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Can ancient crops benefit modern food system?

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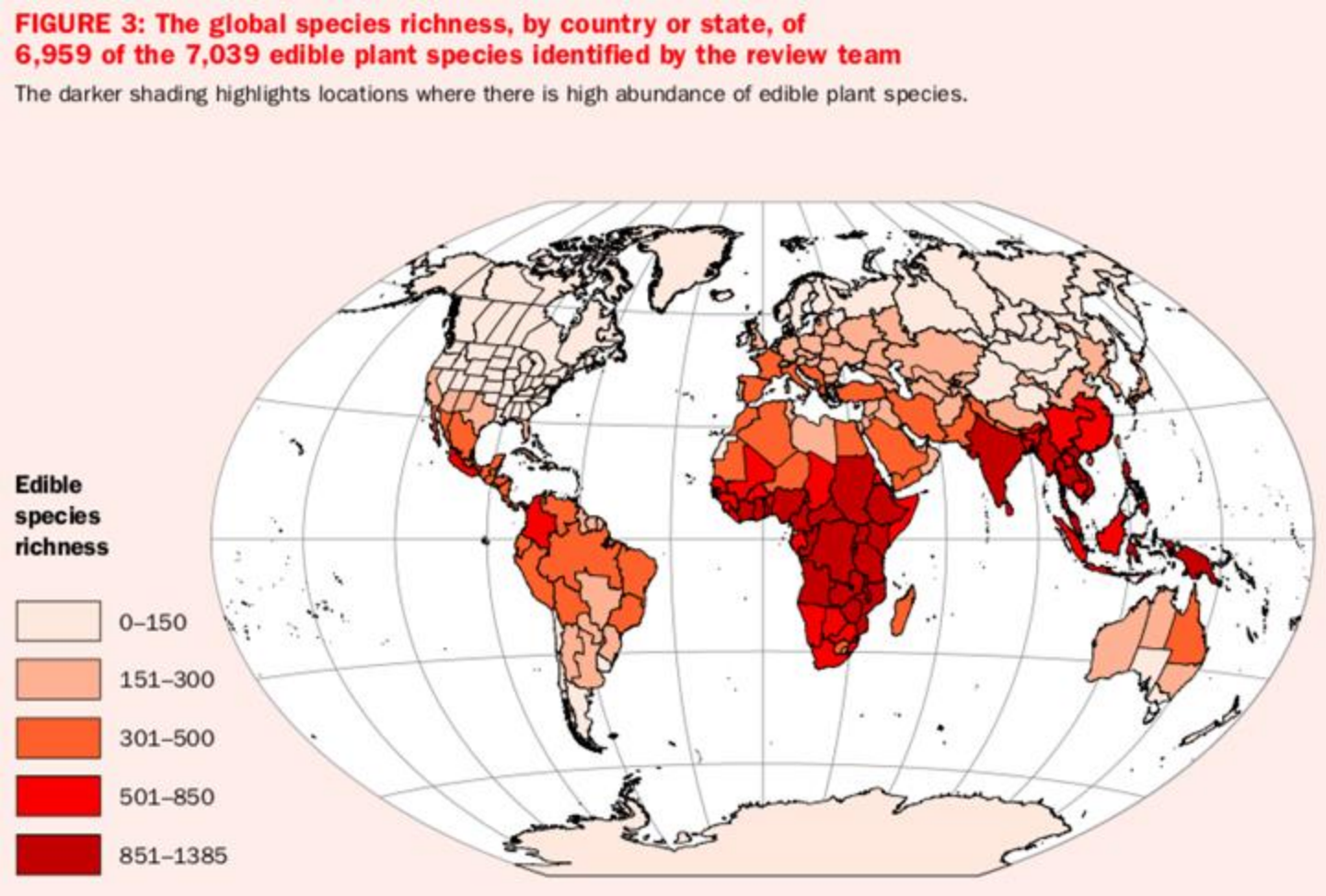
Forgotten, neglected, underutilised, orphan legume crops

- **95%** of calories from **30 crop species** (Dwivedi et al, 2017, *Trends in Plant Sci*)
- **625** of 7039 edible species are **legume** plants (highest for any plant families)



Kew State of the World's Plants and Fungi, 2020

Legumes are **high** in sustainable protein due to nitrogen fixation

- Legumes can fix nitrogen with symbiotic soil bacteria (rhizobia)
- House these symbiotic bacteria in root nodules
- Do not need nitrogen fertilisers to grow if the right bacteria are in the soil

https://www.manitobapulse.ca/2019/03/assessing-soybean-nodulation/
https://www.sciencelearn.org.nz/resources/966-the-role-of-clover

Neglected legume: fava/broad bean (*Vicia faba*)

- Neglected legume crop in Europe
- Known as “Celtic bean”
- Functional food for mental health

How fava beans could become the next big thing in plant protein

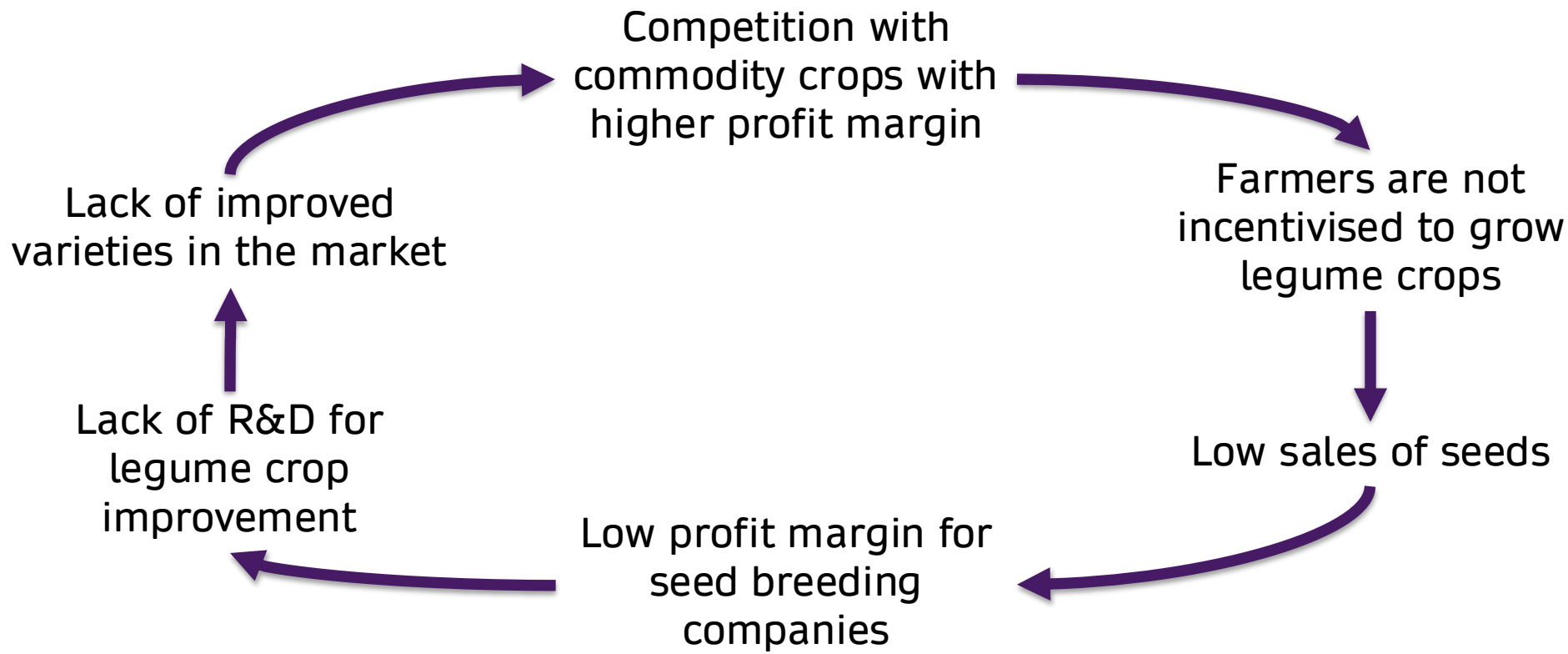
The pulses are making high-profile appearances in products such as Beyond Chicken, and new research and facilities could elevate the ingredient's quality and reach.

Published Jan. 13, 2022

Megan Poinski
Senior Reporter

Vicia faba in flower, from Prof. Dr. Otto Wilhelm Thomé Flora von Deutschland, Österreich und der Schweiz 1885, Gera, Germany (Public Domain; source biolib.de)

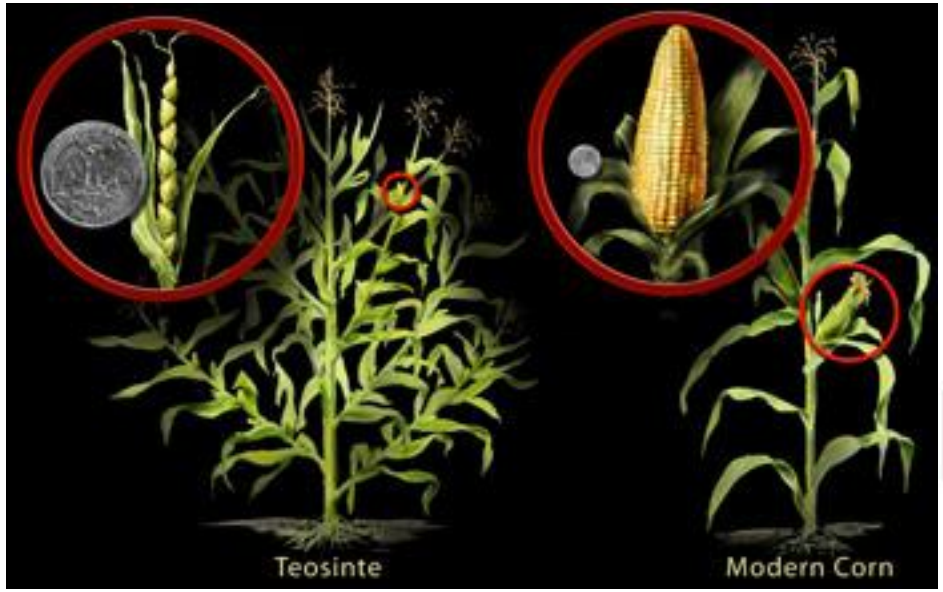
Vicious cycle of (lack of) fava bean improvement and low crop acreage



Plant biotechnology to accelerate crop improvement

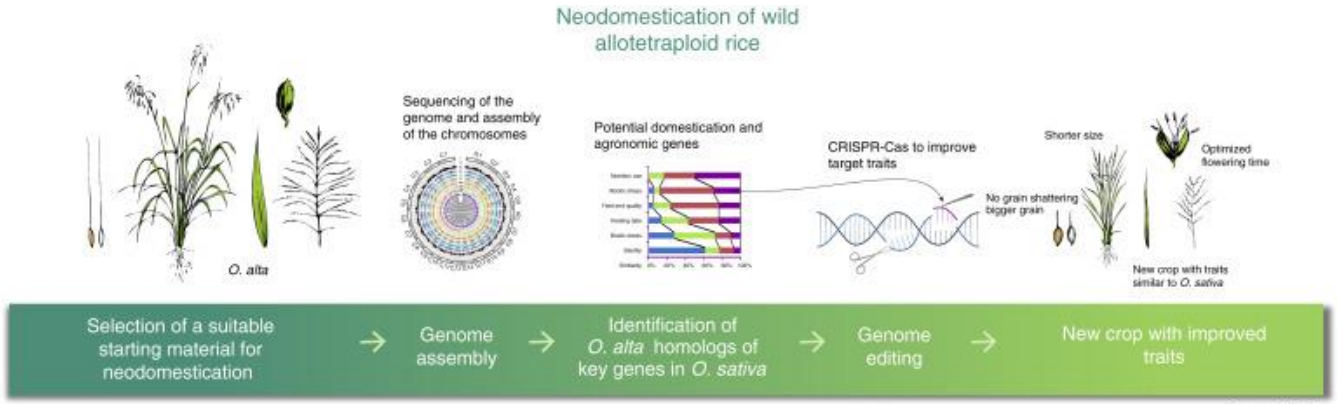
- Classical breeding is slow and tedious
- New genomic technologies (NGT) through gene-editing can improve crops faster

1500 years



https://www.nsf.gov/news/mmg/media/images/corn-and-teosinte_f.jpg

Few years



Fornasiero A, Wing RA, Ronald P. (2022) Rice domestication. Curr Biol, 32(1):R20-R24.

What can we do to utilise forgotten, neglected, underutilized, orphan crops?

- Accessible biotechnology
- Translation of findings from model plants to other crops
- Education to increase awareness

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Thank you

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