Index of Species Information

SPECIES: Elymus repens

Introductory

SPECIES: Elymus repens

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ABBREVIATION :
ELYREP

SYNONYMS :
Agropyron repens (L.) Beauv.
Elytrigia repens (L.) Desv. ex Nevski [4]

SCS PLANT CODE :
AGRE2

COMMON NAMES :
quackgrass
couchgrass
witchgrass
quitchgrass
quickgrass
chiendent

TAXONOMY :
The currently accepted scientific name for quackgrass is Elymus repens (L.) Gould (Poaceae) [51]. One variety and six forms have been recognized [18]. Short descriptions will follow each here, rather than in GENERAL BOTANICAL CHARACTERISTICS.

Form	Glume	Lemma	Rachis
E. r. aristatum	oblong	awned	smooth
E. r. trichorrhachis	oblong	blunt	hairy
E. r. pilosum	oblong	awned	hairy
E. r. vaillantianum	lanceolate	awned	smooth

E. r. heberhachis	lanceolate	blunt	hairy
E. r. setiferum	lanceolate	awned	hairy
E. r. var. subulatum	lanceolate	blunt	smooth

In the laboratory, quackgrass has been successfully crossed with the following species [2,18]:

E. r. x E. arenaurius = Agroelymus adamsii Rousseau
E. r. x Pseudoroegneria spicata
E. r. x Agropyron cristatum.

LIFE FORM :
Graminoid

FEDERAL LEGAL STATUS :
No special status

OTHER STATUS :
NO-ENTRY

DISTRIBUTION AND OCCURRENCE

SPECIES: Elymus repens

GENERAL DISTRIBUTION :
Quackgrass is widely distributed across North America: from coast to coast, south to the southwestern border states and north to Alaska [44]. It is also widespread throughout eastern Canada [18]. Because quackgrass does not tolerate long, hot summers it is absent from the Gulf Coast States (except northern Texas) [36].

ECOSYSTEMS :

FRES10	White - red - jack pine
FRES14	Oak - pine
FRES15	Oak - hickory
FRES18	Maple - beech - birch
FRES19	Aspen - birch
FRES29	Sagebrush
FRES32	Texas savanna
FRES36	Mountain grasslands
FRES37	Mountain meadows
FRES38	Plains grasslands
FRES39	Prairie
FRES41	Wet grasslands
FRES42	Annual grasslands

STATES :

AK	AZ	AR	CA	CO	CT	DE	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	SD	TN	TX	UT	VT	VA
WA	WV	WI	WY	NF	NS	ON	PQ		

BLM PHYSIOGRAPHIC REGIONS :

1	Northern Pacific Border
2	Cascade Mountains

3 Southern Pacific Border
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 Peidmont
14 Great Plains
15 Black Hills Uplift
16 Upper Missouri Basin and Broken Lands

KUCHLER PLANT ASSOCIATIONS :
K055 Sagebrush steppe
K056 Wheatgrass - needlegrass shrubsteppe
K063 Foothills prairie
K064 Grama - needlegrass - wheatgrass
K065 Grama - buffalograss
K066 Wheatgrass - needlegrass
K067 Wheatgrass - bluestem - beedlegrass
K068 Wheatgrass - grama - buffalograss
K069 Bluestem - grama prairie
K074 Bluestem prairie
K100 Oak - hickory forest

SAF COVER TYPES :
1 Jack pine
15 Red pine
16 Aspen
20 White pine - northern red oak - red maple
21 Eastern white pine
27 Sugar maple
19 Grey birch - red maple
51 White pine - chestnut oak
55 Northern red oak
108 Red maple
208 Whitebark pine

SRM (RANGELAND) COVER TYPES :
NO-ENTRY

HABITAT TYPES AND PLANT COMMUNITIES :
NO-ENTRY

MANAGEMENT CONSIDERATIONS

SPECIES: Elymus repens

IMPORTANCE TO LIVESTOCK AND WILDLIFE :
Quackgrass provides cover for numerous small rodents, birds, and

waterfowl [30,45].

PALATABILITY :
Many palatable hybrid crosses of quackgrass and other species have been developed and planted for livestock [2]. Feeding trials in Minnesota showed that a quackgrass biotype was as palatable as alfalfa (Medicago spp.) [37]. In cattle grazing trials in Montana, preference was shown for some clonal lines of a quackgrass-bluebunch wheatgrass (Pseudoroegneria spicata) cross [46].

The degree of use shown by livestock for quackgrass in five western states has been rated as follows [14]:

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

NUTRITIONAL VALUE :
Quackgrass has been rated fair in energy value and poor in protein value [14]. However, food value studies in Minnesota showed that quackgrass had as much crude protein as alfalfa during May [37]. These authors list concentrations of 10 minerals found in quackgrass in Minnesota. Results of Alaskan studies showed that quackgrass did not contain enough magnesium required for ruminant digestion nor did it have a high mineral content. However, digestibility was 64 percent and greater in three harvest trials [38].

COVER VALUE :
The degree to which quackgrass provides cover for wildlife has been rated as follows [14]:

	MT	ND	UT
small mammals	good	fair	good
small nongame birds	fair	good	fair
upland game birds	good	good	fair
waterfowl	good	good	fair

VALUE FOR REHABILITATION OF DISTURBED SITES :
Quackgrass has been used to revegetate mine tailings in Nova Scotia [48]. A quackgrass/Fairway crested wheatgrass hybrid may be useful for revegetating mine spoils and roadsides [2].

OTHER USES AND VALUES :
NO-ENTRY

OTHER MANAGEMENT CONSIDERATIONS :
Although quackgrass is considered an undesirable weed species it is often crossed with other wheatgrasses (Agropryon spp.) to create hybrids for grazing [2,6]. It can be controlled with chemicals such as glyphosate, dichlobenil, and fauzifop [50]. Sometimes, however, chemicals are not effective. In Wisconsin, 2,4-D applied to quackgrass caused a slight increase in quackgrass cover and no effect on stem density [23]. In Midwestern prairies, mowing and raking significantly reduced quackgrass biomass and prevented flowering the following growing season [13]. Mowing, burning, and chemical application combined may be the best way to eradicate quackgrass [33].

BOTANICAL AND ECOLOGICAL CHARACTERISTICS

SPECIES: Elymus repens

GENERAL BOTANICAL CHARACTERISTICS :
Quackgrass is a cool-season, exotic, perennial, rhizomatous graminoid. Its stems are erect, decumbent, and may reach heights of 1 to 3 feet (0.3-1 m) but more commonly grow to 0.25 to 1 inch (0.5-2 cm) high [18,21]. Quackgrass is green to whitish, with hirsute to nonhirsute leaves and awned or nonawned lemmas [18,26]. Rhizomes can grow 23 inches (60 cm) or more from the main shoot before sending out stems [36] and grow as deep as 8 inches (20 cm) [26]. Dahlberg [12] described how to identify seeds of the Agropyron genus to distinguish between desirable and undesirable species.

RAUNKIAER LIFE FORM :
Chamaephyte
Geophyte

REGENERATION PROCESSES :
Quackgrass propagates mainly by rhizomes but also reproduces by seed. Seed production, however, is reported to be as low as 25 viable seeds per plant per season [36]. Studies in Alaska showed that seed viability may vary depending on how deep and long the seeds have been buried; viablity is reduced significantly after burial for 21 months [10]. In greenhouse trials, dormancy of seeds buried 6 inches (15 cm) deep was 16 percent, while dormancy of seeds buried 0.8 inch (2 cm) deep was only 5 percent [9]. Cross-pollination is necessary for seed production [44]. Dormancy in rhizome buds has been related to nitrogen deficiencies, which peak in June [8]. Sod mats can be as dense as 367 meters of rhizomes per square meter [36].

SITE CHARACTERISTICS :
Quackgrass invades gardens, yards, crop fields, roadsides, ditches, and just about any disturbed, moist area [21]. It invades mixed-grass prairies as well as oak (Quercus spp.)-hickory (Carya spp.) and whitebark pine (Pinus albicaulis) forests [1,24,49]. It can tolerate some saline conditions in the low-lying valleys of Utah [26]. Salt-tolerant cultivars have been developed by crossing quackgrass with bluebunch wheatgrass [42]. Elevational range in four western states follows [14]:

State	Elevation
Utah	5,100-8,200 feet (1,554-2,499 m)
Colorado	4,800-10,000 feet (1,463-3,048 m)
Wyoming	4,500-8,000 feet (1,372-2,438 m)
Montana	5,000-6,600 feet (1,524-2,012 m)

Some associate species of quackgrass include sedge (Carex spp.), bulrush (Scirpus spp.), rush (Juncus spp.), bluebunch wheatgrass, crested wheatgrass, red top (Agrostis alba), indiangrass (Sorghastrum nutans), bluestems (Andropogon spp., Schizachyrium spp.), smooth brome (Bromus inermis), poverty oatgrass (Danthonia spicata), panic grass (Panicum spp.), Kentucky bluegrass (Poa pratensis), common ragweed (Ambrosia artemisiifolia), prairie pepperweed (Lepidium densiflorum), prairie dropseed (Sporobolus heterolepis), Canada thistle (Cirsium arvense), Carolina geranium (Geranium carolinianum), and bracken fern (Pteridium aquilinum) [1,5,11,15,24,26,28].

SUCCESSIONAL STATUS :

Quackgrass is an early seral dominant in disturbed areas [15,22,27].

SEASONAL DEVELOPMENT :
Quackgrass flowers from June through August in Colorado, Wyoming, and Montana; and from June through July in North Dakota [14].

Optimum temperatures for growth are between 68 and 77 degrees Fahrenheit (20 and 25 deg C), with no growth occurring above 95 degrees Fahrenheit (35 deg C) or below 35 degrees Fahrenheit (2 deg C) [16,36]. Primary rhizome growth begins in late May or early June and then again in September and October [36]. Rhizome growth seems to be favored by low temperatures [50 deg F(10 deg C)] and long days (18 hours) [36].

FIRE ECOLOGY

SPECIES: Elymus repens

FIRE ECOLOGY OR ADAPTATIONS :
Quackgrass is adapted to certain seasonal fires because of its rhizomes.

POSTFIRE REGENERATION STRATEGY :
Rhizomatous herb, rhizome in soil

FIRE EFFECTS

SPECIES: Elymus repens

IMMEDIATE FIRE EFFECT ON PLANT :
Late spring fires generally reduce quackgrass cover, flowering and biomass, while early spring fires can increase these.

DISCUSSION AND QUALIFICATION OF FIRE EFFECT :
A May burn in oak savannas of Wisconsin significantly reduced quackgrass and halted flowering [13]. Similar results (reduction in biomass and cover) have been shown for other areas [23,28]. Burning quackgrass on a biennial schedule for several years has been effective in eradicating this species [1,3].

PLANT RESPONSE TO FIRE :
Quackgrass cover can increase following fire.

DISCUSSION AND QUALIFICATION OF PLANT RESPONSE :
Five annual late April to early May burns in Minnesota resulted in a

decrease in quackgrass height but an increase in cover [5]. Plant vigor was reduced and flowering stopped, but quackgrass continued to spread into adjacent areas. At the time of the April burns, plant height was between 3.9 and 5.9 inches (10-15 cm), and during the May burn, heights were between 5.9 and 9.8 inches (15-25 cm). May and June burns on North Dakota grasslands "harmed" quackgrass in the first postburn season, but quackgrass recovered to almost preburn levels by the second postburn season. Following the late June fire, quackgrass showed a slight increase in cover, height, shoot density, production, and flowering [39]. Wisconsin grassland fires in March caused an increase in seed production by July and August [23].

FIRE MANAGEMENT CONSIDERATIONS :
Cool-season grasses such quackgrass are best eliminated with early spring burns [20,31,34]. Cool-season grasses can grow in the fall following summer dormancy; therefore, fall burns might also help reduce undesirable cool-season grasses [41].

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