

Compost Bedded Pack Barns



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DTN February 2006



Cow Comfort

- Stalls/Pens
- Ventilation
- Heat Abatement
- Waterers
- Feed Bunk Management
- Alleys & Holding Pens
- Transition Management



Housing Options



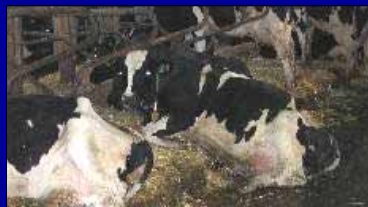
Cows Need Lunge Space



And we haven't always provided it!



Abnormal Lying Behaviors



Abnormal Lying Behaviors



Compost Bedded Packs as Alternative Loose Housing

Can this really work??



From the outside.....



Compost



Freestall



From the inside.....



Compost



Freestall



Compost Barns are NOT Bedded Packs or Pens



Conventional Bedded Pack



Compost Barns – Why the Interest?

- Improved cow comfort and cow health
- Increase productive life and longevity
- Improved SCC and milk production
- Enhance labor efficiency
- Reduce cull rates, expand from within
- Special needs housing
 - Provide fresh cows with great footing 45 to 60 days



Cow Comfort is Great!

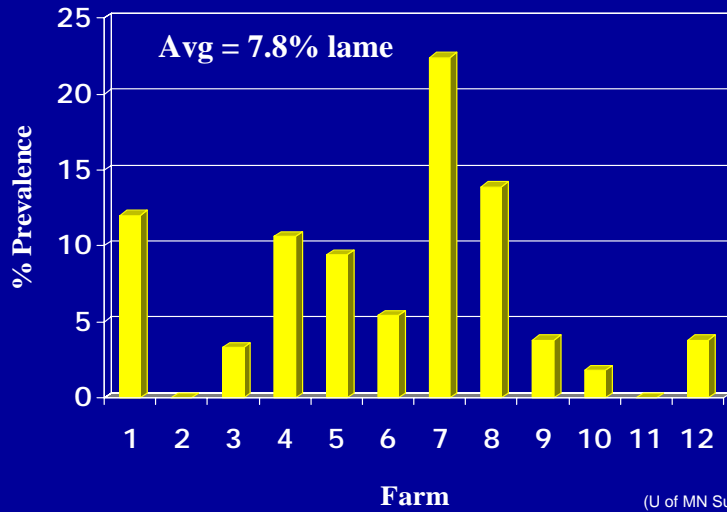


How are They Working?

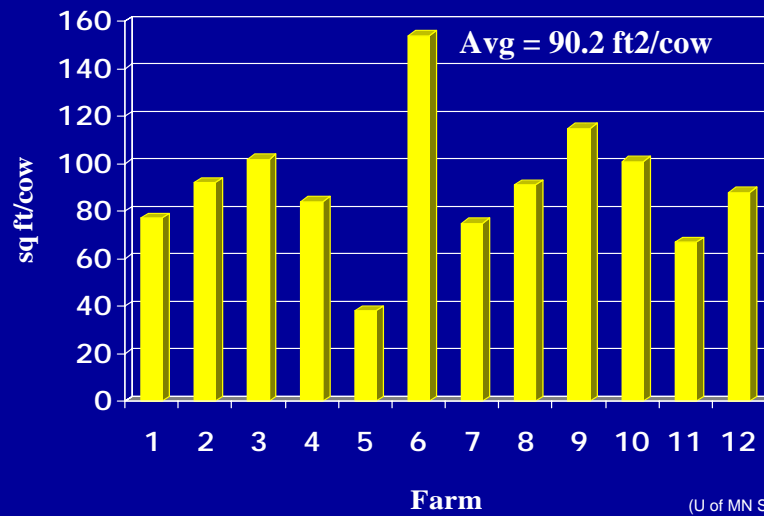
- U of MN survey of 12 compost barns operation more than 1 year
- < 1% cows had severe hock lesions
- Cow hygiene score average 2.7 in a scale of 1 to 5 (1=clean; 5=dirty)
 - Slightly cleaner than freestall comparisons



Lameness Prevalence



Space per Cow

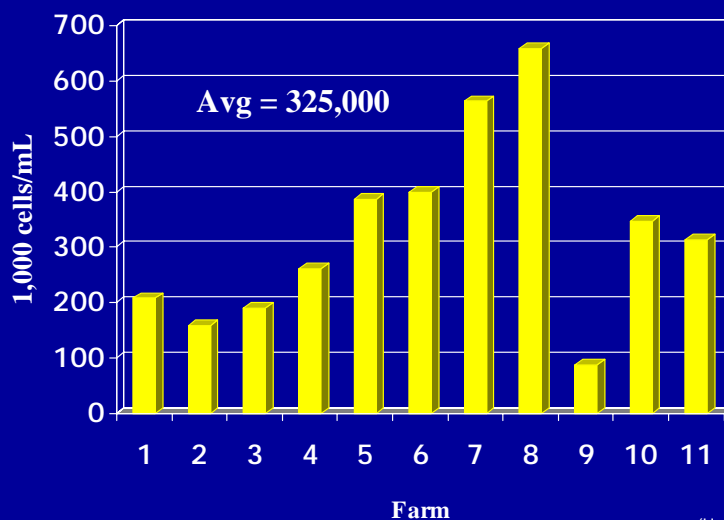


What About Milk Quality?

- Bacteria counts in bedding samples averaged 9,122,699 col/ml
 - Range 2 to 22.5 million col/ml
- Milk prep procedure crucial



Somatic Cell Counts



(U of MN Survey, 2005)

Bedding Management

- Sawdust must be dry or wood shavings
- Finer material for ease of mixing & rapid bacteria growth
- Green sawdust may be too wet
- Cedar based wood products contain natural oils and organic materials that inhibit microbial activity
 - May prevent adequate heating and compost activity
- Start with 18” to 24” of sawdust when first filling



Bedding Management

- Sawdust added 18 to 40 days to maintain good cow cleanliness
 - More often in winter and humid conditions
 - If material begins sticking to cows, it's time for new sawdust!
- Do not stretch bedding!
- Ray & Cheryl Seibert (Sebeka, MN) bedding quote:
 - “If someone is considering a barn like they must know that it will take a lot of bedding. Make sure that it is in the budget”



Stirring Bedded Pack is Critical

- Freshens surface
- Mixes manure and urine
- Aerates and loosens pack
- 10" to 12" depth seems to work the best



Before stirring.....After stirring



Compost Stirring Equipment



Pulls backwards, rest
push forward

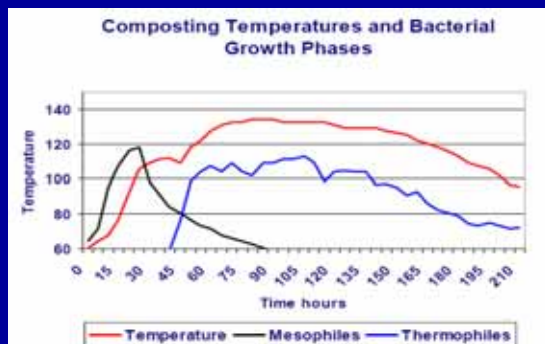


Compost Stirring Equipment



Composting

- Composting generates heat and temperature greater than 130 F
- Composting inactivates pathogens, viruses, weed seeds, & fly larva
- Aerobic process



Manure Composition

- 6 south central MN barns sampled at cleanout
- NPK analysis of 21-8-15 lb/ton and 63% moisture
- pH average 8.6
- Carbon: Nitrogen ratio (C:N) potential concern
 - Raw sawdust has C:N of 400:1
 - Will tie up some N in field during it's breakdown in the soil, causing potential shortage of N to growing corn crop
 - C:N ratio of compost barn bedding averaged 15:1
 - Ratio < 30:1 assures very little, if any N unavailable to growing crop



Manure Handling

- Compost bedded pack provides storage
- Smaller external manure storage
- Concrete alley scraped 1 to 2 times/day and stored
- Composted pack land applied usually in fall



Building Dimensions

- Widths usually similar to 3 row barns
- 4 ft wall surrounds composting pack
- 80 to 100 ft² bedded pack/cow
- Eave overhangs typically 3 ft
- Concrete feed alley
- Bedded pack area can have a clay base
- Access for cows, stirring & aerating 2 times a day, and bedding semi truck



Ventilation & Air Flow

- Excellent ventilation is a **MUST** to keep pack dry and remove heat
- Barns are curtain sided naturally ventilated
- Need to be located in an open area
- 16 ft sidewalls suggested
- Open ridges range from 1" to 3" per 10 ft building width
- Mixing fans are beneficial for blowing air down towards the middle of the composting bedded pack
 - Hang high



Water Options



Adjacent to the inside pack wall



Inside pack wall on corn for greater access



Adjacent to the feed alley



Economic Benefits to Compost Barns

- Cow comfort & increased productive life
- Lower SCC
- Increased milk production
- Smaller manure storage size & cost
- Potential for lower building cost
 - Less Concrete, no freestalls or freestall alley

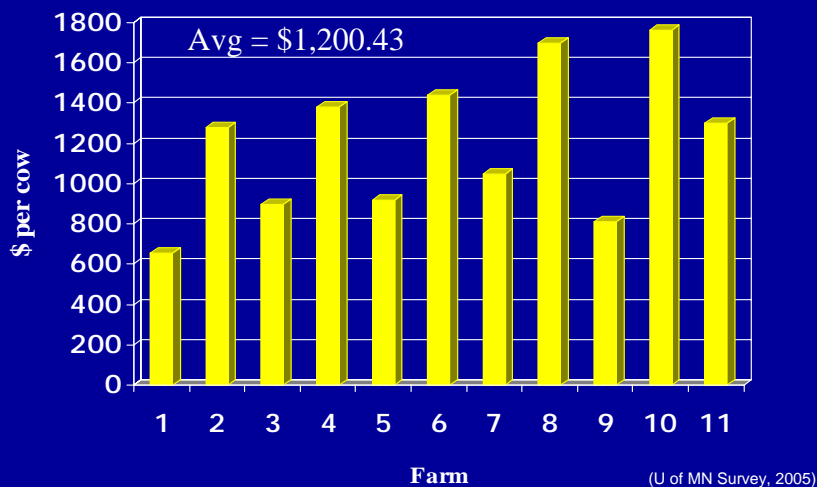


Additional Cost to Compost Barns

- Potential increased building cost
 - Lower cow occupancy – 80 ft²/cow
- Concrete wall surrounding pack
- Solid and slurry manure handling equipment
- Bedding \$0.30 to \$0.85/cow/day
 - Using \$0.50/cow/day = \$182.50/cow/year



Cost Per Cow

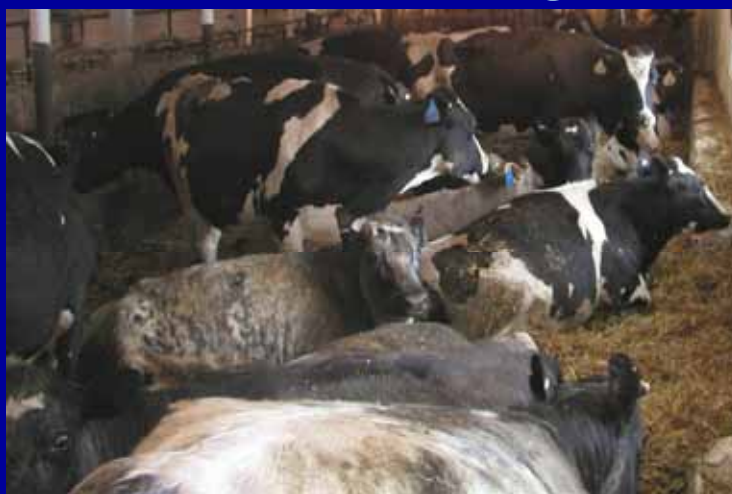


Alternative Bedding Sources??

- Sawdust will be available, but at what cost?
- Material must be processed fine
- Straw and corn stalks not recommended
- Soybean straw, oathulls, rice hulls, flax schives, sunflower hulls, or a blended mix
- U of MN converting a facility to look at alternative bedding sources



Compost Barns Still Require Excellent Management



A compost barn will NOT help this farm! Overcrowding is the issue.

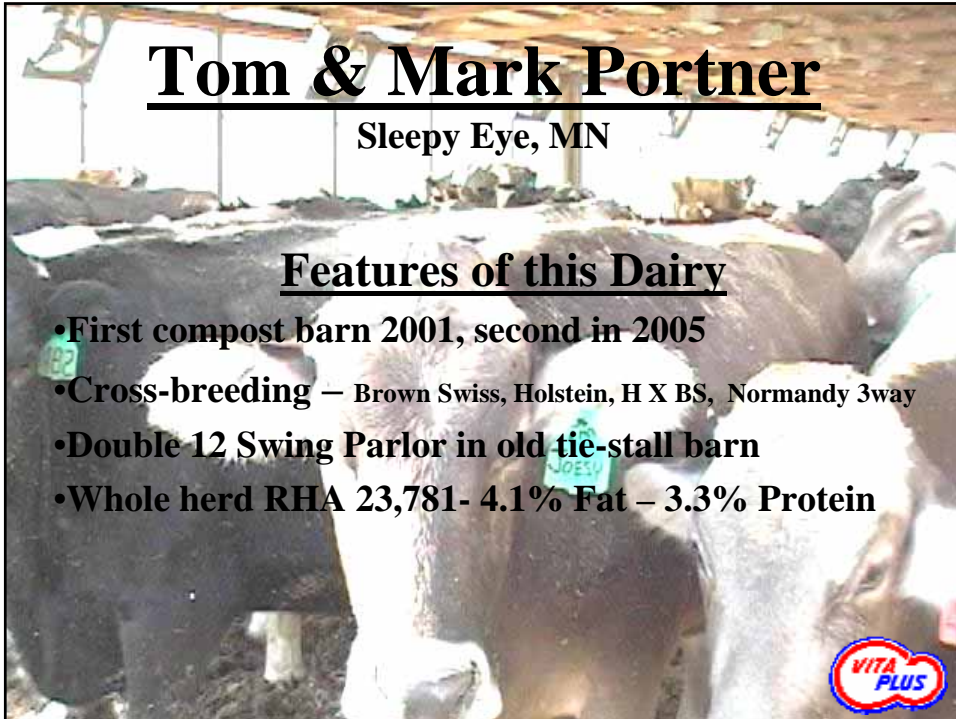


Tom & Mark Portner

Sleepy Eye, MN

Features of this Dairy

- First compost barn 2001, second in 2005
- Cross-breeding – Brown Swiss, Holstein, H X BS, Normandy 3way
- Double 12 Swing Parlor in old tie-stall barn
- Whole herd RHA 23,781- 4.1% Fat – 3.3% Protein



Portners: Early expansions were in free-stalls in out-buildings and cows were fed with drive by feeding



**Portner's Barn One: 136' X 52' - open
ridge – bedded with fine sawdust**



**Portner's Barn One: 14' sidewall with
curtains & fans for summer cooling**



Portner's Barn One: Holds 60 fresh & high cows with 75 sq. ft. / cow



Barka Dairy - Litchfield, MN



- 320' x 80' barn
- 16' sidewalls
- 10" eave opening
(Wishes it was wider)
- Center access door
- Farm Tec curtains



Barka Dairy - Litchfield, MN



- 4 pens 75' wide each
- 12' cow feed alley
- 16' drive through alley
- Adjustable gates to separate pens



Barka Dairy - Litchfield, MN



**Mike & Jude Sellner
Sleepy Eye, MN**



Sellners

- Hoop barn
- Conveyer feeding in 1/4 barn
- “Big Ass” Fans



Greg Schoenbauer – New Prague

- Barn 70' x 240'
- 95 ft²/cow
- 16' feed alley
- 11 ½' scrape alley



Greg Schoenbauer – New Prague

- 2 transition pens on west end 25' x 54'
- 16' sidewalls
- Converted old barn into step-up parlor



Ken & Linda Gliszinski – New Prague

- Moved into barn in August '05
- 224' x 58'
- 75 ft²/cow
- Drive by feeding with 6' overhang



Ken & Linda Gliszinski – New Prague

- Till with 11 1/2' cultivator
- Bed with fine sawdust & red cedar mix
- Loads every 2 weeks in winter, less in summer
- Converted old barn to step up parlor



Frank & Karl Heldberg – Le Seur



- Step-up parlor attached to west end of compost barn
- Calving pen in barn



Frank & Karl Heldberg – Le Seur



Pack height just prior to cleanout



Rick Marschall - Shakopee

- Barn 136' x 50'
- 120 ft²/cow
- 5' cement wall
- Cows also housed in tie stalls
- Cows have access to lot also
- Bedding with oathulls & sawdust



The Opportunities Exist for Improved Cow Comfort

Sometimes we just need to know
where to look



