

Community analysis I

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A Practical introduction to acquisition, validation,
quality control and access to (biodiversity) data

Vlissingen, Netherlands, 14.06.2015



Classical questions

- How similar / dissimilar are stations/samples?
- Why are they similar or dissimilar?
- Which species contribute most to this pattern?
- How do environmental factors influence species distribution?
- Are there differences over time?
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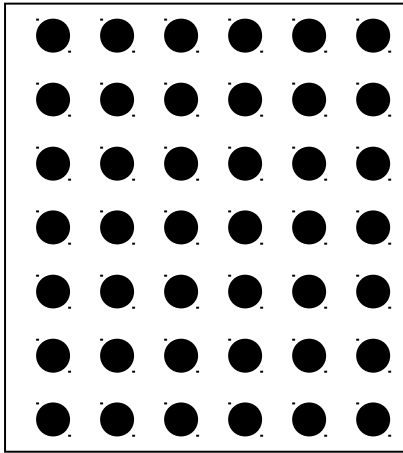
Type of information

- species / taxa
- stations / samples / replicates
- abundance / biomass
- environmental parameters
- metadata: date, season, depth,

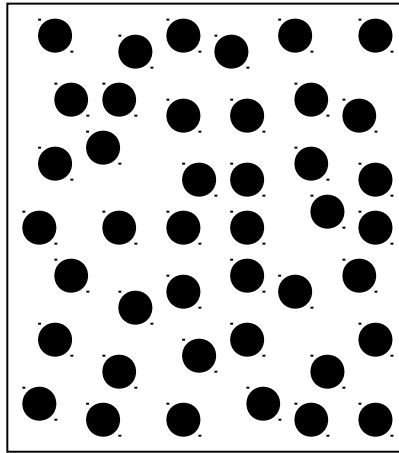
Peculiarities of community data

Distribution

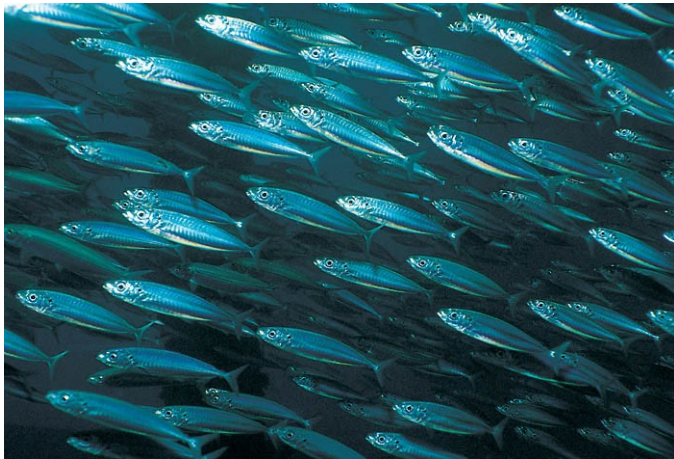
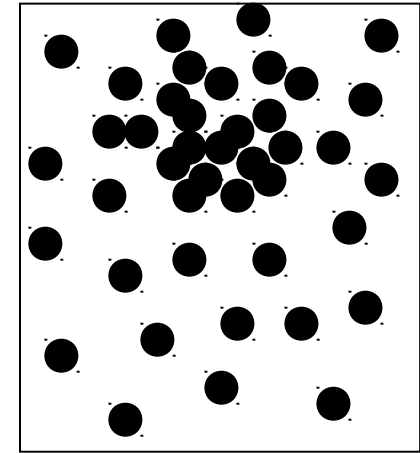
uniform/ homogeneous



random

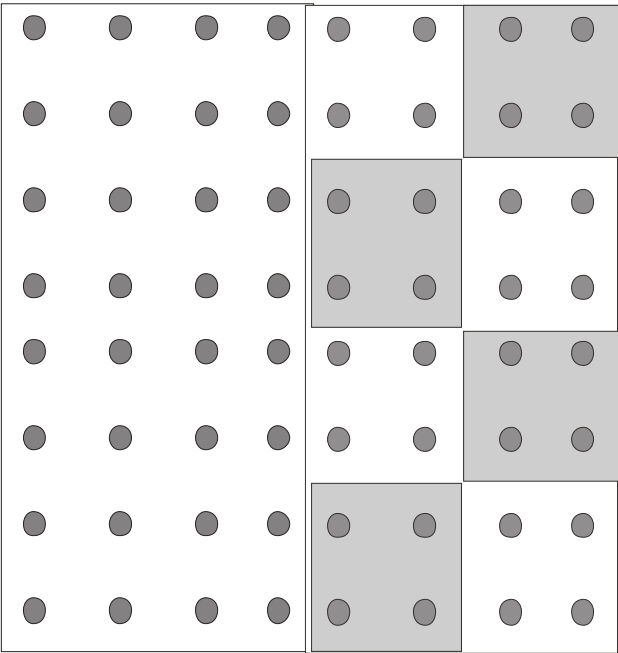


clumped / contagious



Distribution & Sampling

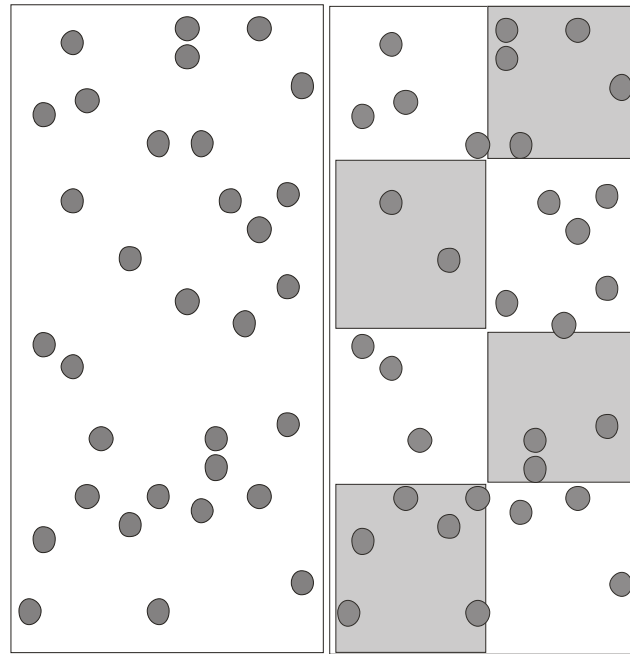
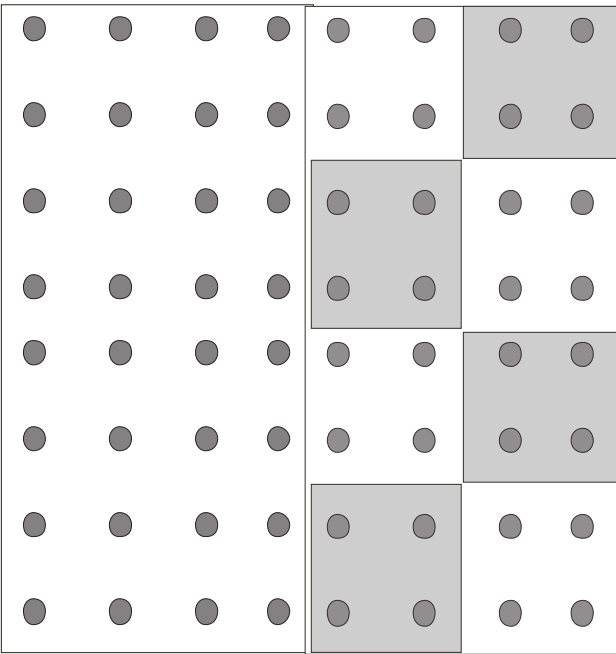
uniform/ homogeneous



Distribution & Sampling

uniform/ homogeneous

random

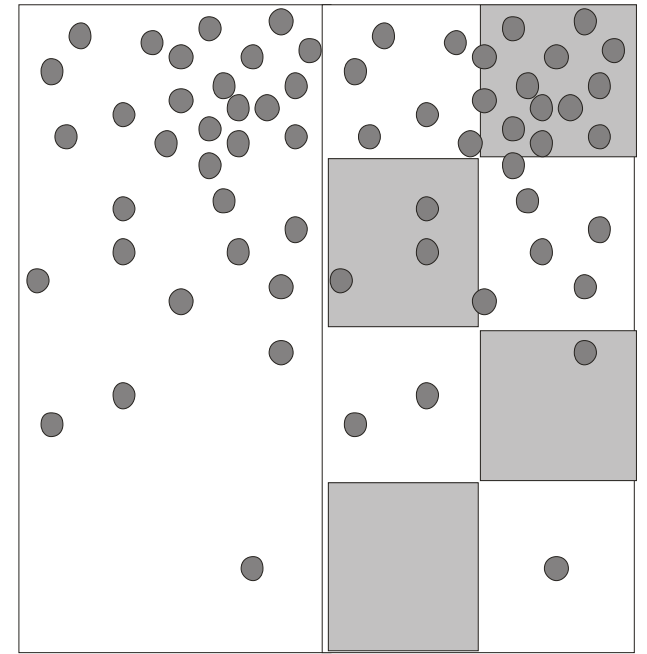
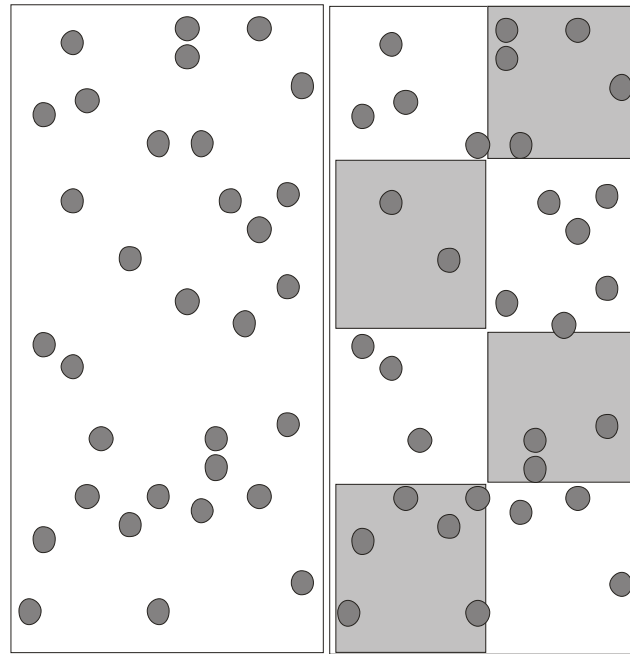
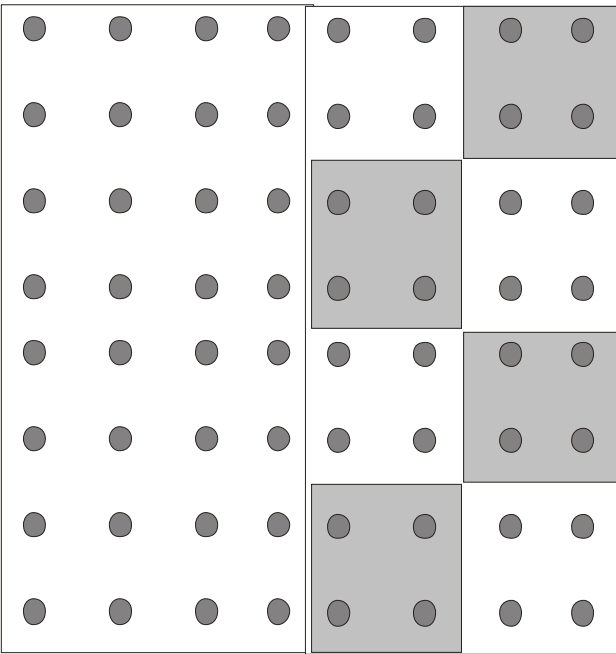


Distribution & Sampling

uniform/ homogeneous

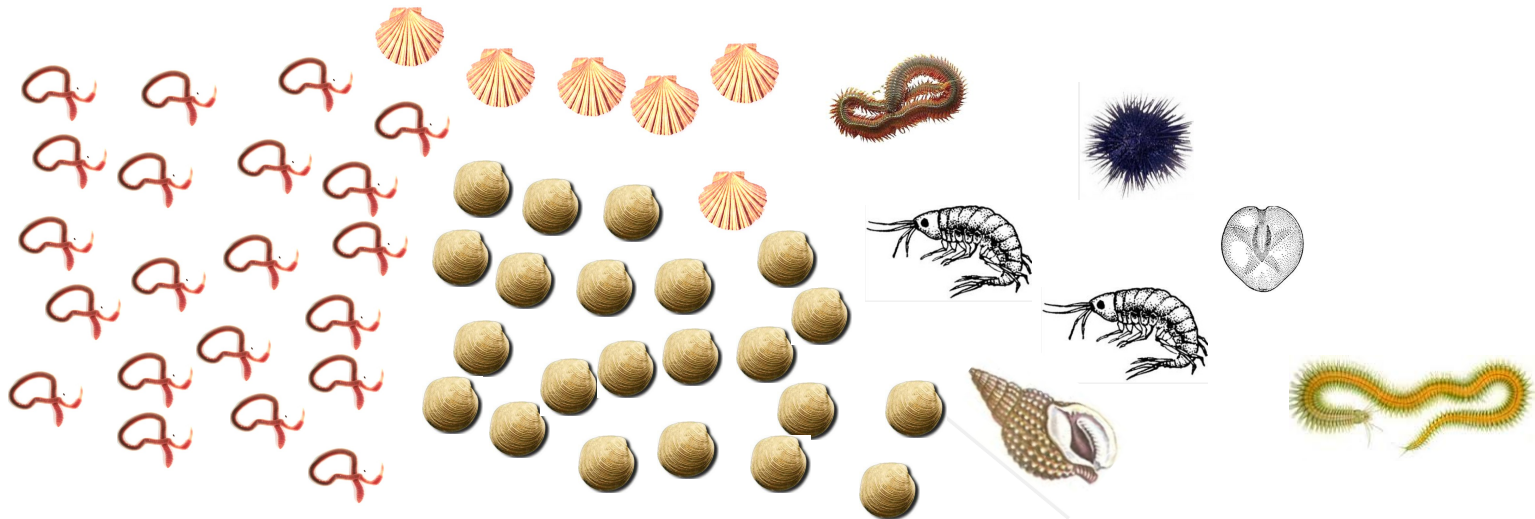
random

clumped / contagious



Peculiarities of community data

- many samples, many species
- number & identity of species per sample important
- contagious / clumped distribution
 - some species very abundant, others very rare
 - many zero values

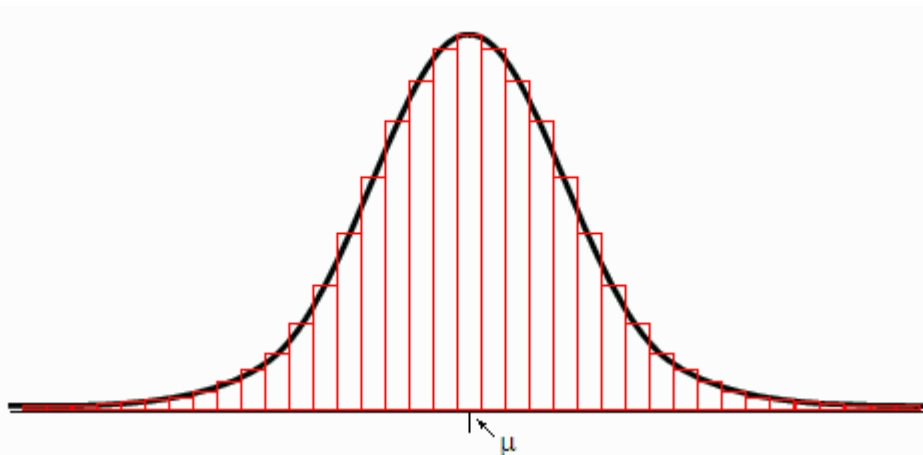


Peculiarities of community data

Species	CALAM-0	CALAM-0	CALAM-0	CALAM-0	CALAM-0	CALAM-0
Platynereis dumerilii (Audouin & Milne Edwards, 1834)	20	11	1	4	3	4
Syllis corallicola Verrill, 1900	8	17	1	3	0	1
Neanthes fucata (Savigny in Lamarck, 1818)	1	0	0	0	0	0
Syllis columbretensis (Campoy, 1982)	1	0	0	0	0	0
Amphiglena mediterranea (Leydig, 1851)	0	0	0	1	0	0
Branchiosyllis exilis (Gravier, 1900)	0	0	0	0	0	0
Chone collaris Langerhans, 1881	0	0	0	0	0	0
Chrysopetalum debile (Grube, 1855)	0	0	0	0	0	0
Eulalia clavigera (Audouin & Milne Edwards, 1833)	0	0	0	0	0	0
Eumida sanguinea (Ørsted, 1843)	0	0	0	0	0	0
Lepidonotus clava (Montagu, 1808)	0	0	3	0	0	0
Lumbrineris coccinea (Renier, 1804)	0	0	0	0	0	0
Lysidice ninetta Audouin & Milne-Edwards, 1833	0	0	3	0	0	1
Myrianida convoluta (Cognetti, 1953)	0	0	0	0	0	0
Myrianida quindecimdentata (Langerhans, 1884)	0	0	0	0	0	0
Mysta picta (Quatrefages, 1865)	0	0	0	0	0	0
Neanthes nubila (Quatrefages, 1865)	0	0	0	0	0	0
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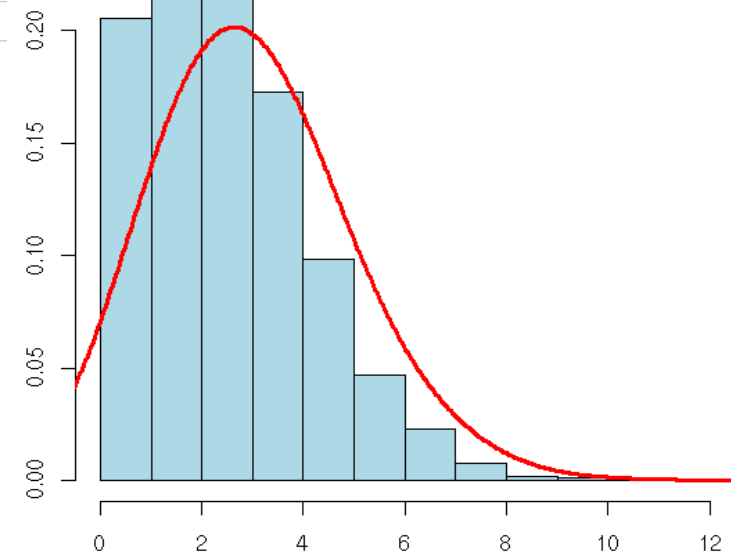
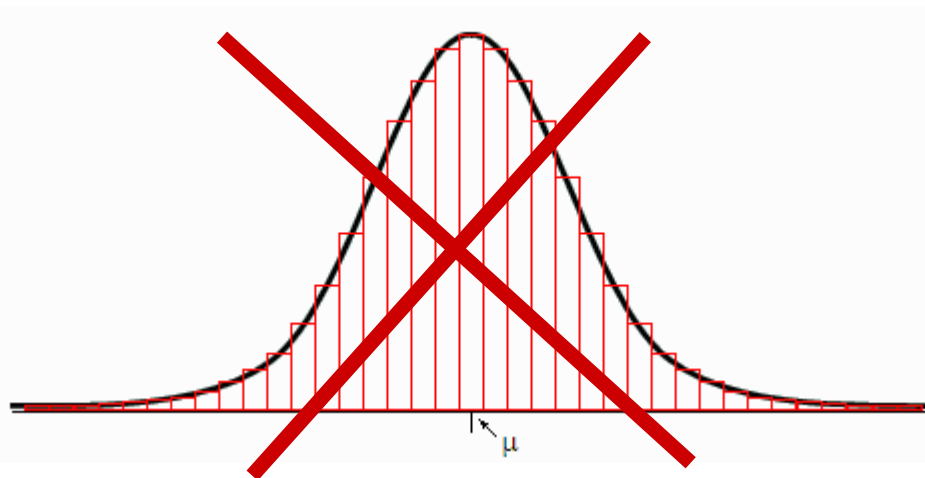
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Branchiosyllis exilis (Gravier, 1900)	0	0	0	0	0	0
Chone collaris Langerhans, 1881	0	0	0	0	0	0
Chrysopetalum debile (Grube, 1855)	0	0	0	0	0	0
Eulalia clavigera (Audouin & Milne Edwards, 1833)	0	0	0	0	0	0
Eumida sanguinea (Örsted, 1843)	0	0	0	0	0	0
Lepidonotus clava (Montagu, 1808)	0	0	3	0	0	0
Lumbrineris coccinea (Renier, 1804)	0	0	0	0	0	0
Lysidice ninetta Audouin & Milne-Edwards, 1833	0	0	3	0	0	1
Myrianida convoluta (Cognetti, 1953)	0	0	0	0	0	0
Myrianida quindecimdentata (Langerhans, 1884)	0	0	0	0	0	0
Mysta picta (Quatrefages, 1865)	0	0	0	0	0	0
Neanthes nubila (Quatrefages, 1865)	0	0	0	0	0	0
Nereis acuminata (Grube, 1840)	0	0	0	0	0	0

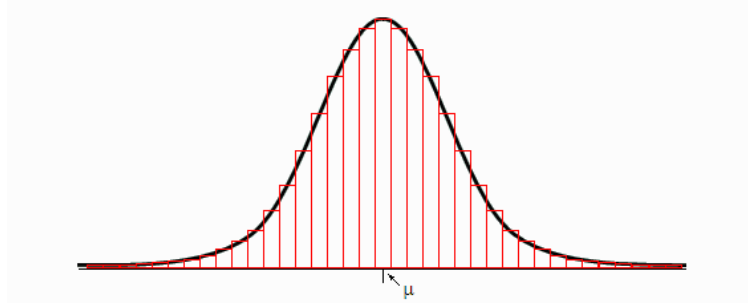


Peculiarities of community data

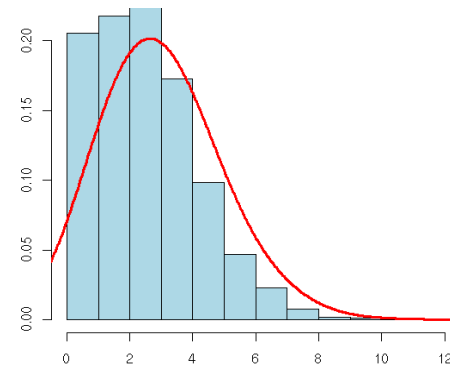
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Lysidice ninetta Audouin & Milne-Edwards, 1833	0	0	3	0	0	1
Myrianida convoluta (Cognetti, 1953)	0	0	0	0	0	0
Myrianida quindecimdentata (Langerhans, 1884)	0	0	0	0	0	0
Mysta picta (Quatrefages, 1865)	0	0	0	0	0	0
Neanthes nubila (Quatrefages, 1865)	0	0	0	0	0	0
Neanthes virens (Quatrefages, 1865)	0	0	0	0	0	0



Types of analyses

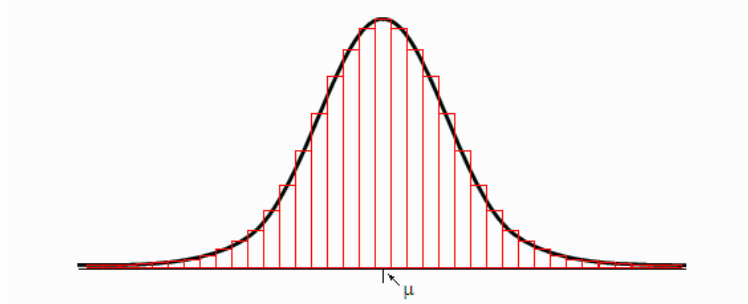


parametric

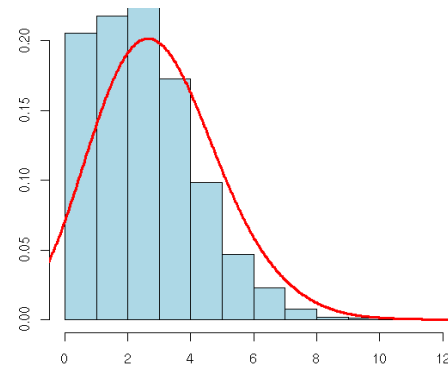


non-parametric

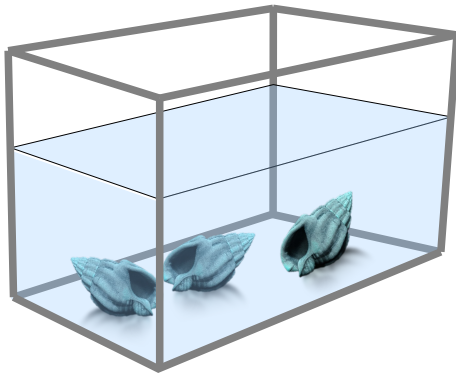
Types of analyses



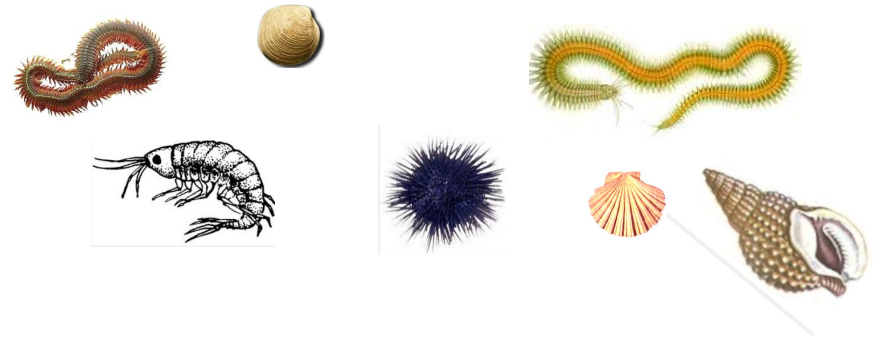
parametric



non-parametric



univariate



multivariate

multivariate analyses

allow us to investigate how multiple variables change simultaneously

“compress” complex information to reveal patterns and trends

examples for multivariate analyses

- Multidimensional scaling (MDS)
- Principal Component Analysis (PCA)
- Hierarchical clustering
- BioEnv
- Analysis of similarities (ANOSIM)
- Similarity percentages (SIMPER)

examples for univariate analyses

- Diversity indices (Shannon, Margalef,...)
- Analysis of variances (ANOVA)
- regression
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The tools

