

Evolving Island bait technology benefits PMPs

Just as the knowledge and skills required for the space program evolved into improvements in our everyday lives, similarly the research and technology Bell scientists have devoted to island rat eradication programs have resulted in new technologies that now benefit the entire pest control industry.

Take Lumitrack Biomarker. This special additive, found in Bell's DETEX and CONTRAC with Lumitrack Blox, illuminates under black light and is a direct result of Bell's work with the Palmyra Atoll Rat Eradication project.

After Bell successfully formulated a bait pellet that could withstand the high humidity level found on Palmyra Atoll, project biologists again approached Bell for some indicator in the bait to help them confirm that dead animals had, in fact, ingested the bait. This would help them determine the impact of the bait application on the rats and non-target species.

Developing Lumitrack Biomarker

Working with a fluorescent chemical, Bell scientists experimented with a dye system for the bait that met three criteria.

"We wanted to make sure it would pass through the animal's gastrointestinal tract, that it would be effective under UV light for monitoring, and it did not add a new taste to the finished product," pointed out Bell's technical director, Peter Martin.

In 2008, they had a bait product ready to test on several small islands in the atoll.

Using UV light, researchers discovered that crabs on the island ingested a lot of the bait.

"Crabs are the ultimate scav-

engers on the island but brodifacoum doesn't have any impact on them," Martin pointed out.

"They not only saw the glow of animals that consumed the bait, confirming it was in their system, but a lot of the undergrowth glowed so they could determine how uniform the drop was," Martin added.

Since then, Bell has taken that technology and applied it commercially first to its non-toxic DETEX bait and most recently to CONTRAC with Lumitrack.

"We learned the biomarker is a really good tracking tool to find where rodents travel and nest. PMPs can then use that information to implement an Integrated Pest Management program," Martin pointed out.

"Pest control technicians typically carry a black light to find rodent urine so this doesn't require them to carry new equipment. It's a new use for the equipment they already carry." ■

Developed for Palmyra Atoll, Lumitrack Biomarker aids PMPs in tracking rodents.



PestWorld 2011

Today's Opportunities. Tomorrow's Success.

Today's Opportunities. Tomorrow's Success. - the theme of PestWorld 2011 convention - proved to be the *modus operandi* at the largest gathering of pest management professions and industry suppliers in the world.

More than 3,100 pest management professionals met in the great recovering city of New Orleans on October 19-22 to view the latest products and technology, learn about innovative control techniques, and generally mix and swap stories with other industry professionals.

On the large trade show floor, Bell Laboratories introduced the industry to several of its new, innovative rodent control products - CONTRAC with Lumitrack, PROTECTA EVO Express Bait Station, T1 Mouse Disposable Bait Station, and new and improved FASTRAC with the active ingredient, bromethalin.

Among participants this year was a record number of international representatives, including several Bell distributors and pest control customers - Edialux from France, along with pest control companies, L'Etoile and Techmo Hygiene; Rimi Chemicals, Israel; PES, South Africa; Bentz Jaz, Singapore; and Killgerm PestWest - Germany.

First-time convention goers also had a chance to meet with Bell representatives in a relaxed setting at the Wine and Cheese Open House hosted by Bell on the opening evening.

Next year's convention will meet in Boston, Mass. ■



Top photo: Bell's VP of Global Sales, Mark Westover, discusses new Bell products with Jeff Weir of Sprague Pest Control.

Above / & r: Bell's Agostino Panetta and Rupert Broome point out features of EVO Express to Reon Hillebrand of PES South Africa. Right: Bell CEO Steve Levy (l) accepts a sponsorship award from NPMA president, Ray Johnson of Johnson Pest Control, Tenn.



Rat control in residential accounts with new pre-baited T1 RAT



On the heels of its new T1 MOUSE, Bell introduces a rat-size version, T1 RAT Disposable Bait Station for controlling rats in residential accounts.

T1 RAT is a disposable, pre-baited bait station that can be left at a residential account and thrown away after the bait, a 4-oz. bromethalin block, has been consumed.

Kid & Dog Resistant
This sturdy, tamper-resistant bait station is labeled "Kid & Dog Resistant," having met the highest level of station security and quality based on test protocols established by the Environmental Protection Agency (EPA).

"Technicians can place T1 RAT in homes and apartments, as well as commercial accounts," noted Suzy Pursell, Bell's product manager. "Plus it can be used indoors and outdoors within 50 feet of buildings accessible to children and dogs."

Both T1 MOUSE and T1 RAT stations are child and dog resistant, but care should always be used when placing the stations, especially in homes where children or pets are present, Pursell cautioned.

"While these bait stations were designed and tested to meet the EPA's highest level of bait station security, they must always be placed in locations away from easy access by kids or pets," she stressed.

Pre-baited T1 RAT holds Bell's rat-sized bait blox with the active ingredient, bromethalin, that kills rodents faster than anticoagulants. Once rats consume a lethal dose, usually in a single night's feeding, they die in as few as two days. Rats stop feeding after eating a lethal dose which reduces the amount of bait required. With bromethalin, there is also a very low risk of secondary poisoning.

Valuable Time Saver in the Field

T1 RAT saves PMPs valuable service time.

With no need to bait the station, technicians simply place it where they've seen signs of rats. The see-through plastic lid makes monitoring bait consumption easy. When bait is gone, the station can be discarded, reducing the need for return visits.

T1 RAT can be placed horizontally or vertically, giving rats access from various angles.

Available in December, T1 RAT is sold in 1-pack cartons and is labeled for individual sale, making it a desirable commodity for do-it-yourself and distributor showrooms or for public distribution by municipalities. ■



Use T1 RAT vertically or horizontally.



Dispose of station when bait is gone.

What's Inside

- ▶ New disposable T1 RAT Bait Station is pre-baited for residential accounts
- ▶ Getting rid of 30,000 non-native black rats on Palmyra Atoll with Bell's pelleted bait and baiting ingenuity
- ▶ Adapting "island" technology to broader pest control use
- ▶ PestWorld 2011 - Today's Opportunities. Tomorrow's Success.



<http://www.facebook.com/pages/Bell-Laboratories-Inc/58604531155>

Address Service Requested

www.belllabs.com

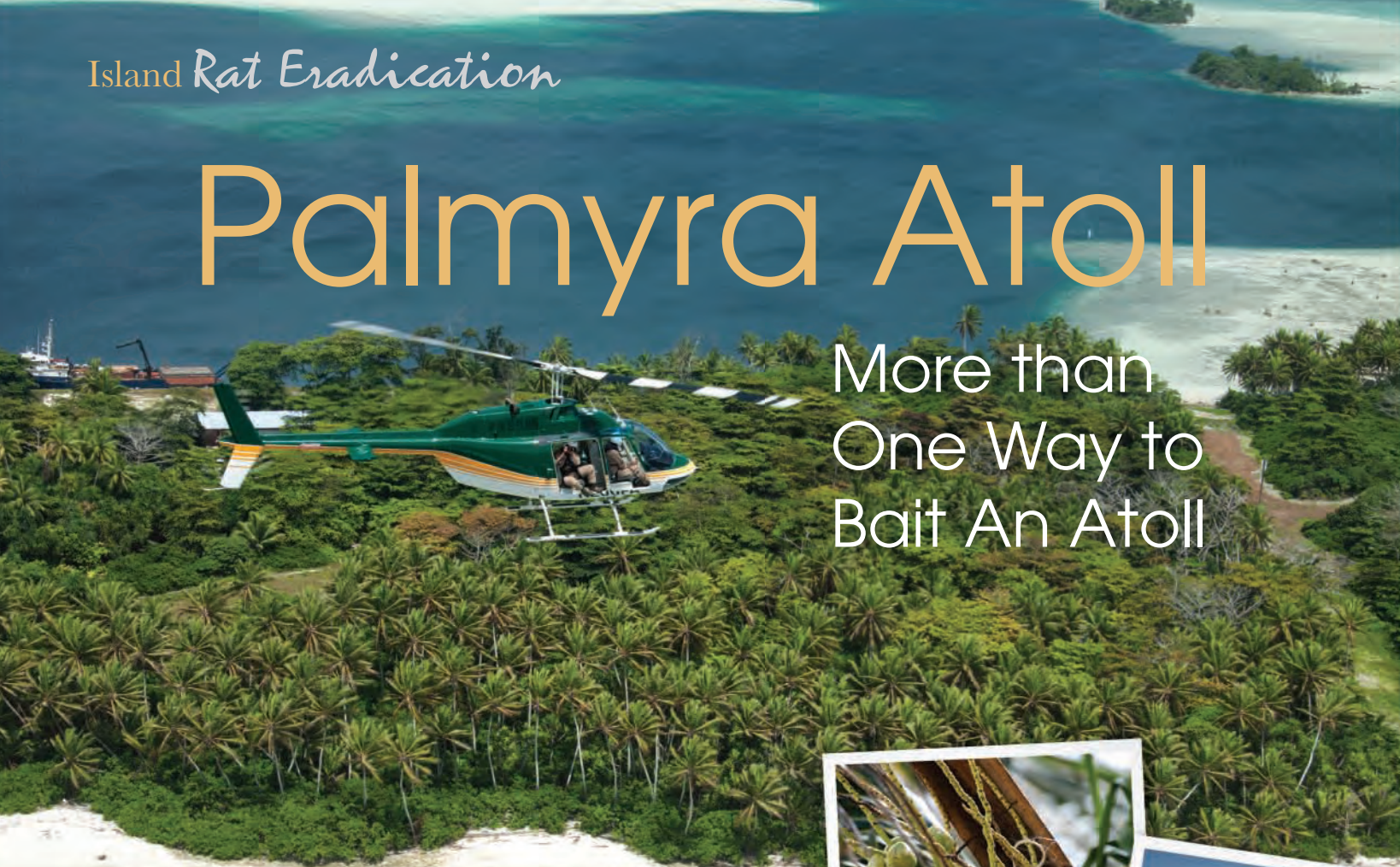
3699 KINSMAN BLVD. | MADISON, WI 53704



PRSR STD
US Postage
PAID
Madison, WI
Permit 1355

Palmyra Atoll

More than One Way to Bait An Atoll



OCCUPIED BY U.S. MILITARY FORCES IN THE PACIFIC DURING WORLD WAR II, PALMYRA ATOLL IS AGAIN THE SITE OF AN OFFENSIVE ATTACK, THIS TIME ON SOME 30,000 NON-NATIVE BLACK RATS.

Suspended from a 50-foot line off the belly of a Jet Ranger helicopter, New Zealander Pete McClelland hovers above the water's edge before dropping down into the tree canopy, a maneuver called human short hauling that he's perfected to strategically place bait in palm crowns that overhang the water.

The idea is simple: wrap a bait bola around a palm frond where it stays until a black rat comes along and chews into it. The rat gets the bait and the bait stays out of the water.

Used in New Zealand as a way to get rid of crows' nests in treetops, human short hauling was the *coup d'état* of an intense, month-long rat eradication effort in June that brought together 41 researchers/team members from five nations to Palmyra Atoll in the Central Pacific.

"Everyone was coveting that job," joked Alex Wegmann, project manager of the Palmyra Atoll Restoration Project.

Yet, "dope-on-a-rope," as it was dubbed by the team, was just one of

five baiting techniques used to rid Palmyra of destructive black rats and ultimately protect hundreds of thousands of seabirds, coconut crabs and one of the largest remaining native coastal strand (*Pisonia*) forests in the Pacific.

Rats Re-engineered Palmyra's Ecosystem

Located 1,000 miles south of Hawaii, Palmyra Atoll today is a National Wildlife Refuge managed by the U.S. Fish and Wildlife Service (FWS) and The Nature Conservancy (TNC). But, during World War II, it was a naval facility for the U.S. military in the Central Pacific.

When the military left, the rats that came with them initially stayed behind and their offspring, in the past 60 or so years, have "re-engineered the entire terrestrial ecosystem on Palmyra," according to Wegmann, a biologist for California-based Island Conservation,



Bait bola used to bait the forest canopy.



Containers holding 43,000kg of bait await ship in Seattle.

which is collaborating with FWS and TNC on the project.

Like other remote seabird nesting islands overrun with rats, Palmyra's native species had suffered the domino effects of rats.

"Rats prevented most of the native tree species from reproducing," Wegmann pointed out.

With their voracious appetites and prolific reproductive capabilities, the atoll's growing number of rats consumed the seeds (fruit) and seedlings of native trees which allowed another introduced species, the coconut palm, to invade most of the land area and out compete the native trees.

"This drastically reduced available nesting habitat for a lot of seabird species that do not

nest in coconut palms," Wegmann explained.

Birds were affected other ways. Rats preyed on the eggs and young chicks of ground-nesting and tree-nesting birds. They more than likely are responsible for the absence of burrow-nesting birds, such as shearwaters and petrels, that would normally nest at Palmyra. And, they compete with shorebirds for food.

Besides devastating the seabird population, rats also attack and eat the atoll's native land crabs and geckos.

Rat Eradication on a Tropical Paradise

Eradicating rats to restore the natural ecosystem of a tropical paradise, which is how Wegmann describes the atoll with its aquamarine waters and balmy temperatures, requires special precautions to protect its rich marine life.

To that end, researchers employed a variety of baiting techniques which included some of the most difficult aerial broadcast baiting performed by helicopter pilots skilled in this line of work, traditional hand baiting and baiting with bait stations, and bola-baiting, a technique to bait the forest canopy and overhanging palms either by human short hauling or deploying bait bolas with slingshots.

Palmyra Atoll is located in the Inter-Tropical Convergence Zone where average annual rainfall is about 260 inches. In 2010, the atoll received 30 inches of rain in the month of May. When the team arrived in June this year, they had one month, only 28 days, to rid the 1 square-mile of land of an estimated 30,000 black rats (*Rattus rattus*).

"Weather is a crap shoot," Wegmann said. "You can't broadcast in the rain. Even though the bait will hold up, the helicopter hopper will get clogged if moisture gets in."

Fortunately, the weather cooperated. For Palmyra it was relatively dry with moderate to low winds.

Unique Problems to Broadcasting Bait

Like many island rat eradication projects that Bell has been involved with, the majority of the baiting on Palmyra was by aerial broadcast. Two helicopters had been specially fitted and shipped to the atoll to spread 38,560 kg of pelleted bait, developed by Bell.

Because the atoll is comprised of narrow strips of land and tiny islands - 580 acres shaped like a horseshoe - an aerial bait broadcast posed a unique set of problems. New Zealand pilots, Peter Garden and Graeme Gale, both experienced in island rat eradication projects, had their skills put to the test on



Project manager, Alex Wegmann, baits the forest canopy with bait bolas deployed with a slingshot.

Photos credit: ©Erik Oberg, Island Conservation

these small parcels of land.

"It was the most challenging place they've flown to broadcast bait," Wegmann reported. "Land areas are so small on the atoll and the pilots had to keep bait out of the water. The slowest they could travel was 35 to 40 knots so they had only two to three seconds to keep the hopper open. It was open-close, open-close."

Further compounding the difficulty of the aerial broadcast, this project called for a high bait application rate.

"Land crabs which aren't affected by the bait gobble it up and compete with the rats for bait. We needed to satiate the crabs and have enough for the rats to eat," he explained.

Running that much bait through the helicopter hopper required some redesigning of the system.

"Bell is such a great partner. They helped us develop a new bait packaging system," Wegmann stressed.

Instead of 50 lb. bags, bait was packaged in 700 lb. bulk bags, the maximum load that the helicopters could lift. A new bait loading system mechanically lifted and dumped the bait into the hopper in one motion. The system required fewer people on the ground loading the hopper and was safer.

"Dumping 14 bags to fill the hopper, you run the risk of bags flying up and disabling the helicopter," Wegmann pointed out. "This was a clean operation and the loading went fast."

There were other problems to work around. Palmyra's more than 110,000 nesting sooty terns and its thousands of red-footed, brown and masked boobies were in greater numbers than the pilots had previously experienced.



The most coveted job on the project - human short hauling.

Sharing the air space with these seabirds required reduced flight speeds and modifying the timing of applications to coincide with lower bird activity.

Normally on these operations, pilots fly tight GPS grids when dropping bait. But, the 2010 satellite imagery could not distinguish between actual shoreline and dense vegetation overhanging the shoreline. Consequently, the pilots had to use their best judgment rather than strictly flying satellite off the imagery which could have led to accidental bait drift into the marine environment.

Despite all these obstacles and adjustments, the first application of bait took five days and the second, two days. Pilots flew from 8 a.m. until 5:30 p.m. when it started to get dark.

Hand Baiting To Fill in Gaps

While 98 percent of the atoll was baited aerially, narrow strips of land, tiny islands, and small gaps left by helicopter baiting needed to be hand baited. Two team members also hand baited bunkers and concrete structures remaining from Palmyra's military days, structures the team considered important rat habitat.

They also baited 180 bait stations around the camp area on Cooper Island, and in and around other buildings. Bait stations were checked every two days initially for a week or so until activity fell off. Then they were checked every two weeks. Team members, equipped with five boats, also placed bait sta-

tions on small islands, which were the preferred roosting site for shorebirds.

Challenge of Baiting the Tree Canopy

Refining details is a natural part of the learning process with island projects and, at Palmyra, the big question was how to bait the tree canopy, including the palm crowns that overhang the water.

"By following rats we knew they spend a majority of their time in the forest canopy, but how to bait the palm crown?" Wegmann recalled from early baiting trials conducted on Palmyra in 2005.

"Some pellets would lodge in the crown but some areas we couldn't reach over the lagoon. We wanted to bait those areas with crown baiting."

The solution: bola baiting.

"Bola baiting is fantastic and totally unique to Palmyra and this project," Wegmann noted.

Bait bolas, a take-off on a throwing weapon, are two small sacks of bait secured on either end of a string. Made of a biodegradable type of gauze commonly used in hospitals, bolas hold bait pellets, as well as a cork which keeps the device floating if it accidentally falls in the water.

The problem was making the 9,000 needed. "It was taking four-person hours to make 25 bolas," Wegmann lamented.

But, thanks to the innovative savvy of an Island Conservation staff member who built a bola-making machine out of PVC pipes on a wooden platform, one person could make 200 in three hours.

"It was quite an amazing machine," Wegmann noted, adding that his co-workers at Island Conservation in Santa Cruz, CA, took turns, working a week and a half, nine hours a day, to get all 9,000 made before embarking for the atoll.

Once the aerial baiting on Palmyra was complete, bola baiting went into full swing with 15 to 20 people armed with sling shots, broadcasting bolas into the forest canopy. Three days later, the coveted human short hauling duo took care of baiting the coastline and the palms overhanging the water.

Protecting Native Species

Keeping bait out of the water and away from non-target species, while exposing every rat on the atoll to bait, was a major challenge for the team. As an added pre-

caution, team members successfully captured and cared for native geckos, 13 bristle-thighed curlews and a Pacific golden plover. All 14 birds were released in early August and eight of the captured curlews have been spotted with other flocks since then.

Promising Signs Already

Now, with help from additional researchers from the U.S. Departments of Agriculture and the Geological Service, monitoring the results on Palmyra is underway. Seven years in the planning and operational stages, it will be another two years before researchers can confirm total rat removal on the atoll.

But the signs already are promising.

"Within a week of the eradication, we saw what we call natural indicators that the application was working," Wegmann reported. "There were fruits from some of the tree species that the rats classically don't even let hit the ground. They just eat it off the stem. We were seeing this fruit all over the ground. None of it was being chewed into by rats."

He also expects drastic changes in the vegetation at Palmyra when he goes back in two years.

"Because of the high rainfall, the plants respond really quickly to any change. Now that the rats are no longer there eating seedlings or seeds, we expect that the native tree species will be recruiting and reproducing like crazy.

"And, every couple months, a wedge-tailed shearwater will come and try to land at Palmyra. During their breeding season, they'll come and try to nest there. But the rats, in the past, have prevented them from doing so. We're hoping that in a few years, they may actually establish and start nesting." ■



Booby mother and chick on Palmyra Atoll.