Package ‘rhoneycomb’

August 23, 2023

Title Analysis of Honeycomb Selection Designs

Version 2.3.4

Description A useful statistical tool for the construction and analysis of Honeycomb Selection Designs. More information about this type of designs: Fasoula V. (2013) <doi:10.1002/9781118497869.ch6> Fasoula V.A., and Tokatlidis I.S. (2012) <doi:10.1007/s13593-011-0034-0> Fasoulas A.C., and Fasoula V.A. (1995) <doi:10.1002/9780470650059.ch3> Tokatlidis I. (2016) <doi:10.1017/S0014479715000150> Tokatlidis I., and Vlachostergios D. (2016) <doi:10.3390/d8040029>.

Depends R (>= 4.2)

License GPL (>= 2)

Encoding UTF-8

RoxygenNote 7.2.3

Suggests knitr, rmarkdown

VignetteBuilder knitr

LazyData true

Imports stats, utils, graphics

NeedsCompilation no

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R topics documented:

`analysis` *Analysis of the honeycomb selection design.*

Description

This function analyzes the response variable of the data frame.

Usage

```
analysis(
  Main_Data_Frame = NULL,
  Response_Vector = NULL,
  circle = 6,
  blocks = FALSE,
  row_element = NULL,
  plant_element = NULL,
  CRS = NULL
)
```

Arguments

`Main_Data_Frame`
: A data frame generated by one of the functions HSD(), HSD0(), HSD01() and HSD03().

`Response_Vector`
: A vector containing the response variable data.

`circle`
: The number of plants per moving ring.

`blocks`
: The moving circular block.

`row_element`
: The position of the plant (number of row) in the center of a moving ring/circular block.

`plant_element`
: The position of the plant (number of plant) in the center of a moving ring/circular block.

`CRS`
: The number of selected plants used for the CRS index.

Value

A list.

References

Fasoula V. (2013). Prognostic Breeding: A New Paradigm for Crop Improvement. Plant Breeding Reviews 37: 297-347. 10.1002/9781118497869.ch6. doi:10.1002/9781118497869.ch6

Fasoula V.A., and Tokatlidis I.S. (2012). Development of crop cultivars by honeycomb breeding. Agronomy for Sustainable Development 32:161–180. 10.1007/s13593-011-0034-0 doi:10.1007/s1359301100340

Fasoulas A.C., and Fasoula V.A. (1995). Honeycomb selection designs. In J. Janick (ed.). Plant Breeding Reviews 13: 87-139. doi:10.1002/9780470650059.ch3

Tokatlidis I. (2016). Sampling the spatial heterogeneity of the honeycomb model in maize and wheat breeding trials: Analysis of secondary data compared to popular classical designs. Experimental Agriculture, 52(3), 371-390. doi:10.1017/S0014479715000150

Tokatlidis I., and Vlachostergios D. (2016). Sustainable Stewardship of the Landrace Diversity. Diversity 8(4):29. doi:10.3390/d8040029

Examples

```
main_data<-HSD(7,2,10,10,1)
main_data$Data<-wheat_data$total_yield

analysis(main_data,"Data",6)
```

`generate` *Available honeycomb selection designs.*

Description

This function is used to generate the available honeycomb selection designs including k parameters.

Usage

```
generate(E_gen = NULL)
```

Arguments

`E_gen`	A single number or a vector of entries.

Value

A dataframe.

References

Fasoula V. (2013). Prognostic Breeding: A New Paradigm for Crop Improvement. Plant Breeding Reviews 37: 297-347. 10.1002/9781118497869.ch6. doi:10.1002/9781118497869.ch6

Fasoula V.A., and Tokatlidis I.S. (2012). Development of crop cultivars by honeycomb breeding. Agronomy for Sustainable Development 32:161–180. 10.1007/s13593-011-0034-0 doi:10.1007/s1359301100340

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Examples

```
generate(1:50)
```

`HSD` *Construction of the honeycomb selection design.*

Description

This function creates a data frame of a honeycomb selection design.

Usage

```
HSD(E, K, rows, plpr, distance, poly = TRUE, control = FALSE)
```

Arguments

`E`	The number of entries.
`K`	The k parameter.
`rows`	The number of rows.
`plpr`	The number of plants per row.
`distance`	The plant-to-plant distance in meters.
`poly`	If TRUE the polygon pattern is displayed.
`control`	Convert the design to controlled.

Value

A dataframe.

References

Fasoula V. (2013). Prognostic Breeding: A New Paradigm for Crop Improvement. Plant Breeding Reviews 37: 297-347. 10.1002/9781118497869.ch6. doi:10.1002/9781118497869.ch6

Fasoula V.A., and Tokatlidis I.S. (2012). Development of crop cultivars by honeycomb breeding. Agronomy for Sustainable Development 32:161–180. 10.1007/s13593-011-0034-0 doi:10.1007/s1359301100340

Fasoulas A.C., and Fasoula V.A. (1995). Honeycomb selection designs. In J. Janick (ed.). Plant Breeding Reviews 13: 87-139. doi:10.1002/9780470650059.ch3

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Examples

```
HSD(7,2,10,10,1)
```

`HSD0` *Construction of the honeycomb selection design without control.*

Description

This function creates a data frame of a honeycomb selection design (one entry, without control).

Usage

```
HSD0(rows, plpr, distance, poly = TRUE)
```

Arguments

`rows`	The number of rows.
`plpr`	The number of plants per row.
`distance`	The plant-to-plant distance in meters.
`poly`	If TRUE set polygon pattern is displayed.

Value

A dataframe.

References

Fasoula V. (2013). Prognostic Breeding: A New Paradigm for Crop Improvement. Plant Breeding Reviews 37: 297-347. 10.1002/9781118497869.ch6. doi:10.1002/9781118497869.ch6

Fasoula V.A., and Tokatlidis I.S. (2012). Development of crop cultivars by honeycomb breeding. Agronomy for Sustainable Development 32:161–180. 10.1007/s13593-011-0034-0 doi:10.1007/s1359301100340

Fasoulas A.C., and Fasoula V.A. (1995). Honeycomb selection designs. In J. Janick (ed.). Plant Breeding Reviews 13: 87-139. doi:10.1002/9780470650059.ch3

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Examples

```
HSD0(10,10,1)
```

`HSD01` *Construction of the honeycomb selection design with one control.*

Description

This function creates a data frame of a honeycomb selection design (one entry, one control).

Usage

```
HSD01(K, rows, plpr, distance, poly = TRUE)
```

Arguments

`K`	The K parameter.
`rows`	The number of rows.
`plpr`	The number of plants per row.
`distance`	Distance between plants in meters.
`poly`	If TRUE the polygon pattern is displayed.

Value

A dataframe.

References

Fasoula V. (2013). Prognostic Breeding: A New Paradigm for Crop Improvement. Plant Breeding Reviews 37: 297-347. 10.1002/9781118497869.ch6. doi:10.1002/9781118497869.ch6

Fasoula V.A., and Tokatlidis I.S. (2012). Development of crop cultivars by honeycomb breeding. Agronomy for Sustainable Development 32:161–180. 10.1007/s13593-011-0034-0 doi:10.1007/s1359301100340

Fasoulas A.C., and Fasoula V.A. (1995). Honeycomb selection designs. In J. Janick (ed.). Plant Breeding Reviews 13: 87-139. doi:10.1002/9780470650059.ch3

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Examples

```
HSD01(1,10,10,1)
```

`HSD03` *Construction of the honeycomb selection design with three controls.*

Description

This function creates a data frame of a honeycomb selection design (one entry, three controls).

Usage

```
HSD03(K, rows, plpr, distance, poly = TRUE)
```

Arguments

`K`	The k parameter.
`rows`	The number of rows.
`plpr`	The number of plants per row.
`distance`	Distance between plants in meters.
`poly`	If TRUE the polygon pattern is displayed.

Value

A dataframe

References

Fasoula V. (2013). Prognostic Breeding: A New Paradigm for Crop Improvement. Plant Breeding Reviews 37: 297-347. 10.1002/9781118497869.ch6. doi:10.1002/9781118497869.ch6

Fasoula V.A., and Tokatlidis I.S. (2012). Development of crop cultivars by honeycomb breeding. Agronomy for Sustainable Development 32:161–180. 10.1007/s13593-011-0034-0 doi:10.1007/s1359301100340

Fasoulas A.C., and Fasoula V.A. (1995). Honeycomb selection designs. In J. Janick (ed.). Plant Breeding Reviews 13: 87-139. doi:10.1002/9780470650059.ch3

Tokatlidis I. (2016). Sampling the spatial heterogeneity of the honeycomb model in maize and wheat breeding trials: Analysis of secondary data compared to popular classical designs. Experimental Agriculture, 52(3), 371-390. doi:10.1017/S0014479715000150

Tokatlidis I., and Vlachostergios D. (2016). Sustainable Stewardship of the Landrace Diversity. Diversity 8(4):29. doi:10.3390/d8040029

Examples

```
HSD03(1,10,10,1)
```

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wheat_data *A dataset*

Description

A dataset containing observations from an R7 honeycomb selection design.

Usage

```
wheat_data
```

Format

wheat_data$main_spike_weight The weight (g) of the main spike of a single plant.

wheat_data$tillers_spike_weight The weight (g) of tillers' spikes of a single plant.

wheat_data$total_yield The total yield (g) of a single plant.

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