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Introductory

SPECIES: *Eragrostis curvula*

AUTHORSHIP AND CITATION :

Walsh, Roberta A. 1994. *Eragrostis curvula*. 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 :

ERACUR

SYNONYMS :

NO-ENTRY

SCS PLANT CODE :

ERCU2
ERCUC2

COMMON NAMES :

weeping lovegrass

TAXONOMY :

The currently accepted scientific name of weeping lovegrass is *Eragrostis curvula* (Schrad.) Nees [[23](#),[28](#),[42](#),[57](#)]. It is in the family Poaceae.

The following varieties are accepted:

E. c. var. *curvula*
E. c. var. *conferta* Nees [[4](#),[11](#)]

LIFE FORM :

Graminoid

FEDERAL LEGAL STATUS :

No special status

OTHER STATUS :

NO-ENTRY

DISTRIBUTION AND OCCURRENCE

SPECIES: *Eragrostis curvula*

GENERAL DISTRIBUTION :

Weeping lovegrass is native to South Africa [[28,57](#)]; it has been introduced into North and South America [[57](#)]. Weeping lovegrass was first introduced into the United States in 1932 [[62](#)]. It occurs in North America from Massachusetts and New York [[22](#)] south to Florida [[28](#)] and west to California [[27,36](#)]. It is common in Oklahoma, Texas, New Mexico, and Arizona [[28,31](#)].

ECOSYSTEMS :

FRES12 Longleaf - slash pine
FRES13 Loblolly - shortleaf pine
FRES15 Oak - hickory
FRES16 Oak - gum - cypress
FRES21 Ponderosa pine
FRES30 Desert shrub
FRES31 Shinnery
FRES32 Texas savanna
FRES33 Southwestern shrubsteppe
FRES34 Chaparral - mountain shrub
FRES35 Pinyon - juniper
FRES38 Plains grasslands
FRES39 Prairie
FRES40 Desert grasslands

STATES :

AL AZ AR CA CO FL GA HI KS LA
MD MA MS NJ NM NY NC OK PA SC
TX VA WV MEXICO

BLM PHYSIOGRAPHIC REGIONS :

3 Southern Pacific Border
4 Sierra Mountains
7 Lower Basin and Range
12 Colorado Plateau
13 Rocky Mountain Piedmont
14 Great Plains

KUCHLER PLANT ASSOCIATIONS :

NO-ENTRY

SAF COVER TYPES :

67 Mohrs (shin) oak

- 80 Loblolly pine - shortleaf pine
- 83 Longleaf pine - slash pine
- 96 Overcup oak - water hickory
- 237 Interior ponderosa pine
- 239 Pinyon - juniper
- 241 Western live oak
- 242 Mesquite

SRM (RANGELAND) COVER TYPES :

NO-ENTRY

HABITAT TYPES AND PLANT COMMUNITIES :

Common associates of weeping lovegrass include turbinella oak (*Quercus turbinella*), pointleaf manzanita (*Arctostaphylos pungens*), Pringle manzanita (*A. pringlei*), desert ceanothus (*Ceanothus greggii*), sugar sumac (*Rhus ovata*), skunkbush sumac (*R. trilobata*), hollyleaf buckthorn (*Rhamnus crocea*), Wright silktassel (*Garrya wrightii*), yellowleaf silktassel (*G. flavescens*), birchleaf mountain-mahogany (*Cercocarpus betuloides*), Mexican cliffrose (*Cowania mexicana*), and Lehmann lovegrass (*Eragrostis lehmanniana*) [[7](#),[14](#),[32](#),[41](#)].

Weeping lovegrass associates in sand dune vegetation in Woodward County, Oklahoma, include sand sagebrush (*Artemisia filifolia*), bush morning glory (*Ipomoea leptophylla*), sand pea (*Tephrosia virginiana*), horseweed (*Erigeron canadensis*), partridge-pea (*Chamaecrista fasciculata*), slender scurf-pea (*Psoralea tenuiflora*), grama (*Bouteloua* spp.), buffalo grass (*Buchloe dactyloides*), sand paspalum (*Paspalum stramineum*), and switchgrass (*Panicum virgatum*) [[47](#)].

MANAGEMENT CONSIDERATIONS

SPECIES: *Eragrostis curvula*

IMPORTANCE TO LIVESTOCK AND WILDLIFE :

Weeping lovegrass is used as a pasture grass [[31](#),[57](#)].

Weeping lovegrass forage value is fair for livestock; it is relatively poor for wildlife [[50](#)].

In central Arizona, Angora goats were introduced to the Tonto National Forest in hopes that they would trample weeping lovegrass seeds into the soil. However, they pulled up and ate a high percentage of the seedlings within 3 weeks after seeding [[32](#)].

PALATABILITY :

Weeping lovegrass is most palatable in the spring, when it is actively growing [[29](#)]; palatability to livestock is rated fair at that time [[56](#)]. Weeping lovegrass becomes unpalatable with maturity, and may be grazed very little from flowering in early summer through dormancy in the fall [[50](#),[54](#)].

In Arizona, livestock frequently prefer weeping lovegrass to many native

grasses in the spring. On some Arizona ranges, it is highly productive and moderately palatable [30]. However, in northwestern Oklahoma, weeping lovegrass was judged to be the least palatable of 57 species tested. It was relatively more palatable in the winter because it greens up earlier in the spring and continues growth later in the fall than native warm-season grasses [47].

NUTRITIONAL VALUE :

In Woodward County, Oklahoma, weeping lovegrass protein content declined from April to January and showed a slight increase the following March [47].

In Lubbock County, Texas, the crude protein content of weeping lovegrass aboveground phytomass was evaluated 1 year after establishment. Protein content dropped from 12.0 percent in May to 3.4 percent in September in uncut plots. During the same time period, crude protein of 30-day-old regrowth in cut plots remained between 8.7 and 12.3 percent [35].

COVER VALUE :

NO-ENTRY

VALUE FOR REHABILITATION OF DISTURBED SITES :

Weeping lovegrass has been planted for soil conservation. It has been used as ground cover on bare, disturbed, and burned areas, on areas around airports and landing strips, and on steep slopes. It has been planted for siltation control on drainageways and for erosion control on roadsides, drainage ditches, and dikes [27,49,56,57]. There are no long-term studies evaluating the efficacy of weeping lovegrass for soil conservation [63].

Weeping lovegrass has been used for grassland revegetation in the southern United States [28], particularly after invasion by woody shrubs [10]. It is used on sandy soils in the Southern Great Plains because of excellent seed production and ease of establishment [55]. Garcia [20] stated that weeping lovegrass provides excellent soil protection on the High Plains of New Mexico [20].

Some severely degraded southwestern grasslands may never be able to return to their original condition; in these areas weeping lovegrass can help stabilize soils, prevent further erosion, and provide some wildlife habitat. However, weeping lovegrass plantations have much lower plant and animal species richness than do undisturbed native grasslands [4].

Weeping lovegrass has been seeded in central Arizona chaparral after brush removal in order to increase annual stream flow. Heavily transpiring, deep-rooted evergreen shrubs were replaced with weeping lovegrass and other shallow-rooted vegetation. Streamflow increased, and the increase has lasted for 18 years with maintenance [26].

Weeping lovegrass is suitable for quick, temporary cover for erosion control on minesoils while other more persistent perennials are developing. It is relatively short lived (2-4 years) on minesoils in the eastern United States unless mowed, burned, or grazed to retard senescence. Even then, weeping lovegrass gradually gives way to other perennial species. It is tolerant of extremely acid minesoils, on which it establishes easily and quickly. It is best used in a mixture with other perennial grasses and legumes, especially in mid- to late-spring seedings [10,53,54].

Excellent stands of weeping lovegrass were established by no-till planting in early June on sloping, eroded, acidic soils in the Piedmont region of Virginia [58].

OTHER USES AND VALUES :

Weeping lovegrass is cultivated as an ornamental grass [22,27,28,31].

OTHER MANAGEMENT CONSIDERATIONS :

Information on weeping lovegrass culture and cultivars is available [[12](#),[55](#),[56](#)].

Effective management for productivity in seeded stands of weeping lovegrass in northwestern Oklahoma includes (1) removing old growth; (2) fertilizing conservatively; (3) deferring grazing in spring until plants are 6 inches high; (4) practicing rotation grazing; (5) mowing or grazing to a 4-inch stubble throughout the summer; (6) resting from September 1 to December 1, and then grazing in winter with supplements for cattle. Weeping lovegrass nutritional value can be optimized by using it with other seasonal forages and native rangelands [[56](#)].

Cattle can be grazed productively on weeping lovegrass, even without irrigation [[12](#),[16](#)]. Cattle gain relatively well on weeping lovegrass without rotation during spring but do poorly the remainder of the growing season [[12](#)]. Fall grazing is detrimental because grazing initiates plant growth, which reduces carbohydrate reserves and predisposes weeping lovegrass to freeze damage. Dormant winter lovegrass leaves make excellent winter forage when supplemented with protein [[12](#)].

In 1951, weeping lovegrass was aerially seeded after wildfire in the Pinal Mountain area of east-central Arizona. Annual use by cattle of 50 to 70 percent of current growth resulted in a decrease in weeping lovegrass cover [[41](#)].

Weeping lovegrass can be successfully established on rangelands in chaparral and some pinyon (*Pinus* spp.)-juniper (*Juniperus* spp.) types in the Southwest. However, stands in these areas may be short lived [[55](#)]. Long-term establishment is restricted to irrigated sites, moist sites such as swales, and areas where annual rainfall exceeds about 15 inches (381 mm) [[12](#)].

Establishment of weeping lovegrass depends on moisture availability and winter temperatures. In the southeastern part of the southern High Plains of New Mexico, weeping lovegrass is favored for ease of germination during the hot, dry summers. However, in the extreme temperatures of the Chihuahuan Desert, supplemental irrigation or mulching is necessary for successful seedling establishment [[20](#)]. Stands of weeping lovegrass have been established in southern Arizona, eastern New Mexico, and West Texas during atypically wet summers; they have persisted for 10 or more years. Weeping lovegrass will persist in western Oklahoma and northwestern and north-central Texas if not fertilized or defoliated prior to freezing winter temperatures. It will not persist in southern Kansas and southeastern Colorado [[10](#)].

Plant and animal populations were sampled between June 1984 and August 1985 in semidesert grasslands on mesas in Santa Cruz County, Arizona. Some areas had been seeded to weeping lovegrass and Lehmann lovegrass (*Eragrostis lehmanniana*); other areas had native grasses, forbs, and shrubs. The stands of exotic grasses differed consistently from native grasslands in terms of indigenous plants and animals. The exotic African lovegrasses covered more than 50 percent of the ground where they had been planted; they grew in tall, nearly monospecific stands. At these sites the native grass cover was reduced by nearly 60 percent compared to unseeded stands. Total native herb canopy, herb species richness, shrub density, and shrub canopy were significantly reduced on plots dominated by weeping lovegrass and Lehmann lovegrass. The hispid cotton rat was more abundant in stands of African lovegrasses than in native grasslands. Ten native plant species, five bird species, three rodent species, and eight grasshopper species were significantly more common in native grasslands [[4](#)].

Grasshoppers, leafhoppers, and other forage-eating insects, even in light populations, are very destructive to weeping lovegrass seedlings.

Rabbits and rodents are sometimes damaging [56].

BOTANICAL AND ECOLOGICAL CHARACTERISTICS

SPECIES: *Eragrostis curvula*

GENERAL BOTANICAL CHARACTERISTICS :

Weeping lovegrass is an introduced, perennial, warm-season, densely tufted bunchgrass [2,30,36]. It is a C-4 carbon fixer [56]. Culms can be pith-filled to hollow; they are erect [23] and 24 to 60 inches (60-150 cm) tall [29,30,50]. Leaves are primarily basal [42] and abundant [56]. Culm leaves are 8 to 12 inches (20-30 cm) long [27,50]; basal leaves can be much longer [23,27,30,42, 50]. The inflorescence is a panicle 4 to 16 inches (10-40 cm) long [23,42]. Spikelets are five- to twelve-flowered [22,50]; the lemma is unawned [50,56]. The fruit is a caryopsis [23]. Weeping lovegrass has an extensive fibrous root system [56].

RAUNKIAER LIFE FORM :

Hemicryptophyte

REGENERATION PROCESSES :

Weeping lovegrass reproduces by seeds; it does not have rhizomes or stolons [2]. Apomixis is facultative [55]. The seedstalks produce approximately 300 to 1,000 seeds per head [39]. Rate of spread by seeds is slow under the best conditions [2]. In most places weeping lovegrass does not actively colonize adjacent nonplanted sites [10].

Seed dormancy is broken after 5 to 6 months in storage [56]. Time to initial germination in a laboratory test was 50 to 52 hours [19]. Best field germination occurs with year-old seed; most seeds germinate in 7 days under favorable conditions [56]. Rainfall pattern is important for successful weeping lovegrass seedling emergence. Less than 20 percent of germinated weeping lovegrass seeds survived 1 day of desiccation after germination. No weeping lovegrass seeds survived 3 days of desiccation [19]. If the soil is dry, adequate moisture within 4 to 7 days after emergence is necessary for seedling survival [12]. Seedlings are vigorous under favorable conditions [47]. Weeping lovegrass can make good cover the first year after seeding. With good moisture conditions some plants head out the first year [56].

Weeping lovegrass produces tillers which grow outward from the edge of the clump. Dead stems prevent production of new tillers to the inside. After a few years without grazing or burning, the only live shoots in the decadent plant are in an outside ring enclosing dead material [12].

SITE CHARACTERISTICS :

Weeping lovegrass grows on dry to moist sites [15] in pastures [50], fields [42], roadsides [23,27], and disturbed areas [23,50,61].

Weeping lovegrass grows and produces well on a wide variety of soils. It grows well on low fertility soils, but it does best on fertile soils [12]. It is best adapted to and most persistent on sandy and sandy loam soils [2,10,12]. It is not well adapted to clayey, salty, or wet soils

[1,12]. Silty loam, clay, and clayey loam soils reduce or inhibit germination, seedling emergence, shoot growth, and root growth [10]. Weeping lovegrass was tested on the High Plains of western Texas on three soil types. Growth was rated good on sandy soil, fair on silty soil, and poor on clayey soil [13]. In the Santa Cruz Basin in southeastern Arizona, weeping lovegrass established poorly on silty clay loam. However, weeping lovegrass seeds sown in sandy to sandy loam upland soils germinated and produced plants that persisted for at least 15 years [11]. Weeping lovegrass requires a 150- to 180-day summer growing season to spread on sandy soils [10].

Weeping lovegrass does well on acid soils in the southeastern United States [12,18]. Lower pH limit is usually considered to be 4.0, but it has grown well on some minesoils with pH 3.8 [54]. Weeping lovegrass also grows on highly basic soils. It will grow on soils of pH 8.0, but severe chlorosis usually occurs as the growing season progresses [12].

Weeping lovegrass is adapted to summer rainfall [12]. Established stands persist where annual rainfall varies from 15.7 to 39.4 inches (400-1,000 mm) [10]. In critical rainfall areas occasional prolonged droughts may kill well-established stands [12]. Plant production declines where summer rainfall exceeds 29.5 inches (750 mm) because of fungal infections, mites, nematodes, and interference from forbs and other grasses [10].

Established stands of weeping lovegrass persist where mean minimum and maximum temperatures vary annually from 32 to 86 degrees Fahrenheit (0-30 deg C) [10]. Weeping lovegrass does not tolerate extended periods of temperatures below 14 degrees Fahrenheit (-10 deg C) [50].

Weeping lovegrass has been reported at the following elevations:

	Feet	Meters	
Arizona	4,921-6,500	1,500-1,981	[4,32,38]
Colorado	5,000	1,524	[15]
Oklahoma	1,975-2,300	602-701	[47]
Texas	3,281	1,000	[44]
West Virginia	below 3,000	below 914	[54]

Weeping lovegrass persistence in western Oklahoma and northwestern and north-central Texas is limited to elevations from 984 to 3,281 feet (300-1,000 m) [10].

SUCCESSIONAL STATUS :

Facultative Seral Species

Weeping lovegrass can establish in disturbed areas and also persist in open grasslands.

During the 1940's and 1950's, upland mesas at the Appleton-Whittell Research Sanctuary in Santa Cruz County, Arizona, were seeded with weeping lovegrass and Lehmann lovegrass. In 1984, these mesas remained dominated by the exotic lovegrasses. Nearby unseeded areas supported native perennial grasses, forbs, and shrubs [4].

Basal cover and production of seeded weeping lovegrass in east-central Arizona tended to be inversely proportional to turbinella oak cover. Turbinella oak in chaparral was burned by wildfire in 1952. Where turbinella oak canopy was reduced less than 50 percent, weeping lovegrass cover remained approximately the same over 3 postfire years. Where turbinella oak cover was reduced more than 50 percent, basal cover of weeping lovegrass increased "markedly" over the 3 years observed [40].

SEASONAL DEVELOPMENT :

An established weeping lovegrass plant begins growth in spring when mean

minimum temperatures rise above 50 degrees Fahrenheit (10 deg C). Productivity peaks when mean minimum and maximum temperatures range between 59 and 86 degrees Fahrenheit (15 and 30 deg C). Growth declines in mid-summer when mean maximum temperatures exceed 86 degrees Fahrenheit (30 deg C) and soils dry [10]. Weeping lovegrass growing season in northwest Oklahoma is March to November [47].

Tillering begins 4 to 6 weeks after a seed germinates. Under favorable conditions several hundred closely packed culms are produced the first year [39].

Weeping lovegrass susceptibility to frost increases if there is a rapid temperature drop when the grass is growing. Injury is also likely during severe cold coupled with dry soil. Fall growth initiated by rainfall, irrigation, fertilization, or grazing seems to predispose weeping lovegrass to freeze damage [12].

Weeping lovegrass flowering times are:

California	August-October	[36]
Florida	April-May	[8]
South Carolina	May-June	[42]
Great Plains	May-August	[23]
Southern Great Plains	late spring and late summer	[56]

FIRE ECOLOGY

SPECIES: *Eragrostis curvula*

FIRE ECOLOGY OR ADAPTATIONS :

The deep roots and dense crown of weeping lovegrass provide protection from fire damage [39].

POSTFIRE REGENERATION STRATEGY :

Tussock graminoid

FIRE EFFECTS

SPECIES: *Eragrostis curvula*

IMMEDIATE FIRE EFFECT ON PLANT :

Weeping lovegrass culms and blades are probably killed by fire. Burned clumps tend to retain about 2 inches of densely packed, unburned stems at the soil surface [12].

DISCUSSION AND QUALIFICATION OF FIRE EFFECT :

NO-ENTRY

PLANT RESPONSE TO FIRE :

Weeping lovegrass numbers generally increase [59] or remain stable after burning. Weeping lovegrass does not decrease after fire in sandy areas in Oklahoma shortgrass prairie [60]. In western Texas, neither high nor low fireline intensities caused a negative impact on weeping lovegrass burned in both headfires and backfires during late winter in 1982 and 1983. Vegetation response was not correlated with fireline intensity or any of the environmental parameters measured [44].

A central Arizona chaparral watershed was burned by wildfire in June 1959. The watershed was seeded with weeping lovegrass in May 1960, and herbicides were used to remove shrubs to increase forage and water yields, reduce fire hazard, and "improve" wildlife habitat. The watershed was prescribed burned in the winter of 1971 to kill returning shrubs; weeping lovegrass frequency increased slightly on burned plots and decreased on unburned plots. In other areas in central Arizona, weeping lovegrass in mixed bunchgrass stands and in pinyon-juniper areas converted to grassland decreased when protected from grazing and fire. Pase and Kruse [37] hypothesized that weeping lovegrass decreases would continue due to the "smothering" effect of old growth on new growth.

DISCUSSION AND QUALIFICATION OF PLANT RESPONSE :

From February 2 to April 15, 1982, and from March 14 to April 28, 1983, 17 plots were burned in headfires and 10 plots were burned in backfires in western Texas. Plots were located in a relatively homogeneous, ungrazed, decadent weeping lovegrass stand established in 1976. Fires were ignited at different times and under a variety of weather conditions to obtain a wide range of fireline intensities. Headfires generated from 67 kW/m to 12,603 kW/m; backfires generated from 117 kW/m to 474 kW/m. Weeping lovegrass plant yield, plant height, and number of seedstalks were measured after one growing season to evaluate the effects of different fireline intensities. There was no significant relationship between fireline intensity and subsequent plant response [44,45].

In June 1956, a wildfire burned over rough mountainland in central Arizona chaparral between 5,000 and 6,500 feet (1,524-1,981 m) elevation. The area was aerielly seeded with weeping lovegrass after the fire. Below 6,000 feet (1,830 m) weeping lovegrass quadrat frequency increased from 3.7 percent in 1956 to 12.1 percent in 1961. Above 6,000 feet weeping lovegrass frequency increased from 0.5 percent in 1956 to 6.0 percent in 1961. Weeping lovegrass herbage production also increased over that time [38].

FIRE MANAGEMENT CONSIDERATIONS :

Weeping lovegrass production is stimulated by periodic burning. Winter burning can be used to maintain dominance by weeping lovegrass in chaparral [37]. A fast-moving fire with long flame lengths will not damage weeping lovegrass any more than a slow moving fire with short flame lengths. A prescribed fire can be conducted under conditions favorable for a variety of intended effects without reducing weeping lovegrass yield or vigor [44].

Weeping lovegrass should probably not be seeded after fire if management objectives include establishing or maintaining native grasses. Weeping lovegrass declines in palatability if not grazed or burned, but it does not usually disappear from a site. As it becomes less palatable, livestock shift grazing pressure to other species, which then decline. Increases in weeping lovegrass after fire can be impeded under very careful management of grazing allotments, however [63].

In the Pinal Mountain area, weeping lovegrass was aerially seeded following a 1951 wildfire that killed aboveground vegetation. A relatively vigorous stand of lovegrass grew among the sprouting shrubs during the first summer; seed was produced, germinated the following year, and thickened the stand. An exclosure was constructed in the stand in 1952; grazing occurred around the exclosure. Percent basal area of weeping lovegrass was as follows [41]:

	1952	1956	1958
Grazed	0.51	0.46	0.08
Ungrazed	0.68	1.25	0.39

To renovate a decadent weeping lovegrass stand, the plants can be burned just prior to spring green-up to remove most of the old material. If the plants are shredded before being burned, burning is more effective in removing dead plant centers [12]. Weeping lovegrass in Oklahoma showed consistently improved forage yields when burned annually with damp to wet soil conditions just before spring green-up between February 26 and March 10 [24].

Weeping lovegrass was planted on the Tonto National Forest in central Arizona after the Boulder Mountain Fire of June 1959, in which wildfire swept over steep, broken chaparral habitat. Weeping lovegrass was broadcast planted with a hand seeder on the fresh burn before loose surface ash had been disturbed by rain. Weeping lovegrass maintained a fair stand with good to excellent vigor during the 1959 and 1960 growing seasons. However, drought in 1961 killed many of the plants, and vigor of those remaining was listed as fair [34].

Weeping lovegrass cover is actually many times the basal area of the plant because of its long, spreading leaves. Five years following the 1956 Pinal Mountains wildfire, weeping lovegrass made up 97.6 percent of the vegetation cover on the burn [7]. Weeping lovegrass cover was decreasing on grazed areas by then, but still increasing in exclosures. By 1958, basal area on both sites had dropped below that of 1952 and many of the weeping lovegrass plants were dead. Weeping lovegrass died out in ungrazed areas as chaparral crown cover approached that of unburned areas [41].

A wildfire in 1987 in southeastern Arizona completely burned 11 native grass plots and 11 plots seeded to weeping lovegrass and Lehmann lovegrass. The fire reduced grass and shrub cover, and increased forb cover, for 2 postfire years in both plot types. Bird numbers increased greatly on burned plots in both habitats for 2 autumns, probably in response to increased seed production and availability. Fire improved weeping lovegrass areas for some summer birds in the short run by reducing otherwise heavy accumulations of litter. There was no evidence that fire can permanently restore the diverse native flora to species-poor plantations of weeping lovegrass [5].

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SPECIES: Eragrostis curvula

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