

23. Improving the vitality of European eel larvae

Jéhannet Pauline ^{1*}, Palstra Arjan P. ¹, Havinga Mara ¹, Heinsbroek Leon T.N. ², Swinkels William ³, Komen Hans ¹

¹Animal Breeding and Genomics, Wageningen University & Research, The Netherlands

²Wageningen Eel Reproduction Experts B.V., Wageningen 3708 AB, The Netherlands

³DUPAN foundation, Wageningen 6708 WH, The Netherlands

* Corresponding author. E-mail: pauline.jehannet@wur.nl

Because the production cycle of the European eel *Anguilla anguilla* has not been closed yet, the aquaculture industry depends on a restricted source of wild juveniles. Hence, propagating eel in captivity is urgently needed to support a sustainable aquaculture industry. Although larvae can be produced on a regular basis, high mortality and deformity rates are often observed. In a series of ongoing experiments at the Eel Reproduction Innovation Center (EELRIC) of Wageningen University & Research, we aim to increase egg and larval quality. In an earlier study (Jéhannet et al., *Animals*, 2021), we compared transcriptomes of larvae that survived less than 3 days post-hatch vs. larvae that survived for at least a week (i.e. non-viable vs. viable larvae) to gain insight in the physiological reasons behind the high mortality rates during the first week of hatching. Results suggested that non-viable larvae suffered from microbial infections since genes related to inflammation and host protection were increased in comparison with viable larvae. Therefore, we tested the effects of antibiotics (rifampicin and ampicillin 50 mg.l⁻¹) or egg surface disinfection treatment (povidone iodine 25 ppm), alone or in combination, on hatching success, larvae survival and deformities in wild and farmed eels. When comparing larvae produced from wild broodstock with larvae from broodstock that we raised from juvenile eels in our facilities, larvae from wild eels had higher hatching success, higher survival rates and lower percentages of deformities. Disinfection had no effect on larvae produced from wild and farmed eels, but antibiotics tended to increase hatching success and larvae survival in larvae from wild eels. In addition, antibiotics significantly decreased the severity of spinal curvature that was the most dominant deformity in both larvae from wild and farmed eels. Although these results show that antibiotics can be applied to increase larval survival in European eels, the heavy use of antibiotics for eel larviculture is not a sustainable solution due to its growing problem for the environment and animal health. Therefore sustainable methods for negative antimicrobial control, aiming at increasing larvae survival, should be developed in European eels.