

## Studies on Radicchio

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### Interpretative Summary

Four cultivars that had performed more favorably of several evaluated in 2000 Spring studies were compared on three plastic mulches and a bare ground control in Spring 2001. All cultivars performed similarly on the plastic, for the most part all performing better than on the bare ground. As in previous studies, the percentage of plants forming marketable was less than desirable, ranging from a low of 34% on bare ground to a high of 60% on silver mulch.

'Indigo', one of the more favorable cultivars evaluated in previous studies, grown under different levels and regimes of nitrogen fertilization, resulted in larger heads of approximately one pound each, and more respectable percentages of plants producing marketable heads.

### 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

#### Fertility Study-

Seeds of 'Indigo' were seeded in greenhouse float-beds on March 09 and transplanted to the field on April 12, 2001. The experiment was organized in a split-plot design with main plots consisting of three levels of broadcast applications of fertilizer prior to transplanting. These levels consisted of (1) 200 lbs/A of 10-10-10, (2) 200 lbs/A of 10-10-

10 plus 20 lbs/A N as 34-0-0 and (3) 200 lbs/A

10-10-10 plus 40 lbs/A N as 34-0-0. Sub-plot treatments consisted of additional levels of 30 and 60 lbs/A N as 34-0-0 applied in drip irrigation in 6 weekly increments over the growing season. Transplants were spaced 12 inches apart in staggered double rows spaced 12 inches apart within the rows on 6 inch raised beds covered with black plastic mulch. Plants were harvested after 82 days of growth. Heads that were relatively compact were considered marketable

#### **Plasticulture/Cultivar Study-**

Seeds of 4 cultivars were seeded in greenhouse float-beds on March 09 and transplanted to the field on April 12, 2001. All plots were fertilized with 500 lbs/A of 10-10-10 fertilizer. Transplants were spaced 12 inches apart in staggered double rows spaced 12 inches apart within the rows on 6 inch raised beds covered with white, black, or silver plastic mulch or on bare ground. Plants were harvested after 82 days of growth. Heads that were relatively compact were considered marketable

### **Results and Discussion**

#### **Fertility Study-**

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 in 2000 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.

In a 2001 Spring study fertilization was incorporated into production of cultivar 'Indigo' on black plastic mulch. A preplant broadcast application of 60 lb/a N significantly increased marketable head yields over 20 and 40 lb/a broadcast treatments (Table 1). An additional fertigation application of 60 lb/a N had the same influence over that of a 30 lb/a N fertigation application. Individual head weight was increased, but not significantly by the additional level of N through fertigation.

#### **Cultivar/Plasticulture Study-**

In a another 2001 study with radicchio involving cultivar evaluation across colored plastic mulches, all plastic mulches included in the study resulted in significantly larger head weights and marketable yields than did bare ground culture (Table 2). Only 34% of the plants produced marketable heads on the bare ground plots as opposed to almost twice that amount on the respective plastic mulches. Across the radicchio cultivars

evaluated, yield performance was about the same on all three plastic mulches. Marketable yield and head weight were greater from 'Red Treviso' than from 'Carmen'. Carmen is a small heading type, whereas Red Treviso is an upright strain with considerably more cover leaves.

Table 1. Head weight, percentage of plants producing marketable heads and total weight of radicchio cultivar 'Indigo' at The University of Tennessee Knoxville Experiment Station, 2001.

| Fertigation Level<br>(b/a N) | Head Weight<br>(lbs/head) | Marketable Yield<br>(lbs/a) | Marketable Heads<br>% |
|------------------------------|---------------------------|-----------------------------|-----------------------|
| 0                            | 1.05a                     | 4548b                       | 71a                   |
| 0                            | 1.10a                     | 5323a                       | 77a                   |
| Broadcast Level<br>(b/a N)   |                           |                             |                       |
| 0                            | 0.94b                     | 4161b                       | 73a                   |
| 0                            | 1.07ab                    | 4688b                       | 69a                   |
| 0                            | 1.20a                     | 5957a                       | 73a                   |

Data (Fertigation Level) represent means taken across the three broadcast levels. Data (Broadcast Level) represent means taken across the two fertigation levels. 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. Head weight, percentage of plants producing marketable heads and total weight of four radicchio cultivars under plasticulture at The University of Tennessee Knoxville Experiment Station, 2001.

| Plastic Mulch | Head Weight<br>(lbs/head) | Marketable Yield<br>(lbs/a) | Marketable heads % |
|---------------|---------------------------|-----------------------------|--------------------|
| one           | 0.67b                     | 1737b                       | 34b                |

|              |       |        |      |
|--------------|-------|--------|------|
| White        | 0.95a | 4558a  | 60a  |
| Black        | 0.96a | 4266a  | 57   |
| Silver       | 1.05a | 4674a  | 59a  |
| Cultivar     |       |        |      |
| Indigo       | 0.84b | 3416b  | 51ab |
| Carmen       | 0.88b | 3294b  | 46b  |
| Red Trevisio | 1.02a | 4677a  | 59a  |
| Fiero        | 0.89b | 3748ab | 54ab |

Data (Plastic) represent means taken across the four cultivars. Data (Cultivar) represent means taken across the four plasticulture treatments. Means in a column followed by the same letter are not significantly different according to Duncan's Multiple Range Test 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.