

Large Scale Vermicomposting of Agricultural Byproducts



Thomas Herlihy
Worm Power

US Composting Council
January, 26 2011

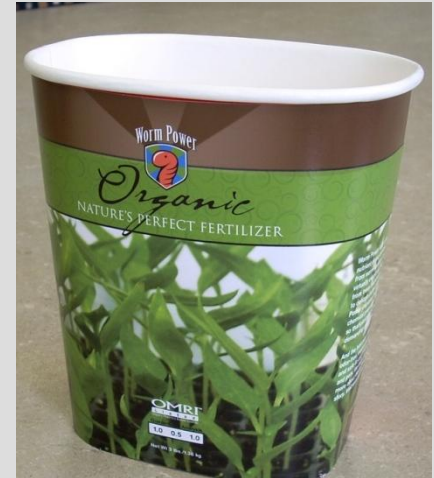


Shameless Promotion



Worm Power

- Created solely to develop professional horticultural products based on vermicomposting technology
- Designed, built own & operate North America's largest vermicomposting facility
- Internationally recognized technology leader (India, UAE, Argentina, Australia)



Secure Consistent Feedstock

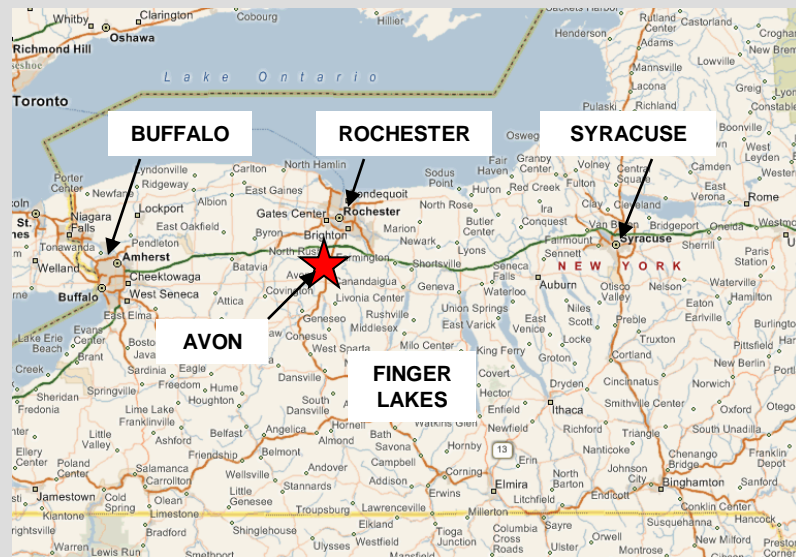


Avon, NY - large dairy concentration

Located on 1,600 head dairy, adjacent to another 1,700 head operation

Less than 5-miles from three primary shipping modes

Great people to work with!



Coyne Farm

- 1,000 Registered Holstein milkers & 600 heifers.
- 4th Generation family owned and operated “Dairy of Distinction” – Not organic certified
- Average Cow weighs 1,800 lbs
- Daily Husbandry
 - Consumes 300 lbs/day of feed and water
 - Yields 85 lbs/day of milk
 - Yields 120 lbs/day of manure

Our coworkers

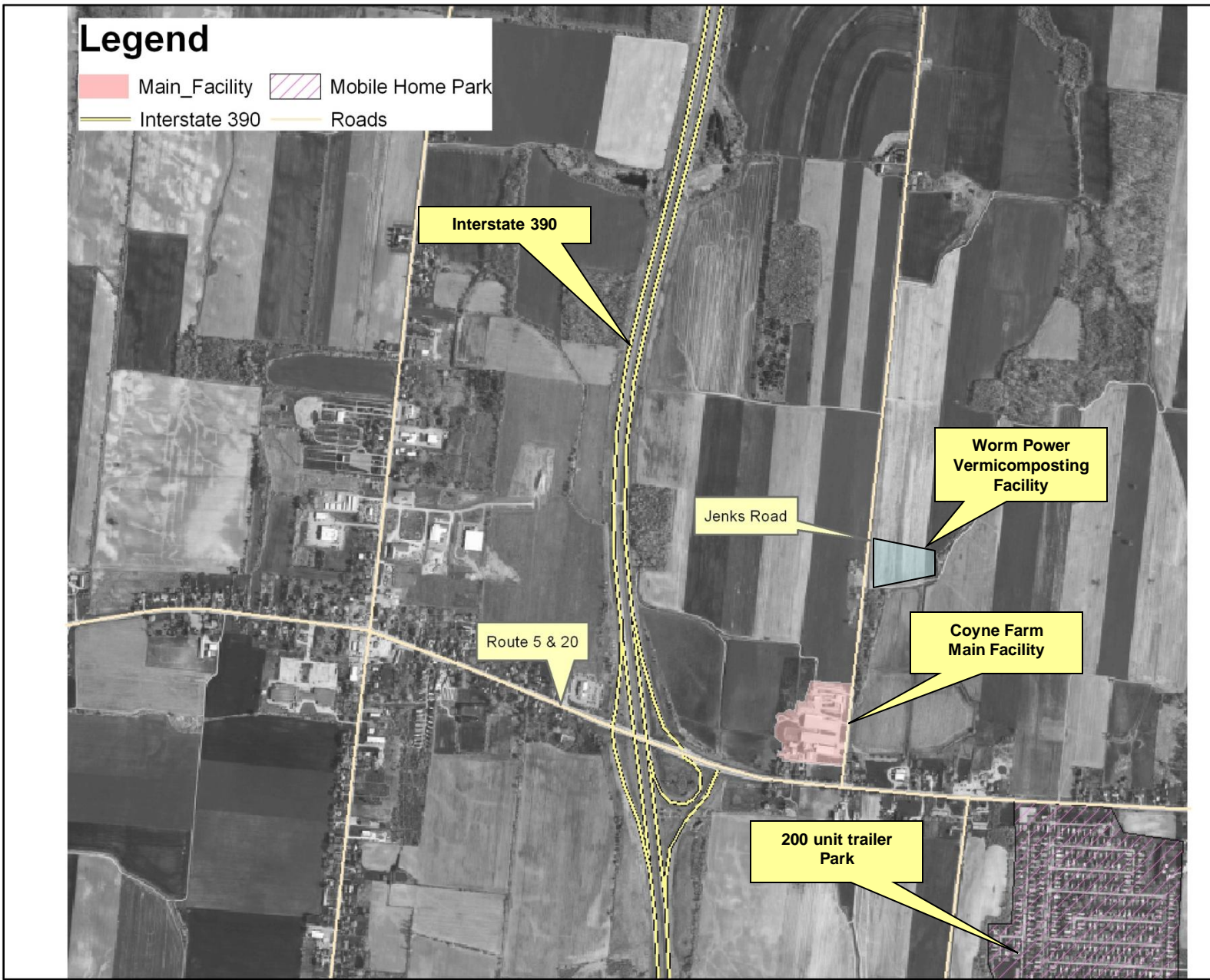


Coyne Farm - Main Facility



Legend

- Main_Facility
- Mobile Home Park
- Interstate 390
- Roads





Manure Separator Feedstock Preparation



prototype manure separator (above).

Fan centrifugal model shown to the right.



Manure Management

Integrating Plant and Animal Agriculture



1,000,000 & 7,000,00 gallon
manure effluent lagoons

Effluent is injected into crop
fields behind chisel plow



Manure Management

Integrating Animal and Plant Agriculture

Separated manure effluent is pumped from lagoons through 5,000' of drag hose to subsurface injector



- Conserves nutrients
- Reduces
 - Odors
 - Road traffic
 - Soil compaction
 - Application costs





Phase I Facility



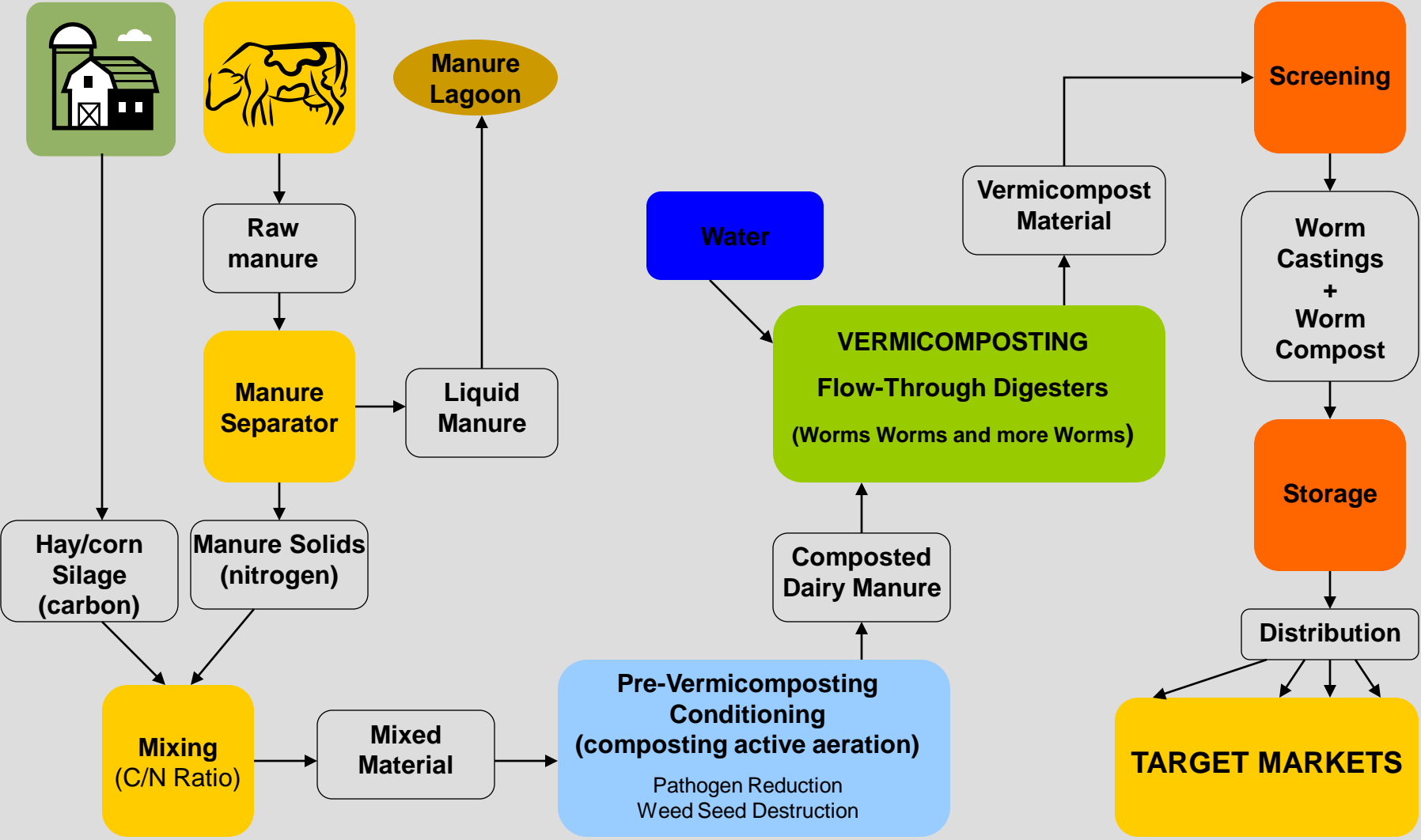
RT Solutions, LLC Vermicomposting Facility
(Left to Right)

- (1) Finished Product Processing Building**
- (2) Vermicomposting Building**
- (3) Office Trailer**
- (4) Composting Building**
- (5) Raw Feedstock Storage**

Completed December 2005



Production Process





Compost Preparation



Raw materials stored in covered facility

Materials are mixed with large agricultural equipment to specific parameters

- Porosity, MC, C:N ratio, bulk density
- Consistent Mixes
(reproduced within 10 lbs)





Composting



Mixed materials loaded into aeration bays

Thermophillic Composting

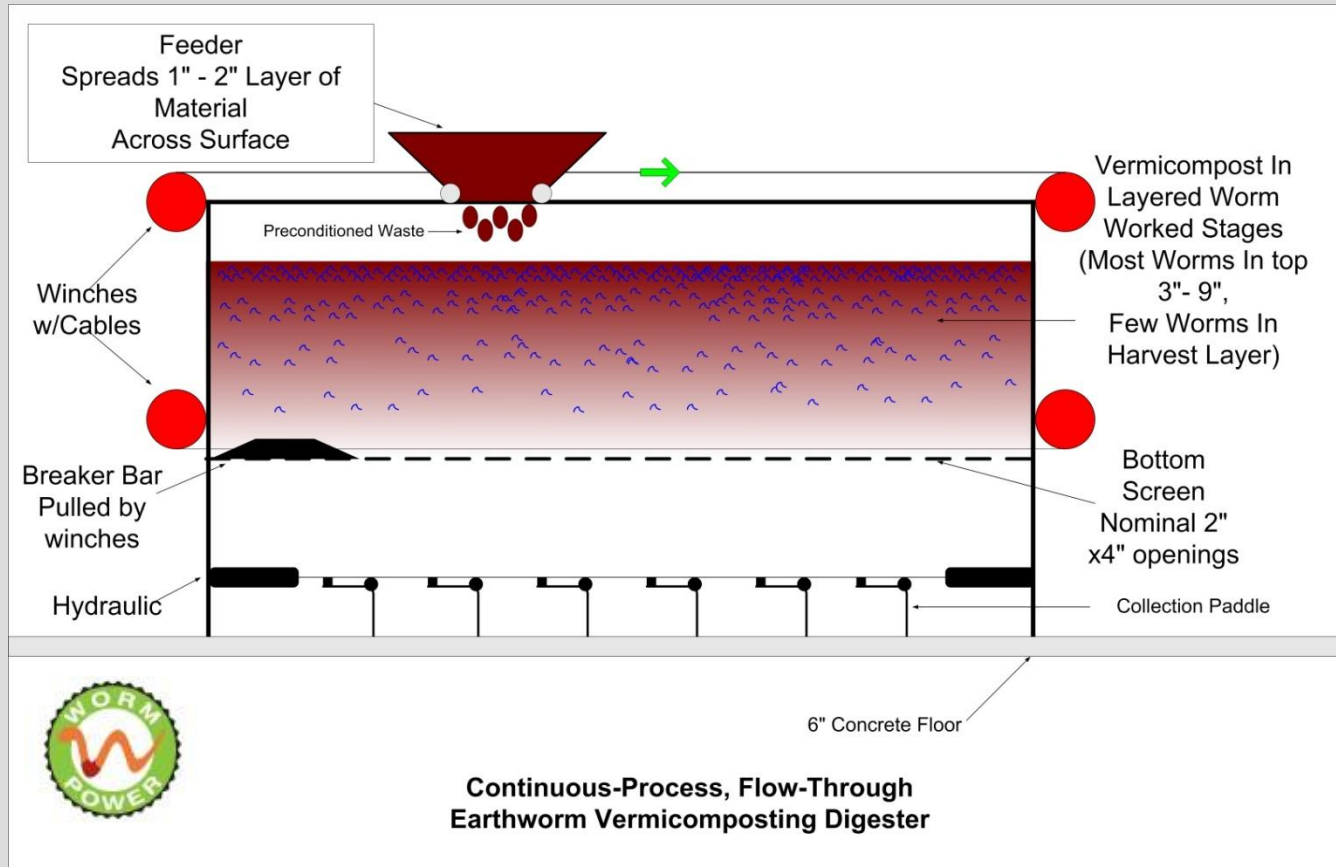
- 14 days with one turn
- Min of 3-days @ 55 degree C
- Weed seed destruction
- Pathogen reduction (PFRP)

Oxygen and temperature are measured, with feedback to air flow - rate & volume controls



Feeding

Material is spread in a uniform 1" layer across the surface of each digester.





Vermicomposting

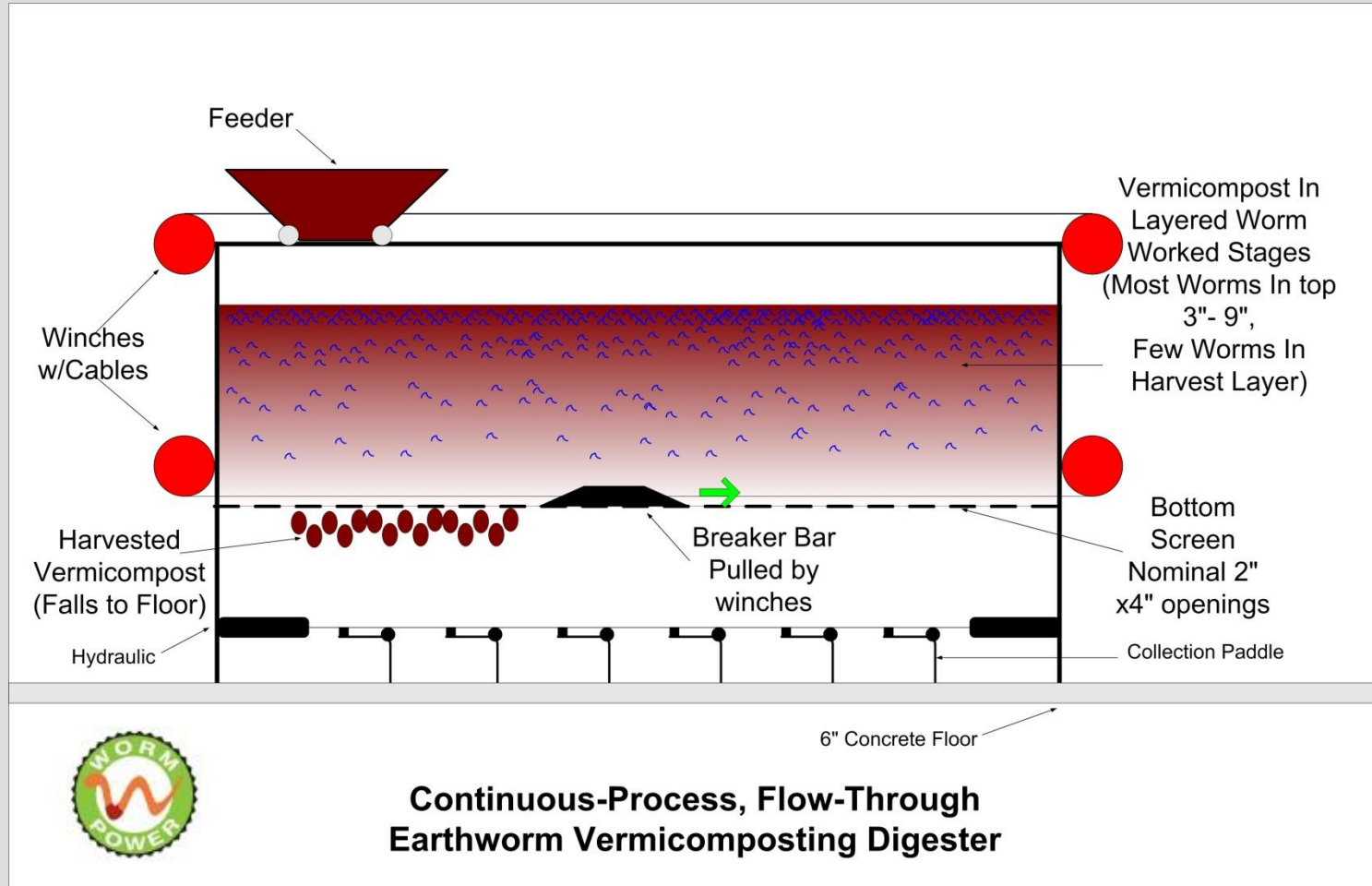


- ➔ Worms are fed “green” uncured compost
- ➔ Buildings engineered with automatic ventilation, watering, heat and directed lighting systems
- ➔ Feeding and harvesting by multiple automatic hydraulic systems -



Harvest

Worm worked material is removed from bottom of each digester



Packaging

➔ Product is screen to minus 1/10”

- Bulk packaging
- Retail packaging
- All product kept in fully enclosed buildings



Vermicompost Products

- Solids
 - Bulk in 2 cu-yd containers (commercial growers)
 - Retail in a variety of small packages 2010 entered into arrangement with Harris Seed
- Liquid vermicompost extracts
 - Bulk 275 gal carboy



Phase II Expansion



In December 2009, RTS secured \$3.5 Million in financing for Phase II of the company's expansion



Original Phase I Facility

RT Solutions, LLC Vermicomposting Facility
(Left to Right)

- (1) Finished Product Processing Building
- (2) Vermicomposting Building
- (3) Office Trailer
- (4) Composting Building
- (5) Raw Feedstock Storage



Phase II Facility – an 800% increase in production (completed October 2010)





Worm Power's Avon, NY Facility

- Largest vermicomposting facility in Western Hemisphere
- 10 acre site
- 8 buildings totaling over 75,000 sq-ft
- All water from rain fed cisterns
- 21 total earthworm digesters
- Processes over 10,000,000 lbs/year of dairy manure





Elzinga & Hoeksema Greenhouses

Grower Of The Year

Labor Savers
Seamless Software
Variety Central:
University Trials



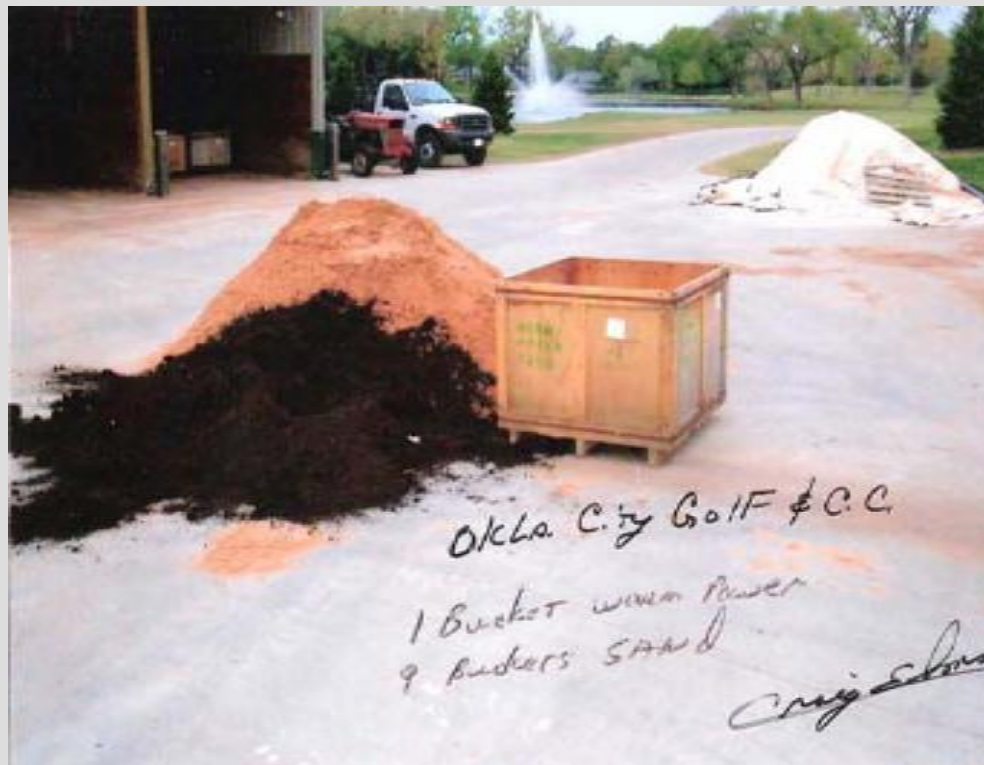
A Meister Publication • www.greenhousegrower.com







Vermicompost in Turf



best year ever
out of 32 year
at this course
The greens did great
Craig
Elmer

Research and Development



- Worm Power is the result of a five-year \$2,000,000 R&D project
- Awarded nine peer-reviewed research grants from Federal and State Agriculture Agencies.
- Long standing research collaboration with multiple Departments at Cornell University



NON INOCULATED

INOCULATED











SOIL



VERMICOMPOST

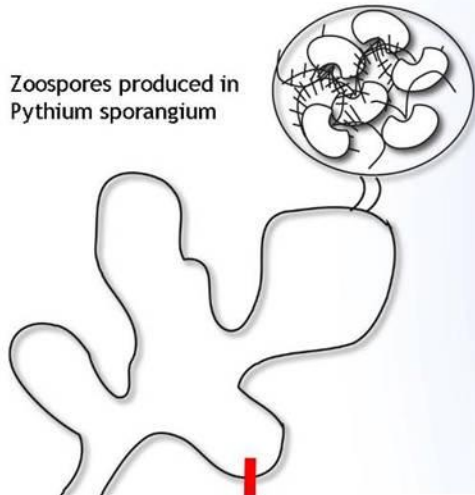


, 50 mL 3×10^5 zoospore mL⁻¹, bar is 3 cm

	Non-inoculated	Inoculated
Sand		
Sterile Batch 3		
Batch 1 2006		
Batch 2 2007		
Batch 3 2008		

Allison Jack, Plant Pathology, Cornell University

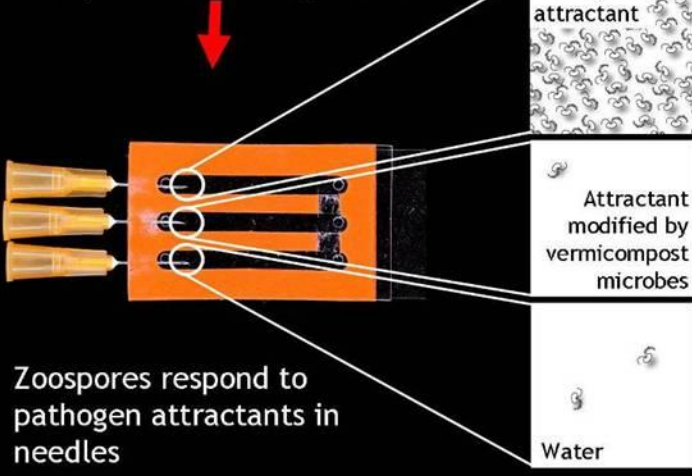
ZOOSPORE INFECTION STAGES WHERE DISEASE PROTECTION COULD OCCUR



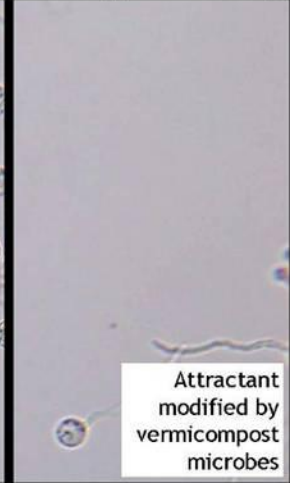
Sporangium



Zoospore swimming maze



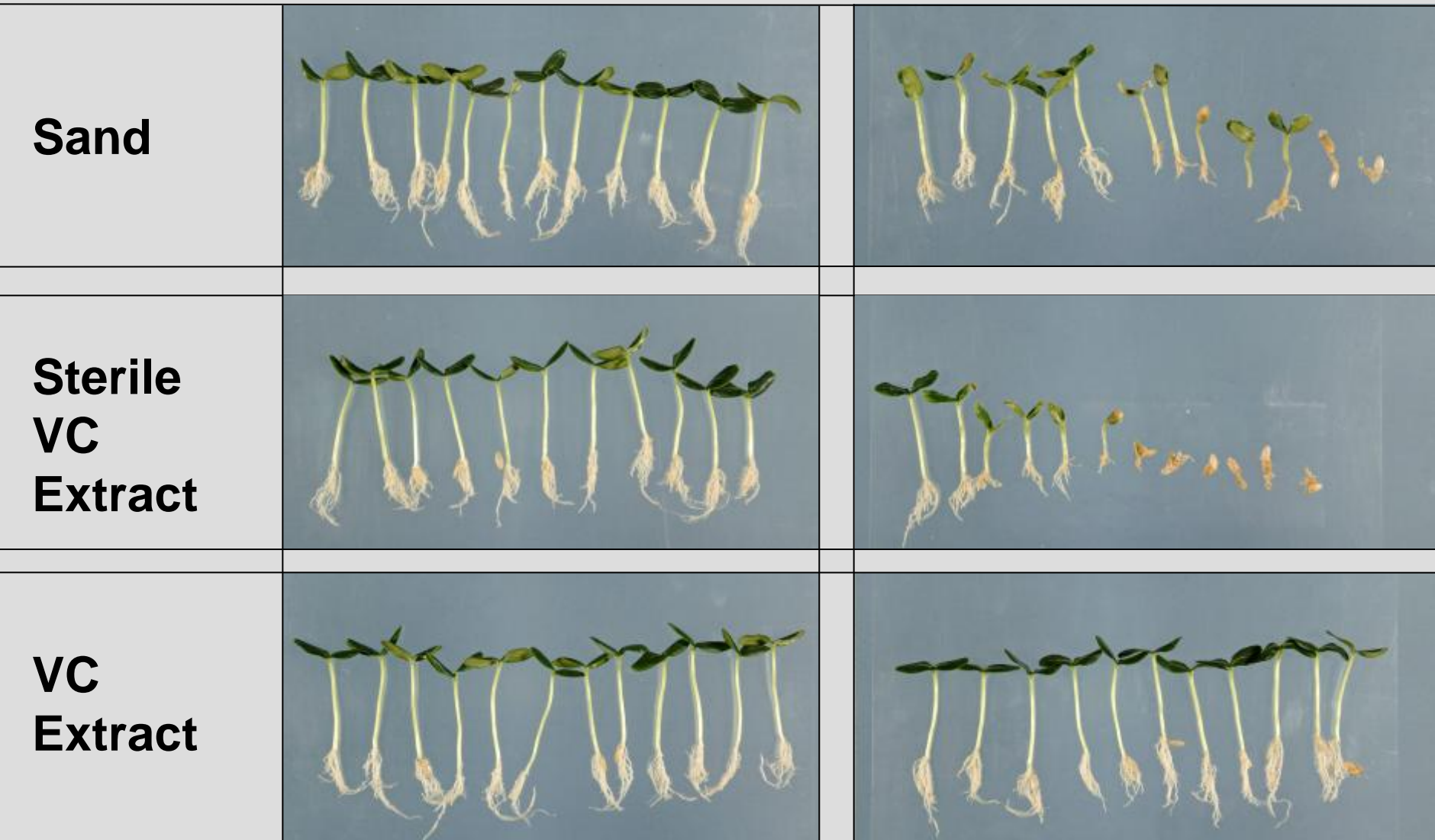
Encysted zoospores germinating



Liquid Worm Power Extract

Non-inoculated

Inoculated



Worm Power Brand



Worm Power is designed to be the nation's largest supplier of certified organic plant growth and plant protection products based on our patented earthworm composting technology

