

# Variation in Mineral Content within Potato Tubers and Between Genotypes



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## Why potatoes?

Potato is the 4th world crop in production terms and the first non-grain food crop.

Important role in the delivery of dietary micronutrients including Fe, Ca, Zn and Mg.

Now promoted as a better staple food for the world's poor.

Bioavailability of minerals is high in potatoes

- high concs of ascorbate
- low concs of phytate & oxalate

## Within tuber mineral variation

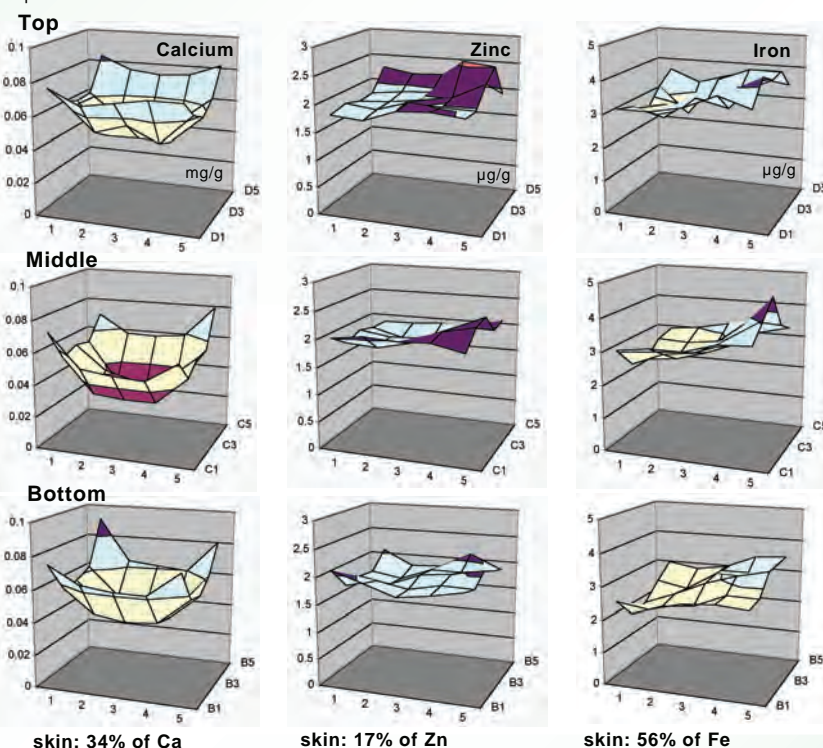
Central portion of the tuber is low in dry matter (10% cf 24% DM).

Potato skin contains most iron.

In tuber flesh, calcium is mostly peripheral.

Zinc is high \*above\* the stolon attachment.

Iron is higher nearer the stolon attachment and declines to the apex.



## Materials and methods

Within tuber data:

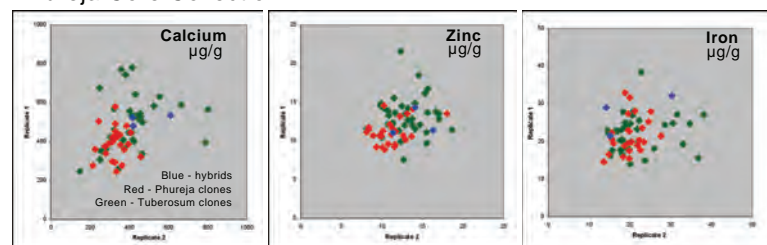
- Five tubers of *Solanum tuberosum* cv. Stirling.
- Five concentric skin samples.
- Peeled tubers were cut into three slices.
- Each slice diced to 25 pieces.

Between genotype data:

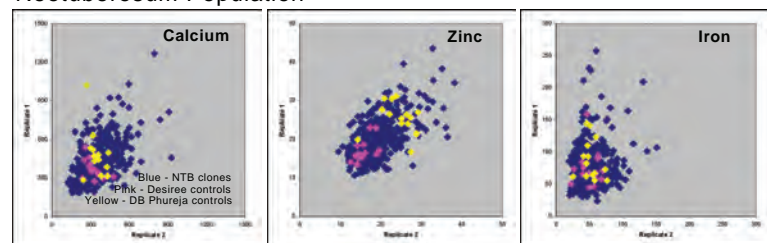
- Phureja Core Collection 64 clones, 2 reps.
- Neotuberosum population 450 clones, 2 reps.
- Sampled two pairs of opposite eighths.
- Freeze-dried powder, acid digested and submitted to ICP-MS.

## Field trial data

### Phureja Core Collection



### Neotuberosum Population



Mineral variation exists between diploid Phureja and tetraploid Neotuberosum (NTB) clones.

Phureja tends to have higher mineral concs and lower yield.

NTB clones shows a greater variation in most minerals and have a broader genetic background.

Weaker correlation between reps for iron, suggesting more environmental influence.

Control lines Desiree and DB337/37 (Phureja) differ consistently for different minerals, markedly so for zinc.

Spatial analysis reveals higher underlying genetic variation, and more refined analysis in progress to increase efficiency.

QTL analysis using a mapping population Stirling x 12601ab underway.

## Future

Partition environmental and genetic sources of variation.

Explore effect of candidate genes.

Seek genetic variation for uptake and storage of applied selenium.

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