ESTIMATED MINERALIZATION RATES, N CREDITS FOR LEGUMES AND AMMONIA CONSERVATION FACTORS FOR ORGANIC NITROGEN

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Estimated nitrogen availability is based on latest data for Mid-Atlantic region, recommended by the University of Maryland Cooperative Extension Service and accepted by the Maryland Department of Agriculture. The following factors shall be used by all nutrient management consultants as basis for calculation of available nitrogen from different forms and sources of the organic wastes for the first year and from previous years of applications.

MANURE MINERALIZATION RATES

% organic nitrogen mineralized each year

Manure source & type	**Year of application**	**1st year after application**	**2nd year after application**
Cattle, dairy & beef (buffalo[1])	35	18	9
Poultry			
a. Caged layers	60	10	5
b. All other (emu[1])	50	15	8
Swine (all types)	50	15	8
Horse (ostrich[1])	20	10	5
Sheep (goat, alpaca, camel, llama[1])	30	15	5
Chinchilla[2]	15	7	3
Rabbit[2]	5	2	1
Vegetable processing effluent[2]	40	15	8
Meat processing residuals[2]	50	10	5
Aquaculture waste, semi-solid[2]	50	15	8
Aquaculture effluent[2]	80	5	0
Fish emulsion[2]	80	5	0
Corn gluten, alfalfa meal, peanut meal[2]	85	10	5
Compost, where C/N<25 [2]	5	0	0
Feather meal, crab meal[2]	60	10	5
Fish powder, hydrolyzed[2]	60	10	5
Seabird guano[2]	60	10	5
Blood meal[2]	65	10	5

1. Based on consultation with animal nutritionists; different animal species are grouped when they have diets and digestive systems similar to the first species in the group, for which mineralization data are available
2. Data based on values from the literature or values that specialists with expertise in the area consider to be best estimates.

SLUDGE MINERALIZATION RATES

(Current year mineralization rates and previous year Km factors)

Sludge Type	Mineralization rates for current application	Km factors for sludge applied (Lbs N mineralized per ton of sludge applied per % organic N)								
		1 yr ago	2 yrs ago	3 yrs ago	4 yrs ago	5 yrs ago	6 yrs ago	7 yrs ago	8 yrs ago	9 yrs ago
Unstabilized	0.40	2.40	0.96	0.44	0.24	0.24	0.24	0.11	0.11	0.11
Lime-Stabilized or Aerobically Digested	0.30	2.10	0.90	0.42	0.32	0.30	0.30	0.30	0.30	0.30
Anaerobically Digested	0.20	1.60	0.72	0.42	0.38	0.38	0.38	0.36	0.36	0.17
Composted	0.10	0.90	0.50	0.50	0.48	0.46	0.46	0.44	0.42	0.42

NITROGEN CREDITS FOR LEGUME CROPS

Crop	Lbs. N/Acre
Perennials	
Alfalfa	100 - 150[a]
Ladino clover	60
Red clover	40
Birdsfoot trefoil	40
Winter Annuals	
Crimson clover	50 - 100[b]
Hairy vetch	75 - 150[b]
Austrian winter peas	75 - 150[b]
Summer Annuals	
Lespedeza	20
Soybeans	15 - 40[c]

a. Credit depends on stand:
   Good (>4 plants per square foot), credit 150 lbs
   Fair (1.5 to 4 plants per square foot), credit 125 lbs
   Poor (<1.5 plants per square foot), credit 100 lbs.
b. Depends on planting date (and biomass production), kill date and subsequent tillage.
c. A minimum of 15 lbs. and may be as much as 1 pound per bushel of soybeans, up to a maximum 40 lbs.

Nitrogen Credit Guidelines

- If an unfertilized cereal grain cover crop was grown during the cool season, do not take a credit for the previous year's legume crop or manure application. A cover crop is defined here as an unharvested crop grown for soil erosion control, water quality improvement, or in the case of legumes, nitrogen fixation. If a crop is grazed or harvested for any purpose, it is not considered a cover crop.
- Do not take a credit for nitrogen-fertilized vegetable legumes (green beans, peas, etc.).
- If a warm-season forage legume (like alfalfa) was killed in the fall and a winter annual legume cover crop was grown in the cool season (like crimson clover), the credits for the following year are summed for the 2 crops.
- When spring seeding alfalfa, do not take a credit for the previous years' legume crop or manure application.
- If recommending organic waste on legume crops to alleviate excess waste issues, do not take credits for previous years' legume crop or manure applications.
- Do not take a credit for previous years' legume crops or manure applications for small grain for grain or grazing.

AMMONIUM CONSERVATION COEFFICIENTS

Liquid Manures and Organic Residuals (<10% dry matter, >90% moisture)

	Tillage practice (see definitions next page)*		
Time to incorporation	Conventional	Conservation	No-till or incorporation after 3 days
Inject (<1 hour)	1.0	1.0	1.0
1-24 hours	.75	.60	-
24-48 hours	.55	.50	-
48-72 hours	.50	.48	-
No-till (over 72 hrs)	-	-	.45

Solid Manures and Organic Residuals (>10% dry matter, <90% moisture)

	Tillage practice (see definitions next page)*		
Time to incorporation	Conventional	Conservation	No-till or incorporation after 3 days
< 1 hr	.96	.66	-
1-24 hours	.78	.57	-
24-48 hours	.58	.47	-
48-72 hours	.53	.44	
No-till (over 72 hrs)	-	-	.35

Poultry Litter

	Tillage practice (see definitions next page)*		
Time to incorporation	Conventional	Conservation	No-till or incorporation after 3 days
< 1 day	.97	.85	
1-2 days	.92	.82	
3 days	.88	.80	
4 days	.84	.78	
5 days	.81	.77	
6-7 days	.77	.75	
8-14 days	.74	.73	
No-till (over 14 days)			.72

***Tillage Definitions** for the purpose of nutrient management planning

Conventional tillage

- Any tillage that leaves <30% residue cover
- Examples include chisel-disc-chisel or Landsman™
- Ammonium conservation maximized

Conservation tillage

- Any tillage that leaves between 30 and 70% surface residue
- Examples include light discing, plug or spike aerators (such as Aerway™), seed bed conditioners and vertical till (such as Turbotill™)
- Assumed to be approximately 25-75% as effective as conventional tillage at conserving ammonium-N ; mid-range value of 50% used to estimate conservation factor

No-till

- Residue cover >70%
- Ammonium conservation minimized