was detected in 9 P. irritans fleas (7 male [6 unfed and 1 engorged] and 2 [engorged] female) from 3 houses, including the house where a confirmed human case of plague had occurred (online Technical Appendix, http://wwwnc.cdc.gov/EID/article/20/8/13-0629-Techapp1.pdf). Eight sequences (GenBank accession nos. KJ361938–KJ361945) were obtained and share 99% nucleotide homology with plasminogen activator genes of Y. pestis published in GenBank (accession nos. AF528537, AY305870). No Y. pestis was detected in the 24 X. cheopis, 10 E. gallinacea, or 1 C. canis fleas collected.

Although only X. cheopis and S. fonqueniei fleas had previously been described as plague vectors in Madagascar, P. irritans fleas were most commonly collected during this field study; engorged and unfed male and female P. irritans fleas carried Y. pestis. Other studies have found P. irritans fleas in the plague risk area in other countries in Africa (5,6); one study found that P. irritans fleas may play a role in plague epidemiology in Tanzania (5). Data on P. irritans fleas in rats make it unlikely that these fleas are involved in rat-to-human transmission of Y. pestis in Madagascar. During 1922–1995, a total of 118,608 rats were caught and examined in Madagascar, but only 148 P. irritans fleas were identified, and none have been found on rats since 1996 (http://www.pasteur.mg/spip.php?rubrique124). The high density of P. irritans fleas we observed in villages where plague outbreaks occurred in late 2012 and early 2013 (http://www.pasteur.mg/spip.php?rubrique124) supports the possibility that P. irritans fleas played a role in domestic human-to-human transmission of Y. pestis during these outbreaks.

Author affiliations: Institut Pasteur de Madagascar, Antananarivo, Madagascar (J. Ratovonjato, S. Boyer); and World Health Organization Collaborating Centre, Institut Pasteur de Madagascar, Antananarivo (M. Rajerison, S. Rahelinirina)

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Address for correspondence: Jocelyn Ratovonjato, Medical Entomology Unit, Institut Pasteur de Madagascar, BP 1274, Antananarivo 101, Madagascar; email: ratov@pasteur.mg

Letters

Serologic Surveillance for West Nile Virus in Dogs, Africa

To the Editor: West Nile fever is caused by the West Nile virus (WNV), a mosquito-borne member of the genus Flavivirus. Birds are the natural reservoir of the virus, which is maintained in nature in a mosquito–bird–mosquito transmission cycle. WNV has been detected in many regions worldwide, including North America, Europe, Africa, the Near East, and Asia (1). WNV has been shown to cause meningocerebralitis in humans and horses. In the United States, seroconversion in dogs was detected 6 weeks before a human case was reported (2). Thus, dogs could be considered as sentinel for WNV infection, but their role as reservoir is unlikely because of short-term and low levels of viremia (3). In this study, we determined the seroprevalence of WNV in dogs living close to humans in different environments to assess their role as sentinels of this potentially severe zoonosis.

During 2003–2012, blood samples were collected from 753 adult dogs from France and 6 countries in Africa (Table). Samples were centrifuged within 24 h after collection, separated, frozen at −20°C, and sent to the virology laboratory of the Institut de Recherche Biomédicale des Armées (Marseille, France). Each sample was systematically tested for IgG against WNV by using an in-house ELISA with inactivated WNV as antigen. Serum samples were considered positive if the optical density at 450 nm was >3-fold the mean of that for negative antigen. Because of the antigenic cross-reactivity among flaviviruses, all positive samples were further tested by Western blot for WNV-specific antibodies (4); seroprevalence was calculated on the basis of Western blot–confirmed cases only.
For the statistical analysis, we used the exact binomial method to calculate 95% CIs of the proportions and the Fisher exact test to calculate p values and compare the seroprevalence rates between countries; significance was set at p<0.05.

Seropositive dogs were found in all portions of Africa and France surveyed except northeastern Gabon and Corsica (Table). Seroprevalence of WNV in native dogs was significantly higher in Chad than in the Democratic Republic of the Congo (DRC) (p<0.001), Senegal (p=0.00001), Côte d’Ivoire (p=0.000001), and Gabon (p=0.000001). Seroprevalence was low in Kinshasa, DRC (12.5%), and Dakar, Senegal (11.1%), but in N’Djamena, Chad, all 5 native dogs tested had specific antibodies against WNV.

As part of the study, we tested 50 military dogs from France twice, before and after a 4-month mission in Chad; 12 (24.0%) became seropositive after the stay. In addition, 12.5% of military working dogs in France imported from Hungary were seropositive on initial testing. We also found that, in France, dogs are the sentinels of WNV circulation in the Var (12.0%) and Gard (9.1%) departments. All dogs we tested that were positive for IgG were negative for IgM, a finding that indicates infection by the virus did not occur recently.

The results and the statistical analysis reveal notable differences in the seroprevalence rates, according to the geographic area. N’Djamena, Chad, where all native dogs tested positive for WNV, is located at the confluence of the Chari and Logone Rivers and is an area with high densities of residential and migratory birds. In contrast, the northeastern region (Haut-Ogooué) of Gabon, where WNV infection is common, was low (3.7%, 3/81) in Kinshasa, DRC (12.5%), and Dakar, Senegal (11.1%), but in N’Djamena, Chad, all 5 native dogs tested had specific antibodies against WNV.

In a large proportion of the human and animal population of Africa, immunity to WNV has developed (1). A serologic survey of dogs from the Highveld region of South Africa showed that 37% (138/377) had neutralizing antibodies against WNV (6). Similarly, seroprevalence of antibodies against WNV is high among dogs in the United States, for example, 55.9% (218/390) in the Gulf Coast region (7). In Turkey, an area where many birds stop over during migration, seroprevalence among dogs was high (37.7%, 43/114) (8).

Our study highlights the role of dogs as sentinels for WNV circulation, particularly in southeastern France (Gard and Var departments), where WNV epidemics and epizootics occurred in 2000 and 2003. In addition, we observed that military working dogs purchased from Hungary, where WNV infection is common (9), may be seropositive. Serocconversion in dogs returning from short missions in WNV-endemic countries such as Chad was also observed. Therefore, our data emphasize the usefulness and convenience of WNV seroprevalence surveys in dogs for studying WNV epidemiology and circulation. It is possible that dogs living close to humans could attract infected mosquitoes, thereby reducing human infection.
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Bernard Davoust, Isabelle Leparc-Goffart, Jean-Paul Demoncheaux, Raphaël Tine, Mamadou Diarra, Grégory Trombini, Oleg Mediannikov, and Jean-Lou Marié

Author affiliations: Groupe de Travail en Épidémiologie Animale du Service de Santé des Armées, Toulon, France (B. Davoust, J.-P. Demoncheaux, G. Trombini, J.L. Marié); Unité de Recherche sur les Maladies Infectieuses et Tropicales Émergentes (IRD 198), Dakar, Senegal (B. Davoust, O. Mediannikov); Centre National de Référence des Arbovirus-Institut de Recherche Biomédicale des Armées, Marseille, France (I. Leparc-Goffart); and Services Vétérinaires de la Gendarmerie Nationale, Dakar (R. Tine, M. Diarra)

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Address for correspondence: Bernard Davoust, Unité de Recherche en Maladies Infectieuses et Tropicales Emergentes (URMITE) CNRS UMR 7278 IRD 198 INSERM U1095 Aix-Marseille Université, Faculté de Médecine, 27 bd Jean Moulin, 13385 Marseille CEDEX 5, France; email: bernard.davoust@gmail.com

Another Dimension

EID publishes thoughtful essays, short stories, or poems on philosophical issues related to science, medical practice, and human health. Topics may include science and the human condition, the unanticipated side of epidemic investigations, or how people perceive and cope with infection and illness. This section is intended to evoke compassion for human suffering and to expand the science reader’s literary scope. Manuscripts are selected for publication as much for their content (the experiences they describe) as for their literary merit.

Severe Encephalitis Caused by Toscana Virus, Greece

To the Editor: In late June 2012, a previously healthy, 49-year-old woman was admitted to the emergency department of Trikala General Hospital in Trikala, Greece, with confusion and delirium. A few hours before admission, she had had a grand mal seizure; she had experienced gastroenteritis with fever (38°C) 5 days earlier. On admission, she was intubated and transferred to the intensive care unit, where she underwent mechanical ventilation and sedation.

The patient was a resident of Genesvi village (350 m altitude), 22 km west of Trikala in the Thessaly region. She had not traveled abroad or to other area of Greece. Results of blood and cerebrospinal fluid (CSF) laboratory testing were unremarkable except slight leukocytosis (leukocytes 11,330 cells/mm³, 92% neutrophils) and slightly elevated serum lactate dehydrogenase level (240 U/L). Brain imaging showed edema (90090-X http://dx.doi.org/10.1016/0021-9975(89)90090-X). The patient was awakened on day 3 of hospitalization and extubated on day 4. Treatment included anticonvulsants, mannitol, antimicrobial drugs (vancomycin and ceftriaxone), acyclovir, and corticosteroids. The patient fully recovered and was discharged from the hospital on day 12 with short-term antiepileptic medication.

Because West Nile virus (WNV) infections emerged in 2010 in Greece and outbreaks have recurered (I), serum and CSF samples from the patient were sent for testing to the National Reference Centre for Arboviruses. Antibodies against WNV were not detected. Reverse transcription nested PCR was conducted by using generic primers for flaviviruses,