

Association for Mexican Cave Studies Glossary

1. Glossary of Scientific and Mexican Terms

Revised from Elliott, William R. 2018. Appendix 2, pp. 271–273 in *The Astyanax Caves of Mexico*, association for Mexican Cave Studies, Bulletin 26, Austin, Texas, 326 pp.

This glossary is in three parts. Many of the terms here relate to caves and geography of the Sierra de El Abra Region in San Luis Potosí and Tamaulipas. I added terms commonly used in the Xilitla Area of San Luis Potosí (Huastec), Oaxaca (Mazatec), and the Yucatán Peninsula (Mayan). See the **Biology Glossary** and **Animals in Mexican Spanish** at the end. —William R. (Bill) Elliott, 14 Dec. 2019

abismo, abyss, pit, sima, sótano

actun or aktun, cave in Mayan

anticline, a fold in geologic strata in the form of an arch

arroyo, a wet weather streambed

basalt, lava or basalto in Spanish

base level, the lower limit for an erosion or dissolution process. Cavers often use this term for the normal, low water table, but that is different. See water table.

bitumen, dark, flammable, but relatively nonvolatile hydrocarbons that occur naturally or are obtained by fractional distillation of petroleum; tar or asphalt. Found in El Abra Limestone and other rocks.

breakdown, a heap of rock filling all or part of a cave passage after the collapse of part of the walls or ceiling. The term usually refers only to large accumulations of rock.

Cañon de Servilleta, the river canyon northwest of Cd. Mante, through which flows the Río Ocampo (formerly Río Boquillas), which becomes the Río Comandante north of Cd. Mante

carbonate platform, a flat-topped reef with limestone-forming marine life

caverna, a large cave

cenote or dzonot, water cave in Mayan

Ciudad or Cd. Mante, a city near the northern Sierra de El Abra, Tamaulipas

Ciudad or Cd. Valles, a city near the southern end of the Sierra de El Abra, S.L.P.

caliza, limestone

cerro, a hill, peak, or mountain plateau

Cerro Rabón, the highland karst area of the Sierra Mazateca east of Huautla de Jiménez, Oaxaca

Cheve Area, the major karst area south of Huautla, for Cueva Cheve

claraboya, skylight entrance

cueva, a walk-in cave as opposed to a sótano or resumidero (vertical) cave

Cretaceous, the geological period from about 145–100 Mya (million years ago)

dinata or dinita, cave in Oaxaca (Mazatec)

dolina or doline, a large sinkhole

dolomite (dolomita), a sedimentary rock composed of calcium magnesium carbonate

domepit, a large vertical underground shaft where water flowing down to the water table at a lower level has dissolved a cylindrical cavity in the rock.

drapery, a thin curtainlike speleothem that forms where water trickles down an inclined surface.

drop, pitch, pit, a pit requiring vertical equipment to descend; *tiro* in Spanish

entrada, entrance

El Abra, literally “the opening” or pass, refers to two, now-dry river passes at the northern and southern ends of the Sierra de El Abra, San Luis Potosí and Tamaulipas

epigean, something from the land surface (epigeum) as opposed to hypogean (cave)

epikarst, the surface “skin” of karst or upper part of a karst system, in which water is stored and percolates to underlying aquifers, with a network of fractures, soils, solution cavities and associated fauna

flowstone, any mineral deposit that forms on the walls or floor of a cave as a result of water flowing over the surface; often called travertine.

formation, a term commonly used for a speleothem. More correctly, a distinct layer of rock from one geologic period, such as the El Abra Limestone in northern Mexico

geology, the scientific study of the earth and the rocks that form it. A scientist who specializes in this study is a geologist.

geological map, a map that shows the kinds of rock lying beneath the soil or reaching the surface in a given area. A topographic map shows the contour or elevation lines, and surface features such as watercourses.

GIS, geographic information system, SIG in Spanish

GPS, global positioning system, SPG in Spanish

Gómez Farías, a small town at the northern end of the Sierra de El Abra/Guatemala Region, Tamaulipas

gruta, grutas, a large cave

gypsum (yeso), Hydrated calcium sulphate, a mineral often appearing as outward-curving petal-like “flowers.” The rock, softer and more soluble than limestone, is sometimes massive enough to permit cave formation.

helictite, a thin, twisting speleothem projecting at an angle other than the vertical.

hoyo, hoyo, hole or pit

Huautla Area, the major karst area around Huautla de Jiménez, Oaxaca

hypogean, referring to subterranean species and objects

hypogene karst processes are caused by deep circulation of groundwater independent of meteoric circulation, and in some cases deriving from magmatic fluid sources

karst (karso), landscapes formed by the dissolution of soluble rocks such as limestone, dolomite, and gypsum, with underground drainage systems, caves, sinkholes, dolines, and springs. See also epikarst, pseudokarst.

kya, thousands of years ago

joint, a more-or-less vertical crack in bedrock, along which caves often form through dissolution by groundwater

joya, jewel, closed valley (different from hoyo or hoyo)

limestone (caliza), a sedimentary rock composed of calcium carbonate and impurities

lutita, shale

Micos caves, three fish caves south of Micos and Las Crucitas, S.L.P.

INEGI, the Mexican federal mapping agency, Instituto Nacional de Estadística, Geografía e Informática

La Huasteca or Huastecan Region, a region along the Gulf of Mexico, which includes parts of Tamaulipas, San Luis Potosí, Veracruz, Puebla, Hidalgo, and Querétaro. Encompasses the “Sierra de El Abra region.”

Huasteca Potosina is the portion in San Luis Potosí, **Huasteca Tamaulipeca** is the portion in Tamaulipas.

Huastec (Huasteco, Wasteko) is the language still spoken by many in this area, which is related to the Mayan languages farther south.

lienzo, a barbed wire fence line in northeastern Mexico (“canvas” in conventional Spanish)

msl or amsl, above mean sea level

Mya or mya, millions of years ago

nacimiento, literally “birth,” a large spring (manantial) or resurgence

Neogene, the later portion of the Tertiary Period and Cenozoic Era, 25–1.8 Mya, including the Miocene and Pliocene Epochs

nita, cave in Oaxaca (Mazatec)

ojo de agua, literally “eye of water,” synonymous with nacimiento or manantial

osto, cave or pit cave in Oaxaca (Mazatec)

Paleogene, the earlier part of the Tertiary Period and Cenozoic Era, 65–25 Mya, including the Paleocene, Eocene, and Oligocene Epochs

phreatic or phreas, relating to the saturated groundwater zone below the water table

polje, a closed karst valley with no surface outlet, which may fill with water and drain out through caves

poza, a pool

pozo, a well or deep pit cave

pseudokarst, a nonkarst area where caves are formed not by dissolution, but by lava flows, littoral waves, erosion, suffosion, or sliding of granite or rhyolite blocks down hillsides.

Quaternary, the latest Period of the Cenozoic Era following the Tertiary Period, including the Pleistocene and Holocene Epochs, from 1.8 Mya to now

resumidero, a swallet cave that takes much runoff (also see sumidero)

río, a river

ríos north to south in the El Abra Region,

Río Sabinas, from Nacimiento del Río Sabinas to Río Guayalejo

Río Frío, from Nacimiento del Río Frío to Río Guayalejo

Río Chamal, the proposed river that used to flow through Puerto Chamalito, but is now subterranean

Río Ocampo or Río Boquillas, flows through two canyons to Río Guayalejo

Río Comandante, the Río Ocampo east of the Sierra Cucharas

Río Guayalejo, flows to the Río Tamesí

Río Capote, Valle de Antiguo Morelos, flows to the Río Ocampo

Arroyo el Lagarto, the upstream (southern) part of the Río Capote

Río San Rafael de los Castro, from a nacimiento of the same name

Río Mante, from the large nacimiento near Ciudad Mante

Río Santa Clara, from a small nacimiento

Río Tantoán, east of Venadito

Río El Salto, near Micos

Río Naranjo, from Micos to Río Valles

Arroyo Grande (Río Puerco), flows south in the Valle de Antiguo Morelos to La Lajilla lake, then to the Río Valles

Río Sabinos, the river that used to drain the Los Sabinos area, now subterranean to the Río Choy

Río Choy, from the large Nacimiento del Río Choy to the Río Tampaón

Río Valles, west of Ciudad Valles to the Río Tampaón

Río El Puente de Diós, near Tamasopo, west of Ciudad Valles

Río Tamasopo, flows to Río Gallinas

Río Gallinas, flows to Cascada Tamul into Río Santa María

Río Santa María, flows out of the Sierra de Tamul to the Río Tampaón

Río Tampaón, receives the Río Valles, flows to the Río Pánuco

Río Coy, flows to the Río Pánuco near Tampico

rudist or rudistid, fossil bivalve molluscs, common in Jurassic and Cretaceous limestones. The reef-building forms of the Cretaceous had one valve that became a flat lid, with the other valve an inverted spike-like cone. See Federico Bonet, 1953.

Salsipuedes Dome, El Abra Limestone hill south of the Río Tampaón, site of Nacimiento del Río Coy

San Luis Potosí or S.L.P., northeastern Mexican state containing the southern half of the Sierra de El Abra

sierra, a mountain range (literally “saw”)

Sierra Chiquita, a small range east of Gómez Farías

Sierra Cucharas, literally “spoons,” a local name for the northern Sierra de El Abra and the foothills of the Sierra de Guatemala

Sierra de El Abra, a low range in the eastern Sierra Madre Oriental, between Cd. Mante and El Pujal

Sierra de El Abra region, the subject of this book, including the El Abra, lower parts of Sierra de Guatemala (Cucharas), northern Sierra de Tamalave, and the Micos and Tamasopos cave areas

Sierra de Guatemala, the high range north of Ocampo and Gómez Farías, Tamaulipas, but probably a misspelling of the old name “Sierra de Mataguala”

Sierra de los Mangos, the ridge on which Gómez Farías is built

Sierra de Nicolás Pérez, an old name for the southern part of the Sierra de Tamalave

Sierra de Tanchipa, a local name for the Sierra de El Abra from south of the northern El Abra pass near Quintero to the southern El Abra pass near Ciudad Valles

Sierra La Colmena, range west of Ciudad Valles, S.L.P.

Sierra Madre Oriental, the larger mountain range in northeastern Mexico, continuous with the Rockies

Sierra San Dieguito, a small range west of Sierra La Colmena, near the Micos caves

simá, a chasm, abyss, or deep sinkhole, often called a “sótano” in Mexico

sistema, a cave system of two or more connected caves

speleogenesis, cave development

sótano, literally “cellar,” commonly applied to a deep pit cave in Mexico or sometimes a pit inside a cave

sinkhole, a surface depression in cave country. A sinkhole is produced when the roof of a cave collapses or when limestone rock underlying the soil is slowly dissolved by water.

soda straw stalactite, a thin-walled tubular stalactite that elongates as minerals are deposited at the tip by water dripping through its hollow interior. All stalactites begin their growth as soda straws.

speleologist, a person who studies caves in any of their scientific aspects. See also caver and spelunker.

speleothem, a general term for any mineral deposit or formation found in caves, such as stalactites, stalagmites, or gypsum flowers.

spelunker, a person who explores caves as a hobby or for recreation. In recent years this term has been applied more to the untrained cave visitor. “Cavers rescue spelunkers” is one way that cavers explain the difference. See also caver and speleologist.

stalactite, an icicle-like deposit of calcium carbonate which grows downward from the ceiling of a cave. See also speleothem, stalagmite.

stalagmite, a deposit, usually of calcium carbonate which builds upward from a cave floor as a result of water dripping from above. See also speleothem, stalactite.

sumidero, a sinkhole or pit cave that may or may not take runoff. See resumidero.

swallet, a stream-capture cave

syncline, a trough of stratified rock in which the beds dip toward each other from either side

synclinorium, a large syncline with superimposed smaller folds

Tamaulipas or Tamps., the northeastern Mexican state containing the northern half of the Sierra de El Abra

Tantobal Dome, El Abra Limestone hill south of the Río Tampaón

tanque or estanque, a water tank or pond

Tertiary, the geological Period from 66–1.8 Mya

tinaja, a water hole or water jar

tunchi, cave in Oaxaca (Mazatec)

vadose, relating to underground water with an air space above the water table; cave streams and pools

Valle de Antiguo Morelos, the north-south valley west of the Sierra de El Abra

Valle de Los Mangos, the valley west of Gómez Farías, Tamaulipas

water table, the top surface of a body of slowly moving groundwater that fills the pore spaces within a rock mass. Above it lies the freely draining vadose zone, and below it lies the permanently saturated phreatic zone. Synonyms are potentiometric surface and piezometric surface.

Xibalba, “place of fear”, the mythical underworld (Mayan)

xol, cave (Huastec)

yeso, gypsum

2. Biology Glossary

By William R. Elliott, 28 Oct. 1999, 10 Dec. 2019, based partly on “The Life of the Cave,” by Charles E. Mohr and Thomas L. Poulson, 1966, McGraw–Hill, with the permission of Thomas L. Poulson.

- adaptation**, an inherited structural, functional, or behavioral characteristic that improves an organism's chances for survival in a particular habitat. See also mutation.
- antenna** (plural antennae), a feeler; an appendage, sensory in function, that occurs in pairs on the heads of crustaceans, insects, and certain other animals.
- appendage**, an arm or other limb that branches from an animal's body.
- aquatic**, living in water. Aquatic cave animals include amphipods, isopods, crayfish, planarians, fish, and blind salamanders. See also terrestrial and marine.
- arthropods**, animals with jointed legs and hard external skeletons (exoskeletons). The group includes insects, crustaceans, spiders, millipedes, and several other types of animals commonly found in caves.
- bacteria**, simple, single cell plants, most of which are unable to manufacture their own food using sunlight. Bacteria are important in some caves as synthesizers of food materials from minerals. They are also important as decomposers.
- barbels**, fleshy threadlike sensory structures hanging like whiskers near the mouths of certain fish, such as catfish.
- bathybenthic**, of the bottom of the truly deep areas of the sea, where the “rain” of organic material produces a deposit of food.
- bathypelagic**, of the deep sea. Refers to the depths between roughly 1000 m below the surface and the bottom of the sea. No food accumulates in these waters.
- biological clock**, an inherited time–measuring process within a living thing, which governs its responses to certain external events.
- biomass**, the total weight of living matter, whether in an entire community, at a particular trophic level, or of a particular kind of organism in the community. Thus, we may refer to the biomass of a pond community, of herbivores in the pond, or of copepods in the pond.
- biospeleology, speleobiology**, the scientific study of cave animal life, or the biology of caves, karst, and groundwater. A biologist who specializes in this study is called a cave biologist, biospeleologist or speleobiologist.
- carbide lamp**, a type of lamp formerly used by miners and cave explorers. It maintains a flame by burning acetylene, a gas produced when water drips on a supply of calcium carbide pellets.
- carnivore**, an animal that lives by eating the flesh of other animals. See also herbivore, insectivore, omnivore.
- cave**, any natural cavity or series of cavities beneath the surface of the earth. Such cavities are usually classed as caves only if they are large enough to permit entrance by humans. The term is generally synonymous with cavern and is commonly applied also to wind– or water–eroded rock cavities.
- cave deposit**, formerly an accumulation of material other than speleothems, such as charcoal, fossils, clay, silt, gravel, and other flood–borne debris. Speleothems are now often considered as deposits.
- caver (cuevero)**, a person who explores caves as a hobby or for recreation. See also speleologist and spelunker.
- cave system**, all the cavities and underground passages in a given area, which are now or at one time were interconnected.
- chlorophyll**, a group of pigments producing the green color of plants; essential to photosynthesis.
- climate**, the average weather conditions of an area, including temperature, rainfall, humidity, wind, and hours of sunlight, based on records kept for many years.
- column**, a pillarlike speleothem resulting from the union of a stalactite and a stalagmite into a single formation.

community, all the plants and animals that live in a particular habitat and are bound together by food chains and other interrelations.

competition, the struggle between individuals or groups of living things for common necessities, such as food or living space.

conservation, the use of natural resources in a way that assures their continuing availability to future generations; the wise use of natural resources.

convergent evolution, the independent evolution of similar features in species of different lineages, such as degenerate eyes in fishes derived from different surface (epigean) ancestors. See parallel evolution.

consumer, any living thing that is unable to manufacture food from nonliving substances, but depends instead on the energy stored in other living things. See also carnivore, decomposers, food chain, herbivore, omnivore, producers.

constant-temperature zone, the area of a cave where air temperature is unchanging throughout the year and approximates the average annual temperature aboveground. See also zonation.

crustaceans, the large class of animals that includes lobsters, crayfish, amphipods, isopods, and many similar forms. Crustaceans typically live in water and have many jointed appendages, segmented bodies, and hard exoskeletons.

cupula (plural cupulae), a jellylike rod projecting into the water from a neuromast, part of a fish's or amphibian's lateral line system. Vibrations in the water cause the cupula to move, thus setting off nerve impulses that enable the animal to detect nearby movements in the water.

decomposers, living things, chiefly bacteria and fungi, that live by extracting energy from the decaying tissues of dead plants and animals. In the process, they also release simple chemical compounds stored in the dead bodies and make them available once again for use by green plants.

ecology, the scientific study of the relationships of living things to one another and to their environment. A scientist who studies these relationships is an ecologist.

embryo, a developing individual before its birth or hatching.

environment, all the external conditions surrounding a living thing.

epigean, an adjective used to describe the surface environment, as opposed to the subterranean (hypogean) environment.

epigeum, the surface environment.

epikarst, the upper zone of a karst area that extends downward as sinkholes, fractures, fissures, and other surface karst features to where the natural porosity of the bedrock is located. Epikarst can range from almost nonexistent to tens of meters deep.

EvoDevo, evolutionary developmental biology, a field of biological research that compares the developmental processes of different organisms to infer the ancestral relationships between them and how developmental processes evolved

evolution, the process of natural consecutive modification in the inherited makeup of living things; the process by which modern plants and animals have arisen from forms that lived in the past. See also mutation.

exoskeleton, an external skeleton. The hard body covering or shell of most invertebrate animals, including insects, crayfish, and millipedes.

food chain, a series of plants and animals linked by their food relationships; the passage of energy and materials from producer through a succession of consumers. Green plants, plant-eating insects, and an insect-eating bat would form a simple food chain. See also food web.

food pyramid, the normally diminishing number of individuals and amount of organic material produced at each successive level along a food chain. The declining productivity at each level results from the constant loss of energy in metabolism as the energy passes along the chain. See also trophic level

food web, an interlocking system of food chains. Since few animals rely on a single food source and since no food source is consumed exclusively by a single species of animal, the separate food chains in any natural community interlock and form a web.

fossil, any remains or traces of animals or plants that lived in the prehistoric past, whether bone, cast, track, imprint, pollen, or any other evidence of their existence.

genome, the genetic material of an organism, the DNA (or RNA in RNA viruses). The genome includes the genes (the coding regions), microsatellites, and the noncoding DNA, as well as the genetic material of the mitochondria and chloroplasts (in plants) apart from the nucleus.

genomics, the branch of molecular biology concerned with the structure, function, evolution, and mapping of genomes

guano, Excrement, as of bats, crickets, or sea birds. In certain bat caves and on islands colonized by sea birds, guano sometimes accumulates in such vast quantities that it is mined commercially for fertilizer.

habitat, the immediate surroundings (living place) of a plant or animal; everything necessary to life in a particular location except the organism itself.

herbivore, an animal that eats plants, thus making the energy stored in plants available to carnivores. See also carnivore, insectivore, omnivore.

hibernation, a prolonged dormancy or sleeplike state in which animal body processes such as heartbeat and breathing slow down drastically and the animal neither eats nor drinks. Nearly all cold-blooded animals and a few warm-blooded animals hibernate during the winter in cold climates. Extremely large aggregations of bats, crickets, and spiders hibernate in some caves.

histo, histoplasmosis, the disease caused by the fungus *Histoplasma capsulatum*, found in bird and bat guano, especially in the southern USA and the tropics. An occupational disease of cavers, aviary and poultry workers, guano miners, and maintenance workers. Infection is usually caused by breathing the microscopic spores, which infect the lungs, or sometimes the eye. Flu-like symptoms accompanied by low-grade fever, breathing difficulties and pain, and miasma may start about 14 days after exposure and continue for weeks, months, or rarely until death, usually from complications. Treatable with various antifungals, such as itroconazole. Often misdiagnosed, as the standard tests may give a false negative.

humidity, relative, the ratio, expressed as a percentage, of the amount of water vapor actually present in air of a given temperature. as compared with the greatest possible amount of water vapor that could be present in air at that temperature. Calculation of relative humidity can be done from tables, special slide rules or calculators, graphs, or complex equations. See also hygrometer and psychrometer.

hygrometer, an instrument that reads the humidity in the air directly; some are based on a hair's ability to shrink or expand with humidity, or on certain electronic chips. Generally, a psychrometer is more accurate at higher humidities (above 95%). See also psychrometer.

hypogean, an adjective used to describe the subterranean environment, as opposed to the surface (epigean) environment.

hypogeum, the subterranean environment.

infrared light, Light not visible to the human eye, with wavelengths longer than those of visible red light and shorter than those of radio waves.

insectivore, Two different terms. In ecology, an animal that feeds on insects. Bats are the Order Chiroptera. Almost all species of North American bats are insectivores (feed on insects), but some feed on nectar, fruit or blood. See also carnivore, herbivore, omnivore. In taxonomy, the Order Insectivora, the shrews.

invertebrate, an animal, such as a planarian, snail, or crayfish, without a backbone. See also vertebrate.

larva (plural larvae), an active immature stage in an animal's life history when its form usually differs from the adult form, such as the grub stage in the development of a beetle or the tadpole stage in the life history of a frog. See also metamorphosis; pupa.

lateral line system, a series of sensory organs, usually appearing in a line or series of lines on the sides and heads of fishes and larval amphibians. The system enables the animal to sense vibrations in the water. See also Cupula; Neuromast

limestone (caliza), Sedimentary rock composed primarily of calcium carbonate. It usually originates through the accumulation of calcareous (limy) remains of marine animals. Because limestone is easily dissolved by carbon dioxide in water, caves are more common in limestone than in any other type of rock. limestone dissolves fastest where the carbon dioxide content is highest at the surface of the water table.

mammals, the class of animals that includes bats, mice, man, and many others. They typically have a body covering of hair and give birth to living young, which are nursed on milk from the mother's breast.

marine relict, an animal whose extinct ancestors lived in salt water but became adapted to life in fresh water when an area formerly covered by the sea became dry land.

metabolic rate, the rate at which a living thing transforms food into energy and body tissue. The higher its metabolic rate, the more food it must consume. Most cave animals live at a reduced metabolic rate.

metabolism, the sum of the chemical activities taking place in the cells of a living thing; the sum of the processes by which a living thing transforms food into energy and living tissue.

metamorphosis, a change in the form of a living thing as it matures, especially the drastic transformation from a larva to an adult. See also pupa. In geology, the process by which rocks are altered in composition, texture, or internal structure by extreme heat, pressure, and new chemicals.

microclimate, "Little climate." The environmental conditions, such as temperature; humidity, and air movement, in a very restricted area, such as a sheltered nook in a cave wall.

microhabitat, a miniature habitat within a larger one; a restricted area where environmental conditions differ from those in the surrounding area. A sheltered nook in a cave wall is an example of a microhabitat within the cave.

microsatellite, a section of DNA with short nucleotide sequences repeated many times, the number of repeats varying between members of the species, used as a marker in determining genetic diversity, identifying important genetic traits, and in forensics, population studies, and paternity studies

mold, a microscopic form of fungus responsible for much food spoilage and, in caves, for conspicuous tufts quickly covering scats, dead insects and bats, and even wooden structures such as ladders.

mutation, a sudden change in the genetic material of an organism's germ cells, resulting in offspring that possess characteristics markedly different from those of either parent. Mutations generally are harmful but occasionally may improve an organism's chances for survival. See also adaptation, evolution.

neoteny, the condition of retaining larval form and behavior even as a mature individual. Certain salamanders in particular are neotenic, retaining gills into adulthood.

neuromast, one of the individual sense organs that make up the lateral line systems of fishes and amphibians. See also cupula.

omnivore, an animal that habitually eats both plants and animals. See also Carnivore; Herbivore; Insectivore.

organic, pertaining to anything that is or ever was alive or produced by a living plant or animal. Organic material brought into the cave from outside is virtually the only source of food for cave dwellers.

paleontologist, a scientist who studies the life of the past by interpreting fossil remains of plants and animals.

parallel evolution, the development of a similar trait in related, but distinct, species descending from the same ancestor, but from different clades (branches).

parietal fauna, pertaining to the inhabitants on the walls of the entrance and twilight zones of a cave.

photosynthesis, the process by which green plants convert carbon dioxide and water into simple sugar. Chlorophyll and sunlight are essential to the series of complex chemical reactions involved in the process.

phreatobite, an inhabitant of groundwater, often exhibiting troglomorphy, but not limited to karst systems. Many examples of amphipods and other crustaceans abound.

pigment, a chemical substance that imparts color to an object by reflecting or transmitting only certain light rays and absorbing all others. For example, a substance that absorbs all but green rays appears green. An object that contains no pigment, on the other hand, appears white because it reflects all light rays and absorbs none. Many troglobites have lost all their pigment

planarian, a flatworm. A relatively simple wormlike animal with a flattened ribbonlike body, a distinct head end, and a mouth located more or less centrally on the underside of the body.

pleiotropy, genes that have multiple effects, some of them obscure.

Pleistocene, Of or pertaining to the most recent period in the earth's history, roughly the past one million years. The period includes at least four major retreats and advances of continental glaciers.

pollution, the fouling of water or air with sewage, industrial wastes, or other contaminants, making them unfit to support many forms of life. Pollution can be especially serious underground where extensive networks of passages spread contaminating materials for long distances.

polygeny, traits that are controlled by multiple genes, such as eye development

preadapted, possessing adaptations that would contribute to survival in a habitat other than the immediate one because of similarities in living conditions in the two habitats. Insects that live in leaf litter on the forest floor, for example, may be pre-adapted to cave life.

predator, an animal that lives by capturing other animals for food. See also prey.

prey, a living animal that is captured for food by another animal. See also predator.

producers, green plants, the basic link in any food chain; by means of photosynthesis, green plants manufacture the food on which all other living things ultimately depend. They are available in the cave community only in the twilight zone, or as debris that falls or washes in. A few types of bacteria also manufacture food from nonliving substances and therefore serve as producers in some cave communities. See also consumer.

psychrometer, an instrument for measuring relative humidity. The simplest sling psychrometers consist of two thermometers mounted on a rotating frame. One thermometer's bulb is kept moist, the other dry. By comparing the "wet bulb" and "dry bulb" readings of the two thermometers after they have been whirled in the air, one can determine the relative humidity. An electric fan is used to ventilate the wet bulb in many psychrometers. See also hygrometer.

pupa (plural pupae), the inactive stage in the life history of certain insects during which the larva undergoes a gradual reorganization of its tissues in the process of becoming an adult. See also metamorphosis.

rabies, an infectious disease of the central nervous system in mammals, caused by a lyssavirus. Usually transferred by the bite of an infected animal, such as dogs, skunks, racoons, or rarely bats. Characterized by choking, convulsions, inability to swallow, etc. Different genetic strains are now recognized and can be identified by tests. Transfer of rabies from bats via aerosols to caged animals in a cave has been demonstrated, but has not been proven in humans.

relapsing fever, one type of *Borreliosis*, caused by various species of *Borrelia* spirochaetes carried by several species of tick. Related to Lyme disease, but less chronic and milder. An occupational disease of some cavers in Texas who come in contact with the soft tick *Ornithodoros turicatae*, which carries *Borrelia turicatae* and may live in cave entrances in Texas.

scats, animal droppings, an important source of food in caves.

scavenger, an animal that eats the dead remains and wastes of other animals and plants. See also predator.

sonar, a system for detecting obstacles by emitting sound and intercepting and interpreting echoes that bounce back. It is used by bats and also by oilbirds and some swiftlets when they fly in the darkness of caves.

species (singular or plural), a group of plants or animals whose members breed naturally only with each other and resemble each other more closely than they resemble members of any similar group.

stygebite, stygobiont, an aquatic troglobite.

stygophile, an aquatic troglophile.

stygoxene, an aquatic troglaxene.

terrestrial, living on land. Not to be confused with "epigeal." Terrestrial cave animals include blind beetles, millipedes, spiders, and crickets. See also aquatic.

troglobite, troglobiont, obligate cavernicole, "cave dweller." An animal that lives in caves and nowhere else.

trogomorphy, the physical characteristics of a troglobite or stygebite; e.g., reduced eyes and pigment, elongated appendages, well-developed tactile and olfactory organs, etc.

troglophile, "cave lover." An animal that can complete its life cycle in caves but may also do so in suitable habitats outside caves.

trogloxene, "cave visitor." An animal that habitually enters caves but must return periodically to the surface for certain of its living requirements, usually food.

trophic levels, Feeding levels in a food chain, such as producers, herbivores, and so on. Most food chains include a maximum of four or five trophic levels.

twilight zone, the area of a cave where light penetrating through the entrance is sufficient to permit human vision. See also zonation.

type locality, the place from which the type specimen of a new species is described, also used in geology for describing a formation

variable-temperature zone, the area of a cave where air temperature fluctuates with the seasons. See also zonation.

vertebrate, an animal with a backbone. The group includes fishes, amphibians, reptiles, birds, and mammals.

Some amphibians and fishes live permanently in caves. See also invertebrate.

White Nose Syndrome (WNS), an infection of hibernating bats by the fungus *Pseudogymnoascus destructans* (previously *Geomyces destructans*). Found in 12 species across 33 US states, including Texas, and 7 Canadian provinces, it has killed millions of bats and caused the listing of the Northern long-eared bat listed as threatened due to its rapid decline. At least seven of the 12 known species occur in Mexico, but WNS has not been reported there yet. If in Mexico, it would likely be found in more northern caves or at higher elevations. See <https://www.whitenosesyndrome.org/>

zonation, the organization of a habitat into a more or less orderly series of distinctive plant and animal associations as a result of variations in environmental conditions. Zones in a cave are the twilight zone, the variable-temperature zone, and the constant-temperature zone.

3. Animals in Mexican Spanish

Español	English
abeja	bee
ácaro	mite, acarid
alacrán, escorpión [can refer to a lizard]	scorpion
amblipigio, amblipígido	amblypygid, scorpion spider
anfípodo	amphipod
arácnido	arachnid
araña	spider
avispa	wasp
camarón	shrimp
cangrejo	crab
cangrejo de río	crayfish
cascabel	rattlesnake
chapulín	grasshopper or cave cricket
ciempiés [not cienpiés]	centipede
coyote	coyote
cuatro naríces, terciopelo (<i>Bothrops asper</i>)	similar to fer-de-lance
escarabajo	beetle
gamba	prawn
garrapata, pinalillo	tick, larval tick
grillo	field cricket
insecto	insect
isópodo	isopod
lagarto	lizard
lobo	wolf
mapache	raccoon
milpiés	millipede
mono, mico	monkey
morgaño, araña patona o segador	opilionid
mosca	fly
mosquito, zancudo	mosquito
murciélago	bat
oso	bear
pez, plural peces	fish [pescado means seafood]
puma, león de montaña	puma, cougar
serpiente	snake
tigre	jaguar
uropigio, uropígido, vinagron	uropygid, vinegaroon
venado	deer