

NOTE 2016

Consortium Recovery Flat Oyster North Sea
Bureau Waardenburg - IMARES – Sas Consultancy

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Distribution and size of Flat oyster larvae at 3 locations in the Voordelta

Introduction

An oyster bed was discovered at the Brouwersdam (Location A in Fig. 1). It is unclear if this bed depends on recruits through larvae supplied from nearby lake Grevelingen (via an outlet) (Location B in Fig. 1) or that local larval production takes place. Answers to this question are important, because of upscaling of pilots as part of the Shellfish Reef Restoration Project Voordelta. When local production can be demonstrated, the size of the bed is sufficient to be self-sustaining. When local production is absent, further studies are needed on the required size of a bed to be self-sustaining under the environmental circumstances of the Voordelta area. In addition, the distribution of larvae in the Voordelta is unclear. It is important to know if larvae are present at the pilot location Hinderplaat (Location C in Fig. 1). When larvae are present in sufficient concentrations supply of settling substrate such as empty shells can be used to increase the size of a bed. When larvae are present in low concentrations or not present at all adult broodstock needs to be introduced.

Oyster larvae have a pelagic phase of about 2 weeks in which they grow up to metamorphosis after which they settle on the bottom. The present study determined larval concentrations and sizes at 3 locations in the Voordelta (Location A, B and C in Fig. 1). Samples at location B (near the outlet) show if larvae are flushed from Lake Grevelingen into the Voordelta. Comparison of the size of larvae at Location A (near the oyster bed) and Location B (near the outlet) can indicate if larvae were produced locally or supplied from Lake Grevelingen.

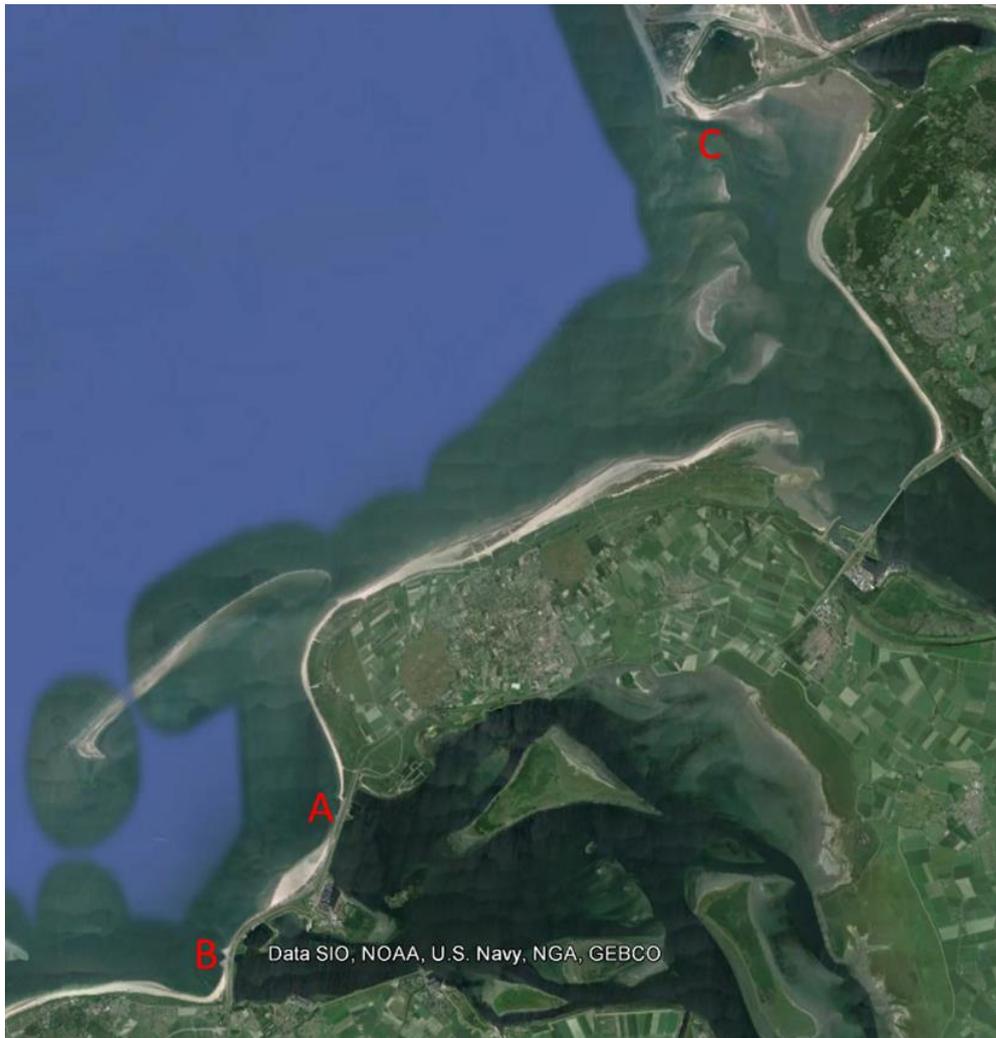


Fig. 1. Location of oysterbed (A) and outlet (B) near Grevelingendam and pilot location near Hinderplaat (C).

Method

Sampling took place weekly in 2016 from week 23 to week 34. This is based on earlier studies in the Grevelingen (van den Brink et al, 2013). Water samples were collected at the Blokkendam (location A), the outlet of the Grevelingen (location B) and the Hinderplaat (location C). At each location 100 liter was filtered over a 100 μm plankton net. Samples were fixed with buffered formaldehyde and transported to the lab in Yerseke for microscopic determination and counting. Most weeks samples were collected at Blokkendam and the outlet from the shore, but in the weeks that the pilots were visited (week 23 and week 30) samples were collected at Blokkendam and Hinderplaat with the RIB of Bureau Waardenburg.

Results

Larvae were found at Blokkendam (location A) and the outlet of the Grevelingen (location B), but not at Hinderplaat (location C). This confirms results of a model study on larval transport from Lake Grevelingen that was carried out by Deltares in addition to the Shellfish Reef Restoration Project Voordelta (Kleissen 2016). Both studies show that there are no larvae present at Hinderplaat. Thus, it is too far from the outlet of Lake Grevelingen. Highest larval concentrations were found in mid-July (week 28 and 29) (Fig. 2). Concentrations were generally higher at the outlet than at Blokkendam (Fig. 2). Sizes of larvae varied over time and were similar or even slightly larger at Blokkendam than at the outlet (Fig. 3). The latter suggests that local production of larvae may take place.

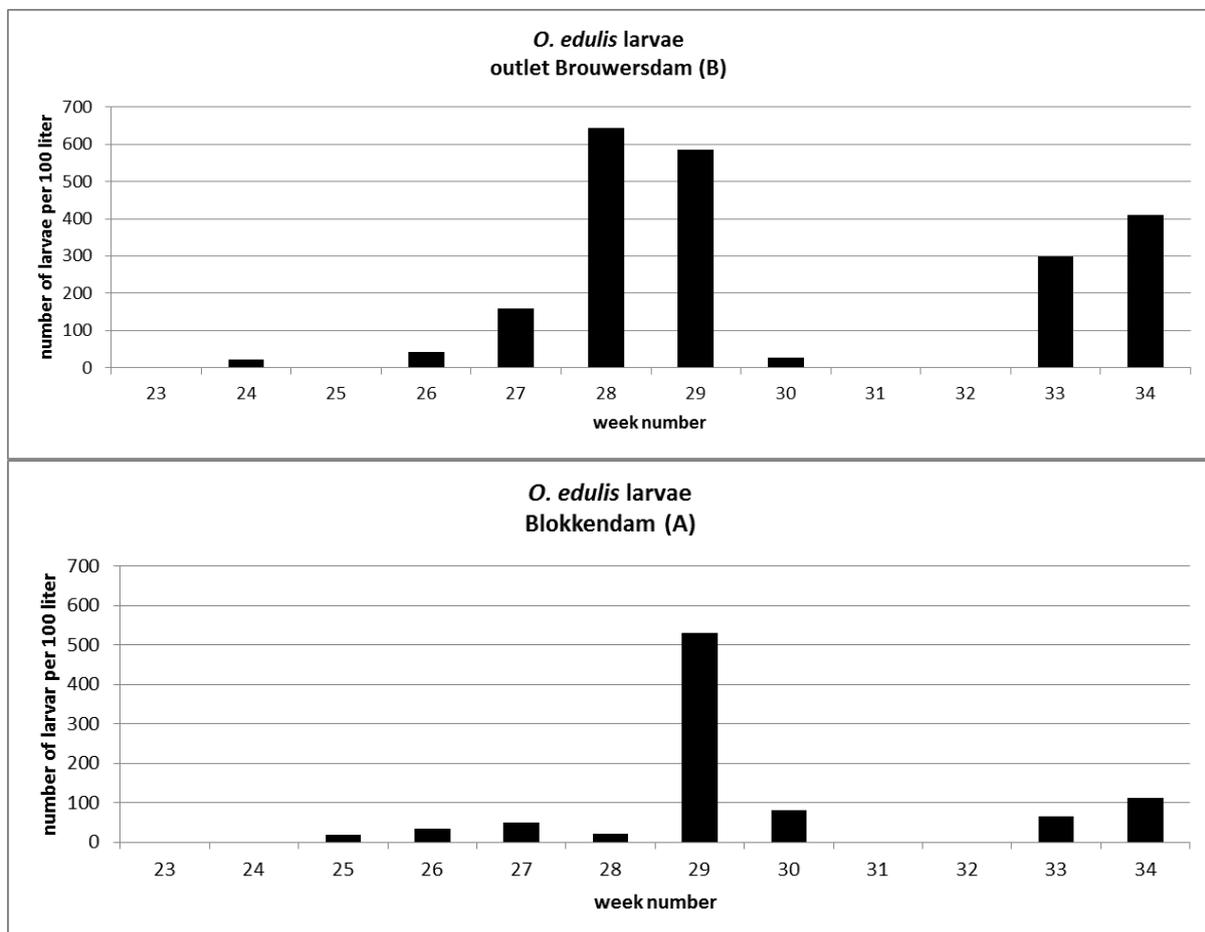


Fig. 2. Concentration (in number per 100 liter) of flat oyster larvae at location B and A in 2016.

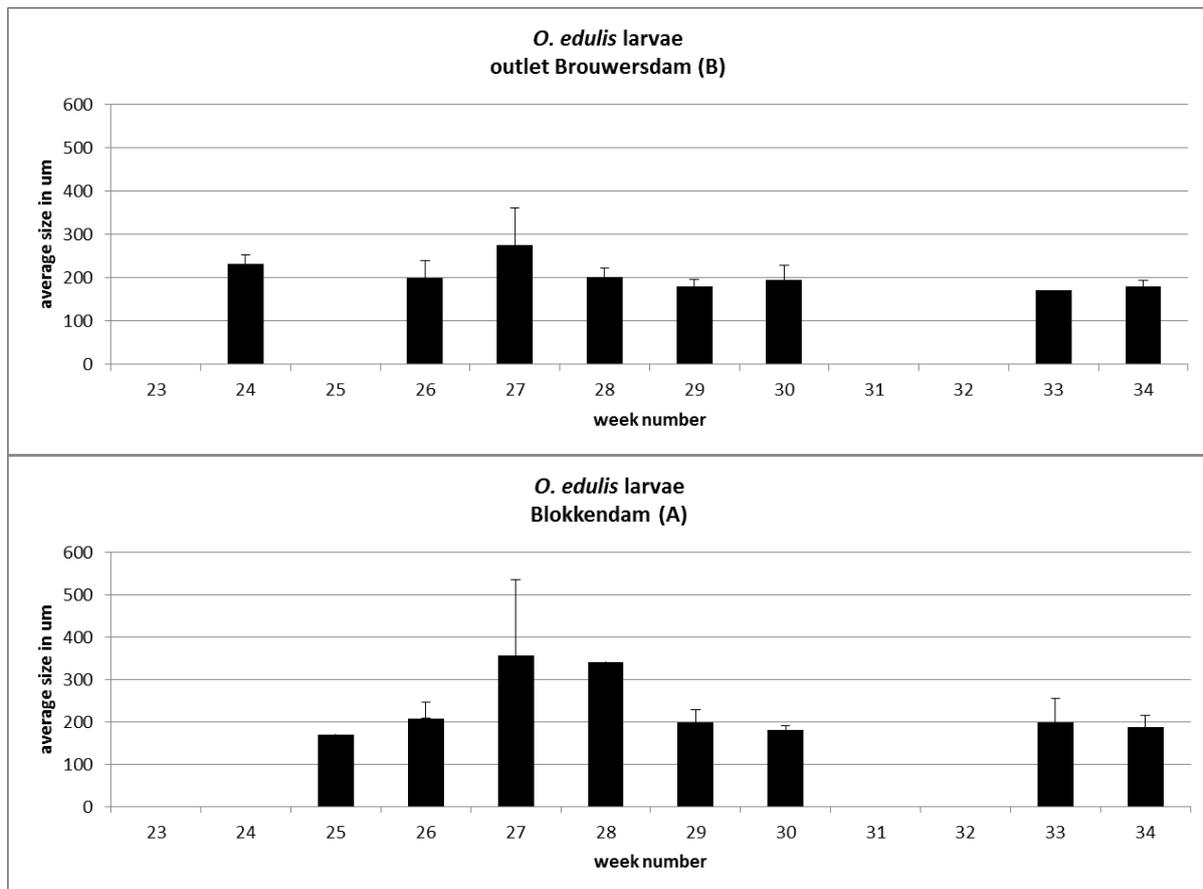


Fig. 3. Average size (in µm with sd) of flat oyster larvae at location B and A in 2016.

Conclusion

Results of the larval analysis suggest that the oyster bed at Blokkendam may depend on local larval production. In addition, Hinderplaat is too far from the outlet to benefit from larval supply from the Grevelingen. This means that, for the Blokkendam location, supply of settling substrate such as empty shells can be used to increase the size of the bed. Empty mussel and oyster shells and settling plates were introduced in the water in the framework of the Shellfish Reef Restoration Project Voordelta on January 18th, February 26th, June 6th and July 26th and will be retrieved in October. Examination of these substrates can probably confirm larval settlement at Blokkendam. When local production is absent, adult broodstock needs to be introduced. However, monitoring of oysters in cages showed no surviving adults at Hinderplaat in July. That makes this location unsuitable for oyster reef restoration.

References

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