Media Release

Speeding stubble decay and nutrient release

September 2022

Trials in a range of cropping regions across Australia have confirmed the ability of innovative Elemental Enzymes product, Res+ to speed up breakdown of the previous crop's stubble, for quicker release of nutrients and improved soil structure for the following planting.

Elemental Enzymes Australia sales and marketing manager, Chris Ramsey said when applied post-harvest or ahead of planting at a rate of 1.2 L/ha, said the product has led to higher yields and higher income from subsequent crops.

Trials were conducted in 2021 across a variety of Australian field-crop stubbles including sorghum, wheat, barley and legumes, followed by horticultural crops, cotton, wheat, barley, and legumes.

Wheat trial, Queensland

At Evanslea on Queensland's Darling Downs west of Toowoomba, Res+ was applied to mung bean stubble 10 days before an early-July planting of Sunchaser wheat.

Mr Ramsey said wheat planted into the treated area was noticeably greener, due to increased organic nitrogen from quicker conversion of mung bean residue to plantavailable nutrients.

Harvested late October, areas of the paddock treated with Res+ yielded an extra 0.24 tonnes/ha, worth $115.20/ha at feed-grade wheat prices.

Wheat trial, Western Australia

A two-year study in 2020-2021 at Katanning in WA showed 7-per cent year-on-year yield benefits from applying Res+ to Sceptre wheat residues prior to planting the next wheat crop.

Mr Ramsey said the researchers concluded that as well as benefitting yield, Res+ was easily integrated into the farming system without major changes.

Canola trial, Victoria

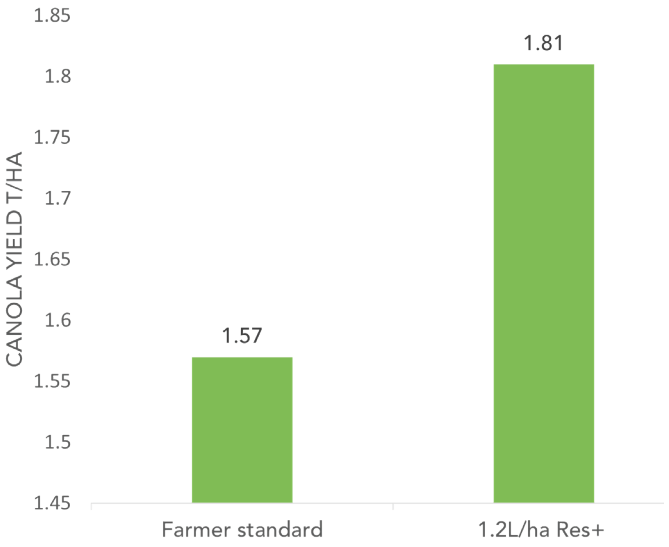
At Lara in Victoria, applying Res+ to barley stubble increased yield of the following canola crop by 15 per cent (0.28 tonnes/ ha) compared with sections receiving the farmer's standard treatment. That extra yield was worth $283/ha at $1000/tonne for canola.

Broccoli trial, Queensland

Mr Ramsey said on Queensland's southern Darling Downs, using Res+ on forage sorghum stubble at Clifton increased yield of the following broccoli crop by 15.5 per cent, with increased head weight of 67 grams/ head and improved broccoli-head quality, estimated to be worth $5401/ha (at $2.37/kg).

"On the Res+ treated portion, the soil was much easier to work and plant the broccoli crop in August, and the October picked crop was ready for harvest a week earlier than the untreated area," Mr Ramsey said.

"Res+ has now proved its worth in a wide range of Australian crops, in corn trials across USA and Europe, and is easily integrated into existing farming operations."



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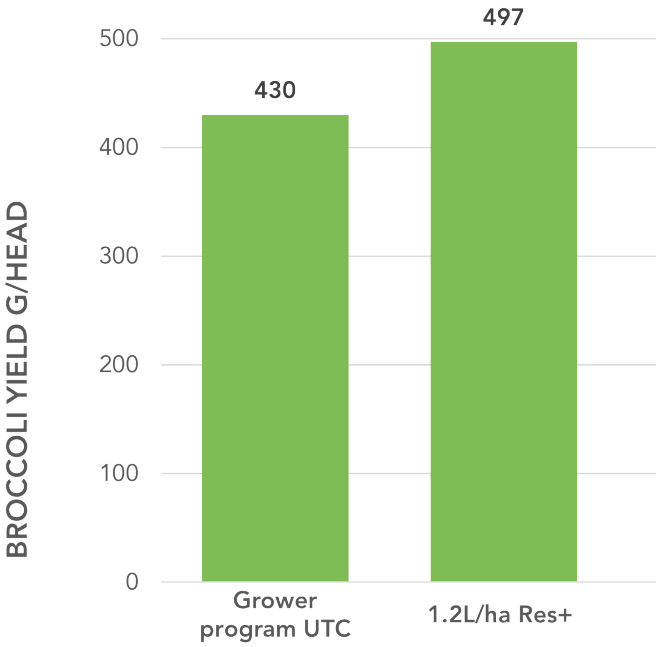

Using Res+ on forage sorghum stubble at Clifton, Qld increased yield of the following broccoli crop by 15.5pc, worth $5401/ha.

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elemental enzymes®

As well as a seven percent year-on-year yield benefit, a 2-year trial at Katanning in WA showed Res+ was easily integrated into the farming system without major changes.

How does Res+ work?

Res+ was developed by US life-sciences company Elemental Enzymes to accelerate crop residue degradation after harvest – allowing quick return of key nutrients to the soil and enhancing microbial activity, soil health and planting conditions for the following crop.

Mr Ramsey said Res+ contained many key factors needed by soil microbes to grow and spread on residues, providing growers with a simple way to optimise and speed up microbial attack of residues and release of nutrients.

"Native soil microbes produce enzymes to break down plant residues into smaller particles that they can digest. The process is complex, but keys to efficient breakdown are temperature, moisture, the presence of essential nutrients, and the ability of microbes to access the carbon trapped in residues.

"Warmer temperatures stimulate greater microbial growth and quicker degradation, and Res+ provides several of the other key ingredients – prolonged stubble moisture, micronutrients, nitrogen, and plant-cell-wall degrading enzymes."

Microbes require moisture to move through the soil to colonise stubble, and to allow direct contact between their excreted enzymes and crop residue, to break down and release nutrients. Mr Ramsey said the humectant in Res+ attracts water to the residue and holds it there, facilitating microbial activity.

"Carbon and nitrogen in residues are major nutrients for these microbes, but they also needed micronutrients including magnesium, boron, copper, manganese, molybdenum and zinc, which Res+ provides in available chelated forms.

"Crop residue is predominantly carbon, in cellulose, hemicellulose and lignin which provide the plant's rigidity and makes stubble resistant to degradation.

"Res+ contains a patented plant cell wall-degrading enzyme to break down cell walls – providing microbes with quick access to the preferred carbon nutrient, the glucose inside cells, and causing quicker structural collapse of residues.

"Res+ also contains 6% available nitrogen, which studies have shown increases structural breakdown by lignindegrading microbes."

Using Res+

Mr Ramsey said applying Res+ provided a uniform, high concentration of essential stubble-degrading enzymes, key supporting nutrients, and moisture-attractant throughout the soil and right across the paddock – leading to faster, more consistent degradation of residues by microbes.

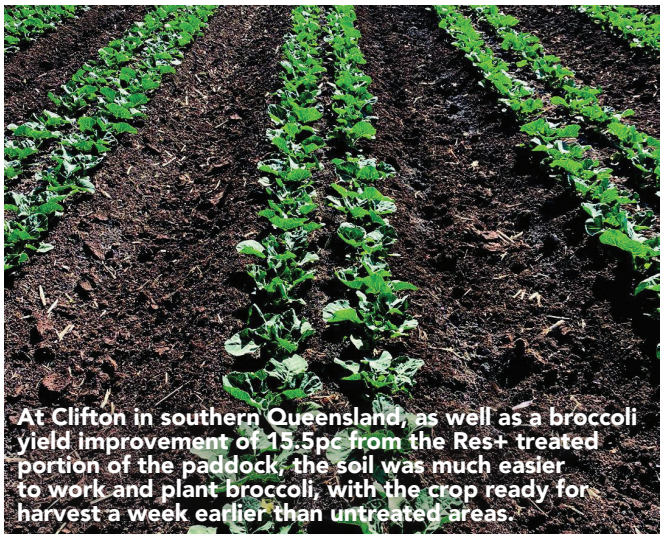
"The enzymes start work immediately and continue for several weeks, providing a nutrient-rich and friable area around seeds and young plants.

"As soil temperatures rise and growers plant summer crops into winter-crop stubble, Res+ will improve paddock workability and speed up cycling of locked-up nutrients.

"Another of the company's enzyme products Lumen, applied with fertiliser at planting, will continue converting residual organic material, and improve young plant growth with increased available N, P and K."

Res+ is formulated in Australia and available in 20L and 1000L packs and can be applied with post- and preemergent herbicides, pesticides and liquid fertilisers (check the Res+ label for more detail on compatibility).

Res+ is one of several innovative products being trialled and introduced to Australian agriculture and Horticulture by Elemental Enzymes.



At Clifton in southern Queensland, as well as a broccoli yield improvement of 15.5pc from the Res+ treated portion of the paddock, the soil was much easier to work and plant broccoli, with the crop ready for harvest a week earlier than untreated areas.

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