

Package ‘electivity’

August 20, 2019

Type Package

Title Algorithms for Electivity Indices

Version 1.0.2

Date 2019-08-13

Description Provides all electivity algorithms (including Vanderploeg and Scavia electivity) that were examined in Lechowicz (1982) <doi:10.1007/BF00349007>, plus the example data that were provided for moth resource utilisation.

URL <https://github.com/DesiQuintans/electivity>

BugReports <https://github.com/DesiQuintans/electivity/issues>

Encoding UTF-8

LazyData true

Depends R (>= 3.4.0)

Suggests utils (>= 3.4.2), usethis (>= 1.0.0)

RoxygenNote 6.1.1

License MIT + file LICENSE

NeedsCompilation no

Author Desi Quintans [aut, cre] (<<https://orcid.org/0000-0003-3356-0293>>)

Maintainer Desi Quintans <science@desiquintans.com>

Repository CRAN

Date/Publication 2019-08-20 14:50:05 UTC

R topics documented:

chesson_alpha	2
electivity	3
ivlev_electivity	3
ivlev_forage	4
jacob_electivity	5
jacob_forage	5

moth_distrib	6
moth_elect	7
strauss_linear	8
vs_electivity	8

Index	10
--------------	-----------

chesson_alpha	<i>Chesson's alpha, or Vanderploeg and Scavia's selectivity coefficient (W)</i>
---------------	---

Description

These two functions calculate the same value; alpha and W are identical.

Usage

```
chesson_alpha(r, p, na.rm = TRUE)
```

```
vs_select_coef(r, p, na.rm = TRUE)
```

Arguments

r	(Numeric) Resource utilisation.
p	(Numeric) Resource availability.
na.rm	(Logical) If 'TRUE', 'NA's will be ignored when calculating the selectivity coefficient (W).

Value

A numeric vector.

Examples

```
data(moth_distrib)

chesson_alpha(moth_distrib$r, moth_distrib$p)
vs_select_coef(moth_distrib$r, moth_distrib$p)
```

electivity	<i>Algorithms for electivity indices and measures of resource use versus availability.</i>
------------	--

Description

This package is essentially Lechowicz (1982) turned into an R package. It includes all algorithms that were described therein plus the example data that was provided for moth resource utilisation.

Details

Lechowicz, M.J., 1982. The sampling characteristics of electivity indices. *Oecologia* 52, 22–30. <https://doi.org/10.1007/BF00349007>

Users are encouraged to read the original paper before deciding which algorithm is most useful for them. Lechowicz recommended Vanderploeg and Scavia's E* index (implemented in this package as `vs_electivity()`) as "the single best, but not perfect, electivity index" because "E* embodies a measure of the feeder's perception of a food's value as a function of both its abundance and the abundance of other food types present." In practice, he found that all indices returned nearly identical rank orders of preferred hosts except for Strauss' linear index (L).

Author

Desi Quintans (@eco_desi)

URL

<https://github.com/DesiQuintans/electivity/>

<code>ivlev_electivity</code>	<i>Ivlev's electivity, E</i>
-------------------------------	------------------------------

Description

Bounded between -1.0 (avoidance), 0 (random feeding), and +1.0 (preference).

Usage

```
ivlev_electivity(r, p)
```

Arguments

r	(Numeric) Resource utilisation.
p	(Numeric) Resource availability.

Value

A numeric vector.

Source

Lechowicz, M.J., 1982. The sampling characteristics of electivity indices. *Oecologia* 52, 22–30.
<https://doi.org/10.1007/BF00349007>

Examples

```
data(moth_distrib)
ivlev_electivity(moth_distrib$r, moth_distrib$p)
```

ivlev_forage	<i>Ivlev's forage ratio, E'</i>
--------------	---------------------------------

Description

Bounded between +0.1 (avoidance), +1.0 (random feeding), and infinity (preference).

Usage

```
ivlev_forage(r, p, log10 = FALSE)
```

Arguments

r (Numeric) Resource utilisation.
p (Numeric) Resource availability.
log10 (Logical) If TRUE, transform the value with `log10()`.

Value

A numeric vector.

Examples

```
data(moth_distrib)
ivlev_forage(moth_distrib$r, moth_distrib$p, log10 = FALSE)
ivlev_forage(moth_distrib$r, moth_distrib$p, log10 = TRUE)
```

jacob_electivity	<i>Jacob's modified electivity, D</i>
------------------	---------------------------------------

Description

Bounded between +0.1 (avoidance), +1.0 (random feeding), and infinity (preference).

Usage

```
jacob_electivity(r, p)
```

Arguments

r	(Numeric) Resource utilisation.
p	(Numeric) Resource availability.

Value

A numeric vector.

Examples

```
data(moth_distrib)
jacob_electivity(moth_distrib$r, moth_distrib$p)
```

jacob_forage	<i>Jacob's modified forage ratio, Q</i>
--------------	---

Description

When logged (which is Jacob's recommendation), bounded between negative and positive infinity.

Usage

```
jacob_forage(r, p, log10 = FALSE)
```

Arguments

r	(Numeric) Resource utilisation.
p	(Numeric) Resource availability.
log10	(Logical) If TRUE, return the value as Log10.

Value

A numeric vector.

Examples

```
data(moth_distrib)
jacob_forage(moth_distrib$r, moth_distrib$p, log10 = TRUE)
jacob_forage(moth_distrib$r, moth_distrib$p, log10 = FALSE)
```

moth_distrib	<i>Distribution of gypsy moth larvae, Lymantria dispar, feeding in a deciduous forest in southwestern Quebec, Canada.</i>
--------------	---

Description

This is Table 2 in the cited source paper.

Usage

```
moth_distrib
```

Format

A dataframe with 19 rows and 6 variables:

binomen Species of tree.

n_indiv Number of randomly sampled trees.

dbh_cm_sum Summed diameters at breast height, in centimeters.

larva_mean_sum Summed numbers of larvae (the means of two counts taken on June 26-27, 1979 and July 3-4, 1979).

r Relative proportion of larvae feeding on trees (Lechowicz 1982, Equation 2)

p Estimate of foliage biomass (Lechowicz 1982, Equation 1).

Source

Lechowicz, M.J., 1982. The sampling characteristics of electivity indices. *Oecologia* 52, 22–30.
<https://doi.org/10.1007/BF00349007>

Examples

```
data(moth_distrib)
```

moth_elect	<i>Electivities of gypsy moth larvae</i>
------------	--

Description

This is Table 3 in the cited source paper.

Usage

```
moth_elect
```

Format

A dataframe with 19 rows and 8 variables:

binomen Species of tree.

E Ivlev's electivity index.

E_prime_i Ivlev's forage ratio.

D_i Jacob's modified electivity.

log_Q_i Jacob's modified forage ratio, log10.

L_i Strauss' linear index.

W_i Chesson's alpha, or Vanderploeg and Scavia's selectivity coefficient.

E_star_i Vanderploeg and Scavia's relativised electivity.

Source

Lechowicz, M.J., 1982. The sampling characteristics of electivity indices. *Oecologia* 52, 22–30.
<https://doi.org/10.1007/BF00349007>

Examples

```
data(moth_elect)
```

strauss_linear	<i>Strauss' linear index, L</i>
----------------	---------------------------------

Description

Bounded between -1.0 (avoidance), 0 (random feeding), and +1.0 (preference).

Usage

```
strauss_linear(r, p)
```

Arguments

r	(Numeric) Resource utilisation.
p	(Numeric) Resource availability.

Value

A numeric vector.

Examples

```
data(moth_distrib)
strauss_linear(moth_distrib$r, moth_distrib$p)
```

vs_electivity	<i>Vanderploeg and Scavia's relativised electivity, E*</i>
---------------	--

Description

Bounded between -1.0 (avoidance), 0 (random feeding), and +1.0 (preference).

Usage

```
vs_electivity(r, p, na.rm = TRUE)
```

Arguments

r	(Numeric) Resource utilisation.
p	(Numeric) Resource availability.
na.rm	(Logical) If TRUE, NAs will be ignored when calculating the selectivity coefficient (W).

Value

A numeric vector.

vs_electivity

9

Examples

```
data(moth_distrib)
vs_electivity(moth_distrib$r, moth_distrib$p)
```

Index

*Topic **data**

moth_distrib, [6](#)

moth_elect, [7](#)

chesson_alpha, [2](#)

electivity, [3](#)

electivity-package (electivity), [3](#)

ivlev_electivity, [3](#)

ivlev_forage, [4](#)

jacob_electivity, [5](#)

jacob_forage, [5](#)

moth_distrib, [6](#)

moth_elect, [7](#)

strauss_linear, [8](#)

vs_electivity, [8](#)

vs_select_coef (chesson_alpha), [2](#)