The availability of N in N-15-labelled mature pea (Pisum sativum L.) residues to subsequent autumn-sown or spring-sown crops was studied in two experiments in field microplots. The residues were incorporated in the soil in August or September. Winter barley (Hordeum vulgare L.) and winter oilseed rape (Brassica napus oleifera L.) recovered about 13% of the pea residue N during the initial 3 months of growth. At maturity the crops had recovered 15 and 13% respectively. This indicates that a major part of the residue N was mineralized and thus available to autumn-sown crops a few months after incorporation of the residues. At maturity, the pea residue N constituted < 5% of total crop N, and the incorporation of residues in soil did not significantly influence the amount of non-labelled soil (+ fertilizer) N accumulated by crops.

The recovery of pea residue N in successive autumn-sown crops of barley, oilseed rape and wheat (Triticum aestivum L.) was 14, 3 and 2% respectively; spring-sown barley, oilseed rape and wheat recovered only 6, 2 and 2% respectively. Similarly, the amount of non-labelled soil N accumulated was almost twice as high in autumn-sown crops as compared to spring-sown crops.

The concentration of organic N-15 in topsoils showed that 55% to 59% of the organic N-15 had been released during 3 yr of decomposition in soils cropped to autumn- or spring-sown crops respectively. The total crop recovery of N-15 was only 20% for autumn-sown and 9% for spring-sown crops. This indicates that of the labelled-N apparently mineralized only 36 and 15% were recovered in autumn-sown and spring-sown cropping systems respectively. Winter barley and winter oilseed rape established at the time of residue incorporation were found to utilize on average 60% of the mineralized N.

This study suggests that in the first year after incorporation, pea residue N may only make a minor contribution to the N supply of autumn-sown crops. Significant amounts of pea residue N are mineralized mainly in the autumn following incorporation of the residues. It is therefore important to select and establish a crop which is very efficient in accumulating N during the autumn. However, pea residue N will increase the pool of soil organic N and in the long term contribute to the supply of available N by mineralization.