

Reproductive biology of Southern Calamari in Cockburn Sound.

Introduction

The southern calamari (*Sepioteuthis australis*) is an iconic species for recreational fishers in south-western Australia, with its popularity increasing markedly in recent years with advances in fishing gear technology. The centre of the recreational squid fishery is based in Cockburn



Sound due to the close proximity of this embayment to the metropolitan region and its possession of extensive seagrass beds which provide the main habitats for this species. As a large shallow and protected embayment, Cockburn Sound is a unique feature

of the coastal topography of south-western Australia. The ecological importance of Cockburn Sound to fisheries in south-western Australia is becoming increasingly evident, with recent studies on Snapper (*Pagrus auratus*) demonstrating that the sound represents a major spawning area for this species and the major source of recruitment to marine waters in south-western Australia (Wakefield et al. 2011).

The importance of Cockburn Sound to the southern calamari has not yet been quantified. However, the extensive seagrass beds and relatively shallow depth of this embayment strongly indicate that, like similar bays found in other states, Cockburn Sound could be of crucial importance to calamari on the lower west coast of Australia. However, Cockburn Sound houses numerous heavy industries, many of which have been a source of pollution in the past. This threat, combined with a significant loss of seagrass (Cambridge and McComb 1984; Kendrick et al. 2002) and an increased intensity of recreational fishing for southern calamari act as threats to the conservation of this species. This is especially a problem because there is a lack of knowledge of the biology of this important cephalopod mollusc in south-western Australia.

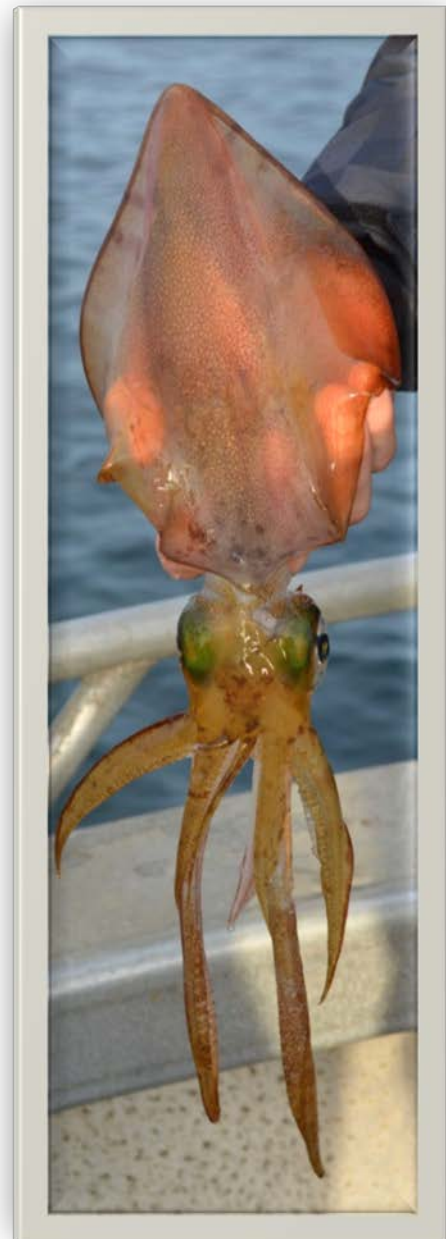
Research in Tasmania and South Australia demonstrate that Southern calamari is a multiple spawner, spawning throughout the year, but with greater reproductive investment in summer months, as determined from higher gonadosomatic indices (Pech 2001; Moltschaniwskyj and Steer 2004; Steer et al. 2006). This species has also been shown to form large aggregations over seagrass and algal beds in shallow water embayments, where they produce benthic egg mops (Moltschaniwskyj et al. 2002). Size at sexual maturity of Southern Calamari in South Australia is 151 and 163 mm mantle length for males and females, respectively (Steer et al. 2006).

The main aim of this proposed study is to determine the characteristics of the reproductive biology of the southern calamari in Cockburn Sound.

Materials and methods

Samples of southern calamari will be collected monthly from recreational and commercial fishers, supplemented by samples collected by P. Coulson and the Honours student. The body size (mantle length), sex and gonad weight of each calamari will be recorded and the mean monthly values for the gonadosomatic index and the percentage frequencies of occurrence of individuals with gonads at different stages of development will be calculated to determine the spawning period and when it peaks. The size at which this species commences spawning will also be determined. In addition, the temporal and spatial abundance of southern calamari eggs will be determined to elucidate where spawning mainly occurs within Cockburn Sound.

This project will provide an Honours student with a sound training in sampling design, the use of techniques for analysing spatial and temporal data on distribution and methods for determining the reproductive characteristics of vertebrates and invertebrates.



Scholarship

A scholarship of \$2000 will be awarded to the successful applicant for this Honours project.

Application details and dates

Please contact Peter Coulson (9360 2695, p.coulson@murdoch.edu.au) for further details. The successful applicant will have a GPA > 2.0.

Full time Honours will commence on the 10th February 2014, with a thesis submission date of the 27th October 2014. However, this project could be undertaken as a part-time Honours, over four semesters (i.e. two years), or one semester full-time and two semesters part-time (18 months).

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