

Temporal and Spatial Distribution Prediction of *Patinopecten yessoensis* Larvae in Northern China Yellow Sea

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Abstract : It takes *Patinopecten yessoensis* larvae more than 20 days from spawning to settlement. Due to the natural environmental factors such as current, *Patinopecten yessoensis* larvae are transported to a distance more than hundreds of kilometers, leading to a high instability of their spatial and temporal distribution and great difficulties in the natural spat collection. Therefore predicting the distribution is of great significance to improve the operating efficiency of the collecting. Hydrodynamic model of Northern China Yellow Sea was established and the motions equations of physical oceanography and verified by the tidal harmonic constants and the measured data velocities of Dalian Bay. According to the passivity drift characteristics of the larvae, combined with the hydrodynamic model and the particle tracking model, the spatial and temporal distribution prediction model was established and the spatial and temporal distribution of the larvae under the influence of flow and wind were simulated. It can be concluded from the model results: ocean currents have greatest impacts on the passive drift path and diffusion of *Patinopecten yessoensis* larvae; the impact of wind is also important, which changed the direction and speed of the drift. *Patinopecten yessoensis* larvae were generated in the sea along Zhangzi Island and Guanglu-Dachangshan Island, but after two months, with the impact of wind and currents, the larvae appeared in the west of Dalian and the southern of Lvshun, and even in Bohai Bay. The model results are consistent with the relevant literature on qualitative analysis, and this conclusion explains where the larvae come from in the perspective of numerical simulation.

Keywords : numerical simulation, *Patinopecten yessoensis* larvae, predicting model, spatial and temporal distribution

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