

FERTILISERS

THE GREAT FERTILISER CONTROVERSY

The decade from 1967 to 1977 will be long remembered by many in Australia for the furious controversy that raged between the solidly entrenched superphosphate-based chemical fertiliser monopoly and the emerging 'embryo' of the alternative and ecologically acceptable natural mineral fertiliser industry.

The author, in his weekly television series 'Today on the Land', dared to question the efficacy of superphosphate based, ionised, water-soluble NPK chemical fertilisers and the wisdom of continuing their unbridled use in every agricultural and horticultural enterprise. It was a match to a short fuse! The reprisals were swift and vicious from the chemical industry, enthusiastically backed up by the various State departments of agriculture; and so it was, that a one man war was declared against the government-backed chemical giants.

The post-World War II 'golden age' of farming was over, and various rural crises (not the least of which was the 'cost/price squeeze') had sensitised the farming community to many issues.

Farmers with declining cereal yields, degenerating pastures, eroding soils and increasing stock health problems, with commensurate vet bills, were beginning to listen more attentively to the arguments against chemical farming and for the organic alternatives. It was a period during which the tight-lipped dogged refusal of the department personnel to consider the alternatives caused a significant downslide of department credibility and prestige with the farmers. That loss of respect has never been regained. Indeed now, twenty years on, the frightening and predicted repercussions from that era of department power and folly, are such that it will be difficult for the departments of agriculture to ever regain their former prestige and respect, in the eyes of many pastoralists.

The refusal of departments of agriculture and government research organisations to engage in extensive and honest investigation of alternative fertiliser and farming practices during that period is likely to be remembered as one of the greater scandals of our agricultural history.

A SUPER HOAX

What Every Gardener and Farmer Should Know about Superphosphate

Somebody once said, 'You can fool some of the people all of the time and some of the people for most of the time; but you can't fool all of the people all of the time.'

Well, it seems that the superphosphate industry at large, and particularly in Australia, in its apparent intention to disprove the cliché and fool all of the people all of the time, has come pretty close to succeeding. Certainly the industry has managed to fool most of the people for most of the time, and that includes not only the end users such as farmers and gardeners, but politicians and supposedly responsible officers of departments of agriculture and public health under a succession of governments.

It was a remarkable achievement for any industry. Not only did they brainwash a nation into believing that there is no alternative to using superphosphate at all times and in every type of agricultural enterprise to achieve successful production, but they also managed to brainwash the taxpayers to support the hoax, through what was known as the superphosphate 'bounty', which heavily subsidised the manufacturers. Well, that must be the envy of every aspiring 'big time' racketeer.

It is perhaps easier to understand how this has come about when looking at the government/industry complex as it related to the superphosphate racket until the early 80s. The Australian and New Zealand governments owned virtually all the sources of raw material, in the island phosphate deposits of Nauru and Ocean Island, under what was known as the 'British Phosphate Commission'. The commission was disbanded in the early 80s and the whole nasty business handed over to the control of the chemical fertiliser organisations.

Now that the Australian and New Zealand governments have bowed out and are no longer obliged to exploit every last kilogram of the nearly exhausted island guano phosphate deposits, it will be interesting to see whether they might now be more amenable to promoting the environmentally desirable alternative—the natural mineral fertiliser industry which has struggled against enormous odds for many years. The only way in which the government could have been exonerated from

what can only be described retrospectively as a highly questionable ploy would have been to offer the same support for the development of the alternative industry, or in other words, to have assisted the farmers in purchasing *any* fertiliser of their own choice, and not only superphosphate.

Nobody would deny the early miracle of superphosphate in bringing into production, vast areas of the nation's arable lands that were seriously deficient in phosphate in the virgin state. But what must be abhorred and exposed is the fact that farmers are encouraged to continue using 'superphosphate' every year on every crop, regardless of the phosphate status now existing in their soils after fifty years or more of continuous application.

There is no doubt at all that there are many millions of hectares of farmlands containing countless billions of dollars worth of unused phosphate, (bought by the farmer with the help of the taxpayers), which is fixed in the soil, and which in many cases, if released, would be sufficient for fifty years of continuous cropping if not 1 gram of additional 'super' were applied. Clearly the industry is aware of this, for the 'superphosphate' pedlars with their super sales spiel convince the farmer that it is a good thing to have these reserves. Indeed, they describe it to the farmer as the 'phosphorus bank', and this while encouraging them to increase the year's phosphate order to overcome the problem of their declining pastures. The so-called 'phosphorus bank' is supposed to be some sort of comfort to the farmer, rather like telling some poor fellow who is down on his luck and doesn't know where his next meal is coming from: 'Take heart, my friend, there's a lot of gold in Fort Knox and almost as much in the Bank of England!' It seems that to tell the farmer about his phosphorus bank balance and deliberately deny him a passbook or a key to the vault, when the process of withdrawal is well known to the industry, is grossly dishonest, particularly when the real purpose of the salesman's call is to encourage the farmer to buy more phosphate that he probably doesn't need.

It would be generous to concede that the salesman's ignorance could be genuine, but impossible to exonerate those technical officers in the higher echelons on the same premise.

It is a fact that only a very small percentage of water-soluble superphosphate is used by crops and by far the greatest portion becomes firmly fixed in the soil jointly by the elements aluminium, iron and calcium. In very light soils in higher rainfall areas or under irrigation it is quickly leached far beyond the root zone and irretrievably lost. The phosphorus combined in the calcium/aluminium/iron/phosphate complex is scarcely available to plants unless released by a group of soil-borne bacteria known as thio-bacilli. The derivation of their name is from the Greek word *theion*, meaning 'sulphur'. These sulphur-dependent bacteria derive their energy from oxidising sulphur which might be rather

unscientifically called their 'food'. The waste product from their life processes is virtually bacterial sulphuric acid which, in turn, attacks the insoluble phosphate complex in the soil and releases soluble, available phosphate which can then be taken up by plant roots.

In suitable soil conditions, the phosphate release, though slow, is adequate. Indeed, its slowness and adequacy provide for long-term conservation of phosphorus and economic use of the element. This was clearly defined by a senior soil scientist, Dr R. Swaby of the CSIRO Division of Soils in South Australia, as far back as the late 60s and resulted from several years of research into the efficacy of bio-phosphates (rock phosphate/sulphur combinations utilising thio-bacilli). The message was clear enough though it was given very little coverage by the agricultural press. In essence, it was that 'under suitable soil conditions of temperature and moisture, etc., bio-phosphates are more efficient in the long term than superphosphates'. Clearly this application is in the best interests of the farmer and all humans, but not necessarily in the best interests of the massive, multi-billion dollar 'super' industry that is likened to a merry-go-round revolving with such momentum that to jump off is to invite broken necks. The preferred alternative is to go faster and cling tighter!

These are harsh words to be sure, but it is time for harsh words when the only way to modify the eternal use of super phosphate as part of the 'NPK mentality of the Western world', as so aptly described by the late Professor Andre Voisin, is to inform the farmer or gardener of the alternatives and show the proof of their efficacy, while pointing out at the same time the expensive and damaging problems of continued, unbridled use of 'super' as a standard ritual, long after any possible value can be derived from the practice in a large proportion of farming enterprises.

Declining pastures, induced trace element deficiencies, animal health problems and environmental hazards including serious pollution of waterways and estuaries are undoubtedly resulting from the overuse of superphosphate and should be the concern of every well-informed and decent citizen.

The fact that superphosphate the world over is shown to contain considerable quantities of some of the most toxic and dangerous heavy metals, cadmium and uranium, together with high levels of fluorine, which at very low concentrations is deadly to enzymes (the chemicals of life), should be enough for the world's agricultural scientists to proceed with great caution and seek to understand a great deal more about this standard fertiliser that is applied to food crops around the world in many millions of tonnes. The average yearly sale of superphosphate in the State of South Australia alone is about 500 000 tonnes, representing only a fraction of the national annual usage.

Converted to farmer dollars at the present cost, that is about \$70 million. We are talking very big business with seemingly very little conscience, if the industry is not prepared to undertake a thorough self-examination in the light of the easily predictable and currently emerging facts of the health-, environment- and economy-threatening effects of superphosphate. The herbicide 2,4,5- T, containing dioxins, the most toxic and deadly substances ever produced during our tenure and mismanagement of the planet earth, has been much in the news during the 80s and 2,4,5- T sales around the world are worth some millions of dollars. We have witnessed the frantic efforts to whitewash 2,4,5- T usage and its attendant disasters as a harmless 'non-event' in the eyes of a now better-informed and not quite so gullible public. However, the 2,4,5-T business is but a pimple on a pumpkin compared with the Gargantuan multi-billion dollar worldwide superphosphate industry. One can reasonably expect then a massive public relations onslaught with no holds barred to protect the status quo and keep the farmer and gardener on side and preferably in ignorance. It is doubtful whether any part of the agricultural or horticultural press would be prepared to delve too deeply, since the chemical fertiliser industry is one of the biggest single sources of advertising revenue. Upon that revenue the rural press depends for its continued existence. 'Freedom of the press' means freedom to print what they like and the same freedom to avoid any truth that might not be in the best interests of their 'cherished geese that lay the golden eggs!'

The truth of the matter with superphosphate is simple; as at 2000, tens of thousands of farmers and home gardeners will be spending tens of millions of dollars on the purchase of possibly worthless and damaging fertilisers that they do not need, largely as a result of false and misleading information, or more accurately 'advertising', however subtle.

The following facts support this serious 'allegation': Farm soils for complete analysis have come to us from all over Australia and it is evident that a large proportion of them contain levels of both 'total phosphorus' and 'available phosphorus' far above the internationally recognised desired optimum levels and sufficient in many cases for fifty to a hundred years or more of continuous cropping without further phosphate applications.

Take, for instance, the case of a dairy farmer from the irrigation flats at Swanport on the River Murray who, with seriously declining pastures, sent in his soil sample to see whether the analysis might indicate the reason for his failure. The National Association of Testing Authorities laboratory report* showed a total phosphorus level of 1300 parts per

million and an available phosphorus figure of more than 300 parts per million!

A total phosphorus reserve of 1300 parts per million, with an available phosphorus figure of only 30 parts per million, would be more than enough for any crop in the world, and yet this unsuspecting farmer with ten times more than the optimum available phosphorus level and fifty times more available phosphorus than many South Australian farms was being encouraged to increase his superphosphate applications!

The same dairy farmer had copper levels in his pasture soils that would be considered high by any world standards and yet his cows were showing clear signs of copper deficiency. One would expect such an anomaly, since one of the dangers of excess soluble phosphate applications is that the free phosphate ions are efficient 'scavengers' for any available copper and zinc and in the process of combining with these elements, copper phosphate and zinc phosphate are formed.

These compounds are recognised as being among the most tightly bound and insoluble compounds known to science, so that total shortages of these elements can be induced, especially in situations where their levels are already 'marginal' to 'low'. When this occurs, the superphosphate pedlars are then in a position to recommend more superphosphate with expensive trace elements (copper and zinc) at a much higher price per tonne. It seems to me that this could be a splendid and most profitable racket for those engaged in exploiting the farming community with an all-consuming profit motive, while the struggling farmer, who is largely uninformed (or improperly informed) and therefore in ignorance, becomes fair game to greedy opportunists. Annual superphosphate bills of \$10000 and \$20 000 or considerably more are common in the farming community.

Readers of this expose, being mostly home gardeners, might well ask, 'What is the situation with phosphate in the backyard?' and 'Do we have a parallel to the farming practices described?'

The answer is 'Yes' - in most cases, metropolitan gardens have higher levels of phosphates than most farms. Almost all chemical fertilisers being marketed to home gardeners are based on superphosphate and are usually laced with sulphate of ammonia (nitrogen, N) and muriate of potash (potassium, K) in accordance with the 'NPK mentality'. It makes no difference whether the labels say 'Complete XYZ Mixture' or 'Super Extra Special Lawn Mixture' or 'Orchard Special Soluble No. 1' or a host of other enticing descriptions, because they are nearly all based on soluble NPK in varying proportions, with superphosphate as the mainstay of the mixture.

*The NATA laboratory report means that the document is supplied by a government-policed and approved laboratory that is a member of the National Association of Testing authorities. Such a document would stand as substantial evidence in any court of law in the world.

Until recently, almost all gardeners used these mixtures in ignorance. Now, however, increasing numbers of wellinformed people are switching to organic methods and we should not be satisfied with the progress of the organic movement until water-soluble chemical fertilisers become largely a thing of the past, or at least enormously reduced in their application.

To answer the question more precisely, my own garden had not received 1 gram of chemical fertiliser or superphosphate in the twenty years of my residence. I do not know anything of its previous history, but with intensive organic methods and one dressing of natural mineral rock phosphate fifteen years ago, plus continuous recycling of kitchen waste via a brace of compost bins, we maintained both a total and an available phosphate level many times greater than almost any farm that has received annual superphosphate applications for sixty years or more. Therefore, suggestions frequently made by chemical fertiliser 'experts' in horticultural publications that organic fertilisers may improve soil structure but do not supply the essential nutrients found in chemical fertilisers is not only dangerous and pernicious nonsense, but culpably misleading. Under the present legislation regarding false or misleading advertising, such a statement should result in prosecution and penalty, or at least a clear warning by the authorities that repetition of such misleading information in advertising may result in prosecution.

Soil science and soil analysis is a very complex business and the methods used by our chosen laboratory are the most sophisticated in Australia. Meanwhile, there is ample evidence to suggest that soil analysis services run by the superphosphate industry are geared to give one answer only - whether to use one, two, three or five bags of 'super' to the hectare regardless of the true status of all other elements in the soil and their complex relationship to each other. If ever any industry needed the deep probing of a Royal Commission in the interests of the quality of life and the common good, it would have to be the chemical fertiliser industry, nationwide. Natural mineral rock phosphate has been described by the Department of Agriculture in its seemingly invincible ignorance as 'useless crushed rocks of no economic value ...' in the same way as the department in South Australia has categorised and dismissed all other natural mineral fertilisers.

Caveat Emptor - Buyer Beware!

A few years ago legislation was passed by the South Australian Government prohibiting any form of advertising that was false or misleading and there was jubilation among the decent, honest citizens who were sick and tired

of the indecent spectacle of the ever-increasing prosperity of 'respectable' thieves, liars, rogues and vagabonds. The trickery and misrepresentation by false advertising that was rife at the time was by no means limited to dishonest used car dealers; every trade and profession it seems has its doubtful components.

The government of the time, keen to test the teeth of the legislation and draw first blood, were quick to seize upon the opportunity to make a public example of the State's most loved and respected emporium by prosecuting with maximum publicity over some genuine and trifling mistake in their weekly newspaper advertising. The splendid firm of John Martins, probably one of the State's most generous benefactors for generations, was duly fined, to no applause by the public. Indeed, most fair-minded people were bewildered or perhaps even outraged. Meanwhile, a clear set of double standards had been applied in various States to this type of legislation which allowed with impunity the continued and ever-increasing sales of superphosphate to hundreds of farmers who do not need it. Clearly, much of the millions of tonnes of superphosphate sold to Australian farmers every year is achieved by blatant misrepresentation, while pedlars of the product encourage the farmer to believe that 'super' is needed when clearly, in a large number of cases, it is not. A great deal of soil is being sold as 'loam', when by definition it is nothing of the kind.

Unsuspecting gardeners purchase loam which is advertised as 'peat', when indeed it is anything but peat, containing often less than 10 per cent organic matter (dry weight) when true peats are so named because of their exceptionally high organic content (60-90 per cent).

Increasing amounts of rebagged chemical fertilisers (including so-called 'organic') are sold from door to door and it has been reported to me that in the State of South Australia some eager salesmen have even added the recommendation of Peter Bennett to their spiel!

Caveat emptor - buyer beware! Secondary treated dried sewage sludge is now being offered to unsuspecting home gardeners and farmers in various mixtures purporting to be 'organic' when indeed their chemical content, including some of the most toxic heavy metals, is dangerously high.

One such fertiliser has been recommended for establishing grass swards on the banks of the River Torrens in South Australia (in the recently planned Torrens Linear Park project) at the rate of 6 tonnes per hectare, with an additional 200 kilograms per hectare of soluble NPK to boot. And this in the immediate catchment area of the delicate, ailing and already badly polluted river.

It is a pity that government authorities do not search as diligently for environmental crimes and commercial swindles

for farmers and home gardeners as they do for a misrepresented set of teaspoons or whatever.

With, more than a casual interest in these matters, we recently made a spot check of some of the materials being offered by chemical fertiliser companies and door-to-door salesmen in South Australia. The results of the analyses conducted by ACS Laboratories Pty Ltd (a thoroughly reliable NATA-licensed and government-approved laboratory) were frightening.

A random selection of so-called 'organic' fertilisers was purchased from retail outlets as far apart as Adelaide and Victor Harbour. We also included three samples of 'Top' brand standard superphosphate from three widely separated retailers and tested for cadmium and uranium. We consider that some of the most poisonous heavy metals are lead, cadmium, uranium, copper, zinc, nickel and chromium.

Dried, secondary treated sewage residues are potentially excellent fertilisers of great value, but until legislation prohibiting the dumping of poisonous commercial waste materials into the drains of our metropolitan sewage systems is tightened up and rigorously policed, such 'organic' materials should be avoided like the plague for the growing of any type of crop and particularly in the organic home garden.

Because the material can be obtained virtually for nothing, and sold at considerable profit, be assured that efforts will be made to sneak these highly contaminated sewage residues into various fertilisers under the respectable cloak of 'organics' and to introduce it by any name other than what it really is.

Considering the high percentage of poisonous and dangerous

residues in sewage sludge materials, it is strongly recommended that caring citizens approach their respective members of parliament with some insistence that government action be taken to ensure that any so-called 'organic' fertilisers containing contaminated sewage residues carry a warning to that effect. There are well-defined laws about labelling any potentially poisonous commodities sold to the public and there could be no valid reason why garden products carrying significantly high levels of internationally recognised toxic heavy metals should be excluded from the tight department of health labelling regulations that already exist.

It is frightening, yet encouraging, to see that in South Australia, at least, dangerously high levels of cadmium have accumulated in animal offal from older stock to the point that the minister for agriculture banned the sale of liver and kidneys in butcher's shops in late 1988. This is undoubtedly a direct result of the over application of cadmium-rich superphosphate to all pastures. Perhaps the 'seeds of wisdom' may have germinated in our Bicentennial year after all. Further ramifications of this disclosure by the hitherto reticent authorities will be interesting, for if cadmium is accumulating in the offal of grazing animals, it is certainly entering the human diet via plant products and, in particular, through vegetables that generally receive much heavier applications of superphosphate than pastures.

ORGANO-TECH FERTILISERS

It would be quite improper to level such harsh criticism at the government/industrial complex as it relates to the

Source	Lead (ppm)	Cadmium (ppm)	Uranium (ppm)	Copper (ppm)	Zinc (ppm)	Nickel (ppm)	Chromium (ppm)
Grow-Well							
organic home fertiliser	150	12	6	500	1000	110	530
Top organic soil builder, sample 1	430	50	3	1400	2500	200	1500
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Top organic soil builder, sample 2	140	20	23	450	640	70	980
Top superphosphate, sample 1		20	35				***
Top superphosphate, sample 2		15	33				
Top superphosphate, sample 3		20	33				

* Cadmium is perhaps the most toxic of the heavy metals and is known to accumulate in leaf vegetables. Cadmium is extremely injurious to health, and has now accumulated to dangerous levels in animal offal.

** This represents about 100 times more zinc than is normally found in a well-balanced healthy soil. Five parts per million zinc in river water will kill fish. *,' Discounting whatever proportion of these uranium levels exist as uranium 235 (the dangerous radioactive isotope), levels of normal uranium between 20 and 30 parts per million must be regarded as potentially poisonous.

*** This is far above the World Health Organization safety limits for lead in soils.