



The Importance of “Down Under”

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The winter nursery in New Zealand not only provides a means to advance lines to another generation from November to February, it also provides a second opportunity every year to make selections among breeding lines.

The New Zealand winter nursery concept was originally forged by Dr. Martin McEwan, a wheat breeder from DSIR (Dept. Scientific and Industrial Research, NZ), who developed contacts with breeders in Canada and the United Kingdom during the mid-1970s. The Cereal Research Centre of Agriculture and Agri-Food Canada in Winnipeg (now located at the Brandon Research Centre) has utilized winter nursery locations in Gore and Lincoln on the South Island and in Palmerston North on the North Island. The environment in Palmerston North is quite similar to south central Manitoba, with comparable day length, rainfall, and disease pressures. This allows breeders to select for resistance to diseases they would normally encounter during the growing season in Manitoba. Selections can be made for resistance to oat crown rust, oat stem rust, and Fusarium Head Blight. Stripe rust, leaf rust, and stem rust of wheat also occur. Natural infestations of Barley Yellow Dwarf Virus, which is not yet prevalent in southern Manitoba, enable selections for tolerance to that disease as well.

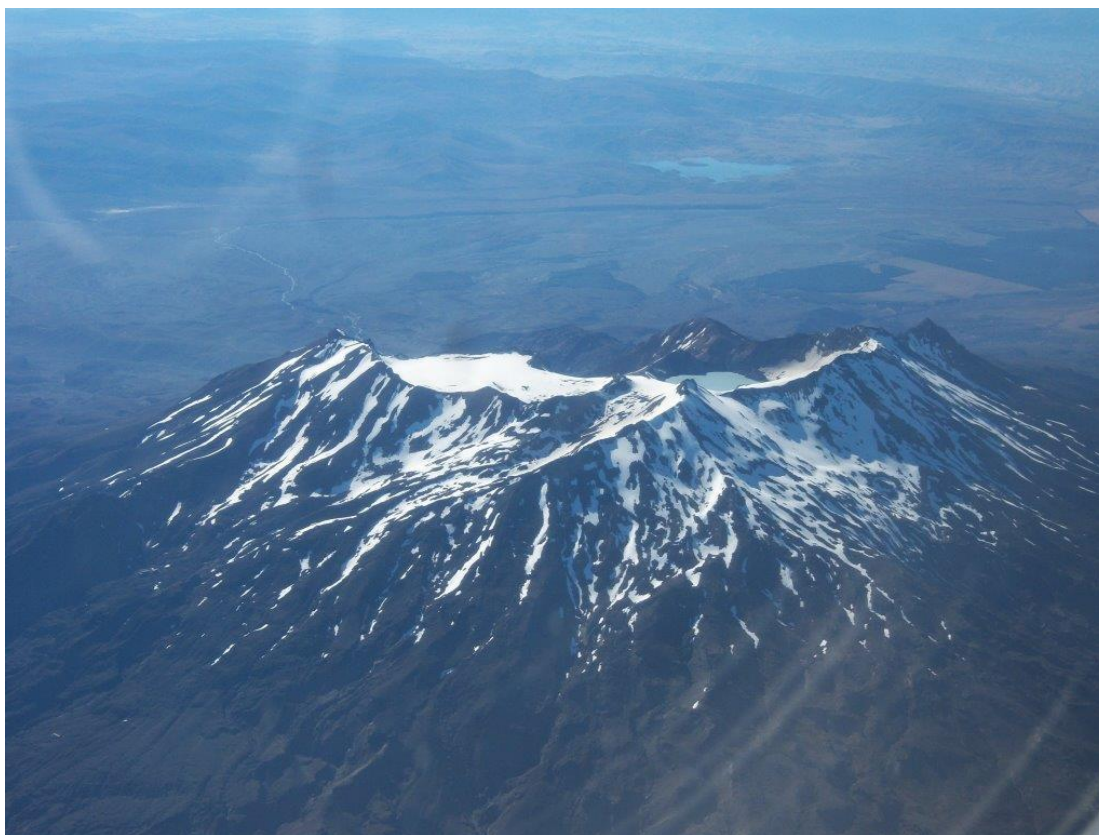
The western oat breeding program normally sends F1 seed to New Zealand for increase, while the F2 increases are screened and evaluated in Canada. The F3 progeny lines are sent to New Zealand as bulk plots or as 40-meter-long space planted rows. Individual heads/panicles are collected from agronomically-suitable disease resistant plants, threshed, and sent back to be planted in the F4 Disease Nursery back in Canada. The F5 seed is harvested in bulk from breeding lines that are lodging and disease resistant (resistant to smut, crown rust, and stem rust). Thirty seeds are sent back to New Zealand to be planted in two hills. Concurrently, seeds are planted in the greenhouse in Canada and inoculated with specific races of oat crown rust and oat stem rust, in order to postulate which resistance genes each line might carry. As well, a bulk sample of seed from each selected line is sent for NIR quality evaluations of percent protein, oil, and hull content. NIR evaluation of beta glucan levels is also done. Lines that are selected based on the data collected in Canada, as well as on their resistance to diseases in New Zealand, will have ten panicles harvested per line. The seed from these is returned to Canada for visual inspection. The five panicles with the most desirable seed (it is all about beauty!) will be planted in the disease nursery in Canada.

This same process is repeated for the F6 lines, which are tested in New Zealand as F7 progeny lines in a 2-rep nursery. Selections are returned to Canada, and those lines producing adequate seed amounts are grown in a single-rep, 4-location preliminary yield trial across western Canada. Sadly, these lines do not return again to New Zealand.

Everyone offers to “travel along” to New Zealand in late January and early February when the breeders go to make selections in the nurseries. However, the 12-hour flight from Vancouver to

Auckland gets rather long and tedious, and, as soon as we arrive in Palmerston North, we check into our motel, then head immediately to the field to get oriented in the nursery. Our days are spent checking emails in the morning (consider that the time in Canada is 6 hours ahead, one day behind the time in New Zealand) to stay in touch with the crew and the families back home, then heading to the field by about 8 am. We make selections and collect notes all day (rain or shine), heading back to the motel for about 5:30 pm to take a quick shower and head out for supper. After supper, time is spent working on the laptops, saving selection decisions, poring through quality data sent from Canada to make further selections among the winter nursery lines, and completing reports and documents required for the Prairie Grain Development Committee/Variety Registration Committee meetings to be held immediately, or one week, after our return to Canada.

The breeders do get a few opportunities to gather with fellow breeders at the winter nursery location on the south island, to take a look at their breeding lines and to discuss opportunities for collaboration over a quick lunch or supper. The time passes very quickly and we are soon back on the long flights to Canada (arriving before we left New Zealand, due to the crossing of the International Date Line) where we will be greeted by the cold winter weather.



Flying from Auckland to Palmerston North, you might get a rare opportunity to have a cloudless day and catch a glimpse of Mount Ruapehu, an active volcano.



Looking southeast from the oat nursery paddock near Palmerston North to the Tararua Ranges



The Southern Alps west of the nurseries near Lincoln, New Zealand (it snowed on the Southern Alps the night before we arrived in Christchurch, February 5, 2015. It was pretty cold in the nursery that day!)



The oat paddock at Palmerston North. Black birds and sparrows are a problem in the nursery, so bird scarers of several types are essential. The yellow wheel in the photo is part of a Jangler, which bounces tin cans filled with rocks or metal washers to make noises at random times.