Protocol Appendix: Animal Class

– by the COMPADRinos

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The COMADRE Animal Matrix Database includes animals of numerous taxonomic classes. This document outlines some basic information about these animal species.

Aves (Vögel)

Birds are mostly based on **terrestrial** ecoregions from costal to rain forests, although some of them may spend significant portions of their lifespans at sea. Reproduction type is **sexual**.

Figure 1: *Larus argentatus* – Silbermöwe

Bivalvia (Muscheln)

These organisms have a two-piece shell and that's why they're called bivalvia. They live in **freshwater** and **marine** ecoregions burried in the sediment, fixed on rocks or on the ground. **Sexual** reproduction is common in them. In their life-cycles, free-living **larvae** are the stages after hatching. The first larval stage is called trochophora larvae, which then develops into a veliger larvae. The latter one settles on the ground and grows to juveniles. A few species are **hermaphrodites** (male and female organs in same individual).

Figure 2: *Cerastoderma edule* - Herzmuschel

Branchiopoda (Kiemenfußkrebse)

This group is constituted by crustaceans, which have gills, like shrimp, Daphnia (Wasserfloh), {*Artemia salina* (Urzeitkrebs). Ecoregions are mostly **freshwater**, sometimes **marine** (*Daphnia*). Their reproduction is sexual but there are some exceptions; for instance, individuals of *Daphnia* can reproduce by **parthenogenesis**, whereby females reproduce asexually from unfertilized yet viable eggs.

Figure 3: *Daphnia* sp. - Wasserfloh

Cephalaspidomorphi

This class contains jawless (kieferlose) fishes, most of them are now in the fossil record. Some examples include lampreys. They live in **freshwater** and **marine** (mostly costal, seldom open sea) ecosystems. In their life cycles,ß **larvae** live buried in the sediment for several years.

Figure 4: Lamprey - Neunauge

Clitellata (Gürtelwürmer)

These class includes worms such as earthworms (Regenwürmer), leeches (Egel) and e.g. *Tubifex* (used for fish food). Their ecoregions

are mostly **terrestrial** but also **freshwater** and **marine**. Reproduction is **sexual** and they are **hermaphrodites** (male and female organs in same individual).

Figure 5: *Tubifex* sp.

Demospongiae (Hornkieselschwämme)

This class represents 81 % of sponges. Individuals of the largest species can attain over 1 m in length. They are all **marine**, except one species, which occurs in fresh water. These sponges have both **sexual** and **asexual** reproduction. Life cycles are complicated regarding to complex asexual reproduction with budding (Knospung) and/or gemmules (Dauerstadium=dormancy).

Figure 6: *Spongia officinalis* - Badeschwamm

Diplopoda (Doppelfüßer)

This class includes millepedes (Tausendfüßer). These animals live in terrestrial, mostly tropical ecoregions. Reproduction types are **sexual** and **asexual**. A special feature of their life cycles is **parthenogenesis** (females asexually produce not fertilized but viable eggs).

Figure 7: Millipede

Echinoidea (Seeigel)

Sea urchins live in marine ecoregions. They reproduce **sexually** and have a **larval stage** called pluteus.

Figure 8: *Sphaerechinus granularis*

Elasmobranchii (Plattenkiemer)

This class includes all cartiloginous fish such as sharks as well as rays (Rochen). These fishes only live in **marine** ecoregions and reproduce **sexually** for the most part, although some sharks can reproduce by **parthenogenesis** too.

Figure 9: *Carcharodon carcharias*

Gastropoda (Schnecken)

This class includes all snails, molluscs with or without a shell. They live in different environments in **terrestrial**, **marine** and **freshwater** ecoregions. Some species are **hermaphrodites** (male and female organs in same individual). Their life cycles include a **larval stage**, which in water is known as veliger or trochophore.

Figure 10: *Helix pomatia* - Weinbergschnecke

Gymnoleamata

This group is a sectin of bryozoa (Moostierchen), which are small multicellular organisms living in water. They are found mostly in **marine** and also **freshwater** ecosystems. Reproduction includes **sexual** and **asexual** parts. The single animals build big colonies via **asexual budding** (Knospung).

Homo sapiens

Homo sapiens are not a class (they are in Class Mammalia) but they are recorded in our Excel spreadsheet within their own Worksheet, although when all the data are released they are lumped with the rest of mammals. Their ecoregions are **terrestrial** and reproduction is **sexual**.

Figure 12: Mensch

Insecta (Insekten)

Insects are animals with three pairs of legs and compound-eyes. They live in **terrestrial** but also in **freshwater** and **marine** ecoregions. Reproduction is **sexual** and sometimes **asexual**. The life cycle includes the stages **larva** and **pupa** and can be partly in water also for terrestrial organisms. Sometimes there is **parthenogenesis** (females asexually produce not fertilized but viable eggs).


Figure 13: *Curcoinolidae* - Rüssekäfer

Malacostraca (Höhere Krebse)

This class includes crabs, lobsters and shrimps. These species live in **freshwater** and seldom **terrestrial** ecoregions. Reproduction is **sexual**. The larva stage is called nauplius. A few of these species are **hermaphrodites** (male and female organs in same individual).


Figure 14: *Cancer pargurus* - Taschenkrebs

Mammalia (Säugetiere)

Mammals live in different environments like **terrestrial**, **marine** and **freshwater** ecoregions. They reproduce **sexually**. Some exceptional cases lay eggs.


Figure 15: *Lotra provocax* - Flussotter

Maxillopoda (eine Klasse der Krebstiere)

This class includes different crustaceans from **marine** and **freshwater** ecoregions. The type of reproduction is **sexual** and their life cycles include **larvae** called nauplius. A few of these species are **hermaphrodites** (male and female organs in same individual).


Figure 16: Balinidae - Seepocken

Merostomata (Hüftmünder)

This class includes recent horseshoecrabs (Pfeilschwanzkrebse) and extinct sea scorpions. They only live in **marine** ecoregions and reproduce **sexually**. **Larvae** are part of the life cycle.


Figure 17: *Limolus polyphemus* - Pfeilschwanzkrebs

Onychophorida (Stummelfüßer)

This class includes the so-called 'worms with legs'. These species live mostly in tropical regions of **terrestrial** ecosystems. Reproduction is mostly **sexual**, one species also reproduces **asexually** (**parthogenesis** for *Epiperiatus imthurni* (no males)).

Ostrascoda (Muschelkrebse)

This class includes small crustaceans such as plancton; other species live on the sea ground. Their ecoregions are **marine** and also **freshwater**. Type of reproduction is **sexual**, seldom **asexual**. Their life cycle include a **larval** stage, called nauplius. Few species are **hermaphrodites** (male and female organs in same individual), seldom **parthenogenesis**.

Figure 19: An ostracod

Polychaeta (Vielborster)

This class includes bristle worms, which live in nearly every **marine** ecosystem, down to the deep sea. They are also sometimes found in **freshwater** ecoregions. Reproduction is **sexual**. **Larva**, as a stage of their life cycle, are called trochophora.

Figure 20: Worm

Reptilia (Reptilien)

Reptiles live in **terrestrial**, **freshwater** and **marine** ecoregions. Most reproduce via **sexual** reproduction, although in cases **asexual** reprodution can also occur via **parthenogenesis**.

Figure 21: *Batagur baska* – Batagur-Schildkröte

Secernentea (Klasse der Fadenwürmer)

A member of this class is the famous nematode *C. elegans*, which was the first multicellular organism with a whole sequenced genome and is as a model lab organism. These worms live in **terrestrial** or in **freshwater** ecoregions and reproduce **sexually**. Sometimes they are parasites with complex life cycles involving several hosts.

Figure 22: *Caenorhabditis elegans*

Spirochaetes (Spirochäten)

This is a group of gram-negative bacteria that live in **terrestrial**, **marine** and **freshwater** ecoregions. Reproduction includes both **sexual** and **asexual** systems. This group includes parasitic species.

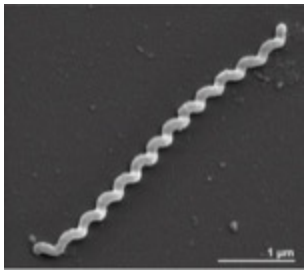

Figure 23: spirochaete

Thaliaceae (Salpen)

Salps are free-floating animals that can form large colonies. They only occur in **marine** habitats. Their life-cycle includes alternate generations: first **sexual** than **asexual** reproduction.

Figure 24: *Pegea confoederata* colony

Virus

A virus is not a cell itself but needs a host cell for reproduction via so called bacteriophages. They could occure in **terrestrial**, **marine** as well as **freshwater** ecoregions.