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► **To cite this version:**

Pierre Patrice, Yoannah François, Alexandre Desgranges, G. Labbé, Pierrick Haffray, et al.. IS SELECTION ON TRIPLOID INDIVIDUALS PERFORMANCES USEFUL IN RAINBOW TROUT (ONCORHYNCHUS MYKISS) BREEDING PROGRAMS?. International Symposium on Genetics In Aquaculture 2022, Nov 2022, Puerta Varas, Chile. . hal-04178952

HAL Id: hal-04178952

<https://hal.inrae.fr/hal-04178952v1>

Submitted on 8 Aug 2023

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IS SELECTION ON TRIPLOID INDIVIDUALS PERFORMANCES USEFUL IN RAINBOW TROUT (*ONCORHYNCHUS MYKISS*) BREEDING PROGRAMS?

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A large part of French rainbow trout production is made from all-female sterile triploid (3N) fish. Like in all other animal species, selective breeding is based on diploid (2N) fish, without having precise knowledge on the correlated responses on 3N offspring. Our aim was to estimate genetic correlations between a 2N group and a 3N sib group for various production traits to assess if the same genetic gains could be achieved in both groups.

Four batches (2 diploids, 2 triploids) of mixed families were produced from Milin Nevez (France) selected line. Two batches (1320 diploids, 1234 triploids) were challenged for an acute hypoxic stress, and time before loss of equilibrium (TLE) was recorded. The two remaining batches (1494 diploids, 1498 triploids) were slaughtered for recording production traits: body weight (BW), length (BL), Fatmeter (FAT%), body parts weights, headed-gutted carcass yield (HGC%), subcutaneous fat (SCF%). All individuals were genotyped and pedigree assigned based on SNP markers. Genetic parameters were estimated under a BLUP animal model using BLUPF90 software. For all traits, genetic correlations between 2N and 3N performances were high: 0.86 ± 0.08 (TLE), 0.71 ± 0.12 (BW), 0.83 ± 0.14 (BL), 0.73 ± 0.12 (HGC%), 0.95 ± 0.03 (FAT%), 0.94 ± 0.05 (SCF%). These results demonstrate that important genetic gain in 3N commercial rainbow trout population can be achieved by genetic selection based on 2N sib performances. However, to maximize genetic gains for 3N BW and HGC%, a dedicated 3N sib testing may be implemented.

This study was granted by FranceAgriMer supported by the European Maritime and Fisheries Fund (HypoTemp project n°PFEA470019FA1000016).

Keywords:

Rainbow trout, diploid, triploid, genetic correlation