

Turfgrass Glossary

Abdomen: The third or most posterior of the three major body divisions of an insect.

Absorption: The process by which an herbicide passes from one system into another, e.g., from the soil solution into a plant root cell or from the leaf surface into the leaf cells.

Acid equivalent (ae): The theoretical yield of parent acid from a pesticide active ingredient, which has been formulated as a derivative. For example, Roundup Pro contains 4 pounds per gallon of the isopropylamine salt form of glyphosate but 3 pounds per gallon of the parent acid.

Acid soil: Soil with a pH value less than 7.0.

Activation: The process by which a surface applied herbicide is moved into the soil where it can be absorbed by emerging seedlings. This is normally accomplished by rainfall, irrigation, or tillage. Activation does not imply any chemical change in the active ingredient.

Active ingredient (ai): The chemical in an herbicide formulation primarily responsible for its phytotoxicity and which is identified as the active ingredient on the product label.

Adjuvant: Any substance in an herbicide formulation or added to the spray tank to modify herbicidal activity or application characteristics.

Adsorption: The process by which an herbicide associates with a surface, e.g., a soil colloidal surface.

Aestivate: To spend the summer in a dormant condition; opposed to hibernate.

Alate: Winged.

Alkaline soil: Soil with a pH greater than 7.0.

Allelopathy: The adverse effect on the growth of plants or microorganisms caused by the action of chemicals produced by other living or decaying plants.

Antagonism: An interaction of two or more chemicals such that the effect when combined is less than the predicted effect based on the activity of each chemical applied separately.

Antennae: In larval and adult stages of an insect, paired segmented appendages, on each side of the head, functioning as sense organs.

Anterior: Toward the front (head), as opposed to posterior.

Antibiosis: Plant characteristics that affect insects in a negative manner (such as increased mortality or reduced fecundity); a type of plant resistance to insects.

Apical: At, near, or pertaining to the tip or apex.

Apices: At or near the apex or "top" of a structure.

Arthropods: Invertebrate animals with jointed appendages; members of the phylum Arthropoda.

Band treatment: Applied to a linear restricted strip on or along crop rows rather than continuous over the field area.

Beneficial: A useful insect, often one that is a predator or parasitoid of a harmful insect.

Bioassay: Quantitative or qualitative determination of herbicide by use of sensitive indicator plants or other biological organisms.

Biological control of weeds: Control or suppression of weeds by the action of one or more organisms, through natural means, or by manipulation of the weed, organism, or environment.

Biological control: Using any biological agent (often an insect) to control a pest.

Biotype: A population within a species that has a distinct genetic variation.

Bivoltine: Two generations per year.

Boot or Booting: A growth stage of grasses (including cereal crops) when the upper leaf sheath swells due to the growth of the developing spike or panicle.

Brachypterous: Having short wings not covering the abdomen.

Broadcast treatment: Applied as a continuous sheet over the entire field.

Broods: A group or cohort of offspring produced by a parent or parent population at different times or in different places.

Callow adult: A recently molted, soft-bodied, pale adult.

Carrier: A gas, liquid, or solid substance used to dilute or suspend an herbicide during its application.

Caterpillar: The larva of a moth, butterfly, skipper, or sawfly.

Cephalothorax: The combined head and thorax of spiders and other arachnids.

Cerci: A pair of appendages at the tip of the abdomen.

Chemical name: The systematic name of a chemical compound according to the rules of nomenclature of the International Union of Pure and Applied Chemistry (IUPAC), Chemical Abstracts Service, or other organization.

Chitin: A colorless, nitrogenous polysaccharide secreted by the epidermis and applied to the hardened parts of an insect body.

Chlorophyll: The green, light-sensitive pigment of plants that in sunlight is capable of combining carbon dioxide and water to make carbohydrates.

Chlorosis: Yellowing of normally green tissue due to chlorophyll destruction or failure of chlorophyll formation.

Chlorotic: Having a fading of green color in plant leaves to light green or yellow.

Chorion: The outer covering of an insect egg.

Cocoon: The silken or fibrous case spun by a larva for protection during its pupal period.

Common name: A generic name for a chemical compound. Glyphosate is the common name for Roundup.

Compatibility: The characteristic of a substance, especially a pesticide, of being mixable in a formulation or in the spray tank for application in the same carrier without undesirably altering the characteristics or effects of the individual components.

Competition: The active acquisition of limited resources by an organism, which results in a

reduced supply and consequently reduced growth of other organisms in a common environment.

Concentration: For herbicides, the quantity of active ingredient or parent compound equivalent expressed as weight per unit volume (such as pounds per gallon for liquids). Dry herbicide concentrations are expressed as percent by weight.

Contact herbicide: An herbicide that causes injury to only the plant tissue to which it is applied, or an herbicide that is not appreciably translocated within plants.

Cool-season grass: A cold-tolerant grass with an optimum temperature range of 60-75°F. (15.5-to 24°C).

Costal margin: The front edge of a wing.

Crochets: Hooked spines on the underside of prolegs of caterpillars.

Culm: The stem of a grass plant.

Cultivar: Cultivated variety.

Cultural control: Manipulation of a crop environment to reduce pest increase and damage.

Cuticle: The outer covering of an insect formed by a layer of chitin.

Cyst: A sac or vesicle.

Degree-day: An accumulation of degrees above some threshold temperature for a 24-hour measure of physiological time for cold-blooded organisms, like insects. Degree-days can be expressed in Fahrenheit (FDD) or Celsius (CDD).

Developmental threshold: The minimum temperature required for development.

Diapause: Physiological state of arrested metabolism, growth, and development that may occur at any stage in the life cycle.

Dicot: Abbreviated term for dicotyledon; preferred in scientific literature over broadleaf to describe plants.

Dicotyledon (dicot): A member of the Dicotyledoneae; one of two classes of angiosperms usually characterized by the having two seed leaves (cotyledons), leaves with net venation and root systems with tap roots.

Diluent: Any gas, liquid, or solid material used to reduce the concentration of an active ingredient in a formulation.

Directed application: Precise application to a specific area or plant organ such as to a row or bed or to the leaves or stems of plants.

Dispersible granule: A dry granular formulation that will separate or disperse to form a suspension when added to water.

Dormancy: The state of inhibited seed germination or growth of a plant organ when in an environment normally conducive to growth.

Dormant: A state of reduced physiological activity.

Dorsum: The upper surface, or back.

Eclosion: Emergence of the adult insect from the pupa; act of hatching from the egg.

Economic injury level (EIL): The number of insects (amount of injury) that will cause losses equal to insect management cost.

Economic threshold (ET): The pest density at which management action should be taken to prevent an increasing pest population from reaching the economic injury level.

Ecosystem: A living community and its nonliving environment.

Ecotype: A population within a species that has developed a distinct morphological or physiological characteristic (e.g., herbicide resistance) in response to a specific environment and that persists when individuals are moved to a different environment.

Elytra (sing., elytron): The two thickened, hardened forewings of beetles.

Emergence: The event in seedling establishment when a shoot becomes visible by pushing through the soil surface.

Emulsifiable concentrate (EC): A single-phase liquid formulation that forms an emulsion when added to water.

Encapsulated formulation: Herbicide enclosed in capsule or beads of material to control the rate of release of active ingredient and thereby extend the period of activity.

Endoparasite: Parasitic organism living inside its host.

Entomophagous: Insect-eating.

Epinasty: That state in which more rapid growth on the upper part of a plant organ or part (especially leaf) causes it to bend downward.

Exoskeleton: The outside skeleton of insects.

Femur (pl., femora): The thigh; in insects, usually the largest segment of the leg articulated at the proximal end nearest the body to the trochanter and distally to the tibia.

Flowable: A two-phase formulation containing solid herbicide suspended in liquid and that forms a suspension when added to water.

Formulation: (1) A pesticide preparation supplied by a manufacturer for practical use. (2) The process, carried out by manufacturers, of preparing pesticides for practical use.

Frass: Solid larval excrement.

Generation: A group of offspring of the same species that develop in approximately the same time frame.

Granular: A dry formulation consisting of discrete particles generally $<10 \text{ mm}^3$ and designed to be applied without a liquid carrier.

Gregarious: Occurring in aggregations.

Grub: An insect larva; a term usually with specific reference to larvae of Coleoptera and Hymenoptera.

Head capsule: The combined sclerites of the head, forming a hard, compact case.

Head or heading: A growth stage of grasses (including cereal crops) when the spike or panicle is emerging or has emerged from the sheath.

Hemimetabolous: Simple, incomplete metamorphosis where larval stages (nymphs) are often similar to adults in appearance and feeding behavior.

Herbaceous plant: A vascular plant that does not develop persistent woody tissue above ground.

Herbicide resistance: The trait or quality of a population of plants within a species or plant cells in tissue culture of having a tolerance for a particular herbicide that is substantially greater than the average for

the species and that has developed because of selection for naturally occurring tolerance by exposure to the herbicide through several reproductive cycles.

Herbicide: A chemical substance or cultured biological organism used to kill or suppress the growth of plants.

Hibernate: To pass the winter in a dormant state.

Hindgut: The posterior region of the digestive tract, between the midgut and anus.

Holometabolous: Having a complete transformation, with egg, larval, pupal, and adult stages distinctly separated.

Incorporate: To mix or blend an herbicide into the soil.

Indigenous: Native to an area.

Insectivorous: Feeding on insects.

Instar: The stage between molts or shedding of the exoskeleton.

Integrated pest management (IPM): A system of economically and environmentally sound practices to reduce the deleterious impact of pest activities; frequently, associated with the use of multiple management tactics (e.g., pesticides, cultural control, host plant resistance, and biological control).

Interference: For plants, the total adverse effect that plants exert on each other when growing in a common ecosystem. The term includes competition, allelopathy, biotic interference, and other detrimental modifications in the community or environment.

Label: The directions for using a pesticide approved as a result of the registration process.

Larva: A young insect; an immature form called a caterpillar, slug, maggot, or grub, depending on the kind of insect.

Lateral movement: Movement of an herbicide through soil, generally in a horizontal plane, from the original site of application.

Leaching: (1) The removal of materials in solution from the soil. (2) The downward movement of material(s) into a soil profile with soil water (material may or may not be in true solution and may or may not move from soil).

Life cycle: The period between egg deposition and attainment of sexual maturity as shown by egg laying.

Macropterous: Long- or large-winged.

Maggot: The larval stage of a true fly (Diptera).

Mandibles: An insect's jaws.

Maxilla: The hind or second set of jaws behind the mandibles.

Metamorphosis: The process of changes through which an insect passes during its growth from egg to adult.

Microsporidium: Any of a group of protozoans some of which are pathogens to insects and other animals.

Migrant: An insect that migrates. Commonly, migrations are usually one way (usually northward) and are dependent on wind currents and weather patterns.

Molt: To cast off or shed the outer skin and so forth at certain intervals before replacement of the cast-off parts by new growth.

Monocot: Abbreviated term for monocotyledon; preferred in scientific literature over grass to describe plants.

Monocotyledon (monocot): A member of Monocotyledoneae; one of two classes of angiosperms, usually characterized by the following: one seed leaf (cotyledon), leaves with parallel venation, root systems arising adventitiously and usually diffuse (fibrous).

Moth: An adult insect (Lepidoptera) with two pairs of scale-covered wings and variously shaped (but never clubbed) antennae.

Multivoltine: Having more than one generation in a year or season.

Nematode: Any of a class of phylum of elongated cylindrical worms that are parasitic in animals or plants or are free-living in soil or water.

Nocturnal: Active at night.

Nonselective herbicide: An herbicide that is generally toxic to all plants treated. Some selective herbicides may become nonselective if used at very high rates.

Nontarget species: A species not intentionally affected by a pesticide.

Nymph: An immature stage in insects with incomplete metamorphosis.

Overtop application: A broadcast or banded application applied over the canopy of crops such as by airplane or a raised spray boom of ground equipment.

Overwinter: To survive the winter.

Oviposition: Egg laying.

Palidia: A group of spines, usually in a line, found near the anus of scarab grubs.

Palp: A segmented process on an arthropod's mouthpart.

Parasite: Any animal that lives in, on, or at the expense of another.

Parasitoid: An arthropod that parasitizes and kills an arthropod host; parasitic in the immature stages but free-living as an adult.

Pathogen: A disease-causing organism.

Pelleted formulation: A dry formulation consisting of discrete particles usually larger than 10 cubic millimeters and designed to be applied without a liquid carrier.

Peripheral: Relating to the outer margin.

Persistent herbicide: A herbicide that, when applied at the recommended rate, will harm susceptible crops planted in normal rotation after harvesting the treated crop, or that interferes with regrowth of native vegetation in non-crop sites for an extended period of time. See residual herbicides.

Pesticide interaction: The action or influence of one pesticide upon another and the combined effect of the pesticide(s) on the pest(s) or crop system.

Phenology, phenological: Temporal and seasonal pattern of life history events in plants and animals.

Pheromone: A substance secreted by an animal that influences the behavior of other individuals of the same species.

Phloem: The living tissue in plants that functions primarily to transport metabolic compounds from the site of synthesis or storage to the site of use.

Phytophagous: Feeding upon plants.

Phytotoxic: Injurious or lethal to plants.

Plant growth regulator: A substance used for controlling or modifying plant growth processes without severe phytotoxicity.

Polyphagous: Eating many kinds of foods.

Postemergence (POST): (1) Applied after emergence of the specified weed or crop. (2) Ability to control established weeds.

Posterior: Toward the rear, as opposed to anterior.

Predator: An animal that preys on another.

Preemergence (PRE): (1) Applied to the soil before emergence of the specified weed or crop. (2) Ability to control weeds before or soon after they emerge.

Preplant application: Applied before planting or transplanting a crop, either as a foliar application to control existing vegetation or as a soil application.

Preplant incorporated (PPI): Applied and blended into the soil before seeding or transplanting, usually by tillage.

Prepupa: A transitional stage between the end of the larval period and the pupal period.

Profile: An outline as seen from a side view.

Prolegs: Fleshy, unsegmented abdominal walking appendages of some insect larvae.

Pronotum: The upper or dorsal surface of the prothorax.

Prothorax: The first, or anterior, of the three segments of the thorax.

Pubescence: Fine hair or setae.

Pupa: The resting, inactive stage between the larva and the adult in all insects that undergo complete metamorphosis.

Raster: A complex of specifically arranged bare places, hairs, and spines on the ventral surface of the last abdominal segment, in front of the anus; found on scarabaeid larvae.

Rate: For herbicides, the quantity of active ingredient expressed as weight per unit area of treated surface or per unit volume of the treated environment for aquatic applications.

Registration: The process designated by the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) and carried out

by the Environmental Protection Agency (EPA) by which a pesticide is legally approved for use in the U.S.

Residual herbicide: An herbicide that persists in the soil and injures or kills germinating weed seedlings for a relatively short period of time after application. See persistent herbicide.

Residue: That quantity of an herbicide or metabolite remaining in or on the soil, plant parts, animal tissues, whole organisms and surfaces.

Resistance: Ability to withstand exposure to a potentially harmful agent without being injured (There is no general agreement as to the distinction between herbicide tolerance and herbicide resistance in plants.)

Rhizome: A jointed underground stem that can produce roots and shoots at each node.

Rostrum: A snoutlike projection on an insect's head.

Safener: A substance that reduces toxicity of herbicides to crop plants by a physiological mechanism.

Sclerotized: Of an insect, hardened in definite areas by formation of substances other than chitin.

Selective herbicide: A chemical that is more toxic to some plant species than to others.

Snout: The prolongation of the head of weevils at the end of which the mouthparts are located.

Sod: Plugs, blocks, squares, or strips of turfgrass plus soil that are used for planting.

Soluble concentrate (SC): A liquid formulation that forms a solution when added to water.

Soluble granule (SG): A dry granular formulation that forms a solution when added to water.

Soluble powder: A dry formulation that forms a solution when added to water.

Solution: A homogeneous or single-phase mixture of two or more substances.

Species: The smallest taxonomic group; a population that has a defined range and can exchange genes.

Spiracle: A breathing pore through which air enters the trachea; in insects, located laterally on body segments.

Spittle: A frothy fluid secreted by insects; saliva.

Spot treatment: An herbicide applied to restricted area(s) of a whole unit; i.e., treatment of spots or patches of weeds within a larger field.

Spray drift: Movement of airborne spray from the intended area of application.

Stage: An insect's developmental status (e.g., the egg stage).

Stipe: A small stalklike structure associated with the maxilla.

Stolon: A jointed, aboveground, creeping stem that can produce roots and shoots at each node and may originate extravagantly from the main stem.

Stylet: One of the piercing structures in piercing-sucking mouthparts.

Subterranean: Existing under the surface of the earth.

Surfactant: A material that improves the emulsifying, dispersing, spreading, wetting or other properties of a liquid by modifying its surface characteristics.

Susceptibility: The sensitivity to or degree to which a plant is injured by an herbicide treatment.

Suspension: A mixture containing finely divided particles dispersed in a solid, liquid, or gas.

Systemic: Synonymous with translocated herbicide, but more correctly used to describe the property of insecticides or fungicides that penetrate and disperse throughout a plant.

Tank-mix combination: Mixing of two or more pesticides or agricultural chemicals in the spray tank at the time of application.

Tarsal claw: The claw, usually paired, found on the end of the last tarsal segment.

Tarsus (pl., tarsi): The foot; the distal part of the insect's leg that consists of one to five segments.

Teneral (callow) period: The time immediately after adult emergence; the adult is soft-bodied and pale.

Thatch: The layer of plant litter from long-term accumulation of dead plant roots, crowns, rhizomes, and stolons between the zone of green vegetation and the soil surface.

Thorax: The second or intermediate region of the insect's body, bearing two legs and wings and composed of three rings, the pro-, meso-, and metathorax.

Threshold: A beginning point in physiology; the point at which a stimulus is just strong enough to produce a response.

Tibia: In insects, the fourth division of the leg articulated at the proximal end nearest the body to the femur and at the distal end to the tarsus.

Tiller or Tillering: A growth stage of grasses when additional shoots are developing from the crown.

Tolerance: (1) Ability to continue normal growth or function when exposed to a potentially harmful agent (there is no general agreement as to the distinction between herbicide tolerance and herbicide resistance in plants). (2) The concentration of a pesticide residue that is allowed in or on raw agricultural commodities as established by the Environmental Protection Agency.

Topdressing: A light covering of soil spread over an established turf grass.

Toxicity: The quality or potential of a substance to cause injury, illness, or other undesirable effects.

Toxicology: The study of the principles or mechanisms of toxicity.

Toxin: A poisonous substance.

Trade name: A trademark or other designation by which a commercial product is identified.

Translocated herbicide: An herbicide that is moved within the plant. Translocated herbicides may be either phloem mobile or xylem mobile. However, the term frequently is used in a more restrictive sense to refer to herbicides that are applied to the foliage and move downward through the phloem to underground parts.

Turgidity: The extent of being distended, swollen or bloated.

Univoltine: Having one generation in a year or season.

Vapor drift: The movement of pesticides as vapor from the area of application after the spray droplets have landed on the target.

Vector: An organism that is the carrier of a disease-producing organism.

Ventral: The underside.

Warm-season grass: A cold-intolerant grass with an optimum temperature range of 80-95°F (27-35°C).

Weed control: The process of reducing weed growth and/or infestation to an acceptable level.

Weed eradication: The elimination of all vegetative plant parts and viable seeds of a weed from a site.

Weed: Any plant that is objectionable or interferes with the activities or welfare of man.

Wettable powder (WP): A finely divided dry formulation that can be readily suspended in water.

Wetting agent: (1) a substance that serves to reduce the interfacial tensions and causes spray solutions or suspensions to make better contact with treated surfaces (see surfactant). (2) A substance in a wettable powder formulation that causes it to wet readily when added to water.

White grub: Whitish, C-shaped larva of insects belonging to the family Scarabaeidae.

Wing pads: The undeveloped wings of nymphs of hemimetabolous insects (e.g., Hemiptera), which show behind the thorax as two lateral, flat structures.

Witches'-broom: An abnormal brushlike growth of weak, tightly clustered plant shoots.

Worker: Among social bees, ants, and wasps, a female either incapable of reproduction or capable of laying only unfertilized eggs from which males emerge.

Xeric: Adapted to an extremely dry habitat.

Xylem: The nonliving tissue in plants that functions primarily to conduct water and mineral nutrients from roots to the shoot.