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## Scallop *Zygochlamys patagonica* (Bivalvia; Pectinidae): distribution, stock structure and fishery potential in the Falkland islands waters

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**ABSTRACT.** An experimental scallop fishing survey was carried out by F/V 'Avel Mad' around the Falkland Islands at depths ranging from 35 m to 160 m between 5 December 2001 and 25 January 2002. Five beds of the Patagonian scallop *Zygochlamys patagonica* (King et Broderip, 1832) with commercial potential were found in the north-eastern and southern Falklands shelf (50°35'S–50°47'S) at depths between 130 and 145 m. All the beds were discrete, dense, and stretched stripe-like along the steep shelf break. The size of beds ranged from 16 km<sup>2</sup> to 168 km<sup>2</sup>. Average scallop CPUE by bed varied from 740 kg/h to 1170 kg/h and the total scallop catch during experimental fishery was 134.1 t. The total biomass of Patagonian scallop over all five beds was estimated to be between 18422 t and 27121 t. The age of scallops, determined using growth marks in the ligament and shell, ranged from 0+ (current year recruits; shell height less than 24 mm) to 21 years old (shell height 77 mm). Adult scallops larger than 50 mm shell height and older than 5–6 years dominated the catches on all Falklands beds. In the last two years successful recruitment was only evident on the northern beds. On average in Falklands waters strong scallop recruitment takes place once every 4 or 5 years. Estimated parameters for the von Bertalanffy growth equation ranged from 59.34 to 73.48 mm for asymptotic shell height, from 0.15 to 0.41 y<sup>-1</sup> for the growth rate, *K*, and from –0.95 to –2.28 for *t*<sub>0</sub>. In general, scallops in Falklands waters grow rather slowly, reaching the usual commercial size (55 mm SH) at age 5–6 years old, and live to 20 years and more. Sexual maturity is reached at 35–37 mm SH and ages 2–3 years, though in coastal areas they apparently mature earlier, at 30 mm SH (2 years old).

the Falkland Islands shelf, and the Burdwood Bank [Lasta, Zamatti, 1981; Waloszek, Waloszek, 1986; Waloszek, 1991]. It inhabits the depth range from 40 m to 200 m but the most important concentrations are found between 60 m and 120 m on sandy or mud substrates [Ciocco et al, 1998]. In Argentinean exclusive economic zone (EEZ) the Patagonian scallop forms discrete beds associated with highly productive waters of three different types: the shelfbreak frontal waters (90–100 m isobath); coastal low salinity mixed waters (60–70 m) and intermediate shelf waters with pronounced seasonal stratification (75–98 m) [Lasta, Bremec, 1998]. 7 beds were found in the Argentinean EEZ on the Patagonian Shelf between 38°50'S and 42°30'S, largely along the 100 m isobath (in shelfbreak frontal waters). Similar oceanographic structures favourable for the development of scallop beds can be found around the Falkland Islands. The hydrography of the shelfbreak area around the Falkland Islands is determined by an interaction of the cold, northward flowing, Falkland Current (FC) and its derivative Shelf Waters (SW) [Bianchi et al., 1982; Ziryjanov, Severov, 1979; Maslennikov, Parfenovich, 1979]. Interaction between FC and SW results in the formation of the Transient Zone Waters (TZW) characterised by steep temperature and salinity gradients over the shelf break [Arkhipkin et al., 2001; Martos, Piccolo, 1988]. Seasonal variability in near-bottom temperatures of the TZW over the eastern Falkland shelf break (150 m) revealed a distinct annual cycle with maximum temperatures in January–February [+7.0°C] and minimum in August–September [+5.0°C] [Arkhipkin et al, 2001]. Together with seasonal variation in the food availability these cycles may influence annual periodicity in scallop growth.

Biology of *Z. patagonica* has been studied mainly in populations of Magellanic province and Argentinean shelf. The growth and age were studied by counting annual rings on the shell or ligament which are produced by winter retardation of growth [Waloszek, Waloszek, 1886; Orensensz et al. 1991]. The readings from the ligament are considered to

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### INTRODUCTION

The Patagonian scallop *Zygochlamys patagonica* (King et Broderip, 1832) is a common pectinid bivalve mollusc found around the southern tip of the South America. Its range covers the Chilean coast from Puerto Montt to Tierra del Fuego, the Patagonian shelf up to the estuary of the Rio de la Plata,