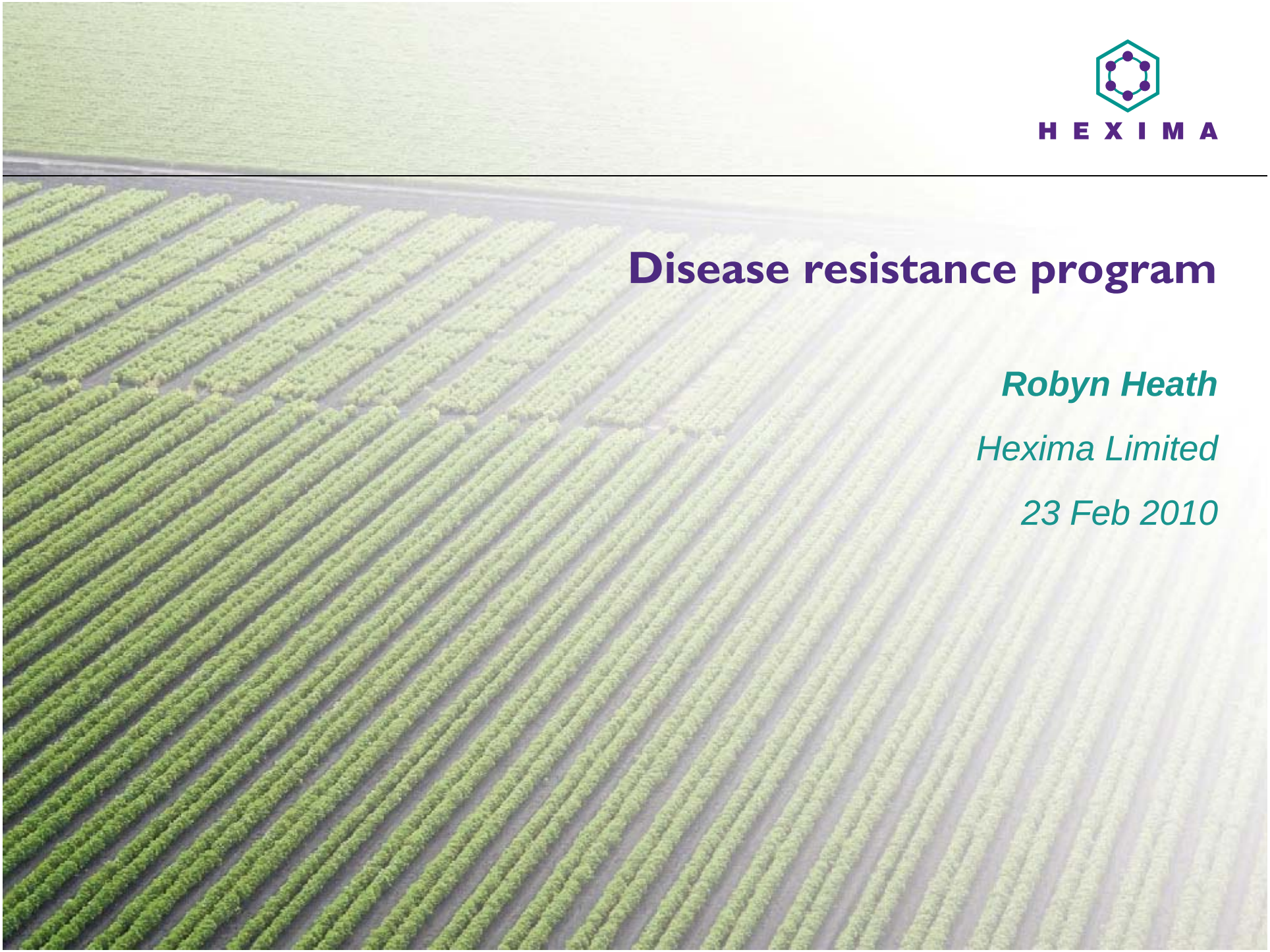


HEXIMA

Disease resistance program

Robyn Heath

Hexima Limited

23 Feb 2010

Who is Hexima?

- Hexima is an ASX listed agribusiness aiming to commercialize basic research in major global crops including corn, soy, canola and cotton
- Hexima was founded in the late 90's at The University of Melbourne
- Hexima listed on the Australian Stock Exchange in 2007, raising 5 years of funding
- Hexima research is contracted to three groups based at The University of Melbourne and La Trobe University
- Gene discovery - Marilyn Anderson (CSO)
- Product Development - Robyn Heath
- Pharmaceutical - Mark Hulett

Major projects

HEXIMA

- Disease resistance
  - corn and soybean (Pioneer)
  - cotton
  - canola
- Insect resistance
  - Climate Ready grant
- MGEV-multigene expression vehicle
  - Research licences with Pioneer and Monsanto
- Pharmaceutical applications

Research and Development

La Trobe University

Gene discovery

The University of Melbourne

Gene constructs & plant analysis
Cotton & canola transformation

Molecules → Proof of concept in transgenic plants

Research and Development

New Hexima glasshouse and tissue culture facility
R&D Park, La Trobe University

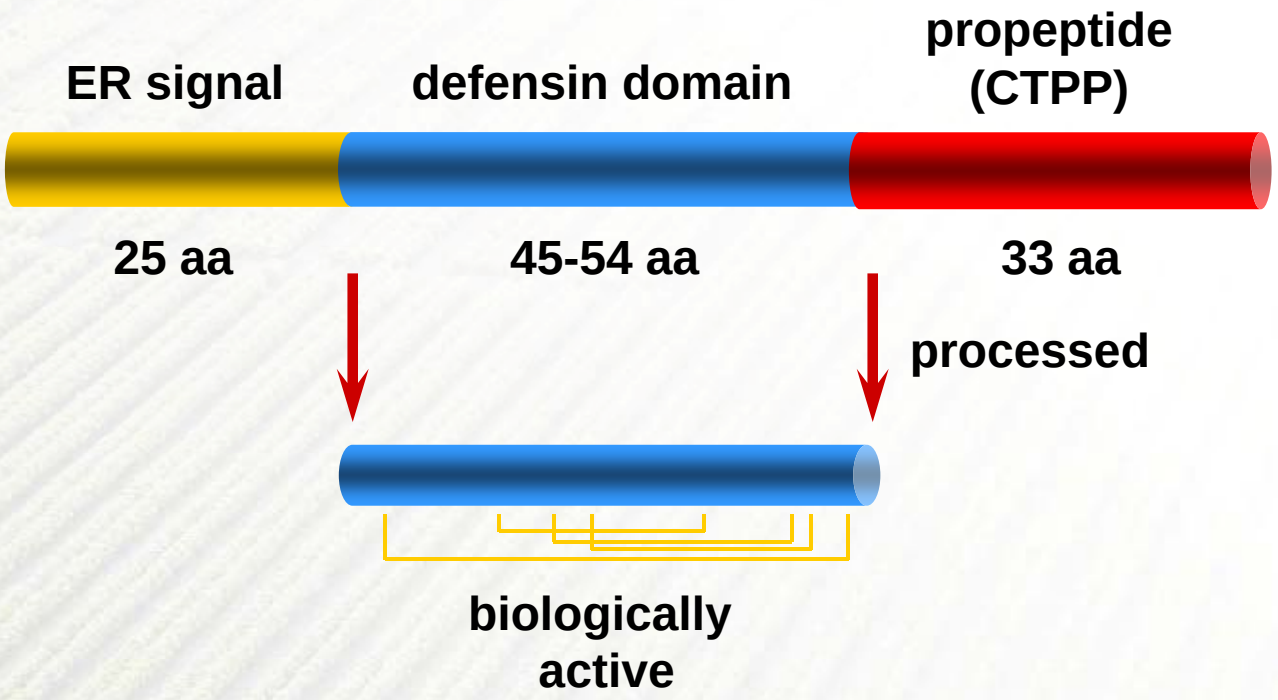
Corn transformation and trait validation

Protein/gene discovery

HEXIMA

- Screen for new antifungal molecules from varied sources
- Robotic platform; laboratory tests against multiple fungal pathogens
- Selection of multiple leads for testing in plants
- Select gene combinations for broad spectrum control

Class II defensin



- Mostly in Solanaceous plants
- Have C-terminal propeptide

HEXIMA

Nicotiana alata defensin (NaD1)

Filamentous fungi	NaD1 IC_{50} (μM)
Fusarium oxysporum f.sp vasinfectum	1
Leptosphaeria maculans	0.8
Verticillium dahliae	0.75
Theilaviopsis basicola	0.80
Aspergillus nidulans	1

- NaD1 is toxic to filamentous fungi at low concentrations
- NaD1 is not toxic to human HeLa cells or Sf-21 insect cells
- NaD1 permeabilizes fungal membranes and enters the cytoplasm (van der Weerden et al, 2008, JBC 283, 1445-14452)

HEXIMA

Product Development

- Proof of concept in transgenic plants (gene constructs, transformation, bioassays, filed trials)

Corn

Cotton

Canola

Plant transformation

HEXIMA

Cotton (U of M)

Canola (U of M)

Corn (LTU)

Disease bioassays

Blackleg bioassay

Fusarium wilt bioassay

Field trials with transgenic cotton

HEXIMA

Fusarium wilt

Yr 1 Yr 2 Yr 3

- Transgenic cotton line expressing NaD1 (T)
- At least 70% better plant survival rates compared to untransformed control (C)
- More than double the lint yields compared to untransformed control
- No adverse agronomic differences or yield penalty in absence of disease

3) Execution