

Chapter 02.17 Mold Dogs

Mold Dogs

A dog's ability to detect and discriminate different odors is amazing. If you entered a kitchen with your dog and noticed the aroma of beef stew, your dog would be smelling the carrots, the peas, the celery, the potatoes and every other individual ingredient including the scent of the chef. Dogs live in a myriad world of odors all the time. They can parse out one odor from another and they can be trained to alert us to specific odors.

Dogs have been used to track down criminals, find lost persons, detect bombs, uncover hidden drugs, alert when cancer cells are forming tumors and countless other uses that require an acute sense of smell. When I heard that dogs were used to locate mold in buildings the pieces fit together and I set out to learn more from these sniffing wizards.

My wife, Tricia, and I had a Labrador Retriever mix named Dax that had been a member of our family for about five years. Dax was our family pet and, similar to many of her canine relatives, had shown an innate ability to use her nose to find things. One year when we were camping in the forested mountains, Dax had found and dug up what I later learned was a type of fungus called a truffle. Originally, pigs were used to search for truffles. The pig would snort over the ground looking for this delicious edible until it was able to locate a buried truffle. Early truffle hunters would earn their living wrestling the truffle from their pig before it was swallowed. I didn't realize it at the time, but when Dax began digging up truffles and brought them to me, we had already begun her training to become a mold dog. Truffles can sell for over \$600 a pound, but I was unknowingly using the pricy fungus to play fetch. Sometimes I would throw the truffle behind a log or into some brush where it would disappear from sight, and I could see Dax using her nose to help her find and retrieve it. Sometime later, I began to wonder if Dax could be trained to help identify hidden mold in buildings. Tricia agreed that we should attempt to train Dax to become a mold dog. We would only use Dax to find mold if it could be done without placing our pet's health at risk.

Before training, I needed to learn about the methods that trainers were already using for teaching detection dogs. I learned that detection dogs communicate to their handlers by "alerting" on the target object. Dogs use two primary methods of communication to signal their recognition of a certain scent. Some dogs are trained to give an "aggressive alert" and others provide a "passive alert". Dogs trained to signal using an aggressive alert will lunge at the source of the odor, bark excitedly, and often times dig with their paws at the source. The aggressive alert is the method commonly used by law enforcement dogs when searching for drug contraband. The aggressive

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nature of the "find" can focus the criminals' attention away from the handler/officer increasing their safety when making an arrest. Of course, this method has its shortcomings. A lost child could become even more frightened when confronted by a dog aggressively pawing at them. The consequences could be even more devastating if the aggressive alert were used by a dog digging at a detected bomb or improvised explosive device. Dogs communicating a passive alert will often have a specific alert behavior they exhibit. The astute trainer will recognize the dog's innate alert behavior and if necessary refine that behavior by training. A common passive alert is for the dog to sniff and find the object of interest, immediately sit next to their find and look back and forth between the handler and what they have found.

I began to search for people that already owned different types of detection dogs to learn what worked for them. I met an owner of a mold dog that had been trained to alert using the aggressive method. The handler and dog were going to demonstrate the dog's ability to detect mold for a group of insurance adjusters at a conference the next day. The handler had shut the dog in the hotel bathroom while we were meeting over dinner. Upon returning, the handler discovered his dog had dug out a substantial portion of the bathroom wall. The hotel bathroom wall cavity was filled with mold that had been covered up cosmetically and not properly remediated. The dog was doing what it had been trained to do, but digging at the wall had caused damage and resulted in a greater release of contamination.

Tricia and I later had the honor to meet and receive mentoring by a number of detection dog handlers that were members of the Canine Specialized Search Team in Mountain View California. These dogs are called human remains dogs and are trained to search for cadavers and non-living human tissue. The dogs are trained with kindness, rewards, and play. If a dog made a mistake, the error was never acknowledged or punished, it was simply ignored and the training continued. However, the dog was rewarded when it correctly identified an intended target. The training was gradual and broken into small steps that culminated in the dog being able to accurately and consistently identify the target of the search. The most successful dogs were trained to use an alert behavior that was innate and comfortable for that individual dog. In order to be successful, the handler needed to understand and recognize the behavior when it was exhibited by the dog. It quickly became apparent that the passive find training technique used to locate human remains would be the most appropriate for training our dog to find mold.

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As I began to meet the recovery dog handlers, many of which worked at the World Trade Center after 9/11, I learned that some had begun to develop chronic respiratory and other health issues after their volunteer service. It was starting to become clear that some of the dogs were dying at an early age. As a mold investigator, I can don protective equipment and wear a respirator when I go into a mold-infested building, but there is no such thing as a dog respirator. Even if there were, it would interfere with the dog's ability to sniff out the locations. Now it was imperative to work out safety principles for protecting canine health and safety during mold investigations.

Mold Dog Safety Considerations

Since dog's can't wear respirators, it was important to develop safety protocols to keep our mold detection dog healthy. The following were the rules we established for working our dog in mold investigations.

- 1) We would not use our dog in buildings where obvious or visible mold was present.
- 2) If known mold contamination was present it would be remediated and the surrounding accessible areas cleaned before our mold dog was brought into the building.
- 3) Our dog would only be used in situations where mold was hidden and could not be found in other traditional investigative ways.
- 4) Our dog's exposure to moldy environments would be limited to a maximum of 30 minutes per day.

Our dog's first training session was at a decommissioned army barracks. About a dozen handlers were there with approximately twenty dogs. The barracks consisted of several long two-story buildings surrounding a central courtyard. The purpose of the first day was primarily to evaluate Dax's aptitude for detection work and we would not be using any mold. Looking back, I understand that first session was also to evaluate Tricia and my aptitude for dog training and to introduce us to the principles. That day we saw some amazing demonstrations. The human remains dogs were trained using human tissue such as teeth, sloughed skin and legally acquired bones from foreign countries.

While the dogs were still in the parking lot with their handlers, a number of training areas were prepared. Scraps of raw poultry and beef were set around as a distraction. In one area, a human tooth was buried a few inches deep in a sandbox. Multiple dogs paraded past the area and would

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stop and indicate the presence of the tooth with their particular behavior. One would stop, sniff and sit beside the place in the sand while staring intently at her owner. Another would sniff and give a single sharp bark. One dog sniffed and sat while looking intently at the spot on the sand. When his handler said, "show me", the dog gently stretched out a paw and touched the sand directly above the tooth. The experienced dogs were amazing. They would ignore scraps of raw poultry and beef that had been set out to distract them. While they were working, their sole focus was to find the target on which they had been imprinted. We thought the exercise was over when our teacher used a sieve to remove the tooth and put it into a protective case in her backpack. More trained dogs were brought by the sand box and each dutifully identified the area of sand where the tooth had been. We were told that the dogs were not only able to detect bodies but could also find a location where a body had been present for up to two years after the body had been removed. The demonstration continued. The area of sand where the tooth had been buried was scooped into a five-gallon bucket which was carried about 20 feet away. The dogs were brought back into the area. They stopped alerting on the sand box, but would suddenly alert as they were walked past the bucket with the sand.

Now it was Dax's turn. We learned that a clicker or whistle provides an understandable instant mark for proper behavior. It was explained to us that a unique sound like a whistle or a click was much more effective than our voice for communicating the exact instant when our dog did something correctly. Before we left that first day Dax had learned that anytime she heard the click she would receive a food reward. At first the treat was given instantly after the click, but slowly we extended that time to a short delay after the click; to allow the necessary time for the reward to be removed from the training pouch to give to her. The idea with this form of training is that when the dog does something right they get an instant click which tells them that a reward treat will soon follow. An incorrect behavior was never punished, but it was also not rewarded. In Dax's case, Tricia and I were trained to click, verbally praise and then treat. The timing of the click was critical to make it clear what the correct behavior actually was. Tricia was much better at clicking at the right instant. I, on the other hand, was treated with the same gentle corrections to get me to click instantly when Dax did what was wanted. It was apparent that Dax was eager to please and had the aptitude. The verbal approval appeared to be as motivating as the food reward. "What a good dog!"

We were sent home with a list of training tools we needed. We purchased a training ball to use as a mold target. This was a fist-sized ball-shaped zippered pouch that could be stuffed with moldy materials sealed in Tyvek® wrap to contain the spores and contaminants but allow the odors to escape. We purchased several doggie toys and Dax chose a rubber hamburger squeaker that would sound off every time she bit down on it. This toy would only be used at the end of a training or working session as the ultimate play reward. A waist pack was selected to hold doggie treats so they were immediately available. The waist pack had a second purpose. It was used exclusively when we were searching for mold. When the pouch was strapped around the

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waist with a nylon belt, our dog would be working. When the pouch was off, she was our family member just like always. Finally, we needed our own clicker to help improve on human canine communication.

The next two weeks were spent playing fetch for five minutes two or three times a day with the mold containing training ball. Dax was a Retriever so bringing back the ball was second nature. Before beginning, I always strapped on the training pouch and only after would I throw the moldy ball. Every time she retrieved the ball, we would instantly click, then praise and reward. At the end of the training session, we always played with the squeaky burger. I would then put away the training pouch and the moldy training ball.

The rule had to be very strict. No pouch, no work. By the end of two weeks, we were throwing the training ball into tall grass. Dax knew approximately where the ball landed but soon learned that she was able to sniff out its exact location for a quicker retrieval, resulting in the coveted click, praise, and reward.

Over the next several months, our dog became very proficient at finding mold, but there were a number of flubs along the way. When we graduated from using the training ball, I began putting the Tyvek® wrapped mold targets in small cardboard boxes, which were hidden in various locations throughout our house immediately before a training session would begin. Finding these moldy materials seemed to be going well until we learned that Dax was also identifying all cardboard boxes as being a target. She needed to start learning to discriminate between the smell of mold and the smell of other types of materials. I started placing control boxes through the worksite. I prepped these boxes to look the same as the targets. New gypsum was wrapped in Tyvek®, but had no mold. If she alerted on a control box there was no click and no reward. Our home soon became too familiar a training ground. At the beginning of a training session Dax would run to all the previous places where mold containing boxes had previously been located before searching the house with her nose. Our friends indulged us by letting us use their homes for training.

Dax almost always alerted on the base of refrigerators, which made me wonder if she was detecting cheese or other fermented foods, or if the condensation pan under the refrigerator had started growing mold. One of the rules for this kind of training was never to make a mistake of rewarding for finding something that wasn't truly moldy. It is better to miss a deserved reward for a proper find than to mistakenly reward for a false find. A single mistake rewarding for something that wasn't truly moldy could create confusion and set the training back by many days. Once Dax was trained, I don't believe she ever made a mistake. Unfortunately, there were several times where we had setbacks because I was inconsistent, incorrectly clicked or caused confusion.

Since all molds produce alcohol we had to teach her that alerting on the alcohol in a liquor cabinet was not acceptable. Although, we did discover where one of our friends was hiding the

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good stuff. A number of the remediation firms helped by saving samples of moldy gypsum wallboard they had removed from houses so that I could have the organisms identified and use a variety of target materials to teach Dax what she was supposed to find. We also used a variety of yeasts for baking and brewing beer as well as samples of lumberyard mold to teach what not to find.

After about six months of training, Dax was ready to be used for finding mold in buildings. Most people hiring a dog to do mold inspections are anticipating that the dog will be able to determine all of the areas where mold is present, but it is typically more complicated than that. The answer depends on the level of detection to which the dog has been trained.

Some questions that are important to ask the handler of every mold dog:

1. What is the minimum amount of mold the dog has been trained to find?
2. Has the dog been trained to identify mold that is dead or dormant as well as alive and growing?
3. How does the dog respond when large quantities of mold are present throughout a single room?
4. How does the dog respond when the mold is up high such as in the upper wall, ceiling or attic?
5. What does the dog do if furniture or a cabinet blocks the access to a problem area?
6. Does the dog alert on alcohol, yeast, cheese, dry salami, lumberyard mold, dry rot, wet rot, mushrooms, moldy fruit, moldy bread or grains?
7. Does the dog react to the stud wall framing after it has been properly remediated?
8. How do you approach attic inspections?
9. How do you approach crawlspace inspections?

Each of these questions offers some further interesting insights into mold dogs. The following answers those questions.

1). What is the minimum amount of mold the dog has been trained to find?

The amount of mold that elicits a positive response by the dog will vary depending on a number of factors. The size of the area is only one factor. As an example: A square inch of visible mold will have a density of at least 1 million spores in that square inch of space. If this amount of mold were spread out over a square foot, the mold growth would likely no longer be visible to the naked eye because the density has dropped to approximately 7,000 spores per square inch. Spreading the same amount of mold out over a square yard would reduce the density to approximately 750 spores per square yard. Spreading that amount of mold across an entire wall results in the same amount of mold present, but it should no longer result in an alert because it has become too diluted and no more concentrated than the normal mold levels that enter a home from the outside.

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Another factor is the length of time that mold contaminants have drifted and settled. A recently well cleaned, hard surface may have very few spores present versus a normal home that hasn't been cleaned for a week may have as many as 50 - 100 spores per square inch that have traveled in from the outside and settled. In order to parse out the difference between 'normal' amounts of mold and 'abnormal' or 'harmful' growth, the handler should have some idea what amount of mold the dog will trigger an alert at a worksite before entering the area. Knowing as much as possible about the worksite conditions will give the team a better chance of finding more useful information.

Mold that is actively growing is likely to exude more of the odors than mold that has been dormant or dead. There is no way of predicting if the levels of odors from older mold will provide sufficient saturation for detection although this is also likely to depend on if the dog has been trained to discriminate amounts of mold.

The amount of mold that is used to train the dog matters, but there is no standardized minimum amount that dogs should detect. People with mold sensitivities may want the dog to be able to detect very small areas of growth, whereas inspections for insurance or real estate transactions may only want levels of mold detected that are going to cause issues for people that do not have mold sensitivities. The dog handler should be able to tell you what size sample they use for training. They should also be able to tell you if they perform size discrimination training and what amount of mold they do not want the dog to identify.

2). Has the dog been trained to identify mold that is dead or dormant as well as alive and growing?

Mold that is alive and growing will frequently produce enough microbial volatile organic compounds (mVOCs) for people to smell them. In these cases, a thermal imaging camera and moisture meter is a good way to indicate where the mold is located. Areas of mold that have dried are not detected by moisture meter or a thermal camera. However a trained dog is able to pick up on residual mold gases. The area may continue to have a detectable odor for many years after the area dries. Nobody knows how long it takes the odors of dead mold to fade to a point where dogs no longer detect the odor of mold. In the case of very old mold, the dog may not be able to find the old dead mold growth. Old mold areas that dogs cannot detect are still important to find since dead mold still releases allergens and may have high levels of mycotoxins. Aged mold growth can result in false negatives (the dog doesn't find the area of mold that is present).

3). How does the dog respond when large quantities of mold are present throughout a single room?

There is no excuse for using a dog to sniff out mold when visible mold is present. This unnecessarily exposes the dog to large quantities of mold and may result in the dog becoming ill. Bringing a dog into a visibly moldy room is past the point of diminished return for the effort.

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By the same token, bringing a dog into a worksite where the mold is hidden, but still just as prevalent and widespread out of sight (such as behind the walls), the dog is likely to be so saturated by the smell such that she will not be able to pinpoint a location. When strong musty odors are present the odors are traveling throughout the area and can be difficult for the dog to pinpoint, but it may also be because there is extensive hidden mold that is overpowering or confusing the dog. When multiple areas of mold growth are hidden and scattered within a room, the dog may also have difficulty focusing on a single area at a time. The dog has been typically trained to find discrete mold conditions and to know that finding mold means that fun or a reward will soon follow. If too much mold is present, the dog may become over stimulated and excited. The experienced handler should know their dog well enough to be able to sort out when this is the case, or to at least recognize that the dog is too distracted to focus properly.

Generally, if you can see visible mold or smell strong musty odors then it is unlikely the dog will provide more information than what you are already able to ascertain with your own eyes and nose.

After Dax had become proficient in identifying single mold targets, we began placing multiple target boxes at various locations in the same general area to attempt to teach her that she should only identify one area at a time before moving to the next. Some empty control boxes were also set to make sure she was focusing on the mold and not the odor of the box. During the first training sessions with multiple mold targets she would run to the first box and start to sit to give the signal that mold was present. But instead of waiting to be told to find more mold, she would jump up and run around wildly between the boxes. To control this behavior we placed Dax on a short leash and walked her slowly around the room to keep her from running uncontrolled from place to place. We would pause at each place until she had given a clear alert, give her praise and a treat, and then command her to "show me more".

4). How does the dog respond when the mold is up high such as in the upper wall, ceiling or attic?

The way the dog has been trained will determine if it will find mold that is located up high. Dogs that haven't been trained to find mold up high will typically ignore it. If the dog has been trained to find mold up high they may use a variety of alerts. Some will perform their typical alert behavior then stare intently up at the ceiling or upper wall where the issue is located. Others will stand with their front feet on the wall. Since dogs are different, it is important the handler understand their animal.

There may also be a problem with stack effect causing the airflow to only travel upward. If the odor is not traveling downward from a ceiling into the area where the dog is located then the mold growth is likely to be missed.

5). What does the dog do if furniture or a cabinet blocks its access to a problem area?

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As in all situations using dogs, the alert behavior depends on the dog and the handler. A typical alert behavior is to put their nose into the area close to where the mold is located, then immediately back up a step and perform the alert behavior. Having a well-trained animal that understands the command "show me" is helpful in directing the dog to use their paw or nose to point to the offending area. It can also be helpful to have the dog inspect the area from the backside of the wall, or if that isn't possible circle the room from the opposite direction. The same area should be indicated each time. It may be helpful to take a break and work some other areas then come back and repeat the search in the suspect room or area.

6). Does the dog alert on alcohol, yeast, cheese, dry salami, lumber yard mold, dry rot, wet rot, mushrooms, moldy fruit, moldy bread or grains?

Many foods like cheese or dried salami are processed with mold and other foods may become moldy as they spoil. There are different opinions about whether dogs should alert on these types of mold. The handler should know how their dog responds. In Dax's case, she was taught not to identify alcohol, but to be more specific. She was also taught to ignore lumber yard mold. Moldy foods would trigger an alert. It was then up to me to decide when the alert was due to the blue cheese salad dressing in the refrigerator or the moldy orange that had rolled behind the refrigerator. Of course, moldy refrigerator condensation pans were almost always present in homes. It is important for the handler and the dog to have a strong enough relationship, and for the handler to have enough knowledge in problematic mold growth, to know when additional issues beyond typical refrigerator alerts are being given which indicate that something is in the adjacent wall or behind the refrigerator.

7). Is the dog trained to be so sensitive that it continues to react to the remediated stud wall framing after it has been properly remediated?

Human remains dogs have demonstrated that they can identify a location where the remains of a crime victim had been located for over two years after the body is removed from the crime scene. Some search and rescue dogs have been trained to a level of sensitivity where they can identify a baby's tear in an area the size of a football field. In order for a mold dog to ignore areas where remediation has been performed, it is necessary to train the dog to discriminate for detecting a certain amount of mold. The amount of mold that should trigger a find needs to be determined by the trainer. It is not possible to switch the dog back and forth between their levels of sensitivity. Using multiple dogs trained at different levels of sensitivity is possible, but is not generally practical. In general, the mold dog does not replace the environmental consultant. Surfaces that have been remediated are best tested using the techniques explained in the section on clearance testing surfaces.

8). How does the dog do attic inspections?

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Little dogs can be placed into an attic and allowed to walk around to identify mold. This is far from ideal because it loads the dog with particles of insulation and exposes the dog to inhaling the nuisance dusts. The dog needs to be thoroughly cleaned after leaving the attic before being transported or performing additional inspections. Big dogs are likely to be too heavy to walk around in an attic without potentially causing damage to the ceiling.

9). How does the dog perform crawlspace inspections?

Crawlspaces usually have higher levels of mold than the living space. Using a dog in a crawlspace can be tricky because of the dog's level of discernment and the issue of too many sources. If a dog alerts to an area of floor above a crawlspace, it needs further inspection to determine if the floor is an issue, or if crawlspace mold gases are penetrating into the living space. Sometimes the dog will alert to furnace and air-conditioning vents in the floor. This may indicate mold growth in the ductwork, but it also frequently indicates air leakage around the supply plenum that is providing a pathway for the gases to come from the crawlspace or cellar into the living space. If a dog is going to be used in an attic or a crawlspace, it should do that part of the inspection last and then be immediately cleaned to prevent spreading contaminants.

Checking the Dog and Handler's Proficiency

During my consulting, I have offered clients a way to perform a quality control assessment during mold dog inspections. The following letter is an example of what my clients have provided to mold dog handlers before the dog is brought into the home. The letter clarifies what is expected and lets them know how they and their dog are being evaluated.

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Dear Mold Dog Handler,

My name is John Banta. I am a Certified Industrial Hygienist with 30 years experience investigating mold problems in buildings. This experience includes working with mold dogs. I am providing consulting services for the client that has supplied this letter to you. The purpose of this letter is to describe the quality control method that I have recommended my client use during the canine mold detection that you will be performing at their house. This information should be provided to you in advance of your inspection so that you will be able to participate with a full knowledge that this quality assurance procedure for your inspection is in place.

1. The home you are about to inspect has six identical boxes that have been placed in various locations throughout the home. Some contain mold samples.
2. The boxes should be set in plain sight about 2 to 4 feet away from exterior walls, vent registers, and kitchen appliances. They should be placed a minimum of 30 minutes before the mold inspection.
3. Each box is uniquely numbered (one through six). An answer key has been provided to your client telling which of the boxes contain mold and which are controls.
4. Three of the six boxes have a nine square inch section of gypsum wallboard with visible mold growth. The molds used are commonly associated with water damage in buildings. The samples are in a sealed Tyvek® envelope to prevent release of mold. Tyvek® is permeable to odors but will not allow spores or fungal fragments to escape.
5. Three of the boxes are controls. They have nine square inch sections of clean gypsum wallboard. The control samples are also sealed in Tyvek® envelopes before placing inside the sealed boxes.
6. Please do not open the boxes or envelopes. This would cause a release of mold into the indoor environment. If your dog has been trained to alert using the aggressive method, the Tyvek® envelopes should provide sufficient protection to prevent a release of spores and fungal fragments should your dog damage the box, but you should be prepared to intervene and stop your dog from retrieving and damaging the sealed envelope, which contains the mold sample.
7. The mold samples have been stored and shipped separately so the mold odors do not cross contaminate the control samples.
8. Please conduct the inspection of the home in accordance with your normal inspection procedures. During the inspection - Your dog should be able to identify the three boxes with mold and ignore the three boxes that do not contain mold.
9. At the end of your inspection, you should inform your client which boxes contain mold and which are controls. This can be checked against the answer key they have been provided.

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Conclusion:

I believe that Dax taught me more about finding mold than I taught her. One of her lessons for me came during a case that had already stumped another mold investigator.

The home was a single-family residence that had a toilet overflow that flooded from the bathroom and developed mold growth in the master bedroom and bathroom. The home had undergone remediation by discarding the carpet, removing the lower two feet of the gypsum walls, and then had repeated detailed cleanings. The building would not pass the post remediation air evaluation. Levels of mold associated with water continued to be present at high levels. I was asked to bring Dax out to the house to see if we could use her to figure out why the home wouldn't clear. I had skipped two days of training over a weekend, but I figured that would be okay. She wouldn't forget her training that quickly. I first walked Dax around the perimeter of each room believed to be unaffected. Dax did not alert anywhere. We then proceeded around the perimeter of the contained master bedroom. Dax kept glancing over to the middle of the bedroom where the master bathroom toilet was sitting on a piece of plastic on the bare concrete slab floor. I was having trouble keeping Dax focused. She dutifully went all through the remediation areas without alerting. I repeated the inspection going the opposite direction around the home, but still no alerts. At that point I took her off her lead and gave her the run of the contained area and said "show me". Dax went straight for the toilet and sat down beside it in her characteristic alert behavior. The remediation crew chief had said that everything in the room had been cleaned. Maybe Dax was thirsty - she had been trained that toilets were not for drinking, but maybe this was her way of asking for a drink. I took her outside for a drink, and then we had a good romp, playing with her rubber burger before going back inside for another round. She went back to the toilet but nowhere else! Very frustrating!

I had put Dax into her travel crate and was getting ready to take her home. I was concerned that the two days off had been a mistake and had cut into Dax's proficiency. I wanted to put her through her paces with known mold targets that I kept for training purposes, but something was nagging at me. I decided to go back inside for one final look. I went to the toilet and lifted the lid. The toilet bowl was stuffed with wet moldy paper towels. Dax had been right, and I had chosen to ignore her alerts. The outside of the toilet had been cleaned - but the inside of the toilet bowl had not been thoroughly dried. Instead it had been stuffed with paper towels which had soaked up some remaining water and grown mold. Dax got a whole real hamburger that day on the drive home, and I was reminded how easy it was for damp materials to grow mold in unexpected places. There can be many confounding or interfering conditions, which make it very important to pay attention to details when performing mold inspections.

I retired Dax from hunting mold about a year and a half after we first started to train her. She was excellent at the work she did, but I found I was unable to keep up the level of training that was required to maintain our team proficiency. I was spending a good deal of time away from home,

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traveling all over the United States and Canada teaching restoration contractor classes in mold remediation. In September 2005 I was in England teaching a mold remediation class when Hurricane Katrina hit New Orleans. A month later in October Hurricane Wilma struck the Florida Keys. There was a period of several months where I was away from home at least half the time.

I have no regrets spending so much time training Dax. I am convinced the time spent made me a better owner and a better mold investigator. After a year taking her into the field, I found that my own abilities as an inspector had sharpened. Her instant feedback helped me to start seeing clues that helped guide me to be better at what I did. But, I also found very few jobs that I could use Dax for without concern for her safety. I also never felt comfortable with the simple "yes there is mold" or "no there isn't mold" response that she was able to communicate. I still needed to provide the same amount of inspection and testing to provide verification about the types and quantities of mold that were present. Today, there are a few mold dogs still working in the United States, but not many. I think it is likely many others came to the same conclusion. Dax continued to be our pet and a valued member of our family for many years.

We felt honored to have members of the Canine Specialized Search Team in Mountain View California mentor Tricia and I. They are constantly prepared and ready to help rescue people or help locate victim remains so they can be returned to their families. Knowing that there are people willing to invest so much time in volunteer work, continually training their dogs to be ready to travel wherever and whenever, is comforting. They and their dogs are true heroes.

John Banta is a Certified Industrial Hygienist with approximately 30 years experience with healthy homes. He specializes in water damage and mold problems in buildings. John is a Coauthor for the book Prescriptions for a Healthy House: A Practical Guide for Architects, Builders and Homeowners.

This section has been excerpted from John's new book that focuses on mold problems in the home. The book's working title is "Mold Controlled, A Practical Guide to Find, Avoid, and Fix Problems in Water Damaged Buildings. The book is scheduled for Publication March 2019. If you don't want to wait for full publication John is making draft chapters available when they are ready - as perks for contributors to his crowd-funding campaign to conduct research to help answer additional questions about mold that still remain unclear.

Learn more about his research and book at www.JohnCBanta.com

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