

Horse Manure and Soil Nitrogen

Horse manure and soil nitrogen. Horse manure is an abundant, locally available source of organic matter for soils. A major concern about horse manure is that it can cause a nitrogen deficiency when added to soils, leading to stunted, yellowed crops. Undiluted horse manure contains modest levels of nitrogen (about 1 to 2% of dry weight), and supplies small amounts of N to plants via slow release. When horse manure is mixed with woody bedding, the resulting product often ties up nitrogen in the soil through microbial immobilization, leading to N deficiency in the crop.



We sampled horse manure from 36 farms and stables in King County, Washington, and determined N concentration and C:N (carbon:nitrogen) ratio in each sample (Tables 1 and 2, Figures 1 and 2). All but one of the undiluted materials had a C:N less than 30:1 and half had a C:N equal to 20:1, while most of the samples with bedding had a C:N greater than 30:1. In general, materials with a C:N less than 20:1 are expected to supply N to plants, and C:N greater than 30:1 are expected to create N deficiency. Materials with intermediate C:N often tie up some N the first few weeks after application and supply N later in the season.

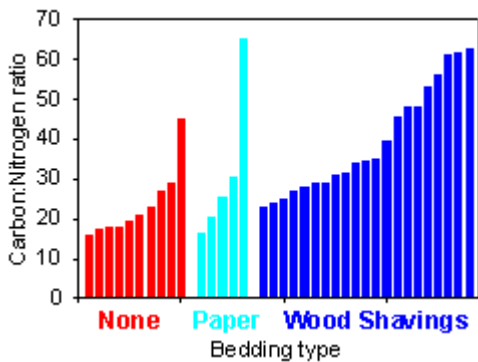


Figure 1.

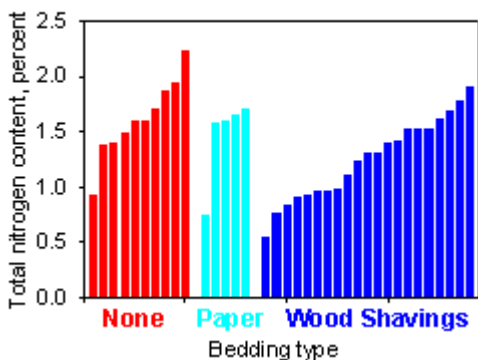


Figure 2.

Table 1. Averages.

Bedding Type	Moisture %	Total N %	C:N Ratio
None	75	1.59	20.2
Paper	66	1.60	25.4
Wood Shavings	67	1.31	34.4

Table 2. Ranges.

Bedding Type	Moisture %	Total N %	C:N Ratio
None	47-81	0.93-2.23	16-45
Paper	61-81	0.74-1.70	16-64
Wood Shavings	52-78	0.55-1.90	23-61

The data indicate that horse manure without bedding will supply a modest amount of N to plants. Horse manure with bedding will often tie up N, and supplemental N is needed when using this material as a source of organic matter for soils. Information on managing N when using horse manure is found in the following link: [A Horse Owner's Guide to Good Stewardship \(pdf file\)](#).