Package 'ggFishPlots'

March 22, 2023

Type Package

Title Visualise and Calculate Life History Parameters for Fisheries Science using 'ggplot2'

Version 0.2.2

Date 2023-03-21

URL https://github.com/DeepWaterIMR/ggFishPlots

BugReports https://github.com/DeepWaterIMR/ggFishPlots/issues

Description Contains functions to create life history parameter plots from raw data. The plots are created using 'ggplot2', and calculations done using the 'tidyverse' collection of packages. The package contains references to FishBase (Froese R., Pauly. D., 2023) <https://www.fishbase.se/>.

Depends R (>= 3.5.0), ggplot2

Imports dplyr, tibble, tidyr, ggridges, fishmethods, broom, rlang, tidyselect, magrittr, ggrepel

Suggests knitr, rmarkdown

License GPL-3

Encoding UTF-8

RoxygenNote 7.2.3

NeedsCompilation no

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Repository CRAN

Date/Publication 2023-03-22 19:40:10 UTC

R topics documented:

`plot_growth` *Plot age-length relationships and growth curves*

Description

Plot age-length relationships and growth curves

Usage

```
plot_growth(
  dt,
  length = "length",
  age = "age",
  sex = "sex",
  female.sex = "F",
  male.sex = "M",
  length.unit = "cm",
  split.by.sex = FALSE,
  growth.model = 1,
  force.zero.group.length = NA,
  force.zero.group.strength = 10,
  force.zero.group.cv = 0,
  show.Linf = TRUE,
  boxplot = TRUE,
  base_size = 8,
  legend.position = "bottom"
)
```

Arguments

`dt`	A data.frame, tibble or data.table
`length`	Character argument giving the name of the length column in `dt`
`age`	Character argument giving the name of the age column in `dt`
`sex`	Character argument giving the name of the sex column in `dt`. Ignored if `split.by.sex == FALSE`.
`female.sex`	A character denoting female sex in the `sex` column of `dt`
`male.sex`	A character denoting male sex in the `sex` column of `dt`
`length.unit`	A character argument giving the unit of `length`. Will be used in the labels of the figure.
`split.by.sex`	Logical indicating whether the result should be split by sex.

`growth.model` Integer defining the growth model. 1 = von Bertalanffy, 2 = Gompertz, 3 = Logistic.

`force.zero.group.length`
Numeric indicating the length to which 0-group should be forced. Use `NA` ignore the forcing.

`force.zero.group.strength`
Numeric indicating how many percent of total fish should be added to the specified `force.zero.group.length`.

`force.zero.group.cv`
Numeric indicating the coefficient of variation for the forced 0-group length. Resulting lengths will be randomly generated from a normal distribution.

`show.Linf` Logical indicating whether Linf values should be shown as dashed vertical lines.

`boxplot` Logical indicating whether boxplots (`TRUE`) should be used to show data over points (`FALSE`)

`base_size` Base size parameter for ggplot. See ggtheme.

`legend.position`
Position of the ggplot legend as a character. See ggtheme.

Details

Uses the `fishmethods::growth` function to calculate the growth curves. Zero group length can be forced to the growth functions using the `force.zero.group.*` parameters.

Value

A list containing the `plot`, `text` for Rmarkdown and Shiny applications, and estimated parameters (`params`).

Author(s)

Mikko Vihtakari // Institute of Marine Research.

Examples

```
# Simple plot. Note that a list is returned.
data(survey_ghl)
plot_growth(survey_ghl, length = "length", age = "age")

# Split by sex
plot_growth(survey_ghl, split.by.sex = TRUE)$plot
# Data as points. Forcing zero group to 10 cm
plot_growth(survey_ghl, force.zero.group.length = 10, boxplot = FALSE)$plot
```

plot_lw *Plot length-weight relationships*

Description

Plot length-weight relationships

Usage

```
plot_lw(
  dt,
  length = "length",
  weight = "weight",
  sex = "sex",
  female.sex = "F",
  male.sex = "M",
  length.unit = "cm",
  weight.unit = "kg",
  split.by.sex = FALSE,
  xlab = "Total length",
  ylab = "Weight",
  use.nls = FALSE,
  init.a = NULL,
  init.b = NULL,
  log.axes = FALSE,
  base_size = 8,
  legend.position = "bottom",
  correct.units = FALSE,
  verbose = TRUE
)
```

Arguments

dt	A data.frame, tibble or data.table
length	Character argument giving the name of the length column in dt
weight	Character argument giving the name of the age column in dt
sex	Character argument giving the name of the sex column in dt. Ignored if split.by.sex == FALSE.
female.sex	A character denoting female sex in the sex column of dt
male.sex	A character denoting male sex in the sex column of dt
length.unit	Character argument giving the unit of length. Will be used in the labels of the figure and for conversion of the a parameter. Allowed values for the conversion: "mm" (millimmeters), "cm" (centimeters), and "m" (meters).
weight.unit	Character argument giving the unit of weight. Will be used in the labels of the figure and for conversion of the a parameter. Allowed values: "g" (grams), "kg" (kilograms), and "t" (metric tons).

split.by.sex	Logical indicating whether the result should be split by sex.
xlab	Character giving the x-axis label without unit
ylab	Character giving the x-axis label without unit.
use.nls	Logical indicating whether the parameters should be calculated using the nonlinear least squares (nls; TRUE) method over the log-log transformed linear model (lm; FALSE) method.
init.a, init.b	Numeric values giving the starting value for a and b parameters respecitively for non-linear least-squares estimation (i.e. when use.nls = TRUE). If NULL, default values are guessed.
log.axes	Logical indicating whether logarithmic axes should be used instead of cartesian ones.
base_size	Base size parameter for ggplot. See ggtheme.
legend.position	Position of the ggplot legend as a character. See ggtheme.
correct.units	Logical indicating whether a and b parameters should be converted for centimeters and grams as in FishBase.
verbose	Logical indicating whether to return warnings and messages.

Details

It is crucial to get the units right when calculating length-weight relationships. In models, the length and weight units should often match those of the data going into the model, while in comparisons with FishBase, the units of length and weight should be centimetres and grams, respectively. If the units are wrong, the intercept, a, will be off the FishBase scale by orders of magnitude (see FishBase). If correct.units = TRUE, plot_lw() attempts to correct for the units to the FishBase standard (cm and g). The function also returns a warning when the returned parameters are not within expected bounds for cm and g estimation. You can ignore this warning if you want to estimate values. Comparing your a and b with those in FishBase for the species is a good idea. This function may contain bugs.

Value

A ggplot together with the a and b parameters.

Author(s)

Mikko Vihtakari // Institute of Marine Research.

Examples

```
data(survey_ghl)

# Simple plot
plot_lw(survey_ghl, length = "length", weight = "weight")

# Split by sex
plot_lw(survey_ghl, split.by.sex = TRUE)$plot
```

plot_maturity *Plot maturity ogive*

Description

Plots an estimate of length or age at 50% mature for a dataset

Usage

```
plot_maturity(
  dt,
  length = "length",
  maturity = "maturity",
  sex = "sex",
  split.by.sex = FALSE,
  female.sex = "F",
  male.sex = "M",
  length.unit = "cm",
  length.bin.width = 2,
  bootstrap.n = NA,
  force.zero.group.length = NA,
  force.zero.group.strength = NA,
  force.zero.group.n = NA,
  force.zero.group.cv = 0,
  xlab = "Total length",
  base_size = 8,
  legend.position = "bottom",
  ...
)
```

Arguments

dt	A data.frame, tibble or data.table
length	Character argument giving the name of the length (or age) column in dt
maturity	Character argument giving the name of the maturity column in dt. Should be either logical (TRUE == mature, FALSE == immature) or integer (1 == mature, 0 == immature).
sex	Character argument giving the name of the sex column in dt. Ignored if split.by.sex == FALSE.
split.by.sex	Logical indicating whether the result should be split by sex.
female.sex	A character denoting female sex in the sex column of dt
male.sex	A character denoting male sex in the sex column of dt
length.unit	A character argument giving the unit of length. Will be used in the labels of the figure.

`length.bin.width`
: Numeric specifying the increment (delta length) by which length data should be binned to calculate maturity proportions. Use `NULL` to remove from the plot.

`bootstrap.n`
: Integer defining the number of bootstrap replicates to be used to calculate 95% confidence intervals for the mean 50% mature estimate. If `NA` (default), the confidence intervals are calculated from the glm object without boostrapping. See Details.

`force.zero.group.length`
: Numeric indicating the length to which 0-group (all immatures) should be forced. Use `NA` ignore the forcing.

`force.zero.group.strength`
: Numeric indicating how many percent of total fish should be added to the specified `force.zero.group.length`. Cannot be used simultaneously with `force.zero.group.n`

`force.zero.group.n`
: Numeric indicating how many observations should be added to the specified `force.zero.group.length`. If `split.by.sex = TRUE`, use a named vector of length two with names referring to `female.sex` and `male.sex`. Cannot be used simultaneously with `force.zero.group.strength`

`force.zero.group.cv`
: Numeric indicating the coefficient of variation for the forced 0-group (all immature) length. Resulting lengths will be randomly generated from a normal distribution.

`xlab`
: Character giving the x-axis label without unit

`base_size`
: Base size parameter for ggplot. See ggtheme.

`legend.position`
: Position of the ggplot legend as a character. See ggtheme.

`...`
: Additional arguments passed to geom_density_ridges.

Details

The 95% confidence intervals for the mean 50% mature estimate are calculated using the glm function by default. This routine might not be optimal when zero group fish are added. Hence, the function contains an option to bootstrap confidence intervals using *the same number of data than observations* (i.e. excluding the added data from the number of randomly resampled rows). Adding an integer to the `bootstrap.n` argument turns on this feature. Note that the confidence intervals calculated this way tend to be narrower than the `glm()` confidence intervals.

Value

Returns a ggplot2 or tibble depending on the `plot` argument showing the maturity ogives.

Author(s)

Mikko Vihtakari // Institute of Marine Research.

Examples

```
# Simple L50 plot
data(survey_ghl)
plot_maturity(survey_ghl, length = "length", maturity = "maturity")

# Bootstrapped CIs are narrower than the glm ones
plot_maturity(survey_ghl, bootstrap.n = 10)

# A50 plot, split by sex
plot_maturity(survey_ghl, length = "age", length.unit = "years",
xlab = "Age", length.bin.width = 1, split.by.sex = TRUE)$plot

# Add juveniles
plot_maturity(survey_ghl, length = "age", length.unit = "years",
xlab = "Age", length.bin.width = 1, split.by.sex = TRUE,
force.zero.group.length = 0,
force.zero.group.strength = 100)$plot
```

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survey_ghl *Greenland halibut measurements from IMR surveys*

Description

Greenland halibut measurements from IMR surveys

Usage

```
data(survey_ghl)
```

Format

A dataframe

Details

Contains length, weight, age, sex and maturity measurements of Greenland halibut acquired on various surveys.

Source

Institute of Marine Research (https://www.hi.no/hi)

`theme_fishplots` *A ggplot2 theme for the ggFishPlots package*

Description

A ggplot2 theme for the ggFishPlots package

Usage

```
theme_fishplots(..., grid.col, grid.size)
```

Arguments

`...`	additional arguments passed to `ggtheme`.
`grid.col`	Character code specifying the color of grid lines. Use `NA` to remove the grid lines.
`grid.size`	Numeric value specifying the width of grid lines.

Value

A ggplot2 theme layer.

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