

Abstract Submitted  
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**Three-dimensionally spiral structure of the water stream induced by a centrifugal stirrer in large aqua-cultural ponds**<sup>1</sup> TOMOAKI ITANO, TAISHI INAGAKI, CHOJI NAKAMURA, MASAKO SUGIHARA-SEKI, Kansai University, JINSUKE HYODO, MMA Solutions — We have conducted measurements of the water stream produced by a mechanical stirrer (diameter 2.4[m], electric power 50[W]) located in shallow rectangular reservoirs (small 0.7[ha], large 3.7[ha]), which may be employed as a cost-efficient aerator for the aqua-cultural purpose, with the aid of both particle tracking velocimetry by passive tracers floating on the surface and direct measurement by electro-magnetic velocimeter under the surface. The present measurements indicate that the stirrer drives primarily the horizontally rotating water stream and secondarily the vertical convection between the surface and the bottom of the reservoir, which results in the three-dimensionally spiral-shaped water streams scaled vertically by just a meter but horizontally by more than ten meters. It is suggested that the spiral structure driven by the stirrer may activate the underwater vertical mixing and enhance dissolved oxygen at the bottom of aqua-cultural pond more effectively than the paddle-wheel aerators commonly used in aqua-cultural ponds.

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