Spartina anglica

<table>
<thead>
<tr>
<th>Kingdom</th>
<th>Phylum</th>
<th>Class</th>
<th>Order</th>
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<td>Plantae</td>
<td>Magnoliophyta</td>
<td>Liliopsida</td>
<td>Cyperales</td>
<td>Poaceae</td>
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Common name

Englisches Schlickgras (German), rice grass (English), townsends grass (English), common cord grass (English)

Synonym

Spartina x townsendii, fertile amphidiploid
Spartina x townsendii, agg.
Spartina x townsendii sensu lato

Similar species

Spartina anglica is a perennial salt marsh grass which has been planted widely to stabilize tidal mud flats. Its invasion and spread leads to the exclusion of native plant species and the reduction of suitable feeding habitat for wildfowl and waders.

Summary

Species Description

"A deep-rooting perennial, 30-130cm high, spreading by soft stout fleshy rhizomes, forming large clumps and extensive meadows. Culms erect, stout, many-noded, smooth. Leaves green or greyish-green; sheaths overlapping, rounded on the back, smooth; ligules densely silky ciliate, with hairs 2-3mm long; blades with a fine hard point, 10-45cm long, 6-15mm wide, flat or inrolled upwards, firm, closely flat-ribbed above, smooth, the upper widely spreading. Panicles erect, finally contracted and dense, 12-40cm long, of 2-12 spikes, overtopping the leaves. Spikes erect or slightly spreading, stiff, up to 25cm long; axis 3-angled, smooth; terminating in a bristle up to 5cm long. Spikelets closely overlapping, in two rows on one side of and appressed to the axis, narrowly oblong, flattened, 14-21mm long, mostly 2.5-3mm wide, 1- rarely 2- flowered, falling entire at maturity, loosely to closely pubescent. Glumes keeled, pointed; lower two-thirds to four-fifths the length of the upper, 1-nerved; upper as long as the spikelet, lanceololate-oblong, tough except for the membranous margins, 3-6 nerved. Lemma shorter than the upper glume, lanceolato-oblong, 1-3 nerved, with broad membranous margins, shortly hairy. Palea a little longer than lemma, 2-nerved. Anthers 8-13mm long. Grain with a long green embryo, enclosed between the lemma, palea, and glumes. Ch. no. 2n = 122-124" (Hubbard, C.E. 1968, Grasses, Penguin Books Ltd, England).
Lifecycle Stages
‘Die-Back’ has occurred since the mid 1920’s in several sward areas in the south of Britain. In Poole Harbour, England for example, 208ha of S. anglica recorded in 1924 was reduced to about 63 ha by 1984 (Gray & Raybould: in Patten 1997). Die-back is due to death caused by soft-rotting of the rhizomes and a gradual decline in vigour of old populations. The definitive cause of die-back is unknown. It however tends to occur in waterlogged, fine sediments, which induce anaerobiosis and toxic sulphide levels.

Habitat Description
S. anglica growth may have perceived benefits other than coastal protection and land reclamation. The increase in elevation level and sediment stabilization caused by S. anglica growth may enable native salt marsh species to establish and may facilitate transitions / successions to other vegetation types. This process will lead to the development of new salt marsh areas. S. anglica has high productivity. Growth and death results in a large amount of energy and organic matter entering the ecosystem. S. anglica may form the basis of many food webs and is a possible food source for many grazers. S. anglica growth may exclude several animal species but it also provides habitat for many others e.g. rails. S. anglica also has the potential to be used for economic benefits e.g. biofuel, paper making, fish food, green manure, or health products (Chung 1993).

Reproduction
Spartina anglica spread occurs in two phases, initial invasion and establishment of seedlings or vegetational fragments, and then expansion of tussocks by radial clonal growth (up to 30cm per year). Spreading tussocks fuse to form clumps that can expand into extensive meadows. Expansions may experience a lag phase. When expansions are occurring it can be very rapid. For example at Poole Harbour, England, S. anglica introduced in 1899, expanded to cover over 200ha (more than 60% of the intertidal mud flat) by 1924 (Gray & Raybould: in Patten 1997).

Spartina anglica is known for the unpredictable production, viability and germination of its seeds. Seed production of S. anglica is variable both temporally and spatially (Gray et al. 1991). It appears that S. anglica has a self-incompatibility system that requires to be broken down for seed set to occur (possibly by higher than average temperatures and humidity). Seed does not set in most years resulting in periods of spread by clonal expansion. Successful seed set has the potential to result in high seed numbers. S. anglica can produce up to 5 million spikelets per hectare. Less than 5% of these spikelets are likely to produce viable seed. S. anglica seeds do not form a seed bank. Seeds failing to germinate in their first season do not remain viable.

General Impacts
S. anglica has been used world-wide as an agent for coastal protection / stabilization and land reclamation. Its invasion and spread leads to exclusion of native plant species such as Zostera and Salicornia species. It also leads to the loss of feeding habitat for wildfowl and waders. The spread of S. anglica also threatens the economic interests of commercial oyster fisheries and tourism industries (due to invasion into amenity areas).
Management Info

Physical: Smothering with plastic sheeting, burying and repetitive burning have achieved kill rates of over 90%. They however, are more costly than herbicides and have practical problems e.g. sheeting may become dislodged by tidal currents. These methods are therefore only suitable for use on small areas. Seedlings or young plants can be dug out. In Northern Ireland the largest plant to be dug out successfully was 50cm in diameter. Attempts to dig up larger clumps have been unsuccessful. Other possible control methods being researched include steam treatment.

Chemical: Herbicide application is the most frequently used control method due to its practical ease of use and cost effectiveness. The herbicides Fluazifop (Fusilade) and Haloxyfop (Gallant) both regularly achieve over 90% kill after one application. Complete eradication requires repeated treatment application.

Biological: Other possible control methods being researched include biological control using an insect (Prokelisia spp.).

Pathway
Coastal protection and land reclamation schemes.

Principal source:

Compiler: Dr. Mark Hammond, Environmental Studies, University of Ulster, Coleraine, Northern Ireland & IUCN/SSC Invasive Species Specialist Group (ISSG)

Review: Dr. Mark Hammond, Environmental Studies, University of Ulster, Coleraine, Northern Ireland.

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ALIEN RANGE
[1] IRELAND
[2] UNITED KINGDOM

[1] NEW ZEALAND

BIBLIOGRAPHY
24 references found for Spartina anglica

Management information

Summary: Information about three species of Spartina that have been introduced into the intertidal areas of Washington. Includes Spartina biology and a review of Spartina control methods.

Alien Plants in Ireland, 2007. Spartina anglica
Summary: The database of alien plants in Ireland contains detailed information on 715 alien plant taxa currently occurring in (semi-) natural habitats in Ireland (both the Republic and Northern-Ireland). This database was developed in 2006 at the School of Natural Sciences, Trinity College Dublin, as part of the BioChange project, funded by the Environmental Protection Agency (EPA), Ireland.


Summary: This report is the first stage in a three-stage development of a Border Control Programme for aquatic plants that have the potential to become ecological weeds in New Zealand. Importers and traders in aquatic plants were surveyed to identify the plant species known or likely to be present in New Zealand. The Aquatic Plant Weed Risk Assessment Model was used to help assess the level of risk posed by these species. The report presents evidence of the various entry pathways and considers the impact that new invasive aquatic weed species may have on vulnerable native aquatic species and communities.

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Summary: This paper uses Spartina species characteristics to predict which Spartina species will invade specific sites along the U.S. Pacific coast. Mean tidal ranges were then used to predict the extent of spatial spread of a Spartina sp. after colonization.


Summary: A report of a meeting held at Liverpool University in 1982. Contains papers about Spartina history in Britain, the effects of Spartina on nature conservation, Spartina population studies and control attempts.


Summary: A report on vegetation development in a man-made dutch salt marsh after the artificial drainage system was discontinued and cattle grazing was reduced. Spartina anglica populations decreased partly through competitive replacement by Phragmites australis and partly due to herbivory by greylag geese (Anser anser).


Summary: Ph.D. thesis examining the effectiveness of various Spartina control techniques and their effect on associated flora and benthic fauna. Includes a management strategy section.


Summary: Collection of papers from a workshop in Seattle 1990. Included papers about Spartina biology and ecology, distribution and impacts, control methods and programs and regional studies.


Summary: Collection of papers about; The biology and natural history of Spartina; Impacts of Spartina infestation; Public activism and Spartina; Risks of control techniques; and Improving efficacy of control techniques and new approaches on the horizon.


Summary: Collection of papers about the history of Spartina invasions in Australia and New Zealand and subsequent control attempts.


General information


Summary: A review of Spartina plantations in China and their effects on coastal morphology, soils, animals and human beings.


Summary: Contains various papers about *S. anglica* biology, competitive ability against *Puccinellia maritima*, use as biofuel, and the effect on bird populations.


Summary: A comprehensive review of *S. anglica* research prior to 1991. Includes, the history of *S. anglica*, the origin of *S. anglica*, variations in *S. anglica*, and the ecology of *S. anglica* (includes control).


Coastal Zone Topics: Process Ecology and Management 1: 29-34.

Summary: Description of a simple *S. anglica* niche model based on multiple regression of 27 physical and tide-related variables (south and west Britain).

ITIS (Integrated Taxonomic Information System), 2005. Online Database *Spartina anglica*

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.


State Noxious Weed Control Board