**Pollination Methods:**

The fertility of 16 Monomorphic populations and 16 polymorphic (6 dimorphic, 10 trimorphic) populations was assessed in a common greenhouse environment. Cuttings and young clonal offspring were collected in the field in 2014 by CGE and in 2015 by MPB + CT. All field collected plants were separated by at least 1 canoe length (16-feet). Plants were potted is 6-inch round pots in ProMix professional potting soil.

Prior to the fertility assay, all plants experienced an artificial winter; they were housed in the dark at 5°C in one of the following locations: coldroom on 3rd floor, growth chamber, or lab fridge. Plants were placed into cold storage in late December 2015 and early February 2016. Over two days, beginning April 20, 2016, all plants were repotted in ProMix professional potting soil and placed into a common greenhouse at Queen’s University.

Hand pollinations were performed from 0800 to 1300. Hand pollinations began on June 30, 2016. Michael practiced emasculations on a few plants that were flowering on June 29, 2016. Only newly opened flowers (< 6hrs old) were used as pollen recipients in this study. **Pollen donors were no more than 1 day old?** Flowers were emasculated prior to anther anthesis. Pollen was transferred by rubbing a freshly dehisced donor anther (extracted using fine forceps) to evenly coat a recipient stigma with pollen. Single pollen donors were used for each pollination. A haphazard sample of flowers were emasculated and not pollinated. These served as negative control to assess possible pollen contamination during the experiment.

**Populations in GH: 32 pops in GH**

Plants were collected in 2014 by CGE and in 2015 by MPB + CT. All populations were taken through cold treatment over the winter of 2015/2016. Plants were placed into GH around April 20 2016.

Table 1 Number of plants from each population alive and growing in the GH.

|  |  |  |  |
| --- | --- | --- | --- |
|  | PopCode2 | n | PopName |
| 1 | EO.T6 | 38 | Cow Bay QUBS |
| 2 | ON.D2 | 26 | Scugog |
| 3 | ON.D5 | 20 | Bewdley A |
| 4 | ON.D7 | 21 | Otty Lake |
| 5 | ON.D9 | 17 | Pumphouse Marsh |
| 6 | ON.M1 | 15 | Horseshoe Lake |
| 7 | ON.M10 | 5 | Lac LaPeche |
| 8 | ON.M12 | 6 | Holland River |
| 9 | ON.M13 | 35 | Barrie |
| 10 | ON.M3 | 34 | Mud Lake |
| 11 | ON.M8 | 17 | Jock River I |
| 12 | ON.T12 | 29 | Loch Garry |
| 13 | ON.T14 | 15 | Black River |
| 14 | ON.T16 | 20 | Rideau Bird Sanctuary |
| 15 | EO.T1 | 3 | Stonehouse Creek |
| 16 | EO.T12 | 2 | Cranberry Lake |
| 17 | EO.T3 | 12 | NE Sanctuary |
| 18 | ON.T10 | 26 | Rice Lake B |
| 19 | ON.T15 | 35 | Puslinch Lake |
| 20 | ON.D10 | 32 | Samuel de Champlain |
| 21 | ON.D8 | 10 | Ardoch |
| 22 | ON.M2 | 14 | Jevins |
| 23 | ON.M4 | 15 | Caledon |
| 24 | ON.M6 | 40 | Hindon bog |
| 25 | ON.M7 | 7 | East Silver Lake |
| 26 | ON.M11 | 19 | Ferguson |
| 27 | ON.M14 | 32 | Lafarce |
| 28 | ON.M15 | 18 | Kagawong |
| 29 | ON.M16 | 24 | Corry Lake |
| 30 | ON.M5 | 19 | Round Lake |
| 31 | ON.M9 | 25 | Constance Lake |
| 32 | ON.T13 | 28 | Joes Lake |

**Type of Pops:**

**Low Fertility (based on seeds/fruit)**

|  |  |  |
| --- | --- | --- |
| ON.D10 | Low | 1 |
| ON.D8 | Low | 2 |
| ON.M2 | Low | 3 |
| ON.M4 | Low | 4 |
| ON.M6 | Low | 5 |
| ON.M7 | low\_no\_seed | 6 |
| ON.M11 | Mid\* | 7 |
| ON.M14 | Mid\* | 8 |
| ON.M15 | Mid\* | 9 |
| ON.M16 | Mid\* | 10 |
| ON.M5 | Mid\* | 11 |
| ON.M9 | Mid\* | 12 |
| ON.T13 | Mid\* | 13 |

\*These pops produced fewer fruit

**High Fertility (based on seeds/fruit)**

|  |  |  |
| --- | --- | --- |
| EO.T6 | High | 1 |
| ON.D2\* | High | 2 |
| ON.D5 | High | 3 |
| ON.D7 | High | 4 |
| ON.D9 | High | 5 |
| ON.M1\* | High | 6 |
| ON.M10 | High | 7 |
| ON.M12 | High | 8 |
| ON.M13\* | High | 9 |
| ON.M3\* | High | 10 |
| ON.M8 | High | 11 |
| ON.T12 | High | 12 |
| ON.T14 | High | 13 |
| ON.T16 | High | 14 |
| EO.T1 | High\_no\_seed | 15 |
| EO.T12 | High\_no\_seed | 16 |
| EO.T3 | High\_no\_seed | 17 |
| ON.T10 | High\_no\_seed | 18 |
| ON.T15 | High\_no\_seed | 19 |

\*These pops produced fewer fruit

**Cross type**

S: self

W: within pop

BS: between pop cross but same types of pop

BD: between pop cross but with between different types of pops

**Crossing Design:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | Low | Low | High | High |
|  |  | **ON.M6** | **ON.D10** | **ON.D7** | **EO.T6** |
| Low | **ON.M6** | Self/out | reciprocal | reciprocal | reciprocal |
| Low | **ON.D10** | any plant from this pop | Self/out | reciprocal | reciprocal |
| High | **ON.D7** | any plant from this pop | any plant from this pop | Self/out | reciprocal |
| High | **EO.T6** | any plant from this pop | any plant from this pop | any plant from this pop | Self/out |

**Mating Sets:**

These will be assembled as plants flower. Populations can be part of multiple sets. For example, EO.T6 should be part of multiple sets because there are 38 plants that are alive in the GH from this population.

Set1:

Low ON.M6

Low ON.D10

High ON.D7

High EO.T6