

FERTILISING PARKS, LAWNS AND HOME GARDENS (Queensland)

1. INTRODUCTION

Apart from air and water, plants need an adequate supply of nutrients for growth. These nutrients are obtained from the soil. Not all soils are fertile enough to completely satisfy plant nutrient demands. In other situations, soils that are initially quite fertile may become depleted in one or more nutrients over the passage of time, or the more fertile topsoil may have been lost or removed during land development.

In these situations, fertilisers are necessary to sustain healthy plant growth. While there are many essential plant nutrients, those most commonly required are nitrogen (N), phosphorus (P) and potassium (K). These nutrients can be applied separately, or as complete NPK fertilisers, which allow all three of these nutrients to be applied simultaneously.

In lawns, the rate at which fertiliser needs to be applied will be higher where lawn clippings are caught and removed. Where clippings are left on the surface, much of the nutrient they contain is recycled.

2. PLANT NUTRIENTS

2.1 Nitrogen (N)

Nitrogen is required in greater quantity than any other nutrient sourced from the soil. It is important in protein synthesis, and for the photosynthetic process (in which light from the sun is utilised in plant leaves in the formation of carbohydrates). Nitrogen deficient plants are slow to grow, and have a pale green to yellow colour.

Nitrogen is subject to leaching, i.e. it can be washed through the soil and beyond the root zone of plants on sandy soils should heavy rain be received. Also when soil of any texture is over-irrigated or becomes water-logged by intense rainfall events – nitrogen is proven to denitrification losses also. For this reason, it is best either to split-apply nitrogen, applying it on several occasions throughout the year. Alternatively use a fertiliser that has been treated with Entec® or eNpower. These products are Ammonium Stabilisers and also referred to as Enhanced Efficiency Fertilisers (EEFs). Entec & eNpower reduce both leaching & denitrification losses by retaining nitrogen in the more efficient & stable ammonium (NH₄⁺) form.

2.2 Phosphorus (P)

Phosphorus plays a key role in stimulating root growth and early plant development. It is often necessary to apply phosphorus when planting vegetables and flowers, and establishing new lawns.

Unlike nitrogen, phosphorus is not subject to leaching, except on deep sands. For lawns, trees and shrubs, a single application of phosphorus once per year is all that is normally required, although it is customary to apply it in combination with nitrogen and potassium as a complete NPK fertiliser on a more regular basis throughout the year.

2.3 Potassium (K)

Potassium is second to nitrogen in terms of the amount required by plants. In fruit and vegetables, potassium is important in giving firm fruit, and for enhancing colour and the longevity of blooms in flowering plants.

Potassium is subject to leaching, less so than nitrogen, but much more than phosphorus. Like nitrogen, it is best to split-apply it on several occasions throughout the year. Potassium may not be required in lawns on heavy textured clay and alluvial soils, but is likely to be needed on sandy soils and in high rainfall coastal areas, particularly where lawn clippings are removed. It is customary to use potassium when planting flowers and vegetables, and in tree crops.

2.4 Sulfur (S)

Like nitrogen, sulfur is important in protein formation, but is required in smaller amounts, about one tenth that of nitrogen. Many complete NPK fertilisers contain sulfur as well, in amounts that comfortably meet plant demands. Deficiency is not common.

2.5 Calcium (Ca) and Magnesium (Mg)

Soils that are low in calcium and magnesium are normally acid as well, i.e. they have a low pH. Acid soils may also contain toxic concentrations of aluminium and manganese.

Lime (calcium carbonate) or dolomite (calcium magnesium carbonate) can be used to supply calcium (and magnesium as well in the case of dolomite) and to correct soil acidity (raise the pH). Gypsum (calcium sulfate) can be used to improve the structure of clay soils high in sodium.

2.6 Trace Elements

The trace elements include boron (B), copper (Cu), iron (Fe), manganese (Mn), molybdenum (Mo) and zinc (Zn). They are only required in small amounts by plants, but still play a vital role. A deficiency can have just as serious an effect as a deficiency of one of the major nutrients. Trace element deficiencies are not common in lawns, but do occur, e.g. of iron. Deficiencies occur more commonly in vegetables and tree crops.

3. FERTILISER PRODUCTS

There are many different fertilisers containing nitrogen (N), phosphorus (P) or potassium (K). In addition, blends or compounds supplying all three nutrients are available. These products are known as complete fertilisers. The analyses of some of the more commonly used fertilisers in lawns and home gardens are shown in the following table.

Incitec Pivot Fertilisers Product Analyses

	Product	Analysis			
		% N	% P	% K	% S
Nitrogen (N)	Urea	46			
	Gran-am	20.2			24
Phosphorus (P)	DAP	18.0	20.0		1.6
	SuPerfect		8.8		11.0
Potassium (K)	Sulfate of Potash			41.0	18.0
	Muriate of Potash			50	
Complete NPK Fertilisers <i>(For planting vegetables and flowers)</i>	Complete Mix 1	7.7	9.5	9.6	8.6
	Croplift® 800	8.1	10.5	10.0	7.5
	CK 55	13.5	15.0	12.5	1.2
	Nitrophoska Special	12.0	5.2	14.1	8.0
Complete NPK Fertilisers <i>(For established lawns and trees)</i>	CK 88®	15.1	4.4	11.5	13.6
	Nitrophoska Special	12.0	5.2	14.1	8.0

Incitec Pivot Complete Mix 1, Croplift® 800, CK 55 and CK 88 are blended fertilisers.

Nitrophoska® is the registered trademark of EuroChem Agro GmbH.

Croplift® & CK 88® are registered trademarks of Incitec Pivot Limited.

4. NPK FERTILISER PROGRAMS

4.1 Lawns

4.1.1 Establishment

If lime, dolomite or gypsum is required, it is best applied when the ground is worked up, and thoroughly incorporated into the soil to a depth of 10 to 20 cm. In the days or last couple of weeks before planting or laying down turf, apply:

- Incitec Pivot “Complete Mix 1” or
- “Croplift 800” at 350 – 450 kg/ha (3.5 – 4.5 kg/100 m²), or
- “CK 55” at 250 – 300 kg/ha (2.5 - 3 kg/100 m²).

If time is short, the fertiliser can be applied on the same day as planting if necessary. Incorporate into the top 5 - 10 cm of soil, after application.

4.1.2 Top Dressing

The type, rate and frequency with which fertiliser is applied to lawns depend on many factors. These include the soil type and its fertility, the grass species and its growing season, rainfall and availability of irrigation water, and whether lawn clippings are removed or not. The desired outcome has to be considered, i.e. balancing a dark green vigorous lawn, with the need to mow fast-growing lawns on a regular basis.

For lawns on loams and sandy soils in coastal areas and where supplementary irrigation water is available, complete NPK fertiliser such as Incitec Pivot CK 88 and Nitrophoska Special are popular.

For summer active lawn grasses such as Sir Walter, Buffalo and Couch, which grow faster during the warmer months of the year, apply Incitec Pivot CK 88 or Nitrophoska Special at 300 - 400 kg/ha (3 - 4 kg/100 m²). The fertiliser can be applied at this rate three or four times a year, e.g. in September, December and March, with the interval between applications being extended during the winter months when growth is slowed.

The higher and more frequent rates are required where the lawn is watered throughout the year, and where grass clippings are collected and removed, and nutrients that would otherwise be recycled are lost.

The lawn’s vigour and colour can be used as a guide to when it is necessary to re-apply fertiliser. When grass growth is slowed, and the grass loses its dark green colour and becomes pale green to yellow, it is time to reapply fertiliser, provided such changes are not attributable to cold weather, moisture stress, insects or disease.

It is best to water the fertiliser into the soil. Where possible, this should be done soon after fertilising and on the day of application. Fertiliser granules and dust that lodge on plant leaves may dissolve in overnight dew and burn the foliage.

Applying fertiliser when rain is forecast may avoid the need to water the fertiliser in, provided enough rain falls to wash the fertiliser from the foliage into the soil. Ten millimetres of rain in the one fall should be adequate for this to occur. Light rain or showers will have the same effect as dew, enough to dissolve the fertiliser but not enough to wash it off the leaves and into the soil.

The risk of leaf burn is increased if fertiliser is applied to wet grass, causing the fertiliser to stick to rather than fall through the foliage, and no further (follow-up) rain is received. Watering the fertiliser in also avoids the risk of accidental ingestion by children, pets or wildlife.

Some fertilisers, such as Urea, can be dissolved and applied in irrigation water or by a hose attachment. The Incitec Pivot Complete NPK and phosphorus fertilisers, e.g. CK 88, and Nitrophoska Special, are not recommended for use in this way, as they are not fully soluble. The residues may block filters and nozzles.

4.1.3 Other Management Factors

The use of fertilisers on lawns may both combat and predispose to competition by weeds, and insect and disease attack. Well-fertilised lawn grasses are better able to out-compete and suppress many weeds, particularly those of the broad-leafed type.

Many lawn grasses, e.g. couch grass, do not tolerate shading, and do not grow well under trees and on the southern sides of buildings, particularly during winter. Sedges, such as Mullumbimby Couch, are a sign of poor drainage or temporary water-logging during periods of heavy rainfall or if the soil is over-watered, lack of aeration and soil acidity.

Lawn grubs can be a major pest of couch grass lawns over the summer months, and can be more prevalent in fertilised lawns. Chemical control is often warranted. Lawns are also subject to disease attacks, particularly during the cooler months of the year, and if the soil is poorly drained.

Where a lawn is weakened by disease, or eaten out by lawn grubs, responses to fertiliser may be disappointing and uneven. This may give a patchy effect, as the lawn responding where the root system and surface runners are strong, so that the plants take up and utilise the fertiliser nutrients, but failing to respond elsewhere.

4.2 Trees and Shrubs

The surface area around trees and shrubs can be fertilised in the same way as established lawns. Spread the fertiliser uniformly on the soil, do not concentrate in a small area.

4.3 Fruit Trees

Trees vary widely in their fertiliser requirements, and the best application times.

If a large number of trees are being grown, i.e. a commercial area, specific advice pertinent to that crop should be obtained. Publications on many tree (and vegetable) crops can be purchased from State Departments of Agriculture or Primary Industry, in which advice is provided on fertiliser programs and other managerial factors.

Where a few fruit trees are grown in a garden or on an acreage block, the following guidelines may be used.

Apply Incitec Pivot CK 88 or Nitrophoska Special three times per year, in August, November and March. Spread uniformly around the tree, applying fertiliser no closer than 20 cm to the trunk out to a point 20 cm beyond the edge of the canopy.

- For small trees (less than 2 metres in diameter), apply 150 g of Incitec Pivot CK 88 or Nitrophoska Special per tree/application.
- For medium size trees (2 – 4 metres in diameter), apply 500 g of Incitec Pivot CK 88 or Nitrophoska Special per tree/application.
- For large trees (5 metres or more in diameter), apply 1.5 kg of Incitec Pivot CK 88 or Nitrophoska Special per tree/application.

Do not concentrate the fertiliser on a small area, as root burn can occur, particularly in those trees with shallow root systems.

4.4 Flowers and Vegetables

If lime, dolomite or gypsum is required, it should be applied as soon as the ground is worked up for the first time, and be incorporated into the soil, to a depth of 10 to 20 cm. Prior to planting, apply:

- Incitec Pivot “Complete Mix 1” or
- “Croplift 800” at 350 – 450 kg/ha (3.5 – 4.5 kg/100 m²), or
- “CK 55” at 250 – 300 kg/ha (2.5 - 3 kg/100 m²).

The fertiliser can be applied on the same day as planting if necessary. Incorporate into the top 5 - 10 cm of soil after application.

About 3 - 4 weeks after planting, apply Incitec Pivot Granular Urea at 1 kg/100 m² (10 g/m²), and water in afterwards.

Note: SuPerfect should not be used in beds that will be used to grow vegetables, on account of its comparatively high cadmium content.

5. LIME

In some soils, lime (calcium carbonate) will be required to correct soil acidity (low pH) as part of a balanced fertiliser program. Lime is most likely to be required in high rainfall coastal areas, and on light sandy soils. Lime is insoluble, and needs time to react in the soil.

Where a seed bed is being worked up, e.g. for flowers and vegetables, or for a new lawn, lime should be applied well before planting, ideally two to three months earlier, and be incorporated thoroughly into the topsoil, to a depth of 10 to 20 cm.

In established lawns and around trees, incorporation into the soil is not possible, so lime is spread on the soil surface, and at lower rates. Lime that is broadcast and left on the soil surface will be slower to take effect than when incorporated into the soil.

Changes in soil pH immediately after the application of lime may affect the availability of other nutrients. A temporary deficiency of one or more of the micronutrients, e.g. zinc or iron, may be induced. This is most likely to occur when lime is applied too close to planting, or to established lawns and trees.

Repeat applications of lime are likely to be required every 2 – 5 years. Dolomite can be used in place of lime where magnesium is required as well as calcium.

5.1 Lawns

In general, grasses are more tolerant of soil acidity than flowers and vegetables. Lawn grasses such as Couch can withstand fairly acidic conditions.

Where a new lawn is to be established and the soil is acid, broadcast lime or dolomite at 2.5 – 5 t/ha (250 - 500 g/m²) prior to breaking up the ground, and then work (cultivate) it into the soil, to a depth of 10 to 20 cm. Ideally, this should be 2 - 3 months before laying down the new turf.

In established lawns and around trees, broadcast the lime at 1.25 – 2.5 t/ha (125 - 250 g/m²), spreading it as evenly as possible. The time of year at which lime is applied is not critical.

Re-application may be necessary for 3 - 5 years.

5.2 Ornamentals, Trees and Shrubs

Many ornamentals, e.g. azaleas, rhododendron, prefer acid conditions, so the optimum pH requirement of the plant should be known if liming is considered.

50 - 125 g/m² of lime or dolomite should suffice for most ornamentals if low pH is suspected. Spread evenly on the soil under and beyond the canopy of the shrub or tree. If the plants are growing in a lawn, timing and method of application will be as for lawns.

5.3 Fruit Trees

Usually lime should be applied on a "per tree" basis. Apply lime at 250 g/m² evenly to the soil under and around each tree, starting 30 cm from the trunk to just outside the canopy. This is the area where most of the roots will be found, and the area into which the roots of young trees will grow.

Alternatively, for mature trees such as citrus, apply lime at 250 g/m² in an annulus around the tree, starting 1m from the trunk, out to 2 m from the trunk. This is an area of about 10 m², so 2.5 kg of lime will be required per tree.

Lime is normally applied during the winter months in tree crops, when growth is slowed or dormant. This allows time for it to react in advance of the spring, when regrowth occurs.

5.4 Flowers and Vegetables

Where the soil is acid and lime is required, broadcast lime on the garden bed at 250 g/m² at least 2 - 3 months before planting and then cultivate or turn it in to the soil to the desired depth. Water the soil occasionally if rain is not received to help the lime to react in the soil.

Lime applications can remain effective for several years. In garden beds, on inherently acid soils, it may be necessary to re-apply lime or dolomite every 2 - 3 years.

6. PETS AND WILDLIFE

While the risk is slight, the ingestion of freshly applied fertiliser may affect the health of grazing animals and wildlife, and in isolated incidents results in death. If practical, it is best to remove animals from areas being fertilised, and not to readmit them until after rain is received or irrigation applied, and regrowth occurs. This minimises the risk of direct ingestion of fertiliser, and nitrate poisoning in young regrowth where nitrogen fertilisers are used.

7. AREA MEASUREMENTS

On farms, fertiliser rates are normally expressed on a hectare basis. In home gardens, much smaller areas are normally dealt with. In this publication, rates are given on a per hectare (ha), per 100 m², or per m² basis, depending on the use.

- One hectare is an area of 10,000 square metres (m²). Expressed another way, it is the area of a square measuring 100 m x 100 m.
- 100 m² is 10 m x 10 m.
- 1 m² is 1 m x 1 m.

WARNING

The information contained in this publication is for use as a guide only. The use of fertilisers is not the only factor involved in producing well-grown lawns, gardens and trees. Local soil, climatic and other conditions should also be taken into account, as these could affect plant response to applied fertiliser.

Fertiliser may burn and/or damage plant foliage and roots.

Before using fertiliser in commercial crops, seek appropriate agronomic advice.

Because climatic and soil conditions, application methods, irrigation and management practices are beyond the control of Incitec Pivot Fertilisers and cannot be foreseen, Incitec Pivot Fertilisers accepts no responsibility whatsoever for any injury, damage, loss or other result following the use of advice and fertiliser programs detailed in this publication, whether used in accordance with directions or not, subject to any overriding statutory provision and provided that such liability under those provisions shall be limited to the replacement of goods as supplied or the rendering again of services provided.

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