

## Glossary of Forage Terms

The following glossary defines some of the most common terms forage producers will encounter.

More forage-related information is available in the *Forage Field Guide*, second edition (Purdue Extension publication ID-317) — available from the Purdue Extension Education Store, [www.the-education-store.com](http://www.the-education-store.com).

### acid-detergent fiber (ADF)

The insoluble residue that remains after extraction with acid detergent (using the van Soest method) — the cell wall constituents minus hemicellulose. This term is inversely related to energy content.

### acid-detergent fiber digestibility

The digestibility of acid-detergent fiber (ADF). It is calculated by comparing the difference in a forage's ADF before and after digestion.

### alternate stocking

The practice of repeated grazing and resting of forage using two paddocks in succession.

### animal unit (AU)

A measurement equal to 1,000 pounds of live animal weight.

### animal unit day

The amount of dry forage one animal unit consumes in a 24-hour period. The term may be extrapolated to other time periods, such as an animal unit week, month, or year.

### available nutrients

The amount of a soil nutrient in chemical forms (or compounds that can be converted to such forms) that are accessible to plant roots during the growing season.

### banding

Also called band application. A method of applying fertilizer (or other agricultural chemicals) where the chemical is applied above, below, or alongside the planted seed row. This can refer to the placement of fertilizers close to the seed at planting or to the subsurface applications of solids or fluids in strips before or after planting.

### bloat

A livestock disorder resulting from an accumulation of gas in the rumen or intestines caused by the fermentation of green forages.

### boot stage

A grass plant growth stage that occurs just before the seed head emerges from the leaf sheath.

### broadcast

The practice of applying seed or fertilizer on the surface of the soil. Tillage may be used to incorporate the material. Seeding rates typically double with this type of application.

### carrying capacity

The maximum stocking rate possible that will achieve a target level of animal performance and that will maintain or improve the vegetation or other resources. This may change from year to year.

### cellulose

A carbohydrate formed from glucose and a major constituent of plant cell walls. It is a colorless solid that is insoluble in water.

### compaction

The process in which soil grains are compressed, decreasing the space between them and making the soil more dense or compact. Can be caused by heavy equipment or heavy use of an area by livestock. Plants can experience growth and development problems in compacted soils

### companion crop

Also called nurse crop. A crop that is sown with another, for example, small grains are companion crops often sown with forage crops.

### concentrate

Any feed that is low in fiber, high in total digestible nutrients (TDN), and supplies the primary nutrients of protein, carbohydrate, and fat — for example, grains, cottonseed meal, and wheat bran are concentrates.

### continuous stocking

A method of grazing livestock on a specific unit of land where animals have unrestricted and uninterrupted access throughout the time period when grazing is allowed.

### cored hay samples

Samples that have been taken from stored hay by using a hollow cylinder to remove a core.

### cover crop

A close-growing crop that provides soil protection, seeding protection, and soil improvement either between periods of normal crop production, or between trees in orchards and vines in vineyards. When plowed under and incorporated into the soil, cover crops may be referred to as green manure crops.

### creep grazing

The practice of allowing juvenile animals to graze areas that their dams cannot access at the same time.

### crude fiber (CF)

(1) The coarse, fibrous portions of plants that are partially digestible and relatively low in nutritional value — for example, cellulose. (2) In chemical analysis, it is the residue obtained after boiling plant material with dilute acid, and then with dilute alkali.

### defoliation

(1) The practice of applying a chemical or using a cultural practice to make a plant's leaves fall prematurely. (2) The practice of removing the leaves (tops) from a plant by cutting or grazing.

### desiccant

A drying agent.

### digestible dry matter (DDM)

A unit that measures the amount of feed livestock consume minus the feces they produce. It is expressed as a percentage of the dry feed matter consumed.

### digestible energy (DE)

A unit that measures an animal's feed intake gross energy minus fecal energy. It is expressed as calories.

### digestible protein (DP)

A unit that measures an animal's feed protein minus feces portion (nitrogen x 6.25). It is expressed as a percentage of amount in feed.

### dormancy

A condition of a viable seed that prevents it from germinating even in the presence of otherwise favorable germination conditions. Can be physical or physiological.

**dormant seeding**

The practice of planting seed during the late fall or early winter after temperatures become too low for seed germination to occur until the following spring.

**dough stage**

The stage of seed development at which the endosperm is pliable like dough. Stages are classified as soft-, medium-, or hard-dough stage. The classification is typically given when 50 percent of the seed on an inflorescence are in that stage of development.

**dry matter**

Amount of forage (usually expressed as weight) once its moisture content has been subtracted.

**endophyte**

An organism that lives in another organism, usually a parasite — for example, endophytic fungi in tall fescue.

**erosion**

The detachment and movement of soil or rock by water, wind, ice, or gravity.

**feeding value**

Some consider this term synonymous with nutritive value. (1) The characteristics that make a particular feed a valuable source of nutrients to animals. (2) The combination of chemical, biochemical, physical, and organoleptic characteristics of forage that determines its potential to produce animal meat, milk, wool, or work.

**fermentation**

An anaerobic chemical transformation in plant materials induced by microorganism activity (such as yeast enzymes), that results in the production of carbon dioxide and alcohol from the sugar.

**fescue endophyte**

Typically, the fungus *Neotyphodium coenophialum* living symbiotically in tall fescue.

**fescue foot**

A condition that results in red and swollen skin at the junction of the hoof of animals grazing in tall fescues. Advanced stages may result in gangrenous sloughing off of hoofs, tail tips, and ear tips, along with a loss of appetite and emaciation. This condition is most severe in cold, rainy, or overcast weather.

**fescue toxicosis**

The collective animal syndromes associated with exposure to tall fescue endophyte. These include fescue foot, fat necrosis, summer syndrome, and other related disorders.

**first-last grazing**

A method of using two or more groups of animals (usually with different nutritional requirements) to sequentially graze on the same land areas.

**fodder**

Coarse grasses, such as corn and sorghum, harvested with the seed and leaves green or alive, and then cured and fed in their entirety as forage.

**foliage**

The green or live leaves of growing plants. It often refers to plant leaves collectively when referring to the aboveground development of forage plants.

**foliar burn**

An injury to shoot tissue that is caused by dehydration due to contact with high concentrations of chemicals (for example, certain fertilizers and pesticides).

**forage**

(1) The edible parts of plants (other than separated grain) that can provide feed for animals or can be harvesting for feeding animals. (2) The material found, harvested, and consumed by livestock themselves that fulfills their nutritional needs.

**forage quality**

(1) The characteristics that make forage a valuable source of nutrients to animals. (2) The combination of the chemical and biological characteristics of forage that determines its potential to produce meat, milk, wool, or work. Some consider this term synonymous with feeding value and nutritive value.

**forb**

Any herbaceous broadleaf plant that is not a grass and is not grasslike.

**frost heaving**

The process in which soils are lifted or move laterally because of freezing processes in association with the formation of ice lenses or ice needles.

**grass**

A member of the plant family *Poaceae*.

**grass tetany**

Also called hypomagnesemia. A livestock disorder that can occur in cattle on lush pastures that have soils that are generally low in phosphorus but high in potassium and nitrogen. This combination inhibits magnesium uptake.

**grassland**

(1) Any land in which the dominant vegetation is grasses. (2) More generally, any plant community in which the dominant vegetation is grasses and/or legumes.

**graze**

A verb: to consume forage (by animals). The animals are always the subject, not the object. Correct example: Cattle graze (cattle is the subject). Incorrect example: People do not graze cattle (people is the subject, cattle is the object).

**grazing cycle**

The time between the beginning of one grazing period and the beginning of the next grazing period in the same paddock. Each grazing cycle includes one grazing period and one rest period.

**grazing season**

The period when grazing can normally be practiced each year or portion of the year. In Indiana, this is typically April to November.

**grazing system/method**

A defined procedure or technique of grazing management designed to achieve a specific objective or set of objectives.

**green-manure crop**

Any crop grown solely to improve the soil by turning the crop under while it is green or soon after it matures.

**hardening**

The process of increasing an organism's stress tolerance by gradually or moderately exposing it to the same or different stresses (for example, preconditioning for drought or frost hardiness, or tolerance).

**hardiness**

The capability of an organism to withstand environmental stress.

**haylage**

A product that is the result of ensiling forage with about 45 percent moisture in the absence of oxygen.

**indigenous**

A plant native to the location where it is growing.

**inoculant**

A seed or soil additive (especially for legumes) that contains nitrogen-fixing bacteria that facilitate nitrogen fixation in the subsequent crop. See: rhizobia.

**intensive grazing management**

A grazing management practice that attempts to increase production, utilization per unit area, or production per animal through a relative increase in stocking rates, forage utilization, labor, resources, or capital. Not synonymous with rotational grazing.

**K<sub>2</sub>O**

Potassium oxide, which is often used to provide potassium to soils. On fertilizer labels the percentage of available potassium is reported as K<sub>2</sub>O.

**leaching**

The removal of soluble materials from one zone in the soil to another via water movement in the profile.

**legume**

A widely distributed family of plants (*Fabaceae*), including peas, beans, alfalfa, and clovers, capable of fixing nitrogen and generally highly nutritious.

**lesion**

A wound or injury, most often a circumscribed change of tissue caused by disease.

**lime, agricultural**

A soil amendment that contains calcium carbonate, magnesium carbonate, and other materials. It is used to neutralize soil acidity and furnish calcium and magnesium for plant growth.

**lodging**

A condition in which a plant's root-stalk falls without breaking the stalk, most often because of a weak root system, root damage, or soil condition.

**macronutrient**

A nutrient that plants need in relatively high amounts. Macronutrients refer to nitrogen (N), phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg), and sulfur (S).

**micronutrient**

A nutrient that plants need in relatively small amounts. Usually refers to boron (B), chlorine (Cl), copper (Cu), iron (Fe), manganese (Mn), nickel (Ni), cobalt (Co), and zinc (Zn).

**milk stage**

In grains, the development stage that follows pollination in which the endosperm appears as a whitish, milklike liquid.

**mineral soil**

A soil that consists predominantly of mineral matter, which also determines the soil's physical and chemical properties.

**mycotoxin**

A toxin or toxic substance produced by a fungus.

**neutral-detergent fiber (NDF)**

A residue that is neutral-detergent insoluble, primarily cell-wall constituents. Inversely related to intake.

**nodule**

A specialized tissue enlargement or swelling on a plant's root, stem, or leaf caused by nitrogen-fixing microorganisms.

**nutritive value**

The relative capacity of a given feed to furnish nutrition for animals. It is often classified as low, high, moderate, etc. See: forage quality.

**nutritive value index (NVI)**

The daily digestible amount of forage per unit of metabolic body size relative to a standard forage.

**organic fertilizer**

A byproduct from processing animal or vegetable substances that contains sufficient plant nutrients to be of value as fertilizers.

**organic soil**

A soil in which the sum of the thicknesses of layers containing organic soil materials is generally greater than the sum of the thicknesses of mineral layers.

**oven-dry soil**

Soil that has been dried at 105°C (221°F) until it reaches constant mass.

**overgrazing**

The situation that arises when a number of animals graze a given area that results in less than satisfactory animal performance, less than satisfactory pasture forage production, or both.

**overstocking**

The practice of placing a number of animals on a given area that will result in overuse if continued to the end of the planned grazing period. This term should not be confused with overgrazing; an area may be overstocked for a short period and the animals removed before the area is overused. Continued overstocking, however, will lead to overgrazing.

**paddock**

A relatively small subdivision of a pasture generally fenced (permanently or temporarily) and used to control livestock grazing.

**palatability**

The degree to which feed is agreeable to an animal's taste; is savory and acceptable.

**parent material**

The unconsolidated, and more or less chemically weathered, mineral or organic matter from which the upper layers of a soil profile are developed by naturally occurring environmental processes.

**pasture**

A grazing management unit, enclosed and separated from other areas by fences or other barriers, that's devoted to producing forage for harvest, primarily by grazing.

**persistence**

(1) The survival by a plant or population of plants. (2) The ability to withstand an unspecified variety of environmental rigors.

**pH, soil**

A scale (0-14) that measures the soil's acidity (<7) or alkalinity (>7). Neutral soils have a pH of 7.

**phosphate**

In fertilizer trade terminology, phosphate is used to express the sum of the water-soluble and the citrate-soluble phosphoric acid (P<sub>2</sub>O<sub>5</sub>). Also referred to as available phosphoric acid.

**protein, crude (CP)**

An estimate of a feed's protein content. It is calculated by multiplying the feed's total nitrogen content by a constant: CP = N x 6.25.

**prussic acid poisoning**

A forage-induced animal disorder that interferes with the oxygen-transferring ability of red blood cells, causing the animal to suffocate. It is most commonly caused by johnsongrass, sorghum, sudangrass, sorghum-sudangrass, and wild cherry following a stress period. Symptoms include excessive salivation, rapid breathing, and muscle spasms and can occur within 10 to 15 minutes of consumption.

**pubescence**

A general term for hairs or trichomes.

**pure live seed (PLS)**

A term used to describe the contents of seed. Seed purity and germination are expressed as percentages. PLS can be calculated by the formula:  $PLS = \% \text{ purity} \times \% \text{ germination}$ .

**ration**

The total amount of feed (diet) allotted to one animal for a 24-hour period.

**relative feed value (RFV)**

A unit of measure based on predictions of intake and digestibility from acid-detergent fiber (ADF) and neutral-detergent fiber (NDF) concentrations.

**reserves**

Accumulated materials in plants, especially assimilates. Tubers, storage roots, and bulbs are examples of specialized organs where reserves accumulate.

**rest**

The practice of leaving an area of grazing land ungrazed or unharvested for a specific time, such as a year, a growing season, or a specified period required within a particular management practice.

**rhizobia**

A rod-shaped nitrogen-fixing bacterium that forms nodules on the roots of legumes. See: inoculant.

**rotational stocking**

A grazing method that involves regularly recurring periods of grazing followed by regularly recurring rest periods among two or more paddocks in a grazing management unit.

**roughage**

Animal feeds that are relatively high in crude fiber (CF) and low in total digestible nutrients (TDN) and protein.

**ruminant**

A suborder of even-toed, cud-chewing, hoofed animals that have a stomach with four complete cavities (for example, cattle, sheep, deer, bison, elk).

**scarification**

The process of altering a seed coat to make it more permeable. This may be accomplished by mechanical abrasion, treatment with acid, hot water, or other materials.

**senescence**

The development stage of plants when deterioration occurs, leading to the end of the functional life of an organism or organ. Sometimes defined from specific criteria, such as a decline in chlorophyll or dry weight.

**sequence grazing**

The practice of grazing two or more land units in succession that differ in forage species composition. In practice, sequence grazing takes advantage of differences among forage species and species combinations grown in separate areas to extend the grazing season, enhance forage quality or quantity, or achieve some other management objective.

**set stocking**

The practice of allowing a fixed number of animals to graze on a fixed number of acres for a fixed amount of time, usually the grazing season.

**silage**

Forage preserved in a succulent condition by partial anaerobic, acid fermentation.

**silage additive**

Material added to forage at the time of ensiling to enhance the fermentation process.

**soil test**

A chemical, physical, or biological procedure that estimates the suitability of a soil to support plant growth.

**sprigging**

The process of vegetative propagation by planting stolons or rhizomes (sprigs) in furrows or holes in the soil.

**standard livestock unit (SLU)**

In grazing studies, a nonlactating bovine weighing 1,000 pounds (500 kilograms) — the same as an animal unit. Using the 0.75 power of body weight for conversion within animal species and the 0.90 power between sheep and cattle, the standard livestock unit can be derived for animals of different live weights. The standard livestock unit for pastures grazed by goats can be calculated using the conversion factors for sheep.

**stocker**

Young grazing cattle, post weaning.

**stocking rate**

The relationship between the number of animals and the grazing management unit utilized over a specified time.

**stockpiling forage**

The practice of saving a portion of the forage produced in one time period to be used at a later predetermined time.

**strip grazing**

The practice of confining animals to an area to be grazed for a relatively short period and where the paddock size is varied to allow access to a specified area.

**superphosphate**

A product obtained when phosphate rock is treated with sulfuric acid ( $H_2SO_4$ ), phosphoric acid ( $H_3PO_4$ ), or a mixture of the two.

**supplement**

A nutritional additive (salt, protein, phosphorus, etc.) intended to improve the nutrition balance and remedy deficiencies in livestock diets.

**surfactants**

A surface-active agent often used with herbicides to assist in achieving fuller coverage on the plant's surface.

**tolerance**

(1) The ability of an organism to perform well or survive despite the existence of a stress condition such as a pathogen, predator, or other factor (for example, frost tolerance, disease tolerance). It is a form of resistance. (2) The ability of an organism to perform well across a range of external conditions (for example, the tolerance theory of plant distribution).

**total digestible nutrients (TDN)**

A unit that measures the sum total of the digestibility of the organic components of plant material and/or seed (for example, crude protein + nitrogen-free extract + crude fiber + fat).

**toxicity**

(1) The quality of being poisonous or toxic. (2) Injury, impairment, or death that results from a poison or toxin, a toxic reaction. Synonymous with toxicosis.

**variable stocking**

The practice of allowing a variable number of animals on a fixed area of land during the time when grazing is allowed.

**vegetative stage**

In plants, the nonreproductive parts (including the leaves and stems).

**vigor**

An indicator of active growth and the relative absence of disease or other stresses.

**weather deterioration**

The loss of quality to a product or process due to weather.

**windrow**

A row of cut or uprooted plants that have been raked up or pulled together to dry and/or to facilitate harvest.

**winterkill**

Any plant injury that occurs during the winter.


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