

Mini data sheet on *Stipa trichotoma*, *Stipa neesiana* and *Stipa tenuissima*

Added in 2009 - Deleted in 2012

Reasons for deletion:

Stipa trichotoma, *S. neesiana* and *S. tenuissima* were added to the EPPO Alert List in 2009 but as no immediate risk was perceived, they were transferred to the Observation List in 2012.

Why

Stipa trichotoma (= *Nassella trichotoma*), *Stipa neesiana* (= *Nassella neesiana*) and *Stipa tenuissima* (= *Nassella tenuissima*) (Poaceae - common names: serrated tussock, Chilean needle grass and Mexican feather grass, respectively) are perennial grasses. All three species have been voluntary introduced into the EPPO region for ornamental purposes, where their distribution is still limited. Because these plants have shown invasive behaviour in different continents and are of limited distribution in the EPPO region, they can be considered as potential emerging invaders in Europe.

Geographical distribution of *Stipa trichotoma*

EPPO region: France (including Corse), Italy.

Africa: South Africa.

North America: USA (Illinois, Kentucky, North Carolina, South Carolina).

South America (native): Argentina, Brazil, Uruguay.

Oceania: Australia (New South Wales, Tasmania, Victoria), New Zealand.

Note: S. trichotoma is regulated in all Australian States and is one of the 20 weeds considered of national significance. It is estimated that it covers more than 1.1 million ha in Australia. In the USA, it is considered a noxious weed, particularly in southern states. In Corse, the species does not seem to exhibit an invasive behaviour so far.

Geographical distribution of *Stipa neesiana*

EPPO region: France (including Corse), Spain.

North America: USA (Alabama).

South America (native): Argentina, Bolivia, Brazil, Chile, Ecuador, Uruguay.

Oceania: Australia (New South Wales, Queensland, South Australia, Tasmania, Victoria), New Zealand.

Note: S. neesiana is regulated in all Australian States and is one of the 20 weeds considered of national significance. Although it had been introduced in 1934 in Australia, it has only been recognized recently as a weed of major importance.

Geographical distribution of *Stipa tenuissima*

EPPO region: France (including Corse), Italy.

Africa: South Africa.

North America: USA (California, New Mexico (native), Texas (native)).

South America (native): Argentina, Chile.

Oceania: Australia (New South Wales, Victoria), New Zealand.

Note: in Australia, S. tenuissima is regulated in Queensland, New South Wales, Southern Australia, Victoria and Western Australia.

Morphology

These three *Stipa* spp. are perennial grasses forming dense tussocks, their leaves are numerous, fine, bristly, tightly rolled, and rough to touch.

Stipa trichotoma

S. trichotoma has a deep fibrous root system and can live more than 20 years. It grows up to 0.6 m high and its leaves are thin, 0.5 mm wide, and glabrous. The seed is 1.5-2 mm long. The species is identifiable via the leaf bases which are more tightly packed than the other *Stipa* spp., slender, and whitish (never purple or blue green).

Stipa neesiana

S. neesiana can grow up to 1 m high, and leaves are 1-5 mm wide. The flowering seed heads show a distinctive purplish colour. In addition to normal flower seeds, *S. neesiana* produces hidden seeds at the node and bases of flower stems. The seed is 8-10 mm long and very sharp.

Stipa tenuissima

S. tenuissima grows up to 0.7 m high. Leaves are thin, 0.5 mm wide. The lower half of glumes are purplish in the lower half. The seed is 2-3 mm long.

Unlike *S. trichotoma*, the mature seeds of *S. tenuissima* do not always fully project and spread, and the flowering stem does not always break at the uppermost stem node when mature.

Biology and ecology

The three species are adapted to a wide range of climates and soils types. They are tolerant to drought, fire and grazing, but are limited by salinity and waterlogging. *S. tenuissima* prefers a dry temperate climate with a mean annual rainfall ranging from 300 to 800 mm. *S. neesiana* grows in temperate regions with annual rainfall greater than 500 mm. *S. trichotoma* seems to have more stringent requirements as hot summer temperatures limit its distribution. *S. trichotoma* does not survive repeated ploughing.

Mature plants of *S. trichotoma* can produce more than 140 000 seeds per plant per year which can be blown by wind over long distances (up to 20 km). *S. neesiana* can produce more than 20 000 seeds. Seedlings are usually outcompeted by other plants, but become competitive under conditions of drought or overgrazing when more favourable pasture species have already been consumed by stock. In the state of Victoria in Australia, the area covered by *S. trichotoma* has been multiplied by 4 in 20 years.

Habitats

According to the Corine Land Cover nomenclature, all three species are recorded in the following habitats: arable land, pastures, natural grassland, road and rail networks and associated land, other artificial surfaces (wastelands).

S. neesiana and *S. tenuissima* also invade banks of continental water, riverbanks/canalsides (dry river beds) and forests.

Pathways

All three *Stipa* spp. are used as ornamental plants. Seeds are spread naturally by wind or water, they adhere to clothing and livestock and can be dispersed on farm machinery or as a contaminant of seeds and fodder.

Impacts

Stipa spp. are vigorous plants which crowd out desirable pasture species, reducing stock carrying capacity. They have a high fibre content and a low nutritive value, and form indigestible balls in the stomach of stock, leading to significant losses in stock production. The sharp seeds may cause injury to stock, including blindness. As seeds contaminate wool, they can devalue its value.

It is estimated that *S. trichotoma* costs New South Wales' agriculture more than 40 million AUD annually. Additionally, in Australia, the estimated average annual cost of controlling *S. neesiana* is between 60 and 120 AUD per ha, depending on whether the infestation is scattered or dense.

These species also cause environmental damage to native grasslands, in New South Wales, trials on heavily infested areas by *Stipa* spp. can also crowd out native grasses in coastal or open areas, and create a fire hazard in urban areas.

It is predicted that *S. tenuissima* may be more invasive than *S. trichotoma* because of its ability to adapt to a wide range of climates. If left to spread, the economic cost to Australia over the next 60 years is estimated to be 39 million AUD annually.

Control

Prevention is the cheapest and most effective method. It includes avoiding purchasing hay, stock feed or stock from contaminated areas. Stock should be placed in a paddock for 7-10 days before moving them. Maintaining weed-free machinery and equipment is also very important. All control programs should aim to reduce the amount of seed produced. Management measures include grubbing out small infestations before they flower and set seed, and to destroy them by burning. Larger infestations can be treated annually with an appropriate herbicide before plants flower and set seed. In arable lands, cultivation techniques such as ploughing may reduce the seed bank. Nevertheless, ploughing or herbicide treatment alone usually results in reinfestation of *Stipa* spp. from seed in the soil. Therefore

an integrated management strategy should be preferred. Continued checking and treatment is needed for 5 to 10 years to control young seedlings that germinate from the soil seed bank. Treated areas should be re-planted with desirable species. Considering the invasive behaviour of these species in Australia, it is considered that pastures, natural grasslands and riverbanks of temperate and Mediterranean EPPO countries might be at risk.

Sources

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