

Cereals 2015 The Living Genebank: Oats, Bere and Barley

Introduction and aims for growing and saving cereal seeds

The activities described here are suggestions for seed work in the classroom and in the field. Observing, comparing, counting and recording are important learning tools during these activities. These will be skills acquired by the young 'seed technicians' while handling seeds and plants, from sowing to harvesting. Many activities are basic genebank tasks such as seed counting, identifying plants, documenting plant material (labelling, recording) and multiplying seeds.

We send you a small amount of cereal each year in order to develop these skills. Traditionally crofters saved their own seeds, using varieties such as Black oats and bere that have developed over the centuries in the Highlands and Islands and survived up to the start of the 20th century as the main cereal crops in some areas, where new varieties failed or did not perform well.

Your pack includes *bere*, Garner barley and Firth oats. We have not been able to source Black Oats this year, but some of you may have saved your own seeds, so we are including them on this worksheet, as usual.



Black or Small Oats, also known as **Shetland Aets**, (*Avena strigosa*)

Black oats are mainly grown as an animal feed. They have a high protein content and have also been used as a high energy feed for working horses. The straw is very durable and is used for making the backs of traditional Orkney chairs and *kishies* or baskets in Shetland.



Bere, or six-row landrace barley

Bere has been grown in Orkney, Shetland and the north Highlands for thousands of years, both for human and animal food. In the old days, it was called *Bygg*, and this is still the name given to barley in Norway. Although we call the meal beremeal, the crop is usually called *corn* in Orkney. It has been the staff of life in the northern isles in the form of bere bannocks since time immemorial.



Firth Oats – a **modern variety** from Pitgaveny Estate Home Farm, in Moray.

Firth is a very popular variety of *milling oats*. It has a high kernel content and good resistance to mildew. It is rather susceptible to crown rust. Firth has large even grains and good standing properties. It has very short straw, like many modern cereals, so that the heavy seed heads do not fall over before harvest.



Garner Barley – a **modern variety** from Pitgaveny Estate Home Farm, in Moray, Garner barley was introduced in 2010 for farmers wanting a high-yielding barley for *feeding livestock*. Garner also produces good quality straw for feed or bedding. It is also resistant to a number of diseases, which makes it a good choice for organic farmers.

Seeds

ACTIVITY 1.

Seed counting: *At the Official Seed Testing Station, it is practice to count seeds in 5s.)*
Make groups of 5 seeds. This makes it quick and easy to count 100 seeds (4 groups of 5x5 seeds). 100 seeds will need 1 sq meter of prepared soil. Some seeds, particularly the small oat seed, will need cleaning before counting and sowing.

Planting and after

ACTIVITY 2.

Planting the seeds: *Preparing a nice seed bed, making the drills, sowing the seeds, covering the seeds.*

Your seed packets should have at least 100 seeds, enough to sow a 1-metre-square plot. Plant 20 seeds in a 1 metre length, 1 seed per 5 cm, rows 20 cm apart. Do not plant more than 1 cm deep. This should be done at the end of April or beginning of May.

ACTIVITY 3.

Observing and counting plant emergence: After sowing, the crofter will go into the field to check how his seeds have come up. Students can count the number of emerged plants per plot. Bear in mind that seeds may take 10 – 14 days to emerge, depending on temperature. How does the number of emerged plants compare with the number of seeds sown?

From young plant to heading

ACTIVITY 4.

Observe and record ear emergence: Observe at the end of June to mid-July how the plants elongate ('booting') and thereafter the ear emerges. This may coincide with school holidays and a volunteer recorder may be recruited to make the observations which are usually done every other day until all ears are visible in the plots. The ear of an oat plant is called a 'panicle', an open, loose, branched cluster of 'spikelets'.

ACTIVITY 5.

Flowering: Once the ears have fully emerged, the cereal plants will start 'flowering': anthers will extrude, burst and start shedding pollen. When does this happen on your plot?

Wild diversity in and around the plots

ACTIVITY 6.

Observe, identify, count and record wildlife in and around the plots:

Insects: any bumblebees?

Birds: list birds and their frequency.

Wild flowers which grow in arable crops: make a list of wild flowers and their frequency:

Name of plant	very common	not common	very few
Stinging nettle			
Wild pansy			
Fat hen			
Daisy			
Field pansy			
Chickweed			
Oxeye daisy			
Poppy			
Ragwort			

Maturity

ACTIVITY 7.

The stages of maturity are:

Milk-ripe, when the grain when squeezed oozes a white milky juice. The lower leaves are dead but the upper leaves are still green. The chaff is also still green. The whole plant has a greenish unripe tinge.

Yellow-ripe. The grain is somewhat tough. The straw is turning yellow except for the upper nodes where the plants are still soft and sappy.

Ripe. In hot weather three to four days after yellow ripeness. The straw has become lighter and the nodes are now dead, shrunken and brown. The grain is harder and firmer.

Dead-ripe; the grain has become brittle when cut and the straw has lost most of its brightness. Ears may become so brittle that they start shattering seeds.

How many plants in the plot are completely yellow?

The best stage to harvest the seed is **yellow-ripe**.

Harvesting

ACTIVITY 8.

Ears can be harvested (with scissors) and taken into the classroom for further activities. Use labelled bags so that ears of the different corn types do not get mixed up.

ACTIVITY 9.

Counting: Number of seeds per ear for each variety.

Number of seeds can be averaged per ear (take 25 ears, count seeds, average the number of seeds per ear)

ACTIVITY 10.

Hand-threshing: Strip the ears from the seeds; usually this separates the seeds from the chaff; if not, carefully remove the chaff.

ACTIVITY 11.

Weighing: Weigh the total seed harvest for each variety and record on a recording sheet

After harvest care and storage

ACTIVITY12.

Drying and storing the seeds: Let the seeds dry off and store them in a cloth or paper bag. Do not use plastic. Keep the seeds dry and cool, for example in a fridge. Do not forget to label the seeds with name of the variety, date and year of harvest. Now your school genebank has its own collection of seeds.

Usually a genebank has a **curator**, a person who takes care of the collection.

Who will be the curator at your school?

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Crofting Connections Cereals recording sheet

Activity 1. seed counts

Count the number of seeds per pack	Pack 1 has bere seeds	Pack 2 has Garner barley seeds	Pack 3 has Small or black oat seeds	Pack 4 has Firth oat seeds
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Activity 2. sowing

Label the plots and sow pack 1 in plot 1, 2 in 2, 3 in 3, 4 in 4	Planting date bere:	Planting date Garner barley:	Planting date Black oats:	Planting date Firth oats:
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Activity 3. Plant emergence

Count the number of plants 10 -14 days after sowing	Number of plants in plot 1:	Number of plants in plot 2:	Number of plants in plot 3:	Number of plants in plot 4:
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Activity 4. ear emergence

Record the date on which half of all plants in each plot have ears completely out	Plot 1:	Plot 2:	Plot 3:	Plot 4:
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Activity 6. Observe, identify, count and record wildlife in and around the plots

Make a list of weeds and their frequency – <i>see table in activities sheet above</i>	Plot 1:	Plot 2:	Plot 3:	Plot 4:
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Activities 7 and 8. maturity and harvest

Maturity date	Plot 1:	Plot 2:	Plot 3:	Plot 4:
Harvest date				

Activity 9. total seed harvest weight

Seed harvest: total weight	Plot 1	Plot 2	Plot 3	Plot 4
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