

**Supplemental Pollination Experiment - HASOC Field Tour Oct. 5, 2021**  
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**Objective**

Trees were supplementary pollinated as part of a larger study designed to determine the underlying cause(s) of conelet abortion in several lodgepole pine seed orchards at the Huallen seed orchard facility near Grande Prairie, Alberta.

**Design**

Supplemental pollination was performed on 12 trees in the B1-PH2 (G804) orchard and six trees in the B2-PH1 (G303) orchard using a polymix. In the B1-PH2 six clones categorized as having a **low average abortion** rate and six clones categorized with a **high average abortion** rate were randomly selected to serve as “female” trees for breeding. In the B2-PH1 three **high abortion** clones and three **low abortion** clones were selected. On each of the female trees three branches carrying at least 3-5 conelets were bagged (3 bags per tree) and three branches were used as open pollinated controls (Fig. 1).

In addition, six additional clones were selected in each orchard as the “male” trees for breeding, with two each from the low, medium and high average abortion rate categories. These “male” clones did not overlap with the selected “female” clones to avoid self-pollination. Pollen was collected from three trees (ramets) for the polymix (2 clones x 3 categories x 3 trees/clone = 18 trees contributing to the polymix). Supplemental pollination occurred over a three-day period from June 4-6, 2021 for a total of three applications.

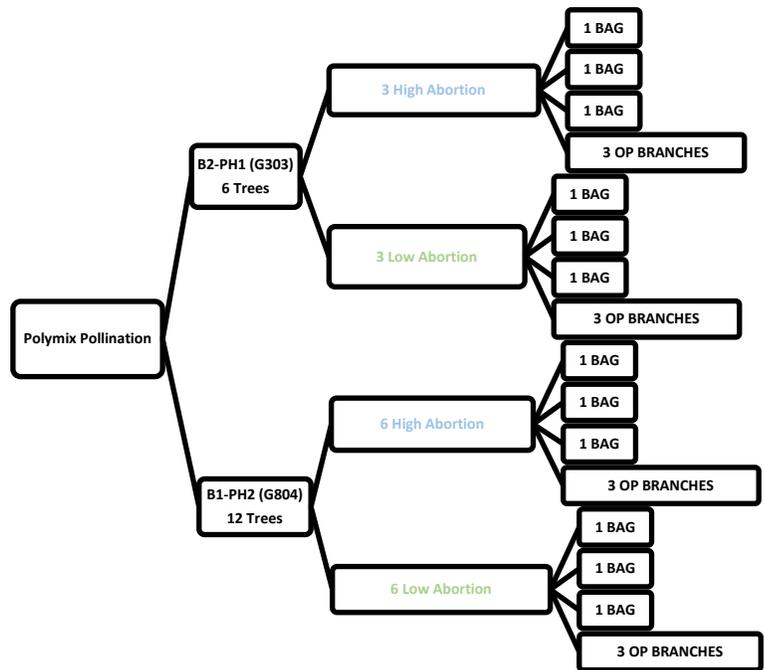


Figure 1. Design of the breeding experiment in two lodgepole pine seed orchards at HASOC.



Figure 2. Bagged branch (left) and application of polymix pollen with needle (right).



Figure 3. Open pollinated branch (left) & supplemental pollinated branch after bag removal (right).

## Results

Clone	% Abortion (# of Conelets)	
	Supplemental Pollination	Open Pollination
<b>Low Abortion Clones</b>		
HU03018	0.0 (10)	25.0 (8)
HU03008	0.0 (11)	18.8 (16)
HU03057	15.4 (13)	50.0 (6)
HU03058	0.0 (15)	53.8 (13)
HU03020	0.0 (17)	62.5 (16)
HU03133	7.7 (13)	30.0 (10)
<b>High Abortion Clones</b>		
HU03106	0.0 (9)	100.0 (8)
HU03214	30.0 (10)	100.0 (7)
HU03059	15.4 (13)	22.2 (9)
HU03074	0.0 (9)	100.0 (6)
HU03154	6.7 (15)	90.9 (55)
HU03063	0.0 (9)	91.7 (12)

### B1-PH2 (G804)



Figure 4. Clone HU03018 (R15-P4) Bag 1. After 3 polymix applications in June (*left*) and in August (*right*).

Clone	% Abortion (# of Conelets)	
	Supplemental Pollination	Open Pollination
<b>Low Abortion Clones</b>		
768	0.0 (6)*	37.5 (8)
1205	0.0 (9)	23.8 (21)
1034	0.0 (14)	21.2 (52)
<b>High Abortion Clones</b>		
667	0.0 (18)	11.5 (52)
775	0.0 (9)	53.8 (13)
1542	5.9 (17)	54.5 (22)

\* 2 branches (bags) only

### B2-Ph1 (G303)



Figure 5. Clone 1034 (R6-P26) Bag 3. After 3 polymix applications in June (*left*) and in August (*right*).

In both orchards, the supplemental pollination reduced the abortion rate in both **low** and **high** abortion clones compared to open pollinated (OP) controls (Figs. 4 & 5). In the B1-PH2 orchard, the average percent abortion in the polymix cross conelets in the **low** abortion clones was **3.9%** vs **40%** in the OP conelets and **8.7%** vs **84.1%** in the OP conelets in the **high** abortion conelets. In the B2-Ph1 orchard, the average percent abortion in the polymix cross conelets in the **low** abortion clones was **0.0%** vs **27.5%** in the OP conelets and **2.0%** vs **39.9%** in the OP conelets in the **high** abortion conelets. Supplemental pollination using a polymix appears to be a promising option to reduce conelet abortion rates. The next step is to see if conelets remain on the trees during their final year of development (Fall 2022) and if they retain the relatively high seeds/cone of the open-pollinated cones as confirmed by earlier studies (~30+ seeds/cone).