Package: ecoteach (via r-universe)

May 26, 2026

Title Educational Datasets for Ecology and Agriculture

Version 0.1.0

Description A collection of curated educational datasets for teaching ecology and agriculture concepts. Includes data on wildlife monitoring, plant treatments, and ecological observations with documentation and examples for educational use. All datasets are derived from published scientific studies and are available under CC0 or compatible licenses.

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Contents

`ecoteach-package` *ecoteach: Educational Datasets for Ecology and Agriculture*

Description

A collection of curated educational datasets for teaching ecology and agriculture concepts. The package provides clean, well-documented datasets that can be used for teaching data analysis, statistics, and ecological concepts in classroom settings. Each dataset includes comprehensive documentation and examples of potential analyses.

Details

The package includes the following datasets:

- `badger_energy`: Energy expenditure data for European badgers with tuberculosis
- `barnswallow_brightness`: Plumage brightness data for barn swallows
- `berberis_treatment`: Data on invasive Berberis management treatments
- `carrion_arrivals`: Vertebrate scavenger visits to roe deer carrion
- `chimpanzee_cameras`: Camera trap detection data for wild chimpanzees
- `dormouse_hibernation`: Hibernation and reproduction data for edible dormice
- `Dsimulans_matechoice`: Mate copying data for fruit flies
- `elephant_farmers`: Agricultural use metrics for elephants
- `leafcutter_disturbance`: Leaf-cutting ant herbivory under human disturbance
- `lion_reproduction`: Reproductive data for Galapagos sea lions
- `magellanic_penguins`: Long-term monitoring data on Magellanic penguins
- `pangolin_habitat`: Habitat occupancy data for Chinese pangolins

- `raccoondog_environment`: Raccoon dog activity and environmental factors in China
- `redpanda_moves`: Movement patterns and weather effects on red pandas
- `scavenger_community`: Scavenger community structure along environmental gradients
- `shark_fishing`: Shark mortality predictions from fishing operations
- `vulture_diet`: Diet composition analysis of African vultures
- `whale_brains`: Brain size evolution data for cetaceans
- `wren_noise`: Southern house wren song response to noise and territorial intrusion

All datasets are provided in tidy format, with factors appropriately coded, and include proper citation information. The package aims to make it easy for instructors to incorporate real ecological data into their teaching.

Data Sources

All datasets are derived from published scientific studies and are available under CC0 or compatible licenses. Full citations and DOIs are provided in the documentation for each dataset.

Author(s)

Maintainer: W. Edwin Harris `<weh9000@gmail.com>` [copyright holder]

References

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Siqueira, F. F. S., Ribeiro-Neto, J. D., Tabarelli, M., Andersen, A. N., Wirth, R., & Leal, I. R. (2018). Human disturbance promotes herbivory by leaf-cutting ants in the Caatinga dry forest. doi:10.5061/DRYAD.KP59G3P

Diniz, P., & Duca, C. (2022). Anthropogenic noise, song, and territorial aggression in southern house wrens. doi:10.5061/DRYAD.TTDZ08M00

Examples

```
# Load a dataset
data(vulture_diet)

# View the structure
str(vulture_diet)

# Basic summary
summary(vulture_diet)

# See what datasets are available
data(package = "ecoteach")
```

`badger_energy` *European badger energy expenditure and tuberculosis infection data*

Description

This dataset contains measurements of daily energy expenditure (DEE) and related variables for European badgers (Meles meles) in relation to their tuberculosis (TB) infection status. The data were collected to examine how disease status and other factors like season, group size, sex, age, and body mass affect energy balance in wild badgers. Some individuals were measured multiple times across different seasons.

Usage

```
badger_energy
```

Format

A data frame with 56 rows and 7 variables:

ID Unique identifier for each badger

age Age class of the badger: "cub" or "adult"

sex Sex of the badger: "F" (female) or "M" (male)

group_size Number of badgers in the social group

body_mass Body mass in kilograms (kg)

daily_energy Daily energy expenditure (DEE) in kilojoules per day (kJ/day)

season Season when measurements were taken: "Winter", "Spring", "Summer", or "Autumn"

disease Tuberculosis infection status: "Negative", "Diseased", or "Exposed"

Source

Barbour, Katie and McClune, David W. and Delahay, Richard J. and Speakman, John R. and McGowan, Natasha E. and Kostka, Berit and Montgomery, Ian W. and Marks, Nikki J. and Scantlebury, David M. (2019). Data from: No energetic cost of tuberculosis infection in European badgers (Meles meles). Dryad Digital Repository. doi:10.5061/DRYAD.MN84H20

Examples

```
# Load the dataset
data(badger_energy)

# Basic exploration
head(badger_energy)
summary(badger_energy)

# Compare energy expenditure by disease status
boxplot(daily_energy ~ disease, data = badger_energy,
```

```
        main = "Daily Energy Expenditure by TB Status",
        ylab = "DEE (kJ/day)", xlab = "TB Status")

# Examine relationship between body mass and energy expenditure
plot(daily_energy ~ body_mass, data = badger_energy,
     col = as.numeric(disease), pch = 16,
     main = "Energy Expenditure vs Body Mass",
     xlab = "Body Mass (kg)", ylab = "DEE (kJ/day)")
legend("topright", levels(badger_energy$disease),
       col = 1:3, pch = 16)
```

---

barnswallow_brightness *Barn Swallow Plumage Brightness and Mate Selection*

Description

This dataset contains information on plumage brightness measurements for North American barn swallows (Hirundo rustica erythrogaster) and their mating patterns. The data includes measurements of belly and breast brightness for social pairs and extra-pair mates. This dataset was used to study assortative mating patterns in barn swallows, investigating how plumage coloration affects mate selection both within social pairs and through extra-pair fertilizations.

Usage

```
barnswallow_brightness
```

Format

A data frame with 19 rows and 7 variables:

MaleID Band ID for the focal male

PairID Band ID for the female social mate

EPID Band ID for the extra-pair mate

PairB_bright Belly brightness for the social male (unitless measurement of reflectance)

PairR_bright Breast brightness for the social male (unitless measurement of reflectance)

EPB_bright Belly brightness for the extra-pair male (unitless measurement of reflectance)

EPR_bright Breast brightness for the extra-pair male (unitless measurement of reflectance)

Source

Morosse, Omar, Tsunekage, Toshi, Kenny-Duddela, Heather, Schield, Drew, Keller, Kayleigh, Safran, Rebecca, & Levin, Iris (2025). North American barn swallows pair, mate, and interact assortatively. Dryad Digital Repository. doi:10.5061/DRYAD.1G1JWSV8G

Examples

```
# Load the dataset
data(barnswallow_brightness)

# Basic exploration
head(barnswallow_brightness)
summary(barnswallow_brightness)

# Compare brightness between social and extra-pair males
boxplot(barnswallow_brightness$PairB_bright, barnswallow_brightness$EPB_bright,
        names = c("Social Male", "Extra-pair Male"),
        main = "Comparison of Belly Brightness",
        ylab = "Brightness")

# Correlation between social and extra-pair male brightness
plot(barnswallow_brightness$PairB_bright, barnswallow_brightness$EPB_bright,
     main = "Correlation between Social and Extra-pair Male Brightness",
     xlab = "Social Male Belly Brightness",
     ylab = "Extra-pair Male Belly Brightness")
abline(lm(EPB_bright ~ PairB_bright, data = barnswallow_brightness), col = "red")
```

---

berberis_treatment *Berberis aquifolium Invasive Species Management Treatment Data*

Description

Experimental data from a management treatment study of invasive Berberis aquifolium (Oregon grape) plants conducted across four heavily infested dune sites in Belgium. The study evaluated the effectiveness of different management treatments on individual plants, with regrowth assessments conducted at 6 months and 1 year post-treatment.

Usage

```
berberis_treatment
```

Format

A data frame with 127 rows and 14 variables:

plant_id Character, unique identifier for each B. aquifolium plant/clone

region Factor, field code identifying the dune site location

date Date, when the plant was initially located and treated (April/May 2013)

treatment Factor, management treatment applied:

- Manual digging - Uprooting by digging with shovels
- Leaf spray (glyphosate) - 5\
- Stem cut + glyphosate - Cut and paint with 5\

- Stem cut + salt - Cut and treat with saturated NaCl solution

height Integer, plant height in centimeters

diameter Integer, clone diameter in centimeters

n_stems Integer, number of stems per individual plant/clone

date_regrowth Date, date of regrowth assessment

regrowth Ordered factor, stem regrowth response (Dead < Limited < Vital)

x_proj Numeric, X-coordinate of plant location (GPS projection)

y_proj Numeric, Y-coordinate of plant location (GPS projection)

days_to_assessment Numeric, days between treatment and assessment

treatment_success Factor, binary outcome (Success/Failure)

volume_approx Numeric, approximate plant volume

Source

Adriaens, T., Verschelde, P., Cartuyvels, E., D'hondt, B., Vercruysse, E., Gompel, W.V., Dewulf, E., & Provoost, S. (2019). Data from: A preliminary field trial to compare control techniques for invasive Berberis aquifolium in Belgian coastal dunes. Dryad Digital Repository. doi:10.5061/DRYAD.ZKH189361

Examples

```
# Load the dataset
data(berberis_treatment)

# Treatment effectiveness summary
table(berberis_treatment$treatment, berberis_treatment$regrowth)

# Visualize treatment effectiveness
barplot(table(berberis_treatment$treatment, berberis_treatment$regrowth),
        beside = TRUE, legend = TRUE,
        main = "Treatment Effectiveness for Invasive Berberis")
```

---

carrion_arrivals *Vertebrate scavenger visits to roe deer carrion*

Description

This dataset contains observations of vertebrate scavenger activity at roe deer evisceration residues (carrion) in a central European mountainous mixed forest. The data was collected from 47 roe deer viscera samples from hunted deer that were exposed to vertebrate scavenging in front of camera traps between May and October 2022. The dataset records visits, feeding, and removal events by various vertebrate scavengers, with events considered independent if more than 20 minutes passed between consecutive pictures. Samples were observed for a maximum of 16 days. The data provides insights into the composition of vertebrate scavenging fauna using evisceration residues, which species remove entire samples, and how long viscera remain available to invertebrate scavengers.

Usage

```
carrion_arrivals
```

Format

A data frame with 599 rows and 7 variables:

Samples Sample site identifier (factor)

Dates Setup Date when camera and sample were set up (Date)

Date Event Date when the scavenging event was recorded (Date)

Time Time when the scavenging event was recorded (hms)

Species Species of scavenger observed (factor)

Behaviour Type of behavior observed: Visit, Feeding, or Removal (factor)

Days2 Time elapsed in days between sample exposure and detected event (numeric)

Source

Schwegmann, Sebastian (2023). Data for: Use of viscera from hunted roe deer by vertebrate scavengers in summer in central European mountainous mixed forest. Dryad Digital Repository. doi:10.5061/DRYAD.Q573N5TPP

Examples

```
# Load the dataset
data(carrion_arrivals)

# Basic exploration
head(carrion_arrivals)
summary(carrion_arrivals)

# Count observations by species
table(carrion_arrivals$Species)

# Compare behaviors by species
table(carrion_arrivals$Species, carrion_arrivals$Behaviour)

# Calculate average days until first scavenger arrival by species
library(dplyr)
carrion_arrivals %>%
  group_by(Species) %>%
  summarize(mean_days = mean(Days2, na.rm = TRUE)) %>%
  arrange(mean_days)

# Visualize scavenger activity over time
if (require(ggplot2)) {
  ggplot(carrion_arrivals, aes(x = Days2, fill = Species)) +
    geom_histogram(binwidth = 1, position = "stack") +
    labs(title = "Scavenger activity over time",
         x = "Days since carrion placement",
```

```
        y = "Number of observations")
}
```

`chimpanzee_cameras` *Chimpanzee Camera Trap Detection Data*

Description

This dataset contains presence/absence data for wild chimpanzees (Pan troglodytes) detected by camera traps in the Issa Valley, Tanzania. The data was collected as part of a study comparing the efficiency of camera traps versus passive acoustic monitoring for detecting chimpanzees in a savanna-woodland mosaic habitat.

Usage

```
chimpanzee_cameras
```

Format

A data frame with observations across multiple cameras and dates:

Camera Camera trap identifier (factor)

Latitude Latitude coordinates of the camera trap location (numeric)

Longitude Longitude coordinates of the camera trap location (numeric)

Method Camera placement method: 'systematic' or 'targeted' (factor)

Vegetation Vegetation type at camera location: 'open' or 'closed' (factor)

Topography Landscape feature at camera location: 'valley', 'slope', or 'plateau' (factor)

date Date of observation (Date)

detection Chimpanzee detection status: 'absent' or 'present' (factor)

Details

The dataset is in long format, with each row representing a camera trap observation for a specific date. Detection values are coded as 'present' (at least one detection during the day) or 'absent' (no detection). NA values indicate days when no survey was conducted (e.g., due to camera malfunction or not being deployed).

Source

Crunchant, Anne-Sophie and Borchers, David and Kuehl, Hjalmar and Piel, Alex K. (2020). Listening and watching: do camera traps or acoustic sensors more efficiently detect wild chimpanzees in an open habitat?. Dryad Digital Repository. doi:10.5061/DRYAD.5DV41NS34

Examples

```
# Load the dataset
data(chimpanzee_cameras)

# Basic exploration
head(chimpanzee_cameras)
summary(chimpanzee_cameras)


# Count detections by camera (requires dplyr)
if (requireNamespace("dplyr", quietly = TRUE)) {
  library(dplyr)
  chimpanzee_cameras %>%
    group_by(Camera) %>%
    summarize(
      total_observations = n(),
      detections = sum(detection == "present", na.rm = TRUE),
      detection_rate = mean(detection == "present", na.rm = TRUE)
    )
}

# Visualize detection patterns over time (requires ggplot2)
if (requireNamespace("ggplot2", quietly = TRUE)) {
  library(ggplot2)
  ggplot(chimpanzee_cameras, aes(x = date, y = Camera, fill = detection)) +
    geom_tile() +
    scale_fill_manual(values = c("absent" = "lightblue", "present" = "darkred"),
                      na.value = "gray90") +
    theme_minimal() +
    labs(title = "Chimpanzee detections by camera over time",
         x = "Date", y = "Camera")
}
```

---

dormouse_hibernation *Dormouse Hibernation and Reproduction Dataset*

Description

This dataset contains hibernation and reproductive data for edible dormice (Glis glis). The data tracks hibernation patterns, body mass changes, and reproductive activity across multiple years and individuals. The study examines how age affects hibernation timing and reproductive behavior in these small hibernating mammals.

Usage

```
dormouse_hibernation
```

Format

A data frame with 290 rows and 16 variables:

animal_id Unique identifier for each dormouse

year_birth Year of birth for the animal

age Age of the animal in years

log_age Logarithm of age

body_mass_before Body mass before hibernation (g)

body_mass_after Body mass after hibernation (g)

hibernation_duration Duration of hibernation in days

hibernation_start Date when hibernation started (DD.MM.YY format)

hibernation_end Date when hibernation ended (DD.MM.YY format)

hibernation_end_year_before End date of previous year's hibernation

body_mass_spring Body mass in spring (g)

year Year of observation

sex Sex of the animal (male or female)

diet Diet type (medium, high fat, or protein)

age_death Age at death in years

repro_active Whether the animal was reproductively active (yes or no)

Details

The research shows that age strongly affects hibernation/activity patterns through two pathways: (1) with increasing age, dormice are more likely to reproduce, which delays hibernation onset, and (2) age directly advances emergence from hibernation in spring. This suggests hibernation is not merely an energy-saving strategy but an age-affected life-history trait used to maximize fitness.

Source

Bieber, Claudia and Turbill, Christopher and Ruf, Thomas (2019). Data from: Effects of aging on timing of hibernation and reproduction. Dryad Digital Repository. doi:10.5061/DRYAD.8004G37

Examples

```
# Load the dataset
data(dormouse_hibernation)

# Basic exploration
head(dormouse_hibernation)
summary(dormouse_hibernation)

# Examine hibernation duration by age
boxplot(hibernation_duration ~ age, data = dormouse_hibernation,
        main = "Hibernation Duration by Age",
        xlab = "Age (years)", ylab = "Duration (days)")
```

```
# Compare body mass change during hibernation
with(dormouse_hibernation,
     plot(body_mass_before, body_mass_after,
          col = as.integer(sex),
          main = "Body Mass Before vs After Hibernation",
          xlab = "Body Mass Before (g)",
          ylab = "Body Mass After (g)"))
legend("topleft", levels(dormouse_hibernation$sex),
       col = 1:2, pch = 1)

# Examine reproductive activity by age
with(subset(dormouse_hibernation, !is.na(repro_active)),
     table(age, repro_active))
```

Dsimulans_matechoice *Mate Copying in Drosophila simulans*

Description

A dataset containing observations of mate choice decisions of *Drosophila simulans* females from three different populations to test whether they copy the mate choice of their conspecifics. The study tested whether female fruit flies acquire a sexual preference for a particular trait of a male after observing a single mating event. The experimental protocol involved a naïve, unmated female first observing a conspecific's mate choice between one artificially colored green and one artificially colored pink male, and subsequently being allowed to choose between two males of the same phenotype herself.

Usage

```
Dsimulans_matechoice
```

Format

A data frame with 383 rows and 14 variables:

Experimentor Who conducted the experiment (SN: Sabine Nöbel, TK: Tim Kaufmann)

Date Date of the experiment

TimeDemo Beginning time of the experiment

Chamber Position in the experimental box (A-F)

Device Number of the experimental set-up

Strain Fly population: Haale (Saale), Maison Salasar, or Deyme

Treatment Experimental treatment: Mate copying (informed) or Control (uninformed)

Temp Temperature (°C) in the experimental room

Humidity Humidity (%) in the experimental room

ColourDemo Color of the male copulating in the demonstration: Green or Pink

Colour1Court Color of the male that started the first courtship: Green or Pink

Colour2Court Color of the male that started the second courtship: Green or Pink

ColourTest Color of the male copulating in the test phase: Green or Pink

MCS Mate-copying score: "Same color" (observer female chose the same colored male as the demonstrator) or "Different color" (observer female chose a different colored male than the demonstrator)

Source

Nöbel, Sabine and Kaufmann, Tim (2025). Data from: Mate copying in Drosophila simulans. Dryad Digital Repository. doi:10.5061/DRYAD.ZS7H44JMC

Examples

```
# Load the dataset
data(Dsimulans_matechoice)

# Basic exploration
head(Dsimulans_matechoice)
summary(Dsimulans_matechoice)

# Examine mate copying rates by treatment
table(Dsimulans_matechoice$Treatment, Dsimulans_matechoice$MCS)

# Compare mate copying across different strains (using base R)
mosaicplot(table(Dsimulans_matechoice$Strain, Dsimulans_matechoice$MCS),
           main = "Mate choice outcomes by strain",
           color = c("lightblue", "salmon"))

# Analyze if environmental conditions affect mate copying
boxplot(Temp ~ MCS, data = Dsimulans_matechoice,
        main = "Temperature effects on mate copying",
        ylab = "Temperature (°C)")
```

---

elephant_farmers *Elephant Agricultural Use Metrics in Mara-Serengeti Ecosystem*

Description

A dataset containing agricultural use metrics for 66 elephants in the Mara-Serengeti ecosystem in Kenya and Tanzania. The data were collected to characterize crop use tactics by elephants and to understand how elephants interact with agricultural areas. The dataset includes metrics such as mean agricultural use, maximum use from a moving average, and the difference between mean and max use. These metrics were used to classify agricultural use tactics for each elephant using Gaussian mixture models. The dataset contains individual-year agricultural use metrics, space use, and elephant metadata, with tactic classifications for both lifetime tracks and individual years.

Usage

```
elephant_farmers
```

Format

A data frame with 202 rows and 17 variables:

subject_name Individual elephant ID

tactic.aggregate Tactic classification for lifetime GPS track of individual: Rare, Sporadic, Seasonal, or Habitual

season.year Year cuts (cut date April 1 of each year)

tactic.season Tactic classification for the associated year: Rare, Sporadic, Seasonal, or Habitual

year.begin Data start date for a given year

year.end Data stop date for a given year

n.fixes Number of GPS relocations for an individual in a given year

year.mean Mean agricultural use for a given year

year.max Maximum agricultural use from a 90-day moving average for a given year

year.delta Difference in mean and max agricultural use for a given year

year.mcp.area MCP homerange for an individual in a given year

mu.daily.disp Mean daily displacement for an individual in a given year

subject_sex Sex of the individual (male or female)

subject_ageClass Age class of individual (young adult or mature adult)

centroid.dist.meters Distance from centroid of homerange to agriculture (meters)

tactic.prev Tactic of the previous year (NA if no previous tactic could be confirmed)

tactic.change Whether an individual changed tactics ("Changed") or stayed the same ("No change")

Source

Hahn, Nathan (2021). Elephant agricultural use metrics in Mara-Serengeti ecosystem. Dryad Digital Repository. doi:10.5061/DRYAD.RN8PK0PBN

Examples

```
# Load the dataset
data(elephant_farmers)

# Basic exploration
head(elephant_farmers)
summary(elephant_farmers)

# Examine distribution of tactics by sex
table(elephant_farmers$subject_sex, elephant_farmers$tactic.season)

# Compare agricultural use metrics across tactics
boxplot(year.mean ~ tactic.season, data = elephant_farmers,
```

```
        main = "Mean Agricultural Use by Tactic",
        ylab = "Mean Agricultural Use")

# Examine tactic changes over time
# Count how many elephants changed tactics vs stayed the same
table(elephant_farmers$tactic.change, useNA = "ifany")

# Look at relationship between distance to agriculture and tactic
boxplot(centroid.dist.meters ~ tactic.season, data = elephant_farmers,
        main = "Distance to Agriculture by Tactic",
        ylab = "Distance (meters)")
```

---

leafcutter_disturbance *Leaf-Cutting Ant Herbivory Under Human Disturbance*

Description

This dataset examines how anthropogenic disturbance and seasonality affect herbivory rates by leaf-cutting ants (Atta opaciceps) in the Caatinga dry forest of northeastern Brazil. The data include measurements of herbivory percentages from eight ant colonies across different disturbance intensities during both wet and dry seasons.

Usage

```
leafcutter_disturbance
```

Format

A data frame with 16 rows and 4 variables:

Colony Integer, unique identifier for each ant colony studied

Disturbance_Index Numeric, quantitative measure of anthropogenic disturbance intensity (higher values indicate greater disturbance from activities like firewood collection and livestock grazing)

season Factor with levels "Dry" and "Wet", indicating the season when measurements were taken

herbivory_percent Numeric, percentage of available vegetation consumed by the ant colony

Details

The study found that human disturbance promotes higher herbivory rates by leaf-cutting ants, with particularly strong effects during the dry season. Despite the low productivity of Caatinga vegetation, these ants maintain foraging activity even during peak dry season by utilizing whatever resources are available, highlighting their adaptive capacity in human-modified landscapes.

The researchers measured herbivory rates across a gradient of human disturbance in the Catimbau National Park, a protected area in northeastern Brazil. The study reveals that leaf-cutting ants can maintain high rates of herbivory even in disturbed and seasonally dry environments, which has implications for understanding ecosystem functioning in human-modified tropical dry forests.

Collection period: 2015-2016 Study location: Catimbau National Park, Pernambuco, Brazil (8°24'00" - 8°36'35" S, 37°09'30" - 37°14'40" W)

Source

Siqueira, F. F. S., Ribeiro-Neto, J. D., Tabarelli, M., Andersen, A. N., Wirth, R., & Leal, I. R. (2018). Data from: Human disturbance promotes herbivory by leaf-cutting ants in the Caatinga dry forest. Dryad Digital Repository. doi:10.5061/DRYAD.KP59G3P

Examples

```
# Load the dataset
data(leafcutter_disturbance)

# Basic exploration
head(leafcutter_disturbance)
summary(leafcutter_disturbance)

# Compare herbivory between seasons
boxplot(herbivory_percent ~ season, data = leafcutter_disturbance,
        main = "Leaf-Cutting Ant Herbivory by Season",
        xlab = "Season", ylab = "Herbivory (%)")

# Examine relationship between disturbance and herbivory
plot(leafcutter_disturbance$Disturbance_Index,
     leafcutter_disturbance$herbivory_percent,
     col = as.numeric(leafcutter_disturbance$season),
     pch = 16, cex = 1.2,
     xlab = "Disturbance Index", ylab = "Herbivory (%)",
     main = "Ant Herbivory vs. Human Disturbance")
legend("topleft", legend = levels(leafcutter_disturbance$season),
       col = 1:nlevels(leafcutter_disturbance$season), pch = 16)

# Linear model of disturbance effect on herbivory
model <- lm(herbivory_percent ~ Disturbance_Index * season,
            data = leafcutter_disturbance)
summary(model)
```

---

lion_reproduction *Galapagos Sea Lion Reproduction Data*

Description

This dataset contains reproductive performance data for female Galapagos sea lions (Zalophus wollebaeki) collected over a 13-year period in the Galapagos archipelago. The data includes information on mother birth dates, body mass, age at first reproduction, and offspring details. This dataset was used to study life history traits and reproductive trade-offs of this tropical apex predator in an unpredictable habitat.

Usage

```
lion_reproduction
```

Format

A data frame with 48 rows and 12 variables:

MotherID Unique identifier for the mother sea lion

MotherBD Mother's birth date

exact Whether the birth date is exact ("Yes"), estimated ("No"), or unknown ("Unknown")

MotherBirthyear Year the mother was born

AgeAtCapture Age of the mother when first captured (in days)

AverageOneYearBodymass Average body mass of the mother at one year of age (in kg)

PupID Unique identifier for the pup

FirstPupBorn Date when the first pup was born

OffspringSex Sex of the offspring ("Male" or "Female")

SeenSince Year the mother was first observed

SeenUntil Year the mother was last observed

AFR Age at first reproduction (in years)

Source

Kalberer, Stephanie, Meise, Kristine, Trillmich, Fritz, & Krüger, Oliver (2018). Reproductive performance of a tropical apex predator in an unpredictable habitat. Dryad Digital Repository. doi:10.5061/DRYAD.6S48579

Examples

```
# Load the dataset
data(lion_reproduction)

# Basic exploration
head(lion_reproduction)
summary(lion_reproduction)

# Calculate mean age at first reproduction
mean(lion_reproduction$AFR)

# Compare age at first reproduction by offspring sex
boxplot(AFR ~ OffspringSex, data = lion_reproduction,
        main = "Age at First Reproduction by Offspring Sex",
        ylab = "Age (years)")

# Relationship between mother's body mass and age at first reproduction
```

```
plot(AverageOneYearBodymass ~ AFR, data = lion_reproduction,
     main = "Body Mass vs. Age at First Reproduction",
     xlab = "Age at First Reproduction (years)",
     ylab = "Average Body Mass at One Year (kg)")
```

---

magellanic_penguins *Magellanic Penguin Foraging and Reproductive Data*

Description

Data from satellite tracking of Magellanic penguins (Spheniscus magellanicus) at Punta Tombo, Argentina, spanning 23 breeding seasons. The dataset contains information on foraging site fidelity, trip characteristics, and reproductive success for individual penguins.

Usage

```
magellanic_penguins
```

Format

A data frame with 212 rows and 21 variables:

SeasonYear Integer, breeding season year

PenguinID Integer, unique identifier for each penguin

PenguinSeq Integer, sequential penguin number within season

InstrumentSeq Integer, instrument deployment sequence

NTripPairsLong Integer, number of long trip pairs

DistBetMean Numeric, mean distance between foraging sites (km)

DistBetSD Numeric, standard deviation of distance between sites (km)

DistBetMin Numeric, minimum distance between foraging sites (km)

DistBetMax Numeric, maximum distance between foraging sites (km)

InstrType Factor, type of tracking instrument used

InstrModel Character, model of tracking instrument

NFledged Integer, number of chicks that fledged successfully

DurDaysMean Numeric, mean trip duration in days

TripDistMean Numeric, mean trip distance (km)

BearingMean Numeric, mean bearing of foraging trips (degrees)

PenguinSex Factor, sex of penguin ("Male", "Female")

NumTrips Integer, total number of foraging trips

NumChicksDeploy Integer, number of chicks at deployment

NumChicksStarved Integer, number of chicks that starved

DeployDurDays Integer, deployment duration in days

ChlaMean Numeric, mean chlorophyll-a concentration

Source

Rebstock, G., Abrahms, B., & Boersma, D. (2022). Data from: Site fidelity increases reproductive success by increasing foraging efficiency in a marine predator. Dryad Digital Repository. doi:10.5061/DRYAD.8931ZCRSV

References

Rebstock, G.A., Abrahms, B. & Boersma, P.D. (2022). Site fidelity increases reproductive success by increasing foraging efficiency in a marine predator. Proceedings of the Royal Society B, 289(1975), 20220175.

Examples

```
# Load the dataset
data(magellanic_penguins)

# Basic exploration
head(magellanic_penguins)
summary(magellanic_penguins)

# Examine foraging efficiency by sex
boxplot(TripDistMean ~ PenguinSex, data = magellanic_penguins,
        main = "Mean Trip Distance by Sex",
        xlab = "Sex", ylab = "Mean Trip Distance (km)")

# Relationship between site fidelity and reproductive success
plot(magellanic_penguins$DistBetMean, magellanic_penguins$NFledged,
     xlab = "Mean Distance Between Sites (km)",
     ylab = "Number of Chicks Fledged",
     main = "Site Fidelity vs Reproductive Success")
```

---

pangolin_habitat *Habitat Occupancy of the Critically Endangered Chinese Pangolin*

Description

A dataset containing habitat occupancy observations of the Critically Endangered Chinese pangolin (*Manis pentadactyla*) in the urban landscape of Dharan Sub-metropolitan City, Nepal. The data were collected to analyze spatial distribution, habitat use patterns, and anthropogenic impacts on habitat occupancy of Chinese pangolins. The study used a single-season occupancy modeling approach, investigating factors influencing detection probability and habitat occupancy across 134 grid cells of 600m × 600m each.

Usage

```
pangolin_habitat
```

Format

A data frame with 152 rows and 18 variables:

object_id Unique identifier for each grid cell

replicate_1 Detection (1) or non-detection (0) in first survey replicate

replicate_2 Detection (1) or non-detection (0) in second survey replicate

replicate_3 Detection (1) or non-detection (0) in third survey replicate

replicate_4 Detection (1) or non-detection (0) in fourth survey replicate

replicate_5 Detection (1) or non-detection (0) in fifth survey replicate

replicate_6 Detection (1) or non-detection (0) in sixth survey replicate

distance_to_water Distance to nearest water body in meters

terrain_ruggedness Terrain Ruggedness Index (TRI), a measure of topographic heterogeneity

mean_ndvi Mean Normalized Difference Vegetation Index, a measure of vegetation density

habitat_type Type of habitat: "Sal Forest", "Mixed Forest", "Human Settlement", or "Agricultural Land"

habitat_structure Topographic structure: "Terrace" or "Cliff"

human_disturbance_index Index of human disturbance, ranging from 0 (low) to 1 (high)

termite_mounds Number of termite mounds in the grid cell

detection_sum Total number of detections across all six replicates

detected Binary indicator of whether pangolin was detected (1) or not (0) in any replicate

disturbance_level Categorized human disturbance: "Low", "Medium-Low", "Medium-High", or "High"

Details

The dataset is particularly valuable for teaching concepts in wildlife conservation, occupancy modeling, and human-wildlife interactions in urban environments. It demonstrates how ecological and anthropogenic factors affect endangered species in human-dominated landscapes.

Source

Subba, Asmit and Tamang, Ganesh and Lama, Sony and Basnet, Nabin and Kyes, Randall C. and Khanal, Laxman (2024). Habitat occupancy of the critically endangered Chinese pangolin (*Manis pentadactyla*) under human disturbance in an urban environment: Implications for conservation. Dryad Digital Repository. doi:10.5061/DRYAD.73N5TB34T

Examples

```
# Load the dataset
data(pangolin_habitat)

# Basic exploration
head(pangolin_habitat)
summary(pangolin_habitat)
```

```
# Examine detection rates across habitat types
table(pangolin_habitat$habitat_type, pangolin_habitat$detected)

# Visualize the relationship between termite mounds and pangolin detection
boxplot(termite_mounds ~ detected, data = pangolin_habitat,
        main = "Termite Mounds and Pangolin Detection",
        xlab = "Pangolin Detected", ylab = "Number of Termite Mounds",
        names = c("Not Detected", "Detected"))

# Examine the effect of human disturbance on pangolin detection
boxplot(human_disturbance_index ~ detected, data = pangolin_habitat,
        main = "Human Disturbance and Pangolin Detection",
        xlab = "Pangolin Detected", ylab = "Human Disturbance Index",
        names = c("Not Detected", "Detected"))

# Visualize detection across disturbance levels
barplot(prop.table(table(pangolin_habitat$disturbance_level,
                         pangolin_habitat$detected), 1)[,2],
        main = "Pangolin Detection Rate by Disturbance Level",
        xlab = "Disturbance Level", ylab = "Detection Rate")
```

---

raccoondog_environment *Raccoon dog activity and environmental factors in China*

Description

This dataset contains records of raccoon dog (*Nyctereutes procyonoides*) detections and other mammal species from camera traps in the Sizuolou Nature Reserve, Beijing, China, along with associated environmental variables. The data was collected from October 15, 2023, to February 29, 2024, covering both autumn and winter seasons. The study examined seasonal activity changes in raccoon dogs and their relationship to environmental and mammalian factors.

Usage

```
raccoondog_environment
```

Format

A data frame with 144 rows and 21 variables:

point_id Camera installation point ID

asian_badger Number of Asian badger detection events

wild_boar Number of wild boar detection events

hog_badger Number of hog badger detection events

leopard_cat Number of leopard cat detection events

masked_palm_civet Number of masked palm civet detection events

rock_squirrel Number of Père David's rock squirrel detection events

raccoon_dog Number of raccoon dog detection events

red_squirrel Number of red squirrel detection events

roe_deer Number of Siberian roe deer detection events

siberian_weasel Number of Siberian weasel detection events

striped_squirrel Number of Swinhoe's striped squirrel detection events

tolai_hare Number of Tolai hare detection events

dist_impervious Distance from camera to nearest impervious area (meters)

dist_agricultural Distance from camera to nearest agricultural land (meters)

dist_water Distance from camera to nearest water source (meters)

dist_roads Distance from camera to nearest road (meters)

Altitude Elevation of camera installation point (meters above sea level)

tpi Topographic Position Index of the camera installation point

Day Date of detection (days since start of study, October 15, 2023)

Season Season at time of detection ("Autumn" or "Winter")

Vegetation Type of vegetation at the camera installation point

Source

Miyamoto, Keisuke and Chen, Chuan and Luan, Xiaofeng (2025). Seasonal activity changes in raccoon dogs and influences of environmental factors from autumn to winter. Dryad Digital Repository. doi:10.5061/DRYAD.C866T1GJN

Examples

```
# Load the dataset
data(raccoondog_environment)

# Basic exploration
head(raccoondog_environment)
summary(raccoondog_environment)

# Compare raccoon dog detections by season
boxplot(raccoon_dog ~ Season, data = raccoondog_environment,
        main = "Raccoon Dog Detections by Season",
        ylab = "Number of Detections", xlab = "Season")

# Examine relationship between environmental factors and raccoon dog presence
# Create a binary presence variable
raccoondog_presence <- raccoondog_environment
raccoondog_presence$presence <- ifelse(raccoondog_presence$raccoon_dog > 0, 1, 0)

# Plot relationship with distance to agricultural land
plot(dist_agricultural ~ presence, data = raccoondog_presence,
     main = "Raccoon Dog Presence vs. Distance to Agricultural Land",
     xlab = "Presence (0=Absent, 1=Present)",
```

```
    ylab = "Distance to Agricultural Land (m)")

# Examine vegetation types where raccoon dogs were detected
table(raccoondog_presence$Vegetation[raccoondog_presence$presence == 1])
```

`redpanda_moves` *Red Pandas on the Move: Weather and Disturbance Effects on Habitat Specialists*

Description

This dataset contains GPS telemetry data from 10 red pandas (Ailurus fulgens) tracked for four months (December 2019 to March 2020) in the Himalayas. The data includes daily movement distances and associated weather conditions, allowing for analysis of how weather events and environmental factors affect the movement patterns of these habitat specialists.

Usage

```
redpanda_moves
```

Format

A data frame with 220 rows and 7 variables:

Animal_Id Factor, unique identifier for each of the 10 study animals

Sex Factor, sex of the animal (Male or Female)

Age Factor, age category of the animal (Adult or Subadult)

Distance Numeric, daily travel distance (m) covered by an individual in 24 hours

Precipitation Factor, weather condition (Clear, Snowfall, or Rainfall)

Snow_cover Factor, presence of snow cover (Yes or No)

Snow_age Factor, age of snow if present (Fresh, Old, or No_snow)

Temperature Numeric, mean daily temperature in degrees Celsius

Details

The study examined how challenging weather events, particularly snowfall, affect the movement patterns and habitat use of red pandas. The data shows that males traveled further than females when there was snow on the ground, and red pandas generally exhibited risk aversion behavior by occupying areas away from human settlements, showing affinity for higher elevations, and avoiding steep slopes when the forest was covered with snow.

The data was collected using GPS satellite collars. Weather data (except temperature) was collected in the field, while temperature was recorded by in-built sensors in the GPS collars. Given the endangered status of red pandas, the exact coordinates of their locations are not included in this dataset.

The mean daily distance traveled by red pandas was 748 ± 40 m (median 573 m). Red pandas moved between 2,528 and 3,250 m elevation during the study period, with a mean elevation of 2,857 ± 107 m when snow was on the ground and 2,816 ± 99 m without snow.

Source

Damber, B. (2024). Red pandas on the move: Weather and disturbance effects on habitat specialists. Dryad Digital Repository. doi:10.5061/dryad.cjsxksngd

Examples

```
# Load the dataset
data(redpanda_moves)

# Basic exploration
head(redpanda_moves)
summary(redpanda_moves)

# Compare movement distances by sex
boxplot(Distance ~ Sex, data = redpanda_moves,
        main = "Red Panda Movement Distances by Sex",
        ylab = "Daily Distance (m)")

# Examine effect of snow cover on movement
boxplot(Distance ~ Snow_cover, data = redpanda_moves,
        main = "Effect of Snow Cover on Movement Distance",
        ylab = "Daily Distance (m)")

# Compare male and female movement with snow
library(dplyr)
redpanda_moves %>%
  group_by(Sex, Snow_cover) %>%
  summarize(mean_distance = mean(Distance),
            sd_distance = sd(Distance))
```

`scavenger_community` *Scavenger community structure in Scandinavian ecosystems*

Description

This dataset contains observations of scavenger communities along an environmental gradient from boreal forest to alpine tundra in central Scandinavia. The data was collected using baited camera traps to quantify the structure of the winter scavenger community and assess how climatic conditions affected spatial patterns of species occurrences at baits. The study found that habitat type (forest or alpine tundra) and snow depth were main determinants of community structure. Occurrence at baits by habitat generalists (red fox, golden eagle, and common raven) typically increased at low temperatures and high snow depth, likely due to increased energetic demands and lower abundance of natural prey in harsh winter conditions.

Usage

```
scavenger_community
```

Format

A data frame with 1255 rows and 61 variables:

id Site identifier (factor)
year Year of observation (numeric)
jd Julian day (numeric)
photo_sum Total number of photos (numeric)
empty Number of empty photos (numeric)
raven Number of photos with ravens (numeric)
crow Number of photos with crows (numeric)
magpie Number of photos with magpies (numeric)
eurjay Number of photos with Eurasian jays (numeric)
sibjay Number of photos with Siberian jays (numeric)
geagle Number of photos with golden eagles (numeric)
wteagle Number of photos with white-tailed eagles (numeric)
rlbuzz Number of photos with rough-legged buzzards (numeric)
goshawk Number of photos with goshawks (numeric)
redfox Number of photos with red foxes (numeric)
arcfox Number of photos with arctic foxes (numeric)
wolverine Number of photos with wolverines (numeric)
badger Number of photos with badgers (numeric)
pinemart Number of photos with pine martens (numeric)
mustelids Number of photos with other mustelids (numeric)
lb Total number of photos with large birds (numeric)
bird Total number of photos with birds (numeric)
mammal Total number of photos with mammals (numeric)
age Age of bait in days (numeric)
snow Snow presence indicator (numeric)
session Sampling session identifier (factor)
ravenm Raven presence/absence (numeric)
crowm Crow presence/absence (numeric)
magpiem Magpie presence/absence (numeric)
eurjaym Eurasian jay presence/absence (numeric)
sibjaym Siberian jay presence/absence (numeric)
geaglem Golden eagle presence/absence (numeric)
wteaglem White-tailed eagle presence/absence (numeric)
rlbuzzm Rough-legged buzzard presence/absence (numeric)
goshawkm Goshawk presence/absence (numeric)

redfoxm Red fox presence/absence (numeric)

arcfoxm Arctic fox presence/absence (numeric)

wolverinem Wolverine presence/absence (numeric)

badgerm Badger presence/absence (numeric)

pinemartm Pine marten presence/absence (numeric)

mustelidsm Other mustelids presence/absence (numeric)

arcfox.day Arctic fox detected that day (numeric)

redfox.day Red fox detected that day (numeric)

wolverine.day Wolverine detected that day (numeric)

raven.day Raven detected that day (numeric)

crow.day Crow detected that day (numeric)

magpie.day Magpie detected that day (numeric)

geagle.day Golden eagle detected that day (numeric)

wteagle.day White-tailed eagle detected that day (numeric)

badger.day Badger detected that day (numeric)

pinemart.day Pine marten detected that day (numeric)

eurjay.day Eurasian jay detected that day (numeric)

sibjay.day Siberian jay detected that day (numeric)

lb.day Large bird detected that day (numeric)

se Session identifier (numeric)

bird.day Any bird detected that day (numeric)

mammal.day Any mammal detected that day (numeric)

length Length of session (numeric)

samean Mean solar angle (numeric)

tamean Mean temperature (numeric)

habitat Habitat type: "Boreal forest" or "Alpine tundra" (factor)

hosl Hours of sunlight (numeric)

scover Snow cover: "Snow cover" or "No snow cover" (factor)

loghosl Log-transformed hours of sunlight (numeric)

altitude Altitude in meters (numeric)

sdepth Snow depth in cm (numeric)

Source

Gomo, Gjermund and Rød-Eriksen, Lars and Andreassen, Harry P. and Mattisson, Jenny and Odden, Morten and Devineau, Olivier and Eide, Nina E. (2020). Scavenger community structure along an environmental gradient from boreal forest to alpine tundra in Scandinavia. Ecology and Evolution. doi:10.1002/ece3.6834

Examples

```
# Load the dataset
data(scavenger_community)

# Basic exploration
head(scavenger_community)
summary(scavenger_community)

# Species richness by habitat type
if(require(dplyr)) {
  # Count number of unique species by examining columns with species data
  scavenger_community %>%
    group_by(habitat) %>%
    summarize(
      raven_present = sum(ravenm > 0, na.rm = TRUE),
      redfox_present = sum(redfoxm > 0, na.rm = TRUE),
      wolverine_present = sum(wolverinem > 0, na.rm = TRUE),
      total_species = raven_present + redfox_present + wolverine_present
    )
}

# Compare bird vs mammal occurrence between habitats
if(require(dplyr)) {
  scavenger_community %>%
    group_by(habitat) %>%
    summarize(
      bird_observations = sum(bird, na.rm = TRUE),
      mammal_observations = sum(mammal, na.rm = TRUE),
      observation_ratio = bird_observations / mammal_observations
    )
}

# Visualize snow depth distribution by habitat
if(require(ggplot2)) {
  ggplot(scavenger_community, aes(x = sdepth, fill = habitat)) +
    geom_histogram(position = "dodge", bins = 20) +
    labs(title = "Snow depth by habitat type",
         x = "Snow depth (cm)",
         y = "Count")
}
```

shark_fishing *Shark Mortality Predictions from Fishing*

Description

This dataset contains mean estimates of species-specific at-vessel (AVM) and post-release mortality (PRM) for shark species caught by longlines and gillnets. The data were derived from a random forest regression model that analyzed mortality rates based on biological and ecological characteristics of each species. The study assessed how retention bans might impact fishing mortality and whether such measures are sufficient to stop overfishing of threatened shark species.

Usage

```
shark_fishing
```

Format

A data frame with 982 rows and 12 variables:

scientific_name Factor, scientific name of shark species

family Factor, taxonomic family

reproductive_mode Factor, reproductive strategy (matrotrophic viviparity, lecithotrophic viviparity, lecithotrophic oviparity)

ac Numeric, active hypoxia tolerance metric

median_depth Numeric, median depth of occurrence in meters

max_size_cm Numeric, maximum size the species can reach in centimeters

ventilation_method Factor, respiratory method (ram or stationary)

habitat Factor, primary habitat type (pelagic or demersal)

estimate_type Factor, type of mortality estimate (AVM Longline, PRM Longline)

mortality_prop Numeric, proportion of individuals that died (0-1 scale)

gear_class Factor, fishing gear type (Longline)

estimate_type_new Factor, simplified mortality type (AVM or PRM)

Details

The dataset includes biological traits for each species (family, reproductive mode, median depth, maximum size), ventilation method (ram vs. stationary), habitat type (pelagic vs. demersal), and predicted mortality proportions for different fishing gear. These predictions help evaluate the potential effectiveness of retention bans as a conservation measure for shark populations.

The study found that smaller-bodied species inhabiting shallow waters were more likely to suffer at-vessel mortality compared to deep-water species, which were more prone to post-release mortality. For threatened shark species, the median ratio of fishing mortality under retention bans compared to maximum sustainable yield was 2.28, indicating that retention bans alone may be insufficient to prevent overfishing.

Collection period: Data compiled through 2024 Study locations: Global analysis

Source

Feitosa, L. M., Caughman, A., D'Costa, N., Orofino, S., Burns, E., Schiller, L., Worm, B., & Bradley, D. (2025). Estimates of Shark at-vessel, Post-release Mortality, and Retention Ban Effects on Stopping Overfishing. Dryad Digital Repository. doi:10.5061/DRYAD.0P2NGF27T

Examples

```
# Load the dataset
data(shark_fishing)

# Basic exploration
head(shark_fishing)
summary(shark_fishing)

# Compare at-vessel vs post-release mortality
boxplot(mortality_prop ~ estimate_type_new, data = shark_fishing,
        main = "Mortality by Estimate Type",
        xlab = "Mortality Type", ylab = "Proportion")

# Examine relationship between depth and mortality
plot(shark_fishing$median_depth, shark_fishing$mortality_prop,
     col = as.numeric(shark_fishing$estimate_type_new),
     pch = 16, cex = 0.8,
     xlab = "Median Depth (m)", ylab = "Mortality Proportion",
     main = "Shark Mortality vs. Depth")
legend("topright", legend = levels(shark_fishing$estimate_type_new),
       col = 1:nlevels(shark_fishing$estimate_type_new), pch = 16)

# Compare mortality by ventilation method
boxplot(mortality_prop ~ ventilation_method, data = shark_fishing,
        main = "Mortality by Ventilation Method",
        xlab = "Ventilation Method", ylab = "Proportion")
```

---

vulture_diet — *Gyps Vulture Stable Isotope Analysis - Feather Data (AR.feather subset)*

Description

Stable isotope data (carbon, nitrogen, and sulfur) from Gyps vulture feathers collected in Tanzania for dietary analysis using stable isotope mixing models (SIMM). This dataset represents the AR.feather subset containing raw consumer isotope values from vulture feathers. Data was collected over 10 months from two protected areas: Serengeti National Park and Selous Game Reserve to analyze vulture dietary patterns across space and time using stable isotope analysis.

Usage

```
vulture_diet
```

Format

A data frame with 21 rows and 5 variables:

d13C Numeric, delta 13C carbon isotope values per mill (‰)

d15N Numeric, delta 15N nitrogen isotope values per mill (‰)

d34S Numeric, delta 34S sulfur isotope values per mill (‰)

species Factor, vulture species sampled (African white-backed or Rüppell's griffon)

tissue Factor, tissue type analyzed (feathers)

Details

Vultures were captured using noose lines around provisioned or natural bait, processed, and released. Feather samples were analyzed for delta13C, delta15N, and delta34S using a PyroCube elemental analyzer at the NERC Life Sciences Mass Spectrometry Facility. The isotope signatures provide insights into vulture diet composition, with delta13C distinguishing between C3 and C4 plant consumers (browsers vs grazers), delta15N indicating trophic level, and delta34S helping separate geographic regions.

This subset was specifically prepared for use in stable isotope mixing models to estimate diet composition in Gyps vultures. The study found that vulture diet consisted primarily of grazing herbivores, with those in Serengeti National Park consuming higher proportions (>87%) of grazing species. Coordinates in the original study were denatured by +0.5 degrees to preserve geographic distribution while ensuring location confidentiality.

Collection period: August 18, 2018 to May 31, 2019 Study locations: Serengeti National Park (2.1540°S, 34.6857°E) and Selous Game Reserve (9.0000°S, 37.5000°E), Tanzania

Source

Baino, A., Hopcraft, G., Kendall, C., Munishi, L., Behdenna, A., & Newton, J. (2021). We are what we eat, plus some per mill: Using stable isotopes to estimate diet composition in Gyps vultures over space and time. Dryad Digital Repository. doi:10.5061/DRYAD.1NS1RN8QF

Examples

```
# Load the dataset
data(vulture_diet)
head(vulture_diet)
summary(vulture_diet)

# Examine isotope signatures by species
boxplot(d13C ~ species, data = vulture_diet,
        main = "Carbon Isotope Signatures by Vulture Species",
        xlab = "Species", ylab = "d13C (per mill)")

# Create isotope biplot
plot(vulture_diet$d13C, vulture_diet$d15N,
     col = as.numeric(vulture_diet$species),
     pch = 16, cex = 1.2,
     xlab = "d13C (per mill)", ylab = "d15N (per mill)",
     main = "Vulture Feather Isotope Signatures")
legend("topright", legend = levels(vulture_diet$species),
       col = 1:nlevels(vulture_diet$species), pch = 16)

# Summary statistics by species
```

```
aggregate(. ~ species, data = vulture_diet[,1:4], FUN = mean)
```

`whale_brains` *The Evolution of Hearing and Brain Size in Eocene Whales*

Description

A dataset containing endocranial volume and body mass measurements for various cetacean (whale) species and other mammals. This dataset was compiled to study the evolution of hearing and brain size in Eocene whales. It includes both extant (living) and fossil species, with a focus on understanding how brain size evolved in relation to body mass and hearing adaptations across different taxonomic groups. The dataset is particularly valuable for teaching concepts in comparative anatomy, allometry, and cetacean evolution.

Usage

```
whale_brains
```

Format

A data frame with 269 rows and 9 variables:

family Taxonomic family of the species

binomial_name Full taxonomic name for each species

common_name Common name for each species (NA for most fossil species)

endocranial_volume Endocranial volume in cubic centimeters (cc)

brain_mass Brain mass in grams

ocw_mm Occipital condyle width in millimeters

body_mass Body mass in kilograms

taxonomic_group Categorization as "Cetacean", "Hippopotamid", or "Other Mammal"

time_period Classification as "Extant" (living) or "Fossil" species

Details

Toothed whales (odontocetes) use high-frequency sounds to echolocate, differing significantly from baleen whales (mysticetes), which use low-frequency sound for long-distance communication. This dataset helps explore how hearing functioned in ancestral archaeocetes, and when the specializations of modern species arose.

Source

Peacock, John and Waugh, David and Bajpai, Sunil and Thewissen, JGM (2025). The evolution of hearing and brain size in Eocene whales. Dryad Digital Repository. doi:10.5061/DRYAD.SF7M0CGH1

Examples

```
# Load the dataset
data(whale_brains)

# Basic exploration
head(whale_brains)
summary(whale_brains)

# Compare brain mass across taxonomic groups
boxplot(whale_brains$brain_mass ~ whale_brains$taxonomic_group,
        main = "Brain Mass by Taxonomic Group",
        ylab = "Brain Mass (g)", log = "y")

# Look at the relationship between brain mass and body mass
# Using log scales to show allometric relationships
plot(whale_brains$body_mass, whale_brains$brain_mass,
     log = "xy", col = as.numeric(whale_brains$taxonomic_group),
     pch = 16, main = "Brain Mass vs. Body Mass",
     xlab = "Body Mass (kg)", ylab = "Brain Mass (g)")
legend("topleft", legend = levels(whale_brains$taxonomic_group),
       col = 1:3, pch = 16)

# Compare fossil and extant cetaceans
cetaceans <- subset(whale_brains, taxonomic_group == "Cetacean")
boxplot(cetaceans$brain_mass ~ cetaceans$time_period,
        main = "Brain Mass in Fossil vs. Extant Cetaceans",
        ylab = "Brain Mass (g)", log = "y")
```

`wren_noise` *Southern House Wren Song Response to Noise and Territorial Intrusion*

Description

This dataset examines how southern house wrens (Troglodytes aedon musculus) adjust their songs in response to both anthropogenic noise and territorial challenges in urban and rural environments. The data include acoustic measurements from playback experiments that simulated territorial intrusions in different noise conditions.

Usage

```
wren_noise
```

Format

A data frame with 144 rows and 17 variables:

PlaybackTrialRecording Character, identifier for the playback trial recording

Date Date, when the playback trial and sound pressure level measurement occurred

PlaybackStage Factor with levels "Playback" (acute aggressive encounter) and "Post-playback" (relaxed aggressive encounter)

Start Numeric, start time of the song in the recording (seconds)

End Numeric, end time of the song in the recording (seconds)

BottomFreq Numeric, song minimum frequency (kHz)

TopFreq Numeric, song maximum frequency (kHz)

Bandwidth Numeric, song frequency bandwidth (kHz): maximum - minimum frequency

SongDuration Numeric, song length in seconds

MeanFreq Numeric, song mean frequency (kHz): average frequency weighted by amplitude

Habitat Factor with levels "Rural" and "Urban", habitat type

Site Factor, study site identifier

MaleID Factor, identity of the recorded male wren

StimulusID Factor, identity of the playback stimulus used

DOY Numeric, day of the year

TimeOfDay Numeric, decimal time or hour of day

Noise_SPL_LAeq Numeric, equivalent continuous sound level (LAeq), a time-averaged sound pressure level in dB

Details

The study investigates the potential trade-off between adjusting acoustic signals to transmit effectively in noisy environments versus communicating aggressive intent during territorial encounters. It includes measurements of song characteristics such as frequency, bandwidth, and duration, along with contextual information about habitat type and noise levels.

The researchers found that urban wrens behaved more aggressively in response to territorial intrusion than rural wrens, regardless of noise levels. Males produced songs with lower minimum frequency and wider frequency bandwidth during acute aggressive encounters, suggesting these song characteristics communicate aggressive intent or fighting ability. Urban wrens consistently produced higher-pitched songs than rural wrens, and those in the noisiest territories produced the highest-pitched trills, but only in non-aggressive contexts.

Collection period: 2018 Study locations: Urban and rural sites in Vitória, Espírito Santo, Brazil

Source

Diniz, P., & Duca, C. (2022). Anthropogenic noise, song, and territorial aggression in southern house wrens. Dryad Digital Repository. doi:10.5061/DRYAD.TTDZ08M00

Examples

```
# Load the dataset
data(wren_noise)

# Basic exploration
```

```
head(wren_noise)
summary(wren_noise)

# Compare minimum frequency between habitats
boxplot(BottomFreq ~ Habitat, data = wren_noise,
        main = "Minimum Song Frequency by Habitat",
        xlab = "Habitat Type", ylab = "Minimum Frequency (kHz)")

# Examine relationship between noise level and song frequency
plot(wren_noise$Noise_SPL_LAeq, wren_noise$BottomFreq,
     col = as.numeric(wren_noise$Habitat),
     pch = 16, cex = 1.2,
     xlab = "Noise Level (dB)", ylab = "Minimum Frequency (kHz)",
     main = "Song Frequency vs. Noise Level")
legend("topleft", legend = levels(wren_noise$Habitat),
       col = 1:nlevels(wren_noise$Habitat), pch = 16)

# Compare song characteristics between playback stages
boxplot(Bandwidth ~ PlaybackStage, data = wren_noise,
        main = "Song Bandwidth by Playback Stage",
        xlab = "Playback Stage", ylab = "Bandwidth (kHz)")
```

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