2.15 Phragmites: Common Reed

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Phragmites australis (Cav.) Trin. ex Steud; emergent plant in the Poaceae (grass family)
Derived from *phragma* (Greek: fence) and *australis* (Latin: southern): “southern plant with fence-like growth”

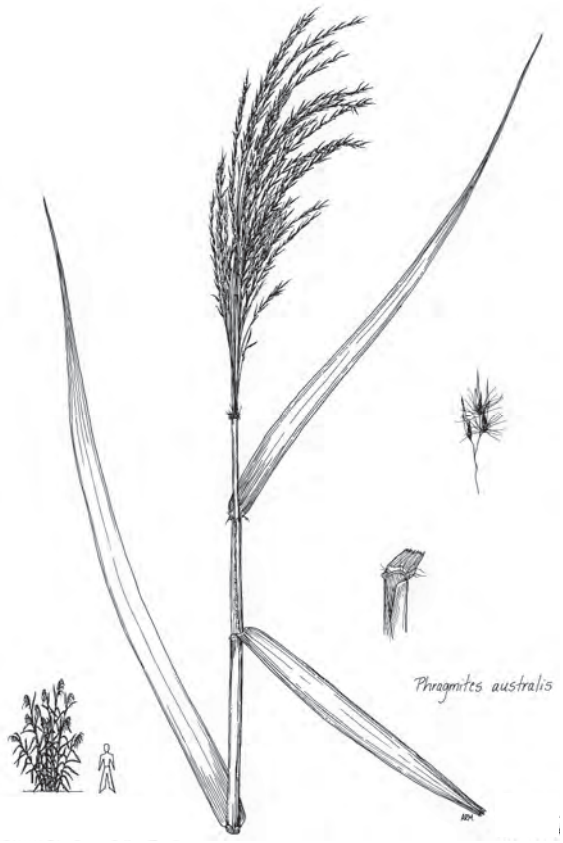
Invasive Eurasian lineage probably introduced from Europe to the northeastern Atlantic Coast (early 1800’s)
Gulf Coast lineage (*Phragmites australis* var. *berlandieri* (E. Fourn.) C.F. Reed) in the southeastern United States (unclear if native or exotic)
Native lineage (*Phragmites australis* subsp. *americanus* Saltonstall, Peterson & Soreng) historically widespread throughout North America, except for the southeastern United States

Introduction and spread

Phragmites (also called common reed) is a tall wetland grass that grows from thick white rhizomes (underground stems) in areas with fresh to brackish water. It is one of the most common flowering plants in the world and is found on every

continent except for Antarctica. Phragmites occurs in every US state except Alaska and in every Canadian province except Nunavut and Yukon. There are three lineages of phragmites in North America – a native lineage (*Phragmites australis* subsp. *americanus*), a Gulf Coast lineage whose origins are unclear (*Phragmites australis* var. *berlandieri*) and an invasive Eurasian lineage.

Native phragmites (*P. australis* subsp. *americanus*) was historically found throughout North America except for the southeastern US. It has been replaced by the Eurasian type in much of its historic range (especially in the Northeast) but can still be found in the Midwest and western states. The Gulf Coast type of phragmites can be found from Florida to California in the southern US. It is unknown whether it is native or was introduced to the Gulf Coast region, but it is not considered a problem species in many areas. However, the Gulf Coast type may grow aggressively in the southwestern US and in some disturbed wetlands in the Southeast, where it can completely replace other vegetation if not properly managed. The Eurasian type is much more invasive than the native and Gulf Coast types and is able to outcompete them for space and resources. It was introduced to the northeastern US in the early 1800s in ship ballast. The Eurasian type is now the dominant type of phragmites along the Atlantic Coast and in the Great Lakes area and is continuing to increase in western and southeastern states. This type of phragmites is very aggressive and has been called an "ecosystem engineer" because it changes the areas it invades and replaces other vegetation. Large monotypic (single-variety) stands of Eurasian phragmites are associated with decreased plant diversity. In addition, soil properties, sedimentation rates and wildlife habitat may be altered when marshes are converted from diverse plant communities to dense, monotypic stands of phragmites.



Phragmites can be found in many different habitats. It is most common in freshwater marshes, salt marshes and on the edges of lakes, irrigation ditches and other waterways. The species can tolerate seasonal drought as well as frequent, prolonged flooding. Phragmites grows best in sites with fresh to brackish water (0 to 5 parts per thousand salinity) but it is highly salt tolerant and can reportedly survive in areas that are as saline as full strength ocean water (35 parts per thousand). It establishes and grows well on disturbed sites such as roadsides and is often considered a weedy or nuisance species.

Description of the species

Phragmites is a perennial grass that can reach up to 20 feet in height, but is typically 10 to 12 feet tall. Leaves are 4 to 20 inches long, 0.4 to 2 inches wide and are blue-green to green in color. Leaves are hairless with rough margins and are arranged in an alternate manner on the stems. The ligule (outgrowth on the upper leaf surface where the leaf blade meets the leaf sheath) is a fringe of long hairs. Stems are stout, erect and hollow and will die back during the winter. Phragmites flowers in late summer through fall and produces flowers in large, light brown panicles (1 to 2 feet in length) that form silky hairs at maturity.

The different lineages of phragmites are very difficult to tell apart in the field and genetic testing is required for identification. However, there are a few traits that may help distinguish between the three major lineages. The native type often grows in mixed stands with other species, whereas the Gulf Coast and Eurasian types form monocultures with high stem densities. Stems of the native and Gulf Coast types are smooth and shiny, while stems of the Eurasian type are dull and have ridges. The flowers of the native and Eurasian types are both upright, but are much more dense in the Eurasian type. In contrast, the flowers of the Gulf Coast type are drooping and more open in appearance.

Reproduction

Phragmites spreads across long distances primarily through seeds, although transportation of rhizome fragments can also play a major role in dispersal. Seeds are spread by wind and water and viability is variable. Local spread of

phragmites is mainly through rhizomes and stolons (creeping horizontal plant stems). Rhizomes have been found buried up to 30 feet deep in the substrate and can spread laterally over 15 inches per year, while stolons can grow more than 4 inches per day and may reach 40 feet in length in a growing season.

Problems associated with phragmites

Invasive phragmites forms large monotypic stands that are virtually impenetrable. These stands replace diverse native plant communities and reduce ecosystem productivity. The Eurasian type of phragmites alters soil properties and sediment accumulation rates and reduces wildlife habitat. However, phragmites does provide minor shade, nesting and cover habitat for mammals and fishes. Phragmites also provides food and sites for nesting, roosting and hunting for a wide variety of bird species, including ducks (Section 1.3). Waterfowl, pheasants and rabbits use the margins of stands of phragmites as cover to hide from predators.

Habitat use by fish (Section 1.2), crustaceans and other aquatic invertebrates can be affected by dense growth of phragmites. For example, small fish and crustaceans prefer habitats with low growing, less dense stands of native smooth cordgrass (*Spartina alterniflora*) to those with infestations of phragmites and populations of aquatic invertebrates are generally highest in areas with other native vegetation such as cattail (*Typha* sp.). Also, several studies report that marshes dominated by phragmites provide less suitable habitat for larvae and small juvenile forms of mud minnow.

Management options

As with any invasive plant, preventing establishment of phragmites is the best available option. This can be challenging due to the similar appearance of Eurasian, Gulf Coast and native phragmites, so you should consult an expert to help identify phragmites populations that are growing aggressively. Eurasian phragmites expanded from the Northeast by hitchhiking on equipment used in ditching, drainage and dredging operations. Therefore, inspecting and cleaning equipment is important before moving equipment into new areas to prevent the dispersal of any aquatic invasive plants, but particularly invasive varieties of phragmites. In addition, maintaining populations of competitive native plant species such as black needlerush (*Juncus roemerianus*) around phragmites stands may help limit vegetative spread.

Chemical control methods (Section 3.7.1) are the most common and effective method of controlling phragmites. There are a number of herbicides currently labeled for control of phragmites in aquatic habitats, including glyphosate, imazapyr, imazamox and triclopyr. Glyphosate and imazapyr are generally the most effective products for phragmites control, although the criteria for herbicide selection are site-specific and dependent on environmental conditions, growth

stage of the plant, presence of desirable nontarget plant species in the area and alternate uses of the water such as drinking and irrigation.

Herbicides may be more effective if applied early in the growing season in areas where plants remain evergreen and grow throughout the year. However, early season treatments could result in winter regrowth, especially in areas such as the coastal Carolinas where it is not possible to completely dewater the soil before herbicide application. Thus, late summer or fall applications may be more effective in areas where the soil remains wet, phragmites goes dormant or where frost is probable. Phragmites often occurs in large, difficult to access areas, so aerial applications may offer the most efficient method for treatment (Section 3.7.4). Backpack sprayers can also be used for small infestations and spot treatments. Plants should be carefully sprayed to wet but runoff should be avoided and herbicide labels list more specific instructions for mixing and usage. Multiple yearly applications are often required for phragmites control and monitoring should be done to track regrowth.

Burning (Section 3.4) or mechanical removal (Section 3.5) of plants is not likely to provide adequate long-term control of phragmites. Burning may provide short-term control for small infestations but neither method can effectively reduce the extensive rhizome systems of large phragmites monocultures. However, integration of burning with flooding or herbicide application has been more successful; for example, one effective strategy is to burn, mow or cut the plants, then apply herbicide after plants begin to regrow. Flooding following a burn may also effectively control phragmites. Another strategy that may promote native plant recovery is to burn following herbicide application since this removes the leaf litter and dead thatch left behind by phragmites and can increase germination success of some native species.

Biological control (Section 3.6) of phragmites is complicated due to the presence of both native and invasive lineages in North America. No purposeful introductions of insects, pathogens or diseases for phragmites control have been attempted to date. Some reports suggest that immature plants are readily eaten by goats, cattle and horses but mature plants not considered to be high-value or highly palatable food for livestock. However, livestock grazing can be useful as part of an integrated strategy with other methods. In addition, two European shoot mining noctuid moths (*Archanara geminipuncta* and *A. neurica*) have recently been evaluated for phragmites control and were found to prefer the Eurasian type over the native type. Biological control may be a viable solution for phragmites management in North America in the coming years.

Summary

Phragmites is a widely distributed wetland species with three major lineages in the US: a native lineage, an invasive Eurasian lineage and a Gulf Coast lineage whose origins remain unclear. The Eurasian type has mostly replaced the native lineage in the northeast and has become established throughout the southeastern and midwestern states. The Gulf Coast type is problematic in western states and in disturbed wetlands in the Southeast. Invasive phragmites populations create large monotypic populations which are associated with decreased plant diversity and changes in soil properties, sedimentation rates, bird and fish habitat use and food webs. Phragmites management is made more challenging by the presence of the native type, which can be a desirable part of aquatic ecosystems and is similar in appearance to the Eurasian and Gulf Coast types. A variety of methods can be used to control invasive phragmites and greatest success is realized when multiple methods (such as burning followed by herbicide application) are employed in an integrated program.

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