THE CONDITION INDEX OF OYSTERS *CRASSOSTREA* CF. *MADRASENSIS*, OF MLONGGO BEACH, JEPARA, INDONESIA

Retno Hartati, Delianis Pringgenies & Rimawan
Marine Science Department, Faculty of Marine Science and Fisheries, Diponegoro University, Campus Tembalang, Semarang, Indonesia

ABSTRACT

A separate study on the condition index of oysters (*Crassostrea* cf. *madrasensis*) was conducted prior to main project on broodstocks assessment for oyster culture. The condition index is based on the ratio between the dry weight of the soft parts and the volume of the shell. The results of present work showed that the condition index of oysters of Mlonggo beach fluctuated in the range of 21.24 to 145.00 from June to August. The soft body of oysters was fat in July prior to their reproduction.

INTRODUCTION

Oysters have a good prospect for culture in Indonesia. The demand for natural oysters collected at the shore has increased in the last few years concordant with an increasing number of sea food restaurants. Previously, oysters could easily be collected from North Java shores, due to the favourable temperature, sunlight, and the availability of nutrients. But the continued exploitation poses a severe threat to the natural populations. Hence, it is necessary to find alternative means to increase the production of oysters. Culture is a possibility which not only will be beneficial to fishermen, but also reduce the pressure on oyster populations of the natural habitats. It is therefore important to estimate production of larvae and to draw conservation measures. We have aimed at investigating the condition index of oysters, *Crassostrea* cf. *madrasensis* (Preston), prior to main research on broodstock assessments for oyster culture, and to study the state of gonad maturation of broodstock related to their condition.

MATERIAL & METHODS

Oysters were collected at Mlonggo beach, Jepara, Indonesia, in June, July, and August 1996. The shell lengths ranged from 4.2 to 9.0 cm, and they were assumed to be mature. Phytoplankton density and water quality (temperature and salinity) were recorded every month.

Condition index of the oysters was determined at the Marine Biological Laboratory (Marine Science Department, Diponegoro University at Teluk Awur), Jepara, following Quayle's (1980) method:

$$\text{Condition index} = (\text{Dry weight of meat (g)} \times 1000) \times (\text{Shell volume (ml)})^{-1}$$

Oyster gonads were examined histologically and their maturation state was identified according to Dinamani (1974).

RESULTS AND DISCUSSION

The condition index of oysters during June, July and August ranged from 21.24-91.51, 46.60-112.16, and 29.44-145.0 respectively. The average is shown in Fig. 1. The quantity of oyster meat was determined as dry meat (dry weight), and measurements of the shell encompassed shell volume in accordance with Davenport & Chen (1987). According to Walne (1977) condition index of bivalves is defined by the ratio between shell volume and dry weight of the meat. The growth of the oysters is reflected by the condition index which in turn is influenced by biological and ecological factors.

The average condition index was highest in July followed by August and June (Fig. 1), contrary to abundance of their natural food.

Table 1. Histological study of gonad maturation in oysters from the north coast of Java during June, July, and August 1996.

June	M2: Few primary and secondary spermatids; wide bands of early stages in sections of the follicles. F3: Secondary oocytes (> 25 µm) attached to follicles by stalk-like connections, few of them were free in the lumen. Follicles enlarged in size and extent.
July	M4: The follicles occupy a large area; spermatozoa constitute the central area of the follicle; with narrow band of spermatocytes peripherally. M5: Many follicles were discharged; the masses of spermatozoa were separated from the follicular walls. F4: Large free ova occur in the lumen; rounded to oval (35 - 45 µm); follicles occupy the entire gonadal area, with little or no interfollicular tissue.
August	M5: Many follicles were discharged; masses of spermatozoa were separated from the follicular walls. F5: The follicles appear partly shrunken. The follicular lumen was empty, except for a few unspent residual ova. A second series of secondary oocytes was found in the follicular wall.

The density of phytoplankton was highest in August (1667 cells l^{-1}) followed by July (1500 cells l^{-1}) and June (1250 cells l^{-1}). The phytoplankton population was dominated by diatoms and dinoflagellates (*Nitzchia*, *Chaetoceros*, *Rhizosolenia*, *Thalassiothrix*, *Skeletonema*, *Coscinodiscus*), favourite food of oysters (Danakusumah 1979). The energy of the food is partly used for various metabolic activities, such as shell movements and water filtration, and partly for growth and fattening (storage of glycogen in special cells of the connective tissue). Another possible reason behind these adverse result is the salinity. Quayle (1980) suggested that the changes in condition index of oysters could be a result of extreme fluctuations of the salinity. The growth of the shell will in such cases be faster than that of the meat (Kastoro 1975). In the present work, the salinity fluctuated only between 29 and 30 ‰ during June to August.

The difference in condition index in this study may be related to the reproductive activity. The gonad maturation index was examined histologically and is presented in Tab. 1. In June males and females were developing gonads at stage M2 and F3, respectively. In July the male oysters were mostly ripe (M4) and some has started spawning (M5), and females in F4. In August both males and females were spawning (M5, F5). The glycogen stored in the connective tissue is mobilised when oyster are preparing themselves for spawning (Korringa 1976); the gonads will then rapidly become filled with eggs or sperm. These activities will reduce the condition index of the oysters (Yonge 1960; Meadcof 1961).

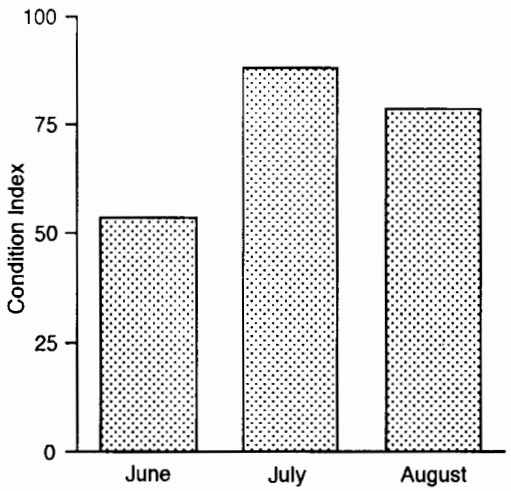

Figure 1. Average of Condition Index of *Crassostrea* cf. *madrasensis*.

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