

How can we enhance phosphorus retention in constructed farm wetlands?

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Constructed and restored wetlands have significant potential to reduce nutrient losses in drainage waters from New Zealand farms. While both types of wetland show reasonably good nitrogen removal efficiencies, they are not always so effective at phosphorus (P) removal and their flooded topsoils can be net sources of P. Wetland P removal efficiency could be enhanced, either by adding a P-retentive amendment to the soil in the bottom of the wetland, or installing a porous filter with a high P adsorbency and retention capacity at the end of the wetland.

A literature review (Ballantine and Tanner, 2010) was carried out to evaluate a range of materials reported in the scientific literature as having the ability to remove P from water. Materials reviewed included (1) naturally occurring materials, such as soils, sands, clays and aggregates, (2) processed and modified materials, and (3) waste materials. A simple scoring system based on P removal characteristics, availability, likely cost and potential reuse or disposal on saturation was used to identify the materials with most promise as soil amendments or filters for constructed wetlands.

Allophane, Papakai tephra and limestone were judged as materials with the most potential as soil amendments. Field and lab tests have been undertaken to determine which of the above materials might be most suitable to enhance P removal in constructed farm wetlands, and results of tests are reported in this contribution.

References

Ballantine, Deborah J. and Tanner, Chris C.(2010) 'Substrate and filter materials to enhance phosphorus removal in constructed wetlands treating diffuse farm runoff: a review', New Zealand Journal of Agricultural Research, 53: 1, 71 –95.