

Package ‘popgenr’

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Type Package

Title Accompaniment to Population Genetics with R: An Introduction for Life Scientists

Version 0.2

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Description Provides several data sets and functions to accompany the book “Population Genetics with R: An Introduction for Life Scientists” (2021, ISBN:9780198829546).

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coal *Simulate and visualize a coalescent process*

Description

A function that provides a simple starting off point to simulate a coalescent process.

Usage

```
coal(length, number, muscale, reps, prnt)
```

Arguments

length	Length of sequence to simulate.
number	Number of starting lineages.
muscale	Mutation rate, scaled by $4N\mu$.
reps	Number of replicates to run.
prnt	Whether to print calculation output to the terminal (prnt=1), or not (prnt=0).

Examples

```
#assign genotype counts
length=250

number=8

muscale=6.25 # theta = 4Nμ = 25, theta/4 = 6.25

reps=100

prnt=0

#run function
coal(length, number, muscale, reps, prnt)
```

Dcalc *Calculate and visualize LD*

Description

Calculates the degree of linkage disequilibrium between two biallelic diploid loci and plots the results.

Usage

```
Dcalc(AABB, AaBB, aaBB, AABb, AaBb, aaBb, AAbb, Aabb, aabb)
```

Arguments

AABB	Count of A and B double homozygotes.
AaBB	Count of A heterozygotes, B homozygotes.
aaBB	Count of a and B double homozygotes.
AABb	Count of A homozygotes, B heterozygotes.
AaBb	Count of double heterozygotes.
aaBb	Count of a homozygotes, B heterozygote.
AAbb	Count of A and b double homozygotes.
Aabb	Count of A heterozygotes, b homozygotes.
aabb	Count of a and b double homozygotes.

Examples

```
#assign genotype counts
AABB=2
AaBB=0
aaBB=0
AABb=0
AaBb=1
aaBb=0
AAbb=1
Aabb=0
aabb=0

#run function
Dcalc(AABB, AaBB, aaBB, AABb, AaBb, aaBb, AAbb, Aabb, aabb)
```

 fly

Drosophila melanogaster bw75 data

Description

A matrix of observed allele counts from Buri (1956). Each row contains observations starting at generation 1 in the first row, across 107 replicates of the number of bw75 allele.

Usage

```
fly
```

Source

Buri, P. (1956). Gene frequency in small populations of mutant *Drosophila*. *Evolution*, 10, 367-402.

genotypes	<i>Genotype data from Aleppo Pines</i>
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Description

Multiple sampled alleles from Aleppo Pine (*Pinus halepensis*) in the Eastern Mediterranean. Adapted from Gershberg et al. 2016.

Usage

genotypes

Source

Gershberg, A., Ne'eman, G., Ben-Shlomo, R. (2016). Genetic structure of a naturally regenerating post-fire seedling population: *Pinus halepensis* as a case study. *Frontiers in Plant Science* 7: 549.

moth	<i>Temporal allele frequency shifts</i>
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Description

Change in allele frequency over eight generations in the scarlet tiger moth (*Callimorpha dominula*).

Usage

moth

Source

Fisher, R. A. and E. B. Ford (1947). The Spread of a Gene in Natural Conditions in a Colony of the Moth *Panaxia dominula*. *Heredity* 1: 143-174.

snp	<i>SNP information for 25 loci</i>
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Description

Single Nucleotide Polymorphism data for 25 loci. Includes information on allele frequency, homozygosity, heterozygosity, chromosome location, and functional location of SNP.

Usage

snp

Source

1,000 Genomes Project (<http://www.internationalgenome.org>)

thirteen	<i>Genotypes across 13 CODIS loci</i>
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Description

Genotypes of 1,036 individuals across 13 core CODIS (Combined DNA Index System) loci, collected in the USA.

Usage

thirteen

Source

Hill, C.R., Duewer, D.L., Kline, M.C., Coble, M.D., and Butler, J.M. (2013) U.S. population data for 29 autosomal STR loci. *Forensic Sci. Int. Genet.* 7: e82-e83. Accessed from: <https://strbase.nist.gov/fbicore.htm>

whale

Genotypes of 246 South Pacific Blue Whales

Description

Data frame of genotypes collected from 264 individual blue Whales (*Balaenoptera musculus*) across seven distinct loci. Adapted from Attard et al. 2012.

Usage

whale

Source

Attard, C. R., Beheregaray, L. B., Jenner, K. C. S., Gill, P. C., Jenner, M. N., Morrice, M. G., Robertson, K.M. and Moller, L. M. (2012). Hybridization of Southern Hemisphere blue whale subspecies and a sympatric area off Antarctica: impacts of whaling or climate change? *Molecular Ecology*, 21(23), 5715-5727.

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