

Mini data sheet on *Pennisetum setaceum* (Poaceae)

Added in 2009 - Deleted in 2012

Reasons for deletion:

Pennisetum setaceum was added to the EPPO Alert List in 2009 and transferred to the List of Invasive Alien Plants in 2012.

Why

Pennisetum setaceum (Poaceae) is a perennial grass originating from Northern Africa which is used as an ornamental plant. Within the EPPO region, its distribution is still limited. Because this plant has shown invasive behaviour in all continents and is of limited distribution in the EPPO region, it can be considered an emerging invader in Europe.

Geographical distribution

EPPO region: Algeria (native), France, Israel (native), Italy (including Sardinia), Morocco (native), Spain (including Balears and Islas Canarias), Tunisia (native).

Africa: Egypt (native), Eritrea (native), Ethiopia (native), Djibouti (native), Kenya (native), Libya (native), Sudan (native), Somalia (native), Swaziland, Tanzania (native), Zambia (native), Zimbabwe (native).

Asia: Indonesia, Lebanon (native), Oman (native), Saudi Arabia (native), Syria (native), Yemen (native).

North America: Bermuda, USA (Arizona, California, Colorado, Florida, Hawaii, Louisiana, New Mexico, Oregon, Tennessee).

Caribbean: Guadeloupe, Puerto Rico.

Oceania: Australia (New South Wales, Queensland), Fiji, French Polynesia, Guam, New Caledonia, New Zealand, Palau.

Note: the species is listed as a State Noxious Weed in the USA. In Australia, the plant is prohibited in Queensland and in New South Wales. In the Spanish mainland, the species has escaped into the wild in the provinces of Alicante, Granada, Malaga and Valencia.

Morphology

P. setaceum is a perennial grass with erect stems growing up to 1.3 m high. Leaves are 30 cm long and 3 cm wide. Their coloration may depend on water availability: they are green in winter and brown in summer. The small flowers are grouped in pink or purple, long feathery inflorescences up to 8-30 cm long. Fruits are small achenes.

Biology and ecology

The species grows rapidly and can live to up to 20 years. The plant flowers between March and September in Islas Canarias and reproduces by seeds. It reaches maturity in the first year, and produces seeds every year. Each plant may produce on average 100 seeds dispersed by wind which may remain viable in the soil for 6 years or longer. After 18 months, the viability of seeds decreased from 80% to 44% in laboratory experiments. Apomixis (asexual seed formation) may occur. An ornamental cultivar "Rubrum" or "Cupreum" is recognized, which does not produce seeds.

P. setaceum requires open space, warm temperatures and prefers full sun, but it can tolerate partial shade. Germination requires natural seasonal disturbance such as seasonal rainfall. The species has a wide elevational range but is limited to areas with a median annual rainfall of less than 127 cm. It can grow on all types of soils (clay to sandy), acid to slightly alkaline, but does not tolerate saline conditions. *P. setaceum* is considered to become facultatively inactive with extended drought, freezing, or near freezing temperatures. The species is very aggressive in dry habitats. In wet habitats however, it is out competed by other grasses.

Habitats

The species is known to occur in deserts, grasslands and disturbed sites such as roadsides. According to the Corine Land Cover nomenclature, these habitats correspond to: Pastures, Natural grassland;

Deserts (sparsely vegetated areas); Road and rail networks and associated land; Other artificial surfaces (wastelands).

Pathways

The plant is used as a landscape ornamental plant, and is used for soil stabilisation. In Las Palmas (Islas Canarias), it is hypothesised that seeds of the plant were carried during the construction of the airport with machinery coming from the Western Sahara. Seeds are dispersed by the wind, by water and possibly by birds. Seeds may also be dispersed by vehicles and livestock. It has been observed that new infestations may occur at more than 1 km from parent plants.

Impacts

P. setaceum has been the object of a Weed Risk Assessment done by PIER (Pacific Islands Ecosystems at Risk) concluding that the species represents a high risk (the score obtained was 26, a species representing risk when the score reaches 7). *P. setaceum* is a poor pasture grass because of its coarse rough leaves, and is considered a weed in many dry habitats. It is a very aggressive plant forming monospecific stands and out competing native plants by reducing available space and taking scarce water and nutrients. It also raises fuel loads, and becomes extremely inflammable in winter, increasing the intensity and spread of fire, resulting in severe damage to native dry forest species adapted to less extreme fire regimes. Fires that follow invasions impact ground nesting birds and terrestrial animals and have the ability to change the structure of deserts. In Hawaii, *P. setaceum* dominates areas that formerly supported native *Heteropogon contortus* (Poaceae).

P. setaceum is thought to have higher photosynthetic rate, to produce more total biomass, and to allocate more biomass to leaves compared to *Heteropogon contortus*. Once in desert grassland where fire is part of the ecology, the presence of *P. setaceum* is not as serious an ecological threat. In Macaronesia, the species is known to affect endangered species and other vulnerable species. Additionally, infestations may impede pedestrian and vehicle access.

Control

Planting native species after the removal of *P. setaceum* will help to prevent re-establishment of the plant. Monitoring for seedlings and removing them is a good practice as they are easy to pull up when young. The species has been subject to eradication plans in Islas Canarias.

The long lived seeds of the plant make the control extremely difficult. Small infestations may be managed by uprooting plants by hand or by digging them out destroying the inflorescences in order to prevent seed dispersal. Removal by hands may need to be repeated several times per year. Seed heads may be removed to slow the spread of the plant, taking into consideration that the plant seeds several times a year.

Extensive infestations may be controlled with systemic herbicides such as hexazinone.

Sources

California Exotic Pest Plant Council – Plant assessment form for *Pennisetum setaceum*.

http://sbsc.wr.usgs.gov/research/projects/swepic/SWVMA/PLANTPDF/Pennisetum_setaceum_AZ_PAF.pdf

Global Invasive Species Database - *Pennisetum setaceum*.

<http://www.issg.org/database/species/ecology.asp?si=309&fr=&sts=tss>

Invasiveness and Impact assessment of *Pennisetum setaceum* in Victoria.

www.dpi.vic.gov.au/DPI/Vro/vrosite.nsf/pages/impact_fountain_grass

www.dpi.vic.gov.au/dpi/vro/vrosite.nsf/pages/invasive_fountain_grass

Medio Ambiente Canarias (1999) [Eradication of *Pennisetum setaceum* on the Island of La Palma]. Issue 15/1999. (In Spanish).

<http://www.gobiernodecanarias.org/cmoyot/medioambiente/centrodocumentacion/publicaciones/revista/1999/15/217/index.html>

Pacific Island Ecosystems at Risk (PIER) - Weed Risk Assessment for *Pennisetum setaceum*.

http://www.hear.org/pier/wra/pacific/pennisetum_setaceum.htmlwra.htm