



# Evaluation of Rice Nutrition Ratings Through Full Season Foliar Analyses

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# Plant Tissue Sampling

## Soil testing

- Shows if sufficient nutrients exist in the soil to be “potentially” taken up by the plant.
- Tries to predict nutrient availability for the upcoming crop

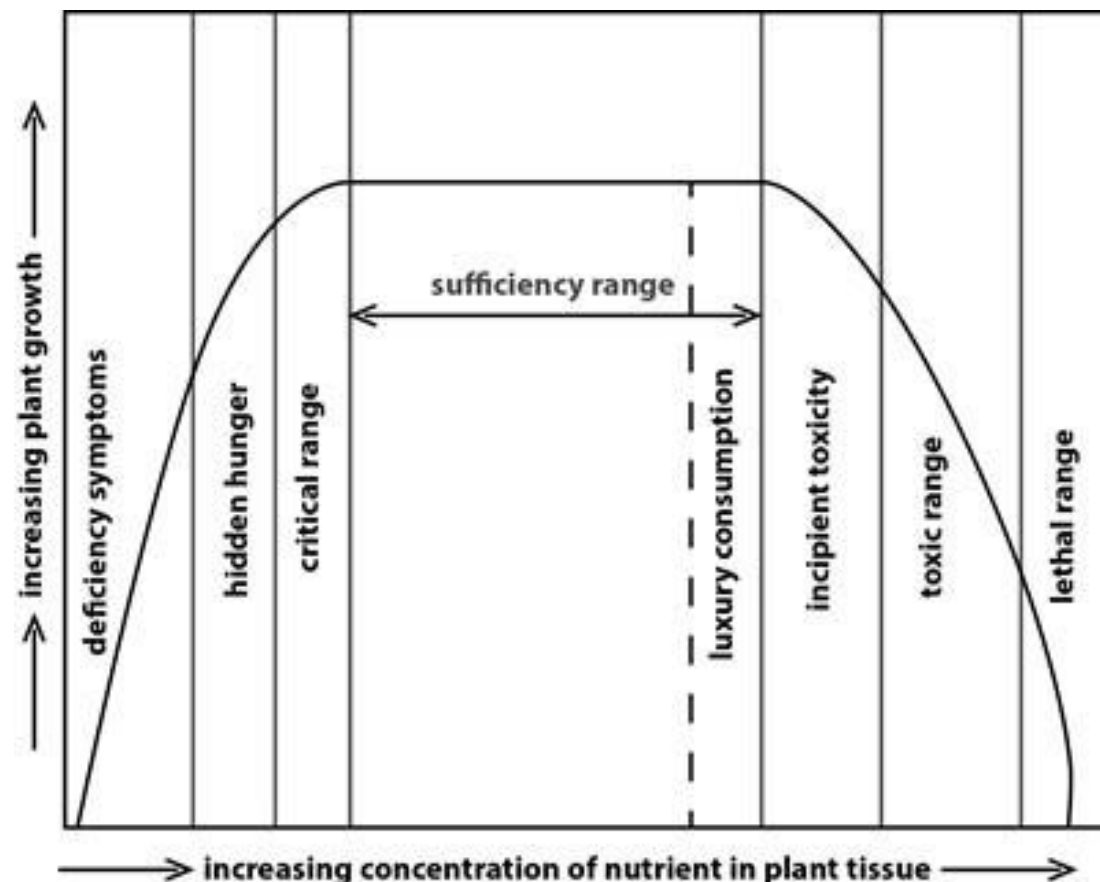
**VS**

## Plant analysis

- Gives a snap shot of nutrient uptake for a particular time.
- Cannot be used to predict very far in advance.

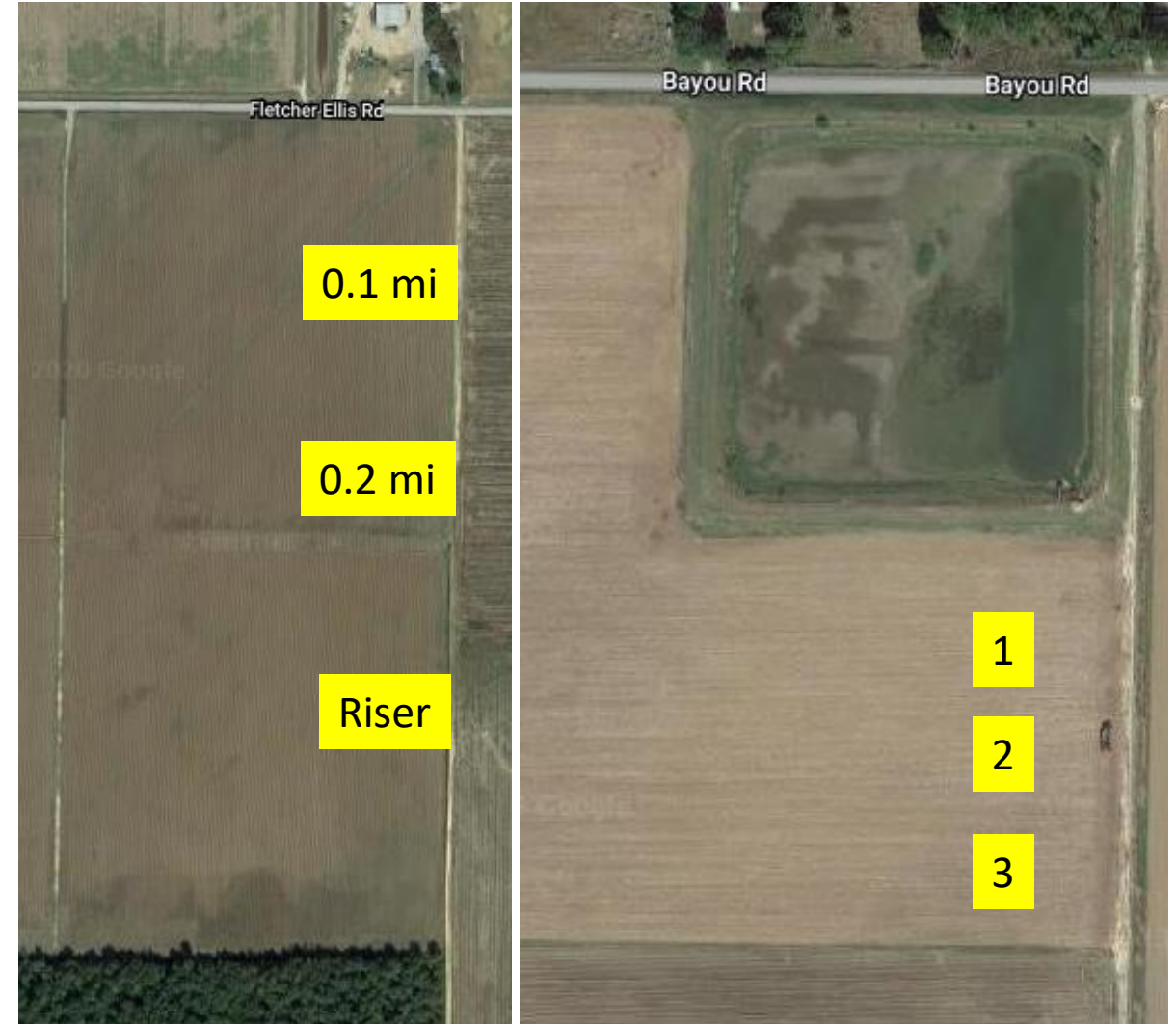
# Plant Tissue Sampling

- Rice nutrient levels have not been updated
  - SERA-6
- Shows “hidden hunger”
- Top yields when nutrient levels are kept in the upper half of sufficient
- Best when used as part of a program
- Can be used as a diagnostic tool
  - pair “good” and “bad” areas in conjunction with a soil test
- Complements precision ag soil sampling program



# Location and Methods

- Griffithville, AR – Feather Farms
- 2020 - ‘Diamond’ UofAR conventional rice
- 2022 – DG263L DynaGro conventional rice
- 3 set points sampled throughout the each season
  - 2020 F field - 0.1 miles from road, 0.2 mi, Riser
  - 2022 Bayou Rd – 1, 2, 3
- Sampled as weekly as possible
- Foliar PT2 Analysis
  - Total macro and micronutrients
  - Plant Analysis Handbook III, 2014



# Location and Methods

- Waypoint Analytical S3M Soil Analysis
  - Soil Analysis. Handbook of Reference Methods. 1999.
    - Mehlich 3, pH 1:1, Loss on ignition OM%

|        | pH  | OM% | CEC<br>meq/100g | P ppm | K ppm | Ca ppm | Mg ppm | K%  | Ca%  | Mg%  | Ca/Mg | K/Mg | S ppm | B ppm | Cu ppm | Fe ppm | Mn<br>ppm | Zn ppm |
|--------|-----|-----|-----------------|-------|-------|--------|--------|-----|------|------|-------|------|-------|-------|--------|--------|-----------|--------|
| 0.1 mi | 6.7 | 2.7 | 6.8             | 41    | 56    | 1055   | 118    | 2.1 | 77.6 | 14.5 | 5.35  | 0.15 | 9     | 0.2   | 1.1    | 309    | 91        | 5.6    |
| 0.2 mi | 6.7 | 1.9 | 7.3             | 30    | 70    | 1141   | 125    | 2.5 | 78.2 | 14.3 | 5.47  | 0.17 | 6     | 0.2   | 1.1    | 204    | 133       | 3.2    |
| Riser  | 6   | 2.6 | 7.2             | 40    | 96    | 973    | 106    | 3.4 | 67.6 | 12.3 | 5.5   | 0.28 | 7     | 0.1   | 1.4    | 232    | 74        | 3.8    |
| 1      | 6.7 | 2.7 | 8.0             | 85    | 176   | 1155   | 148    | 5.6 | 72.2 | 15.4 | 4.69  | 0.36 | 11    | 0.4   | 2.1    | 299    | 156       | 6.1    |
| 2      | 6.5 | 2.7 | 9.4             | 112   | 223   | 1263   | 176    | 6.1 | 67.2 | 15.6 | 4.31  | 0.38 | 42    | 0.4   | 2.4    | 301    | 170       | 7.3    |
| 3      | 6.5 | 2.6 | 8.3             | 76    | 157   | 1167   | 146    | 4.9 | 70.3 | 14.7 | 4.78  | 0.33 | 16    | 0.4   | 2.0    | 287    | 170       | 6.4    |

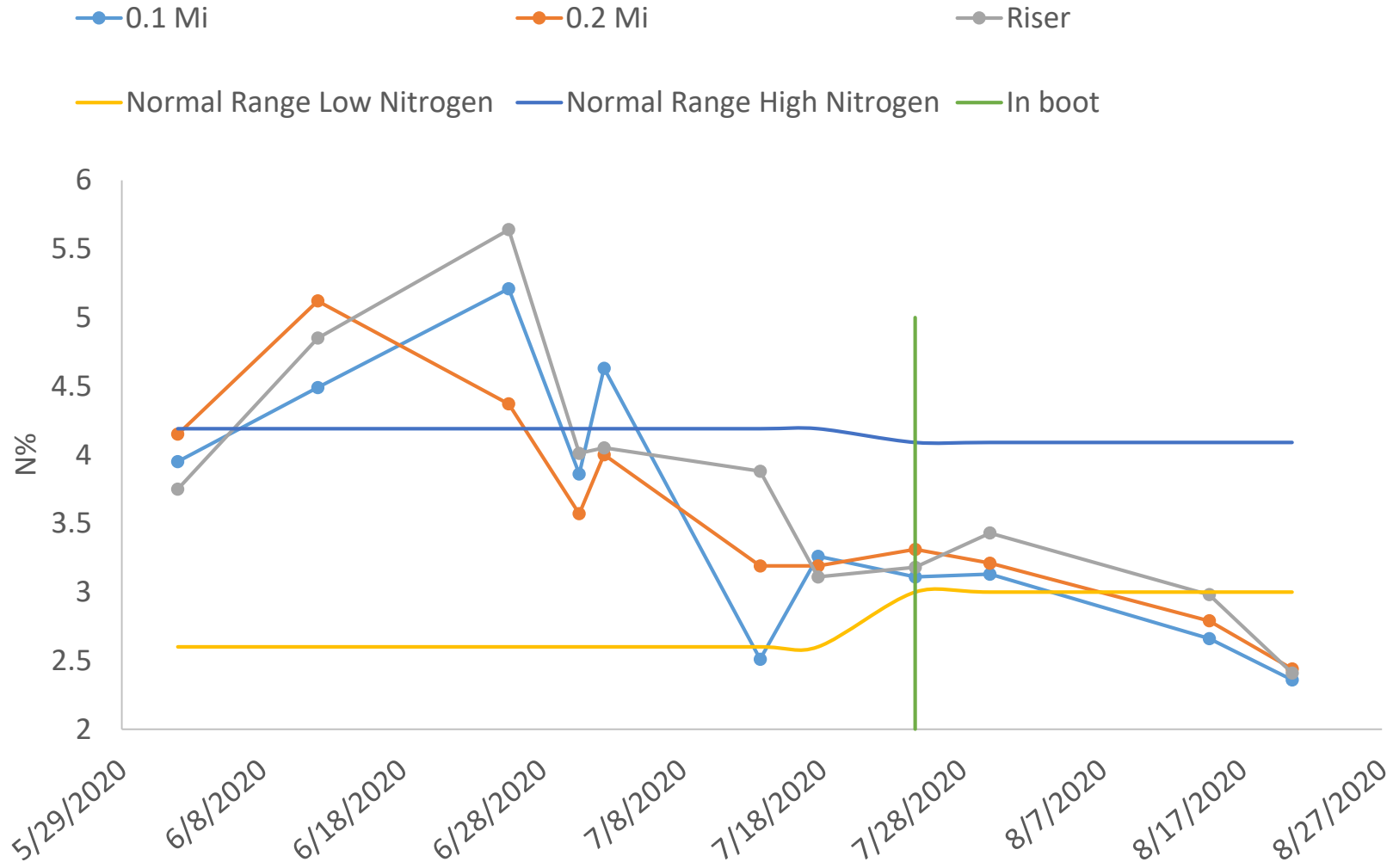
# Location and Methods

- Foliar Analysis
  - V5- R1 – Sampled Most Recently Matured Leaf (1 pint)
    - Fully emerged leaf with collar
  - R2 (in boot) – R8 – Flag leaf (1 pint)

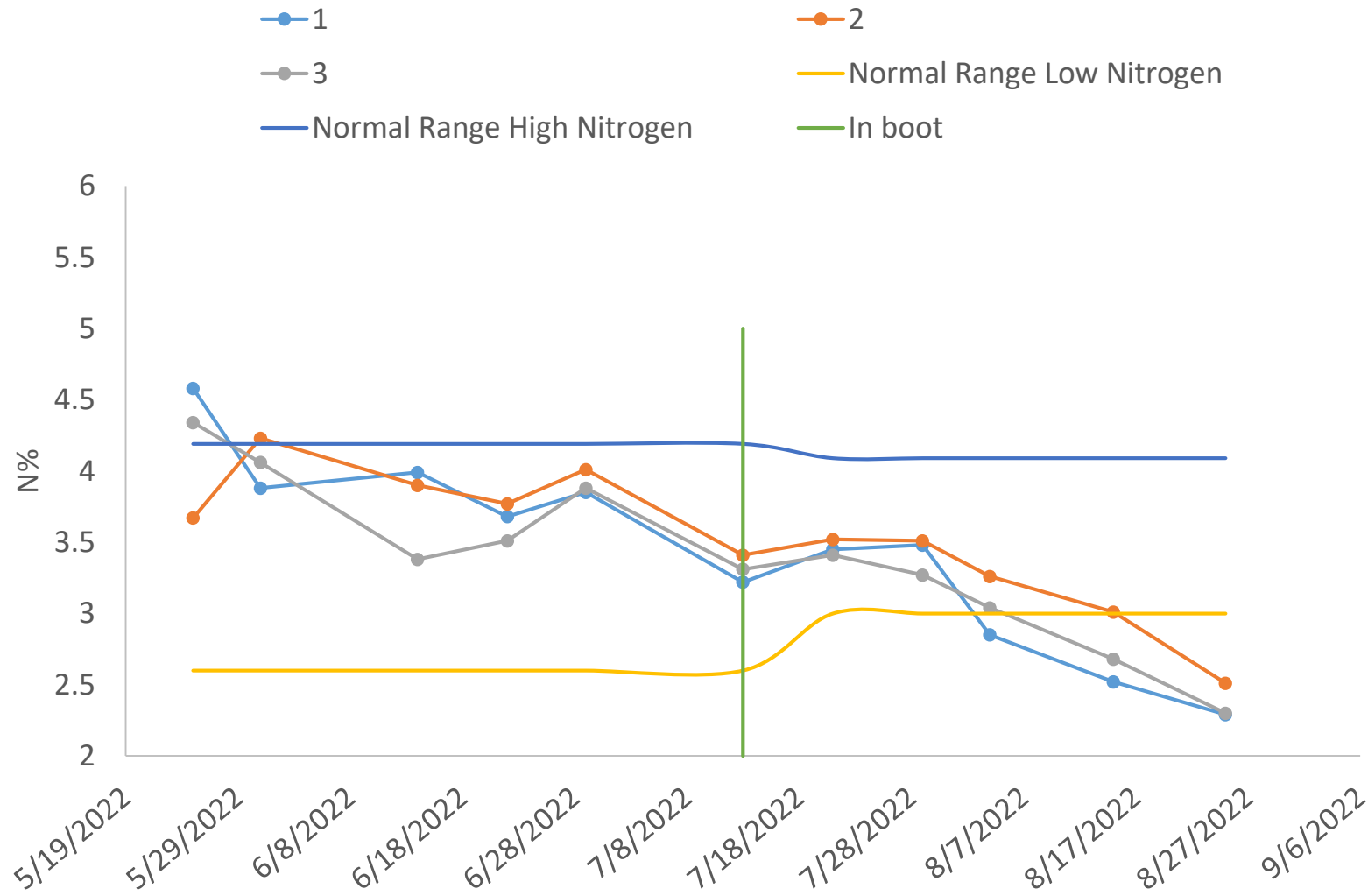
**In boot**



# Nitrogen 2020

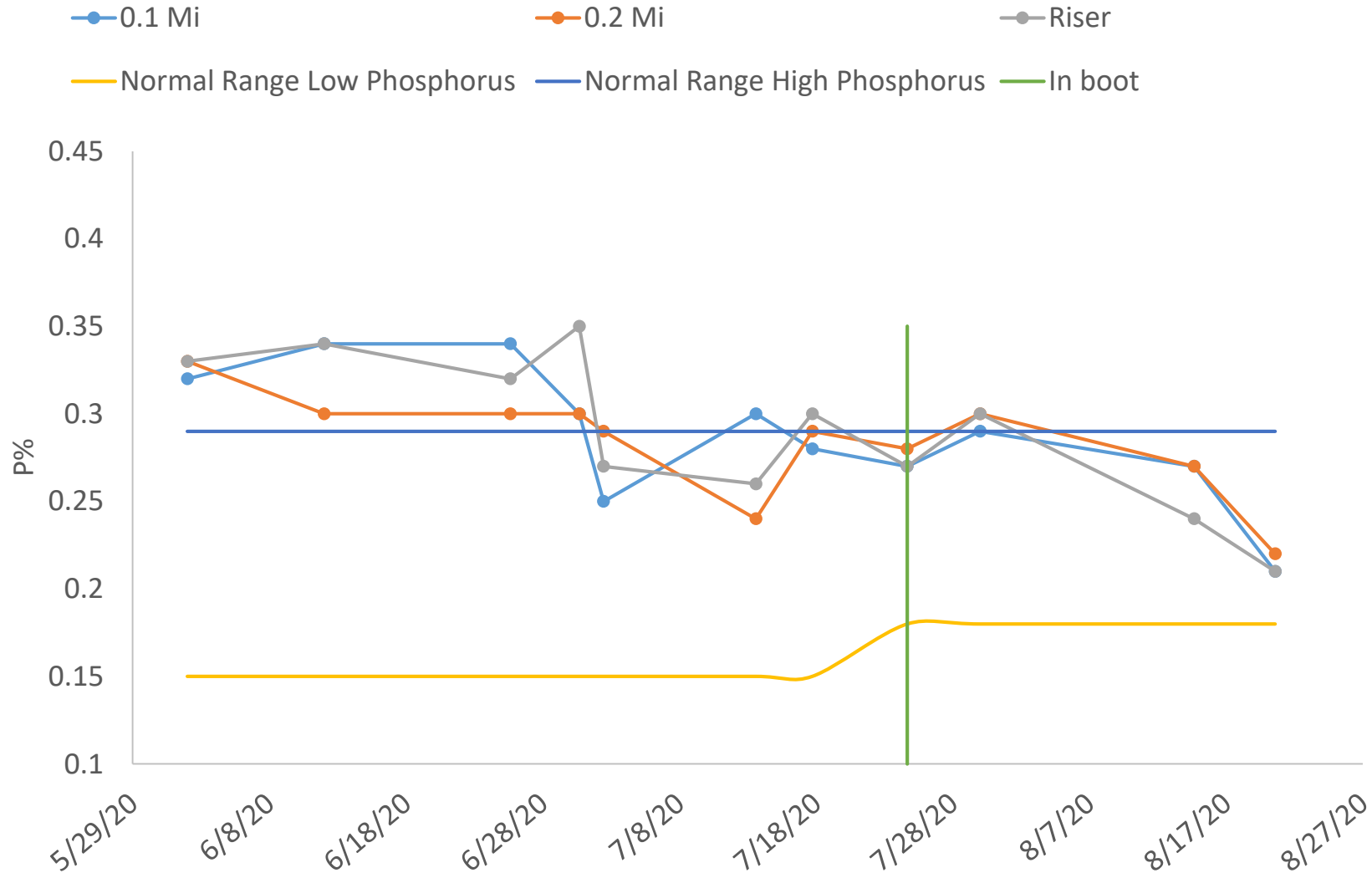


# Nitrogen 2022

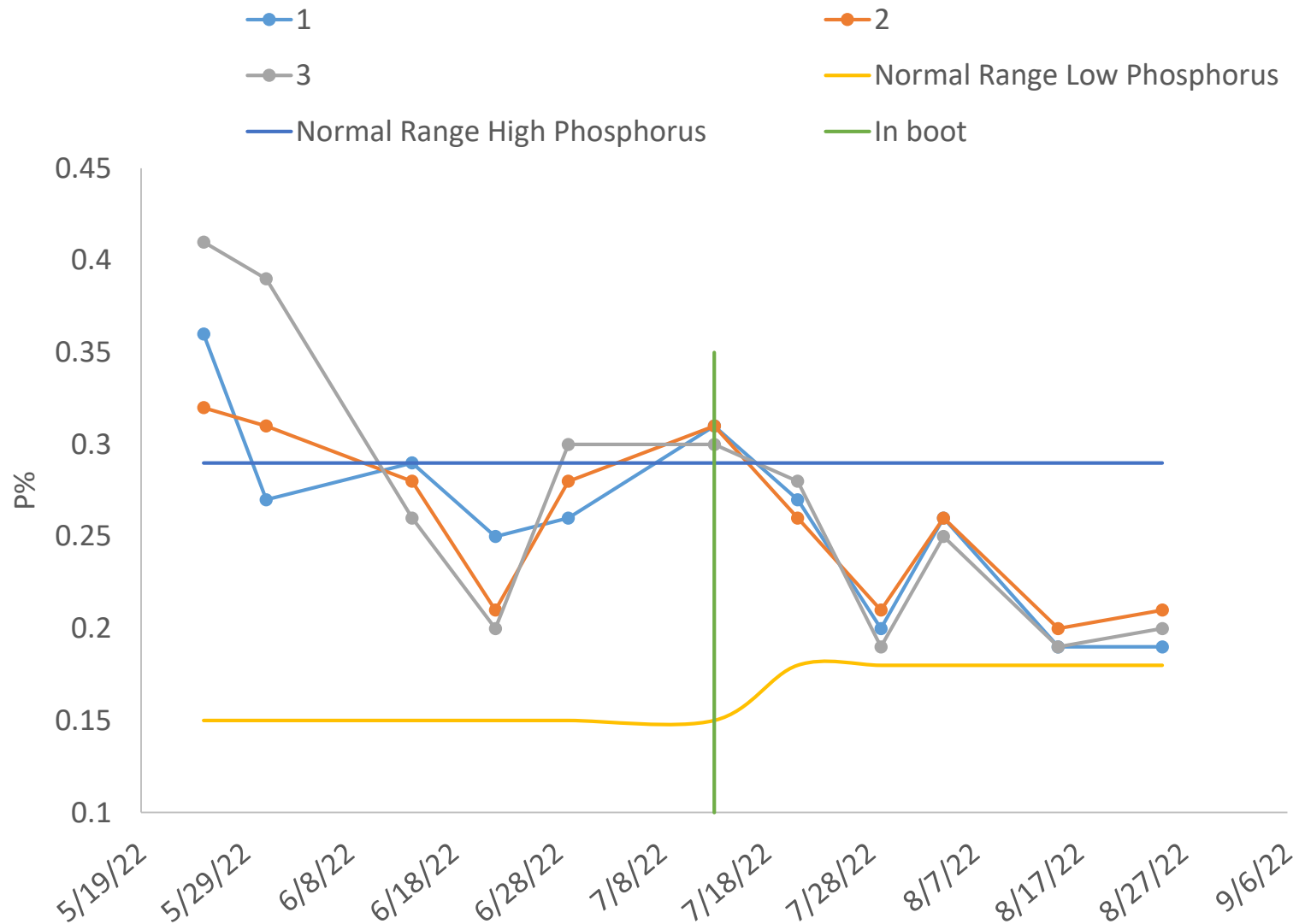




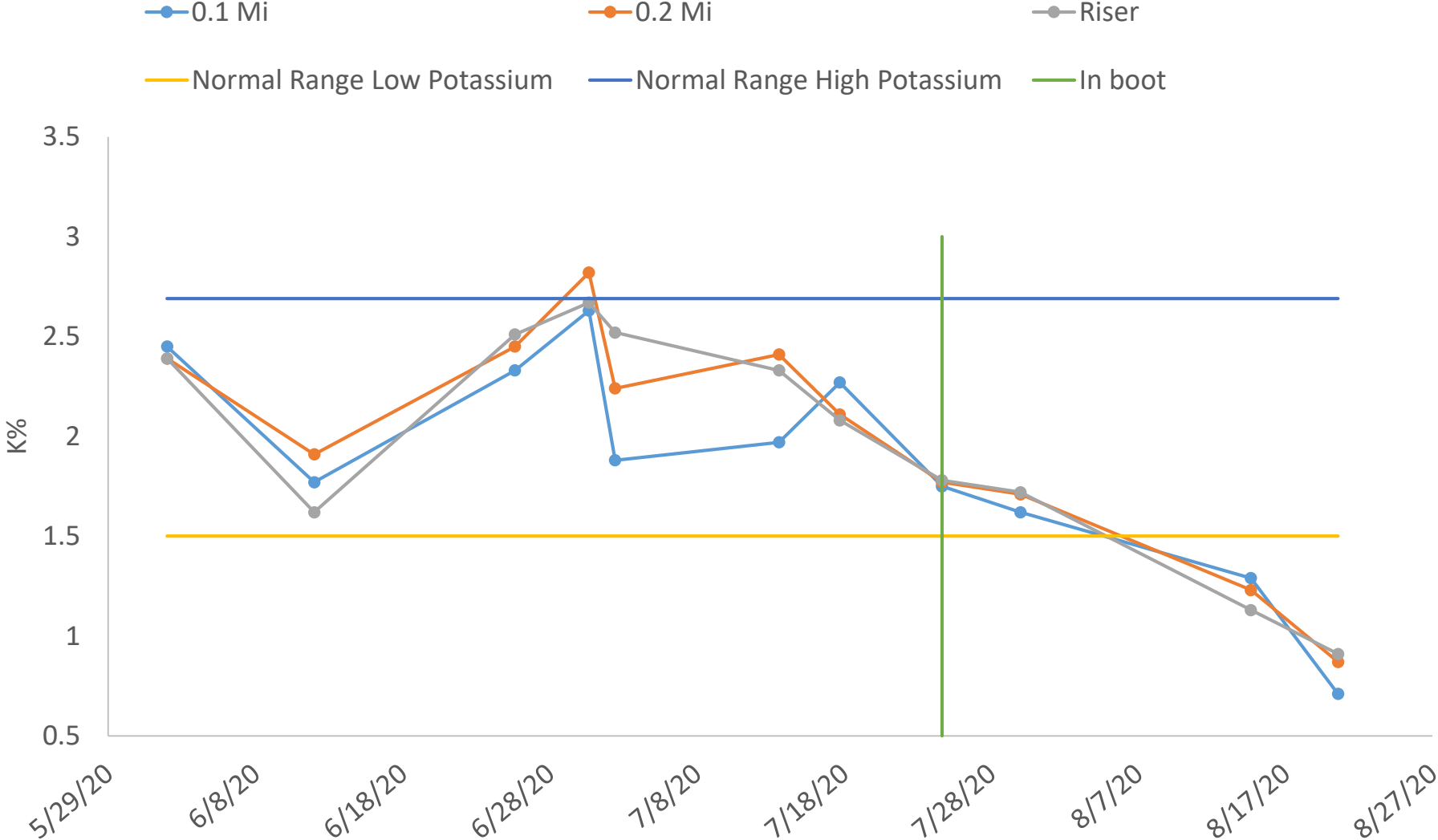
# Phosphorus 2020



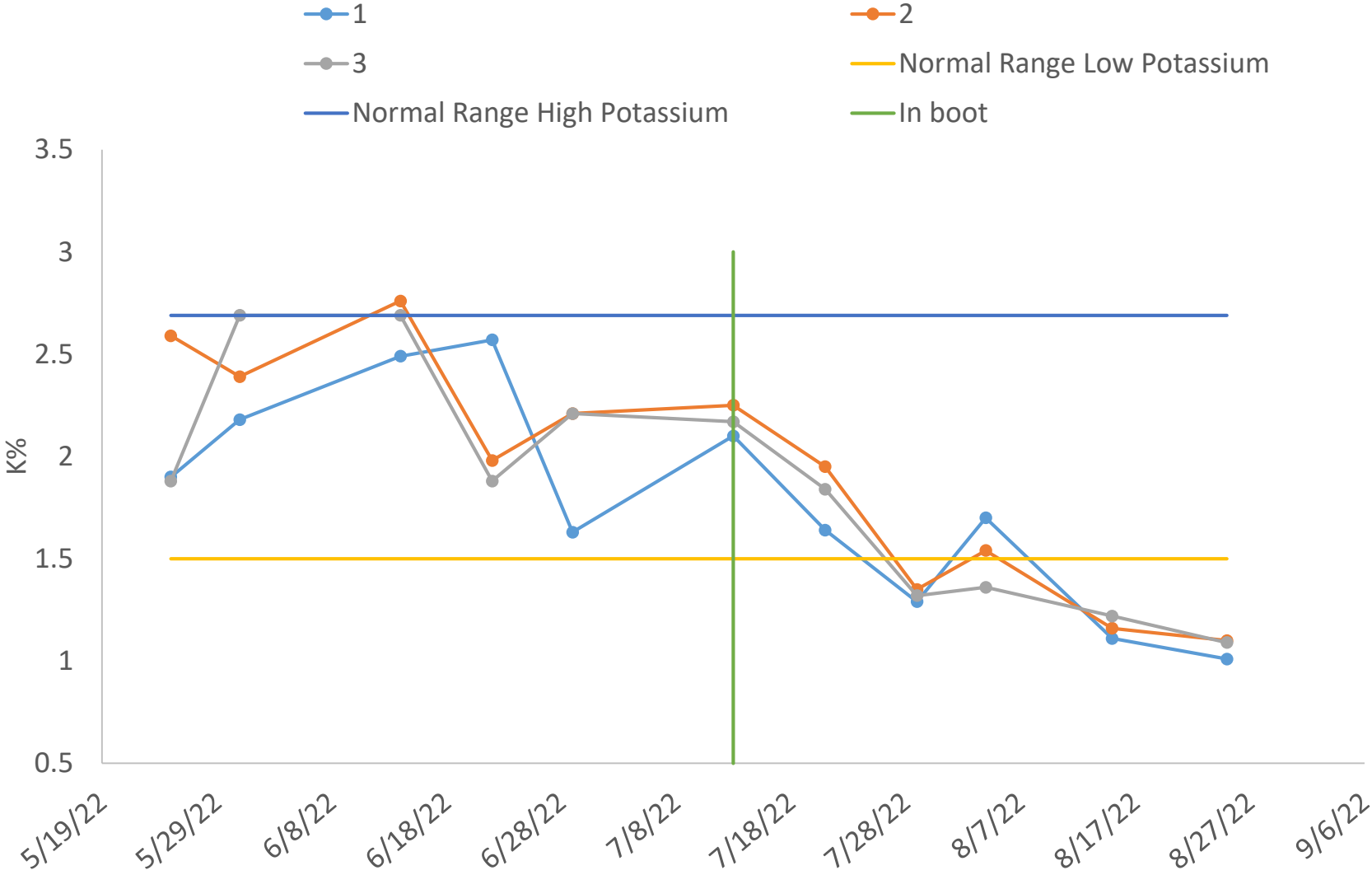
# Phosphorus 2022



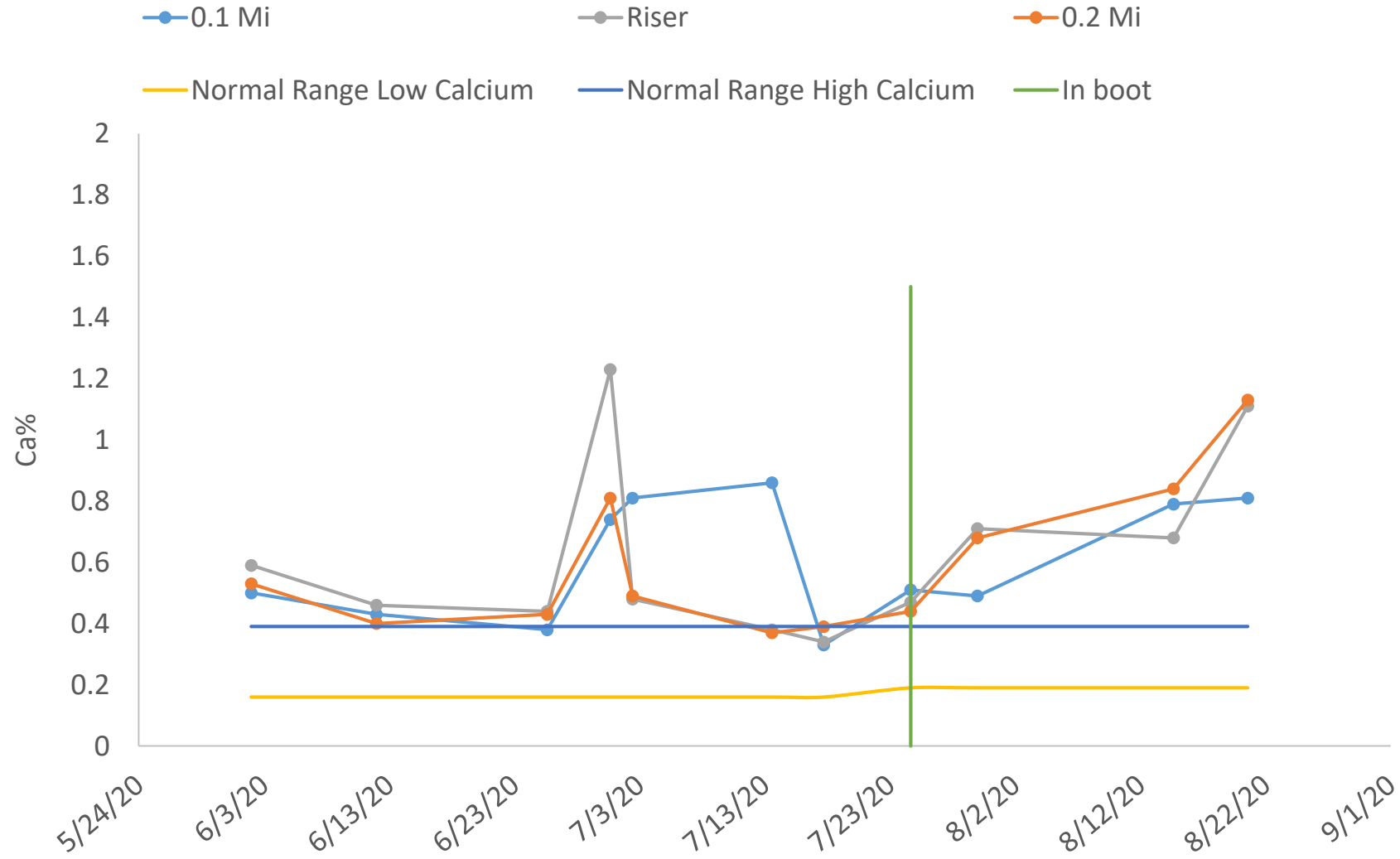
# Potassium 2020



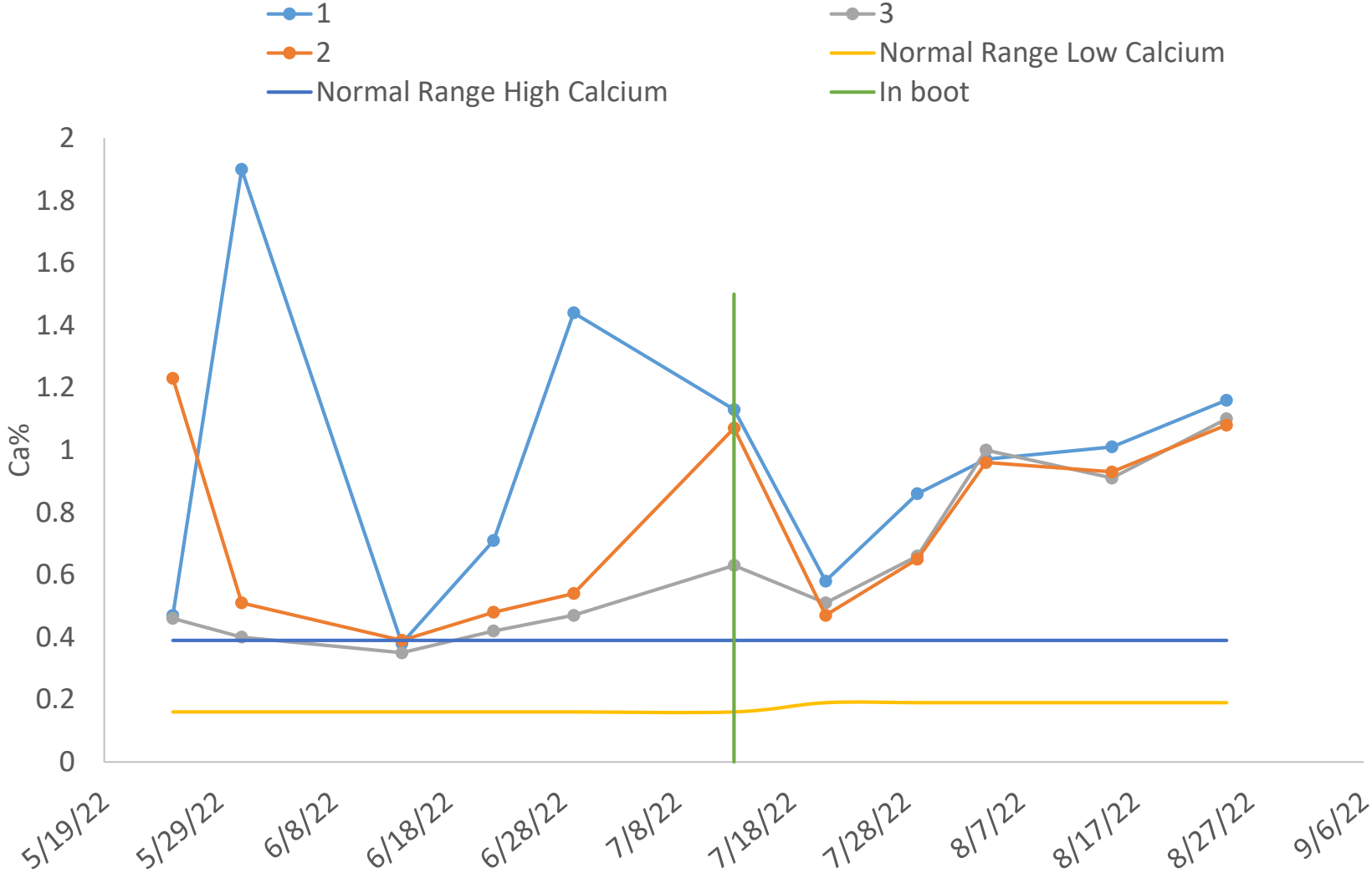
# Potassium 2022



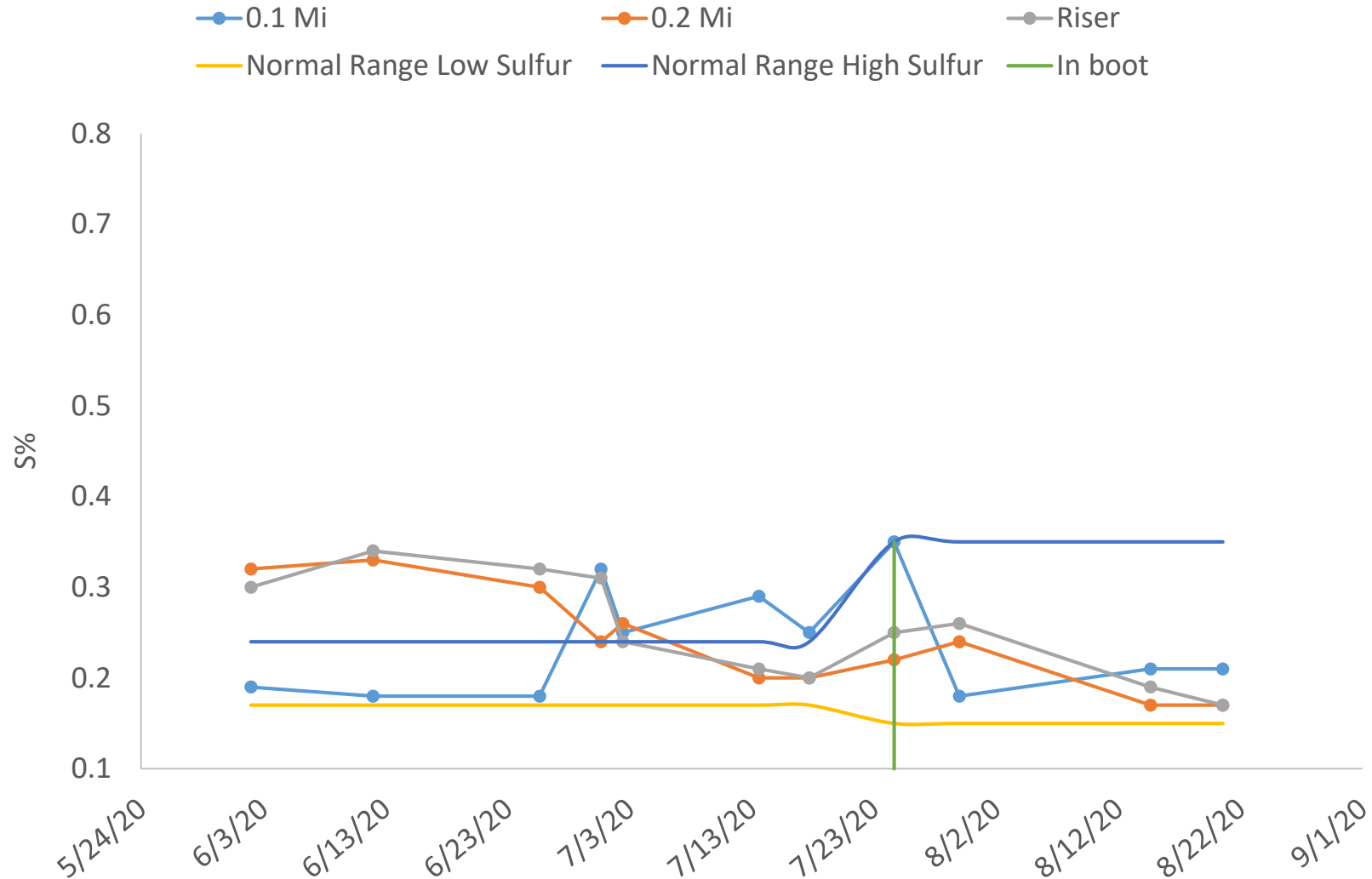
# Calcium 2020



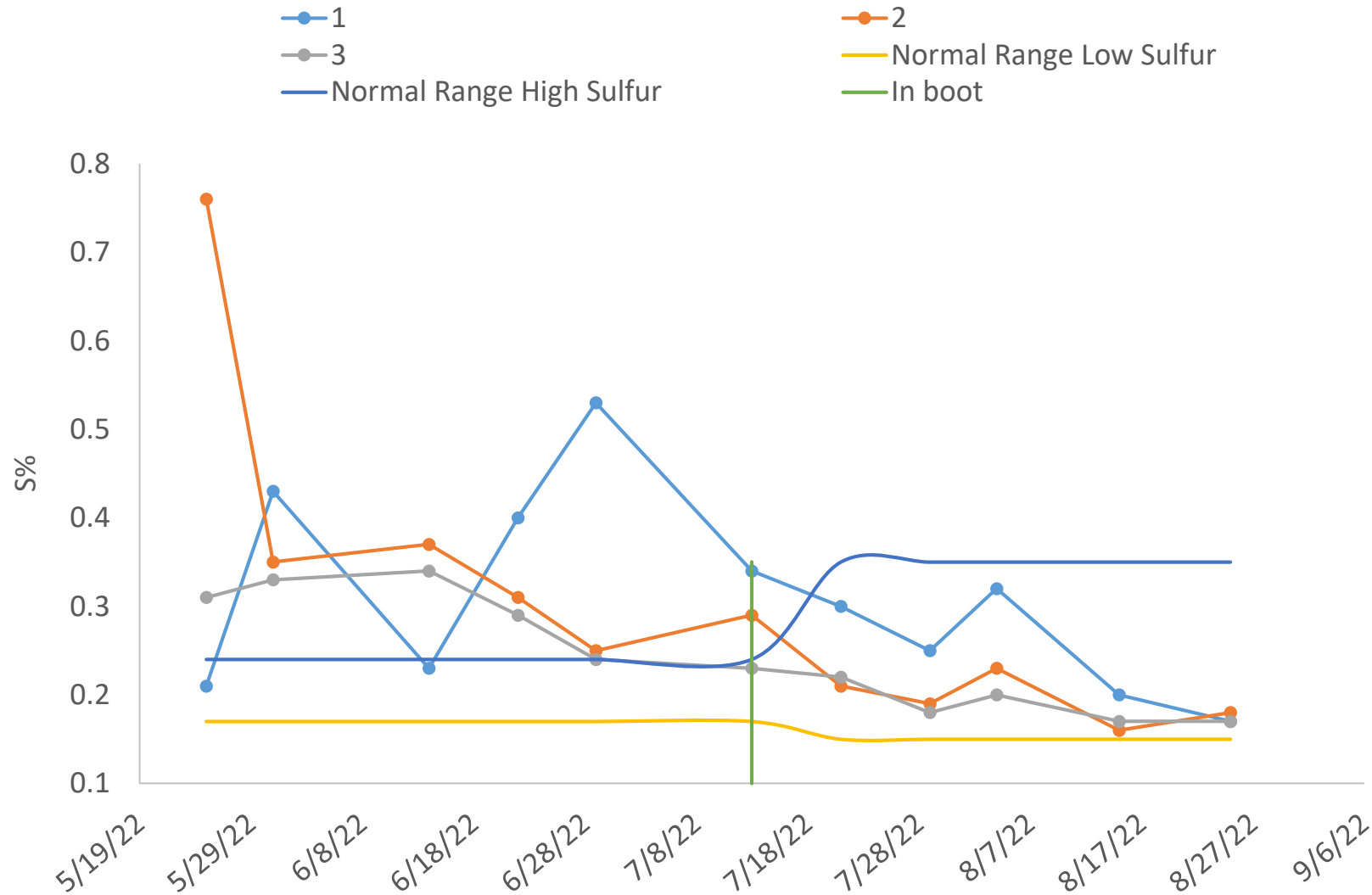
# Calcium 2022



# Sulfur 2020

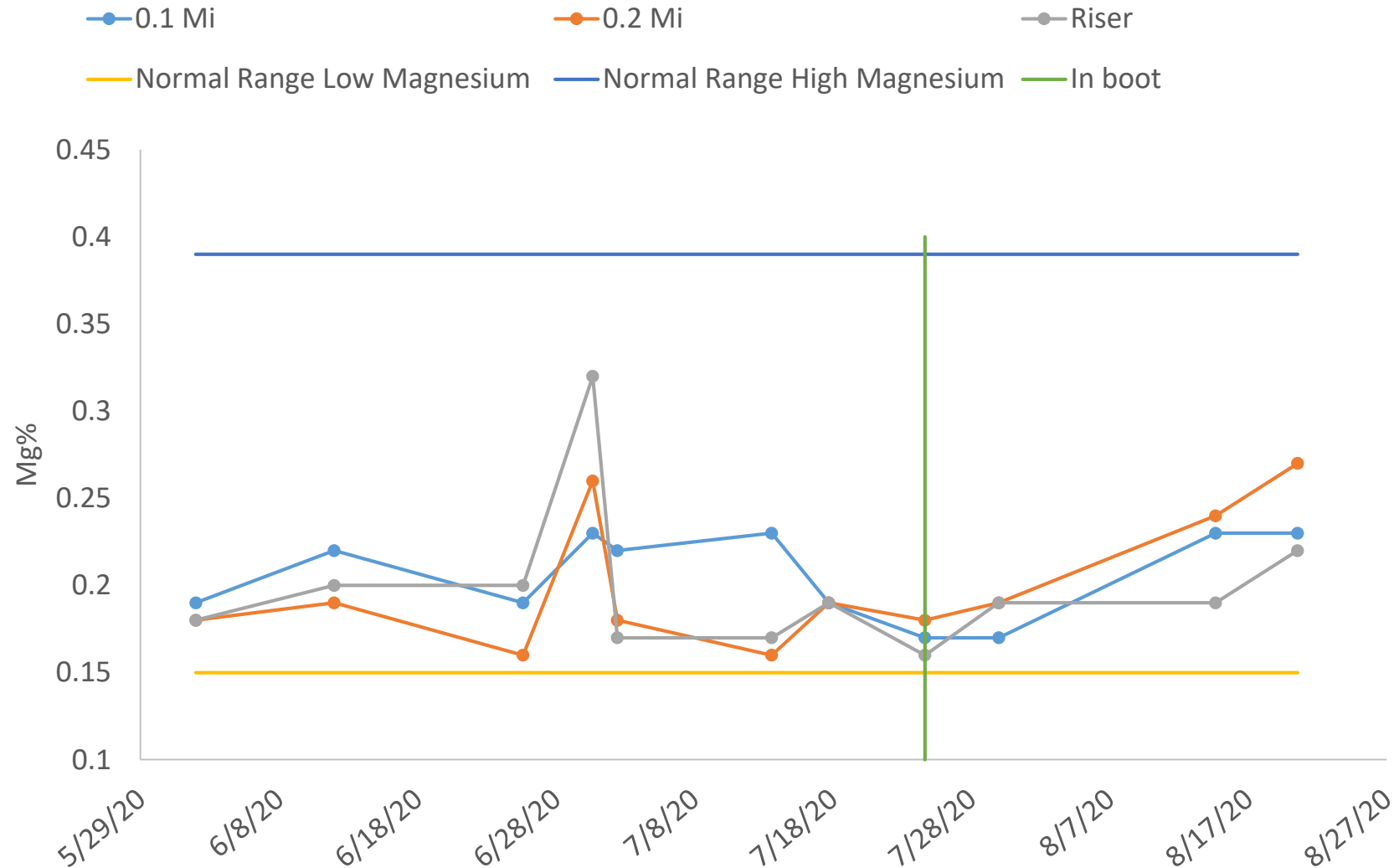


# Sulfur 2022

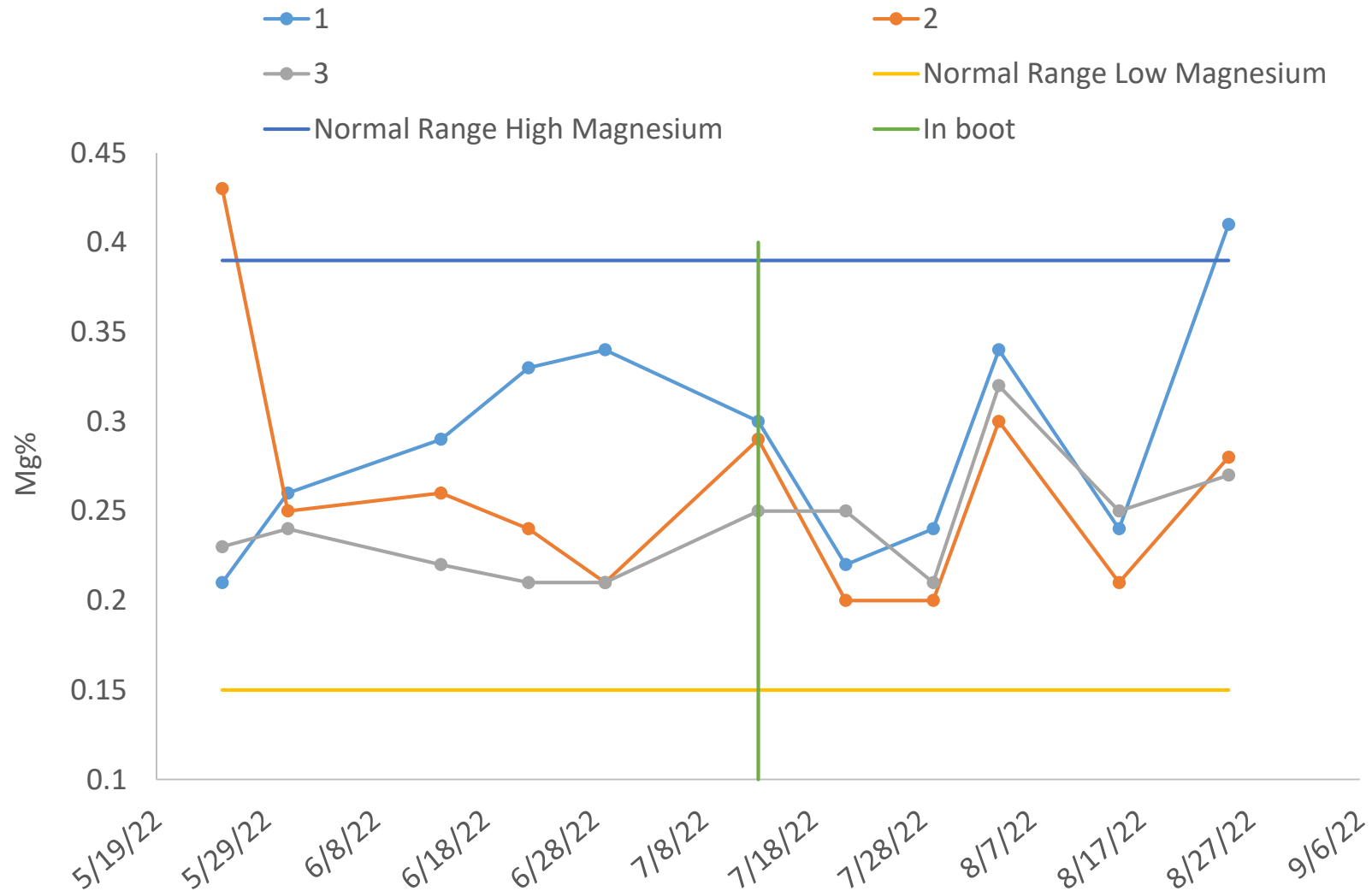




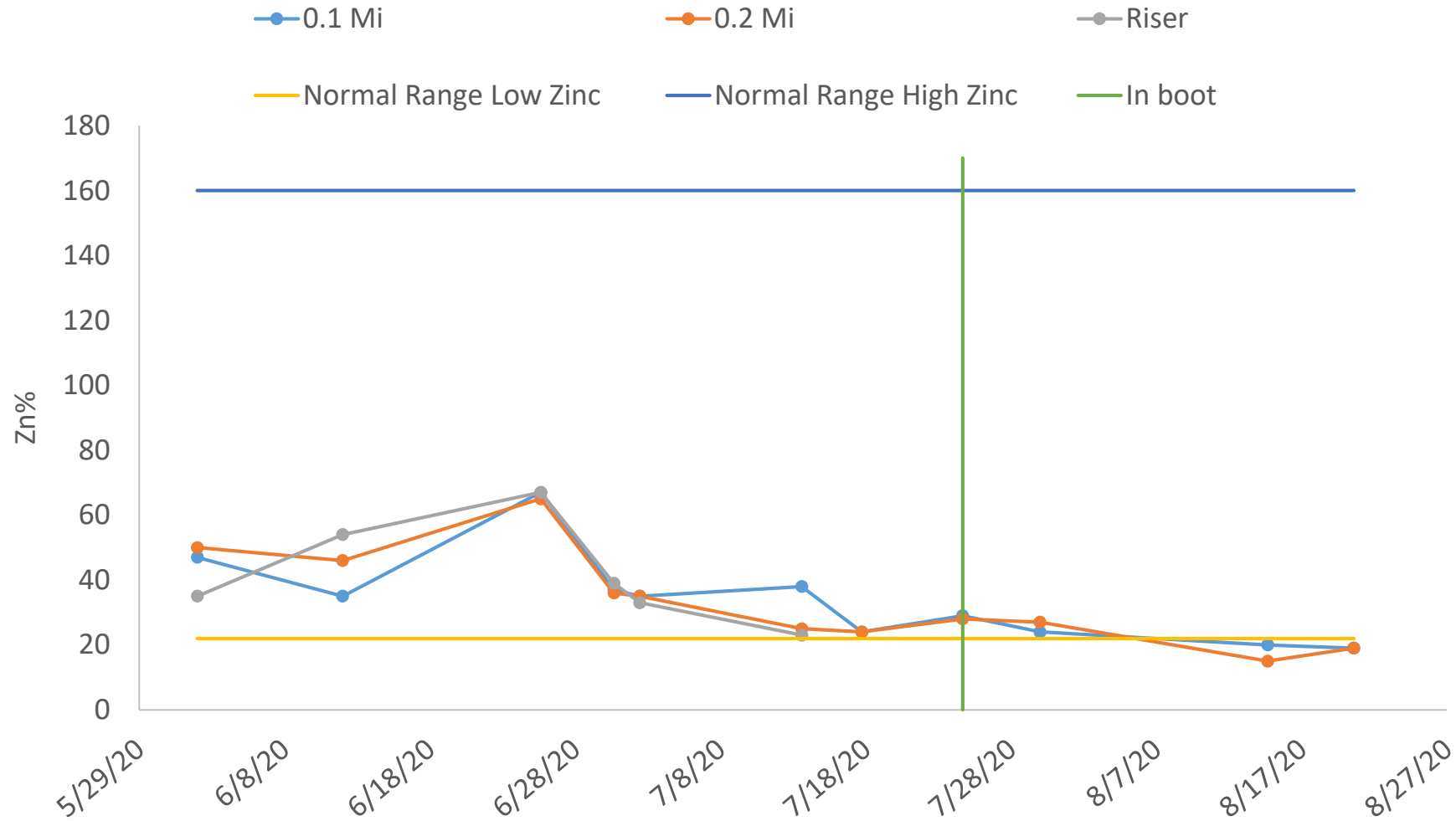
# Magnesium 2020



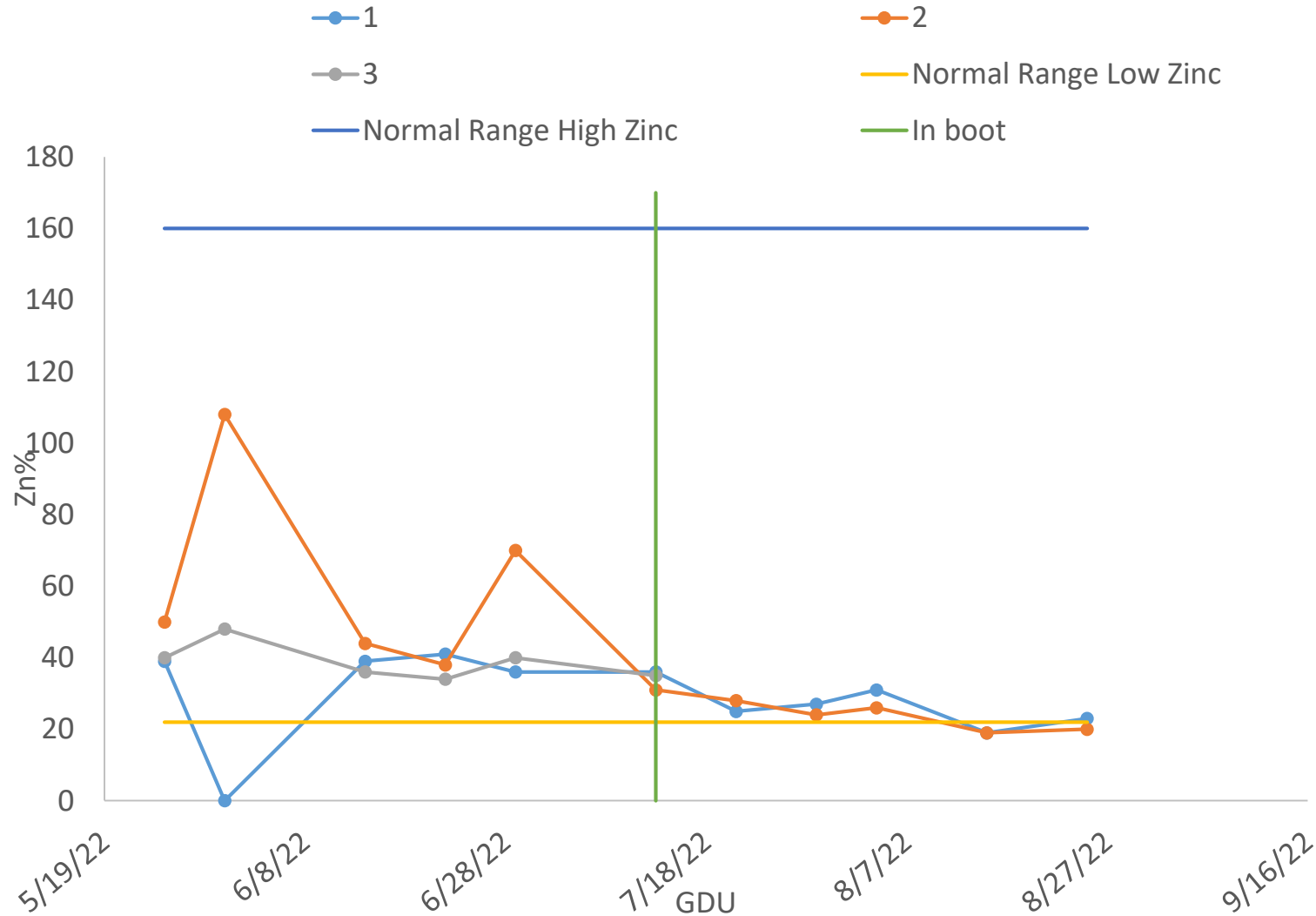
# Magnesium 2022



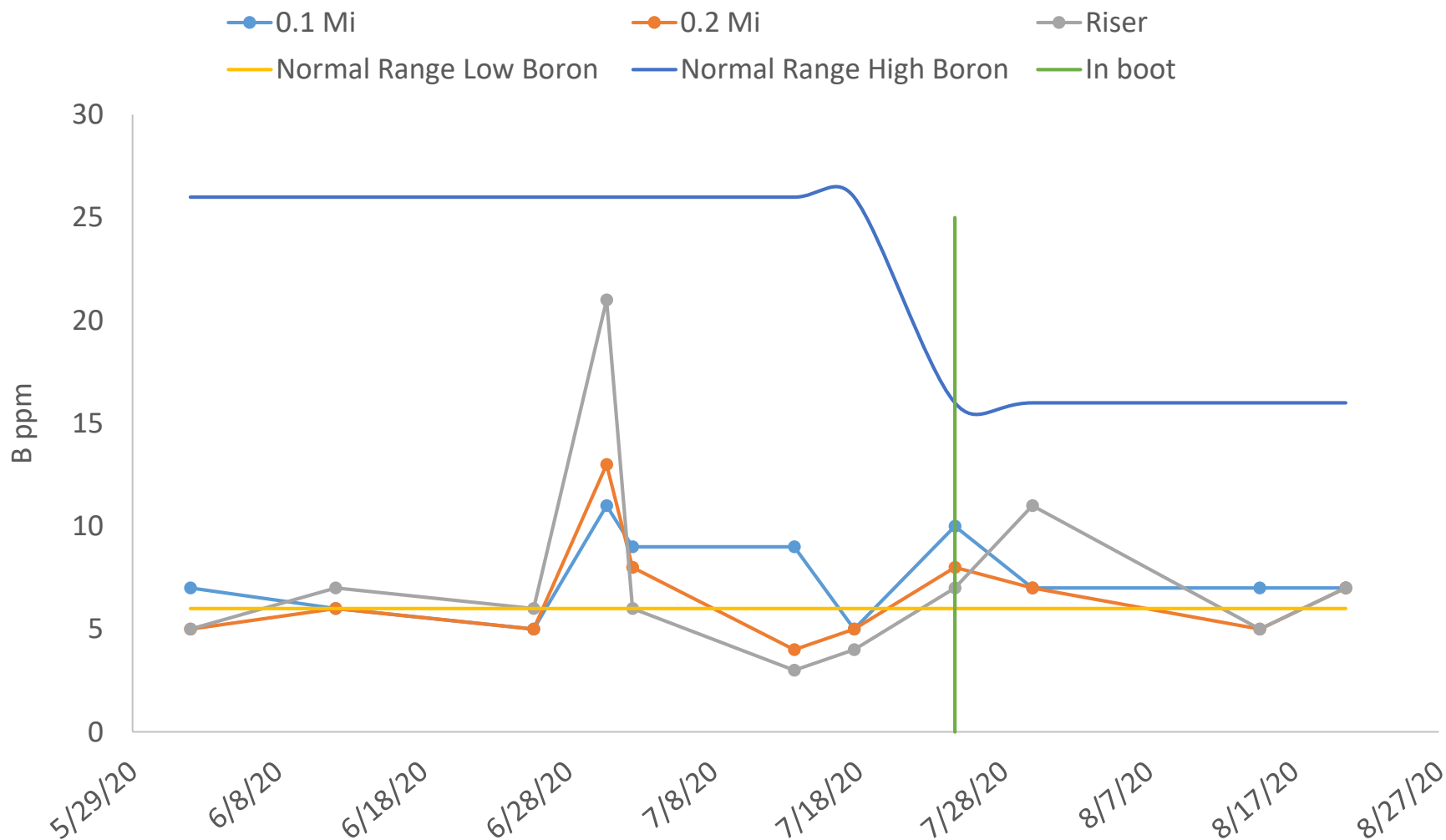
# Zinc 2020



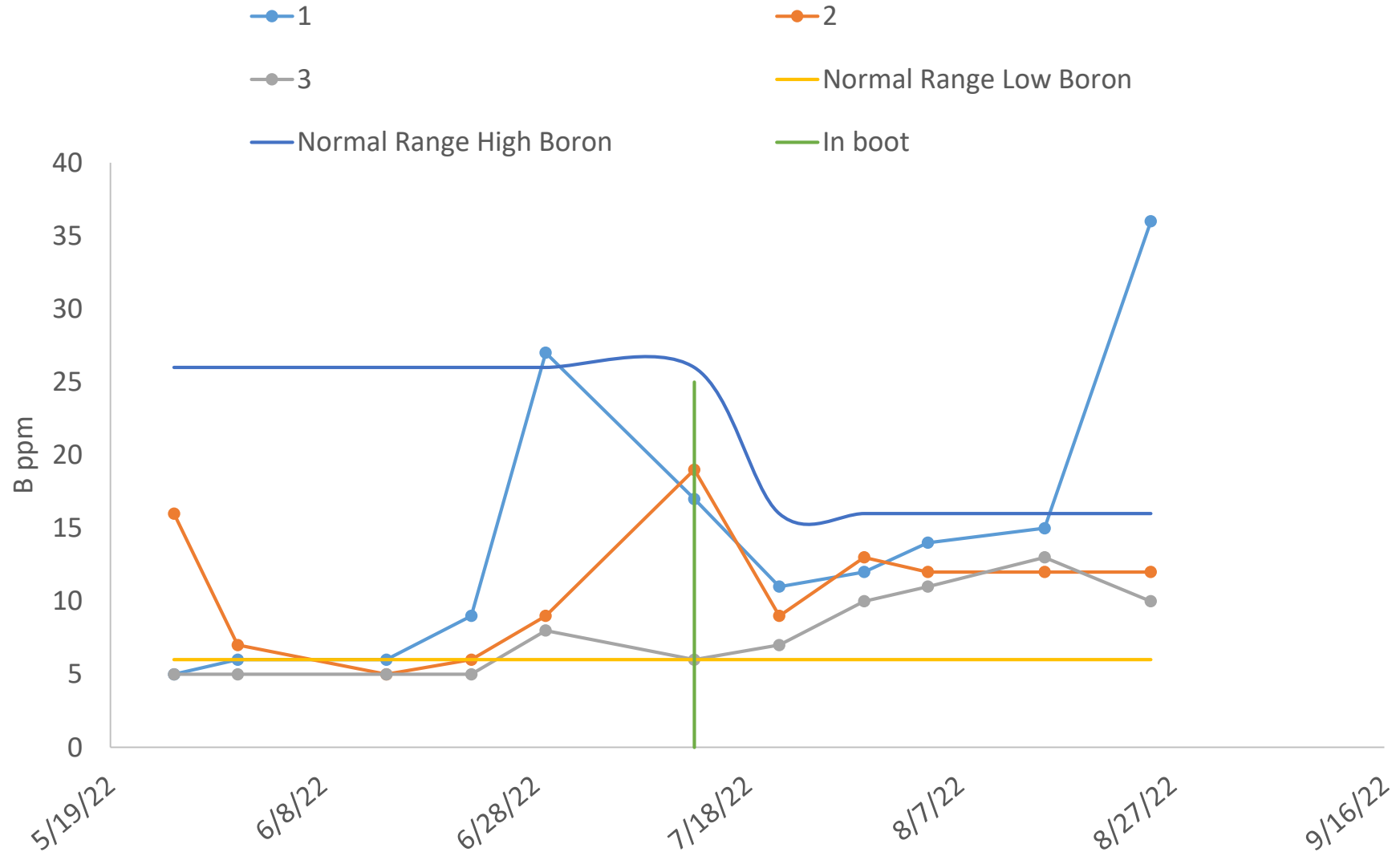
# Zinc 2022



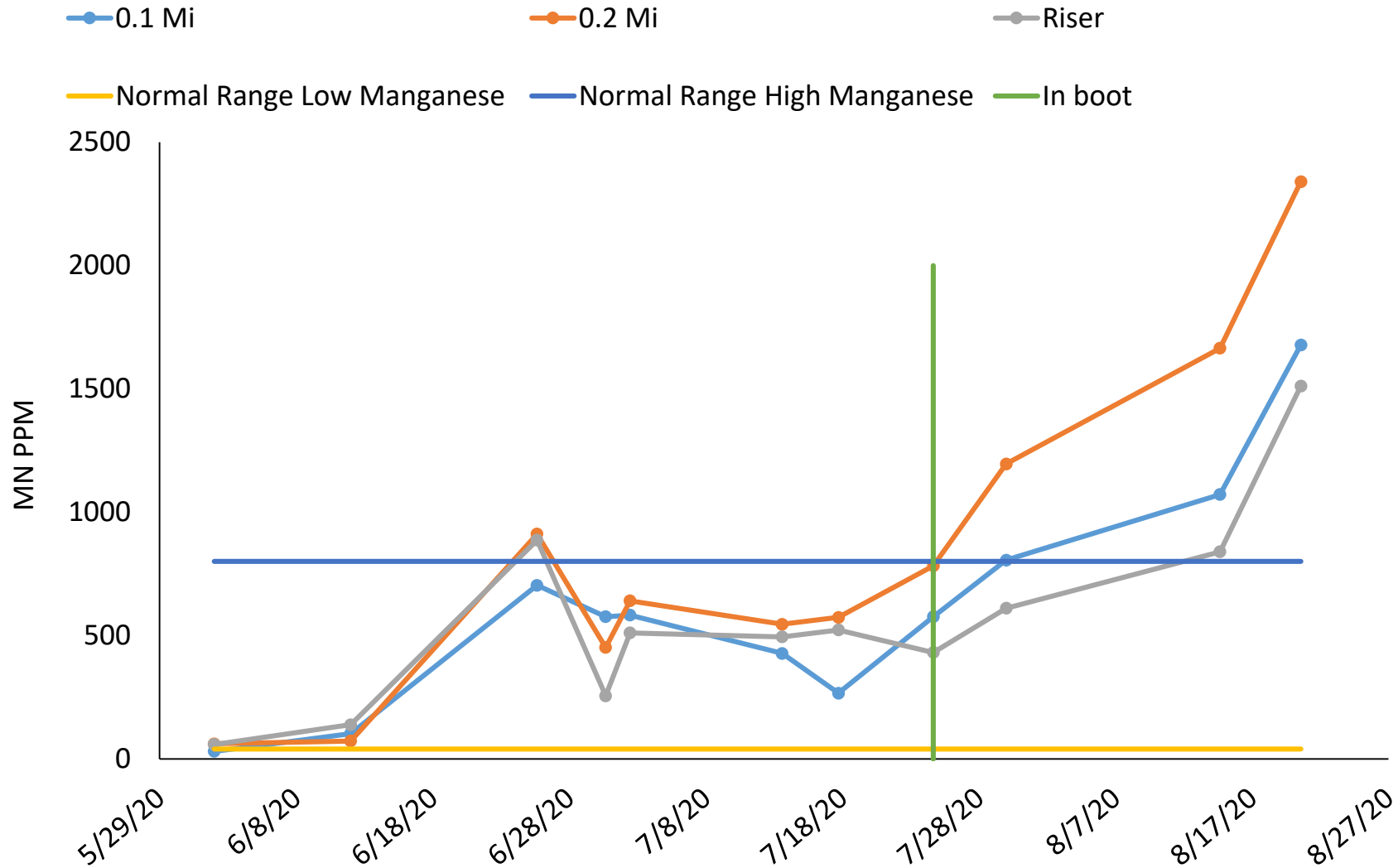
# Boron 2020



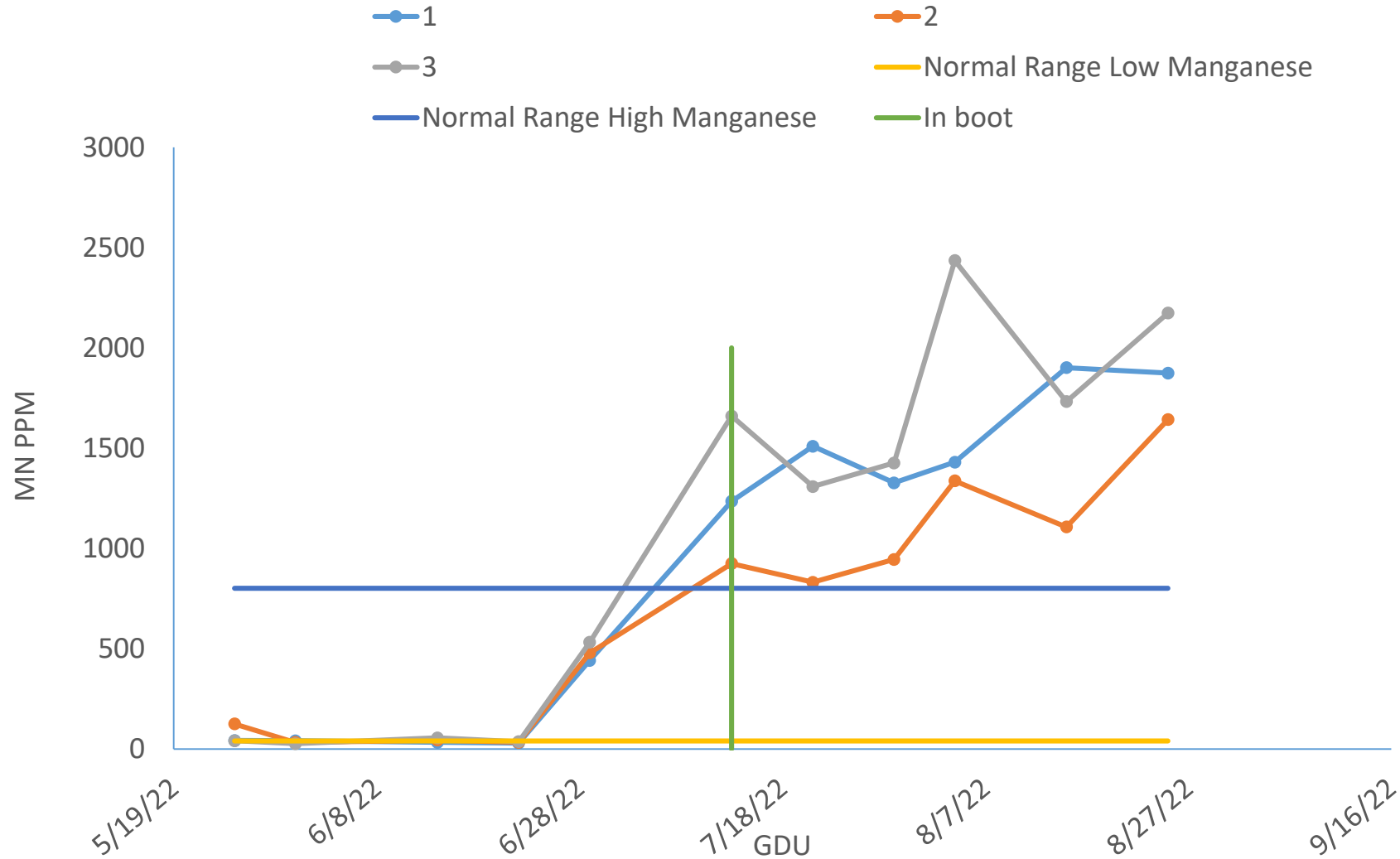
# Boron 2022



# Manganese 2020

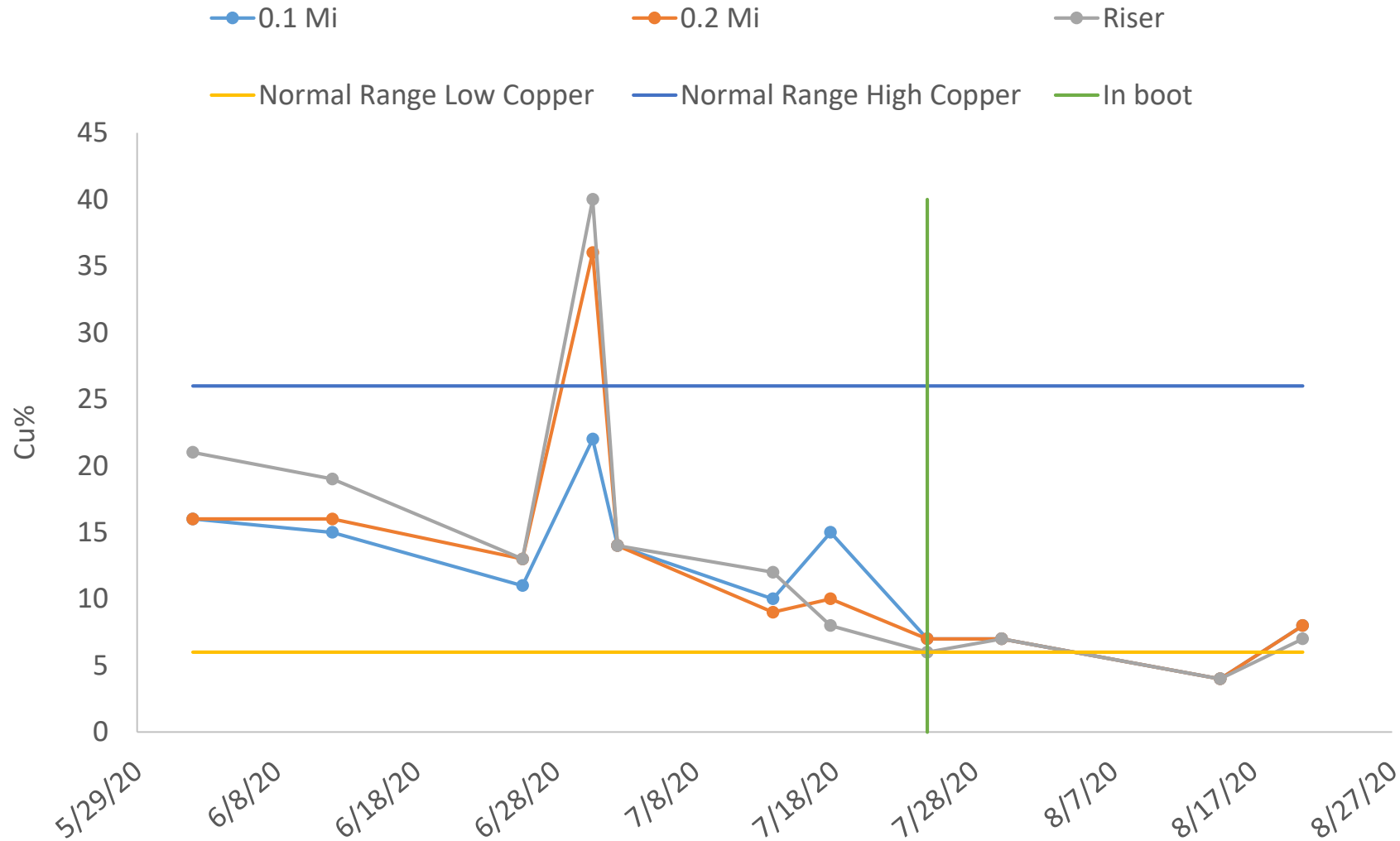


# Manganese 2022

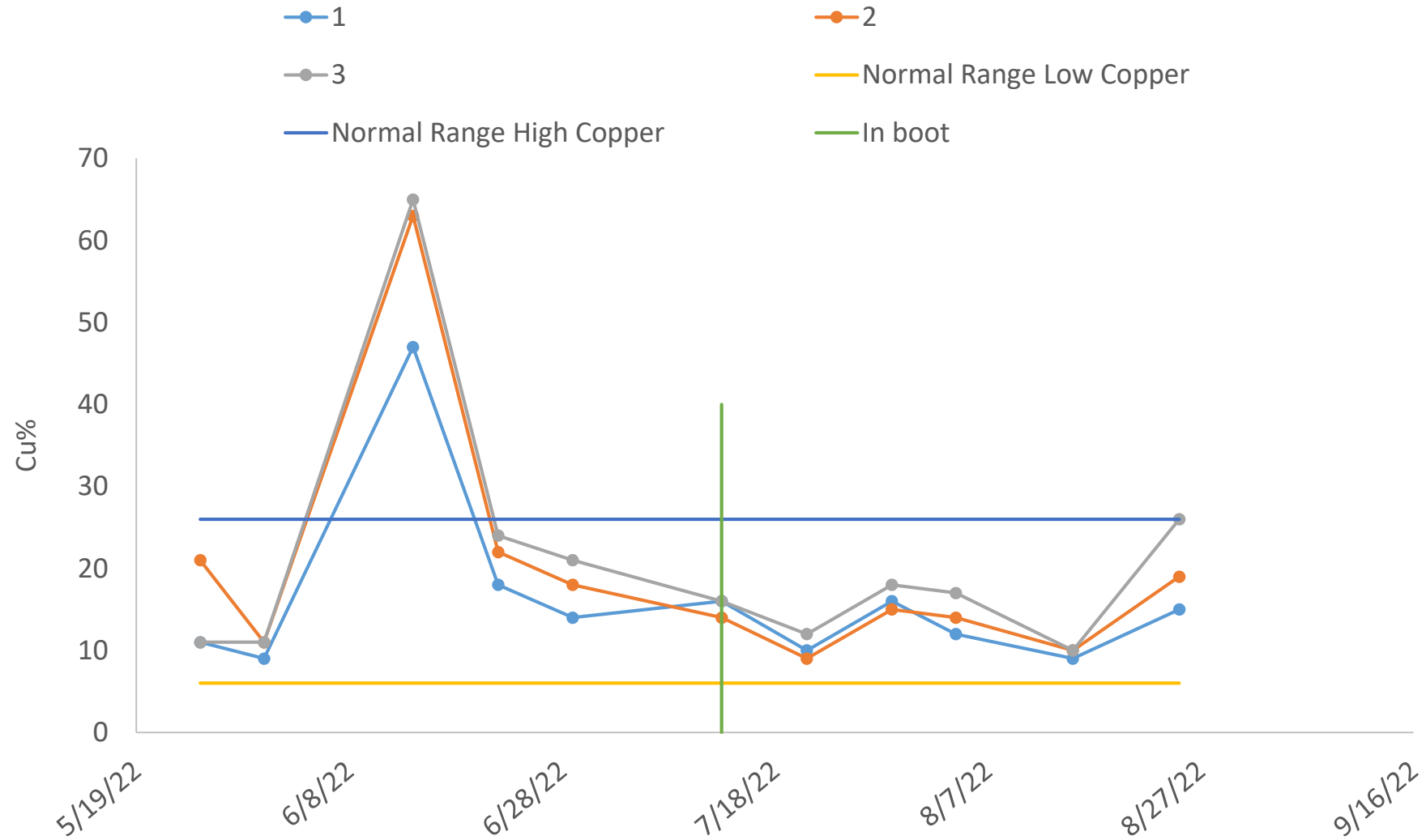




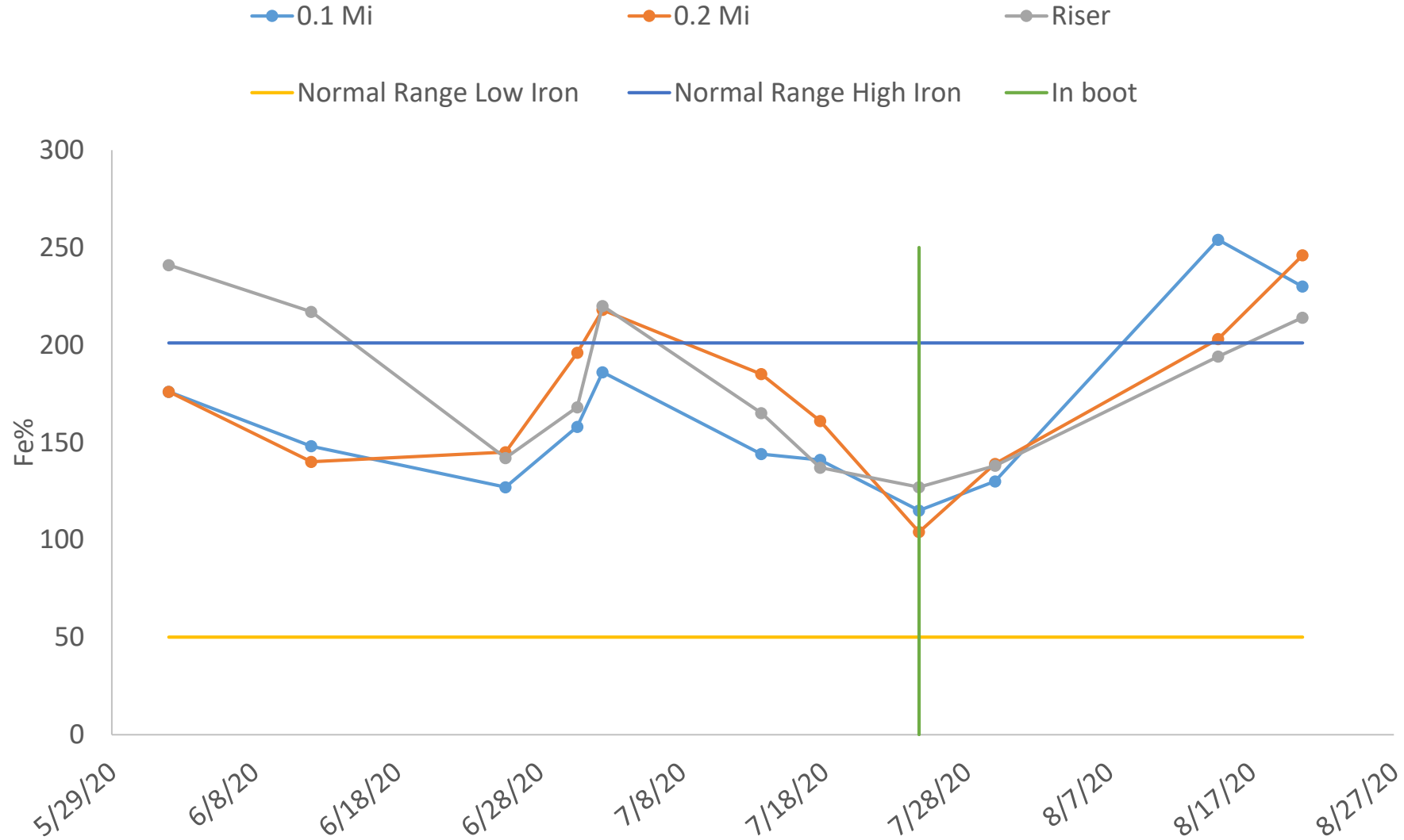
# Copper 2020



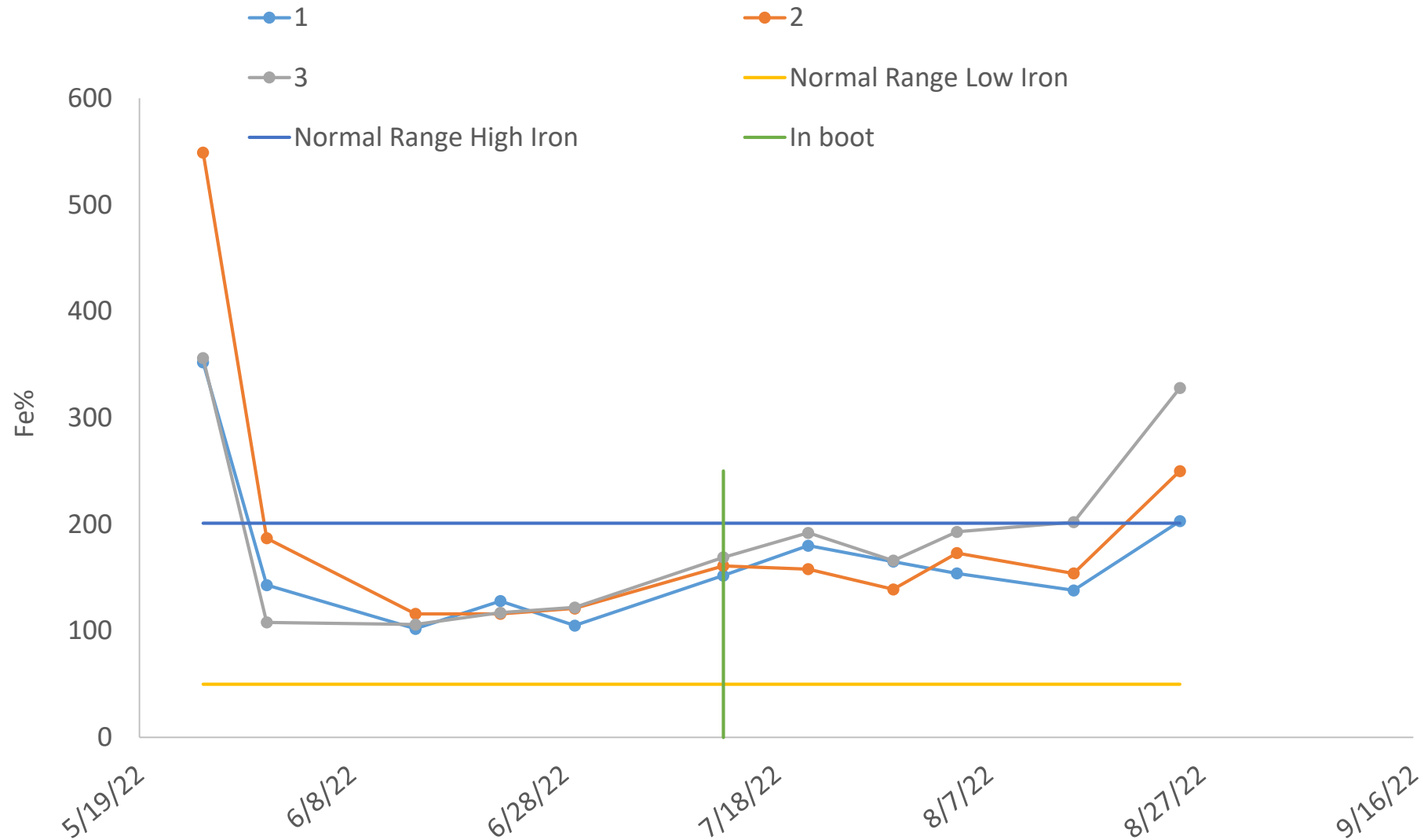
# Copper 2022



# Iron 2020



# Iron 2022



# Results

- Mobile macronutrients decrease throughout the season as expected
- Issues to note and possibly address
  - Zinc stays on the low side of sufficient throughout the entire season



# Conclusion and Goals



- Continue to evaluate current rice tissue levels to update sufficiency ratings
- Evaluate the effects Zinc, Boron and Copper in-season applications on tissue levels and yield
  - All 3 of these nutrients play a critical role in pollination, starch production and grain quality.



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