Package 'thermgRad'

March 10, 2022

Title Tools for germination analysis on thermal gradient plate

Version 0.0.1

Description It is a long established fact that a reader will be distracted by the readable content of a page when looking at its layout. The point of using Lorem Ipsum is that it has a more-or-less normal distribution of letters, as opposed to using 'Content here, content here', making it look like readable English.

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Encoding UTF-8

Roxygen list(markdown = TRUE)

RoxygenNote 7.1.2

Suggests knitr,
rmarkdown,
testthat (>= 3.0.0)

Config/testthat/edition 3

Imports utils,
dplyr,
magrittr,
ggplot2,
readr,
tidyr,
tidyverse,
methods

VignetteBuilder knitr

R topics documented:

`cardinal` *Cardinal temperatures outputs*

Description

Calculates and plot cardinal temperatures and sub/supra regression equations after selecting a temperature fluctuation threshold

Usage

```
cardinal(
  data = "template dataframe",
  dayBL = "Diurnal bottom left temperature",
  dayBR = "Diurnal bottom right temperature",
  dayTL = "Diurnal top left temperature",
  dayTR = "Diurnal top right temperature",
  nightBL = "Nocturnal bottom left temperature",
  nightBR = "Nocturnal bottom right temperature",
  nightTL = "Nocturnal top left temperature",
  nightTR = "Nocturnal top right temperature",
  petri = "Number of petri in a column or row",
  method = "tbd",
  adjust = "tbd",
  fs = "lower thershold of fluctuation values",
  fe = "higher threshold of fluctuation values"
)
```

Arguments

`data`	A template dataframe
`dayBL`	Average diurnal temperature at the bottom left side of the thermal gradient plate
`dayBR`	Average diurnal temperature at the bottom left side of the thermal gradient plate
`dayTL`	Average diurnal temperature at the bottom left side of the thermal gradient plate
`dayTR`	Average diurnal temperature at the bottom left side of the thermal gradient plate
`nightBL`	Average diurnal temperature at the bottom left side of the thermal gradient plate
`nightBR`	Average diurnal temperature at the bottom left side of the thermal gradient plate
`nightTL`	Average diurnal temperature at the bottom left side of the thermal gradient plate
`nightTR`	Average diurnal temperature at the bottom left side of the thermal gradient plate
`petri`	Number of Petri dishes in a column or a row.
`method`	Leave blank to use average corner temperature values or use "precise" to create a temperature gradient based in individual corner temperatures
`adjust`	tbd, but will be used to center temperature into Petri dish
`fs`	Lower fluctuation threshold
`fe`	Higher fluctuation thresholds

Value

Cardinal temperatures, sub and supraoptimal equations and a visualization

coolbear *Obtain T50 values*

Description

Obtain T50 values using Coolbear et al. (1984) formula modified by Farooq et al.(2005). Vector containing scoring days must have same length than vector containing cumulative germination data

Usage

```
coolbear(
  day = "vector containing scoring dats",
  cumulative = "vector containing cumulative germination for each day",
  n = "total number of viable seeds"
)
```

Arguments

day	A vector containing scoring days
cumulative	A vector containing the cumulative germination for each day
n	Number of viable seeds in the Petri dish (Total sown seeds - empty seeds)

Value

t50 value in days

Examples

```
coolbear(seq(1,10,1),c(0,0,0,0,0,6,12,15,18,20),20)
```

petri_grid *Obtain T50, Germination Rate for each Petri dish in the thermal gradient*

Description

This function transform an excel spreadshit cumulative germination data from every Petri dish into a grid containing petri dish label, T50 and Germination rate. See details to format the input data correctly. The last column must be the total number of viable seeds of each petri dish (germinated + fresh & mouldy after cut test). It does not have to be (necessarily) a 13 by 13 Petri dish grid

Usage

```
petri_grid(x)
```

Arguments

x	A data.frame, probably imported from an excel spreadsheet. See details for formatting

Details

Input for this function is a data frame with this format. Please note this table has a header and is relevant for the function for "Days" to be the header and not a row. This is because thermal plate germination data is probably recorded in a excel spreadsheet with this format

Day	1	3	6	8	12	15	17	22	Total
A1	0	0	0	6	10	12	17	17	21
A2	0	0	0	3	10	10	10	11	19
A3	0	0	0	3	4	5	5	5	20
A4	0	12	15	15	18	20	20	20	20
...	...	...	...	...	...	...	...	...	...
M11	0	0	0	8	13	14	17	19	20
M12	0	0	0	1	1	5	8	20	20
M13	0	0	0	1	5	10	10	15	21

Value

A data frame with thermal plate T50 and GR values

`plot_tempgrad` *Plots thermal gradient temperature for each Petri dish*

Description

Taking into account thermal gradient plate corner temperatures this function return a graph with the temperatures of each Petri dish. Using the "precise" method returns a more accurate estimated grid of temperatures across the thermal plate, while with the adjust parameter is possible to estimate the temperature at the center of each Petri dish

Usage

```
plot_tempgrad(
  x = "output dataframe from tempgrad function",
  toplot = "tbdescribed"
)
```

Arguments

`x`	a dataframe outputted by tempgrad function
`toplot`	Decides between plotting average Petri dish temperature (="average) or fluctuation (="fluctuation)

Value

A graph with average Petri dish temperature or temperature fluctuation

Examples

```
x<-tempgrad(dayBL=0,dayBR=0,dayTL=40,dayTR=40,nightBL=0,nightBR=40,nightTL=0,nightTR=40,petri=13)
plot_tempgrad(x,toplot="average")
plot_tempgrad(x,toplot="fluctuation")
x%>%plot_tempgrad(toplot="average")
#'
```

`tempgrad` *Generate temperature gradient grid*

Description

Taking into account thermal gradient plate corner temperatures this function return a data frame with day and night temperatures for each petri dish, their average temperature and the temperature fluctuation. Using the "precise" method returns a more accurate estimate of temperatures across the thermal plate, while with the adjust parameter is possible to estimate the temperature at the center of each Petri dish

Usage

```
tempgrad(
  dayBL = "Diurnal bottom left temperature",
  dayBR = "Diurnal bottom right temperature",
  dayTL = "Diurnal top left temperature",
  dayTR = "Diurnal top right temperature",
  nightBL = "Nocturnal bottom left temperature",
  nightBR = "Nocturnal bottom right temperature",
  nightTL = "Nocturnal top left temperature",
  nightTR = "Nocturnal top right temperature",
  petri = "Number of petri in a column or row",
  method = "tbd",
  adjust = "tbd"
)
```

Arguments

`dayBL`	Average diurnal temperature at the bottom left side of the thermal gradient plate
`dayBR`	Average diurnal temperature at the bottom left side of the thermal gradient plate
`dayTL`	Average diurnal temperature at the bottom left side of the thermal gradient plate
`dayTR`	Average diurnal temperature at the bottom left side of the thermal gradient plate
`nightBL`	Average diurnal temperature at the bottom left side of the thermal gradient plate
`nightBR`	Average diurnal temperature at the bottom left side of the thermal gradient plate
`nightTL`	Average diurnal temperature at the bottom left side of the thermal gradient plate
`nightTR`	Average diurnal temperature at the bottom left side of the thermal gradient plate
`petri`	Number of Petri dishes in a column or a row.
`method`	Leave blank to use average corner temperature values or use "precise" to create a temperature gradient based in individual corner temperatures
`adjust`	tbd, but will be used to center temperature into Petri dish

Value

A data frame with day and night temperatures, average temperature and temperature fluctuation for each Petri dish

Examples

```
tempgrad(dayBL=0,dayBR=0,dayTL=40,dayTR=40,nightBL=0,nightBR=40,nightTL=0,nightTR=40,petri=13)
```

`tg_example` *Load example*

Description

Loads a dataframe which can be used as an example to try out the functions

Usage

```
tg_example()
```

Value

an example data frame

Examples

```
df<-tg_example()
```

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