



**Results of 2005 Wēkiu Bug
(*Nysius wekiuicola*) Surveys on
Mauna Kea, Hawai‘i Island**

Hawaii
Biological
Survey

Final Report

March 2006

**RESULTS OF 2005 WĒKIU BUG (*NYSIUS WEKIUCOLA*) SURVEYS
ON MAUNA KEA, HAWAI'I ISLAND**

FINAL REPORT

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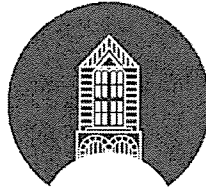
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EXECUTIVE SUMMARY

This study continues research conducted by the Hawaii Biological Survey of the Bishop Museum beginning in the early 1980s, resuming in 1997, and ongoing since 2002. The objectives of this study were to 1) survey for the presence or absence of wēkiu bugs at the summits of various pu‘u’s (cinder cones) located in the alpine zone of Mauna Kea, 2) determine the elevational and microhabitat distribution of wēkiu bugs on Mauna Kea, 3) assess whether different pitfall trapping methods used in earlier Bishop Museum studies provide comparable data in regard to wēkiu bug captures, 4) assess habitats among different elevations and cinder cone areas, and 5) obtain microhabitat data on wēkiu bug habitat using temperature and relative humidity loggers.

In 2005, surveys for wēkiu bug distribution and abundance at the summit area of Mauna Kea occurred in May and June, while data loggers recording microhabitat parameters such as relative humidity and temperature were installed in December 2004 and data downloaded June 2005. A wide range of areas were surveyed, including several important areas that were previously unsampled, including the area above the Pu‘u Lā‘au cabin in the western summit region, and Pu‘u Lilinoe. Sampling effort in 2005 was the highest to date of the recent studies, with 529 trap days in May and 382 trap days in June, for a total effort of 911 trap days. This compares to 274 trap days in 2004 and 398 trap days in 2002.

Important discoveries in 2005 included the finding of a new core wēkiu bug population at Pu‘u Lilinoe and the rediscovery of a large population at Pu‘u Poliahu. While both the shrimp pitfall and older style ethylene glycol traps were found to have limitations during the present study, collections of wēkiu bugs through visual observations around areas of snowbanks proved exceedingly successful. For example, as many wēkiu bugs were collected during 20 minutes of visual observations at the summit of Pu‘u Hau Kea as compared to 9 days of trapping at this cinder cone. The long-term test of trapping efficiency continued to determine whether data from shrimp pitfall traps presently used can be compared to data collected in the original 1982 study using ethylene glycol traps. Although the results remain generally inconclusive, it is apparent that glycol traps attract wēkiu bugs in a very efficient manner under certain cases of reduced snow pack, such as in the late spring. On the other hand, there appears to be little difference in trap efficiency such as in May 2005 when a large snowpack was available, or in other seasons having low wēkiu bug abundance such as in the warm and dry July 2004.

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This year marked the first time wēkiu bug distribution and temperature patterns at various areas within the Mauna Kea summit were examined. Logger data indicated the summit area is marked by low mean temperatures, wide surface temperature variations, and long periods of ice and snow resulting in much less variation. A transect of loggers at various positions on Pu‘u Hau Kea indicated that the bottom area of this cinder cone has much lower temperatures than are found at the summit regions. Preliminary findings from the data loggers indicate that wēkiu bugs may seek areas of thermal stability, such as the summit areas with long-lasting snowbanks. The spring months when wēkiu bugs are most active exhibited dramatic daily temperature shifts, with temperatures dropping below freezing on a nightly basis.

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Table 3. Wēkiu bug capture data from surveyed Mauna Kea cinder cones using visual collections, shrimp pitfall, and ethylene glycol pitfall traps in May and June 2005.

Cinder Cone	Date	Trap #	Trap Elevation ¹	GPS Coordinates	Wēkiu #'s	Trap Type
Pu'u Hau Kea	5 May	1s	4,114 m	19.81489°N 155.47252°W	2	shrimp
Pu'u Hau Kea	8 May	Vis	4,113 m	19.81332°N 155.47272°W	13	vis. collect
Pu'u Hau Kea	8 May	5s	4,113 m	19.81332°N 155.47272°W	1	shrimp
Pu'u Hau Kea	8 May	5g	4,113 m	19.81332°N 155.47272°W	5	glycol
Pu'u Hau Kea	8 May	1	4,094 m	19.81413°N 155.47243°W	2	shrimp
Pu'u Hau Kea	8 May	2	4,126 m	19.81331°N 155.47206°W	1	shrimp
Pu'u Pohaku	8 May	36	4,009 m	19.82548°N 155.49011°W	1	shrimp
Pu'u Lilinoe	10 May	64	3,810 m	19.80832°N 155.45529°W	2	shrimp
Pu'u Lilinoe	10 May	66	3,902 m	19.81012°N 155.45741°W	3	shrimp
Pu'u Lilinoe	10 May	Vis	3,902 m	19.81012°N 155.45741°W	1	vis. collect
Pu'u Wekiu	4 June	Vis	4,119 m	19.82245°N 155.46765°W	1	vis. collect
Pu'u Wekiu	11 June	Vis	4,184 m	19.82186°N 155.46826°W	1	vis. collect
Pu'u Wekiu	11 June	Vis	4,197 m	19.82180°N 155.46825°W	1	vis. collect
Pu'u Poliahu	5 June	Vis	4,139 m	19.82310°N 155.48026°W	2	vis. collect
Pu'u Poliahu	5 June	Vis	4,150 m	19.82310°N 155.48026°W	2	vis. collect
Pu'u Poliahu	5 June	Vis	4,127 m	19.82280°N 155.47993°W	12	vis. collect
Pu'u Hau Kea	7 June	Vis	4,128 m	19.81408°N 155.47345°W	4	vis. collect
Pu'u Hau Kea	7 June	1s	4,088 m	19.81488°N 155.47246°W	1	vis. collect
Pu'u Hau Kea	7 June	1g	4,110 m	19.81488°N 155.47246°W	1	glycol
Pu'u Hau Kea	7 June	3g	4,128 m	19.81408°N 155.47345°W	1	glycol
Pu'u Hau Kea	7 June	3	4,055 m	19.81408°N 155.47241°W	1	shrimp
Pu'u Hau Kea	7 June	4	4,095 m	19.81331°N 155.47195°W	1	shrimp
Pu'u Hau Kea	9 June	4g	4,098 m	19.81369°N 155.47339°W	1	glycol
Pu'u Hau Kea	9 June	5g	4,122 m	19.81326°N 155.47258°W	1	glycol
Pu'u Hau Kea	9 June	2	4,082 m	19.81440°N 155.47263°W	1	shrimp
Pu'u Hau Kea	12 June	1g	4,110 m	19.81488°N 155.47246°W	2	glycol
Pu'u Hau Kea	12 June	3g	4,128 m	19.81408°N 155.47345°W	2	glycol
Pu'u Hau Kea	12 June	4g	4,098 m	19.81369°N 155.47339°W	2	glycol
Pu'u Hau Kea	12 June	5g	4,123 m	19.81326°N 155.47258°W	1	glycol
Pu'u Hau Kea	12 June	5	4,076 m	19.81265°N 155.47186°W	1	shrimp
Totals					70	