

PPP_sustainPotato: samarbeid for å fremme sortsutvikling av potet i Norden

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Nordic Public Private Partnership for Pre-breeding (PPP)

- ✓ Nordic collaboration between practical plant breeding and plant breeding research – since 2012.
- ✓ Funded by the Nordic countries and plant breeding entities (50/50), and the secretariat is placed at NordGen.
- ✓ PPP aims to:
 - strengthen plant breeding in the Nordic countries
 - promote sustainable use of genetic resources in the Nordic region
 - introduction of new traits in commercial breeding
 - development of efficient tools and methods
 - *Network (pre-competitive collaboration)*



Nordic pre-breeding PPP: 4 phases 2012 – 2023...



PPP_Barley
2012-2020



PPP_Ryegrass
2012-2020



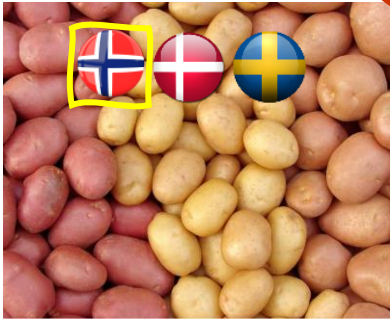
PPP_Apple
2012-2021



PPP_Strawberry
2018-2020



PPP_Wheat
2021-2023...



PPP_Potato
2021-2023...



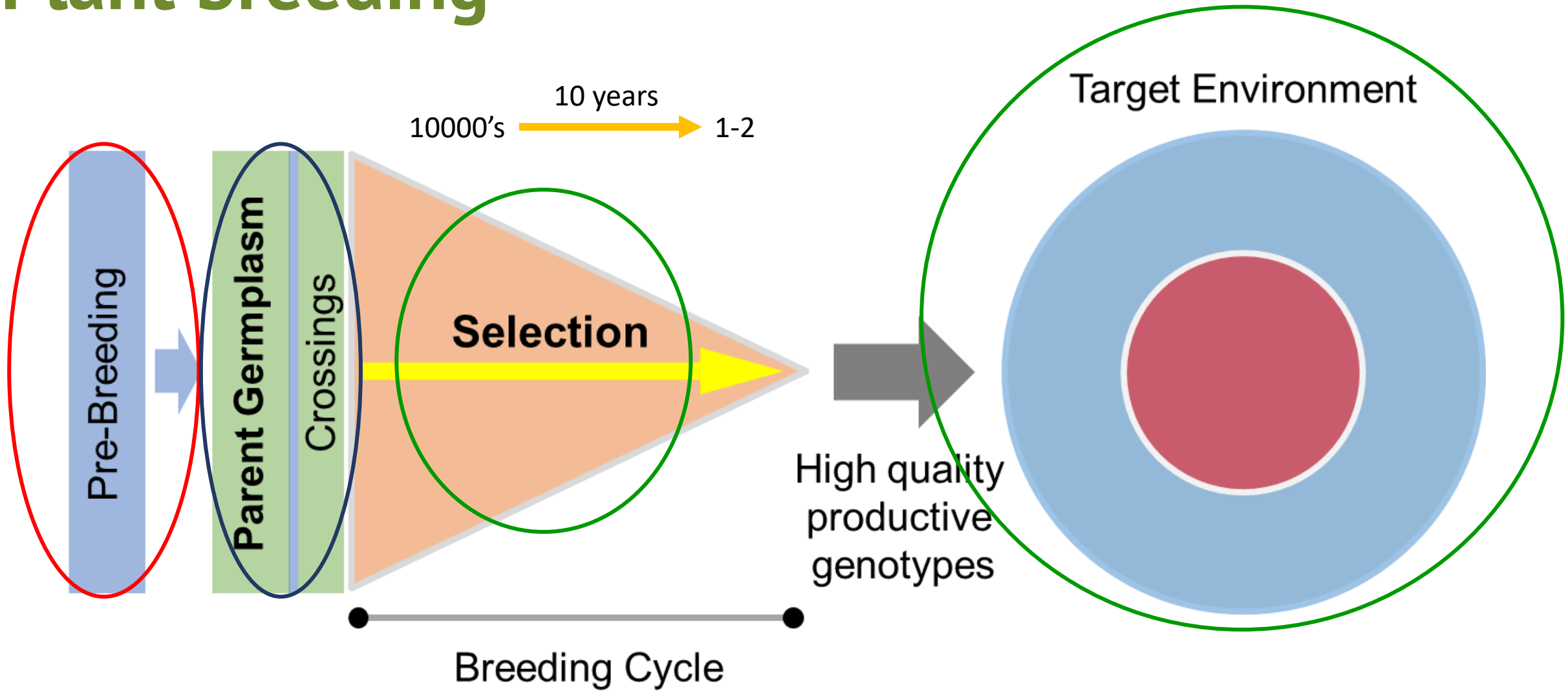
PPP_Phenomics
2015-2023...

Pre-breeding the road to breeding

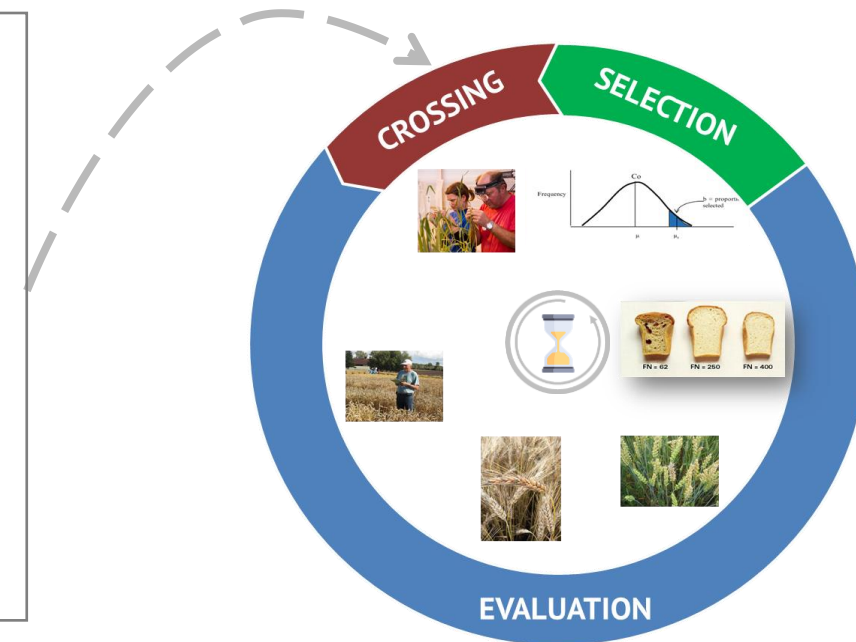
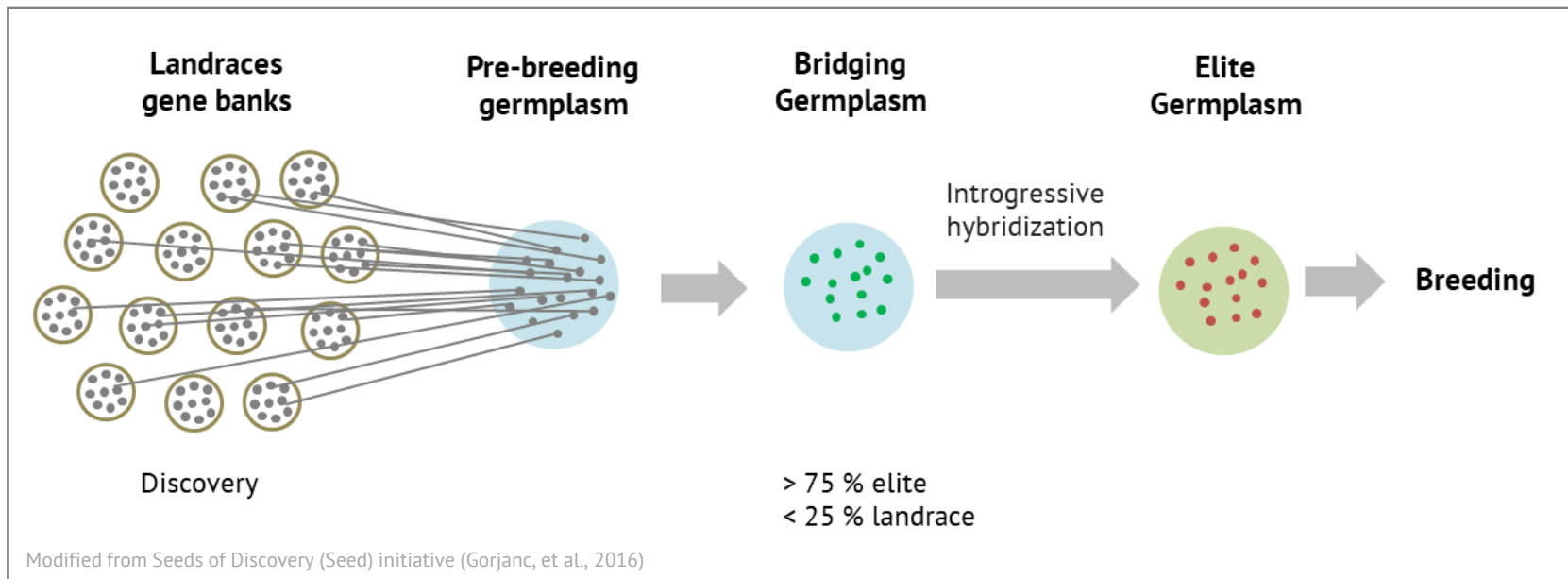
- ✓ Pre-breeding involves all activities associated with identification of desirable traits/genes from un-adapted germplasm (donor) (exotic/wild species), and to transfer these traits into well-adapted genetic backgrounds (recipients). (Sharma et al., 2013)
- ✓ Pre-breeding is the way for a successful breeding
- ✓ Pre-breeding
- ✓ Needs collaboration between: Gene banks • Universities • Research institutes • Breeding companies...
- ✓ Needs public support (as pre-market stage).

✓ Ideal model is PPP (Public Private Partnership)

Plant breeding



Pre-breeding the road to breeding



PPP_SustainPotato in NUTSHELL



- Objective: Facilitate efficient resistance breeding by utilizing genetic resources and modern molecular tools. Diseases in focus: late blight, common scab, silver scab, and powdery scab.
- This goal will be reached through these secondary objectives:
 1. Broaden Nordic potato genetic
 2. High-throughput phenotyping methods for efficient and quantitative phenotyping
 3. Association genetic analysis for further use in host plant resistance breeding
 4. PPP Nordic potato networking



- Period: 1 March 2021 – 28 February 2024 (3 years)
- Budget: 13.198 mSEK (PPP: 5.914 mSEK and Private: 7.284 mSEK)
- Project leader: Muath Alsheikh, Graminor



Main focus is diseases



Late Blight (Tørråte) – oomycete *Phytophthora infestans*

- ✓ Release zoospores at rel. low temp. (optimal 10-13°C) and infection at higher temp. (optimally 20-24°C) and humid.
- ✓ 'In Nordic Europe both *P. infestans* mating types (A1 and A2) are present, thus propagating sexually that increases genetic variation and possibility to survive in the soil as oospores.



Common Scab (Flatekury) – bacteria *Streptomyces*

- ✓ Needs warm and dry soil
- ✓ Severity of the disease increases with increasing soil alkalinity (pH 5.2 to 8.0).



Silver Scab (Sølvskury) – Fungus *Helminthosporium solani*

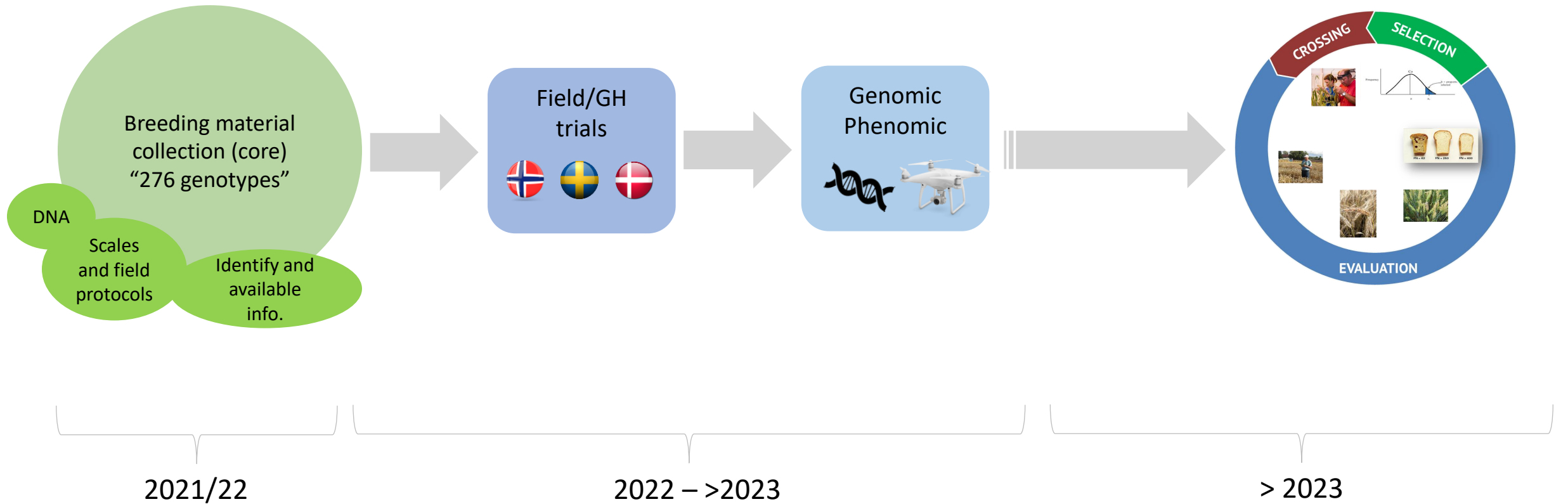
- ✓ Survives on infected seed tubers and on plant debris in infested soil from the previous potato crop. High humidity and temperature encourages disease development during storage.



Powdery Scab – Protozoan *Spongospora subterranea*

- ✓ Is a vector for *Potato mop-top virus*
- ✓ The inoculum that initiates powdery scab can originate from infected seed tubers or infested soil. Once fungus is introduced into a soil, its resting spores survive indefinitely (...3 to 10 years).

Project plan



Takk for meg!



Graminor