Little published information is available
on the ease with which V. simulatum can be
crossed with cultivated forms of the highbush
blueberry or on the fertility of the F1 hybrids.
Ballington (cited by Luby et al., 1991) noted
that preliminary information on crossability
supported the maintenance of V. simulatum
and V. corymbosum as separate species. Vander
Kloe (1988) had earlier treated V. simulatum
as a race of V. corymbosum. In this report, we
compare F1 hybrid seedlings from five crosses
of each of two types: cultivated southern high-
bush x V. simulatum and cultivated southern
highbush x V. simulatum. The goal was to see
whether reduced fertility would cause
problems in breeding with V. simulatum.

Materials and Methods

Seed number and mass were compared
following open-pollination of 1.5-year-old
seedlings from five V. corymbosum x V.
corymbosum and five V. corymbosum x V.
simulatum crosses (Table 1) in a high-density
field nursery at the Horticultural Unit of the
Univ. of Florida, Gainesville, in 1994. Most of
the other seedlings in the nursery, and the most
abundant source of pollen, were hybrids be-
tween advanced selections of southern high-
bush (tetraploid, largely V. corymbosum but
with introgression from V. darrowi Camp five
to six generations back). Twenty F1 seedlings
per cross were randomly selected at ripening
time from the seedlings that fruited, and four
berries were randomly picked per plant to
produce one 80-berry sample per cross. The
seeds were extracted separately from the ber-
ries of each cross using a food blender (Gal-
lerta, 1975), and were separated from non-seed
debris by washing in water. The seeds were
then dried for several days at room tempera-
ture (±22 °C) on a benchtop in an air-condi-
tioned laboratory. After they were dried, the
seeds obtained from each 80-berry sample

Table 1. Comparison of masses of air-dried seeds from five V. corymbosum x V. corymbosum and five V. corymbosum x V. simulatum F1 populations after open-pollination in the field.

<table>
<thead>
<tr>
<th>Cross</th>
<th>Mean seed mass/berry (mg)¹</th>
<th>Mean mass/seed (mg)²</th>
</tr>
</thead>
<tbody>
<tr>
<td>91-16</td>
<td>17.3</td>
<td>0.58</td>
</tr>
<tr>
<td>82-217</td>
<td>17.5</td>
<td>0.50</td>
</tr>
<tr>
<td>92-79</td>
<td>27.0</td>
<td>0.56</td>
</tr>
<tr>
<td>92-97</td>
<td>16.8</td>
<td>0.52</td>
</tr>
<tr>
<td>92-81</td>
<td>18.0</td>
<td>0.55</td>
</tr>
<tr>
<td>Mean</td>
<td>19.3</td>
<td>0.54</td>
</tr>
<tr>
<td>(V. corymbosum) x (V. corymbosum)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(V. corymbosum) x (V. simulatum)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HB cvs</td>
<td>92-286</td>
<td>14.5</td>
</tr>
<tr>
<td>Marima</td>
<td>(92-156 + 92-152B)²</td>
<td>12.8</td>
</tr>
<tr>
<td>90-174</td>
<td>19.5</td>
<td>0.41</td>
</tr>
<tr>
<td>90-173</td>
<td>21.8</td>
<td>0.46</td>
</tr>
<tr>
<td>90-150</td>
<td>19.3</td>
<td>0.45</td>
</tr>
<tr>
<td>Mean</td>
<td>17.5</td>
<td>0.45</td>
</tr>
</tbody>
</table>

Significance

¹Based on 80 berries (four berries from each of 20 seedlings) per cross.
²Based on 200 seeds (randomly selected from total seeds from 80 berries) per cross.
³Southern highbush cultivars and advanced selections from the Florida blueberry breeding program.
⁴All originated from Grandfather Mt., N.C.
⁵Bulk of seed from six crosses.
⁶Bulk of pollen from two clones.
⁷Overall means for the two types of populations differ at P ≤ 0.05 (*) or do not differ (ns) by analysis of variance.
were weighed. Two-hundred well-developed seeds were then selected randomly from each sample and weighed to estimate mean seed mass for the well-developed seeds of each cross.

Mean seed mass per berry and mean mass per well-developed seed were calculated for each cross. The means for the two types of crosses (V. corymbosum x V. corymbosum and V. corymbosum x V. simulatum) were compared by analysis of variance, using a completely random design in which the five V. corymbosum x V. corymbosum crosses were considered a random sample representing all crosses of this type that could have been made and the five V. corymbosum x V. simulatum crosses were considered a random sample from possible crosses of that type. Variation among crosses within type of cross was used as the error variance in the F-tests.

Results and Discussion

Each blueberry ovary normally contains 100 or more ovules, each of which can become a seed (Darnell et al., 1992; Vorsa and Ballington, 1991). If bees and compatible pollen are abundant, seed number per berry can be a good measure of female fertility. Highly fertile plants of V. ashei Reade (rabbiteye) and V. corymbosum (highbush) clones usually produce 15 to 30 well-developed seeds per berry when open-pollinated in mixed-cultivar field plantings (Kushima and Austin, 1979; Moore et al., 1972), although they can produce more seed when cross-pollinated by hand with pollen from compatible cultivars. On the other hand, plants of low fertility, such as V. darrowi x V. arboreum Marsh F1 hybrids (Lyrene, 1991), triploids (Dweikat and Lyrene, 1988), and pentaploids (Meader and Darrow, 1944; Vorsa et al., 1987), produce fewer seeds. The number of well-developed seeds in the triploid and inter-specific hybrid plants mentioned above ranges from zero to two seeds per berry following hand pollination with their most compatible pollinizers.

F1 hybrids between V. corymbosum x V. corymbosum and V. corymbosum x V. simulatum appeared to have high fertility after open-pollination in the field in Gainesville, Fla. (Table 1). The high seed mass/berry and the lack of significant differences between the two types of hybrids indicate that V. corymbosum x V. simulatum F1 clones are fully female-fertile. Well-developed seeds from the V. corymbosum x V. simulatum hybrids were significantly lighter than V. corymbosum x V. corymbosum seeds (Table 1). The average number of well-developed seeds per berry for each type of cross, estimated from the data in Table 1, was 35.4 and 39.1 for V. corymbosum x V. corymbosum and V. corymbosum x V. simulatum F1 hybrids, respectively. These values are quite high, demonstrating that both types of hybrids have high fertility. The high fertility of the V. corymbosum x V. simulatum F1 hybrid seedings is an indication that the V. simulatum clones from Grandfather Mountain are probably tetraploid.

The seed content of the fruit indicated that V. corymbosum x V. simulatum F1 hybrids were as fertile as V. corymbosum x V. corymbosum F1 hybrids when open-pollinated. The high fertility of the interspecific hybrids suggests that V. simulatum could be used to breed V. corymbosum cultivars, since fertility of the hybrids would not be a limitation.

## Literature Cited


