A Glossary of Terms In the Literature and Practice of Biological Control of Weeds and Insect Pests

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-A-

abdomen
the last of the three insect body regions; usually contains the digestive and reproductive organs

abiotic
nonliving

acaricide
a pesticide that kills mites or ticks (adj.: acaricidal)

achene
a small, dry, thin-walled fruit that has one seed

acidic soil
soil with a pH value less than or equal to 6 in the root zone

active ingredient
the specific chemical in a pesticide that actually kills the pest

aculeate
prickly, or having a sharp point; having a sting (typically used to describe wasps, ants, and bees)

adelphoparasitism
a highly specialized type of parasitism seen in some endoparasitic wasps in which males develop only as parasites (hyperparasites) of female larvae and pupae of their own species (adj.:adelphoparasitic)

adjuvant
a material that improves the storage or application properties of a pesticide (for example, emulsifiers, penetrants)

adult
a reproductive stage of an insect; the only insect stage in which the insect has wings

adventitious
growing in an unusual location, usually refers to a plant structure such as root or leaf

adventive
not native; refers to a species found in a new site but not yet completely established there

aestival
taking place during the summer

aestivation
dormancy during a warm or dry season

agar
a material made from seaweeds that forms a gel when mixed with water and heated; used to grow fungi and other microorganisms

aggressiveness
a trait seen in many weeds; the ability to rapidly inhabit an area, increase in population, and outcompete other plant species (adj.: aggressive)

agronomy
the science of crop production and farm management (adj.: agronomic)

alate
having wings

alien
not native to an area but brought in by people

alkaline soil
soil with a pH value above 7.3 in the root zone

alkaloids
nitrogen-containing organic compounds found in certain plants; often having repellent or poisonous effects on animals that eat plants

allelochemic responce
a response in one individual species to a chemical produced by another individual or species

allelopathy
the release of toxic chemicals into the soil by one plant in order to slow down the chemical processes of another plant (adj.: allelopathic)

allomone
a type of allelochemic response which is beneficial to the organism giving off the chemical

allopatric
having distributions that do not overlap; usually refers to a species or population

alternate host
one of the two or more different plant hosts needed by certain fungi (for example rusts) and insects to complete development

anatomy
the study of the internal structure of plants or animals; the internal structure of an organism (adj.: anatomical)

annual
a plant that completes its life cycle in 1 year

annulate
ringed

antenna
a segmented appendage on the top of an insect's head that performs a sensory function (pl.: antennae)

anther
a structure at the tip of a stamen that produces and releases pollen

anthesis
flowering; the opening of a flower bud

anthophily
feeding on or at flowers, or attracted to flowers (adj.: anthophilous)

antibiotic
a chemical produced by a bacterium that kills or slows down the growth of another bacterium

antibiosis
an association between two different organisms that is harmful to one of them

antixenosis
a type of plant resistance to carnivorous insects in which cues that normally attract the pest are removed or hidden; the host plant itself can still be eaten

apetalous
having no petals

apex
the tip

aphid
a small, soft-bodied, pear-shaped insect that sucks plant juices, usually from the tender, growing parts of a plant; some aphids cause the formation of a gall or vector plant diseases; have gradual metamorphosis (order Homoptera)

apomictic
the ability to reproduce without fertilization

apothecium
the fruiting body of some fungi; contains asci (pl.: apothecia)

apterous
having no wings

arachnids
arthropod animals such as spiders, mites, ticks, and scorpions (class Arachnida); related to insects

arrhenotoky
a type of insect reproduction in which males develop only from unfertilized eggs

arthropod
a member of the animal phylum Arthropoda; animals that have jointed appendages and anexternal skeleton (exoskeleton); includes the insects, arachnids, centipedes, and crustaceans

artificial diet
a man-made diet used to raise insects in a laboratory or mass-rearing environment; provides necessary nutrition and encourages further development but usually has little or no resemblance to the insect's natural food(s)

ascomycete
a fungus that produces ascospores during sexual reproduction

ascospore
a haploid fungal spore

ascus
a specialized cell that produces ascospores and is the site of sexual reproduction in certain fungi (pl.: asci)

asexual reproduction
the production of new plants or animals without the union of male (sperm) and female (egg) cells; products of asexual reproduction are usually called clones

aspect
the direction (for example, north or southwest) in which an object or area faces

aspirator
a device that uses suction to pick up and collect small insects

Asteraceae
the more commonly accepted name for the plant family Compositae

attractant
a chemical that, when detected, causes a directed movement toward the source of the chemical

augmentation
a biological control method that usually involves handling environmental conditions so that they favor natural enemies already found in an area; may also refer to biocontrol methods involving the release of more natural enemies into an area

autecology
the ecology of one organism

autocidal control
control of an insect pest species by letting out large numbers of genetically-altered individuals that mate with normal, wild individuals and can't produce offspring; the sterile-male technique

autotrophic
able to make its own organic nutrients from available inorganic nutrients using energy from the sun (green plants)

autumnal
happening in the fall

auxin
a type of plant growth hormone; a chemical that controls growth and development of plant tissues

auxotrophic
needing more specific growth factors than the wild type; unable to live in nature or on normal culture media; usually refers to a mutant strain of a fungus or other microorganism

avirulent
unable to cause a disease

awn
a bristle found on the end of a bract (modified leaf) in some grasses

axil
the upper angle where a leaf stalk or small stem joins a larger stem

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***Bacillus thur ingiensis* (Bt)**
a bacterium that causes diseases in insects, especially larval pest Lepidoptera; various typeshave been made for control of insect pest groups (for example, mosquitoes, beetles); other *Bacillus* species are also insect pathogens

bacteria
very small one-celled microorganisms that reproduce asexually and take on distinctive shapes (sing.: bacterium)

baculovirus
one of a large group of viruses, distinguished by a rod-shaped structure, including several groups that are insect pathogens

ballistic
the ability of a fruit to break open when ripe, releasing seeds some distance from the parent plant

basic
alkaline; having a pH greater than 7.0

beak
the overhanging mouthparts of a sucking insect (orders Homoptera and Hemiptera)

beetle
a member of the insect order Coleoptera that has complete metamorphosis; adults have hard or leathery forewings (elytra) while larvae may be grublike or mobile

beneficial
having a positive effect in the environment according to humans; usually refers to natural enemies of pest species

bias
normal mistakes that cause differences between numerical values from a sample and their comparable population values

biennial
a plant that lives for 2 years

biflorous
flowering in both the spring and summer

bioactive
able to affect a living organism or living tissue; usually refers to natural or man-made chemicals

bioassay
a test of the strength of a bioactive substance, conducted by measuring its effect on a test organism or tissue and comparing this effect to that caused by a standard substance

biogeography
the study of the geographical distributions of plants and animals and the factors that influence those distributions (adj.: biogeographical)

bioherbicide
a biological pesticide used against a weedy plant

biological control
reducing the abundance of a pest by using its natural enemies (predators, parasites, and pathogens); also called biocontrol

biological pesticide

a pesticide that uses a living organism (for example, virus, fungus, bacterium, or nematode) as its active ingredient and is applied similar to a chemical pesticide; also called a biopesticide

biomass
the total fresh or dry weight of a plant or animal species, or a group of species, in a unit area

biome
a community of plants and animals on land usually characterized by the major type of vegetation (for example, grassland, coniferous forest)

biometry
the study of the size, shape, and weight of living organisms and the differences in these values (adj.: biometric)

biophyte
a parasitic plant

biorational pesticide
a biological pesticide; may also refer to chemical counterparts of naturally-occurring substances used as pesticides (for example, plant growth regulator, allelopathic compounds)

biotechnology
the use of living or genetically-modified cells or microorganisms to make (for example, drugs or other chemicals) or break down (for example, pollutants, waste products) various products

biotic
related to, caused by, or made by living organisms

biotic potential
the highest possible rate of population increase for a species, happens when the reproduction rate is high and the death rate is low

biotype
a subdivision of a species; a group of organisms that are identical in form and structure to other individuals of a species but differ in internal structure (for example, able to attack a normally resistant host or not affected by pesticide)

bivoltine
produces two generations in 1 year

blight
a disease characterized by the sudden and rapid dying of shoots, leaves, or flowers

blotch
a large, irregular, discolored area of dead or dying plant tissue

bolt
to produce long, flowering stems

borer
an insect that digs and feeds inside plant tissues, usually stems or roots

botanist
one who studies botany

botany
the study of plants and fungi

brachypterous
having short wings

bract
a modified leaf associated with the flower; a petal-like leaf that may surround part of a flower

broadleaf
common name for angiosperm trees in temperate regions

browse
woody growth (especially twigs and leaves) eaten by grazing mammals (n.); to eat woody growth (vb.)

brush
woody growth; usually refers to shrubs and small trees

bud
an undeveloped, embryonic shoot or flowering structure often covered by protective scales

bug
a member of the insect order Hemiptera that eats plants or other insects and has a gradual metamorphosis; also used as a common term for all insects and small organisms

bulb
a specialized underground stem formed from many layers of leaves surrounding the main stem; usually stores sugars and other food during the winter

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calcareous
containing calcium carbonate (lime); usually refers to soils developing over a limestone surface

callus
a mass of abnormal plant tissue that forms around wounded or infected parts of stems and roots; also, a mass of immature, undifferentiated plant cells that can develop into various mature tissues in tissue culture

cambium
an area of rapidly-dividing cells that make new tissue in order to increase the diameter in plant stems and roots (adj.: cambial)

canopy
the top part of plants, including leaves and branches, that forms the uppermost, light-restricting vegetative cover

capitulum
the flower head (pl.: capitula)

carbohydrates
a group of organic molecules made by plants and animals and used as food by animals and fungi; include simple (for example, glucose and sucrose) and complex sugars (for example, cellulose and starch)

carcinogen
a chemical substance that causes cancer (adj.: carcinogenic)

carpel
the female reproductive structure in plant flowers; made up of one or more ovules, a stigma, and a style

carrying capacity
the maximum number of individuals of a species that can survive indefinitely in an environment

caterpillar
the larval stage of a moth or butterfly (order Lepidoptera)

cell culture
cells growing outside a living organism in a nutrient medium

cellulose
a complex carbohydrate that makes up most of the plant cell wall

chitin
a hard, brittle carbohydrate that makes up most of the exoskeleton of insects and other arthropods; also found in some fungi

chitinase
an enzyme that breaks down chitin

chitinous
containing chitin

chlorophyll
a group of pigments that give plants their green color and absorb light energy during photosynthesis

chlorosis
a yellowing of green plant tissue caused by disease, a sucking insect, or a lack of nutrients

chrysalis
a butterfly pupa, usually quite hard and decorative (pl.: chrysalides)

circadian rhythm
the roughly 24-hour pattern of some internal processes that are maintained in many organisms with or without light

classical biological control
a biological control method involving the release in one region of natural enemies brought in from another region; usually directed against foreign pests, this method uses natural enemies from areas where the pest is native

cleistogamy
flowering in some plants in which the flowers never open to allow self-pollination; flowers are usually small and unnoticeable (adj.: cleistogamous)

cleptoparasitism
a type of insect parasitism in which a second parasite kills a first parasite of a host and takes over that host; an insect that eats insect prey or other food originally provided by a bee or wasp host for it's larvae (adj.: cleptoparasitic)

climate
the general, long-term weather conditions of an area (adj.: climatic)

clone
any of two or more genetically identical organisms made by vegetative (asexual) reproduction (n.); to make genetically-identical offspring using asexual reproduction (vb.)

cocoon
the silken case spun by an insect larva for pupation

coevolution
evolution between or among two or more unrelated species that happens at the same time because of the close relationship between or among them (for example, flowering plants and pollinating insects)

coexistence
two or more species that use the same or very similar space and resources at the same time

cohort
a group of individuals of the same age within a population

colonization
the first establishment of a foreign species in a new location

colonizers
the first individuals of a foreign species to reach a new area, survive, and reproduce

community
a naturally occurring, self-contained group of different species of organisms that live and interact with one another

competition
negative relationship between individuals of the same or different species that use the same limited resource(s); one species may survive and increase in number at the expense of the other(s)

competitive displacement
the removal of one species and the survival of another in a given area when the two species need the same food and habitat

complete metamorphosis
type of insect development characterized by immature stages (larvae and pupae) that differ from the adults in appearance, habitat, diet, and behavior

complex species
a group of similar, related species (for example, fungi) that have not yet been fully differentiated

Compositae
The largest plant family in the Dicotyledonae; plants whose flower heads consist of a thick grouping of many small, fairly unnoticeable flowers (disk flowers) surrounded by larger, noticeable ray flowers and a group of small leaves; includes daisies, sunflowers, and thistles (adj.: composite)

conidiophore
specialized fungal hyphae that hold conidia

conidium
a sexual spore made by certain fungi (pl.: conidia)

conservation
human handling of the environment in order to get survival and population growth of natural enemies of a pest(s)

consumer
an organism that cannot make its own food and must eat other organisms or their products

control
reduction in the amount of pest species in a given area; in experiments, a control is a standard used as a comparison against other treatments

correlation
a relationship between two or more variables in which values of one increase or decrease as values of another increase or decrease, but in which one does not cause the other

cortex

in plant stems, the tissue immediately below the outer layer of cells (epidermis); also referred to as cortical tissue

cosmopolitan
having a nearly worldwide distribution

cotyledon
a seed leaf (or leaves) growing from the plant embryo

cover
part of the vegetative canopy in a certain area due to an individual or a single plant species

crepuscular
active during dawn or dusk

cryptic
hidden by coloration or behavior

culm
the jointed stem of a grass or sedge

cultivar
a grown variety of a plant or animal species that has certain unique, desirable characteristics

cultural control
the use of cultural methods such as mowing, plowing, burning, flooding, or mulching to control weeds or other plant pests

culture
growth and multiplication of an organism under controlled laboratory conditions; often refers to the growth of fungi or bacteria for identification

cyathium
small, cup-like inflorescence

cytokinin
a type of plant growth hormone

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damage
the negative biological, ecological, physical, and economic effects (impacts) of a pest or other outside factor

day-neutral plant
a plant in which the length of the photoperiod does not primarily control when flowering begins

decay
the breakdown of plant or other tissue by fungi and other microorganisms

deciduous
having leaves that are lost each year, usually in the winter

defoliation
an unusual loss of leaves due to insect or fungal attack or nonliving factors (for example, hailstorms)

defoliator
an organism that eats large amounts of plant leaves and may remove most or all of a plant's leafage; usually refers to insects

demography
the study of populations; referring to the distribution, density, and other statistical characteristics of populations (adj.: demographic)

density
the number of individual plants or animals living in a certain area

density dependent
impact varies in a positive or negative way with the size of a population; usually refers to factors that deal with reproduction and death and that affect a population differently as their numbers increase or decrease (for example, birth rates, parasitism)

density independent
the impact on a population stays fairly stable despite the size of the population (for example, weather)

deterrent
a substance that stops or slows down a physiological process that would normally take place without it

detoxification
the process by which a plant or animal changes the active ingredient in a pesticide or other toxic chemical into a less harmful or nontoxic substance

detritus
small, dead or decaying pieces of plant or animal tissue

detritivore
an organism that eats detritus (adj.: detritivorous)

diagnosis
identification of a species or other taxon from similar species or taxa; identification of a disease or pest infestation from symptoms of the causal organism(s)

diagnostic trait
unique characteristic of a species (for example, pests, disease)

diapause
a resting state used by some insects in order to survive harmful environmental conditions; begins before unfavorable conditions come and does not end when favorable conditions come back

dicot
a flowering plant belonging to the subclass Dicotyledonae; identified by its net-like leaf venation and two seed leaves (cotyledons) in the embryo

diploid
refers to cells in an organism that have two of each type of chromosome

disease
a change in the normal structure or function of an organism; usually refers to those changes caused by microorganisms

disk flower
a small, inner group of flowers with unnoticeable petals; found in the family Asteraceae (Compositae)

dispersal
the spread of animals and plants from any point; the redistribution of plant seeds, fungal spores, insect eggs, larvae, or adults (adj.: dispersive)

dissemination
the movement of a pathogen's infective stages from their source to healthy plants

distribution
the geographic range of a species or other organisms

disturbance
a human or environmental disruption that changes the physical nature of an area, the species in a community and their abundance (for example, floods, fire, plowing)

diurnal
active during the day

diversity
the number of different species found in a community or a certain area

dominant species
specie(s) in a community that affect the environment in such a way that they control the abundance and distribution of other species in the community

dormancy
a state of inactivity

dorsal
referring to the top or back of an insect's body

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-E-

eclosion
the way in which an adult insect leaves the pupal or last nymphal skin

ecology
the study of plants and animals and their interactions with each other and the rest of the environment (adj.: ecological)

ecotone
the transition zone between two major ecological communities

ecotype
how an organism looks according to interaction between the organism and the specific environment in which it lives

ectoparasite
a parasite that lives on the outside of its host and has some type of feeding structure that is used to enter the host's skin (for example, ticks, nematodes, dwarf mistletoes) (adj.: ectoparasitic)

ectotherm
an animal whose main heat source is outside its body; a cold-blooded animal

edaphic
referring to the soil

efficacy
effectiveness; usually refers to how effective a control technique of pesticide is at killing a target pest (adj.: efficacious)

elytron
the thickened, leathery front wings of a beetle (pl.: elytra)

emergence
when an adult insect comes out of the medium in which it has developed (for example, soil, plant tissue); when plant parts appear above the soil surface

emigration
the movement of individuals away from a specific area

endemic

native to an area; refers to a disease that is permanently established in an area but not damaging to the environment

endoparasite
a parasite that lives inside the tissues of its host and eats from the inside (adj.: endoparasitic)

endosperm
nutritive tissue that surrounds the embryo in plant seeds

endotherm
an animal that can produce its own body heat; a warm-blooded animal

entomogenous
growing in or on insects; usually refers to fungi

entomologist
one who studies entomology

entomology
the study of insects (adj.: entomological)

entomopathogen
an organism that causes a disease of insects (adj.: entomopathogenic)

entomophage
an organism that feeds on insects (adj.: entomophagous)

entomophyte
a fungus growing on or in an insect

environment
the climatic, physical, chemical, and living factors that together affect survival, growth, and reproduction of a living organism

epicenter
the place where a pest or disease outbreak starts or is first known, and from which it spreads to cause an epidemic

epicormic
growing from an inactive bud

epidemic
a widespread disease, insect or other pest that builds up and spreads very rapidly

epidermis
the outermost layer of cells in a plant or animal

epidemiology
the study of epidemic diseases, usually among humans or other mammals (adj.: epidemiological)

epiphyte
a plant that grows on another plant but does not get nutrients from it (that is, it is nonparasitic)

epiphytotic
a widespread and harmful outbreak of a plant disease (that is, an epidemic in a plant population)

equilibrium
a condition in which prey and predator, host and parasite, or host and pathogen populations live together and remain fairly constant over time

eradication

complete elimination of a pest from a specific area

eruciform
shaped like a caterpillar; cylindrical

establishment
the process of an introduced organism living from year to year and increasing in number in a new location without help from humans

estival
happening in the summer; aestival

estivation
aestivation

ethology
the study of animal behavior while the animal is in its natural environment (adj.: ethological)

etiology
cause of a disease; also refers to the interaction of host, pathogen, and the environment that causes a disease (adj.: etiological)

eukaryote
an organism whose cells have a membrane-bound nucleus, numerous chromosomes, and distinct cell organelles; includes all animals and higher plants and fungi (adj.: eukaryotic)

evapotranspiration
loss of water from the soil by both plant transpiration and evaporation from the soil surface

exit hole
the hole made by an adult insect when coming out of the plant tissue or host (also called an emergence hole)

exoskeleton
the hard, supporting skeleton of an insect or other arthropod that is found on the outside of the body

exotic
not native; deliberately or accidentally introduced into an area where it is not found naturally

exuvia
the skin (part of the exoskeleton) left behind by an insect after molting or leaving the pupa (pl.: exuviae)

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-F-

facultative parasite
an organism that can live as a saprophyte or parasite

family
a subdivision of a taxonomic order that has a group of related genera, tribes, or subfamilies; insect family names end in “idae” while most plant family names end in “aceae”

fecundity
the number of eggs produced by a female

feedback process
a process whose products or results control the process itself

field insectary
: where many host plants or animals and biological control agents are released and grown with or without help from humans

fitness
: the possibility that an organism will pass its genes on to the next generation under certain environmental conditions

flea beetles
: small leaf beetles (order Coleoptera: family Chrysomelidae) that are used for the biological control of leafy spurge; the adults are active jumpers and feed on plant leaves while larvae feed on plant roots

floret
: one of the many small disk flowers that make up a composite flower (family Asteraceae or Compositae)

flush
: a period of rapid, vegetative growth in a woody plant

fly
: an insect in the order Diptera; adults have only one pair of wings and larvae are wormlike (maggots); has complete metamorphosis; often used to refer to flying insects in general

food chain
: a sequence of plants and animal species in which each is the food for the next member in the chain

food web
: all interconnected food chains in an ecosystem

forage
: parts of plants that can be eaten by grazing mammals

forb
: a nonwoody plant that is not a grass and is not grasslike in form

foreign exploration
: in classical biological control of foreign pests, represents the process of studying the target pest in its native habitat to determine possible biological control agents

frass
: the waste produced by insects, especially larvae; contains feces and undigested plant material; symptomatic of individuals feeding inside plant tissues

fruiting body
: the reproductive structure of a fungus that has specialized cells for producing spores (for example, a mushroom or conk)

functional response
: the increased usage of the most abundant prey or host by the predator or parasite

fungistasis
: the slowing down of fungal growth (adj.: fungistatic)

fungivore
: an organism that eats fungi (adj.: fungivorous)

fungus
: a microorganism that is usually multicellular, lacks chlorophyll, is made of hyphae, and reproduces by spores (pl.: fungi; adj.: fungal)

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gall
a plant tumor; a growth of abnormal plant tissue with a characteristic shape and color caused by an insect, nematode, or fungus or other microorganism; gall-making insects usually live and feed inside the gall

gall midge
a small fly (family Cecidomyiidae) that causes a plant gall where the larvae will eat and develop

gall wasp
a small wasp (family Cynipidae) that causes a plant gall where the larvae will eat and develop

gallery
a hole or tunnel in plant tissues dug by an insect

gaster
the rounded part of the abdomen behind the narrow waist in ants and wasps

gene
the basic unit of heredity that transfers information from one generation to the next; contains DNA needed to make specific proteins and nucleic acids (adj.: genetic)

gene flow
spread of genes within and among populations as a result of outbreeding

generalist
an animal that is able to eat many different prey or food plants

generation
the complete life cycle of an insect from egg to adult

genetics
the study of genes

genetic variability
the differences in a physical trait due to the many different genes or groups of genes controlling that trait; results from mutations

genome
all the genes of an organism

genotype
the genetic makeup of an individual organism (adj.: genotypic)

genus
a group of closely related species; the first name in a scientific name (pl.: genera; adj.: generic)

geographic information system (GIS)
a computer-based system used when working with different data describing locations on the Earth's surface; can make maps, store data, and determine relationships between different types of data

geographic isolation
the separation of two or more populations of a species by a physical barrier (for example, mountains, oceans), resulting in the evolution of different species

geophyte
a plant with dormant parts that are found underground (buds, bulbs, tubers, and so forth)

germination
the beginning of growth of a seed or spore

glabrous
smooth, hairless

global positioning system (GPS)
a system that uses orbiting satellites to describe the location of a point on the earth's surface by latitude, longitude, and elevation

gradual metamorphosis
type of insect development with immature stages (nymphs) that look like adults but don't have wings; no pupal stage

graminaceous
a member of the grass family (Poaceae or Graminae); grasslike in appearance

graminivore
an organism that eats grasses (adj.: graminivorous)

graminoid
a grass or grasslike in appearance

granivore
an organism that eats grains and seeds (adj.: granivorous)

grassland
an area or region in which the major vegetation is grasses (for example, prairies, steppes)

gravid
holding or containing eggs

grazing
the removal of edible plant parts by an animal

gregarines
a group of protozoans that are endoparasites of invertebrates

gregarious
happening in groups

grub
a slow, thick-bodied beetle larva

guild
a group of species that need similar habitats (for example, grazers, insect predators)

gummosis
a condition in woody plants in which cell walls become gummy and release a sticky substance; usually caused by certain bacteria

gynecious
having only female (pistillate) flowers

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-H-

habitat
the part of the environment where a plant or animal lives

habitat selection
the process by which a mobile organism picks the right habitat

halteres
small, knoblike structures behind the wings of flies (order Diptera)

haploid
an organism or cell having only one of each type of chromosome

harvestman
daddy-long-legs; an arachnid that looks like a spider but is not a true spider (order Opiliones)

hemimetabolous
having gradual metamorphosis

Hemiptera
an insect order that contains a group of insects with beaked mouthparts that eat on plants or other insects and have gradual metamorphosis (true bugs)

herb
a nonwoody green plant that loses its parts above the ground at the end of the growing season

herbaceous
nonwoody

herbarium
a collection of preserved plant samples that are used to identify plant species

herbicide
a chemical that kills plants; usually refers to manmade chemicals used against weedy plants

herbivore
an animal that eats plants (adj.: herbivorous)

heteroecious
describes an organism that needs two hosts to finish its life cycle; usually refers to some rust fungi

heterophylly
a plant having leaves of different shapes on different parts of the plant (adj.: heterophyllous)

heterotroph
an organism that gets its food from the environment (green plants) because it can't make its own organic food (includes all animals, fungi, most bacteria, and a few flowering plants) (adj.: heterotrophic)

hexapod
a six-legged animal; an insect

hibernal
happening in the winter

hibernation
a state of dormancy that many animals are in during the winter; usually starts once unfavorable conditions (cold) begin

holarctic
a biogeographic region that includes the far northern parts of the Old and New Worlds; taking place in far northern regions

holometabolous
having complete metamorphosis

Homoptera
an insect order that includes a large group of plant-feeding insects such as aphids, planthoppers, spittlebugs, whiteflies, and scale insects; have gradual metamorphosis

honeydew

a sugary waste product made by insects in the order Homoptera

hormone
a chemical made by an organism to regulate organs and tissues inside that organism (adj.: hormonal)

hornworm
the plant-feeding caterpillar of a hawk moth (order Lepidoptera, family Sphingidae) that has a fleshy horn near its rear end

host
the plant or animal on which an organism feeds; the organism used by a parasite or pathogen

host range
the different hosts that are used by a plant- or animal-feeding organism

host specificity
how much an organism is limited to a certain number of plant or animal hosts

humus
organic material in the soil resulting from the decay of plant and animal tissues (adj.: humic)

hyaline
translucent or transparent; glassy

hybrid
the offspring of two parents of different species

hybridization
the production of hybrids; crossbreeding

hybrid sterility
the inability of hybrid organisms to successfully reproduce

hybrid zone
an area in which the distribution of two or more interbreeding species overlap and produce hybrids

hydric
having plenty of moisture

hygric
having high humidity; adapted to humid conditions

Hymenoptera
an insect order that includes bees, wasps, ants, and sawflies and has complete metamorphosis

hyperparasite
an organism that is parasitic on another parasite (adj.: hyperparasitic)

hypersensitivity
the localized death of plant cells that happens after a plant pathogen enters; limits further growth of the pathogen

hypertrophy
too much growth due to an increase in cell size (adj.: hypertrophic)

hypha
filamentous strand that is part of the nonreproductive body of a fungus (pl.: hyphae; adj.: hyphal)

Back_to_start

identification
giving the correct scientific name to an unknown plant or animal specimen

imago
the adult insect (adj.: imaginal)

immigration
the movement of individuals into a specific area

imbibition
absorption of water by seeds or spores before germination

imperfect fungi
an artificial grouping of fungi that do not seem to have sexual stages

incomplete metamorphosis
gradual metamorphosis

incubation
the time between infection of a host by a pathogen and when the disease symptoms appear

indicator species
species that characterize a specific set of environmental conditions such as various soil types or nutrient levels

indigenous
native to a particular area

infection
the invasion of plant or animal host tissues by microorganisms

infestation
the occurrence of a pest species in numbers that are large enough to cause significant negative impacts in an area

inflorescence
a specialized plant stem with flowers; a cluster of flowers

injury
damage to a plant or animal by another organism or by a physical or chemical factor

inoculation
the placement of microorganisms into soil, hosts, culture media, and so forth (for example, pathogens into a host)

inoculative release
a biological control strategy in which a fairly small number of natural enemies are released into a pest population; establishment and spread are expected without additional human effort

inoculum
the parts of a pathogen that start the infection of the host; the microorganisms placed into a host or culture medium

inquiline
an animal that lives in the nest, gall, and so forth of another animal while sharing food resources but does not seem to have any harmful effects on the host

insect
a small arthropod animal that, as an adult, has six legs, three distinct body regions, one pair of antennae, and one or two pairs of wings

insectary
an area or building for the raising and multiplication of insects

insecticide
a pesticide used to kill insects

insectivore
an organism that eats insects (adj.: insectivorous)

insolation
direct exposure to solar radiation

instar
an insect between molts

integrated pest management (IPM)
a management strategy that is based on a knowledge of the biology and population dynamics of a pest and that uses all available management techniques while minimizing environmental and other social costs; uses preventative measures and keeps pest populations at acceptable levels

integument
the skin or outer covering of an insect's body

internode
the area of a plant stem between places where the leaves are attached (nodes)

interspecific competition
competition among individuals of different species

intraspecific competition
competition among individuals of the same species

introduced
not native; alien; foreign

introduction
the release of a nonnative species in a particular area

inundative release
a biological control strategy involving the release of a large number of natural enemies against a pest population, knowing the released organism will probably not become established and will only affect one pest generation; often refers to the use of biological pesticides

invasion
the colonization of a host by a pathogen or parasite; the spread of a weed or other pest into previously-uninfested areas

invasive
likely to colonize and become established in new habitats; usually refers to weeds

invertebrate
an animal that doesn't have a backbone (for example, arthropods)

in vitro
refers to the processes that happen outside the body of an organism such as in cells or tissues growing in culture

in vivo
refers to the processes that happen naturally inside the body of an organism

involucre
a whorl of bracts below a flower cluster

IPM
integrated pest management

isolate
to make a pure culture of a microorganism (vb.); one pure culture of a microorganism (n.)

isophylly
a plant having leaves that are all the same shape (adj.: isophyllous)

Back_to_start

-J-

jelly fungi
a group of fungi with jellylike fruiting bodies

juvenile hormone
an insect hormone that maintains the larval or nymphal stage

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-K-

kairomone
a type of allelochemic response which is beneficial to the receiver but not to the source

key factor
the most important factor affecting the mortality of a species based on data from a life table

key pest
one of the most important pests of a crop or commodity; usually the most difficult to control

Back_to_start

-L-

labile
unstable; changeable

lacewings
insects in the order Neuroptera; adults are green with white or clear wings (green lacewings, family Chrysopidae) or are brown with tan wings (brown lacewings, family Hemerobiidae), but both groups have fairly large wings that have many small veins and are held rooflike over the body; larvae are predators of other insects such as aphids

lactifer
a plant cell or duct that has latex

lactiferous
containing latex

larva
the immature feeding stage of an insect that undergoes complete metamorphosis; unlike a nymph, it looks different from the adult (pl.: larvae)

latent infection
an infection by a pathogenic organism that doesn't produce symptoms that can be seen, even though the pathogen may still be passed on to another host

latex
a bitter, milky juice or sap made by many different plants, including the Euphorbiaceae

LC_{50}
the lethal concentration; the amount of toxicant that kills 50 percent of test organisms, expressed as a function of volume (cc/animal); also, the amount that kills 50 percent of test organisms in the environment (usually water), expressed as parts per million (ppm) or parts per billion (ppb)

LD_{50}
: the lethal dose; the amount of a toxicant that kills 50 percent of test organisms, expressed as a function of body weight (mg/kg); usually used to show how safe a pesticide is to humans (the lower the LD50, the more toxic the compound)

leader
: the terminal shoot on the main stem of a plant

leaf area index (LAI)
: measure of the photosynthetic area (leaf surface area) of a plant species or all plants over a marked area of ground

leaflet
: individual unit of a compound leaf

leaf miner
: an insect whose larval stage lives and eats inside tissues of a leaf

leaf roller
: an insect with larvae that roll plant leaves and live and eat inside it

legume
: a member of the family Fabaceae (Leguminosae); has characteristic pealike flowers, compound leaves, and roots that often have nitrogen-fixing nodules (for example, peas, beans, vetches, clovers) (adj.: leguminous)

Lepidoptera
: an insect order that includes butterflies and moths and has complete metamorphosis; larvae are called caterpillars, and most eat plants

lesion
: a localized area of diseased or dead plant tissue from insect feeding, a pathogen, or nonliving factors

liana
: a woody vine

life cycle
: the series of changes (stages) that an organism goes through as it develops from egg, seed, or spore to adult or reproductive stage; the length of time needed to finish these changes

life history
: life cycle

life table
: a research summary that lists mortality factors that affect various stages in the life cycle and shows the likelihood of surviving adults or other reproductive stages reproducing; usually used to predict the size of future insect populations

litter
: undecomposed or partly decomposed plant parts (leaves, stems, branches, seeds) found on the soil surface

loam
: a medium-textured soil with sand, silt, and/or clay, and some humus

loess
: soil made by windblown deposits

long-day plant
: a plant that flowers only if the length of daylight is past a critical point

looper

an inch worm; a caterpillar that arches its back into a loop when it crawls (order Lepidoptera; family Geometriidae)

Back_to_start

-M-

macroclimate
the climatic conditions of a relatively large area (adj.: macroclimatic)

maggot
fly larva that has no legs (insect order Diptera)

manual control
the use of hand-held tools, such as hoes or brushcutters, to control weed populations

marsh
plant community developing on wet soils

mass rearing
the production of large numbers of living organisms in a laboratory or factory setting; the organisms live under artificial conditions (such as constant temperature and fluorescent lighting) and eat artificial diets

mass trapping
a control method against insect pests that uses a large number of traps; the goal is to reduce damage and/or reproduction by capturing enough of the pest population

mating disruption
a control method against insect pests in which large numbers of pheromone dispensers are distributed over an area; the goal is to reduce reproduction by keeping large numbers of pests from finding mates

mealybug
an oval, wingless, soft-bodied insect covered with a mealy or waxy secretion; many are pests of indoor and greenhouse plants, outdoor ornamental plants, and fruit trees (order Homoptera)

mean
the average value; determined by adding a set of numerical values and dividing by the number of values added together

mechanical control
the use of equipment, such as tractors or bulldozers, to control pest populations

median
the middle value in a set of numbers arranged in ascending or descending order; an equal number of values in the set are larger and smaller than the median

medium
liquid or solid material on which microorganisms or other small organisms are grown in the laboratory; has all the nutrients needed for growth (pl.: media)

meiosis
a type of cell division associated with sexual reproduction in which one diploid cell produces four haploid cells

meristem
a region of rapid mitotic cell division in plants that is a source of specialized cells (for example, shoot apical meristems produce stems, leaves, and flowers) (adj.: meristematic)

mesic
having adequate moisture levels

mesophyll

internal plant leaf tissue that supports photosynthesis and the storage of starch

metabolism
the total chemical process of energy transfer in plant and animal cells; involves the storage and release of energy from molecules to be used for growth and other life processes (adj.: metabolic)

metamorphosis
the changes that an insect undergoes as it develops from egg to adult; may be gradual or complete

microbe
a microscopic organism; often refers to bacteria and viruses (adj.: microbial)

microbial pesticide
a biological pesticide that uses a microorganism (bacterium, fungus, or virus) as its active ingredient

microclimate
the specific, localized climatic conditions of the area in which an organism lives (for example, soil microclimate, leaf surface microclimate) (adj.: microclimatic)

microfauna
animal populations made up of individuals too small to be seen without a microscope; includes protozoa and nematodes (adj.: microfaunal)

microflora
plant organisms made up of individuals too small to be seen without a microscope; includes algae, bacteria, and fungi (adj.: microfloral)

microhabitat
the subdivision of the habitat that includes only that area in which the organism actually lives; characterized by a microclimate

microorganism
any organism too small to be seen without a microscope; usually refers to viruses, bacteria, fungi, and protozoans

midrib
the central vein of a plant leaf

migration
a cyclical movement of animal populations that happens at regular intervals; a movement from a given area followed by a return to that area

mildew
a fungus whose interwoven hyphae or mycelia grow over a substrate, usually making it look white; a fungal disease (such as powdery mildew) of plants identified by a lot of mycelial growth on the surfaces of leaves or other plant surfaces.

mimicry
the adoption by one species of the structures, color, behaviors, and so forth of another species over evolutionary time in order to avoid predators

mine
the tunnel left by a leaf miner as it eats through leaf tissues

minute
very small; describes insects 2 mm or less in size

mites
small or minute arachnids that may eat plants, other mites, or small insects, or may be ectoparasites of insects and other arthropods

mitosis
type of cell division in which one diploid parent cell produces two diploid daughter cells (adj.: mitotic)

model
a mathematical description of actual or hypothesized natural events and processes

mold
fungi with a lot of visible hyphal growth and fruiting bodies on the outside surface of a substrate

molt
the process by which insects and other arthropods lose their exoskeleton (skin) as they grow and develop; in insects, molting only occurs in larval or nymphal stages

monoecious
having both male and female reproductive structures in different flowers on the same plant

monophagous
having a very limited prey or host range, usually limited to one species

morphology
the external shape, structure, appearance, and form of an organism (adj.: morphological)

monticolous
living in a mountainous region

morph
one of the possible forms that an organism can take

moth
a member of one of the major divisions of the order Lepidoptera; adults are usually dull gray or brown and are usually active at night

multiple parasitism
by two or more parasitic species; also called multiparasitism

multivoltine
able to finish many (generally, at least three) generations (life cycles) in 1 year

mummy
the dry, hardened body of an insect host parasitized by larvae that later emerge from it as free-living adults; usually refers to the hard, straw-colored bodies of aphids parasitized by various small parasitic wasps

mutagen
an agent, such as X-rays, UV light, or some chemicals, that causes mutations (adj.: mutagenic)

mutant
an individual that shows the effects of a mutation; a gene that has undergone a mutation

mutation
a change in the genetic makeup of an organism that may involve one gene or entire chromosomes and may or may not be passed on to future generations; can happen automatically or through the action of a mutagen and may lead to evolutionary change through natural selection

mutualism
symbiosis

mycelium
the interwoven hyphae that make up a fungus (pl.: mycelia; adj.: mycelial)

mycetophage
an organism that eats fungi (adj.: mycetophagous)

mycoflora
the fungal species found in an area or region

mycoherbicide
a biological herbicide in which the active ingredient is a pathogenic fungus

mycology
the study of fungi (adj.: mycological)

mycoparasite
a parasite whose host is a fungus (adj.: mycoparasitic)

mycoplasm
very small, simple, one-celled microorganism similar to a bacterium; some cause animal and plant diseases

mycoplasmlike object (MLO)
a one-celled organism that looks like a mycoplasm but cannot be positively identified

mycorrhiza
a modified plant rootlet caused by an association between plant tissues and a specialized fungus; usually a beneficial relationship (pl.: mycorrhizae; adj.: mycorrhizal)

mycosis
a disease caused by a fungus (pl.: mycoses)

mycotoxin
a toxin produced by a fungus

myrmecophile
a plant that is pollinated by ants (adj.: myrmecophilous)

Back_to_start

-N-

native
indigenous; occurring in a habitat or area left alone by humans

natural enemies
the predators, parasites, and pathogens associated with a plant or animal population

Nearctic
biogeographic region including the Arctic and temperate areas of North America; occurring in the Nearctic region

necrogenic
capable of causing necrosis

necrosis
death of cells or tissues while still a part of the living organism; causes a darkening of affected plant tissues (adj.: necrotic)

necrotoxin
a toxin that causes necrosis (adj.: necrotoxic)

nectar
a sugar-containing secretion produced by plants, usually in flowers

nectary
specialized cells or structure used to produce and store nectar

negative feedback

a regulatory mechanism by which the outcome or products of a process slow down or stop that process

nematode
a minute to microscopic, unsegmented roundworm used in the biological control of weeds and insects; some are parasitic on insects or plants (usually attacking roots) and may carry viral, fungal, or bacterial diseases

Neotropical
biogeographical region including Central America, South America, and the Caribbean Islands; occurring in the Neotropical region

neutral
having a pH of 7.0; neither alkaline nor acidic

niche
the ecological role of a species in a community; all physical, chemical, spatial, and temporal factors needed for survival of a species; no two species can live in the same niche in the same habitat

nitrogen fixation
the conversion of nitrogen in the air to a form that can be used (for example, ammonia, nitrates)

nitrogenous
containing nitrogen

nocturnal
active at night

node
the part of a plant stem where leaves or buds are attached (adj.: nodal)

nodule
specialized structure on the roots of legumes and some other plants that contains nitrogen-fixing bacteria

noninfectious disease
a disease caused by an environmental factor (for example, air pollution, lack of nutrients) and not by an infectious pathogen; a disease that cannot be passed from one host to another

nontarget species
not a pest; a non-pest plant or animal that may be unintentionally affected by a pesticide or biocontrol agent

normal distribution
a bell-shaped curve; a distribution whose mean and median are equal

Nosema
a genus of protozoans that are obligate endoparasites of many insects; some cause diseases of pest insects and may be used in biological control programs, often as biological pesticides

noxious weed
an economically damaging weed that must be controlled; its movement is regulated by federal or state law

nucleopolyhedrosis virus (NPV)
a viral pathogen of insects, particularly larval Lepidoptera

nutrient
a material needed for the growth and life of a plant or animal

nyctanthous
flowering at night

nymph
the immature feeding stage of an insect that has gradual metamorphosis; looks like the adult but does not have functional wings and is not sexually mature (adj.: nymphal)

Back_to_start

-O-

obligate parasite
a parasitic organism that can't live without a host

oligophagous
having a limited range of hosts; usually limited to many host species

omnivore
an organism that eats both plants and animals (adj.: omnivorous)

oncogenic
capable of causing tumors

ontogeny
the entire development of an organism (adj.: ontogenic)

order
a broad taxonomic classification between class and family; insect order names usually end with “ptera”

organism
any living thing

orientation
the position an organism takes in response to a stimulus

ortet
the one original ancestor of a clonal population

Orthoptera
an insect order that includes the grasshoppers, crickets, cockroaches, mantids, and related insects; have gradual metamorphosis

outbreak
a sudden increase and impact of a pest species in an area; usually refers to insect pests

ovariole
one of the egg tubes that make up an insect ovary

ovary
in insects, the structure inside the female abdomen that produces eggs; in plants, the part of the female flower structure that produces seeds (adj.: ovarial)

overwintering stage
the developmental stage of an insect or fungus during the winter; usually a dormant stage

oviposit
to lay eggs

oviposition
the act of laying eggs

ovipositor
a specialized structure in adult female insects for laying eggs

Back_to_start

-P-

palatability
: the attractiveness of potential food to a predator or herbivore; usually refers to the attractiveness of plants to herbivores

Palearctic
: biogeographic region including Europe, northern Asia, and northern Africa (n.); occurring in the Palearctic region (adj.)

pandemic
: an epidemic that occurs at the same time over a very large area, especially over many parts of the world

panmixis
: random mating (adj.: panmictic)

pappus
: a bristle, hair, or featherlike structure on the small, disk flowers (florets) of plants in the family Asteraceae (Compositae); helps spread the seeds (for example, dandelion parachute)

parasite
: an organism that lives, for at least part of its life cycle, on or in the tissues of another organism (host) in which it gets its food; needs only one, or part of one, host to finish its development (adj.: parasitic)

parasitism
: the relationship between a parasite and its host

parasitoid
: an insect with free-living adults and larvae that are parasitic on another insect, usually killing the host; often used in the biological control of pest insects

parenchyma
: soft plant tissues made up of thin-walled cells

parthenogenesis
: the development of an individual from an unfertilized egg; common among some insect groups (adj.: parthenogenic)

pathogen
: a living or nonliving agent that causes a disease; usually refers to microorganisms that cause disease (adj.: pathogenic)

pathogenicity
: the ability to cause disease

pathology
: the study of diseases, including those caused by viruses, bacteria, fungi, nematodes, and other microorganisms and sometimes those caused by nonliving factors (adj.: pathological)

peduncle
: the flower stalk of a plant

perennial
: a plant that lives for many years

pest
: any organism that causes economic or medical problems for humans and their crops and livestock; a damaging insect, fungus, bacteria, virus, weed, rodent,and so forth, according to humans (pests in one area may not be pests in another)

pest control

reduction in the numbers of a pest in an area due to interference by humans (use of chemical control, biological control, or some other method)

pesticide
a chemical, mixture of chemicals, or microorganism applied to kill a pest (adj.: pesticidal)

pest management
strategies used to reduce the numbers of a pest and its economic effects in an area; usually refers to strategies that consider the ecological relationships between the pest and its environment and, at the same time, try to minimize pest damage and its negative effects on beneficial or nontarget organisms; often part of a broad resource management scheme (for example, forest management, range management, and so forth)

petiole
the stalk by which a leaf is attached to a stem (adj.: petiolate, nonpetiolate)

pH scale
a scale ranging from 1 to 14 that measures acidity or alkalinity; a pH of 7 indicates neutral conditions, whereas values less than 7 indicate acidic conditions (1=most acidic) and values greater than 7 indicate alkaline conditions (14=most alkaline)

phanerophyte
a tree or shrub with dormant buds that are aboveground

pharate
refers to adult insects that have just eclosed and are still stay pale and softbodied

phenolics
organic compounds that are based on the chemical structure of benzene; may be insect or fungal toxins in plant tissues

phenology
the developmental events in the life cycle of an organism that are affected by local weather, climate, and site conditions (for example, temperature or rainfall patterns) (adj.: phenological)

phenotype
the physical appearance and internal processes of an organism resulting from its genetic makeup (genotype) and the environment; identical genotypes do not necessarily produce identical phenotypes (adj.: phenotypic)

pheromone
a chemical produced by one individual that is perceived by another individual of the same species and starts a specific response in the receiver; usually used to attract mates, mark trails or territories, start aggregation, or cause aggressive or defensive behaviors

pheromone trap
a device that uses some type of pheromone to capture individuals of a species; usually used to estimate the population size or geographic occurrence of a pest insect

phloem
conducting tissue in plants that transports photosynthate

photoperiod
the length of daylight in a 24-hour period

photosynthate
organic molecules (such as sugars) that are made during photosynthesis

photosynthesis
the complex chemical process in which green plants use the energy of sunlight and change carbon dioxide and water into organic molecules (adj.: photosynthetic)

phototaxis

directed movement of a mobile organism in response to light (adj.: phototactic)

phototropism
directed plant growth movement in response to light (adj.: phototropic)

phycomycete
a fungus included in a grouping of lower fungi

phylloplane
the surface of a plant leaf

phylogeny
the evolutionary history of a species or other taxon (adj.; phylogenic)

phylum
a major taxonomic grouping dividing the plant and animal kingdoms; divided into various classes (pl.: phyla)

physiological race
a subgroup of a pathogenic species in which the subgroup's disease-causing ability is limited to one or more races, cultivars, or varieties within a single host species

physiology
the internal processes and functions associated with plant and animal life; the study of such processes (adj.: physiological)

phytoalexin
a substance made by a plant in response to infection by bacteria or fungi; may limit the spread and damage caused by the pathogen

phytochemistry
biochemical processes associated with plants and the chemicals plants make (adj.: phytochemical)

phytoparasite
an organism that is parasitic on plants (adj.: phytoparasitic)

phytopathology
plant pathology; the study of plant diseases (adj.: phytopathological)

phytophage
an organism that eats plants (adj.: phytophagous)

phytotoxin
a chemical that is harmful or deadly to plants (adj.: phytotoxic)

pileus
umbrella-shaped cap of mushroom fungi (pl.: pilei)

pilose
covered with fine hairs or down

pistil
the structure of a flower that makes the seeds, made up of one carpel or several fused carpels

pistillate
having pistils but no stamens in flowers; female flowers

pitfall trap
a trap buried in the soil that captures insects and other small animals walking along the ground

pith
the spongy core of a stem

plant growth regulator
a naturally-occurring substance that affects the growth of plants (a plant hormone); a chemical whose effect on plant growth allows it to be used as a herbicide

poikilotherm
an animal having a body temperature that is the same as that of its surroundings; a cold-blooded animal (adj.: poikilothermic)

pollen
small, grainlike structures produced by plant flowers that contain male gametes

pollination
the transfer of pollen from anther to stigma in angiosperms or from male to female cones in gymnosperms; the movement of pollen from flower to flower by nonliving factors or living organisms

pollinium
a mass of fused pollen grains seen in orchids and some other plants (pl.: pollinia)

polyphagous
having a broad host range; able to use a wide range of unrelated hosts

population
all individuals of a particular species that are found in a given area

population dynamics
the changes in the abundance of a species over time and the mechanisms that caused these changes

positive feedback
an unstable regulatory mechanism in which the outcome or products of a process start or speed up that process

predation
consumption of prey organisms by a predator

predator
a free-living organism that kills and eats other organisms; unlike a parasite, they eat more than one prey organism to finish development

prepupa
a resting stage found in some insects that go through a complete metamorphosis, usually happening late in the last larval stage before the organism pupates; inactive and looks different than earlier larval stages (adj.: prepupal)

prey
an animal eaten by another animal

primary host
the host plant on which the first two stages of a rust fungus occur; the host plant on which the sexual form(s) of an insect with alternating generations is found

primary pathogen
a pathogen that invades a host first, before secondary pathogens, and can cause disease symptoms by itself

primary succession
plant succession that begins on bare ground

prokaryote
a simple, one-celled organism with one chromosome and no membrane-bound nucleus or defined cell organelles; includes bacteria and some algae (adj.: prokaryotic)

proleg
an unjointed, leg-like appendage on the abdomen of caterpillars and some other insect larvae; functions in locomotion but is not a true insect leg

propagule
the reproductive stage of an organism that gets separated from the parent (such as a fungal spore); sometimes refers to the infective stage of a plant pathogenic organism that enters the host plant

prostrate
lying along the ground or growing close to the soil surface; refers to a plant growth form

prothorax
the front of an insect's middle body region (thorax)

protozoan
a one-celled animal; includes organisms that are pathogenic to insects, mammals, and other animals (pl.: protozoa)

pruinosity
a whitish, powdery covering (adj. pruinose)

pupa
a nonfeeding, resting stage that happens between the larval and adult stages among insects with complete metamorphosis (pl.: pupae; adj.: pupal)

pupal cell
a defined area or structure in soil or inside plant tissues made by an insect larva in which it pupates

puparium
in the order Diptera, a hard covering of the pupa made from the last larval skin (pl.: puparia)

pupation
the changing of an insect larva into a pupa

pustule
in some plant diseases, a blisterlike spot on a leaf or stem where the spore-bearing structure of the pathogenic fungus appears

pycnidium
a flask-shaped sporophore that produces various types of spores; occurs among the rust fungi and various other fungal groups (pl.: pycnidia)

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-Q-

quadrate
a rectangular area of the surface of the ground used as a sampling unit

quarantine
regulation limiting the sale, shipment, or transport of soil, plants, plant parts, animals, or animal products among states, regions, or nations; used to stop foreign pests from coming in or limit the spread of established pests; also refers to the holding or rearing of organisms in a controlled facility from which escape into the environment is impossible

quiescence
temporary pause of growth or activity due to unfavorable environmental conditions (adj.: quiescent)

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-R-

race
a genetically distinct group in a species; a strain of a pathogenic species in which the host range is limited to one species, cultivar, or variety

raceme
a flower head with stalked flowers that spiral around a central axis; typically, the flowers open from the bottom up; also, the cluster of fruits made by flowers in a raceme

radiation
electromagnetic energy that moves through space at the speed of light; includes short-wavelength energy, such as X-rays or gamma rays, medium-wavelength energy, such as visible or infrared light, and long-wavelength energy, such as radio waves

radicant
having roots that come from the part of the stem that is aboveground

radication
rooting part of a plant that forms the root

radicel
a small root

ramet
one individual from a clone

random sample
a sample taken in such a way that all members of a population have the same chance of examination or collection; an unbiased sample

rangeland
land on which the vegetation is mainly grasses, grasslike plants, and forbs and can support grazing mammals

ray
one of the large, outermost florets in the flower heads of some plants, especially in the family Asteraceae (Compositae); usually have large, noticeable petals

receptacle
modified part of a plant stem where flower parts are attached; the base of a flower

recovery
the successful collection of introduced biological control agents after the agents are released in an area; indicates that an agent can survive and reproduce in an area

refuge
an area, usually near an annual crop field, that has favorable conditions for the survival and population growth of biological control agents; provides a source of natural enemies to colonize pest populations in the crop

registration
the process by which a pesticide is approved by regulatory agencies for specific uses

release
the placement of an organism in an area by humans

repellent
a chemical that causes movement away from the source of the chemical; a substance that discourages attack on plants or animals normally used as food by insects and other animals

replication
the process of using many experimental units in order to improve statistical accuracy and/or precision

reproduction
process in which organisms give rise to others of the same kind (adj.: reproductive)

reproductive phase
the time during the fungal life cycle when spores are produced

research
the process of scientific questioning during which events are described, new facts are discovered, and theories are tested through observation and replicated experimentation

reserves
nutrients that are stored in the organs of plants and animals to be used when nutrients are no longer available in the environment

resident population
a population of organisms established in a given area

resin
a chemical or mixture of chemicals found in plants that harden to produce a crystalline substance; often associated with wounds and may have a repellent or toxic effect on insects or fungi

resinous
producing or having resin

resistance
the ability of various microorganisms, fungi, plants, and animals to resist and survive negative environmental factors, such as parasites and pathogens; the ability of pests to survive normally lethal doses of a pesticide

respiration
the exchange of oxygen and carbon dioxide between an organism and its environment; the use of oxygen in the breakdown of food to release energy (adj.: respiratory)

resurgence
the unusually fast recovery of a pest population that had been significantly reduced by a pesticide; results from reduced competition or removal of natural enemies

reticulate
marked with a mesh or network pattern of crossing veins or fibers

rhizocarp
a perennial, nonwoody plant in which the stems above the ground die each winter but the underground structures survive

rhizodermis
outermost layer of plant root tissue

rhizomatous
having rhizomes

rhizome
a horizontal, underground plant stem that is distinguished from roots by the presence of nodes, sometimes having buds or leaves; functions in storage and vegetative reproduction

rhizomorph
rootlike fungal structure made up of interwoven hyphae (adj.: rhizomorphic)

rhizophage
an organism that eats plant roots (adj.: rhizophagous)

rhizoplane

the part of the rhizosphere that is right next to root surfaces (within about 1µm)

rhizosphere
the soil mirohabitat immediately surrounding plant roots

rhizotaxis
how a plant's roots are arranged

rickettsia
a simple, bacterialike microorganism that often causes diseases in mammals (pl.: rickettsiae, adj.: rickettsial)

Riker mount
a thin, glass-topped box or case filled with cotton, used for showing dried insect or plant specimens

riparian
next to rivers, streams, or other bodies of water

rogue
to pull out unwanted plants (for example, weeds or diseased plants) from a field by hand

root
part of the underground portion of higher plants that functions in anchorage, absorption of water and nutrients, and storage

root collar
the area where the main roots join the plant stem or trunk, usually at or near ground level

root crown
root collar

root hairs
fine, hairlike outgrowths from root surfaces that increase surface area for absorption of water and nutrients

rosette
a cluster of leaves usually found at or near ground level on a plant; refers to the plant itself if its only leaves are found in a cluster at ground level

rot
advanced decay of plant tissue caused by fungi or bacteria; a plant disease characterized by this condition

ruderal
a weedy plant living on disturbed sites

runner
a long, slender plant stem that runs along the surface of the ground and carries out vegetative reproduction; has buds that give rise to new plants

rust
a plant disease caused by a rust fungus characterized by red, brown, or black pustules and orange spores on leaves or stems

rust fungus
a fungus that is an obligate plant parasite; usually has a complex life cycle with two or more plant hosts and several types of spores

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-S-

sacculate
formed by or divided into small sacs

sample
a part of a population that is studied in order to determine its characteristics

saprophage
an organism that eats dead or decaying plant or animal tissues (adj.: saprophagous)

saprophyte
a saprophagous organism (adj.: saprophytic)

scab
a dark, crusty wound on a plant leaf or fruit

scale insects
a group of small, soft-bodied insects in the order Homoptera that suck plant juices; noticeable stages can't move and are usually covered by a hard secretion (the scale)

sclerenchyma
plant tissue with thick cell walls; functions in structure or support

sclerophyllous
having thick, tough leaves that help it adapt to dry conditions

sclerotium
a resting stage in many fungi; usually a hard, dark ball of hyphae that may reach 25 cm or more in diameter and is often found in the soil (pl.: sclerotia)

sclerotization
hardening and darkening of the new outer layer (cuticle) of the insect after molting

sclerotized
having a hard, dark outer layer or cuticle

scorch
injury to plant leaves, flowers, fruit, or bark from too much heat, sunlight, salt, wind, or other nonliving factors, usually resulting in localized tissue death and a brown, dry appearance; nontarget plant injury due to improper herbicide application

screening
the examination of many different possible plant hosts to determine whether they are suitable for a biological control agent; evaluation of pesticides based on their ability to kill a target pest

scrub
a plant community dominated by shrubs

secondary growth
growth in the width of plant stems from cell division in cambial tissue

secondary host
a host species attacked by an herbivore, parasite, or pathogen less frequently than the main or primary host

secondary pathogen
a pathogen that can't invade a host by itself but can invade a host weakened by a wound or stress, or attacked by an insect or primary pathogen; may or may not be able to cause disease symptoms on its own

secondary pest
a species that normally occurs at low, nondamaging levels but becomes a pest after natural or human processes disturb the factor(s) that control its population

secondary succession
the second vegetative growth that comes up in an area; previously inhabited by different

vegetation

seedbank
the pool of plant seeds that are capable of living and are found in the soil

selection pressure
the action of a living or nonliving environmental factor that causes death among certain genotypes in a population, thus causing changes in the occurence of genotypes (that is, genetic changes) in the population over time

selective medium
a medium that limits the growth of certain microorganisms

selective pesticide
a pesticide that is more toxic to some pests than others; a pesticide that is generally not harmful to most nontarget organisms

semiherbaceous
having the lower part of the stem woody and the upper part herbaceous or nonwoody

semiochemical
a chemical involved in communication between two or more different organisms (such as pheremones and allelochemics)

senescence
the aging process in plant and animal tissues, characterized by reduced metabolic processes and the gradual breakdown of tissues (adj.: senescent)

sepal
the green, leaflike, outermost part of a flower

septum
a partition separating two cavities or two parts of a structure; used to describe the hyphae of some fungi (pl.: septa; adj.: septate)

sequential sampling
a sampling method used to make decisions or predictions about the population in question; sampling continues until results show that the population falls in one of several predetermined categories (for example, treatment required vs. no treatment)

sex ratio
the number of males divided by the number of females in a group or population; equal numbers of males and females give a sex ratio of 1.0

shoot
the part of the plant that is above ground in a herbaceous plant, including the attached leaves

short-day plant
a plant that flowers only when the length of daylight is less than a critical point

shrub
a small, woody plant that doesn't have a main stem

sibling species
closely-related species that are usually structurally identical but are considered separate species due to other differences

sign
visible mark of an insect or pathogen attack on a host plant, usually when the organism itself can't be seen

significance

in statistical analysis, an observed result represents a real event and not one that happened by chance

site
the environmental conditions of an area, especially those that affect the vegetation that may live there

skeletonizer
an insect that eats the soft portions of a leaf but not the veins

skiophyllous
growing in the shade

smut fungus
a plant-parasitic fungus with spore-bearing structures that look black and sooty; many are serious crop pests

soil profile
a vertical section through soil that shows the different layers

soil reaction
the degree of acidity or alkalinity of a soil, usually expressed as a pH value

soil texture
the proportion of sand, silt, and clay particles in a soil

specialist
an animal that has one or a few prey and can use one or a few host animals or food plants

species
a group of interbreeding populations of organisms that are reproductively isolated from other such groups and are characterized by a unique scientific name; the basic unit of taxonomy (adj.: specific)

spinose
having spines

spinulose
having many small spines

spiracle
one of the openings in the thorax and abdomen of an insect that lets air in and out of the respiratory system (adj.: spiracular)

sporangium
the structure in fungi that produces asexual spores (pl.: sporangia)

spore
the reproductive structure among fungi and bacteria that is made up of one or several cells and surrounded by some sort of wall; may be able to survive long periods of unfavorable conditions and then produce a new individual in favorable conditions

sporophore
a structure in fungi that produces or holds spores; fruiting body

sporulation
the process by which spores are formed and released

spot treatment
the application of a pesticide to small infested patches rather than over a larger general area

stadium

the period of time between successive molts by an insect larva or nymph (pl.: stadia; adj.: stadial)

stage
a distinct period in the development of an organism, usually marked by a unique structure and function (for example, larval stage of an insect)

stamen
the male reproductive structure in flowers made up of a stalk (filament) and an anther at the end where pollen is produced

staminate
having stamens but not carpels; a male flower

stem
the main axis of a plant where buds and shoots develop

stenophagous
having a limited host range; uses more than one host but only a few; more limited host range than an oligophagous organism

steppe
a dry, treeless grassland

stigma
the part of a carpel to which pollen grains attach

stimulant
a substance that causes a process to begin or continue faster

sting
to inject venom

stinger
a modified ovipositor found in some insects that is used to inject venom

stipule
a leaflike structure found where a true leaf joins the stem; sometimes modified into thorns or tendrils (adj.: stipular)

stolon
runner

stomate
a small opening in a plant leaf or stem through which oxygen, carbon dioxide, and water vapor enter or leave the plant (pl.: stomata; adj.:stomatal)

strain
a group of organisms in a species or variety that are identified by one or more minor characteristics

stress
any factor that disrupts the steady state of an organism or system (for example, lack of soil moisture causes water stress in plants)

stroma
a mass of fungal hyphae and host plant tissues that may make sporophores (pl.: stromata)

stunt
to reduce the size of a plant; usually happens in response to unfavorable environmental conditions or disease

style

the stalklike part of the carpel; connects the stigma and ovary

stylets
slender, hollow mouthparts that cut through animal or plant skin to get to blood or sap

sublethal
not causing death immediately, but resulting in death after continued exposure

subspecies
a division of a species; refers to populations of a species that are different structurally and are geographically isolated but can still interbreed

substrate
the material or substance on which a microorganism feeds, grows, and develops

succession
the change in plant and animal communities that happens over time, from the beginning of colonization to the development of a stable, long-lived community (adj.: successional)

succulent
full of water, juice, or sap; a plant with swollen, water-storing leaves and stems adapted to dry conditions (for example, cacti)

sucker
a shoot growing from a rhizome, a root below the ground, or the lower part of a stem

superparasitism
the parasitic infection of a host by two or more individuals of the same species at the same time (adj.: superparasitic)

suppression
the reduction of a pest population in an area to nondamaging levels through the use of one or more control methods

survey
observation of a large area to find pest outbreaks, estimate pest abundance, or determine pest damage

susceptibility
the degree to which an organism is vulnerable to attack or infection by another organism; the vulnerability of an economically important plant or animal to damage by a pest (adj.: susceptible)

swamp
a flooded area dominated by trees and having wet soils

swarm
a large group of individuals of an insect species

symbiosis
a relationship between organisms of different species that is beneficial to both (adj.: symbiotic)

sympatric
species or populations with overlapping distributions

symptom
visible reaction of a host plant to attack by a disease or insect; changes in an organism as a result of disease or other pest attack

syndrome
the whole range of symptoms produced in a host by a given disease

synecology

ecology of plant or animal communities

synergist
a chemical that alone is not toxic to a pest but when added to a pesticide increases the toxicity of the active ingredient of the pesticide

systematics
taxonomy

systemic
involving the whole organism; distributed throughout the body; often refers to pesticides that enter a plant and then spread into most or all plant tissues

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-T-

taproot
the long, straight, central root of a plant that may be used for food storage (for example, a carrot)

target
the pest organism to be controlled with treatment

target area
the region to which pesticide or other treatment is applied

taxis
directed movement of an organism or cell toward (positive) or away from (negative) a stimulus (adj.: tactic)

taxon
any category into which organisms are grouped according to structural characteristics and evolutionary relationships (examples of taxons include a genus, family, or order) (pl.: taxa)

taxonomist
one who studies taxonomy; a specialist who makes official identifications of plant or animal specimens

taxonomy
the study of the classification of organisms; the development of a classification scheme for various groups of organisms based on structural characteristics and evolutionary relationships (adj.: taxonomic)

temperate
a climate with long, warm summers and cold winters

tendril
a modified stem or leaf that winds around another object to support the plant

teneral
pale and soft-bodied; refers to recently molted insects

tephritid
a fly belonging to the family Tephritidae (order Diptera); adults are small insects with patterned wings, and larvae attack plant seeds or fruits or cause plant galls

teratogen
a chemical agent that causes birth defects (adj. teratogenic)

terminal
at the end of a plant stem; the shoot at the end of a stem

thelytoky
insect reproduction in which only female offspring are produced and males are rare

thermophyte
a heat-tolerant plant (adj.: thermophytic)

thigmotropism
directed plant growth in response to touch seen in tendrils (adj.: thigmotrophic)

thorax
the middle body region of an insect where the legs and wings are found, if present

threshold
the level of pest abundance or damage that triggers some type of control strategy; no action is taken at levels below the threshold

thrips
a small, slender insect in the order Thysanoptera that feeds on sap or other insects; adults may be wingless or have long, narrow, fringed wings; have gradual metamorphosis (pl.: thrips)

tiller
a branch that forms from the base of a plant; found in cereals and other grasses

tissue
a large group of similar plant or animal cells organized to perform a specific function (for example, muscle tissue, phloem tissue)

tissue culture
a technique in which individual plant or animal cells grow and divide in a sterile, nutritive liquid medium; can be used to generate plant organs or whole plants from single cells or groups of cells

tolerance
the ability of an organism to survive in unfavorable environmental conditions; a condition in which a host shows signs of disease or insect attack but has only minor damage and is able to recover relatively quickly

topography
the mapping of the various surface features of an area, such as elevation, bodies of water, roads, and other manmade objects; the physical characteristics of an area (adj.: topographical)

toxicant
a poisonous substance

toxicity
the ability of a toxin to kill an organism; the amount of a toxin needed to kill a specific organism

toxicology
the study of toxins and other poisons (adj.: toxicological)

toxin
a substance that is produced by a living organism and that can kill another organism (adj.: toxic)

transect
portion of an area used as a sample unit for studying the area's vegetation

transgenic
an animal or plant with genes from another species; purposely developed through genetic engineering procedures

translocation

the active movement of dissolved materials from one part of a plant to another, usually through the phloem

transmission
the transfer of a disease-causing agent from one host to another

transpiration
the movement of water out of a plant through stomata

tree
a woody perennial plant with one main trunk, a crown of leafage, and a height of at least 4 m

tribe
a subdivision of a family in taxonomy, containing one or more genera

trichoid
hairlike

trichome
small epidermal outgrowths (such as hairs, spines, or hooks) in plants

trophic level
division in a food chain that is defined by how food is obtained (for example, primary producer, secondary consumer)

tropical
a climate characterized by high humidity, rainfall, and temperature and only minor seasonal changes

tropism
a plant growth movement toward (positive) or away from (negative) a stimulus (adj.: tropic)

tropophilous
adapted to seasonal climate changes

tuber
an enlarged underground root or stem with buds; usually contains starch as a food reserve for the winter

tubercles
small, round, raised nodes

tumor
a growth resulting from an abnormal multiplication of cells

typical
showing most or all major characteristics of a species or genus

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-U-

ultraviolet (UV) light
a type of shortwave solar radiation that can only be seen by some organisms such as insects (not humans); can cause mutations

umbel
a flower head whose flowers come from a common center and form a flat-topped cluster (adj.: umbellate)

umbelliferous
having flowers in umbels; belonging to the family Umbelliferae (for example, carrot, parsley)

univoltine
having only one generation per year

uredium
the fungal structure that produces uredospores (pl.: uredia)

uredial stage
the summer stage of rust fungi

uredospore
the spore produced during the summer by some rust fungi

urticarial
causing an allergic reaction; refers to the stinging or poison-filled hairs or spines of some insects and plants; also called urticaceous

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-V-

vagility
the ability to move freely (adj.: vagile)

variance
a statistical term that describes the amount of variation about a mean value; the greater the variance the less uniform the sample and population

variation
any differences between individuals in a population or between parents and offspring due to environmental rather than genetic factors

variegation
patchiness or irregularity of color in plant leaves due to genetic or environmental factors (for example, some viruses can be environmental factors)

variety
an informal division of a species based on distinct structural characteristics; a race of a pathogenic or parasitic species that is limited to part of the normal host range; a grouping in a cultivated plant species distinguished by one or more characteristics wanted by humans and maintained over generations; cultivar (adj.: varietal)

vascular
carrying blood or lymph in animals; the xylem and phloem in plants used for transporting water and nutrients (sap)

vascular plants
plants with xylem and phloem

vector
an organism, particularly an insect or nematode, that carries a pathogen from one host to another and serves as a link between many hosts; a carrier

vegetative phase
the growth or nonreproductive stage of a fungus

vegetative reproduction
production of a new plant by asexual means

vein
conducting vessel in a plant leaf that forms distinctive patterns often used to identify plants

venom
a poison made by some animals (for example, spiders, stinging insects) that is forcibly injected into a victim's body; a defensive or food-gathering function

venomous
containing or producing venom

ventral
referring to the underside (belly side) of an organism

vermicular
wormlike in appearance or movement

vermiform
a legless, wormlike insect larva that usually doesn't have a well-developed head

vernal
appearing during the spring

vernalization
a condition seen in many temperate plants in which continued development and flowering will not occur unless the plant is given a period of cold (winter)

vernalize
to start the growth and flowering of a plant by giving it an artificial cold period

viability
the ability of a seed or spore to germinate and develop under favorable conditions (adj.: viable)

virion
the mature virus

viroid
a small ring of RNA that may cause plant diseases (not a true virus); usually carried by insects

virulence
degree of pathogenicity (degree to which it can cause disease); all the characteristics of an organism that cause it to be pathogenic to another organism

virulent
capable of causing a severe disease; strongly pathogenic

virus
an obligate parasite of bacteria and plant or animal cells that causes various plant and animal diseases; the smallest, simplest organisms known that carry out their metabolism by taking over the metabolic mechanisms of cells they infect (adj.: viral)

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-W-

weed
a pest plant; a plant that grows where it is not wanted and where it interferes with human activity or causes economic damage

weedy
having the characteristics of a weed, including fast growth, ability to establish in new areas, and ability to survive in extreme environmental conditions

weevil
a type of beetle (family Curculionidae) in which the adults have long, curved snouts and the larvae are curled and legless (grubs); larvae of many species dig into plant roots, shoots, or seeds

wild type
an organism's normal physical appearance in natural or laboratory populations (distinguished from mutant types)

wilt
loss of stiffness and drooping of plant parts caused by the lack of water; a plant disease identified by these symptoms, caused by an infection of the plant's vascular system; blight

winter annual
an annual plant that germinates in the fall, develops and reproduces, and dies the following spring or summer

wood
secondary xylem; the hard, dead part of a tree or shrub

woody plant
any perennial plant with hard, secondary xylem in the stem; a tree or shrub

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-X-

xeric
dry; having low or irregular rainfall

xerophilous
adapted to survive drought; can live in xeric environments

xerophyte
a plant species adapted to growing in dry areas (adj.: xerophytic)

xerotherm
an organism adapted to hot, dry conditions (adj.: xerothermic)

xylem
the main water-conducting tissues of plant stems, leaves, and roots

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-Y-

yeast
a simple, one-celled fungus

yellows
a plant disease identified by chlorosis of plant tissue

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-Z-

zoology
the study of animals (adj.: zoological)

zoogeography
the geographic distribution of animal species (adj.: zoogeographic)

zoophage
an organism that eats animals (adj.: zoophagous)

zoophily
a condition in plants in which the flowers are adapted for pollination by animals other than insects (adj.: zoophilous)

zoospore
mobile spores made by certain fungi

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