



RESULTS OF THE 2009 ALIEN SPECIES  
AND WĒKIU BUG (*NYSIUS WEKIUICOLA*)  
SURVEYS ON THE SUMMIT OF  
MAUNA KEA, HAWAI'I ISLAND

Hawaii  
Biological  
Survey

Final Report

July 2010

WĒKIU BUG (*NYSIUS WEKIUICOLA*) SURVEYS  
MAUNA KEA, HAWAI'I ISLAND

Location:

For:

Forest Management

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*Hawaii Biological Survey Report on the 2009 Mauna Kea Alien Arthropod Sampling*

**EXECUTIVE SUMMARY**

As part of a continuing long-term study, the Hawaii Biological Survey of the Bishop Museum was contracted by the Office of Mauna Kea Management (OMKM) to monitor for alien arthropod species and to continue monitoring populations of the wēkiu bug (*Nysius wekiuicola* Ashlock and Gagné), which is endemic to the Mauna Kea summit area of Hawai'i Island. A nine-day field trip was conducted in July 2009 to continue the monitoring of introduced arthropod species found at the Mauna Kea summit, and to continue monitoring wēkiu bug populations within critical core habitats. The objective of the alien arthropod baseline and monitoring surveys was to provide information to managers on any potential threats to endemic Mauna Kea arthropod species such as the wēkiu bug. Intensive surveys for ants were conducted to assess if any populations are currently found within any areas in close proximity to wēkiu bugs. Ants are already well-established at the summit regions of Haleakalā National Park on Maui, and this elevational range is well-within that of lowest elevation that wēkiu bugs have been found. Because of the predatory and social nature of ants, and because ants have caused the extinction and decline of native arthropods throughout Hawai'i, it was imperative to search high risk areas around the Mauna Kea summit region.

During the course of the 2009 field study we collected 118 wēkiu bugs at different cinder cones throughout the Mauna Kea summit region, and also set out 89 traps for alien species monitoring. In 2009, No new resident alien species were found during intensive alien arthropod species monitoring around the summit region, and species of particular concern such as ants were not found from Hale Pohaku (2,755 m) to the highest point in the Hawaiian Islands of Pu'u Wēkiu (4,205 m). Aeolian arthropod drift capture density and species diversity in the arthropod traps set out around the summit was quite high in 2009, likely a result of moist conditions in the lower elevation regions of Mauna Kea during the preceding winter.

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TABLE 1. WĒKIU BUG CAPTURE DATA FROM THE 2009 FIELD SAMPLING SEASON.

SAMPLE NUMBER	Cinder Cone	2009 Date Set	2009 Dates checked	Elevation	GPS Coordinates (WGS 84)	Wēkiu #'s	Trap Type
009	Puu Hau Kea	July 2, 2009	July 5, 8, 2009	4124 m	19.81455°N 155.47333°W	0	Shrimp
010	Puu Hau Kea- Keck Side	July 2, 2009	July 5, 8, 2009	4120 m	19.81463°N 155.47339°W	0	Shrimp
011	Puu Hau Kea- Inside Crater	July 2, 2009	July 5, 8, 2009	4116 m	19.81436°N 155.47325°W	0	Shrimp
012	Puu Hau Kea- Keck Side	July 2, 2009	July 5, 8, 2009	4125 m	19.81426°N 155.47346°W	0	Shrimp
013	Puu Hau Kea-	July 2, 2009	July 5, 8, 2009	4118 m	19.81383°N 155.47322°W	0	Shrimp
014	Puu Hau Kea	July 2, 2009	July 5, 8, 2009	4128 m	19.81365°N 155.47336°W	0	Shrimp
015	Puu Hau Kea	July 2, 2009	July 5, 8, 2009	4124 m	19.81323°N 155.47261°W	0	Shrimp
016	Puu Hau Kea	July 2, 2009	July 5, 8, 2009	4115 m	19.81342°N 155.47261°W	0	Shrimp
017	Puu Hau Kea	July 2, 2009	July 5, 8, 2009	4116 m	19.81358°N 155.47192°W	0	Shrimp
018	Puu Hau Kea	July 2, 2009	July 5, 8, 2009	4126 m	19.81368°N 155.47151°W	1	Shrimp
019	Puu Poliahu	July 2, 2009	July 5, 8, 2009	4155 m	19.82215°N 155.48135°W	0	Shrimp
020	Puu Poliahu	July 2, 2009	July 5, 8, 2009	4154 m	19.82250°N 155.48131°W	0	Shrimp
021	Puu Poliahu	July 2, 2009	July 5, 8, 2009	4158 m	19.82272°N 155.48116°W	0	Shrimp
022	Puu Poliahu	July 2, 2009	July 5, 8, 2009	4159 m	19.82294°N 155.48088°W	1	Shrimp
023	Puu Poliahu	July 2, 2009	July 5, 8, 2009	4144 m	19.82306°N 155.47998°W	2	Shrimp
008	Puu Hau Oki- Near the Weather Station crater floor	July 3, 2009	July 6, 9, 2009	4118 m	19.82658°N 155.47552°W	26	Shrimp
025	Puu Hau Oki- on slope near Subaru Scope	July 3, 2009	July 6, 9, 2009	4135 m	19.82600°N 155.47583°W	9	Shrimp
026	Puu Hau Oki- Slope Westside of Subaru Scope	July 3, 2009	July 6, 9, 2009	4151 m	19.82586°N 155.47607°W	10	Shrimp
027	Puu Hau Oki- On rim next to Keck Scope	July 3, 2009	July 6, 9, 2009	4174 m	19.82626°N 155.47493°W	3	Shrimp
028	Puu Hau Oki -1/4 down	July 3, 2009	July 6, 9, 2009	4161 m	19.82656°N	7	Shrimp

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	slope from Keck on East slope				155.47494°W		
029	Puu Wekiu	July 3, 2009	July 6, 9, 2009	4191 m	19.82156 N 155.46893 W	0	Shrimp
030	Puu Wekiu-Outer slope	July 3, 2009	July 6, 9, 2009	4213 m	19.82128°N 155.46809°W	4	Shrimp
031	Puu Wekiu-Rim near Ahu Tower	July 3, 2009	July 6, 9, 2009	4227 m	19.82055°N 155.46800°W	0	Shrimp

SAMPLE NUMBER	Cinder Cone	2009 Date Set	2009 Dates checked	Elevation	GPS Coordinates (WGS 84)	Wekiu #'s	Trap Type
032	Puu Wekiu-Inside slope on Ahu side	July 3, 2009	July 6, 9, 2009	4216 m	19.81995°N 155.46809°W	5	Shrimp
033	Puu Wekiu-Outer Slope	July 3, 2009	July 6, 9, 2009	4215 m	19.81907°N 155.46799°W	0	Shrimp
034	Puu Wekiu-Outer Slope	July 3, 2009	July 6, 9, 2009	4196 m	19.81849°N 155.46904°W	0	Shrimp
035	Puu Wekiu-Inner Crater 2/3 down	July 3, 2009	July 6, 9, 2009	4167 m	19.81920°N 155.47018°W	12	Shrimp
036	Puu Wekiu-	July 3, 2009	July 6, 9, 2009	4153 m	19.81927°N 155.46980°W	8	Shrimp
037	Puu Wekiu	July 3, 2009	July 6, 9, 2009	4180-m	19.82049°N 155.46971°W	0	Shrimp
038	Puu Wekiu	July 3, 2009	July 6, 9, 2009	4185 m	19.82115°N 155.46944°W	2	Shrimp
100	Puu North VLBA	July 3, 2009	July 6, 9, 2009	3776 m	19.80279°N 155.45695°W	0	Shrimp
101	Puu North VLBA	July 3, 2009	July 6, 9, 2009	3819 m	19.80312°N 155.45805°W	0	Shrimp
102	Puu North VLBA	July 3, 2009	July 6, 9, 2009	3860 m	19.80325°N 155.45892°W	0	Shrimp
103	Puu North VLBA	July 3, 2009	July 6, 9, 2009	3858 m	19.80358°N 155.45909°W	0	Shrimp
104	Puu North VLBA	July 3, 2009	July 6, 9, 2009	3864 m	19.80379°N 155.45935°W	0	Shrimp
105	Puu South VLBA	July 3, 2009	July 6, 9, 2009	3770 m	19.79994°N 155.45564°W	1	Shrimp
106	Puu South VLBA	July 3, 2009	July 6, 9, 2009	3786 m	19.79963°N 155.45563°W	7	Shrimp
107	Puu South VLBA	July 3, 2009	July 6, 9, 2009	3811 m	19.79901°N 155.45518°W	0	Shrimp
108	Puu South VLBA	July 3, 2009	July 6, 9, 2009	3809 m	19.79919°N 155.45558°W	1	Shrimp

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			2009					
109	Puu South VLBA	July 3, 2009	July 6, 9, 2009	3806 m	19.79904°N 155.45605°W	0	Shrimp	
115	Puu Pohaku-Base near Weather Station	July 4, 2009	July 7, 10, 2009	4010 m	19.82540°N 155.49005°W	0	Shrimp	
116	Puu Pohaku	July 4, 2009	July 7, 10, 2009	4024 m	19.82498°N 155.49040°W	0	Shrimp	
117	Puu Pohaku	July 4, 2009	July 7, 10, 2009	4029 m	19.82485°N 155.49052°W	1	Shrimp	
118	Puu Pohaku	July 4, 2009	July 7, 10, 2009	4034 m	19.82448°N 155.49080°W	0	Shrimp	
120	Puu Pohaku	July 4, 2009	July 7, 10, 2009	4046 m	19.82455°N 155.49203°W	0	Shrimp	
121	Poi Bowl	July 6, 2009	July 9, 2009	4,168 m	19.82563°N 155.47490°W	6	Shrimp	
122	Poi Bowl	July 6, 2009	July 9, 2009	4,153 m	19.82536°N 155.47479°W	1	Shrimp	
123	Poi Bowl	July 6, 2009	July 9, 2009	4,144 m	19.82502°N 155.47472°W	0	Shrimp	
124	Poi Bowl	July 6, 2009	July 9, 2009	4,123 m	19.82447°N 155.47495°W	6	Shrimp	
125	Poi Bowl	July 6, 2009	July 9, 2009	4,105 m	19.82393°N 155.47501°W	5	Shrimp	
<b>2009 Totals</b>							118	

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Table 2. Summary of 2009 sample effort and wēkiu bug captures from surveyed Mauna Kea cinder cones using shrimp pitfall traps in July 2009.

Cinder Cone	Highest Elevation	Total Traps	Wēkiu bugs in traps	Wēkiu bugs visual observation only	Trap Dates	Total Trap Days <sup>1</sup>
Pu'u Hau Kea	4,131 m	10	1	0	2-8 July	60
Pu'u Hau Oki	4,174 m	5	55	0	3-9 July	30
Pu'u Wēkiu	4,205 m	10	31	0	3-9 July	60
Pu'u N. VLBA	3,852 m	5	0	0	3-9 July	30
Pu'u S. VLBA	3,809 m	5	9	0	3-9 July	30
Pu'u Pohaku	4,046 m	5	1	0	4-10 July	30
Pu'u Poliahu	4,159 m	5	3	0	2-8 July	30
Poi Bowl	4,168 m	5	18	0	6-9 July	15
<b>Totals</b>		<b>45</b>	<b>118</b>	<b>0</b>		<b>285</b>

<sup>1</sup>Trap days = total nights x total traps per cinder cone.