Short Communications

Frequency distribution of worker sizes in *Megaponera foetens* (Fabricius)

R.M. Crewe,* C.P. Peeters and M. Villet

Department of Zoology, University of the Witwatersrand,
1 Jan Smuts Avenue, Johannesburg,
2001 Republic of South Africa
*To whom correspondence should be addressed

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The sizes of workers from raiding columns and an excavated colony of *Megaponera foetens*, were determined using measurements of interocular distance and scape length. These measurements confirmed that workers exhibit monophasic allometry. Analysis of the frequency distribution of worker sizes in samples taken from columns and the nest, did not reveal any significant differences, indicating that workers of all sizes are recruited for foraging. However, the two largest size classes of workers predominate in the samples from the nest, suggesting that these individuals may be involved in reproduction.

Die grootte van werkers versamel vanuit roofkolonne en 'n opgegraafde kolonie van *Megaponera foetens*, is bepaal deur meting van die interokulêre afstand en die lengte van die eerste segment van die antenna. Hierdie metings bevestig dat die werkers enkelfase-allometrie vertoon. Daar was geen statistiese betekenisvolle verskil tussen die frekwensiedistribusie van werkergroottes in monsters wat uit die kolonne en die nesholte geneem is nie. Die range van die grootste werkers in die monsters van die kolonie het egter die vernaamste deel uitgemaak, en dit het voorgekom asof hierdie individue by voortplanting betrokke was.

The Matabele ant *Megaponera foetens*, which is renowned for its raiding columns which attack termitaria, has notably polymorphic workers. The workers have been regarded as dimorphic by taxonomists (Arnold 1915; Bolton 1973). However, measurements of head width versus head length on a double logarithmic plot on a sample of 23 workers by Wilson (1953) indicated that rather than being dimorphic, this species exhibited monophasic allometry (i.e. the allometric regression line has a single slope). This was confirmed by Longhurst & Howse (1979) on a sample of 384 workers.

As part of a study of reproductive behaviour in ponerine ants, we collected samples of workers from both raiding columns and a mature colony of *M. foetens* that we excavated in the Tuli Block, Botswana. Raiding columns of the excavated nest were not sampled, and its excavation took place after its raiding columns had returned to the nest. These samples were then used to determine whether the frequency distribution of sizes in the two samples was the same. The samples of individuals from the raiding columns were mixed, and a random sample of 90 ants removed. Similarly, a sample of 90 workers from those individuals obtained from the excavated nest was removed. Using an eyepiece micrometer, the interocular distance and the scape length were measured for each of the 180 ants. A double logarithmic plot (Figure 1) of these measurements confirmed that the samples of workers that we were dealing with exhibited monophasic allometry as had been demonstrated previously. Using these two morphological measures, the two samples were divided into a number of arbitrarily defined size classes and frequency tables generated (Table 1).

In Table 1, interocular distance has been divided into 10 size classes, and there are nine classes of scape length. In order to test whether the two distributions of worker sizes were significantly different from each other, the non-parametric Kolmogorov-Smirnov test was used. The Kolmogorov-Smirnov D values (Table 1) were not significant at the 5% level.

The fact that these two frequency distributions are not significantly different from each other, is the first quantitative demonstration that all worker sizes are involved in foraging. Indeed, Longhurst & Howse (1979) in their discussion of recruitment in this species said: 'If recruitment was successful, a column of ants, containing all worker castes, emerged from the nest . . .'. Our data support their contention, but emphasize that division of labour in this species is not simply based on caste polytheism.

Examination of individual size classes within the frequency distribution given in Table 1, shows that individuals in the largest two size classes are more numerous in the colony sample. This is significant in that it may indicate that some of the larger workers in *Megaponera* may be gamergates (= mated workers). These gamergates could act as auxiliary reproduc-

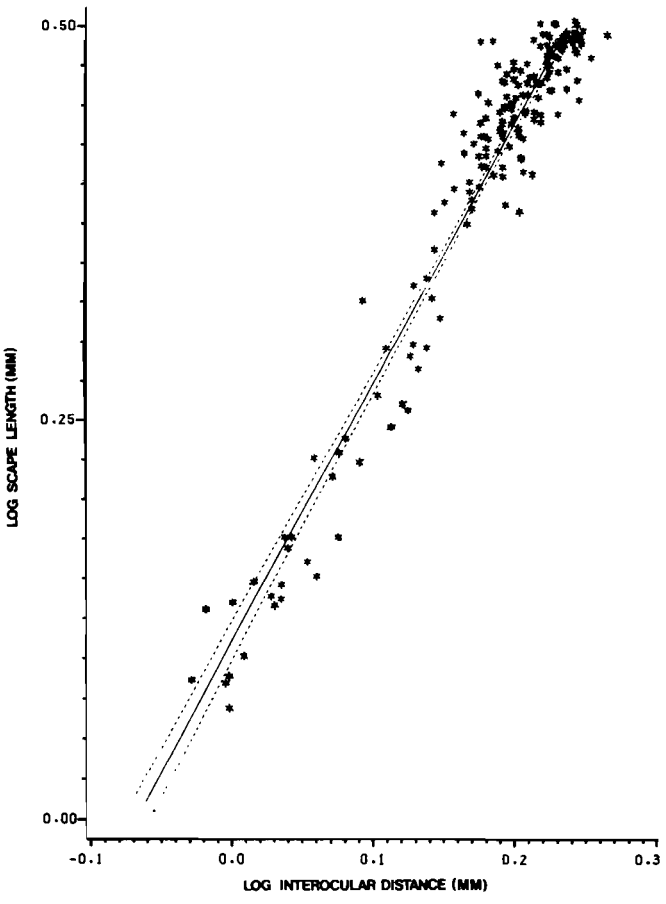

Figure 1 Monophasic allometry indicated by the double logarithmic plot of interocular distance against scape length for the 180 *Megaponera foetens* workers sampled from raiding columns and an excavated nest.

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)

	Morphological measurement										
	Classes of IODAI										
Group	1	2	3	4	5	6	7	8	9	10	Total
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.

	Classes of SLAI									
	1	2	3	4	5	6	7	8	9	Total
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.

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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.

Kleinvissies 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. Kleinvissies 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