IMPROVING RESISTANCE TO ACUTE HYPERTHERMIA BY GENOMIC SELECTION TO ADAPT RAINBOW TROUT LINES TO CLIMATE CHANGE

Henri Lagarde, Delphine Lallias, Pierre Patrice, Martin Prchal, Yoannah François, Jonathan D'ambrosio, Ana Acin Perez, Frédéric Cachelou, Emilien Segret, Pierrick Haffray, et al.

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Lagarde[1*], H., Lallias[1], D., Patrice[2], P., Prchal[3], M., François[2], Y., D'Ambrosio[2], J., Acin-Perez[4], A., Cachelou[4], Y., Segret[4], E., Haffray[2], P., Dupont-Nivet[1], M., Phocas[1], F.

[1] Université Paris-Saclay, INRAE, AgroParisTech, GABI, 78350 Jouy-en-Josas, France; [2] SYSAAF, French Poultry and Aquaculture Breeders Association, 35042 Rennes, France; [3] University of South Bohemia in České Budějovice, Faculty of Fisheries and Protection of Waters, South Bohemian Research Center of Aquaculture and Biodiversity of Hydrocenoses, Zátiší 728/II, 389 25 Vodňany, Czech Republic; [4] Viviers de Sarrance, Pisciculture Labedan, 64490 Sarrance, France.

[*]henri.lagarde@inrae.fr

Rainbow trout (Oncorhynchus mykiss) is sensitive to rapid temperature increases which are becoming more frequent with global warming. Selecting fish more resistant to acute hyperthermia is therefore interesting to mitigate the detrimental effects of climate change. However, there is still a lack of information to introduce this trait in a selection scheme, such as its heritability and its genetic correlations with production traits like growth or carcass yields. Genomic selection is also an opportunity to improve efficiency of future breeding programs and its relative efficiency will benefit from being estimated in rainbow trout when compared to pedigree or mass selection.

Sibs from the Viviers de Sarrance breeding company were used to estimate genetic parameters and genetic correlations between production traits and acute hyperthermia resistance. The first group (n = 1,384) was phenotyped for acute hyperthermia resistance at 275 days post-fertilization (dpf) and the second group (n = 1,508) was phenotyped for production traits at 600 dpf. Fish were genotyped for 57K SNP and their genotypes were imputed at high-density thanks to their parents on a 665K SNP array.

Heritability of acute hyperthermia resistance was estimated to be 0.32 ± 0.06. Genetic correlations between acute hyperthermia resistance and production traits were found to be non-significantly different from zero meaning that selecting for acute hyperthermia resistance would have no deleterious impact on classical production traits, and *vice versa*. Genomic selection allows an increase in the accuracy of the selection of 8% for acute hyperthermia compared to a pedigree-based selection (0.55, 0.51 respectively).

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