THE EFFECT OF COOKING ON CARAPACE LENGTH OF SOUTHERN ROCK LOBSTER, JASUS EDWARDSII (HUTTON), 1875 (DECAPODA, PALINURIDAE)

BY

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ABSTRACT

In several Australian states, the claimed potential for shrinkage of rock lobsters during cooking is a problem for enforcement of rock lobster fisheries regulations based on a minimum legal size. In Tasmania, uncertainty ab out the potential for shrinkage of rock lobster (Jasus edwardsii) regularly prevents prosecution. We tested the potential for shrinkage of rock lobsters by cooking 21 animals under typical industry protocols. Cooking had no statistically detectable effect on carapace length.

RÉSUMÉ

Dans plusieurs états australiens, la revendication d'un potentiel rétrécissement de la langouste durant la cuisson pose probl ème à la mise en vigueur de législations des pêches basées sur une taille legal minimale. En Tasmanie, l'incertitude sur le

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rétrécissement de la langouste (Jasus edwardsii) est un obstacle regulier aux poursuites judiciaires. Nous avons examiné le potentiel rétrécissement de la langouste chez 21 animaux soumis à la cuisson en conditions industrielles. La c uisson n'avait aucun effet signicatif sur la longueur de la carapace.

The southern rock lobster, Jasus edwardsii (Hutton, 1875), is common around coastal regions of southern Australia and New Zealand. The species supports valuable commercial and recreati onal fisheries across the whole of its range, which covers several management jurisdictions. One consistent management tool is the use of a minimum legal size based on carapace length (CL), although actual size limits differ between states (Frusher et al., 1997; Hobday & Ryan, 1997; McGarvey et al., 1997) . Carapace length in Tasmanian legislation is defined as 'the minimum distance measured from the anterior surface of the median suture to the posterior edge of the dorsal region of the carapace, excluding any attached hairs'.

If processing of lobsters for human consumption causes the CL of legal sized lobsters to shrink below the legal limit, there are implications for the enforcement of size restrictions. Post-catch handling techniques that may cause alterations to the CL include killing by osmotic shock in fresh water and cooking. Difficulties for enforcement agencies in obtaining convictions for the possession of under size rock lobster, due to uncertainty about the potential for shrinkag e, prompted us to test if there was a basis to these claims.

To test if the CL of lobsters changes during cooking, 21 legal -sized southern rock lobsters were collected in pots from Alum Cliffs, south -eastern Tasmania, Australia in October 1999 (42.95ºS;147 .35ºE). The sample consisted of 7 female and

14 male lobsters ranging from 106 mm CL to 153 mm CL (mean = 120 mm CL). Each animal was abdominally tagged using individually marked t -bar tags (Hallprint T-bar anchor tag, TBA1; Hallprint Pty Ltd, 27 Jacobsen Crescent, Holden Hill, SA 5088, Australia). All lobsters were measured five times to the nearest 0.1 mm CL in a random manner, before and after processing. This repeated measurement of all specimens in random order was intended to evaluate measurement erro r. Processing was typical of that used commercially and involved killing the lobsters in fresh water before cooking in pre-boiling salted water for 12 minutes.

The effect of processing on CL was analysed by regression analysis of the mean CL measurement from the 5 random measures of each animal before and after processing. The analysis was conducted in two stages. First, size after cooking was regressed against initial size to test if the intercept passed through zero. Carapace length data for this regression were first adjusted by subtracting the minimum legal size of females (105 mm CL) from both male and female sizes to avoid a large extrapolation to establish the intercept (fig. 1). This analysis indicated that cooking had no effect on CL as the intercept was not significantly different from 0 ($P>0.5$) and the slope approximated unity (0.999).

While this regression analysis was informative, it suffers from greater leverage of smaller animals. The second stage in analysis was to test if lobster initial size altered propensity to change size during cooking. This was tested by regressing the change in carapace length between measurements before and after cooking, against initial length (fig. 2). This regression indicated that the slope was not significant ly different from zero ($\underline{P}>0.4$), thus there was no evidence that change in carapace length during cooking was more likely to occur with larger animals than smaller animals.

Finally, we noted that although there was no evidence for the hypothesis that lobsters shrink during cooking, measures of CL from before and after cooking were often different. We hypothesised that this apparent sampling error was mainly due to the greater difficulty in measuring animals that were alive and moving. This was tested by comparing the standard deviation of the 5 measurements of each animal before and after processing by t-test. The test confirmed that variation in measurement and thus sampling error was greatest in initial measurements when the animals were alive ($P = 0.016$).

J.H. Bradbury (unpublished) undertook similar research to that presented here in Tasmania during April 1976 for the same need of addressing enforcement problems. Bradbury compared the CL of eleven southern rock lobsters before and after cooking and presented the results in an unpublished internal report for the Tasmanian Department of Sea Fisheries. As with our study, he concluded that any change in CL through the process of cooking is less than 0.5 mm and could not be considered significant for management or enforcement purposes.

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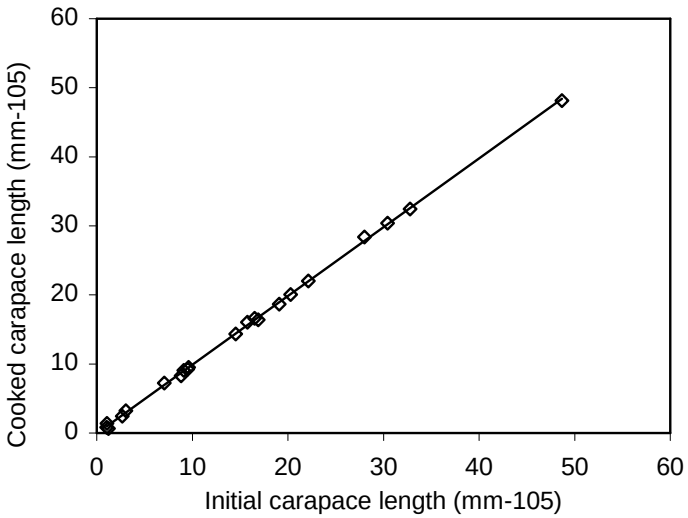
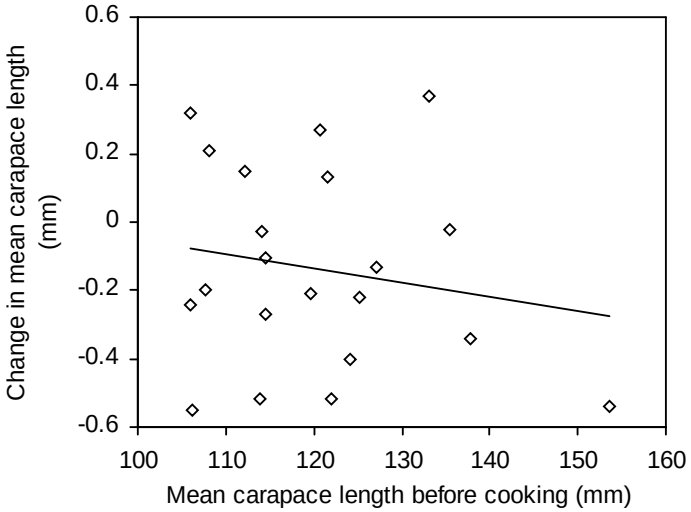
Captions

Fig. 1. Carapace length of cooked lobsters, Jasus edwardsii (Hutton, 1875), in relation to their initial or uncooked carapace length. The regression provides no evidence of a change in size with the intercept not significantly different from zero ($P>0.5$) and the slope approximating one ($y = -0.071 + 0.999x$; $r^2 = 0.999$).

Fig. 2. Change in measurements of carapace length taken before and after cooking, relative to absolute carapace length of uncooked lobsters, Jasus edwardsii (Hutton, 1875). The slope is not significantly different from 0 ($P>0.4$) which indicates that larger animals are no more likely to change size than smaller animals ($y = 0.373 + -0.004x$; $r^2 = 0.03$).


Cooked carapace length (mm-105)
Initial carapace length (mm-105)
0
10
20
30
40
50
60


0.6
0.4
0.2
0
-0.2
-0.4
-0.6
Change in mean carapace length (mm)
100
110
120
130
140
150
160
Mean carapace length before cooking (mm)