THE EFFECT OF SEED SPACING AND NITROGEN LEVELS ON THE SIZE OF NETTED GEM POTATOES.\textsuperscript{1}

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Netted Gem (Russet Burbank) is the most acceptable variety of table potato for the British Columbia market. It is very specific in its growth requirements and unless these are met it often produces many rough and small tubers.

Close planting or soil moisture deficiency may tend to restrict tuber sizing and result in an excessive proportion of small tubers. The effect of soil moisture deficiency on Netted Gem is minimized on Vancouver Island in British Columbia by confining production almost exclusively to organic soils. Soil moisture is usually adequate on the deep organic soils but often inadequate on the shallower phases where no water table exists to provide a moisture reserve. Field observations indicate that a wider spacing may be advantageous here to conserve soil moisture and improve tuber sizing. On Vancouver Island whole Netted Gem seed is usually planted at a 12- to 15-inch spacing in rows three feet apart. The purpose of these experiments was to determine whether wider spacing would be advantageous on two organic soils, first, to increase the proportion of large tubers without a reduction in the yield of marketable potatoes and, secondly, to reduce the rate of soil moisture depletion during the growing season. Two nitrogen levels were used to determine whether the nitrogen level would affect tuber sizing.

A spacing of eight inches is recommended for Netted Gem on organic soil in Eastern Canada (2). Rieman (4), however, growing Russet Burbank (Netted Gem) on organic soil in Wisconsin has shown that spacings of 21 and 30 inches increased both the total marketable yield and the proportion of large tubers. Results from experiments using 6, 8, 10, 12, 14 and 16 inches on mineral soils in British Columbia (3) have favored the 12- and 14-inch spacings for Netted Gem. Smith (5) reports that close spacing gave the best yield of Sebago while Houghland and Parker (1) report that the yield of Irish Cobbler increased with closer spacing.

\textbf{Materials and Methods}

Field plots were established at two locations as split plot experiments with four replicates.

Two nitrogen levels, 55 and 110 pounds per acre, made up the main plots, and four spacings, the subplots. Subplots consisted of two 44-foot rows of which the center 40 feet were used for the experiments leaving two feet at each end as a guard. The sides of main plots were separated from each other by two guard rows but there were no guard rows between subplots.

A 2-row potato planter (with the rear discs removed) was used to

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open the furrows for hand planting and to place in bands a uniform application of 55-240-250 pounds of N-P₂O₅-K₂O per acre which provided the 55 pounds per acre level of nitrogen. The plots requiring 110 pounds of nitrogen per acre received an additional broadcast application of 165 pounds of ammonium nitrate per acre incorporated during the normal course of land preparation.

Spacing distances of 12, 16, 20 and 24 inches were used in rows 36 inches apart, accuracy of spacing being obtained by placing the seed pieces opposite marks on a specially prepared rope. Whole two-ounce tubers were used for seed throughout the experiments.

The experiments were conducted on Arrowsmith peat from 1959 to 1961 and on Metchosin muck in 1960 and 1961, both on the farm of John Pendray, Victoria, British Columbia. The ignition loss on a surface sample of Metchosin muck was 88%, the total nitrogen 2% and the pH 4.7. The ignition loss on a surface sample of Arrowsmith peat was 94%, the total nitrogen 1.2% and the pH 4.4. The moisture depletion rate for each planting distance was determined on the Metchosin muck by the oven drying method at two-week intervals throughout the growing season. Similar measurements were discontinued on the Arrowsmith peat as a high water table prevented depletion of the soil moisture reserves.

The plots were separated in the fall by first harvesting the two-foot guards at both ends of each row. Then the plots were dug mechanically and the potatoes from each plot graded into five classes and weighed. The following standards were used:

- Marketable — Canada No. 1
- Small — 1 ¾ to 2 3/8 inches in diameter.
- Medium — over 2 3/8 inches in diameter but weighing less than 10 ounces.
- Large — 10 ounces and over.

- Unmarketable
  - Very small — less than 1 ¾ inches in diameter.
  - Culls — mis-shapen, cracked or knobby tubers.

RESULTS AND DISCUSSION

Soil moisture data from Metchosin muck obtained at two-week intervals over a two-year period showed that spacings made no apparent difference to the rate of soil moisture depletion. The total moisture depletion for 12-, 16-, 20- and 24-inch spacings was 5.40, 5.27, 5.41 and 5.53 inches respectively. During the same two years a similar but shallower soil showed an average moisture depletion of 8.41 inches for potatoes spaced at 18 inches. It appears that the soil moisture deficit as measured in the spacing experiment was minimized by a water table which may have masked any differences in moisture requirement resulting from wider spacings.

The effect of planting distance on the total yield and tuber size is shown in Table 1.

Although the data suggest that the highest yields were obtained from the 16- and 20-inch spacings, the differences were not significant at the