

# TOWARDS PRODUCTION-SCALE STERILITY IN DIPLOID ATLANTIC SALMON

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Early sexual maturation poses a major challenge for many producers of Atlantic salmon; the maturation process is energetically demanding with adverse effects on growth feed conversion rates, health, and fillet quality. The onset and timing of sexual maturation is a complex process involving a significant genetic component but also strongly influenced by environmental factors such as light abundance, temperature, and food intake. Selective breeding for late maturation, including marker-assisted selection for a major QTL, has resulted in genetic improvement of this trait. However, achieving complete sterility of production animals remains highly desirable, in part because it also reduces the risk of introgression between farmed escapees and wild stocks.

To this end, we have studied different methods to achieve sterility through the production of germ cell-free salmon. This includes design of two delivery systems that deliver molecules inhibiting germ cell development to all fertilized eggs at production scale. These technologies will also be applied for mass delivery of CRISPR-Cas systems to achieve gene editing without microinjection. These methods hold promise for commercial-scale production of sterile, and potentially also gene edited, animals to tackle some of the most pressing sustainability issues in salmon farming.