

## Starter Fertiliser in Salads and Vegetable crops

**Concept** A good response in establishment and early growth has been shown in bulb onions, salad onions, leeks, lettuce and in some other crops to small quantities of phosphate and nitrogen fertilisers injected at sowing beneath seed level (*Stone DA*) This nutrient is ideally placed to produce a significant growth response and is much more effective than a similar quantity of broadcast nutrient. Improved early growth and an economy of fertiliser use can both be achieved through the use of starter fertiliser. Excellent commercial results have been achieved using this technique across the UK in Ireland and in Europe.

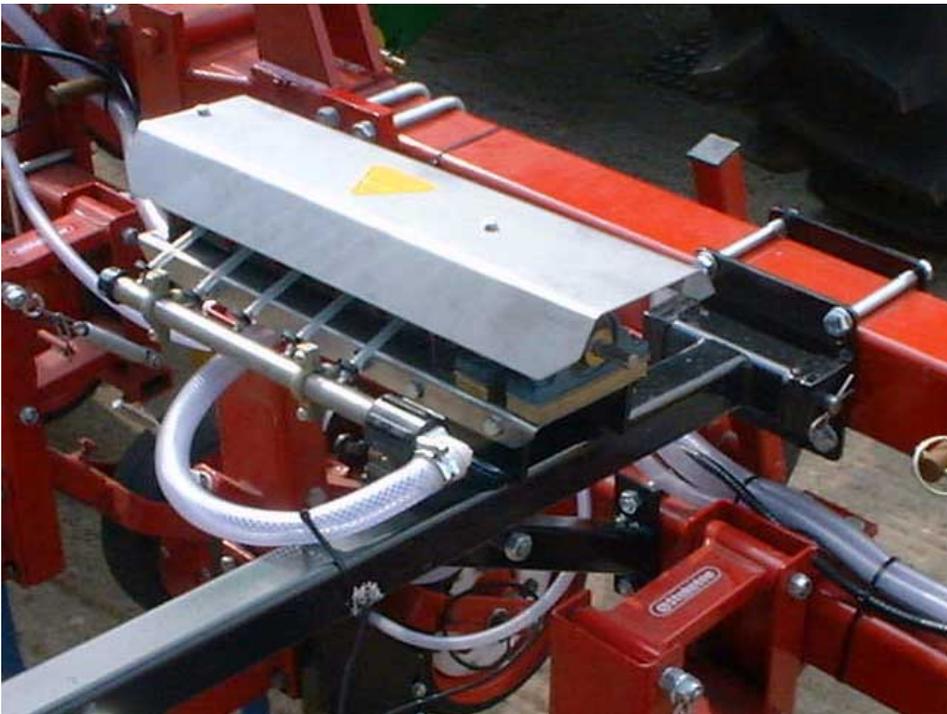


Starter fertiliser effect in onions on left compared to untreated bed on right

**Application** It is almost impossible to meter and deliver solid fertilisers without serious disruption of the seedbed surface hence we have developed a relatively non-intrusive system of injection of liquid. By using a knife coulter working in conjunction with the drill or planter coulter it is possible to accurately deliver the required nutrition with minimal disturbance. This is achieved using an injection kit consisting of a precision pump and tines together with associated tubes and valves mounted onto the drill or planter framework.

**Tanks** The tank needs to be sized to hold sufficient fluid to treat at least 1 ha per fill. On a single bed drill or 4-row planter a 350 litre tank will normally achieve this and can be front mounted on the tractor. Triple bed drills require 1000 litre tanks that are best fitted into a frame carried on the front of the tractor.

To improve the uniformity of fluid flow between multiple pump units fitted to three bed drills an electric system pump with small system header tank will be supplied. This addition will be required for all multiple pump units serving 12, 15 or 18 rows. Single bed drills do not normally require a system pump and header tank except when used on undulating sites.



**Pumps** Several different types of pump have been evaluated. For accuracy and freedom from corrosion and blockage we believe the peristaltic type of pump offers the best performance. Each injector tine is fed from one small pump that simplifies distribution of fluid and metering and gives excellent accuracy, stability and consistency of performance.

Pumps are driven from a land - drive shaft on the drill or planter so that once calibrated the flow

rate is in direct proportion to the forward speed. The fluid quantity per unit length of row therefore remains constant independent of engine revs or forward speed.

Fluid rate adjustment is by a combination of chain driven sprockets and pump tube diameter. Normal output is 12-15 ml per metre per outlet and adjustment is achieved using the sprockets supplied.



**Injector tines** Essentially tines cause soil disturbance and so must be thin in section but strong and durable to resist normal knocks and bumps and wear from abrasive soils. Our tines are machined and heat treated to give the required strength and wear resistance.

Each tine carries a welded-on stainless steel fluid delivery tube. The fluid delivery tube is carefully engineered and positioned to minimise the risk of blockage. Experience has shown the risk of blockages is minimal providing care is taken when lowering the drill into the working position.

Once the machine is lifted out of work fluid is prevented from draining out of the delivery tubing by a small diaphragm check valve (DCV) in the pipe.

**Mounting** For many seeders, tines are mounted on the scraper of the clod deflector brackets that mount directly on the drill toolbar. The tines are located in line with the centre line of a twin coulter or slightly to the side of a single coulter. On planters the tines are normally mounted to deliver nutrients exactly in line with the plants. They follow exactly the land contours and accurate depth placement is guaranteed. They are normally angled with the tip forwards in the working position.

Most drill and planter models and types can be fitted with starter fertiliser kits and we will be pleased to discuss and adapt to individual requirements.

**Configurations** Assemblies are made to order in configurations of 4, 5 and 6 row standard options. Multiple units are used to create versions for 12, 15 and 18 row drills. Other configurations can be made to special order.

**Fertilisers** Proprietary liquid fertilisers suitable for use as starters are made up from monoammonium phosphate or MAP, typically 52% P<sub>2</sub>O<sub>5</sub> and diammonium phosphate or DAP, typically 46% P<sub>2</sub>O<sub>5</sub>). In the UK 10:30:0 w/v liquid is normally readily available.

### *Research Papers on Starter Fertiliser in Vegetables*

Stone, D.A. 1998. The effect of «starter» fertiliser injection on the growth and yield of drilled vegetable crops in relation to soil nutrient status. *J. Hort. Science & Biotech.* 73: 441-451.

The effects of starter fertilizers on the growth and nitrogen use efficiency of onion and lettuce **Author:** Stone, D. A.<sup>1</sup>. **Source:** [Soil Use and Management](#), Volume 16, Number 1, March 2000, pp. 42-48(7) **Publisher:** [Blackwell Publishing](#)