

EFFECT OF PLANT DENSITY ON GROWTH
AND YIELD OF THREE POTATO VARIETIES
(Solanum tuberosum L.)

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SUMMARY

The experiment was conducted in the Field experiment of Horticulture Department College of Agriculture, Abu-Ghraib, during spring season of 1985.

The experiment was carried out in a split-plot design, with four replications using three American cultivars (Atlantic, Norchip and Katahdin) as main plots and plant densities (20, 30 and 40 cm.) as sub-plots.

The objective of this study was to determine the effect of plant density on the performance of three potato cultivars for vegetative growth characters, yield, yield components and tuber quality.

The results could be summarized as follow:

1. Percentage of emergence:

The emergence was high for all treatments (97.0-99.75%).

There was no significant differences between treatments.

2. Vegetative growth:

a. The cultivar Atlantic was significantly higher than other cultivars in plant height, number of nodes per plant, dry weight of haulm per plant, while cultivar Norchip was significantly higher than the other two cultivars in the number of branches per plant.

However, the study indicated that the cultivar Katahdin senesced earlier than other cultivars.

- b. All cultivars which planted on 20 cm apart produced significantly taller plants, beside these, plants senesced earlier than other plants which planted on 30 and 40 cm apart. The cultivars which planted on 40 cm apart gave a higher number of branches, number of nodes and dry weight of haulm per plant.
- c. There was a significant interaction between cultivars and plant density on some vegetative growth characters. It was found that Atlantic cultivar which planted on 20 cm apart was significantly taller in plant height than others plant densities and this cultivar when planted on 40 cm produced also higher number of nodes and dry weight of haulm. While Norchip cultivar which planted on 40 cm produced the highest number of branches. The study indicated that Katahdin cultivar which planted on 20 cm apart was the earliest in senescence.

3. Yield and primary yield components:

- a. The cultivar Norchip significantly produced higher total number of tubers and number of unmarketable tubers, while Atlantic and Katahdin produced heaviest weight per tuber and highest of the largest tuber and higher yield per plant.

b. There was no significant effect of plant density on total number of tubers per plant on the first measurement, while on the second and third measurement, significant differences were found for total number of tubers per plant and number of each of marketable and unmarketable tubers per plant and total yield per donum.

The cultivars planted on 40 cm apart produced heavier weight of tuber, weight of largest tuber, and higher yield per plant at the final harvest.

c. The interaction between cultivars and plant density significantly affected the yield and primary yield components. Norchip cultivar planted on 20 cm produced higher number of each of marketable tubers and unmarketable tubers and total number of tubers. The cultivar Atlantic planted on 40 cm produced heavier weight of tuber and weight of largest tuber and higher yield per plant. The same cultivar planted on 20 cm gave the highest yield per donum.

4. Yield quality:

a. The percentage of tuber dry matter was increased with the age of tuber age increased. The tubers of Atlantic cultivar were significantly higher in the percentage of tuber dry matter, Specific

gravity and starch content. on the other hand, the tubers of Katahdin cultivar were significantly higher in the total soluble solid (TSS).

The cultivars Katahdin and Atlantic were significantly higher in the percentage of protein content.

b. There was no significant effect of plant density on the characters of tuber quality.

c. Tuber quality was significantly affected by the interaction between cultivar and density.

Atlantic planted on 40 cm apart was significantly higher in dry matter and starch contents, while Katahdin planted on 30 cm apart gave higher total soluble solid dry matter. The same plants of cultivar katahdin gave higher percentage of protein.

5. The correlation study:

A significant and positive correlations between branch numbers and node numbers, between branch numbers and the dry weight of haulm, and also between node numbers and the dry weight of haulm per plant was found. All these characters were significantly and positively correlated with tuber yield per plant.

The number of tubers per plant was significantly and positively correlated with branch numbers per plant. Tuber yield per plant showed a significant and negative correlation with plant senescence. Positive correlations were found between specific gravity and dry matter content, between specific gravity and starch content and also between dry matter and starch content, but all these characters were negatively correlated with protein content.