

effectively at the site following disturbance. In order to document revegetation of the site, we also measured changes in the biomass of plant material over time. Although the rate of increase slowed in 1999 (1.05 m³/month) compared to 1998 (1.52 m³/month), the total biomass of vegetation at the site continued to grow throughout the study period.

Public education is key to the success of any conservation program. Thanks to a supplemental award from the National Science Foundation's Informal Education Program, we have been able to incorporate a public education component into our work on the base. Although Cuban iguanas comprise a conspicuous component of the local fauna and have been adopted as an informal mascot by many base residents, their biology and conservation status are not widely understood or appreciated. A major focus of our educational efforts has been to provide opportunities for the general public to participate actively in our field research effort. On three separate trips in 1997, we offered interested volunteers on the base the opportunity to participate in standardized iguana censusing and help collect data on antipredator and thermoregulatory behavior. Feedback from over 40 participants in the form of surveys was overwhelmingly positive, with 93% of respondents finding the research experience extremely worthwhile, 83% of respondents experiencing a positive shift in attitude regarding scientific research following their field experience, and 90% of respondents indicating that they would recommend the research experience to other base residents.

In collaboration with HVS Productions, we also produced a video that describes the basic biology of iguanas, their conservation status and requirements, and the goals, study methods, and results of our research program. Copies of the videotape have been distributed to the environmental office, library, and schools on the base. On each of our trips to the base, we have offered public lectures at which we provide information on iguanas, their conservation status, and how to appreciate and enjoy them without harming them. We have given numerous presentations to both elementary and secondary students on the base, prepared an endangered species pamphlet for incoming base personnel, and designed an Iguana Crossing sign for sites on the base where road casualties were known to have occurred.

Our work at Guantanamo Bay is but one example of the many contributions zoos are making to the conservation of West Indian iguanas. Over 20 American Zoo and Aquarium Association (AZA) member institutions have provided direct funding and other resources to West Indian iguana conservation projects, primarily in Jamaica, but also in Dominica, the Cayman Islands, the Dominican Republic, the Bahamas, the Turks and Caicos Islands, and the British Virgin Islands. With the help of zoos and other dedicated conservation partners, some of the rarest and most impressive lizards in the world are starting to make a comeback.

FURTHER READING

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NATURAL HISTORY NOTES

Instructions for contributors to Natural History Notes appear in Volume 33, Number 1 (March 2002).

GYMNOPHIONA

OSCAECILIA ZWEIFELI (Zweifel's Caecilian). **PREDATION.** Virtually nothing is known about the ecology of *Oscacilia zweifeli* (Lescure and Marty 2000. *Atlas des Amphibiens de Guyane*. Patrimoines Naturels, 45). At the field station of Nouragues (4°5'N, 52°41'W 110 m elev.), 8 km N of Saut Pararé, Arataye River, French Guiana, during the rainy season on 25 May 1999, one of us (RB) found, under a rotted trunk on the ground, an *O. zweifeli* (Muséum National d'Histoire Naturelle, Paris [MNHN] 1997.6482) whose head was maintained by the chelicera of an adult giant tarantula, *Theraphosa leblondi* (Theraphosidae) (Fig. 1). The tarantula had produced a silk cocoon around the head of the dead caecilian; the head was already partly digested. When disturbed, the tarantula raised its forelegs and threw urticating setae. This specimen of *O. zweifeli* is the second one known from French Guiana, the species having been recorded in that country only from a single specimen from Cayenne (Lescure and Marty, *op. cit.*).

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FIG. 1. Giant tarantula, *Theraphosa leblondi* (Theraphosidae) preying on a Zweifel's caecilian, *Oscacilia zweifeli*, at Nouragues Field Station, French Guiana, May 1999.

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CAUDATA

AMBYSTOMA LATERALE (Blue-Spotted Salamander). **HABITAT.** On 6 April 2001, a gravid female *Ambystoma laterale* was collected at George Wyth Memorial State Park, Cedar Falls, Black Hawk County, Iowa, USA. On 7 April 2001, a male (evidenced by a swollen cloaca) was collected at the same locality. *Ambystoma laterale* are listed State Endangered by the Iowa Department of Natural Resources and are only found at two sites within the State, Behrens Ponds, Linn County, and George Wyth Memorial State Park, Black Hawk County.

Before this study, only one individual of *A. laterale* had been reported (by a park visitor) at the George Wyth Memorial State Park site (1996) since the completion of the Hwy 218 expansion project in 1989, which runs adjacent to the park. It was feared *Ambystoma laterale* had been extirpated from the George Wyth site because of the altered hydrology caused by the highway expansion. Both specimens were returned to the exact locations where they were found. Future research will concentrate on gaining an accurate estimate of the size and genetic diversity of this geographically disjunct population.

We thank Gary Dusenberry (Director of George Wyth Memorial State Park) and the students of Field Zoology at UNI for their assistance. We also thank James W. Demastes for confirming the species identification and the opportunity to search for the salamanders under Iowa DNR permit number SC-5530101.

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AMBYSTOMA MACRODACTYLUM KRAUSEI (Northern Long-toed Salamander). **VOCALIZATION.** Vocalization has been documented in many terrestrial salamanders, often in association with defensive or aggressive behavior (Licht 1973. Can. J. Zool. 51:1055–1056; Brodie 1978. Copeia 1978:127–129). On 24 April 2001 at a wetland near Lost Horse Creek in the Bitterroot Mountains, Montana, USA (46°05'91"N, 114°15'82"W), a male *Ambystoma macrodactylum krausei* in breeding condition twice made a squeaking noise and three times produced a series of rapid clicks while being manipulated for photographs. The squeaks were produced with the mouth closed and might have been caused by expelling air through the nostrils. The clicks were produced by the salamander inflating its body and rapidly snapping its jaws 2–3 times. Both types of sound were audible from 0.5 m. Biological significance of the noises is uncertain because no defensive postures or aggressive movements were observed.

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DESMOGNATHUS CAROLINENSIS (Carolina Mountain Dusky Salamander) and **PLETHODON WELLERI** (Weller's Salamander); **DESMOGNATHUS MONTICOLA** (Seal Salamander) and **DESMOGNATHUS WRIGHTI** (Pygmy Salamander). **GYRINOPHILUS PORPHYRITICUS** (Spring Salamander) and **DESMOGNATHUS OCOEE** (Ocoee Salamander).

INTRAGUILD PREDATION. Plethodontid salamanders are generalist predators as well as competitors, and thus fit the definition of intraguild predators (Polis et al. 1989. Annu. Rev. Ecol. Syst. 20:97–330). Hairston (1986. Amer. Nat. 127:266–291) experimentally demonstrated that both predation and competition structure salamander ensembles of *Desmognathus*. However, there is a paucity of records of interspecific predation by salamanders (perhaps because habitat partitioning effectively reduces opportunities for size-mediated predation) and the idea that predation is a significant ecological factor in structuring salamander ensembles has been questioned (Camp 1997. J. Herpetol. 31:613–616). Here I document three different predator-prey interactions based on disgorged stomach contents of wild caught salamanders. On 9 September 1995, a large (SVL 58.6 mm) gravid *Desmognathus carolinensis* was collected along Grandfather Trail on Grandfather Mt., Avery Co, North Carolina (USA) that disgorged a partially digested *Plethodon welleri* (TL 58 mm). On 20 June 1995, an adult *Desmognathus monticola* collected at Glade Gap, Nantahala Mountains, Macon Co., North Carolina disgorged a partially digested *Desmognathus wrighti*, not previously reported from this area. In September 1987 I flushed the stomach of an adult *Gyrinophilus porphyriticus* captured at Whiteside Mountain, Jackson Co., North Carolina; it disgorged a large male *Desmognathus ocoee* (SVL >50 mm).

These observations document three different predator-prey interactions involving six different species. In each case, not surprisingly, the larger individual ate the smaller individual, suggesting that body size evolution in plethodontids that coexist with other species of salamanders can drastically alter a species' role as predator or prey. For example, the large body size attained by *Desmognathus carolinensis* at high elevations throughout its range may be an example of ecological release. At these high elevation sites, it occupies a territory largely devoid of the large aquatic species (e.g., *D. monticola*, *D. quadrimaculatus*, and *Gyrinophilus porphyriticus*) that normally prey upon the smaller species. Such ecological release may drive evolution of body size in high elevation populations of *D. ocoee* and *D. carolinensis* allowing these species to take on the role of dominant predator to prey upon smaller species.

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GYRINOPHILUS PORPHYRITICUS (Spring Salamander). **MALE COMBAT.** Behavioral interactions among plethodontid