

What we did

Five new and three continuing trials were established in 2021 through the uPtake project across the greater South West (Peel-Harvey to Oyster Harbour catchments) to examine the response of pastures to phosphorus (P). Thirty-two trials were established from 2019 to 2020. Trials were established on soils with low to high phosphorus buffering index (PBI) with varying soil P levels. Pasture growth was measured in response to P applications ranging from 0-40 kg/ha, both with and without basal nutrients; nitrogen, potassium, sulphur and trace elements.

Why we did it

The information from these trials contributes to defining the **relationship between the amount of P in the soil and pasture growth**. The amount of P in the soil measured by a soil test to achieve a target production or yield is called the **critical value**. Critical values for soils with low to high PBI have been reported previously from similar trial data managed through the national **Better Fertiliser Decisions for Pastures project** (BFDP link below). The uPtake project aims to assess how relevant the national data and critical values are for South West WA soil types and contemporary pasture species. By enhancing industry confidence in the science supporting fertiliser recommendations, uPtake aims to make nutrient use on grazing farms more efficient, reduce nutrient loss to waterways and ultimately improve water quality in our rivers and estuaries. A **fertility index** (soil test value divided by the critical value) is being used to compare trial results with expected results based on national data. A fertility index of 1 (where soil P is the same as the critical value P) is considered optimal. For a fertility index of 1 or greater, little or no pasture response to P is expected. For soils with a fertility index of less than 1, a pasture response to P is expected.

What we found

- **All 40 uPtake trial results to date are consistent with national BFDP data** (i.e. trial results were within 20 per cent of the predicted response) demonstrating the national data is relevant to South West WA conditions.
- **32 per cent of sites with a fertility index of less than 1 did not respond to P even though they were predicted to.** This result suggests the BFDP values may be slightly conservative for rye grass dominated pasture and is being investigated further.
- **82 per cent of the trials showed a response to other nutrients when P was not applied** (nitrogen, sulphur, potassium and micronutrients) indicating nutrients other than P were limiting production.

So, what does this mean to me as a farmer?

1. Results from trials to date show that the national critical values for P used to inform P fertiliser recommendations are relevant to South West WA. You can therefore have confidence in that P fertiliser recommendations based on critical values from BFDP.
2. If your soil test shows that your soil contains excess P for your target production levels, (i.e your fertility index greater than 1) adding more P will not increase productivity. Adding more P will unnecessarily increase costs and may escalate P movement into waterways, contributing to algal blooms. If your P soil test shows a fertility index of 1 at the start of the season, then it contains sufficient P for seasonal pasture growth. Soil testing should guide subsequent pasture P requirements.
3. Addressing limiting nutrients in your soil (e.g. nitrogen, sulphur, potassium, micro nutrients) and correcting low pH can dramatically increase production and minimise unnecessary losses of nutrients to the environment.
4. Soil testing and comparison with critical values is essential to determine the nutrient requirements of your soil to meet your production targets.

Where to next

The uPtake project will run to June 2023 and aims to undertake at least 50 trials across the South West. Results from the next year of trials will be added to the 2019-21 trial data to build a robust validation of national data and enhanced understanding of P responses in South West WA soils with contemporary pasture species.

Ten P trials will be established in 2022, six new sites and four continuing. A split P application trial will also continue to look at the best time to apply P for optimising productivity and minimising loss to the environment. Stay up to date about field days and trial results through your local catchment group.

Better Fertiliser Decisions for Pasture

<https://www.asris.csiro.au/downloads/BFD/Making%20Better%20Fertiliser%20Decisions%20for%20Grazed%20Pastures%20in%20Australia.pdf>

<https://www.publish.csiro.au/CP/CP19068>

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