Asiatic Sand Sedge

Carex kobomugi Ohwi
Sedge family (Cyperaceae)

NATIVE RANGE

Coastal areas of northeastern Asia

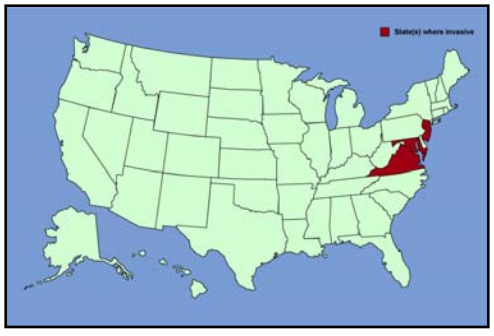
DESCRIPTION

Asiatic sand sedge is a perennial adapted to coastal beaches and dunes and possibly the only Carex species found in upper beach habitat along the U.S. Atlantic Coast. The mature sedge is a coarse and stout member of the genus that forms extensive colonies through cord-like rhizomes that extend many feet under the sand and produce new shoots. Flowering and fruiting occurs April through June and individual plants have either male or female flowers. As with many other members of the genus Carex, the flowers are numerous, subtended by scales, and arranged in spikes at the end of a flowering stalk that is triangular in cross section. A papery sac or perigynium encloses the female flowers, each of which develops into a single-seeded fruit, called an achene.

Because flowering culms are evident for a relatively brief period during the spring, and some colonies and Asiatic Sand Sedgenew infestations may spread extensively without flowering, it is useful to learn to recognize the plant in its sterile form. Asiatic sand sedge may be confused with at least two colonial, rhizomatous native grass species - American beach grass (*Ammophila breviligulata*) and beach panic grass (*Panicum amarum*). Leaves of Asiatic sand sedge are longer tapering than those of the above grasses, have a yellow-green rather than bluish-green cast, and small teeth along the margin that are easily felt or seen with the help of magnification. These differences become more obvious when observed in the field. Several species of another sedge genus, Cyperus, sometimes grow on dunes and on wash flats and strongly resemble Carex when not in flower. However, these Cyperus species flower from late summer to fall, have leaves without serrated margins and, unlike Asiatic sand sedge, are weakly to non-rhizomatous.

ECOLOGICAL THREAT

Asiatic sand sedge invades wash flat habitat occupied by the federally listed plant, seabeach amaranth (*Amaranthus pumilus*), which is a poor competitor against it. On established, vegetated sand dunes, Asiatic sand sedge can out-compete native dune-binding grasses, like American beach grass and sea oats (*Uniola paniculata*). Dunes dominated by Asiatic sand sedge are also more vulnerable to wind blowouts and storm erosion. There is evidence to suggest that fewer native plant species, and fewer individuals, occur on dunes dominated by Asiatic sand sedge than on comparable dunes dominated by the native American beach grass.



DISTRIBUTION IN THE UNITED STATES

Asiatic sand sedge occurs in maritime areas from Massachusetts to North Carolina.

HABITAT IN THE UNITED STATES

Asiatic sand sedge grows on primary dunes and on upper parts of ocean beach wash flats that have recently been disturbed by ocean storms. Like American beach grass, it appears to create more habitat for itself by trapping wind-blown sand to form dunes. Sand burial appears to stimulate the growth of rhizomes.

BACKGROUND

Asiatic sand sedge was first observed in the United States, at Island Beach, New Jersey in 1929. Specimens were collected on the Virginia part of the Delmarva (Delaware-Maryland-Virginia) Peninsula as early as the 1940s. Although the circumstances of its introduction are unclear, sand sedge was apparently introduced intentionally for use as a sand binder in erosion-prone areas and may have spread accidentally as a result of its use as a packing material in ship cargo.

BIOLOGY & SPREAD

Once established, Asiatic sand sedge spreads primarily by vegetative means, through production of rhizomes. Sexual reproduction, which requires both male and female plants to be present, is not necessary for a colony to expand locally. Expansion of a colony was observed at Island Beach, New Jersey, despite the absence of any seedlings. Long-distance dispersal of Asiatic sand sedge is uncertain but it is likely that its seeds are tolerant of salt water immersion and carried by ocean currents and storm surges. Plant fragments may be dispersed by ocean currents, and may remain viable after extended salt-water immersion, but this has not been confirmed. Some observation suggests that inundation by storm surges can kill growing plants. In newly forming colonies, sexual reproduction may be somewhat limited, since plants of the opposite sex may not occur nearby. Pollen may be carried long distances by the wind. Much research is needed to gain a better understanding of modes of dispersal and establishment of Asiatic sand sedge.

MANAGEMENT OPTIONS

Various mechanical and chemical methods have been used successfully in managing Asiatic sand sedge. Regardless of method, it is important to avoid breaking underground parts and leaving them untreated and to conduct follow-up monitoring and treatment if needed. Mapping infestations with a Global Positioning System (GPS) prior to treatment is very helpful for relocating sites, especially in sandy natural areas like beaches with few permanent landmarks. Cooperation and coordination among coastal area land managers should lead to more effective control.

Because Asiatic sand sedge is capable of forming extensive colonies, early detection and treatment of infestations is critical for effective management. The potential for considerable long-distance dispersal of seeds necessitates routine monitoring and possible follow up treatments, even after it is believed to be eradicated. Because of the likelihood of leaving viable below-ground parts after an excavation, it is important to revisit the site in subsequent years to ensure that an infestation has been eradicated.

Manual

Excavation of individual plants by digging and hand-pulling is feasible and has been successful when used to control small infestations (e.g., fewer than 200 shoots). This method may not be economically or logistically feasible on larger control projects. Excavation generally involves digging with a shovel under and around each individual plant shoot to expose and loosen the roots. Individual shoots are often connected to other shoots by cordlike rhizomes that are about ¼ inch thick and often of considerable length. Once shoot and roots are loose, all rhizomes need to be gently excavated by hand, following them through the sand to minimize breaking. Rhizome parts left buried are likely to grow into new plants. Because the tips of new tillers (shoots) can be sharp enough to puncture skin, it is important to wear thick gloves when handling below-ground parts. Plants should be removed from the beach and disposed of in habitat unsuitable for the sedge (e.g., lawns), spread out to dry, or composted in black plastic until dead.

Chemical

Larger colonies of Asiatic sand sedge that have formed considerable dunes are probably most effectively controlled using chemical herbicides. A 2% glyphosate (e.g. Roundup®, Rodeo®, etc.) and water solution applied to the leaves during the growing season has provided effective control. One or two treatments in the same season followed by spot treatments are usually needed. Mid-summer (June through July in Maryland and New Jersey) treatments are just as effective as fall (October in Maryland) applications and allow for same season monitoring and re-treatment. Because rhizomes can be extensive, follow-up monitoring and treatment are necessary for several seasons to ensure long-term control.

Good coverage of herbicide is needed but can be difficult because of the plant's narrow leaves. To help track application and to minimize misapplication and waste, a colorant can be added to the spray solution. Herbicide applications should be made when the chance of rain is low for at least six hours after application and when winds are minimal (e.g., 0-7 mph), to minimize drift of herbicide to non-target areas. Herbicide users should read and follow all label instructions and, when possible, mix chemicals where a spill containment and/or clean-up facility is available instead of on site. Transport of herbicide is likely to be more rapid through sand than in other soils, and microbial activity that can break down herbicides is likely to be low in beach sand. When it is necessary to mix herbicide on the beach or dunes, it is recommended to mix over a waterproof basin set on top of a waterproof tarp.

USE PESTICIDES WISELY: Always read the entire pesticide label carefully, follow all mixing and application instructions and wear all recommended personal protective gear and clothing. Contact your state department of agriculture for any additional pesticide use requirements, restrictions or recommendations.

NOTICE: mention of pesticide products on this page does not constitute endorsement of any material.

CONTACTS

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- Virginia Natural Heritage Program/Virginia Native Plant Society fact sheet http://www.dcr.state.va.us/dnh/fscako.pdf

SUGGESTED ALTERNATIVE PLANTS

Asiatic sand sedge was originally introduced as a dune stabilizer, although it is apparently less effective in this role than native species, such as American beach grass (*Ammophila breviligulata*), which occurs throughout the North American range of Asiatic sand sedge. In the southernmost part of this range, sea oats (*Uniola paniculata*) is the dominant native dune binding grass.

Dune Restoration and Planting

Once successful control of Asiatic sand sedge has been achieved, establishing native vegetation is an integral part of dune restoration. Native species such as American beachgrass (*Ammophila breviligulata*) and sea oats (*Uniola paniculata*) should be planted to protect vulnerable dunes from storm damage and blowouts and to prevent re-colonization by Asiatic sand sedge. American beachgrass establishes itself well on primary foredunes were shifting sands are common and should be planted during late winter to early spring. In primary backdune areas and places where sands are usually more stable, consideration should be given to planting species such as seaside goldenrod (*Solidago sempervirens*), beach panic grass (*Panicum amarum*), dune panic grass (*Panicum amarulum*), and sea-rocket (*Cakile edentula*), in combination with American beachgrass and sea oats.

OTHER LINKS

- http://nbii-nin.ciesin.columbia.edu/ipane/icat/browse.do?specieId=121

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REFERENCES

Fernald, M.L. 1950. Gray's manual of botany, 8th ed. 1987 reprint. Dioscorides Press, Portland, OR.

Small, J.A. 1954. *Carex kobomugi* at Island Beach, New Jersey. Ecology 35: 289-291.

Swearingen, J. 2009. WeedUS Database of Plants Invading Natural Areas in the United States: Asiatic Sand Sedge (*Carex kobomugi*). http://www.invasive.org/weedus/subject.html?sub=10110.

USDA, NRCS. 2009. The PLANTS Database (http://plants.usda.gov). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

Virginia Department of Conservation and Recreation and Virginia Native Plant Society. Date unknown. (Fact Sheet) Invasive alien plants of Virginia: Asiatic Sand Sedge (*Carex kobomugi*) Ohwi.