Submersed aquatic plants

By Stephen H. Futch, Kenneth Jones and David W. Hall

The submersed aquatic plants discussed in this article are frequently found in and around ditches, canals and ponds in or near citrus groves. Aquatic plants need to be treated with herbicides or managed by other means to maintain adequate water flow in ditches and canals, thereby minimizing the potential for grove flooding or elevated water tables that will impact citrus root growth.

Articles on emerging and floating aquatic weeds were printed in the May and August issues of *Citrus Industry* magazine.

Vic Ramey, 1999, University of Florida

COON-TAIL

Ceratophyllum demersum

Leaves: olive to dark green, whorled, finely dissected and two-fifths to 1.2 inches long, with inconspicuous teeth on the margins

Stems: slender elongated, branching, brittle

Flowers: very small, grown at base of the leaf (leaf axils); flowers throughout the year

Fruit: one-seeded nutlet, about three-sixteenths inch long, with one or two basal spines

Seeds: combined with fruit

Height: typically found near the bottom, in deeper water; can form dense mats 6 to 8 feet thick on bottom

Life cycle: perennial, submersed aquatic herb

Growth characteristics: free-floating, submersed aquatic plant without roots, but often anchored by modified branches

Distribution: found throughout the United States

Origin: native in Florida

Comments: reproduces by seeds and fragmentation

Ann Murray, 1999, University of Florida

EAST INDIAN HYGROPHILA

Hygrophila polysperma

Leaves: opposite, hairy, stalkless, three-eighths to 1.5 inches long, up to a half-inch wide; elliptic or obovate-elliptic when emergent, elliptic to oblong when submersed; submersed leaves usually larger than emergent leaves

Stems: squarish, lower stems creeping; roots produced at joints

Flowers: in axils of upper leaves, petal united, two-lipped; upper lip two-lobed, lower lip three-lobed; blue or white, hairy, up to three-eighths inch long

Seeds: tiny, round

Fruit: linear capsule, three-eighths inch long

Height: submersed stems to 6 feet long; can grow to surface in 10 feet of water

Life cycle: perennial herb

Growth characteristics: mostly submersed, found in streams and slow-moving water; partly emersed, found creeping along the edges; forms dense surface mats that interfere with navigation and flood control

Distribution: primarily Florida and south central Texas

Origin: East Indies, India, Malaysia and Taiwan

Comments: fast growing and spreading invasive that outcompetes and shades out other submersed vegetation; can occupy the entire water column; serious problems for navigation and flood control, replacing hydrilla in some parts of Florida

Vic Ramey, 1999, University of Florida

HYDRILLA

Hydrilla verticillata

Leaves: strap-like, pointed, distinctly saw-toothed margin; one-third to three-quarters inch long and one-fifth inch wide; occur in whorls of three to eight; usually have one or more teeth or conical bumps on the underside midrib; lowest leaves are opposite and smaller than mid to upper leaves

Stems: slender, long branching, up to 25 feet long; stems can fragment to form floating mats

Flowers: small white flowers in June and July that arise singularly from long stalks near the growing tip

Seeds: no seeds produced; hydrilla is dioecious (plants are either male or female); Florida population only has female plants

Height: can grow to surface in water up to 25 feet deep

Life cycle: submersed perennial herb

Growth characteristics: grows from horizontal rhizomes in the substrate, sometimes forming tuber-like turions; stems also frequently form turions in the axils of leaves and branches; both tuber-like turions and turions can produce new plants; both can survive for several years

Distribution: dioecious hydrilla is naturalized in most of the southeastern United States and subtropical and tropical climates

Origin: thought to be native to Asia or Africa; brought into the Tampa, Fla. area as an aquatic ornamental in the 1950s; discovered as an escape from cultivation in Crystal River in the 1960s

Comments: reproduces asexually via fragmentation and from both subterranean turions on the rhizomes and axillary turions on the leaves and branches; turions are dense bud-like clusters of apical leaves that will function like tubers

Photos used with permission from the University of Florida/IFAS Center for Aquatic and Invasive Plants.

Submersed aquatic plants

Vic Ramey, 2001, University of Florida

ILLINOIS PONDWEED

Potamogeton illinoensis

Leaves: two types of leaves; floating leaves, often absent; blades elliptic to oblong-elliptic; 1 to 7.5 inches long, one-half to 2.5 inches wide, leathery, tip rounded; stalkless or short-stalked; submersed leaves, universally present; blades lanceolate to elliptic, 1.5 to 8 inches long and approximately 1-inch wide, thin, nearly translucent, sharp-pointed; long-stalked

Stems: rhizomes thin, horizontal, red-spotted or red-streaked; vertical stems more or less erect, simple or branched

Flowers: very small, whorled, in a dense spike, three-quarters to 3 inches long, borne at the tip of the stem; flowers from late winter into fall

Fruit: greenish nutlet, up to one-eighth inch wide, oval, with three rounded ridges

Seeds: nutlet one-seeded

Height: usually found in shallow water; it can grow to the water's surface when 7 or more feet deep, depending on water clarity

Life cycle: submersed perennial herb

Growth characteristics: arising from a network of slender horizontal rhizomes

Distribution: common in much of Canada and the United States

Origin: Canada and United States, native in Florida

Comments: reproduces by seed germination and growth from rhizomes; can form thick surface mats impeding navigation and water flow; however, it is a valuable waterfowl food source and provides good fish habitat

Vic Ramey, 2001, University of Florida

LIMNOPHILA

Limnophila sessiliflora

Leaves: in whorls of four to 10, mostly to 1.5 inches long; polymorphic with different submersed and emersed leaves; submersed leaves are finely divided and feathery; emersed leaves are more or less lance-shaped with torn, irregular margins

Stems: grow to 15 feet with the upper several inches emersed and erect, branched

Flowers: rare, single, blue or violet flowers grow in leaf axils, usually on the emersed part of the stem

Fruit: a four-parted, ellipsoid, sessile capsule, one-eighth or one-quarter inch long; green-brown when submersed, dark brown when emersed; many-seeded (200 to 300)

Seeds: tiny, almost round

Height: can grow to 12 feet

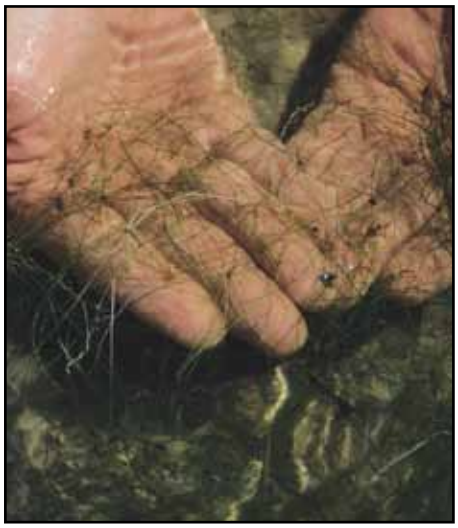
Life cycle: herbaceous perennial

Growth characteristics: a freshwater amphibious herb, rooted in the hydrosoil; grows to the surface forming dense mats of stems

Distribution: southern United States including Florida, Georgia and Texas

Origin: native to India, Ceylon and the Philippines

Comments: reproduces via fragmentation and seeds; fills the entire water column, clogging waterways and shading out native submersed vegetation; a major weed problem in wet crops in Asia



Ann Murray, 1999, University of Florida

ROAD-GRASS, PROLIFERATING SPIKERUSH

Eleocharis baldwinii

Leaves: bladeless, papery sheaths at base of aerial stems

Stems: horizontal stems are stolons; erect stems are round, unbranched, and 1 to 8 inches tall; usually occur in clusters

Flowers: occur in ellipsoid heads/spikes; heads about 1 to 4 inches long; heads composed of spiral scales; each flower tiny and contained by a single scale

Seeds: tiny, gray-green, three-sided nutlet with a cap at the tip and bristles from the base, about one-thirty-second inch long; seeds often sprout while in the head

Height: plants 1 to 8 inches tall; often forming mats

Life cycle: perennial, reproduces sexually and vegetatively

Growth characteristics: mat-forming, has two growth forms; it can be found as a short, grass-like sedge covering moist areas (road-grass), or a dense tangle of stems when growing in deeper water (proliferating spikerush)

Distribution: coastal plain states

Origin: native in Florida

Comments: the common name, road-grass, is due to a tendency to form extensive mats covering entire road surfaces on the moist soils of sandy woods roads; when in deeper water, seeds germinating within the heads grow into additional plants whose seeds then also germinate within the heads; this growth from each new head can continue, causing extensive colonies of these attached plants which, on occasion, can fill a portion of or the entire water body; commonly fed upon by waterfowl and provides good fish habitat

Submersed aquatic plants

SOUTHERN NAIAD

Najas guadalupensis

Leaves: dark green to greenish-purple leaves, two-fifths inch to 1 inch long and one-twenty-fifths inch wide; ribbon like, narrow and slightly broadened at the base; usually opposite or arranged in a whorl of three; leaf margin usually with inconspicuous teeth

Stems: slender, very long and very branched

Flowers: primarily spring into fall, but often throughout the year

Fruit: contains a single seed that is surrounded by a membranous coat and tucked into a sheath at the base of the leaf

Seeds: are quite small, elliptic in shape, and covered with a network of tiny pock marks

Height: can grow to produce a dense surface mat in water up to 6 to 8 feet deep

Life cycle: submersed, perennial aquatic herb

Growth characteristics: reproduces by fragmentation and seed germination

Distribution: found in Atlantic and Gulf Coast states and west to California, Oregon, Mexico and Central America

Origin: native in Florida

Comments: can cause problems similar to hydrilla, but usually displaced by hydrilla

Vic Ramey, 1999, University of Florida

SOUTHERN WATER GRASS

Luziola fluitans

Leaves: flat and short, approximately 1 inch in length and two-tenths inch in width; margins rough; generally crowded at or near the tips of the stems, often matted; streaming in the current or floating on the surface

Stems: horizontal stolons and erect stems slender, branching; erect stems to 3 or more feet in length

Flowers: male and female flowers are separate, but on the same plant, small and hidden, inconspicuous; male and female flowers both approximately three-sixteenths inch long; flowering summer into fall

Seeds: rarely seen, approximately one-sixteenth to one-eighth inch, ovoid, slightly asymmetrical and minutely lined

Height: can form surface mats in water several feet deep

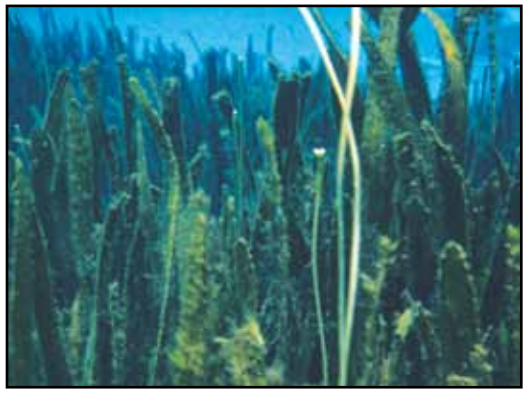
Life cycle: semisubmersed perennial

Growth characteristics: most frequently found in still or slow-moving water; when water goes down, plants can form upright growth, usually in a cushion, to several inches tall; reproduces by seeds and fragmentation of the stolons

Distribution: coastal plains from North Carolina into eastern Texas

Origin: native in Florida

Comments: forms thick carpet-like mats in shallow water along the edges of slow-moving streams, lakes and ponds; provides good fish habitat and waterfowl feed on both leaves and seeds



Vic Ramey, 2002, University of Florida

TAPE-GRASS or EEL-GRASS

Vallisneria americana

Leaves: alternate, dark green, tape-like, 1 or 2 inches wide and up to 6 feet in length; found in short-stemmed clusters, arising from nodes on horizontal rhizomes; blades show faint veining, especially the almost inperceptible mid-rib, with some cross-veins barely visible in the mid portion; margins near the leaf tip with minute, irregular teeth and a single tooth at the leaf tip

Stems: horizontal rhizomes and short, vertical stems with clusters of leaves arising from joints on the rhizomes

Flowers: male and female flowers on separate plants; about 200 male flowers with three transparent sepals, in a sheath/spathe at base of plant; when mature are shed, floating to the surface to meet the female flowers; female flowers with three sepals and three white petals, one flower per stalk; mature as the long stalk on which they grow makes its way to the surface; after fertilization, this long stem coils and pulls the maturing fruit to the bottom; flowering throughout the year

Fruit: slender, banana-like, linear capsule with several hundred tiny seeds; capsule splits along one side; shedding seeds in a mass

Seeds: tiny, elongated, ridged

Height: vertical stems only an inch or few long, bearing leaves up to 6 feet long

Life cycle: submersed perennial herb

Growth characteristics: submersed perennial growing from creeping rootstock with fibrous roots; reproduces from seed germination and vegetatively from rhizomes; can form dense mats that impede navigation and water flow

Distribution: found in both the eastern and midwestern United States

Origin: Canada and the United States, native in Florida

Comments: valuable as a waterfowl food source and for fish habitat

SELECTED SOURCES

Aquatic Weed Identification and Control Manual. A.P. Burkhalter, L.M. Curtis, R.L. Lazor, M.L. Beach and J.C. Hudson. Florida Department of Natural Resources. Bureau of Aquatic Plant Research and Control, 1972, 100 pp.

Center for Aquatic and Invasive Plants website, University of Florida, IFAS Extension http://plants.ifas.ufl.edu/

Florida Freshwater Plants – A Handbook of Common Aquatic Plants in Florida Lakes. M.V. Hoyer, D.E. Canfield, Jr., C.A. Horsburg and K. Brown. University of Florida, Institute of Food and Agricultural Sciences, SP189. 1996. 260 pp.

Florida Wetland Plants – An Identification Manual. J.D. Tobe, K.C. Burks, R.W. Cantrell, M.A. Garland, M.E. Sweeley, D.W. Hall, P. Wallace, G.A. Anglin, G. Nelson, J.R. Cooper, D. Bickner, K. Gilbert, N. Aymond, K. Greenwood and N. Raymond. University of Florida, Institute of Food and Agricultural Sciences. 1998. 598 pp.

Hydrilla verticillata (L.F.) Royle (Hydrocharitaceae), *"The Perfect Aquatic Weed."* K.A. Langeland. 1996. Castanea 61: 293-304

Identification & Biology of Non-Native Plants in Florida's Natural Areas. K.A. Langland, H.M. Cherry, C.M. McCormick and K.A. Craddock Burks. University of Florida, Institute of Food and Agricultural Sciences Communication Services. 2008. 193 pp.

Identification Manual for Wetland Plant Species of Florida. R.L. Dressler, D.W. Hall, K.D. Perkins and N.H. Williams. University of Florida, Institute of Food and Agricultural Sciences, SP-35. 1987. 308 pp.

Stephen H. Futch is a multi-county citrus Extension agent at the Citrus Research and Education Center in Lake Alfred; Kenneth Jones is a senior biological scientist at the Center for Aquatic and Invasive Plants, Citrus Research and Education Center in Lake Alfred; David W. Hall is a retired botanist with the University of Florida departments of botany and natural sciences in Gainesville.