SHORT COMMUNICATIONS

A TEMPORAL STUDY OF NICHE BREADTH AND OVERLAP IN TWO SYMPATRIC SPECIES OF MYSTACOCARIDA (CRUSTACEA)

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During a temporal study of the psammolittoral meiofauna in Algoa Bay two mystacocarid species were encountered and found to overlap in distribution on Sundays River beach (33°43'S/25°53'E). *Derocheilocaris delamarei* was originally described from Angola by Hessler (1972) while *D. algoensis* was described from Algoa Bay (McLachlan & Grindley 1974). These two species differ only in size and minor anatomical features such as length of furcal setae and shape of cephalon, yet they can be relatively easily recognized and they overlap in distribution. As this is one of only two recorded cases of overlap of mystacocarid species, the other being in Israel (Masry & Por 1970), Hessler suggested that an investigation on Sundays River beach might throw some light on whether these are really distinct species.

Details of the physical and chemical features as well as the meifauna of Sundays River beach have already been published (McLachlan 1977*a*, *b*; McLachlan & Furstenberg (1977)), but no temporal or detailed comparison of the distribution of these two species was made. The data used here were collected over a period of thirteen months at three tide levels and a series of 15 cm depth ranges in the sand during the study of McLachlan & Furstenberg (1977) (Table 1).

From these data indices of niche breadth and overlap were calculated as follows:

$$1 \ldots\ldots\ldots B = 1 \Big/ \sum_{i=1}^{n} P_i^2$$

where B is the niche breadth of the species, i.e. a measure of how widely and evenly it is distributed in the study area, P*i* its proportion in the *i* th habitat unit of the environment, and *n* the number of units (Levins 1968). In this study the habitat was the sandy beach and a series of 15 cm depth ranges at each tide level made up the units.

$$2 \ldots\ldots\ldots \underset{ij}{\infty} = \sum_{h} P_{ih} P_{jh} \Big/ \sum_{h} P_{ih}^2$$

where ∞ is the niche overlap or probability of species *j* overlapping species *i*, and P*ih* and P*jh* are the proportions of species *i* and *j* respectively in the *h* th unit of the habitat (Levins 1968). If distribution for the two species is identical, i.e. complete overlap, $\infty = 1$.

Numbers fluctuated during the study period, being lowest during the two summers (less than 50 individuals of each species) and highest in winter (6–VII–74, more than 200 of each species) when both species tended to move towards the surface at mid-water (MW). Gravid females of both species were encountered throughout the year suggesting continuous recruitment in both cases, as already recorded for *D. algoensis* on Kings Beach (McLachlan 1977*c*).

Niche breadth values were all under 5, never reaching 40% of the theoretical maximum value (where distribution would be even throughout the study area) of 13. This shows that both species had specific distribution patterns and were concentrated in certain parts of the intertidal area. On all occasions except 2–X–74 *D. algoensis* had the greater niche breadth and was generally present at both MW and deeper high water (HW) sites while *D. delamarei* was more confined to MW, only penetrating noticeably to low water (LW) on 2–X–74. Neither species was abundant in the upper 30 cm at HW where considerable desiccation of the sand occurred during low tide.

Overlaps were absent with lowest numbers (14–I–75) when *D. delamarei* occurred only at MW and *D. algoensis* only at HW. During the winter peak, however, considerable overlaps were recorded as both species were concentrated

in the upper layers at MW. Overlaps were also relatively high during 8–I–74 when both species were again concentrated at MW.

Although there is definite overlap between these two species it is evident that their distributions differ, with *D. algoensis* occurring from MW to deeper layers at HW and *D. delamarei* concentrating around MW. They therefore tend to segregate vertically when they become sympatric. Further, there was no overlap on 14–I–75, or on another beach, Kings Beach, where only *D. algoensis* occurred (McLachlan & Furstenberg 1977). It appears that these are two distinct species although it is surprising that forms that differ so little anatomically should be sympatric. A study on feeding methods might shed more light on this.

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TABLE 1.

Numbers of *D. delamarei* (*D. d.*) and *D. algoensis* (*D. a.*) 10 cm^{-2} at three tide levels and a series of 15 cm depth ranges on Sundays River beach during 1974/1975. B = niche breadth, ∞ = niche overlap.

∞ = probability of one species overlapping the other.

Tide level and Depth (cm)	8–I–74		5–IV–74		6–VII–74		2–X–74		14–I–75	
	D.d.	*D.a.*	*D.d.*	*D.a.*	*D.d.*	*D.a.*	*D.d.*	*D.a.*	*D.d.*	*D.a.*
LW 0–15	0	0	0	0	0	0	9,4	5,6	0	0
LW 15–30	0	0	0,9	0,9	0	0	27,2	0,6	0	0
LW 30–45	1,5	0	0	2,3	0	0,5	19,3	0	0	0
MW 0–15	0,4	0,4	15,6	2,4	170,7	99,6	4,4	1,6	0	0
MW 15–30	3,7	8,6	31,5	0	94,1	89,9	7,7	46,1	0,3	0
MW 30–45	6,1	8,9	11,9	8,9	48,1	3,7	8,7	41,1	1,3	0
MW 45–60	28,6	5,4	21,5	4,5	38,5	0	1,0	7,8	1,0	0
HW 0–15	0	0	1,0	1,0	0	0	0	0	0	0
HW 15–30	0	0	1,5	1,5	0	0,8	0,3	0	0	0
HW 30–45	0	0	0,5	3,0	0	0,3	0	0	0	1,5
HW 45–60	0	0	0	1,0	0	6,8	0	0	0	13,5
HW 60–75	0	0	0	3,5	0	13,0	0	0,8	0	6,5
HW 75–90	0	0	0	18,0	0	20,3	0	4,5	0	1,8
Total	40,3	23,3	84,4	47,0	351,4	234,9	78,0	108,1	2,6	23,3
B	1,86	2,98	3,86	4,79	2,95	2,95	4,48	2,97	2,28	2,35
∞	0,77	0,48	0,30	0,24	0,92	0,92	0,28	0,42	0,0	0,0

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A POPULATION OF *TYPHLOPS BRAMINUS* (DAUDIN) ON THE CAPE PENINSULA (REPTILIA; TYPHLOPIDAE)

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Typhlops braminus (Daudin, 1803)
Eryx braminus Daudin, 1803: 279.
Type locality: Vizagapatam.

Andrew Smith (1846: pl. 51, fig. 3; pl. 56, figs. 9–16) described a new species of *Typhlops* from South Africa under the name *Onycocephalus capensis* and stated "Inhabits the Interior of Southern Africa, and is found, like other members of the genus, either in the ground or under stones &c." FitzSimons (1937) examined the specimens in the British Museum and under the heading *Typhlops braminus* made the following comment. "There are four specimens of Smith's *O. capensis* in the British Museum regarded as typical. These were described by Smith as from the Interior of Southern Africa and here again a confusion of localities has taken place as the species in question occurs only in Southern Asia and the islands of the Indian Ocean." Roux-Estève (1974) lists Smith's *O. capensis* as a synonym of *T. braminus* and remarks that the type can no longer be found.

Rendahl (1918) described another two *Typhlops* species based on specimens allegedly collected at the Cape in 1906. He named them *Typhlops capensis* and *T. albanalis*, but Roux-Estève considers them to be examples of *T. comorensis* Boulenger and *T. ocularis* Parker respectively.

While working through the South African Museum collection, the writer found six specimens of *Typhlops braminus* from the Cape Peninsula, two more have been brought in recently, and Dr D G Broadley has kindly drawn attention to one in the Transvaal Museum collected by J D Visser. Yet another was found in the Museum grounds by G Avery but, being damaged, was not retained.

Details of the specimens are given in Table 1.

It is clear from the above specimens that there is a thriving colony of *Thyphlops braminus* established on the Cape Peninsula and that the species has spread as far as Plumstead which is some 10 km south of Cape Town. It is obvious that Smith did indeed collect his specimens of *Onycocephalus capensis* in the Cape probably from the Company's garden, but being notoriously casual about precise type-localities, described them as coming from the "Interior" as he did in the case of so many other species. It may appear strange that Smith collected four specimens while only a few more have come to light in the ensuing 125 years. However, as Wall (1921) has pointed out, this snake is incredibly common in Ceylon and