

# Index of Species Information

**SPECIES:** *Dactylis glomerata*

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## Introductory

**SPECIES:** *Dactylis glomerata*

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**AUTHORSHIP AND CITATION :**

Sullivan, Janet. 1992. *Dactylis glomerata*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis/> [2007, September 24].

**ABBREVIATION :**

DACGLO

**SYNONYMS :**

*Dactylis aschersoniana* Graebn.

**SCS PLANT CODE :**

DAGL

**COMMON NAMES :**

orchardgrass  
cocksfoot (European)

**TAXONOMY :**

The currently accepted scientific name of orchardgrass is *Dactylis glomerata* L. [[21](#),[62](#),[67](#)]. Recognized varieties include [[21](#)]:

*D. g.* var. *ciliata* Peterm.  
*D. g.* var. *detonsa* Fries

**LIFE FORM :**

Graminoid

**FEDERAL LEGAL STATUS :**

No special status

**OTHER STATUS :**

NO-ENTRY

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**DISTRIBUTION AND OCCURRENCE****SPECIES: *Dactylis glomerata***

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**GENERAL DISTRIBUTION :**

Orchardgrass was introduced to the eastern United States from Europe in 1760. It is widely planted in the United States and Canada, and is found from Nova Scotia south to the Carolinas, west to central California, and north to coastal British Columbia [[21](#),[67](#)].

**ECOSYSTEMS :**

FRES11 Spruce - fir  
FRES19 Aspen - birch  
FRES20 Douglas-fir  
FRES21 Ponderosa pine  
FRES26 Lodgepole pine  
FRES29 Sagebrush  
FRES34 Chaparral - mountain shrub  
FRES36 Mountain grasslands  
FRES37 Mountain meadows  
FRES38 Plains grasslands  
FRES39 Prairie  
FRES40 Desert grasslands  
FRES41 Wet grasslands

**STATES :**

AZ AR CA CO CT DE GA HI ID IL  
IN IA KS KY ME MD MA MI MN MO  
MT NE NV NH NJ NM NY NC ND OH  
OK OR PA RI SC SD TN TX UT VT  
VA WA WV WI WY AB BC NF NS ON  
PQ

**BLM PHYSIOGRAPHIC REGIONS :**

1 Northern Pacific Border  
2 Cascade Mountains  
4 Sierra Mountains  
5 Columbia Plateau  
6 Upper Basin and Range  
7 Lower Basin and Range  
8 Northern Rocky Mountains  
9 Middle Rocky Mountains  
10 Wyoming Basin  
11 Southern Rocky Mountains  
12 Colorado Plateau  
13 Rocky Mountain Piedmont  
14 Great Plains

- 15 Black Hills Uplift
- 16 Upper Missouri Basin and Broken Lands

**KUCHLER PLANT ASSOCIATIONS :**

NO-ENTRY

**SAF COVER TYPES :**

NO-ENTRY

**SRM (RANGELAND) COVER TYPES :**

NO-ENTRY

**HABITAT TYPES AND PLANT COMMUNITIES :**

An introduced species, orchardgrass is not generally used for habitat typing. However, Sugihara and others [68] have described an Oregon white oak (*Quercus garryana*)/orchardgrass vegetation type in Redwood National Park, California. This vegetation type occurs exclusively as closed canopy stands, and is predominant on lower slopes. A mixture of tall perennial grasses and perennial forbs codominates the understory with orchardgrass. The shrub layer is sparse. Other important associates in this type include yerba buena (*Satureja douglasii*), mountain sweetroot (*Osmorhiza chilensis*), California strawberry (*Fragaria californica*), western sanicle (*Sanicula crassicaulis*), American vetch (*Vicia americana*), and climbing bedstraw (*Galium nuttallii*). California honeysuckle (*Lonicera hispidula*) and rigid betony (*Stachys rigida*) are common characteristic species [68].

Smith [64] has described an Oregon white oak/poison oak (*Rhus diversiloba*)/orchardgrass vegetation type as an even-aged woodland with three well-developed strata. Oregon white oak and California black oak (*Quercus kelloggii*) are the dominant overstory trees; poison oak and wild rose (*Rosa* spp.) are the dominant midstory or shrub-layer; and orchardgrass and hedgehog dogtail (*Cynosurus echinatus*) are codominant grasses [64].

Orchardgrass is listed as a dominant or codominant understory plant in the following publications:

Plant associations within the Interior Valleys of the Umpqua River Basin, Oregon [64].

The principal plant associations of the Saint Lawrence Valley [74].  
Vegetation of the Bald Hill oak woodlands, Redwood National Park, California [68].

## MANAGEMENT CONSIDERATIONS

**SPECIES: *Dactylis glomerata***

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**IMPORTANCE TO LIVESTOCK AND WILDLIFE :**

Orchardgrass is moderately nutritious and highly palatable to deer, elk, bighorn sheep, cattle, and domestic sheep and goats. The persistent, green, basal rosette provides good winter forage for deer and elk [14,50]. Early spring growth provides green forage for all species [60]. Cattle will eat orchardgrass preferentially in early spring and summer, up to 50 percent of total diet [59,65]. Elk and mule deer also prefer orchardgrass over a number of other species [42]. In areas disturbed by fire where orchardgrass has been seeded (usually in a mixture with other grasses and forbs), wildlife use increases over nonseeded areas and nonburned areas [19,42,44,50,58]. Forest openings, where orchardgrass is dominant, are associated with rufous hummingbirds, pine siskins, slate-colored juncos, American robins, valley pocket gophers, desert harvest mice, deer mice, Mexican voles, and white-tailed deer [56]. Grasshopper sparrows and eastern meadowlarks were more abundant in cultivated fields in Georgia codominated by orchardgrass than in fallow or natural fields [33]. Wild turkeys graze orchardgrass in winter, and poults use it as a source of cover and insects in late summer. Rabbits use orchardgrass for food and cover; Canada geese feed on the seeds and leaves [13].

**PALATABILITY :**

Palatability is rated high for cattle, elk, mule deer, and white-tailed deer [15,50,59,64].

**NUTRITIONAL VALUE :**

Orchardgrass is ranked below other popular grass species in nutritive value and is considered by many farmers to be poor, but this perception is based on harvesting orchardgrass for hay after its peak nutritive level in the spring. Nutritive values have been shown to decline steadily after the early season peak [62,72]. Crude protein is highest in the spring and declines to an average winter level of 4.3 percent [62].

A number of studies have been done on nutritional values and digestibility for cattle, elk, and domestic sheep. The tables below represent the range of average values as reported by author under different conditions and extraction methods.

Cattle	crude protein	14-16% [22]	16-19% [7]
	crude fiber	23-25% [22]	
	lignin	4-8.5% [22]	5-7% [9]
	organic matter	92-93% [22]	
	dry matter	20-25% [9]	
	digestibility	56-77% [22]	55-59% [9]
Sheep	crude protein	8-21%	
	fiber	17-33%	
	organic matter	89-93%	
	digestibility	55-81% [22]	
Elk	crude protein	9-13%	
	organic matter	87%	
	digestibility	55-62% [8]	

**COVER VALUE :**

NO-ENTRY

**VALUE FOR REHABILITATION OF DISTURBED SITES :**

Orchardgrass is widely recommended and used for a variety of rehabilitation applications. It is recommended for planting with a mixture of grasses and legumes to reduce erosion after devegetation by fire. Orchardgrass often shows early success, eventually being replaced by native vegetation or other seeded species [12,45,49].

Orchardgrass is used in seed mixtures with other grasses and forbs (usually clover or alfalfa) for rehabilitation of overgrazed lands. The success of orchardgrass appears to depend on the appropriateness of the site to specific adaptations of orchardgrass cultivars, and also on proper management of grazing [[1](#),[10](#),[18](#),[47](#),[63](#)].

Orchardgrass is planted in areas that have been logged and burned to provide a vegetative cover for soil stabilization and provide forage for cattle and/or wildlife [[10](#),[31](#),[49](#)].

Orchardgrass is also used for rehabilitation of sites disturbed by mining [[28](#),[46](#)]. The most successful applications in the western United States appear to be sites that are relatively cool and moist (upper elevations, shaded areas, etc.) [[27](#),[29](#),[53](#)].

Plantings of orchardgrass mixtures do well where there is adequate moisture (12 inches or more annual precipitation) [[28](#),[60](#)] and where temperatures are not extreme [[4](#),[70](#)]. In the drier western states it is better adapted for higher elevations or in irrigated pastures and croplands [[69](#)]. However, in the northeastern United States, particularly the southern part of the region, orchardgrass is so well adapted that it will invade alfalfa stands (*Medicago* spp.) [[72](#)].

Some cultivars are more drought resistant than others [[54](#),[55](#)]. The following list of cultivars indicates the wide range of strains available; there are many more cultivars available--new ones are still being listed.

'LATAR' is a late-season strain, highly recommended for pasture and hay production; it is 10 percent higher in digestibility than other cultivars and is more compatible with legumes, especially alfalfa (*Medicago sativa*) [[30](#)].

'POTOMAC' is an early-season strain, better adapted to mountain sites [[30](#)].

'PAIUTE' is more drought tolerant than other cultivars [[30](#)].

'POMAR' is a specially adapted low-growing strain particularly suited as a cover crop in orchards and for road bank stabilization [[30](#)].

#### **OTHER USES AND VALUES :**

Orchardgrass is a widely planted pasture grass [[1](#),[21](#),[25](#),[62](#)] and is used to increase forage production on rangelands [[48](#)]. It is frequently part of mixtures that are seeded in mountain brush (especially Gambel oak (*Quercus gambellii*) types to improve rangeland. These mixtures are drilled or broadcast seeded after some type of surface preparation--usually removal of brush by burning or chaining, or by herbicide application [[6](#),[38](#)]. Orchardgrass is used to stabilize ski slopes in Montana and to suppress annual weeds [[5](#),[39](#),[40](#),[41](#)].

#### **OTHER MANAGEMENT CONSIDERATIONS :**

As a forage species, orchardgrass does not withstand continuous heavy use; it is therefore recommended for planting in less accessible sites, and for early season, moderate grazing [[32](#),[47](#),[65](#)]. Grazing tends to increase both crude protein and dry matter production, and increase production of phytomass the following spring [[57](#)]. Orchardgrass responds well to nitrogen fertilizers, and moderately well to coplanting with legumes [[62](#),[72](#)]. Clipping height has an effect on productivity--it is recommended that orchardgrass not be clipped below 3 inches (7.6 cm) in height as it appears to become much more drought sensitive [[72](#)]. Clipping frequency is apparently not as critical; orchardgrass has been found to be as productive when cut at 2- to 3-week intervals as when cut at 5- to 7-week intervals [[72](#)].

Burned sites (either from wildfire, or sites that have been logged and burned) seeded with orchardgrass had higher forage values than either unseeded or unburned areas [[37](#),[45](#),[53](#)]. However, seeded grasses may suppress growth of desirable timber species and native forbs. [[2](#),[17](#),[35](#),[45](#),[47](#)]. Seidel and others [[61](#)] reported that seedling mortality of Douglas-fir and ponderosa pine were slightly increased (5-6 percent) over unseeded areas. They concluded that a light rate of seeding is compatible with the establishment of tree seedlings [[61](#)]. Seedling survival of trees planted in established stands of orchardgrass can be greatly enhanced (depending on soil type) by the application of herbicide before planting.

On sites where growth of tree seedlings is desirable, grazing by cattle and wildlife improves tree growth compared with no grazing or grazing by wildlife alone. The degree of forage use and timing of grazing are critical to tree growth/cattle use compatibility; light, early season grazing is the most beneficial [[36](#),[47](#)].

## BOTANICAL AND ECOLOGICAL CHARACTERISTICS

### SPECIES: *Dactylis glomerata*

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#### GENERAL BOTANICAL CHARACTERISTICS :

Orchardgrass is a cool-season, perennial bunchgrass, 1.4 to 4 feet (0.5-1.2 m ) tall with erect, glabrous culms and blades 4 to 16 inches (10-40 cm) long and 0.1 to 0.5 inch (0.2-1.1 cm) wide. The inflorescence is a panicle with two to six florets per spikelet, with the spikelets tightly clustered on one side of the branch. Orchardgrass is nonrhizomatous [[21](#)]. Most root development is in the upper 3 inches (8 cm) of soil but extends to at least 18 inches (46 cm) below the surface [[23](#)], producing a dense sod of medium-sized roots [[26](#)].

#### RAUNKIAER LIFE FORM :

Hemicryptophyte

#### REGENERATION PROCESSES :

Orchardgrass reproduces largely by seed and by tiller formation. The relatively large seed does not have an innate dormancy [[24](#)]. Seed can germinate in either light or darkness; germination is largely controlled by moisture availability, and most seed germinates in the fall. Thus, orchardgrass does not tend to build up seedbanks in the soil [[24](#)].

#### SITE CHARACTERISTICS :

Orchardgrass is best adapted to well-drained, rich or moderately fertile soils with an adequate water regime (12 inches or more annual precipitation [30 cm]) [[24](#),[28](#),[62](#),[71](#)] and temperatures that are not extreme [[4](#),[28](#)]. Optimum top growth is achieved at temperatures of approximately 70 degrees Fahrenheit (21 deg C) [[72](#)]. Orchardgrass is shade tolerant and does well at higher elevations in the western United States and Canada (4,900 to 6,200 feet [1,500-1,900,m]) [[28](#)]. It is widely planted in the eastern United States, most notably in Pennsylvania, Maryland, and West Virginia [[13](#)].

**SUCCESSIONAL STATUS :**

Facultative Seral Species

Orchardgrass is shade tolerant. It is often seeded on disturbed areas and is naturalized to fields, meadows, and waste places [67]. It is long-lived but susceptible to replacement by native species, especially in drier areas, and does not usually persist past 1 or 2 decades [12,42,43].

Stands of orchardgrass tend to become clumpier with age, especially under high nitrogen conditions. This may be best explained by the relative amounts of competition among tillers and among plants [72].

**SEASONAL DEVELOPMENT :**

Orchardgrass begins growth early in spring and flowers from May to September or October. In dry areas it is dormant in summer, but will add new growth in the fall, and will flower again in fall under appropriate conditions. Most European populations are obligately dormant in the summer, showing no growth even when irrigated. Some Mediterranean populations do not have this obligate dormancy [16]. A green basal rosette is maintained through winter [14]. Flowering appears to be temperature rather than light dependent [20]. Seed shattering takes place in late summer; most seed will germinate in fall as there is no innate dormancy [24].

## FIRE ECOLOGY

**SPECIES: Dactylis glomerata**

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**FIRE ECOLOGY OR ADAPTATIONS :**

NO-ENTRY

**POSTFIRE REGENERATION STRATEGY :**

Tussock graminoid  
Caudex, growing points in soil  
Ground residual colonizer (onsite, initial community)  
Secondary colonizer - offsite seed

## FIRE EFFECTS

**SPECIES: Dactylis glomerata**

**IMMEDIATE FIRE EFFECT ON PLANT :**

In general, bunchgrasses with large accumulations of dead material can generate high temperatures for long periods of time after the fire has passed. This can reduce fire survival for older plants [[73](#)].

**DISCUSSION AND QUALIFICATION OF FIRE EFFECT :**

NO-ENTRY

**PLANT RESPONSE TO FIRE :**

Orchardgrass is reported to increase or remain stable after burning [[11](#),[52](#)].

**DISCUSSION AND QUALIFICATION OF PLANT RESPONSE :**

NO-ENTRY

**FIRE MANAGEMENT CONSIDERATIONS :**

Orchardgrass is frequently seeded onto areas disturbed by fire to control soil erosion. Concern has been raised that the increase of grass species in the area, especially summer-dormant grasses such as orchardgrass, could increase the risk of fast-spreading, low-intensity fires that could set back the rate of tree and shrub regeneration. The application of seed to reduce erosion is, therefore, not always beneficial [[12](#),[31](#)].

Orchardgrass mixtures are recommended in the conversion of chaparral to grassland to reduce fire intensity and frequency [[6](#)].

## FIRE CASE STUDIES

**SPECIES: *Dactylis glomerata***

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**CASE NAME :**

Vegetation response to spring and fall burning for wildlife habitat improvement

**REFERENCE :**

Noste, N. V. 1982 [[51](#)]

**SEASON/SEVERITY CLASSIFICATION :**

Spring- moderate severity

Fall -extreme severity

**STUDY LOCATION :**

Ten miles (16 km) north of Missoula, Montana, on a generally southeast aspect below 4,920 feet (1,500 m).

**PREFIRE VEGETATIVE COMMUNITY :**

The study site had been previously burned by wildfire in 1945, which set back the successional stage to a seral shrub community. The habitat type is Douglas-fir/ninebark (*Pseudotsuga menziesii*/*Physocarpus malvaceus*). This area remained unburned until 1979 (the year of the prescribed burns), and the shrub species important for wildlife had become decadent.

Herbaceous vegetation aerial crown cover averaged 19 percent prior to the fall burn, and 24 percent prior to the spring burn.

Species present on the site prior to the spring burn were serviceberry (*Amelanchier alnifolia*), evergreen ceanothus (*Ceanothus velutinus*), creeping Oregon grape (*Berberis repens*), ninebark (*Physocarpus malvaceus*), chokecherry (*Prunus virginiana*), Scouler willow (*Salix scouleriana*), snowberry (*Symphoricarpus albus*), spreading dogbane (*Apocynum androsaemifolium*), kinnikinnick (*Arctostaphylos uva-ursi*), arrowleaf balsamroot (*Balsamorhiza sagittata*), pinegrass (*calamogrostis rubescens*), elk sedge (*Carex geyeri*), orchardgrass (*Dactylis glomerata*), and timothy (*Phleum pratense*). Species present prior to the fall burned site included all of the above, except creeping Oregon grape, spreading dogbane, arrowleaf balsamroot, kinnikinnick, and timothy, but did include Douglas hawthorn (*Crataegus douglasii*) and spotted knapweed (*Centaurea maculosa*).

**TARGET SPECIES PHENOLOGICAL STATE :**

The target species for this study was evergreen ceanothus (*Ceanothus velutinus*), selected for its importance to wildlife. A number of species were monitored preburn and postburn. Orchardgrass on the spring burn site was in a green growing stage, not yet in flower. On the fall burn site, orchardgrass was generally dormant (tall dead material with a green basal rosette).

**SITE DESCRIPTION :**

Both burned sites occurred on generally southeast aspect below 4,920 feet (1,500 m). The slope averages 30 percent with a maximum of 50 percent.

**FIRE DESCRIPTION :**

Fuel loadings on the fall burn were greater than on the spring burn, but fuel loadings on both sites were low. The amount of fine fuel was marginal for carrying the fire.

The fall fire prescription called for a "hot fire moving fast enough to consume all grasses and forbs and kill the cambium at the stems of most of the shrubs." For the fall fire, rate of spread ranged from 40 chains per hour on the lower slope to 56 chains per hour on the upper slope. On the spring fire, rate of spread ranged from 10 chains per hour on the mid-slope, 11 chains per hour on the upper slope to 18 chains per hour on the lower slope.

Weather and fuel moisture conditions during the burn are shown in the tables below:

Fine fuel moisture contents:

Transect	Fuel	
	Dead	Live
	----(percent)----	
Fall fire	6	55
F1-4 upper slope	8	62

F1-2 mid slope	8	53
F1-1 lower slope		
Spring fire		
S1-2 upper slope	8	67
S1-3 mid slope	9	156
S1-1 lower slope	12	149

Weather conditions during the burn:

Transect	Observations			
	Dry bulb temperature	Relative humidity	Wind velocity	
	(deg F(deg C))	(percent)	(Mi/h)	(km/h)
Fall fire				
F1-4 upper slope	59 (15)	30	6/gusts to 8	(10)
F1-2 mid slope	69 (20)	23	8	(13)
F1-1 lower slope	70 (21)	18	7/gusts to 12	(11)
Spring fire				
S1-2 upper slope	65 (18)	36	5/gusts to 7	(8)
S1-3 mid slope	57 (14)	30	6/gusts to 10	(10)
S1-1 lower slope	62 (17)	37	6/gusts to 8	(10)

#### **FIRE EFFECTS ON TARGET SPECIES :**

In the 2 years following the spring burn, herbaceous aerial crown cover averaged 21 to 22 percent. In the 2 years following the fall burn, average herbaceous aerial crown cover was 28 percent. Orchardgrass was considered an important component of the preburn vegetation that reproduced well.

Prior to the spring burn, orchardgrass provided 253 cubic feet per acre (2.9 m<sup>3</sup>/ha) and in the following 2 years provided 45 cubic feet per acre (0.52 m<sup>3</sup>/ha) and 654 cubic feet per acre (7.5 m<sup>3</sup>/ha) respectively.

Prior to the fall burn, orchardgrass is reported as 554 cubic feet per acre (6.35 m<sup>3</sup>/ha), and in the years following the burn is reported as 30 and 134 cubic feet per acre (0.34 and 1.54 m<sup>3</sup>/ha), respectively.

#### **FIRE MANAGEMENT IMPLICATIONS :**

The fall burn was hotter and faster moving than the spring burn, and apparently caused more damage to orchardgrass plants than did the spring burn. But even the greater severity of the fall burn did not result in a complete removal of orchardgrass. As is true of most perennial grass species, orchardgrass is well adapted to recover after even severe fires, although recovery is slower after severe burns or hot fires. If the management objective is to increase orchardgrass specifically (as this study was not intended), then a less severe treatment, such as the spring burn, would be recommended.

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**SPECIES: *Dactylis glomerata***

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