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To assess the vector potential of H. truncatum ticks for Venezuelan equine encephalitis (VEE) virus, larval ticks were allowed to feed on a viremic guinea pig infected with an epizootic virus while feeding or a viremic guinea pig, transstadially transmitted the virus to subsequent nymphs and adults, and tranmitted the virus to susceptible hosts.

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Short Report

Laboratory transmission of Venezuelan equine encephalomyelitis virus by the tick *Hyalomma truncatum**

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Epizootic strains of Venezuelan equine encephalomyelitis (VEE) virus (*Alphavirus*, family Togaviridae) cause serious disease in horses and humans throughout the 'New World' tropics and subtropics (WALTON & GRAYSON, 1989). Although various mosquito species serve as vectors of this virus during epizootics, recent experimental evidence has indicated that ticks may be involved in the maintenance cycle (LINTHICUM *et al.*, 1992). With the rapid expansion of air travel between the Americas and Africa and Europe the potential for importation of VEE virus into the 'Old World' poses a threat to immunologically naive human and equine populations. *Hyalomma truncatum* Koch is a tick species commonly found in Africa and south-west Asia, and is a known vector of Crimean–Congo haemorrhagic fever virus (*Nairovirus*, family Bunyaviridae) (LOGAN *et al.*, 1989). To assess the vector potential of *H. truncatum* for VEE virus, larval ticks were allowed to feed on a viraemic guinea-pig infected with an epizootic VEE virus strain. Subsequently, ticks were evaluated to determine if virus replication occurred and if virus was transmitted.

H. truncatum ticks used in this study were maintained as described by LINTHICUM *et al.* (1991). All experiments were conducted in a BL3+ laboratory specifically modified to contain ticks. Guinea-pigs used in this study had not been previously exposed to either VEE virus or ticks. The strain of VEE virus used (Trinidad donkey, variant 1-A) is almost always fatal to guinea-pigs. Virus content of sampled ticks was determined by plaque assay on Vero cell monolayers (LINTHICUM *et al.*, 1992).

Initially one guinea-pig was infested with approximately 2000 tick larvae. One day later, the guinea-pig was inoculated subcutaneously with $10^{6.2}$ plaque-forming units (PFU) of VEE virus. On day 4 after infestation the serum viral titre in the guinea-pig was $10^{7.5}$ PFU mL. The guinea-pig died 5 d after infestation.

More than 800 fed larvae dropped off the guinea-pig 4–5 d after infestation. All 10 fed larvae sampled after dropping off contained VEE virus (mean titre = $10^{2.6}$ PFU, range $10^{1.6}$–$10^{3.3}$). Fed larvae started to moult 12 d after infestation, and at 14 d after infestation 3 of 21 pools of unfed nymphs [minimum infection rate = 3 105 2·9%] contained virus (mean titre = $10^{4.7}$ PFU, range $10^{4.0}$–$10^{5.7}$). On day 14 after infestation about 100 of these unfed nymphs were placed on another guinea-pig, which died 6 d later; however, no virus was isolated from it or from 45 fed nymphs 2 d after they had dropped off the animal.

On day 21 after infestation of the first guinea-pig, none of 95 unfed nymphs sampled contained virus; however, when 100 unfed nymphs were placed on a guinea-pig the animal died 6 d later with a serum viral titre of $10^{7.1}$ PFU mL. At drop-off, 6 of 7 (86%) fed nymphs contained virus (mean titre = $10^{3.6}$ PFU, range $10^{2.8}$–$10^{4.3}$). About 80 partially fed nymphs were transferred to another guinea-pig, which died 4 d later, with a serum viral titre of $10^{6.1}$ PFU mL, and 28 31 (90%) fed nymphs contained virus (mean titre = $10^{4.3}$ PFU, range $10^{1.9}$–$10^{5.3}$) when they dropped off. At 56 days after infestation 3 of 14 (21·4%) subsequent adults contained virus (mean titre = $10^{3.9}$ PFU, range $10^{2.5}$–$10^{4.6}$).

On day 28 after infestation, 2 of 40 pools of unfed nymphs [minimum infection rate = 2 200 (1%)] contained virus (mean titre = $10^{2.1}$ PFU). About 200 unfed nymphs were placed on a guinea-pig at this time, and the guinea-pig survived. Only 1 of 124 (0·8%) fed nymphs contained virus (titre = $10^{5.0}$ PFU) when they dropped off.

The ability of *H. truncatum* larvae to become infected with VEE virus while feeding on a viraemic guinea-pig, trans-stadially transmit the virus to subsequent nymphs and adults, and transmit the virus to susceptible hosts, indicates that this species is a competent laboratory vector of the virus. Infection and transmission rates, and the viral titres observed for *H. truncatum*, are equal to or greater than those observed previously for *Amblyomma cajennense* infected with the same strain of virus (LINTHICUM *et al.*, 1992). Thus if VEE virus were introduced into south-west Asia or Africa it could be maintained in, and transmitted by, an indigenous tick species.

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Corrections

F. Pratlong *et al.* 1993). Characterization of *Leishmania* isolates from two AIDS patients originating from Valencia, Spain. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **87**, 705–706.

The international code numbers of 2 of the strains of *Leishmania infantum* isolated from these patients were incorrectly printed on p. 705, 3 lines from the bottom of column 2, and p. 706, line 13 of column 1; the correct numbers are MHOM/ES/91/LEM2298 and MHOM/ES/91/LEM2361, respectively. The editor apologizes for these errors.

M. Corcos and C. Corcos 1993). A transposon in Hansen's bacillus? [Correspondence]. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **87**, 708.

The authors have pointed out that the word 'its', in line 4 of paragraph 5 of their letter, appeared as 'whose' in the original typescript, and that this more clearly indicates their meaning, that it is the replication of the *plasmid* which is an epiphenomenal self-perpetuating feedback process.