

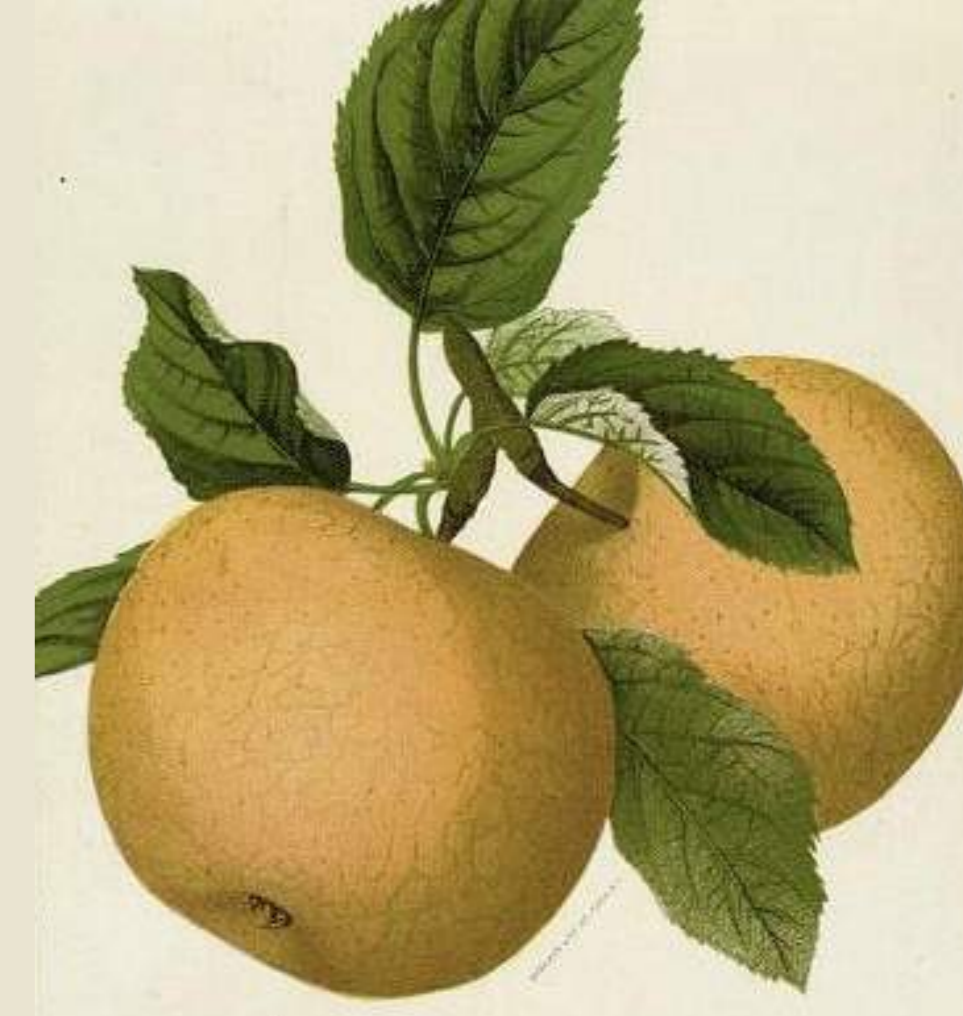
Russet Apples: Look Beyond Looks

Transcriptional Regulation of Triterpenes In Russet Apple Skin

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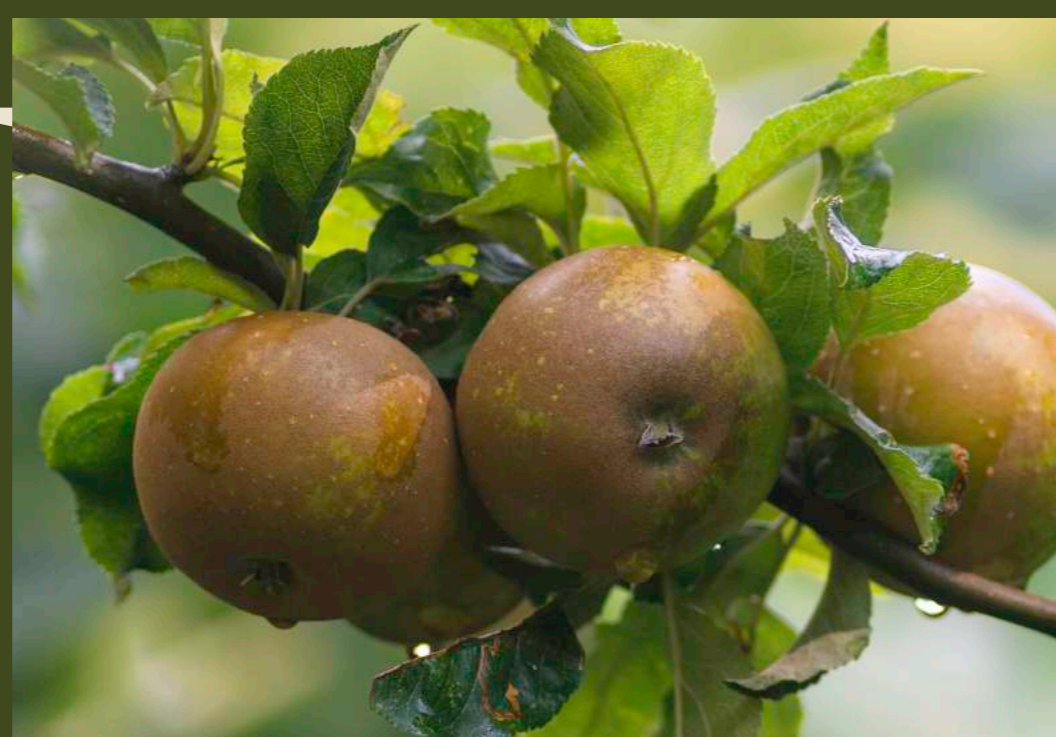


RUSSETING – Beauty Is On The Outside

- 🍏 **New Zealand** Apple Fruit Industry - \$829 million^[1] – exports predominantly red & waxy cultivars like 'Royal Gala'
- 🍏 Russeting – rough brownish repair patches on skin
- 🍏 Not visually appealing – lower commercial value despite a nutty flavor
- 🍏 Contains potent immunomodulatory compounds - **TRITERPENES**

Smooth Skin

Russet Skin



What Causes Russeting?

- 🍏 **SKIN** – protective barrier ^[2]
- 🍏 Environmental and genetic factors – skin develops **microcracks**
- 🍏 Triterpenes – Secondary metabolites in the apple skin -- **machinery** controlling their production poorly understood
- 🍏 Triterpene **composition** affected

Skin Functions



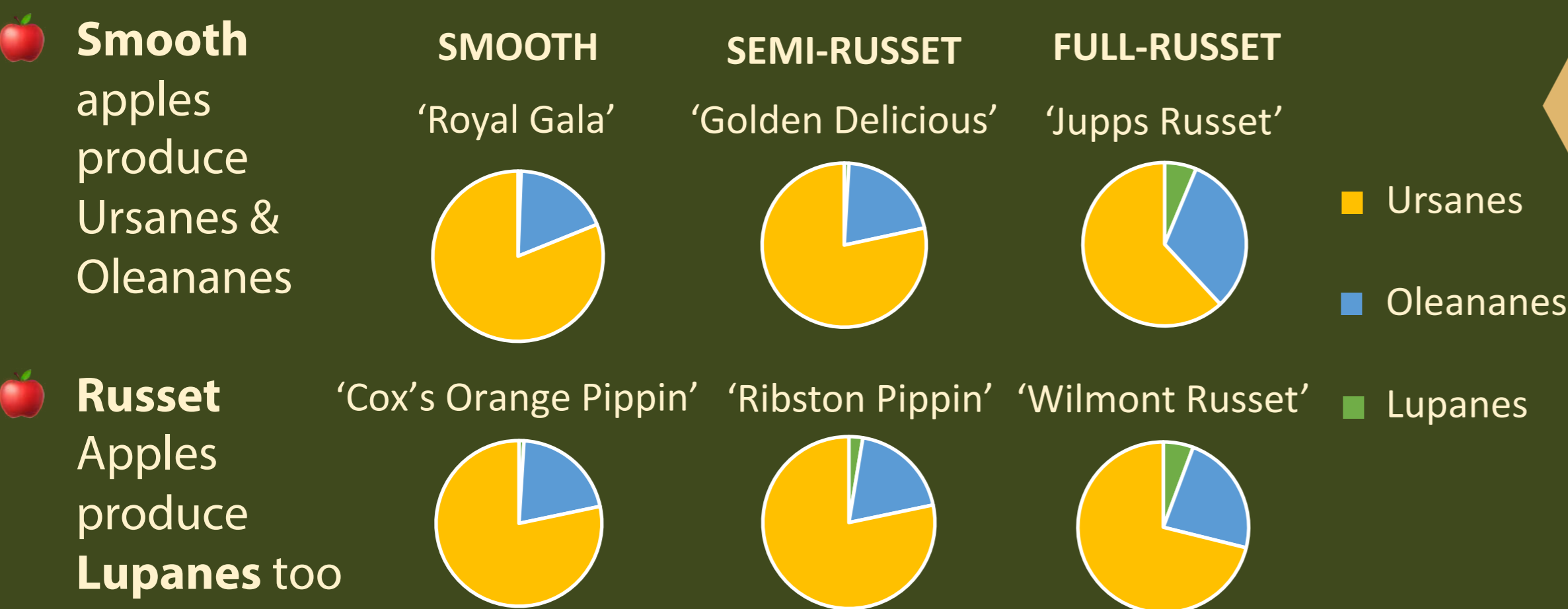
Research Question

- 🍏 What **controls** the production of triterpenes in the apple skin?
- 🍏 Preliminary data identified **KEY GENES** expressed in russet skin- *MdMYB52*, *MdMYM66*, *MdMYB67*, *MdMYB93*, *MdNAC038-like*

Objectives

- 🍏 Check **gene expression levels** across apples exhibiting different levels of russeting
- 🍏 Analyse the varying triterpene **composition** of the skin
- 🍏 **Functional Analysis** – Are one or more genes upregulating the production of specific triterpenes?

Triterpene Composition



Materials

- 🍏 11 apple varieties – 3 groups based on skin type
- 🍏 Smooth, Semi-Russet, Fully-Russet



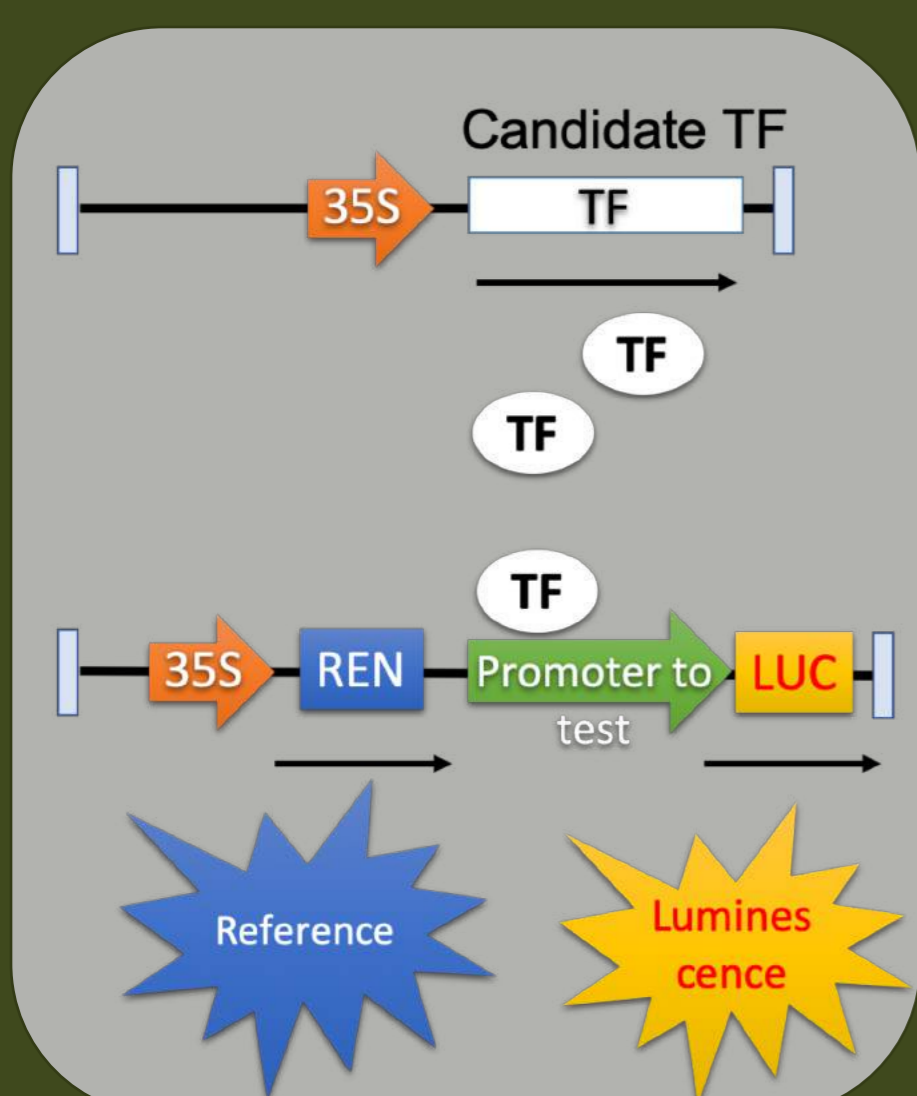
'Royal Gala'

'Golden Delicious'

'Wilmont Russet'

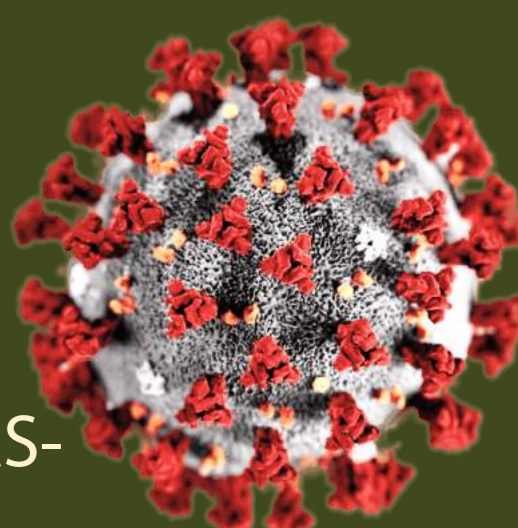
Functional Analysis

- 🍏 Transcription Factors (TFs) – control expression of other genes by activating their promoters



Why Become a Russet APPLE-OGIST?

- 🍏 Develop improved apple varieties with higher triterpene content
- 🍏 Triterpenes produced in russet apples – anti-inflammatory, anti-cancer, anti-malarial and anti-viral properties
- 🍏 **CORONAVIRUS**
 - 🍏 Lupanes – competitive inhibitor of SARS-Cov2-3CL protease^[3]
 - 🍏 Ursanes and Oleananes – Potential as inhibitors of SARS-CoV2 replication according to computer modelling^[4]



References

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