

Combined use of manure and mineral fertilizers in conventional grain production

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Both in Central Norway and parts of the South-Eastern Norway many farms combine grain production and animal husbandry. Knowledge about how to exploit the available manure effectively when used in combination with mineral fertilizers in grain fields has, however, been a scarcity. The amount and kind of mineral fertilizer should be adjusted according to the nutritional value of the manure in order to achieve a best possible balance between the plants' demand and the total supply of nutrients. Plants suffering of sulphur deficiency will for instance not be able to make full use of the given fertilizer's content of plant available nitrogen. In order to examine to what extent manure from milk cows and pigs met the nutritional demand of a grain field, field trials with different combinations of amount and kind of manure and mineral fertilizer were performed at Kvithamar research station in Central Norway (63°29' N, 10°52' E, 26 m a.s.l.) during the years 2010-2013. For two of the years, the spring was cold, and hence both root development and mineralization of the given manure was slow. In these years there were clear differences between plots which, in addition to the manure, were given mineral fertilizer with or without sulphur content, respectively. Plots without sulphur had got a lighter green colour, reduced growth, and a lower yield level. The differences were most pronounced where the given amount of manure was low. In years with a warmer spring, the effect of adding sulphur through a mineral fertilizer was lower and only significant where the lowest amount of manure from milk cows was used. The results also indicated that manure both from milk cows and pigs seemed to cover the plants' demand for other nutrients than nitrogen and sulphur.