

Short Note

Tagging study reveals interesting red crab (*Geryon maritae*) movements off Namibia (South West Africa)

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During the period 1979 to 1984, a total of 10 246 red crabs were tagged and released in three areas on the Namibian commercial red crab grounds (which fall roughly between latitudes 17°12'S and 22°00'S and depths of 400 and 900 m). This short note reports some interesting and unexpected movements revealed by recaptures. *Geryon maritae* movement and its relevance to the Namibian fishery is discussed more fully elsewhere (Melville-Smith, 1987).

Chi-square contingency tests on a portion of the data showed that large male crabs (≥ 105 -mm carapace width) moved significantly farther than small males do ($P < 0.01$), but considering that the distances ranged by males of all sizes were relatively limited (only about 10% moved more than about 36 km), the data were not separated by size.

The movements of males were compared with those of immature females (the maturity of the females was established according to the method described by Melville-Smith (in press)), but no significant difference was found between these two groups ($P > 0.50$), and they were therefore combined and tested against the distances moved by mature female crabs. This latter group was found to move significantly farther ($P < 0.001$) than the rest of the population and, in line with this finding, they were treated separately in further analyses.

All usable recapture data collected over a six-year period are presented in Figure 1. In addition to showing the extent of the distances covered by mature females (approximately 32% moved more than 100 km, compared with only 3% of the males and immature females), the figure also shows that both sexes tended to move northwards and then generally dispersed farther from their point of release than those that went southwards. Though numerous tests were performed on the data, no correlation was found between season and extent or direction of movement.

The above trends, together with other data, suggest that mature female *Geryon maritae* may be more active foragers and as a result cover greater distances than males and immature females. It is further postulated

that the northern Namibian crab grounds are environmentally more suited to red crab (as is evident from higher catch per unit effort figures in the north than the south (Melville-Smith, unpub. data)) and that crabs moving northwards are therefore more likely to remain or even wander farther north than those moving southwards. The maximum recorded distance covered by a crab during this study was 380 km for a mature female crab which moved northwards.

The mean velocity of movement for the two categories of crabs discussed in this note is presented in Table 1. The mature females moved faster than the other crabs, in line with the greater distances that they covered while at large. For obvious reasons, the true velocity of movement when a crab is moving in a specific direction is likely to be much greater than the figures presented in Table 1. This can be illustrated by the fact that several mature females covered considerable distances (100 to 180 km) at mean velocities of up to 2 km per day.

It is worth noting that some of the movements revealed for *Geryon maritae* by this study are similar to those that have been inferred by Hepper (1971) to explain carapace width frequency distributions of male *Geryon tridens* trawled off the west Irish coast. He noted that the mean size increased over a 90-km band from west to east and suggested that the main population lay to the east and "that the older, and hence larger, individuals move out from this centre". This hypothesis fits the observation that large *Geryon maritae* males move significantly farther than small ones, but superficially it does not appear to fit the fact that males do not tend to move particularly far from their point of release.

However, two factors have to be borne in mind when evaluating the tagging results presented in Figure 1. First, the majority of recaptures were taken within the first year of their release, and secondly, *Geryon* crabs are slow growing (maximum intermoult periods recorded for adult males are in excess of six years for *Geryon quinquedens* (Lux *et al.*, 1982) and over three years

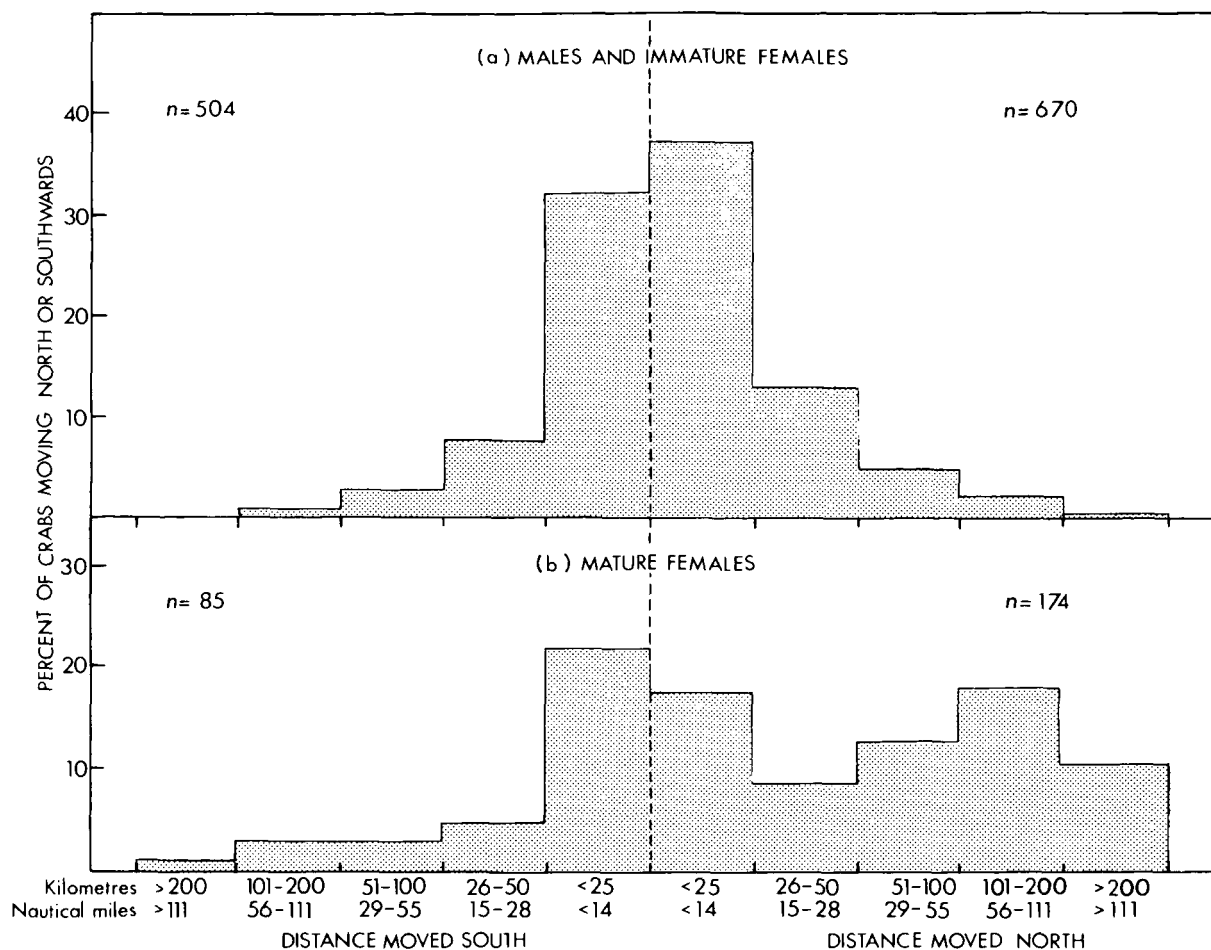


Figure 1. Distances moved between tagging and recapture by (a) males and immature females and (b) mature females.

for *Geryon maritae* (Melville-Smith, unpub. data). Over the long time intervals between moults, male crabs may cover substantial distances (for example, the mean distance moved by male *G. maritae* at large for longer than four years was 65 km). Bearing this in mind, trends in population size frequency such as were noted by Hepper (1971) are quite possible.

Table 1. Mean velocities in northward and southward directions, calculated from tag recoveries over a three-year period. Data taken from a tagging survey conducted during October 1982.

Males and immature females		Mature females	
Southwards (km day ⁻¹)	Northwards (km day ⁻¹)	Southwards (km day ⁻¹)	Northwards (km day ⁻¹)
0.05 (n = 284)	0.05 (n = 332)	0.11 (n = 52)	0.46 (n = 119)

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References

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