



PHOSPHORUS

PHOSPHORUS IN SOILS

Australian soils are characteristically low in phosphorus (P) in their native state, except for a few soils of basaltic origin and some alluvial soils. This reflects the geological age of the continent and its soils. Agriculture can further deplete soil fertility, even in soils that initially are high in phosphorus, due to the removal of nutrients in farm produce.

Most of the phosphorus in soils is associated with organic matter. Even in mineral soils between 20% and 80% of the total phosphorus will be present in organic forms.

Phosphorus is most available for uptake by plants in the pH range 6.5 – 7.5. At pH levels below 5.5, phosphorus availability is reduced due to the presence of the slowly soluble oxides of iron, aluminium, and manganese; and at pH levels above 7.0, slowly soluble calcium phosphate is formed.

Phosphorus in the soil is relatively immobile. Phosphorus applied as fertiliser does not usually move far from where it is applied without some form of physical mixing, e.g. cultivation. The distance that the phosphorus front moves in the soil from fertiliser granules is rarely more than 4 – 5 cm.

PHOSPHORUS IN PLANTS

Phosphorus is one of the primary nutrients, along with nitrogen (N) and potassium (K). It is required in large quantities by plants. Most plants take up the bulk of their phosphorus requirement early in their life, in the seedling stage of annuals and early regrowth of perennials. While phosphorus is not mobile in soils, it is one of the more mobile nutrients in plants. It is readily moved within the plant from old to young tissue. Phosphorus is required for cell division at growing points and is particularly important in stimulating root development. Consequently, the best responses to phosphorus fertiliser are obtained if it is applied early, e.g. banded with or near the seed at planting in annual crops, and at the start of the main growing season in perennial crops and pastures.

Plant uptake of immobile nutrients, such as phosphorus and zinc, is enhanced by AMF (Arbuscular mycorrhiza fungi), a beneficial fungus which grows in association with plant roots.

DEFICIENCY SYMPTOMS

The symptoms of phosphorus deficiency include:

- Poor legume growth and loss of the legume component in mixed pastures.
- Slow emergence and growth of annual crops.
- Plants look stunted and spindly. Cereals tiller poorly.
- Off-green (often dark, not light green or yellowish) foliage with purplish veins and purplish petioles.
- Low yields.

PHOSPHORUS FERTILISERS

The phosphorus fertilisers marketed by Incitec Pivot Fertilisers are listed below.

Incitec Pivot Product	Common Name	Analysis			
		%N	%P	%S	%Ca
SuPerfect®	Single Superphosphate (SSP)	-	8.8	11	19
MAP	Monoammonium Phosphate	10.0	21.9	1.5	-
DAP	Diammonium Phosphate	17.7	20.0	1.6	-

SuPerfect

Single Superphosphate (SSP) is manufactured by treating phosphate rock with sulfuric acid at Incitec Pivot's Geelong site (in Victoria). SSP is particularly suited to grass legume pastures where both phosphorus and sulphur (S) are required. It is also used in legume grain crops. Molybdenum (Mo) fortified grades are also available. Molybdenum plays an important role in legume nodulation.

Triple Superphosphate

Triple Superphosphate (TSP) is no longer being manufactured or imported into Australia by Incitec Pivot Pty Ltd.

Ammonium Phosphates

MAP (monoammonium phosphate) and DAP (diammonium phosphate) are manufactured by reacting ammonia with phosphoric acid. These fertilisers are made at Incitec Pivot's Phosphate Hill facility in north-west Queensland; with domestic manufacturing being supplemented with imported products also.

MAP

MAP is popular as a planting fertiliser in grain and cotton crops on neutral to alkaline soil types. It is used to supply all the phosphorus the crop requires plus some starter nitrogen. MAP is usually preferred to DAP as a planting fertiliser as it is less likely to harm germinating seeds and emerging seedlings due to its lower nitrogen content. It is also more suitable for storage in silos than DAP, as it is less hygroscopic, i.e. it is less likely to absorb atmospheric moisture and set in storage.

DAP

DAP is the most traded phosphorus fertiliser on world markets. Its high analysis (both N and P) makes it economical to freight, store and apply. In Australia, DAP is used in cropping and on grass pastures, both on its own and in blends, e.g. for sugarcane and horticulture.

The granulated phosphorus fertilisers marketed by Incitec Pivot Fertilisers are not suitable for application in solution, e.g. in fertigation programs, nor should they be used as phosphorus supplements for livestock.

Solution Grades of MAP are normally used where phosphorus is applied in solution, while dicalcium phosphate (DCP) is commonly used as a mineral supplement for livestock.



APPLICATION

Because phosphorus is required for root development and is mobile in plants it is best applied early. In annual crops, it should be applied at planting, banded with or near the seed or transplants. This ensures early access (phosphorus does not move far in the soil) and reduces fixation. In pastures and tree crops, phosphorus is normally applied at the start of the main growing season. For pastures in southern Australia, phosphorus is commonly applied in the autumn, but can also be applied in the spring.

Because phosphorus does not leach readily, there is usually no need to apply it more frequently than each time a crop is planted, or once per year in perennial tree crops and pastures.

SAFETY DIRECTIONS

Refer to the Safety Data Sheet (SDS) for more detailed safety advice. Before use, read the Product Label and the SDS. Use safe work practices and avoid contact with the eyes and skin. Avoid ingestion and inhaling dust. Protective clothing, eyewear and dust masks should always be used when dealing with this product. Observe good personal hygiene, including washing hands after use. Avoid loss of fertiliser to waterways.

WARNING

This document contains information of a general nature. Before using fertiliser seek independent agronomic advice. Fertiliser programs may need to be varied depending on the plants being grown, climatic and soil conditions, application methods, irrigation, agricultural and livestock management practices, the soil's fertility, and cultural practices. ('Unforeseen Elements')

Fertiliser may burn and/or damage crop roots or foliage. Foliar burn to the leaves, fruit or other plant parts is most likely to occur when fertilisers are foliar applied at high concentrations and/or on a regular basis, different products are mixed and sprayed together at cumulatively high rates, the water is of poor quality, or the spray is applied under hot dry conditions, e.g. in the heat of the day.

Fertiliser and supplements may affect animal health. Seek independent advice before using any supplements in livestock rations.

DISCLAIMER

As Unforeseen Elements are beyond the control of Incitec Pivot Limited, in no event Incitec Pivot Limited and its related bodies corporate be liable or accept any responsibility whatsoever for any direct, indirect, punitive, incidental, special or consequential damages (including but not limited to loss of revenue, crops and livestock), in respect of the illness, injury or death of a person, damage to property (including of a third party), or any other loss whatsoever arising out of or connected with the use or misuse of this fertiliser, or its transport, storage, handling or application. Where Incitec Pivot Limited and its related bodies corporate's liability cannot be lawfully excused, it and its related bodies corporate's liability shall be limited to the replacement of, or cost of the fertiliser supplied. The buyer accepts and uses this product subject to these conditions.

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