

SMALL FARMS SERIES:

Animal Manure As Fertilizer



Photo courtesy of Nick & Kay Wardle

LPM-00340

A value that is often overlooked by persons producing animals on a small scale is the potential of the manure as a source of fertilizer. For example, a 1,000 pound cow will produce 15 tons of manure per year. This 15 tons (based on a feedlot source) contains an equivalent of 213 pounds of nitrogen (N), 192 pounds of phosphate (P_2O_5), and 267 pounds of potassium (K_2O).

Table 1 — Composition of Manures and Waste Materials¹

Source	Percent Moisture	N		P_2O_5		K_2O	
		%	lbs. per ton	%	lbs. per ton	%	lbs. per ton
Beef feedlot	68	0.7	14.2	0.6	12.8	0.9	17.8
Dairy	79	0.6	11.2	0.2	4.6	0.6	12.0
Liquid dairy	91	0.2	4.8	0.05	0.1	0.2	4.6
Swine	75	0.5	10.0	0.3	6.4	0.5	9.2
Liquid swine	97	0.1	0.2	0.1	0.1	0.1	0.2
Horse	70	0.7	13.8	0.2	4.6	0.7	14.4
Sheep	65	1.4	28.0	0.5	9.6	1.2	24.0
Poultry (no litter)	54	1.6	31.2	0.9	18.4	0.4	8.4
Liquid poultry	92	0.2	3.2	0.04	0.8	0.3	5.8

¹ Adapted from L.S. Murphy in *Fertilizer Solutions* magazine, March-April 1972. Found in Western Fertilizer Handbook—Horticulture Edition, 1990, p. 143.

In addition to the 3 major elements of nitrogen, phosphorous and potassium, manure also contains essential micro-nutrients. The average pounds per ton of these nutrients is shown in Table #2.

Animal	Boron	Calcium	Copper	Iron	Magnesium	Manganese	Mo	Sulfur	Zinc
Horses	.03	15.7	.01	.27	2.8	.02	.002	1.4	.03
Cattle	.03	5.6	.01	.08	2.2	.02	.002	1.0	.03
Sheep	.02	11.7	.01	.32	3.7	.02	.002	1.0	.05
Hogs	.08	11.4	.01	.56	1.6	.04	.002	2.7	.12
Laying Hens	.12	74.0	.03	.93	5.8	.18	.011	6.2	.18
Broilers	.08	29.0	.06	2.00	8.4	.46	.007	—	.25

² USDA Research Data - Ohio

Other animal manures may offer fertilizer benefits.

	N	P ₂ O ₅	K ₂ O
	----- % -----		
<i>Fresh manure with normal quantity of bedding or litter</i>			
Duck	1.1	1.5	0.5
Goose	1.1	0.6	0.5
Turkey	1.3	0.7	0.5
Rabbit	2.0	1.3	1.2

³ Taken from Western Fertilizer Handbook-Horticulture Edition, 1990, p. 144.

Moose droppings have the following fertilizer equivalent values during the months of May and June: Moisture 74%, nitrogen 2.5%, phosphate (P_2O_5) 1.8%, potassium (K_2O) 1.2%, zinc 0.6%, calcium 1.6% and magnesium 0.7%. The nutrient values for moose droppings during the winter months is less than 50% of the summer values.¹

Animal manure also supplies valuable organic matter. Organic matter improves soil tilth, increases water holding capacity, lessens erosion, improves soil aeration, and has a beneficial effect on soil microorganisms and plants.

The value of animal manure is based on:

1. Class of animal.
2. Kind of feed consumed.
3. Kind of bedding used.
4. Method of handling.
5. Rate and method of application.
6. Kind of soil and crops on which it is used.

Research has shown that manure will lose approximately $\frac{1}{3}$ of its fertilizer and organic matter value in three months, $\frac{1}{2}$ in 6 months, and even more over a longer period. When manure is exposed to the weather, ammonia gas is released and nitrates leach out with the rain, phosphorous is washed or drained away with the liquid portion, potassium is either washed away or carried off in the urine, and organic matter is rotted away.

To reduce manure losses the following steps are recommended:

1. Use ample bedding to absorb liquid manure.

2. Store manure in straight-sided well-packed piles.
3. Store manure in an area that has a water-tight bottom and provide overhead protection from weather.
4. Keep livestock on pasture as much as possible in summer months.
5. Add phosphate to manure pile to trap nitrogen, at a rate of 20 lbs. of 0-46-0 per ton of manure.
6. Use plenty of bedding and let manure accumulate in stables until it can be hauled and spread directly in the fields.

Other points to consider when handling manure include:

1. Avoid spreading manure on frozen ground.
2. Avoid spreading manure when the wind is blowing toward your neighbor's house.
3. Avoid spreading manure within 100 ft. of streams, lakes, or ponds.
4. Incorporate manure by disking and plowing when practical.
5. Do not exceed 12 tons per acre or 550 lbs. per 1,000 sq. ft. when applying manure.
6. Manure that comes from animals which consume hay may contain weeds and grass seeds that can germinate and contaminate your fields. Chickweed and quack grass are two examples.
7. The application of cat and dog manure on soil used for human food is not recommended. These animals have diseases and parasites that can be transmitted to humans through their manure.

¹U.S. Forest Service Research - Anchorage

This publication was originally developed in 1982 by Jerry Purser, Agriculture Resource Management Agent, Cooperative Extension Service.

Revised April 2000 by Tom Jahns, Extension Land Resources District Agent.

For more information contact:

Tom Jahns

Extension Land Resources District Agent

Cooperative Extension Service

43961 K-Beach Road, Suite A

Soldotna, AK 99669-9728

phone (907) 262-5824

e-mail: fftrj@uaf.edu

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