



# KEY FACTORS FOR MAXIMISING BROADACRE PRODUCTION



**DUAL CHELATE  
FERTILIZER**  
THE SCIENCE IN PLANT NUTRITION

Dual Chelate Fertilizer is an  
ISO 9001:2015 Certified Company

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# KEY FACTORS FOR MAXIMISING BROADACRE PRODUCTION

Nutritional problems in cereal, legume, and rapeseed are common and indicated by symptoms such as diminished shoot and root growth, rhizome or stolon production, stand density, and quality yield. Therefore, Nitrogen, Phosphorus, and trace elements must be supplied at the right stage of the growth cycle.

Most Dual Chelate Products contain Patented Organic Activators, formally known as Complex Polymeric Polyhydroxy Acid (CPPA), which Dual Chelate Fertilizer currently provides under Patent. CPPA includes a mixture of naturally occurring organic substances. Containing natural acids with tannins, plant growth regulators, stimulators and auxins, which are well suited for use in any seed, bulb and rooted plant known to humanity.

## NITROGEN DEFICIENCY

One of the most common deficiencies in broadacre cropping is Nitrogen. Nitrogen deficiency is commonly characterised by leaf yellowing, leaf tip die-back and a decrease in shoot density and tillering. Nitrogen deficiencies are commonly seen in sandy soils that have been heavily leached or waterlogged.

Nitrogen is the most essential nutrient in cereal production. It is a component of many plant cell structural, genetic and metabolic compounds. Nitrogen affects both crop yield and quality. It is a significant component of chlorophyll — the green pigment in plants essential for photosynthesis (the process plants use to turn sunlight into energy, as carbohydrates). Nitrogen is the primary constituent of grain protein and the oil content of canola. Care should be taken with the supply of nitrogen. Increasing the yield of grain has a diluting effect on the protein. This explains why in seasons of low output (e.g., dry seasons), a more significant proportion of the crop is of higher protein percentage, whereas in seasons of high-yielding grain, the quality is low. Nitrogen is typically applied pre-plant, with supplementary applications made at critical times throughout the season.

**Nitrogen is the most important nutrient in cereal production. It is a component of many structural, genetic and metabolic compounds of plant cells.**



## APPLICATION BENEFITS

- Important for protein production and grain yield
- Foliar spray is ideal for application at critical times (e.g., grain initiation and formation).
- The use of streaming nozzles is also an ideal way to apply in-crop Nitrogen

## RECOMMENDED TREATMENTS:

Product Name	NPK (W/V %)	Patented Organic Activators
Activated N	41-0-0+ 0.05% Zn	CPPA + Amino acid



## PHOSPHORUS DEFICIENCY

Phosphorus deficiency is frequently characterised by older leaves developing a dark green colour that progresses to reddish-purple, wilting stand and reduced shoot and root growth during establishment.

Cereals require a readily available supply of phosphorus at all stages of growth, particularly in the early stages. Phosphorus is necessary for cell division, plant growth and root and shoots development. It is also involved with photosynthesis, energy transfer and movement of carbohydrates within the plant. Cereals low in phosphorus are often predisposed to damping off diseases such as Pythium. Phosphorus is generally applied at planting to be utilised in early growth. In some growing areas, pH or high amounts of calcium in the soil can tie up phosphorus. This means that although adequate Phosphorus soil levels may exist, it may not be plant available.

Phosphorus deficiencies are commonly seen in soils low in organic matter or high in sand content, highly weathered, iron-rich acid soils and calcareous soils.

### RECOMMENDED TREATMENTS:

Product Name	NPK (W/V %)	Patented Organic Activators
Momentum ZnP	0-18-0+ 14% Zn	CPPA
Dual Grow FreeFos	10-15-0 + 0.92% Zn	CPPA + Kelp
Dual Grow 12-17-0 Plus B-Zn-Mo	12-17-0 + 0.49% B, 2.10% Zn, 0.40% Mo	CPPA + Amino Acid
Dual Grow 12-17-0 Plus Co-Mo-B	12-17-0 +2.79%B, 0.02% Co + 0.04% Mo	CPPA

Zinc, copper, manganese, molybdenum, boron, calcium and magnesium are essential broadacre nutrients in some areas. Dual Chelate Fertilizer supplies a range of single and combination trace element products to prevent deficiencies commonly encountered by broadacre growers.

## ROLE OF ZINC

Zinc is associated with the formation of chlorophyll. It is also involved in several enzyme systems and is essential for protein synthesis. Zinc also has a vital role in the functioning and biosynthesis of several hormones, including auxin, which regulates plant growth rate and development. Cereals must receive adequate zinc from an early age, so seed dressings are considered an efficient method of delivering zinc to emerging plants. Zinc also plays a regulatory role in water uptake and efficient use. Being an immobile element, post-emergence zinc deficiency is best corrected via foliar spray.

### RECOMMENDED TREATMENTS:

Product Name	NPK (W/V %)	Patented Organic Activators
Momentum ZnP	0-18-2 + 14% Zn	CPPA
Dual Force Zn (micro Prill)	10.00% Zn	IDHA
Dual Grow 12-17-0 Plus B-Zn-Mo	12-17-0 + 0.49% B, 2.10% Zn, 0.40% Mo	CPPA



## ROLE OF COPPER

Copper is a common deficiency of cereals, although it can occur in soils high in phosphorus. Copper is required for enzymatic reactions within the plant and is involved in lignin manufacturing, which helps give plant cells their strength. It also involves several reactions that maintain the balance of hormones and plant defence mechanisms. Copper deficiency affects the amount of live pollen formed in cereals. As a result, plants that outwardly appear healthy can produce partially filled or even empty heads.

### RECOMMENDED TREATMENTS:

Product Name	Cu (W/V %)	Patented Organic Activators
Dual Force Cu (Micro Prill)	10.00% Cu	IDHA

Copper deficiency affects the amount of live pollen formed in cereals.

## ROLE OF MOLYBDENUM

The primary function of molybdenum is to assimilate nitrogen within the plant. This involves the conversion of nitrates to ammonium, which is the first step in synthesising proteins. It has also been suggested that cereals low in molybdenum may be more prone to frost damage. Leaf margin chlorosis symptoms displayed in grains result from a build-up of nitrate-nitrogen that has not been converted to ammonium. In this respect, the chlorosis and eventual necrosis of leaf margins are, in fact, toxic build-up of nitrates.

### RECOMMENDED TREATMENTS:

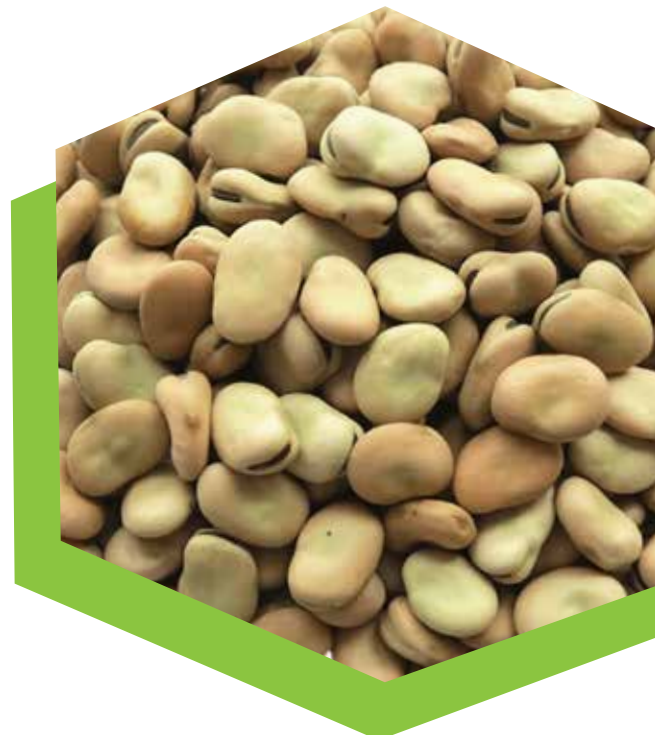
Product Name	NPK (W/V %)	Patented Organic Activators
Dual Grow 12-17-0 Plus Co-Mo-B	12-17-0 +2.79%B, 0.02% Co + 0.04% Mo	CPPA

## ROLE OF MANGANESE

Manganese deficiency is uncommon in cereals but can occur during cool, dry weather. Grains grown in high-pH calcareous soils are more prone to defects. Manganese has several functions in the plant. It is closely associated with iron, copper and zinc as a catalyst in plant growth processes. Manganese is necessary for photosynthesis and in forming other compounds required for plant metabolism. High manganese levels in plants may induce an iron deficiency and vice versa. Manganese also affects chlorophyll production and carbohydrate and nitrogen metabolism.

### RECOMMENDED TREATMENTS:

Product Name	Mn (W/V %)	Patented Organic Activators
Dual Force Mn (Micro Prill)	9.00% Cu	IDHA



## ROLE OF BORON

Root elongation is usually the first effect of B deficiency in most plant species, but it is rarely seen in wheat. However, yield responses to Boron applications have been reported in many countries and some parts of Australia.

Boron is required in plants to translocate sugar and starch from the leaves to the grain head and fruits.

The reproductive phase is the most sensitive to wheat deficiency, resulting in male sterility due to disrupted pollen formation. This causes a significant reduction in the number of grain sets and, thus, a reduction in yield. This condition can only be diagnosed by either soil or plant analysis or yield responses to B fertilisation.

In addition to wheat, other crops known to be relatively sensitive to B deficiency, such as oilseed rape (canola) and sunflower, have been found to have a more critical requirement for B during their reproductive phase than during their period of vegetative growth.

Boron regulates flowering and fruiting, cell division, germination, and carbohydrate metabolism.

## ROLE OF CALCIUM

The functions of calcium in the plant are associated with membrane maintenance, cell division and elongation, cell wall strength and integrity, protecting cells from toxins, cation/anion balance, and osmoregulation.

Calcium deficiency in seedlings can result in cotyledons becoming chlorotic, turning muddy yellow instead of bright yellow, which is seen with nitrogen and phosphorus deficiency.

Symptoms of calcium deficiency appear on new shoots and new leaves. Calcium requires boron so that calcium can perform the regular metabolic chore. It is involved in the deposition of Calcium in new cell material and the growing tip of the pollen tube.

### RECOMMENDED TREATMENTS:

Product Name	NPK (W/V %)	Patented Organic Activators
Momentum B	12% B	CPPA
Momentum ZBM Trio	0.15% Mg, 5.30% B, 5.01% Zn, 0.24% Mo	CPPA
Dual Grow 12-17-0 Plus B-Zn-Mo	12-17-0 + 0.49% B, 2.10% Zn, 0.40% Mo	CPPA



### RECOMMENDED TREATMENTS:

Product Name	NPK (W/V %)	Patented Organic Activators
Dual Force Ca (Micro Prill)	7.20% Ca	IDHA
Momentum Cal Bor	3.02% Ca, 3.06% B	CPPA
Transit Calcium (SP)	3-0-0 + 16.20% Ca	Amino Acid + CPPA
Crystal Cal N B	12-0-0 + 17.80% Ca, 0.20% B	CPPA



## ROLE OF MAGNESIUM

Magnesium is essential for forming chlorophyll and is the only mineral constituent of the chlorophyll molecule.

One of the symptoms of Mg deficiency is a pale green or yellow leaf. Magnesium has a crucial role in phosphorus transportation.

Magnesium regulates cellular pH by moderating the cation/anion balance and carbohydrate partitioning.

Boron deficiency in soils reduces plant uptake of both magnesium and calcium.

## RECOMMENDED TREATMENTS:

Product Name	NPK (W/V %)	Patented Organic Activators
Dual Force Mg (Micro Prill)	4.50% Mg	IDHA
Transit Magnesium (SP)	4-0-0 + 12% Mg	Amino Acid + CPPA
Crystal N MCB	12-0-0 + 12% Ca, 4% Mg, 0.2% B	CPPA



## PRODUCTS APPLICATION RATES

Core Products	What	Where	Rate
Momentum ZnP	Highly available Zn and P	Seed treatment and foliar application. Helps establishment and root development	3-5 L/tonne for seed treatment 2-5 L/ha foliar application 5-15 L/ha soil Injection
Amino Boost Transit Max	Plant-derived Amino Acids, Kelp, Fulvic acids, and CPPA-patented organic Activator	Seed treatment, at the early establishment and root development	5 L/Ha
Transit Re-leaf	Plant-derived Amino Acids, Fulvic acids, and CPPA-patented organic activator	Seed treatment, at the early establishment and root development	1 L/ha
Dual Grow 8-15-3 +TE	8-15-3 + 1% Ca, 2% Zn+ 0.1% B, 0.1% Mo +0.05% Co + Organic Activators	Soil injection	10-30 L/ha
Dual Grow FreeFos	10-15-0 + 0.92% Zn + Kelp	Soil injection	10-30 L/ha
Dual Grow 12-17-0 Plus B-Zn-Mo	12-17-0 + 0.49% B, 2.10% Zn, 0.40% Mo	Soil injection	10-30 L/ha
Dual Grow 12-17-0 Plus Co-Mo-B	12-17-0 +2.79%B, 0.02% Co + 0.04% Mo	Soil injection	10-30 L/ha
Activated N	41-0-0 + 0.05% Zn + EDDHSA Fe	In crop streaming	50-150lts/ha
Activated N	41-0-0 with 0.05%Zn and EDDHSA Iron	Early establishment followed by 1-2 applications if required	20-25 L/Ha
Dual Force Zn	IDHA Zn 10.00%	Early establishment	0.25-2 Kg/ha
Dual Force Cu	IDHA Cu 10.00%	When it's required	0.75-2 Kg/ha
Dual Force Mn	IDHA Mn 9.00%	When it's required	0.75-2 Kg/ha
Dual Force Ca	IDHA Ca 7.20%	When it's required	1-2 Kg/ha
Dual Force Mg	IDHA Mg 4.5%	When it's required	1-2 Kg/ha
Momentum Boron	12% Boron	When it's required	1-2 L/ha

## TANKMIX COMPATIBILITY FOR SEED TREATMENTS:

### Dual Chelate Fertilizer Products

No	Chemical/Fertilizer Name	Type	Active Ingredient	Rate	Momentum ZnP	Dual Force Zn	Transit Zn	transit Re-Leaf
					5L/ton	3kg/ton	3kg/ton	1L/ton
1	Cruiser® 350	Insecticide	Thiamethoxam 350g/L	600ml/100kg	C	C	C	C
2	Vibrance®	Fungicide	Difenoconazole 66.2 g/L, Sedaxane 13.8 g/L	360ml/100kg	NC	NC	C	C
3	Goucho®	Insecticide	Imidacloprid 600 g/L	400ml/100kg	C	C	C	C
4	Raxil®	Fungicide	Tebuconazole 25 g/kg	100ml/100kg	C	C	C	C
5	EverGol®	Fungicide	Metalaxyl 61.4 g/L, Penflufen 38.4 g/L, Prothioconazole 76.8 g/L	260ml/100kg	C	NC	NC	C
6	Rancona®	Fungicide	Ipconazole 25 g/L, Metalaxyl 20 g/L	320ml/100kg	C	C	C	C

Key: **C** Compatible **CA** Compatible with agitation **NC** Not Compatible





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