

## Organic and mineral fertilisation of temporary grassland

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**Introduction** In Italy, the need to reduce the application of chemical fertilisers and to dispose of different kinds of bio-wastes (municipal solid waste (MSW), olive mill waste, distiller's grains) has led to more compost being made from these materials. Since 1995 our Institute has carried out several studies on different crops. The results obtained so far for grain and industrial crops (Montemurro *et al.*, 2003; Maiorana *et al.*, 2004) appear very interesting. But rarely have the composts been applied to fodder crops. Therefore, this research is aimed to evaluate the effect of MSW-compost on temporary grassland of cocksfoot (*Dactylis glomerata*) and of lucerne, (*Medicago sativa*) in Southern Italy (Apulia Region).

**Materials and methods** The experiment was established in the autumn of 2001 at Rutigliano (41° 01' N, 4° 39' E, 90 m. a. s. l.) on the experimental farm of the Institute. Two types of fertilisation were compared on plots of 7 m<sup>2</sup> each: organic (with MSW-compost) and mineral (with 50 kg N per ha for cocksfoot and 75 kg P<sub>2</sub>O<sub>5</sub> per ha for lucerne). The experimental design was a split-plot with 3 replications, assigning the split to crops and the plot to fertilisation treatments. In the field, MSW compost was applied yearly in the same amount of element as chemical fertilisers. Crops were grown under dry conditions, except for a post-sowing irrigation of 300 m<sup>3</sup> of water per ha. At the time of harvest, green forage production was determined for each centre plot. Samples of 1 kg of forage were oven-dried at 105 °C, to measure dry matter content and crude protein concentration was determined on samples of 100 g after oven-drying at 80 °C for 24-36 hours. The experimental data were submitted to a separate analysis of variance for each crop.

**Results** The results obtained during the first two years (Table 1) show that cocksfoot with mineral nitrogen fertilisation produced significantly higher yields with a higher protein concentration than cocksfoot with compost. This is probably because the mineral nitrogen present in the compost becomes available over a longer time and not only during the growing period. In contrast, there were no significant differences on production or crude protein concentration of lucerne.

**Table 1** Effects of treatments on production and protein concentration

Treatments	Green forage (t ha <sup>-1</sup> )	Dry matter (t ha <sup>-1</sup> )	Plant height (cm)	Protein content (%)
COCKSFOOT				
MSW-compost	15.6 <sup>b</sup>	4.3 <sup>b</sup>	35.5	20.8 <sup>b</sup>
N mineral	20.6 <sup>a</sup>	5.9 <sup>a</sup>	39.6	25.3 <sup>a</sup>
LUCERNE				
MSW-compost	43.6	10.8	43.75	23.0
P <sub>2</sub> O <sub>5</sub> mineral	47.7	11.8	45.22	23.4

Values with different letters in columns are significantly different at P≤0.05

**Conclusions** On the whole, the results obtained till now have shown that MSW compost was less effective than N fertiliser on cocksfoot. However compost had the same effect as P<sub>2</sub>O<sub>5</sub> on lucerne. The research will continue to assess the possible long-term effects of MSW compost, not only on cocksfoot performance, but also on the possible accumulation of heavy metals in the soil.

### References

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