

# Broadacre Advisory

February 2010, V4



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## Direct Inject Liquids for Broadacre



### *Direct Inject – with the Seed*

Liquid fertilizer can be injected into the seed row either below or with the seed similar to granulated products. Obviously there is a requirement for some different application components but this is usually very easy to set up and certainly not cost prohibitive.

Applying liquid fertilizers, offers much greater efficiency with the availability of the applied nutrients, compared to granules.

In some cases, minerals such as Phosphorous, Potassium, Calcium, and most micronutrient cations, which are normally very immobile in the soil, can actually move with the wetted front. This increases the plants ability to source these essential nutrients.

Due to the ease at which different liquid fertilizer products can be combined (taking into consideration simple chemistry), the flexibility of applying a balanced nutrient mix in close proximity to the feeding roots, increases the plants response, and yield potential.

It should be noted, some elements are quite immobile within the plant. If deficiencies are suspected, applying them in a soluble and readily available form will reduce plant stress and yield limitations.

For example, Calcium has limited mobility within a plant and only moves in the xylem; up the plant, and is stored in the older leaves. Calcium is required for growth; it is used by the plant in cell wall construction. If available Calcium is limited in the seed zone, it may affect the growth and expansion of the roots. Applying Calcium as a foliar while a very sound way to improve Calcium availability to the growing leaves and grain, it will not be available to the roots.

A health high yielding plant needs a balanced root to shoot ratio, so large health roots are necessary. A liquid form of soluble Calcium in conjunction with plant and soil biota stimulants is a very sound approach to solving the Calcium deficiency in the root zone. Use; **BiologiCAL** or **BiologiCAL Plus**

Some Product choices:

- Spring Start 11:16:0
- Spring Start 11:16:0 + Kelp
- Spring Start 11:16:0 + Kelp + zinc
- Spring Start Zn NPK + QuadSHOT
- BiologiCAL PLUS

See our Broadacre Nutrient Solutions 2010 Advisory for the full story on liquids for broadacre – seeding, seed treatment, top dress

**There are several different ways to add a liquid injection system to your sowing equipment.**

We have condensed a lot of information, into some simple suggestions. You can build a Liquid inject system as basic or as complex as your imagination will allow.

You can pump the product mix to;

- a gravity feed head / manifold,
- a squeeze pump to create positive pressure and operate as a manifold
- a pressurized manifold using orifice plates.

Your choice of machinery and the type of liquid or fluid fertilizer you wish to use, will dictate the type of direct injection system you should use. The soluble products work in any system. The suspension type products will work in a pressurized, orifice plate system, but may lead to blockages without adequate agitation. Whichever system you use, you need to aim for a minimum of <5% variation in product flow, across all tynes. Aim to deliver the fluid mix at or just below the seed at sowing. You need to consider at least 50L/Ha and up to 100L/Ha.

#### A Simple System for Liquid Fertilizer Injection

- An applicator tank (new or 2<sup>nd</sup> hand)
- A flow jet pump
- An inline filter and manual flow regulator
- A simple manifold with nozzle bodies (like a spray boom)
- Orifice plates in the nozzle bodies with tubes going down the tynes

*You can fill the tank from a 1000L IBC, gravity fed into the applicator tank, add water, adjust the flow rate to match the travel speed, and your away...*

#### A more complex system

- Bulk storage tank on farm (Lease or Purchase from SLTEC)
- Poly transfer pump
- Batching or nurse tank (acts like a grouper)
- Applicator tank
- A stainless steel Hypro pump
- A filter system with a large surface area (pre primary manifold)
- An automatic variable flow regulator
- A Primary manifold (splitting the main discharge into a number of secondary manifolds)
- A second inline filter, per secondary manifold
- A final / secondary manifold, per toolbar fold or to match air seeded heads
- Orifice plates at either or both the primary and/or secondary manifolds
- Small diameter injection tubes down the tynes.

With this style of system you would store your products in bulk tanks on farm (cheaper to buy per Litre), pump the product to the nurse tank, where it is mixed into the application mix. The same transfer pump is used to pump the mix into the applicator tank ready for use. There is ample filtration as the mix is transferred from the application tank through the distributing manifolds and down the tyne. Variations of this style of set up are the most common.

A simple way to create this system is to purchase a 2<sup>nd</sup> hand boom sprayer, with the tank, pump, filter system, regulator and primary manifold already in place. You will need an electric or hydraulic motor on the pump, and you will need to run some hoses thru to the toolbar and the secondary manifolds for distribution to the tynes. From these distribution manifolds, you can use airline (8 mm) hose connected with a quick release socket to the manifold. This way if the line down the tyne is blocked or damaged you can easily change it.

#### Super Doper

- Similar to above, only with separate inline injection ventures' for each different product you wish to apply
- This style of system would allow multiple changes on the go to satisfy even the most demanding variable rate enthusiast.

## Liquid injection Package

• Bulk Storage Tank (32,000L)	To purchase	~ \$9,000.00
• Batch Tank (5,000L)		~ \$4,400.00
• Poly Transfer Pump ( <a href="http://www.iwgroup.com.au/prod2576.htm">http://www.iwgroup.com.au/prod2576.htm</a> )		~ \$1,300.00
• Application Tank (2,000L)		~ \$2,000.00
• Flush Tank (200L)		~ \$ 550.00
• Application Pump - (electric – flow jet)		~ \$ 200.00
• - (Ground drive)		~ \$1,700.00
• - (Hypro S. Steel)		~ \$2,550.00
• Inline Filters		~ \$ 450.00
• Primary Manifold (No. Solenoids = Distributer heads)		~ \$1,000.00
• Tubular manifold Distributer (with tyne hoses)		~ \$1,800.00
~ \$45.00 each Tyne (per 40 tines)		
<a href="http://www.liquidsystems.net/store/price_list2.asp?grp_id=1">http://www.liquidsystems.net/store/price_list2.asp?grp_id=1</a>		

The following web sites are worth looking at to get some additional ideas;

[http://www.stolls.com.au/site/files/ul/data\\_text12/1338590.pdf](http://www.stolls.com.au/site/files/ul/data_text12/1338590.pdf)  
[http://www.capstanag.com/pdfs/SharpShooter\\_Solution\\_08.pdf](http://www.capstanag.com/pdfs/SharpShooter_Solution_08.pdf)  
<http://www.sprayerbarn.com/>  
[http://www.liquidsystems.net/store/price\\_list2.asp?grp\\_id=1](http://www.liquidsystems.net/store/price_list2.asp?grp_id=1)

## Direct Injection Application Rate - Calculator

1Ha = 100 x 100m    1 x 10,000m = 1Ha

**At 50L/Ha** = 50,000 ml per Ha  
= 50,000 ml/10,000m = **5 ml per 1 m travel/ meter (wide)**

**Sowing speed**  $\frac{(\text{Km/Hr} \times 1000)}{60}$  = **m/min**  
At 12 Km / Hr = 200 m per min  
At 8.5 Km/Hr = 140.7 m per min

**Tyne Spacing/Meter**  $\frac{100}{\text{Tyne spacing (cm)}}$  = **No. Tynes /meter**

13.5" 33.33 cm spacing = 3 Tynes/m  
7" 17.5 cm spacing = 5.7 Tynes/m  
10" 25 cm spacing = 4 Tynes/m

~ 50 L/Ha x 12 Km/Hr = 5 ml x 200m = **1,000 ml / min / m wide**

At 25cm Tyne spacing (10") =  $\frac{1,000 \text{ ml}}{4 \text{ Tynes}}$  = 250 ml / Tyne / min

At 33.3cm = 333 ml / Tyne / min

~ 40ft x 10" spacing = 48 Tynes x 250 ml/min = **12 L/min total**

~ 40ft x 13.5" spacing = 35 Tynes x 333 ml/min = **11.7 L/min total**

For more information about SLTEC Products and Services call the SLTEC Team;

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