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VASE LIFE OF LEATHERLEAF FERN HARVESTED AT VARIOUS TIMES OF THE YEAR AND AT VARIOUS FROND AGES[1]

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Additional index words. postharvest, *Rumohra adiantiformis.*

Abstract. **Newly emerging fronds (fiddleheads) of leatherleaf fern [Rumohra adiantiformis (G. Forst.) Ching] were tagged every 4 weeks for 1 yr. Ten fronds were then harvested 6 weeks after tagging and again at 4-week intervals until fern had been harvested 6 times. Fiddleheads emerging in June, July and August had the shortest vase life, 2-8 days, those emerging September through November lasted 3-16 days, while those emerging December through March lasted 7-28 days. Although inconsistent, fern harvested 6 weeks after emergence usually had longer vase life than older fern. The correlation coefficient of frond age to vase life was —0.98, height at 7 weeks to vase life was —0.82, and the b factor of the quadratic equation of growth to vase life was —0.96.**

The short vase life of leatherleaf fern has been a serious postharvest problem for at least 10 yr, occurring primarily in summer or early fall (4, 6). Soil moisture was implicated as a causal factor of fern wilt and the suggestion was made that leatherleaf fern is often overwatered (1, 7). A 3-yr test (5) showed very slight differences in vase life when watered at 1.25 inches/week or 2.5 inches/week, but all fern in the experiment lasted 17 days or longer except 1 group harvested in September which showed a vase life of 8 days. Henny (2) suggested blockage of the vascular tissue in the basal 0.5 inch of the stripe as a cause of fern wilt. Nell, et al. (6) suggested reduced water uptake was due to blockage of the stem. Prange and Ormrod (8) reported that the osmotic potential of the ostrich fern [*Matteuccia struthiopteris* (L.) Tod.], was higher in immature fronds than in mature fronds, water stress in immature fronds decreased total water and pressure potentials, but stress of mature fronds increased total water and pressure potentials. Marousky (3) reported mature leatherleaf fronds had a shorter vase life than immature fronds. Research in 1979-1980 (4) indicated that high fertilization with urea should be avoided due to adverse effects on yield. Fronds harvested from 63 or 73% shade showed no difference in fern wilt at 1 location and reduced wilt under 73% shade at a second location (9). This report (9) was the first publication to distinguish between fern wilt, actually a leaf curl phenomenon, and yellowing, a loss of chlorophyll in the center portion of the frond, both presenting an unattractive frond. The objective of this experiment was to determine vase life of different aged fronds cut during different seasons.

Materials and Methods

A 7-yr-old fern bed on Blanton fine sand at AREC-Apopka under 73% shade receiving about 1 inch water weekly was utilized for the test. Beginning April 19, 1982, 65 fiddleheads were tagged and thereafter 65 additional fronds were tagged every 4 weeks for 1 yr. Ten fronds were harvested 6, 10, 14, 18, 22 and 26 weeks after each tagging for vase life determinations. Fertilization rate was 750 lb. N/acre-year applied as 0.57 lb./32 ft^2 monthly from an 8-4-7 (N-P-K) ratio fertilizer. Fronds were harvested between 8 and 10 AM, placed in deionized water filled beakers with the pinna exposed to light in rooms with light intensities of 150 ft-c supplied by Cool White fluorescent lamps 12 hr daily. Temperatures in the rooms were maintained at 70-78°F and relative humidities were 50 ± 15%. Wilt and yellowing of the harvested fronds were recorded for 28 days or until vase life was terminated. Wilting of fern was characterized by partial or complete folding of green pinna along the mid vein and/or loss of overall frond rigidity. A frond was considered as yellow when the yellowing covered 5% of the frond surface.

Results and Discussion

Data from this test clearly show the influence of season

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Table 1. Vase life (days) of leatherleaf fern harvested at various times of the year and at various frond ages.

Date of fiddle-head emergence	Harvest date, 1982-1983																Avg vase life for emergence date (days)	Ht (inches) at 7 wk
	8/2	8/30	9/27	10/25	11/22	12/20	1/17	2/14	3/14	4/11	5/9	6/6	7/5	8/1	8/29	9/26		
Jun 14	4	5	2	5	4	2											3.7	25
Jul 12		5	3	3	3	3	3										3.3	22
Aug 9			6	6	8	3	5	3									5.2	21
Sep 6				15	8	5	3	4	8								7.2	21
Oct 4					12	7	7	3	6	8							7.2	22
Nov 1						14	10	9	16	11	10						11.7	22
Nov 29							11	12	16	16	15	13					13.8	22
Dec 27								12	22	22	16	15	12				16.5	19
Jan 24									28	25	25	26	17	12			22.2	17
Feb 21										28	27	23	19	15	8		20.0	21
Mar 21											28	27	25	13	12	7	18.7	18
Avg vase life for date of harvest	4.0	5.0	3.7	7.2	7.0	5.7	6.5	7.2	16.0	18.3	20.2	20.8	18.2	13.3	10.0	7.0		

Frond age (wk)						Frond age/vase life correlation coefficient
6	10	14	18	22	26	
Avg vase life (days)						
14.8	13.8	13.2	11.1	9.7	7.8	−0.98

on fern vase life. Fiddleheads emerging during the warm months had a much shorter vase life than those emerging during the cooler months (Table 1). Although the correlation coefficient for frond age to vase life is highly negative (−0.98), an examination of Table 1 shows inconsistencies from the various dates of fiddlehead emergence. Fiddleheads emerging July 12, September 6, October 4, January 24, February 21 and March 21 had decreasing vase life as frond age increased, but fiddleheads emerging the other months did not exhibit this pattern. The average vase life for the various harvest dates does not conform to the accepted thought that fern harvested in the summer have a shorter vase life than those harvested in the cool months of the year. Fern harvested August through February had a vase life of 3.7-7.2 days, while those harvested March through August had a vase life of 10.0-20.8 days. Although vase life termination was recorded as either leaf curl (wilt) or yellowing (chlorophyll degradation), the tables present simply the average vase life. All fronds with vase life terminated in less than 1 week were wilted. Very few fronds with vase life terminated 1-2 weeks were yellow. Many of the fronds terminated after 2 weeks were terminated because of yellowing, but only 6% of all fronds were terminated because of yellowing.

The correlation coefficient of vase life to growth rate was also highly negative (Table 2). The taller the fronds were at 7 weeks, the shorter the vase life (Table 1). Mature fronds with an average height of less than 20 inches (with the exception of those emerging in February) had a vase life of more than 16 days, but fronds with a height above 20

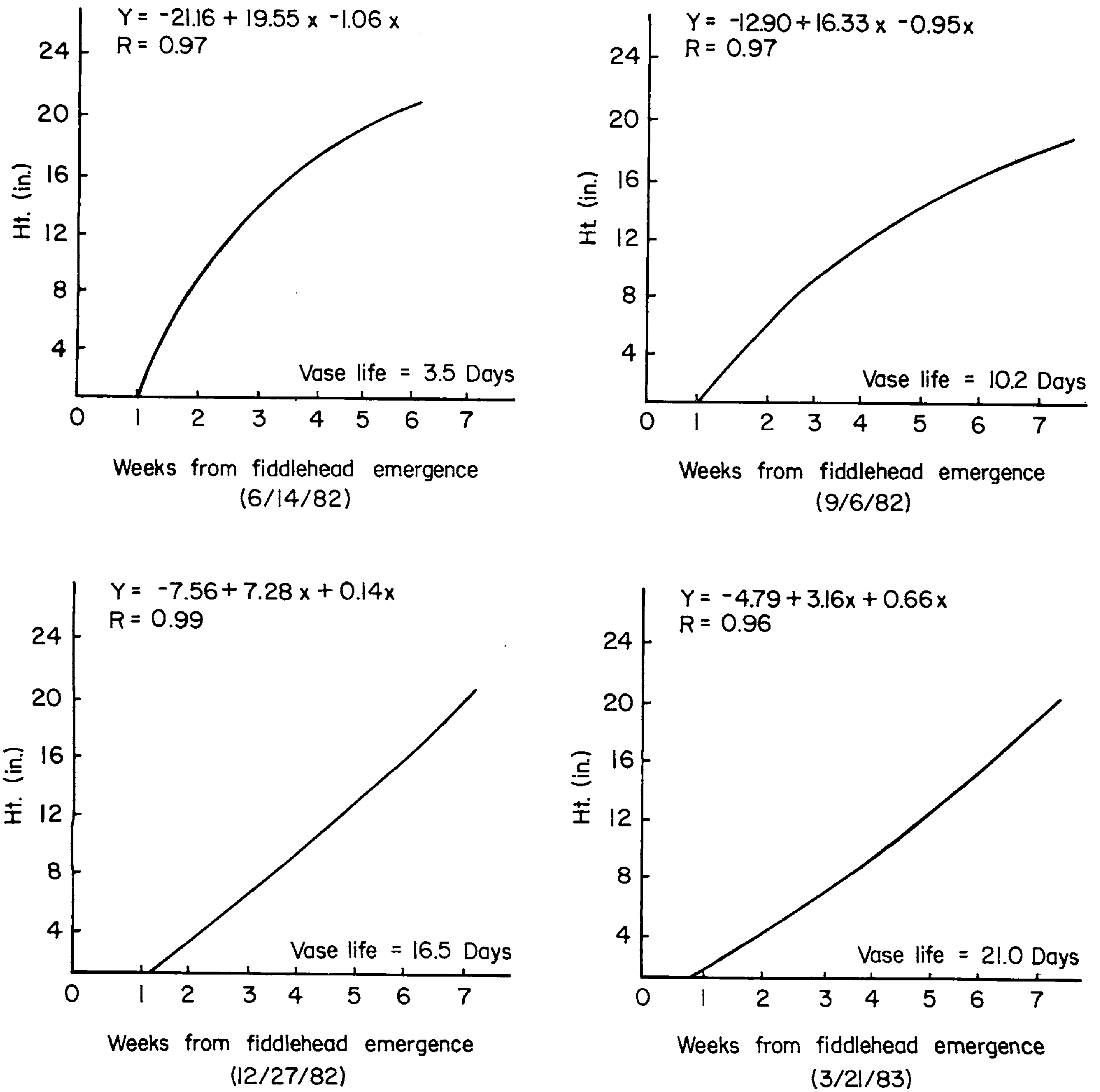

Fig. 1. Frond growth rate for 4 fiddlehead emergence dates, June 14, 1982; September 6, 1982; December 27, 1982; and March 21, 1983.

inches had a maximum of 13.5 days vase life with most less than 10 days. The tallest fronds, those emerging in June with a height at 7 weeks of 25 inches, had a vase life of only 3.5 days. Correlating the b factor, which indicates the slope of the quadratic growth equation with vase life, produces a correlation of −0.96, again indicating the rate of growth may influence the length of vase life. Regressions for growth of fronds emerging June, September, December and March are shown in Fig. 1. The slope of the curves clearly indicate that if rate of initial growth is high, vase life is short.

Table 2. Correlation coefficient of vase life to growth.

Ht (7 wk)/vase life	−0.82
b-quadratic equation/vase life	−0.96

The results of this research suggest that efforts should be made to reduce the rapid growth of leatherleaf fern, primarily by reducing fertilizer and water during the months when emerging fiddleheads are expected to have shortened vase life. Harvesting fronds immediately after maturity may also maximize vase life.

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EVALUATION OF OVERSEEDED TURFGRASSES FOR PUTTING GREENS[1]

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Additional index words. wear tolerance, dollar spot disease, bermudagrass, *Cynodon* spp.

Abstract. **Putting greens in the southern United States are overseeded during the winter months to provide a contrast in color, improve the playing surface, and primarily to provide a medium for wear to minimize damage to dormant turf. Forty-one cool-season turfgrass species, blends, or mixtures were evaluated for overseeding suitability. Overseeding plots were established on a 'Tifgreen' bermudagrass** (Cynodon spp.) **putting green. Turf quality, disease incidence and wear tolerance were evaluated periodically. Nineteen of the 41 overseeded grasses were equal in turf quality. Differences were noted in tolerance to traffic and dollar spot disease** (Sclerotinia homeocarpa **F. T. Bennett).**

Putting greens in the southern United States are overseeded during winter months for 3 primary reasons: 1) to provide a contrast in color, 2) to improve the playing surface, and 3) to provide a medium for wear to minimize damage to dormant turf (2). Continued development and release of new cool-season turfgrass cultivars requires continuous screening for proper recommendations to the turfgrass industry. The objective of this study was to evaluate cool-season species, blends, and mixtures for overseeding suitability.

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Methods and Materials

Overseeded plots were established on a 'Tifgreen' bermudagrass putting green at the Turfgrass Field Laboratory, Institute of Food and Agricultural Sciences, Gainesville, FL. All turfgrasses in Table 1 were seeded on November 10, 1983 except 'Medalist', 'Medalist 6', and 'Medalist 7' which were seeded on November 28, 1983. The entire area was lightly vertical-mowed in 1 direction to remove excess thatch just prior to seeding. Plots, 1 x 3 m, were hand seeded in 4 replications and the entire area was then topdressed using fumigated topsoil. Seed and topdressing were worked into the semi-dormant bermudagrass using a stiff broom. The following rates of seeding were used:

	Rate	
	g/m^2	lb./1000 ft^2
Perennial ryegrass (*Lolium perenne* L.)	175	35
Perennial ryegrass + rough bluegrass (*L. perenne* + *Poa trivialis* L.)	100	20
Perennial ryegrass + fine-leafed fescue (*L. perenne* + *Festuca rubra* L.)	150	30
Perennial ryegrass + rough bluegrass + (*L. perenne* + *P. trivialis* + *F. rubra*)		
fine-leafed fescue	125	25

Turfgrasses included in the study are presented in Table 1.

After seeding, plots were irrigated with 3 mm of water 3 times daily until germination at 10 days following seeding. Mowing commenced at a height of 8 mm (5/16 inch) for the first 2 weeks after seedling emergence and then height-of-cut was lowered to 6 mm (1/4 inch) for the re-