



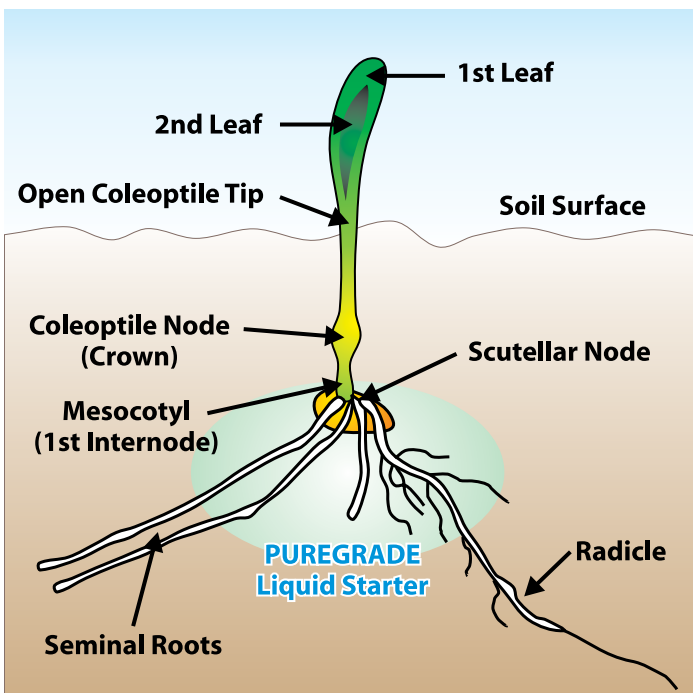
THE ANDERSONS, INC | TECHNICAL BULLETIN 071

FIRST ROOTS NEED NUTRIENTS FAST

PUREGRADE® FERTILIZERS HAVE THE PERFECT SET OF CHARACTERISTICS TO MATCH THE NUTRIENT NEEDS DURING THE EARLY STAGES OF CORN GROWTH.

The importance of in-furrow starter fertilizer in corn becomes evident once we take a look at how corn root systems develop during the first few weeks of life. Growers who study corn plant development know there are different stages of vegetative and reproductive growth. Let's take a look at root development during the very first stage of growth called "VE" or germination and emergence and why an adequate supply of easily available nutrients is needed at this time.

The first roots to emerge from the seed are called the radicle and lateral seminal roots. Usually, these are lumped together into what's called the seminal or primary root system. These are the first functioning roots and begin taking up nutrients even before the corn spikes through the soil. They continue to function throughout the plant's life, but are most important during the first few weeks while the nodal roots are developing.



PureGrade Liquid Starter should be placed within the early growth zone of the Primary Root System. It is easy to place into the seed furrow with available equipment.

Only small amounts of fertilizer nutrients are needed during the very early stages of growth, but the root system is small and doesn't touch very much soil or nutrients. In addition, cool soil conditions may slow root development. This can be offset by placing a concentrated band of nutrients in the immediate vicinity of the developing seminal root system. The roots will intercept the band of fertilizer and proliferate in and near the band after contact. Nutrients must be placed where they will be intercepted by the roots because roots are not attracted to fertilizer.

This early stage is very important to the corn plant. This is the time when all the different plant parts are being initiated. The final size of leaves, ears and other parts depends to a large extent on having an adequate supply of nutrients available at the first stages of growth.

PureGrade fertilizers have the perfect set of characteristics to match the nutrient needs during the early stages of corn growth.

- Nutrient availability. The nitrogen, phosphorus and potassium are ready for root uptake as soon as the seminal root system is ready to absorb nutrients.
- PureGrade is high in orthophosphate. Orthophosphate is the form of phosphorus that plants use. Regardless of the weather and variable soil temperatures, the orthophosphate in PureGrade is ready to work when root contact occurs.
- PureGrade can be easily banded into the seed furrow where it will be in close proximity to the developing seminal root system. This leads to faster and more uniform crop growth earlier in the growing season.
- PureGrade is a pure solution. Every spoonful has the same NPK analysis. Every linear foot of row gets the same ratio and amount of nutrients.
- PureGrade has a low salt index and is virtually non-corrosive.

These benefits offer increased seed safety and reduces corrosion on expensive planter parts.

Successful corn growth depends upon many factors. Some can be controlled and others can't. Placement, the amount and the quality of the fertilizer are all easily controlled with the right fertilizer placement equipment and the right fertilizers. PureGrade starter fertilizers are the best choice for maximizing early nutrient uptake in corn.



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EARLY GROWTH

We've discussed the importance of having starter fertilizer in place during corn's VE stage of growth, or germination and emergence, plus, we mentioned that the final size of leaves, ears and other parts depends on having an adequate supply of nutrients when the radicle and seminal roots begin growth before emergence. Let's move out a couple more weeks and see why a banded supply of fertilizer amongst the seminal roots continues to be important to final yields.

Lots of exciting things begin to happen, at least from the corn plant's perspective, during the first 4 weeks of life. It hasn't reached adolescence, yet. It has to transition from the seminal root system to the permanent or nodule root system that will function throughout the rest of the plant's life.

Tassel formation is initiated and the uppermost harvestable (final ear) is initiated. Usually, 8 to 10 identifiable ear shoots will develop, but it is generally the uppermost one that becomes the ear that is harvested.

Kernel row number determination begins at about stage V5 and may be completed by stage V8 or about 4 week after emergence. Row number is largely determined by genetics, but severe stress before stage V8 can change that. In contrast, the number of kernels per row is determined later and depends a great deal on environmental factors.

Many stresses during the first few weeks of life can impact yield. We can control fertility, weeds, insects and provide moisture if irrigation is available. We can control excessive moisture to some degree by maintaining drainage systems.

Often, it is temperature that places the greatest stress on crop growth. Root growth is slowed and fewer nutrients are

absorbed. This can happen when either excessively high or low temperatures occur over extended periods. Positioning a band of PureGrade nutrients in the root zone helps overcome slow growth due to temperature extremes.

PureGrade fertilizers placed in a band in or near the row during planting is the best way to prevent early nutrient stresses on corn and other crops. Because of the proximity of the PureGrade to the root system, nutrients are quickly found and absorbed. The early assimilation of nutrients produces faster growth regardless of soil temperatures. Nutrients like phosphorus and potassium are especially needed during the time that soils remain cold and wet.

Many growers add a foliar application of PureGrade liquid fertilizer during the early growth period to increase the nutrient levels in the plant and stimulate growth. In addition to the starter application, foliar fertilizer helps keep the plant strong to resist environmental stresses.

DRIER GRAIN

In addition to higher yields, another big advantage of using PureGrade fertilizer with high phosphorus content is the likelihood of drier grain at harvest, or being able to start harvest a few days sooner. It's common to have 1 to 2% drier grain and sometimes more due to starter phosphorus.

The savings in drying expense can help pay for the PureGrade application. Another way to look at it is that harvest can start 3 or 4 days earlier. That might be just enough to get everything done before the snow comes. Savings on drying costs can pay up to about half of the cost of a typical PureGrade Plant Food starter application depending on fuel costs.

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