Package: AgroTech (via r-universe)

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Type Package

Title Data Analysis of Pesticide Application Technology

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Description In total it has 7 functions, three for calculating machine
calibration, which determine application rate (L/ha), nozzle
flow (L/min) and amount of product (L or kg) to be added. to
the tank with each sprayer filling. Two functions for graphs of
the flow distribution of the nozzles (L/min) in the application
bar and, of the temporal variability of the meteorological
conditions (air temperature, relative humidity of the air and
wind speed). Two functions to determine the spray deposit
(uL/cm2), through the methodology called spectrophotometry,
with the aid of bright blue (Palladini, L.A., Raetano, C.G.,
Velini, E.D. (2005), <doi:10.1590/S0103-90162005000500005>) or
metallic markers (Chaim, A., Castro, V.L.S.S., Correles, F.M.,
Galvão, J.A.H., Cabral, O.M.R., Nicolella, G. (1999),
<doi:10.1590/S0100-204X1999000500003>). The package supports
the analysis and representation of information, using a single
free software that meets the most diverse areas of activity in
application technology.

Encoding UTF-8

RoxygenNote 7.2.1

Imports ggplot2, gridExtra, xlsx, readxl, ggrepel, stats, nortest,
lmtest, crayon, utils

License GPL (>= 2)

Depends R (>= 3.6)

NeedsCompilation no

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Contents

---

example_markblue   *Dataset: Example markblue*

Description

The data are part of an experiment that studied the spray deposit

Usage

```
data(example_markblue)
```

Format

data.frame containing data set

curva Vector with curves

TRATAMENTO Numeric vector with treatment

repe Numeric vector with repetition

Abs Numeric vector with absorbance

area Numeric vector with area

Author(s)

Rodrigo Yudi Palhaci Marubayashi, <marubayashi@uel.br>

Gabriel Danilo Shimizu

Otavio Jorge Grigoli Abi Saab

Examples

```
data(example_markblue)
```

---

example_markbluecurve   *Dataset: Example markbluecurve*

Description

The data are part of an experiment that studied the spray deposit

Usage

```
data(example_markbluecurve)
```

Format

data.frame containing data set

curva Vector with curve

Amostra Numeric vector with sample

Abs Numeric vector with absorbance

ppm Numeric vector with concentration

Author(s)

Rodrigo Yudi Palhaci Marubayashi, <marubayashi@uel.br>

Gabriel Danilo Shimizu

Otavio Jorge Grigoli Abi Saab

Examples

```
data(example_markbluecurve)
```

---

example_markmet   *Dataset: Example markmet*

Description

The data are part of an experiment that studied the spray deposit

Usage

```
data(example_markmet)
```

Format

data.frame containing data set

trat Vector with treatment

repe Numeric vector with repetition

ppm Numeric vector with concentration

Author(s)

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Gabriel Danilo Shimizu

Otavio Jorge Grigoli Abi Saab

Examples

```
data(example_markmet)
```

---

example_meteorological

Dataset: Example meteorological

Description

The data come from a meteorological station on a rural property in the city of Rolandia/PR

Usage

```
data("example_meteorological")
```

Format

data.frame containing data set

tempo Numeric vector with time

temp Numeric vector with air temperature

ur Numeric vector with relative humidity

vento Numeric vector with wind speed

Author(s)

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Otavio Jorge Grigoli Abi Saab

Examples

```
data(example_meteorological)
```

---

flowgrap	*Flow graphic of nozzles on spray bar*

Description

This is a function to check the conditions of the spray nozzles

Usage

```
flowgrap(
  file,
  pointsize = 3.5,
  xsup = 1.1,
  xinf = 0.9,
  pointcolor = "red",
  xlab = "Nozzle number",
  ylab = NA
)
```

Arguments

file	Numerical vector with the flows
pointsize	Point size (*default* 3.5)
xsup	Upper limit
xinf	Bottom limit
pointcolor	Point color (red)
xlab	x axis legend
ylab	y axis legend

Value

Returns graph of ggplot2

Author(s)

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Gabriel Danilo Shimizu

Otavio Jorge Grigoli Abi Saab

References

ANDEF Associacao Nacional de Defesa Vegetal. Manual de tecnologia de aplicacao de produtos fitossanitarios. Campinas: Linea Creativa, 2004. 50p.

BOLLER, W.; RAETANO, C. G. Bicos e pontas de pulverizacao de energia hidraulica, regulagens e calibracao de pulverizadores de barras. In: ANTUNIASSI, U. R.; BOLLER, W. (Organizadores). Tecnologia de aplicacao para culturas anuais. Passo Fundo: Aldeia Norte; Botucatu: FEPAF, 2011. p.51-82.

SPRAYING SYSTEMS CO. Catalogo 51A-PT - Produtos de pulverizacao para agricultura. Wheaton: Spraying Systems Co., 2014. 160p.

Examples

```
resp=c(881,854,865,876,906.3,
874.7,868.3,878.7,872.7,901.7,
823.3,889.7,861.3,900.3,890.3,
886.7,916.7,872,912.7,894)
flowgrap(resp)
# flowgrap("file.xlsx")
```

---

flowpres   *Flow calculation as a function of working pressure*

Description

This is a function to determine the flow rate of a spray nozzle as a function of the working pressure

Usage

```
flowpres(q1, q2, p1, p2)
```

Arguments

q1	Nozzle flow 1 (L/min)
q2	Nozzle flow 2 (L/min)
p1	Nozzle pressure 1 (bar)
p2	Nozzle pressure 2 (bar)

Details

Nozzle flow 1:

$$q1 = \frac{\sqrt{p1}}{\sqrt{p2}} * q2$$

Nozzle flow 2:

$$q2 = \frac{q1}{\frac{\sqrt{p1}}{\sqrt{p2}}}$$

Nozzle pressure 1:

$$p1 = (\sqrt{p2} * \frac{q1}{q2})^2$$

Nozzle pressure 2:

$$p2 = (\frac{\sqrt{p1}}{(\frac{q1}{q2})})^2$$

Value

Returns values of flow (L/min) or pressure (bar)

Author(s)

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BOLLER, W.; RAETANO, C. G. Bicos e pontas de pulverizacao de energia hidraulica, regulagens e calibracao de pulverizadores de barras. In: ANTUNIASSI, U. R.; BOLLER, W. (Organizadores). Tecnologia de aplicacao para culturas anuais. Passo Fundo: Aldeia Norte; Botucatu: FEPAF, 2011. p.51-82.

SPRAYING SYSTEMS CO. Catalogo 51A-PT - Produtos de pulverizacao para agricultura. Wheaton: Spraying Systems Co., 2014. 160p.

See Also

flowrat product

Examples

```
flowpres(q1=NA,q2=0.80,p1=1.00,p2=2.80)
flowpres(q1=0.48,q2=0.80,p1=1.00,p2=NA)
```

flowrat	*Calculation of required spray nozzle flow*

Description

This is a function to determine the required flow rate of a spray nozzle

Usage

```
flowrat(Q, q, V, W = 50)
```

Arguments

Q	Application rate (L/ha)
q	Nozzle flow (L/min)
V	Sprayer speed (km/h)
W	Spacing between spray nozzles (cm)

Details

Application rate (L/ha):
$$Q = \frac{60000 * q}{V * W}$$

Nozzle flow (L/min):
$$q = \frac{Q * (V * W)}{60000}$$

Sprayer speed (km/h):
$$V = \frac{\frac{60000 * q}{Q}}{W}$$

Spacing between spray nozzles (m):
$$W = \frac{\frac{60000 * q}{Q}}{V}$$

Value

Returns values for flow, application rate, sprayer speed, spacing between spray tips

Note

60000 Units conversion factor

Author(s)

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References

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SPRAYING SYSTEMS CO. Catalogo 51A-PT - Produtos de pulverizacao para agricultura. Wheaton: Spraying Systems Co., 2014. 160p.

See Also

flowpres product

Examples

```
flowrat(Q = 190,q = NA,V = 10,W = 50)
```

---

markblue	*Spray deposit (glowing blue marker)*

Description

This is a function to determine spray deposit using bright blue marker and then after performing tests of assumptions, analysis of variance and comparison of means

Usage

```
markblue(
  d1,
  d2,
  vl,
  ci,
  ncu2 = 1,
  ntrat2 = 2,
  nrep2 = 3,
  nresp2 = 5,
  naf2 = 6,
  analysis = TRUE,
  design = "DIC",
  transf = 1,
  quali = TRUE,
  grau = 1,
  test = "parametric",
  mcomp = "tukey",
  ylab = expression(mu ~ cm^2),
  save.xlsx = FALSE
)
```

Arguments

`d1`	Curved worksheet
`d2`	Experiment worksheet
`vl`	Wash volume (mL)
`ci`	Initial marker concentration
`ncu2`	Column referring to the curve (*default* is 1)
`ntrat2`	Column referring to treatment
`nrep2`	Column referring to repetition
`nresp2`	Column referring to absorbance
`naf2`	Sheet area (cm2)
`analysis`	Perform statistical analysis
`design`	Experiment design
`transf`	Data transformation
`quali`	Qualitative or quantitative treatment (*default* is TRUE)
`grau`	degree of the polynomial (when treatment is quantitative)
`test`	Parametric or Nonparametric (*default* is "parametric")
`mcomp`	Mean comparison test (*default* is "tukey")
`ylab`	y axis name (*default* is expression(mu~cm^2))
`save.xlsx`	Want to export in excel format (*default* is FALSE)

Value

Returns the comparison between the treatments of the experiment

Note

Curve name on the curve worksheet (d1) must be the same as the curve name on the experiment worksheet (d2)

Author(s)

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References

No reference

See Also

markmet

Examples

```
data("example_markbluecurve")
data("example_markblue")
markblue(d1=example_markbluecurve,
         d2=example_markblue,
         vl=20,
         ci=1500,
         ncu2 = 1,
         ntrat2 = 2,
         nrep2 = 3,
         nresp2 = 4,
         naf2 = 5)
```

---

markmet   *Spray deposit (metallic marker)*

Description

This is a function to determine spray deposit using metallic markers and then after performing tests of assumptions, analysis of variance and comparison of means

Usage

```
markmet(
  ppm,
  white,
  VL,
  AL,
  analysis = TRUE,
  trat,
  block,
  design = "DIC",
  transf = 1,
  quali = TRUE,
  grau = 1,
  test = "parametric",
  mcomp = "tukey",
  ylab = expression(mu ~ cm^2),
  save.xlsx = FALSE
)
```

Arguments

ppm	Concentração
white	White reading
VL	Wah volume (mL)
AL	blade area (cm2)

analysis	Perform statistical analysis
trat	Vector with treatment
block	Vector with block (if design = "DBC")
design	Experiment design
transf	Data transformation
quali	Qualitative or quantitative treatment (*default* is TRUE)
grau	degree of the polynomial (when treatment is quantitative)
test	Parametric or Nonparametric (*default* is "parametric")
mcomp	Mean comparison test (*default* is "tukey")
ylab	y axis name (*default* is expression(mu~cm^2))
save.xlsx	Want to export in excel format (*default* is FALSE)

Value

Returns the comparison between the treatments of the experiment

Author(s)

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Gabriel Danilo Shimizu

Otavio Jorge Grigoli Abi Saab

References

No reference

See Also

[markblue]

Examples

```
library(AgroTech)
data("example_markmet")
with(example_markmet,
     markmet(ppm = ppm,
             white = 0.02,
             VL = 35,
             AL = 63.61,
             analysis = TRUE,
             trat=trat))
```

---

product   *Amount of phytosanitary product per spray tank*

Description

This is a function to determine the amount of commercial product to be placed in the sprayer tank at each fill

Usage

```
product(Ct, Dose, Q)
```

Arguments

Ct	Spray tank volumetric capacity (L)
Dose	Product dose to be applied (L/ha, mL/ha, kg/ha, g/ha)
Q	Application rate (L/ha)

Value

Returns values for amount of product (L or kg)

Author(s)

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Gabriel Danilo Shimizu

Otavio Jorge Grigoli Abi Saab

References

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SPRAYING SYSTEMS CO. Catalogo 51A-PT - Produtos de pulverizacao para agricultura. Wheaton: Spraying Systems Co., 2014. 160p.

See Also

flowpres flowrat

Examples

```
product(Ct = 800,Dose = 200,Q = 100)
```

---

vartemp | *Temporal variability graph of weather conditions*

Description

This is a function to check weather conditions in agricultural spraying

Usage

```
vartemp(
  file,
  nx = 1,
  ny = 2,
  variable = NA,
  ylab = "Dependent",
  xlab = "Independent",
  size.text = 12,
  size.title = 12,
  size.strip = 12,
  size.lty = 0.7
)
```

Arguments

file	Excel file (xlsx)
nx	Time
ny	Weather conditions
variable	Variable name
ylab	y axis (Dependent)
xlab	x axis (Independent)
size.text	Size text (*default* is 12)
size.title	Size title (*default* is 12)
size.strip	Size strip (*default* is 12)
size.lty	Size line (*default* is 0.7)

Value

Returns graph of ggplot2

Author(s)

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Gabriel Danilo Shimizu

Otavio Jorge Grigoli Abi Saab

References

No reference

Examples

```
data("example_meteorological")
vartemp(example_meteorological)
```

Index