

Nitrogen, phosphorus and potassium usage for grassland and arable crops in 2003

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Introduction

Data from the Teagasc National Farm Survey of 2003 were used to conduct a survey of fertilizer use. The aim is to determine the amounts of N, P and K nutrients and types of fertilizer used on grassland and arable crops and to measure the relationships between fertilizer use and such factors as farm size, enterprise and stocking rate. Comparisons were also made between fertilizer use and current Teagasc fertilizer advice.

Materials and Methods

The survey data consists of information from a random selection of farms which represent the major farm systems and sizes. These had been selected using information from the CSO Census of Agriculture 2000 (Connolly et al, 2004). Farms were classified into four main farm types namely: dairying, cattle, sheep and tillage; these were derived from the 8 standardised EU farming system types as used by the EU Statistics Bureau (Eurostat).

The distribution of farms size showed that 27% of farms in the survey were in dairying while over 50% were involved in cattle enterprises. Almost 37% of Irish farms had an area of 20 ha or less.

Using the SAS statistical package, tables were obtained relating the mean N, P and K fertilizer use for grassland and crops to geographic regions and farm management factors such as farm enterprise, farm size, stocking rate, soil use class etc. The mean values for different crops were weighted according to the crop area. Standard errors were obtained for all means to allow comparisons to be made between them but these are not shown in the tables here.

The survey results were validated by comparing the nationally published annual sales of N, P and K with the amount calculated from the survey results for N, P and K usage for different crops in farms of different sizes. The published national areas under these crops and the distribution of farm sizes in the selection of farms were also used in the calculation.

Results and Discussion

Table 1 shows that the national total sales of the fertilizer elements N, P and K are very close to the calculated total usage, based on the mean use of the elements on the farms. This validates the survey results.

Table 1 Comparison of sales and surveyed usage

	N	P	K
National Sales (kt/year)	388.1	43.8	111.1
Calculated Usage (kt/year)	383.0	44.7	111.3
Discrepancy	-1.3%	2.0%	0.2%

Table 2 shows the mean usage of nutrients for different grassland systems. Comparison with usage in 2000 (Coulter *et al*, 2002) shows that mean N usage for grazing had decreased by 5%, P by 11% and K by 14%. For silage, the mean N, P and K usage for 2003 reduced by 11, 15 and 20% respectively from the means for

2000; these are much greater decreases than the decline in national fertilizer sales of 4.8%, 11% and 9.4% for N, P and K respectively.

Nitrogen use for silage was less than published Teagasc advice; the P rates were numerically between Teagasc slurry and no-slurry advice. This suggests that greater economy in P would be possible if more farmers took into account the nutrient value of the P content of slurry.

Table 2 Nutrient usage for grassland (kg/ha)

System	N	P	K
Grazing	104	8	18
Silage	120	13	41
Hay	53	11	25

Comparison between N use for grazing cows and Teagasc advice (Table 3) showed that at stocking rates below 2.1 LU/ha, farmers used much more than was recommended, but above 2.1, the N rates were appropriate. For cattle, N use rates were much lower than Teagasc advice.

Table 3 N usage for grazing at different stocking rates

Stocking Rate (LU/ha)	Teagasc N Advice (kg/ha)	N Usage Dairying (kg/ha)	N Usage Cattle (kg/ha)
< 1.2	45	77	29
1.2 - 1.5	60	100	59
1.8	100	134	69
2.1	160	177	112
2.4	225	216	171
2.7	300	258	-

The N, P and K usage for tillage crops (Table 4) showed that for cereal crops, N usage rates were higher than published Teagasc advice, but P and K rates were lower. The N rates for sugar beet was higher than Teagasc advice but N rates for other root crops, and P and K rates for all root crops were lower.

Table 4 Nutrient Usage for Tillage Crops (kg/ha)

Crop	N	P	K
Winter Barley	167	30	71
Spring Barley	123	26	55
Winter Wheat	203	23	55
Spring Wheat	152	24	53
Winter Oats	138	26	48
Spring Oats	113	25	49
Sugar Beet	159	43	157
Fodder Beet	129	48	162
Potatoes	115	102	225

References

- Connolly, L., Kinsella, A. and Quinlan, G. (2004) National Farm Survey 2003. Teagasc, Dublin. ISBN 1-84170-365-6.
- Coulter, B., Murphy, W., Culleton, N., Finnerty, E and Connolly, L. (2002) A survey of fertilizer use in 2000 for grassland and arable soils. Teagasc, Dublin. ISBN 1-84170-295-1 pp 80.