

Table 1 The frequency distribution of workers in 10 size classes based on the log of the interocular distance (IODAI) and 9 size classes based on the log of scape length (SLAI). Two worker samples were analysed, one from raiding columns (COL) and the other from an excavated nest (NEST)

Group	Morphological measurement										Total
	Classes of IODAI										
	1	2	3	4	5	6	7	8	9	10	
COL	4	3	3	2	1	6	14	35	19	3	90
NEST	1	1	5	3	4	7	5	19	28	17	90

Kolmogorov-Smirnov (IODAI Test) $D = 0,2473$ N.S.

Group	Classes of SLAI									Total
	1	2	3	4	5	6	7	8	9	
COL	3	5	3	2	3	1	7	37	29	90
NEST	1	3	3	4	5	4	5	16	49	90

Kolmogorov-Smirnov (SLAI Test) $D = 0,2126$ N.S.

tives, or even replacements were the ergatoid queen to be lost. If they are true gamergates such as those found in *Ophthalmopone berthoudi* Forel (Peeters & Crewe 1984), then their presence in the nest could be explained by the fact that once workers have been mated, and sperm is stored in their spermathecae, their behaviour changes and they no longer participate in foraging activities (Peeters & Crewe, unpublished data; Ward 1981). Indeed, a number of larger workers present in the nest sample were dissected and found to have active ovaries (one indication of a gamergate condition), and these may be the individuals that have ceased to forage. The question of the existence of both ergatoid queens and gamergates in *Megaponera* colonies is being investigated.

Acknowledgements

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Shallow-water trawling off the Swartkops estuary, Algoa Bay

Lynnath E. Beckley

Zoology Department, University of Port Elizabeth
Present address: Zoology Department, University of Cape Town,
Rondebosch, 7700 Republic of South Africa

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Juvenile fish occurring in Algoa Bay off the mouth of the Swartkops estuary were collected using a 3-m beam trawl. *Pomadasys olivaceum*, *Engraulis capensis*, *Caffrogobius agulhensis*, *Argyrosomus hololepidotus* and *Galeichthys feliceps* were the most abundant species in the trawl catches. Despite the proximity of the Swartkops estuary the trawls failed to capture species which are abundant as juveniles in the estuary and it is concluded that the estuary has little influence on the juvenile fish fauna outside the mouth.

Kleinivissies wat in Algoabaai naby die Swartkopsriviermonding voorkom is deur middel van 'n 3 m-balksleepnet gemonster. *Pomadasys olivaceum*, *Engraulis capensis*, *Caffrogobius agulhensis*, *Argyrosomus hololepidotus* en *Galeichthys feliceps* was die volopste spesies in die sleepnetvangste. Kleinivissies wat in die riviermonding volop is, was nie in die sleepnetvangste verteenwoordig nie, en daarvan word afgelei dat die riviermonding die visgemeenskap in die aangrensende see baie min beïnvloed.

In the Eastern Cape, juveniles of various fish species utilize the estuaries (Winter 1979; Beckley 1983a; Beckley in press), the beach surf zone (Lasiak 1981; 1982; 1983) and the inshore marine environment (Wallace & Kok 1983) as nursery areas. To ascertain which juveniles occurred in the area immediately off an estuary mouth, where it was too shallow for the R.V. *T.B. Davie* to operate safely, trawling from a ski-boat was attempted. Six successful trawls were completed in April 1980, July 1980, May 1981, September 1981, December 1981 and March 1982 in the area outside the breakers off the Swartkops estuary mouth (33°52'S/25°38'E) (Figure 1).

The trawling equipment consisted of a 3 m × 1,5 m beam trawl with a stretched mesh of 12 mm. The net was towed by a 6-m ski-boat at a speed of about two knots across the mouth of the estuary as close as possible to the backline of breakers. Trawling was done during daylight with the trawls of 30 min duration. Each trawl covered a distance of about 1,5 km in water 5–7 m deep.

Juveniles of eleven teleost species, three elasmobranch species (Table 1) and some invertebrates including the swimming crab *Ovalipes punctatus* and the swimming prawn *Macropetasma africanum* were captured in the trawls. *Pomadasys olivaceum* was the most abundant fish in the trawls comprising 76% of the total catch and nearly all the specimens were juveniles <60 mm (Figure 2). Lasiak (1982) reported this species to be particularly abundant in the Algoa Bay surf zone whilst Wallace & Kok (1983) found *P. olivaceum* to be the second most important species in their south coast inshore trawls. In the shallow inshore waters along the Natal coast, juvenile *P. olivaceum* are also very abundant and these fish have been found to migrate to deeper offshore reefs on attaining sexual

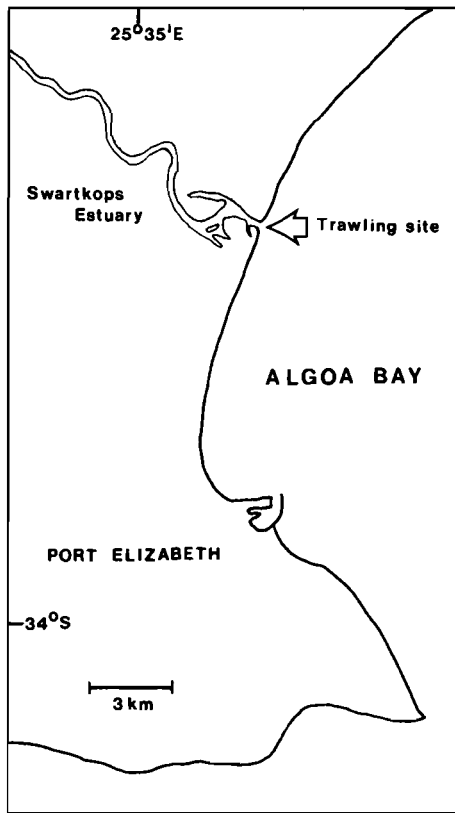


Figure 1 Location of trawling site off Swartkops estuary mouth in Algoa Bay.

Table 1 Catch composition of six trawls off the Swartkops estuary mouth

Name	Number	Size range (mm T.L.)
<i>Pomadasys olivaceum</i> ^{ab}	1186	35 – 91
<i>Engraulis capensis</i>	209	21 – 59
<i>Caffrogobius agulhensis</i>	65	24 – 43
<i>Argyrosomus hololepidotus</i> ^{ab}	35	13 – 228
<i>Galeichthys feliceps</i> ^{ab}	30	52 – 131
<i>Umbrina canariensis</i> ^b	9	36 – 56
<i>Cynoglossus capensis</i> ^b	3	70 – 88
<i>Rhabdosargus globiceps</i> ^{ab}	2	56 – 58
<i>Pomatomus saltatrix</i> ^{ab}	1	147
<i>Amblyrhynchotes honckenii</i> ^{ab}	1	134
<i>Trichiurus lepturus</i> ^b	1	325
<i>Raja miraletus</i> ^b	2	157 – 163
<i>Dasyatis pastinacus</i> ^b	1	370
<i>Torpedo fuscomaculata</i>	1	262

^a = recorded from Swartkops estuary (Winter 1979).

^b = recorded from the Algoa Bay surf zone (Lasiak 1982).

maturity at 130 mm (van der Elst 1981). Juveniles of this species are also found in the lower reaches of Algoa Bay estuaries (Winter 1979; Beckley in press).

The presence of juvenile anchovy *Engraulis capensis* in the trawl catches of December 1981 and March 1982 supports the results of ichthyoplankton studies in Algoa Bay (Beckley 1983b) which found anchovy larvae to constitute 35% of the inshore ichthyoplankton with peak abundance in the mid-summer months. Using the growth estimate of 0.5 mm day⁻¹ (Badenhorst & Boyd 1890) it appears that the anchovies trawled in March (\bar{x} = 42 mm T.L. n = 205) were probably spawned in early January.

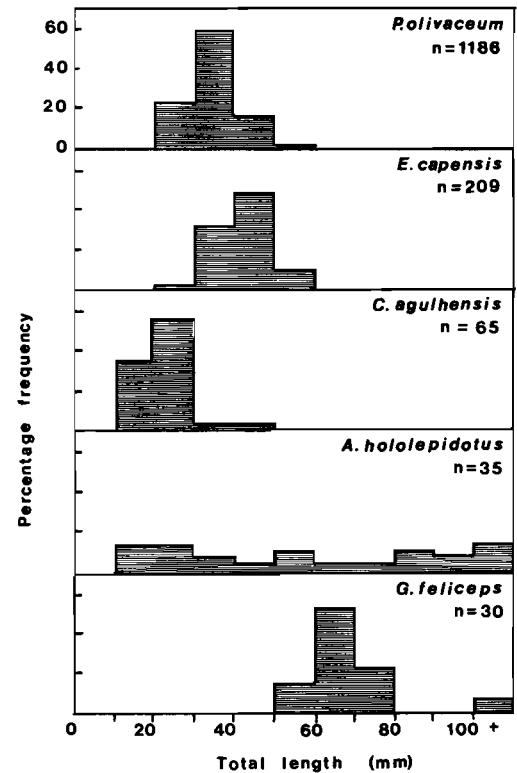


Figure 2 Length frequency distributions of the five most abundant fish species in the trawl catches.

Caffrogobius agulhensis is a small goby which attains 85 mm in length and occurs subtidally from False Bay to East London (Smith 1965). The biology of the species is unknown but those captured were juveniles as none showed gonad development. Juvenile *Argyrosomus hololepidotus* of the size range captured in the trawls (Figure 2) are infrequent in Eastern Cape estuaries (Winter 1979; Beckley in press) and did not occur in the surf zone catches of Lasiak (1982). They were, however, abundant in the south coast trawls of Wallace & Kok (1983) and the inshore marine environment has been identified as the major nursery area of this species.

The *Galeichthys feliceps* juveniles captured off the Swartkops estuary mouth were all greater than 50 mm which is the size at which they are released by the mouth-brooding parent male. Large numbers of juvenile *G. feliceps* were captured in the south coast trawls and east of Cape St Francis this was the most abundant species in the catches (Wallace & Kok 1983). No juveniles were captured in the surf zone by Lasiak (1982) and though juveniles are not abundant in Algoa Bay estuaries (Winter 1979; Beckley in press) adults occur frequently (Marais & Baird 1980; Marais 1981). Marais (1983) has suggested that *G. feliceps* breeds in the mouths of Eastern Cape estuaries.

A comparison of the species occurring in the different coastal environments showed that 39% of the species captured in the trawls off the Swartkops estuary mouth were common to the estuary, 69% to the surf zone and 100% to the inshore marine environment. Despite the proximity of the estuary, the trawls off the mouth failed to capture species such as *Rhabdosargus holubi*, *Lithognathus lithognathus*, *Pomadasys commersonii*, *Solea bleekeri* and *Liza dumerili* which are abundant as juveniles in the Swartkops estuary (Winter 1979; Beckley 1983a). The estuary thus appears to have little influence on the composition of the fish fauna off the mouth and the species captured, with the exception of *Engraulis capensis*, are typical inshore marine species (Smith 1965; van der Elst 1981).

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The reproductive biology of the moony, *Monodactylus falciformis*, in Algoa Bay

Theresa Lasiak

Department of Zoology, University of Port Elizabeth
Present address: Department of Zoology, University of Transkei,
Private Bag X5092, Umtata, Transkei

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Gonadosomatic indices, macroscopic and microscopic examinations of gonads were used to establish the breeding cycle of *Monodactylus falciformis*. Spawning took place between October and February and evidence for serial spawning is presented.

Gonadosomatiese indekse, makroskopiese en mikroskopiese ondersoek van die gonades is gebruik om die broeisiklus van *Monodactylus falciformis* te bepaal. Kuitskiet het tussen Oktober en Februarie plaasgevind en bewys van opeenvolgende kuitskiet word gegee.

The teleost, *Monodactylus falciformis* is widespread in the Indo-pacific region extending almost to the Cape (Smith 1965). It is the third most abundant species caught in the surf off King's Beach, Algoa Bay, accounting for 10% of the numbers landed (Lasiak, in press). Being of no commercial significance, little is known of its biology. Juveniles and sub-adults are fairly common in estuaries (Whitfield 1980; Marais & Baird 1980; Beckley 1983 and Marais 1983), whereas the moonies caught off King's Beach were all sexually mature.

Moonies were collected monthly between September 1978 and October 1980 by seine netting in the surf zone in Algoa Bay. Gonadosomatic indices were estimated and summarized monthly for the separate sexes. The maturation state of each

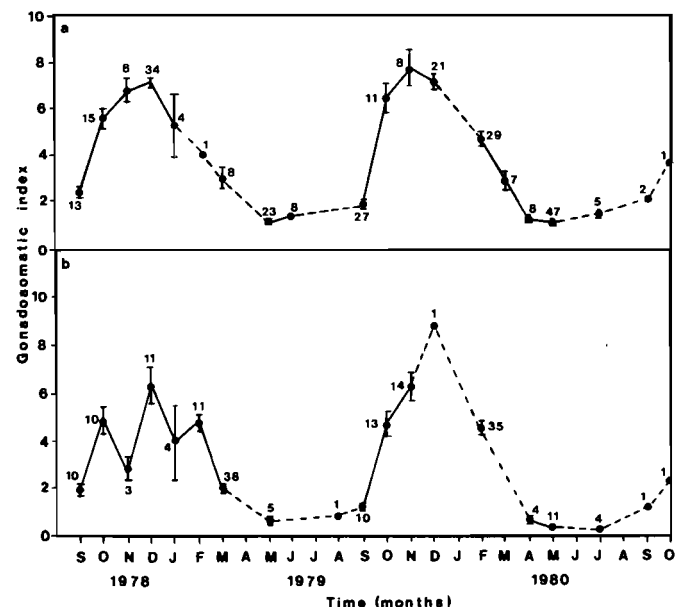


Figure 1 Seasonal variations in the gonadosomatic indices of (a) female and (b) male *M. falciformis*. Data are given as mean \pm S.E.M. Numbers denote sample size.