

Evaluation of Radicchio, Plant Science Farm, Knoxville Experiment Station

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Interpretative Summary

Eleven radicchio cultivars evaluated in Spring 2000 were generally unacceptable in that only about 10-50% of the plants formed compact heads suitable for marketing. Fall production

of the most desirable cultivar ('Indigo') from the spring planting grown on bare ground, and black, white, or silver plastic mulch resulted in more favorable yield potentials for radicchio as a possible alternative vegetable crop for Tennessee. Yields on plastic mulch were about twice of those from bare ground production.

Description of Radicchio

Radicchio {also *Cichorium intybus* L., Asteraceae family) is also known as red chicory and Italian red lettuce in certain supermarkets. Radicchio is a popular salad vegetable and garnish in Europe. It has a distinctively bitter flavor. The beautiful red-and-white heads can grow from orange to grapefruit size. The leaves are slightly bitter like endive, but also sweeten slightly with cooler day temperatures. In the past, only a portion of radicchio plants made tight heads, but new cultivars, including some hybrids, have improved uniformity in color and heading. Radicchio is grown much like head lettuce and needs a long, cool growing period. Spring crops are started very early and transplanted to the field when 3 to 4 weeks old. A fall crop is likely to be of higher quality than a spring crop. The fall crop is often direct-seeded about 85 days before the first average fall frost. The row is covered with a board or very light mulch to keep soil temperatures

cooler while the seeds germinate. Long days and/ or high temperatures can cause radicchio to bolt, increase in bitterness, and develop tipburn. Radicchio is frost tolerant, but growth will be slow in cold weather. Radicchio is used raw or lightly grilled or roasted and added to salads. Radicchio can also serve as a colorful garnish.

Materials and Methods

Spring Study-

Seed of 11 cultivars were seeded in the greenhouse on March 10 and transplanted to the field at the Plant Science Farm at Knoxville, Tennessee on April 20, 2000. Plots were fertilized with 400 lbs/A of 10-10-10 fertilizer. Transplants were spaced 12 inches apart in rows spaced 42 inches apart. Weed control was accomplished with herbicide at

recommended rate. Plants were harvested after 68 days of growth. Heads that were relatively compact were considered marketable.

Fall Study-

The most promising cultivar, 'Indigo,' from the spring study was selected for the fall study. Seeds were planted into 128 cell Speedling trays on July 14 and placed in a 50% shaded house for germination. On July 21 trays were moved to a 30% shaded house and on July 24 trays were moved to full sunlight where they were allowed to grow until transplanting into the field September 1, 2000. Eighty-one percent of the seeds germinated under these conditions. Field plots received 400 lbs/A 10-10-10 fertilizer before planting and plants received two sidedressings of ammonium nitrate of 30 and 20 lbs/A, respectively. Plants were planted in double rows 18 inches apart with plants spaced 12 inches apart within the rows on 6 inch raised beds covered with white, black, or metalized UV reflective silver plastic mulch or on bare ground. Plants were harvested on November 11. Heads that were compact were considered marketable.

Results and Discussion

With the exception of two or three cultivars, all cultivars evaluated failed to produce sufficient percentages of compact heads under environmental conditions of the spring growing season, to be economically acceptable. Cultivar 'Indigo' had the highest percentage of marketable heads, but with only 56% which is still quite low (Table 1) . A low percentage of head formation is a general problem with most all cultivars of radicchio according to most seed catalog listings. A small number of the plants bolted during the spring growing season, but the frequency was not significant among the cultivars evaluated. Those cultivars which formed 40-50% compact heads, produced heads that appeared to be of acceptable marketable size in about the 0.5 to 0.6 lb range. Total marketable yield from the best performing cultivar was only 3552 lbs per acre which is probably unacceptable, even at premium prices that have been quoted for radicchio sold in the packaged, fresh salad industry.

Plasticulture during fall production appeared promising on this relatively unfamiliar crop. The use of plastic mulch almost doubled the yields over those on bare ground culture. Table 2 lists the results from this study. Per cent head formation and individual head size were substantially increased with mulch culture. Heading percentages of greater than 80% were obtained in this study, compared to heading percentages of only 20-50% obtained from plants in the spring study. Also, plant populations can be substantially increased under this system, increasing the potential to increase yields. Per acre yields from plants grown on black and white mulches were nearly similar and about one and one-half times those of yields from plants grown on bare ground. Yields from plants grown on white mulch were about twice those grown on bare ground but not significantly greater than those grown on silver and black plastic mulches.

Table 1. Radicchio cultivar evaluation at the University of Tennessee Knoxville Experiment Station, Spring study, 2000.

Cultivar	Compact		Marketable Heads		Head Weight (Lbs.)	
	Heads	Bolting				
	%	%	No./plot	No./A	Average	Acre
Carmen	39.6 ab	2.1 a	9.5 ab	4926 ab	0.44 bcd	2295 a
Prima Rosa	40.6 ab	1.0 a	9.8 ab	5056 ab	0.51abcd	2580 a
Medusa	32.3 b	0.0 a	7.8 b	4019 b	0.55 abc	2159 a
Chiogga Red Preco	40.6 ab	1.0 a	9.8 ab	5056 ab	0.51 abcd	2528 a
Trevisio	27.1 b	1.0 a	6.5 b	3371 b	0.63 a	2100 a
Inferno	19.8 b	2.1 a	4.8 b	2463 b	0.34 d	933 b
Melrose	18.8 b	4.2 a	4.5 b	2334 b	0.57 ab	1420 b
Alto	19.8b	0.0 a	4.8 b	2463 b	0.39 cd	1037 b
Augusto	20.8 b	5.2 a	5.0 b	2593 b	0.39 cd	1115 b
Tero	41.7 ab	1.0 a	10.0 ab	5186 ab	0.47 abcd	2353 a
Indigo	56.3 a	1.0 a	13.5 a	7001 a	0.48 abcd	3552 a

Means in a column followed by the same letter are not significantly different according to Duncan's Multiple Range Test at P = 0.05.

Table 2. Radicchio production on plastic mulches at the University of Tennessee Knoxville Experiment Station, Fall study, 2000.

	Plasticulture Treatment			
	None	Black	Silver	White
SuSurvivability				
Number	39.5 a	39.3 a	39.5 a	39.8 a
Percent	98.8 a	98.1 a	98.8 a	99.4 a
H Head Production				
Number	29.8 a	32.3 a	28.3 a	32.8 a
Percent	75.4 a	82.2 a	71.6 a	82.3 a
Weight Production (lbs.)				
Total	14.1 b	22.5 a	23.0 a	25.7 a
Per Head	0.48 c	0.71 b	0.82 a	0.79 ab
Acre Production (no. & lbs.)				
Heads	6170.7 a	6689.3 a	5859.6 a	6793.0 a
Weight	2919.4 b	4664.4 a	4775.8 a	5338.5 a

Means in a row followed by the same letter are not significantly different according to Fisher's Protected LSD at P=0.05.

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This research represents one season's data and does not constitute recommendations. After sufficient data is collected over the appropriate number of seasons, final recommendations will be made through research and extension publications.