b-riik & t-riik

Hannes Kollist

www.plantsignalresearch.com

www.plantinvent.com

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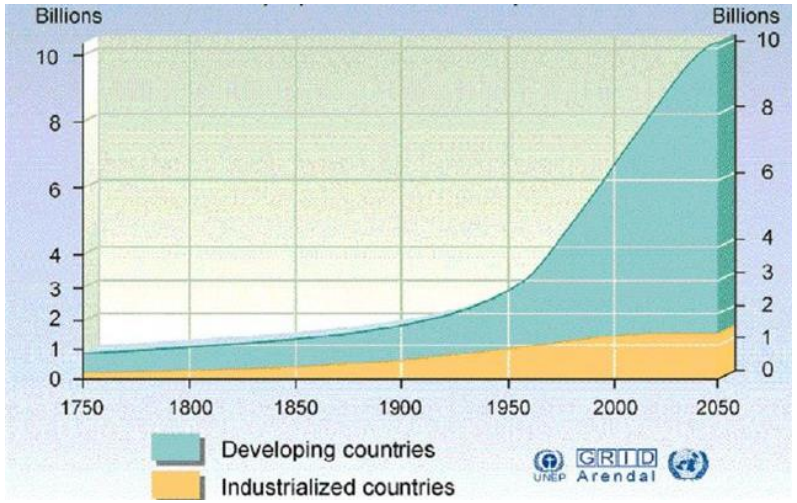
Euroopa Liit maaelu arenguks

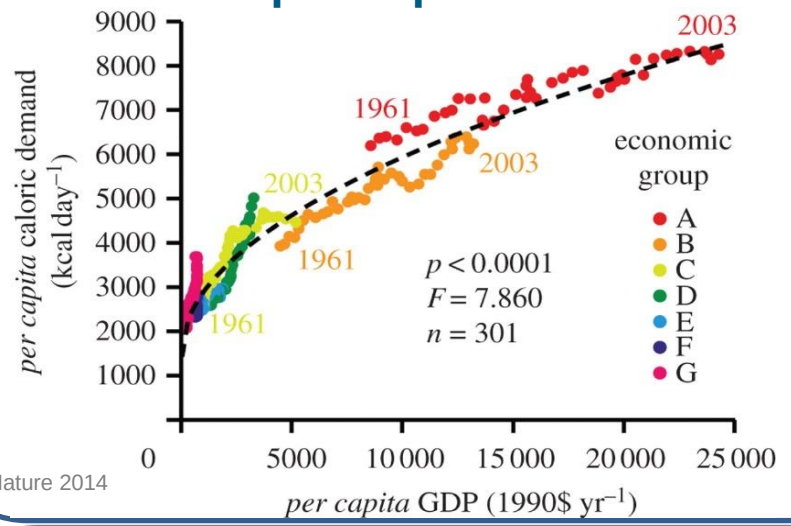
Euroopa Maaelu Arengu Põllumajandusfond: Euroopa investeeringud maapiirkondadesse

Nutikas taimede kasutamine on jätkusuutliku arengu võtmeküsimus

Rahvastiku kasv

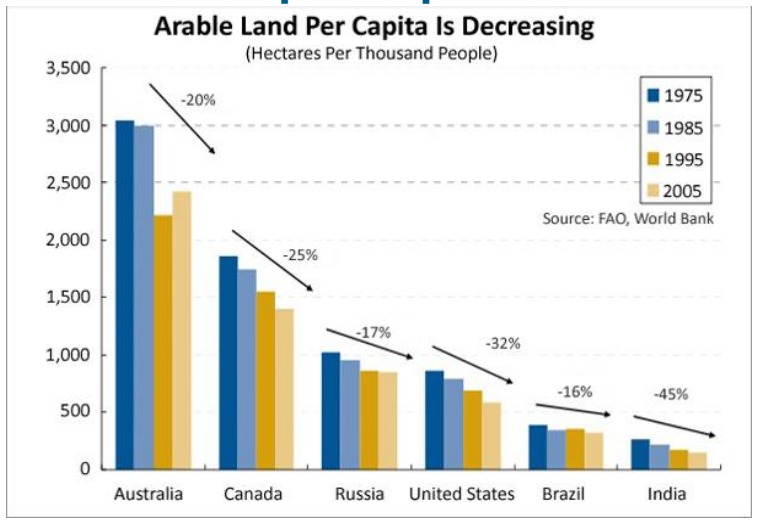


Kasvav per capita tarbimine

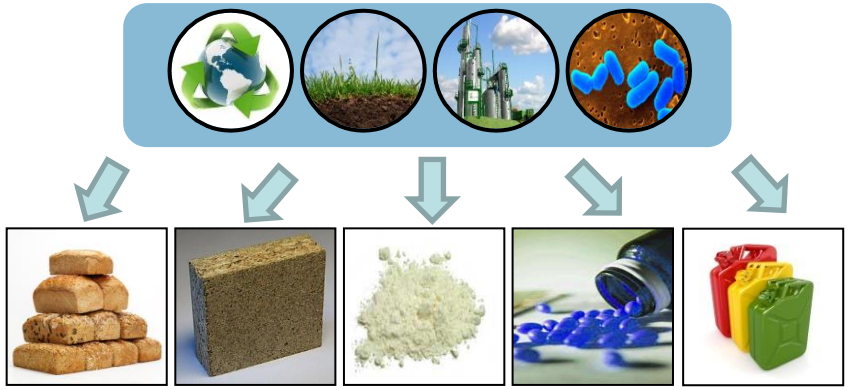


Nature 2014

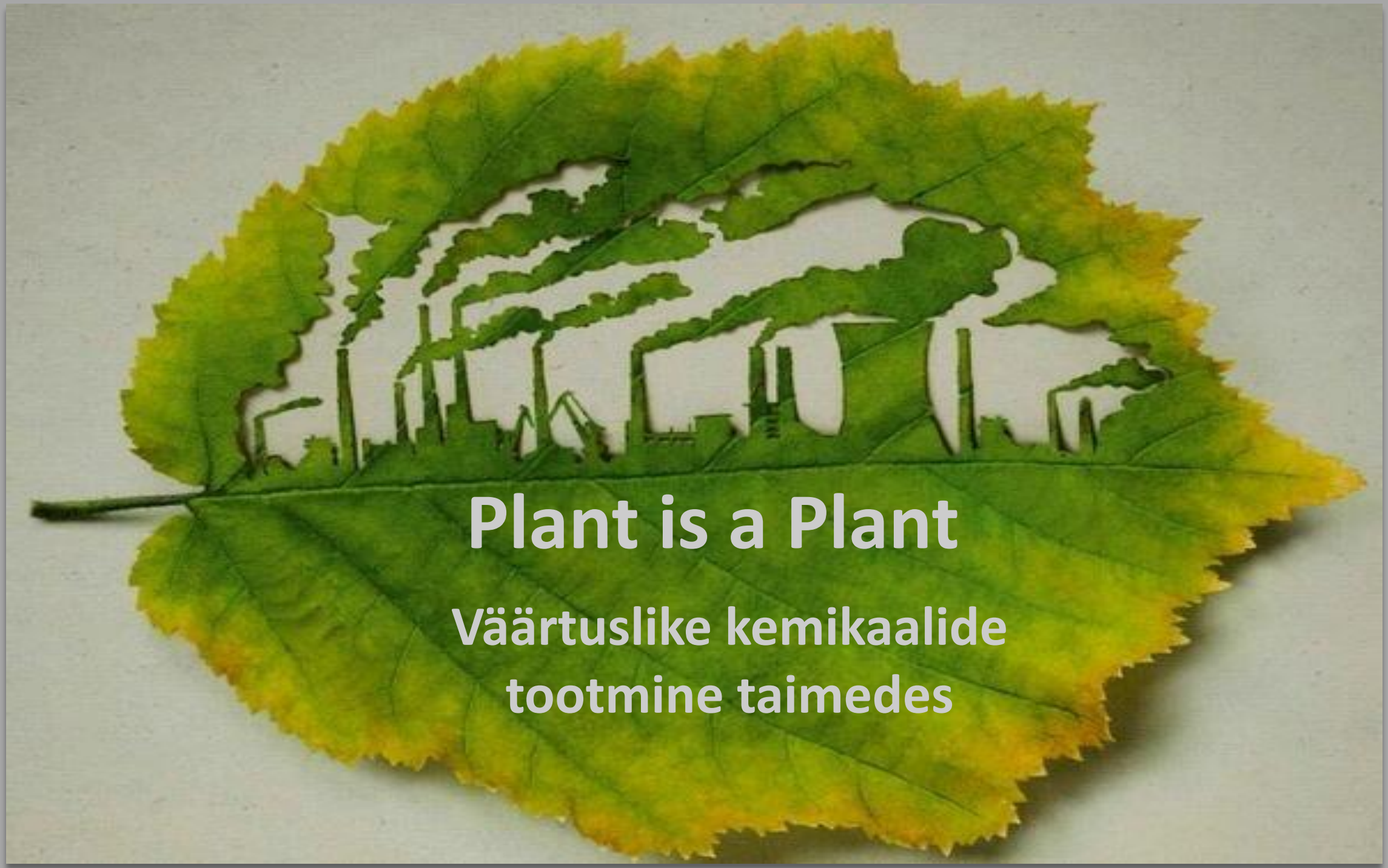
Haritava maa per capita kahanemine



Kasvav vajadus taimede mitmekülgseks rakendamiseks



Need for diversification



Plant is a Plant

Väärtuslike kemikaalide tootmine taimedes

Health is in our nature

Medicago develops vaccines and treatments to help fight emerging global health challenges, today and in the future.

Discover our business →

Terapeutiliste valkude tootmine taimedes

Põud Eestis, 2021

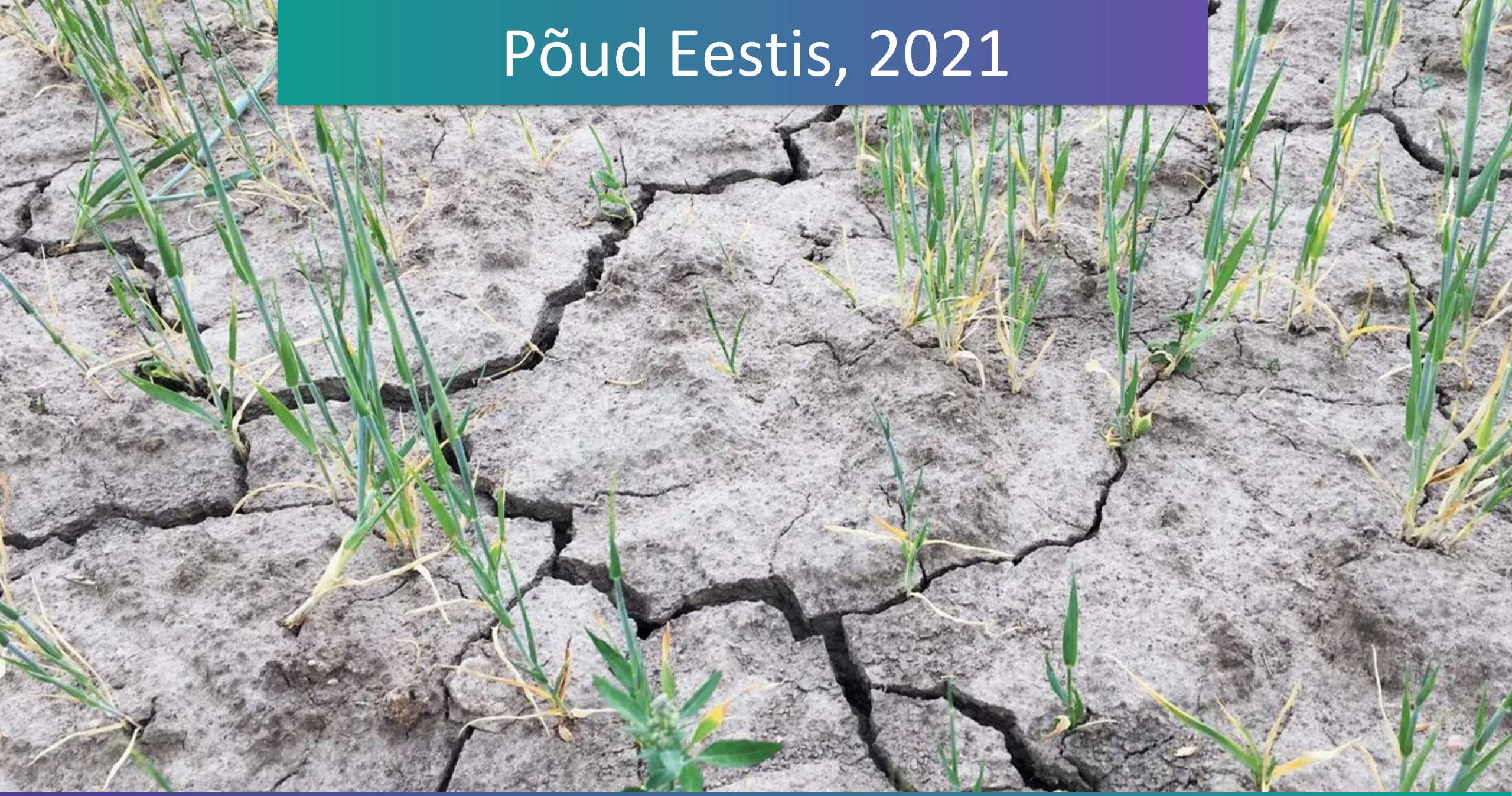
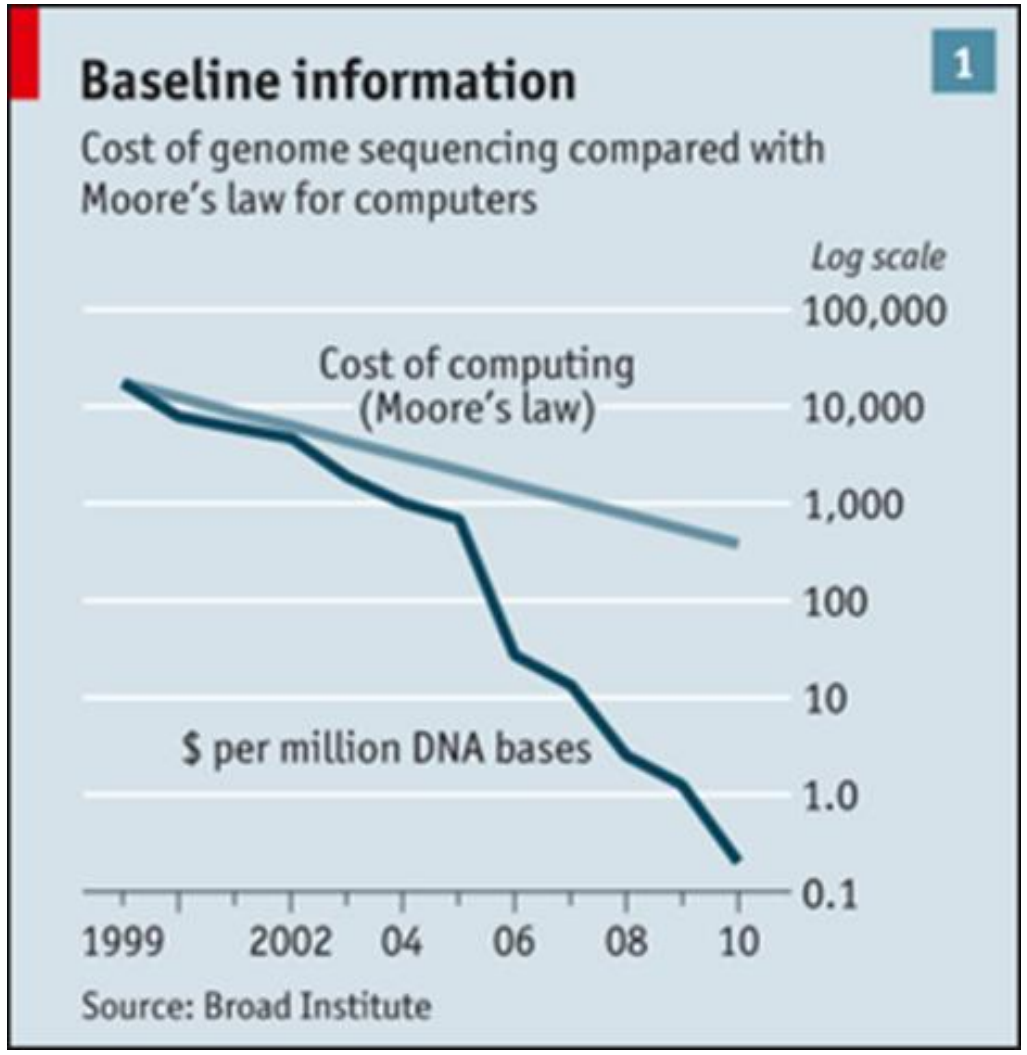


Photo: Olev Kenk/ERR

Kust on tulnud areng?

- DNA sekveneerimine



Kust on tulnud areng?

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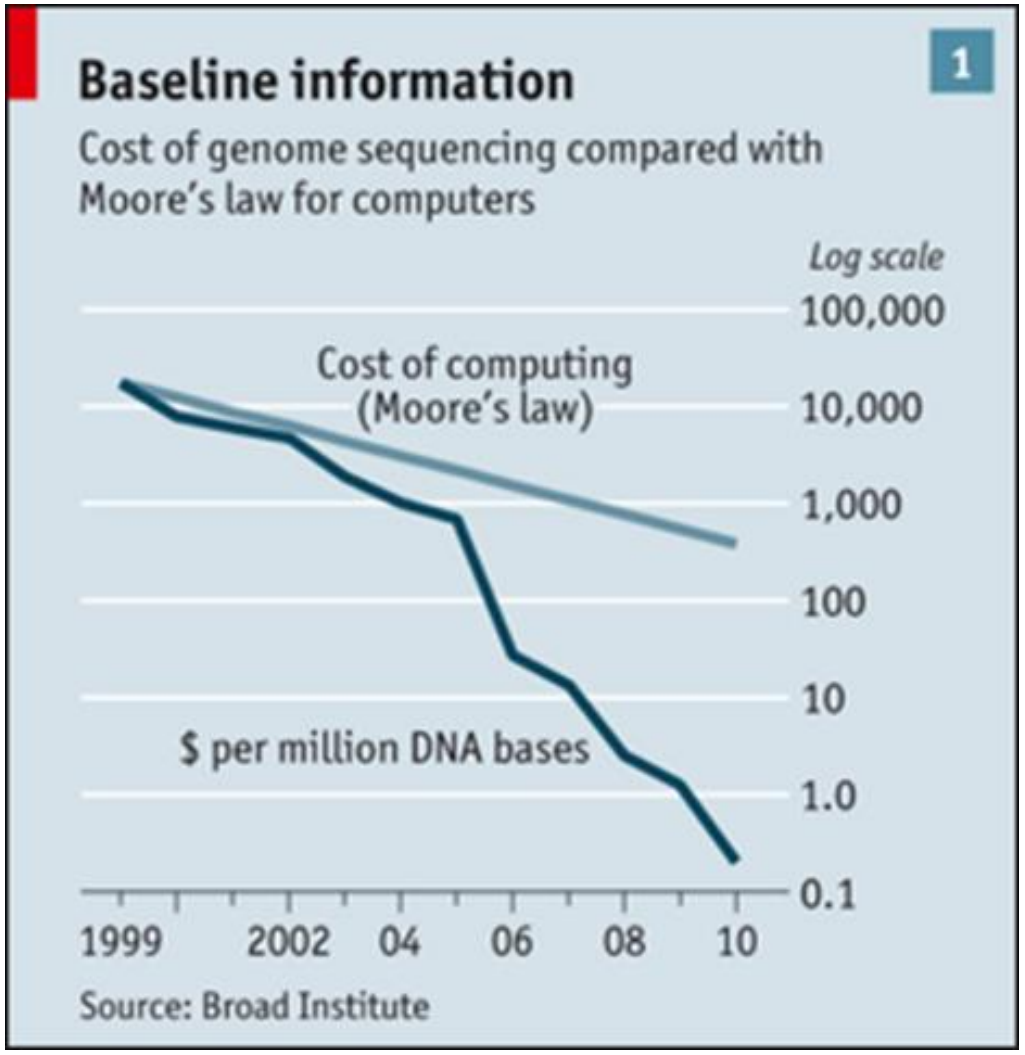
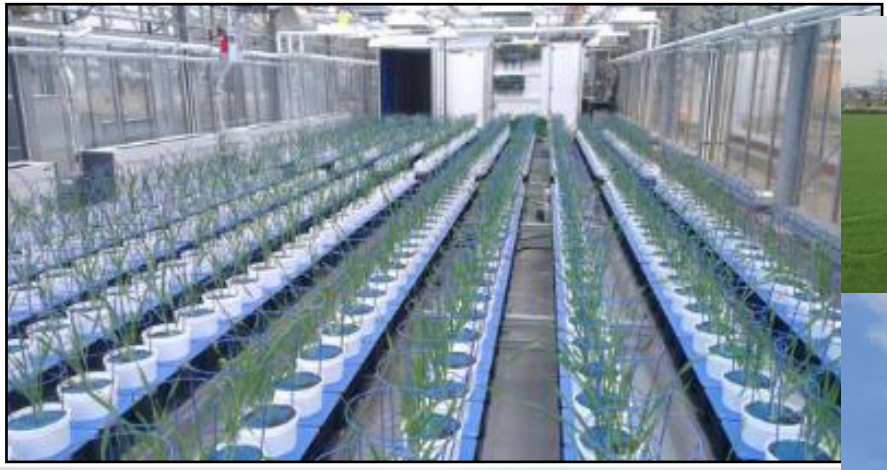


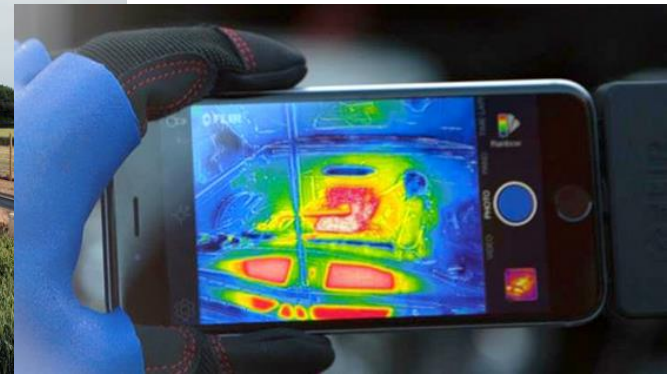
Mis on kujunenud pudelikaelaks?

- Fenotüpiseerimine

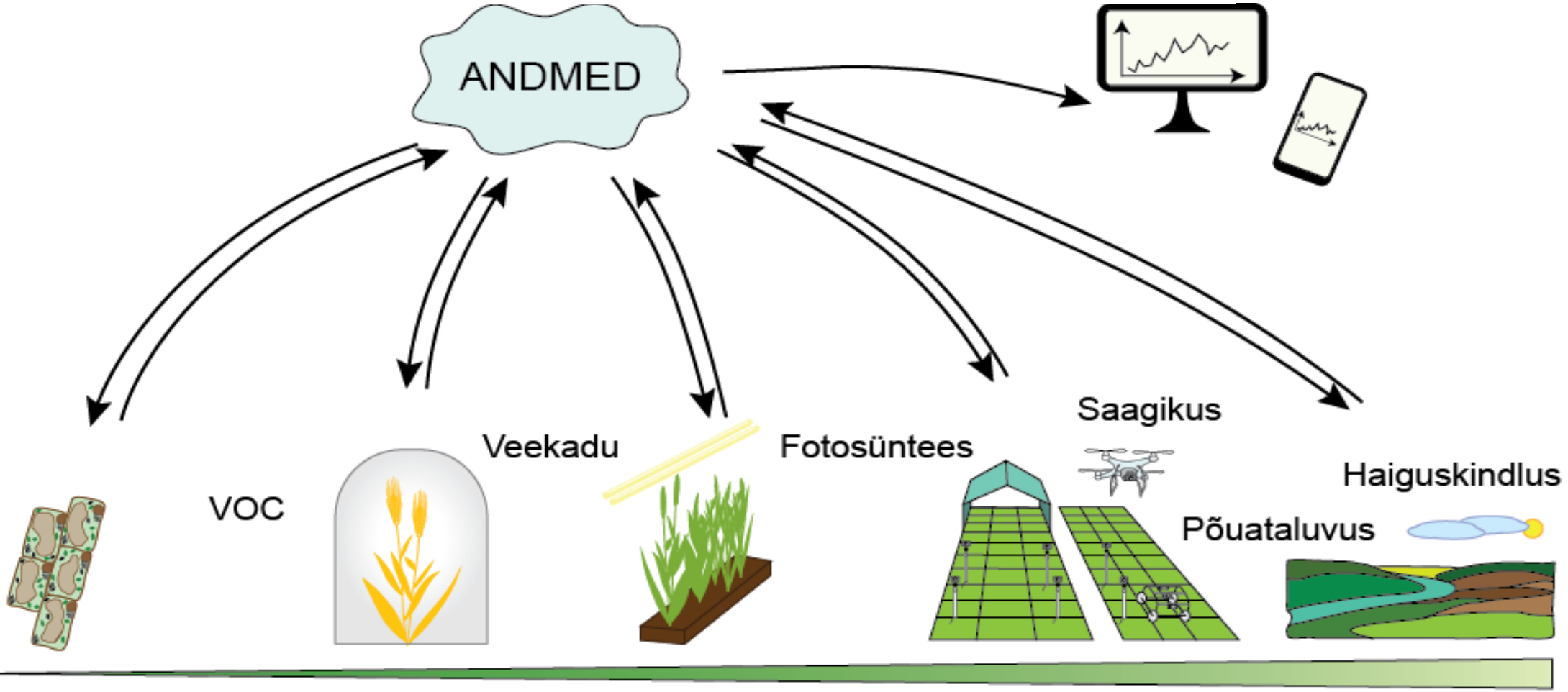


Flying platforms

Portable sensors („cheap“)



Taimebioloogia Infrastruktuur



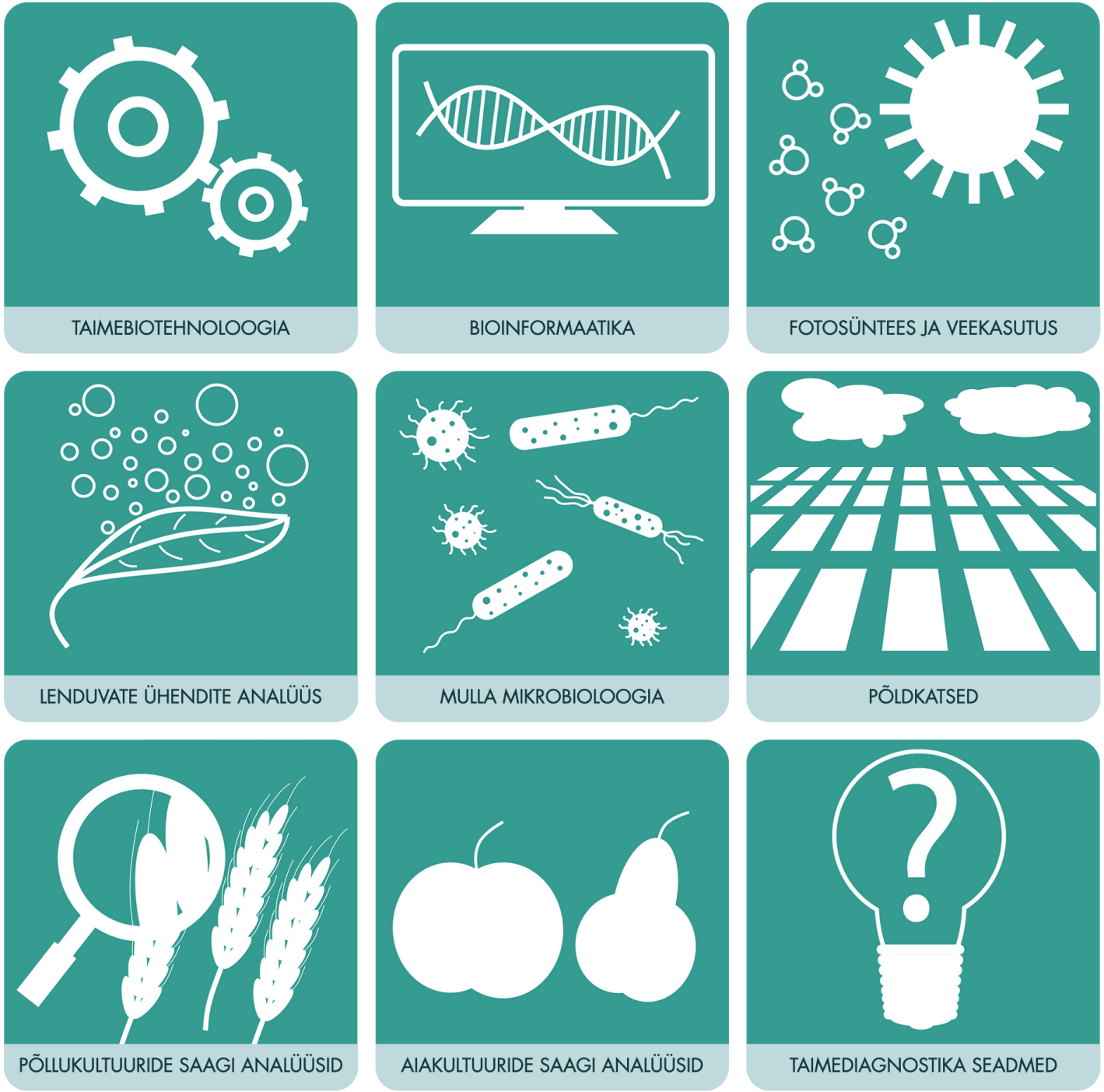
TÜ, TalTech, EMÜ	TÜ, TalTech, EMÜ	TÜ, TalTech, EMÜ	ETKI	ETKI, EMÜ


Euroopa Liit
Euroopa Regionaalarengu Fond
Eesti tuleviku heaks
TAIM
Taimebioloogia infrastruktuur
www.taimebioloogia.ee

Taimebioloogia Infrastruktuur

TEENUSED

www.taimebioloogia.ee



Tehnoloogiad taimede fenotüpiseerimiseks

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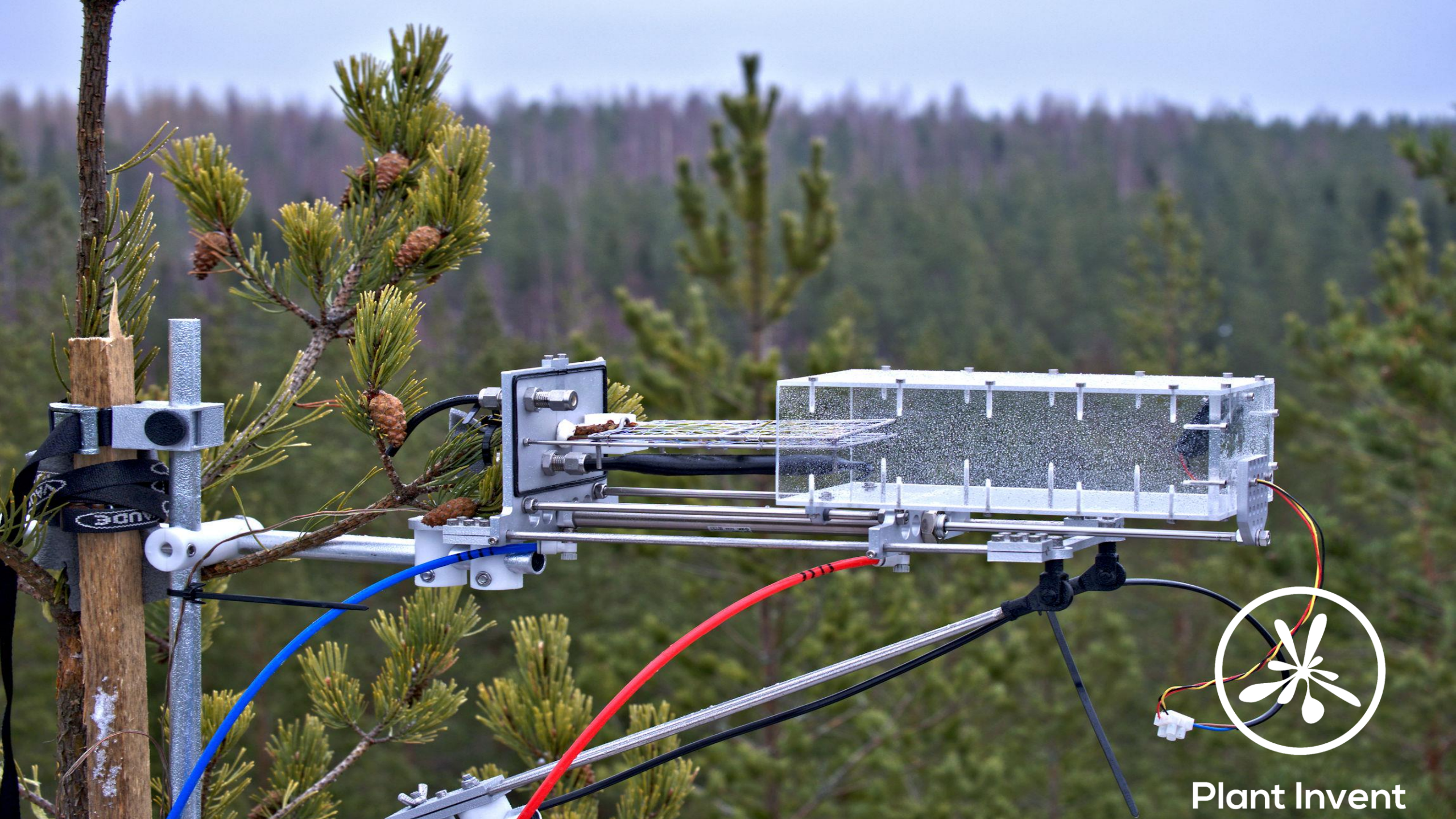
Photos by: Kaspar Koolmeister

Taimediagnostika instrumendid

Plant Invent

Photo by: Kaspar Koolmeister

Plant Invent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Eesti tingimustes hästi kasvava odra ja nisu aretamine

barista
FOR SUSTAINABLE BARLEY
2019-2022

BRACE – *põuakindel oder, odra genoomi editeerimine*
2021-2024

NOBAL wheat
2021-2023

Horizon 2020
European Union Funding
for Research & Innovation

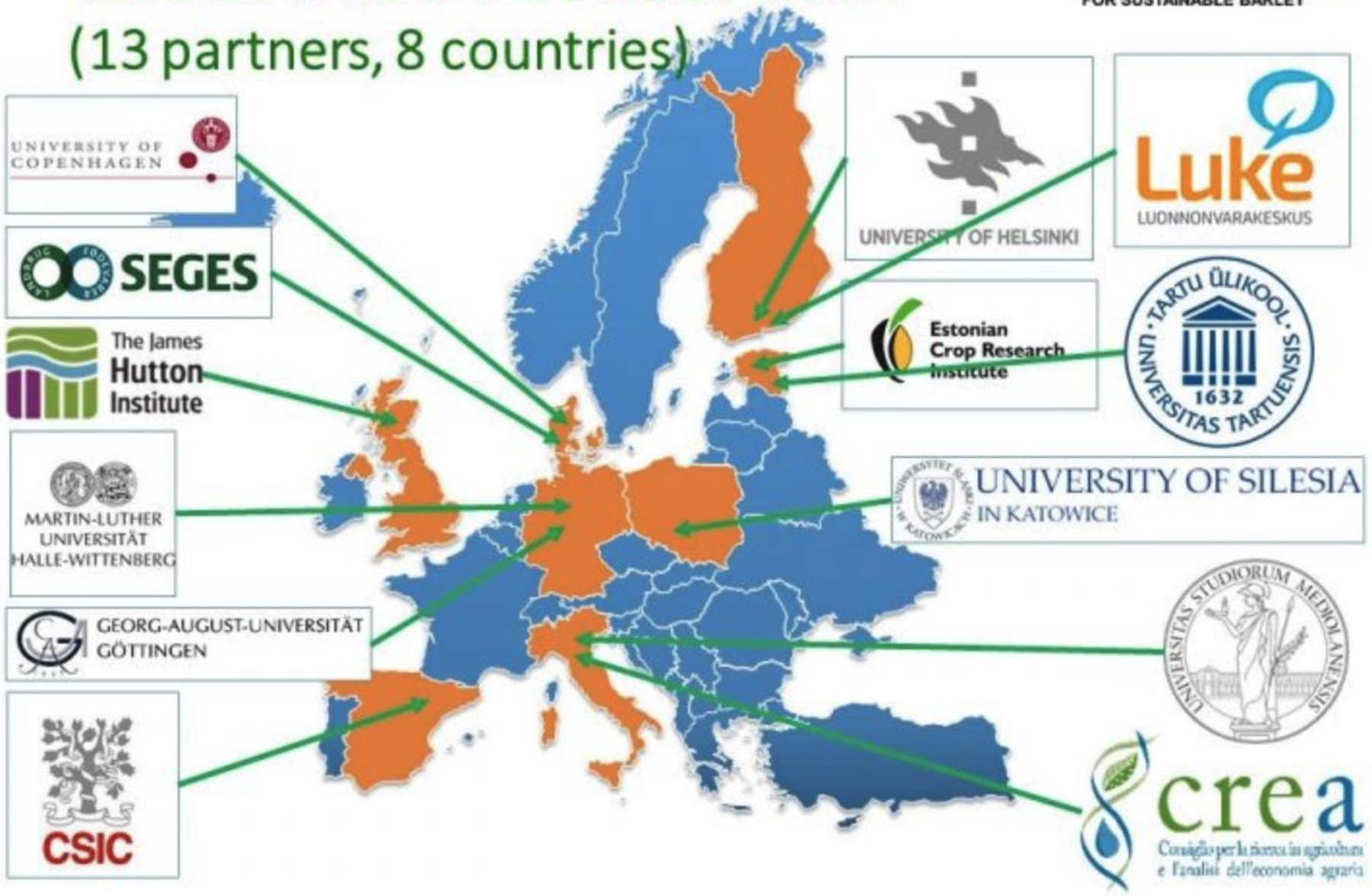
MAAELUMINISTEERIUM

Eesti
Taimekasvatuse
Instituut

The BARISTA Consortium

(13 partners, 8 countries)

barista
FOR SUSTAINABLE BARLEY



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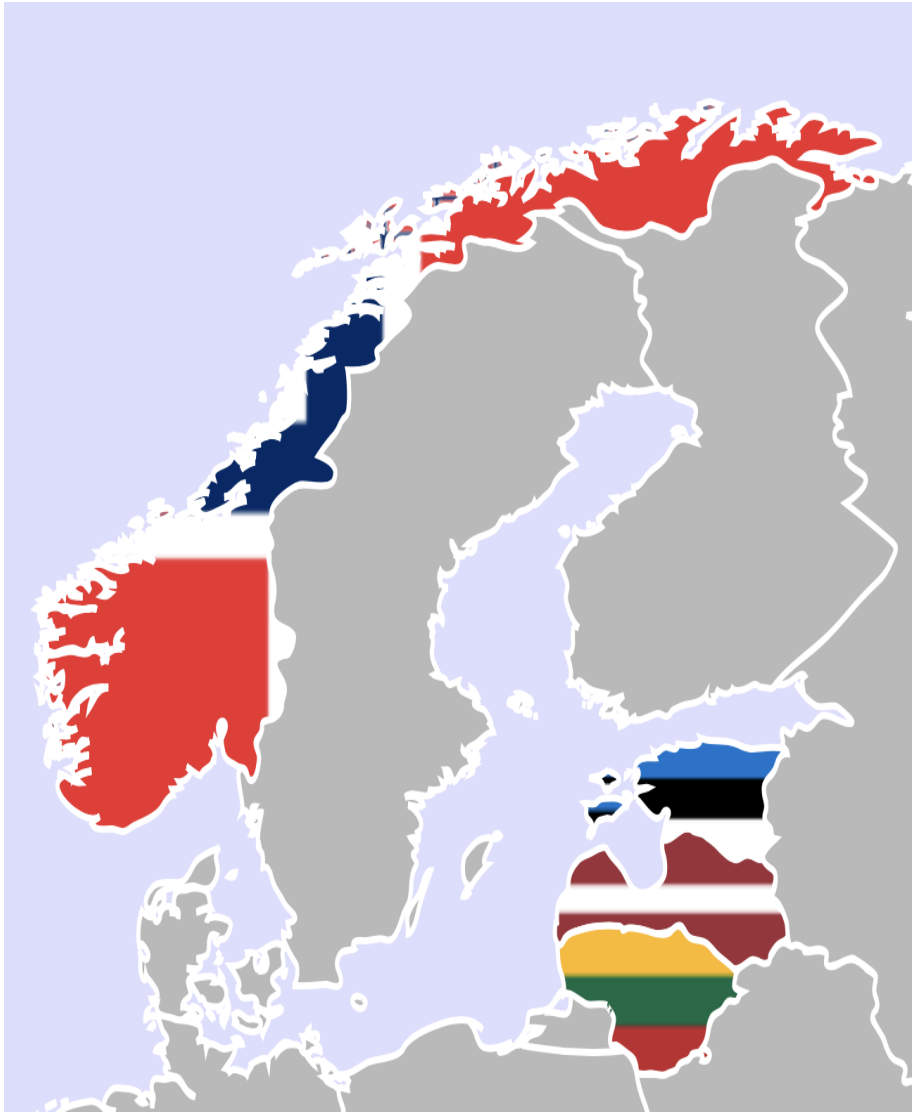
Iceland Liechtenstein Norway grants

NOBAL wheat

Breeding toolbox for sustainable food system of the Nordic-Baltic region



LAMMC
LITHUANIAN RESEARCH CENTRE FOR AGRICULTURE AND FORESTRY

Estonian Crop Research Institute

N M B U
Norwegian University of Life Sciences

TARTU ÜLIKOOL 1632 UNIVERSITAS TARTUENSIS

AREI

Põldkatsete prototüüp - KaRaL

Mõõdab taime transpiratsiooni, õhulõhede juhtivust ja CO_2 omastamist fotosünteesis

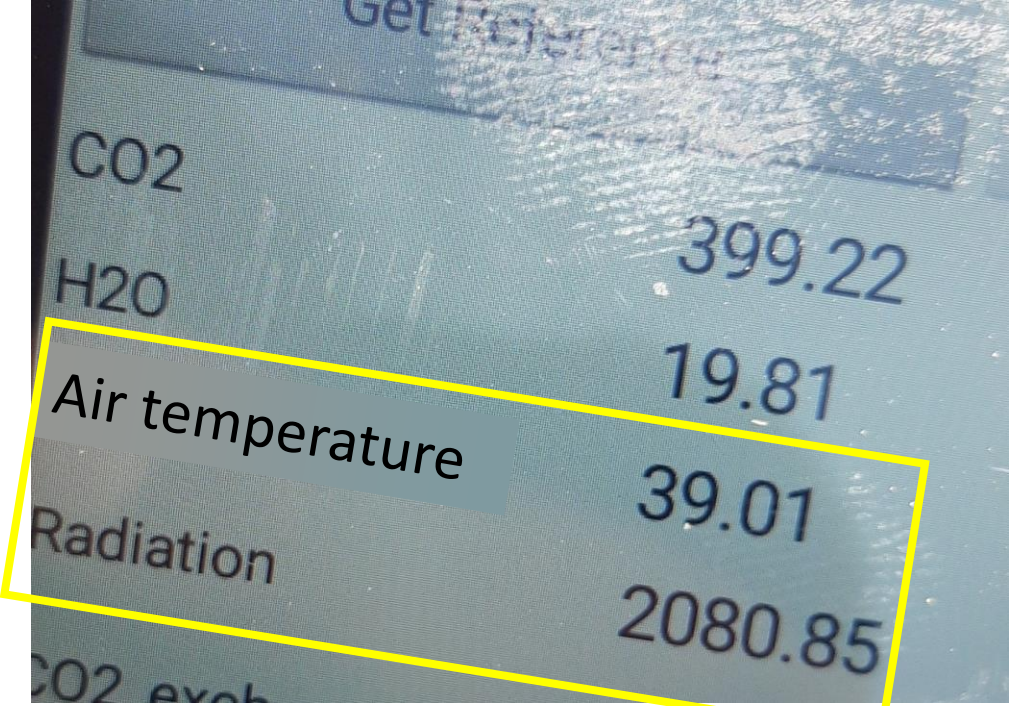
Lisaks mõõdab instrument lehe temperatuuri, valguse intensiivsust ja valideerib jooksvalt tulemuste kvaliteeti

1 taimelehe mõõtmiseks kulub – 8 sekundit.
1 katselapi mõõtmiseks (20-30 taimelehte) kulub 7-8 min

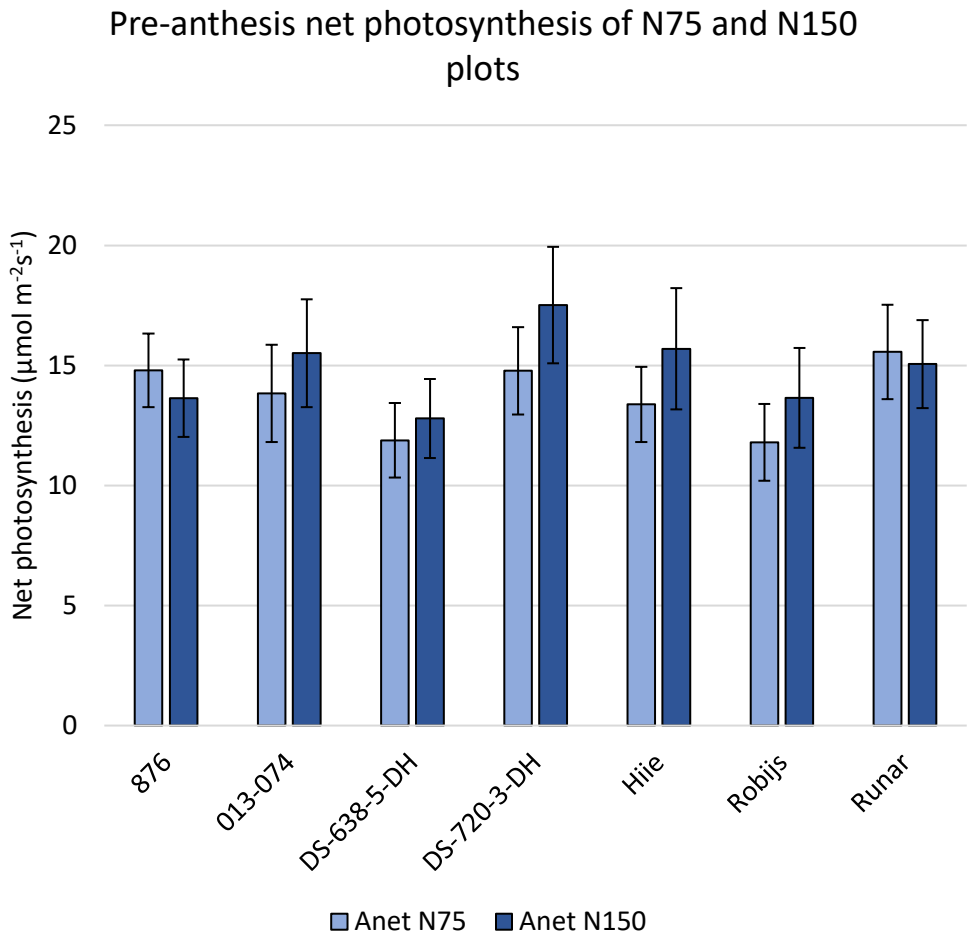
NOBALWheat – Norra, Läti, Leedu, Eesti nisusortide aretusprojekt

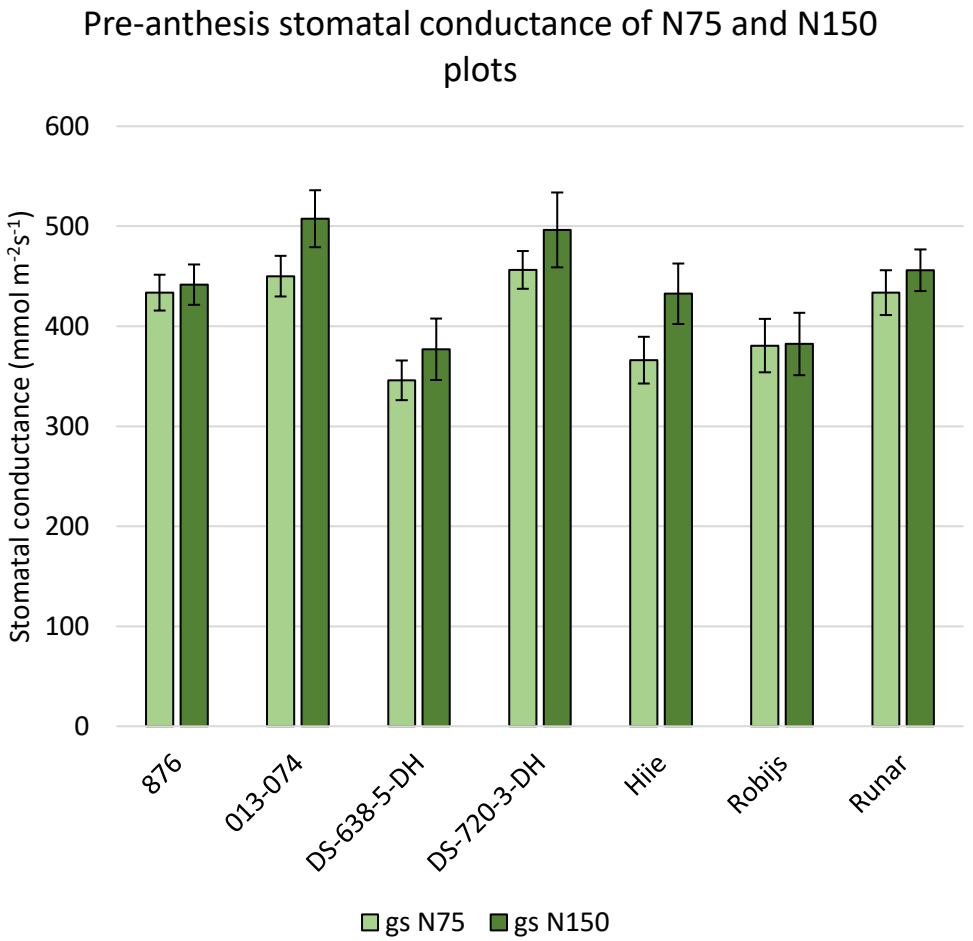
- ~75 nisu sorti kõigist osalevatest riikidest
- põldkatsed 300 sordiga, 3 aastat kõigis riikides
- erinevad analüüsid, TÜ teeb vee kasutuse ja fotosünteesi analüüse
  - 7 sorti
    - N75 and N150
      - 2 korduses

20 lehte igast katselapist, 8 minutid 1 lapi mõõtmiseks
Mõõtepäevadel uuriti 1000+ lehte

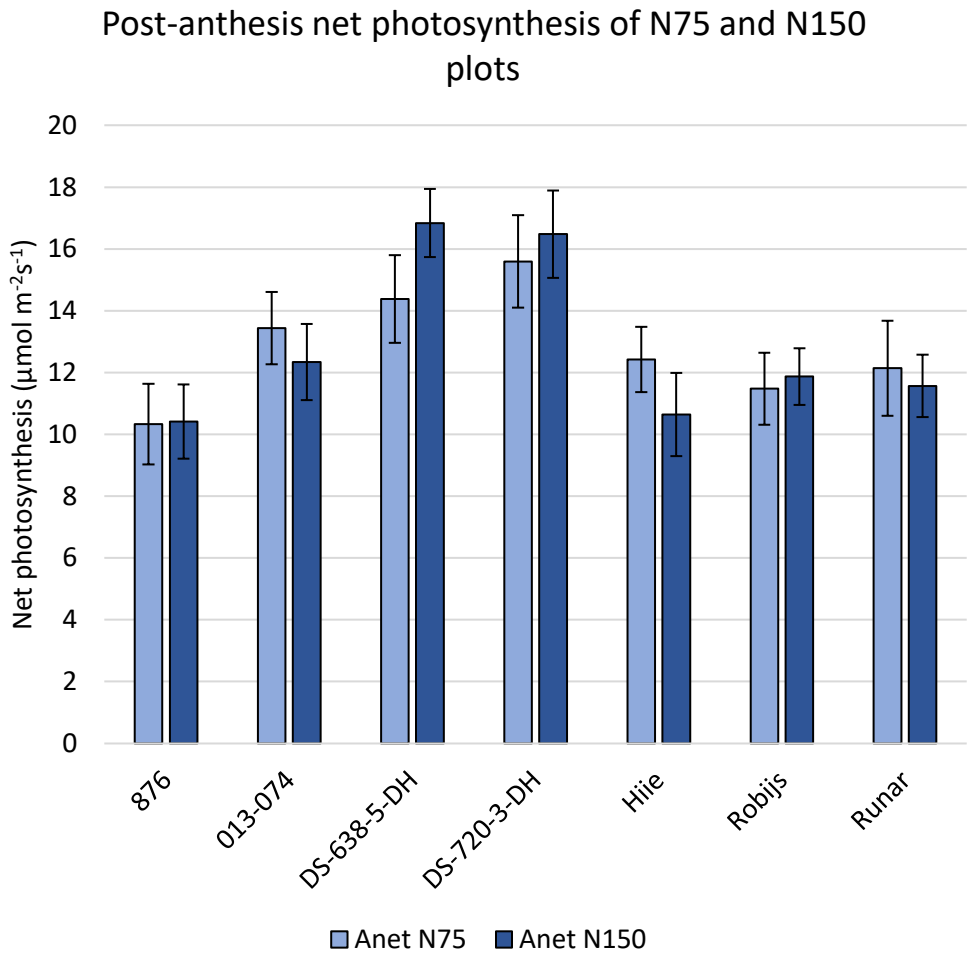

CO2
399.22
H2O
19.81
Air temperature
39.01
Radiation
2080.85

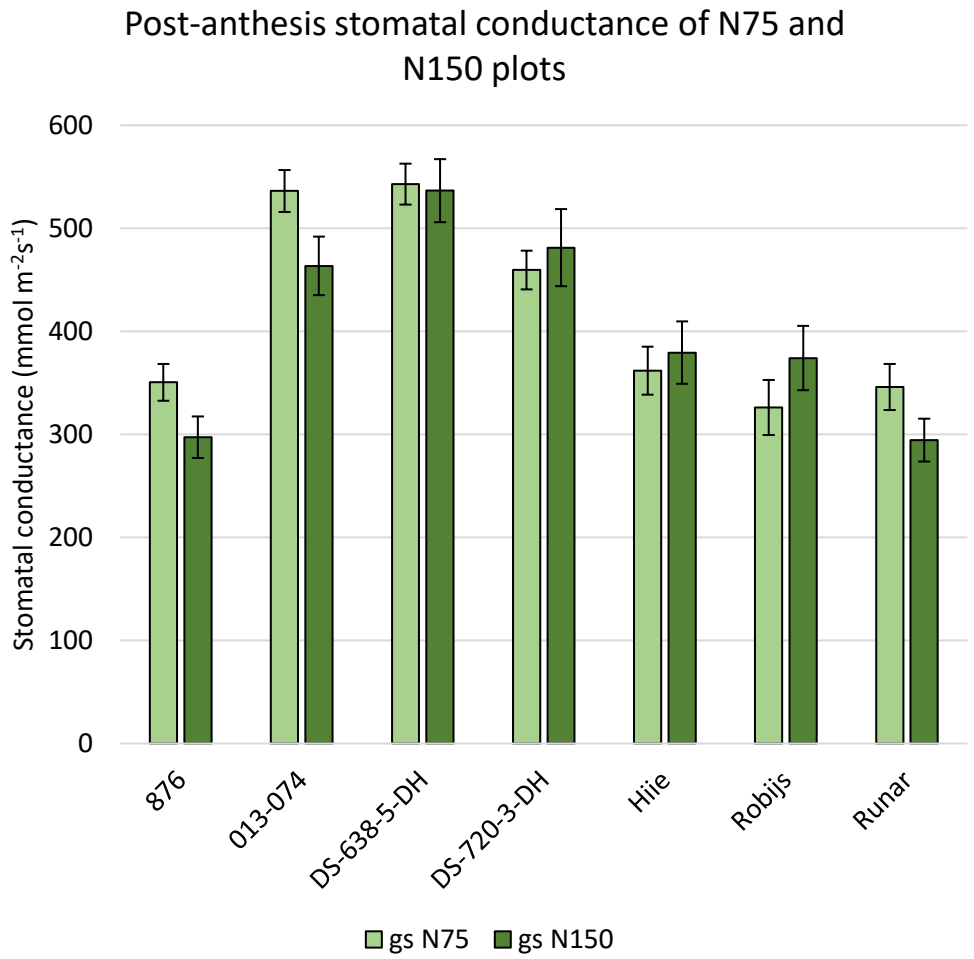
Nisu gaasivahetuse tulemused – enne õitsemist



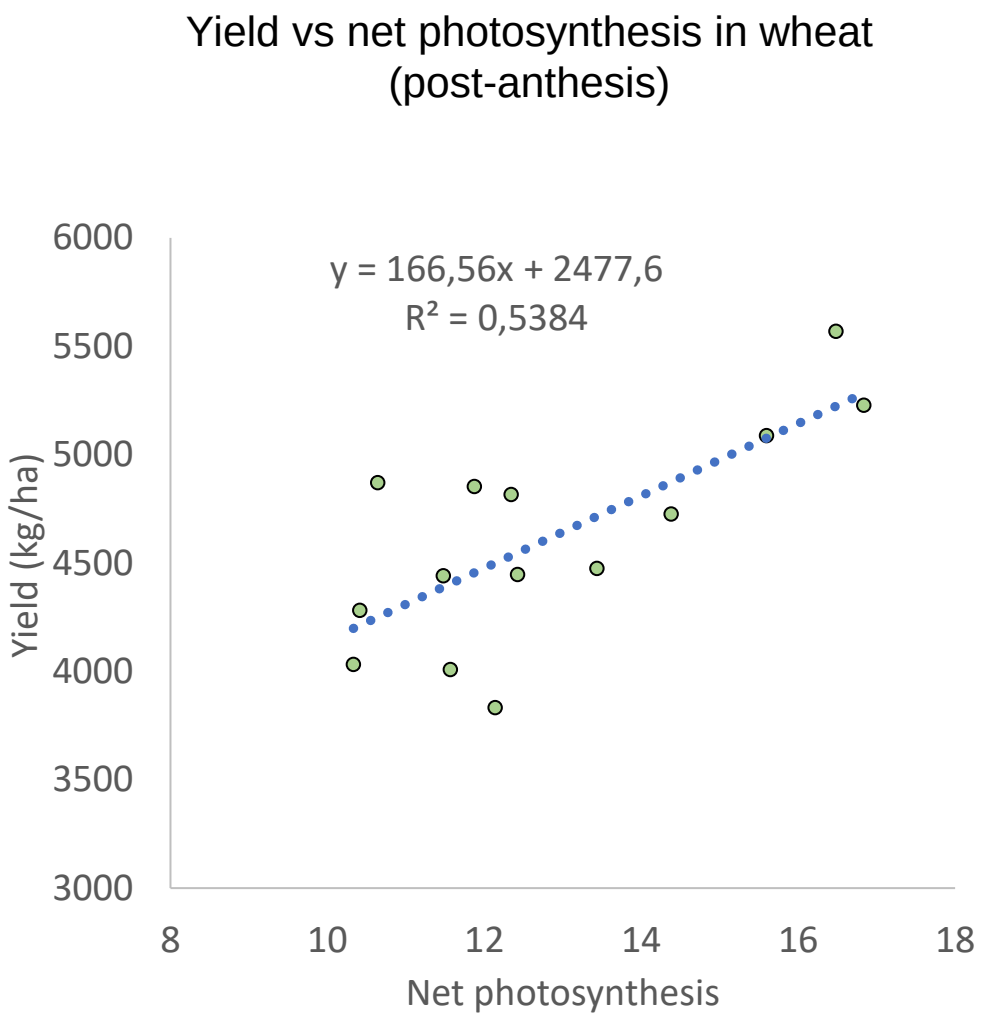


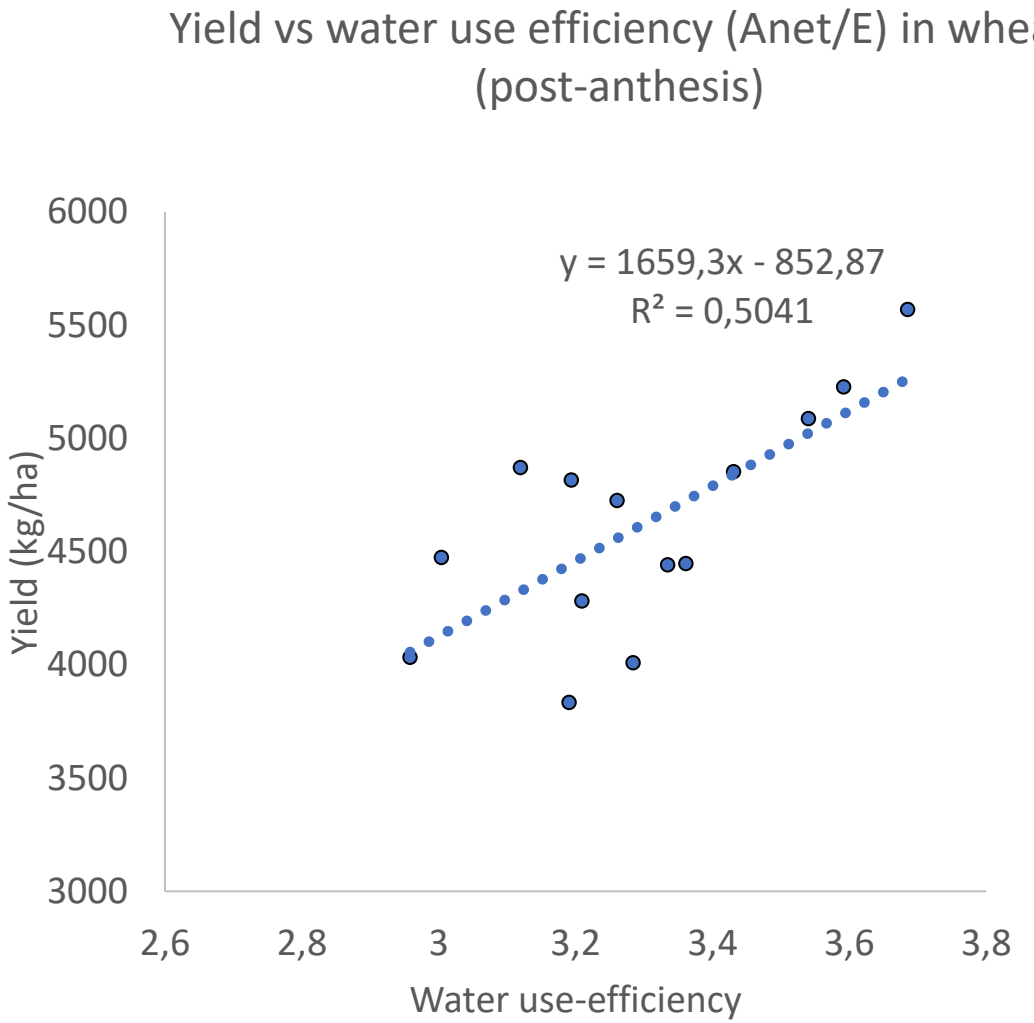
Nisu gaasivahetuse tulemused – peale õitsemist





Nisu gaasivahetuse tulemuste korrelatsioon saagiga





BARISTA Field gas exchange experiments

Egon Meigas, Ebe Merilo, Hannes Kollist, Tartu 2021

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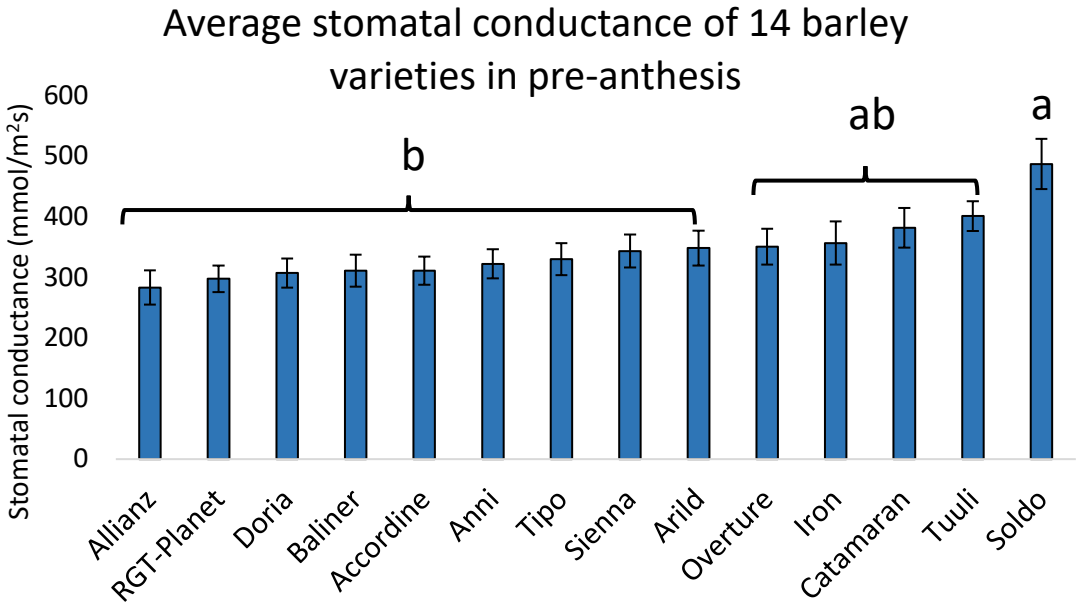
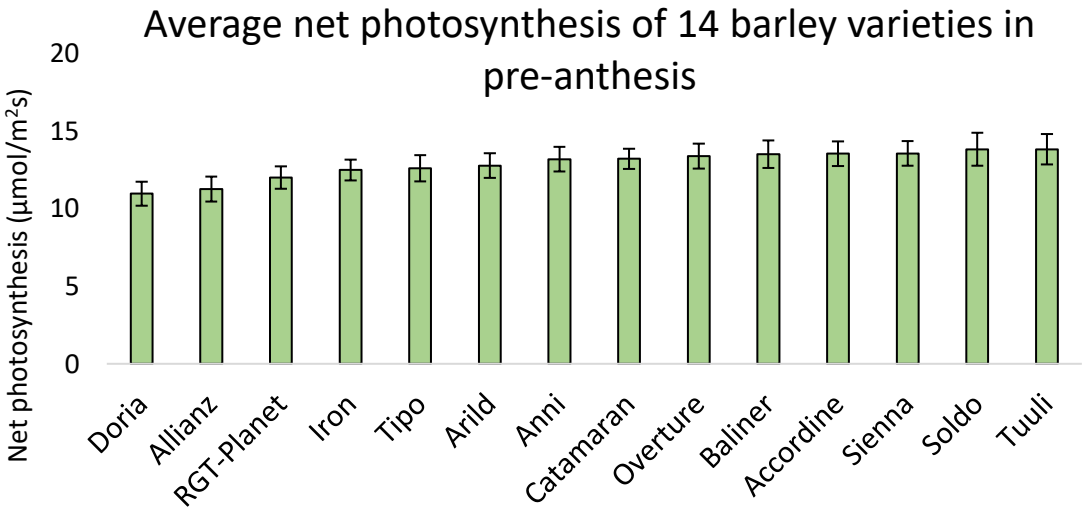
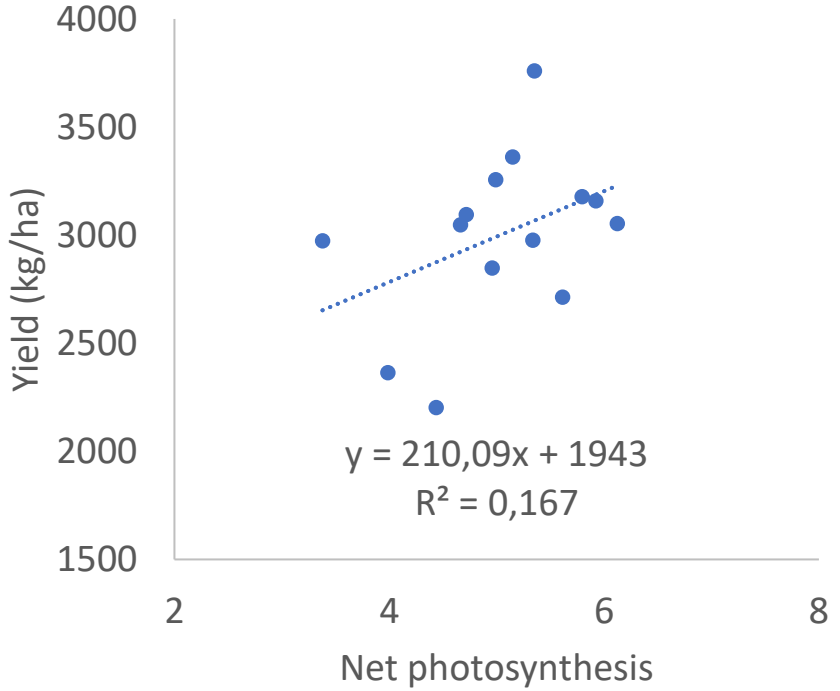
barista
FOR SUSTAINABLE BARLEY

Preliminary results 2021

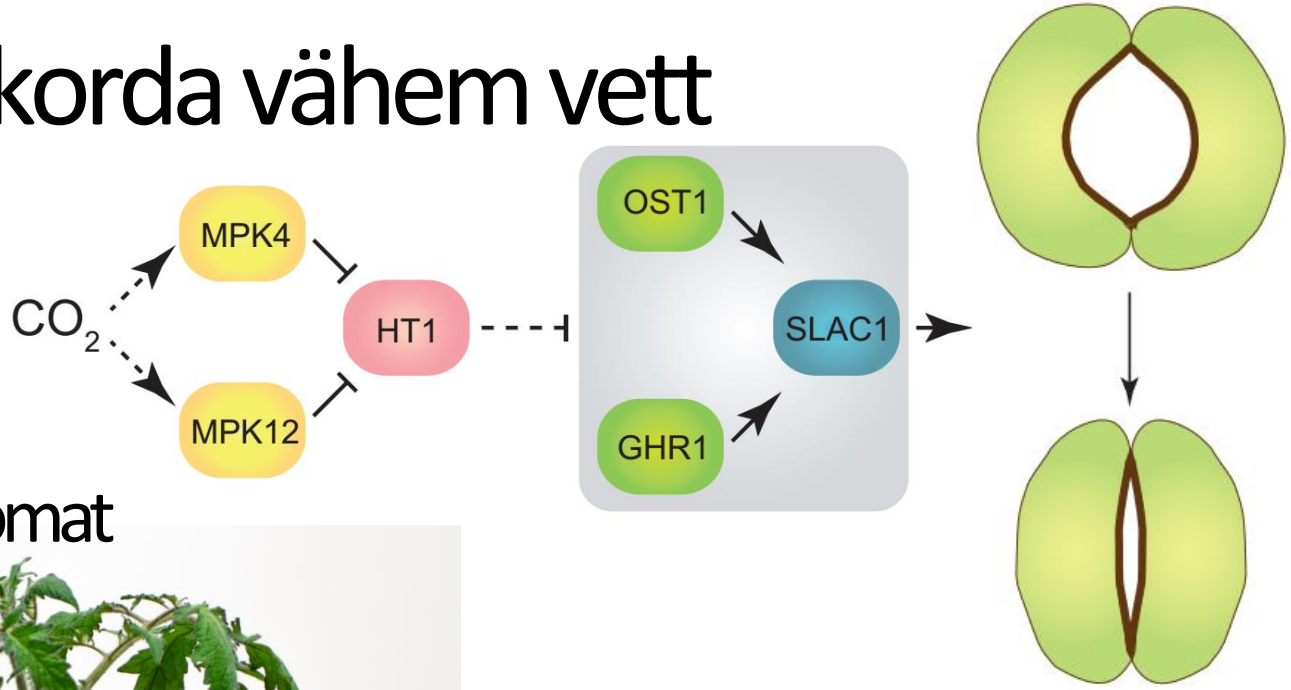






Enhanced senescence due to abiotic and biotic stresses

Tomatitaimed, mis tarbivad 2 korda vähem vett



Tavaline tomat

CRISPR tomat

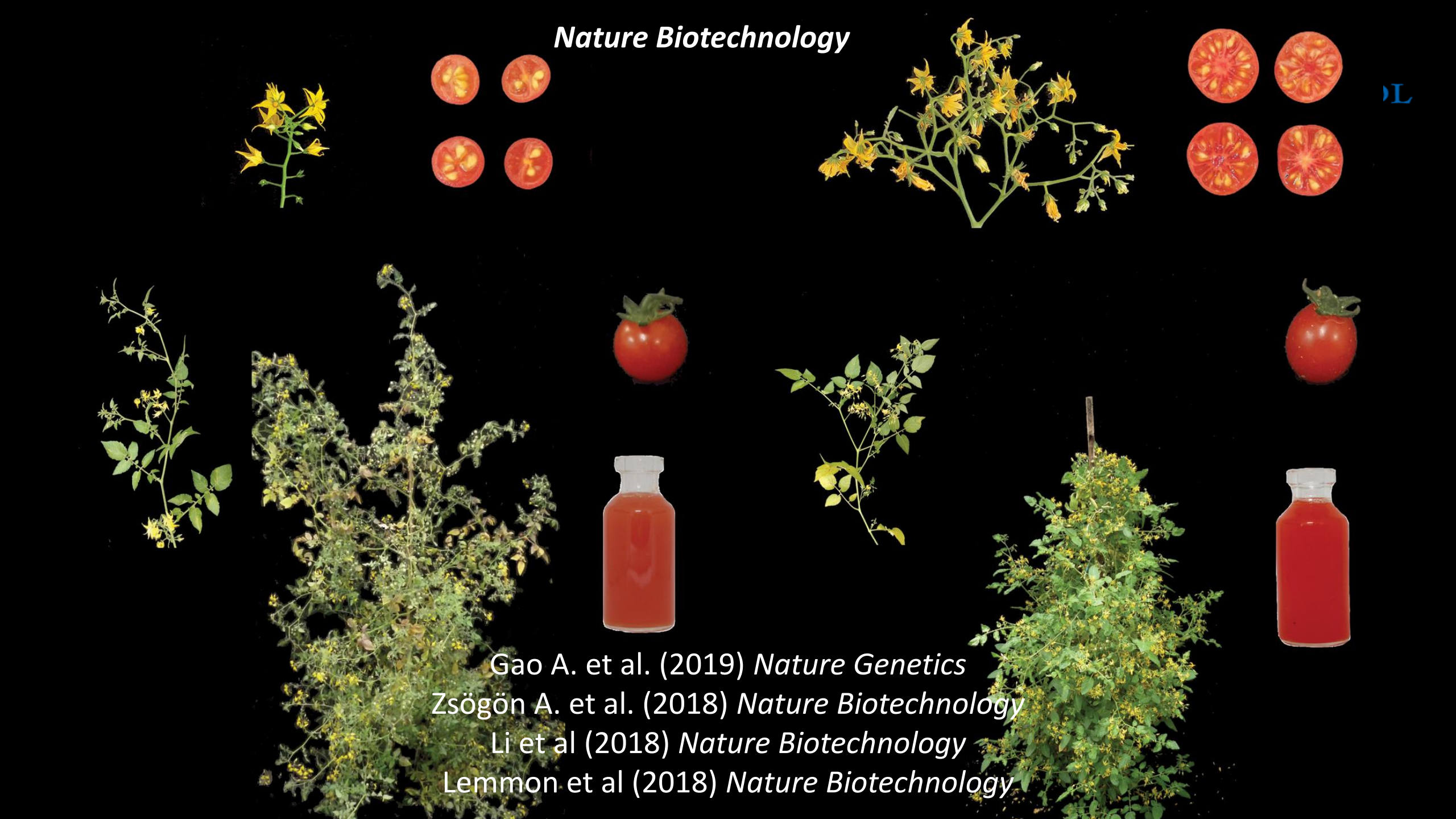
Vahisalu et al. 2008 *Nature*
Jakobson et al. 2016, *PLOS Biology*
Hõrak et al. 2016, *Plant Cell*
Tõldsepp et al. 2018, *Plant Journal*
Merilo et al. 2018 *Plant Phys*
Hsu et al. 2018 *PNAS*
Zhang et al. 2018, *Current Biology*
Sun et al. 2019 *PNAS*
Kollist et al. 2020 *Trends in Plant Science*
Dittrich et al. 2020, *Nature Plants*

Triinu Arjus, Kaspar Koolmeister & Collaboration prof Jörg-Peter Schnitzler

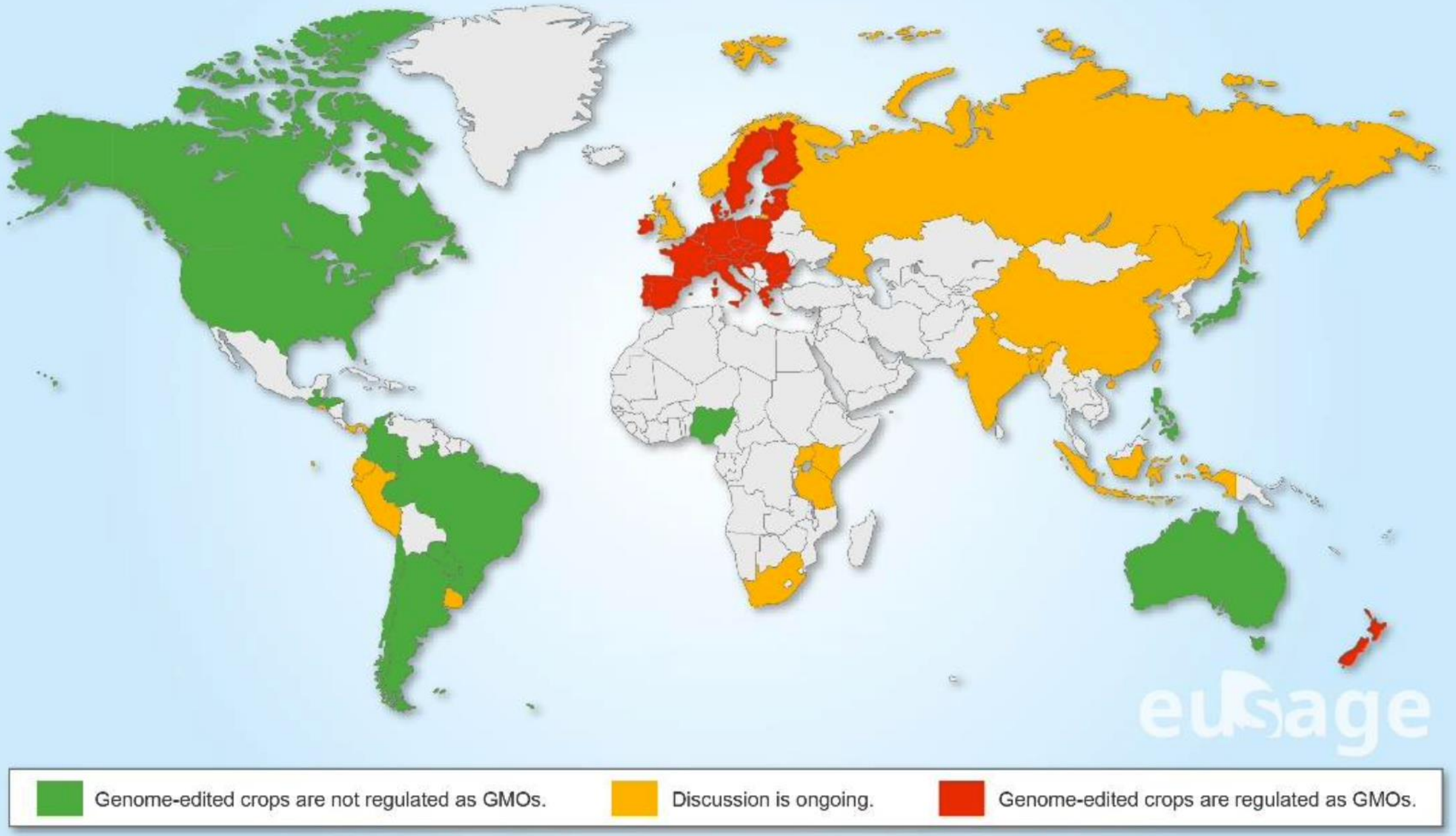
Finally! A way to return flavor to bland tomatoes

Scientists have discovered a rare gene that could help "make tomatoes great again"... or at least taste less bland.

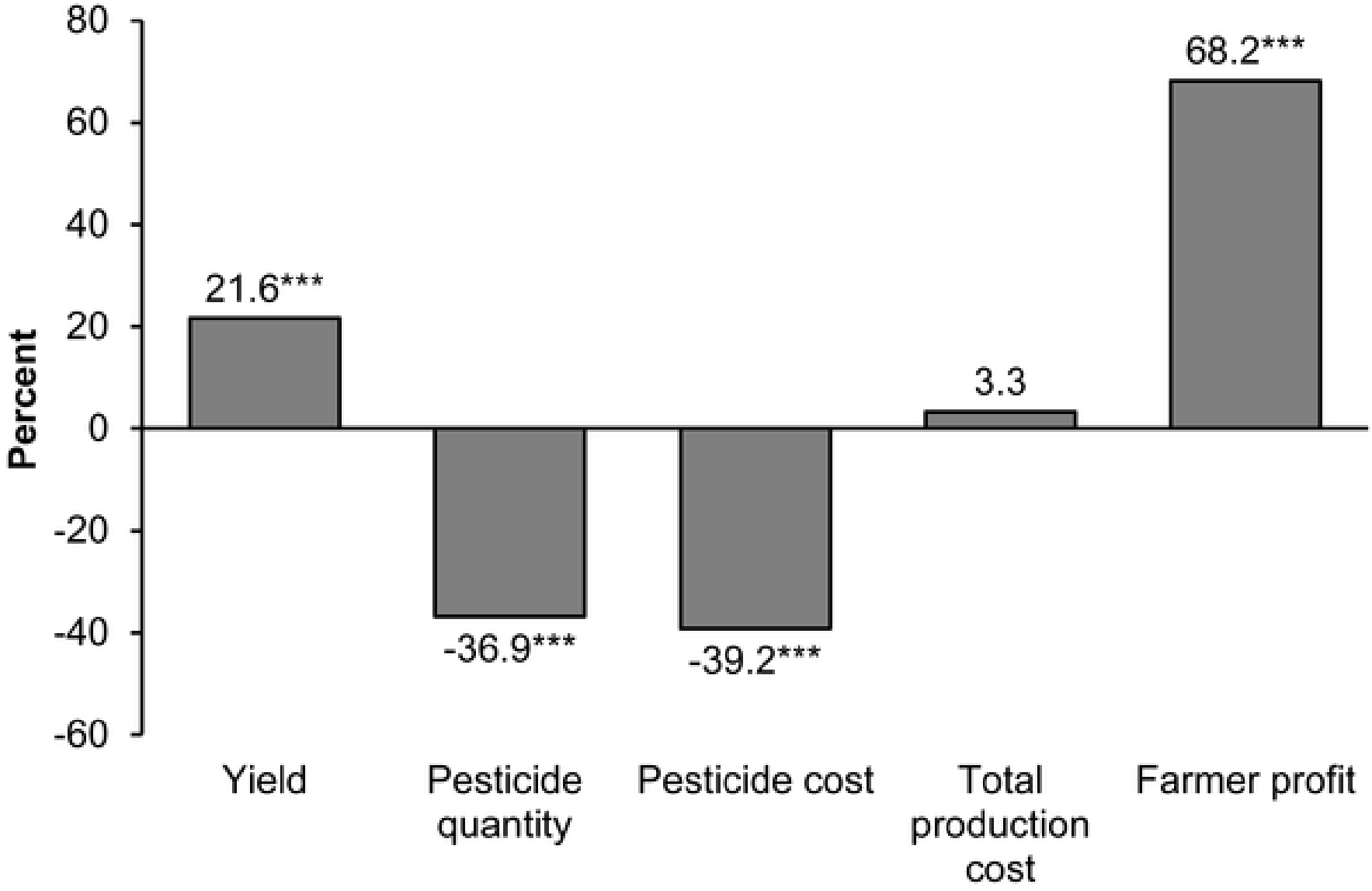
https://www.dw.com/en/finally-a-way-to-return-flavor-to-bland-tomatoes/a-48732899


Nature Biotechnology
Gao A. et al. (2019) Nature Genetics
Zsögön A. et al. (2018) Nature Biotechnology
Li et al (2018) Nature Biotechnology
Lemmon et al (2018) Nature Biotechnology

Genoomide editeermine ja geneetiline modifitseerimine



GM-taimede kasutamise mõju – 114 uuringut koondav metaanalüüs

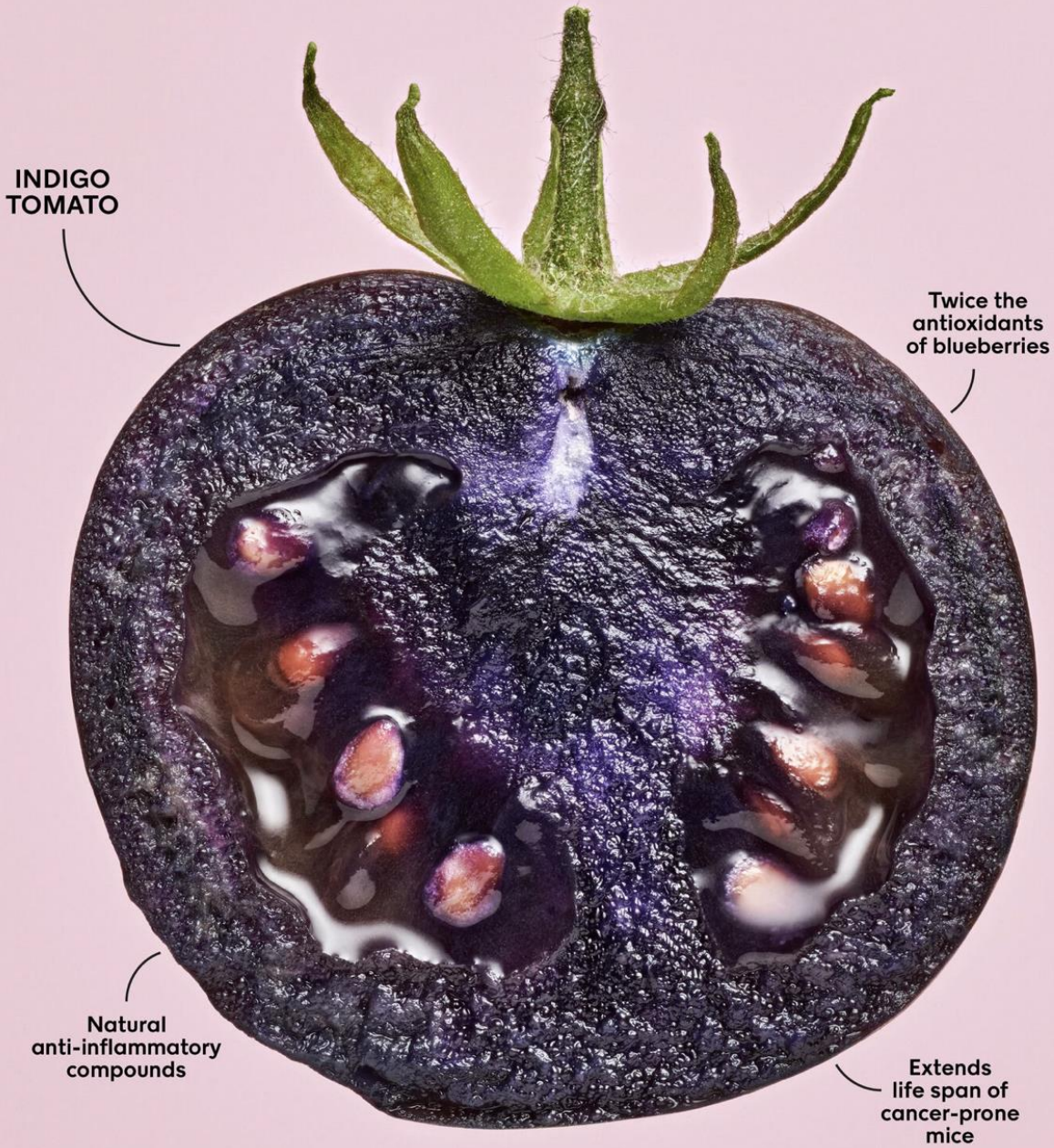


Klümper W, Qaim M (2014) A Meta-Analysis of the Impacts of Genetically Modified Crops. PLOS ONE 9(11): e111629.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0111629

The New York Times Magazine

Learning to Love G.M.O.s

Overblown fears have turned the public against genetically modified food. But the potential benefits have never been greater.



Taimsete signaalide uurimisrühm

www.taimebioloogia.ee

www.plantsignalresearch.com

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barista FOR SUSTAINABLE BARLEY

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