

Ecology



In general Martian ecology is less diverse than Earth ecology. There are few differences between ecosystems in the same climate zone; there has simply not been time enough for them to diverge and the terraforming project never got far enough to introduce artificial variety.

Animals and plants have been taken from many terrestrial ecosystems, but the general “style” is Mediterranean in the warm coastal regions, northern European/Siberian in the temperate coastal regions, Peruan/Mongolian highland ecosystem with bamboo forests in the temperate uplands and a mixture of desert and Antarctic ecology in the cold uplands.

The terraforming started by introducing Antarctic ecosystems in the newly thawed environment, followed by arctic ecosystems. As the planet warmed the new ecosystems migrated north and south, while new systems were built near the equator. Unfortunately the Crash stopped this work before it had completed the Mediterranean ecosystems, and the Fimbuldawinter destroyed much. Hence the ecology of the equatorial regions is somewhat patchy; it is composed of a mixture of Mediterranean vegetation, temperate vegetation and random garden plants and pets that have filled various ecological niches.

Most plants and animals have been genetically modified in one way or another. Especially plants needed to be adapted to the longer year and the colder conditions. Most plants are able to thrive in salty soils and fix nitrogen, and often have additional functions such as climate control or chemical production.

Plants/Fungi/Bacteria

Metaleater

A number of algae and bacteria were designed to break down carbonates to prevent carbonate buildup. They oxidize sulfur, iron and other metals for energy, using carbon from carbonates as their carbon

source. Easily outcompeted on richer soils, they thrive in the badlands and deep subterranean layers. They also thrive on old abandoned equipment, where they form strange lichen-like growths.

Dome plants / Landcorals

A lichen that glues together quartz grains using gypsum into tiny domes or coral-like structures, producing a protected environment underneath where algae and other lichen can grow. Domeplants and landcorals are mainly found in the southern deserts, clinging to rocks near glaciers and on the high Tharsis plateau.

Blackening Mold

A fungus used mainly during the early terraforming stages to keep the poles dark. The Blackening Mold thrives in the polar regions and release thick clouds of very black spores as winter falls. At their height they noticeably darkened Mars poles. Over time it has been outcompeted in most regions by other species, but it is still cultured for its excellent black color used for inks, dyes and smoke bombs.

Lichens

Mars is home to a large number of lichens. Since lichens are hardy and perfect as the first stage of soil production the MTN ecotects designed many adaptable species. But over the years mutations have caused the algae and fungi composing the lichens to mutate into further varieties. Today there are lichens of many colors, shapes and preferred habitats growing everywhere from desert rocks to old buildings. Along rocky coastal regions the Ironeye Lichen is common, forming thick red-grey mats.

Ice Saguaro

A large cactus that sends down deep roots to extract water. A common plant, and popular as a source of moisture.

Marinova plants

Several plant species produce greenhouse gasses. They were designed to thrive mainly in cold climates; if the climate turns colder they will spread, heating it up. If it gets too hot they vanish, allowing it to cool. They bind salt strongly, using the halogens for greenhouse production. Most Marinova plants are poisonous and smell strongly; the greenhouse gas and temperature dependence genes were tied strongly to other genes beneficial to the plants so as to make it unlikely that mutants would have unwanted properties.

Martian Kudzu

A soil binding succulent plant, able to bind even the Martian sand dunes. It has fine hairs keeping it warm, and flowers in bright colors (a popular decoration among poor people).

Marinerian Moss

Valles Marineris is home to a wide variety of moss species, and many have been bioengineered in various ways. Especially the Angeltown carnifexes designed many useful species during the Labyrinthian Wars before being destroyed by the Nia. Today new variants are still discovered, often claimed by Marinerians to be from the mythical Bathys biotechs.

The phosphorescent gloni moss is relatively common; it thrives in low-light conditions, especially when regularly doused by extra nutrients. It is widely used in both Marineris and elsewhere as a way of marking dark passages or rooms. Oahaly moss is widely used as an insulating material, and together with the painkilling yroben one of the major exports of Tithonus.

Bamboo

Several modified species of bamboo have been introduced, and thrive in temperate areas where they often form sizeable bamboo forests. Variants of *Phyllostachys aureosulcata*, *nuda* and *flexuosa* are common and important sources of wood, food and shelter.

Martian Grapes

A version of *Vitis vinifera* that thrives on cliffs, buildings and steep slopes in the equatorial regions. Like many Mars-adapted plants it has hairy leaves protecting it. While producing smaller grapes than its terrestrial relative it is hardier, and has spread widely outside human farms. The grapes are used for food, raisins, wines, and their seeds for oil and soap. They form a major export from the Margaritifer islands and northern Marineris, where the steep southern faces provide perfect growing conditions.

Medical Plants

The biotechnologists designing Martian ecology introduced a wide variety of plants engineered to have medical uses, something that has been praised by subsequent generations. There were even attempts to mark plants with medical uses using the “flower language”, a code of leaf shape, flower color and form that enabled practitioners to deduce the use of an unknown plant. Unfortunately some medical plants have vanished or only grow in special regions. Others have found uses as recreational drugs or poisons. While most have biochemical safeguards against overdoses and poisoning (large doses self-inhibit) there are ways of preventing this by treating the drugs in various ways, which have long since been discovered by pharmacists.

Weirdberries

An accidental result of some genetic design or possibly interbreeding. Weirdberries are tart but sweet red crunchy berries found growing on bushes in many mountainous regions. Being a hardy plant it provides an ingredient in some local cooking through weirdberry flour, although it is most commonly eaten as part of a dessert or drinks. Weirdberry cider is a delicacy.

Sea Plum

Underwater crop developed by the Wagner Caves clan in Nepenthe during the Crash. Sea Plums are closely related to Martian kelp, but produce edible fruits that can be harvested by hand or through trained otters.

Network Tree

A very hardy variant of banyan (*Ficus bengalensis*) that thrives in the warmer regions of Mars. Intended to help spread woodland ecosystems, the banyan is symbiotic with a poplar “helper species”. The poplar, called the “Duneshield”, is a very fast grower and often used to protect fields and towns from wandering dunes. The banyan then begins to grow around the poplar, sending out air roots and extending between the neighbouring trees. The result is a great web of trunks and roots holding up a wooden ceiling or mesh, through which the poplars continue to grow to great height, supported by the extensive construction. These walls provide food and habitat for many other species, besides creating excellent shelter. The tree has a rubbery sap that is both bactericidal and can be used to make a good rubber substitute. The trees are often used for building treehouses, or planted to extend themselves around a building, providing it with biological extra “rooms”. Many small Martian towns or homesteads are surrounded by a banyan “city wall”.

Health trees

As a protection against the harsh environment Health Trees were created. A Health Tree has a hollow trunk that can be forced open, which contains air enriched in oxygen, shelter and edible tissue. As “thanks” the user is expected to give the tree his or her excretions. After a few months the tree has healed itself and is ready for a new visitor.

Housetrees

A variant of Health Trees, where the hollow trunk can be made to grow fungus-like extrusions that act as rooms. The outer bark is soft and insulating, while the interior is dry. Usually found only in human settlements since the trees cannot survive well on their own in the wild.

Security Plants

Biotech defenses from the Crash era. Ivy or grass was given nettle stingers and neurotoxin genes, making plants that were not just unpleasant to touch but actually dangerous. A touch produces local paralysis within minutes, and more extensive contact can be deadly. Especially the security grass has thrived around its original locations in the southern uplands, since it would cause animals to be paralyzed and die in the vicinity, contributing nutrients to the local soil. A few people have deliberately planted the grass surrounding their estates.

Alife

Borehole ecologies

Since Mars lacks a geological cycle the terraformers had to create something similar. Using meteor impacts and drills to create cracks in the crust they created geologically active regions at the bottom of the new oceans. These upwellings of relatively warm water keep the oceans liquid and bring nutrients to the surface. They also feed local ecologies very similar to terrestrial deep-sea vent ecologies.

Borers are nanotech creatures/devices created to help maintain the boreholes. They send down “roots” along cracks and dissolve rocks (especially carbonates) to allow cold water to be heated; this acts as a heat exchanger powering them and giving them enough energy to grow and reduce carbonates. While originally intended only to sustain deep-sea ecologies borers have been adapted to cave ecologies, where they provide warmth and nutrients by drilling down into the deeper layers.

Surrounding borers and their hot outflow black plants flourish; algae with special pigments absorbing the radiation in the deep red and infrared. These algae in turn form the basis for other ecologies, especially in cave systems.

Saltshapers

Mars has far saltier seas than Earth, and even many lakes and rivers are brackish due to salt leached from sediments in their surroundings. This complicates life, as many wells and oases suffer from too salty water to be readily useful for humans and animals (plants are often quite resistant). Desalination plants and devices are a must in many upland settlements.

An alife species developed by the Engineers is the saltshapers, a combination of algae and nanolife that absorb salt in order to keep the water sweet. A saltshaper is a coral-like structure that consists of salt bound with a resin matrix, covered with algae with nanosymbionts that pick up salt and bind it. Saltshapers grow in shallow water in upland oases, where they can form strange reefs. Since the salt is strongly osmotic it can act as a wick sucking up water, enabling the shaper reefs to rise several meters with their covering algae. When storms blow past the shapers break apart and pieces blow out into the desert, removing salt from the water.

Uplanders often seed wells with saltshapers to keep the water sweet. There is also a widespread belief that they absorb all manners of impurities (true), and hence can be used for washing (somewhat true, but hard on the clothes) or healing (superstition).

Bigentials, "Plantsects"

One problem with terraforming is to spread plants and animal species widely. The bigentials are an ingenious solution: a number of paired plant and insect species in close symbiosis, where each carries not just their own genome but also the genome of the other. An insect would lay eggs which would either be insect eggs or small seeds of the plant. The plant produces not just seeds but insect eggs. The result is rapid spread of both species.

An especially successful bigential is the martian scarab, which collects mammoth (or other) dung into balls, in which it places its larvae and the seeds of its symbiotic grass. The grass will grow in a nutrient rich environment, and since the scarab prefers to dig in soft soil or sand it will often be the first to exploit a bare patch of earth. The grass produces tiny first instar larvae of the scarab, but since it (unlike other plantsects) does not give them a good first start in life most succumb. Still, enough survive to restart the scarab population if it has been severely depleted, and the larvae provide food for ant species that quickly move in to new grass patches and bring their own symbiotic species. Another elegant solution is the Goldwing butterfly, which lives in symbiosis with Rock Tea. The larvae feed from competitor species, helping the tea bush to thrive and spread widely.

Bigentials have also been used for a few more complex purposes. One problem has been to create viable water ecologies within isolated crater lakes. The solution was the creation of seaweeds that had seeds that survived transport using birds (or in some cases like *Ulva perflatus* have seeds that easily dry and blow away if the temporary lakes or puddles where it grow dry out). These seaweeds in turn produce larvae of crustaceans and even fish, supplying ponds and lakes with animals. *Chondrus piscis* is the source of the popular Redperch fish, found almost everywhere in the southern hemisphere.

Animals

Martian Bumblebee

The Martian bumblebee is the main pollinator of plants in most places. It looks roughly like a terrestrial bumblebee but is larger (to conserve heat). It was mainly intended for the colder regions, but since the equatorial ecosystem was lacking a pollinator it has adapted to it too.

Extracting honey from bumblebee hives is far harder than from honeybee hives, but beekeepers have successfully bred more efficient honey producers.

Martian Bat

A highly successful species inhabiting many of the cave systems and old ruins.

In Xanthe the bat is a symbol for community feeling and sharing (since they roost in clusters). In Marineris bats are a common food, and Marinerian bat dumplings are popular across Xanthe. Around the Elysian sea bats are seen as a symbol for intelligence – they have so heavy brains that they rest upside down and they can see through darkness.

Narghile

Mars only monotreme animal, an unusual genemod relative to the platypus but without the bill. The Narghile lives in rivers and lakes, eating fish and insects. Unlike the platypus the poison in its spurs is highly psychoactive in humans, causing muscle relaxation, memory impairment and a languid mood. In nature the poison seem to be useful to escape predators and in territorial battles but the design is likely more for human benefit. Eating the poison glands produce an intense high, sometimes leading to severe memory loss. Despite (or perhaps because) this, the narghile has been hunted to near extinction.

Messenger Parrots

Originally the pets of the CSRE; the messenger parrots have escaped and now live both in the wild and as human pets. Messenger parrots have a wide variety of coloring due to selective breeding, but the most important trait is their language. Originally enhanced with human speech centers the parrots are able to understand and speak human languages in a limited but useful fashion (their intelligence is still merely a parrot's). One important use is the trigger parrots, which can be given a message they will repeat only when given the right codeword.

Escaped parrots have expanded into many niches, and are slowly becoming the dominant form of bird life in the equatorial regions. Especially in the cities small parrots like budgerigars fill the role of pigeons and sparrows. Some parrots have even begun to eat insects to supplement their nutrition. There are rumors that there have appeared predator or scavenger parrots, but most biologists mistrust them.

Bloodfur

A biotech living fur that keeps the bearer warm. It is essentially a symbiotic pet consisting of just skin, fat and muscle. The fur is the mature form of a small rabbit-like creature that can be bred normally. When given certain hormones the creature starts to put on weight and grow, dissolving its skeleton and most organs. The original furs of the Red Era were supplied with nutrient solution when they had to be used beyond their fat and moisture reserves, but after the Crash other solutions had to be found. One was the bloodfur, which links to the circulatory system of the wearer and lives of his blood. When not in use the blood-furs can be kept fed by attaching them to camels or other domestic animals.

The noble families knowing the secrets of bloodfur transformation have earned quite well on them. While anybody can breed immature bloodfurs only the right technique can make them grow into adults. Bloodfurs have also been bred for different purposes – shape, fur color and texture, for use as torture instruments and food storage.

Martian Mammoth

The woolly mammoth had been resurrected on Earth in the middle of the 21st century. The MTN biodesigners adapted it to act as a large grazer for Mars. Today it is an important source of meat, ivory, fur and heavy transport in colder regions.