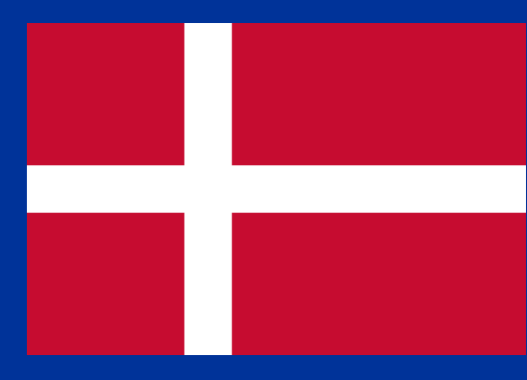


Peas – a genetic resource for sustainable protein production in the Arctic?



I.M. Vågen¹, U. Carlson-Nilsson², K. Aloisi², S.K. Rasmussen³, G. Poulsen³, M.W. Leino⁴, P. Pärssinen⁵, A. Rajala⁶ and A. Palmé²

¹NIBIO Norwegian Institute of Bioeconomy Research, Dept. of Horticulture, N-4886 Grimstad, Norway. ²NordGen, The Nordic Genetic Resource Centre, SE-230 53 Alnarp, Sweden. ³University of Copenhagen, Dept. of Plant and environmental sciences, DK-1871 Frederiksberg C, Denmark. ⁴Stockholm University, Dept. of Archaeology and Classical Studies, SE-106 91 Stockholm, Sweden. ⁵Boreal Plant Breeding Ltd, FIN-31600 Jokioinen, Finland. ⁶LUKE Natural Resources Institute Finland, FIN-31600 Jokioinen, Finland.

The “Arctic peas” project

Climate changes expected in the near future will result in higher temperatures and longer growing season at high latitudes. This might open up for possibilities for pea production in Arctic and northern areas, and the need for cultivars more adapted to northern conditions is likely to increase. At NordGen - a common genebank for all the Nordic countries - a large number of Nordic pea accessions are conserved, including both cultivars, landraces and breeding material. Does this material hold keys to the future?

The ongoing Nordic cooperation research project «Arctic peas» aims to identify germplasm of peas well adapted either for breeding or immediate cultivation in the Arctic/Nordic regions. The project evaluates important traits in 50 selected accessions from NordGen in field trials at four contrasting Nordic locations, at latitudes ranging from 55° to 69° N (see map). Among the evaluated traits are flowering time, maturation time and yield, as well as protein content. Will the genetic material show different expressions at locations with clear distinction in daylength, temperature and climate?

The project also aims to increase the knowledge and use of the Nordic pea accessions conserved at NordGen, and strengthen the collaboration between companies, organizations and researchers in the Nordic countries.



Field inspection in Tromsø, Norway. Photo: Anne Linn Hykkerud



Tromsø, Norway. Photo: Ewelina Wojciechowska Umeå, Sweden. Photo: Ulrika Carlson-Nilsson

Accessions

Acc no	Accession name	Reference cultivars:
7128	NORRØNA (NO)	KARITA (FI)
10778	ASLAUG (NO)	INGRID (SE)
11149	JÆRERT (NO)	
11750	SOCKERÅRT FRÅN ARVIDSJAUR (SE)	
13469	STÄME (SE)	
13784	MARMA (SE)	
14642	LIT (SE)	
17650	SUNNA (FI)	
17832	FARMOR (SE)	
17833	ÖGONSOCKERÅRT FRÅN BOARYD (SE)	
17837	SVARTBJÖRSBYN (SE)	
17839	VALLAGÅRDEN (SE)	
17842	EDSÅS (SE)	
17855	TANT ERIKA (SE)	
17859	SOLLERÖÅRT (SE)	
17863	SAXBO (SE)	
17865	ENVIKEN (SE)	
17866	BISKOPEN 2 (SE)	
17869	KÄRRBODA (SE)	
17873	PUGGOR FRÅN BALLINGSLÖV-GLIMÅKRA (SE)	
17882	GÄSTRIKLAND (SE)	
18057	MARTHA (SE)	
18059	AVESTAÅRT (SE)	
18680	SUMO (DK)	
20011	HEDENÅSET (SE)	
20012	DELIKATESS (SE)	
20043	LOM (NO)	
20121	MARIE (NO)	
20201	GRÖTOM (SE)	
20205	GAPERHULT (SE)	
21659	RINGERIKSERT (NO)	
21951	SIGNAL (DK)	
22830	RABER (SE)	
22832	GENDALENS ÄRTER (SE)	
23819	TIDLIG LAV (NO)	
24333	BJURHOLMS BLÅÅRT (SE)	
24334	BJURHOLMS GRÅÅRT (SE)	
24335	BJURHOLMS SMÅÅRT (SE)	
24765	KARLS HØJE ÆRT (DK)	
100930	KLOSTERÅRT (SE)	
101109	STRÅL (SE)	
102222	WBH 2222 (SE)	
103076	JÄMTLÄNSK GRÅÅRT (SE)	
103488	WBH 3488 (SE)	
103491	HJA 10953 (FI)	
103496	HJA 51229 (FI)	
103523	WBH 3523 (SE)	
103549	ELIN (SE)	
103826	SIMO (SE)	
103853	INKILÄN HERNE (FI)	

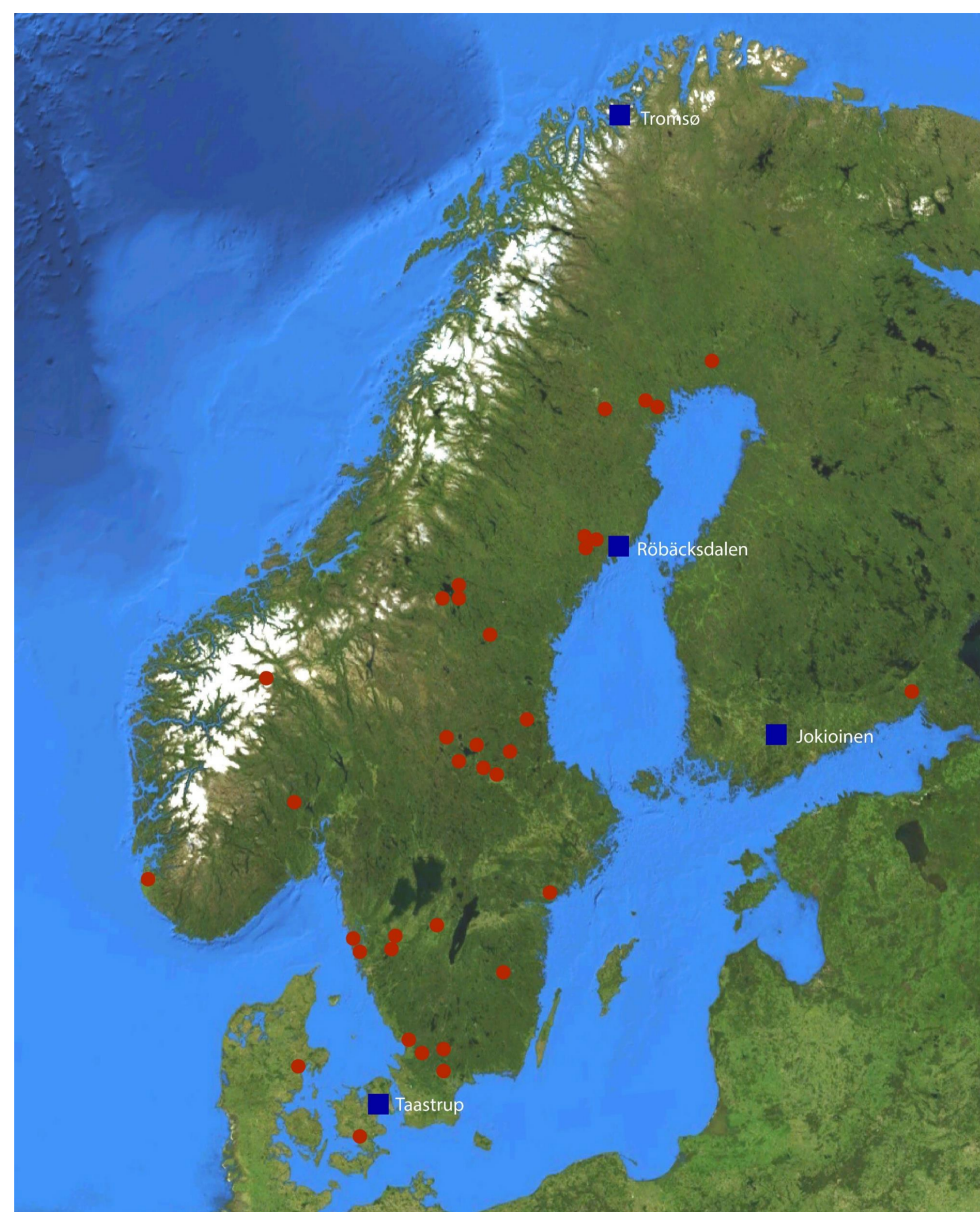


Illustration: Matti W. Leino

Field trial locations

Tromsø, Norway
(69°39' N 18°54' E)

Röbäcksdalen, Sweden
(63°49' N 20°11' E)

Jokioinen, Finland
(60°48' N 23°28' E)

Taastrup, Denmark
(55°67' N 12°30' E)

● Location of accessions with specific geographic origin (landraces)



Frost in Tromsø, Norway, October 2018. Photo: Ewelina Wojciechowska

Taastrup, Denmark, June 2018. Photo: Ulrika Carlson-Nilsson

Screening for disease resistance

Due to yearly differences in disease pressure in field trials, scoring and identification of disease resistance is sometimes not possible because of low infection rate. Therefore, a promising marker targeting *Erysiphe pisi*-resistance (SSR A5) will be examined and optimized on a subset of pea accessions. DNA from selected accessions has been extracted and the selected marker is used to genotype the accessions for resistance genes.



20201 Grötom (SE) 23819 Tidlig lav (NO) 17882 Gästrikland (SE) 24334 Bjurholms gråårt (SE) 20201 Grötom (SE)
Photos: Ulrika Carlson-Nilsson and Sanna Kulmala



UNIVERSITY OF COPENHAGEN



The project is partly funded by the Nordic Council of Ministers' Arctic Co-operation Program.

NordGen

The Nordic Genetic Resource Center is an organization dedicated to conservation and sustainable use of plants, farm animals and forest trees. Biological diversity is the foundation of human existence and adaptation to constantly changing environmental conditions. NordGen secures the biological livelihood of present and future generations.

NordGen Plants

Box 41, SE-230 53 Alnarp, Sweden
Visiting address: Smedjevägen 3
Tel: +46 40 53 66 40
Fax: +46 40 53 66 50

