

Pig slurry a valuable fertiliser for spring crops

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Raymond Moloney farms near in Ballinspittle, Co Cork, with his two sons Killian and Gavin where they run a pig and tillage enterprise on their farm. The business consists of a 400-sow integrated pig unit producing 5,900m³ (1.3m gallons) of slurry every year and the tillage enterprise of 160ha which is made up of a combination of owned and rented land plus some share farming. “We use a lot of the slurry from the pig unit on our tillage land, but we also export a large quantity of the slurry to neighbouring farmers,” says Raymond. “We regularly soil test to monitor soil pH, P and K levels in order to maintain soil pH in the optimum range and adjust slurry applications based on soil P and K levels.”

Fertiliser (P & K) value of pig slurry
Phosphorus (P) and potassium (K) applications are based on soil analysis in conjunction with crop P and K off-takes based on grain yields. For example, the average spring barley yield on the farm over the last number of years has been 8t/ha.

On index 3 ground, the crop removes 30kg P/ha (25 units/ac) and 91kg K/ha (73 units/ac). Therefore, to meet crop nutrient requirements during the growing season and maintain soil fertility levels, the fertiliser programme must deliver this level of nutrient. Table 1 shows N, P and K advice for spring barley yielding 8t/ha at different soil indexes (1 to 4).

“Depending on soil results, we use either slurry alone or a combination of slurry and chemical fertiliser to supply crop requirements,” says Raymond “We’ve found that using pig slurry alone in some situations has resulted in some K levels dropping, so we use 15:3:20 to deliver a proportion of the crop’s N, P and K requirements in the seed bed. We use muriate of potash (50% K) to replenish soil K levels based on soil test results.”

Fertiliser N value of pig slurry

Pig slurry is a valuable source of nitrogen (N), as each 1,000 gallons contains approximately 19 units N at 4% dry matter (good quality). To maximise the recovery of N by the crop, it is essential that slurry is well

agitated, applied in moist, cool conditions and most important that it is ploughed-in within three to six hours of application. Raymond has found from experience that it is important to adjust bag fertiliser N applications to take account of the N in the slurry.

“Once soil temperatures increase, slurry N is released and if we don’t reduce early N applications to the crop, lodging is a real risk later in the season,” says Raymond.

He has noticed over the years that land receiving repeated applications of slurry releases extra nitrogen over time, offering a further saving in terms of reduced crop N requirements.

Fertiliser programme

The typical fertiliser programme for spring barley on Moloney’s farm comprises of pig slurry at 2,000gal/ac plus two bags/ac of 15:3:20 and 1.75 bags/ac of ASA (26% N, 14% S). Higher rates of pig slurry are applied to very low to low P/K index fields (Index 1 and 2) due to higher P and K demands, as shown in Table 1.

The fertiliser and slurry programmes and nutrient supply are shown in Table 2. Pig slurry is applied and ploughed in ASAP; 15:3:20 is applied and incorporated at sowing time and the 1.75 bags/ac ASA is applied when the crop is at mid- to late tillering.

Raymond says the reason for having such a low requirement for chemical nitrogen is that he always endeavours to apply slurry and plough the field on the same day to aid maximum recovery of the nitrogen.

Building soil P and K

On the Moloney farm, fertiliser programmes will change depending on soil P and K fertility levels. For example, where new land was taken on and soil fertility levels were Index 1 for P and K, a combination of 10:10:20 and slurry was applied.

The 10:10:20 is a more suitable fertiliser due to the higher demand for P and K on very low-fertility soils, plus the P in slurry is not as available (reduced availability of slurry P by 50% on Index 1 and 2 soils). Raymond hopes to reduce the amount of chemical fertiliser here as his indices rise. It is planned to retest this new land after three years to see the changes in soil fertility levels.

Slurry quality

Raymond believes that knowing the dry matter of the slurry is one of the most important factors to applying the correct rate. Slurry application rate is adjusted based on knowledge of the slurry dry matter depending on the part of the pig unit it comes from.

The dry content of pig slurry can be easily determined on farm by a slurry hydrometer at least cost. For example, the application rate for slurry from the dry sow house is increased compared with slurry from the finisher house to ensure the correct level of N, P and K is applied.

Fertiliser costs and pig slurry

The efficient use of the slurry has significantly reduced chemical fertiliser costs on the Moloney farm. The 2016 Teagasc e-Profit Monitor shows fertiliser costs for spring barley was €251/ha compared to the Teagasc costs and returns figure of €313/ha. When further analysed, a block of land which did not receive slurry (too far from the piggery), but only received chemical fertiliser, the fertiliser costs totalled €340/ha.

In comparison, the land which received the slurry, two bags/ac of 15:3:20 and 1.75 bags/ac 24% ASN, fertiliser costs only amount to €183/ha – a saving of €157/ha, after the cost of spreading is shared between the tillage farm and the piggery.

Changes to legislation

The ending of the transitional arrangements that were in place for pig and poultry farms has made it more difficult to utilise and export pig slurry (see following article). While the aim is to apply the majority of pig slurry in the springtime to attain maximum nitrogen utilisation, it is difficult to build soil fertility for winter crops without autumn application.

Changes in the Nitrates Directive are required, in that slurry applied is attached to the crop rather than the year in which it is applied, as in the case for winter crops. For example, slurry applied to winter crops planted in October 2016 for the 2017 harvest goes into the 2016 records instead of the 2017 records.

“Pig slurry will always have to be carefully managed,” says Raymond. “But when used carefully, it’s a fantastic fertiliser which benefits the soil and crop profitability.”



Table 1: N, P and K advice for spring barley yielding 8t/ha

Soil index	N (kg/ha)	P (kg/ha)	K (kg/ha)
1	165	50	121
2	130	40	106
3	105	30	91
4	70	0	0

Table 2: Fertiliser programme for feed barley at 8t/ha receiving pig slurry

Nutrient requirements kg/ha (units/ac)		22m ³ /ha pig slurry kg/ha (units/ac) (2,000gal/ac)	Crop balance required kg/ha (units/ac)	Fertilisers applied (bags/acre)
N (Index 1)	165 (132)*	69 (55)	96 (77)	2.0 bags/ac 15-3-20, 1.75 bags / ac CAN
P (Index 3)	30 (25)	18 (14)	12 (10)	
K (Index 3)	91 (73)	48 (39)	43 (34)	

* 8.5t/ha (135kg + 30kg = 165kg N/ha)