Fertilisation: Nitrogen

What role does nitrogen play in plant growth and yield?

Nitrogen occurs in the chlorophyll of plants and is responsible for vegetative growth. The leaves of plants that receive sufficient nitrogen have a dark, blue-green colour which promotes photosynthesis.

Photosynthesis is the process by which light energy is intercepted by plants and stored in the form of starches and sugars. This process is essential to sustain normal plant growth.

What are the symptoms of a nitrogen deficiency?

The leaves have a pale green appearance and could even be yellow in extreme cases. Plant growth is suppressed because of insufficient photosynthesis.

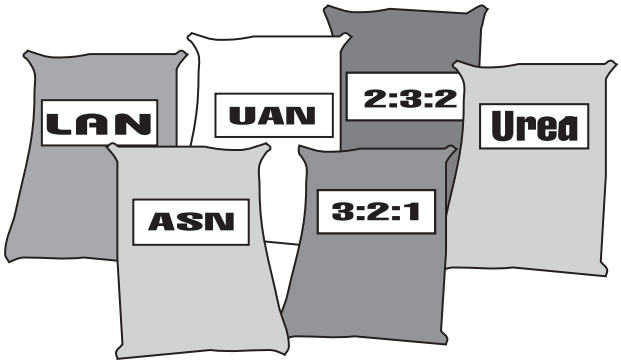
In the case of maize and grain sorghum an inverted V-shaped pattern on the leaf tips is an indication of a nitrogen deficiency. The leaf edges die off, inhibiting plant growth.

In what form is nitrogen available to the farmer?

- Nitrogen occurs in the soil and in the atmosphere.
- Legumes fix atmospheric nitrogen in symbiosis with bacteria and make it available to the plant.
- Nitrogen is usually provided to the plant in the form of fertiliser. Fertilisers that contain only nitrogen are known as single nitrogen carriers.

The following single nitrogen carriers are available:

LAN (28):	limestone ammonium nitrate
ASN (27):	ammonium sulphate nitrate
Urea (46):	urea
$(NH_4)_2SO_4$ (21):	ammonium sulphate
UAN (32):	urea ammonium nitrate
ANS (19) and (21):	ammonium nitrate solution
NH_3 gas:	anhydrous ammonia



- Nitrogen is also chemically mixed or blended with phosphate (P) and potassium (K) in various ratios to meet nutrient requirements of plants. Examples are:

  4.3.4 (33) + 0,5 % Zn: 12 % N, 9 % P, 12 % K + 0,5 % Zn

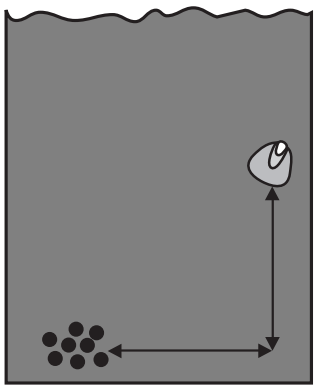
  3.2.1 (25) + 0,5 % Zn: 12,5 % N, 8,3 % P, 4,2 % K + 0,5 % Zn

2.3.2 (22) + 0,5 % Zn: 6,3 % N, 9,4 % P, 6,3 % K + 0,5 % Zn

2.3.4 (30) + 0,5 % Zn: 6,7 % N, 10 % P, 13,3 % K + 0,5 % Zn

2.1.0 (30) + 0,5 % Zn: 20 % N, 10 % P, 0 % K + 0,5 % Zn

Nitrogen can be blended in any combination with phosphorus and potassium in fertiliser mixtures, provided it meets the required stipulation of the Fertilizer Act (Act No. 36 of 1947).



How is nitrogen applied?

Nitrogen is usually applied to summer crops in two instalments.

- At planting, nitrogen, in a mixture with other nutrients (phosphorus and potassium), is band-placed in the plant row, 5 cm below the seed and 5 cm away from the seed.
- Depending on the type of plant, nitrogen is applied as topdressing after the plant has emerged.

Which nitrogen sources acidify the soil the most?

Nitrogen-containing fertilisers which contain large quantities of ammonium and amine nitrogen have a greater acidifying effect on soil than nitrate-containing fertilisers. LAN (28), for example, has the least acidifying effect because of its nitrate content and the 20 % lime which it contains.

Ammonium sulphate contains only ammonium nitrogen and sulphur which accelerates the process of soil acidification. It is used especially in irrigation areas where the pH is high and the acidifying effect therefore has a neutralising effect.

The table shows the classification of nitrogen carriers from the most acidifying source to that with the least acidifying effect.

Rank order	Source
1 (most acidifying)	Ammonium sulphate (21)
2	ASN (27)
3	Urea, UAN (32), ANS (19), ANS (21), anhydrous ammonia and ammonium nitrate
4 (least acidifying)	LAN (28)

Contact the Fertilizer Society of South Africa for further information
PO. Box 75510, Lynnwood Ridge 0040
Tel: (012) 349 1450 Fax: (012) 349 1463

Compiled by the Directorate Communication of the National Department of Agriculture in cooperation with the Fertilizer Society of South Africa
Printed and published in the Republic of South Africa by the National Department of Agriculture and obtainable from the Resource Centre, Directorate Communication, Private Bag X144, Pretoria 0001
1998