INSECTA MUNDI

A Journal of World Insect Systematics

0005

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Date of Issue: 25 April 2007

CENTER FOR SYSTEMATIC ENTOMOLOGY, INC., Gainesville, FL

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Insecta Mundi 0005: 1-3

Published in 2007 by
Center for Systematic Entomology, Inc.
P. O. Box 147100
Gainesville, FL 32604-7100 U. S. A.
http://www.centerforsystematicentomology.org/

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ISSN 0749-6737

INSECTA MUNDI 0005: 1-3 2007

New and old mosquito records for extreme southern Florida (Diptera: Culicidae)

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Abstract: New locality records for *Culiseta inornata* (Williston) are reported from Big Pine Key, Grassy Key, and No Name Key in Monroe County, Florida. Five specimens were collected in dry ice-baited light traps. An old, previously unrecognized record for *Anopheles grabhamii* Theobald from Miami, Dade County, Florida, is reported based on specimens found in the Florida State Collection of Arthropods.

Key words: Mosquito, Culicidae, Florida Keys, Dade County.

Introduction

The Florida Keys are islands that lie east, south, and southwest of the southernmost tip of the Florida peninsula within Dade and Monroe counties. The Florida Keys Mosquito Control District has conducted mosquito operations on the larger inhabited islands within Monroe County since the late 1950s. Since 1998, surveillance for adult mosquitoes has been a significant component of these operations. Adult surveillance is conducted primarily through use of dry ice-baited light traps.

During the latter part of December 2004 the Florida Keys experienced exceptionally strong winds blowing from the north. For example, on the 15th of December, average wind speed and direction was 18 mph, NNE; and on the 16th, 15 mph, NNE. After this windy period, five adult female *Culiseta inornata* (Williston) were collected in dry ice-baited light traps, all on the night of 20-21 December 2004. Three specimens were collected on No Name Key, and one each on Big Pine Key and Grassy Key. The specimens have been deposited in the Florida State Collection of Arthropods (accession number E2005-840).

Culiseta inornata has not been collected very often in the Florida Keys. Pritchard et al. (1949) reported "a number of specimens" taken in a light trap on Stock Island, near Key West. This species was not reported from any other islands in the Florida Keys, nor was it detected in more recent surveys (Hribar 2002, Hribar and Vlach 2001). One is tempted to wonder whether the strong winds transported these specimens from further north. Not much is known about windborne transport of mosquitoes (Service 1980), although Horsfall (1954) observed *Aedes vexans* (Meigen) transported long distances on a strong cold front, and Hamlyn-Harris (1933) wrote about transport of *Ochlerotatus vigilax* (Skuse) on winds. Owen (1937) reported that *Cs. inornata* in Minnesota would migrate a mile or more from its breeding grounds. The fact that these five specimens were collected in December is consistent with the statements of Carpenter (1941), Mitchell (1970), and Thibault (1910) that *Cs. inornata* is a winter mosquito in the southern United States. Sellers (1980) discussed the implications of such windborne transport of mosquitoes on the spread of viral diseases of animals, stating that viral diseases could be repeatedly introduced into an area due to annual movements of mosquitoes. In regard to West Nile virus, *Cs. inornata* has been demonstrated to be an efficient laboratory vector, it has been found naturally infected with the virus, and it may serve a minor role as an enzootic or bridge vector of the virus (Goddard et al. 2002, Turell et al. 2005).

Darsie et al.(2002) added *Anopheles grabhamii* Theobald to the fauna of the United States based upon the collection of a single female in a dry ice-baited light trap on Big Pine Key. Later, Hribar (2005) reported several collections of this species from No Name Key, adjacent to Big Pine Key. During a visit to the Florida State Collection of Arthropods in January 2005, four female specimens of *An. grabhamii* collected in Miami, Dade County, were located. They were in a pinning tray along with material from Puerto Rico, the United States Virgin Islands, and some specimens with no locality data. The four specimens each have two labels on the pins. The top label has the handwritten information, "12-27-56" and "Miami, Fla." on the obverse; the reverse has the handwritten notations, "BOAC# VP-TBL" and "Nassau, dir.". No collector is named. A second label contains the identification as *An. grabhamii*. Examination

under a microscope revealed the large broad wing scales diagnostic for this species, as illustrated by Darsie et al. (2002). The notation of "Nassau, dir." may indicate that these specimens were collected on board an aircraft that had flown directly from Nassau in the Bahamas to Miami (the British Overseas Airways Corporation (BOAC) was the British state airline from 1939 until 1974). It would be interesting to know whether this species has been collected since 1956 in Dade County.

The transport of mosquitoes via aircraft has been of concern since the early 20th century, and is still so today. In a recent study, Dobbs and Brodel (2004) found no mosquitoes in 730 cargo aircraft landing at Miami. However, Porter (1957), Evans et al. (1963), and Gratz et al. (2000) have cited numerous papers containing reports of mosquitoes collected from aircraft. Hughes (1961) reported data from 13 years' inspections at seven airports within the continental United States, Hawaii, and Puerto Rico. *Anopheles grabhamii* was intercepted 31 times between July 1, 1947, and June 30, 1960. One specimen was collected alive and the rest were found dead in the aircraft. Unfortunately, the data for collections from the five airports in the continental United States are "lumped", so it is not possible to determine how many of the collections were made at the Miami airport. Hughes (1961) makes no mention of disposition of voucher specimens, so it is unknown whether these specimens were collected during his study. It is unlikely that the specimens reported by Darsie et al. (2002) and Hribar (2005) were transported by aircraft, but they may have been blown into the Florida Keys by winds from passing storms, or more likely they are the progeny of insects previously introduced into the islands.

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Accepted: April 16, 2007