

EXHAUSTIVE GROWTH

Sometimes it's not the latest hi-tech gadgets but the simplest of solutions that achieve results. **Carene Chong** speaks to a farmer who's gone back to basics with his latest invention



If you paid enough attention to science classes in primary school, you would have learned that carbon dioxide (CO₂), a gas deemed harmful to the environment in excessive amounts, is beneficial to vegetation.

Plants need CO₂ for photosynthesis and release oxygen as a waste product, which organisms such as humans in turn breathe in. Consequently, we breathe out CO₂, which plants take in and the cycle continues.

This very concept formed the foundation of New South Wales farmer Colin Harper's latest invention, the Exhaust Fertiliser.

NATURE'S WAY

The name speaks for itself. Instead of allowing tractor fumes to escape into the atmosphere, Harper's system pumps the exhaust into the ground, which is then used as fertiliser for crops. Exhaust fumes consist mainly of

nitrogen and CO₂, which are destructive to the environment but they are crucial for the survival of plant life and soil micro-organisms.

Therefore, in addition to feeding crops with the nutrients and elements they need, the system helps farmers reduce their carbon footprint.

"Fuel is oil and oil is organic matter that's just been buried and composted," Harper explains.

"We're basically burning compost,



OPPOSITE: Aria Park farmer Colin Harper's canola crop which has been sown and fed with nothing but tractor exhaust
 ABOVE: The Exhaust Fertiliser unit is mounted on top of a tractor with all hot points out of reach
 RIGHT: The system can be installed on any tractor model and can be used on any implement of choice, whether an airseeder, offset disc or deep ripper



which is a plant matter, and feeding it back to plant matter."

For that reason, just about anything in the exhaust is beneficial to plants.

However, plants cannot thrive without the help of microbiology in the soil such as bacteria and fungi. These are responsible for releasing essential nutrients crops need as well as converting atmospheric elements such as nitrogen into compounds easily absorbable by plants. As soil microbes thrive on carbon, the Exhaust Fertiliser fits into the picture perfectly.

"All the trace elements in exhaust, especially carbon, are big stimulants to soil biology," Harper says.

"So the more biology in the soil, the healthier your crops get and as the residue breaks down into compost it feeds the soil microbes which continue to thrive and provide your crop with the

nutrients it needs. It's just a win-win circle after that."

EASIER SAID THAN DONE

The concept seems simple enough; it's just a matter of leaving nature to do what it's supposed to. In fact, the idea has been around for almost 100 years, Harper says.

In the 1920s, several ambitious farmers were on to the concept and were coming up with machines to inject exhaust fumes into the ground for fertilisation purposes. However, the limitations in technology and resources back in the day meant there wasn't a machine viable and affordable enough to be used for full scale exhaust fertilisation.

Furthermore, following the widespread use of artificial fertiliser post-world war, the concept slowly faded away.

In the 1960s, the idea was re-introduced into agriculture by incorporating exhaust fumes into irrigation systems, but it wasn't until the introduction of the air seeder that the tables were truly turned and Harper wasn't one to miss out on the massive opportunity.

A REVOLUTIONARY SYSTEM

Following four years of development and trials, Harper released his Exhaust Fertiliser system on to the market mid-to-late-2013. The system comprises a tractor-mounted unit that extracts

RIGHT: Colin Harper installing the unit on to a tractor which he says is easy enough for anyone to do by themselves

exhaust fumes from the top of the tractor and feeds it into the air seeder for injection into the ground along with the seeds during sowing.

“We’ve got a simple mounting system that will fit any tractor roof,” Harper says. “The unit features an exhaust cooler that cools the fumes as they come out of the tractor. All the hot points are out of reach, making it a very safe system to use.”

In addition to the unit, farmers will need to buy a conventional hose or pipe to connect the unit to the air seeder, available at any supplies store.

“We have an auto-flow chamber in the unit, so when the tractor starts up and the air seeder fan is put into gear, the air seeder draws the exhaust through and pumps it out into the ground along with the seeds,” Harper says.



“It’s a really simple unit to use. You can just set and forget.”

Several electric fans are installed underneath the cooler to keep the exhaust output temperature at an ideal level.

“It’s a really simple unit to use. You can just set and forget,” Harper says.

On top of providing natural fertilisation for crops, Harper says the system also aids in speeding up germination.

“Because we’re using exhaust to carry the seed down the tube it’s actually coating the seed with all those beneficial trace elements such as carbon, nitrogen, phosphorous and zinc in addition to warm moist air for quicker germination,” he says.

“I had a soil scientist inspect my trials this year and even though we’re just halfway through the season, we’ve

already noticed an improvement in germination of 10 per cent.”

Because the unit is installed on top of the tractor and not on to the implements utilised, Harper says the system can also be used during cultivation with offset discs or deep rippers.

“You can pump the exhaust in during cultivation to stimulate the soil biology beforehand so when you go to sow, again with the Exhaust Fertiliser, you’re further adding to the biology of the soil so there’s a double bonus there,” he says.

AU NATUREL

Harper, who farms 1,200 hectares of canola, wheat and sheep in Ariah Park, NSW has used nothing else but the Exhaust Fertiliser to feed his crops and grass for the past four years. So far, he has been elated with the results.

“My canola crops are currently at their early flowering stage, and tissue tests have shown that the crop had all the nutrients and trace elements that it needed, and it was sown with Exhaust Fertiliser only, no synthetic fertilisers, insecticides or fungicides,” he says.

“A Solvita biological test revealed the soil is high in microbiology similar to a soil that had been treated with manures or green manure.”

The positive results seem to have had a roll-on effect for Harper’s livestock.

“I reckon my sheep are healthier too,” he says.

“If my soil is better and the biology is actually working, the grass that the sheep consume would be better for them.”

Will this mean farmers can ditch fertilisers altogether for his system? Harper says while it is absolutely possible, he does not recommend cutting normal fertiliser use off completely.

“I won’t suggest going cold turkey on the synthetic fertilisers but I’d be confident in cutting your fertiliser costs in half,” he says.

ON TO THE MARKET

So far the response to his system has been lukewarm at best, but Harper is confident it will get better as time passes.

“People have been very interested and curious but there is that hesitation as it almost sounds too good to be true,” he says. “But I’ve had mine for about four years now and a few units have been sold to other farmers, so we’re gaining a lot more confidence in the unit.”

Harper exhibited the Exhaust Fertiliser system at the AgQuip agricultural field days in Gunnedah, NSW between August 19 and 21. ●