

Evaluation of broccoli varieties for winter production in non-heated greenhouse in Middle Tennessee

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The objectives of this project were to develop the production system for winter broccoli in non-heated greenhouses, and to provide new resources to support the business for local small farmers. Variety trials were conducted inside the non-heated greenhouses at two different locations; the McCraw's farm at Clarksville, Tennessee and the Agricultural Research Station at TSU, Nashville, Tennessee during the fall and spring seasons. During fall 2021, 14 broccoli varieties were grown and evaluated in McCraw's farm. The stage of the plant, width and height of the flower heads were recorded weekly starting from the first week of December. The flower heads were harvested from second week of December till 1st week of January. The quality of the flower heads was found to be good during this period. 10 varieties were selected as candidate varieties for winter production in non-heated plastic greenhouses.

During spring 2022, 19 Broccoli varieties were evaluated for Spring broccoli production in McCraw's farm. Seeds were sown in February, transplanted into hoop-houses in March. In May 2022, data were recorded for the stage of plants, and width and height of the flower heads. 15 varieties produced flower heads. The flowerheads were harvested on the last week of May. Most of the broccoli were found to be very matured and started seed formation which may happen due to the high temperature. Based on customer survey, five broccoli varieties (PI 1687055, PI 1687111, PI 1687112, PI 1687109 AND PI 1687041) were preferred.

In fall 2022, broccoli seeds were germinated to re-evaluate the fall-winter production system at McCraw's farm. Unfortunately, the seeds had very low germination rate, and the few germinated seedlings grew very poorly. So, the second batch of seeds were planted on Sept 16th, 2022 at Tennessee State University. 10 varieties of broccoli namely; Purple Sprouting Late, Big Sur F1, Zeus F1, Purple Sprouting Xmas, G28307, Atlantic, White Sprouting Early, Green Comet F1, Florette F1, and Green Sprouting Early was selected. 10 seeds per variety was sown in the jiffy pellets and watered daily. The seed started to germinate after 3-5 days of sowing. These seedlings were transplanted to five-gallon pots and grown in a non-heated plastic greenhouse on TSU farm on Nov 10th, 2022. During the extremely cold days from the third week of December 2022, plants were covered with double layers of fiber cloth and an insulated blanket for two days. The greenhouse was partially opened on sunny day from 9:30m am to 2:30 pm when the air temperature was above 60°F. It was closed on cloudy and raining days. Broccoli plants grow healthy, and some variety started to form flower heads on Jan 1st, 2023.