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SPECIES: *Kochia scoparia*

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Introductory

SPECIES: *Kochia scoparia*

AUTHORSHIP AND CITATION :

Esser, Lora L. 1995. *Kochia scoparia*. 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 :

KOCSO

SYNONYMS :

Kochia alata Bates [[103](#)]
Kochia sieversiana (Pallas) Mey [[103](#)]
Kochia trichophila Stapf. [[103](#)]

SCS PLANT CODE :

KOSC

COMMON NAMES :

summer-cypress
kochia
common kochia
burning bush

TAXONOMY :

The currently accepted scientific name of summer-cypress is *Kochia scoparia* (L.) Schrad. [[35,39,55,94,96](#)]. It is a member of the Chenopodiaceae family. Various authors recognize the following varieties:

K. s. var. scoparia
K. s. var. cultiva Farw. [[35,39,62](#)]
K. s. var. pubescens Fenzl [[73](#)]
K. s. var. subvillosa Moq. [[39](#)]
K. s. var. trichophila (Stapf.) Bailey [[35,103](#)]

LIFE FORM :

Forb

FEDERAL LEGAL STATUS :

No special status

OTHER STATUS :

NO-ENTRY

DISTRIBUTION AND OCCURRENCE**SPECIES: Kochia scoparia**

GENERAL DISTRIBUTION :

Summer-cypress is a forb of Eurasian origin that has become naturalized in the Great Plains and the western states [34,35]. It is also found in New England and the Midwest [9,53,62,73]. In Canada summer-cypress occurs in the Prairie Provinces and Quebec [8,13,63].

ECOSYSTEMS :

FRES29 Sagebrush
FRES30 Desert shrub
FRES31 Shinnery
FRES33 Southwestern shrubsteppe
FRES34 Chaparral-mountain shrub
FRES35 Pinyon-juniper
FRES36 Mountain grasslands
FRES37 Mountain meadows
FRES38 Plains grasslands
FRES39 Prairie
FRES40 Desert grasslands
FRES41 Wet grasslands

STATES :

AZ CA CO CT HI ID IL IN IA KS
ME MA MI MN MT NE NV NH NM NY
ND OH OK OR SD TX UT VT VA WA
WY AB MB PQ SK

BLM PHYSIOGRAPHIC REGIONS :

3 Southern Pacific Border
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 :

- 220 Rocky Mountain juniper
- 239 Pinyon-juniper

SRM (RANGELAND) COVER TYPES :

- 101 Bluebunch wheatgrass
- 303 Bluebunch wheatgrass-western wheatgrass
- 310 Needle-and-thread-blue grama
- 408 Other sagebrush types
- 414 Salt desert shrub
- 415 Curlleaf mountain-mahogany
- 416 True mountain-mahogany
- 501 Saltbush-greasewood
- 502 Grama-galleta
- 504 Juniper-pinyon pine woodland
- 508 Creosotebush-tarbrush
- 601 Bluestem prairie
- 604 Bluestem-grama prairie
- 605 Sandsage prairie
- 606 Wheatgrass-bluestem-needlegrass
- 607 Wheatgrass-needlegrass
- 608 Wheatgrass-grama-needlegrass
- 609 Wheatgrass-grama
- 610 Wheatgrass
- 611 Blue grama-buffalograss
- 612 Sagebrush-grass
- 615 Wheatgrass-saltgrass-grama
- 701 Alkali sacaton-tobosagrass
- 702 Black grama-alkali sacaton
- 703 Black grama-sideoats grama
- 704 Blue grama-western wheatgrass
- 705 Blue grama-galleta
- 706 Blue grama-sideoats grama
- 707 Blue grama-sideoats grama-black grama
- 709 Bluestem-grama
- 712 Galleta-alkali sacaton
- 714 Grama-bluestem
- 715 Grama-buffalograss
- 722 Sand sagebrush-mixed prairie

HABITAT TYPES AND PLANT COMMUNITIES :

Summer-cypress occurs mainly in grassland, mixed-grass prairie, shortgrass prairie, sagebrush, and desert shrub communities of western North America.

Summer-cypress is common in floodplain and riparian habitats.

In Quebec summer-cypress is codominant with mayweed (*Matricaria maritima*) along disturbed riverbanks [63]. In eastern Montana and Wyoming summer-cypress occurs on meadow floodplains and temporary mudflats [50]. It has been noted in Utah in marshes dominated by bulrushes (*Scirpus* spp.) and cattails (*Typha* spp.). Upland associates include black greasewood (*Sarcobatus vermiculatus*), Europe swampfire (*Salicornia europaea*), and smotherweed (*Bassia hyssopifolia*) [66,96]. It also occurs with saltcedar (*Tamarix ramosissima*) [15]. On the Colorado-Kansas border, summer-cypress occurs on the Arkansas River floodplain. Common associates include saltcedar, sand dropseed (*Sporobolus cryptandrus*), saltgrass (*Distichlis spicata*), and western wheatgrass (*Pascopyrum smithii*) [57]. In New Mexico summer-cypress forms a dense cover along creek floodplains. Associates in the adjacent grassland include cholla cactus (*Opuntia imbricata*), blue grama (*Bouteloua gracilis*), sideoats grama (*B. curtipendula*), hairy grama (*B. hirsuta*), and muhly (*Muhlenbergia* spp.) [68].

Prairie and plains grassland associates not previously listed include red

threeawn (*Aristida purpurea*) and plains silver sagebrush (*Artemisia cana* ssp. *cana*) in South Dakota [19]. In Kansas summer-cypress occurs in mixed-grass prairie with sunflower (*Helianthus annuus*), switchgrass (*Panicum virgatum*), ragweed (*Ambrosia psilostachya*), western poison-ivy (*Toxicodendron rydbergii*), and lambsquarter (*Chenopodium album*) [29,42]. Summer-cypress occurs also occurs in the Great Plains with saltgrass, foxtail barley (*Critestion jubatum*), and alkali sacaton (*Sporobolus airoides*) [91]. In Colorado summer-cypress occurs in shortgrass prairie dominated by indiangrass (*Sorghastrum nutans*) [10]. In Texas summer-cypress occurs in the Southern High Plains [84].

Summer-cypress occurs in desert shrub communities of Utah, Montana, and Wyoming [25,50]. In Utah summer-cypress occurs in shadscale (*Atriplex confertifolia*) [25], in saline meadows dominated by saltgrass and annual weeds, and in saltgrass-alkaligrass (*Puccinellia* spp.) communities [14]. In Montana and Wyoming summer-cypress occurs in saltbush (*Atriplex* spp.) desert shrubland and greasewood (*Sarcobatus* spp.) desert shrubland communities [50]. Common associates include Gardner's saltbush (*A. gardneri*), budsage (*Artemisia spinescens*), indiangrass, and plains prickly pear (*Opuntia polyacantha*) [50].

MANAGEMENT CONSIDERATIONS

SPECIES: *Kochia scoparia*

IMPORTANCE TO LIVESTOCK AND WILDLIFE :

Likelstock readlty graze summer-cypress, but it may cause photosensitization and polioencephalomalacia if overgrazed [17,22,35]. Toxic nephrosis and toxic hepatitis may also occur [22]. Toxic substances identified in summer-cypress include saponins, alkaloids, nitrates, and oxalates [22,104].

Despite its potential toxicity, summer-cypress is considered good forage in arid and semiarid regions [36] and in the Great Plains [9]. In New Mexico cattle on blue grama rangeland graze summer-cypress [53]. It is highly preferred by cattle in northeastern Colorado [93].

Pronghorn and white-tailed deer in Montana and Colorado graze summer-cupress [1,72]. In northcentral Montana the volume of summer-cypress in white-tailed deer diets increased from 6 to 41 percent from early to late winter. Summer-cypress is also grazed in the spring, summer, and fall [1]. In Colorado, North Dakota, and South Dakota, black-tailed prairie dogs eat summer-cypress seed [10,52].

PALATABILITY :

Palatability ratings for summer-cypress are as follows [24]:

	CO	MT	ND	UT	WY
cattle	fair	good	good	good	good
sheep	fair	good	good	good	good
horses	poor	fair	good	fair	good

NUTRITIONAL VALUE :

Although summer-cypress is potentially toxic, nutritional levels are adequate to meet the requirements of most classes of livestock, especially in the early growth stages [46,97]. Energy and protein content ratings of summer-cypress are fair [24]. In Saskatchewan in 1984, mean nutrient composition (%) of summer-cypress hay, harvested at two maturity stages, was as follows [51]:

	summer-cypress	
	full bloom (Aug. 3)	early seed (Aug. 29)
crude protein	10.5	6.4
ash	13.2	9.4
cellulose	30.7	34.9
NDF *	51.0	61.1
ADF **	32.2	38.9
IVOMD ***	57.7	48.7

* neutral detergent fiber

** acid detergent fiber

*** in-vitro organic matter digestibility

Summer-cypress nutritional values are rated as follows [24]:

	UT	WY	MT	ND
elk	fair	poor	poor	----
mule deer	good	poor	poor	good
white-tailed deer	----	poor	poor	good
pronghorn	fair	fair	----	good
upland game birds	good	----	----	good
waterfowl	poor	----	good	----
small nongame birds	good	----	----	good
small mammals	good	----	----	----

COVER VALUE :

Summer-cypress cover values are rated as follows [24]:

	UT	WY	MT	ND
elk	poor	poor	----	----
mule deer	fair	poor	----	good
white-tailed deer	----	poor	----	good
pronghorn	fair	poor	----	fair
upland game birds	good	fair	poor	good
waterfowl	poor	poor	----	good
small nongame birds	good	poor	poor	good
small mammals	good	good	poor	fair

VALUE FOR REHABILITATION OF DISTURBED SITES :

Summer-cypress colonizes disturbed sites such as streambanks, oil well pits, and surface-mined lands. Although an exotic, it has been used for revegetation of disturbed lands. It is rated moderately good for erosion control and long-term revegetation potential and good for short-term revegetation potential [24]. In Texas summer-cypress, at low seeding rates in mixtures with perennial species, will establish on rangelands that have been exposed to on-site disposal of drilling fluids [58].

Summer-cypress may colonize surface-mined lands very well but persists for only a few years. In North Dakota summer-cypress is the dominant colonizer on surface-mined lands. Iverson and Wali [44] studied a series of topsoiled, contoured, and seeded mined lands in western North Dakota. Summer-cypress was the dominant species in first year areas, showed high density but low vigor in second year areas, and was virtually eliminated by the third year. Decaying shoots and roots of large first-year summer-cypress may inhibit the growth of second-year seedlings [43,45].

In Saskatchewan summer-cypress is the dominant plant in abundance and percent cover among all pioneer species in sodic soils resulting from surface mining activity [78]. Summer-cypress seed is the most abundant species on spoilbanks created by strip-mine coal operations [4]. Summer-cypress offers the possibility for obtaining a rapidly established but short-lived protective vegetative cover on saline soils [78]. This cover could be used as a forage species or as a soil stabilizer, allowing more desirable species to establish [4,78]. On a strip-mine site on the Illinois prairie, summer-cypress percent cover was 14.1 the second year after disturbance [3].

In Alberta summer-cypress was chosen for germination trials on a phospho-gypsum tailings site. Germination rates were low for the control (30%) and for the three tailings treatment sites (20%). None of the summer-cypress germinants reached the first leaf stage [83].

OTHER USES AND VALUES :

Summer-cypress is planted as an ornamental [27,96].

OTHER MANAGEMENT CONSIDERATIONS :

In the Great Plains and the Pacific Northwest, summer-cypress is becoming a serious weed in pastures and rangelands [9,26,30].

Summer-cypress can be effectively controlled with a variety of herbicides; but is not controlled by phenoxy herbicides at rates recommended for crops [67,82]. Grazing or mowing will not control summer-cypress or stop seed production [9].

Summer-cypress is allelopathic, inhibiting early growth of other summer-cypress seedlings as well [108].

BOTANICAL AND ECOLOGICAL CHARACTERISTICS

SPECIES: Kochia scoparia

GENERAL BOTANICAL CHARACTERISTICS :

Summer-cypress is an introduced, annual forb that grows from 1 to 6 feet (0.3-1.8 m) tall [9,27,98]. Stems are erect, simple to much-branched, and often form pyramidal or rounded tops [6,35,37,39]. Leaves are 0.8 to 4 inches (2-10 cm) long and 0.02 to 0.48 inch (0.5-12 mm) wide [35,39,98]. The dry fruit has a single seed from 0.08 to 0.12 inch (2-3 mm) long [17,35]. Roots generally penetrate to depths of 6 to 8 feet (1.8-2.4 m) [9,26,27,32], but reached depths of 16 feet (4.8 m) in a sorghum field in Kansas during a severe drought [100]. Roots can extend laterally up to 22 feet (6.6 m) [9,27]. Summer-cypress is drought tolerant [27,46,58]. It is not tolerant of spring flooding [51].

RAUNKIAER LIFE FORM :

Therophyte

REGENERATION PROCESSES :

Summer-cypress reproduces exclusively by seed. It exhibits extreme reproductive plasticity in that one plant can produce over 50,000 seeds per year under favorable conditions, but only 5 seeds per year under stressful conditions [9,44]. Typically a summer-cypress plant will produce about 14,600 seeds per year [27]. Major means of seed dissemination is a "tumbleweed" dispersal mechanism via stem abscission

[4,9,43,44]. Wind and water are effective dispersal agents as well [45]. Seeds of summer-cypress have a dormancy period of 2 to 3 months and germinate early in the spring [27,30,45]. Seeds germinate in temperatures ranging from 39 to 106 degrees Fahrenheit (3.9-41 deg C), with optimum germination occurring at 61 degrees Fahrenheit (16 deg C) [27]. Seeds have little or no seedbank viability [44]; they either germinate or decay in 1 year [9]. In eastern Washington and Oregon summer-cypress seeds buried 4 inches (10 cm) in soil had less than one percent viability after 2 years [9,27]. Seed viability is reduced by livestock digestion [8,9]. Seedlings of summer-cypress are frost tolerant [9,27,44].

SITE CHARACTERISTICS :

Summer-cypress is common in fields, pastures, rangelands, waste places, and along roadsides [6,30,35,41,89]. Summer-cypress is most often found in open, unshaded areas on disturbed sites [9,17,46,55,90]. It grows well on a variety of soil types [46,55], and is often found on saline/alkaline soils [89,90].

Elevations for summer-cypress are as follows:

	feet	meters	
California	<5,000	<1,500	[39]
Colorado	4,000-9,700	1,200-2,910	[24,38]
Montana	<4,000	<1,200	[50]
New Mexico	6,200-7,000	1,860-2,100	[41,68]
Utah	2,800-6,550	850-1,985	[24,96]
Wyoming	3,600-6,200	1,080-1,860	[24]

SUCCESSIONAL STATUS :

Summer-cypress invades disturbed sites and may move onto undisturbed sites when growing conditions are ideal [18,56,59,78]. It colonizes rapidly and may suppress other vegetation [56]. Summer-cypress often invades saline rangelands [78,90].

Summer-cypress is an early pioneering annual on denuded areas. On a disturbed mixed-grass prairie site in Wyoming, summer-cypress was one of six forbs to dominate vegetation in the first few years after disturbance; summer-cypress persisted on the site for over 10 years [71]. In the Northern Great Plains summer-cypress invades wetland basins during drought and is especially opportunistic around brackish or saline wetlands [56]. In Montana summer-cypress often forms dense single-species stands; on recently disturbed sites other introduced annuals are common associates [37].

In Colorado summer-cypress is an early seral forb on disturbed sites and can dominate vegetation for the first 2 years on sites that are disturbed; if nitrogen is added, summer-cypress may dominate for up to 5 years [60]. On the Arkansas River, Colorado, in mature (20-25 year-old) saltcedar stands, summer-cypress cover in the forb layer is nearly 100 percent [57].

Near the Great Salt Lake, Utah, die-back of shadscale has favored summer-cypress and other species; summer-cypress is especially prevalent in valley bottoms [25].

SEASONAL DEVELOPMENT :

Summer-cypress flowering dates are as follows:

California	Aug-Oct	[64]
Colorado	Jun-Oct	[24]
Illinois	July-Sep	[62]
Kansas	July-Oct	[6]
Montana	Jul-Aug	24]
New England	Sep-Oct	[73]
North Dakota	July-Sep	[24]

Utah	July-Oct	[98]
Virginia	Jun-Sep	[99]
Wyoming	July-Oct	[98]
Great Plains	July-Oct	[35]

In Idaho, Oregon, and Washington, summer-cypress flowers from July to the first killing frost [9].

FIRE ECOLOGY

SPECIES: *Kochia scoparia*

FIRE ECOLOGY OR ADAPTATIONS :

Summer-cypress seed may colonize burned sites via its "tumbleweed" dispersal mechanism.

POSTFIRE REGENERATION STRATEGY :

Initial-offsite colonizer (off-site, initial community)

FIRE EFFECTS

SPECIES: *Kochia scoparia*

IMMEDIATE FIRE EFFECT ON PLANT :

Summer-cypress is probably killed by fire.

DISCUSSION AND QUALIFICATION OF FIRE EFFECT :

NO-ENTRY

PLANT RESPONSE TO FIRE :

In the Little Missouri Grasslands of North Dakota, 5,400 acres (2,160 ha) of grassland burned in 1988. In 1989, summer-cypress had "broken through the blackened land of a year ago" [23].

DISCUSSION AND QUALIFICATION OF PLANT RESPONSE :

NO-ENTRY

FIRE MANAGEMENT CONSIDERATIONS :

NO-ENTRY

References for species: *Kochia scoparia*

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