



Phenology of Curlyleaf Pondweed (*Potamogeton crispus*) in the Southeastern US

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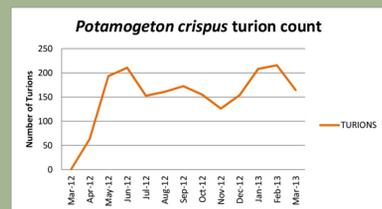
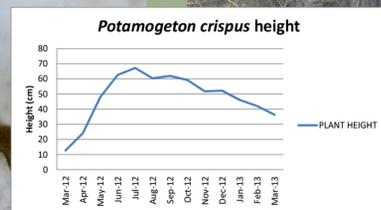
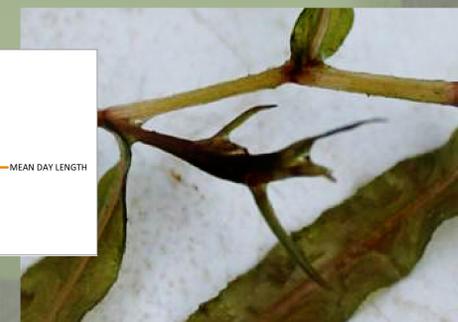
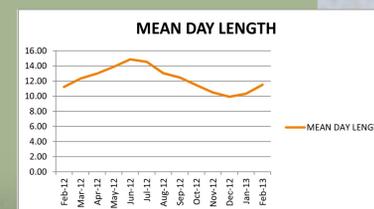
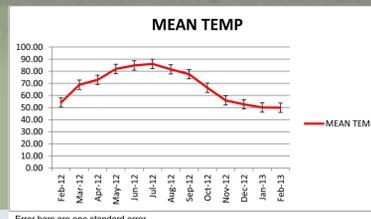
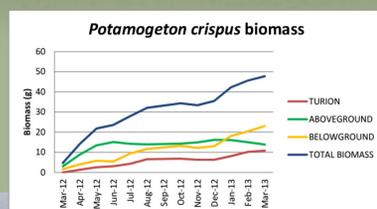
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Abstract

Curlyleaf pondweed (*Potamogeton crispus*) is a submersed aquatic plant that is native to Europe, Asia, Africa, and Australia. It first appeared in the United States in the 1840's and has since been distributed throughout the lower 48 states. Curlyleaf pondweed spread across the southeastern parts of the US in the 1940's and 50's. Long distance dispersal is thought to occur mainly through fish hatchery activities and in many states the first observance of curly leaf pondweed was in hatchery ponds. Curlyleaf pondweed is capable of outcompeting native species and forming large monospecific beds. Curlyleaf pondweed primarily reproduces vegetatively via turion production or rhizome elongation. Turions, vegetative structures capable of surviving extreme conditions (i.e. drought, freezing, herbicide treatments) and producing a viable plant capable of reproduction, are typically produced in the weeks before the plant senesces. In northern populations, curlyleaf pondweed has an atypical growth cycle in that it senesces in early summer, is dormant through the summer, and turions sprout in mid to late fall, and produce turions in the spring. Our study was conducted to better understand the phenology of curlyleaf pondweed in the southern US because so little is known about these populations. In our study, plant height peaked in July at 68 cm. This coincided with maximum annual water temperatures of 30C (86F). Total biomass peaked in August 2012 and January 2013. However, plant growth occurred in all months. Turion, aboveground (minus turions), and belowground plant structures made up 19 %, 44 %, and 37 % of total plant biomass respectively. On average, plants yielded 39 turions per individual or 2,140 turions per square meter of substrate. It appears that plant growth and turion production occur year round suggesting that southern populations of curlyleaf pondweed have altered their phenology to climatic conditions present in the southeastern U.S.

Materials and Methods

The study was conducted at the R. R. Foil Plant Science Research Center, Mississippi State University, Starkville, MS in three, 1500-gallon mesocosms from February 2012 through February 2013. Curly-leaf pondweed was propagated from stock cultures at Mississippi State University. Turions were collected from the bottom of propagation tanks and placed in a five gallon bucket of water for seven days to stimulate sprouting. Once sprouted, two turions were planted in one gallon containers filled with sediment. The sediment was amended with Osmocote® (19-6-12) fertilizer at rate of two g/L of soil to maintain plant growth. 72 potted containers of curly-leaf were placed into each of the 1500-gallon mesocosms. Plants were allowed to grow for one month prior to the first harvest. Each month three containers were harvested from each tank. Plants were measured and checked for the presence of new shoots, flowers, and turions at each harvest. The number of turions per plant was also recorded. All harvesting consisted of collecting aboveground, belowground, and turion plant tissues. Plant tissues were washed to remove dirt and debris, placed into labeled paper bags, and dried at 70 C for 5 days. After drying, plant tissues were weighed. Day length and water temperature were recorded for the duration of the study.



Results and Discussion

Curlyleaf pondweed plant height peaked in July at 68 cm. This coincided with maximum annual water temperatures of 30C (86F). Total biomass peaked in August 2012 and January 2013. However, plant growth was observed year round. Turion, aboveground (minus turions), and belowground plant structures made up 19 %, 44 %, and 37 % of total plant biomass respectively. Plants yielded an average of 39 turions per individual or 2,140 turions per square meter of substrate. In northern populations, curlyleaf pondweed has an atypical growth cycle in that it senesces in early summer, is dormant through the summer, and turions sprout in mid to late fall, and produce turions in the spring. In our study, it appears that curlyleaf pondweed growth and turion production occur year round suggesting that southern populations of curlyleaf pondweed have altered their phenology to climatic conditions present in the southeastern US.

Literature Cited

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