NOTE

Settlement of *Chlamys tehuelchus* (D'Orb.) on artificial collectors. Seasonal changes in spat settlement*

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ABSTRACT: Seasonal changes in the settlement of the pectinid *Chlamys tehuelchus* (D'Orb.) were studied at a site in the San José Gulf (Chubut, Argentina). Two discontinuous series of experiments were carried out during 1978 to 1980 and 1980 to 1982 by setting out artificial collectors made of plastic mesh bags (1.5 mm mesh) filled with standardized quantities of 'tangle' of polyethylene monofilament. Results suggest that the main spat collection of *Chlamys tehuelchus* takes place between November and April with a peak generally in February.

For the past 10 yr scallop fisheries have had a great importance in the economy of the San Matías and San José Gulf areas. They have depended entirely on natural stocks which, however, had almost died out due to overfishing in the San Matías Gulf (Olivier et al. 1974, Zaixso 1980a). Artificial spat collection may have great potential value in maintaining production.

The techniques used in the present work were in general taken from Japanese cultivation systems for *Patinopecten yessoensis* (Jay) (Ventilla 1982). The study of monthly variation in spat settlement of *Chlamys tehuelchus* on artificial collectors and the determination of peaks are of the utmost importance in developing commercial culture techniques for this species (Brand et al. 1980, Zaixso 1980b, Paul et al. 1981, Ventilla 1982, Wallace 1982). The following account gives information on seasonal changes in *C. tehuelchus* (D'Orb.) spat settlement.

Two series of experiments were performed in San José Gulf (Chubut, Argentina) near a commercially important scallop area. The first series was carried out between November 1978 and February 1980 and the second series between November 1980 and April 1982.

The collectors were made from plastic mesh bags (50 x 40 cm with 1.5 mm mesh) and were filled with standardized quantities of teased polyethylene monofilament (40 g in the first series and 50 g in the second). Two ropes, each having 3 collector bags, were placed in the sea, with a weight at one end and a subsurface buoy at the other. The bags were fixed on the rope at 2 m intervals, so that they remained 2 to 6 m from the bottom. Ropes and bags were replaced at 1 mo intervals. Depth was 10 m at low tide and 16 m at high tide.

The monthly collector bags were washed vigorously in a bucket. Then the scallops collected were sieved through a 250 μm mesh and counted under a stereomicroscope. In the first series, individuals were also measured. During the first series, 96 collector bags were analyzed and 108 during the second. Actual settlement values of the first and second series are not directly comparable because of the differences in the quantity of polyethylene monofilament tangle, which affected the spat settlement number (Zaixso & Espíndola 1981).

All data were first transformed into natural logarithm (ln[X + 1]). Then, after having assessed the homogeneity of variances, an analysis of variance was performed.

First series (Nov 1978 to Feb 1980). An analysis of variance was performed with the monthly settlement values, excluding those of May to October, in which settlement was nil, or (August) collectors were lost at sea (Fig. 1). In this series, size and size range of the
Highly significant differences were found between the monthly settlement values ($F = 22.488; \text{d.f.} = 9/50; p < 0.001$). The months with the highest spat settlement mean values were January, February, and March 1980. It can be concluded that the time of spat settlement of *Chlamys tehuelchus* on artificial collectors in the San José Gulf lasts from November through April with a peak generally in February. Ciocco (unpubl.), who studied the sexual cycle of this species through histological observations for the period 1980 to 1982, concluded that mass spawning took place mainly in December during the summer season 1980 to 1981 and in December to January during the summer season 1981 to 1982.

Spats whose size varied between 1 and 3 mm were found in bottom samples taken at the beginning of January 1982 (Ciocco pers. comm.). It can be assumed then that the spatfall occurred 2 or 3 wk before, that is to say in December 1981. These results are similar to those obtained in a previous study by Lasta & Calvo (1978). It can be seen that in both summer seasons (1980–1981 and 1981–1982) mass spawning activity took place roughly 1 mo before the peak of spatfall (Fig. 2) and can therefore be used as a predictor for the time of placing collectors at sea.

The exact timing of the peak may differ from year to year, as it depends mainly on climatic or physical conditions, such as fluctuations of the annual seawater temperature cycles, salinity, and food availability (Bayne 1965, Thorson 1966, Sastry 1979), which affect not only the gonadal cycle in adults (Raimbault 1966) but also larval development (Bayne 1965, Calabrese 1969, Bourne & Smith 1972, Widdows 1978, Sastry 1979 [p. 202], Newell & Bayne 1980). Isolated *Chlamys tehuelchus* spats have been found in the sea bottom in winter (Ciocco pers. comm.). During this period (May to early November) no settlement occurred on artificial collectors. A similar case was reported for *C. opercularis* in the northern Irish Sea (Brand et al. 1980). These authors affirm that natural settlement of the species takes place throughout the year on benthic epifauna, while no spats are to be found on collectors placed at sea after September.

It was found in a previous study on the San José Gulf area (Zaïxso & Toyos in press) that although different spat quantities were counted at different depths, the depth distribution was not always the same. This lack of an optimal value in the depth distribution may be due to the variable conditions of the water mass, i.e. shallow depth and high tidal range.
The present study demonstrates the strong seasonality in spat settlement of *Chlamys tehuelchus* (D'Orb.) and the high potential value that artificial collection methods can have in developing the scallop fisheries in this area.

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**LITERATURE CITED**


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