

THE TROPHIC ECOLOGY OF TWO OMMASTREPHID SQUID SPECIES,
OMMASTREPHES BARTRAMII AND *STHENOTEUTHIS OUALANIENSIS*, IN THE
NORTH PACIFIC SUB-TROPICAL GYRE

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Abstract

This paper examines the trophic ecology of the squids *Ommastrephes bartramii* and *Sthenoteuthis oualaniensis*, using stomach contents and stable isotopic techniques. Simple energetics models were constructed using some of the data collected.

Samples for stomach contents were collected from 1996-2001 and 323 *O. bartramii* and 302 *S. oualaniensis* were captured. Fish and cephalopod remains dominated the stomach contents. Myctophids were found most abundantly in both squids, *Symbolophorus evermanni* was recovered at the highest percentage (7.5%) in *O. bartramii*, while *M. lychnobium* or *spinosum*, *Lobianchia gemellerii*, and *Myctophum selenoides* were all recovered at similar proportions ($\approx 5\%$). Of the Myctophidae found in *S. oualaniensis* stomachs, *S. evermanni* was the most abundant (37%), followed by *C. warmingii* and *H. proximum/rheinhardti* (both $\approx 15\%$), and *M. lychnobium* (5%). Beaks from Onychoteuthidae occurred most frequently (14%) in *O. bartramii*, while Histioteuthidae, Enoploteuthidae, and unidentified beaks all occurred at similar frequencies (10-12%). In *S. oualaniensis*, Enoploteuthidae occurred most frequently (17%) followed by Onychoteuthidae (10%). The diet of *O. bartramii* was more general while *S. oualaniensis* diet was more specialized on certain prey groups.

From 1998-2001 samples were taken from captured squids for stable isotope analyses, 143 *O. bartramii* and 160 *S. oualaniensis*. SIA was conducted on the mantle muscle of *O. bartramii* that were divided into five categories based on mantle length, (1-7 mm) was 6.4‰, (75-100 mm) was 6.9‰, (200-300 mm) was 11.1‰, (300-400) was 13.3‰, (400-570 mm) was 12.8‰. The $\delta^{15}\text{N}$ values for all *O. bartramii* mantle muscle samples showed a logistic increase with mantle length. The mean $\delta^{15}\text{N}$ value for *S. oualaniensis* sub-adult and adult mantle muscle (128 to 324 mm) was 8.2 ‰ The mean $\delta^{15}\text{N}$ value for paralarvae was 6.2‰. The $\delta^{15}\text{N}$ values for all *S. oualaniensis* mantle muscle samples showed an exponential increase with mantle length.

Eye lenses, and blood samples were also taken from each squid species and showed similar patterns of $\delta^{15}\text{N}$ increase with mantle length respectively, blood was unavailable in the smaller size ranges of *O. bartramii*.