

transient and resident, from separate breeding stocks. Transient killer whales prey mainly on marine mammals, especially seals. Conversely, resident killer whales are primarily fish eaters (Jefferson 1987 and references therein). Jefferson (1987) argued that the behaviours performed by Dall's porpoise imply that these animals can distinguish between aggressive (transient) and non-aggressive (resident) killer whales.

Applying this argument to the dusky dolphin-killer whale interaction suggests that Otago Peninsula dusky dolphins can also distinguish between aggressive and non-aggressive killer whales. However, killer whales are seen relatively infrequently along the Otago coast in contrast to the situation in British Columbia and Washington. It is therefore unclear as to how dusky dolphins might acquire the requisite knowledge for identifying aggressive killer whales.

ACKNOWLEDGMENTS

Sincere thanks to Chris Spiers, master of *rv Munida*, for his enthusiastic support of the work reported here. Constructive comments on earlier versions of this paper by Elisabeth Slooten and Joseph McKee are much appreciated.

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SHORT COMMUNICATION

SEXING *HELICE CRASSA* BY THE MORPHOLOGY OF THEIR CHELAE

L.M. HAYES

Department of Zoology, University of Canterbury, Christchurch 1, New Zealand.

(Received July 1988; revised and accepted 29 May, 1989)

SUMMARY

Hayes, L.M. (1989). Sexing *Helice crassa* by the morphology of their chelae. *New Zealand Natural Sciences* 16: 117-119.

Differences in the relationship between chelae length and carapace width, chelae depth and carapace width, and chelae length and depth for male and female *Helice crassa* crabs are discussed. Adult male *H. crassa* have larger and broader chelae than adult female *H. crassa*. This difference allows sex to be determined from chelae remains.

KEYWORDS: *Helice crassa* - chela - carapace width - allometry - sexual dimorphism.

INTRODUCTION

Crab chelae may be used to infer a great deal of information about their owners, for example, species, sex and size (Hartnoll 1978). *Helice crassa* (Grapsidae) Dana 1851 is an endemic crab found on coastal mudflats throughout New Zealand. *H. crassa* constructs burrows chiefly in the upper half of the intertidal zone, and feeds at low tide on fine particulate organic matter (Jones 1980). In this paper I show that adult *H. crassa* may be sexed by their chelae alone, which is a great advantage when determining the sex of crabs from partial remains. This method has been used to determine the diet of kingfishers (*Halcyon sancta vagans*) from discarded crab remains (Hayes 1989).

METHODS

The crabs were collected from Brooklands Lagoon, 15 km NNE of Christchurch. Although the lagoon has no direct connection to the sea, it is still subject to a tidal rise and fall of water (Knox & Bolton 1978). At low tide, extensive mud flats scattered with feeding *H. crassa* are exposed for 4 - 6 h. *H. crassa* burrows were excavated using a large trowel. Fifty-five male and 55 female crabs with carapace widths ranging from

3 - 15 mm were collected and preserved in 70% EtOH.

In the laboratory, Mitutoyo vernier calipers were used to measure maximum chelae length (CL) and depth (CD), and carapace width (CW) across the widest part. Crabs were sexed according to abdomen width: females having broader abdomens than males.

RESULTS

For juvenile *H. crassa* (carapace width 3 - 7 mm) the relationship between chelae length and depth is similar for both sexes. The sex of juvenile crabs cannot, therefore, be distinguished by chelae alone. As crabs mature and increase in size it becomes easier to determine sex using chelae, since the relationship between chelae length and depth begins to diverge for males and females. Adult male crabs have proportionally longer and wider chelae when compared to adult females with the same carapace width (Table 1, Figs 1 & 2). For larger *H. crassa* (carapace width >8 mm), the relationship between chelae length and depth differs for male and female crabs, but does not differ for right and left chelae for either sex (Table 1, Fig. 3). The difference in the relationship between chelae length and depth becomes larger as crab size increases, until a chelae