

Seedbed feeding comes full circle

There's renewed interest in applying crop nutrients during sowing. But does it deliver agronomic benefit?

By Andrew Blake

The idea of feeding seedbeds is far from new. In the 1970s, sowing seed and compound N:P:K fertilisers together was common practice for most combinable crops. But then the need to speed autumn sowing took over, and triggered a widespread move to seed-only drills. It was also widely accepted that soil phosphate and potash indices could be equally well maintained by fertilising at other times.

Now several factors, not least the desire to boost winter oilseed rape yields, are driving fresh examinations of seedbed feeding's value, especially for supplying phosphorus.

Although combine drilling may be less common, placing fertiliser when sowing potatoes is widely practised, notes consultant Chris Dawson.

"Phosphate is particularly immobile in soils, moving at most only a few millimetres, so a poor-rooting crop such as potatoes may

“Crop growth in the autumn can be considerable, and the soil may not be able to supply its full nutrient needs, especially when the root system is small.”





Chris Rigley warns that with phosphates under environmental scrutiny, growers may be forced to achieve more with less.

not find enough even in Index 2 soils, and some assistance, through fertiliser placement, may be beneficial."

Placement puts a significant proportion of the nitrogen, phosphate and potash dressing below and to the side of the seed tuber so that the growing



roots inevitably encounter the fertiliser band, he explains.

"When roots take up nitrogen or phosphate there is a signalling within the plant which encourages more roots to grow in that area, so maximising nutrient recovery."

Ian Matts of Yara believes the main reasons that seedbed feeding is back in vogue are the move to establishing oilseed rape in wide rows and the clear benefits to the crop from early autumn nitrogen.

"The seed is very small and contains low nutrient reserves. Crop growth in the autumn can be considerable, and the soil may not be able to supply its full nutrient needs, especially when the root system is small."

In a 2010/11 company trial, 25kg/ha of broadcast nitrogen benefitted the crop by £48/ha, he notes. Placing the same amount, as liquid, banded in line with the seed raised the extra return to £118/ha.

"We plan to look into the effects of banded autumn fertiliser in wheat this season."

Firm advocate

Chris Rigley of CNI Agronomy is a firm advocate of seedbed feeding via the company's Nutri-Feeder. He says trials over 12 years at four sites on different soil types with varying nutrient indices have convinced him of the benefits of enhancing root mass by applying liquid fertilisers during sowing.

"Liquids are available to the plant almost immediately. This is vitally important if conditions are dry. I have yet to see a plant that can deal with solids before they go into soil solution, which can take time."

Adding a package of nutrients during sowing always pays dividends, he maintains, the main one being phosphite to stimulate root-driving phosphate. But spring-sown crops, with less time in the ground to achieve their potential, probably benefit more than winter ones.

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CNI Agronomy trials have shown phosphite treatment (right) increases root biomass.

► we can achieve when using nutrition as part of the disease control strategy.”

Other micronutrients are included according to soil type, he explains. “We add molybdenum on lower pH soils and increase the manganese rate on our light land site.”

Where P and K Indices are 2+ or above, seedbed feeding

can reduce overall costs by applying those nutrients in a more focused, targeted way, he adds.

“Why feed weeds in between the crop rows unnecessarily?”

“In animal rearing we don't withhold the right available food in the first days of life, and I believe it shouldn't be any different in crop husbandry.

Cup of tea to revive flagging crops

Growers are being encouraged to try a new microbe-rich treatment to give crops a boost, especially in poor soils or where yields are low. Compost Tea is made on farm by ‘brewing’ a small volume of good quality compost with a catalyst in aerated water for 24 hours. It can then be added to other treatments applied via a conventional sprayer, either directly to crops or to the soil.

The brewing process produces a light brown solution, hence the product's name. The catalyst encourages rapid multiplication of micro-organisms contained in the compost, says UK supplier Martin Lishman, and it's these that are claimed to help plants make better use of soil and applied nutrients, while also being more resistant to diseases.

Lincs grower Justin Stafford regularly sees yield and crop-health benefits from the treatment for some low-yielding crops he grows at Duncombes Farm, Little Bytham, near Grantham.

“Treated wheat crops always have a greater leaf volume and much better tillering. When we harvested

2011's crops we had to drop a gear on the combine harvester because the crop was much thicker. Treated crops stayed green longer, and plants had a much better developed root system, which was what kept them going during dry weather.”

In 2010, Compost Tea with half rates of nitrogen and agrochemicals was tried against a regime with full conventional inputs on one of his “most difficult” fields. The Compost Tea regime achieved 6.52t/ha compared with 5.19t/ha. The treated crop had a protein of 12.40% against 10.83% from the conventional inputs.

After several years' use, the Compost Tea also appears to be helping improve the workability of his soils, he says, which vary widely in type from heavy clays through to light, brashy types.

“We have also raised oilseed yields from 3.50t/ha to 4.43t/ha. The plants in the Compost Tea treated area were bigger, better branched and healthier, and we also noticed better root development as well,” he reports.

“Phosphates are under environmental scrutiny and we will, in time, be forced to achieve the same, if not more, with less.”

Productivity advances

Precision farming in all its guises has helped deliver advances in productivity across all crops, says De Sangosse's Kim Christo.

“Granular applicators, like those used by maize, vegetable and potato growers for many years, are now being applied in combinable crops, such as OSR, with great success.”

Research carried out by Yorks-based NDSM and Suffolk and Cambridge Crop Station over the past five years has highlighted the importance of nutrient availability in the first stages after germination, he points out.

“It's fundamental to crop establishment and plant development. A seed has only a limited reserve of nutrients in which to get itself established — just enough to avoid death, rather than sufficient to get the plant through to the first application of N, P or K.

“The same research has also revealed the importance of micronutrients, such as zinc, to plant establishment.”

As a result the firm has developed a range of starter fertilisers to ensure young plants get off to the best possible start, he says.

“Because the young plant has only small roots it's important to place the nutrient in close proximity so that it can be easily accessed, typically within 3mm of the seed, and in a suitable format, such as a micro-granule. This is essential in the case of phosphorus. ▶



Wheat plants treated with Compost Tea (left) are claimed to develop better roots in autumn.

The farm follows a basic two-pass crop-establishment system. Heavier land is ploughed, while lighter soil types are cultivated with a home-made cultivator combining tines and rollers, which runs ahead of his home-made cultivator drill.

The Compost Tea regime is applied to Sept-planted winter wheat at 350 l/ha in Nov. Further applications of 250 l/ha are made in spring once the crop has started growing vigorously, and continue until it's in full ear. This makes a total of between five and seven applications, timed so they fall between crop protection applications.

“We apply the solution in the evening, at night or in the early morning to avoid evaporation, using conventional nozzles without filters. We make it in 400-litre batches, which are diluted in another 1,200 litres of water in the sprayer,” says Justin Stafford.

Soil tests completed on fields where the system has been used for several years, suggest there's also a long-term benefit. Treated soils have around 20% greater levels of both bacteria and fungal activity, according to results. Levels of Ciliates — organisms that play a crucial role in converting bacteria into plant-available nitrogen — were also raised significantly in the tests.

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Modern combined drills typically place fertiliser in a narrow band close to the seed

► “You need to mount an applicator onto an existing cultivator/subsoiler to apply it, but results suggest that it’s highly beneficial to do so.”

The technology behind the company’s starter products prevents the applied phosphorus being locked up in the soil, he explains.

“We have data from independent trials specialist NDSM in 2010 on spring barley that demonstrated a yield gain of 0.77t/ha, compared with the crop which received a conventional fertiliser regime.”

Trials in 2011 on winter wheat returned a yield increase of 0.9t/ha compared with

conventionally treated crops, he adds.

“It’s clear that applications of minor nutrients, and their bio-availability immediately after germination, are important to a crop’s final performance.”

Any deficiency in phosphorus, calcium, zinc or manganese will limit growth immediately after germination, warns Peter Scott of Carrs Fertilisers.

“Phosphorus is arguably the single most important nutrient during establishment as it’s directly involved in the energy processes responsible for cell division and therefore root and shoot growth.

“Placement of fertilisers is particularly

beneficial in low P soils, for crops with inherently poor root systems, such as potatoes and maize, and spring-sown crops where quick establishment is paramount. Autumn-sown crops on heavy or very wet soils will also benefit from placement.

“Ideally, an adequate supply of nutrients should be placed in the seedbed, either in a band or combine drilled. But it’s not physically practical to apply all the nutrient requirements with the seed, so a sufficient ‘starter’ quantity may be the best approach.”

Coated granules

To counter potential P fixation by other elements in the soil, the firm offers phosphate granules, coated with a polymer-based liquid called Avail. Harper Adams maize trials showed that, when placed with the seed, 25kg/ha of P_2O_5 treated with Avail was just as effective yield-wise as the standard rate of 58kg/ha untreated, he notes.

“I don’t see approaches such as placement and seed dressings as displacing the concept of maintaining overall soil nutrients at optimum levels. Regardless of the method or timing of application, it’s still an essential aspect of soil fertility that the base elements and soil pH be maintained at optimum levels.”

Even with seedbed applications, the more

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a soil nutrient status declines from Index 2, the more likely it is that crops will be unable to find their entire nutrient needs, warns Chris Dawson.

“It seems fashionable to believe that there is no downside, and even a financial benefit, from maintaining a soil at lower nutrient index than was appropriate in the past, despite higher yields being achieved.

“The concept of maintaining soils at Index 1 is like walking close to a cliff edge. It’s probably fine if you’re lucky and there’s no sudden gust of wind.”

Nutrient seed dressings, such as Detonator, Take-Off and Wintercrop, are

Trials with spring barley have demonstrated clear yield benefits, claims Kim Christo.



available for oilseed rape. The latter, also available on wheat, has also proved especially promising on spring barley in Cornwall, where one of four trials sites was manganese-deficient, according to CYO Seeds’ Jon Tisdall.

Detonator is a no-charge option on all varieties supplied by United Oilseeds, notes the firm’s technical manager Richard Elsdon.

Agrii’s oilseed rape specialist Philip Marr says that if soil temperatures remain low in Sept, poor nitrogen mineralisation will make seedbed nitrogen particularly important. “It will also be vital to apply extra phosphate or potash in bands at sowing wherever P or K indices are below 2.

“With the extent of phosphate demand for root development, I wouldn’t be sowing anything without Take-Off this autumn either.”

David Barrett, who farms on the Lambourn Downs in Berks, says he grew peas a few years ago in adjacent fields, one from seed treated with Take-Off and the other without.

“On our chalkland, with pHs of up to 8, we get a lot of nutrient lock-up. The germination was much better with the treatment and the benefit carried all the way through to yield.”

However, GrowHow’s Allison Grundy says that in its former guise as Kemira, the company arranged experimental work with P,



Chris Dawson points out that seedbed applications are no substitute for maintaining the correct soil index for all nutrients.

K, Mg and Zn seed coatings on cereals and oilseed rape.

“The results were very inconsistent and the best responses we got were on sites where soil indices were sub-optimal. West Crop, who did the work, recorded increased plant populations and early crop vigour, but never a yield response.

“Maintaining soil indices at optimal levels is always going to be the cheapest and most effective way of ensuring that enough P, K and Mg are available to grow economic crops.” ■

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