

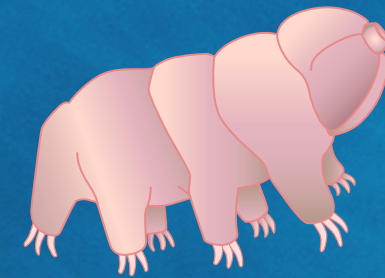


Arizona
Astrobiology
Center

astrobiology.arizona.edu

Extreme Life

WATER BEAR



- Tardigrades are so small that they're about the size of a period at the end of a sentence → .
- They can survive radiation, high pressure, and extreme temperatures
- They live in many extreme environments, like the deep ocean, hot deserts, frozen mountain tops, and volcanoes
- Fun Fact: Tardigrades are the first known animals to survive direct exposure to outer space (radiation) and revive!



Tardigrade

Ultra Extremophile



Tardigrada; Water Bear

Ability
Survives high levels of radiation, pressure, and extreme temperatures

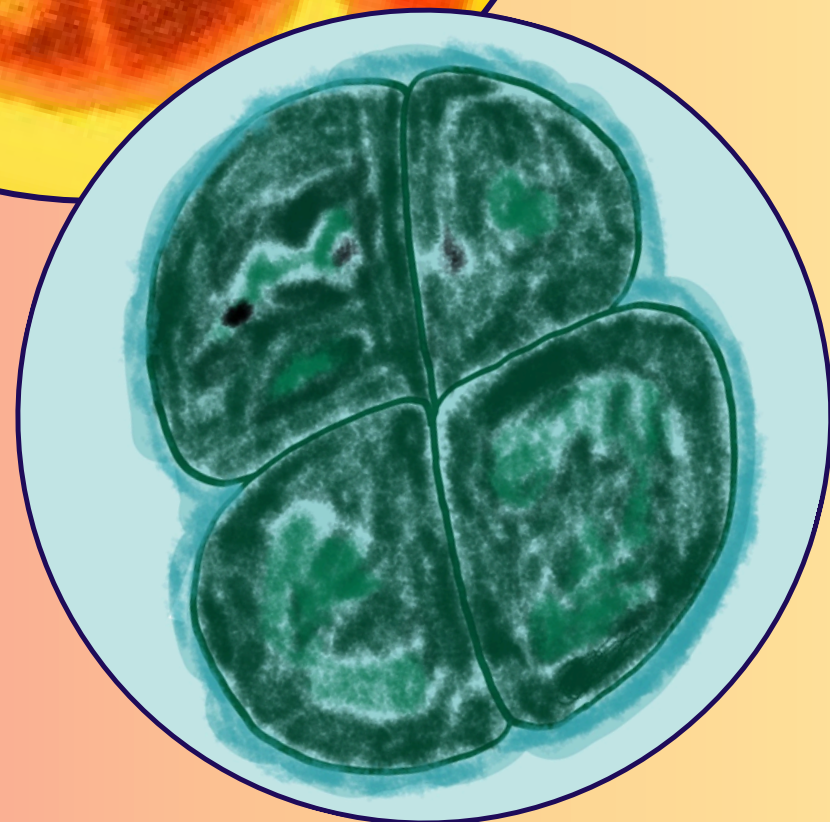
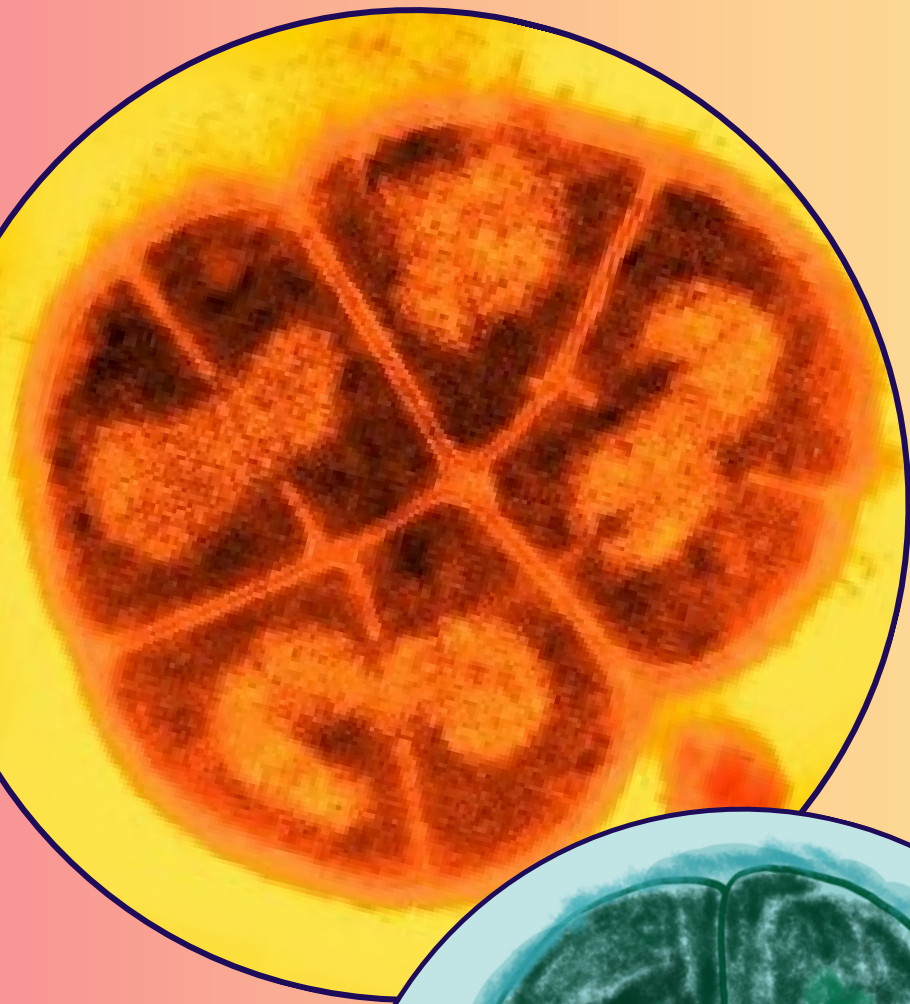
Microanimal

Type

Resistance

★★★★

CONAN THE BACTERIUM



- *Lives in extreme places, such as nuclear reactors, deserts, and outer space*
- *Can survive thousands of times more radiation than humans can*
- *It can live in very cold and low pH environments*
- *Fun Fact: It once survived for an entire year on the outside of the International Space Station!*

D. Radiodurans

Ultra Extremophile

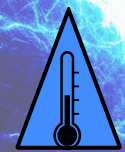


Deinococcus radiodurans

Ability

Thrives in bodies of high levels of radiation, cold temperatures and tolerates acid.

Bacterium



Type



Resistance

SEA MONKEY



- Sea monkeys are tiny animals that live in warm salt water
- They're found in places like the Great Salt Lake in Utah
- Their eggs can survive for years in a dormant state called cryptobiosis
- Fun fact: some people keep them as pets!

Sea Monkey

Poly-extremophile

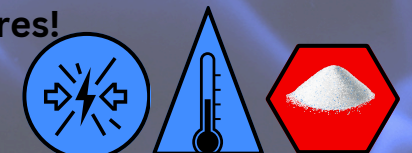


Artemia Salina

Ability

Thrives in bodies of water with high salt concentrations.
Enjoys warm temperatures!

Crustacean



Type



Resistance

Bonus Fact:
Swims up-side down



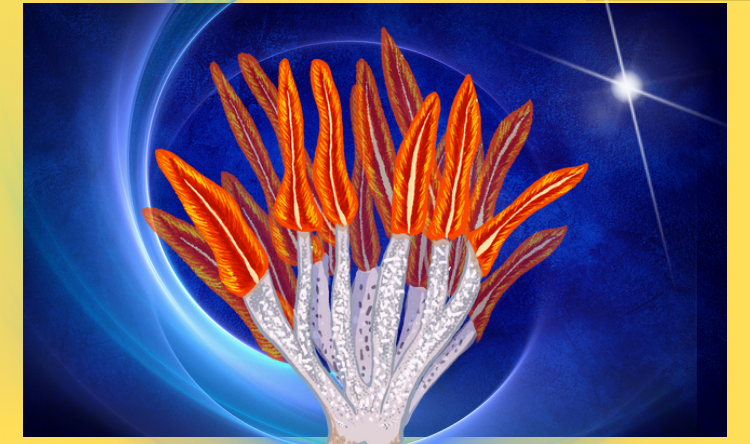
GIANT TUBE WORM



- They have special bacteria inside them that make food from chemicals in underwater volcano vents
- Their red top carries oxygen safely to their bacteria friends
- They live in total darkness and can handle super hot, high pressure water where almost nothing else can live
- Fun Fact: They have no mouth or stomach!

Giant Tube Worm

Ultra Extremophile



Riftia pachyptila

Ability

Thrives in deep bodies of water with high temperatures and pressures.

Invertebrate

Type



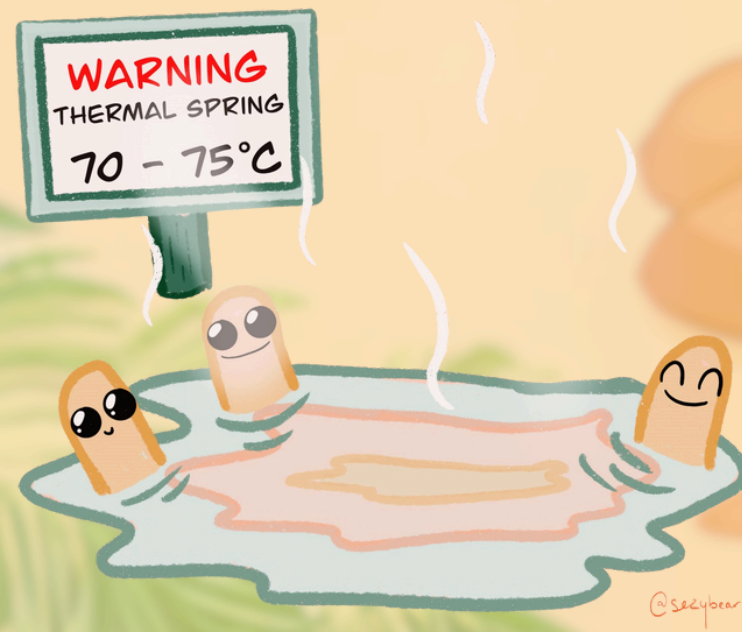
Resistance

T. AQUATICUS

Type of Bacteria

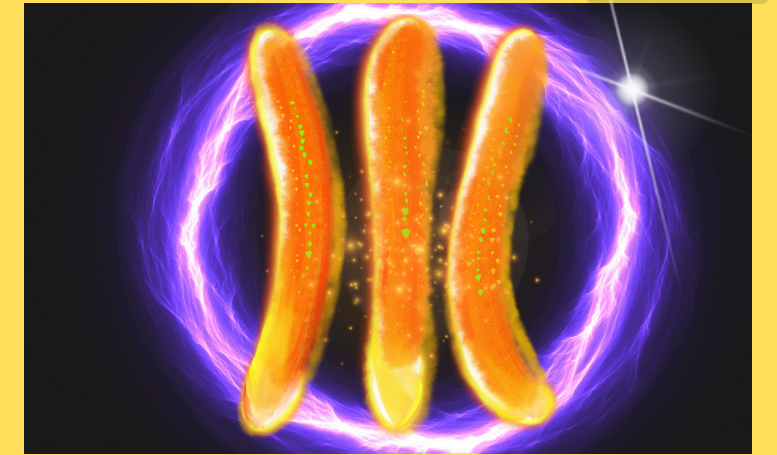


- Lives in hot springs that are around 160°F
- It was discovered in Yellowstone National Park hot springs
- It has a heat-proof enzyme that helps copy DNA
- Fun Fact: This organism produces a special enzyme that helped scientists create COVID-19 tests and crime scene DNA tests!



T. Aquaticus

Extremophile

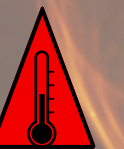


Thermus aquaticus

Ability

Thrives in very hot temperatures.
Really likes heat and steam!

Bacterium



Type



Resistance

DESERT INK CAP



- *This mushroom lives in hot, dry deserts*
- *It grows in sandy soil and survives with very little water*
- *The cap can turn into inky black goo as it gets older*
- *Fun Fact: It can be found right here in Arizona!*



Montagnea

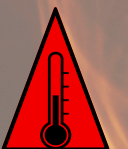
Extremophile



Montagnea arenaria

Ability

Survives in hot temperatures and low humidity.



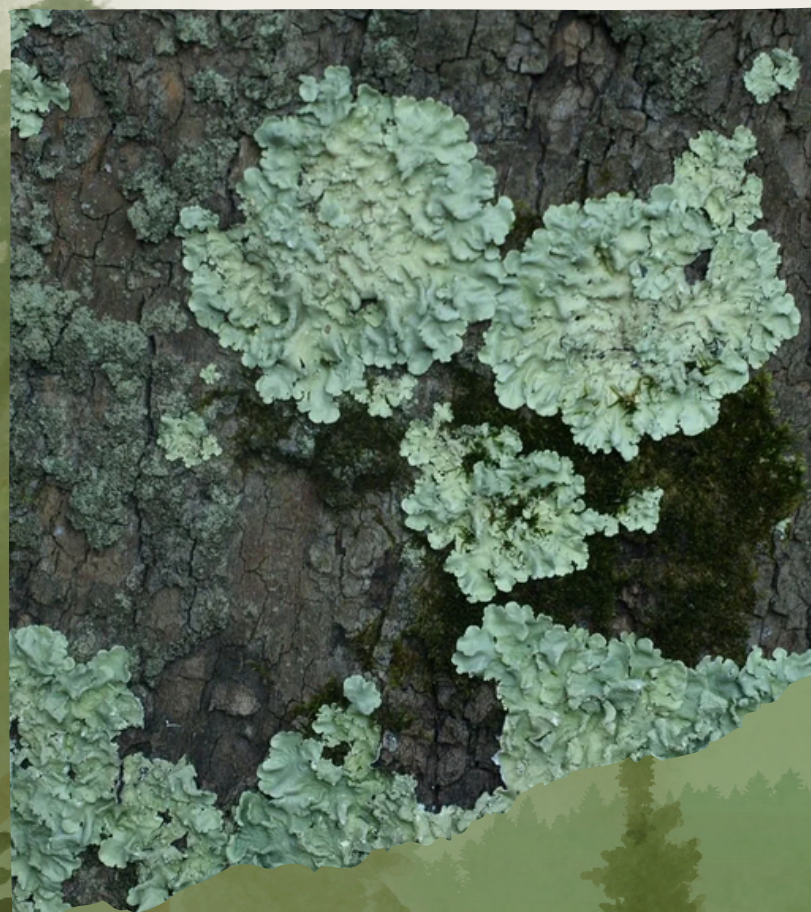
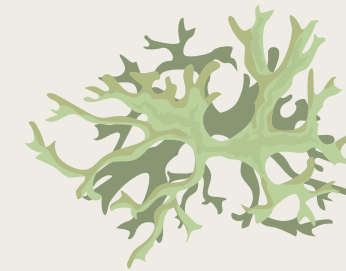
Fungi

Type

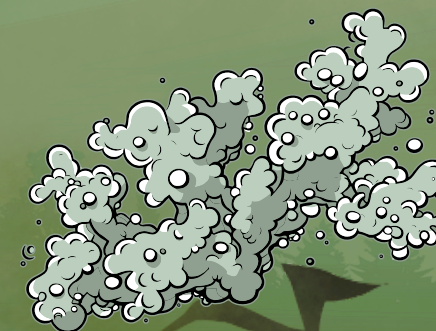


Resistance

LICHENS



- Lichens are part fungus, part algae
- They grow on rocks, trees, and even sidewalks
- They can survive in very hot temperatures and low humidity
- Fun Fact: They are some of the first things to grow after a volcanic eruption!



Lichens

Extremotolerant



Acarospora socialis

Ability
Survives in hot temperatures and low humidity.

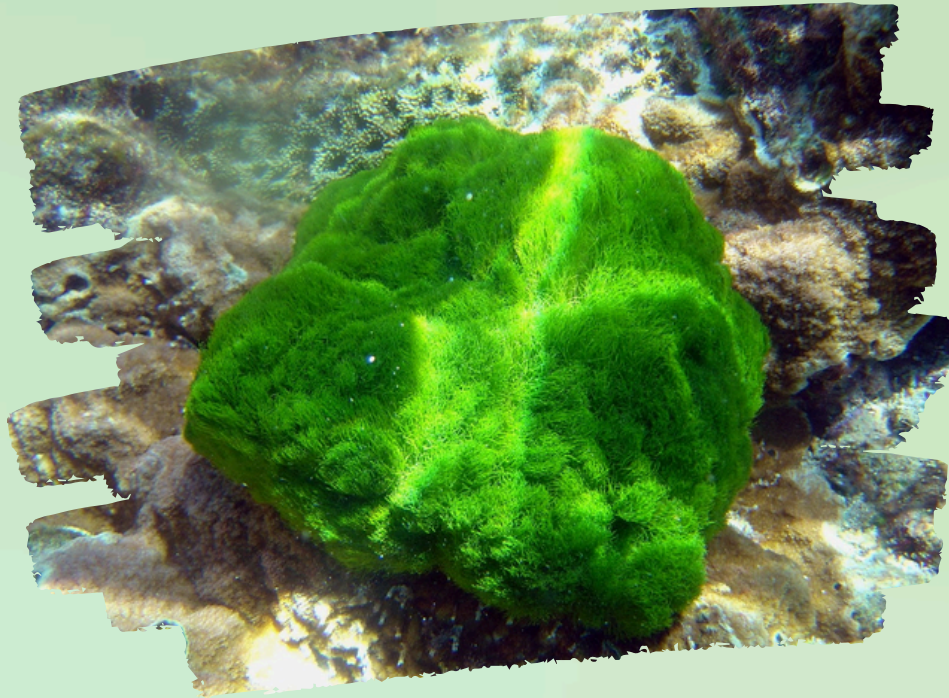
Fungi

Type

Resistance

★★

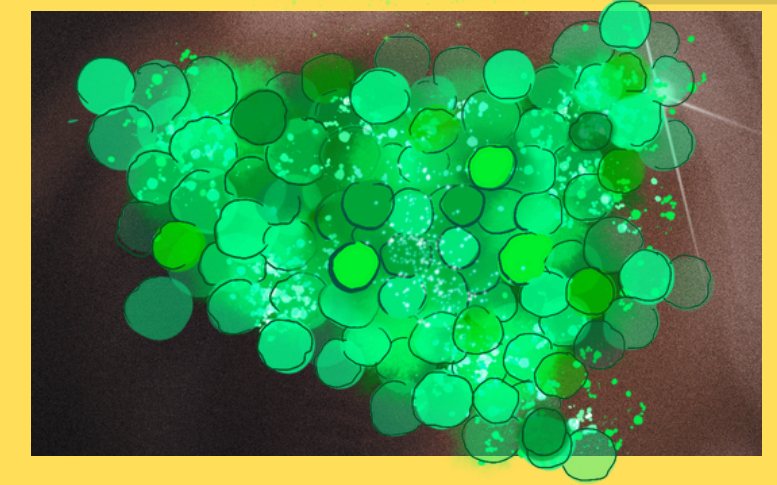
GREEN ALGAE



- These plants can live in super acidic places, like volcanic lakes and toxic water near old mines
- They make oxygen and feed lots of creatures like tiny water animals
- Fun Fact: In acidic lakes, some green algae turn red or orange by making special pigments that protect them from acid and sunlight!

Chlorophyta

Extremophile



Chlamydomonas acidophila

Ability

Thrives in extremely acidic conditions.

Fungi

Type

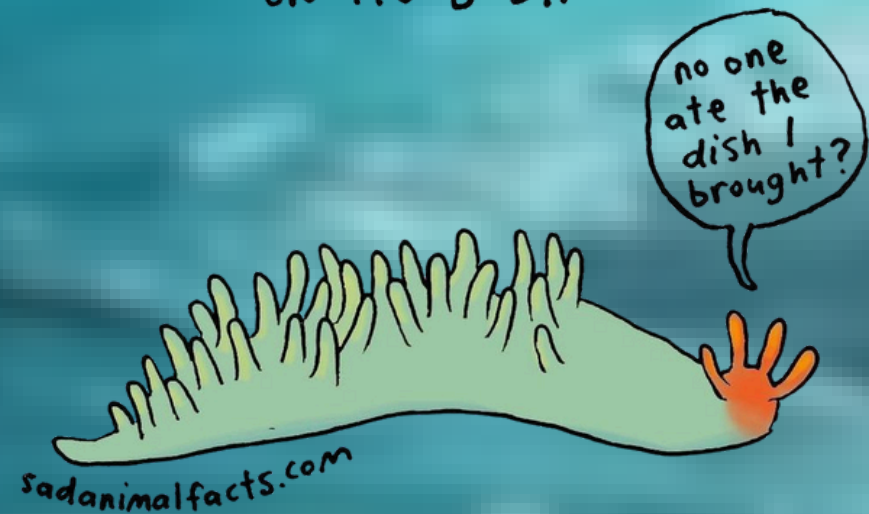


Resistance

POMPEII WORM



A POMPEII WORM
GROWS ITS OWN FOOD
ON ITS BODY.



- These worms live at the bottom of the ocean near extremely hot underwater volcano vents
- They can survive extremely high pressure
- They're covered in fuzzy bacteria on their backs that keep them cool, even in boiling water
- They're among the most heat-tolerant animals known!



Pompeii Worm

Poly-extremophile



Alvinella pompejana

Ability

Survives in deep hot waters.

Invertebrate

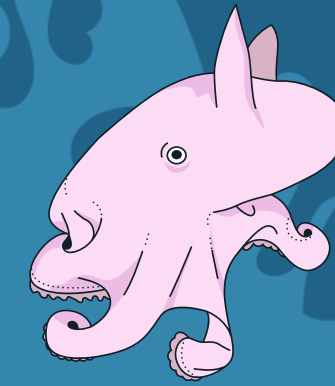
Type



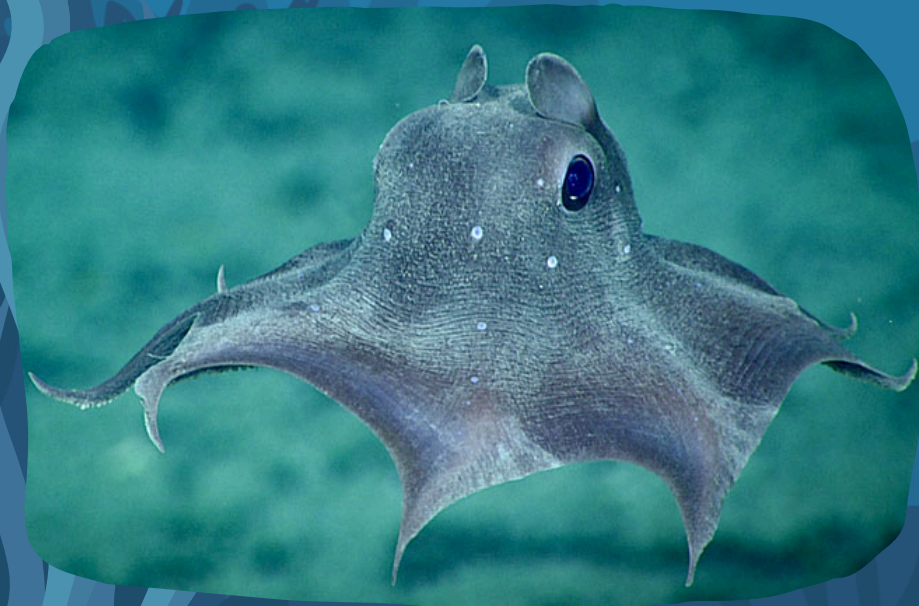
Resistance



DUMBO OCTOPUS



- Lives really deep in the ocean where there's high pressures and cold temperatures
- It's named after the Disney character Dumbo because it uses its big "ear" fins to swim, just like the flying elephant!
- Fun Fact: The dumbo octopus can swim deeper than Mount Everest is tall!



Dumbo Octopus

Poly-extremophile



Grimpoteuthis

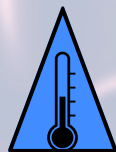
Ability

Thrives in deep bodies of water with high pressures and cold temperatures.

Octopod



Type

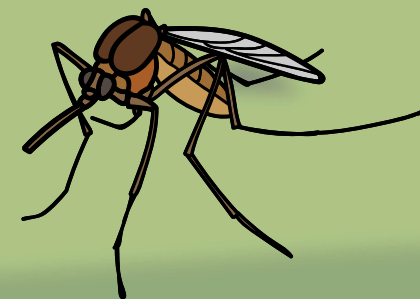


Resistance

CULEX MOSQUITO



- This species of mosquito only lives around hot thermal pools in New Zealand.
- These mosquitos lay eggs in very hot pools. Their larvae also live in these hot pools.
- The pools are often as hot as 93 degrees Fahrenheit (34 °C) - much too hot for most insect eggs to survive! But, Culex survives the heat just fine.



Culex

Poly-extremophile



Culex Rotoruae

Ability
Survives in high altitudes and hot steamy temperatures.

Insect	Resistance
★ ★ ★	