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A new parental assignment tool for complex mating and large number of animals

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Recent evolution in genotyping technologies increases the opportunity of molecular parentage inference in animal breeding. For a genotyping laboratory, meeting the objectives of customers relies on the choice of an appropriate marker panel and on a highly performing assigning program.

Our tool combines exclusion and likelihood methods in a program that minimizes false exclusions due to null alleles, typing errors and mutations without increasing computational cost. It can rank putative couples of parents in case of polyassignment and discriminate the true parents in a sample with high relationship level.

The most technically robust microsatellite markers were analyzed to estimate allele frequencies. These frequencies were used to simulate larger families with more relationships and different inbreeding levels. The resulting data were processed with the new assignment program to select the smallest efficient panel.

Using 13 microsatellites, a 97% assignment rate was obtained in a rainbow trout *Oncorhynchus mykiss* population composed of 5192 offsprings and 233 putative parents (100 males and 133 females).

This method was also applied with success in enlarged populations and complex mating schemes in pure species or interspecific hybrid using microsatellites or SNPs.

Keywords: Microsatellites, SNP, parental assignment