April, 2021

AllocateMate: An R package for mate allocation

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### Contact

WorldFish Communications and Marketing Department, Jalan Batu Maung, Batu Maung, 11960 Bayan Lepas, Penang, Malaysia. Email: [fish@cgiar.org](mailto:fish@cgiar.org)

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# 1. Introduction

WorldFish manages multiple family-based genetic improvement programs for tilapia and carp species (Charo-Karisa et al., 2020; Hamilton et al., 2019a; Hamilton et al., 2019b; Hamilton et al., 2021; Hamzah et al., 2014). In family-based genetic improvement programs, mate allocation is a process whereby selected parents (or in some cases families) are allocated to mating pairs prior to a spawning event. Mating pairs are then crossed to produce next-generation families of known pedigree.

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# 2. AllocateMate package

AllocateMate is a R package (R Core Team, 2020) comprised of two primary functions: *allocate.mate.ped* and *allocate.mate.H*. These functions allocate parents to mating pairs based on genetic relationships provided by the user in the form a pedigree file (*allocate.mate.ped*) or a relationship matrix (*allocate.mate.H*). These functions generate mating lists:

* to minimise the average Wright’s inbreeding coefficient (*F*) of progeny (Wright, 1922), using a linear programing approach (Berkelaar, 2020) and assuming equal numbers of progeny from each mating pair, or
* according to assortative mating principles (Saura et al., 2017) – that is, parents with high estimtated breeding values (EBVs) are mated with other parents with high EBVs and parents with low EBVs are mated with other parents with low EBVs, while constraining the maximum level of *F* in progeny.

Inputs, outputs and examples of use for the *allocate.mate.ped* and *allocate.mate.H* functionsare detailed in Annex 1 and Annex 2.

# 3. Installing AllocateMate

AllocateMate Version 1.0 is available at <https://github.com/mghamilton/AllocateMate> or for download as a .tar.gz **‘**source file**’** (provide link). To install the package from the .tar.gz source file:

* use the *install.packages* function **in R** – install.packages(*path****-****to****-****source****-file***, repos = NULL, type="source"); or
* within R studio, go to Tools -> Install Packages and then set ‘Install From’ to ‘Package Archive File (.zip; .tar.gz)’ before browsing to find the downloaded .tar.gz file.

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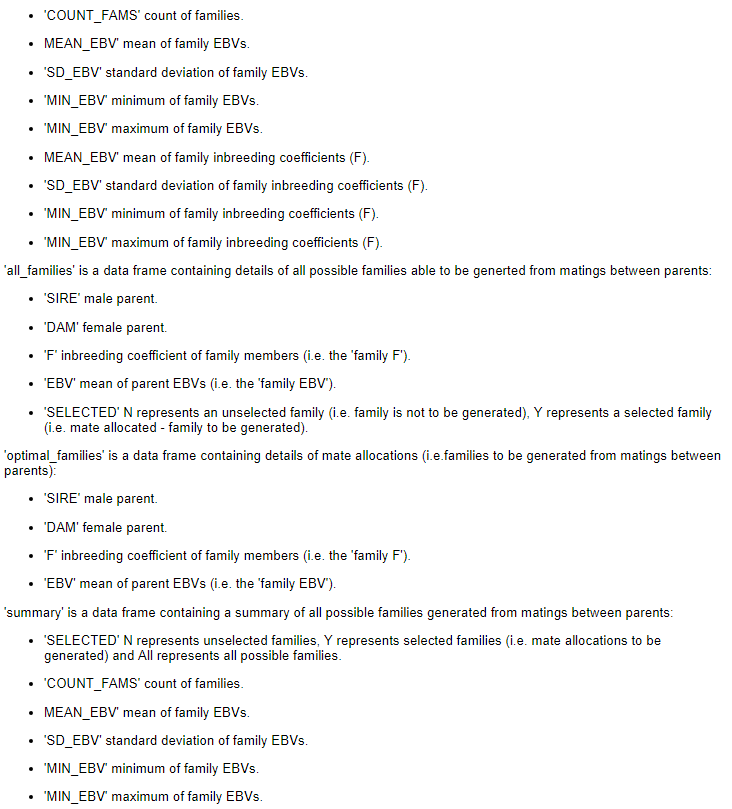
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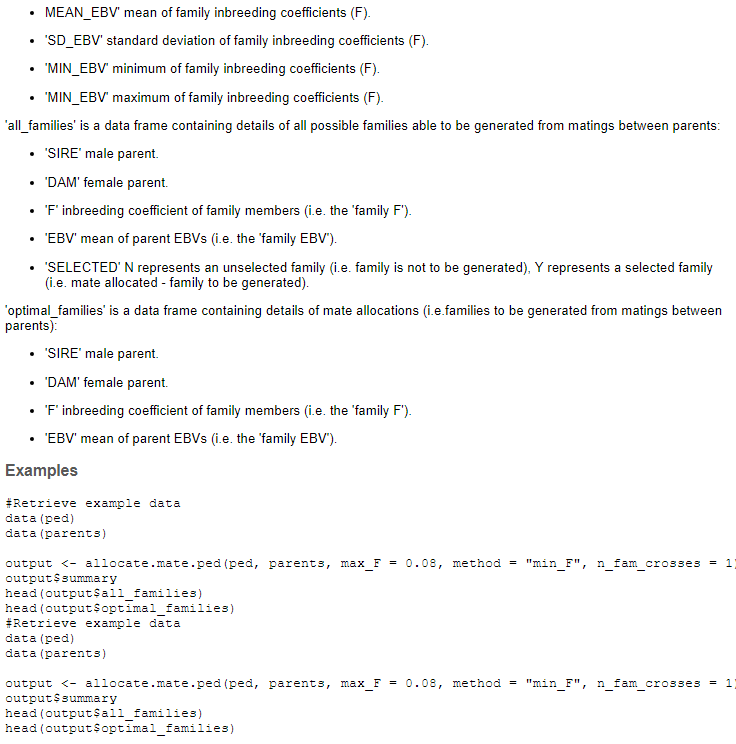
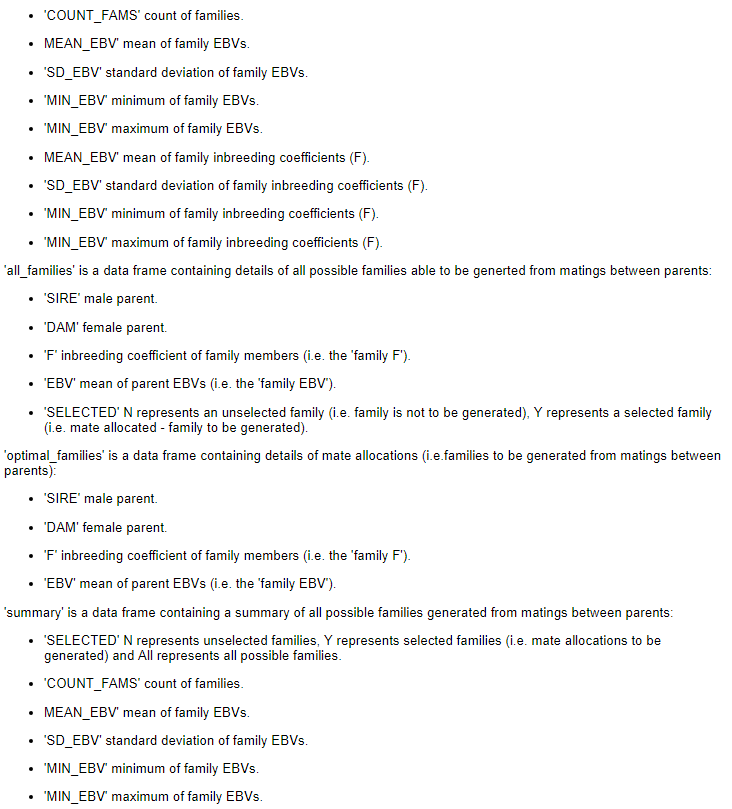
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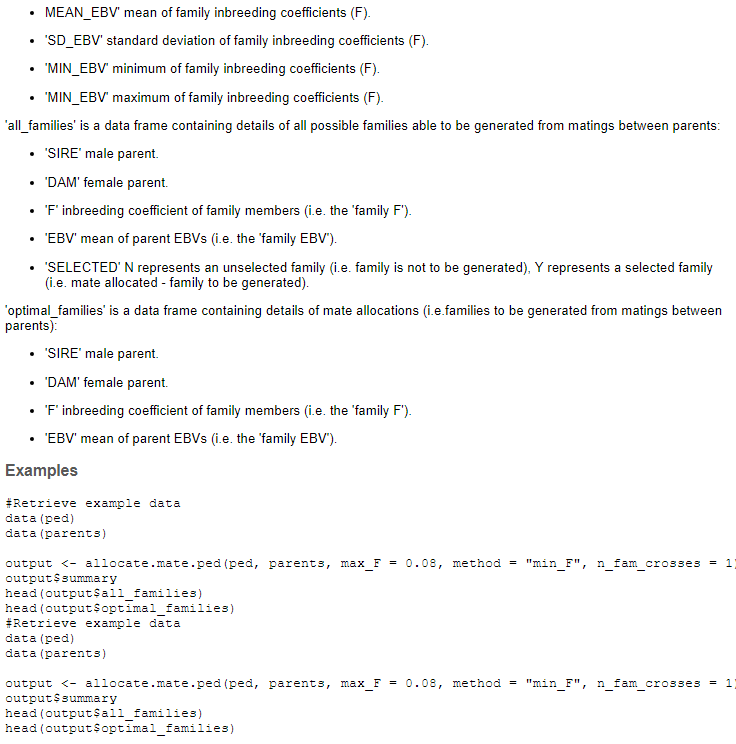
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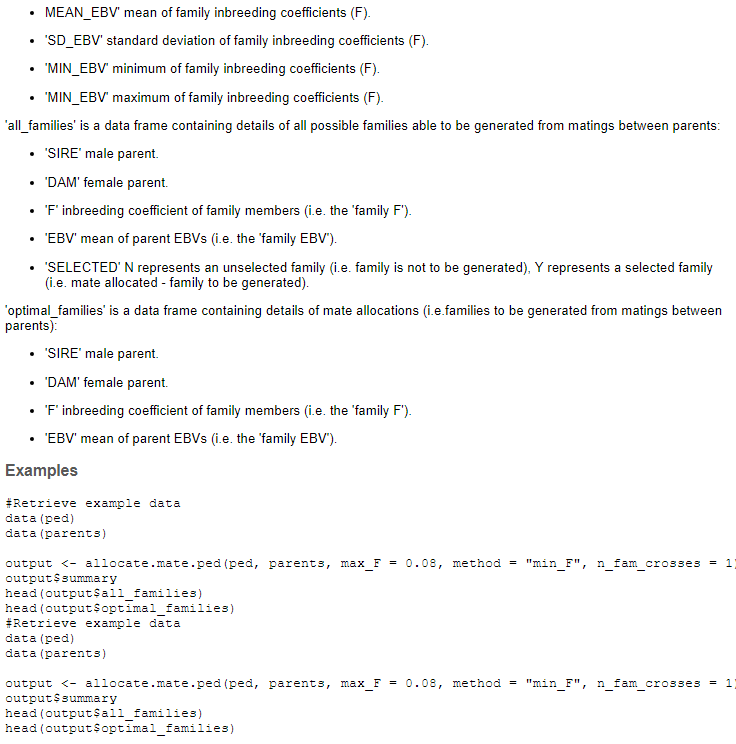
# Annex 1. allocate.mate.ped function R help







# Annex 2. allocate.mate.H function R help





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