LSU AgCenter 2018 Red Cabbage Fertilizer Trial

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Red cabbage variety 'Red Dynasty' was the only variety to show significant statistical difference in head size in response to fertilizer treatment.

Introduction

Cabbage (*Brassica oleracea*) is a popular cool season vegetable primarily sold at fresh markets in Louisiana. In 2017, 126 producers grew fresh market cabbage on 222 acres in Louisiana. The 2017 gross farm value (GFV) of fresh market cabbage was approximately $2.45 million (2017 Louisiana Ag Summary) Commercial producers yield fair sized green cabbage, but many growers find growing large sized red or purple cabbage difficult (personal communication LFVGA members). Red cabbage with notable size is a challenging crop to produce in Louisiana.

In an attempt to determine if head size could be controlled by variety, a trial was established at Covey Rise Farms in Husser, LA in the fall of 2017. Cabbage varieties were planted in replicates of 3 blocks on black plastic with drip irrigation and fertilized at a rate of 50lbs N per acre as a preplant. Of the varieties trialed, most yielded about the same head size (Fontenot et al., 2018). The 2018 study used three of the red cabbage varieties trialed before but added a fertilizer component to the study. The Southeastern U.S. Vegetable Crop Handbook provides guidelines for fertilizing cabbage. The fertilizer recommendations are based on soil test results. For

instance in the 2018 Southeastern U.S. Vegetable Crop Handbook, the recommended rate of fertilizer for cabbage are as follows:

Nitrogen recommendations range from 100 to 175 lbs of actual N per acre with 50-100 pounds placed into the field as a preplant application and the remaining amount as sidedress applications in at least 2 applications. P and K are soil test dependent. Both with rates of 0lbs., 50 lbs. 100lbs. or 200lbs. per acre for Very High, High, Medium, and Low results respectively.

The objective of this trial was to increase the recommended preplant rate of nitrogen (N) by 1.5 and 2 times that of the recommended rates in the SE US Veg Crop Handbook to determine if additional N fertilizer would increase red cabbage head size.

Materials and Methods

Three red cabbage varieties were selected from the 2017 LSU AgCenter red cabbage variety trial: 'Red Dynasty', 'Red Jewel', and 'Red Express'. Seeds were planted on Sept 18, 2018 into 50 count cell trays using SunGrow media. Seedlings were watered daily on a can yard at the Hill Farm teaching facility at LSU's Campus in Baton Rouge Louisiana. The seedlings were then transplanted into a field located at the LSU AgCenter Botanic Gardens (30.4057072, -91.103358) on Nov 19, 2018.

According to the 2018 Southeastern Vegetable Crop Handbook, a total of 100-175lbs of actual N fertilizer should be applied throughout the growing season with 50-75 actual pounds of N being applied at the preplant application. For this study, 50 lbs. N/acre was used as the 1X rate, 75 lbs. N/acre as the 1.5X rate, and 100 lbs. N/acre as the 2X rate. The cabbage was side dressed twice-using 50 lbs. of actual N/acre in the form of ammonium sulfate at each application during the growing season on Dec 18 and Jan 8, 2018. Therefore, the 1x cabbage received a total of 150lbs of actual N throughout the study and the 1.5X and 2X rates received a total of 175 and 200 lbs. of actual N per acre respectively.

Red cabbage plants were transplanted in field on November 19, 2018. The plants were planted on 48-inch-wide rows. Irrigation was provided as needed. The winter 2018- early 2019 spring was extremely wet. Each plot was 20 ft. long with a skip space of 5 ft. between plots. Each plot had 20 plants and each variety by fertilizer rate was replicated three times. Cabbage was harvested on March 11, 2019. Ten heads from each plot (3 plots per variety by fertilizer treatment) were cut using knives leaving a quarter inch of stem. Outer wrapper leaves were removed leaving 1 to 2 wrapper leaves on each head for fresh weights. Cabbage heads were weighed immediately after harvest.

Grass was a problem in the cabbage field and was sprayed with the herbicide Select at 16 oz./acre on January 10, 2019. Insecticides and fungicides were not used.

Results

Variety	1X Fertilizer Rate (lbs.)	1.5X Fertilizer Rate (lbs.)	2X Fertilizer Rate (lbs.)

Red Dynasty	1.16b	1.35ab	1.53a
Red Express	1.45a	1.61a	1.70a
Red Jewel	1.7a	1.79a	1.97a

Table 1 Average head weight by variety and fertilizer application. 50 lbs. N/acre as the 1X rate, 75 lbs. N/acre as the 1.5X rate, and 100 lbs. N/acre as the 2X rate
Numbers with different letters across rows are significant by $p \leq 0.05$ using SAS proc GLM with Duncan.

Conclusions

Cabbage grown in the 2X fertilizer plots yielded noticeably bigger cabbage heads for all varieties when physically looking at the heads in the field. However, 'Red Dynasty' was the only red cabbage variety to yield results statistically significant between 1X and 2X fertilizer rates. 'Red Express' and 'Red Jewel' both yielded bigger cabbage heads at the 2X rate; however, this was not statistically significant. We would recommend farmers increase their pre plant fertilizer rate for red cabbage to 2X the given rate in the U.S. Southeastern Vegetable Crop Handbook. This study will be replicated in the fall of 2019.

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