

November 2018: An open letter to New Zealand farmers

'The potential of RPR (reactive phosphate rock) for New Zealand'

Dr Bert Quin, Managing Director, Quin Environmentals (NZ) Ltd

I have been involved with RPR research and promotion in New Zealand for 40 years. I spent 17 years as a soil fertility research scientist with the Agricultural Research Division of the Ministry of Agriculture - what became AgResearch – including 3 years as Chief Scientist (Soil Fertility) at Ruakura. I designed and coordinated the 'National Series' of RPR trials, which ran over a period of up to 8 years on 19 farms throughout New Zealand in the 1980s.

The trial sites were all deliberately selected to have below-optimum soil Olsen P levels, to more clearly show any differences in performance. Despite this, differences in pasture production between RPR and super were minimal - 0-3% on average - and had totally disappeared by Year 3 on low and medium P-retention (ASC) soils and by Year 5 on the highest P soils. The only exception was a low-rainfall (700mm), non-irrigated site at Winchmore in mid-Canterbury which had also been over-limed to a soil pH of 6.4.

The simple solution to any initial 'lag-phase' with RPR was proven to be to use a blend of RPR and high-analysis P fertilisers such as TSP, DAP or MAP (and added S as required) for the first few years. Note that mixtures of RPR and superphosphate were shown to be not as effective for this purpose.

Subsequent research demonstrated that where Olsen P levels were at or above optimum – as is the case on about 98% of dairy farms and about 75% of hill country farms in New Zealand – there were no measurable differences in pasture production right from the start of using RPR, meaning a soluble P component is unnecessary.

If the fertiliser industry in NZ was not dominated by the superphosphate manufacturing duopoly, I am convinced that RPR – mixed with sulphur and other nutrients as required for individual farms – would (i) already be the main source of P used in NZ, and (ii) we would have far less polluted waterways and lakes as a result. RPR is proven to result in far less run-off of water-soluble P than superphosphate. Imported high-analysis would be blended in where required.

Also, because RPR particles dissolve in the soil steadily over time, releasing P for direct uptake by plants, there is far less P existing as soluble P adsorbed onto the surface of soil particles than is the case with superphosphate. Most of what is described as 'particulate P' lost from soil in run-off and erosion is actually present in the form of soluble fertiliser P that has become adsorbed (to use the technical term) onto soil particles near the soil surface. When these particles end up in a waterway or lake through soil erosion, as much as 25% of this adsorbed P can easily be desorbed back into water-soluble form, (as demonstrated in an excellent soil chemistry paper by Australians Barrow & Shaw in 1975). This 'particulate P' form of loss is also greatly reduced with RPR, but you need multi-year constant-treatment trials to clearly demonstrate this.

Unfortunately, this vital area of water-quality research has received no funding in NZ, largely because most of the government research funding on fertiliser and the environment is – completely inappropriately - channelled through the duopoly, who have no wish to encourage this research.

New Zealand simply does not need to be taking the manufacturing-grade phosphate rock from the Moroccan-occupied deposit in the Boucraa area of the Western Sahara to make into superphosphate. Certainly, superphosphate has played a very important part in developing NZ's low-P soils. However, virtually all our agricultural soils have long been developed to the point where they can now be maintained very easily with slow-release form of P, containing up to 30% soluble P where needed, to ensure that our waterways are protected.

If we continue to allow the industry to be dominated by two management groups who refuse to accept what is happening to our environment, we will only have ourselves to blame as we progressively lose our hard-earned reputation as a 'clean and green' country. Farmers must consider the question 'Which P fertiliser should I use, and why?' far more seriously than they have in the past.

Algerian RPR is easily the match of any other RPR agronomically, and contains a low cadmium level of 18ppm, which represents only 140 mg Cd per kg P, well under the Biogro's and Demeter's organic farming limits, and only half the limit that the industry allows itself. It performed even better than North Carolina RPR in trials run by the International Fertilizer Development Center, Alabama, USA. The Managing Director and the Senior Scientist of the IFDC released the following statement in 1999:

"Unground Djebel Onk (Algerian) phosphate rock is classified as a highly reactive phosphate rock for direct application to acid soils".

All NZ soils are acid. As it happens, all RPRs are also liming agents in their own right, automatically reducing and in some cases going close to eliminating the need for maintenance lime applications. Algerian RPR has the highest lime equivalent (58%) of all RPRs, helped a bit by the small amount of naturally-occurring dolomite running through the deposit (3-7% by weight).

Note that the naturally-occurring 3-7% phosphatic dolomite in Algerian RPR can reduce its citric acid solubility in NZ's current but obsolete 30-min test. This is an artefact only, and has no effect whatsoever on the excellent field performance of Algerian RPR. It also contains among the lowest levels of Cd, mercury (Hg) and uranium (U) of all IFDC-recognised RPRs.

Because of all these positive attributes, some industry players have tried to put farmers off using Quinfert Algerian RPR by playing the 'it is not soluble enough in NZ's test' game. So we also offer the product with some of the dolomite screened out, to ensure it reaches 30% citric solubility in the current test. Both the normal (V1) and 'low-Mg' (V2) versions perform the same as each other in the field as fertilisers, i.e., exceptionally well. One just has a bit more dolomite than the other!

Finally, there are several other low-Cd RPRs available for blending from around the world as well, so there is absolutely no reason for anyone to resort to reducing the high cadmium level in Sechura RPR by mixing it with a low-Cd manufacturing-grade (non-RPR) phosphate rock, which may be as little as 20% as effective as an RPR.

A 50/50 blend of Sechura with Boucraa slimes (PB3) or Moroccan rock may be only 60% as effective agronomically as 100% RPR. And take note, the Khouribga rock from Morocco, commonly used in the manufacture of fertilisers, can contain large amounts of uranium, up to 566 ppm (FAO, 2004). This is so high (10 times higher than Algerian RPR for example), it can be economically mined to produce uranium! Ask for an updated declaration of the heavy metals in your superphosphate.

The ball is in your court. Please phone or email me if you have any questions.

Yours sincerely

Dr Bert Quin
021 427 572
bert.quin@gmail.com
www.quinfert@xtra.co.nz