

Earthworms at Work

Potential of Earthworm Activity

Top Soil (16cm) of One Hectare

Mineral Nutrition

Soil vs Earthworm Castings

No. of Worms/20x20 cm Spade	No. of Worms /ha	Weight of Worms/ha (Kg)	Weight of Casts/ha/Day (Kg)	Weight of Casts/Yr (Tonnes/ha)	N/Day/ha (Kg)	N/Year/ha (Tonnes)	N/equiv. Urea/Year (Tonnes)	Nutrient Element	SOIL (0-16cm)	Worm Casts (Surface)	CASTS Nutrients % increase
1	250,000	165	165	60	2	1	1	TEC m.e	22	26	19
2	500,000	330	330	120	3	1	2	PH	6.5	7	8?>
3	750,000	495	495	181	5	2	4	Humus %	14	25	77
4	1,000,000	660	660	241	7	2	5	NO3 ppm	4	77	2103
5	1,250,000	825	825	301	8	3	6	NH3 ppm	13	66	408
6	1,500,000	990	990	361	10	4	7	Total N ppm	17	143	768
7	1,750,000	1155	1155	422	12	4	8	Sulphur ppm	25	29	16
8	2,000,000	1320	1320	482	13	5	10	P (eas.Extr) ppm	39	155	297
9	2,250,000	1485	1485	542	15	5	11	P (Bray) ppm	162	253	56
10	2,500,000	1650	1650	602	17	6	12	Calcium ppm	3320	4150	25
11	2,750,000	1815	1815	662	18	7	13	Magnesium ppm	250	420	68
12	3,000,000	1980	1980	723	20	7	14	Potassium ppm	170	253	49
13	3,250,000	2145	2145	783	21	8	16	Sodium ppm	38	39	3
14	3,500,000	2310	2310	843	23	8	17	Boron ppm	1	2	52
15	3,750,000	2475	2475	903	25	9	18	Iron ppm	49	64	31
16	4,000,000	2640	2640	964	26	10	19	Manganese ppm	35	66	89
17	4,250,000	2805	2805	1024	28	10	20	Copper ppm	7	30	355
18	4,500,000	2970	2970	1084	30	11	22	Zinc ppm	9	33	266
19	4,750,000	3135	3135	1144	31	11	23	Mean % increase			306
20	5,000,000	3300	3300	1205	33	12	24	Analysis by Brookside Laboratories			

Organic Matter and Nitrogen

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Appendix 9: Organic Matter and potential Nitrogen

The following table gives hypothetical numbers in kg/ha per year for N. The mineralisation rates are based on temperate regions and gives kg N/ha in the biomass of soil life. (Adapted from Scheller 1993)

% SOIL ORGANIC MATTER	Total kg N/ha in 30cm topsoil	kgN/ha in biomass (soil life)	Mineralisation in kg/ha per year at different rates (as a percentage of total N)		
			2%	3%	4%
3	6000	300	120	180	240
4	8000	400	160	240	320
5	10.000	500	200	300	400
6	12.000	600	240	360	480
7	14.000	700	280	420	560
8	16.000	800	320	480	620

Numbers adapted from original Scheller table.

The other numbers are based on linear progression and will require further investigation. This table requires some explanation. This potential can only be reached if the conditions for mineralisation are met. A number of processes that influence mineralization rates happen at the same time in the soil.

NB. [1] 2% Mineralisation Rate column: Using N Check or N Min analysis results below the numbers presented indicate functional deficiencies; e.g. Water, biology, chemistry and/or physical issues. All would need investigating.

[2] 4% Mineralisation Rate column: N Check /N Min results consistently higher than the figures presented require further research to fine tune the hypothesis. Rates above these are unusual.

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