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Ecological Specialization

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Ecological Specialization refers to how many species limit themselves to small diet- or habitat-niches, as a result of evolutionary trade-offs.

Animals can be loosely divided into specialists and generalists. This division can be used for both diet and habitat.

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Generalists

Generalists may forage on a variety of food items or be able to live in a variety of habitats. Specialists, as the name implies, are fussier about where they live or what they eat.

There are benefits to both strategies. Generalists have a much easier time coping with the loss of a food species or type of habitat while specialists are harder hit by those types of changes to the environment.

Specialists

However, specialists rarely have much competition for the resources they use, while generalists have to compete with all the other generalists around.

Additionally, many specialists eat plants or animals that are toxic or undesirable to other

species, reducing competition for that resource even further.

Perhaps the best known specialist is the koala bear who survives exclusively on a diet of eucalyptus leaves. While there are multiple species of eucalyptus and koalas are capable of foraging on all of them, they are the only animal that eats eucalyptus leaves.

Cichlids

Cichlid ^[1] fish are a type of freshwater fish that are found in warmer waters around the world. Approximately 10% of all bony fish are cichlids.

New World cichlid species range from southern Texas down to Argentina. Old World cichlids are found in Africa, Sri Lanka, the southern coast of India, and parts of the Middle East.

There are a number of things about cichlids that are fascinating including their unusual amount of parental care which may last for weeks or even months; highly unusual in a fish species.

A single lake in Africa may have hundreds of species of cichlid in it, all of which have evolved from a single ancestor through adaptive radiation. They have developed a number of different adaptations and specializations that have led to whole new species.

To avoid predation from larger fish species, the cichlids tend to stay close to rocky areas in the lake, effectively leading to an island effect which has allowed them to evolve separately with little interbreeding.

The different species have become specialists that exploit virtually every aspect of the habitat. Fourteen different types of food resource are exploited by different species. They range in size from 4 cm, small enough to live in a snail shell, to 90 cm (about 3 feet). There are differences in morphology, particularly of feeding mechanisms, as well as many behavioral differences between the various species.

In the case of the cichlid, specialization has allowed many species to co-exist in an environment, thereby increasing biodiversity ^[2].

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Links

[1] http://www.cichlid-forum.com/articles/lake_tanganyika_diverse.php

[2] <https://explorable.com/biodiversity-and-extinction>