

BURROWING IN THE EAST AFRICAN MANGROVE CRAB,
CHIROMANTES ORTMANNI (CROSNIER, 1965) (DECAPODA,
BRACHYURA, SESARMIDAE)

BY

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Crabs are the most abundant of the mangrove macro-fauna and are a valuable asset to the mangrove ecosystem. Burrowing crabs are particularly important and many should be considered ‘ecological engineers’ (cf. Jones et al., 1994). Crabs aerate the sediment by burrowing (Micheli et al., 1991), reduce pore water salinity by allowing flushing of the sediment via their burrows (Ridd, 1996), trap energy within the mangrove forest (Robertson, 1986; Lee, 1998), create microhabitat for other fauna (Bright & Hogue, 1972; Gillikin et al., 2001), contribute to secondary production (Lee, 1997), and increase the amount of nutrients and decrease the sulfide concentration in the sediment due to their burrowing activities (Smith et al., 1991). Therefore, it is important to have knowledge of which species are burrowing and which are not.

Currently, the burrowing ecology of many mangrove crabs is not well documented. In East Africa, little is known about the burrowing behavior of *Chiro-mantes ortmanni* (Crosnier, 1965), *C. eulimene* (De Man, 1895), *Perisesarma guttatum* (A. Milne-Edwards, 1869), and *P. samawati* Gillikin & Schubart, 2004. All of these species are highly mobile and can easily be found in high densities in their respective habitats. *Perisesarma guttatum* has been noted to only create burrows in dry areas where no other shelter (roots, crevices) is available, but no data or references were given regarding these observations (Skov, 2001; Skov & Hartnoll, 2002). The newly described *P. samawati* probably burrows or maintains crevices, but this is also not certain (Gillikin & Schubart, 2004). Currently, it is believed that both *Chiromantes* species do not burrow, but utilize the burrows of other species, such as *Neosarmatium meinerti* (De Man, 1887) (cf. Gillikin, 2004). However, Hartnoll (1975) did list *C. ortmanni* as a burrower, but no further information was provided.

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To test if indeed *Chiromantes ortmanni* can construct burrows, a preliminary laboratory experiment was conducted in Gazi Bay, Kenya. Two buckets, each containing approximately 4 liters of firmly packed sand were watered with 1 liter of full strength seawater and the surface smoothed. Two individuals of *C. ortmanni* were placed into each bucket, with bucket 1 containing crabs with carapace widths (CW) of 22.3 and 12.9 mm, and bucket 2 with crabs of 19.9 and 10.2 mm CW. Two fresh green *Avicennia marina* (Forsk.) Vierh. leaves were also provided in each bucket. Observations were recorded at least daily for eight days (22-30 May 2005). Within eight hours, the sand in both buckets showed signs of digging, with depressions about 1 cm deep. The next day, bucket 2 had a burrow 2.5 cm deep, as well as a shallow depression. The larger crab in bucket 1 consumed the smaller crab, illustrating that this species is carnivorous. After the second day, bucket 2 had two burrows and on the third day, three burrows. Burrows were only deep enough that the crabs could fully hide their bodies within them. However, after eight days, the burrows extended to the bottom of the bucket (9 cm deep). Burrows were single-shafted and were at a slight angle ($\sim 70^\circ$ from horizontal), they were not turreted (they were more or less smooth with the surface) and were each about 2 cm in diameter. Bucket 1 still only had a slight depression after eight days. Therefore, to test if the crab in bucket 1 did not burrow because it was alone (e.g., because of the absence of a threat of another crab), another experiment was conducted with only one crab (12.5 mm CW). Similar to bucket 2 with two crabs, this lone crab also burrowed, so the crabs in bucket 2 did not burrow because of the presence of a second crab.

These preliminary results therefore prove for the first time that *C. ortmanni* are well suited for burrowing. Whether or not they regularly maintain burrows in the field remains to be tested, but they probably behave as Skov and co-workers suggested that *P. guttatum* behave: only burrowing when they have a need to (Skov, 2001; Skov & Hartnoll, 2002). It is clear that when disturbed, *C. ortmanni* will retreat into the burrows of other crabs (Gillikin, 2004). However, *C. ortmanni* inhabit regions of the mangrove where the larger burrowing crab species, *Neosarmatium meinerti* are absent (Gillikin, 2004), and probably do actively burrow in these regions. We suggest that similar experiments be carried out for other species whose burrowing ecology is unknown, in addition to in situ field experiments.

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