

Status of Irish Plant Genetic Resources for Food and Agriculture

EURISCO Training Workshop 09th – 11th October 2018



Department of
**Agriculture,
Food and the Marine**

An Roinn
**Talmhaíochta,
Bia agus Mara**

Cara Mac Aodháin DAFM

Presentation Outline

Irish Plant Genetic Resources

- Genetic Resources Grant Aid Scheme
- Irish Genebanks
- Irish Inventory
- Irish Seed Savers Association
- Sustainable uses success'

Genetic Resources Grant Aid Scheme (GRGAS)

National Scheme established in 1996

3 Primary Objectives

- Identification, evaluation and conservation of Irish GR
- Development and utilisation of Genetic Resources
- Promotion of public awareness and support for GR conservation management strategies

Advisory Committee established which includes nominees from Government, researchers from Universities and Semi-State bodies, NGO's and farming bodies

Genetic Resources Grant Aid Scheme (GRGAS)

Advisory Committee there to provide advice and steer direction of agricultural genetic resources in Ireland

Initial focus on Plants, Animals and forestry

Expanded to Aquatics, Microorganisms and Invertebrates

Reviewed in 2013

Updated and expanded membership of the Advisory Committee

Approved amendment on operation of scheme

Sharing of ideas/best practice between experts

GRGAS plant projects – Plant Strategy and Potato publication

REPORT ON THE PRODUCTION OF A GENETIC CONSERVATION STRATEGY FOR
PLANTS IN IRELAND: CROP WILD RELATIVES AND LANDRACES



Mixed crop of Potatoes, Rye and Cabbage on Inis Meáin, Aran Islands, Co. Galway

Report to the Department of Agriculture, Food and the Marine: Conservation of
Genetic Resources Grant Aid Scheme for Food and Agriculture

Dr Tom Curtis
October, 2014

Potato Varieties of Historical Interest in Ireland



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**Agriculture,
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Heritage variety example - The National Apple Collection

THE HERITAGE APPLES OF IRELAND
MICHAEL HENNERTY



BLOODY BUTCHER



HISTORY: First recorded by Lamb (1951) in Co. Kilkenny, but also reported in Co. Meath. The cultivar in existing collections differs from the one described by Lamb (1951) in shape and stem length. Budwood supplied by the National Fruit Collection, Brogdale.

SYNONYMS: Bloodhound (Co. Kilkenny) and Winesap (Co. Offaly).

USES: Dual purpose.

FLOWERING: Mid season.

PICKING: Mid August to early September.

RIPENING: October to November.

REFERENCES: Lamb (1951), Choiseul (1997), Morgan & Richards (2002), Clark (2003), Anon. (2007).

SIZE: Large, 70 – 80mm x 60 – 70mm

SHAPE: Round. Uneven, lopsided. Ribs present and distinct. Apex irregular.

COLOUR: Yellow to yellowish green. Large areas covered with red to orange red blush, occasionally extending over the rest of the fruit. Frequent red stippling. Occasional small areas of russet and lenticels visible as brown dots.

BASIN: Broad in width and shallow to medium in depth. Extremely uneven due to the presence of three to five large fleshy knobs, making one side higher than the other. Occasionally completely covered with deep red blush, usually partially covered.

EYE: Generally partially open, although occasionally closed. Sepals slim, long and erect with reflexed tips. Pubescent.

CAVITY: Broad and medium to shallow in depth. Generally very even. Occasionally the presence of one large fleshy knob on one side makes it uneven. Partially, although sometimes completely, covered with russet extending beyond the base.

STALK: Usually short and stout, below the level of the base. Slight to moderately pubescent.

LONGITUDINAL SECTION
TUBE: Broad and conical in shape.
STAMENS: Median.
PISTIL POINT: Present and pubescent.
CORE LINES: Meeting.
CARPELS: Round or elliptical, not tufted.

TRANSVERSE SECTION
CORE: Abaxile.

Current GRGAS funded project on CWR's

WILD CARROT

Daucus carota
Irish Name: Mealbhacán

Caution: Wild carrot has been confused with Hemlock with serious results. If you are unsure scrape the roots. Wild carrot smells just like carrots; Hemlock has a very off-putting, noxious odour. But best of all is consult an expert. Carrot leaves both wild and cultivated can induce phytophotodermatitis in sensitive individuals so it is best to collect the plants wearing gloves. Raffinose. This very common Irish species occurs throughout a range of habitats. The widespread subspecies is subsp. *carota* whilst another which is very restricted to a few coastal places is subsp. *gummifer*. The wild plant has small, pale-coloured tap roots in contrast to the orange-coloured ones of modern cultivars all of which are included within subsp. *sativus*. Like Sea beet Wild carrot is a valuable potential source of disease-resistant genes.



Culinary: In addition to its potential use as a herb grown for its aromatic leaves and seeds, which was its use from earliest times, there are a few recipes given by Phillips (op.cit.) for the wild species. He suggests collecting the roots from one-year old plants at the end of the Autumn. The juice has been used as a food colouring and the syrup has been made into a sweetening agent whilst a tincture of carrot seed has been used in French liqueur. It seems the roots were also roasted as a substitute for coffee in times of shortage. Phillips states that it is a most tasty vegetable but difficult to find roots of sufficient size to make collecting worthwhile. The roots can be steamed or boiled and served with butter. Perhaps growing the species in cultivation would permit easier collection of sufficient quantities of roots.

The flowers are also used to make a jelly and the flower stalks when peeled can be eaten. Any recommendations by foragers state that it is important to eat the roots when young.

No 10km squares: 111.
No 10km squares: 688.
ITPGRFA: Annex I.
Red Data List: No.
Status: Not on Flora Protection Order (1999, 2015).
IUCN category: Least Concern.
Current economic value: High.
Economic potential: High.
In gene bank? Yes DAFM, Back Weston
Quantity of accessions: 11.
Representativeness: Cork (2); Waterford (3); Wexford (1); Wicklow (3); Louth (1); Donegal (1).
Ranking: 9.
Priority: High.
Conservation status: Collection of wild plants is highly sustainable.

Description: A hairy biennial with a solid stem which is grooved and reaches 30-75 cm in height. Leaves divided twice or three times into fine-lobed leaflets. Umbels large, terminal flat or domed at first but becoming concave as the seed matures. Rays 20-40 with large bracts which are very numerous, much-divided bracts with the smaller ones under each flower slender and entire. Flowers white or pinkish-white. Fruit ovoid and covered with bristles. Flowering from July to August. The differences between the two subspecies are said to rest on umbel shape and root colour but Irish plants seem very variable and the subspecies not very distinct. The cultivated Carrot is a rare escape from cultivation.

Ecology: A common species of grasslands, sand dunes, sea cliffs, roadsides, railway banks and waste ground.

Vegetative nature: Herbaceous biennial whose leaves, roots and seeds can be used for food and flavouring.



The umbels are large, flat (left) or domed (above) when in flower and becoming concave as the seeds mature.

Category: Food crop ITPGRFA and CWR Ireland.

History: The wild species is unlike any modern varieties in having a slender, whitish root and an acrid taste and Davidson (op.cit.) points out that the species was not eaten until the 8th to 10th

Centuries when purple-coloured forms were spread across the Arab world from Afghanistan. Seeds of the species have been found in prehistoric sites in Switzerland and the plant was also grown in the 8th Century B.C. gardens at Babylon and there not as a vegetable but as an aromatic herb. Its seeds and leaves are fragrant and this use survived well into the classical times. These were probably of the wild species.

Carrot is mentioned in Ireland in the 12th Century old Irish story of the Vision of MacConglinne who being a gluttonous poet dreams of all sorts of foods including carrots (Connerly op.cit.). Clearly Carrots in their near modern forms were grown in Ireland before 1300 and their introduction by the Normans seems highly probable. It also seems that a vegetable called Meacan has been eaten in Ireland since prehistoric times and in modern Irish this word has been translated as Carrot and Parsnip which suggests that Wild carrot was being used. The Parsnip is perhaps more problematic as it is considered an introduction in Ireland though through much of Britain it is considered a native. The Dutch were primarily responsible for the development of the Carrot from the 15th Century on.

Still used in Ireland: There is no evidence that the Wild carrot is used widely though it is so common that it has a good potential to be exploited. The cultivated vegetable is of great importance and is of major economic significance to Irish agriculture. Most Irish Carrots are home grown but early crops are imported from France and sometimes Kenya.

Still used elsewhere: Yes. There are various forager websites who provide multiple uses for Wild carrots both in Britain and America where it is an introduction and a serious weed in places.

Distribution general: Abundant throughout the island except for parts of the North-west. Subspecies *Carota* is recorded from a few coastal sites in Wexford, Waterford and Cork.

Plant Genetic Resources

- Plant Strategy Report 2014

- 40 recommendations, 7 subsequently prioritised for GRGAS funding

Surveys on landraces leek, spinach, cucumber, corn, runner bean, cresses, parsley and thyme

Collections of wild apples, damsons, plums, bullaces

Production of baseline inventory for aquatic plants + priority list for algae, seaweeds

Critical curation/viability testing and duplication of collections

Genetic (and phenotypic) characterisation of genomes in genebanks including identification of tools to carry out same

Publication of data collated to date for Landraces and CWR's

Address gap area of CWR in parts of Donegal, Mayo, Roscommon and Clare

Ex-Situ Conservation – Irish Genebanks

DAFM, Backweston (Cereal and CWR predominantly)

DAFM, The Tops, Raphoe, Co. Donegal (Potatoes)

Teagasc Oakpark, Co. Carlow (Forages Genebank)

Irish Seed Savers Association (Brassicas, Cereals, Vegetables and including the full Irish Apple Collection)

Trinity College Dublin (Vegetables and CWR)

National Botanic Gardens, Dublin (CWR)

University College Dublin (Irish Apple collection safety duplicate)

Irish Seed Savers Association

Non-Governmental Organisation (NGO) founded in 1991

Partly funded by DAFM

Carry out specific tasks in relation to conservation and sustainable use of Irish Plant Genetic resources

Agree KPI's with DAFM each year in the following broad areas

- Maintenance of the full Irish apple orchard collection*
- Bulking up and distribution activities of Irish PGRFA*
- Supporting On-Farm management and conservation of Irish PGRFA*
- Maintenance of ISSA genebank, regeneration and maintenance*
- Carrying out descriptor work on Irish PGRFA*
- Promotional and educational activities*

DAFM Genebank Backweston



Irish Accessions on EURISCO

- Irish collection small relative to most other countries
- 1415 accessions listed on EURISCO
 - 487 *Lolium Perenne*
 - 386 *Solanum Tuberosum*
 - 130 *Trifolium Repens*
 - 125 *Brassica Rapa*
 - 97 *Hordeum Vulgare*
- Recent Collections of CWR's for uploading
- Heritage Irish Apple Collection for uploading

DAFM Cereal Genebank Backweston

Cleaning and recording of recent Crop Wild Relative collections completed

Genebank curation training procured in 2017

Regeneration programmes

Requests for germplasm under SMTA

Accessions deposited in the Global Seed Vault Svalbard, including in early 2018



Sustainable uses of Heritage Malting barely varieties

Rich history of breeding malting barley in Ireland

Government Barley breeding programme with funding from Guinness (1901-1960's)

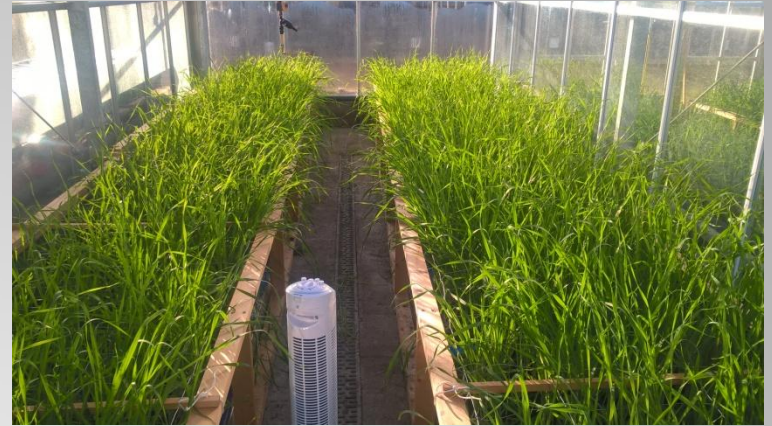
Recent increase in number of craft breweries and distilleries

Increased interest in using Irish heritage varieties for Irish malt

Commission Decision 2008/62/EC

- "DUS Light" – Phenotypic descriptors
- Place on conservation variety European Catalogue

Heritage Malting barley varieties



Other work

- Genetic characterisation
- Research on screening for disease resistance, waterlogging tolerance etc
- Repatriation of accessions from other genebanks
- Work on black barleys for malting
- Exploring sustainable uses for oats and wheat
- Input into future RDP - genetic resources included
- Sustainable uses for apples/pears

Thank You