

Promoting biodiversity through the use of regional wild plant seeds

from collection and reproduction to utilization in landscapes



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Agricultural teaching and research center



Teaching Unit: Raumberg (Agricultural High School)

Research Unit: Gumpenstein

Institution of the Federal Ministry

 Federal Ministry
Agriculture and Forestry, Climate
and Environmental Protection,
Regions and Water Management
Republic of Austria

Initial situation at AREC Raumberg-Gumpenstein

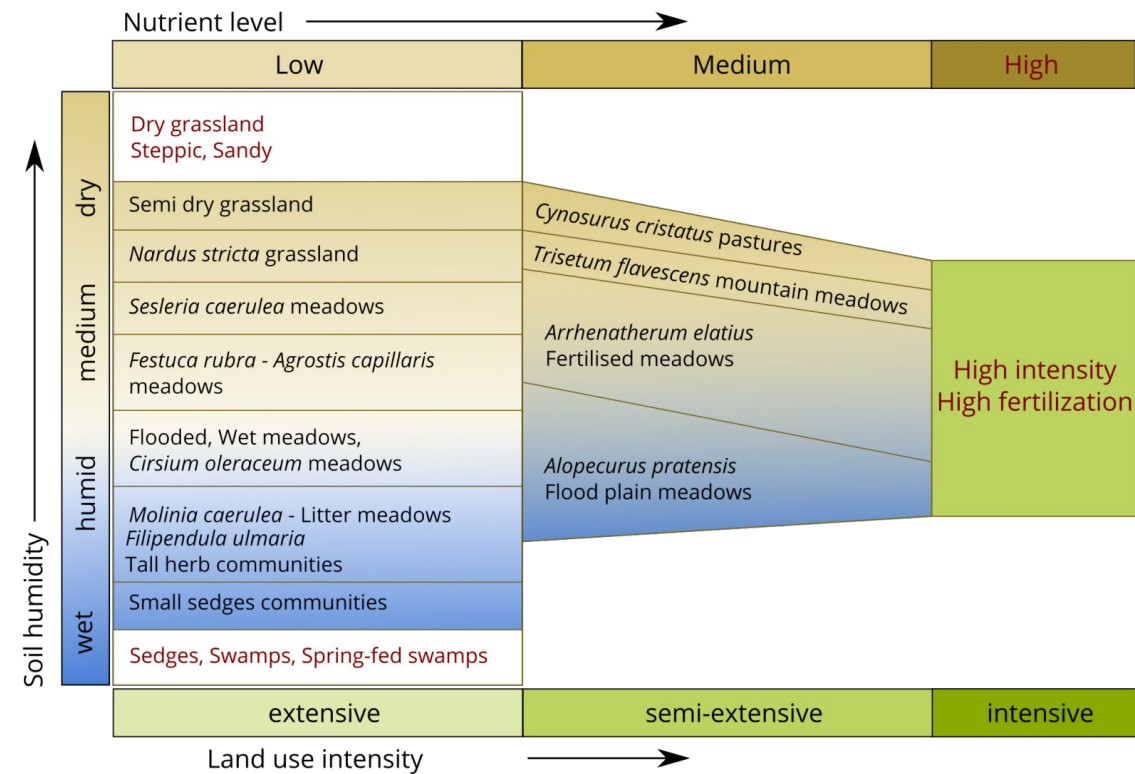
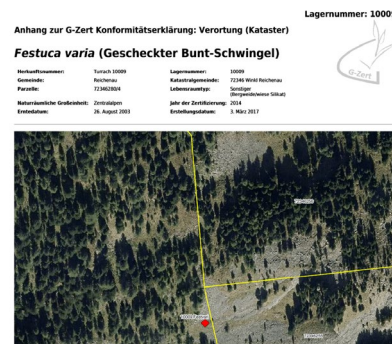
- Occupation with breeding of fodder plants since the 1970s
- Since 1989 collection of a genetic cross-section of important grassland grasses and legumes as a basis for breeding
- Since 1992 collection of subalpine and alpine grasses and herbs, activities focused on developing the basis and principles for the production of alpine ecotypes
- In a series of tests, various origins were examined for their suitability for seed production in valley locations
- In addition to basic scientific work a partner was also necessary for the commercial implementation - cooperation with seed company Kärntner Saatbau e.Gen. started
- After overcoming the inevitable setbacks, the first seed mixtures for the greening of ski slopes and areas at high altitudes were offered in 1995.

Initial situation at AREC Raumberg-Gumpenstein

- For innovative farmers and seed producers, this created the possibility of lucrative, non-regulated production.
- The demands on production technology are extremely high. Only a few companies, with many years of experience, are able to meet the extreme demands on product quality with sufficient yields.
- With the Agricultural Law Amendment Act 2004, the HBLFA Raumberg-Gumpenstein (AREC) was commissioned with the conservation of genetic resources related to grasses, small-grained legumes and herbs
- Since 2005 scientific activities started on the collection and long-term storage of seeds

Selection of collection sites - habitat types

- Collections of seeds on semi-natural grassland of Austria
- Donor areas in their regional form to ensure the original genetics, not reseeded in the last 30 years
- Classification of habitat types for characterization and selection of collection sites



The most relevant grassland habitat types

Mesophile grasslands: e.g. Lowland hay meadow (Welser Heide, Austria)



The most relevant grassland habitat types

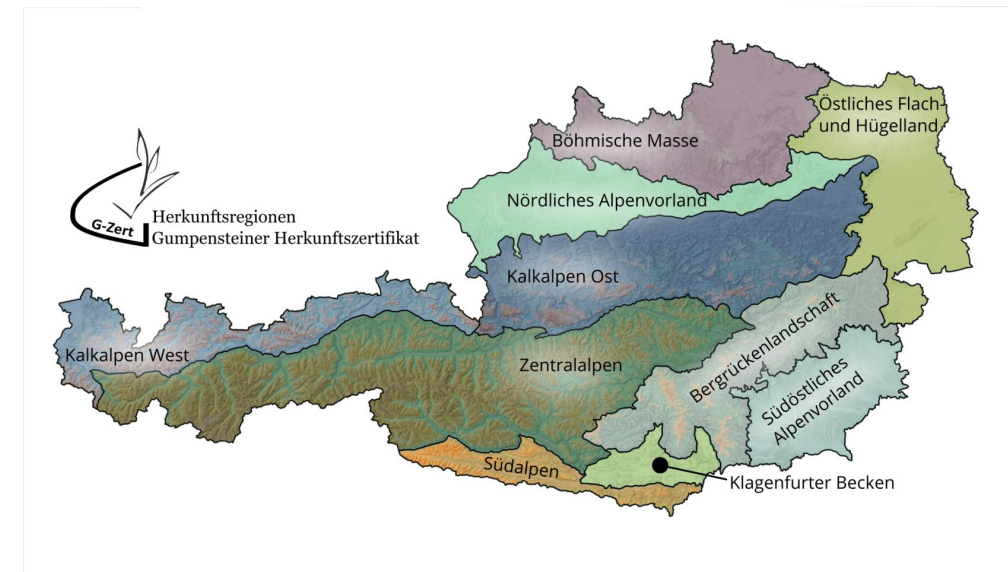
Semi-natural tall-herb humid meadows: e.g. Molinia meadow (Wörschach moor, Austria)



Selection of collection sites - biogeographical units

In order to correspond to the different regions of Austria, collections are carried out in all 10 large Biogeographical units of Austria according to the following criteria:

- characteristic species of one of the previously mentioned habitat types
- Occurrence of the habitat type in the large natural unit
- At least 50 individuals per species, area and collection location per collection site



Ongoing work

- 2006 started the seed company Kärntner Saatbau e.Gen. to dedicate species-rich seed mixtures with site-appropriate seed at lower altitudes
- With the help of the nature conservation department of the province of Upper Austria, regional origins of various species were collected
- 16 species were available in 2011, propagated on a large scale by farmers. An additional 24 species are in pre-propagation at AREC.
- Years of intensive cooperation between science, research, practical trial work, economic propagation of ecotypes by Austrian farmers and intensive advisory activities



Gumpensteiner certificate of origin „G-Zert“ (www.gzert.at)

- In 2012, AREC Raumberg-Gumpenstein launched an independent certification for wild plant seeds (G-Zert) valid throughout Austria
- Collection, seed extraction, seed producing companies, cleaning companies and the sales organization are included in the certification system
- The production and cleaning facilities, as well as the sales organization, take place annually through an external control body (Agentur Ritt)
- Origin and regionality, volume flow and generational succession transparent and traceable
- Value-determining properties: purity or germination capacity of the seeds tested by Austrian Agency for Health and Food Safety GmbH, very important for consumers



Example of adhesive label and delivery note

	Avenula pubescens			
	Flaumhafer	Gewicht g:	4000	
Herkunft	Welser Heide Flughafen 10816			
Naturr. Gr.:	Nördliches Alpenvorland			
Generation:	V2	Tkg g	3,113	Keim.% 57
Lagernr./Partienr:	12758	Entnahme:	25.02.2019	

Kontroll-/Zertifizierungssystem sichergestellt durch Agentur Ritt GmbH

Abs.: HBLFA Raumberg-Gumpenstein, Dr. Bernhard Krautzer
Raumberg 38, 8952 Irdning-Donnersbachtal
Tel: 03682 22451 310

Lieferschein für G-Zert Saatgut (Gumpensteiner Herkunftszertifikat)

Empfänger

Fa Kärntner Saatbau KSB

Kraßnigstraße 45

9020 Klagenfurt



Sämtliche nachfolgend aufgelisteten Positionen sind im Status G-Zert konform! Auslagerung: 01.08.2022

Botanischer Name	Artname	Lagernr	Ernte	Herkunftsnr	Naturr. Große	Gen.	Gewicht in g	Zweck
Anthemis tinctoria	Färber-Hundskamille	13655	2021	Marchfeld 7059	Östliches Flach- und Hügelland	V2	8000	Vermehrung Dienst Johannes

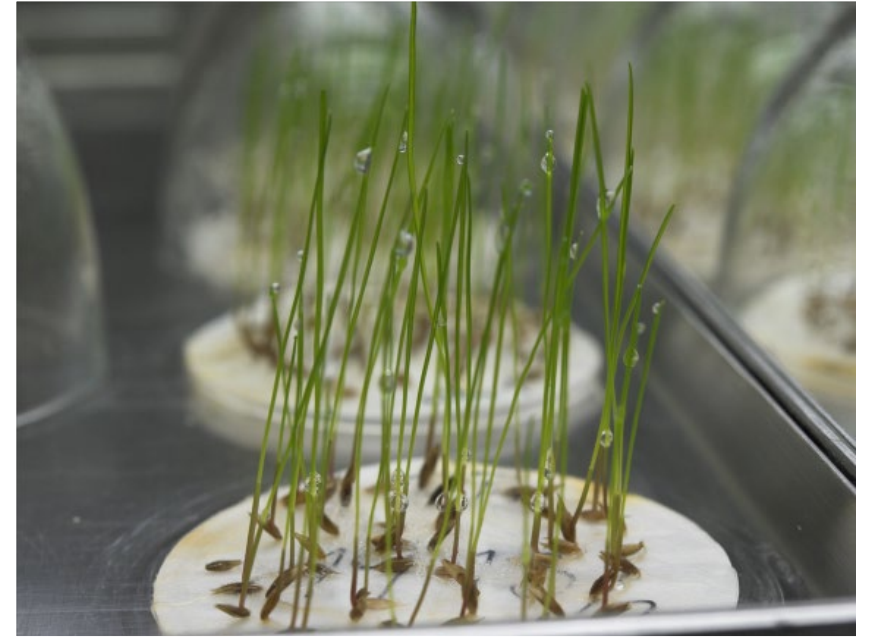
Seed quality testing

- Purity test: proportion of foreign seeds, if the proportion is too high, post-cleaning



Seed quality testing

- Germination capacity according to the specifications of the International Seed Testing Association (ISTA): substrate, pre-treatment, temperature regime,
- Testing in germination cabinets or in the Jacobsen germinator





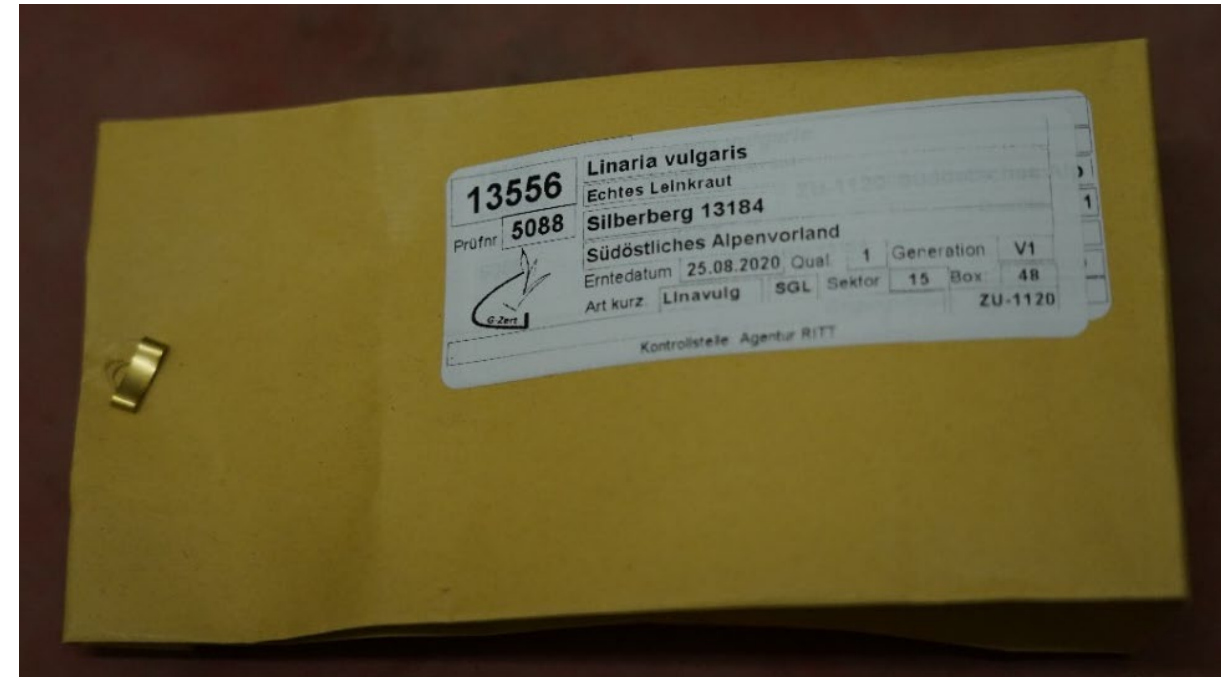
Larger scale plant propagation – G-Zert certified

- 2017 set up new official cooperation contract with seed company Kärntner Saatbau e.Gen. (www.saatbau.at)
 - Provision of seed material according to G-Zert, the seed company pays expense allowance
 - AREC undertakes to provide early seed stages for further propagation
- Transfer to contract farmers (quality controlled) via seed company Kärntner Saatbau e.Gen.
- Specialized farmers - seed propagators in Upper Austria and Lower Austria, max. 5 generations of reproduction
- 136 species approximately 130 ha will be harvested in 2017



Storage of seeds - working collection

- Assignment of unique identification - provenience number
- Storage in a cold room (temperature and humidity control): + 4°C and 50 % relative humidity, water content of the seeds approx. 8 %



Long-term storage in the freezer
(temperature control): - 20°C, additional
drying to approx. 5 % water content and
sealing in coated aluminum bags



Harvest of propagated regional seed



New sowings of biodiversity areas with regional seed mixtures, funded via Austrian Agri-Environmental Programme (ÖPUL) from 2023

- Top up measure: at least 30 species from seven different plant families from positive species list of 75 species out of 21 plant families
- Proportion of a single species may not exceed 5 weight%
- Regional origin of the seed material must be proven (G-Zert, REWISA or comparable certification)
- Seed rate of 20 kg/ha - Seed quantity and composition must be documented by seed labels and reference invoices
- Mulching is not allowed, also no fertilization
- Mowing at least once to a maximum of twice a year, the removal of the vegetation material is mandatory

Cropland and grassland seed mixture of regional wildflowers (50 accessions)

(according to „positive species list“)



Mischung für Grünland		Mischung für Acker	
Mischungszusammensetzung:		Mischungszusammensetzung:	
Ruchgras	<i>Anthoxanthum odoratum</i>	Echte Schafgarbe	<i>Achillea millefolium</i>
Zittergras	<i>Briza media</i>	Wundklee	<i>Anthyllis vulneraria</i>
Kammgras	<i>Cynosurus cristatus</i>	Echte Betonie	<i>Betonica officinalis</i>
Horstrotschwingel	<i>Festuca rubra comm</i>	Wiesenkümmel	<i>Carum carvi</i>
Wiesenrispe	<i>Poa pratensis</i>	Skabiosen-Flockenblume	<i>Centaurea scabiosa</i>
Echte Schafgarbe	<i>Achillea millefolium</i>	Kornblume	<i>Centaurea cyanus</i>
Wundklee	<i>Anthyllis vulneraria</i>	Wiesen-Flockenblume	<i>Centaurea jacea</i>
Echte Betonie	<i>Betonica officinalis</i>	Wiesenpippau	<i>Crepis biennis</i>
Wiesenkümmel	<i>Carum carvi</i>	Wegwarte	<i>Cicorium intybus</i>
Skabiosen-Flockenblume	<i>Centaurea scabiosa</i>	Wilde Möhre	<i>Daucus carota</i>
Wiesen-Flockenblume	<i>Centaurea jacea</i>	Karthäuser-Nelke	<i>Dianthus carthusianorum</i>
Wiesenpippau	<i>Crepis biennis</i>	Wilde Karde	<i>Dipsacus follosum</i>
Wegwarte	<i>Cicorium intybus</i>	Natternkopf	<i>Echium vulgare</i>
Wilde Möhre	<i>Daucus carota</i>	Echtes Labkraut	<i>Galium verum</i>
Karthäuser-Nelke	<i>Dianthus carthusianorum</i>	Echtes Johanniskraut	<i>Hypericum perforatum</i>
Natternkopf	<i>Echium vulgare</i>	Wiesen-Witwenblume	<i>Knautia arvensis</i>
Echte Nelkenwurz	<i>Geum urbanum</i>	Wiesen-Löwenzahn	<i>Leontodon hispidus</i>
Wiesen-Labkraut	<i>Galium album</i>	Herbstlöwenzahn	<i>Leontodon autumnalis</i>
Echtes Labkraut	<i>Galium verum</i>	Magerwiesen-Margerite	<i>Leucanthemum vulgare</i>
Wiesen-Witwenblume	<i>Knautia arvensis</i>	Fettwiesen-Margerite	<i>Leucanthemum ircutianum</i>
Wiesen-Löwenzahn	<i>Leontodon hispidus</i>	Kuckuckslichtnelke	<i>Lychnis flos cuculi</i>
Herbstlöwenzahn	<i>Leontodon autumnalis</i>	Sichelluzerne	<i>Medicago falcata</i>
Magerwiesen-Margerite	<i>Leucanthemum vulgare</i>	Weißer Steinklee	<i>Melilotus albus</i>
Fettwiesen-Margerite	<i>Leucanthemum ircutianum</i>	Gelber Steinklee	<i>Melilotus officinalis</i>
Kuckuckslichtnelke	<i>Lychnis flos cuculi</i>	Klatschmohn	<i>Papaver roheas</i>
Gelbklee	<i>Medicago lupulina</i>	Pastinak	<i>Pastinaca sativa</i>
Pastinak	<i>Pastinaca sativa</i>	Wiesensalbei	<i>Salvia pratensis</i>
Spitzwegerich	<i>Plantago lanceolata</i>	Rote Lichtnelke	<i>Silene dioica</i>
Mittlerer Wegerich	<i>Plantago media</i>	Nickendes Leimkraut	<i>Silene nutans</i>
Gew. Brunelle	<i>Prunella vulgaris</i>	Aufgeblasenes Leimkraut	<i>Silene vulgaris</i>
Kleiner Wiesenknopf	<i>Sanguisorba minor</i>	Feldklee	<i>Trifolium campestre</i>
Rote Lichtnelke	<i>Silene dioica</i>	Fadenklee	<i>Trifolium dubium</i>
Nickendes Leimkraut	<i>Silene nutans</i>	Großblütige Königskerze	<i>Verbascum densiflorum</i>
Aufgeblasenes Leimkraut	<i>Silene vulgaris</i>		
Feldklee	<i>Trifolium campestre</i>		



Cropland ÖPUL - May 2021



Grassland ÖPUL - End of April 2022



June 2022



June 2022

: Austrian Agri-Environmental Programme

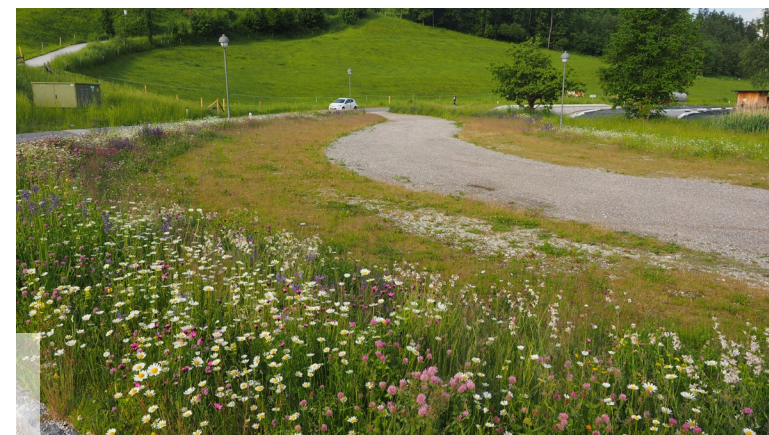
- Seed company Kärntner Saatbau e.Gen. started in consultation with AREC with the production of regional seeds for the ÖPUL program in larger scale and number of species from 2020
- But, the support measure was not accepted by the farmers as planned
- The seed warehouse was filled with tons of regionally certified seed, sales also collapsed across countries
- Payout price to farmers (always fixed before the harvest) and seed production area was from 2024 reduced

Year	Seed production area in ha	Number species
2017	130,8	128
2018	131,7	117
2019	150,7	107
2020	200,9	128
2021	224,2	135
2022	254,9	127
2023	238,5	121
2024	224,3	102
2025	150,4	79

Use of certified regional wild plant seeds in other areas

- Public spaces
- Retention basins
- Gravel turf, Green roofs, green tramway tracks
- Roadside areas and landscaping, embankements,
- Greening in horticulture and viticulture
- Restoration at high altitudes: Ski runs, infrastructural interventions

These possible uses will keep the fragile seed production regional wild plants in Austria going in the future.



Thank you for your attention!

