

# TRAITS FOR FUTURE CEREAL CROPS

Agriculture will need to become even more agile in the future: with pressure to reduce chemical inputs, genetic traits will have to do more of the heavy lifting.

Traits for future cereal varieties include:

- Yield and its components
- Enhanced, stable resistance to pests and diseases
- Increased resource-use efficiency
- Tolerance to abiotic stresses
- Weed competitiveness
- Enhanced nutritional value
- A good fit with future rotations and farming systems

NIAB is screening variety collections and our own diverse pre-breeding material to search for beneficial variation for these key traits, bringing together our experts in crop genetics, pathology, entomology, physiology and agronomy with other academic partners and industry stakeholders.

Figure 1. We have identified promising leads for genetic resistance to Yellow Wheat Blossom Midge, which is increasing in some areas as insecticides are withdrawn.



Figure 3. This 2020 pre-breeding trial was designed to measure yield and protein responses to reduced N inputs, but faced additional challenges due to late planting, high blackgrass pressure and spring drought. Repeated selection under tough conditions can help to identify more resilient varieties.



Figure 2. Grain Protein Deviation (GPD) measures the relationship between yield and grain protein. A recent FSOV collaboration identified NIAB pre-breeding lines with high GPD. These could help growers trim back N inputs whilst maintaining output, with important net-zero implications.

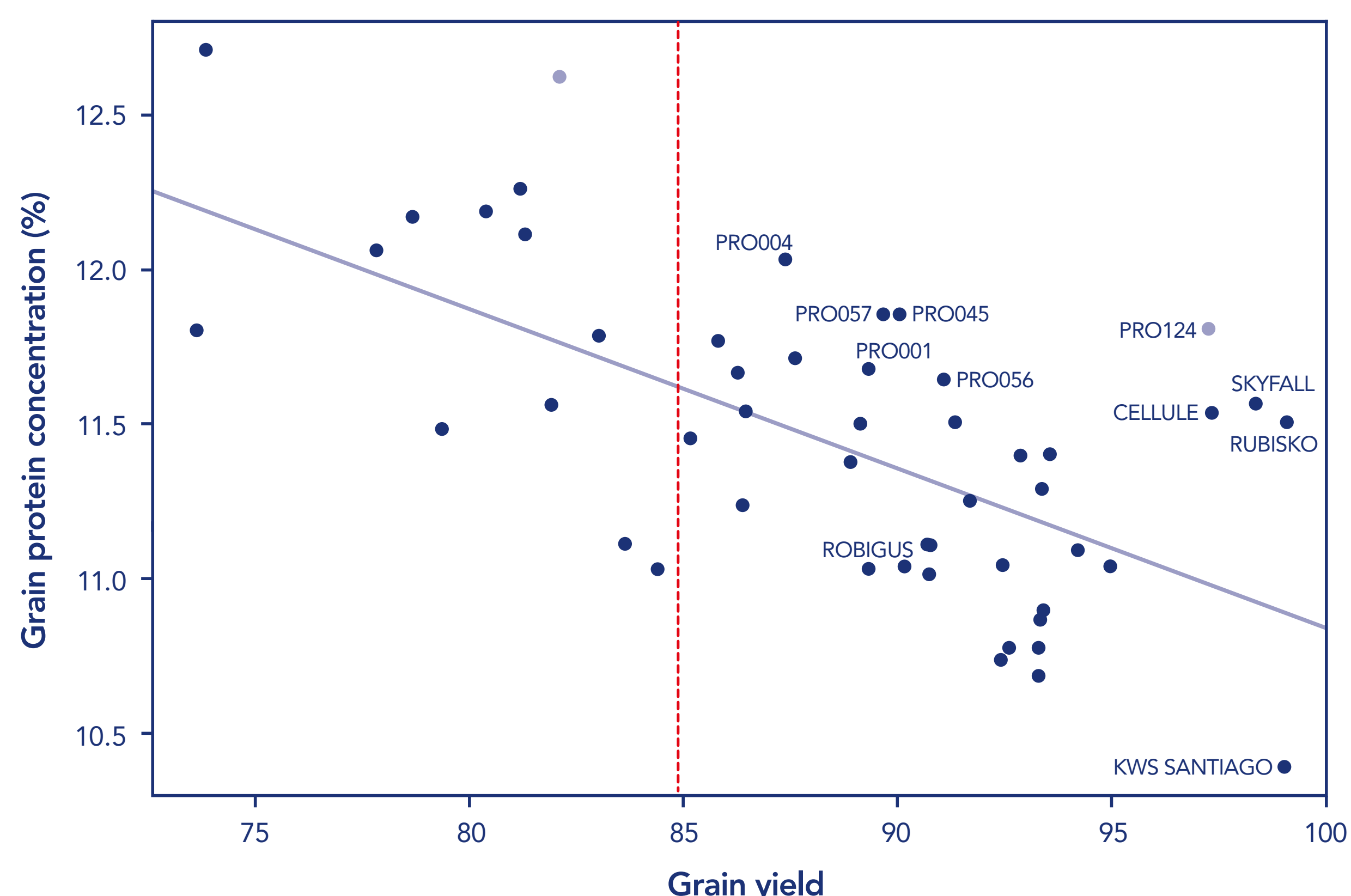


Figure 4. Naked barley (left) is well-suited to food uses and specialist types can offer increased fibre content or slower sugar release. Wheat nutritional targets include pigmented grains (right), improved mineral levels and higher fibre.

