

THE
NATURE
OF NEXT

FMC

FMC LEAF ANALYSIS SURVEY SPRING 2018

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16/10/18

FMC

PROJECT BACKGROUND

- Recent publications have indicated that a crop suffering from a recognised/accepted deficiency is likely to be deficient in another or several other nutrients.



- What is deficient here?
- Manganese?
- Very unlikely that manganese alone is limiting the crop.

PROJECT BACKGROUND

- The concept is illustrated perfectly by **Liebig's Barrel**.
- The information suggests as an industry we are focusing on raising the level of one stave that we understand is limiting yield.
- But how many other staves are limiting us at the same time?



- Over 400 Samples collected
 - 77% Wheat
 - 21% Barley
 - 2% Oats
- Samples collected between March and June
- Covering all areas of GB, England, Scotland, Wales and Ireland.
- Analysis carried out by NRM laboratories

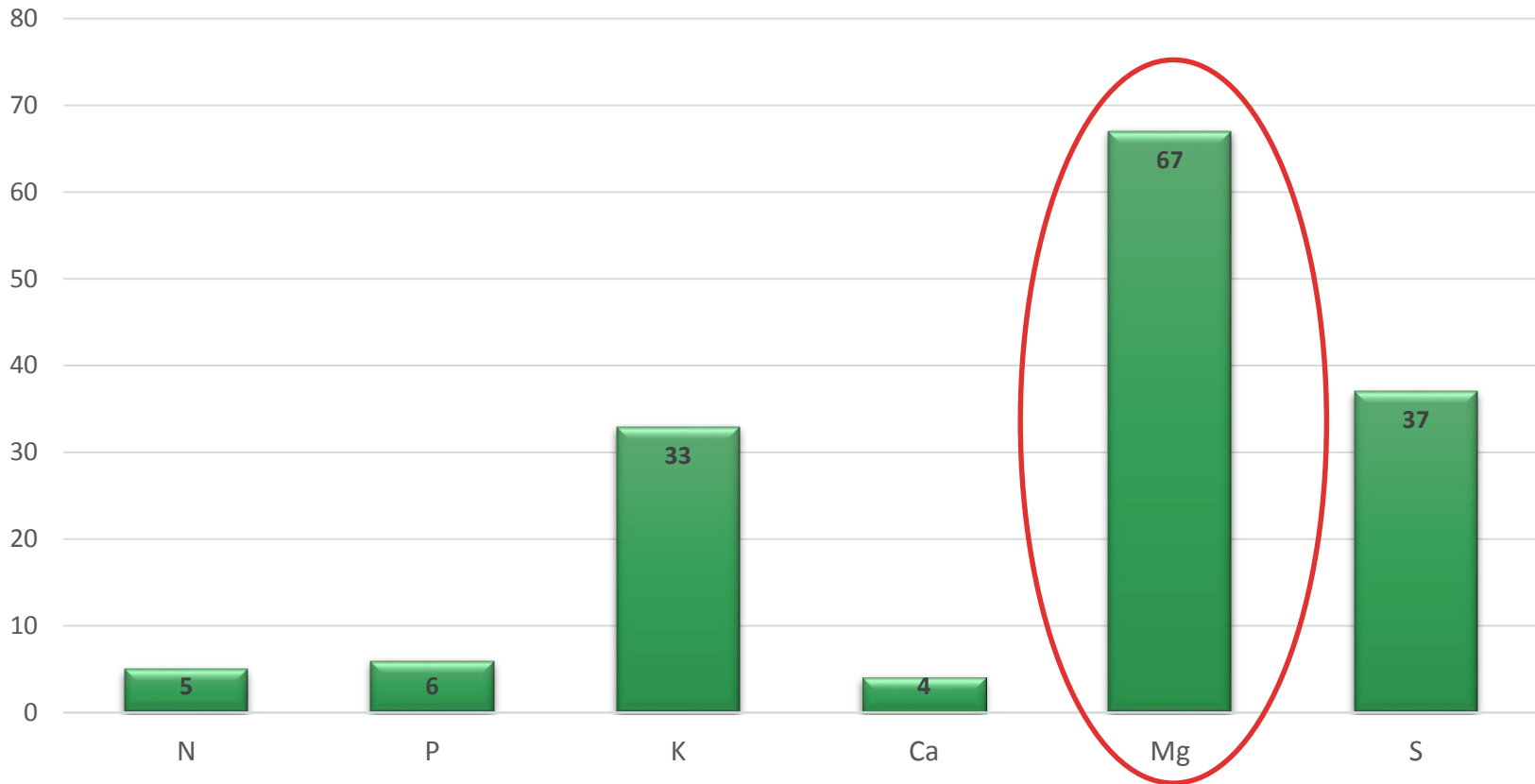
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SPRING SURVEY 2018

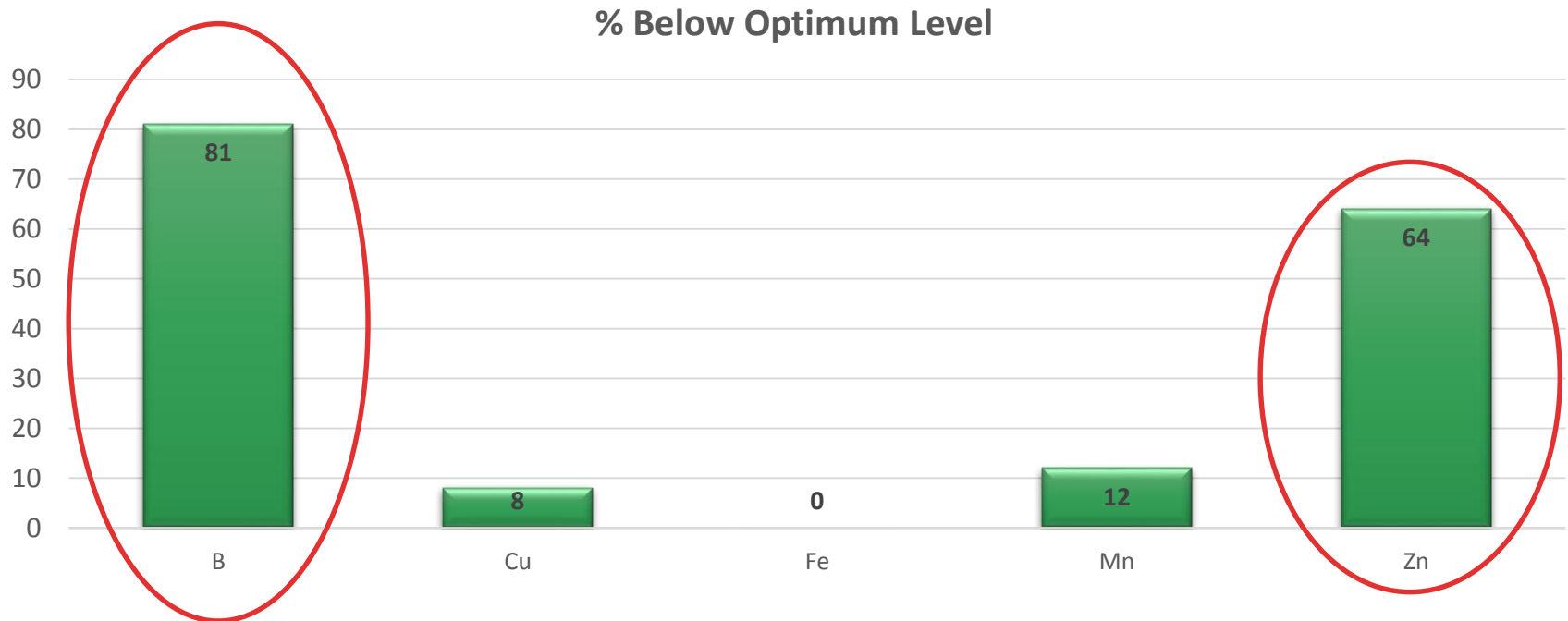
MAJOR NUTRIENTS

% Below Optimum Level



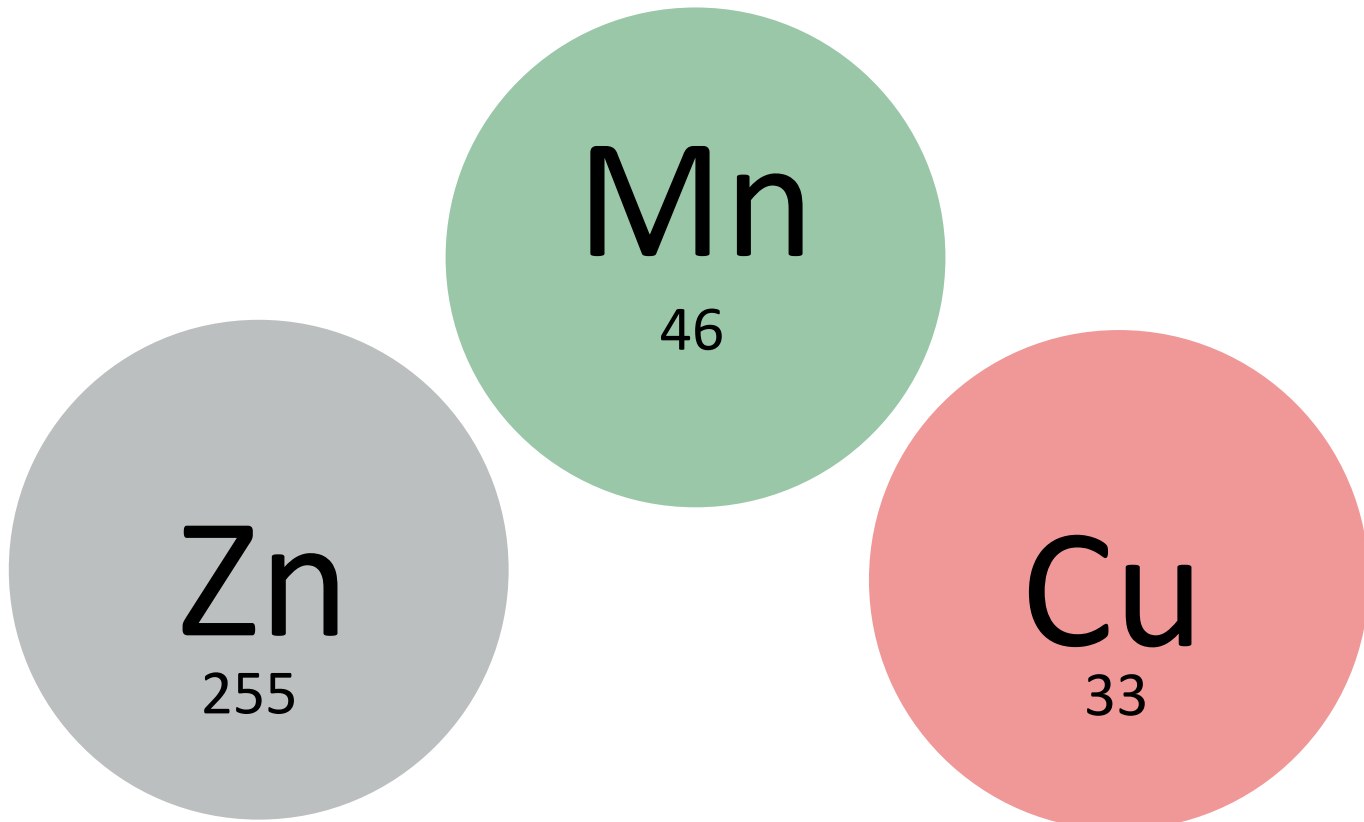
- Generally good levels of NPK - more issues seen with K than N or P.
- Stand out here is **Mg** - traditionally applied later in the season for transportation of sugars from the flag leaf to the grain.

MICRONUTRIENTS



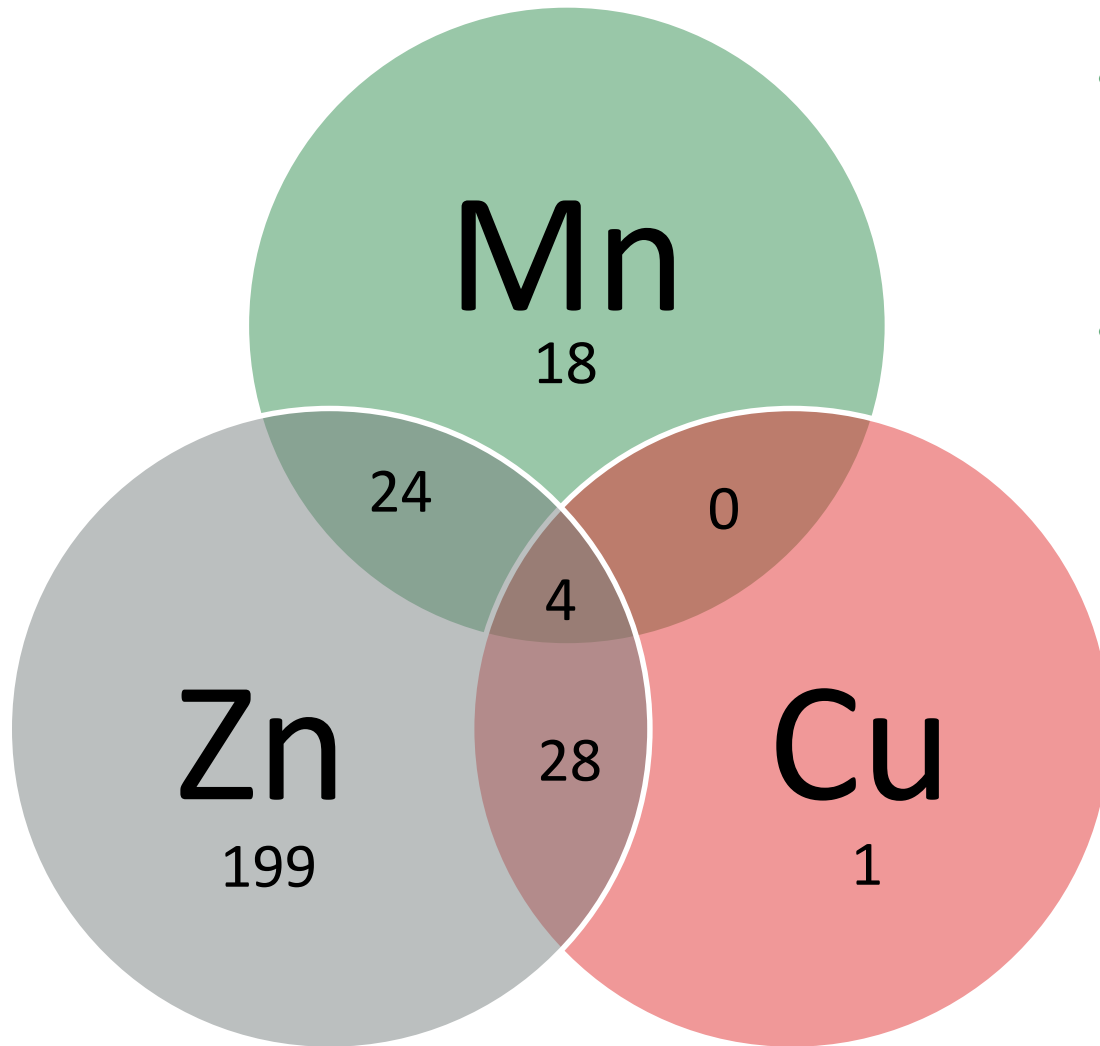
- **Zinc** – required for the assimilation of CO₂ during photosynthesis, the production of auxins and the structural integrity of cell membranes. Zn deficiency can lead to reductions in grain yields. Often found in analysis to be deficient but obvious visual symptoms are rare in the UK.
- **Boron** – there has been a trend over the last 5 years plus for high numbers of B deficient samples. Not seen as a priority for cereals. FMC investigating use of B on cereals with further work planned for 2019.

KEY CEREAL MICRONUTRIENTS



- We would have expected more Mn deficiency - many had already applied Mn routinely before the samples were taken.
- Clearly Zn deficiency was most prevalent this year.

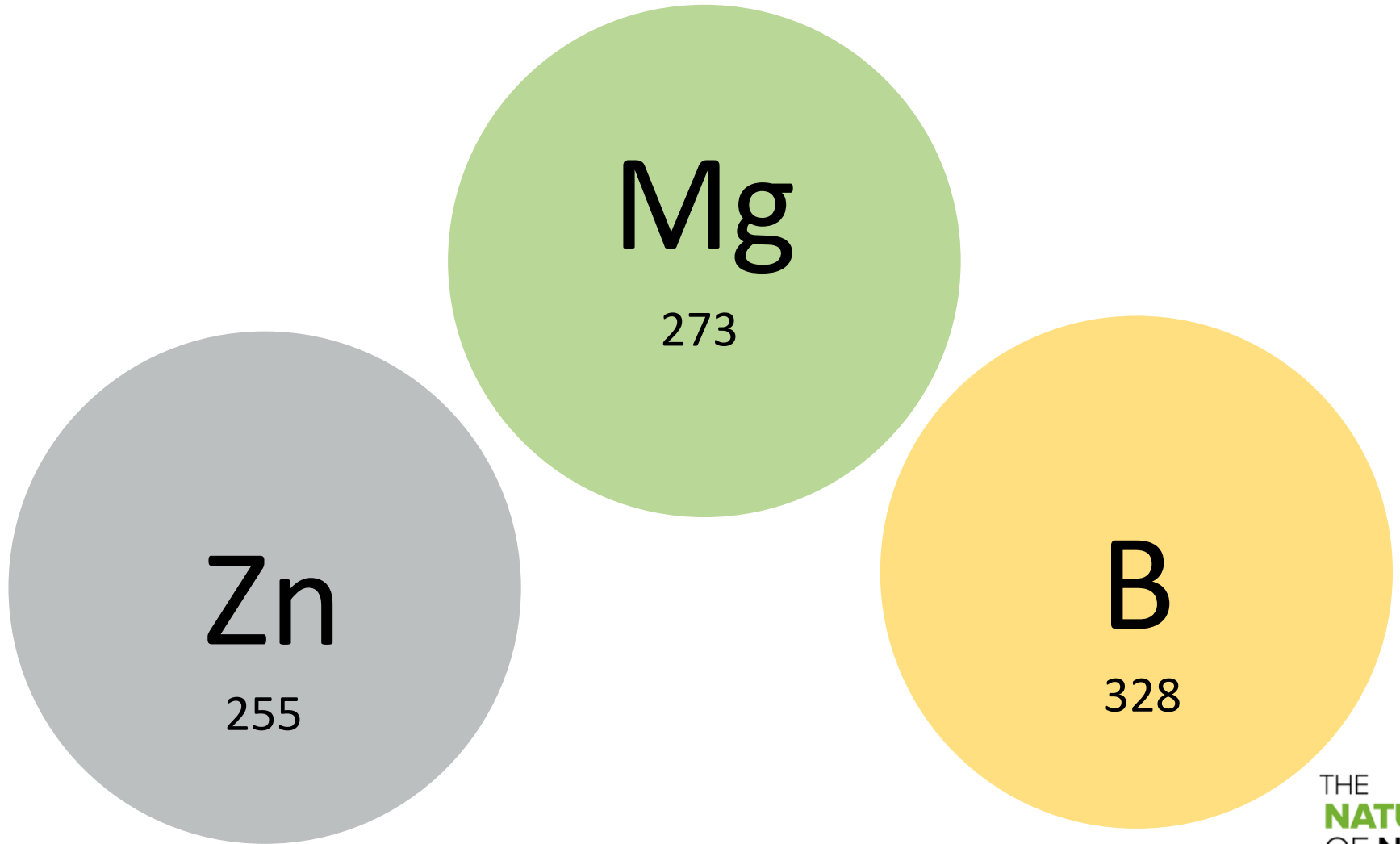
COMBINED DEFICIENCIES



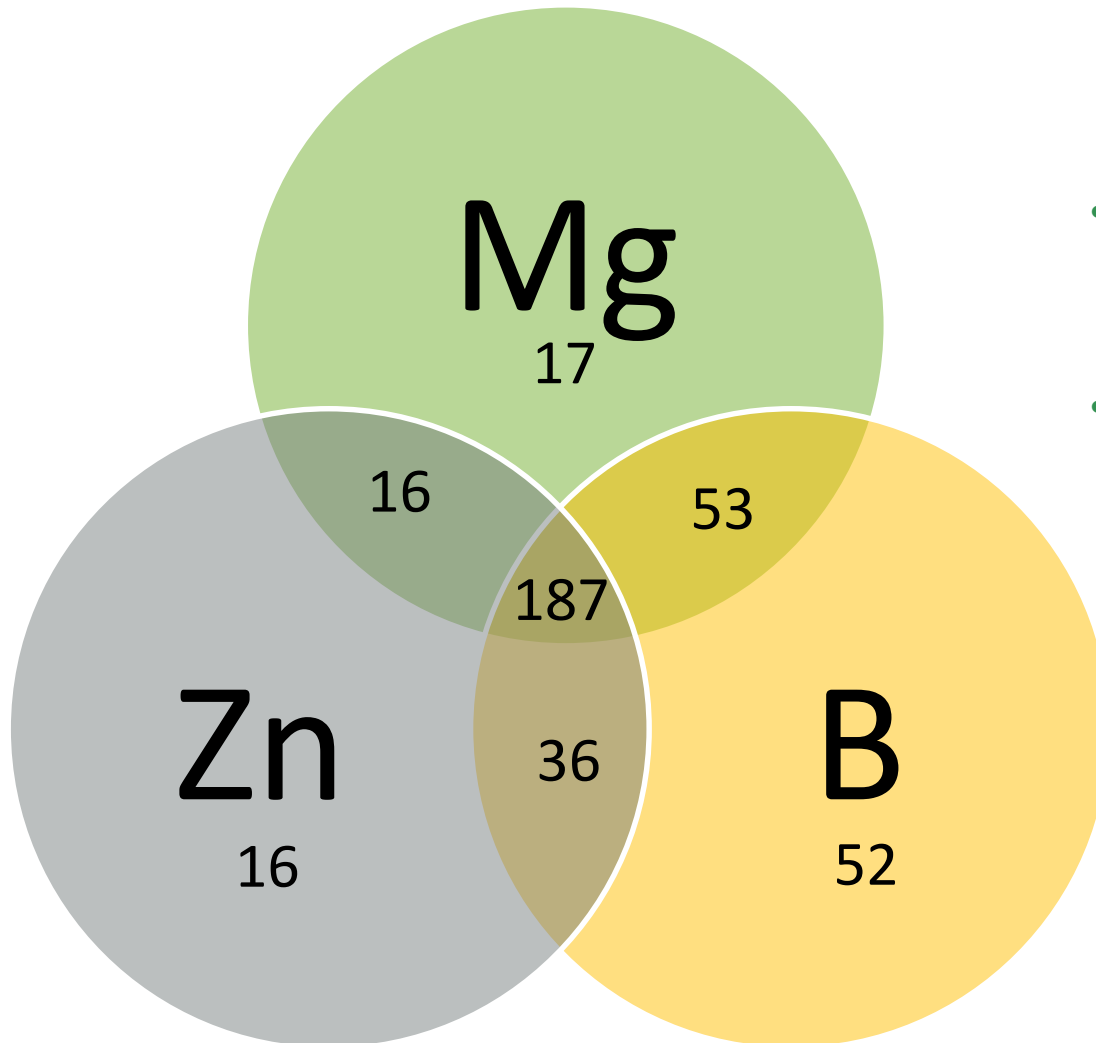
- 61% of Mn deficient samples were also deficient in Zn.
- 97% of Cu deficient samples were also deficient in Zn.

** Venn Diagram not drawn to scale*

2018'S BIG DEFICIENCIES



COMBINED DEFICIENCIES



- Only 6% of Magnesium deficient crops were only deficient in Mg
- 25% were also deficient in either Zinc or Boron
- 69% of were also deficient in both Zinc and Boron

** Venn Diagram not drawn to scale*

WHY THESE 3 NUTRIENTS?

- Weather could be a factor
- **Magnesium** is the most easily leached of the large cations
- **Boron** is leached in wet conditions and becomes limiting in dry soils following
- **Zinc** issues more common in cool wet conditions and soil availability is reduced by flooding



CEREALS THIS AUTUMN

Manganese

Efficient Establishment and Health

- Synthesis of chlorophyll
- Photosynthesis

Frost Tolerance

- Enzyme activation for lignin formation



NOVOJETT 300

NUTRIENT CONTENT

Manganese (Mn): 300 g/l as a nitrate based suspension

RATES OF USE

- 1 l/ha
- minimum of 200 l/ha water
- After the 3-leaf stage or when foliage is sufficient to absorb the spray



CEREALS THIS AUTUMN

Don't Forget Magnesium

Efficient Establishment and Root Development for Strong Crop Going Into Winter

- The central atom of chlorophyll
- Crucial for photo-synthesis to support strong establishment
- Required for good root development

MAGNITE

NUTRIENT CONTENT

Magnesium (MgO): 133 g/l in the nitrate form

RATES OF USE

- 4 l/ha
- Minimum of 200 l/ha water
- After the 3-leaf stage or when foliage is sufficient to absorb the spray



CEREALS THIS AUTUMN

KEY MICROS INCLUDING BORON

- **Boron** – Involved in lignin formation and the integrity / strength of cell walls, important for frost tolerance. Also required for healthy root growth
- **Copper** – A component in proteins and lignin formation, deficiency can have a dramatic effect on grain formation.
- **Manganese** – Efficient establishment, development and frost tolerance.
- **Zinc** - Involved cell division and auxin production - promoting good root development. Also plays a role in cold stress resistance

NOVOFOUR

NUTRIENT CONTENT

Boron (B): 25 g/l Copper (Cu): 50 g/l Manganese (Mn): 150 g/l
Zinc (Zn): 150 g/l

RATES OF USE

- 1.0 – 1.5 l/ha
- Minimum of 200 l/ha water
- After the 3-leaf stage or when foliage is sufficient to absorb the spray

