

On-farm research helps inform management decisions

How do you know that a product you are using is having a positive impact on your crop?

There can be a large range of products being promoted in the banana industry at any time, especially 'biostimulant' or 'biological' products which aim to promote plant growth. The effects of these products are often tested in experiments in controlled conditions in laboratory and glasshouse studies. While there is some science to support the efficacy of some products, extrapolating these results is a long way from the commercial situation where they are being promoted. Small on-farm trials can be useful to test for any effects in a commercial situation if they are done properly.

The key points to consider when planning any on-farm trials are:

1. What to measure

The first question to ask is: **what do you hope to achieve by using the product?** The answer to this question will help you determine what it is you should monitor and measure. For example, you may want the product to increase bunch size, reduce crop cycling time, reduce the required fertiliser inputs or reduce nematodes and other soil borne disease. Therefore some of the things you may measure might include leaf emergence rates, the plant height, the time to bunching, the bunch weight or the root rating relating to nematode damage. The more detailed measurements you take the more information will be obtained, allowing better management decisions.

2. How to set up a trial

Treating an entire block with a product and monitoring its performance over time will not give you a fair comparison of the performance of a product against your normal farming practice. Your normal farming practice is often referred to as an **untreated area** or the **control**. In setting up the trial it is recommended you keep it as simple as possible. For example, compare an area treated with a product to an adjacent untreated area with your normal farming practice (Figure 2). This might mean not applying the product to a couple of rows or even half a paddock. If there is some variation across the block (e.g. soil type, drainage) it is suggested to replicate the treated and untreated areas a number of times. This will enable you to be more certain about the effects (Figure 2). In some cases it may be worth comparing different rates or different products, which should be randomised so each treatment has an equal chance of being applied to different parts of the block. You can do this by drawing product names out of a hat to correspond with different locations in the block.



Figure 1. Comparing a product to your normal farming practice will help you identify whether the product is improving your production

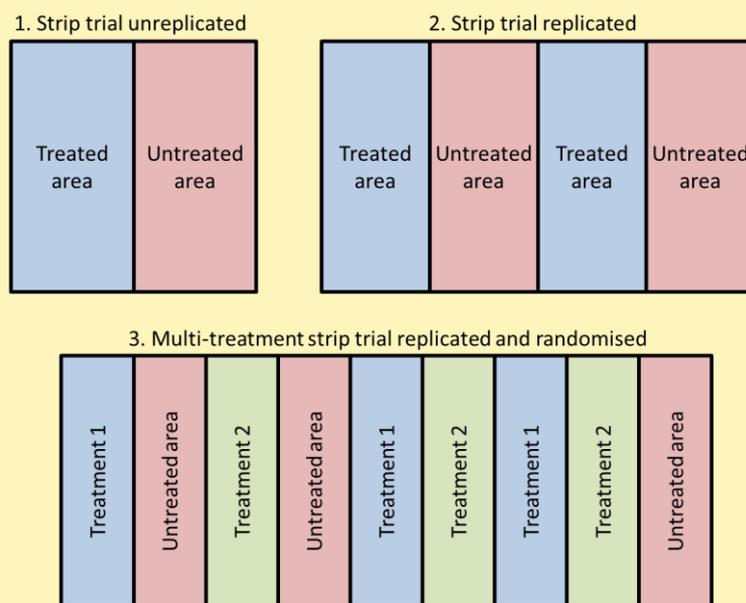


Figure 2. Some designs for on-farm field trials, which can be simple unreplicated designs to more complex multi-treatment, randomised designs

3. How long should a trial run for and how frequently should I take measurements?

How long a trial should run for and how frequently you should take measurements will depend on **a)** the type of product you are using, **b)** what you hope to achieve by using the product, and **c)** the type of measurements or observations you are making. One thing to consider when deciding the duration of the trial is that environmental conditions can have a big impact on growth rates and how products work. It is important to take measurements or observations at several different times of the year at different stages of plant development. It is a good idea to take measurements before application and at selected time intervals after application. It is very important that whenever you take measurements that you do it the same way and at the same time for both the treated and untreated areas. This will ensure that you make a fair comparison.

4. Analysing your results

When analysing the results of your trial it is important to not only look at the average for the treated and untreated areas, but also the variation. A simple measure of the variation is the difference between the maximum and minimum values (known as the range) and a small range suggests small variation. Big differences between the treated and untreated averages with a small variation may suggest there is an effect of the treatment. If your treatment areas are replicated then you can perform statistical tests such as *t*-tests to statistically compare the averages for the treated and untreated areas.

If you have taken measurements over different times of the year it is also interesting to look at the values at each of these time points as well as the total average values. A simple graph of the values over time can provide good insight into any differences between the treated and untreated areas. Although it can be difficult, relating results from a trial to an economic assessment will in most cases help determine the level of effectiveness of a practice. The more information that you can generate from trials directly related to your farm then the more informed you will be to make management decisions about different products.

For more information:

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