

*Spartina densiflora* [简体中文](#) [正體中文](#)

**System:** Terrestrial

Kingdom	Phylum	Class	Order	Family
Plantae	Magnoliophyta	Liliopsida	Cyperales	Poaceae

<b>Common name</b>	Austral cordgrass (English), espartillo (English, Argentina, Uruguay)
<b>Synonym</b>	<i>Chauvinia chilensis</i> , Steud. (1855) <i>Spartina montevidensis</i> , Arechav. (1894) <i>Spartina patagonica</i> , Speg.(1897) <i>Spartina densiflora</i> , Brongn. var. <i>typica</i> St.-Yves, nom inval. (1932) <i>Spartina densiflora</i> , Brongn. var. <i>typica</i> St.-Yves subv. <i>brongniartii</i> St.-Yves (1932) <i>Spartina densiflora</i> , Brongn. var. <i>typical</i> St.-Yves subv. <i>pauper</i> St.-Yves (1932) <i>Spartina juncea</i> , Willd. var. <i>montevidensis</i> (Arechav.) St.-Yves (1932) <i>Spartina juncea</i> , Willd. var. <i>laxiflora</i> St.Y.ves (1932)
<b>Similar species</b>	<i>Scirpus maritimus</i> , <i>Spartina alterniflora</i> , <i>Spartina anglica</i> , <i>Spartina foliosa</i> , <i>Spartina maritima</i> , <i>Spartina patens</i> , <i>Triglochin maritima</i>
<b>Summary</b>	<i>Spartina densiflora</i> 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 <i>Spartina densiflora</i> a threat to local biodiversity in regions where it is invasive.



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## Species Description

*Spartina densiflora* is a cordgrass that grows caespitously 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* demonstrates 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 quantities 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 anoxic (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 successfully populates rocky shores of softer limestone substrate or hard volcanic rock (Bortolus, 2006).

## Reproduction

*Spartina densiflora* relies 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 densities 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 salinity concentrations. The die-back on *S. densiflora* is significantly increased when a carbon imbalance 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 Ecología en Ambientes Costeros (GEAC) Centro Nacional Patagónico - CONICET. Argentina

**Publication date:** 2008-05-16

## 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: \[www.cal-ipc.org\]\(http://www.cal-ipc.org\).](#)

**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

Bortolus, Alejandro & Oscar Iribarne., 1999. Effects of the SW Atlantic burrowing crab *Chasmagnathus granulata* on a *Spartina* salt marsh. Mar Ecol Prog Ser 178: 79-88, 1999

Bortolus, Alejandro., Pedro Laterrab, Oscar Iribarne., 2004. Crab-mediated phenotypic changes in *Spartina densiflora* Brong. Estuarine, Coastal and Shelf Science 59 (2004) 97-107

[California Invasive Plant Council., undated. Online database \*Spartina densiflora\*.](#)

**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](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 salinity 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](http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=505303) [Accessed 30 January 2008]

Lellaert, F., Kerckhof, F. and Coppejans, E. 2000. Eerste waarnemingen van *Undaria pinnatifida* (Harvey) Suringar (Laminariales, phaeophyta) en de epifyt *Pterothamnion plumula* (Ellis) Nageli (Ceramiales, Rhodophyta) in Noord Frankrijk en België. *Dumortiera*.

Mateos-Naranjo, Enrique; Redondo-Gomez, S.; Silva, J.; Santos, R.; Figueroa, M. E., 2007. Effect of prolonged flooding on the invader *Spartina densiflora* Brong. *Journal of Aquatic Plant Management*. 45 JUL 2007. 121-123.

Nievaa, F. J. J.; A. Diáz-Espejo, E. M. Castellanos and M. E. Figueroa., 2001. Field Variability of Invading Populations of *Spartina densiflora* Brong. in Different Habitats of the Odiel Marshes (SW Spain). *Estuarine, Coastal and Shelf Science* (2001) 52, 515-527

**Summary:** This study, done in the Odiel Marshes of southwest Spain focuses on the ways that *Spartina densiflora* is able to achieve such high ecological success.

Nieva, F.J.J; Castellanos E.M Castillo J.M; Figueroa M.E., 2005. Clonal growth and tiller demography of the invader cordgrass *Spartina densiflora* Brongn. at two contrasting habitats in SW European salt marshes. *Wetlands*: Vol. 25, No. 1 pp. 122-129

**Summary:** This study's aim was to gain knowledge of *Spartina densiflora* and its clonal growth habits as well as its interactions with the physiographic position in the tidal frame.

[NWCB, 2007. Washington State Noxious Weed Control Board. Online database \*Spartina densiflora\*.](#)

**Summary:** Online database that provides information on noxious weeds and invasive species to the Washington state area.

Available from: [http://www.nwcb.wa.gov/weed\\_info/Spartina\\_densiflora.html](http://www.nwcb.wa.gov/weed_info/Spartina_densiflora.html) [Accessed 4 February 2008]

[Pfauth, M. and M. Sytsma. 1998. Key to West Coast \*Spartina\* Species Based on Vegetative Characters. Portland State University Lakes and Reservoirs Program Publication 98-1.](#)

**Summary:** This paper gives detailed information about the physical characteristics of *Spartina densiflora* and provides a key.

Available from: <http://www.uaf.edu/ces/aiswg/pdf-documents/VegKeyNew-read.pdf> [Accessed 4 February 2008]

[San Francisco Estuary Invasive \*Spartina\* Project., undated. Invasive \*Spartina\* Project: Introduced \*Spartina densiflora\* \(dense flowered cordgrass\)](#)

**Summary:** Project outlining details and local impacts of *Spartina densiflora* in San Francisco Bay estuaries.

Available from: [http://www.spartina.org/species/spartina-densiflora\\_v2.pdf](http://www.spartina.org/species/spartina-densiflora_v2.pdf) [Accessed 4 February 2008]

[Tatum, E., P. Clifford, A.J. Pickart, and A. Craig, undated. California Invasive Plant Council., undated. 2005 Symposium Presentations. Online database. Comparison of removal methods for \*Spartina densiflora\* in Humboldt Bay.](#)

**Summary:** Online database that contains presentations from past symposiums held by California Invasive Plant Council.

Available from: [http://www.cal-ipc.org/symposia/archive/2005\\_presentations.php](http://www.cal-ipc.org/symposia/archive/2005_presentations.php) [Accessed 14 February 2008]

[University of California, undated. Online database \*Spartina densiflora\*.](#)

**Summary:** Online database that contains general information about invasive plant species.

Available from: <http://ucce.ucdavis.edu/datastore/detailreport.cfm?usernumber=77&surveynumber=182> [Accessed 7 February 2008]

[USDA, ARS, 2008. \*Spartina densiflora\* Brongn. National Genetic Resources Program. Germplasm Resources Information Network - \(GRIN\) \[Online Database\]. National Germplasm Resources Laboratory, Beltsville, Maryland.](#)

**Summary:** Available from: <http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?416236> [Accessed 30 January 2008]

[USDA, NRCS, 2008. The PLANTS Database \*Spartina densiflora\* Brongn. \(<http://plants.usda.gov>, 29 January 2008\). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.](#)

**Summary:** Online database that includes detailed information about various plants in the United States and its territories.

Available from: <http://plants.usda.gov/java/nameSearch?keywordquery=spartina+densiflora&mode=sciname> [Accessed 30 January 2008]