Nitrogen supply to organic oilseed rape – a study of nitrogen sources, time of application and incorporation techniques

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Summary of results

The demand of domestically produced protein products for food and feed, based on organic rapeseed is steadily increasing due to certification standards of 100 % organic fodder for ruminants. The acreage of organic oilseed rape in Sweden, that mainly constitutes of winter oilseed rape (WOSR) has increased from a few hundred hectares in 1997 to an average of 4200 hectares during the last five years. The production of organic winter oilseed rape is often hazardous and the grower has to expect great variations in yield levels. The N requirement of WOSR is large during the vegetative stages. At stem elongation the uptake rate is high. In April and the beginning of May, the net N mineralisation usually is low in Swedish soils due to low soil temperature. The efficiency of four organic N fertilisers in WOSR were investigated when applied during periods with low temperatures in early spring. Four amendments available on the market, Vinass (a by-product from the yeast production), Biofer (meat and bone meal), chicken manure and dairy slurry, were compared in six field experiments in south and central Sweden harvested in 2006 - 2008. Field experiments were established with hybrid cultivars at row distances of 12 and 48 cm. In autumn 30 kg ha^{-1} N was applied as Biofer to all treatments. Inter row hoeing was performed in 48 cm row distance after application in autumn and spring. The fertilisers were applied at a rate corresponding to 100 kg ha^{-1} N in early spring before the start of growth in March (early) and after the start of growth in April (normal time). The early application of Vinass was only carried out in one of three years due to unfavourable weather conditions. All four organic fertilisers significantly increased the yield. The yield of unfertilised plots was on average 1400 kg ha^{-1} (91% DM), but ranged from 400 to 3000 kg ha^{-1} between the experimental sites. There was no difference in yield between application of fertilisers in 12 cm row distance compared with in 48 cm row distance with inter row hoeing after application. Neither did application of Vinass after inter row hoeing or injection of Vinass at hoeing improve yield. Vinass increased yield more than the other fertilisers when applied early (27 March) and at normal application time in spring (20 April). The yield increased by 1300 kg ha^{-1} for early application of Vinass and by 700 kg ha^{-1} at normal application time. With Biofer, chicken manure and dairy slurry the yield increase was 400 kg ha^{-1} regardless of application time. The results clearly show a larger N availability in WOSR after application of Vinass, both before and after plant elongation of WOSR than after the other fertilisers. Consequently an early application of Vinass can be recommended, as yield was improved under dry weather conditions. Application of Biofer, chicken manure and dairy slurry provided a similar N supply for WOSR, regardless of row distance and application time. A delayed N supply after normal application time compared with early application was indicated by a lower oil content, even though it did not affect yield. A delayed N supply after application in 48 cm row distance with inter row hoeing, compared with in 12 cm, was indicated by a lower oil content, but did not affect yield.