

2000 GARLIC RESEARCH SUMMARY

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While garlic has received considerable producer interest in the past decade, recent positive steps towards imposing duties on low priced imports may renew interest in growing the crop. Garlic production research at Ridgetown College has been ongoing for several years, and is focused on improving management practices associated with garlic production. This also includes evaluating forms of mechanization, whose impact on quality and productivity need to be documented.

Objectives of the 2000 research program included evaluating the influence of in-row and row spacings, and leaf removal on yield and quality of garlic. Garlic (Music strain) was hand seeded into a Brookston clay loam sand spot phase soil (10% O.M; pH = 7.8) on the Ridgetown College research farm on 08 November 1999.

Current in-row spacing recommendations for garlic in Ontario were re-evaluated to determine if yield improvements could be realized without significantly reducing bulb size. Rows were spaced 65 cm wide, and cloves were spaced in the row at 5, 10 and 15 cm. A range of row widths are also used in garlic production in Ontario, often based on the dimensions of available equipment. Few growers grow garlic in narrow rows on bed systems, as is common in California, and done with onions in Ontario. In another trial, cloves were placed 10 cm apart in rows which decreased from the standard 65 cm to 45, 25, and 15 cm.

In the in-row spacing trial, we found that by decreasing the spacing from the standard 10 cm to 5 cm, average bulb weights were reduced by 15%, but yields increased by 74%. Increasing in-row seed spacings from 10 to 15 cm did not affect bulb size, but decreased yields by 32%. In the row width trial, significant increases in yield were found as garlic row widths were reduced from 65 cm to 45, 25, and 15 cm, bulb weights only dropped slightly across this range (Figure 1). Top dry weight and the number of bulbs harvested were not affected by changing row widths. Other studies have shown that the yield of garlic bulbs has been found to increase as the plant densities increase up to 100 plants/m², but often at the expense of bulb size. Densities in California range from 40 to 60 plants/m², with lower densities used for fresh market, where bulb sizes are important. Densities in our in-row spacing study ranged from 10 to 30 plants/m² (65 x 15 cm - 65 x 5 cm), and from 15 to 65 plants/m² in the row width study (65 x 10 cm – 15 x 10 cm).

This work suggests that acceptable bulb sizes can be maintained by reducing row widths to below a standard 65 cm (with 10 cm in-row spacings). However, specialized equipment for planting, cultivating, and harvesting will be needed at very narrow spacings. The present in-row spacing recommendations (10cm) appears to maximize bulb size, but increases in yield with a slight drop in bulb size can be achieved at reduced in-row spacings.

Several years ago when scapes were of little value, we noticed growers removing them mechanically with mowers which ran above the crop. This was being done when the scapes were short, and the process often took portions of the top leaves as well. We wondered if leaf removal affected yields and bulb sizes, and set up a trial to imitate this practice. Scapes were removed when they were approximately 15 cm long, and either 0, 1, 2, 3, or 4 leaves immediately below the scapes were removed at the same time. The

total leaf area of a garlic plant is relatively small (around 500 cm²), and the removal of 1, 2, 3, and 4 leaves was equal to a reduction of 11, 28, 48, and 63% of the total leaf area respectively.

While we expected yields to be affected by some degree of leaf removal, we were surprised at how dramatic the response was. By removing only 1 leaf at scape removal, bulb sizes were reduced by 13% and yield was reduced by 17.5%, with bulb sizes and yield being further reduced as the number of leaves removed increased (Figure 2). Garlic cloves are formed from lateral buds which develop in the axils of the youngest 2 or 3 foliage leaves, which may make their removal more detrimental. If garlic scapes are to be removed mechanically, it may be better to allow the scapes to grow longer in order to reduce the chance of removing leaves. Previous work at Ridgetown has demonstrated that allowing the scapes to grow 30-40 cm long before removal has little effect on yield.

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Figure 1: Influence of row width on yield and bulb weights of garlic

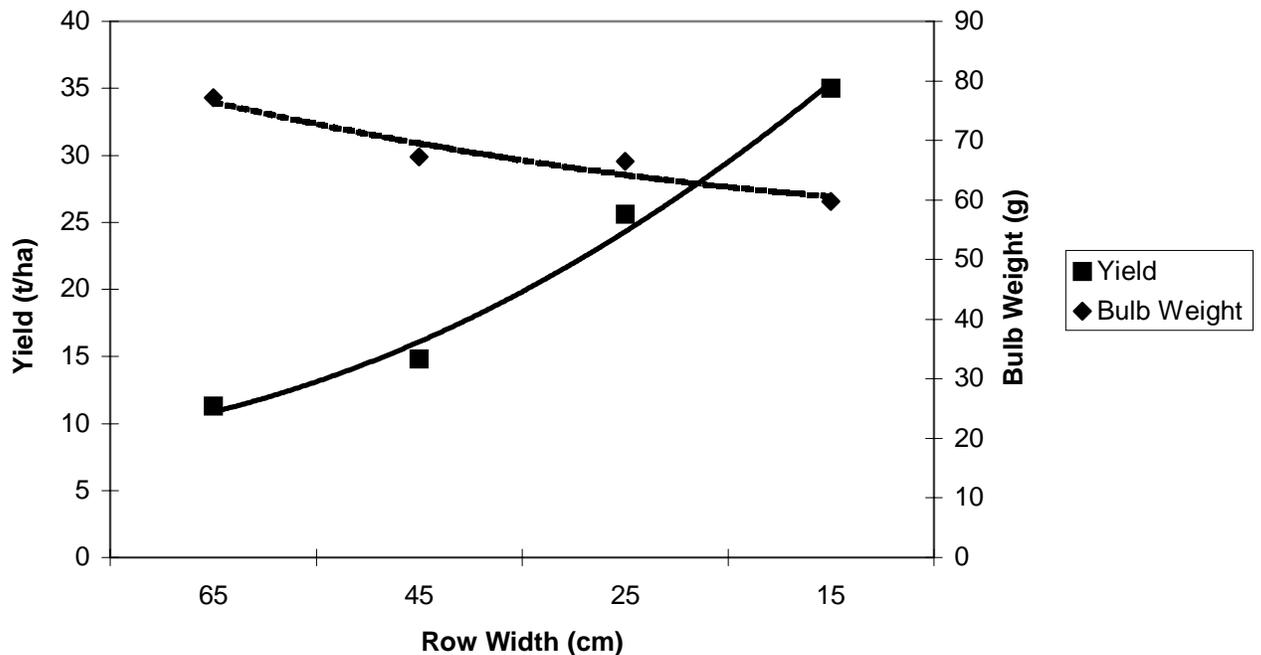


Figure 2: Influence of leaf removal on yields and bulb weights of garlic

