SEASIDE GOLDENROD

Solidago sempervirens L.

Plant Symbol = SOSE

Seaside goldenrod (Solidago simpervirens L.) Photo by, William Skaradek, USDA NRCS.

Alternate Names
Common Names:
salt-marsh goldenrod

Scientific Names:
Aster sempervirens (L) Kuntze;
A. mexicanus;
Solidago mexicana L.;
S. sempervirens subsp. *mexicana*;
S. sempervirens var. *Mexicana*

Description
General: Seaside goldenrod is a native, late-flowering perennial forb. It may grow up to 6 ft tall at maturity, blooming August through October. The terminal flowering heads are dense, clustered spikes of bright yellow flowers that are larger than those of other goldenrod species.

The leaves are fleshy, somewhat succulent, dark green, oblong, and lance-shaped. They are arranged alternately along the entire length of the stem. The leaves at the base are the largest, up to 8 in long and ½ –1 ½ in wide, gradually decreasing in size towards the top of the plant.

In winter, the plant's persistent whitened leaves, coarse stalks, and dried flower parts make it easily identifiable. Red leaves sprout in late February and early March, and soon become dark green. From late August to early October, its bright yellow flowers provide an attractive contrast to its lush, thick, green vegetation.

Seaside goldenrod is a short-day perennial (flowering coincides with shortened photoperiods). So that at some point as a critical dark periods lengthens, flowering is initiated. The flowers are an important food/energy source for fall migrating monarch butterflies traveling the Atlantic coastal flyway. This species can hybridize with rough-stemmed goldenrod (*Solidago rugosa*).

The fruit of the seaside goldenrod is a capsule with a pappus in a single circle of bristles. The seeds require no cold stratification for germination. When buried, seed viability decreases after the first year in both disturbed and undisturbed areas (Lee, 1993). Therefore, seaside goldenrod does not appear to have a persistent seed bank.

Transition areas (areas of greater sand movement and accumulation) tend to have greater amounts of seed in the seed bank (up to 58 seeds/m^2) when compared to grasslands (Lee, 1993). However, studies have also found germination of the plant limited to areas of minimal sand accumulation.

Distribution: Seaside goldenrod mainly grows east of the Mississippi. It grows in the northeast from Canada and the Great Lakes region, south along the Mid-Atlantic coast to Florida, and as far west as Texas. For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Habitat: Stands of seaside goldenrod colonize blowouts, grasslands, and transition areas. Seaside goldenrod often occurs with other native dune plants such as coastal panicgrass (*Panicum amarum*), switchgrass (*Panicum virgatum*), salt meadow cordgrass (*Spartina patens*), and American beachgrass (*Ammophila breviligulata*).

Adaptation
Seaside goldenrod can grow in coarse to medium infertile soils with a pH range from 5.5–7.5. Seaside goldenrod is well adapted to coastal habitats including the backside of primary dunes, low secondary dunes, and edges of salt marshes. It has some tolerance for drought, allowing it to survive in the dry conditions of the dunes. Seaside goldenrod is also tolerant of high salinity, salt spray, and fire.

Uses
Wildlife Use: Like many *Solidago* spp., seaside goldenrod is an important resource for over-wintering, gall-producing insects. Some of these insects are predatory wasps that are beneficial to have near crops. In addition, gall larvae provide an excellent source of nutrition in the winter for birds such as the chickadee or woodpecker. It increases the value of wildlife habitat by providing food and shelter for butterflies, birds, and small mammals. The migrating monarch butterfly uses seaside goldenrod as one of its primary food sources in the fall.

Along with American beachgrass (*Ammophila breviligulata*), seaside goldenrod plays an important role in providing nesting habitat between primary and secondary dunes for birds such as willets (*Catoptrophorus semipalmatus*), killdeer (*Charadrius vociferous*), piping plovers (*Charadrius melodus*), and black skimmers (*Rynchops niger*)(Safina and Burger, 1983).

Erosion Control: Seaside goldenrod is a native perennial that has been successfully used in dune stabilization and erosion control projects. Stems arise from short, stocky rhizomes. The root-length is a minimum of 14 in and provides excellent erosion control. Seaside goldenrod initiates dune formation by trapping sand and debris. Sites with seaside goldenrod help the secondary establishment of annual forbs such as seaside sandmat (*Euphorbia polygonifolia*), and American searocket (*Cakile edentula*) (Ailstock, n.d.).

Ethnobotany
While the medicinal value of this particular species of goldenrod remains unknown, many species in the *Solidago* genus have been used for generations as a natural remedy for a variety of health conditions (ex. *S. Canadensis* and *S. vigaurea*). Thomas Edison explored ways of using latex from the seaside goldenrod for the production of natural rubber (caoutchouc).

Status
Threatened or Endangered: No.

Wetland Indicator: FACW (Facultative Wetland). Seaside goldenrod usually occurs in wetlands, but may occur in non-wetlands.

Please consult the PLANTS Web site (http://plants.usda.gov/) and your State Department of Natural Resources for this plant's current status (e.g., threatened or endangered species, state noxious status, and wetland indicator values).

Planting Guidelines
Seaside goldenrod may be propagated by seed or division. Currently the only developed method of establishing seed production plots and dune restoration plantings is with containerized stock transplanted in late winter to early spring.

The first year of establishment is the most critical for survival. Once the stand is established, it requires little maintenance and only minimal irrigation due to its ability to withstand hot and dry conditions. Producers should irrigate if an extended dry period occurs. Fertilization will increase vigor of seaside goldenrod, but is not necessary for survival.

To establish, prepare a clean, weed-free seedbed. Start seeds in 2-inch deep trays, grown into vegetative plugs, planted every 2 feet in rows with 3 feet in between centers. When planting into a dune site, it is important to keep the substrate attached to the roots of the seedling to prevent desiccation (Shumway, 2008).

Growing plants with American beachgrass (*Ammophila breviligulata*) in both broadcast and seed-drilled experimental plots improves production. These nurse crops may lower temperature and increase moisture for seaside goldenrod populations. *S. sempervirens* has dehydromatricaria ester in the roots (Lam et al., 1992). This allelopathic compound is lethal to nematodes and inhibits the growth of rice seedlings.

Management
Producers often manage weeds with a pre-emergent herbicide and after establishment with mechanical cultivation. The decline in health of the closely associated American beachgrass could be used to signal when goldenrod should be fertilized.

Pests and Potential Problems
It has been reported that the release of root exudates by seaside goldenrod produce allelochemicals that negatively affect the growth of nearby vegetation. Studies by Cheplick and Aliotta (2009) found that seaside goldenrod has a negative effect on the growth of native grasses such as purple sandgrass (*Triplasis purpurea*) and sanddune sandbur (*Cenchrus tribuloides*). Being a perennial, seaside goldenrod should also have a distinct advantage over annuals when competing for limited resources. Nevertheless, because seaside goldenrod has a moderate growth rate, a shorter life span than other *Solidago* spp., a limited ability to spread through seed, and produces seedlings with low vigor, it is not considered an invasive plant.

Goldenrods in general are popular hosts to overwintering gall insects. Approximately half of all gall insects are lost to predation. Three common herbivores that feed on seaside goldenrod are the goldenrod leaf miner (*Microrhopala vittata*), red goldenrod aphid (*Uroleucon pieloui*) and the goldenrod leaf beetle (*Trirhabda Canadensis*).The goldenrod leaf miner feeds on the upper leaves, creating numerous small holes. Unlike aphids, population densities for the goldenrod leaf miner remain low and only occasionally create severe damage. The goldenrod leaf beetle is strongly attracted to the odor of the host plant *S. sempervirens*, and has been shown to prefer it to the odor of non-host plants (Puttick et al., 1988). There is no known research suggesting that *S. sempervirens* can negatively affect the growth of nearby food crops.

There is no significant herbivory recorded. Coastal or island herbivores such as rabbits and deer will occasionally browse plants in fall and winter.

Environmental Concerns
There are no environmental concerns with use of this plant.

Control
Please contact your local agricultural extension specialist or county weed specialist to learn what works best in your area and how to use it safely. Always read label and safety instructions for each control method. Trade names and control measures appear in this document only to provide specific information. USDA NRCS does not guarantee or warranty the products and control methods named, and other products may be equally effective.

Seeds and Plant Production
Researchers are trying to develop effective methods to grow seaside goldenrod from direct seeding in a dune setting. Seed consistently has good germination rates when grown in controlled settings such as a greenhouse or germination chamber, but stands fail to develop when directly seeded in dune trials. Currently the best way to propagate the plant is with vegetative plugs. The seed has a 3-year average of 70 % germination from 2009–2011 at the Cape May PMC, in Cape May, NJ.

Seaside goldenrod produced 75 lb/ac of seed (first year of establishment) to 220 lb/ac of seed (2 years after establishment) at the Plant Materials Center. Plants were sown 1.5 ft apart, in rows with 3.5 ft between centers. For this same population, the germination rate was 72 % after one year of storage at 40° F and 64 % after two years of storage. The plant bed was prepared with a pre-emergent herbicide and the weeds in the inter-rows were cultivated once per season.

Cold stratification and use of a light source can break dormancy and encourage germination. Seed will germinate only on the surface of sand at high temperatures. These seeds can easily dry out and die if there is no supplemental moisture or irrigation. Cross-pollination is required for viable seed. There are approximately 700,000 seeds/lb.

Cultivars, Improved, and Selected Materials (and area of origin)
Monarch Germplasm seaside goldenrod is a source-identified composite germplasm from several native populations developed by the Cape May Plant Materials Center in Cape May, NJ. Seed was collected from natural stands among the dunes of several Mid-Atlantic States: New Jersey, Delaware, and the eastern shore of Virginia. Cape May Plant Materials Center has evaluated seaside goldenrod for over ten years.

Cultivars should be selected based on the local climate, resistance to local pests, and intended use. Consult with your local land grant university, local extension or local USDA NRCS office for recommendations on adapted cultivars for use in your area**.**

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Citation

Sheahan, C.M. 2014. Plant Guide for seaside goldenrod *(Solidago sempervirens).* USDA-Natural Resources Conservation Service, Cape May Plant Materials Center. Cape May, 08210.

Published February, 2014

Edited:

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