

NOTE
Habitat Selection by *Cryptoblepharus poecilopleurus* (Scincidae)
in the Mariana Islands

MICHAEL J. MCCOID¹

Division of Aquatic and Wildlife Resources, P. O. Box 2950, Agana, Guam 96910, USA

GORDON H. RODDA

*National Biological Survey, 4512 McMurry Ave., Fort Collins,
Colorado 80525-3400, USA*

REBECCA A. HENSLEY²

Division of Aquatic and Wildlife Resources, P. O. Box 2950, Agana, Guam 96910, USA

and

THOMAS H. FRITTS

*National Biological Survey, National Museum of Natural History,
Washington, D.C. 20560, USA*

Abstract—The snake-eyed skink (*Cryptoblepharus poecilopleurus*), widespread in the Pacific Basin, has been characterized as terrestrial, arboreal, beach-associated, and forest-dwelling, depending on the part of the range surveyed. All these habitat characterizations are represented in the Mariana Islands, but except on Guguan the species may occupy different subsets of these, even on adjacent islands. While reasons for these island habitat differences in the Marianas are enigmatic, this apparent plasticity may explain colonization success throughout the Pacific Basin.

Introduction

The snake-eyed skink (*Cryptoblepharus poecilopleurus*) is widespread in the Pacific Basin (Gibbons 1985). In the Mariana Islands, the species has been recorded on 13 of the 15 major islands in the archipelago (Falanruw 1989, Rodda

¹ Present Address: Caesar Kleberg Wildlife Research Institute, Texas A&M University, Kingsville, Texas 78363, USA

² Present Address: Texas Parks and Wildlife Department, 1231 Agnes Street, Corpus Christi, Texas 78401, USA

et al. 1991). The two islands with no records are Farallon de Medinilla and Pagan, but it is likely that further surveys will reveal the presence of this species. In other areas of the Pacific Basin, *C. poecilopleurus* has usually been characterized as a ground-dwelling littoral associate occurring in high-energy environments. Both Schwaner (1980), in American Samoa, and McKeown (1978), in the Hawaiian Islands, typified the species as restricted to rocky beach or strand habitats devoid of vegetation. In the Palau Islands, Wiles & Conry (1990) reported sightings in beach-associated forest. In contrast, in the Cook Islands, Crombie and Steadman (1986) found *C. poecilopleurus* in open woodlands not associated with littoral habitats and occurring up to 10 m high in vegetation. On Tonga, Pregill (1993) collected specimens on fallen trees and logs, but noted that all specimens came from within 0.5 km of the coast. Our experiences (and data associated with museum specimens) from most islands in the Mariana archipelago indicate that *C. poecilopleurus* can occur in a variety of habitats including those mentioned above. This information also suggests that *C. poecilopleurus* can occupy different habitats on adjacent islands.

Methods and Results

Herpetological surveys of most of the islands in the U. S. Commonwealth of the Northern Mariana Islands (CNMI) (all islands north of Guam) were conducted in 1988 and 1989 (Rodda et al. 1991). Surveys of the U. S. Territory of Guam and the southern islands of the CNMI (Rota, Tinian, and Saipan) have been intensively conducted since the mid-1980's. Additional information was obtained from field notes associated with specimens deposited at the U. S. National Museum of Natural History and literature records. From a herpetological point, Guam, Rota, Tinian, Saipan, Guguan, Alamagan, and Asuncion are well known (Rodda et al. 1991). Cocos Island, Guam, currently harbors the most diverse herpetofauna in the Mariana Islands (Rodda et al. 1991).

Compilation of these data suggested that all islands in the Mariana archipelago have or are expected to have *C. poecilopleurus* as a component of their herpetofauna. From south to north, the presence and the types of occupied habitat(s) are as follows:

Cocos— On Cocos Island, a small (35 ha) motu on a barrier reef, approximately 2 km south of Guam, *C. poecilopleurus* is a conspicuous member of the herpetofauna where it occurs in large numbers in *Casuarina equisetifolia* (Australian pine) groves along the windward (east) side of the island. Commonly, one or two lizards occur per tree; most sightings of this species have been on trees at heights of 0.1 to 10 m (Hensley & McCoid 1994). This species may occasionally be seen on limestone rubble.

Guam— The only specimen known was collected from "1 mi south of Inarajan" in 1969. Areas south (by highway) of Inarajan are all coastal and it is likely that this specimen was collected in coastal strand forest or beach strand. Recent surveys in the same area failed to yield additional specimens.

Rota— Wiles et al. (1990) judged *C. poecilopleurus* to be uncommon on Rota. The species occurred in strand habitats, but was recorded only at two localities. At both sites, *C. poecilopleurus* was found on the ground in rocky and sandy areas and in low (<1m) *Pemphis acidula* shrubs.

Aguijan— Specimens deposited at the USNM confirm the presence of this species on the island. Craig & Chandran (1992) sighted a single animal on rocks near the ocean.

Tinian— Wiles et al. (1989) mentioned that three specimens were collected in 1985 in a grove of *Leucaena leucocephala* (tangantangan) trees. This suggests that these specimens were arboreal, but since the locality is near the coast, the species might also be beach associated. In 1989, we collected three at night under *C. equisetifolia* bark at Chulu Beach.

Saipan— The earliest known specimens were collected in 1963 (Dryden & Taylor 1969) but lacked information on habitat associations. In early 1993, the species was rediscovered on a small (ca. 3 ha), steep-sided island (Isleta Maigo Luao) off the east coast of Saipan. The species was common on the treeless, grass-covered higher elevations (to 41 m) where it co-occurred with *Emoia atrocostata*, but was absent at lower elevations along the rocky coastline.

Farallon de Medinilla— This island has been closed to surveys because it is used as a bombing range for the U. S. military. No specimens are known from the island, but it is expected that *C. poecilopleurus* will occur there.

Anatahan— Specimens have only been collected on the ground in leaf litter from *Cocos nucifera* (coconut palm) trees. Most specimens came from areas adjacent to the coast.

Sarigan— Similar to Anatahan, specimens have only been collected adjacent to the coast on the ground in leaf litter.

Guguan— In addition to specimens collected along the coast, specimens have also been collected from areas not associated with littoral environments. Both terrestrial and arboreal habitats contain *C. poecilopleurus*. Additionally, Guguan is characterized by loose, volcanic sands and *C. poecilopleurus* will dive into this substrate while being pursued. This 'sand-swimming' evasive behavior is similar to that displayed by North American desert dwelling lizards, *Uma* spp. (Stebbins 1966).

Alamagan— Specimens have been collected on the ground, beneath debris, and are associated with coastal habitats.

Pagan— No specimens have yet been collected from this island, however it is likely that *C. poecilopleurus* is present.

Agrihan— Surveys have shown that *C. poecilopleurus* is terrestrial and beach associated, occurring on and beneath debris.

Asuncion— Similar to Agrihan, *C. poecilopleurus* is beach associated, but specimens have been recorded on the ground and in trees.

Maug— Eldredge et al. (1977) and Falanruw (1989) reported terrestrial *C. poecilopleurus* from Maug.

Farallon de Pajaros (Uracas)— Falanruw (1989) observed ground-dwelling *C. poecilopleurus* on this island.

Discussion

While habitat characterizations of *C. poecilopleurus* on some of the poorly known islands (Aguijan, Anatahan, Sarigan, Agrihan, Maug, and Farallon de Pajaros) may be incomplete, characterizations on well known islands (Guam, Rota, Tinian, Saipan, Guguan, Alamagan, and Asuncion) indicate a wide array of occupied habitats.

Cryptoblepharus poecilopleurus in the Mariana Islands is known to be terrestrial and arboreal, and to occupy littoral and inland habitats, but only on one island (Guguan) are all these options utilized. Guguan is also the only island where fossorial activity has been noted. *Cryptoblepharus poecilopleurus* which are chased to the ground on Cocos Island in areas of loose sand have never been observed to employ 'sand-swimming'. This may be due to differences in the sand characteristics; sand particles on Guguan are larger than those on Cocos Island and less compacted (Rodda et al. 1991).

The reasons for perceived habitat associations of *C. poecilopleurus* in the Mariana Islands are problematic. The coexistence with *Emoia caeruleocauda* (Scincidae) has been invoked (Rodda et al. 1991) to explain occupation of littoral and arboreal habitats by *C. poecilopleurus*. Presumably, the terrestrial and forest-dwelling *E. caeruleocauda* excludes *C. poecilopleurus* from utilizing similar habitats. However, in the southern Mariana Islands (Cocos, Guam, Rota, and Saipan), *E. caeruleocauda* can also be arboreal. On Cocos Island, *C. poecilopleurus* is primarily arboreal and most abundant in Australian pine groves. *Emoia caeruleocauda* is also arboreal on Cocos Island but in the dense, interior forest. By early 1993, after two defoliating typhoons in 1990 and 1991, *C. poecilopleurus* invaded the vegetationally simplified forest where it then co-occurred arboreally with *E. caeruleocauda*. This suggests an additional factor that may affect local distributions in the Marianas from year to year. Crombie & Steadman (1986) indicated that *C. poecilopleurus* preferred sunny exposures, suggesting that the species is heliotropic. This observation, coupled with observations of this species in exposed habitats on many of the islands in the Marianas, seems to explain currently occupied habitats. Enigmatically, *C. poecilopleurus* co-occurs with *Emoia atrocostata* in exposed, littoral habitats on Rota and in grass-covered higher elevations on Isleta Maigo Luao (Saipan), yet has not been recorded syntopically on Cocos Island or the rocky shore areas of Isleta Maigo Luao. *Emoia atrocostata* on Cocos Island exclusively occupies the high energy splash/*Pemphis acidula* zone, similar to Rota.

Possible differences in habitat use due to morphological and biochemical differences between island populations of *C. poecilopleurus* have not been investigated. However, Falanruw (1989) mentioned that specimens from Maug and Farallon de Pajaros were darker in coloration than those from more southern islands.

Although reasons may be obscure for the pattern of inter-island habitat use in the Marianas at this time, *C. poecilopleurus* displays a high degree of ecological plasticity that is evident in this use of varied habitats. The general trend in the

Marianas is of a terrestrial, beach-associated species. This portrait mirrors previous characterizations by Schwaner (1980) and McKeown (1978). However, the species is also known to be arboreal and occupy inland forests in the Mariana Islands. This plasticity may contribute to the species' apparent ability to successfully colonize and invade habitats on many islands in the Pacific Basin. These data also suggest that habitat characterizations may not always be reliable predictors of natural history parameters of species that are poorly known or occur in areas that are incompletely surveyed.

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