NEW ORLEANS MOSQUITO & TERMITE CONTROL BOARD

2008 ANNUAL REPORT

Aedes aegypti

6601 Stars & Stripes Blvd.
New Orleans, LA 70126
(504) 658-2400
mosquitocontrol@cityofno.com
www.cityofno.com

Coptotermes formosanus

DIRECTOR'S REPORT

Annual report on the activities of the City of New Orleans Mosquito and Termite Control Board during the period of January through December, 2008

The following reports document the accomplishments of the employees of the City of New Orleans Mosquito, Termite and Rodent Control Board. Considering the post-Katrina circumstances under which we continue to operate, I cannot over emphasize that our employees have done a truly remarkable job this year.

Nuisance and potential disease vector mosquitoes and their related human diseases were at or below normal. Rodent activity and residential service requests continues to decline. We are seeing the results of intensive rat baiting pressure on these populations.

As has now become the new norm, termite and spider research and control has continued at a fast pace, producing both control of these pests and publishable data that can be used by our peers.

It is this writer's sincere desire and goal to be typing this annual report prelude behind his *new* desk in his *new* office in our *new* administration building in 2010.

Respectfully submitted,

Michael K. Carroll

Michael K. Carroll, Ph.D.
Director

ASSISTANT DIRECTORS'S REPORT
CLAUDIA RIEGEL

Employees:

Mrs. Pat Schultz retired in March of 2008. Pat began her career at the City of New Orleans 27 years ago. Pat was the backbone of our organization and made sure our bills were paid, our personnel issues were resolved, and much more. She was the first person that people would see every morning. She has been, and is, a phenomenal person and was a dedicated city employee. Pat would stay late and work extra hours in order to complete every job. She has become a close friend to many and we will miss working with her on a daily basis.

Our staff underwent several changes during the second quarter. Vanessa Logan transferred to the Health Department. In addition, our staff was reduced by an additional two people. Josh Osbey was hired May 15th as a Pest Control inspector 2. He worked for our department as a summer worker in 2005. In addition we hired Timmy Madere and Shaune Gilbert as Pest Control Inspector 2s in the fourth quarter of the year.

All four of our Mosquito Control inspectors, Kurt Agnelly, Ashley Freeman, Princeton King, and Tommy Thomson became certified with the Louisiana Department of Agriculture and Forestry in March 2008. They passed the mosquito pesticide applicator (8A) test. In addition, Joyce Brown and Ashley Freeman became certified in Rodent Control (8B).

In January and February, we had a college student, Isis Sanchez, from São Paulo, Brazil that interned with our termite and rodent divisions. She assisted the termite division in preparing laboratory experiments and conducting general lab maintenance. In addition, she assisted the rodent division by installing palatability studies in the field. She was responsible for data collection and data entry.

In March 2008, we had college students from several U.S. universities volunteer their time assisting in the recovery of New Orleans. We had approximated 30 students that spent a week with our mosquito and rodent divisions. These students assisted our inspectors with area-wide storm drain treatments and with swimming pools inspections and treatment. These volunteers were extremely helpful and we appreciate their time and dedication.

In 2006, we implemented a pilot study of a Performance Management Plan (PMP) for our employees. The goal of the PMP was to clearly outline expected outcomes and responsibilities of each employee in our organization. The PMP describes four to five major goals for each employee for the entire year. In addition, there are specific tasks that must be completed by certain dates in order to achieve success with their expected outcomes. In 2006, the pest control inspectors all received a PMP and the PMPs produced the expected outcome. The employee and the supervisor were clear on the expectations and the role of the employee in the overall direction of the NOMTCB program. The PMP has a midyear review and a final that coincided with the Civil Service evaluation forms. All 2007 evaluations (PMP and Civil Service) were completed by April 1st. In 2008, we continued with the Performance Management Plan.

We hired 12 summer workers this year. This group was the best summer crew we have ever hired. The students came from our local high schools and from local and state universities. Many students return each year and we had several veterans this year. We teach each person skills that they will be able to use in the future. We look for self-motivated, ambitious students. They are able to increase the overall productivity of our program during the summer months and they are also able to assist in special projects.

Facilities:

Biocontrol Laboratory

The mosquito biocontrol building (biolab) incurred major roof damage during Katrina. A FEMA project worksheet was completed for the roof and we are preparing the bid specifications for its repair. Water damage to the drop ceilings were repaired by LJ Kabel, our "do-it-all" Specialist 2. At that time LJ noticed that there was rodent damage in the attic.

Figure 1. LJ Kabel and Jimmy Jesse clean-up and repair the Biolab building.

Prior to Katrina, chickens were raised at the biolab for arbovirus surveillance. During that time, rodents entered the building and infested the building for a short time. The rodents were eliminated years ago, however, they caused some damage to the drop ceiling and ventilation system. In March, LJ Kabel and Jimmy Jesse removed the rodent droppings (Figure 1), replaced the water damaged ceiling tiles, and repaired the air conditioning ducts.

In addition, LJ has been working at the biolab each week since January to address minor issue such as leaky plumbing hardware, inoperable electrical outlets, and much more. LJ is a true asset to the City of New Orleans and we are fortunate to have him on our team! This year, the mosquito control updated the inventory of the biocontrol laboratory building (biolab). The Audubon Institute, with the help of our department, put in a butterfly garden at the biolab. LJ Kabel trimmed the vegetation on the property. Doug Rauch, from the Audubon Institute, was responsible for cleaning the building has maintained the building clean and organized. The biolab has never looked this good.

A nationwide search for a mosquito control pilot was initiated. Our current pilot will retire January 22, 2009 after many years of service to the City of New Orleans. We received 85 applicants for the position. The process of evaluating the resumes was started.

Lakefront Facilities:

We are still working from damaged buildings. Shortage of office space has been a problem since Katrina. Part of our staff is housed in an office trailer and at our offices at the Lakefront facilities. LJ, with the assistance of our inspectors has rebuilt temporary office space. They have done a tremendous job cleaning the building and constructing new offices in our damaged facilities. The receipts for the temporary offices have been submitted to FEMA for reimbursement.

Project worksheets for all of our facilities have been completed and the funding is in place. The amount of manhours spent on project worksheets and hazard mitigation has been daunting. Much of my time is taken away from our operations to deal with FEMA and State issues. A 404 proposal for the airplane hanger has been drafted in order to request funds for hazard mitigation that is not covered by the 406 mitigation found in project worksheets. The issue that slowed our progress in constructing new buildings has been the securing of a location where the building will be constructed. Dr. Mike Carroll, Ed Bordes, and I spent many hours inspecting potential properties and seeking approval from City Hall. We finally located a property at Leon C. Simon (Figure 2) for our administration building. A survey of the site was conducted (Figure 3). A project management company and an architectural company have been assigned to our department.

Until a suitable piece of property is located for a warehouse and the administration building is constructed, we will stay in our damaged buildings and office trailer.

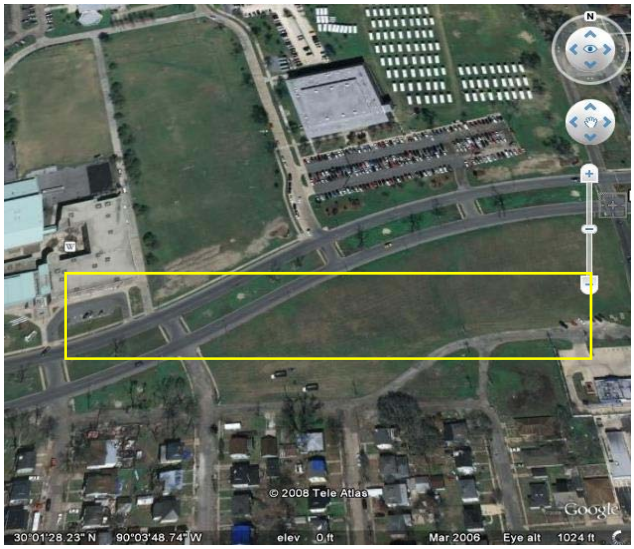

Figure 2. City of New Orleans property located at Leon C. Simon and Elysian Fields that will be the new site of the NOMTCB administration building.

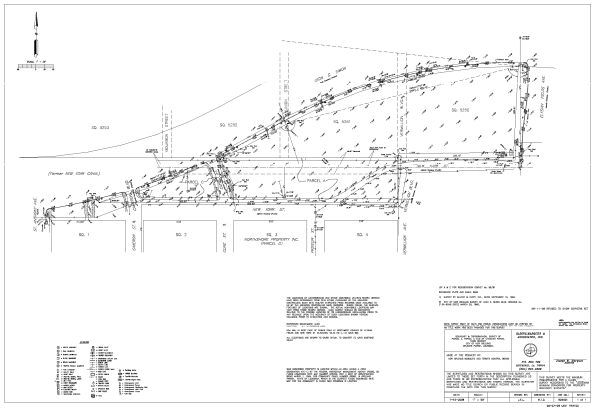

Figure 3. Survey conducted at the City of New Orleans property located at Leon C. Simon and Elysian Fields that will be the new site of the NOMTCB administration building.

Operations

Pest and disease related mosquito activity was at or below average for the entire year. Mosquito control functions concentrated on the inspection and treatment of abandoned swimming pools. The number of identified abandoned swimming pools in Orleans Parish has decreased, but this project is expected to continue for years to come. We provided a list of known swimming pools to the Health Department. In addition, we hired three summer workers with GIS capabilities. They verified the location and address of each known pool and plotted the information on maps that were also provided to the Health Department. The list and maps (Figure 4) were updated regularly and given to them several times this year. In addition, lists of abandoned lots and houses were also turned over to Code Enforcement.

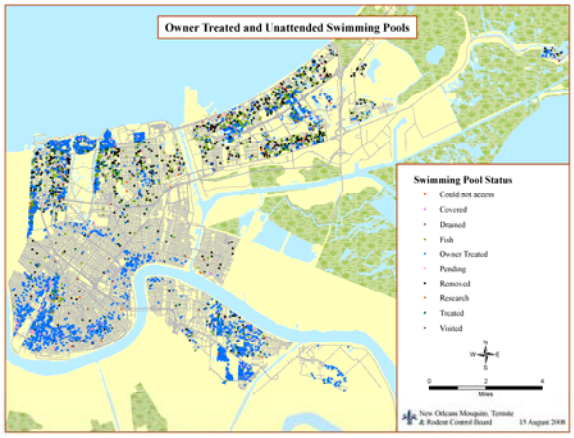

Figure 4. Map generated with locations of abandoned swimming pools. The maps constantly changes due to new pools located and pools being maintained by their owners.

Our rodent and structural control divisions continued to do an outstanding job in responding to ameliorating service requests. City employees from all departments call us to remediate pest issues. It has been a challenge to work with many departments to clean their properties, trim landscape, and remove trash and clutter. It often takes several visits and many communications to begin to make changes in habits and behavior. When the people at a particular building work with our group and follow our recommendations, we are successful and pest problems are remediated. Changing the mindset of the employees in city buildings from just spraying an insecticide to practicing an integrated pest management program will take time. In many departments, the shift has already begun.

Figure 5. Fumigation of the public works building at 838 S. Genois Street.

The public works building at 838 South Genois Street was fumigated after a high infestation of brown recluse spiders was discovered (Figure 5) during a routine inspection. Dr. Ellen Thoms and Dr. Joe DeMark of Dow AgroSciences traveled to New Orleans in order to assist with the fumigation. A bioassay using brown widow spiders was conducted during the fumigation. Eric Guidry (NOMTCB) collected the spiders and monitored the bioassays in the laboratory after several exposure periods. We thank the Public Works Department for their cooperation preparing for the fumigation and during long hours of the fumigation. We also would like to thank the New Orleans Police Department for providing security the evening of the fumigation. Due to everyone's cooperation, the fumigation was a success.

The termite division has had another successful spring and summer. There were new parishes that our staff confirmed the establishment of Formosan subterranean termites (FST). The group worked with pest control companies and mosquito abatement districts which assisted with these new reports. The termite division also surveyed parks and other municipal, state, and federal properties. Results of the work were presented at a Region 6 EPA meeting that took place in New Orleans.

Many requests for inspections were made in 2008 by the City of New Orleans departments. When there is god cooperation between the employees at the pest infested building and our department, we have seen exceptional success. Property Management and Parks and Parkways have been the most helpful.

An Integrated Pest Management (IPM) Program was initiated in November of 2006. Spraying or applying pesticides alone will not remedy pest problems. The goal was to implement an IPM program at City of New Orleans buildings. An IPM program implements a thorough inspection, identification of the pests, detailed recommendations to the property owner/manager, treatment and continued evaluations of the site. IPM incorporates sanitation, exclusion, mechanical control and chemical control to manage pests. The goal of the program was to reduce the amount of pesticides used, apply targeted treatments only when needed, save money for the City of New Orleans in man hours, equipment usage, and pesticide costs and to maintain a pleasant workplace for city employees.

In 2008, the Integrated Pest Management Program conducted over 65 inspections. The city buildings inspected and treated (if required) included the police headquarters and police stations, fire stations, New Orleans Recreation Department centers (NORD), City Hall, Civil/ Juvenile Courts, Criminal Court, Dental Clinics, and the City of New Orleans Main Library, and many more. Inspections revealed reoccurring problems including the presence of clutter and unusable items stored improperly (Figure 6) and grass/ weeds over 18 inches in height. Trash and debris were found in and around buildings. Construction materials improperly stored created potential rodent harborage. Available water in cleaning buckets and faucet leaks provided a water source for rodents (Figure 7). Vegetation and trees in close proximity or touching buildings created bridges for rodents and pests to gain access to structures.

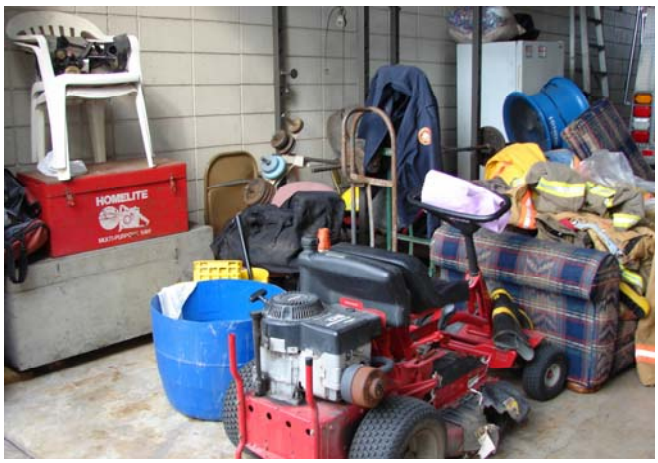

Figure 6. Items stored improperly cause harborage for pests.

Figure 7. Leaks and standing water were a reoccurring problem that contributed to rodent infestations.

Hurricane Activities

The NOMTCB secured equipment, vehicles, and buildings for hurricanes Gustav and Ike in the weeks of Sept 1 and Sept 8. Everyone worked together several days prior to the evacuation. Most of the equipment, computers, and papers were stored at our laboratory space at the were stored at our laboratory space at the USDA. No damage was sustained to any vehicle or any of our equipment.

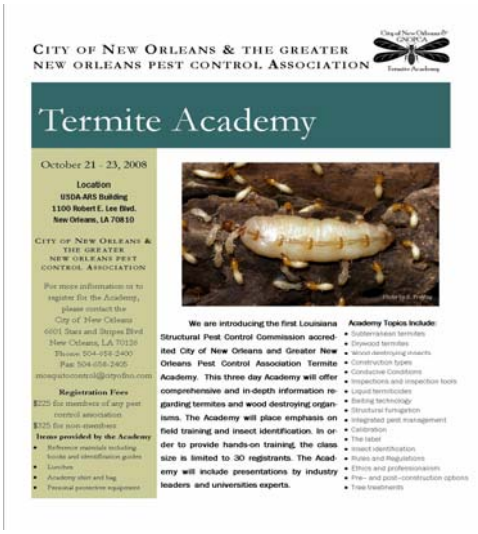

Figure 8. Termite and Pest Control Academy announcements.

Education and Extension

Joyce Brown (Rodent control supervisor), Ed Bordes, and I traveled to New York City in May to participate in the NYC Health Department's Rodent Academy. The Academy was taught by the world renown urban rodentologist, Bobby Corrigan. Participating in the Academy improved our rodent control knowledge. When we returned to New Orleans, we made several changes in our operations that have improved our success in managing rodents.

Ken Brown, Ed Freytag, Ed Bordes, and I have spent a significant amount of time researching other Pest Control and Termite schools across the United States. We have received valuable information from University of Georgia, Oklahoma State University, Orkin, and others. New Orleans Mosquito and Termite Control Board and the Greater New Orleans Pest Control Association will offer a comprehensive and in-depth academy regarding termites (Figure 8) and an academy regarding general pest control (Figure 8). The Academies will placed emphasis on field training and insect identification. The class size was 22 in each Academy.

Dr. Mike Carroll and I attended the American Mosquito Control Association (AMCA) annual meeting in Reno, NV. I presented a scientific paper about the research regarding the unattended pool project our mosquito group has been conducting. We also attended the meeting because the 2009 AMCA meeting will be in New Orleans. Mike and I are on the local arrangements committee and will be assisting the AMCA with the meeting and extramural activities.

Dr. Mike Carroll was also able to verbally secure New Orleans for the 2013 International Society for Vector Ecologists Meeting. This meeting will bring several thousand mosquito control professionals to New Orleans.

MOSQUITO FIELD OPERATIONS
STEVE SACKETT

New Orleans was fortunate again this year to have relatively low mosquito populations and only two reported case of human West Nile virus with no deaths. Mosquitoes were collected weekly from 14 gravid trap sites and tested from March 31 through October 28. Mosquitoes positive for WNV were identified from seven of those sites (Table 1), but infection rates for mosquitoes remained below the threshold associated with virus transmission to humans (Table 2). A minimum infection rate (MIR) greater than 6 is typically observed in areas where WNV transmission to humans is occurring. Noting the case mentioned above, it is obvious that sufficient sampling is critical to detecting virus activity, and that there are generally exceptions to every rule.

Fog trucks were utilized when necessary to reduce localized problems for both pest and vector mosquito species, but our insecticide usage for the year is one of the lowest on record (Figure 9). Aerial adulticiding treatments were not conducted this year due to difficulties replacing parts of the insecticide spray system on our Islander airplane. Intergovernmental cooperation agreements in place with St. Tammany, East Baton Rouge, and Calcasieu parishes would have allowed for aerial adulticiding treatments had they been necessary. High tides and rain from hurricanes Gustav and Ike hatched some small broods of floodwater and container-breeding mosquitoes, but the huge populations of *Aedes sollicitans* and *Culex salinarius* that have plagued us in years past did not occur.

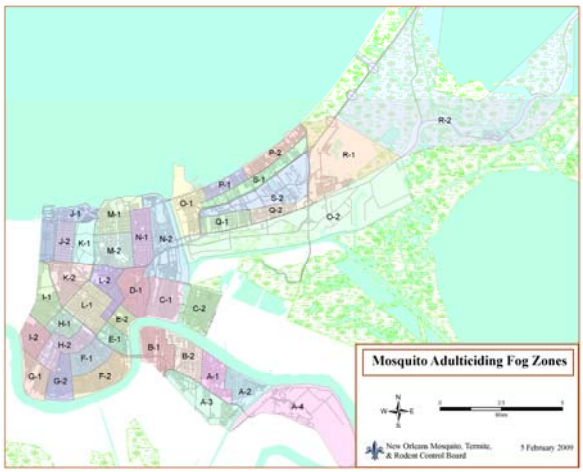

Figure 9. Fog zone map of the City of New Orleans generated by Mark Mitchell, a summer intern.

Figure 10. Source reduction at the corner of Robert E. Lee and Marconi.

We continue to inspect and treat abandoned swimming pools but are now finding a high percentage that have been placed back into service, have locked gates, or have been filled with soil. Re-inspections indicate that mosquitofish have survived in the majority of the pools, but some do require additional stocking. We conducted water quality tests to see if there are any pools that were not able to support fish populations. Some of the parameters checked were dissolved oxygen, pH, temperature, salinity, water depth, turbidity, nitrogen, and chlorine levels. It is believed that the majority of fish kills are due to bleach or other toxic substances placed in the pools by owners or neighbors. Signs were placed next to the pools to inform the homeowners that NOMTCB had placed fish in the pool.

Fish were also stocked into two large swales to minimize mosquito production. One of the swales located at Marconi and Robert E. Lee Blvd was ditched and drained by our source reduction crew with great success (Figure 10) The other swale is under surveillance and will also be ditched if it is not filled soon.

Our source reduction crew has also been involved in a successful aquatic weed control program, treating water hyacinths and water lettuce in the City Park lagoons. These weeds provided habitat and security for large concentrations of *Mansonia titilans* and various *Culex* species. *Mansonia* is unique in that it uses a modified air tube to pierce the roots of aquatic vegetation to breathe. This species has disappeared from the park following the elimination/reduction of the aquatic weeds.

Table 1. POSITIVE MOSQUITO POOLS

Date of Collection	Pool #	Site	Type	Species
5-06-08	67	Kim Dr.	WNV	Cx.q.
5-28-08	122	Louisiana	WNV	Cx.q.
6-10-08	152	Jay St.	WNV	Cx.q.
6-24-08	186	Gen. Meyer	WNV	Cx.q.
7-29-08	291	Gen. Degaulle	WNV	Ae.alb.
8-26-08	256	Harrison	WNV	Cx.q.
8-26-08	257	Harrison	WNV	Cx.q.
9-16-08	393	Paris Ave.	WNV	Cx.q.

Table 2. NEW ORLEANS MOSQUITO POOLS

Minimum Infection Rate (MIR)

Date of Collection	# Positive Pools	# Mosquitoes Tested	MIR
5-06-08	1	176	5.7
5-28-08	1	503	2.0
6-10-08	1	577	1.7
6-24-08	1	479	2.1
7-29-08	1	465	2.1
8-26-08	2	836	2.4
9-16-08	1	532	1.9

MIR = (# positive pools/# mosquitoes tested) x 1000

Our annual survey of buck moth caterpillars (Figure 11) continued into 2008 with results very similar to 2007. Figure 12, the buck moth chart, illustrates the moth captures and the percentage of the oak trees that were positive for caterpillars. Caterpillars were observed in 97% of the trees that were examined. Buck moths and caterpillars were dense in some areas, but populations in general were still significantly below those observed in the late 1980s.

Figure 11. Fourth instar Buck moth caterpillar (*Hemiluca maia)* feeding on live oak tree.

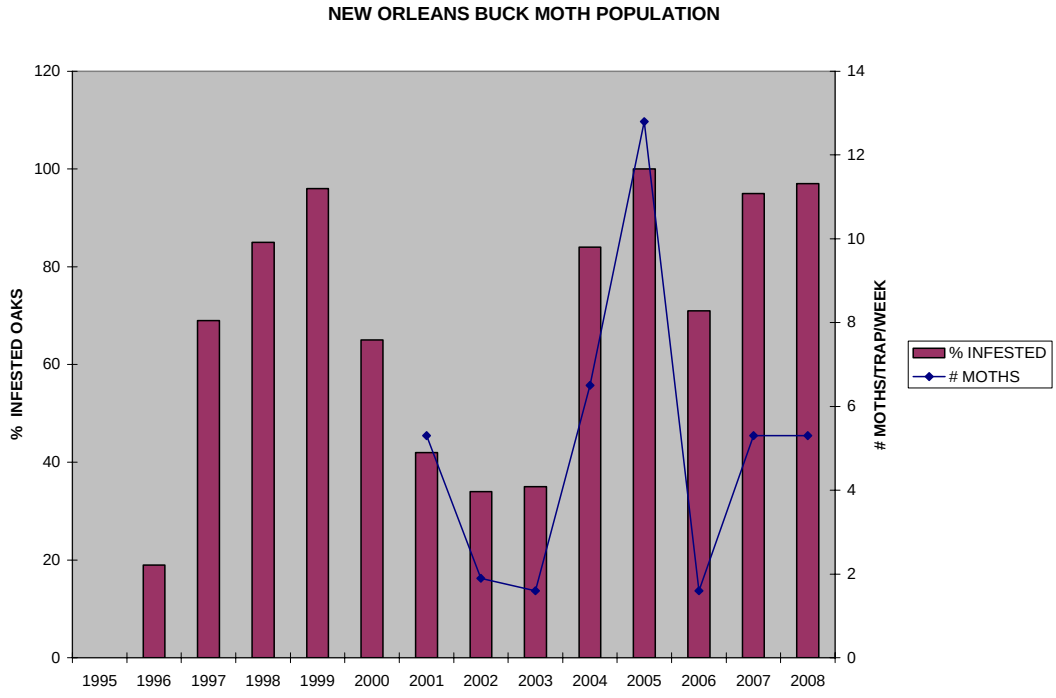

Figure 12. Buck moth populations from 1995-2008.

BIOLOGICAL CONTROL
Greg Thompson

Hurricane Katrina drove out the city's population and rendered much of New Orleans uninhabitable. One of the myriad problems left in the wake of the storm was the large number of abandoned swimming pools that, if not treated by mosquito control personnel, had the potential to create both a massive mosquito problem and a possible public health crisis. NOMTCB launched what is probably the largest biological control project ever attempted in an effort to make the outdoors livable and safe for our returning population. Swimming pools and ponds that were not maintained by homeowners were located and their mosquito production controlled through the introduction of a small native omnivorous fish, *Gambusia affinis* (minnows).

Our staff had located slightly more than 5,600 pools as of January 1, 2008. This number has grown to over 6,100 during 2008. A total of 900 more pools were actually located in 2008 but, just as last year, the merging of duplicate entries for previously located pools offset half of these newly located pools in the total. Many pools were located multiple times because houses and even entire blocks of houses continue to lack address numbers. Subsequent visits, using a printout of our database, have begun to discover these multiple entries and eliminate them. The percentage of pools that were either being maintained by their owners or had been removed since our initial visit has grown to nearly four of every five pools. This is a significant year-to-year increase in the percentage of pools that are no longer a threat to produce mosquitoes. In 2007, owners were maintaining or had removed less than two-thirds of the pools we visited. This is great news in the sense that people continue to return to New Orleans. Unfortunately, this still leaves about 20% of the pool-owning population that has not returned more than three full years after Katrina and it leaves approximately 1,500 known pools that will need to be visited one time a year or more for the foreseeable future.

NOMTCB and the city have been lucky in one way regarding these unattended pools. The pools have produced few mosquitoes during warm weather when the threat of mosquito-borne diseases is greatest and large numbers of mosquitoes after the weather has cooled and the threat of disease has lessened. As everyone knows, we have nine months of warm weather in New Orleans. This pattern of high mosquito production during cooler weather may be the result of the larvae-eating insect predators that have established themselves in these pools since the storm. A steep decline in insect predators in the winter probably permits mosquitoes to develop into flying adults. Fish, when present, continue to consume and control mosquito larvae throughout the winter. We have conducted operational research to determine the dynamics of the newly created ecosystems.

Aerial photographs of New Orleans were already being used to locate pools and these pre-hurricane photographs were of great assistance in locating pools that were not visible from the street. However, awnings, pool covers and our city's wonderful live oaks obscured many pools from view. The hurricane destroyed awnings, removed pool covers and stripped leaves from those trees it did not uproot. Aerial photos taken post-hurricane have exposed many more backyard pools. We continue to locate additional pools each time newer aerial photos of the city become available.

The lessons we have learned during our large scale efforts to prevent abandoned swimming pools from producing massive numbers of mosquitoes seemed, until recently, to be of little more that local interest. The bursting of the real estate bubble, however, has now presented many cities with large numbers of abandoned homes with hidden backyard swimming pools. Similar methods will be required in these locations to reduce potential health risks to residents.

It has been our pleasure to work each year with one or more gifted high school students on their state science fair projects. This year we again helped a talented student conduct a short research project that should win honors at the state level.

VECTOR RODENT CONTROL
Joyce Brown

City Properties:
During the months of January through December of 2008, New Orleans Vector/Rodent Control surveyed and treated the following city or state buildings each month: Municipal Auditorium, Treme Center, Café du Monde, Woldenberg Park, Police Headquarters, Moonwalk, City Park, Tulane Hospital, Lee Circle, Main Bus Station, City Hall, Civil/Juvenile court building, River Walk, Main Library, Charity Hospital, and University Hospital, and selected fire stations, police stations, and NORD facilities. City facility inspections and treatments are conducted on an ongoing basis with additional follow-up for individual incoming department service requests. An emphasis was placed on educating the individuals at City properties regarding specific things they can do to manage the pest problems such as reducing clutter and improving sanitation practices.

Service Requests:
During the months of January 2008 through December of 2008, New Orleans Vector/Rodent Control Program received complaints by e-mail 311, and calls to the Rodent Control office (78 of the 1,659 complaints were residents that called multiple times). All complaints were followed with inspections and treatments as required. Of the 1,659 complaints 334 residents had rodent activity on the property, 599 rat burrows were treated, and 651 bait packs were placed inside the rat burrows. A total of 4,789 storm drains were treated. When serving request form for rodents, the inspectors record all vacant lots and vacant houses that are in violation under the city code, this form is turn in to their supervisor and then reported to Environmental Enforcement; the inspectors continues to distribute literatures, ant bait and other incentives to educate the public on eradicating rodents.

Area-wide Treatments:
Rodents: In March and April of 2008 rodent inspectors and volunteers treated storms drains in the downtown and uptown area for management of rats. The areas were selected based on rodent activity observed (burrows, droppings, live rodents) and elevated incoming requests for service. The inspectors evaluated the bait for consumption 14 days after application in the storm drains (Figure 13).

Red Imported Fire Ants: Rodent inspectors treated red imported fire ant mounds in the Uptown area prior to carnival parades. The areas included: Tchoupitoulas, Napoleon, and St. Charles to Lee Circle. The inspectors treat this area once a year.

In the month of May, rodent inspectors re-inspected and re-baited 271 storm drains in the uptown area, 11 storm drains were reported broken or clogged. The rodent inspectors assisted in the termite treatment of buildings in the French Quarter (the Supreme Court Building, The Artillary Park, 517 N. Rampart St. and the Mint building). These building were treated for termites once a month.

Between June and August 2008, rodent inspectors, along with summer interns, Mary Green, Adharsh Ponnapakkam, (Figure 14) and Elise Hepting (Figure 14), began a project trapping rodents to evaluate the prevalence of ectoparasites and rodent-borne viruses in the rodent population throughout New Orleans. This was a cooperative project with Dr. Dan Bausch of Tulane University that will continue into 2009. This project included trapping along the River Walk which is located along the Mississippi River, and throughout scattered neighborhoods in the city where residents complained of rodent infestation.

Figure 13. Gail Brooks, (from front to back) Princeton King, and Brooks Hartman prepare rodenticide to bait storm drains.

Figure 14. Summer workers, staff, and Tulane University student who were involved in the summer trapping project.

Blood and tissue samples were collected from the rodents. The tissue and blood samples were taken to Tulane for cryogenic storage**.** Ashley Freeman, Pest Control Inspector 2, has taken the lead on the trapping projects after the interns left. This project will be continued in 2009. Ashley has done an excellent job taking the lead on this and other rodent projects.

Career Development, Cross-Training, and Public Education:

Rodent control inspectors attended classes through Civil Service (Business writing, public speaking/oral presentation, Introduction to Supervision & Introduction to Workplace Discipline for First Time Supervisors). These courses enhanced the inspectors in performing their duties.

Rodent control inspectors attended the City of New Orleans' defensive driving class at the Municipal Training Academy located at 401 City Park Avenue to reinforce safe driving methods. Rodent control inspectors attended the City of New Orleans Greater New Orleans Pest Control Pest Control Association Termite Academy in October and the Pest Control Academy in November.

I attended the New York City Rodent Academy conducted by Dr. Robert Corrigan, an urban rodentologist. The training I received in New York City was implemented in New Orleans' rodent control program. The training and the rodent control methods I learned in the Rodent Academy enhanced the rodent control offering provided by the City.

The rodent control inspectors are continually being trained in Mosquito & Termite duties, along with learning different software to improve computer skills in (Microsoft Excel) data entry and charts.

Each employee had a Performance Management Plan (PMP). The PMP had clear work objectives for the employee for the 2008 evaluation year. The PMP was a joint effort of the employee, the employee's supervisor, and the Assistant Director. Five goals for the 2008 year were clearly described. In addition, line items were included with deadlines in order accomplish the five goals.

AVIATION
Joseph Riedl

This year started out as usual. Public notice was given for our intentions to continue aerial spraying for mosquitoes over Orleans Parish. A plan of operation was submitted to the F.A.A. along with the reciprocal spraying agreement between Orleans, East Baton Rouge, St. Tammany, and Calcasieu parishes. The insurance policy was renewed. Plans were formulated for the upcoming adulticide season.

Maintenance continued on the twin-engine Islander. A new battery was installed on the airplane. The emergency locator battery also was replaced. Several air worthiness directions (mandatory F.A.A. requirements) were compiled. New spark plugs were installed on the engine. Four worn brake hoses were replaced. Engine hot air intake ducting was replaced. Cracked tubing that connected the manifold pressure gauge to the intake manifold was changed. A spray pattern guidance system has been installed on the airplane. New pesticide tanks are being worked on for installation to replace our twenty-five year old units. This should solve the spraying system clogging problems. A 100 hour and annual inspection was completed. Preventive maintenance was accomplished. Maintenance on the hanger and ground support equipment was carried out. An overhaul facility for the tug was carried out. An overhaul facility for the tug was located. The F.A.A. inspected the Islander and our maintenance operations. All log books and records were included.

F.A.A. regulations were complied and necessary paperwork was kept up to date. Pilot requirements were met. Inspection authorization was renewed. The airplane was evacuated to Jackson, Mississippi to protect it from hurricanes Gustav and Ike.

I will be retiring next January after 18½ years of service to the City of New Orleans and 6½ years with St. Bernard Parish (Figure 15). A nationwide pilot search was initiated. We received applications from 85 pilots. Currently, the applicants are being reviewed and two pilots have been interviewed. More interviews are scheduled for the first two weeks in January.

Figure 15. Joe Riedl and NOMTCB's twin-engine Britten-Norman Islander.

TERMITE ENTOMOLOGY
ED FREYTAG

Computer and communications issues

I have been responsible for purchasing and maintaining the computers for the Mosquito, Termite and Rodent Control personnel since our audio-video specialist retired several years ago. Since we have not had timely and satisfactory responses from MIS (the department that oversees the City computers and networks) when requesting assistance, I have used my limited computer skills to keep our desktops and laptops operating. It has been at times rather challenging because computers problems can be attributed to either software or hardware or a combination of both, and it may take hours or days to determine the problem and eventually fix it. Most of the computers purchased in 2005 or before are now out of warranty, since we usually purchase a three year repair term. When our old computers have hardware problems it's probably going to be more economical to replace a three year old damaged computer out of warranty than to have it serviced. We purchased seven new Lenovo/ IBM laptops but now we also have to purchase MS Office 2007 since we don't have enough licenses to install the 2003 version, and it's no longer available for purchase. We hired a computer specialist to take over the computer maintenance in 2009, so I am looking forward to focusing on termite research and photography.

In preparation for the possible arrival of hurricane Gustav, sensitive and expensive equipment was moved from the trailer, the airport buildings, and the Biocontrol Laboratory in east New Orleans to higher ground or to the USDA building office where damage would not occur in case of flooding. All electronic equipment, including computers, printers, monitors, copiers and laboratory equipment were disassembled and stored at the USDA building in the offices and laboratory space assigned to us. Although Gustav caused widespread power outages and most of the personnel evacuated for several days, our facilities in New Orleans did not experience any damage. Still, we felt that we had spent too much time and money invested in replacing the equipment that we lost during the flooding from hurricane Katrina to take any chances. All the equipment was returned to the offices, but I lost several days of work just returning the equipment and installing all the computers and accessories. We have labeled all the computer equipment with the user's name so that it will be easier to remove and then return them to their right office in case of another evacuation.

I assisted in the development, implementation and maintenance of termite, mosquito, and rodent inspection databases using Filemaker Pro software. One of the most important aspects of designing a database is to brainstorm how the information is going to be queried and analyzed. The information fields must be extremely explicit in order to produce the reports or answer the specific questions after the data has been entered. We have found that the best way to design a database is to work backwards: design mockups of the report and summaries and then build the database structure based on those designs.

Inspections

The head coach of the New Orleans Lakeview Soccer Association complained that red imported fire ants were stinging the players and coaches during practice. We inspected the soccer fields and found that the fire ants had taken over the green space. We responded by donating twenty-five bags of granular ant insecticide to their soccer association to help them control fire ants in the soccer fields in City Park off Marconi Drive and Harrison Avenue. Their groundskeeper applied the granular insecticide using a spreader, but it was only enough to treat one field. We provided them with a pallet (approximately 80 bags) of ant granules to treat all five soccer fields.

Since hurricane Katrina we have been collecting carton nests from trees and dissecting them to try to locate a queen. Homeowners or tree cutters sometimes call us to let us know that they found termites inside the trees and want us to come and inspect them. We rarely find a Formosan subterranean termite queen even though we have inspected plenty of trees. Finding a queen is like finding buried treasure and we get very excited about it. We were able to recover a large carton nest and brought it to the laboratory at the USDA building. During the dissection we found several small queens, and they were all tertiary, or ergatoid reproductives (Figure 16). They are highly uncommon in Formosan subterranean termite colonies, so this was a great find. The Formosan subterranean queens were placed in alcohol and saved as voucher samples.

Figure 16. Tertiary, or egatoid reproductives, found in carton extracted from a live oak.

Usually when we travel out of state we tend to inspect structures and trees looking for termites or other insects. During a visit to Dr. Brian Forschler's laboratory, professor of Entomology at the University of Georgia in Athens, I inspected a Walmart store with one of his graduate students and found one brown widow spider and several egg sacs. The first Georgia state record was previously published by our Principal Research Entomologist, Dr. Ken Brown. I also found a brown widow spider in the University of Southern California campus in Los Angeles while visiting the university. We have both samples in our permanent voucher collection.

Several sites were inspected for Formosan subterranean termites, termite damage or conducive-conditions as requested by either City officials or to assist the pest control industry. Some of the most interesting sites included the Orleans Parish Prison, where, besides having live Formosan subterranean infestations, there were also brown recluse spiders in the ceiling joists; a three-story building under renovations at 814 St. Philip that, because the owner lives out of town, has been producing Formosan subterranean termite alates for quite some time; and a historic mansion located on 1749 Coliseum St. that was home of the famous New Orleans writer Grace King in the early 1900s (Figure 17).

Figure 17. Historic house where Louisiana-native writer Grace King once resided.

Over the years we have tested and purchased many specialized detection tools to help us find live termites, damage, or moisture. Among these are the Videoprobe flexible boroscope, the infrared camera, and an acoustic detection device. Even with these instruments we realize that we can't always find live termite infestations in buildings, especially in the French Quarter, due to the type of architecture and construction. Many new instruments are being tested by private companies, government agencies and universities, and this year we assisted a university scientist in a study to detect vibrations in buildings using laser technology. The laser technology was marginal at best at discovering termites. So far we have not found a stand alone tool that we can rely on to find live termites with a high degree of confidence.

Operational Research

The protocol for an industry sponsored study to test the efficacy of the Advance termite bait system was modified in 2008 to place bait stations around live trees instead of placing bait stations around tree stumps. A five-gallon bucket was buried next to the infested tree to provide an untreated area to monitor the termite population (Figure 18).

Figure 18. Carrie Owens (Entomologist I) and Chad Vignes (summer intern) excavating soil for the installation of a five-gallon bucket next to an infested tree.

One of the main reasons for switching to live trees was that the Formosan subterranean termites abandoned the tree stumps once they consumed all the wood, and secondly, most of the tree stumps were mechanically ground up by contractors or by the Parks and Parkways department. A total of 29 trees were selected and prepared with bait stations and buckets for the study, but only 16 will be included in the study (10 baited and 6 controls). Some of the bait installa-

were infested with crazy ants and we had to abandon the sites because they forced the termites away from the buckets and stations. In some locations the trees selected were less than 200 feet apart and we were infested with the same colony, determined after releasing termites marked with blue or red dye. We are also conducting consumption trials in the laboratory and in the field to test different bait matrix designs for the Advance termite bait system. One setback has been designing a testing procedure for maintaining moisture in the bait matrix and to prevent contamination of the matrix with the sand-vermiculite mixture used as a habitat media. A prototype design using Petri dishes connected with Tygon tubing was tested and found that the putty used to connect the tubing did not restrain the termites inside the Petri dishes. Different types of adhesives and caulking are now being tested for this study.

Several trees were inspected with the Videoprobe for Formosan subterranean activity for a cooperative study with Dr. Maureen Wright, research microbiologist working with USDA-ARS Operation Fullstop. The infested water oaks were treated in May with a fungal spore solution by injecting the material using a foaming machine through access holes drilled into the trees (Figure 19). Unfortunately we discovered that all the trees were cut down and ground up when we went back to inspect them in the fall. We are planning on treating another set of trees in 2009 but will try to select trees that are in better health so that they won't be cut down during the duration of the study.

Figure 19. Injecting a foam solution containing fungal spores into an infested tree.

Photography

This year we purchased three digital SLR cameras from Nikon. We found that the small point-and-shoot cameras are convenient to carry, but there are times when they are too many limiting, especially when trying to take a close up picture of insects or damage. We also purchased a specialized macro-photography flash kit which allows the photographer to take more three-dimensional pictures of an insect as opposed to the flat-look from a single flash from the camera, as demonstrated in the pictures of a mastisfly in Figure 20.

Figure 20. A manstisfly photographed using Nikon's double-flash setup and a 100mm macro lens.

I was also asked to take detailed pictures of our aging airplane tug and email the pictures to the manufacturer to try to obtain parts to repair the unit. Even with serial numbers, it is difficult to determine what parts were used in the tug, but with the pictures the manufacturer can see what carburetor or engine parts may be needed. I also shot pictures of the Britten-Norman Islander airplane chemical tanks because the old new tanks were manufactured differently than what was installed originally. We emailed pictures to the manufacturer of the old tank's mounting bolt bracket which is missing in the new container so that they can correct the mistake in manufacturing the tanks.

We also purchased two consumer-grade video cameras and a professional-grade video camera. The Canon FS10 is a small hand-held video camera which records in its internal 16 gigabite memory chip, but also has a slot for a SD card. This allows the camera to record up to five hours in the lowest resolution and 2 hours in the highest resolution. The F100 is extremely easy to use, inexpensive, and very portable, making it convenient to carry around. Because it's all-digital, the video can be transferred directly to a computer via USB cable where it can be edited with the included software.

via USB cable where it can be edited with the included software. It also has no moving parts for recording video, so we should have less maintenance problems with these type of units. The Canon XL2 also records in a digital format, but it uses mini DV tape and can record up to one hour per tape. This camera was chosen because it has an adapter accessory that allows mounting any of the professional digital lenses available for the Canon SLR cameras. We chose no to purchase HD (high definition) cameras because the video is more difficult to edit and requires more powerful computers and larger and more expensive storage devices.

The Keyence VHX-600 digital microscope was not purchased in 2008 as the funds were not available. We are planning on purchasing it in early 2009 to use for insect identification and for taking extreme close-up pictures of insects, such as the example of a close-up of the underside of the head of a Formosan subterranean termite (Figure 21). The microscope was able to capture the fine detail of the setae on the head and antennae, which demonstrates the excellent resolution of the lens. We are also planning on publishing a photographic key of the adults and larvae of the mosquitoes of Louisiana, similar to the Termites of Louisiana publication by Matt Messenger.

Figure 21. Close-up detail of the ventral side of the head of a Formosan subterranean termite obtained with the Keyence VXH-600 digital microscope.

KENNETH S. BROWN AND CARRIE OWENS OPERATIONAL TERMITE RESEARCH, EXTENSION, AND EDUCATION & TRAINING

Introduction

Two thousand and eight was a tremendously productive year for the termite division. None of the accomplishments listed in this report would have been possible without the hard work and dedication of our staff: Ed Freytag (Research Entomologist), Barry Yokum (Lab Specialist 1), Carrie Owens (Entomologist 1), Perry Ponseti (Pest Control Specialist 2), Barry Lyons (Pest Control Inspector 3), Jamie Ward (Pest Control Inspector 2), and Eric Guidry (Pest Control Inspector 2). I am very grateful for and proud of the job they do day-in and day-out. I am also proud of the optimism, professionalism, and commitment exhibited by our group during adverse situations such as preparations for and recovery following hurricanes Gustav and Ike.

I would also like to recognize Josh Osbey, Timmy Madere, and Shaune Gilbert who we welcomed to our group in 2008. All three were hired as pest control inspectors; Josh in May and Timmy and Shawn in December. They have all begun to apply their talents, skills, and abilities to our department's operational research and pest control operations. Josh has quickly learned the PestPac system and Timmy and Shaune bring pest control and safety experience to our department. Two additional accomplishments/ recognitions from 2008 bear repeating here. First, in August, Carrie Owens was awarded the Sarah Bradley Tyson Memorial Fellowship ($1,000) which recognizes women who have displayed outstanding scholarly achievement in science. Second, Barry Yokum was identified by our "new" Dow representative, Joe DeMark, as the best cooperator in his region (Midwest U.S.). We are very proud of both of these accomplishments.

Historic and City Owned Properties

Termite activity was identified and remediated at multiple historic buildings/trees and city owned properties in 2008. Among them are the Old U.S. Mint, the French Market "Red Building" (1008 N. Peters St.), the Upper Pontalba apartments, the Lower Pontalba apartments, Perseverance Hall, Chalmette Battlefield administration building, the Old Algiers Courthouse, the Almighty Oak, the Isaac Delgado Oak, the Dreyfous Oak, the McDonogh Oak, and Jackson Square trees (Figure 22).

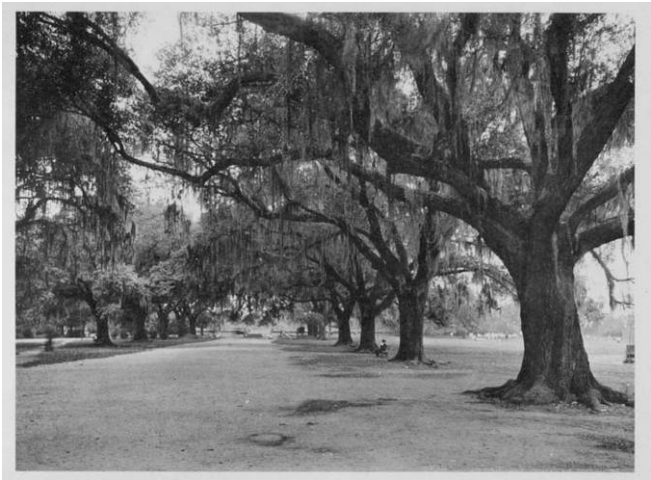

Figure 22. Historic photograph of New Orleans' live oaks.

NOFD Fire Headquarters (317 Decatur St.), Fire Station #7 (Basin St.), Fire Station #20 (Opelousas Ave.), Orleans Parish Prison, New Orleans Criminal Courthouse, Rosedale Police Station (801 Rosedale), and Milton H. Latter Memorial Library. Each of these instances represents a considerable savings to the city of New Orleans in reduced remediation costs and prevention of potential repair costs. A few examples are given in the following paragraphs.

The Upper and Lower Pontalba apartments, the oldest apartments in the U.S., are arguably among the most recognizable of New Orleans' historic structures. New termite activity was identified in each of these buildings in 2008. We have controlled the termites in this building for the past 10 years. NOMTCB inspectors identified Formosan termites in two third floor apartments in the Upper Pontalba building in October and November of 2007. The termites were tunneling through and feeding on floor boards and were visible through the floor's clear finish. Above ground bait stations were installed at that time. The colonies continued to consume bait through April of 2008. The amount of bait consumed indicates that the colony feeding on the structure may have been of considerable size. No subsequent termite activity has been noted during monthly inspections from May of 2008 to date. In October of 2008, termite activity was

identified in an apartment in the Lower Pontalba building. However, the termites were not subterranean (Formosan or native) but drywood. Specific aspects of drywood termite biology make utilizing baiting systems and soil treatments ineffective. These issues were discussed with building managers and wood removal during renovations was identified as the optimal remediation option. NOMTCB will continue to monitor the situation in the coming year.

Fire station #7, 1441 St. Peter St., is another example of an historic, city owned property with extensive termite activity which was remediated by our group in 2008. This building has had a history of termite activity. Our group utilized the structure for independent and industry supported research. In May, above ground station and in-ground bait stations were used to eliminate termites from the building. In the end, the property provided valuable information for us regarding termite detection tools and provided a location for field testing new industry developed control methods. The termite activity was eliminated from the building, we continue to expand our industry revenue, and our staff remains on the forefront of termite control technologies. The building was incorporated into the PestPac system in August. It will continue to be monitored for subsequent termite activity.

Figure 23. Eric Guidry inspects a passive sticky trap at public works administration building with multiple brown recluse spiders.

Our group continues to expand our involvement in general pest inspections and remediation. This summer our inspectors identified a sizable infestation of *Loxosceles reclusa,* the brown recluse spider at the public works administration building, 838 S. Genois St. We were originally called to the site for an ant infestation. Inspectors identified the spiders on passive sticky traps set out to monitor ant populations (Figure 23). The decision was made to fumigate the building. A bioassay to determine efficacy rates or sulfuryl fluoride on brown widow spider, *Latrodectus geometricus* egg sacs was conducted during the fumigation. The information from this bioassay represents the only such information for the egg sacs of this introduced and locally abundant spider. The results of the bioassay indicate that although the highest rate of sulfuryl fluoride significantly reduces the number of successful hatches and the number of surviving spiderlings within successful hatches, it is not 100% effective against brown widow eggs. Again, the benefit was multiple. The recluse infestation was eliminated, our group gained valuable experience in the area of structural fumigation, and novel pest management data was gained.

In addition to these sites that did have termite activity in 2008, we continued to monitor for new activity at multiple additional city owned buildings and green spaces and historic buildings and trees. Preventing damage to these properties and the thousands of dollars in potential repair costs is one of the termite division's top priorities. Our inspectors take this responsibility seriously and do an outstanding job ensuring that the sites are regularly monitored and any new termite activity is eliminated efficiently. They also do a great job talking to property management and building maintenance personnel about ways to remediate conducive conditions.

Operational Research

The termite division continues to conduct multiple operational research projects. The goals are to gain a better understanding of pest organism biology, treatment and detection tool efficacies, monitor for introduced pest of urban/medical importance, and monitor the populations of established pest species. Information gained from these studies allows us to more effectively manage pest populations, provide accurate and up to date information to the public regarding pest populations, and garners recognition for our organization as leaders in the area of urban pests. The following paragraphs provide examples of some of our operational research efforts.

Inundation Project - Laboratory:

Microsatellite genotyping of FST samples to determine colony survival and movement before and after flooding has been completed. Microsatellite genotyping was performed on pre- and post- flood

samples from selected areas of the city. There were a total of 20 colonies evaluated for this study. Three were from the French Market, which did not flood and acts as a control. Three were from City Park Pan American Stadium, five were from the islands in Old Bayou Metairie, two were from Tad Gormley Stadium, and four were from Louis Armstrong Park. There was one colony each from Parks and Parkways, Pump Station 7, and City Park South Course. It was originally determined that several in-ground monitoring stations at City Park Pan American Stadium and the French Market were occupied by different colonies before and after the flood. However, these samples were re-evaluated and it was determined that these in-ground monitoring stations were occupied by the same colonies pre- and post-flooding.

Therefore, it was determined that the colonies occupying in-ground monitoring stations prior to flooding were the same as those that were active in the stations following flooding for each location evaluated. This suggests that subterranean termite colonies were able to survive heavy inundation for extended periods of time. It also suggests that any movement of these colonies during inundation is limited. The mechanism by which they were able to survive is not yet well understood.

Figure 24. River batture study site near the Endymion Den before flooding (left) and at peak flooding (right)

Inundation Project – River Batture:

To determine FST colony movement and means of survival during inundation, in-ground monitoring stations have been installed at two sites along the river batture, which floods annually (Figure 24), and at three control sites which do not flood. The monitoring stations are the Pro Series 6-inch small round valve boxes (Orbit Irrigation Products, Inc., North Salt Lake, UT). The two sites along the river batture are both located on the Westbank. One site is near the Endymion Den, and the other is located adjacent to the Gretna-Jackson Ave. Ferry. There are five infested cottonwood trees at the site near the Endymion Den, and one infested cottonwood tree at the site adjacent to the Ferry. Two control sites which do not flood include an infested hackberry tree located at the corner of Downman Rd. and Hayne Blvd., and an infested live oak tree located at the corner of Lakeshore Dr. and Beauregard Ave. The third control site has an infested live oak tree adjacent to Popps Fountain in City Park. This third control site has replaced a previous control site at City Park Pan American Stadium, due to renovations at the stadium.

Figure 25. Drilling an infested tree (left) and using a video boroscope (right) to confirm termite infestations.

Monitoring stations were installed in a grid of 3 m centers and at least a 9 m radius from the infested tree. Infested trees located along the river batture were inspected for FST activity prior to and immediately following this year's annual flood. Following the flood, an Everest XLG3 video borescope system (General Electric) was used to document termite activity (Figure 25). Termites were detected within infested trees along the river batture both before and after flooding. This also indicates a termite colony's ability to survive heavy inundation.

Two above-ground monitoring stations have been installed on either side of each infested tree (Figure 26). These stations will allow for monitoring of any vertical movement of FST colonies. Above-ground stations were assembled by inserting ½-inch clear flex hose into an in-ground station containing cellulose material. This section of flex hose was approximately 1 m in length and was attached to a 3 m section of white ½-inch polyvinyl chloride (PVC). At the opposite end of the PVC, a 0.3 m section of clear ½-inch PVC was installed. To this section of clear PVC, a 0.3 m section of white ½-inch PVC was installed. A 2 L rectangular plastic container filled with cellulose material was installed at the top. The above-ground stations lay flush to the tree, to avoid damage to the PVC. Termites will be able to freely move throughout the above-ground stations, and the clear sections of the station will allow monitoring of vertical movement prior to flooding.

Figure 26. Above-ground station installed on an infested live oak tree in City Park, adjacent to Popps Fountain (left) and more detailed view of HOBO data logger and above-ground trap containing cellulose (right).

To determine if FST foragers are active or moving within voids of the trees, a HOBO data logger (Onset Computer Corporation, Bourne, MA) was installed on each infested tree. These measure temperature and relative humidity, and each data logger is connected to three sensors. The three sensors were installed at each tree by drilling holes at increasing heights. Holes were drilled at 1 m from ground level, 2 m from ground level, and 3.5 m from ground level. Sensors were inserted into the drilled holes, and plumbing caulk was applied to create a waterproof seal. These sensors will record data every six hours until they are removed for analysis after the annual flood waters recede. An increase in temperature would indicate an increase in termite activity, while a sharp decrease in temperature would most likely be caused by flood water filling voids in trees.

Monthly inspections of field sites began in September of this year. An average of 13 stations remains active at the control site on the corner of Downman Rd. and Hayne Blvd. An average of two stations remains active at the control site in City Park. However, no termite activity has been documented in any in-ground monitoring stations at the control site on Lakeshore Dr. and Beauregard Ave. or at either river batture site, although activity in these trees was visually confirmed using a video boroscope. None of the above-ground stations indicate any signs of vertical termite movement or activity. Monthly inspections of the river batture study sites will continue in 2009 until the trees are inundated. Monthly inspections of the control sites will continue throughout the year.

Louis Armstrong Park Reinvasion Study:

Microsatellite genotyping is currently being conducted to delineate termite colonies that have reinvaded Louis Armstrong Park after baiting and eliminating previously existing colonies. In 2002, 20 FST colonies and 6 *Reticulitermes* colonies existed in the park (Figure 27). Several of these colonies exhibited extensive foraging areas and remained stable in their movement. After baiting, these colonies were eliminated. Since then, termite activity has increased within the monitoring stations. This project represents one of the largest area-wide termite population studies ever undertaken.

During March of this year, 76 monitoring stations within Louis Armstrong Park contained ac-

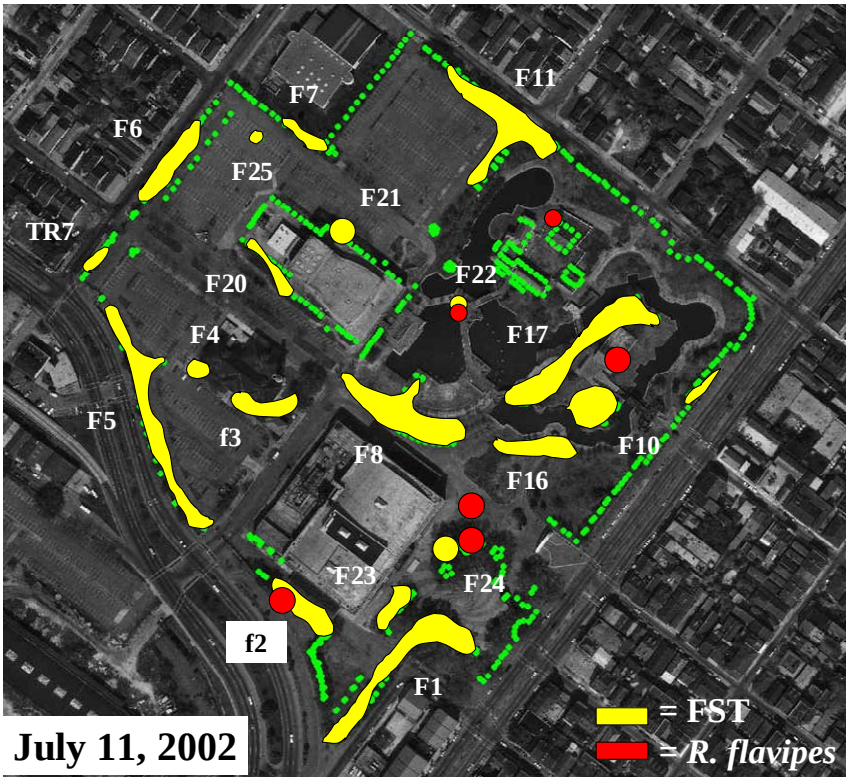

Figure 27. Delineation of FST and *Reticulitermes* colonies in Louis Armstrong Park in 2002.

tive foraging termites. Of those samples, 41 are being genotyped for colony delineation. So far, 29 of these 41 samples have already been analyzed. Preliminary data indicates that at least 19 FST colonies are reinvading Louis Armstrong Park (Figure 28). To complete this study, 12 more FST samples need to be analyzed, as well as *Reticulitermes* samples that were collected. Further analysis will conclude whether these colonies consist of simple families with one reproducing pair within the colony, or extended families, in which more than one reproducing pair exists within the colony. This study gives two snapshots in time of termite colony foraging activity prior to and following baiting control strategies. It also gives further evidence of high termite pressure within the city, in which termite colonies that are eliminated can be easily replaced by different, reinvading colonies.

In addition to monitoring foraging termite populations in Armstrong Park with in-ground stations, sticky traps were used to monitor numbers of winged reproductives. Nuptial chambers, designed by our group, were used to monitor successful pairings from reproductive flights. The data obtained from these monitoring techniques will provide additional information regarding the potential for reinvasion of previously treated urban areas and the mode by which the reinvasions occur.

Statewide Formosan Termite Survey:

The termite division continues to conduct a statewide survey to document the spread of the FST within the state. Populations of FST were confirmed in six additional parishes (Cameron, Livingston, Rapides, St. Martin, St. James, and Avoyelles; Figure 29). During survey trips, NOMTCB personnel take the opportunity to educate residents about FST biology, eliminating conducive conditions, and common ways FST is inadvertently transported to uninfested areas. Survey results were presented at the 2008 National Conference on Urban Entomology and at the July meeting of the Louisiana Structural Pest Control Commission. The presentations garnered much interest and our group is now recognized by state officials as authorities on current FST state distributions.

We are at different stages of progress on a number of additional research projects including evaluating a novel method for marking termites for ecological studies. Results of these operational research projects are presented at scientific meetings and published in peer-reviewed scientific journals. The most recent being “Additions to the known U.S. distribution of *Latrodectus geometricus* (Araneae: Theridiidae)” which was published in the September issue of the Journal of Medical Entomology.

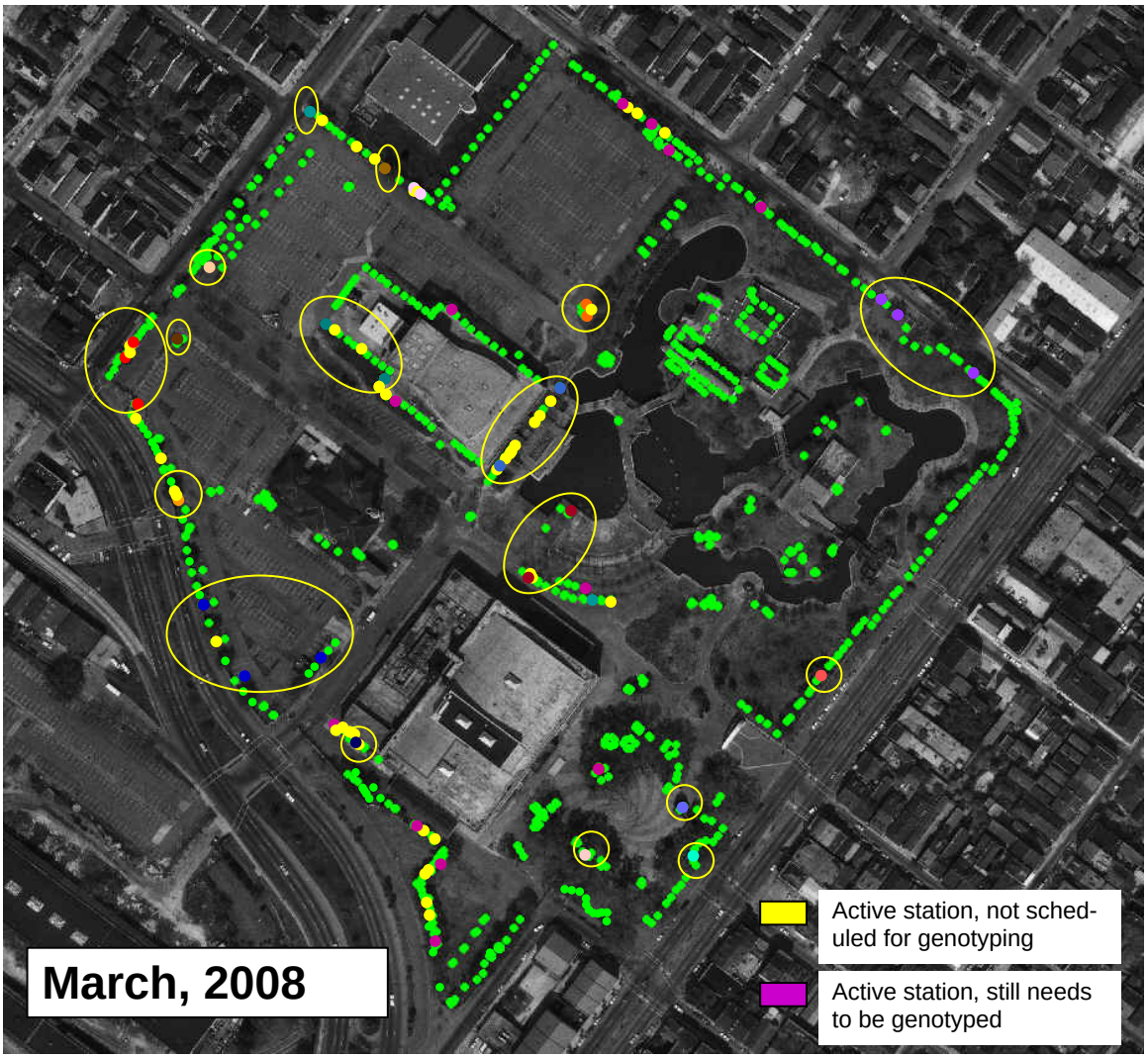

Figure 28. Current delineation of FST colonies in Louis Armstrong Park

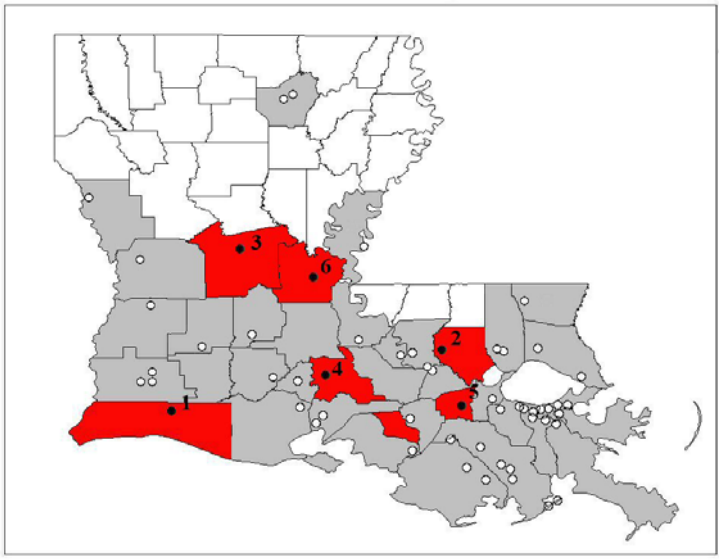

Figure 29. Current distribution of the FST in Louisiana based on current survey including new parish records (red shading; 1 – Cameron, 2 – Livingston, 3 – Rapides, 4 – St. Martin, 5 – St. James, 6 – Avoyelles). St Martin parish has two geographically separate areas.

Industry-Supported Research

In 2008, our group continued to expand the number of projects we are conducting under research agreements with corporations with interests in the urban pest control field. The principle increase has come in our agreements with Whitmire Micro-Gen. Although we are obligated not to publish specific information regarding these studies, we now have laboratory and field research projects in progress under agreements with Whitmire. We also continue to evaluate ongoing projects under agreements with Dow Agro-Sciences and FMC. Each year we incorporate infested city properties into these research protocols. The African American museum, Stern tennis center, and additional municipal buildings were utilized for these protocols in 2008. The increased number of projects means an increase in our research agreement revenues. These agreements also give our group the opportunity to gain experience with termite management tools/chemistries before they become commercially available.

Operation Full-Stop

NOMTCB along with Louisiana State University and the United States Department of Agriculture – Agricultural Research Service is a primary partner in the federally funded Operation Full-Stop Program. The program has as its goal the area-wide management of the FST in New Orleans' historic French Quarter. Many of our activities in support of this program continued in 2008 (i.e. monitoring populations of the FST along the riverfront railroad, planters, and greenspaces, conducting infrared termite inspections of French Quarter properties, supporting PestPac inspections, managing the specimen collection). We also added new responsibilities within the program in 2008. The following paragraphs provide updates on ongoing Full-Stop associated projects and outline some of our new projects.

Figure 30. Aerial image of Cabrini dog park in the French Quarter. Yellow shaded area indicates location of termite activity identified in 2008.

In 2008, our group began delineating termite colonies along the length of Canal St. from the river to the I-10 overpass. Over 1,200 stations line the neutral ground and sidewalks on either side of the street. Upon completion of colony delineation, all termite colonies in this area will be eliminated, undoubtedly reducing the number of winged reproductive captured on sticky traps within the French Quarter as well as protecting the associated palms from future attack. Data from colony delineations will be compared to colony information obtained via genetic analysis. The project is a cooperative effort between our group and USDA and LSU collaborators.

The termite division also took on the task of identifying areas in the French Quarter that until now may have escaped any type of termite treatment. A sizeable percentage of the French Quarter is greenspace. Much of this area is in courtyards which, from the street, are hidden from view. Although the trees and buildings have been and continue to be inspected for signs of termite damage, the green-spaces may be home to "hidden", currently undetected colonies. Our group confirmed one such instance in 2008 in Cabrini Dog Park located in the 900 block of Barracks St. (Figure 30). Termite monitoring within the park revealed termite activity on the northern perimeter of the park grounds. The amount of bait consumed to date indicates that the colony occupying this area is of considerable size. Our inspectors continue to look for additional "overlooked" sites.

Approximately 6,500 termite samples and 400 mosquito larvae samples have been archived and entered into our database. These samples are being stored at the NOMTCB Biolab facility. Each sample is stored in a plastic snap-cap vial and given a unique identifying number. The information pertaining to that sample is then entered into the database, fresh ethyl alcohol is added to the sample if needed, and the vial closure is wrapped in Parafilm (Pechiney Plastic Packaging, Chicago, IL). This prevents alcohol from evaporating and leaking out and protects the contents from damage caused by natural disasters in the future. The process to create and insert a label inside each

vail is ongoing. The internal label will retain information that may be accidentally removed or damaged on the external adhesive label.

Africanized Honey Bees

Our group has first hand experience in dealing with Africanized honey bee colonies. We responded to numerous honey bee calls in 2008 (Figure 31). Recent introductions of Africanized bees into St. Bernard Parish have illustrated the need to be prepared for possible emergency situations within the city. Our current practice is to collect bees from the swarms/hives before having the bees removed by a pest control operator licensed for bee removal. This year, our genetics laboratory received primers enabling us to test the bees for the presence of Africanized genes. None of the bees tested so far have had Africanized genes. We will continue to monitor for the presence of Africanized bees within the parish. We are also considering installing a limited number of traps to facilitate monitoring efforts.

Figure 31. Honey bee colony in window air conditioning unit at residence in Algiers.

GIS Update

Our group made considerable progress in the area of GIS during this calendar year. Three summer workers (Eugene Grace, Margaret McLellan, and Mark Mitchell) with GIS experience began the task of creating geodatabases for our operational and research data. By far the biggest task was creating the citywide swimming pool shapefile. The completion of this project eventually led to identifying hundreds of additional swimming pools some of which received treatment (fish). The GIS crew also created geodatabases for rodent bait stations, termite bait stations, fog zones, and service requests. In December, our group evaluated a commercially available GIS solution for mosquito larviciding, adulticiding, service requests, and surveillance. The software has some specific limitations which cause us to have reservations at this time. We do believe that we can generate a geodatabase that will handle our operational data that will better fit our needs (i.e. N.O. street dropdowns, geoportals, unique fields). Mark Mitchell will return in 2009 to continue this important work.

Extension, Technology Transfer, and Education

Training and extension activities were a big part of the termite division's year. In fact, 2008 may arguably be one of our most productive years in this area in some time. As a result NOMTCB received local, statewide, and national attention for our outreach activities. Our staff did a tremendous job cooperating to make these endeavors the successes that they were. The following paragraphs highlight some of these activities.

In January, we were asked by members of the Greater New Orleans Pest Control Association to begin teaching Termite and Pest Control Academies. In June, the agenda and speaker list for the Termite Academy was approved by the state Structural Pest Control Commission. With that the NOMTCB – GNOPCA Termite Academy became the second training series in the state to be approved to fulfill the training requirement for the state structural pest control license.

We began to prepare to teach these academies by identifying what has been successful at other such training facilities around the country. We gained valuable advice, tips, and experience from training centers at the University of Georgia, Oklahoma State University, and the Orkin training facility in Atlanta. A tremendous amount of work went into preparing for the Academies. Our group did an outstanding job preparing laboratories, demonstrations, and talks.

Figure 32. Participants in the first NOMTCB – GNOPCA Termite Academy October 2008.

The first NOMTCB – GNOPCA Termite Academy was held the 21st – 23rd of October 2008 (Figure 32). We had 22 participants for this three day academy. The participants ranged from pest control specialists with years of experience in termite management to technicians with less than six months experience. Topics ranged from basic biology to laboratory identification of termites and wood destroying organisms to hands on field training with equipment used for termite detection and management. Feedback from the academy was tremendous and 20 of the 22 participants passed the final exam.

The first NOMTCB – GNOPCA Pest Control Academy was held the 4th – 6th of November 2008. We again had 22 participants with a range of pest control experience. In class presentations covered topics such as basic entomology, cockroaches, bed bugs, ants, rodents, mosquitoes, ethics and professionalism, and safety. The associated laboratories allowed participants the opportunity to view specimens, droppings, damage, and management tools (Figure 33). Again, the feedback and student success was extremely positive.

By all measurements, these initial academies seemed to be a tremendous success. Many of our personnel successfully completed one or both academies gaining valuable urban pest management experience. Apart from providing valuable training for the participants, the tips, techniques, and knowledge gained by local pest management professionals will benefit the public in better quality of service and improved pest management decisions. We are now in the process of scheduling academies for 2009.

Figure 33. Laboratory demonstration during 2008 NOMTCB – GNOPCA Pest Control Academy.

Our group was involved in a number of other training activities this past year. The following employees successfully passed the Louisiana Department of Agriculture's structural pest control technician exam in 2008: Eric Guidry, Jamie Ward, Sara Ward, Carrie Owens, and Josh Osbey. All of our personnel completed a driver's safety training offered by the city during 2008. Several members of our group are pursuing higher education. Carrie Owens completed three courses this year through the University of Florida's distance education program towards receiving her doctorate degree. These classes included Statistical Methods in Research, Insect Physiology, and Biology and Identification of Urban Pests. She continues to maintain a high grade point average. Barry Yokum completed a short course entitled "Wood destroying organisms" offered by Purdue University, a leading university in urban pest management. We are very proud of all of these endeavors.

NOMTCB continues to be recognized as leaders in the urban entomology field and as such we have had the opportunity to provide information at multiple local, state, and national venues. Additional extension opportunities include termite detection equipment training for Georgia Department of Agriculture and Forestry inspectors, talks for the Master Gardeners, LDAF technician recertifications, and the Department of Health and Hospitals, presentations at the national meetings (i.e. National Conference on Urban Entomology), and fact sheets available on-line, at our facilities and at the Audubon Insectarium. Carrie Owens successfully trained two summer workers this year on laboratory safety, DNA extractions, polymerase chain reaction (PCR), gel electrophoresis, and sample archiving. In addition to laboratory experience, summer workers were able to gain experience in field operations by assisting other employees. Carrie has also provided training on laboratory techniques related to the LiCor sequencer for local university faculty. Additionally, members of our staff sit on biosafety committees at Tulane and the University of New Orleans.

Figure 34. Holy reliquary containing remains of Father Francis X. Seelos

We also continue to identify urban pest specimens for the Greater New Orleans Pest Control Association and the public. One unique instance came in June when we were asked to identify a beetle infesting the holy reliquary of Father Francis X. Seelos (Figure 33). The beetle turned out to be *Anobium punctatum*, the furniture beetle, and the reliquary was fumigated. Details of the fumigation were published in Pest Control Technology's online edition (Harbison 2008) and the Seelos Center's newsletter (Miller 2008).

The following is a comprehensive list of scientific and extension publications and presentations members of NOMTCB's termite division participated in:

Honors and Awards:
C. B. Owens. 2008. Awarded the Sarah Bradley Tyson Memorial Fellowship for women who have displayed outstanding scholarly achievement in science.

E. D. Freytag. 2008. Named to the University of New Orleans' Institutional Animal Care and Use Committee.

A. Anderson. 2008. City of New Orleans and Greater New Orleans Pest Control Association Pest Control Academy graduate.

A. Freeman. 2008. City of New Orleans and Greater New Orleans Pest Control Association Termite Academy and Pest Control Academy graduate.

B. Lyons. 2008. City of New Orleans and Greater New Orleans Pest Control Association Termite Academy graduate.

C. B. Owens. 2008. City of New Orleans and Greater New Orleans Pest Control Association Pest Control Academy graduate.

E. Guidry. 2008. City of New Orleans and Greater New Orleans Pest Control Association Termite Academy and Pest Control Academy graduate.

J. Brown. 2008. City of New Orleans and Greater New Orleans Pest Control Association Pest Control Academy graduate.

J. Osbey. 2008. City of New Orleans and Greater New Orleans Pest Control Association Termite Academy and Pest Control Academy graduate.

J. Ward. 2008. City of New Orleans and Greater New Orleans Pest Control Association Termite Academy graduate.

P. King. 2008. City of New Orleans and Greater New Orleans Pest Control Association Termite Academy graduate.

P. Ponseti. 2008. City of New Orleans and Greater New Orleans Pest Control Association Termite Academy graduate.

T. Madere. 2008. City of New Orleans and Greater New Orleans Pest Control Association Pest Control Academy graduate.

T. Thompson. 2008. City of New Orleans and Greater New Orleans Pest Control Association Pest Control Academy graduate.

Publications (peer reviewed):
Brown, K. S., J. S. Necaise, and J. Goddard. 2008. Additions to the known U.S. Distribution of *Latrodectus geometricus* (Araneae: Theridiidae). J. Med. Entomol. 45: 959-962.

Brown, K. S., G. H. Broussard, B. M. Kard, A. L. Smith, and M. P. Smith. 2008. Colony characterization of *Reticulitermes flavipes* (Isoptera: Rhinotermitidae) on a native tallgrass prairie. Am. Midl. Nat. 159: 21-29.

Publications (non-peer reviewed):
Are you smarter than a termite researcher? Feb., Mar. 2008. Pest Control Technology.

Brown, K. S., C. Riegel, F. S. Guillot, and M. K. Carroll. 2008. New approach to area-wide management of the Formosan subterranean termite (*Coptotermes formosanus*) in Louisiana. Proc. 2008 National Conference on Urban Entomology.

Harbison, Byron. 2008. New Orleans PCO's Work to Eliminate Infestation at Shrine. PCT Online. www.pctonline.com/news/news.asp?ID=6236.

Miller, Rev. Byron. 2008. A Bug's Life. Seelos Center News. 67: no. 9.

Posters/Presentations at Scientific Meetings:
Brown, K. S., C. Riegel, F. S. Guillot, and M. K. Carroll. 2008. New approach to area-wide management of the Formosan subterranean termite (*Coptotermes formosanus*) in Louisiana. National Conference on Urban Entomology, Tulsa, OK.

Presentations:
Brown, K. S. October 21. Termite biology. City of New Orleans and Greater New Orleans Pest Control Association Termite Academy. New Orleans, LA

Bordes, E. October 21. Types of construction in Louisiana. City of New Orleans and Greater New Orleans Pest Control Association Termite Academy. New Orleans, LA

Freytag, E. D. October 21. Tools and techniques for termite inspections. City of New Orleans and Greater New Orleans Pest Control Association Termite Academy. New Orleans, LA

Freytag, E. D. October 21. Practical guide to the use of inspection tools. City of New Orleans and Greater New Orleans Pest Control Association Termite Academy. New Orleans, LA

Freytag, E. D. October 21. Tree treatments. City of New Orleans and Greater New Orleans Pest Control Association Termite Academy. New Orleans, LA

Brown, K. S. October 22. Calibration and calculations. City of New Orleans and Greater New Orleans Pest Control Association Termite Academy. New Orleans, LA

Riegel, C. October 22. Pesticide labeling and federal regulation. City of New Orleans and Greater New Orleans Pest Control Association Termite Academy. New Orleans, LA

Riegel, C. October 22. Baiting systems. City of New Orleans and Greater New Orleans Pest Control Association Termite Academy. New Orleans, LA

Riegel, C. October 23. Fumigation. City of New Orleans and Greater New Orleans Pest Control Association Termite Academy. New Orleans, LA

Bordes, E. October 23. Ethics, professionalism, & training – can it improve your bottom line? City of New Orleans and Greater New Orleans Pest Control Association Termite Academy. New Orleans, LA

Brown, K. S. November 4. Introductory insect anatomy and biology. City of New Orleans and Greater New Orleans Pest Control Association Pest Control Academy. New Orleans, LA.

Brown, K. S. November 4. Cockroaches and bedbugs. City of New Orleans and Greater New Orleans Pest Control Association Pest Control Academy. New Orleans, LA

Freytag, E. D. November 4. Occasional invaders and common garden insects. City of New Orleans and Greater New Orleans Pest Control Association Pest Control Academy. New Orleans, LA

Bordes, E. November 5. Ethics, professionalism, & training – can it improve your bottom line? City of New Orleans and Greater New Orleans Pest Control Association Pest Control Academy. New Orleans, LA

Freytag, E. D. November 5. Integrated pest management. City of New Orleans and Greater New Orleans Pest Control Association Pest Control Academy. New Orleans, LA

Riegel, C. November 5. Rodent control: back to the basics. City of New Orleans and Greater New Orleans Pest Control Association Pest Control Academy. New Orleans, LA

Riegel, C. November 5. Pest-proofing and pest exclusion. City of New Orleans and Greater New Orleans Pest Control Association Pest Control Academy. New Orleans, LA

Riegel, C. November 6. Pesticide labeling and federal regulation. City of New Orleans and Greater New Orleans Pest Control Association Pest Control Academy. New Orleans, LA

Brown, K. S. November 6. Pesticides and their mode of action. City of New Orleans and Greater New Orleans Pest Control Association General Pest Academy. New Orleans, LA

Sackett, S. November 6. Mosquito biology, control, and West Nile virus. City of New Orleans and Greater New Orleans Pest Control Association General Pest Academy. New Orleans, LA

Brown, K. S. September 29. Formosan termites: what every New Orleans homeowner needs to know. New Orleans Botanical Garden Fall Educational Series. New Orleans, LA

Brown, K. S. May 7. Africanized honey bee emergency response. Greater New Orleans Pest Control Association recertification. Mandeville, LA

Brown, K. S. January 24. Formosan subterranean termites. Louisiana Landscape Industry Symposium. New Orleans, LA

Brown, K. S. March 14. The brown widow spider and other local spiders of medical importance. Orleans Parish Department of Health and Hospitals' "LearnLink" (podcast for Louisiana medical professionals). Metairie, LA

Owens, C. B. May 23. Termite biology and identification. Greater New Orleans Pest Control Association recertification. Harahan, LA

Riegel, C. Feb 6. Termite detection tools. North Carolina Pest Control Association.

Riegel, C., M.T. Nguyen, C. Harrison, G.K. Thompson, and S. Sackett, 2008. Mosquito control in backyard swimming pools in New Orleans, Louisiana after Hurricane Katrina. 74th Annual American Mosquito Control Association, Sparks NV.

Riegel, C. Mosquito biology and control. Center for Disease Control, NEHA training. Atlanta, GA.

Riegel, C. March. Rodent control: back to the basics. Greater New Orleans Pest Control Association Recertification. Kenner, LA.

Workshops:

Brown, J. March. New York City Rodent Academy. New York, NY.
Brown, K. S. August. Adobe Photoshop training. New Orleans, LA
Freytag, E. D. August. Adobe Photoshop training. New Orleans, LA
Krohn, C. August. Adobe Photoshop training. New Orleans, LA
Riegel, C. March. New York City Rodent Academy. New York, NY.

Press Release: New Orleans termites sacrifice their lives for injured anteater

New Orleans Mosquito and Termite Control Board (NOMTCB) inspectors came to the aid of Barques, an injured young giant anteater, (*Myrmecophaga tridactyla*) at Audubon zoo (Figure 35). While recovering from an injury, the young anteater had to be fed through a tube. As it recovered, zoo personnel attempted to transition the young anteater back to its insectivorous diet. However, Jeff Vaccaro, assistant curator of the swamp exhibit, soon realized that the young anteater was finicky, preferring to eat only live termites.

Audubon personnel contacted NOMTCB staff to request assistance in securing enough termites to supplement the anteater's diet during its recovery. Our group trained Dierdre Havnen and Lauren Thibault from Audubon's insect rearing facility in the finer points of termite collection, preparation, and husbandry. On Friday, April 11 we delivered over 30,000 Formosan subterranean termites to the injured animal (Figure 36). The anteater quickly ate the termites mixed with the normal diet.

Figure 35. Barques eating live Formosan subterranean termites provided by NOMTCB.

Figure 36. Ken Brown and Jamie Ward look on as Barques enjoys his termite meal.

Figure 37. Barques, the anteater, is doing much better thanks to the help of the NOMTCB termite division.

Jeff has reported that the anteater seems to be improving, aided, at least in part, to its termite supplemented diet (Figure 37).