



Finally, fresh seeds of perennial oat at PGRC!

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This is a short note about a significant success at PGRC (Plant Gene Resources of Canada) that has been achieved after about 16 years of trial and error. Everybody working in an active genebank knows that crop wild relatives can occasionally be a great challenge when it comes to seed regeneration. In our PGRC genebank we have one sample of the perennial oat species *Avena macrostachya* (accession CN 24393). It was collected in 1972 in Algeria by AAFC scientists Bernard Baum and John Martens. This species is unique among all 29 *Avena* species because it is the only one that is perennial and outcrossing. It has been used in Europe to introduce powdery mildew tolerance and winter hardiness into cultivated oat.

Starting in the year 2000, we attempted to make this material flower and set seed. Many plants celebrated their birthdays in the greenhouse vegetatively and only sporadically did they have a flowering stalk. Despite all kinds of treatments with heat, cold, drought, water, light, darkness, and many other things that we can do to plants, the number of flowering panicles that emerged was very small. Because of the low number of panicles flowering, cross-pollination did not occur and there was no seed produced. We needed to continue distributing material to PGRC clients from our preserved seed stock, so the seed amounts at PGRC decreased over time to a critical limit. In the meantime, PGRC curator Axel Diederichsen's hair went grey. Three technicians worked on the project over the years, in addition to working on many other tasks: David Williams, Dana Nordin, and Mark Schierling.

This fall, 2016, we finally obtained seeds from a small population of the *A. macrostachya* accession established at the Saskatoon Research Farm. The plants had been started in the greenhouse in the spring of 2014. They remained in the greenhouse and were vernalized over the winter of 2014-15 for about three months. In the spring of 2015, they were planted in the field. A few plants flowered in 2015, but there was no significant seed set. They were covered with straw in November, 2015, to protect them from the usually harsh Saskatchewan winter temperatures. In 2016, these plants flowered abundantly and more plants that had undergone the same preparation were added from the greenhouse. The flowering and seed set in 2016 was satisfying. The recently-hired Seed Germination Technician at PGRC, Debbie Nordstrom, showed that the well-developed seeds – many were empty – had very good germination. We will see how the plants do this coming winter in the field and we have more plants started in the greenhouse to add to the field population in 2017. It seems that we can finally replenish the seeds of this sample at PGRC. The key issues were, firstly, to make the plants flower and, secondly, to have a sufficiently large population to ensure pollination and seed set.

This success is the result of perseverance, cooperation, and communication within the PGRC team over a long period of time. Thank you to all.



Mark Schierling inspecting the panicles of the perennial *Avena macrostachya* plot at the Saskatoon Research Farm in October, 2016.