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Chinese Tallow Gets Worse!

By Greg Jubinsky

In 1988, an article entitled "Another Exotic Nuisance - the Chinese Tallow Tree" by Steve Farnsworth, published in *The Palmetto*, Winter, 1989, referred to Chinese tallow tree (*Sapium sebiferum*) as the "north Florida melaleuca", in reference to "chilling" similarities to the south and central Florida pest: its potential for rapid expansion; its promotion by beekeepers as a honey plant; and its ability to spread widely from a single parent tree, especially in moist areas.

Chinese tallow tree - *Sapium sebiferum* (L.) Roxb. - is a member of the Euphorbiaceae, a family of more than 1,000 species and varieties, many of which are classified as poisonous. The genus *Sapium* consists of approximately 100 species. Common names for *S. sebiferum* in the United States include popcorn-tree, Florida aspen, Chinese tallow and Chinese tallowtree. The latter names arise from the fact that the outer layer of the seed can be used to obtain solid vegetable tallow. The plant is known as the popcorn-tree because of the appearance of white seeds when the capsules split open.

Distribution

The tree is a native of China, where it has been cultivated for at least 14 centuries as a seed-oil crop. It has been



introduced to various subtropical parts of the world, including the American sunbelt, as an ornamental plant. Earliest accounts reported that it was brought to Charleston, South Carolina, in the late 1700s.

By the early 1900s the Foreign Plant Introduction Division of the U.S. Department of Agriculture's Bureau of Plant Industry introduced it to the U.S. Gulf coast in significant numbers with the intent of establishing local soap industries based upon the large amounts of vegetable tallow found around the seed.

Additionally, an oil, known as stil-lingia oil, can be extracted from the seed, and has been thoroughly investigated as an ingredient for varnishes and paints.

The oil is considered poisonous and has been proven to be toxic to cattle. The tree produces heavy seed crops, and the oil in the seed averages 20% by weight.

Since the initial introductions, it has spread into coastal prairie habitats, and is now naturalized in the southern coastal plain from South Carolina south to Florida and west to Texas. In Florida, it is distributed from the Alabama border eastward to Jacksonville and south as far

as Tampa. According to the most recent survey conducted by the Department of Natural Resources, the plant can presently be found in 38 of the 67 Florida counties and is rapidly invading wild areas where it has not been seen before, as evidenced by the fact that thirteen of these counties have numerous populations, numbering at least 50 trees per cluster, outside the ornamental landscape. These clusters are found adjacent to wetlands and in disturbed sites. This is understandable since Chinese tallow typically thrives in upland, well-drained areas near human habitation, as well as natural, undisturbed areas such as closed canopy forests, in bottomland hardwood forests, on shores of water bodies, and sometimes on floating islands.

Description

S. sebiferum is a small to medium-sized tree with a milky sap that is commonly thought to be poisonous. It is a popular ornamental because of its fast growth, resistance to pests, and attractive foliage that becomes yellow to red in the fall. It flowers and fruits from the time it is about three feet (1 m) tall. Inflorescence on some plants are solitary terminating branchlets, each narrowly cylindrical, two to eight inches (5-20 cm) long. On other plants, the inflorescence is branched. The fruit is usually three-lobed with one seed in each lobe. Each fruit is about 0.4 of an inch (1 cm) long and broad; it dehisces to leave three dull white, roundish seeds covered with a white, waxy coating that stay attached to the plant for a period of time, and superficially resemble popcorn.

It is commonplace to find trees 15 to 20 feet tall (4.5-6 m), with some older sites having plants at heights of 30 to 40 feet (9-12 m). The national champion, located in Travis County, Texas, is 10 feet (3m) in circumference, 52 feet (16m) in height, with an 86-foot (26m) spread.

Biology

Chinese tallow possesses the classical characteristics of most exotic pest species: it grows quickly, fruits when young, produces abundant seeds, is resistant to native pests, grows in a wide range of soils, invades undisturbed habitats, and has traits that people find attractive and are therefore promoted and distributed. In

many cases, Chinese tallow has invaded Florida's ecosystems as a result of human introductions.

The plant is deciduous, losing leaves in autumn. Fruits ripen from August to November. Maximum life span is probably less than 100 years, though root stocks may live much longer. Typical trees live only 15 to 25 years.

The primary vectors for seed dispersal are birds and moving waters. Preliminary studies indicate that the seeds can float for several weeks and still maintain their viability. The species also regenerates from stump sprouts and is easily propagated by cuttings. It spreads over the landscape at a high rate. Seedlings quickly produce a taproot system and are able to withstand extended periods of drought.

A high percentage of plants survive when inundated with fresh water, and when raised in soil wetted, but not inundated, with brackish water, giving them the potential for invading freshwater lakes and rivers, as well as tidal estuarine and coastal wetlands.

Part of the flood tolerance in seedlings may be due to heavy growth of lenticels and adventitious roots and the production of thicker feeder roots. These traits are related to an ability to oxidize root regions and are typical of woody plants capable of surviving prolonged flooding and low soil redox potentials.

The plant is restricted by climate only if temperatures drop below about 0°F (-18°C).

S. sebiferum can have significant effects on surrounding ecosystems. They may increase eutrophication by adding (actually recycling) nutrients through decay of their leaves, which is more rapid than that of native *Salix nigra* (black willow) and other deciduous leaves. Furthermore, the plant produces tannins, which are known to inhibit the feeding of isopod and amphipod invertebrates of aquatic systems and which are also toxic to vertebrates.

Additionally, the plant produces toxic organic chemicals capable of stupefying fish. It also produces skin-irritating and tumor-promoting esters. The latex is acrid and induces blistering. Florida biota are not adapted to these powerful chemical defenses and would, in many cases, be repressed by them.

Management

In appropriate habitats, herbicides such as Garlon (triclopyr) and Banvel 720 (dicamba plus 2,4-D) should be at least partly effective for removing *S. sebiferum*. Preliminary Department of Natural Resources' test results suggest an 11% triclopyr solution with JLB Oil Plus controls trees with dbh less than 6 inches (15 cm); while a 20% solution appears to work on larger trees.

Cutting of horizontal shoots results in the immediate production of small independent plants, making mechanical control impractical.

Habitat manipulation may help to control the plant. Controlled burning of *Sapium* is proposed to evaluate whether this would work in Florida ecosystems.

The plant apparently lacks serious insect biocontrols or pathogens in the United States, though the bagworm, *Eumeta*, from Japan appears to be a pest.

Summary

Chinese tallow has been spreading across the southern coastal plain of the United States, including Florida. It is tolerant of shade, bright sun, and various soil conditions. It produces seeds after only three years of growth, but it can also reproduce vegetatively. The seeds are used as food by wildlife, further disseminating the plant. It monopolizes space and colonizes in greater density than native flora. It competes with native plants that provide preferred cover and food for native fauna.

In short, it is bad news

A copy of the complete 15-page report, titled "*Sapium sebiferum*, Literature Review and Status in Florida", is available from Technical Services Section, 3919 Commonwealth Blvd., Mail Station 710, Tallahassee, FL 32399-3000.

Greg Jubinsky is environmental administrator for the Technical Services Section for Aquatic Plant Management (formerly part of the Department of Natural Resources; as of July 1, 1993, Department of Environmental Protection).

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