GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: ***Bromus inermis***

Bromus inermis 简体中文 正體中文

System: Terrestrial

Kingdom	Phylum	Class	Order	Family
Plantae	Magnoliophyta	Liliopsida	Cyperales	Poaceae

Common name Russian brome (English), Austrian brome (English), grannelose trespe (German, Switzerland), staklos hejre (Danish), wu mang que mai (Chinese), smooth bromegrass (English), sverep bezbbranný (Czech), kweekdravik (Dutch), brome sans arete (French), smooth brome (English), Hungarian brome (English), awnless brome (English), brome de hongrie (French), rehukattara (Finnish), vihneetön kattara (Finnish), idänkattara (Finnish)

Synonym *Bromopsis inermis* , (Leyss.) Holub

Similar species

Summary Bromus inermis is an invasive, perennial C3 grass that has made an extensive impact on the grasslands of North America. B. inermis has become established by invading disturbed prairies and through repeated introductions for soil retention and livestock graze. It is known to have negative impacts on growth of native plants by slowing their growth and increasing extinction. B. inermis is also known to significantly impact the population dynamics and movement behaviour of several native arthropod species in North American prairies.

view this species on IUCN Red List

Species Description
Bromus inermis is a perennial C3 grass that grows from an extensive creeping rhizome. Its stems are hairless and erect, reaching 1.5 metres. Leaf blades are flat, hairless and 15-40cm long and 5 -15mm wide (ANHP, 2004). Leaf blades are greyish blue on the upper side and green on the lower side (Hilty, 2007). *B. inermis* displays closed leaf sheaths, with a small V-shaped notch and does not have auricles. It possesses an open panicle 5-20cm long, with 1 to 4 branches per node. Generally, there are several purple-brown spikelets per branch, each 2-3cm. long. Seeds are elliptical and range in colour from pale yellow to dark brown, and are approximately 1.2cm long. Awns are less than 3mm but may or may not be present (ANHP, 2004).

Lifecycle Stages
Bromus inermis is a perennial plant. Seeds remain viable for 2-10 years (ANHP, undated).

Uses
Silver leafhopper (*Athysanus argentarius*), an insect introduced form Europe, is frequently found in fields of smooth brome. Other insects that feed on *Bromus* spp. include the large headed grasshopper (*Phoetaliotes nebrascensis*) and the many winged wainscot (*Leucania multilinea*). Because smooth brome \"lacks awns that can injure...mouthparts and gastrointestinal tracts\" it is enjoyed by rabbits and hoofed herbivores (Hilty, 2007). *B. inermis* is planted to increase forage or to reduce erosion after fire (Grace *et al*, 2002). Smooth brome is used as hay, pasture, or silage for livestock, as it is high in protein. It works well in a cropping system with alfalfa or other legumes. *B. inermis*' massive root system makes it a very effective erosion control (USDA, 2007).

Habitat Description
Bromus inermis occurs on roadsides, riverbanks, edges of fields, prairies, woods and pastures. It prefers sandy soils to silty ones (Sather, 1987). *B. inermis* needs well aerated soils with a pH from 5.5-8. *B. inermis* is not tolerant of anaerobic, calcareous, or salty conditions, but can tolerate temperatures as low as negative 38 degrees Celsius (ANHP, 2004). It is also very drought tolerant which can be attributed to its deeply penetrating root system (Sather, 1987) *B. inermis* is not shade tolerant, and seed production, number of shoots and rhizomes, and dry weight of plant decreases when *B. inermis* does not receive sufficient sunlight (Sather, 1987).

Reproduction
Bromus inermis is a cool season grass. Growth phase begins in early spring and continues into the late fall. Roots develop within 5 days of germination. Seed production is variable, with plants producing between 156 and 10,080 viable seeds (Lowe & Murphy, 1955 in Sather, 1987). Seeds remain viable for 2-10 years (ANHP, 2004). Plants flower in synchrony and pollination can occur between plants up to 50m apart. *B. inermis* is an open pollinated plants and is self-incompatible. *B. inermis* can also reproduce through rhizome development which begins three weeks to six months after germination (Sather, 1987; North Dakota Department of Agriculture, Undated).

General Impacts
Bromus inermis is a highly competitive C3 grass that forms a dense sod, resulting in smothering and exclusion of other (native) species and decreasing natural biodiversity (ANHP, 2002; Oftinowski *et al*., 2007). ANHP (2002) writes that \"Smooth brome may inhibit natural succession processes...and [serves as an] alternate host for viral diseases of crops.\" *Anemone patens*, a long lived native perennial in North American grasslands, is negatively affected by the presence of B. inermis. The thatch left by previous *B. inermis* growth creates an issue for survival and germination of *A. patens* seeds (Williams & Crone, 2006). *B. inermis* has also shown to alter the population dynamics of the dominant native perennial prairie cordgrass (*Spartina pectinata*). When *B. inermis* grows in conjunction with native *S. pectinata* is known to reduce patch growth, decrease colonization rates and increase extinction rates of the native species (Dillemuth *et al*., 2009). *B. inermis* is also known to significantly impact the population dynamics and movement behaviour of several native arthropod species in North American prairies (Baum *et al*., 2004; Cronin 2003a, b, 2007; Cronin & Haynes 2004; Cronin *et al*., 2004; Haynes & Cronin 2003).

Management Info
Management in some areas is aided by *Bromus inermis*' tendency to grow in nearly pure swaths. Sather (1987) offers a caveat, that \"because of its cool season habit [*B. inermis*] is often lumped together with *Poa pratensis*,\" another exotic grass that affects tallgrass /mixed prairies. However, differences in the two species biology and their responses to management techniques reveal \"that there is a difference in the timing of the most susceptible phenological stages of the two species\" (Sather, 1987). Sather (1987) notes that \"more effective management of smooth brome might be achieved by first understanding the relative proportions of *B. inermis* to *P. pratensis* and their spatial distributions in the mosaic of vegetation. Treatment schedules could then be adapted to impact smooth brome in the boot stage in areas where it is the rightful target species.\" \r\n
Mechanical: Cutting smooth brome while it is still in boot stage (while the flowering head is still enclosed in sheath) may be the most effective means of mechanical control. Boot stage usually occurs while *B. inermis* is between 18-24 inches. Ideal conditions for cutting *B. inermis* include \"hot moist weather at the time of cutting, followed by a dry period\" (Sather, 1987). Managers of park areas may have even greater success if they continue mowing throughout the season. \r\n
Physical: Land managers report some success in reducing the establishment, spread and abundance of smooth brome with the use of prescribed burns (Willson & Stubbendieck, 2000). Willson and Stubbendieck (2000) recommend burning in early spring at the four or five leaf stage of smooth brome. This tactic is thought to work because smooth brome is a cool season grass that begins its growth cycle and sets seeds before native warm season grasses (i.e., C4). Therefore, a properly timed prescribed fire may reduce smooth brome abundance before it set seeds, while freeing up space and resources for native warm season grasses to flourish. According to Willson and Stubbendieck (2000), warm season grasses needed to respond and achieve a minimum of 20% coverage before the next year’s growth cycle begins for this practice to effectively reduce smooth brome populations. Rigorous field testing of this management tactic has yet to be attempted.\r\n
However, most research indicates that fire has not demonstrated an ability to effectively control *B. inermis*. Grilz and Romo (1994) note that tiller density, standing crop, and leaf area indices reveal that not only is *B. inermis* resistant to fire, but it may actually increase incidence of *B. inermis* as fire will restrict or kill its competitors. \r\n
Chemical: April or May applications of glyphosate at 2kg/ha has shown some ability to control spread. Paraquat is generally less effective that glyphosate (Sather, 1987).

Pathway
B. inermis is widely planted as a forage crop.*B. inermis* has been introduced to some areas for use in wildlife and conservation cover mixes for nesting cover and food.

Principal source:
Sather, Nancy. 1987. Element Stewardship Abstract for Smooth Brome.The Nature Conservancy.\r\n
Alaska Natural Heritage Program (ANHP). 2004. Invasive Species of Alaska--Smooth Brome.

Compiler: National Biological Information Infrastructure (NBII) & IUCN/SSC Invasive Species Specialist Group (ISSG)

Review: Forrest P. Dillemuth, Louisiana State University

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ALIEN RANGE

[8] CANADA

[41] UNITED STATES

Red List assessed species 2: EN = 1; VU = 1;

Anthus spragueii **VU**

Platanthera praeclara **EN**

BIBLIOGRAPHY
34 references found for **Bromus inermis**

Managment information

Blankespoor, G.W. & Larson, E.A .1994. Response of smooth brome (*Bromus inermis* Leyss.) to burning under varying soil moisture conditions. American Midland Naturalist 131: 266-272.

Bush, Tony. 2007. Plant Fact Sheet--Smooth Brome. USDA/NRCS.

Summary: Provides information about *Bromus inermis* management and agricultural uses.
Available from: http://plants.usda.gov/factsheet/pdf/fs_brin2.pdf [Accessed 20 July 2007]

Cronin, J.T., Haynes, K.J. & Dillemuth, F.P. 2004. Spider effects on planthopper mortality, dispersal, and spatial population dynamics. Ecology 85: 2134-2143.

Grace, J.B., M.D. Smith, S.L. Grace, S.L. Collins, and T.J. Stohlgren. 2001. Interactions between fire and invasive plants in temperate grasslands of North America. Pages 40–65 in K.E.M. Galley and T.P. Wilson (eds.). Proceedings of the Invasive Species Workshop: the Role of Fire in the Control and Spread of Invasive Species. Fire Conference 2000: the First National Congress on Fire Ecology, Prevention, and Management. Miscellaneous Publication No. 11, Tall Timbers Research Station, Tallahassee, FL.

Summary: This article discusses the use of fire as a management tool for invasive grasslands species.
Available from: http://jfsp.nifc.gov/invasive%20publications/ttrs_22pr_04_40_65_c.pdf [Accessed 20 July 2007]

Grilz, P., and Romo, T. Water Relations and Growth of *Bromus inermis* Leyss (Smooth Brome) Following Spring or Autumn Burning in a Fescue Prairie . American Midland Naturalist, Vol. 132, No. 2. (Oct., 1994), pp. 340-348.

Summary: The authors present discussion and statistical analysis on the effect of using controlled burns as a method of control of *Bromus inermis*

Higman, P. & Campbell, S. 2009. Meeting the Challenge of Invasive Plants: A Framework for Action. Michigan Department of Natural Resources Wildlife Division.

Summary: Available from: http://www.michigan.gov/documents/dnr/Invasives_strategy_final_289799_7.pdf

Sather, Nancy. 1987. Element Stewardship Abstract for Smooth Brome. The Nature Conservancy.

Summary: This resource provides detailed information about *Bromus inermis* ranging from habitat and reproductive strategies to in depth discussions of management techniques.
Available from: http://www.imapinvasives.org/GIST/ESA/esapages/documnts/bromine.pdf [Accessed 14 May, 2010]

Solecki, M.K. 2002. Vegetation management guideline. Smooth brome (*Bromus inermis* Leyss). Illinois Nature Preserves Commission.

Summary: Available from: http://dnr.state.il.us/INPC/VMG/VMG%20Smooth%20brome%20revised%202002.pdf [Accessed 14 May, 2010]

Utah State University Extension. Online database. *Bromus inermis*. 2002.

Summary: Provides detailed overview of *Bromus inermis* biology and effect on local environments. Also discusses management techniques.

Willson, G.D., Stubbendieck, J. 2000. A provisional model for smooth brome management in degraded tallgrass prairie. Ecological Research 18(1): 34-38.

General information

Alaska Natural Heritage Program. 2010. Weed Ranking Project

Summary: Available from: http://akweeds.uaa.alaska.edu/akweeds_ranking_page.htm

Alaska Natural Heritage Program (ANHP). 2004. Invasive Species of Alaska - Smooth Brome.

Summary: Provides a detailed overview of *Bromus inermis* habitat, invasive potential, and ecological impacts.
Available from:http://akweeds.uaa.alaska.edu/pdfs/species_bios_pdfs/Species_bios_BRIN.pdf [Accessed 20 July 2007]

Barkworth, M.E., Anderton, L.K., Capels, K.M., Long, S. &Piep, M.B. 2007. Manual of Grasses for North America. Utah State University Press: Utah.

Baum, K.A., Haynes, K.J., Dillemuth, F.P. & Cronin, J.T. 2004. The matrix enhances the effectiveness of corridors and stepping stones. Ecology 85: 2671-2676.

Canadian Botanical Conservation Network. Undated. Invasive Plant Lists.

Summary: Available from: http://www.rbg.ca/cbcn/en/projects/invasives/i_list.html

CONABIO. 2008. Sistema de informacin sobre especies invasoras en Mxico. Especies invasoras - Plantas. Comisin Nacional para el Conocimiento y Uso de la Biodiversidad. Fecha de acceso.

Summary: English:
The species list sheet for the Mexican information system on invasive species currently provides information related to Scientific names, family, group and common names, as well as habitat, status of invasion in Mexico, pathways of introduction and links to other specialised websites. Some of the higher risk species already have a direct link to the alert page. It is important to notice that these lists are constantly being updated, please refer to the main page (http://www.conabio.gob.mx/invasoras/index.php/Portada), under the section Novedades for information on updates.
Invasive species - Plants is available from: http://www.conabio.gob.mx/invasoras/index.php/Especies_invasoras_-_Plantas [Accessed 30 July 2008]
Spanish:
La lista de especies del Sistema de informacin sobre especies invasoras de mxico cuenta actualmente con informacin aceca de nombre cientfico, familia, grupo y nombre comn, as como hbitat, estado de la invasin en Mxico, rutas de introduccin y ligas a otros sitios especializados. Algunas de las especies de mayor riesgo ya tienen una liga directa a la pgina de alertas. Es importante resaltar que estas listas se encuentran en constante proceso de actualizacin, por favor consulte la portada (http://www.conabio.gob.mx/invasoras/index.php/Portada), en la seccin novedades, para conocer los cambios.
Especies invasoras - Plantas is available from: http://www.conabio.gob.mx/invasoras/index.php/Especies_invasoras_-_Plantas [Accessed 30 July 2008]

Cronin, J.T. 2003a. Matrix heterogeneity and planthopperparasitoid interactions in space. Ecology 84: 1506-1516.

Cronin, J.T. 2003b. Movement and spatial population structure of a prairie planthopper. Ecology 84: 1179-1188.

Cronin, J.T. 2007. From population sources to sieves: the matrix alters hostparasitoid sourcesink structure. Ecology 88: 2966-2976.

Cronin, J.T. & Haynes, K.J. 2004. Invasive plants promote unstable hostparasitoid patch dynamics. Ecology 85: 2772-2782.

Dillemuth, F D., Rietschier, E. & Cronin, J.T. 2009. Patch dynamics of a native grass in relation to the spread of invasive smooth brome (*Bromus inermis*). Biological invasions 11: 1381-1391.
Summary: Available from http://www.biology.lsu.edu/webfac/jcronin/biograph/publications/Dillemuth%20brome%20invasionl.htm [Accessed 14 May, 2010]
Haynes, K.J. & Cronin, J.T. 2003. Matrix composition affects the spatial ecology of a prairie planthopper. Ecology 84: 2856 2866.
Hilty, John. 2007. Grasses, sedges, and non-flowering plants of Illinois. Online database. *Bromus inermis.*
Summary: Provides information on *Bromus inermis* habitat and biology, as well as its role in the food web.
Available from: http://www.illinoiswildflowers.info/grasses/grass_index.htm#sm_brome [Accessed 20 July 2007]
Hitchcock, A.S. 1963. Manual of the grasses of the United States. Dover Publications: New York.
ITIS (Integrated Taxonomic Information System), 2005. Online Database *Bromus inermis* Leyss
Summary: An online database that provides taxonomic information, common names, synonyms and geographical jurisdiction of a species. In addition links are provided to retrieve biological records and collection information from the Global Biodiversity Information Facility (GBIF) Data Portal and bioscience articles from BioOne journals.
Available from: http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=40502 [Accessed 20 July 2007]
Kentucky Exotic Pest Plant Council. 2008.
Summary: Available from: http://www.se-eppc.org/ky/list.htmhttp://www.se-eppc.org/ky/list.htm
Larson, D.L., Anderson, P.J. & Newton, W. 2001. Alien plant invasion in mixed-grass prairie: effects of vegetation type and anthropogenic disturbance. Ecology Applications 11: 128-141.
Minnesota Department of Natural Resources. 2010. Smooth brome grass *Bromus inermis*.
Summary: Available from: http://www.dnr.state.mn.us/invasives/terrestrialplants/grasses/smoothbromegrass.html
North Dakota Department of Agriculture. Undated. Smooth brome (*Bromus inermis.*
Summary: Available from: http://www.agdepartment.com/noxiousweeds/pdf/smoothbrome.pdf
Otfinowski, R., Kenkel, N.C., Catling, P.M. 2007. The biology of Canadian weeds. 134. *Bromus inermis* Leyss. Canadian Journal of Plant Science 87: 183-198.
Porcher Michel H. *et al*. 1995 - 2002 Sorting Bromus Names. Multilingual Multiscript Plant Name Database - A Work in Progress. Faculty of Land & Food Resources. The University of Melbourne. Australia.
Summary: This website provides alternate taxonomies and common names in a variety of languages.
Available from: http://www.plantnames.unimelb.edu.au/Sorting/Bromus.html [Accessed 20 July 2007]
Stubbendieck, J., Friisoe, G.Y. & Bolick, M.R. 1994. Weeds of Nebraska and the Great Plains. Nebraska Department of Agriculture, Bureau of Plant Industry, Lincoln, Nebraska.
USDA, ARS, 2007. *Bromus inermis* Leyss. National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. *Bromus inermis*.
Summary: This website provides a comprehensive native distribution list.
Available from: http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?7807 [Accessed 20 July 2007]
USDA, NRCS, 2008. *Bromus inermis* Leyss. smooth brome. The PLANTS Database. National Plant Data Center, Baton Rouge, LA 70874-4490 USA.
Summary: Available from: http://plants.usda.gov/java/profile?symbol=BRIN2# [Accessed 20 May 2008]