Overview of the Asparagus Breeding Program

Parent selection

Hybrid seed production

First field trial

many new hybrids

First field trial

many new hybrids

Advanced field trial:

selected hybrids only

Release of new variety

Prospective parents of selected hybrids through inbred and close capture to increase seed production

8-week old seedlings grown in 2.5 cm cells and planted in May

First trial layout: 6 replicate plots/line; 19-20 plants/plot

• 5 foot (1.5 m) row spacing,

• 1 foot (30 cm) plant spacing

• First harvest in year 2: 3 weeks;

• year 3 and after: 9 weeks

• Plots harvested MWF each week

• Data recorded once per week

Breeding Strategies

• Through the use of andromonoecious x male outcrossing, we are able to produce supermales that have superior hybrid characteristics. These supermales have a reduced genetic propensity for andromonoecy compared to supermales produced through selfing, allowing for the production of F1 progeny with little to no andromonoecy. The hybrids made from these supermales show a lot of promise combining the large spear size and Fusarium and rust tolerance of New Jersey varieties with the spear head tightness of California varieties.

• The supermale parent B0 was created using andromonoecious x male outcrossing and is the male parent of one of our four best experimental hybrids, 77-80. B0 was created from a cross between M256 and an andromonoecious male that has Sneep (Dutch andromonoecious line) and California parentage. The female 77 is a single plant selection from a cross between New Jersey and California material. In the UC trial planted 2013 (data shown) hybrid 77-80 has 54.6% higher adjusted* marketable yield than DePaoli.

Data Collection Methods

Prior to data collection a picking crew uses our mobile trimming station and belt knife to trim spears and harvest them in their respective plots.

Using Trimble® Nomad® computers and mobile platforms has increased the speed of data collection by at least 43% compared to previous methods. Our program (which uses Visual CE® by Syware®) performs real-time error checking for inconsistencies in the data. Errors in plot number assignments are reduced by guiding the technician along a predetermined serpentine path. Spears are collected from plots and weighed and graded by the technician. If any missed spears are observed they can be harvested, collected, and trimmed on the platform.

Clonal Cultivars

• Prior to 1975 all commercial cultivars were open-pollinated. With the release of UC57 the world saw its first clonal hybrid variety, where the parents used to produce seed are maintained as clones. The inception of supermales allowed the creation of all male clonal hybrid varieties. The next step may be to produce a cultivar consisting of clones of one genotype, we call this a clonal variety.

• Our most recent trial includes a single 20-plant plot of an experimental clonal variety. Some preliminary data from this and other genotypes over 3 or more years show high single-plant spear quality and marketable yield. We hope to determine if clones of these genotypes can produce high marketable yields on a commercial scale. The first harvest of this trial will be in 2019.

• We are planning to use somatic embryogenesis to reduce the price per plant while maintaining low levels of somaclonal variation. This may allow clonal cultivars to compete with seed propagated commercial cultivars.

Espada: Newest UC Release

• The overall objective of the breeding program at UC Riverside is to develop new asparagus cultivars for California that have higher yields of green, fresh market asparagus than existing cultivars. An emphasis is placed on high yields of large straight spears with tight heads.

• Espada is UC's newest release; In the Riverside 2013 field trial over 3 years of harvest Espada produced an adjusted* marketable yield of 5678 kg/ha compared to 4778 kg/ha produced by DePaoli. Espada is a cross between FCE4 and M256. FCE4 has European (Venidim) and California (F109) parentage; M256 is the male parent of DePaoli.

New Plantings and Cultivars

Domestic and International Field Trials

Prospective Release of The First All Male UC Hybrid

• In the 2013 field trial planted at UC Riverside the hybrid 77-80 had 3.4 times the adjusted* marketable yield of UC57, when measured over 3 years.

• In the same trial the percentage of the total yield which is marketable for 77-80 was 47.8 compared to 32.6 for UC57.

• Due to promising three year data at UC and first year data from trials in several geographical locations the all male hybrid 77-80 is likely to be released within the next 2-4 years.