Effect of cultivar, cropping on female/male asparagus yields

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Test area and sprouting status of white asparagus in the rootstock planting forcing culture. Credit: *HortScience* (2022). DOI: 10.21273/HORTSCI16786-22

Asparagus (Asparagus officinalis L.) is a dioecious perennial plant. Male plants have a higher yield than female plants; therefore, all-male cultivars are more commonly produced. In contrast, female plants have a higher spear weight than that of male plants. To increase profitability, selective cultivation of only female plants would increase the yield of asparagus with a thick spear, which has a higher unit price.

However, the effects of cultivar and cropping type on the growth and yield of male and female asparagus plants have rarely been examined. A

team of scientists in Japan compared the growth and yield of female and male plants of three cultivars grown under various cropping types: a rootstock planting forcing culture (RPFC); a long-term harvest production system (LHPS) in an open field; and a semi-forcing culture.

The sex differences in the growth and yield of 1-year-old green asparagus cultivars Early California and UC157 grown in RPFC were investigated to determine which of the cultivars is more suitable for RPFC. Additionally, using a LHPS, this study examined yield differences between the sexes of 2- to 4-year-old asparagus cultivars, specifically green asparagus UC157 and purple asparagus Pacific Purple, in open field and semi-forcing cultures to determine whether the female purple asparagus plants have advantages over the male plants in terms of profitability. UC157 is widely grown in Japan and was used as a control for each cropping type.

As a measurement of growth, the rootstock weight was significantly higher for female plants compared with that of male plants with the rootstock planting forcing culture. Regarding yield measurements, the spear weight and yield were not significantly different with the rootstock planting forcing culture. However, with the long-term harvest production system in the open field and semi-forcing cultures, the weight and yield of female plants were equivalent to or significantly higher than those of male plants, regardless of the cultivar, except during some harvest periods.

These results indicated that the selective production of female plants may be advantageous in terms of growing heavier spears with a higher unit price in a long-term harvest production system in the open field and semi-forcing cultures in Japan. The sex identification process for plants is time-consuming and can be costly because it involves DNA extraction and polymerase chain reaction analysis. Although the development of simpler sex identification methods is ongoing, the cost of such methods

is a factor to be considered when determining the cost-effectiveness of female plant production for each cropping type, cultivar, and region.

The study is published in *HortScience*.

More information: Satoru Motoki et al, Effects of Cultivar and Cropping Type on the Growth and Yield of Female and Male Asparagus Plants, *HortScience* (2022). DOI: 10.21273/HORTSCI16786-22

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