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SCIENTIFIC NOTE

FIRST RECORD OF *AEDES* (*STEGOMYIA*) *UNILINEATUS* IN THE KINGDOM OF SAUDI ARABIA

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ABSTRACT. Entomological surveillance was conducted in Asir, Jizan, and Makkah regions, Kingdom of Saudi Arabia, during December 2000 in response to an outbreak of Rift Valley fever. *Aedes* (*Stegomyia*) *unilineatus* was collected in CO_2-baited Centers for Disease Control miniature light traps at 4 widely spaced sites. This represents the 1st record of this species from the Arabian Peninsula. Previously, the distribution of *Ae. unilineatus* included Africa, Pakistan, and India. No arboviruses were isolated from 18 females tested by Vero cell plaque assay.

KEY WORDS *Aedes unilineatus, Stegomyia,* Saudi Arabia, distribution, arboviruses

On September 15, 2000, the occurrence of an outbreak of Rift Valley fever was confirmed in Jizan Region in the southwestern part of the Kingdom of Saudi Arabia, and subsequently in Yemen (CDC 2000a, 2000b; Shoemaker et al. 2002). Cases of Rift Valley fever, with numerous fatalities, occurred in both humans and domesticated animals. This was the 1st report of Rift Valley fever occurring outside of Africa. In response to a renewed spread of Rift Valley fever cases north of the initial outbreak focus, a team composed of members from the Division of Vector-Borne Infectious Diseases (DVBID), Centers for Disease Control and Prevention, Fort Collins, CO, and the Saudi Ministry of Health in Riyadh and Abha, the capital of the Asir Region, conducted an entomological survey in Asir and the adjacent areas of Jizan and Makkah regions of Saudi Arabia from December 5 to 13, 2000 (Miller et al. 2002).

Fourteen sites were selected for this survey, including 6 near Al-Birk on the flat Red Sea coastal plain (the Tihama) in Makkah Region, 1 site in Jizan Region near Khamis Al Bahr, 3 sites near Muhayil, and 2 sites each in the vicinity of Al Majardah and Rijal Alma'a. The latter 7 sites are located in the foothills of the Sarawat Mountains in Asir Region. All sites were arid, and consisted of gravel desert along the coastal plain and rocky hill country inland. The predominant vegetation in all areas was *Acacia* species. The survey sites were residences of recently confirmed or suspect human cases of Rift Valley fever and were generally permanent in nature, although 1 was a temporary dwelling belonging to a nomadic Bedouin herdsman. Some sites consisted of a single isolated residence, whereas others were clusters of several houses, or small villages, in which 1 or more cases of Rift Valley fever had occurred. All case-patients owned livestock, predominately sheep and goats, and smaller numbers of camels and cattle. The animals lived in close proximity to their owners, and in many instances they lived in a fenced enclosure surrounding the family dwelling. The predominant crop was sorghum grown in diked fields watered by rainfall or by flood irrigation with water pumped from nearby wadis (valleys or floodplains of seasonal rivers).

Adult mosquitoes were collected with CO_2-baited Centers for Disease Control miniature light traps. Light trap collections were transferred to 1.8-ml cryovials and frozen in liquid nitrogen or on dry ice until they could be transferred to a −70°C freezer for storage at DVBID before identification and virus testing. Larval habitats that were sampled included artificial containers around residences, flooded diked fields, rock pools formed in drying wadis, cisterns used for water storage, drinking troughs for livestock, and catchments for household wastewater. A complete description of study sites, mosquito species composition, and the results of virus testing will be published elsewhere (Miller et al. 2002).

Adult *Aedes* (*Stegomyia*) *unilineatus* (Theobald) were collected in light traps at 4 sites (Fig. 1): site 1 (Maratkh), 24 km from Muhayil on December 6, 2000 (18°22.829′N, 41°54.895′E; elevation 2,271 m); site 4 (Mahduwah), approximately 10 km south of Khamis Al Bahr on December 7, 2000 (18°9.600′N, 41°52.214′E; elevation not available); and from sites 11 and 12 (no local names), 12 and 18 km, respectively, from Rijal Alma'a on December 13, 2000 (18°19.5′N, 42°7′E; elevation 849 m;

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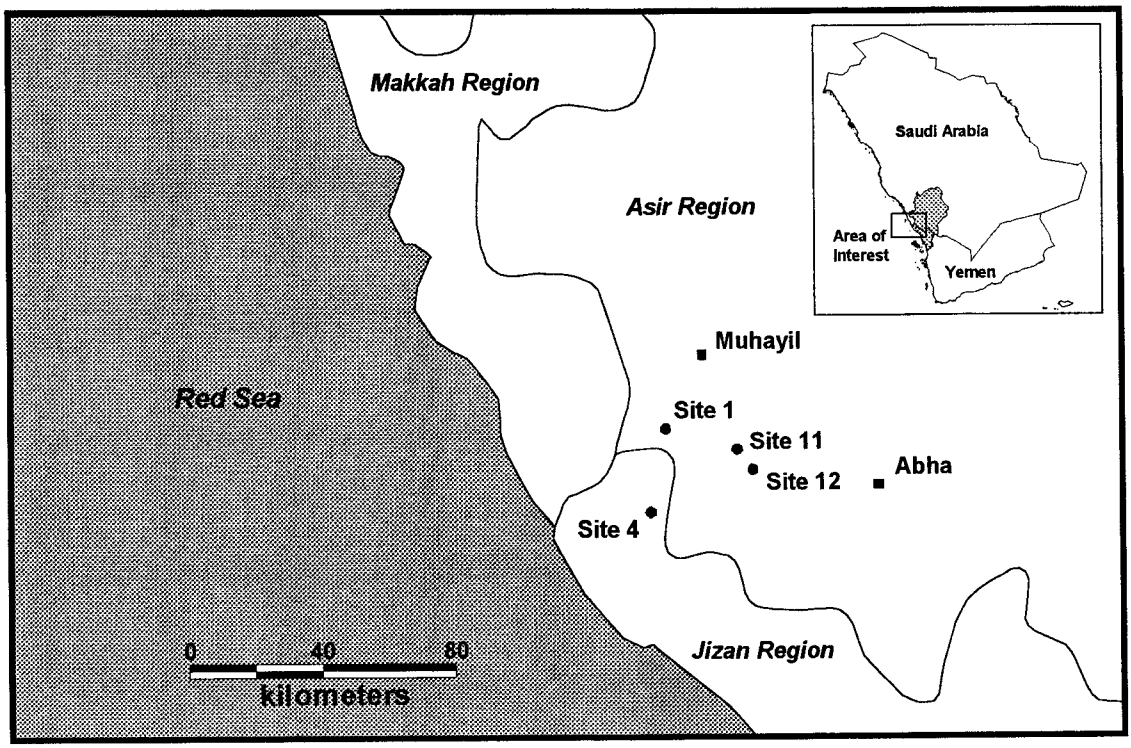

Fig. 1. Four study areas in Asir and Jizan regions where *Aedes unilineatus* was detected. Major cities are designated by squares.

and 18°16.3′N, 42°9.7′E; elevation 1,038 m). Eighteen females and 3 males were collected. Although many of the specimens were damaged, the identification was based on the presence of a single medial line of white scales on the scutum, and a median patch of white scales on the anterior face of the mid-femur (Edwards 1941, Jupp 1996). The terminalia of the 3 males were detached and mounted on microscope slides and were characteristic of *Ae. unilineatus,* with a long straight gonostylus with a long subterminal spine, and with the basal mesal lobe of the gonocoxite elongate and fringed with long hairs apically (Edwards 1941). The mounted genitalia were examined by Peter Jupp, National Institute of Virology (NIV), Johannesburg, South Africa, to confirm our identifications. Two of the mounted genitalia (specimens HMS 562 and 563) have been deposited in collections of the U.S. National Museum, Washington, DC, and the 3rd specimen (HMS 564) has been deposited at the NIV.

Literature on ecology of *Ae. unilineatus* is sparse. Mattingly (1952) considered *Ae. unilineatus* to be a savannah species with great drought resistance that is not reported to occur in Africa in regions with more than 140 cm of rain per year. The distribution in India is similar, except for the Bombay area. The reported larval habitats are tree holes, including papaya (*Carica papaya*), and rock holes (Barraud 1934, Hopkins 1952, Ribiero and Ramos 1973). Although we did not detect larval *Ae. unilineatus* among the species we collected (*Aedes vexans arabiensis* Patton, *Aedes vittatus* (Bigot), and *Culex pipiens* L. complex [Miller et al. 2002]), the most likely larval habitats are rock holes or small pools in drying wadis, or perhaps artificial containers around residences. Our limited success in collecting larvae may be due to the lack of significant rainfall during the several weeks before our survey. No records have been found of arbovirus isolations from this species, and no isolates were obtained from the 18 females we tested.

Aedes unilineatus previously has been reported from Africa, India, and Pakistan (Barraud 1934, Edwards 1941, Walter Reed Biosystematics Unit 2001). Thus, the species possibly survived as relict populations in Saudi Arabia, but was not found in previous surveys (Mattingly and Knight 1956, Buttiker 1981, Wills et al. 1985, Abdullah and Merdan 1995, Cope et al. 1996, Jupp et al. 2002). Also, *Ae. unilineatus* possibly was introduced more recently via movement of people and goods between eastern Africa and the Arabian peninsula.

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