GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: ***Spartina densiflora***

Spartina densiflora 简体中文 正體中文

System: Terrestrial

Kingdom	Phylum	Class	Order	Family
Plantae	Magnoliophyta	Liliopsida	Cyperales	Poaceae

Common name Austral cordgrass (English), espartillo (English, Argentina, Uruguay)

Synonym
Chauvinia chilensis , Steud. (1855)
Spartina montevidensis , Arechav. (1894)
Spartina patagonica , Speg.(1897)
Spartina densiflora , Brongn. var. *typica* St.-Yves, nom inval. (1932)
Spartina densiflora , Brongn. var. *typica* St.-Yves subv. *brongniartii* St.-Yves (1932)
Spartina densiflora , Brongn. var. *typical* St.-Yves subv. *pauper* St.-Yves (1932)
Spartina juncea , Willd. var. *montevidensis* (Arechav.) St.-Yves (1932)
Spartina juncea , Willd. var. *laxiflora* St.Y.ves (1932)

Similar species *Scirpus maritimus, Spartina alterniflora, Spartina anglica, Spartina foliosa, Spartina maritima, Spartina patens, Triglochin maritima*

Summary Spartina densiflora is an invasive cordgrass that primarily inhabits marsh and wetland environments. It is an extremely aggressive species that is capable of outcompeting native plants in their local ecosystems. The rapid growth rate and lack of dormancy period make Spartina densiflora a threat to local biodiversity in regions where it is invasive.

view this species on IUCN Red List

Species Description
Spartina densiflora is a cordgrass that grows caespitosely and has been known to form small meadows (Pfauth, 1998). Stems are up to 1.5 meters in length and are glabrous like the leaves which are inrolled when fresh, with pronounced ridges and leaf margins minutely ciliate. Rhizomes are present, though they are thin and wiry (Pfauth, 1998).

Notes
Spartina densiflora shows great phenotypic plasticity. It may vary between a tall form of 1.5 m and a short form of few centimeters tall (often called the Patagonian form). The density of inflorescences, spikes, spikelets, and their shape and size may vary importantly among plants (and that is why the common name “densflower” may lead to the misidentification of introduced clones) (Dr. Alejandro Bortolus, pers.comm., 2009).

Lifecycle Stages
Spartina densiflora demostrates a pattern of sequential development of identical growth units derived from tillers. Populations of *S. densiflora* are sustained by the growth of live shoots to support an annual die-back phase (Castillo, 2007). Spring to early fall is the time for rapid growth and development. *S. densiflora* blooms from April through July when it experiences the die-back phase with the loss of flowering culms (NWCB, 2007). *S. densiflora* does not show a clear dormancy period during the year within its native range (Bortolus 2006).

Uses
Spartina densiflora provides shelter from predators and nest building material for birds in southern South America, birds include two rare and endemic species as well as nearly 35 other bird species that use the marsh for migration (Bortolus, 2006). Mammals also benefit from the growth of *S. densiflora* as a place to feed and breed in urban areas where other such places may be scarce (Bortolus, 2006). In native ranges *S. densiflora* provides mass quanitities of detritus to estuarine systems annually (NWCB, 2007).

Habitat Description
Spartina densiflora is capable of invading a broad spectrum of habitats from intertidal marshes to terrestrial ecosystems. Soils that can support *S. densiflora* vary from well drained and oxygenated, to muddy and anoixc (Bortolus, 2006). Within the tidal marsh itself, *S. densiflora* outcompetes native flora between the lowest and highest topographic levels (Nieva, 2001). *S. densiflora* inhabits estuaries as well as open coastline where it succesfully populates rocky shores of softer limestone substrate or hard volcanic rock (Bortolus, 2006).

Reproduction
Spartina densiflora relys on both vegetative tiller production and seed germination to drive expansion over a range of salinities. The lack of a dormant period allows *S. densiflora* a competitive advantage over other species. Studies show that the germination rate of seeds are limited with increased salinities (Kittleson, 1997). In addition, higher desities of propagules can be found at higher elevations within the marsh. A negative correlation between rate of flowering and rate of propagule production exists (Nieva, 2001). Population density as well as competition effect these rates of establishment and reproduction as undisturbed areas are much more vulnerable to colonization success (Kittleson, 1997). Both sexual and asexual reproduction are a part of the reproduction of *S. Densiflora*, but the asexual role is very small in comparison (Nieva, 2001).

Nutrition
The photosynthesis process for *S. densiflora* can be impacted by the increase in salinity levels. Leaf expansion and leaf water potential are negatively correlated with salinty concentrations. The die-back on *S.densiflora* is significantly increased when a carbon inbalance is present. This is possible when the short photoperiods and anoxic sediments place more physiological stress on the plants than they can handle. This process causes a lower count of live shoots to be produced, thus making the die-back more catastrophic to the future survival of the plant (Castillo 2005).

General Impacts
Competition between *Spartina densiflora* and native flora leads to a loss of local plant biodiversity and decline of species specific habitats, which negatively effects local fauna. The increased invasion of *S. densiflora* can lead to a rise in marsh elevation because of plant presence on mud flats, thus limiting water flow and increasing sedimentation (San Fransisco Estuary Invasive Spartina Project, undated).
S. densiflora adds more complexity to mudflat habitats and it may increase local abundance and diversity of the associated fauna (Dr. Alejandro Bortolus, pers.comm., 2009).

Management Info
Physical: Manual or mechanical extraction as well as mowing, burning or covering are all management techniques that can work effectively on small populations of *Spartina densiflora* but have complications in areas with a large population.
Chemical: A combination of the aquatic herbicides imazapyr or glyphosate and surfactant is applied through various means directly to *S. densiflora* to eradicate and control populations of the invasive cordgrass. These two herbicides are currently the only aquatic chemicals approved for use in estuarine environments in the state of California by the USEPA and the California Department of Pesticide Regulation (CDPR) see (San Fransisco Estuary Invasive Spartina Project, undated).

Principal source: Bortolus, Alejandro., 2006. The austral cordgrass *Spartina densiflora* Brong.: its taxonomy, biogeography and natural history
NWCB, 2007. Washington State Noxious Weed Control Board. Online database *Spartina densiflora*.
Kittelson, Pamela M.; Milton J. Boyd ., 1997. Mechanisms of Expansion for an Introduced Species of Cordgrass, *Spartina densiflora*, in Humboldt Bay, California. Estuaries, Vol. 20, No. 4. (Dec., 1997), pp. 770-778.

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

Review: Dr Alejandro Bortolus, Grupo de Ecologia en Ambientes Costeros (GEAC) Centro Nacional Patagonico - CONICET. Argentina

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ALIEN RANGE

[1] MEDITERRANEAN & BLACK SEA
[2] SPAIN
[1] MOROCCO
[7] UNITED STATES

Red List assessed species 1: EN = 1;

Reithrodontomys raviventris **EN**

BIBLIOGRAPHY

26 references found for **Spartina densiflora**

Managment information
Ayres, Debra R.; Debra L. Smith, Katy Zaremba, Shannon Klohr & Donald R. Strong., 2004. Spread of exotic cordgrasses and hybrids (*Spartina* sp.) in the tidal marshes of San Francisco Bay, California, USA Biological Invasions 6: 221-231, 2004.
Summary: A study that looked at the spread of *Spartina densiflora* and other non-native *Spartina* species. The researchers also examined the ability of the non-natives to colonize a given habitat.
Cal-IPC. 2006. California Invasive Plant Inventory. Cal-IPC Publication 2006-02. California Invasive Plant Council: Berkeley, CA. Available: www.cal-ipc.org.
Summary: Available from: http://www.cal-ipc.org/ip/inventory/pdf/Inventory2006.pdf [Accessed 19 May 2008]
Collins, J.N, May M, Grosso C. 2003. Dense-flowered cordgrass *Spartina densiflora*. Practical Guidebook to the Control of Invasive Aquatic and Wetland Plants of the San Francisco Bay - Delta Region.
Summary: Information on description, economic importance, distribution, habitat, history, growth, and impacts and management of species.
Available from: http://legacy.sfei.org/nis/densecordgrass.html [Accessed 22 May 2010].
The Guidebook is available from: http://legacy.sfei.org/nis/index.html
Daehler, Curtis C. & Donald R. Strong., 1996. Status, prediction and prevention of introduced cordgrass *Spartina* spp. invasions in Pacific estuaries, USA. Biological Conservation Volume 78, Issues 1-2, October-November 1996, Pages 51-58
Summary: A study that analyzed the ways in which *Spartina* species invade in order to make predictions about ways to protect habitat from the invasives.
Kittelson, Pamela M.; Milton J. Boyd ., 1997. Mechanisms of Expansion for an Introduced Species of Cordgrass, *Spartina densiflora*, in Humboldt Bay, California. Estuaries, Vol. 20, No. 4. (Dec., 1997), pp. 770-778.
Summary: A study done in Humboldt Bay, California that looked at the mechanisms for expansion for *Spartina densiflora*.

General information
Bortolus, Alejandro., 2006. The austral cordgrass *Spartina densiflora* Brong.: its taxonomy, biogeography and natural history Journal of Biogeography 33 (1), 158–168.
Summary: This paper serves as a brief overview of *Spartina densiflora* in many different aspects.
Bortolus, Alejandro., 2008. Error Cascades in the Biological Sciences: The Unwanted Consequences of Using Bad Taxonomy in Ecology. Ambio Vol. 37, No. 2, March 2008
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Summary: Online database that provides information on invasive plants that effect the state of California.
Available from: http://www.cal-ipc.org/ip/management/plant_profiles/Spartina_densiflora.php [Accessed 5 February 2008]

Castillo, J.M, Alfredo E. Rubio-Casal, Susana Redondo, Antonio A. Alvarez-Lopez, Teresa Luque, Carlos Luque, Francisco J. Nieva, Eloy M. Castellanos, & Manuel E. Figueroa., 2005. Short-term responses to salinity of an invasive cordgrass. Biological Invasions (2005) 7: 29–35
Summary: A study that looked at the correlation between salinty levels and distribution limits of *Spartina densiflora*.
Castillo, J. M. & Figueroa, E., 2007. Effects of abiotic factors on the life span of the invasive cordgrass *Spartina densiflora* and the native *Spartina maritima* at low salt marshes: Changes in life span of cordgrasses
Summary: Variations in the life span of *Spartina densiflora* were analyzed in this study to help identify factors that limited the plants colonization and continued growth.
Castillo, J. M.; L. Fernandez-Baco; E. M. Castellanos; C. J. Luque; M. E. Figueroa; A. J. Davy., 2000. Lower Limits of *Spartina densiflora* and *S. maritima* in a Mediterranean Salt Marsh Determined by Different Ecophysiological Tolerances The Journal of Ecology, Vol. 88, No. 5. (Oct., 2000), pp. 801-812.
Summary: A study that looked at the tolerances of *Spartina densiflora* and *Spartina maritima* to different ecophysiological factors that can influence growth patterns and habitat limits.
Fortune, P. M., K. Schierenbeck, D. Ayres, A. Bortolus, O. Catrice, S. Brown and M. L. Ainouche., 2009. The enigmatic invasive *Spartina densiflora*: A history of hybridizations in a polyploidy context. Molecular Ecology (2008) 17, 4304–4316
ITIS (Integrated Taxonomic Information System), 2008. Online Database *Spartina densiflora* Brongn.
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=505303 [Accessed 30 January 2008]
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