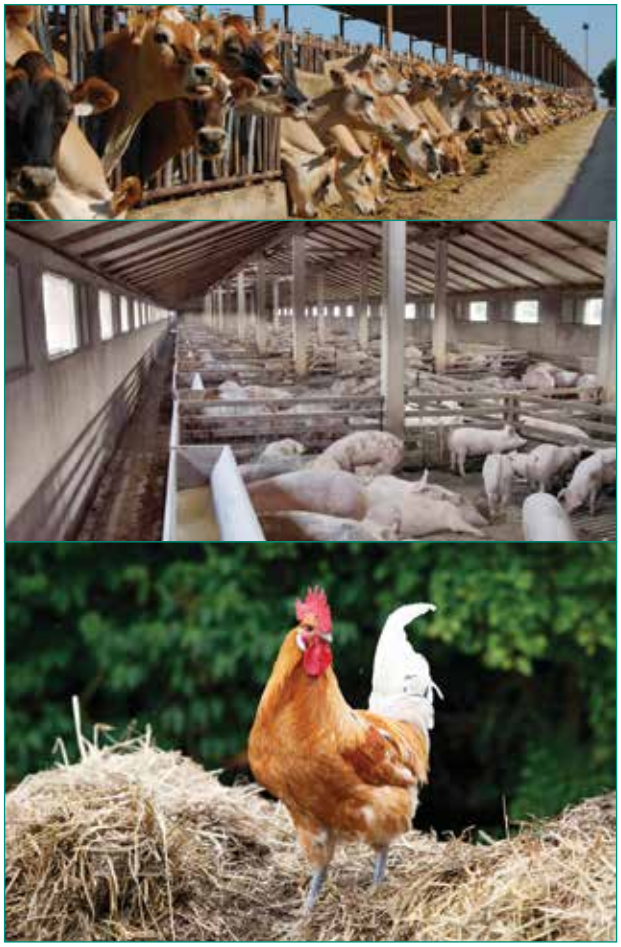
AGRICULTURE

WASTE MANAGEMENT



Ecological Laboratories is the industry leader in biological product development and market supply for applications in the agricultural market since 1976.

We provide unmatched biotechnology to enhance manure management at all levels of manure containment with multiple befits for barns, pits, increased fertilizer value, odor elimination and increased crop yields.

Our MICROBE-LIFT® products are the ideal choice to improve manure management processes. With unparalleled capabilities to breakdown waste, reduce toxic gases, and improve manure handling, MICROBE-LIFT® Technology drives down costs, increases operational efficiency, provides return on investment and supports regulatory compliance.

The unique consortium of microbes in MICROBE-LIFT® Technology combine with indigenous microbial populations to provide a bio-system that enhances the natural elemental cycles responsible for processing manure. MICROBE-LIFT® products will reduce corrosion, pump-out time and pit solids while improving manure nutrient values and controlling odor in the barn and on application. With the additional benefit of producing higher value fertilizer containing a microbial population that improves soil biology. MICROBE-LIFT® Technology provides added benefits by contributing to plant health and yield.

- MICROBE-LIFT® /HOG
- MICROBE-LIFT® /DFP
- MICROBE-LIFT® /AOE-P

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AGRICULTURE - WASTE MANAGEMENT

11100 Swine Management

11101	Odor Control, Reduced Solids, Lower Mortality, & Increased Crop Yields with MICROBE-LIFT® Add Up to Increased Profits
11102	Reduced Solids & Odor Control Improves Swine Health & Farm Profits
11103	Healthier Swine, Easier Manure Handling, & Increased Crop Yields Improves Profits with MICROBE-LIFT®
11104	Solids Reduction Dramatically Improves Manure Handling In Western Pennsylvania with MICROBE-LIFT®
11105	Sludge & Crust Removal by MICROBE-LIFT® Solves Manure Handling Problems in South Dakota
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11107	Hog Farm Improves Work Conditions & Wastewater Treatment with MICROBE-LIFT®/HOG
11108	MICROBE-LIFT® Technology Treatment Saves Farm from Closure in Dominican Republic
11109	MICROBE-LIFT®/HOG Increases Efficiency of Operations with Healthier Environment
11110	Hog Farm Eliminates Surface Crust & Reduces Effluent BOD by 70% with MICROBE-LIFT®/HOG in South Korea

The case study results listed above were achieved with MICROBE-LIFT® Technology and products, formulated and manufactured by Ecological Laboratories Inc., with technical support for administering the products provided by Ecological Laboratories Inc., in support of their worldwide representatives.

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Odor Control, Reduced Solids, Lower Mortality, & Increased Crop Yields with MICROBE-LIFT® **Add Up to Increased Profits**

Location: **Hatfield's Country View Family Farms, Pennsylvania**

Background: Hatfield Farm is a producer for Country View Family Farms (CVFF), a subsidiary of Hatfield Quality Meats Company of Pennsylvania. CVFF is one of the largest swine co-ops in the United States with over 200 grow farms and 50 sow facilities. Working closely with their growers, CVFF is constantly working on technologies to improve efficiency.

Objective: Raising swine is a challenging business. Environmental and public health issues have been of real concern to farm operators worldwide. The increasing demand for production and the market pressures for price control have weighed heavily on swine producers. Economic demands have led the industry to consolidate into larger and larger facilities. With greater numbers of animals at each facility, these industrialized farms deal with increasing concentrations of waste. Manure management is an important issue for industrialized farms. EPA regulations are being enacted and enforced to control odor in increasingly populated areas, prevent pollution of water resources, and control disposal of waste solids to prevent damaging nutrient run-off.

Hatfield's Country View Family Farms decided to test MICROBE-LIFT®/HOG at several farms to determine if it could help improve manure management operations.

Results: Consistently, these tests showed numerous improvements:

- Reduction in noxious gases leading to improved animal health and decreased mortality rates.
- Odor control provides safer working conditions and reduces complaints
- Less sludge build-up eliminating pumping problems and the need to agitate manure
- Decrease in fly populations as a result of eliminating the odors and solids that attract, feed, and harbor them.
- Increased crop yields.

The unexpected result was the significantly increased crop yields that resulted from land application of higher-value manure.

Starting the program in 2000, CVFF has repeated trials over and over again on different farms with the same beneficial results. To date, MICROBE-LIFT®/HOG application has been incorporated into the operation of over 80 farms in Western Pennsylvania. Experiencing beneficial results at every farm, CVFF has developed plans to roll out the program to their other facilities.

MICROBE-LIFT® Technology has proven to be an environmentally safe and economical solution to meet the ever-increasing challenges of manure management. MICROBE-LIFT®/HOG helps swine farmers maintain the highest level of integrity in animal welfare and bio-security, while producing safe and wholesome products their consumers can trust.

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Reduced Solids & Odor Control Improves Swine Health & Farm Profits

Location: Pfleegor Farm, Lewisburg, PA

Background: Pfleegor Farm is a contract grower for Country View Family Farms (CVFF), one of the largest swine farm co-ops in the United States. Gary Pfleegor operates a compact 15 acre, two-barn facility on a land tract that includes his personal home. The swine farm is relatively new and Gary has incorporated some of the latest technologies to optimize efficiency. His barns are kept in excellent condition. They are cleaned and the surfaces sanitized following each "grow cycle" to minimize potential problems within each production colony.

Objective: Gary wanted to improve operations by developing more efficient manure removal, reduce bottom solids, and reduce odors and associated fly populations. Gary was convinced that the heavy fly populations were a contributing factor in the health of his animals. Since his home was located extremely close to his two barns, improvements in odor and fly populations would improve his own living conditions as well.

Manure transfer was a laborious process with the build-up of large quantities of heavy bottom solids. Agitation was required prior to removal and residual sludge solids often interfered with the pumping process.

Working closely with his contract pumper, Gary ran a trial with MICROBE-LIFT® Technology. In the spring of 2000, after the 350,000 gallon waste pit was pumped, six gallons of MICROBE-LIFT®/HOG was applied to the pit. Thereafter one gallon was added each week for four weeks, followed by one gallon per month until the pit was again pumped.

Results achieved: During the first year's trial, Gary reported a reduction in odor and fly populations in the treated barn, evidenced almost immediately. At the time of waste removal, the pit's bottom and sides were found to be extremely clean. The two feet of solids, which had usually remained after waste removal in the past, was gone.

Encouraged by initial results, Gary converted both barns to MICROBE-LIFT® Technology in 2002. He reports that his herd health is significantly better with mortality rates dropping from 5% to 2%. There is less odor in the barns and surrounding areas with far fewer flies.

Gary remains convinced that fly reduction is key to his herd's improved health as flies are known to transmit disease. When fly populations appear to increase, Gary simply applies one additional gallon to each side to the barn's pits and he notes that odors and associated fly populations decrease within twelve hours.

Gary states that treatment with MICROBE-LIFT®/ HOG " *just makes going to the barn more pleasant. I have not seen a solid manure build-up since I have been using MICROBE-LIFT®".*

While MICROBE-LIFT® Technology does not claim to control flies, it does control odors and solids build-up that often attract and harbor these insects. Gary and his family can now leave their windows open on any day or evening, even during the hottest weather, something they could never do prior to using MICROBE-LIFT®.

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Healthier Swine, Easier Manure Handling, & Increased Crop Yields Improves Profits with MICROBE-LIFT®

Location: **Brubaker Farm, Lewisburg, PA**

Background: The Brubaker Farm includes 600 acres where Jim Brubaker contracts as a grower for Country View Family farms (CVFF). His facility includes a number of deep 500,000-gallon manure pits. Jim also grows 5-600 acres of corn for feed or sale.

Objective: Like most swine farmers Jim experienced a build-up of hydrogen sulfide and ammonia gases toxic to both animals and workers. Flies were another nuisance as well as a potential for transmitting disease.

Jim was also concerned about odor generation when he land applied manure.

Results achieved

Always on the lookout for improved efficiency, Jim launched a trial of MICROBE-LIFT® Technology. Jim was extremely pleased when use of MICROBE-LIFT®/ HOG completely eliminated problems with the surface and bottom solids in his deep manure pits, removed almost all of the odor in the barns and significantly reduced odors when applying the treated manure to his farm land. He also noted a decrease in fly population in his barns and improved health of his swine.

However, these were not the only benefits Jim noted. Jim closely monitors his crop yields. Once he started utilizing treated manure as fertilizer, Jim realized that he had increased corn production from 120 bushels per acre to 180 bushels per acre, a 50% increase in yield. In addition, he tracked nitrogen content of the soil and found that MICROBE-LIFT® helped stabilize nitrogen for a much longer period in the crop cycle, an effect believed to be due to the MICROBE-LIFT® microorganisms' ability to fix nitrogen from the atmosphere.

Jim Brubaker has utilized MICROBE-LIFT® Technology for over five years consistently achieving these benefits. He is working with a local university to further document the mechanisms involved to produce these clear benefits. In simple terms, the university is studying MICROBE-LIFT® Technology to determine how the proprietary microbial blend aids the natural degradation process to establish a biomass that more effectively breaks down organic waste in the manure pits.

In the process of degrading waste manure, the bacteria in MICROBE-LIFT® increased in number and actually produce and store nutrients in a form that benefits plants when the treated manure is used as a fertilizer. Because the bacteria in treated manure help make nutrients more available to plants, they increase growth rates and overall health of crops. This treated manure also provides active microbes that attach to soil and organic matter lowering nutrient loss through run-off and oxidation. Thus, MICROBE-LIFT® treated manure helps restore microbial balance to the soil ecosystem that is so vital to healthy crop growth.

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Solids Reduction Dramatically Improves Manure Handling In Western Pennsylvania with MICORBE-LIFT®

Location: **Farmer Boy Agricultural Supply Co., ViewFamily Farms (CVFF),Western Pennsylvania**

Background: This was a CVFF contracted sow farm constructed with shallow manure pits in two barns, each followed by million gallon collection pits.

Objective: This farm was experiencing problems with their large pull-plug operations. The shallow pits in the barns were blocked with sludge causing additional problems in their two million gallon collection pits. One of these collection pits had developed a cone-shaped sludge pile measuring 18 feet high, extending from the pit bottom to the surface of the water level when the pit was full. It was difficult to effectively agitate the manure and pumping was almost impossible.

To resolve his problem, the contract pumper was willing to try MICROBE-LIFT® technology.

Solution: In 2006, a low dosage program to treat the shallow pits was recommended. This program resolved the shallow pit problems within the first 60 days of treatment. In addition, when the two million gallon collection pits were pumped out in the following spring, the contract pumper reported that for the first time since he had been servicing this farm, he could pump the holding lagoons without any problems. This resulted in a large savings in time and expense to CVFF. In addition, the cone-shaped sludge pile in the first million-gallon collection pit was totally eliminated in one growing season, while only treating the shallow pits in the barns.

Fig.1: *CVFF sow operation. The effluent sent to two receiving lagoons every one to two weeks.*

Treatment:

Treatment was continued in an effort to resolve problems in the downstream receiving lagoons. The results are depicted in the pictures below:

Fig. 2: *Downstream lagoon after six months of treatment of the manure pit with MICROBE-LIFT®/HOG. No treatment was added directly to this waste lagoon yet a substantial amount of crust has been removed and clear zones are beginning to appear.*

Fig. 3: *The second lagoon was completely cleared of solids after the six-month pit treatment.*

Results:

After a six-month treatment program on all barn pits, the results were impressive. Solids were eliminated from all barn pits, odor was reduced, and surface and bottom solids in the storage lagoons were eliminated. Pit pumping problems were resolved and an astonishing six to seven feet of bottom solids were removed from the lagoons.

Based on these results, Farmer Boy Supply expanded its distribution of MICROBE-LIFT® technology from Pennsylvania to New York and Ohio.

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CS11104

Sludge & Crust Removal by MICROBE-LIFT® Solves Manure Handling Problems in South Dakota

Location: Plainview Colony, Ipswich, South Dakota

Background: Located nine miles north of Ipswich, SD, this hog operation utilizes multiple barns and maintains approximately 10,000 hogs on site. The hog operation manager, Larry Wipf, is an experienced, well-seasoned operator. The barns operate on a pull–plug manure collection system with all the hog waste draining to a common pumping station approximately 100 feet north of the 750,000-gallon concrete holding pit. The level of waste in this pit is maintained at a pre-set level and as that level is exceeded, a pumping station approximately 30 feet to the west of the pit, automatically pumps the excess to the lagoon system. The lagoon system consists of two large lagoons set-up in sequence. The primary lagoon effluent is gravity fed to the second lagoon via an installed culvert system. The secondary lagoon is pumped yearly and the effluent is land applied by a pivot irrigation system.

Objective: In early May 2003, after successfully testing MICROBE-LIFT®/HOG in a barn without a mechanical scraper, the manager inquired about a program for the concrete holding pit to reduce solid waste and control odor. Under normal circumstances, this pit is pumped in the spring and fall requiring extensive mechanical agitation. The waste is hauled by tanker trucks and land applied to selected fields. In 2003, May was a very wet month and the fieldwork started late and consequently the labor and equipment required to pump the pit was not available. The manager was advised that a treatment program using MICROBE-LIFT®/HOG may eliminate the need to pump.
On May 21, 2003, the pit was inoculated with only 10 gallons of MICROBE-LIFT®/HOG, 5 gallons introduced directly into the pit and, since the crust on the top of the pit was 5-6 inches thick, 5 gallons of MICROBE-LIFT®/HOG was mixed with water and spray-applied to the thick crust. The manager reported that after only 72 hours the pit bubbled and the crust began to open up

Results achieved

Five days after this initial treatment, substantial bubbling was evident and the solid crust had been significantly reduced on two-thirds of the pit surface. MICROBE-LIFT®/ HOG application to the pit was continued at the rate of 2 gallons weekly during the next 4 weeks and 2 gallons monthly thereafter.

After 26 days of treatment extensive bubbling had occurred and crust was reduced to only a couple of inches on the entire pit surface except for approximately 12-15 feet on the southern end of the pit. The manager happily reported very minimal odor release from the pit. He also noted continued release of chunks of solids from the bottom of the pit as MICROBE-LIFT®/HOG continued to degrade the waste.

After 47 days, sludge reduction was dramatic. No crust was visible on two-thirds of the pit and the remaining crust had been reduced to approximately one inch or less. Again, the manager reported that there was minimal odor further supporting the success of treatment.

Elimination of solids by MICROBE-LIFT®/HOG treatment solved expensive, labor-intensive sludge handling problems. There was no longer a need for extensive mechanical agitation during bi-annual clean out. In addition to sludge and crust removal in just five weeks of treatment, the manager reported significant odor control.

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During the trial the manager also reported that he normally experiences significant problems with solid waste buildup in the common pumping station often resulting in pump malfunctions. MICROBE-LIFT®/HOG was introduced into this pumping station as part of the weekly treatment program. MICROBE-LIFT®/HOG treatment successfully degraded the solid waste in the pumping station eliminating the associated pumping problems.

MICROBE-LIFT®/HOG very successfully treated the barn pits and the concrete holding pit at Plainview Colony and controlled odors. The hog operation manager was very satisfied and expanded the use of MICROBE-LIFT®/HOG to other pits in the barns.

Fig 1: *After 26 days of treatment the crust shows evidence of bubbling and chunks of sludge being brought to the surface.*

Fig 2: *After 47 days of treatment most of the surface scum and bottom solids have been eliminated.*

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CS 11105

Reduced Odors, Decreased Mortality, & Higher Value Fertilizer
Increases Profits on Swartz Farm in Pennsylvania

Location: Swartz Family Farm, Thompson, PA

Background: Swartz Family Farm works 400 acres. For over 12 years this farm has contracted with Country View Family Farms (CVFF) as a finisher operating a 2180 head finishing hog barn with a total deep pit volume of 800,000 gallons.

Objective: As with most swine farms, odors and associated fly populations, caused problems for animals and workers alike. Manure crusting and sludge build-up also interfered with efficient pumping and land application. But the major problem for Delbert Swartz was the bothersome fly population.

Results achieved

Delbert became aware of the potential benefits of MICROBE-LIFT® technology from an associate farmer who had used MICROBE-LIFT®/HOG with resulting improvement in barn conditions and reduction in fly population. Delbert applied MICROBE-LIFT®/HOG to his 300,000-gallon pits at a level slightly below the recommended application rate. He used 6 gallons for the first charge after pumping the pit, then 1 gallon per week for the following four weeks, followed by one gallon per month until the pit waste was removed for field application.

Not only did Delbert achieve almost complete fly reduction in his barns, he noted additional benefits. The most significant benefit was the reduction in mortality rate from an average of 4-5% to 3% during initial product introduction. Mortality is currently averaging 2%, a significant achievement and substantial cost savings.

In addition to substantial reduction in barn odors, surface solids in the pit were eliminated easing pit waste removal. This ease of removal was due also to a dramatic reduction in pit bottom solids accumulation which was apparent at the time of pumping. There was also a significant reduction in odor when the manure was land applied.

While Delbert Swartz was looking for a solution to reduce his fly population, he developed a wide range of benefits that improve the profitability of his operation:

- Resolved surface solids crusting problem
- Significantly lowered odors
- Reduced fly populations in and around the barn resulting from decreased odor
- Reduced mortality rate from 4-5% to a current 2%
- Reduced odor generated on land application of manure
- Provided higher value manure fertilizer that is more homogeneous and easier to spread.

After a decade of use, Delbert Swartz remains a committed user of MICROBE-LIFT® technology today.

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Hog Farm Improves Work Conditions & Wastewater Treatment with MICROBE-LIFT® /HOG

Location: **Swine Farm, Southeast Georgia**

Background: This twenty-year old farm consisted of several barns each of which was equipped with two 242-gallon rinse tanks that were used to flush the pit area under the barns twice daily. The manure pits discharged to a 5.5 million gallon lagoon. The lagoon was not meeting the discharge permit levels. Examination determined that there was no presence of biological activity in the lagoon and the solids build-up on the lagoon surface was at a critical level. H_2S odor was so severe that plant employees were often unable to perform their duties because of respiratory problems and eye irritation.

Objective: A three-pronged MICROBE-LIFT®/HOG treatment program was prescribed.

Results Achieved: The waste lagoon was treated with a single application of 45 ppm (250 gallons) of MICROBE-LIFT®/HOG resulting in immediate reduction of offensive odor emanating from the lagoon. Within 14 days, the lagoon showed signs of increased biological activity along with a substantial reduction in surface solids. Twenty-one days after treatment, the lagoon was extremely active with biological activity. The water and surface solids were virtually eliminated.

The barns were also treated by addition of MICROBE-LIFT®/HOG. The product was added to the 242-gallon rinse tank in each barn at a rate one quart per tank. Each barn contained 2 tanks that were used to flush the pit area under the barns twice daily. The hydrogen sulfide reduction was immediate. Covers were removed from the junction boxes and no offensive odors were detectable.

MICROBE-LIFT®/HOG was also used in the cleaning process of the farrowing barn. The product was applied with the use of a chemical input line on a pressure washer at a rate of 6 ounces per gallon. The entire interior of the barn was washed with the product. The results were outstanding. The only odor apparent in the farrowing barn following the treatment came from the feed in the barn.

The treatment program continued for a test period of two months. The plant employees reported remarkable reductions in the side effects of hydrogen sulfide as levels were substantially reduced.

MICROBE-LIFT®/HOG treatment was considered a success. It solved the TSS and BOD problems in the waste lagoon after a single treatment. The lagoon was functioning effectively just 21 days following treatment. Hydrogen sulfide odors, and associated toxicity, were greatly reduced by using MICROBE-LIFT®/HOG in the pit rinse system and cleaning systems in the barns.

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MICROBE-LIFT® Technology Treatment Saves Farm from Closure in Dominican Republic

Location: Company, Dominican Republic

Background: The Agrotel Company owns and operates a wholesale agricultural supply company as well as a swine farm in Moca, Dominican Republic. The farm maintains 450 to 500 sows and approximately 10,000 piglets. The barn wash-down and manure wastewater is collected, the solids are separated for feed and fertilizer, and the wastewater flows into a lagoon. There is no surface exit for runoff, but water does percolate through the soil and emit odors downstream.

Objective: In spite of superior design and management, odor from the waste lagoon was causing complaints from the surrounding neighbors and city authorities threatened to close the farm if the problem could not be resolved. Juan Carles Inea, the farm's operational manager, tried numerous odor control technologies and nothing worked. An exclusive international distribution partner for wastewater treatment, convinced Juan to try a simple treatment plan using MICROBE-LIFT® Technology.

Results achieved: With only one gallon per week using MICROBE-LIFT® Technology, they were able to eliminate the odors in the lagoon, In addition, the sludge build-up in the lagoon began to decrease to the point that they could use the water for crop irrigation in the surrounding fields.

Fig 1: *Modern Agrotel Company Farm in Dominican Republic*

After treatment, Juan was quoted as saying *"MICROBE-LIFT® Technology saved my farm from being shut down".*

Fig. 2: *Waste lagoon after treatment with* MICROBE-LIFT® *Technology shows improved water clarify and reduction in solids.*

Based on their initial success, Juan is now using MICROBE-LIFT® Technology to improve their composting of carcasses. The compost system is in a series of concrete silos where carcasses are allowed to degrade in water. One liter of MICROBE-LIFT® Technology was applied every other week to the water in the silos and, after treatment, the runoff water was clean enough to be used to fertilize the fields surrounding the lagoon.

MICROBE-LIFT® Technology speeds the composting process while producing a value-added liquid fertilizer from the compost runoff. Juan also noted a significant reduction in flies around the composting unit validating the reduction of odor.

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MICROBE-LIFT®/HOG Increases Efficiency of Operations with Healthier Environment

Location: **McClellan Farms Inc., Bradford County, PA**

Background: McClellan Farms is a contract grower for Country View Family Farms (CVFF). The farm consists of two 2100-head finishing operations and one 8800-head nursery operation. The swine in these three buildings produce close to 2.5 million gallons of manure each year that must be managed efficiently.

Objective: Foul-smelling odors emanating from the field application of manure and gases exhausted from barns by the fans were causing problems with neighbors. Mathew McClellan also had concerns for the health, safety, and overall environment to which his animals and workers were exposed.

Results Achieved: Mathew had heard of successful applications of MICROBE-LIFT® technology from other CVFF contract farmers. He was skeptical due to the comparatively low cost of treatment but he applied MICROBE-LIFT/HOG and MICROBE-LIFT®/SA (Sludge Away) as directed.

Not only did Mathew see a major reduction in odor when they land applied manure, but he is convinced that the treatment has helped create an improved air quality within the facility as well.

Mathew states "*I continue to have several neighbors ask us when we are going to spread manure, and it's always a pleasure to tell them we already have*".

After treatment, Mathew was also pleased to report that odor control was only a small part of the benefits he received from the use of MICROBE-LIFT® The collected manure was much more consistent without any of the solid crust or settled sludge that usually interfered with pumping. Liquefied consistency means that the manure containment system is operating efficiently without the typical development of crust that can harbor rodents and insects. Treated, liquefied manure can be applied consistently as fertilizer without the uneven application normally caused by clumping. Consistency and the incorporation of key beneficial microorganisms from the MICROBE-LIFT® consortium in their manure fertilizer have helped the farm to stabilize nutrient effluent levels within Pennsylvania requirements.

Mathew has consistently utilized MICROBE-LIFT® technology for approximately five years. He states that he believes it has had a positive effect on the overall production of the pigs and creates a much more positive atmosphere for anyone directly or indirectly involved with his facilities. He heartily recommends this technology to other swine farmers.

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Hog Farm Eliminates Surface Crust & Reduces Effluent BOD by 70% with MICROBE-LIFT®/HOG in South Korea

Location: **Swine Farm, South Korea**

Background: This hog farm had a concrete lagoon system that had a completely encrusted surface that caused problems with pumping and field application of the manure. Odor was a problem.

Objective: This farmer applied MICROBE-LIFT®/HOG and the results are recorded in the following photos.

Results Achieved: Results started showing in the first three days and by the end of 45 days of lagoon treatment the lagoon surface was completely clear.

Fig.1:
On the day of inoculation, the crust was very thick and covered the entire lagoon.

Fig.2:
In only three days the crust has been disrupted with clear patches evident

Fig.3:
At four days, more clear patches are noted and the crust has dissolved into a slurry form.

Fig.4:
With only five days of treatment, most floating solids have disappeared.

Fig.5:
At the end of the 45-day treatment program, the surface of the lagoon is absolutely clear with no visible floating solids.

As a result of treatment, the scum was eliminated, odors were gone, and effluent BOD was reduced by 70%.

The novel microbial consortium in MICROBE-LIFT®/HOG provides excellent degradation capabilities with extreme ecological diversity that allows it to excel in anaerobic, facultative, aerobic, and photosynthetic environments. Its capabilities provide the energy and metabolic capability required to meet the demands of today's higher volume production facilities.

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AGRICULTURE - WASTE MANAGEMENT

11200 Dairy Manure

11201	MICROBE-LIFT® Achieves Odor Control and More Efficient Manure Handling at Wolfe Dairy
11202	MICROBE-LIFT® Technology Solves Waste Treatment Problems for Feed Lot in Vera Cruz, Mexico
11203	MICROBE-LIFT® Technology Removes Two Feet of Surface Scum from Manure Pit

The case study results listed above were achieved with MICROBE-LIFT® Technology and products, formulated and manufactured by Ecological Laboratories Inc., with technical support for administering the products provided by Ecological Laboratories Inc., in support of their worldwide representatives.

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MICROBE-LIFT® Achieves Odor Control and More Efficient Manure Handling at Wolfe Dairy

Location: Wolfe Power Line Dairy, Milton, PA

Background: The Wolfe Power Line Dairy is a 750-head dairy farm with a 1.8 million gallon, above-ground manure storage silo designed to hold six to twelve months of manure production. The storage system is 30 feet below the barn grade and utilizes gravity to feed manure to the bottom of the containment vessel.

Objective: : Ray Wolfe wanted to remove bottom solids that had built-up and blocked the flow of manure to the containment vessel. This build-up had effectively reduced the manure capacity, which had been designed for six to twelve months' volume to only three to four month's capacity. Ray also wanted to remove manure surface crust and to reduce odors in the barn and during land application, both of which were major concerns. He decided to test the ability of MICROBE-LIFT®/DFP to meet his needs.

Results achieved

In June 2002, MICROBE-LIFT®/DFP (dairy) was introduced to the barn through the primary manure discharge line. The first treatment was initiated following normal pumping of the storage pit pump-down. Twelve gallons of MICROBE-LIFT®/DFP were applied in the first treatment, followed by a dosage of two gallons per week for four weeks, and then reduced to one and a half gallons per month until the tank was pumped again.

Mr. Wolfe achieved his initial goal of removing the sludge build-up that prevented full utilization of the containment vessel. He also noted significantly reduced odor both in the barn as well as during land application. The use of MICROBE-LIFT®/DFP also degraded the surface manure cap of 15 to 20 inches saving both time and fuel by eliminating the need for agitating manure prior to land application. Successful liquefaction of the manure provides a very consistent, easy to apply, high value fertilizer.

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MICROBE-LIFT® Technology Solves Waste Treatment Problems for Feed Lot in Vera Cruz, Mexico

Location: **Cattle Ranch Feedlot, Vera Cruz, Mexico**

Background: This ranch has a capacity of 22,000 head of cattle. The waste system consists of 16 lagoons (12 X 18 X 5 meters each). Twelve lagoons are saturated, 2 are closed, and 2 are new lagoons. In the lot, there are 7 separate sections with two lagoons collecting waste from the holding yards. In the pits, the fall manure is mixed with the existing manure daily, collected in lagoons, and gravity fed to the waste lagoon system. Total pit volume is 1,083 M^3.

Objective: There were a number of issues of concern to the management. There was visual pollution with 5 cm. of surface solids and heavy sludge build-up in each containment lagoon. There were significant odor issues and a concern that effluent waste was contributing to river pollution and affecting downstream ranches. This ranch was facing potential environmental fines for exceeding effluent discharge limits.

Their goal was to:

1. Remove surface crust and sludge from lagoons
2. Achieve a liquid, flowing waste in receiving pits liquefying the entire water column in the pits
3. Improve liquefaction of waste for improved consistency and flowability throughout the system
4. Increase waste degradation to meet effluent parameters
5. Stop polluting nearby land and rivers

Ecological Laboratories developed a program using MICROBE-LIFT®/DFP (ML/DFP) including dosage to each lagoon.

The following before and after pictures show the dramatic results as the scum and sludge are removed from the lagoons and pits.

Fig.1: *Shows two pictures representing the condition of the lagoon before and after treatment. These pictures show dramatic improvement, eliminating the surface crust in this lagoon.*

Fig.2*: This figure shows another lagoon before and after treatment. Visible crust on a lagoon is almost completely removed after treatment with* MICROBE-LIFT® /DFP.

Fig.3: *These two pictures show another lagoon before and after treatment with* MICROBE-LIFT® /DFP

Fig 4: Another lagoon cleaned by highly active microbes in MICROBE-LIFT® /DFP shows dramatic improvement.

Fig 5: The following pictures show an additional three lagoons cleaned by MICROBE-LIFT® /DFP with the before pictures on the left and the treated lagoons on the right.

Fig. 6: *Cleaner effluent is discharged to the river. Note the scum on the "before" picture on the left and the much cleaner water on the river after treatment on the right.*

Conclusion:

In conclusion, just as scum removal is evidenced by these dramatic pictures, all the defined objectives of this application were achieved by the described treatment program with MICROBE-LIFT® /DFP:

- Reduced surface and bottom solids
- Reduced odor
- Better flow of solids-free waste to the lagoons
- Improved effluent water quality to meet effluent parameters and reduced pollution impact on river and downstream farms.

For more information on MICROBE-LIFT® Technology contact

Ecological Laboratories Inc.

www.EcologicalLabs.com

CS 11202

MICROBE-LIFT® Technology Removes Two Feet of Surface Scum from Manure Pit

Location: Dairy Farm, Shelby, Ohio

Background: Merlin Newswenger's dairy farm includes a 70' X 70' lagoon with 8' walls that holds 39,200 cubic feet or approximately 300,000 gallons. This farm currently maintains 72 cows, using straw and shavings as bedding. Due to capacity constraints, the lagoon needed to be cleaned out approximately every four months based on cow numbers and rainfall. Surface solids (crust) were up to 24 inches thick that required extra payment to a manure hauler to agitate the pit before pump-out.

Objective: Merlin wanted to determine if utilizing MICROBE-LIFT® technology would eliminate the need and associated cost for agitation and provide a more consistent manure fertilizer for crops.

In late December 2004, Merlin removed the liquid portion from the lagoon from under two feet of frozen crust and then added the 6 gallons of MICROBE-LIFT®/DFP. One gallon of MICROBE-LIFT®/DFP was added per week for the next four weeks and thereafter one gallon was added per month for February, March, and April. Additional liquid was removed from the lagoon at the end of February due to capacity concerns, as the Newswengers did not think they would have enough capacity to hold until the expected clean out in early May.

Results achieved: At clean out in early May the entire 24 inches of surface solids (crust) was gone. A thin scum was left on top and very little agitation was used to incorporate this scum into the liquid. Merlin Newswenger and his manure hauler were equally impressed and commented that the lagoon was consistent from top to bottom. They were both shocked that the crust was gone and the regular agitation was not required. Land application of this treated manure seemed much more even as the manure had a consistent color and lacked the chunks normally seen. Odor had not been a serious problem for this farm due to its remote location. Therefore, no observations were documented regarding the reduction in odor that is typically seen with this treatment.

It was estimated that agitation would have cost an additional $50 per clean out from the manure hauler. In addition, Merlin's time would have been required to check on agitation equipment set up by the manure hauler. Merlin would normally have to monitor and move this equipment several times over a two-hour period.

Based on his experience, Merlin Newswenger has no doubt regarding the benefit of MICROBE-LIFT®/DFP to eliminate surface scum and produce a more consistent, easy to handle manure for fertilization.

Additional benefits include odor control for farms where odor is a concern and the increased value of beneficial microbes in manure used for crop fertilization. Once the microorganisms in MICROBE-LIFT® technology have been established in the manure collection system, reduced dosages will make this technology increasingly cost effective.

For more information on MICROBE-LIFT® Technology contact
Ecological Laboratories Inc.
www.EcologicalLabs.com
CS11203

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AGRICULTURE - MANURE MANAGEMENT

11300 Poultry Manure

11301 Long-term Odor Control Achieved in Poultry Farm with MICROBE-LIFT®/AOEP

11302 Syrian Poultry Farm Increases Profits by 34% with MICROBE-LIFT® Technology

11303 MICROBE-LIFT® Technology Provides Easier & Faster Manure Composting for Poultry Farmer in Central America

I1304 Ammonia Reduction & Reduced Beetle Larvae with MICROBE-LIFT® Technology in Poultry Composting

The case study results listed above were achieved with MICROBE-LIFT® Technology and products, formulated and manufactured by Ecological Laboratories Inc., with technical support for administering the products provided by Ecological Laboratories Inc., in support of their worldwide representatives.

For more information on MICROBE-LIFT® Technology contact

Ecological Laboratories Inc.
www.EcologicalLabs.com

Made in the USA

Long-term Odor Control Achieved in Poultry Farm with MICROBE-LIFT®/AOEP

Location: **Bledsoe Poultry Farm, Jamestown, TN**

Background: Jim Bledsoe operates several grow houses for chickens. As in other poultry operations, ammonia is a concern that needs to be addressed. Jim had used every product he found on the market that claimed to provide ammonia removal, including market leaders such as All Clear and PLT, but had not achieved the ammonia control desired.

Objective: When introduced to MICROBE-LIFT® /AOEP, Jim decided to run a trial to maximize ammonia control. He found that the method of application was the key to the product performance.

MICROBE-LIFT® /AOEP was applied as follows:

1. De-crust and wait one day or more to allow drying of the litter (24 hours).
2. Apply MICROBE-LIFT® /AOEP at a rate of two to three gallons per house diluted with 40 gallons of water (1 to 40 with tap water). Allow drying for one day, then apply top dress litter and allow an additional 4 to 5 days drying cycle.
3. Just prior to the introduction of birds, close the windows (vents) and turn on the heat in preparation for bird introduction (24 hours). The increase in temperature will cause a temporary release of ammonia, raising the ammonia level within the house as the ammonia is driven off.
4. The birds are added at this time, the day after barn heating, and following the application of MICROBE-LIFT® /AOEP, and top dress. The ammonia level will still be at a noticeable level however the ammonia level will stabilize and then drops off within a day or two to an acceptable level .

Results Achieved: Through application to numerous cycles it was determined that the following benefits were achieved with proper use of MICROBE-LIFT® /AOEP:

- Effective ammonia management control
- Lower cost of application
- Efficacy greater than other chemical and microbial technologies
- Longer term control than competitive products

When the above procedure was followed, MICROBE-LIFT® /AOEP reduced ammonia effectively and held it at a lower level than achieved by other odor control technologies. MICROBE-LIFT® /AOEP provided ammonia control for the entire growth cycle while competitive technologies offered two weeks control. Jim advised that he liked the advantages MICROBE-LIFT® /AOEP provided in both cost and performance. Jim had supplied other similar farm operations in the area with MICROBE-LIFT® /AOEP technology and they reported the same long-term ammonia control.

For more information on MICROBE-LIFT® Technology contact

Ecological Laboratories Inc.
www.EcologicalLabs.com

CS11301

Made in the USA

Syrian Poultry Farm Increases Profits by 34%
with MICROBE-LIFT®Technology

Location: **Poultry Farm, Syria**

Background: The idea of using MICROBE-LIFT® in poultry production was encouraged by fact that many international manufacturers of veterinarian products have recently introduced feed additives containing various forms of live bacteria. These probiotic products, which usually contain a short list of non-pathogenic bacteria, work on the basic premise of symbiotic growth of the bacteria adhering to the intestinal lining and remaining after the food moves down the digestive track. As the bacteria contained in MICROBE-LIFT® play the same role when used on the solid surfaces (walls, pipes, floors, etc.) of stables, barns and food processing plants, it was logical to think that the non-pathological bacteria consortium in our products would be worth studying in this capacity.

This effort was supported by the fact that MICROBE-LIFT® was used successfully in shrimp farm trials in the USA and Taiwan a few years ago, and the results of these trials on increasing growth, individual weight, and reduction of feed were quite astonishing.

Objective

This trial was designed to determine the effect of MICROBE-LIFT® usage on poultry production through:

- Adding MICROBE-LIFT® to the birds drinking water in order to minimize the effects of pathogenic bacteria in birds intestine and stomach, with the goal of reducing the mortality rate and improving the birds overall health.
- Spraying MICROBE-LIFT® on the floors of the barns, thus eliminating the various gases produced by the chickens' manure, to improve environmental conditions, which in turn would result in healthier birds and increase over all production profits.

Benefit analysis was measured by tracking the following data:

- Mortality rate versus standard control.
- Weight of average chicken versus standard control.
- Feed conversion coefficient versus standard control.

Methodologies and Procedures

Barns and Poultry Population Groups

Two barns, each measuring 700 square meters, were selected and fully disinfected by an iodine-based disinfectant.

Each barn was stocked with 10,200 birds. The populations of experimental birds were all from the same source, hatched within one day of each other, stocked in the barns at the age of one to two days, and all were inspected and considered to be in good health.

During the entire trial, the two herds were subject to the same preventive medical plan, and when there was a need for therapeutic action, the same antibiotics were administered to both Groups. In this manner, care was taken to limit the variables, other than the usage of MICROBE-LIFT®

Syrian Poultry Farm Increases Profits by 34% with MICROBE-LIFT®Technology

MICROBE-LIFT® Application

Product was diluted at 1:40 parts of water and sprayed on the barns floors, and walls. This application was implemented three times: at day 7, day 21, and day 35. (Total product used in this fashion was 26.25 Litres)

Product was mixed with the drinking water of the herd as follows:

1. One part of MICROBE-LIFT® to 3000 parts of water starting from the 1st day through the 7th day, then
2. One part of MICROBE-LIFT® to 2000 parts of water starting from the 8th day through the 15th day, then
3. One part of MICROBE-LIFT® to 1000 part of water starting from the 16th day through the 46th day of the trial.

(Total product used in above a, b, c phases was 139.08 Litres)

Results Achieved: The following data provides assessment of the effect of treatment:

Description	Control Herd	Experiment Herd
Herd's No.	1039	1040
Area of Barn	700 M2	700 M2
Populations	10,200 birds	10,200 birds
Starting Date	Oct.30.2005	Oct.30.2005
Duration of Experiment	46 days	46 days
Mortality Rate	22.17%	9.91%
Mortality Count	2261 birds	1011 birds
Average Weight	1365 gm/bird	1812 gm/bird
Conversion Coefficient	3.14	2.8

Economic Analysis: Microbe-Lift experimental herd produced the following savings:

$4,500.00	Cost of 1250 birds was less due to lower mortality
$7,097.46	Cost of the weight increase was less due to improved feed conversion
$1,862.46	Cost of feed savings which amounted to 4,828.6 kg
$13,489.92	Total savings vs. control
$1,965.60	Less cost of ML
$11,524.32	NET PROFIT BENEFIT

Conclusion

This poultry trial project demonstrates the efficacy of using MICROBE-LIFT® as a cost-effective food additive in poultry production. The economic benefits to the poultry industry can be summarized as follows:

- **Increased Average Weight**

  As referenced in the trial, the average bird weighted 0.447 kg. more than the control birds, which amounted to a value of some U.S. $0.894 per bird.

- **Reduced Mortality Rate**

  The experimental group exhibited a mortality of only 9.91% versus 22.17% for the control group, amounting to increase of U.S. $0.493 per bird.

- **Reduced Feed Cost**

  The conversion rate improved from 3.14 kg. of feed to one kg. of meat, to 2.85 kg. of feed to one kg. of meat, resulting in a savings of U.S. $0.203.

While net savings will vary by market, this trial in Syria resulted in a 34.61% increase in profit based on the total selling price of experimental herd versus the control herd. The additional benefit, albeit subjective, was the significant reduction in odor. This was noticed by staff and neighbors, a true benefit to our position in the community. This farm manager was very pleased with the results and will continue to use MICROBE-LIFT® as a fundamental part of the production regimen.

For more information on MICROBE-LIFT® Technology contact

Ecological Laboratories Inc.
www.EcologicalLabs.com

CS11302

MICROBE-LIFT® Technology Provides Easier & Faster Manure Composting for Poultry Farmer in Central America

Location: **Poultry Farm, Central America**

Background:

One of the major functions of a poultry farm is the handling of manure and composting it to be utilized as fertilizer. In Central America, stabilized manure is a source of revenue as it is sold as fertilizer.

Many barns designed for laying chickens in Central America are up to 150 meters long and 14 meters wide. They are approximately 2,100 square meters in area with barn floors built 3 meters above the ground, making them accessible for front-loaders and manual labor.

Manure piles collect underneath each barn often building to a depth of 40 to 50 centimeters (1.5 feet). The chicken manure is allowed to create a solid heap underneath the barns.

The manure creates a tremendous odor problem and the compost is slow to stabilize (degrade). The piles are typically not turned for aeration. Therefore they are removed and dried for fertilizer about every 12 to 16 months.

Objective:

- This farm wanted to reduce odor, as they had numerous complaints from adjacent properties.
- They also wanted to speed up the composting process and (as a side benefit) improve the fertilizer value of the composted manure.

Treatment

MICROBE-LIFT® technology made by Ecological Laboratories, typically reduces the time required to stabilize a compost pile by up to 40 or 50%. Fertilizer value will also be improved as demonstrated by up to 30 to 50% increased crop yields. Generally, MICROBE-LIFT® formulation is diluted 1:50 with water and sprayed at the rate of 1 gallon diluted mixture for every 20 sq. ft. of surface area to a moisture level of approximately one inch.

The best way to determine that the manure is stabilized is the odor. Poultry manure has very high nitrogen content that leads to ammonia creation. MICROBE-LIFT® treatment will produce an odor that is more earthy, not repugnant or putrid, and the ammonia odor will be reduced and eventually eliminated.

A critical step is to achieve a temperature of 60° to 75°C (140 to 175°F) indicating good biological activity. The volume is reduced as organics degrade and gas is evolved. As the harder-to-degrade organics are oxidized, the compost is stabilized and ready to apply as fertilizer.

Different methods of composting affect the time of stabilization. The heap or pile method can take many months, even up to a year depending on the composition. If the pile is bulked up with coarse material such as wood chips to allow for air circulation, the reaction will be faster. The windrow method takes only 45-90 days depending on the composition of the pile and how often the piles are turned.

For best results, treat barns that have had their piles removed and spray the MICROBE-LIFT® dilution on the piles as they build up. Odor changes help determine when the piles are ready to be dried and sold. This process will be accomplished in less time, often a 50 to 60 percent shorter time frame when treated with MICROBE-LIFT®. technology.

For existing piles, turn the manure and apply the MICROBE-LIFT® dilution as the piles are turned.
Once this process has been completed, spray the outer surface as it builds up.

Results Achieved

This trial validated the efficacy of MICROBE-LIFT® technology. Manure was removed and composted demonstrating faster stabilization. Once the manure was removed, the barns treated new manure periodically significantly reducing odors and quickly stabilizing the manure for use as fertilizer.

For more information on MICROBE-LIFT® Technology contact
Ecological Laboratories Inc.
www.EcologicalLabs.com
CS11303

Ammonia Reduction & Reduced Beetle Larvae with MICROBE-LIFT® Technology in Poultry Composting

Location: Experimental Farm, Honduras

Background: Lazarus & Lazarus, a technology-based construction firm in Honduras, contacted a distributor of Ecological Laboratories to explore technology to improve their poultry litter processing. Ecological Laboratories' technologists devised a test protocol using MICROBE-LIFT® technology conducted at an experimental poultry farm. This farm is utilized to evaluate new technology to optimize efficiency of operations for poultry farms.

Objective: The objective of this trial was to determine if this technology could:

- Reduce ammonia to create a healthier environment for birds and workers
- Decrease the incidence of beetle larvae in the broiler bedding
- Accelerate the composting process and produce a higher quality fertilizer.

Results achieved: This trial was evaluated by the farm manager, Daniel Martinez, and Daniel Irias, the technical representative from Lazarus & Lazarus. The results are tabulated as follows:

Incidence of Beetle Larvae	Presence of larva actively proliferating.	Presence of larvae significantly lower than control	Intensive visual evaluation in one square meter
Concentration of airborne ammonia	≥10 ppm	5 ppm	Indicator tape for NH4OH
Human appreciation of ammonia odor	High concentration on the human perception	Very low concentration on the human reception	Personal qualitative appreciation
Composting Process	High moisture, very low composting development	Low moisture, significantly higher composting process	Observation of the physical condition of the bedding

Based on the parameters listed above, the broiler bedding trial achieved the following results:

- MICROBE-LIFT® technology worked as expected, lowering the ammonia in the air both quantitatively and qualitatively. It significantly reduced odor noted by human perception and by air measurement showing the recommended 5ppm concentration inside the warehouse.
- There was a significant decrease in the amount of moisture and also a significant acceleration of the composting process.
- The incidence of the beetle larvae was significantly reduced; this was a secondary experiment of discovery that was tested based on previous experience reducing infestations in other applications. While MICROBE-LIFT® technology is not sold as an insecticide, it appears to change conditions that discourage their growth.

All objectives of the program were successfully achieved.

For more information on MICROBE-LIFT® Technology contact

Ecological Laboratories Inc.
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CS11304

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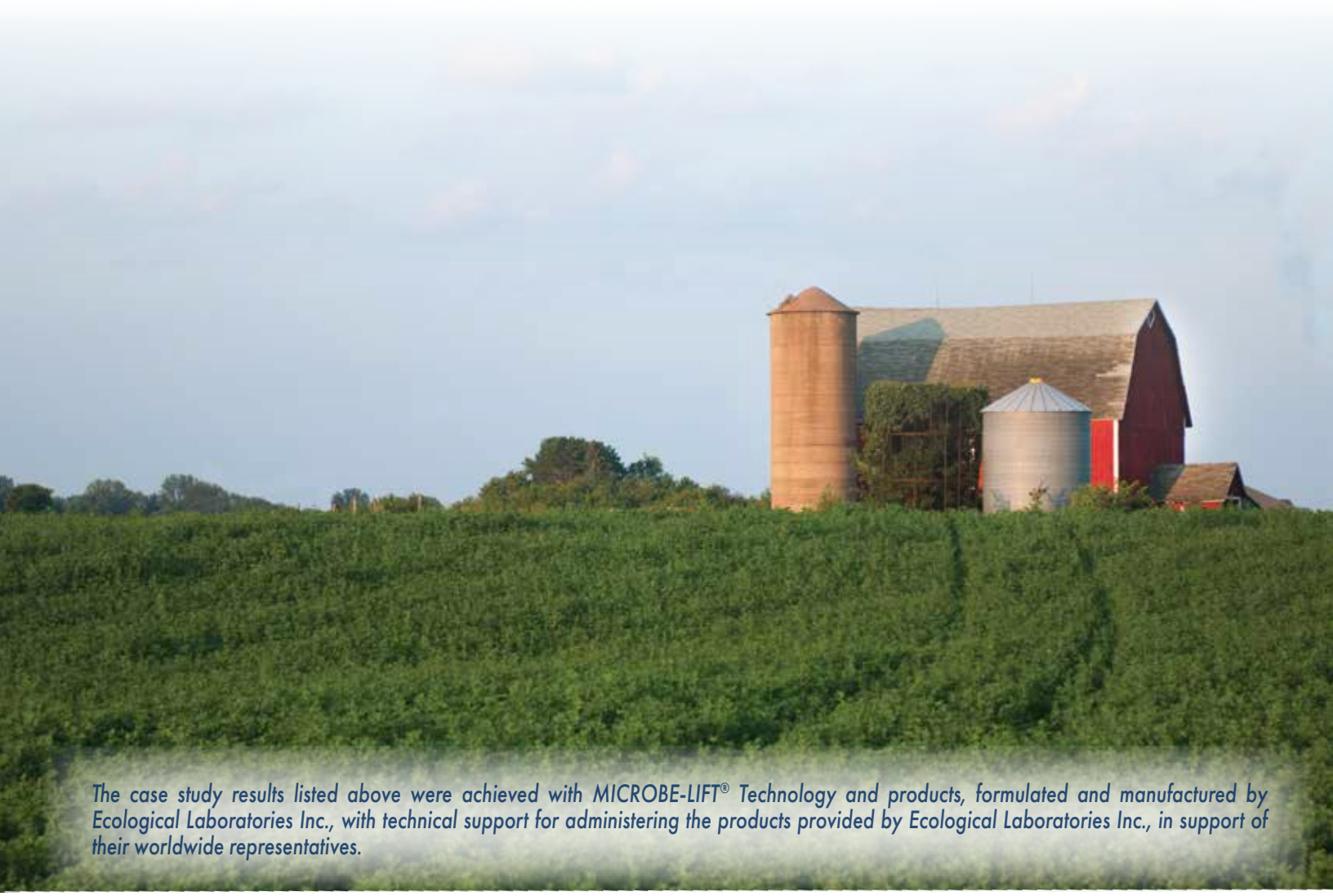
AGRICULTURE - MANURE MANAGEMENT

11400 Technical Essays and Testimonials

T11401 Three Brothers Farms L.L.C. Testimonial

T11402 MICROBE-LIFT® Products & McClellan Farms Inc. Testimonial

T11403 Swartz Family Farm L.L.C. MICROBE-LIFT®/HOG Testimonial



The case study results listed above were achieved with MICROBE-LIFT® Technology and products, formulated and manufactured by Ecological Laboratories Inc., with technical support for administering the products provided by Ecological Laboratories Inc., in support of their worldwide representatives.

For more information on MICROBE-LIFT® Technology contact

Ecological Laboratories Inc.

www.EcologicalLabs.com

CS11401

Made in the USA

Three Brothers Farms L.L.C. Testimonial

Three Brothers farm
626 190th Street
Ogden, Iowa 50212

My name is Ben Hollingshead;

I am a Co-owner of Three Brothers Farms L.L.C. We operate a 4800 head wean to finish hog barn for Cargill Pork in central Iowa.

MICROBE-LIFT/HOG & MICROBE-LIFT/SA manure treatment

We started using MICROBE-LIFT/HOG and MICROBE-LIFT/SA (Sludge Away) products after we had experienced severe foaming problems in our pit, and a fire due to a result of the foaming. We had used another pit product before using Ecological Laboratories MICROBE-LIFT products to try and take care of our pit problem. The difference with Ecological Labs products is that they really look at the entire system and formulate products that do not just treat the bottom solids in our pit but also add in the aerobic and facultative bacteria that are critical for the health of the ENTIRE pit.

When we started we used their purge application to jump start our imbalanced pit. Within a few weeks of the application we noticed a difference in the appearance and smell of our pits.

However the true deal maker was when we pumped the pits in the spring after two and a half months on the program. Our custom applicator was absolutely amazed at the way the manure pumped. The consistency, texture and smell of the manure completely sold us on the products.

Furthermore, as the growing season continued it was clear that the crops were more even from the application, there were no waves or streaks in the fields that we had seen before when we do our fly over aerial imagery. We are very anxious to harvest the corn from the field that we spread on because I really think we will see a yield increase simply from the better nutrient availability in the manure from using Ecological Labs pit products.

If that is not enough proof that MICROBE-LIFT works. Our barn air quality has greatly improved and we went the ENTIRE summer with absolutely no flies

We are extremely satisfied with all the products and the service we receive and will continue to use the products.

Sincerely
Ben Hollingshead
Three Brothers Farms L.L.C.

For more information on MICROBE-LIFT® Technology contact
Ecological Laboratories Inc.
www.EcologicalLabs.com
T11401

Made in the USA

MICROBE-LIFT® Products & McClellan Farms Inc. Testimonial

August 14, 2011
To: Douglas Dent
Ecological Laboratories, Inc.

MICROBE-LIFT Products & McClellan Farms Inc

I just wanted to follow up with you about the conversation we had a few weeks ago regarding the use of the MICROBE-LIFT bacteria products that I have been using for several years now (about 5 years now).

To refresh your memory, I use a combination of the regular MICROBE-LIFT/HOG bacteria as well as the MICROBE-LIFT/SA (Sludge Away) products in the facilities I own and operate with my family.

McClellan Farms Inc. consists of two 2100-head finishing operations and one 8800-head nursery operation here in Bradford County Pennsylvania. The three buildings combined give us close to 2.5 million gallons of manure to manage each year.

Odor reduction in barn and field: I believe the reason we got started on the MICROBE-LIFT product was the potential to reduce odor from manure applied to the land, as well as the possible reduction of gases being exhausted from ventilation fans. Like anything else I wasn't sure what to expect from the product, especially because of the relative lower cost than other products on the market claiming to do the same, but cost much more money! Well Doug, not only have we noticed a major improvement in the odor reduction from the manure we land apply, I truly feel the product has helped create an improved air quality environment inside the facility as well! I continue to have several neighbors ask us when we are going to spread manure and it's always a pleasure to tell them we already have.

As far as the odor reduction from within the facility I have always been a firm believer that if the air quality is poor in a facility that the pigs will be the first to tell you so through performance. After the pigs complain to you, the help will be the next to let you have it, because let's face it, if you don't provide a work environment tolerable for your help they will not be your help very long!

Manure quality and fertilizer value: As I stated, when we began the MICROBE-LIFT program the reduction of odors were the main focus. But I have been extremely pleased to report that reducing the odor has only been a small piece of the positive experiences we have had using the product. Other positive results have been the consistent flow of manure from the first load to the last load hauled. The consistent flow is very important for several reasons as follows. If your flow is consistent through the pump to the tank then your manure content is very liquefied. If your manure is liquefied then your manure storage space is being completely utilized in an efficient capacity.

Liquefied manure also translates into the elimination of the nasty crust on the top of your manure level that is an open door for pests to run on and those horrible insects to nest and multiply!

The only drawback I have seen since using the product and keeping the manure content so controlled is that sometimes it's hard to see where you've spread one load to the next because of the lighter color due to a better liquid consistency. The more consistent manure will also allow a farmer to be more effective in the crop production.

We have been able to keep our Total Nitrogen, Ammonium, Organic, and Total Potash well within Pennsylvania requirements and in turn manage the Total Phosphate levels at a very respectable amount.

I do believe that I could go on about how pleased I am with your product and how I truly believe that it has also had a positive effect on the overall production of the pigs we are responsible for growing for CVFF but that may start to bore you or others who may read this?

The bottom line is this. The MICROBE-LIFT product has the ingredients to positively effect the manure management of a facility. But, like anything else we do if you don't follow the program set up for your facility you probably won't get the results you should, or shall I say that your pigs and your help, and your neighbors, and your crops deserve!

I firmly believe that since I have started using the MICROBE-LIFT product that it has allowed me to create a much more positive atmosphere for anyone/thing involved directly or indirectly with our facilities. I would be glad to answer any questions or share any information that anyone may have regarding this product.

Thanks Doug for sharing your knowledge with me and getting me involved with your Microbe-Lift product!

Sincerely,

Matthew L. McClellan

For more information on MICROBE-LIFT® Technology contact
Ecological Laboratories Inc.
www.EcologicalLabs.com
T11402

Swartz Family Farm L.L.C. MICROBE-LIFT®/HOG Testimonial

Delbert & Deron Swartz

115 Delmar Lane
Thompsontown, PA 17094
717-463-4097- Fax
717-463-3466- Home
717-363-6844- Delbert cell

August 15, 2011

Swartz Family Farm is located near Thompsontown, Pa. We farm 400 acres and for the past 12 years have been a contract finisher with Country View Family Farm operating a 2180-head finishing hog barn with a deep pit volume of 800,000 gallons.

MICROBE-LIFT/HOG

We have used Microbe-Lift Hog for approximately 9 to 10 years.

Prior to the product's use we had surface crusting which resulted in a fly problem. We have seen improvement in less crusting and lower fly population which results in better herd health with lower mortality.

Our Service person has told us our barn has performed better than other similar barns. While a hog barn will always have odor we believe there is much less odor in the barn, but have really noticed less odor in the field application.

The manure certainly is more consistent from the first load to the last load out.

Unaware that we were using a product, our manure hauler noticed the consistency immediately when we first started using the MICROBE-LIFT/ HOG.

While we have not done any trials we believe the product use in the pit results in better nitrogen utilization by the crops.

I have heard other producers say it is just another expense in these challenging times but I believe it is a good tool in the overall management of the barn. I would recommend MICROBE-LIFT/ HOG to other farmers.

Delbert Swartz

For more information on MICROBE-LIFT® Technology contact
Ecological Laboratories Inc.
www.EcologicalLabs.com
T11403