



Cape May Plant Materials Center

United States Department of Agriculture
Natural Resources Conservation Service

Plant Materials Program
Wetland Technology Update

WETLAND EMERGENT PLANTS

PMC FIELD OBSERVATIONS

Alisma subcordata (water plantain)

- in northern most wetland cell at Cape May, this species was only seeded into 12 ft. of row at 10 seeds/in. in 1994; by June of 1997 this plant can be found growing throughout the entire ¼ acre wetland cell
- does not readily establish from seed in the greenhouse (0-10% germination), but under field conditions seedling emergence is high with good survivability
- establishes and competes well in thick stands of bulrushes
- seed is readily produced and easily harvested then cleaned

Carex crinita (fringed sedge)

- this species is conducive to raised bed production for plants and seed
- after one year's growth, vegetative increase of transplanted seedlings is approximately 65 to 80 culms / plant
- seeds are set in Cape May by mid-June
- when grown in open field conditions, seed production increases
- with wild collected seed, germination has been consistently near 100% regardless of stratification method

Carex lurida (shallow sedge)

- it will be effective to grow this species under raised bed conditions for seed and vegetative production, as long as soil moisture is kept high
- one year after single seedlings were transplanted, the stem count had increased to ± 50
- this species sets seed by mid-June at Cape May
- with wild collected seed, germination has been consistently near 100% regardless of stratification method

Eleocharis obtusa (blunt spikerush)

- seedlings easily establish on exposed wet soils from naturally distributed means
- under greenhouse conditions, germination occurs within five days and is consistently near 100%
- this annual has potential for being utilized as a wetland cover crop

Glyceria obtusa (Atlantic mannagrass)

- stratification improves greenhouse germination (< 1 wk.)
- under cultivated conditions this species grew to ± 3 ft. tall
- this species and possibly other manna grasses have potential in riparian systems, in seasonal wetlands, and along the margins of permanent wetlands

Iris versicolor (blue-flag iris)

- a persistent clump of intertwined woody-like corms enable this emergent to provide shoreline protection, while exhibiting a colorful floral display from June to July
- when planted and maintained in cultivated raised or flat rows, this species increases well and adequately produces seed, which has potential for combining
- the first year after transplanting, seedlings vegetatively have an increase of 5 stems / clump, the following years the multiplication is based on the available nutrients and adequate water
- seed germination is slow in the greenhouse regardless of stratification technique

Juncus effusus (soft rush)

- under greenhouse conditions emergence can be expected in 5 to 8 days when stratified in moist sand or peat, while non-stratified seed will emerge in about 14 days; either procedure will result in near 100% germination success
- the calculated seeding rate for this species is ± 1 oz. PLS / acre (calculated using 25 PLS seeds / sq.ft. and 18,000,000 seeds per pound); seeds are easily cleaned with light to no air and small screens
- the seeds have a tacky surface which allows them to adhere to most any object they contact (ie. birds, mammals, other veg. Etc.)
- very persistent, even when heavily encroached upon by high rhizomatous species; I have not been able to determine whether this is an exhibit of root dominance or allelopathy
- after 3 1/2 growing season on the PMC, this species vegetative mass increased from ± 30 stems / plant to well over 500 live stems; in this same time the area of coverage of this species has increased from ± 4 sq.in. to ± 4 sq.ft., with ± 10 live stems / sq.in.; this plant typically grows in a near circular pattern
- at the Cape May PMC, the particular plant source observed has typically reached heights of ± 3.5 ft.
- plant growth responds well to annual dormant season burning; this species has an explosive burn, where both dead and live tissue burns fast: may have bio-fuel potential

Panicum virgatum (switchgrass)

- stem increase of the James R. collection has ranged from 30 to 50 annually
- clumps of the James R. collection have persisted with very good vigor and increase while being inundated for the past 3.5 years
- as with many of the other fibrous rooted species, switchgrass competes well under emergent conditions with the highly rhizomatous species
- based upon greenhouse trials with seed of the James R. collection, direct seeding rates could be half of those recommended for critical areas

Peltandra virginica (arrow arum)

- pre-soaking fruit in water at room temp is the most effective means of initiating germination; it makes selecting live seeds easier
- with utilizing pre-soaked fruit, propagation success is fast and reliable
- row production is conducive to both seed and vegetative harvest
- this species persists well under the encroachment of highly rhizomatous species
- at the cape May PMC it has taken until the 4th growing season for this species to mature both physiologically and sexually while maintained in mixed stands
- seeds are large and easy to work with

Pontederia cordata (pickerel weed)

- in order for this species to survive winter conditions the soils must be at least saturated
- if grown in dense mixed stands of emergent vegetation the effects of winter are less apparent
- once established in a wetland and it survives, this species will spread by natural seed dispersal to available growing sites

Rhexia virginica (meadow beauty)

- this showy light purple flowered forb has potential for adding or increasing the visual appeal of freshwater wetlands
- seeds are small but non-tacky; there are over a million seeds per pound
- mass seed production seems realistic; seed pods are typically terminal and upright, not shattering until winter
- under greenhouse conditions seeds germinate quickest (1 wk.) when stratified in peat, but near 100% germination and emergence was observed with to stratification after 2 wks.

Sagittaria latifolia (duck potato)

- this species can be propagated effectively from seed harvested during the prior growing season; germination of fresh seed has been observed within 2 days if prestratified; seed stored >1 yr. does not have adequate performance
- field harvesting dormant tubers is difficult without completely turning soil 2 to 3 times to expose them; a more effective means of field producing tubers is needed
- very compatible within the stand spread area of either species of *Typha*; dormant tubers have often been recovered with the rhizomes of cattail; even no other species is found growing in stands of cattail, duck potato can often be found
- when adequate growing space was available, I observed annual radial growth at ± 15 lineal feet from vegetatively established planting units

Scirpus acutus (hard-stem bulrush)

- seed stores well; germination averaged 50% when stored for >2 yrs.; fresh harvested seed (<1 yr. in storage) yields near 100% germination when stratified in moist peat for 90 days
- maximum annual vegetative radial spread observed at Cape May was ± 10 feet; as with most other rhizomatous species, hardstem bulrush's rate of spread reduces once the majority available growing space has been utilized
- seed production is relatively low per unit area for this species (4 to 8 seeds produced / stem)
- rhizomes are densely covered with short (1-2 in.) hair roots giving a brush effect; mature root stock has a reddish cast to it

Sc. cyperinus (woolgrass)

- unlike most other bulrushes, this species is clump forming with a deep fibrous root system
- seeds are small (16,000,000 seeds / lb.); each seed has attached fibers, which are easily detached when hammer-milled; once fibers are removed screen cleaning is easy with low air; taking into consideration seed size, average germination (close to 100%), and the recommended seeding rate of 25 PLS seeds / sq.ft. (KY-PMC); the recommended seeding rate per acre would be 1.1 oz.
- the terminal seed head of this species makes it conducive to mechanical harvesting
- wind blown seed has established most disturbed wetland areas on the PMC
- one year old seedlings yield ± 20 stem divisions

Sc. maritimus (saltmarsh bulrush)

- seed stratified for 90 days in moist sand or peat germinates within one week at nearly 100%
- tubers are soybean sized and begin growing within 24 hrs. of removing from cold storage; plants thrive under mist irrigation for the first two weeks, but then soon begin to dampen off
- seed bracts are large and easily spotted when searching to collect

Sc. pungens (three square bulrush)

- rhizomes have small diameters and are red; of the species I have observed this has to be rated as the most aggressive and prolific at spreading; annually this species has been observed to laterally spread ± 15 ft. even when most other species have reduced their spread due to population densities
- rhizomes are shallower than most other bulrushes allowing them to spread with minimal comp
- in March this species has been the target of herbivory by both ducks and muskrats; such disturbance has only stimulated its vigor and growth
- seeding success has only been moderate, with 60 to 80 % germination rates in the greenhouse

Sc. tabernaemontani (soft-stem bulrush)

- the largest of the bulrushes observed at Cape May, soft-stem bulrush has reached heights of 6 ft. without the addition of commercial fertilizers
- seed germination under greenhouse conditions has been good (90 to 100%) with good seedling vigor and survival
- maximum annual vegetative radial spread observed at Cape May was ± 12 feet; as with most other rhizomatous species, soft-stem bulrush's rate of spread reduces once the majority available growing space has been utilized; it typically takes +2 growing seasons for this species to completely populate the available growing space
- rhizomes are densely covered with short (1-2 in.) hair roots giving a brush effect; mature root stock has a yellowish cast to it; such a root system increases the total surface area which will uptake luxury amounts of nutrients
- seed production is moderate, only yielding 10 to 20 seeds per stem (@ ± 12 stems/sq.ft.)

Sparganium eurycarpum (giant burreed)

- seed production of this species is moderate to high when compared to other emergent species; the large (corn kernel sized) seed is produced on terminal stalks in round clusters, allowing for potential mechanical harvest
- rate of spread for this rhizomatous species is high, = up to 12 ft. lateral spread annually
- foliage annually dies back to root stock; finger-like tubers are primary over-wintering storage organs; tubers are easily harvested manually or mechanically
- greenhouse germination has been slow with seed stored longer than 2 years, freshly harvested seed (<1 yr.) stratified for 90 days in moist sand or peat yield 60 to 80% germination

Spartina cynosuroides (giant cordgrass)

- seed is easily harvested, stores well dry for >2 years, and germination of seed sources tested at Cape May is consistently 90 to 100%
- vegetative divisions establish well into mid summer with > 70% survival
- second growing season initially yields 4 to 6 stems; for adequate field increase it may take two to three growing seasons

Triadenum virginicum (marsh St. Johnswort)

- this showy white flowered forb has potential for adding or increasing the visual appeal of freshwater wetlands
- seeds are small but non-tacky; there are over a million seeds per pound
- mass seed production seems realistic; seed pods are typically terminal and upright, not shattering until winter
- under greenhouse conditions seeds germinate quickest (2 wk.) when stratified in peat, but near 100% germination and emergence was observed with to stratification after 2 wks.

Typha angustifolia (narrow-leaf cattail)-TYAN

- this was less aggressive vegetatively and produced more seedheads than broad-leaf
- fresh harvested seed (<1 yr.) germinated within 1 to 2 days in greenhouse studies
- co-existed with most other species with no signs of allelopathic effects
- even though this species is less aggressive, I would not recommend planting this species at greater than a 1:30 ratio of narrow-leaf cattail to other emergents unless solid stands are desired
- TYAN flowers \pm 1 month before TYLA, pollen of TYAN matures and is wind born by mid-June at the Cape May PMC

Typha latifolia (broad-leaf cattail)-TYLA

- when grown in solid stands this cattail is very aggressive and shows its ability to out compete or deter encroaching rhizomatous species chemically (the actual means was not determinable at the PMC)
- planting individuals in mixed stands with ratios nearing 1:50 (cattail to other emergents) discouraged the domination of the planting site; but even in solid stands, duck potato co-existed well with this cattail
- in neighboring unplanted wet cells volunteer seedlings of TYAN and TYLA were found
- the foliage of this species has been observed to burn hot and fast, as an alternative use for constructed wetland biomass, its possible that this species could be utilized as a bio-fuel

Xyris fimbriata (fringed yellow-eyed grass)

- this showy bright yellow flowered forb has potential for adding or increasing the visual appeal of freshwater wetlands
- seeds are small but non-tacky; there are over a million seeds per pound
- mass seed production seems realistic; seed bracts are terminal and upright, not shattering until late fall
- under greenhouse conditions seeds germinate quickest (2 wk.) when stratified in peat, but near 100% germination and emergence was observed with to stratification after 2 wks.

Zizania aquatica (wild rice)

- seeds easily shatter when ripe, allowing them to be easily harvested from a boat
- large seeds are easy to handle, but are fragile; cleaning can be difficult depending on the amount of inert material allowed; to remove the majority of hull
- more nursery related production efforts need to be focused on this species, currently there are no commercially available seed sources from native stands from the NE, but plenty from the Lake States; the PMC has a good opportunity here for multiple products
- this species may have use as an initial cover crop that will give way to other more persistent emergents
- bodies of water which once supported populations of this species no longer do; it would be a fruitful project to determine why wild rice has been eliminated from those ecosystems and how to successfully reintroduced (ie. establish and maintain for >10 yrs.) this species

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