POSTER

AN AUTOMATED VERTICAL INCUBATOR FOR RAINBOW TROUT (*ONCORHYNCHUS MYKISS*) EMBRYOS TO REDUCE FOOD LOSS DURING EARLY DEVELOPMENT

M. Zarantoniello[1], F. Conti[2], A. Mancini[3], F. Maradonna[1], Anna Laura Eusebi[4], F. Fatone[4], Ike Olivotto[2]

[1]Dept. of Agricultural, Food, and Environmental Sciences, Università Politecnica delle Marche, Italy; [2]Dept. of Life and Environmental Sciences, Università Politecnica delle Marche, Italy; [3]Dept of Information Engineering, Università Politecnica delle Marche, Italy; [4]Dept of Science and Engineering of Materials, Environment and Urban Planning, Università Politecnica delle Marche, Italy

The early embryonic development still represents the most vulnerable phase in rainbow trout productive cycle due to rapid infections spreading. The present study aimed to develop and validate an automatic incubator prototype able to promptly recognize and remove the non-developing or infected embryos. A deep learning model was trained using pictures of good and bad embryos acquired by visible and near infrared spectral cameras and labelled by domain experts. The prototype was then integrated with a 45° inclined motorized screw conveyor to lift embryos to the sorting area, high-resolution Basler USB 3.0 cameras responsible for embryos' classification, a GPU-equipped computer to manage image acquisition and detect healthy and dead embryos, a device that precisely removes non-viable eggs based on camera-derived data, a Pacific system for water parameters monitoring and a water flow meter. The prototype was tested under real farming conditions. A batch of 600 fertilized eggs (in triplicate) was maintained in the prototype until the eyed-egg stage, subjected to one complete passage through the screw conveyor and camera inspection daily. After this period, eyed embryos were transferred to conventional hatchery systems until hatching. The prototype efficiently lifted the embryos without affecting their integrity and cameras discriminated them with a 94% accuracy. The prototype was able to improve up to 5% the number of embryos that achieved the eyed stage respect to the control ones maintained in conventional systems.

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