Package 'placer'

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Type Package

Title PLastic ACcumulation Estimate using R (PLACER)

Version 0.1.3

Description Assessment of the prevalence of plastic debris in bird nests based on bootstrap replicates. The package allows for calculating bootstrapped 95% confidence intervals for the estimated prevalence of debris. Combined with a Bayesian approach, the resampling simulations can be also used to define appropriate sample sizes to detect prevalence of plastics. The method has wide application, and can also be applied to estimate confidence intervals and define sample sizes for the prevalence of plastics ingested by any other organisms. The method is described in Tavares et al. (Submitted).

Depends R (>= 3.5.0)

Suggests dplyr, knitr, rmarkdown, kableExtra

VignetteBuilder knitr

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Encoding UTF-8

LazyData true

RoxygenNote 6.1.1

NeedsCompilation no

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R topics documented:

`ctern` *Caspian terns plastic debris in Senegal.*

Description

A dataset containing absence and presence observations of plastic debris for the Caspian terns in the coast of Senegal.

Usage

```
ctern
```

Format

A data frame with 529 rows and 8 variables:

species species name, add more info

location location, add more info

country country, add more info

latitude latitude, add more info

longitude longitude, add more info

year year, add more info

nest_code nest code, add more info

debris_presence debris presence absence, add more info

References

Tavares et al. Submitted.

placer *placer: A package to estimate the accumulation of plastic debris in bird's nests*

Description

The package placer consist of two main functions to estimate the accumulation of plastic in bird's nest as a function of sample size, and a routine to plot the plastic prevalence probability, and their confidence intervals as a function of sample size.

Main functions

The function `plastic.prev.prob` calculates the plastic prevalence probability for a given sample size based on presence and absence data The function `plastic.ci` estimates the 95% confidence intervals for a given prevalence probability of plastic debris. In addition, the package placer includes a plotting routine `prevalence_plot` to show the estimated plastic prevalence probability and their 95% confidence intervals as a function of sample size.

plastic.ci *Confidence intervals of plastic prevalence probability*

Description

Bootstrap simulations to estimate 95% bootstrapped CIs for the prevalence of debris obtained with different sample sizes.

Usage

```
plastic.ci(plastic_abs_pres, max_sample_size = 300, bs_rep = 1000,
  lower_ci = 0.025, upper_ci = 0.975)
```

Arguments

`plastic_abs_pres`	numeric vector, containing a binary values with 0 or no for absence of plastic, and 1 or yes for presence of plastic.
`max_sample_size`	integer, specifying the maximum number of samples to use for estimating the prevalence of plastic debris. By default 300 samples. Increasing sample sizes substantially increases computational time.
`bs_rep`	integer, specifying the number of bootstrap replications. By default 1000 replications.
`lower_ci`	numeric, specifying lower confidence interval. By default 2.5%, based on Efron and Tibshirani (1993)
`upper_ci`	numeric, specifying upper confidence interval. By default 97.5% default, based on Efron and Tibshirani (1993).

Value

A list (cidtf) with a data frame with sample sizes, mean CI, lower CI, upper CI, and a matrix (prevprob) with prevalence probability of plastic debris for all sample sizes and their estimated prevalence of debris.

Note

The confidence intervals are calculated in a sequence of varying sample sizes, i.e. 1,2,3...,n and the function can be also used for defining sample sizes that would provide 95% CIs with the desired accuracy.

References

Efron, B., & Tibshirani, R. (1993). An introduction to the Bootstrap. Boca Raton: Chapman & Hall.

See Also

`plastic.prev.prob`, `prevalence_plot`

Examples

```
plastic.ci(rbinom(1000,1,0.5), 30, 100)
```

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plastic.prev.prob *Plastic prevalence probability*

Description

`plastic.prev.prob` estimates the prevalence probability of plastic from a randomly selected sample of absence/presence observations of plastic debris.

Usage

```
plastic.prev.prob(plastic_abs_pres, num_sample)
```

Arguments

`plastic_abs_pres`	numeric vector, containing a binary values with 0 or 'no' for absence of plastic, and 1 or 'yes' for presence of plastic.
`num_sample`	integer value, specifying the number of samples to randomly draw from the observations.

Value

Prevalence probability of plastic debris in a given sample size.

See Also

plastic.ci, prevalence_plot

Examples

```
plastic.prev.prob(rbinom(1000,1,0.5), 1)
plastic.prev.prob(rbinom(1000,1,0.5), 10)
```

---

prevalence_plot *Plastic prevalence probability plot*

Description

Plot to show the plastic prevalence probability in seabird's nests as a function of different sample sizes and their corresponding confidence intervals.

Usage

```
prevalence_plot(prev_prob_mat, sample_sizes, lower_ci, upper_ci,
  xlab = "Sample size", ylab = "Plastic prevalence probability",
  colobs = "grey", colci = "#64B5F6")
```

Arguments

prev_prob_mat	numeric matrix, containing plastic prevalence probability with dimensions (samples_size, bootstrap_replicates).
sample_sizes	numeric vector, containing sequence of sample size used to estimate the confidence intervals plastic.ci.
lower_ci	numeric vector, containing values for lower confidence interval and with the same length as sample_sizes.
upper_ci	numeric vector, containing values for upper confidence interval and with the same length as sample_sizes.
xlab	string, label of x axis.
ylab	string, label of y axis.
colobs	color of observations.
colci	color of confidence intervals.

See Also

plastic.ci, plastic.prev.prob

Examples

```
binomtest <- plastic.ci(rbinom(1000,1,0.5), 30, 100)
prevalence_plot(binomtest$prevprob,
                binomtest$cidtf$N,
                binomtest$cidtf$lower_ci,
                binomtest$cidtf$upper_ci)
```

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