RESULTS

No alien species of concern were encountered during our surveys at PUHO, though there have been two reliable reports of Jackson's chameleons by staff within the park. Both of the sightings were immediately adjacent to the parking areas. At KAHO we did not encounter any alien species of concern, nor were there any reported sightings of aliens of concern within the park boundaries. However, there have been reports by park staff of both Jackson's chameleons and coquis from nearby areas. There were no alien species of concern found at PUHE, nor were any reports of these species in the nearby area brought to our attention. Brown anoles have not been reported from areas within or near any of the parks surveyed.

Although identifying populations of alien species of concern was the main urgent focus of this project, all the other species of herpetofauna in the parks were censused as well. Results are summarized in Table 1, which lists species and their status within each park.

Table 1. *Established and inchoate herpetofaunal populations in the three West Hawai`i national parks; based on surveys in July – September 2004.*

			Presence in parks		
Family	**Scientific Name**	**Common name**	**PUHO**	**KAHO**	**PUHE**
Bufonidae	Bufo marinus	giant toad, cane toad, bufo toad, bufo	L**	L	-
Chamaeleonidae	Chamaeleo jacksonii xantholophus	Jackson's chameleon	N**	N	-
Cheloniidae	Chelonia mydas mydas	Pacific green sea turtle, green sea turtle, honu	E	E	-***
Gekkonidae	Gehyra mutilata	stump-toed gecko	E	E	-
Gekkonidae	Hemidactylus frenatus	house gecko	E	E	E
Gekkonidae	Hemiphyllodactylus typus	tree gecko	E	E	-
Gekkonidae	Lepidodactylus lugubris	mourning gecko	E	E	-
Gekkonidae	Phelsuma laticauda laticauda	gold dust day gecko	E	E	E
Iguanidae	Iguana iguana	green iguana, iguana	N	-	-
Leptodactylidae	Eleutherodactylus coqui	coqui treefrog, coqui	N	N	-
Leptodactylidae	Eleutherodactylus planirostris	greenhouse frog	-	-	-
Polychridae	Anolis carolinensis	green anole	E	-	-
Scincidae	Cryptoblepharus poecilopleurus	oceanic snake-eyed skink, snake-eyed skink	-	E	-
Scincidae	Lampropholis delicata	metallic skink	E	-	-
Typhlopidae	Ramphotyphlops braminus	brahminy blind snake, island blind snake, Hawaiian blind snake, blind snake	E	L**	E

E = encountered.
L = likely current inhabitants of the park, though not encountered during this project. Based on habitat types present and reports of target taxa by park staff.
N = not encountered, not yet established, though has established populations in the surrounding area.
- = not encountered, not yet established, no known established populations in the surrounding area.
** Reliable reports from within the park, though not encountered during this survey.
*** May be an incidental visitor.

At all parks surveys were conducted during both day and night time hours. Table 2 shows the length of time spent during the day and night per park and summarizes the number of individuals for each species observed during daytime versus night time hours. More detailed data listing survey times and number of individuals per species encountered are listed in Appendix C.

Table 2. *Inventory effort and results for day time versus night time at the three West Hawai`i national parks.*

	KAHO Day	KAHO Night	PUHE Day	PUHE Night	PUHO Day	PUHO Night
Total # of Days/Nights	3	5	8	3	17	5
Total Duration (hrs:min)	11:27	20:05	24:49	13:17	31:51	15:12
Anolis carolinensis					13	1
Chelonia mydas mydas	5	9			3	
Cryptoblepharus poecilopleurus	6					
Gehyra mutilata		10				27
Hemidactylus frenatus	3	85	98	219	16	61
Hemiphyllodactylus typus		1				1
Lampropholis delicata					14	
Lepidodactylus lugubris	1	56			11	67
Phelsuma laticauda laticauda	17	0	12		32	2
Ramphotyphlops braminus			1	6	1	
unidentified gecko			4		13	2
unidentified lizard	1				2	
unidentified skink					3	

Pu`uhonua o Hōnaunau National Historical Park

We encountered nine herpetofauna species representing five different families at PUHO. In addition to these confirmed species, reports from residents near PUHO indicate that two species of herpetofauna that were not found in the park, iguana (*Iguana iguana*) and the coqui frog, have likely established populations near the upslope botanical garden of the park which is 1.5 km away. However, it is unclear how long these species have been seen in this area. We know of no voucher specimens that been collected in this area for either iguanas or coqui frogs. The scope of the current inventory did not allow time for surveys in the surrounding area of this national park to verify the anecdotal evidence.

PUHO's non-contiguous upslope botanical garden, while small in size, harbored eight out of nine of the herpetofauna species encountered anywhere in the park. The only exception was the green sea turtle (*Chelonia mydas mydas*). Additionally, four of the nine species found at PUHO were only found at the botanical garden: the green anole (*Anolis carolinensis*), the tree gecko (*Hemiphyllodactylus typus*), the metallic skink (*Lampropholis delicata*), and the blind snake (*Ramphotyphlops braminus*). Figure 1 shows survey tracks and sites of herpetofauna encounters at PUHO.

Figure 1. Map of survey tracks and herpetofauna encounters at Pu`uhonua o Hōnaunau National Historical Park, 2004

Kaloko-Honokōhau National Historical Park

KAHO was found to have seven species of herpetofauna from three different families (Table 1). Like PUHO, each family was represented by one species, with the exception of Gekkonidae, which had five representative species. Also like PUHO, Jackson's chameleons and coqui frogs have been reported from nearby areas, but it is uncertain when they were first observed. Again, we know of no voucher specimens that been collected in this area for either iguanas or coqui frogs. Due to the limited scope of the current inventory we were unable to conduct surveys in surrounding lands.
Figure 2 shows survey tracks and sites of herpetofauna encounters in this park.

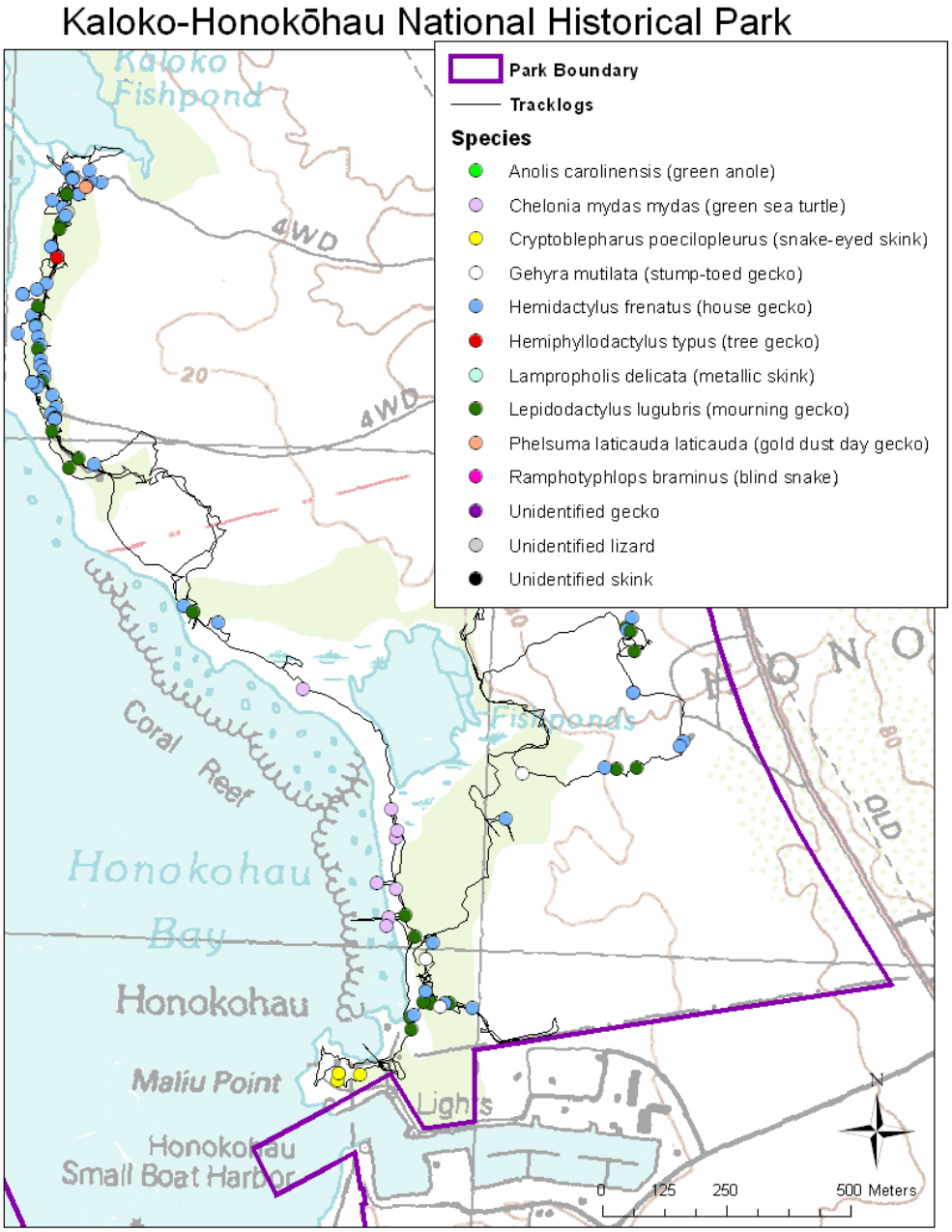

Figure 2. Map of survey tracks and herpetofauna encounters at Kaloko-Honokōhau National Historical Park, 2004.

Pu`ukoholā Heiau National Historic Site

PUHE had the lowest herpetofauna diversity of the parks surveyed, with only two families encountered on park property for a total of three species (Table 1). One of these species, the house gecko (*Hemidactylus frenatus*), was vastly more abundant than the other two species of herpetofauna found in the park, though the gold dust day gecko (*Phelsuma laticauda laticauda*), while still a relatively recent introduction to the Island of Hawai`i, has already gained a foothold. It is not known when this gecko arrived on the Island of Hawaii; it was first released in Mānoa Valley on the Island of Oahu in 1974.

The third and last species of herpetofauna encountered at PUHE was the blind snake. This seldom-encountered fossorial snake was quite common in comparison to the other two parks investigated. Six individuals were found at PUHE compared to one at PUHO and none at KAHO. A total of four out of the six individuals that were found at PUHE were encountered on tree trunks, all between 0.5 m and 1.5 m above ground level (Figure 3).

Figure 3. A blind snake on the trunk of a kiawe tree at Pu`ukohola Heiau National Historic Site at night, August 26, 2004.

Survey routes and sites of herpetofauna encounters at PUHE are illustrated in the following figure.

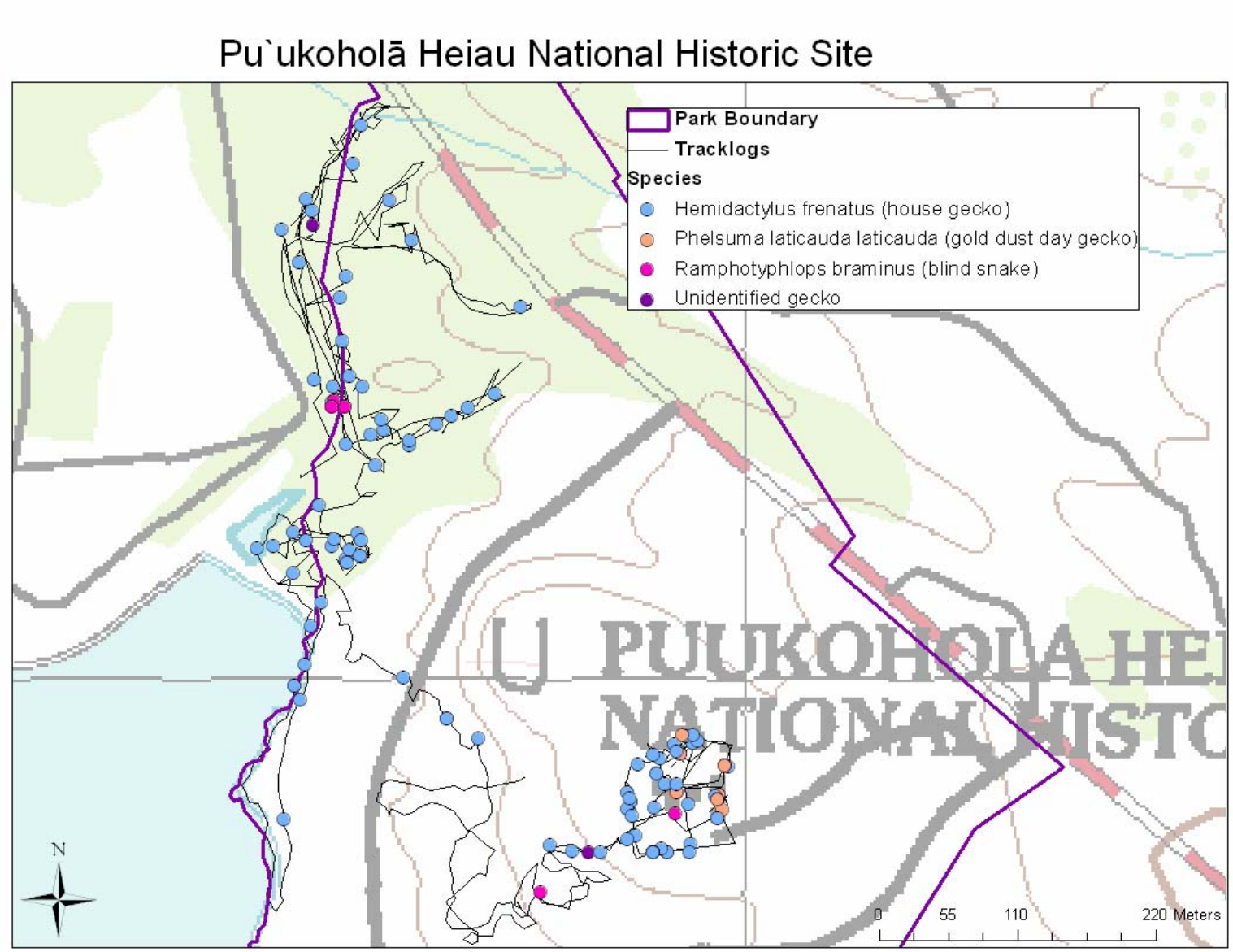

Figure 4. Map of survey tracks and herpetofauna encounters at Pu`ukohola Heiau National Historic Site, 2004.

Relative Abundance and Habitat Associations in all three West Hawai`i National Parks

Table 3 lists qualitative estimates of the abundance of all species encountered based on definitions used in NPSpecies, the National Park Service biodiversity database, which are provided in Appendix B.

Table 3. *Qualitative estimates of herpetofauna encountered in the three West Hawai`i national parks, July – September 2004.*

			Abundance*		
Family	**Scientific name**	**Common name**	**PUHO**	**KAHO**	**PUHE**
Bufonidae	Bufo marinus	giant toad, cane toad, bufo toad, bufo	-	-	-
Chamaeleonidae	Chamaeleo jacksonii xantholophus	Jackson's chameleon	-	-	-
Cheloniidae	Chelonia mydas mydas	Pacific green sea turtle, green sea turtle, honu	C	C	-
Gekkonidae	Gehyra mutilata	stump-toed gecko	C	U	-
Gekkonidae	Hemidactylus frenatus	house gecko	A	A	A
Gekkonidae	Hemiphyllodactylus typus	tree gecko	R	R	-
Gekkonidae	Lepidodactylus lugubris	mourning gecko	A	A	-
Gekkonidae	Phelsuma laticauda laticauda	gold dust day gecko	C	U	U
Iguanidae	Iguana iguana	green iguana, iguana	-	-	-
Leptodactylidae	Eleutherodactylus coqui	coqui treefrog, coqui	-	-	-
Leptodactylidae	Eleutherodactylus planirostris	greenhouse frog	-	-	-
Polychridae	Anolis carolinensis	green anole	U	-	-
Scincidae	Cryptoblepharus poecilopleurus	oceanic snake-eyed skink, snake-eyed skink	-	U	-
Scincidae	Lampropholis delicata	metallic skink	C	-	-
Typhlopidae	Ramphotyphlops braminus	brahminy blind snake, island blind snake, Hawaiian blind snake, blind snake	R**	-	U

* Abundance: R=rare, U=uncommon, C=common, A=abundant
** Apparent rarity may be an artifact of secretive behavior

Looking at the three parks together, some trends worth noting become apparent. Figure 5 illustrates the habitat associations of all the species encountered throughout all of the West Hawai`i national parks.

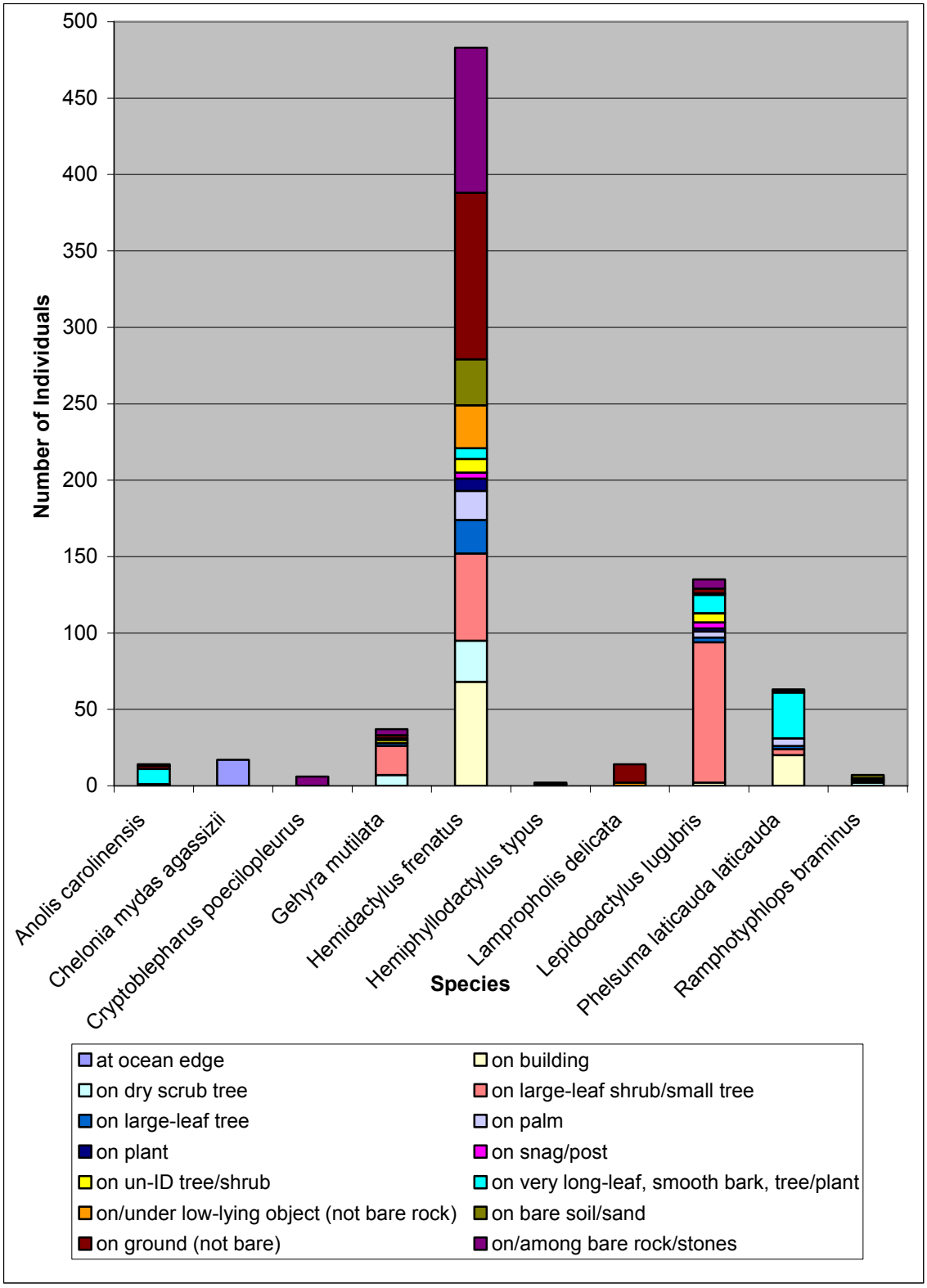

Figure 5. Number of herpetofauna encountered in the West Hawai`i national parks by vegetation type, July – September 2004. (See Appendix A for a list of common and scientific names.)

All of the species found had one or perhaps two clear preferences in habitat types, except for the house gecko. The house gecko was the most abundant species at all of the parks investigated, and was found rather evenly throughout a number of different habitat types. The one species other than the house gecko that had two seemingly unrelated habitat type preferences was the gold dust day gecko. This species was encountered largely on plants and trees with smooth bark and markedly long leaves (e.g., hala [*Pandanus sp.*] and ti [*Cordyline fruticosa*]), as well as on the even surface of the walls of buildings.