

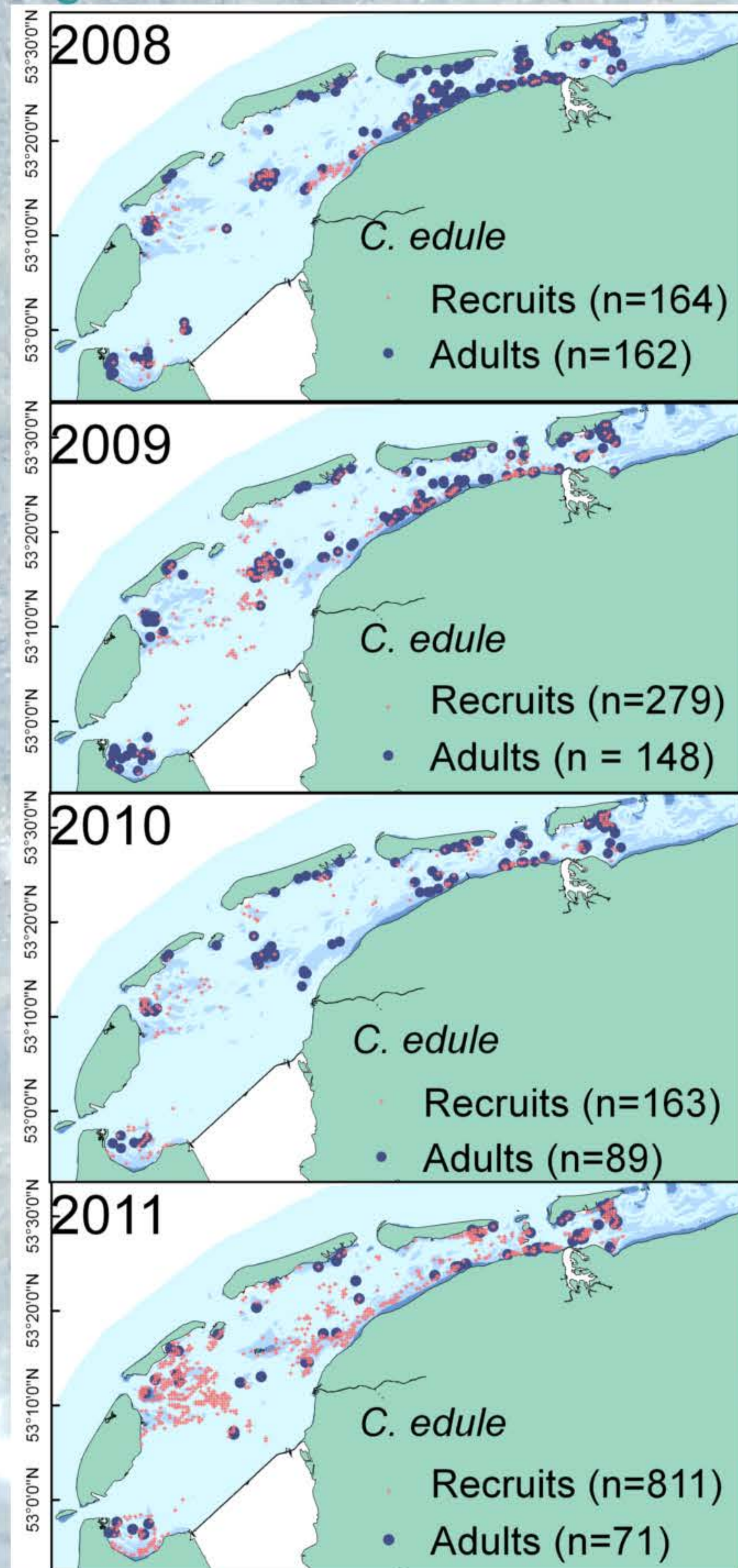


# Ontogenetic habitat associations in the cockle *Cerastoderma edule*



Tanya J. Compton, Sander Holthuijsen, Job ten Horn, Anita Koolhaas, Anne Dekinga, Matias Duran Matute, Lisa Klunder, Maarten Brugge, Niamh McSweeney, Jaap van der Meer, Henk van der Veer, Theunis Piersma

**Figure 1**



**Hypothesis:** *C.edule* recruits have the same habitat associations as the adults.

Recruitment is defined as settlement from the pelagic larval phase to the benthic early juvenile phase (Caley et al. 1996 Ann Rev Ecol Syst 27 p 477)

**Data:** Synoptic intertidal benthic survey data from summers of 2008 to 2011. Recruits and adults distinguished by age rings on shells.

**Figure 1** shows the occurrence of recruits (ring 0) and adults (ring 3) for the years 2008 to 2011.

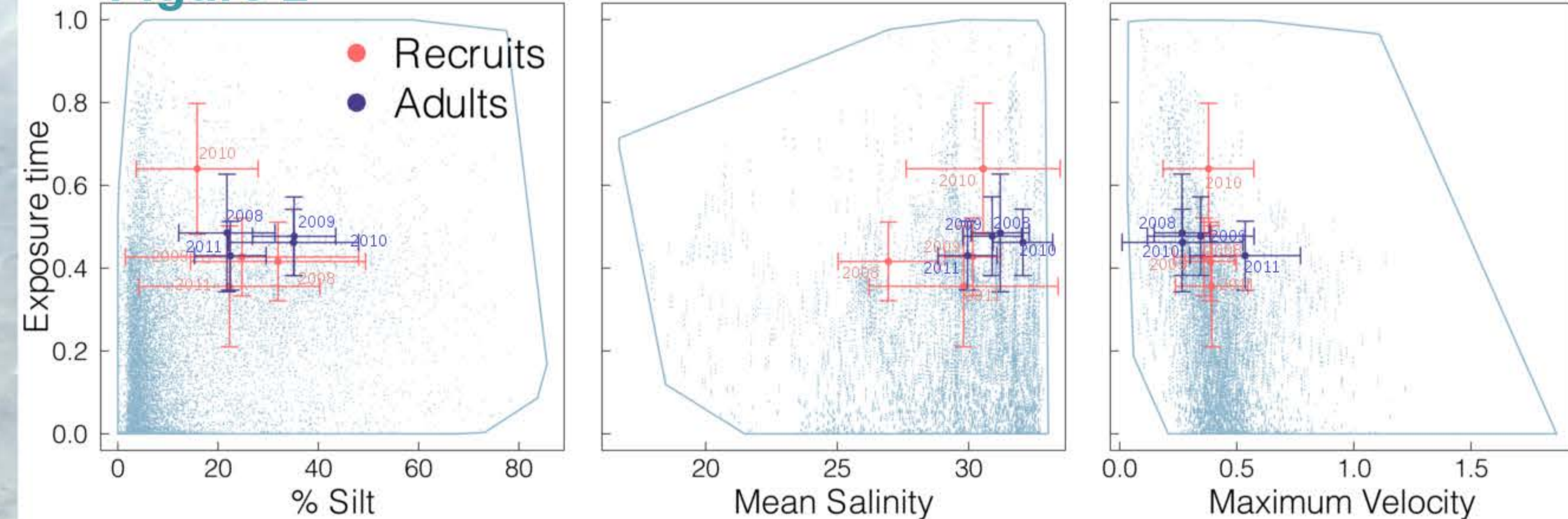
**Environmental variables:** Fraction of exposure time, mean salinity, percentage silt, maximum current velocity.

**Model:** Occurrence of recruits and adults were modelled for each year separately as a function of environment, the factor West-East Wadden Sea and sampling method. Occurrences were modelled as a function of these variables using Boosted Regression Trees analysis (see Hastie 2009 Elements of Statistical learning, Elith & Leathwick 2008 J Anim Ecol 77, p802, De'Ath 2007 Ecol 88 p243).

**Table 1. % Variable contributions**

	Recruits	Adults
Exposure time	31+/-5	31+/-8
Mean salinity	32+/-3	23+/-7
Max. velocity	12+/-2	18+/-10
%Silt	21+/-65	24+/-3
West-East	3+/-4	3+/-3
Method	2+/-2	2+/-1

**Figure 2**



**Figure 2.** Environmental optima, and the standard deviations, in relation to major environmental predictors as determined from model fitted values. The points and polygon indicate the available environment as measured by SIBES.

**Figure 3.** Observed density of recruits versus adults (log scale and jittered) from 2008 to 2011 show that the majority of recruits do not settle in the direct vicinity of the adults.

**Results:** Models of the recruits had a mean AUC 0.77 (+/- 0.06 sd) and adults had a mean AUC 0.86 (+/- 0.04 sd). The fraction of exposure time was influential for describing the occurrence of recruits and adults, followed by mean salinity for the recruits and % silt for the adults, see **Table 1**. *C. edule* adults and juveniles tended to occur in areas of moderate exposure (0.46) and silt (25%), high salinities (32 ppt) and relatively fast current speeds (0.35 cm/s). But compared to the adults, the juveniles were predicted to occur over wider range of environments (see **Figure 2**).

**Conclusions:** Recruits tend not to settle in the direct vicinity of the adults. This together with recruitment across a wider range of environments compared to adults suggests a combination of mortality processes and active habitat selection shape the final habitat of adult *C. edule*.

