

Effect of Different Organic Fertilizers and Soil Conditioners on Soil Microbial Populations in Organically Managed Strawberry Plants

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Introduction

The management of fertilization under organic farming affects the interaction between soil microorganisms and plants. However, the impact of non-plant-parasitic and bacteria-eating nematodes on plant-growth-promoting bacteria and on horticultural plants is still not well understood, particularly in relation to the application of organic inputs and microbial inocula as soil amendments. A study was carried out to evaluate the effect of different organic fertilizers and amendments on nematodes and bacterial populations in the soil.

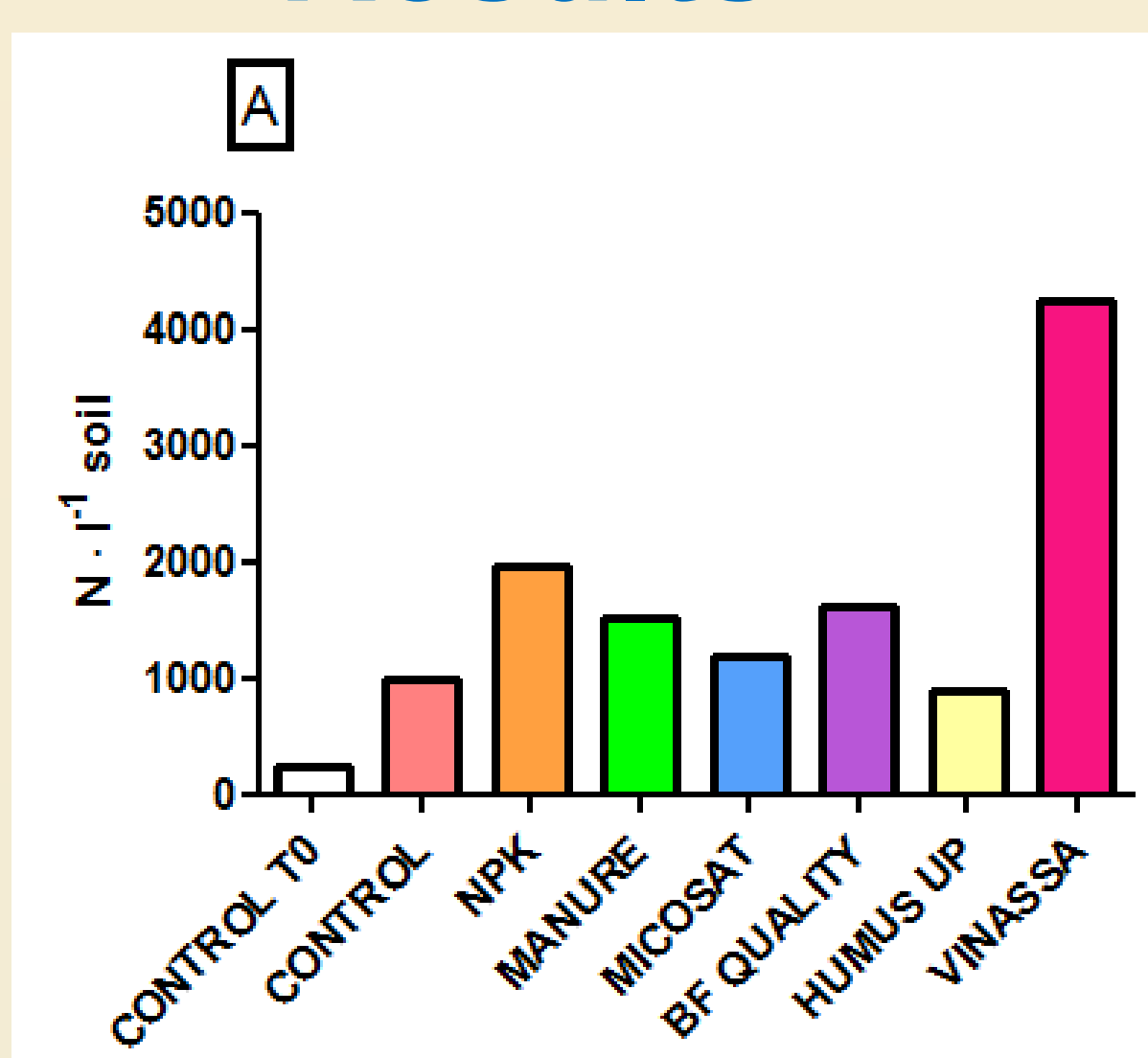
Materials & Methods

Strawberry plants cv. Elsanta were treated with dry manure alone (full dose) or in association (half dose manure) with other products. Unfertilized plants and plants fertilized with a chemical NPK fertilizer were used as the control.

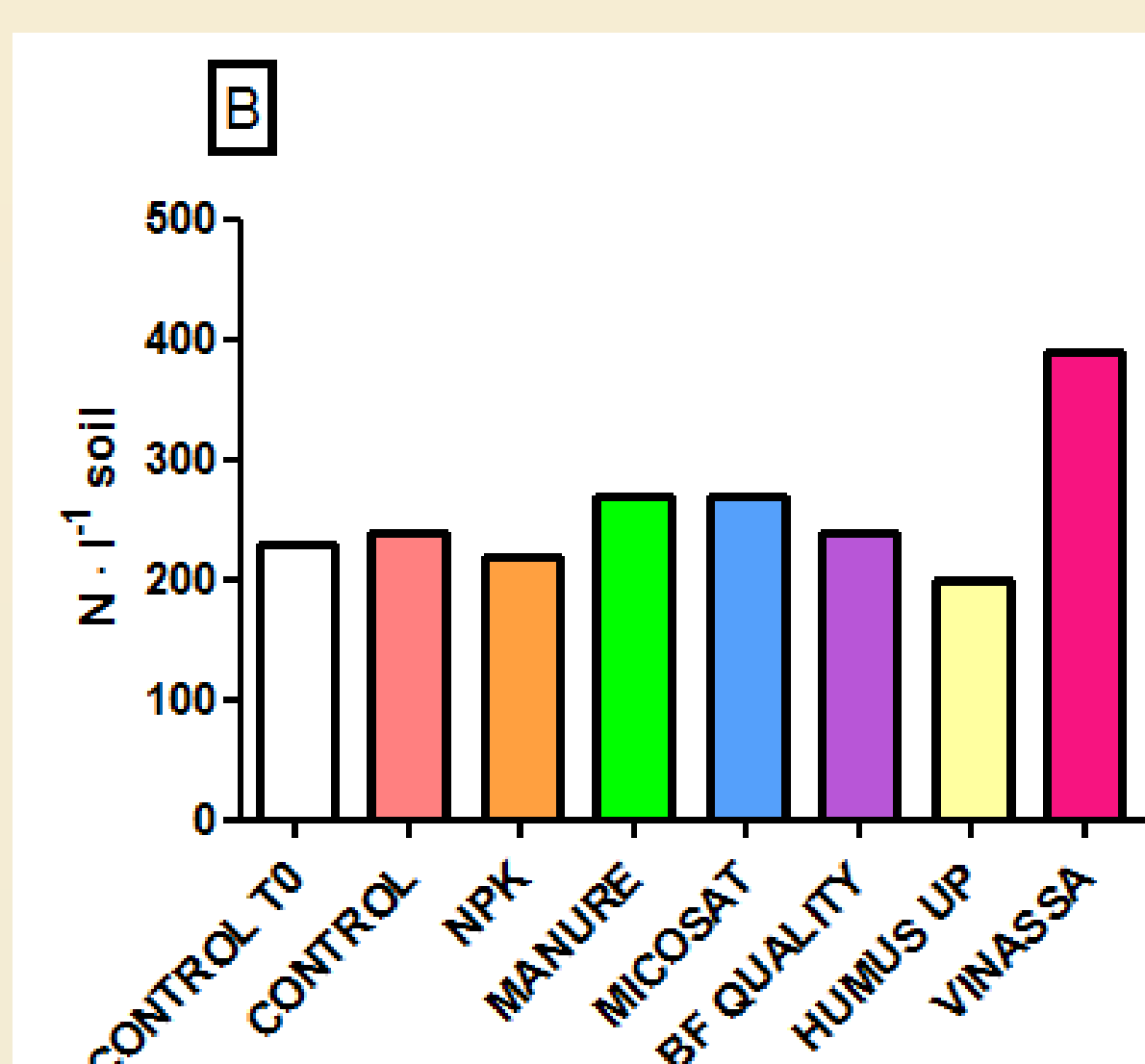
Soil was sampled from the root zone. Bacteria were grown on PDA medium. Nematodes were collected using the Oostenbrink funnel method and classified in 4 trophic groups.



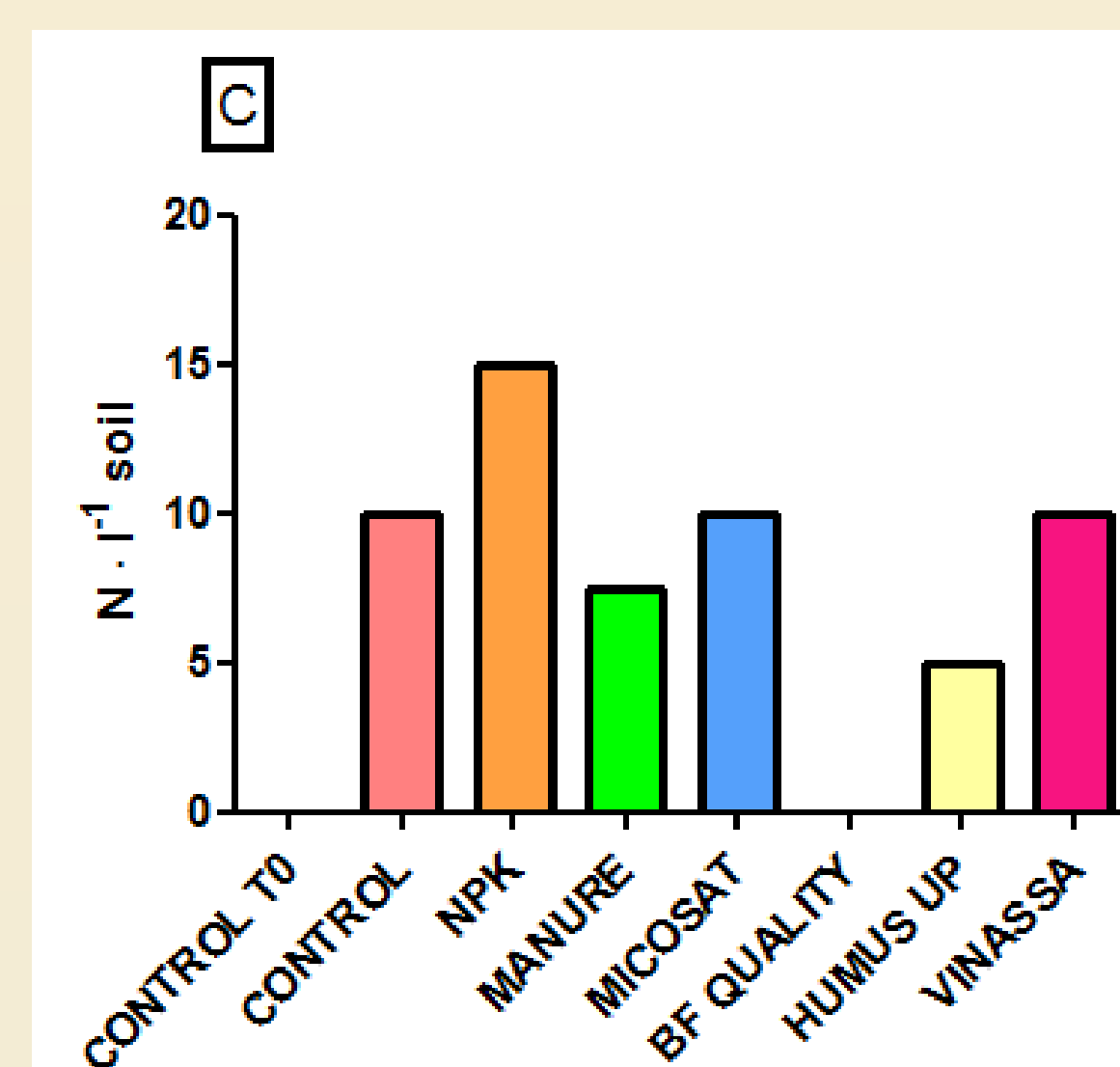
Results



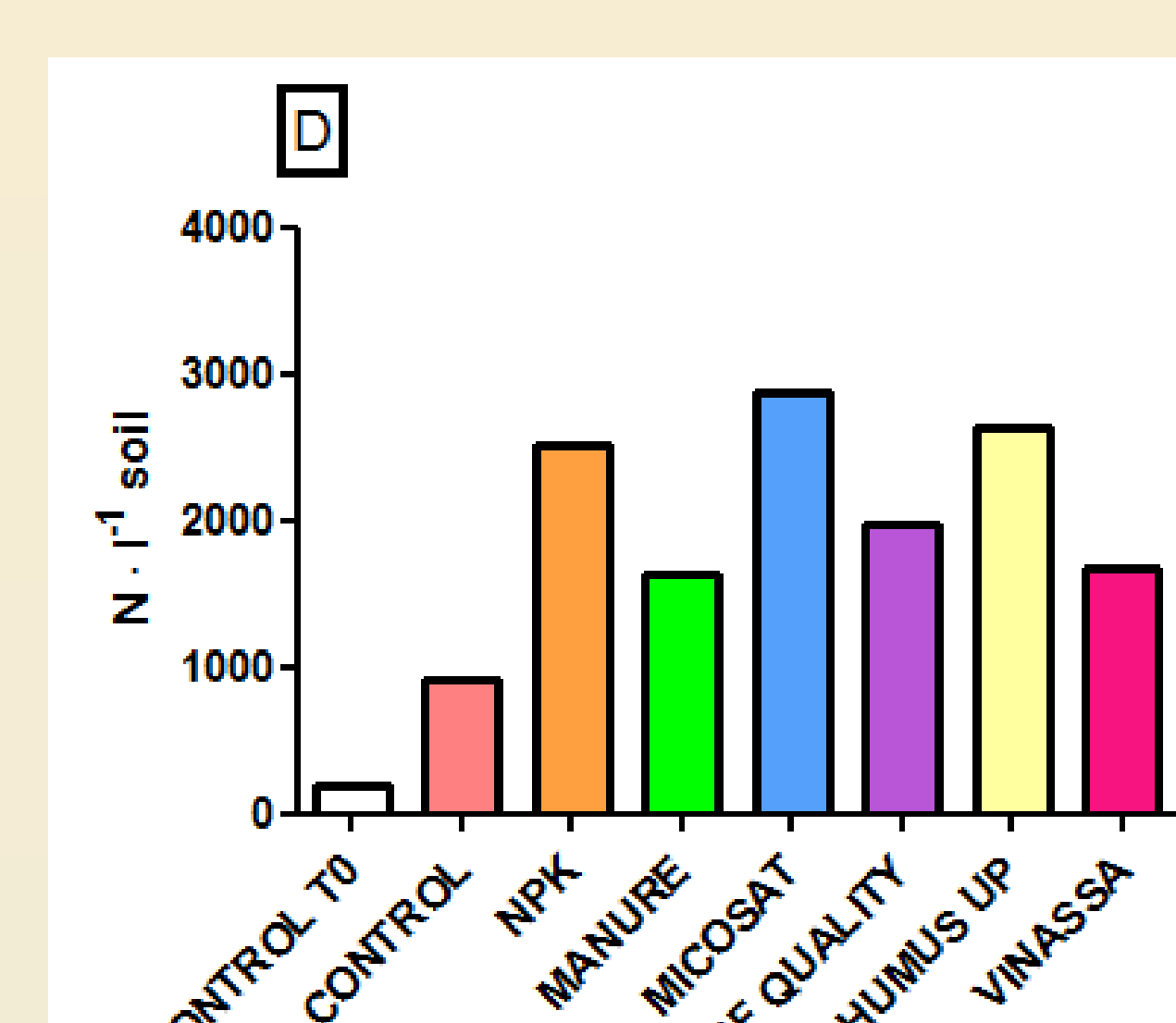
The number of saprophytic nematodes (A) increased in all the treatments with respect to the control before planting. However, only Manure, BF Quality, Vinassa, among organics, and NPK had a higher number with respect to the untreated control.



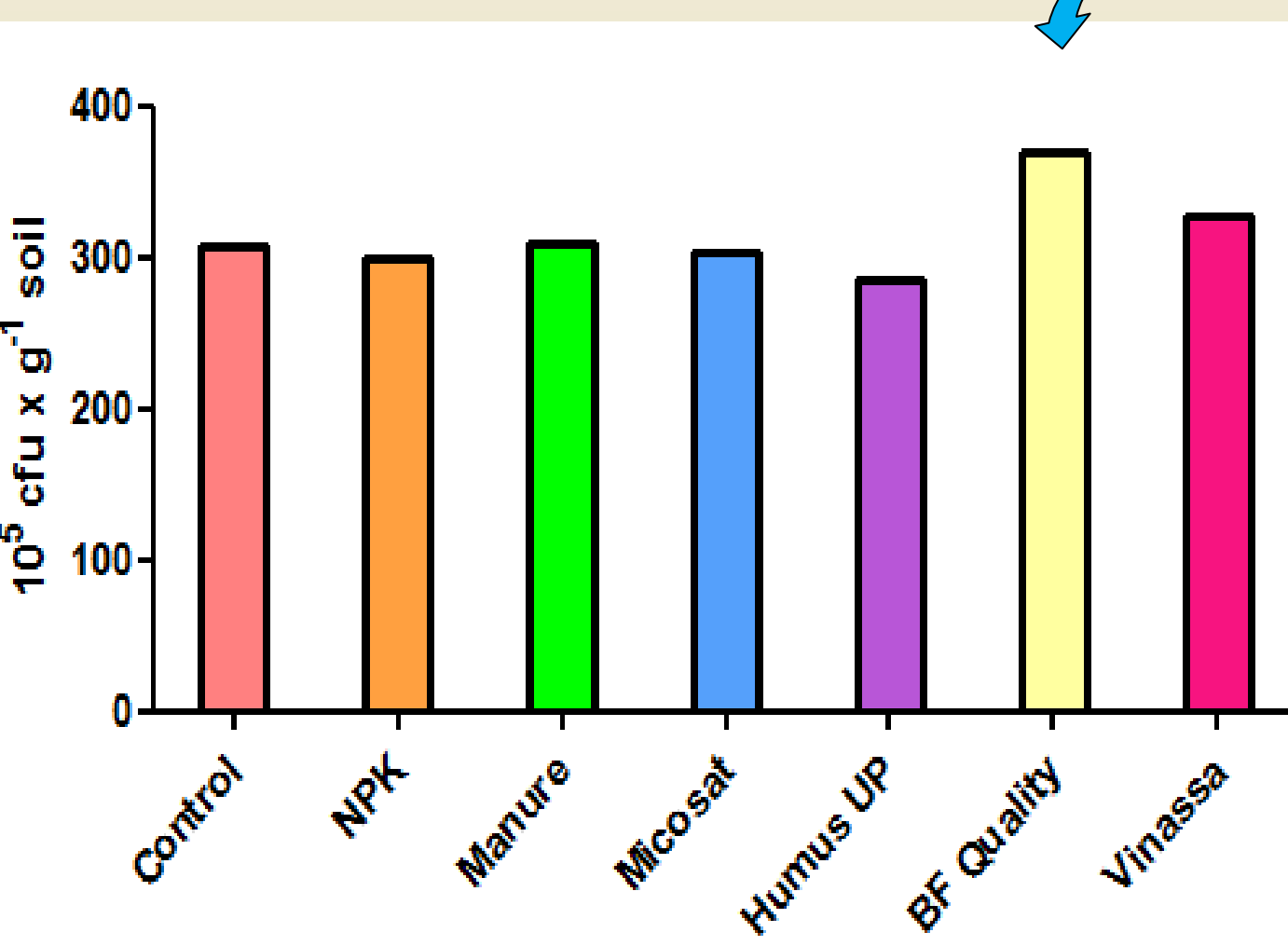
Mycophagous species (B) were found in a similar number among all the treatments, also with respect to the initial sample, except in the case of Vinassa.



Predatory nematodes (C), not present in the initial sample, were found in all the treatments, except when BF Quality was used.

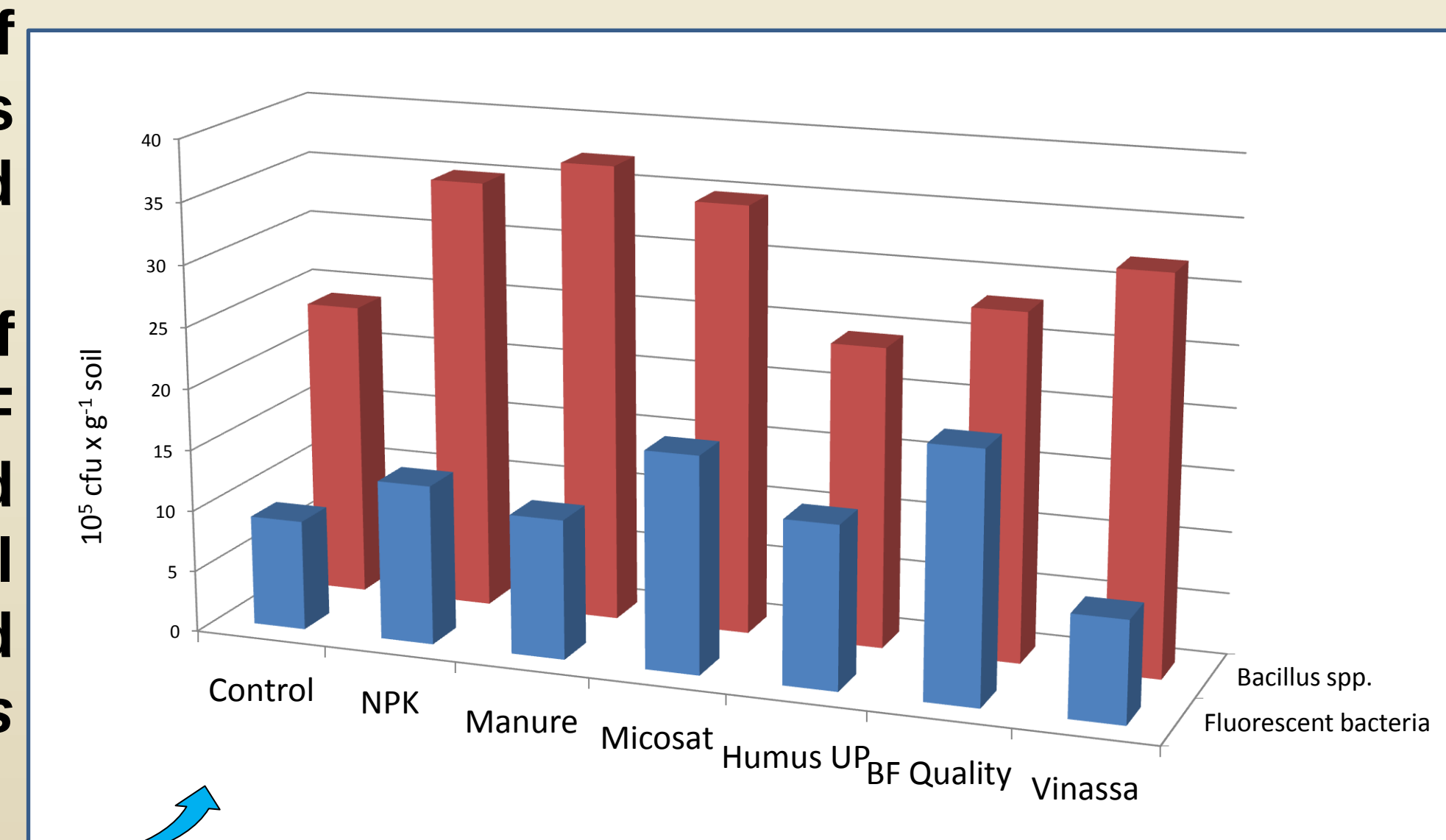


The number of parasitic nematodes (D) was higher in all the treatments than in the control. However, the treatments with Manure, BF Quality and Vinassa resulted in a lower increase with respect to the chemical fertilization (NPK).



No difference in the total number of bacteria was found among the treatments and in comparison with the untreated control.

Differences were found in the size of populations of beneficial bacteria. BF Quality and Micosat treatments favoured the development of *Pseudomonads*. All the products, except Humus UP, induced an increase in the population of *Bacillus* species.



Conclusions

- The application of organic fertilizers induced an increase in the number and biodiversity of the nematode populations present in the root soil volume of strawberry plants. This is confirmed by the increase in predatory species, not present in the initial sample.
- Among the beneficial species, the saprophytes were significantly in higher numbers in comparison with mycophagous species. The treatments with Manure, Micosat and Vinassa were those inducing the highest increase in these trophic groups.
- The number of parasites also increased in comparison with the initial sample and unfertilized plants. However, Manure, BF Quality and Vinassa showed a lower number in comparison with the other fertilizers.
- Even though no changes were found in the total number of bacterial populations, the number of potentially beneficial bacteria was increased by the organic fertilizers, mainly Micosat, BF Quality and Vinassa.