A tool for selecting plants when restoring habitat for pollinators

This document provides basic instructions for applying the plant selection tool presented in M'Gonigle et al. (2016) to a plant pollinator data-set. The genetic algorithm is coded in R (R Core Team, 2015) and can be found in the various `.R` files in the `R` directory (once the .zip file is extracted). Running the code in `main.R` will load the data-set on which analyses in the manuscript were conducted and optimize some basic objective functions. The four objective functions presented in the manuscript can be called here under the following functions names:

$f_V \rightarrow$ `abundance`

$f_R \rightarrow$ `richness`

$f_T \rightarrow$ `numsupported`

$f_B \rightarrow$ `phenology`

Combinations of the above can be found by combining the `R` function names, in alphabetical order. For example,

$f_{VRT} \rightarrow$ `abundance.numupported.richness`

These objective functions are then optimized using the function `find.model` (see `main.R`).

The loaded data contains five objects:

`plants`: identity of plant species for each record

`date`: date of each record

`bloom.times`: bloom times of plant species

`flight.times`: flight times of pollinator species

`v.mat`: plant $\times$ pollinator interaction matrix

Species identities have been removed from the above objects and replaced with generic names. To request the full data-set, please contact the corresponding author.

Optional arguments can be passed to the function `find.mix` in order to tune the genetic algorithm. For a full list of these, see Table 1 below.

Name	Description
`N`	The "population size".
`n.gens`	Number of iterations.
`s`	Strength of selection.
`p.mutate`	Probability of mutating a mix.
`p.rec`	Probability of recombining two mixes.

Table 1: Description of optional genetic algorithm arguments.

References

M'Gonigle, L. K., N. M. Williams, E. Lonsdorf, and C. Kremen, 2016. A tool for selecting plants when restoring habitat for pollinators. Cons. Lett. .

R Core Team, 2015. R: A Language and Environment for Statistical Computing. R Foundation for Statistical Computing, Vienna, Austria. URL `https://www.R-project.org/`.