Brown Flatsedge (*Cyperus fuscus*) A Potential Rice Weed

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Introduction

Brown flatsedge (*Cyperus fuscus* L.) is native to Europe, Asia, Indian subcontinent, and the Mediterranean Region of Northern Africa, from Greenland and Iceland to China, south to Spain, Iran, Egypt, Algeria, northern India, and Pakistan (DeFilipps 1980, Kükenthal 1935-1936, Kukkonen 2001). It was apparently introduced into North America in ballast or around wharfs and was first discovered along Revere Beach in Essex County, Massachusetts in 1877 (Britton 1886; Rhoades and Klein 1993). Since that time, brown flatsedge has been found in Canada and elsewhere in the United States in California, Connecticut, Maryland, Missouri, Nebraska, Nevada, New Jersey, Pennsylvania, South Dakota, and Virginia (McKenzie *et al.* 1998). More recently, populations were detected in Arkansas, Kansas, and Mississippi. In addition to the association with ballast and wharfs, dispersal of brown flatsedge seeds has been attributed to waterfowl and human activities, including construction equipment (McKenzie *et al*. 1998, C.T. Bryson, personal observations).

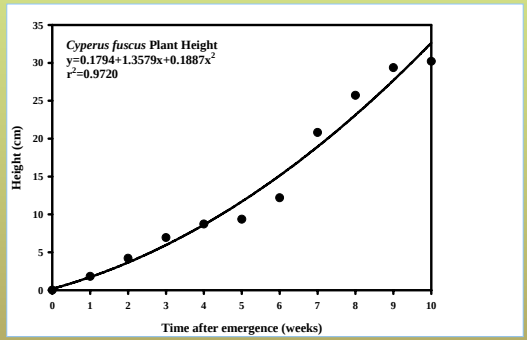
Brown flatsedge is a clumping annual with few to many stems and reddish-brown fibrous roots. Stems are upright, inclined or decumbent, and the habit often depends on habitat and surrounding vegetation. Isolated brown flatsedge plants on mudflats form dome-shaped clumps with decumbent and inclined stems. Stems are 2-30 cm long, 0.6-1.1 cm wide, smooth, easily compressed, and triangular in cross section. Leaves are three-ranked, spreading, flat, 4-10 cm long, and 2-4 mm wide. The inflorescence is comprised of spikes on rays, subtended by 2-3 bracts of unequal lengths; bracts are 1-20 cm long, 1.2-3 mm wide, and the longest erect or nearly so and the rest spreading. Spikes are comprised of 3-12 spikelets. Spikelets are narrowly ellipsoid, flattened, 3-7 mm long, 0.9-1.2 mm wide, with 8-16 floral scales. Floral scales are 0.9-1.1 mm long, 0.8-1.0 mm wide, with reddish-brown to dark purple sides, and a green or greenish yellow midrib. Achenes are light brown to almost white, ellipsoid, 0.7-0.9 mm long, 0.3-0.4 mm wide. The life history of brown flatsedge is similar to smallflower umbrellasedge (*Cyperus difformis* L.). Both are annuals, produce copious seeds, require moist or shallow standing water habitats, have a short life cycle with multiple generations per year, and produce seed in as few as 4 to 6 weeks following germination.

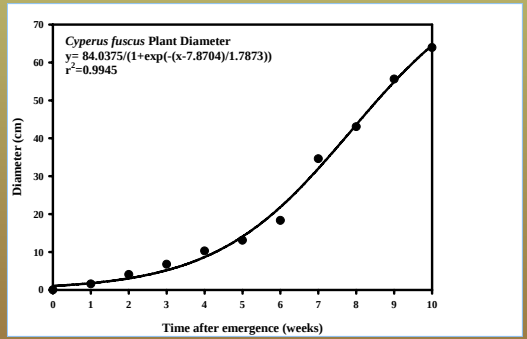
Brown flatsedge was reported as a weed in semitropical areas of the old world (Holm *et al*. 1979, Kukkonen 2001; Simpson and Inglis 2001), where it is a significant weed in rice (Weedon and Stephens 1969; Mingyuan and Dehu 1970; Holm *et al*. 1979). Because it was recently detected in the rice production areas of the Delta Region, research was initiated at Stoneville, MS, to study the basic biology and ecology of brown flatsedge.

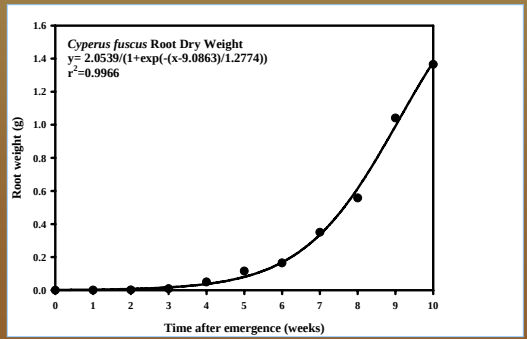
Material and Methods

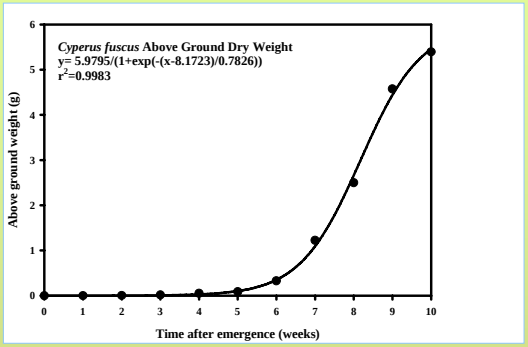
Field observations were made at three sites, Chicot County, Arkansas, and Pearl River and Washington counties, Mississippi. Observations were made from early spring until frost from 2003 through 2007.

Experiments were established in the greenhouse to determine growth parameters and the reproductive potential of brown flatsedge. Brown flatsedge seed were collected from Washington County, Mississippi, during the fall of 2006 and planted during 2007 in 15-cm diam. plastic pots in a 1:1 mixture of potting media and soil (Bosket sandy loam, fine-loamy, mixed thermic Molic Hapludalfs). Upon emergence, seedlings were thinned to one plant per pot and grown in a greenhouse set to 30/22 C (± 3 C) day/night temperature. Natural light was supplemented with light from sodium vapor lamps to provide at least 14-h of light each day. Plants were watered from below and were grown in greenhouse for 10 weeks. Plant height, diameter, number of leaves and culms per plant, and days to first flower were recorded from living plants. All plants were harvested, pressed and dried at 10 weeks after emergence. Plant parts were separated and dry weights were recorded for roots, leaves, culms, bracts and inflorescences. Ten plants were harvested per week for 10 weeks, and the experiment was duplicated. Data were subjected to ANOVA using SAS. Because there were no significant experiment by date interactions, data were pooled for each week and means were subjected to regression analysis.









Results

Field observations at three sites in Arkansas and Mississippi, determined that brown flatsedge was highly dependent on persistently moist soil or shallow standing water for establishment, growth, and seed production. Over a five-year period under natural field conditions, brown flatsedge seeds germinated from late March and early April until frost. Plants producing seed were observed as early as May and seed production continued until frost. Floral scale color varied from predominately green with a trace of reddish-brown or purple in spring and summer months to mostly reddish-brown to dark purple in the fall as day lengths become shorter and air temperatures become cooler.

Brown flatsedge plant height, diameter, and dry weights for roots and above ground plants from greenhouse studies are presented in figures. This species is possibly in the lag phase and could pose a threat to rice agriculture in Arkansas, California, Louisiana, Mississippi, Missouri, Tennessee, and Texas. Additional research is needed to determine the ecological range and to develop control methods for brown flatsedge.

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