

## RESEARCH NOTES

### Precocious sexual maturity in *Cerastoderma glaucum* (Bruguière) reared in the laboratory

Kobina Yankson\*

Department of Zoology, University College of Swansea, Singleton Park,  
Swansea SA2 8PP, Wales, U.K.

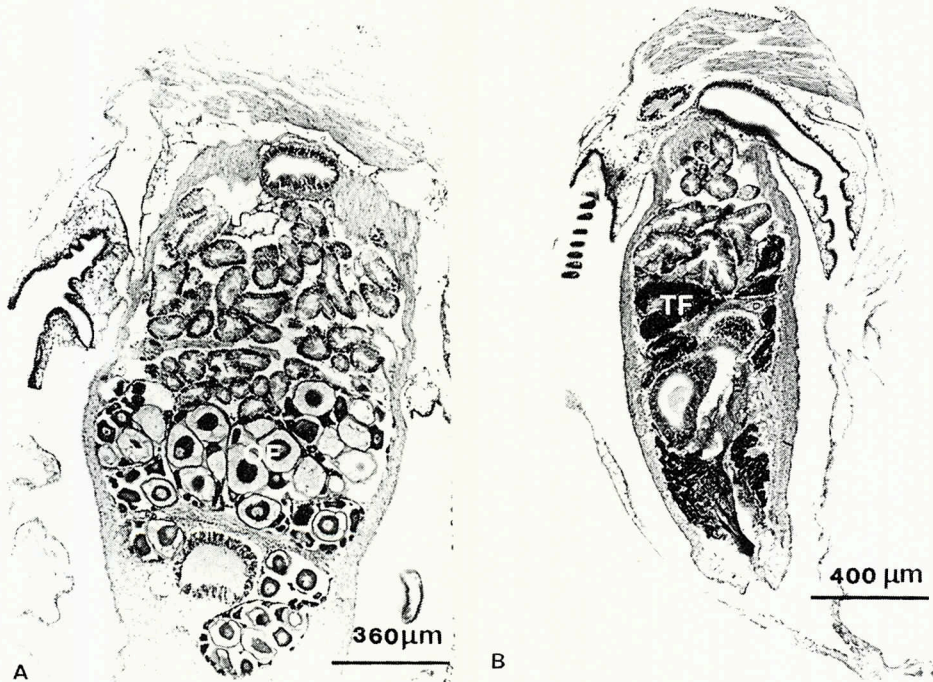
Since the identification of *Cerastoderma glaucum* (Bruguière) as a distinct species from *C. edule* (L.)<sup>1,2</sup>, its reproductive biology has been extensively studied. But information on the age at which individuals attain sexual maturity is scanty and varied. It is reported that *C. glaucum* (= *C. lamarcki*) from Kising fjord (Denmark) is capable of spawning in the autumn of the same year in which they themselves were spawned, while in the nearby Dybso fjord they do not mature until they are one year old<sup>2</sup>. In an English lagoon (Widewater) the species starts maturing in May/June in the year following their settlement, whereas in the Lago Lungo (Italy) individuals become sexually mature in less than 6 months<sup>3</sup>. It appears therefore,

that the rate of gonad maturation in juvenile *C. glaucum* varies depending on local conditions.

As part of an extended study on the reproductive biology and culture of the species, the gonads of spat reared in the laboratory (from artificial fertilization) were examined histologically to determine the age at which they become sexually mature. The spat were fed daily with reasonable quantities of a mixed diet consisting of equal packed cell volumes of T-ISO<sup>4</sup>, *Monochrysis lutheri* Droop and *Phaeodactylum tri-cornutum* Bohlin. The culture was maintained at  $20 \pm 2^\circ\text{C}$  and the seawater medium (30%) was changed twice weekly.

The results of histological assessment of the gonads of spat reared in the laboratory are shown in Table 1. It is evident that all the 7 weeks old (from day of fertilization) spat were already sexually mature with

\*Present address: Department of Zoology, University of Cape Coast, Cape Coast, Ghana.



Photomicrographs of T.S. of *C. glaucum* spat (7 weeks old) showing gonads in advanced stages of maturity. A, female; B, male. OF, ovarian follicle containing eggs; TF, testicular follicle containing spermatozoa.

**Table 1.** Stages of sexual maturity recorded in *C. glaucum* spat reared in the laboratory. I, initiation of gametogenesis, II, proliferation of follicles and gametes; III, ripening of gametes; IV, spawning; V spent/resting.

Age (wks)	Mean Shell Length (mm)	Stages of Sexual Maturity					Number of Individuals	
		I	II	III	IV	V	♂	♀
7	4.0	0	4	8	0	0	6	6
13	6.9	0	0	3	7	0	6	4
20	11.1	5	0	0	0	0	2	3

**Table 2.** Diameters of sections of oocytes from a laboratory reared ♀ III compared with those from a typical ♀ III from the natural population—*C. glaucum*. GM\* Gelatinous membrane

Source of Oocyte	Mean Oocyte diameter plus GM* ( $\mu\text{m}$ )	Standard Deviation	Mean Oocyte diameter minus GM* ( $\mu\text{m}$ )	Standard Deviation	No.
Laboratory reared ♀ III	112.5	13.6	56.3	6.0	16
Typical ♀ III from natural population	106.9	9.8	55.9	6.1	20

ripe or developing gonads (see Fig. 1). It can also be inferred from Table 1 that the young, sexually mature spat were capable of spawning and re-development since no signs of gametic resorption were observed in any of the older spat (from the same batch) some of which had empty follicles and/or developing gonia. The frequent changes of the culture medium seemed to have triggered the spawning<sup>5</sup>. Personal observations over 2 years (1981, 1982) indicated that *C. glaucum* from the locality of the parent stock used in this work (Aberthaw Power Station Lagoon) attained sexual maturity after one year. Hence the laboratory reared cockles underwent an accelerated gonadal development.

The question to be answered now is whether the gametes of such extremely young spat would be capable of fertilization and normal development. The morphology of the gametes of the 7 weeks old spat is similar to those of the adults collected from the natural field population (Table 2). It may thus be presumed that fertilization trials could achieve positive results similar to those achieved with the spat of *Syndosmya alba* and *Cardium fasciatum*<sup>6</sup> although this has to be empirically tested.

It is concluded that under favourable laboratory rearing conditions precocious sexual maturity can be induced in *C. glaucum*. A species which can be reared to sexual maturity within 7 weeks is obviously a suitable material for genetic studies since several generations can be raised in a relatively short period.

#### REFERENCES

- MARS P. 1951. *Bull. Mus. Hist. nat. Marseille*, **11**, 1-31.
- PETERSEN, G.H. 1958. *Medd. Fra. Danm. Fisker- og Havund.*, **22**, 1-31.
- IVELL, R. 1979. *J. moll. stud.* **45**, 364-382.
- EWART, J.W. and EPIFANIO, C.E. 1981. *Aquaculture*, **22**, 297-300.
- KINGSTON, P.F. 1972. Ph.D. Thesis, University of London. 233 pp.
- ORTON, J.H. 1924. *Nature Lond.*, **114**, 244.