Why Use Natural Organics?

- slow release nitrogen
- Low leaching potential
- Temperature-based nutrient release (coincides with plant growth?)
- Potential benefits to the soil and the microbial community (??)
- Make use of a valuable resource / waste product

Why Not?

- High phosphorus (P)
- No or little potassium (K)
- Unknown or unfamiliar release characteristics (we like to stick with what we know)

Natural Organic Fertilizer

Association of American Plant Fertilizer Control Officials (AAPFCO)

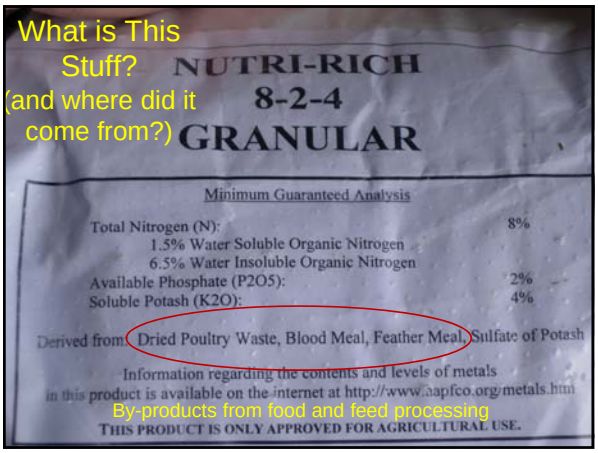
Material derived from either plant or animal products containing one or more elements other than carbon, hydrogen, and oxygen, which are essential for plant growth.

Biosolids

Stabilized solids from municipal wastewater treatment plants which must meet federal regulations for land application

Synthetic organic fertilizers – urea, coated ureas (PCU, PCSCU), matrix products (e.g. Duration), methylene urea (MU) and ureaformadehyde (UF), IBDU.

What is This Stuff? (and where did it come from?)



Feather meal, hydrolyzed poultry feather meal

- » 13% N
- » Slow release
- » Feathers processed at 285F

Poultry waste, poultry manure

- » May contain solid and/or liquid waste, bedding material
- » Thermally dehydrated

Soybean Meal

- » 7% N, 2% P, 1% K
- » Slow release
- » Remaining product following extraction of oil from the beans.

Alfalfa Meal

- » 3% N, 1% P, 2% K
- » Slow release
- » Dried, ground, pelletized alfalfa

Blood Meal

- » 12% N, 1% K
- » Quick release
- » Chelated iron (Fe)

Nitrate of Soda

- » 15% N
- » quick release
- » 26% sodium (Na)
- » Mined caliche ore, crushed, dissolved. Nitrate precipitates removed, dried, crystallized, prilled

Bone Meal, Steamed Bone Meal, Fish Bone Meal

- 1% N, 20% P, 23% Ca
- slow release
- Dried, ground, steamed, pressure cooked to remove fat, proteins, fibers

Biosolids

- Solids remaining from wastewater treatment process
- Class A biosolids are treated (heat or chemically) to destroy pathogens
- Dried, screened
- No permit needed to apply Class A biosolids

A Brief History …

WSDA funded study ('99 – '02) addressing public agency recommendations– mowing heights, N rates, N sources

Turfgrass Quality (1 – 9, 5 = acceptable)

N Source	2000 Spring	2000 Fall	2001 Spring	2001 Fall	2002 Spring	2002 Fall
Nat Org	5.3	5.4	5.2	4.7	5.2	4.7
Syn	5.4	5.0	5.5	5.1	6.0	5.2
	ns	**	ns	**	**	**

A Brief History …

Broadleaf weeds (#)

N Source	Nov '00	Nov '01	Nov '02
Nat Org	20	25	22
Syn	8	11	9
	**	**	**

- Lots of products
- Many different nutrient source materials
- Many unknowns

- Can we measure N release characterisitcs?
- Can we identify similarities / differences?

WSDA – Turf Response to Natural Organic Fertilizers

- 5 natural organic fertilizers, 4 others
- 4 applications per year (Apr, June, Sept, Nov), 1 lb N / M each, PR 2” ht.
- Weed populations
- N availability / uptake (Apparent Nitrogen Recovery), turf quality
- 4 yrs into project (data complete for ~3 yrs)

- Milorganite 6 – 2 – 0
  Biosolids
- Nature’s Intent 9 – 3 – 4
  Feather meal, steamed bone meal
- Richlawn 5 – 3 – 2
  Dried poultry manure
- Ringer Lawn Restore 10 – 2 – 6
  Hydrolyzed poultry feather meal, nitrate of soda, bone meal, soybean meal
- Whitney Farms 8 – 2 – 4
  Blood meal, dried poultry waste, feather meal, bone meal
- Best Turf K 24 – 3 – 10 PCSCU 67% slow
- Ammonium sulfate, calcium nitrate

Apparent Nitrogen Recovery

- Grass cut only 4x / yr (prior to fert application)
- Total yield (clipping wt.) measured
- % N measured
- Calculate total N uptake
- Adjust by subtracting out unfertilized check

Lb N / M recovered in leaf tissue

Source	Jun 07	ANR Jun 07
AmS	2.7	1.4
Cal Nit	3.2	1.9
PCSCU	2.8	1.5
Milorg	2.5	1.2
Ringer (fm)	2.6	1.3
WF (pw)	2.3	1.0
NI (fm)	2.5	1.2
RL (pw)	2.8	1.5
check	1.3	0

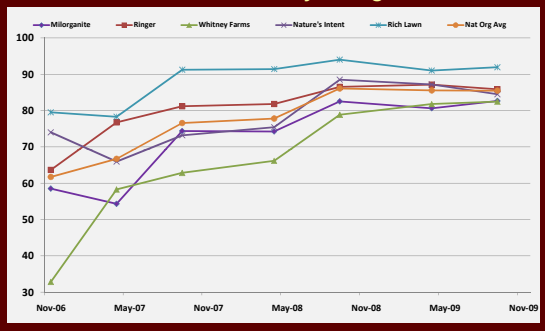
Cumulative ANR

	Sep 07		Sep 08		Sep 09	
Fertilizer	lb N/M	%	lb N/M	%	lb N/M	%
AmS	2.4	59	4.0	50	5.4	45
Cal Nit	2.8	71	5.7	71	8.3	69
PCSCU	2.5	62	4.8	60	6.8	56
Milorg	1.9	48	4.0	50	5.6	47
Ringer (fm)	2.1	52	4.2	52	5.9	49
WF (pw)	1.6	40	3.8	48	5.6	47
NI (fm)	1.9	47	4.3	53	5.8	48
RL (pw)	2.3	58	4.5	57	6.3	52

Cumulative ANR, lb N/M
Synthetic fertilizers

Source	9/07	9/08	9/09
AmS	2.4	4.0	5.4
Cal Nit	2.8	5.7	8.3
PCSCU	2.5	4.8	6.8
Avg.	2.6	4.8	6.8

Cumulative ANR, Organic fertilizers
% relative to Syn Avg.



Summary

- Total N uptake from NO ferts (avg of all products) was approx. 85% of the uptake from SO ferts over ~3 years
- RichLawn slightly higher uptake (7 – 12%) compared to other NOs
- N uptake from feather meal products was similar; uptake from poultry waste/manure products was not
- If changing to NO ferts, you may need to apply higher rates during the first 1-3 years to compensate
- Study will continue at least one more year without additional fert application

Cumulative ANR
kg N/ha