On Tutuala Island, 26 toads were collected in suburban and park areas in the village of Taufa'a and 28 were collected in secondary forest and primary rainforest (forest) of Amalao and Obovalo Crater near Fatuga. Toads were collected from 24 October 1992 to 13 July 1994 and always 2-4 h after sunset to allow some time for foraging by the toads. Collected toads were immediately placed in plastic bags and frozen until processing.

<table>
<thead>
<tr>
<th></th>
<th>Combined</th>
<th>Suburban/Park N = 26</th>
<th>Forest N = 28</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVL (mm)</td>
<td>97.2 (13.9)</td>
<td>88.5 (11.9)</td>
<td>105.4 (10.2)</td>
<td>0.000</td>
</tr>
<tr>
<td>JW (mm)</td>
<td>36.9 (5.5)</td>
<td>33.8 (4.9)</td>
<td>39.8 (4.3)</td>
<td>0.000</td>
</tr>
<tr>
<td>BM (g)</td>
<td>90.6 (41.8)</td>
<td>68.0 (29.9)</td>
<td>111.6 (37.0)</td>
<td>0.000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Suburban/Park N = 26</th>
<th>Forest N = 28</th>
<th>P</th>
</tr>
</thead>
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<tr>
<td>Entire contents (g)</td>
<td>7.3 (1.8)</td>
<td>4.7 (3.2)</td>
<td>0.001</td>
</tr>
<tr>
<td>Animal contents (g)</td>
<td>1.3 (1.7)</td>
<td>2.9 (2.1)</td>
<td>0.004</td>
</tr>
<tr>
<td>Plant/grit contents (g)</td>
<td>1.0 (1.2)</td>
<td>1.8 (1.9)</td>
<td>0.058</td>
</tr>
</tbody>
</table>

Intact toads, entire stomach contents, animal content of stom-achs, and plant/grit content of stomachs were weighed to the near-est 0.1 g on a triple-beam balance. Snout-vent length (SVL) and maximum width of the jaws was measured with dial calipers to the nearest 0.1 mm. Animal prey were identified to the lowest possible taxonomic level and quantified.

Forest toads were longer, had wider gaps, and weighed more than suburban/park toads (Table 1). In addition, the stomachs of forest toads contained twice as much food by mass as did those of suburban/park toads. Animal contents, but not plant/grit contents, of the stomachs were significantly greater in forest toads (Table 2).

Toads in both habitat types took a wide variety of prey (Table 3). Nearly one half of the prey taken by forest toads was milli-pedes, whereas suburban/park toads took more moths, caterpillars, and beetles. The largest centipede taken was 51 mm long. Termites, geckos, and dog food were also eaten by toads in suburban/park habitats (P. Craig, B. Grant, P. Trail, pers. comm.), but the latter two items were not found in the stomachs of this study. Nearly equal numbers of animal prey were found in suburban/ park toads (227) as in forest toads (217). Because the animal con-

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**Prey of the Introduced *Bufo marinus* on American Samoa**

GILBERT T. GRANT

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The giant cane or marine toad, *Bufo marinus*, is native to Central and northern South America (Zug and Zug 1979) but has been widely introduced to islands in the West Indies, the Pacific, Australia, and New Guinea (reviewed by Zug et al. 1975). In many areas it was introduced primarily to control sugar cane insect pests and has apparently been fairly successful in some areas in reducing damage to this crop (Wolcott 1937).

*Bufo marinus* was introduced from Hawaii to Tutuala Island (14°20′5, 170°43′W), American Samoa, in 1953 and the population was estimated to be over 2 million by 1976 (Amerson et al. 1982). Toads occur island-wide on Tutuala, have colonized neighboring Aunu’u Island, but do not presently occur on the nearby islands of Tauf, Ofo, and Olasega, nor on Savaii and Upolu of Western Samoa.

Marine toads have catholic tastes (Alexander 1965; Hinkley 1963; McCoid 1994; Zug et al. 1975). The purpose of this study was to examine the food habits of marine toads in two different habitats on Tutuala, American Samoa.

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tents in stomachs weighed twice as much in forest toads, indi-
vidual prey items were substantially larger, on average. 
Toads took substantial quantities of plant material. Eighteen 
(69.2%) of suburban/park toads and 20 (71.4%) of for-
est toad stomachs contained plant material. Many very small
arthropods were found among the vegetation in some toad stom-
achs. Two pieces of plastic wrap measuring 4 cm x 2 cm and 3 cm
x 2 cm were found in one forest toad.
Zug et al. (1975) reported that B. marinus in rainforest habitats
of New Guinea were both longer and heavier than savannah toads,
a finding similar to that reported here. The body size differences
reported in savannah and forest toads was attributed to the
greater quantity and quality of food taken by forest toads (Zug
et al. 1975). The size differences observed in American Samoan
toads may be attributed to prey quality and quantity, sex, ratio
differences in the populations, or increased mortality rates in the
suburban/park population. Unfortunately, I did not sex toads col-
lected in this study. Zug and Zug (1979) showed that in neotropical
populations females attained larger body size than males and that
sex ratios varied in different populations. Some populations had
twice as many males as females; others had twice as many fe-
males as males. Increased mortality rates were likely in the Sa-
mona suburban/park habitat due to the presence of street lights
and roads. Surface water for breeding was available in both Sa-
mona habitats. Thus, the size differences are probably not due to
differential recruitment rates.
Samoan forest toads consumed twice the quantity and animal
content as did the suburban/park toads. Prey diversity was much
greater in New Guinea toads (Zug et al. 1975) than Samoan toads,
probably due to decreased prey diversity on small, distant islands.
B. marinus is known to consume a wide variety of prey, in-
cluding geckos, other toads, arthropods, vegetable matter, dog,
and cat food, and discarded pork spare ribs (Alexander 1965;
Hinkley 1963; McCoid 1994; Zug et al. 1975; this study).
Many small arthropods (especially beetles and true bugs, Table
3) were found among some of the plant material in toad stom-
achs. Perhaps these arthropods were taken incidental to feeding
on plant material, or conversely, the taking of plant material was

| Table 3. Animal prey of 54 B. marinus in two habitats on Tutuala, American Samoa (N = sample
size, NS = number of individuals with a particular prey item, NP = number of prey items). |
<table>
<thead>
<tr>
<th></th>
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<td>Suburban/Park (N = 36)</td>
<td>Forest (N = 28)</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Prey Types</td>
<td>NS</td>
<td>%</td>
<td>NP</td>
<td>%</td>
<td>NS</td>
<td>%</td>
<td>NP</td>
</tr>
<tr>
<td>Moluccata Smalls*</td>
<td>7</td>
<td>9.0</td>
<td>16</td>
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<td>7.0</td>
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<tr>
<td>Slugs</td>
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<td>Araneida</td>
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<td>1</td>
<td>0.4</td>
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<tr>
<td>Diplopoda</td>
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<td>11.5</td>
<td>24</td>
<td>10.6</td>
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<td>Orthoptera</td>
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<td>1</td>
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<tr>
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<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

* includes 2 Oxydes irigatus and 20 Subalutes octona.
** includes a fish scale 12 mm long and the tibia of Rattus sp.
incidental to the taking of small arthropods. The presence of a Rhus sp. tibia and a fish scale in toad stomachs is probably best attributed to incidental take while feeding on arthropods associated with carrion. Prey taken by neotropical populations of toads varied from one locality to the next and probably reflects the seasonal and habitat abundance of prey (Zug and Zug 1979).

Zug et al. (1975) reported toad densities 10 times greater in savanna habitats. I made no attempt to quantify densities. However, on Tutuila, American Samoa, population densities of B. marinus are highest in lowland areas with mowed lawns and villages and lowest in upland villages and forests (Amerson et al. 1982).

Acknowledgments.—This paper benefited from reviews by P. Craig, M. J. McCoid, W. Meshaka, J. P. Powell, and M. Shields. This study was funded by the Federal Aid in Wildlife Restoration Act administered by the U.S. Fish and Wildlife Service.

LITERATURE CITED


Bufo marinus (Cane or Marine Toad). USA: Puerto Rico; Caribbean National Park. Illustration by Karen A. Wilson.

Herpetological Review 27(3), 1996