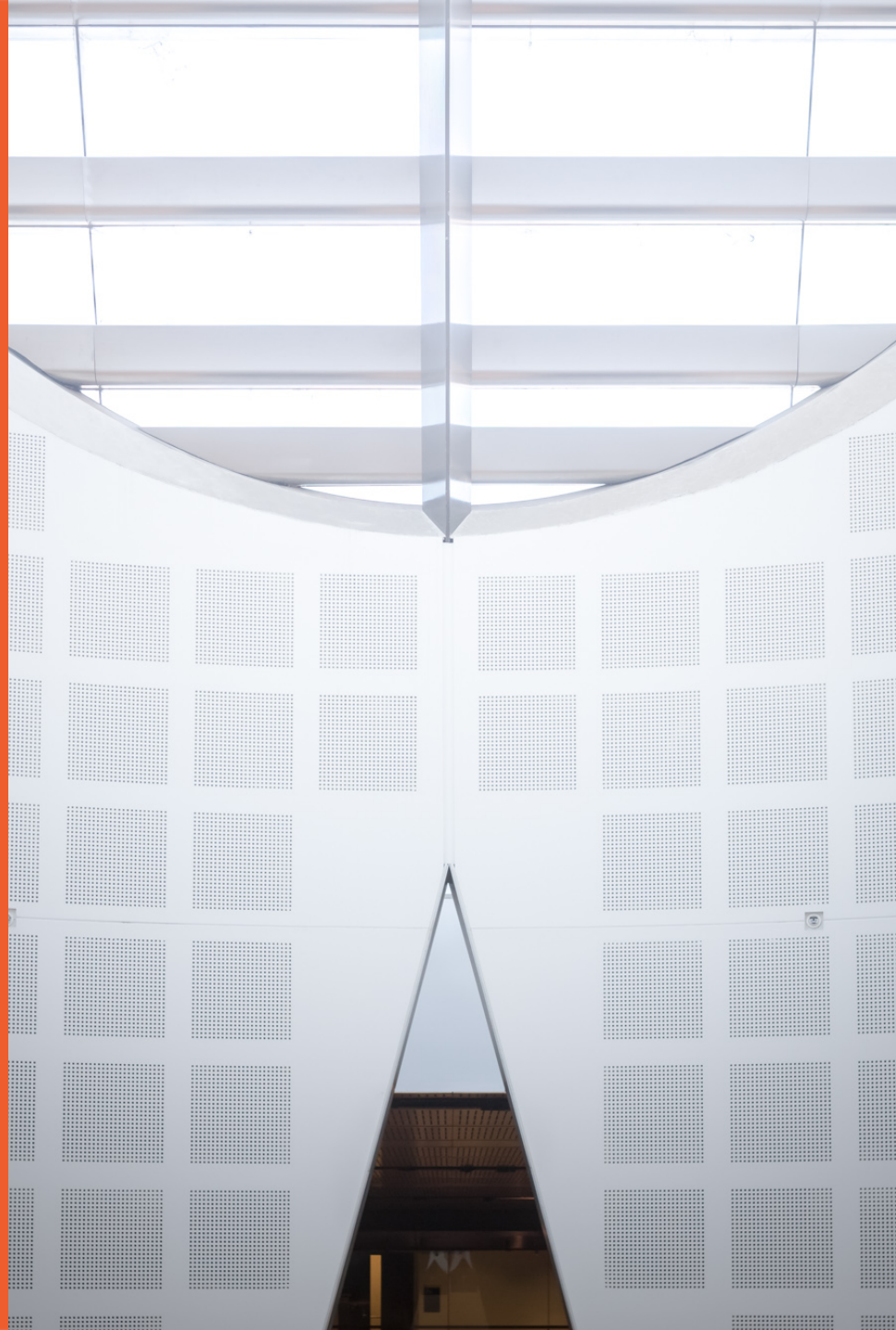


Saving Wheat from Rust Diseases

Presented by
Naeela Qureshi



THE UNIVERSITY OF
SYDNEY



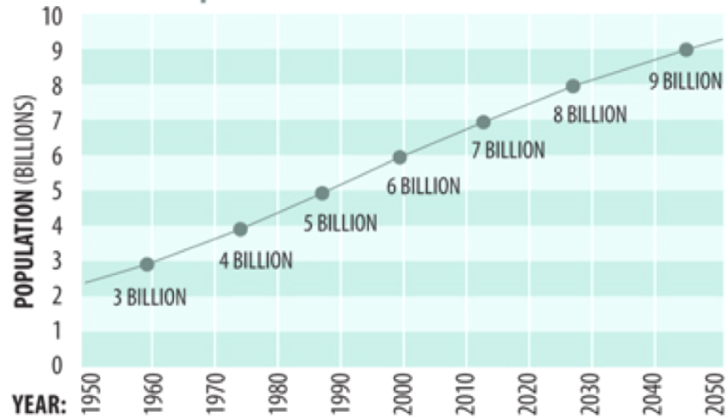
A wide-angle photograph of a vast, flat field of golden wheat stretching to the horizon. The sky is filled with large, white and grey clouds, with a bright light source (the sun) visible near the horizon, creating a lens flare effect. The wheat is in full bloom, with long, golden stalks and heads. The overall tone is warm and natural.

**“Without food, man can live at most but a few weeks;
without it, all other components of social justice are
meaningless”**

Norman Borlaug



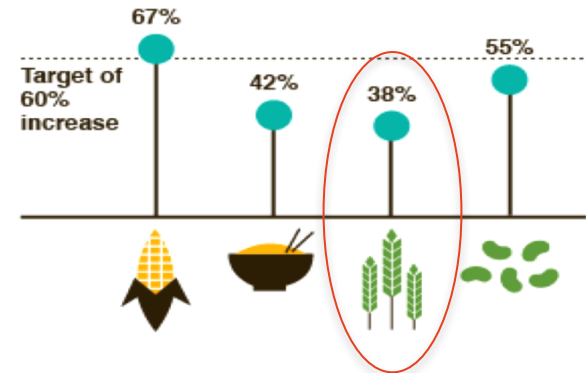
Food Security

World Population 1950–2050



Source: U.S. Census Bureau, International Data Base, June 2010 Update

Yields of maize, rice, wheat, and soybean all need to **INCREASE BY 60%**, by 2050 to meet demand but current growth in yield are falling short of the target.



In the year **2050**,
the world **population**
will require **100%**
more **food**,¹ and

Food Security



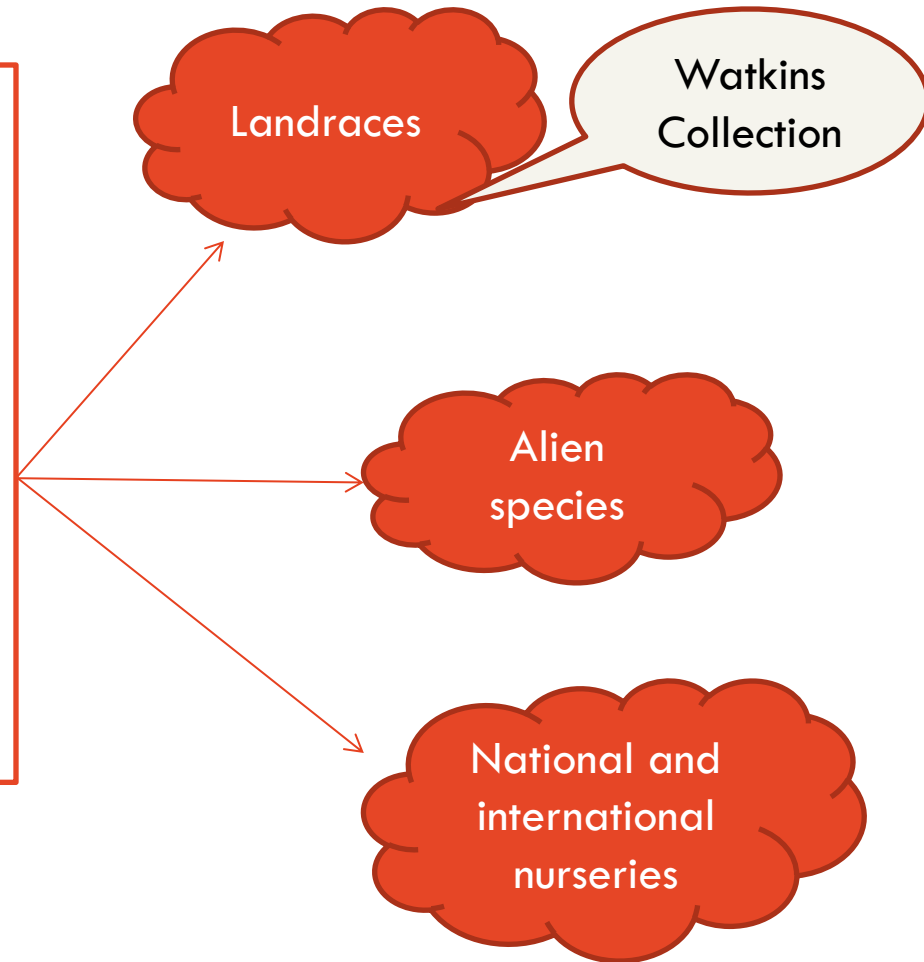
Wheat Rusts-No 1 Threat



Breeding for resistance is the best control strategy

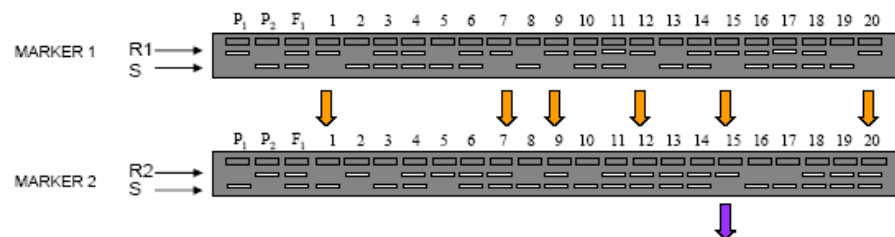
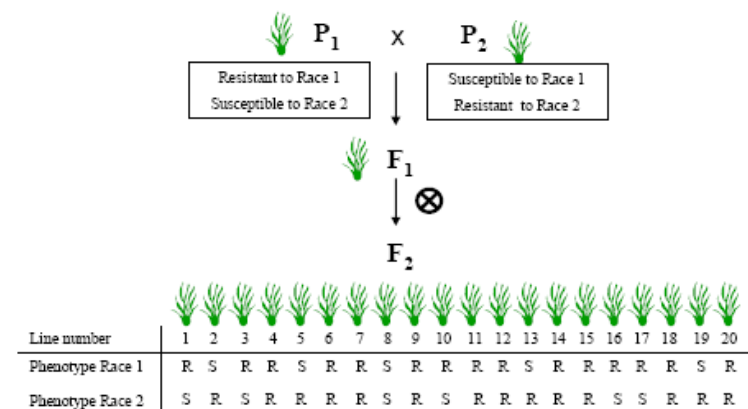
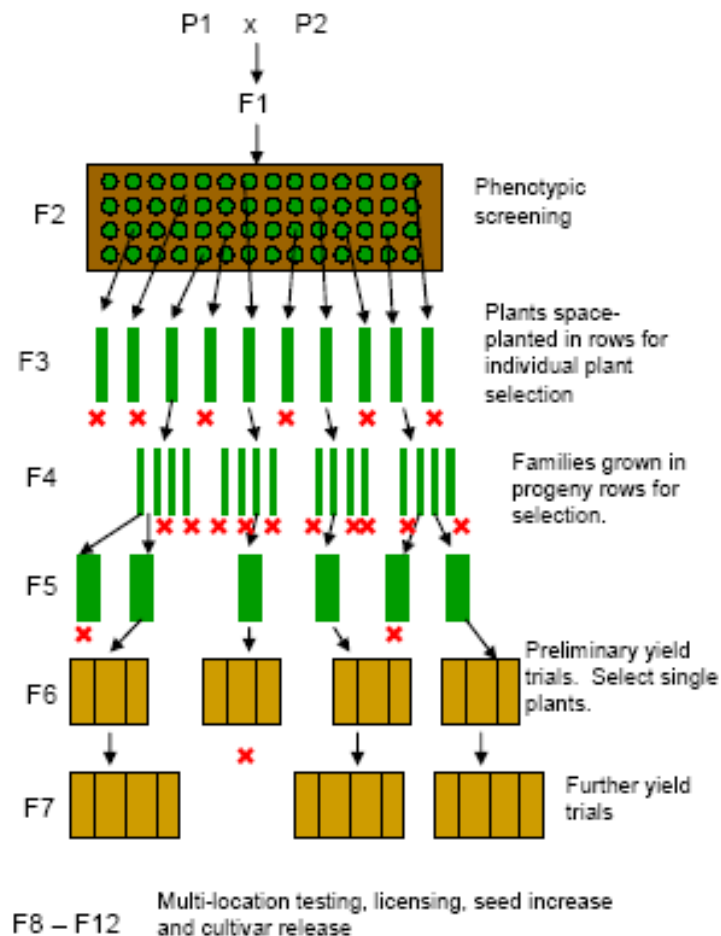
Genetic Control

There is a continuous need to identify, characterize and deploy diverse sources of resistance in wheat cultivars to combat highly evolving rust pathogens using combination of phenomic and genomic technologies



Classical Breeding and Marker-Assisted Breeding

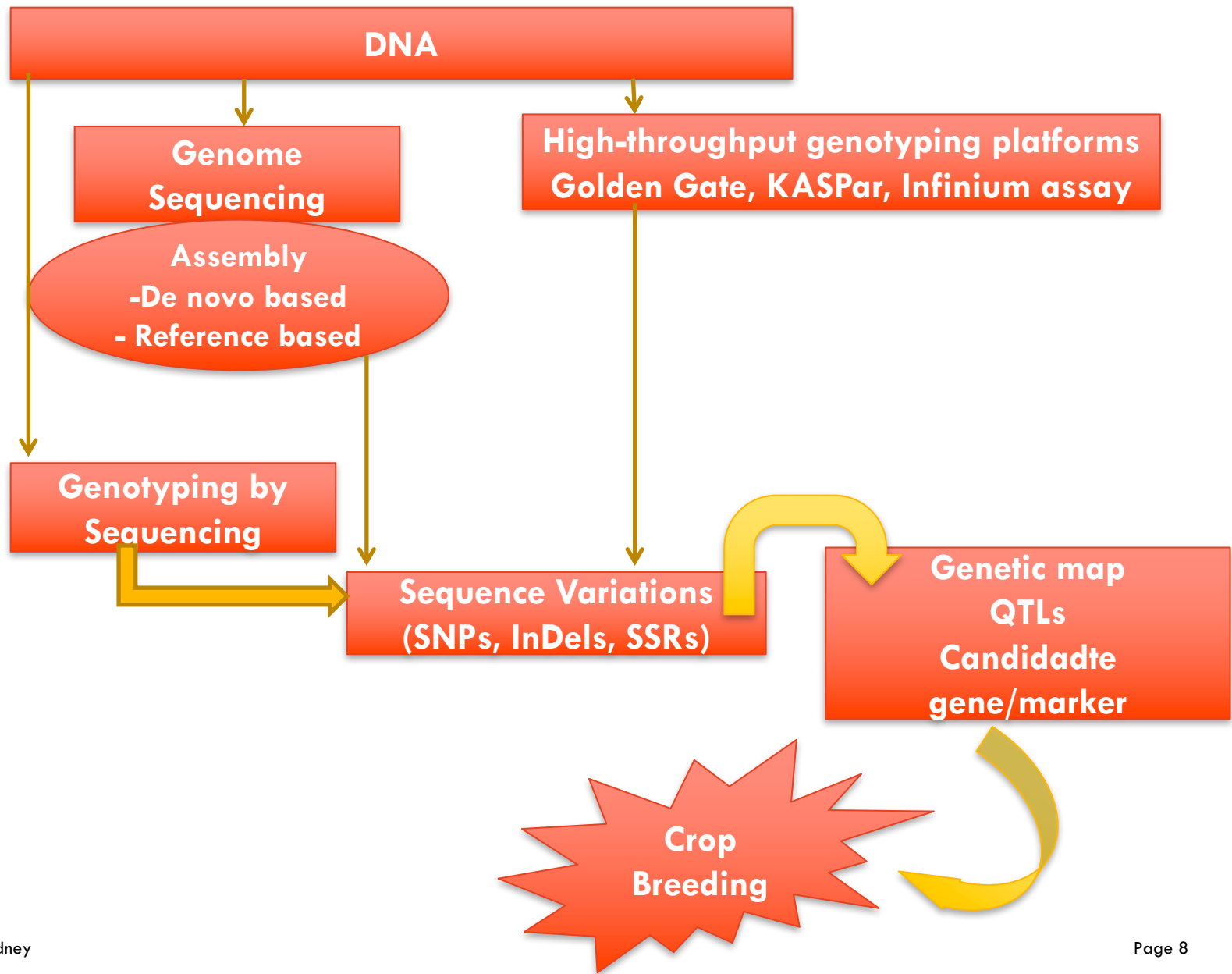
PEDIGREE METHOD



Marker assisted pyramiding of two disease resistance genes.

Note that homozygotes can be selected from the F₂ population

Marker Development Platforms



Examples of marker development using different resources

Gene	Linked marker	Resources used
Yr34	<i>sunKASP_112, sun712</i>	IWGSC_Refseq_v1.0
Yr47/Lr52	<i>sun180</i>	Survey sequences
Lr48	<i>IWB70147</i>	90 K Infinium assay
Lr49	<i>KASP_21</i>	Flow Cytometry
Lr61	<i>Sun683, sunKASP_60</i>	Survey sequences, Sanger sequencing
Lr79	<i>sun786</i>	Survey sequences

Deployment of Resistance Genes

