

PLANT LIFE FORMS

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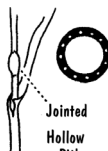



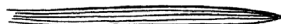





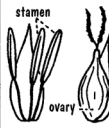








	IMPORTANT RANGE PLANT GROUPS				
	GRASSES	GRASSLIKE		FORBS	SHRUBS (Browse)
		Sedges	Rushes		
STEMS	 Jointed Hollow or Pithy	 Solid Not Jointed		 Solid	 growth rings Woody Solid
LEAVES	 Parallel Veins			 "Veins" are usually netlike	
	 Leaves on 2 sides of stem	 Leaves on 3 sides of stem	 Leaves on 2 sides of stem; rounded		
FLOWERS	 (floret)	 stamen ovary male female (may be combined)		 Often showy	
EXAMPLE	 Western Wheatgrass	 Threadleaf Sedge	 Wire Rush	 Western Yarrow	 Big Sagebrush (twig)

Figure 1. Characteristics of major rangeland plant groups (from Holechek et al. 2011; Gay 1965).

Most of us can identify plants by the names of the individual species, either by scientific name or common name. However, in ecology, such classification may be less important than the life form (or growth form) of the plant. Using such classifications may assist in determining the appropriate plant species best suited for certain environmental conditions, landscape position, and function for rangeland restoration projects or even in home landscaping projects.

Plant species (at least the higher forms most easily recognized) are classified taxonomically mainly by the similarity of their flowering parts. Species are grouped into genera, genera into orders, and orders into families. For example, our local velvet mesquite (*Prosopis velutina*) is in the same genus (*Prosopis*) as is a number of different species

of mesquite that range throughout the American Southwest and further south into Argentina. They have similar flowers and leaves, but occupy different habitats and ecological zones. The genus *Prosopis* is included in the legume family, Fabaceae, which also contains alfalfa, peas, beans, catclaw, whitethorn, and lupine; plants which have little in common ecologically.

For this reason, ecologists often group plant species by life form rather than by taxonomic groups. Life form is a term that relates to the general growth habit and appearance of the plant, or to its physiological basis for adapting to environmental conditions. There is no single system of classifying plants by life form as there is for taxonomic classification. Many ways of classifying life form have

been used depending on the purpose for which the plants are studied and the kind of ecosystem involved. The following defines a few categories of life forms useful for understanding ecology of arid and semiarid rangelands.

GRASSES, FORBS, WOODY PLANTS

Grasses and forbs are *herbaceous* plants, which means that they have no woody growth. Aboveground parts of these plants die back to the ground each year and regrow in the following year. Grasses belong in the Gramineae family (also called the Poaceae family by some authors), which means they are distinguished by their hollow, jointed stems; fine, narrow leaves with parallel veins; and fibrous root systems (Holechek et al. 2011), and particular flower parts. Sedges (*Carex* sp.) and rushes (*Juncus* sp.) are often grouped with grasses and referred to as *grasslike* plants (they are all in the same family). Sedges and rushes have leaves and fibrous roots like true grasses but they differ in appearance as they have non-jointed, solid stems (Holechek et al. 2011). Forbs include all the non-grasslike broad leafed herbaceous plants with taproots. Shrubs and trees are called *woody* plants, meaning their stems are composed of a living outer portion and a dead, woody inner portion. They do not die back to the ground each year, but continue to add new growth from the existing above ground stems and branches. Trees differ from shrubs as they have a defined trunk that branches well above the ground (Holechek et al. 2011). As with most classifications of natural things, there are some exceptions. For example, bamboo is a grass that is woody. Some shrubs, like burroweed and snakeweed, may partially die back each year. These plants are sometimes called *half-shrubs* or *suffrutescent* plants. Please see Figure 1 for a visual reference to the major rangeland plant groups.

ANNUALS, BIENNIALS, AND PERENNIALS

Plants can also be grouped according to their longevity or life span. Annual plants only live one growing season. They must come up from seed each year. Biennials are plants that require two years to complete their lifecycle. Biennials may germinate in one year, but do not produce seed until the second growing season, after which they die. Normally these plants form a basal cluster of leaves the first year (called a rosette) and send up a seed stalk (or bolt) the second year. Common examples of biennial plants include various thistles (*Cirsium* sp.) and common mullein (*Verbascum thaspis*). Perennials are plants that live for more than two years, and may even persist for hundreds of years. These plants remain alive during the entire year and thus must be able to survive the extremes of dry, wet, cold, and heat that occur during their lifetime. Frequently perennial plants will die back during the winter months and sprout from their rootstock in the spring to begin their reproductive cycle each year.

COOL SEASON/WARM SEASON

This classification refers to the temperature responses of plants and relates to the photosynthetic pathway that each type of plant possesses. Some plants grow best under cool conditions, and some favor warm. As one might expect, plants native to far northern regions are mainly cool-season, and those found in the tropical areas are warm season. In between, as in Arizona, we may find both types occurring and responding to rainfall received in different seasons. When winter rains come, there is abundant growth of such plants as filaree (*Erodium* sp.), red brome (*Bromus rubens*), foxtail (*Hordeum* sp.), lupine (*Lupinus* sp.), and other spring flowers, all cool season plants. Most of the perennial grasses in southern Arizona are warm season plants. They may grow some (green-up) in the spring, but the main growth period for most southern Arizona grasses is in the late spring and summer.

EVERGREEN/DECIDUOUS

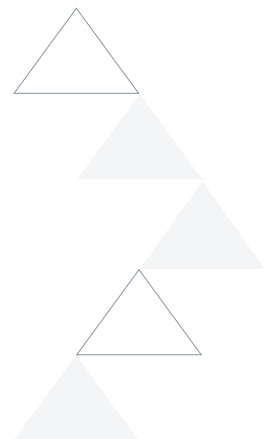
This classification applies only to woody plants. Evergreen shrubs or trees keep their leaves through at least one year, sometimes for several years. An evergreen plant must be able to take up enough moisture to keep the leaves alive during the whole year. Examples include pine trees (*Pinus* sp.), live oaks (*Quercus* sp.), juniper (*Juniperus* sp.), creosote bush (*Larrea tridentata*), and burroweed (*Isocoma tenuisecta*). Deciduous shrubs and trees shed their leaves during part of the year, either due to cold weather, dry conditions or both. Examples of deciduous trees or shrubs include mesquite, cottonwood, willows, and whitethorn.

SUCCULENTS

Some plants have “fleshy” parts that contain a lot of moisture. These parts may be stems or leaves. Cactus are classified as “stem succulents” while yucca and desert spoon are classified as “leaf succulents.” The ability to store moisture in the leaves or stems is obviously an advantage in dry environments.

TREES/SHRUBS

We all use these terms, but they are often not well-defined. Generally, we think of trees as taller woody plants and shrubs as shorter. But how tall, and how short? There is not much problem when we compare giant sequoia (*Sequoiadendron giganteum*) to burroweed (*Isocoma tenuisecta*), but sometimes the differences are not so obvious. In general, trees achieve a height of 20 feet or more and usually have a single trunk, such as cottonwoods. Shrubs however, are generally shorter and often have multiple stems originating from the base, like catclaw (*Senegalia greggii*). But some plants can be either a tree or a shrub depending on the environmental conditions where they occur. For example, mesquite achieves tree form in riparian areas where groundwater is fairly shallow,



but may have a shrub form on uplands where moisture is limiting and rooting depth restricted.

BUNCHGRASSES AND SOD-FORMERS

Grasses are often classified as bunchgrasses or sod-formers (Figure 2). Bunchgrasses occur as well-defined individual plants, often appearing with a tufted or bunched growth habit. They generally increase in size by adding new tillers (stems) and produce new plants from seed. Examples include drop seeds and sacaton (*Sporobolus* sp.), threeawns (*Aristida* sp.), and Arizona cottontop (*Digitaria californica*). Sod-formers spread from either underground stems (rhizomes) or aboveground stems or runners (stolons) or both. A good example is Bermuda grass (*Cynodon dactylon*), which has both. Some of these plants do not produce much viable seed and rarely reproduce by seed, such as black grama (*Bouteloua eriopoda*). These are the grasses often used for turf purposes but they also occur on rangelands.

CRYPTOGAMS, MICROPHYTES

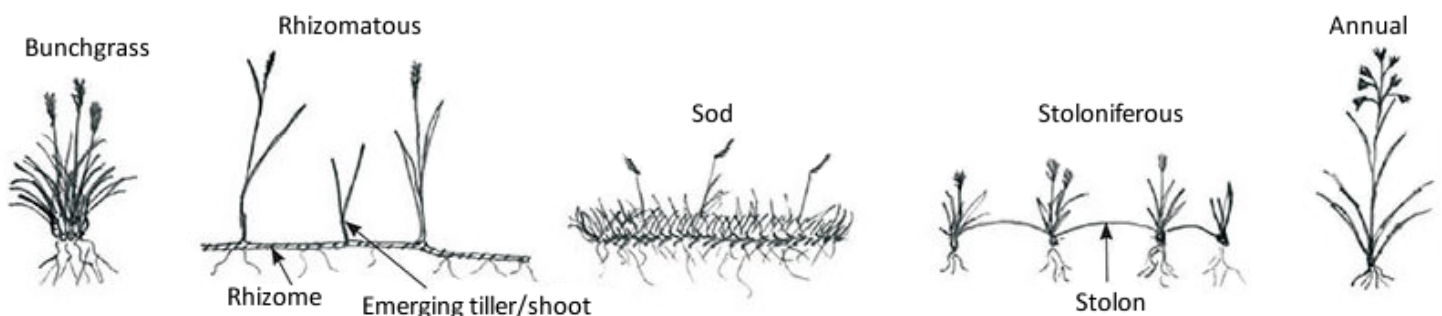
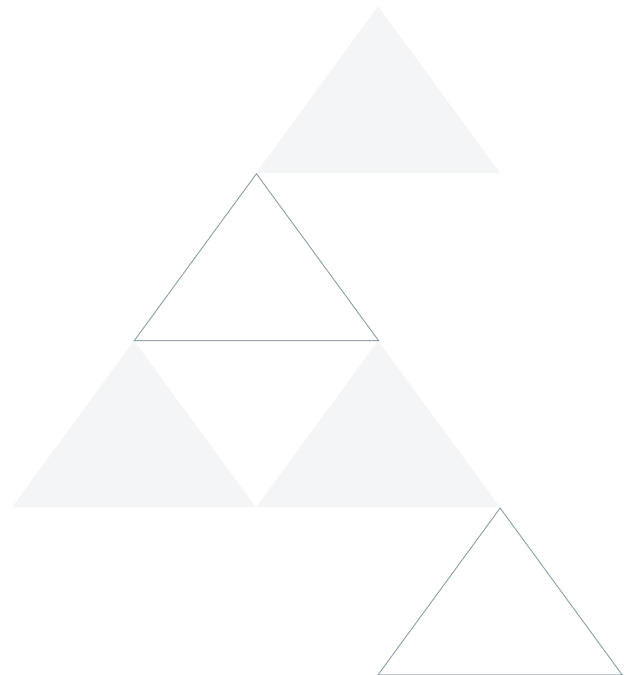
Cryptogams are plants that do not reproduce by seeds, but rather by spores. Examples are fungi, lichens, and some mosses. “Crypto” means hidden, and “gam” refers to the reproductive parts, or gametes. Because not all of these soil surface type plants are technically cryptogams (e.g. algae), some prefer to use the term microphytes. These plants represent the earlier or “lower” forms of plant evolution, in contrast to the “higher” flowering plants that evolved later. “Lower” and “higher” refer to their evolutionary status, not their size. These plants may form biological crusts on the soil surface.

Understanding plant life forms is a critical piece of understanding ecosystem dynamics and rangeland ecology. Knowing what plants are suited to what environments helps land managers with selecting the right plant species for rangeland treatment, restoration, and rehabilitation projects.

For more information about rangelands and rangeland plants, please visit GlobalRangelands.org.

REFERENCES

- Black, A. 2016. Managing grass through grazing. The Angus Journal. April 2016 pp 106-110.
- Gay, C. 1965. Range management. How and why. Las Cruces, NM: New Mexico State University Cooperative Extension Circulation 376.
- Holechek, J.L., R.D. Pieper, and C.H. Herbel. 2011. Range management: principles and practices 6th edition. Prentice-Hall, One Lake Street, Upper Saddle River, NJ 07458.



► Figure 2. Growth forms of grasses (Illustration by Casey Matney, 2012 from Black, A. 2016).