Ammophila arenaria **System:** Terrestrial

Kingdom	Phylum	Class	Order	Family
Plantae	Magnoliophyta	Liliopsida	Cyperales	Poaceae

Common name European beachgrass (English), oyat (French), ammophile des sables (French), marram (English), marram grass (English), élyme des sables (French), helm (Dutch), grama de las dunas (Spanish), Peskoljubka Pescanaja (Russian), sparto pungente (Italian), roseau des sables (French), Strandhafer (German), sand-hjaelme (Danish), barrón (Spanish)

Synonym
Arundo arenaria , (Linnaeus)
Ammannia coccinea purpurea , (Lam.) Koehne
Ammannia teres , (Raf.)
Calamagrostis arenaria , (L.) Roth

Similar species

Summary Commonly known as marram grass, *Ammophila arenaria* is a beach grass native to Europe, the Mediterranean, and the coasts of the Black Sea. Widely distributed to stabilise and establish sand dunes for forestry plantings, property protection and erosion control, it can compete with and displace native vegetation communities and alter habitats with further consequences for invertebrate communities and bird species such as the 'Endangered (EN)' Chatham Island oystercatcher (see *Haematopus chathamensis*). Once established, it spreads through rigorous rhizome growth and is difficult and costly to control.

view this species on IUCN Red List

Species Description
Ammophila arenaria is a coarse, perennial grass with stout culms that may reach 120 cm tall (Huiskes, 1979; in Buell *et al.*, 1995) with dense, spike-like panicles and long, sharp leaf blades which may reach up to five feet (Green, 1985). It has extensive and deep, scaly rhizomes (Green, 1965) which may give it an advantage in accessing water and nutrients (Partridge, 1995; in Dixon *et al.*, 2004).

Notes
In Europe, two different subspecies, which correspond to northern (ssp. *arenaria*) and southern (ssp. *arundinacea*) ecotypes, have long been recognized (Rodriguez-Echeverria *et al.*, 2008)

Lifecycle Stages
In the United States, inflorescences of *Ammophila arenaria* are initiated in autumn of the second year after germination and mature in May or June with flowering occuring from May to August (Russo *et al.*, 1988). In Europe, anthesis occurs in July and August but has been reported as early as May with mature fruits being dispersed in September, and seeds germinating in the following spring (Russo *et al.*, 1988). The viability of seeds however is very low with most reproduction occuring vegetatively through rhizome fragments (Russo *et al.*, 1988).

Uses
Ammophila arenaria has been widely distributed along coasts to stabilise and establish sand dunes for forestry plantings, property protection and erosion control (Russo *et al.*, 1988; Dixon *et al.*, 2004; Hilton, 2006).

Habitat Description
Ammophila arenaria grows in substrates with low organic matter and free drainage, growing most vigorously in mobile or semi-stable sand dunes (Huiskes, 1979; in Buell *et al.*, 1995) and thriving in wind-blown, foredune areas above the high tide line (Buell *et al.*, 1995). It is highly adapted to sand accretion, growing vigorously with the continued addition of fresh sand, and requiring it to avoid senescence (Russo *et al.*, 1988). Burial by sand promotes elongation of the leaves and the development of adventitious roots (Ranwell, 1959; in Russo *et al.*, 1988). It tolerates a range of soil pH from 4.5 - 9.0, soil temperatures from 10 - 40°C (Ranwell, 1959; in Russo *et al.*, 1988), and salt concentrations of no more than 1 - 1.5 % (Pickart, 1997). In its native range *A. arenaria* alone makes up the foredune plant community (Russo *et al.*, 1988). Further inland, other species are able to establish when the sand movement stabilises and *A. arenaria* subsequently begins to senesce (Russo *et al.*, 1988). In introduced habitats, *A. arenaria* initiates the formation of foredunes but does so differently than native plants, altering the habitat and subsequently displacing various native coastal species (US Fish and Wildlife Service, 2001; Moore & Davis, 2004).

Reproduction
Ammophila arenaria primarily reproduces vegatatively both from rhizomes and small basal buds located at the base of stems under their lower leaf sheaths (Green, 1965). It is capable of flowering from the end of June through August (in Oregon) but rarely produces viable seeds (Green, 1965). Seedlings have been found in nature but occur rarely with any seedlings that are observed usually living no longer than seven weeks due to small-scale sand erosion, desiccation, or burial (Huiskes, 1977). However, at certain locations where water is retained by an impermeable layer of boulder clay and the soil remains damp for longer periods, seedlings may establish (Huiskes, 1977).

General Impacts
Ammophila arenaria is a strong competitor, capable of completely displacing native vegetation communities in some parts of its introduced range (Pickart, 1997; Hilton *et al.*, 2005). This is attributed primarily to the ability of *A. arenaria* to rapidly accrete sand and survive the subsequent burial for much longer than native plant species (Hilton, *et al.*, 2005) in addition to its higher drought resistance (Dixon, *et al.*, 2004), vigorous rhizomatous reproduction (Hertling & Lubke, 2000) and ecological tolerance, including resistance to erosion (Hertling & Lubke, 2000; Hilton *et al.*, 2006).
It has also been suggested that *A. arenaria* may acculmulate local pathogens to the detriment of nearby native plants (Eppinga *et al.*, 2006).
A. arenaria forms dense monospecific stands which can differ greatly from the sparse native coastal vegetation that are the norm for some invaded areas in the United States and New Zealand (US Fish and Wildlife Service, 2001; Moore & Davis, 2004). This alters the natural dynamics of dune systems and can result in a drastically changed coastal topography or beach profile (Russo *et al.*, 1988), with the creation of taller and steeper dunes than normal (US Fish and Wildlife Service, 2001; Moore & Davis, 2004).
In addition to altering the impact and effect of storms and reducing the supply of sand to nearby areas (Dolan *et al.*, 1973; in Russo *et al.*, 1988), this can also reduce the nesting habitats of birds including the 'Endangered (EN)' Chatham Island oystercatcher (see *Haematopus chathamensis* in the IUCN Red List of Threatened Species) (Moore & Davis, 2004) and the federally listed snowy plover, (See *Charadrius alexandrinus* in the IUCN Red List of Threatened Species) (US Fish and Wildlife Service, 2001). *A. arenaria* is also known to significantly alter invertebrate communities, with even small percentages of cover severely depressing arthopod populations (Slobodchikoff & Doyen, 1977) and with dunes planted with *A. arenaria* having a higher Diptera abundance but lower Isopod abundance when compared to unmodified dunes (Web *et al.*, 2000).

Management Info
Please follow this link for a detailed account of the management and control of *Ammophila arenaria*. A summary can be found below.

Physical control: Physcial control is the most effective, but also the most cost and labour intensive management option; it involves hand pulling or digging out plants with a shovel or alternatively using heavy machinery to excavate and bury or rip underground rhizomes (Pickart, 1997).

Chemical Control: Glyphosate based herbicides such as Roundup and Rodeo have been found to be effective as well as haloxyfop based herbicides such as Gallant (Pickart, 1997; Moore & Davis, 2004). Haloxyfop based herbicides have the advantage of being grass-specific and therefore will not kill non-target native broadleaf species like glyphosate based herbicides (Moore & Davis, 2004).

Integrated management: All chemical treatment programs will have to include a physical removal element, as regrowth is not sufficiently exposed enough for follow up herbicide use, and dead biomass needs to be manually cleared before native habitat can be restored (Pickart, 1997). Futhermore, integrated management involving the use of prescribed fires (which are ineffective if used alone) followed by glyphosate-based herbicide use have shown promising and cost-effective results as an alternative to physical control techniques (Hyland & Holloran, undated).

Pathway
Most introductions of *Ammophila arenaria* to new locations result from intentional planting to the stabilize sand dunes (Aptekar & Rejmanek, 2000).*Ammophila arenaria* may be dispersed to new locations by the marine transport of dormant rhizomes, which can withstand submersion for long periods (Pickart, 1997).

Principal source: Pickart, Andrea J. 1997. Control of European Beachgrass (*Ammophila arenaria*) on the West Coast of the United States. California Exotic Pest Plant Council, The Nature Conservancy Lanphere-Christensen Dunes Preserve Arcata, CA 95521.
Russo, Mary; Andrea Pickart; Larry Morse and Rick Young, 1988. Element Stewardship Abstract for *Ammophila arenaria* European Beachgrass.

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

Review:

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ALIEN RANGE

[2] AUSTRALIA
[1] CHILE
[5] NEW ZEALAND
[7] UNITED STATES
[2] CANADA
[1] FALKLAND ISLANDS (MALVINAS)
[1] SOUTH AFRICA

Red List assessed species 4: EN = 2; VU = 1; NT = 1;

Charadrius obscurus **EN**
Haematopus chathamensis **EN**
Sterna nereis **VU**
Thinornis rubricollis **NT**

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43 references found for **Ammophila arenaria**

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Summary: Problems with degradation and management of sand dunes occur in both Australia and New Zealand. Many parts of sandy coastlines have been modified, particularly since European settlement. Marram grass (*Ammophila arenaria*), introduced last century to both countries to assist in stabilising dunes, has become a successful coloniser of dunes in higher latitudes where the climate is temperate. Management of marram grass-dominated sites is becoming a major issue in situations where coastal management agencies and community Coast Care groups wish to restore sites to indigenous vegetation communities while maintaining sand stability. Use of marram grass in New Zealand and the south-eastern states of Australia is reviewed. Examples of research and operational projects designed to replace marram grass with indigenous species are described. Continuing collaboration between research providers and dune managers on both sides of the Tasman is likely to result in enhancement of the natural character of the dunes without compromising the stabilising role of the vegetation cover.
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