orbivirus* contains several viruses such as bluetongue virus (BTV; 26 serotypes), epizootic hemorrhagic disease virus (EHDV; 8 serotypes), and African horse sickness virus (AHSV; 9 serotypes). These viruses cause serious diseases in domestic and wild animals. Several orbiviruses have been reported in Algeria. Bluetongue disease caused by BTV serotype 2 (BTV-2) was detected in 2000 (*1*); serotype 1 was detected in 2006 (*2*). BTV-1 was detected again in 2008, and new outbreaks were detected in 2009 and 2010 (*2*). Epizootic hemorrhagic disease (EHD) caused by EHDV serotype 6 (EHDV-6), was reported in Morocco in 2004 and 2006 (*3*). AHSV serotype 9 (AHSV-9) was detected in Morocco in 1965 (*4*).

These orbiviruses were frequently reported to have originated in sub-Saharan Africa (*3*,*5*–*7*). In many cases, outbreaks of orbivirus diseases in Algeria were followed by incursions of these viruses into southern Europe, most likely through passive wind-borne transmission of infected vectors (*8*,*9*). The aim of this study was to identify 3 particular orbiviruses (BTV, EHDV, and AHSV) in Algeria and determine their geographic distribution.

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DOI: http://dx.doi.org/10.3201/eid1712.110928

The Study

Algeria contains 19.6 million sheep, 3.8 million goats, 1.6 million cattle, ≈230,000 horses, and 290,000 camels. This country is divided into 48 provinces (wilayas). For reasons of animal health, transportation of animals is not allowed between southern and northern Algeria. Vaccination against bluetongue disease, EHD, and African horse sickness in Algeria is forbidden by law because vaccinated animals cannot be differentiated from naturally infected animals.

Sampling was conducted during August–September 2008. Cattle, sheep, goats, and camels were sampled in the BTV survey, cattle were sampled in the EHDV survey, and horses and mules were sampled in the AHSV survey. To avoid detection of antibodies from previous outbreaks, only livestock 6–12 months of age were sampled. For detection of EHDV and BTV, the epidemiologic unit was the herd.

Sample size was calculated to enable detection of ≥2% of infected cattle farms at a 95% confidence level (149 herds) and a within-herd prevalence ≥30% (9 animals/herd). In addition to cattle for detection of BTV, 359 samples were obtained from 65 sheep flocks, 71 samples from 27 goat herds, and 92 samples from 26 camel herds. For detection of AHSV, the epidemiologic unit was the animal, and sample size was calculated for detection of ≥2% of infected horses and mules at a 95% confidence level (149 animals).

IgG against BTV was detected by using a competitive ELISA (Pourquier Bluetongue Competitive ELISA; Pourquier Laboratory, Montpellier, France). To detect BTV genotypes, a real-time reverse transcription PCR (RT-PCR) (TaqVet BTV-FCO-all genotypes rRT-PCR; LSI Vet, Lissieu, France) was performed. Positive samples were tested by using RT-PCR kits for BTV-1, 2, 4, 6, 9, 11, and 16 (Taqvet BTV European BTV Typing; LSI Vet). A competitive ELISA provided by the Institute of Animal Health (Pirbright, UK) was performed to detect IgG against EHDV according to the protocol of Thevasagayam et al. (*10*). IgG against AHSV was detected by using a blocking ELISA (Ingezim AHSV compact plus 14.AHS.K.3; Ingenasa Laboratory, Madrid, Spain). Tests were performed according to manufacturer's instructions.

We detected an overall BTV seroprevalence of 24%. BTV seroprevalence differed among wilayas (Table; Figure) but was higher in northern wilayas and Ghardaia in central Algeria. In contrast with official 2008 data in which only 6 outbreaks were reported, our results indicated that BTV was widespread in 2008.

BTV seroprevalence differed between species (Table): 29% in cattle, 14% in sheep, and 21% in goats. In addition, a high seroprevalence (21%) was found in camels. In a recent study, BTV was isolated from the blood of 3