

All of this to cover our flanks because of the failure of performance of termiticides in recent years.

"We who spend some \$100 million per year purchasing termiticides need some answers. We know that alternatives to modern-day termiticides are not exactly earth shattering, at least at this point, so we're stuck with the materials we've been using to perform these services.

"Hear us that there are real and monumental problems. Get real on your research; on the meaningfulness of your research and the truthfulness of your research. To our researchers, to our manufacturers, we ask that you please accelerate finding answers to our problems. We have to depend on you. We beg you, provide us with the materials, with the application equipment, with the techniques and

with the training to perform subterranean termite control effectively and dependably.

"Let me cite you an example: A termite salesman went out and sold what he considered to be a jewel of a sale. It was good money. He had some competition to bid against, but he was able to get the job virtually at his original price without having to cut it. He came in jubilant about this

THE TERMITICIDE CONTROVERSY: A RESEARCHER'S VIEW

By Dr. Roger Gold

At the 59th Annual National Pest Control Convention & Trade Show in Dallas, Texas, Bill Clark, president of Bill Clark Pest Control, Beaumont, Texas, opened a panel discussion session with some comments on the need for more applicable information on the termiticides which are used today. Mr. Clark presented the audience with some thought-provoking questions and comments that I would like to address.

Let me preface my remarks by stating that there is excellent research being conducted on termites and their control. Some of this work is basic and deals with the biology of termites, while other work emphasizes the applied aspects. One of the problems we face is that there is no way to speed up data collection. If you are seeking five-year data on a termiticide, the only way to get that data set is to collect it over a five-year period. The best way to determine whether a technique or chemical works is to test it under controlled conditions. This is called reductionist research wherein we attempt to manage the number of variables to make sure that what is being investigated is actually what is being observed.

For example, it is not appropriate from a scientific viewpoint merely to apply termiticide around a single structure, and then decide whether or not it worked. What is required is to apply termiticide around several structures of approximately the same construction type, with the same relative level of termite infestation, on the same soil type, in the same environmental zone, by the same crew, and using the same application equipment and procedures. If we can accomplish this, then we will be able to determine if under that specific set of conditions the treatment worked. If we do the treatment only around one structure and then draw conclusions from that single situation, there would be a very high probability that the conclusion could be incorrect. I recognize that the industry needs results fast, but I must assume that you need accurate information, not just an answer that sounds good for today.

I share Mr. Clark's concerns about the efficacy of termiticides and their application. He raised some very important points in his presentation that need to be addressed. We also continue to hear that retreatments are up; it is more difficult to control termites than it has been in the past; chemicals and equipment are more expensive; that customers are reluctant to pay more for services; warranties have had to be reworded with disclaimers added; and more information is needed on chemicals, equipment and application technologies. We agree more training of technicians is needed. We further recognize that validated information about non-chemical control measures for termites is lacking.

I am aware that several companies have looked at this entire situation and have decided to get out of the termite control business. So where does all of this leave us? The answer is what it has always been. Those individuals and

companies that can adapt to these situations, incorporate new information and technologies into their operations, and recognize problems and solve them will survive, and will make a profit. Those that cannot or will not adapt will simply not make it. This is one of the basic laws of nature, and it is never wrong.

THE ROLE OF RESEARCHERS. How is the scientific community helping you to adapt and respond to the challenges that you face? Let me assure you that we hear your messages and are working as quickly as possible with the limited resources at our disposal. There are already excellent research programs that were developed to answer your questions and needs for information. Several of these programs have been underway for many years, others have been started within the past few years, but all are producing relevant information that the pest control industry needs.

The scientific method requires that an hypothesis be stated; methods and materials be developed which will test the hypothesis; experiments be performed during which time data is collected and observations are made; and finally, the hypothesis be either accepted or rejected. If the correct conclusions are drawn, then the results of the research will stand the test of time. Often, the amount of time needed to draw conclusions is longer than we would like, but scientists have a tendency to be very careful not to extract more information from a data set than is appropriate.

As an example, if you want to know how long a specific termiticide will last in a specific soil it will take several years during which time samples will be taken and analyzed. In business, it is common to use data collected over a short period of time to predict long-term trends. This is not appropriate in science. Projections cannot be made for five or 10 years from only one year's data. It is also important to understand that data best describes what will happen in the specific location and under the experimental conditions used in the study. In other words, if you want to know how long a termiticide will last, data from Texas or Louisiana may not represent the soil or environmental conditions in your part of the country. We can make predictions on what will happen, but the best situation is to get data from conditions that are closest to what you are experiencing. This is often not possible, so use the data which most closely represents your interests.



Dr. Roger Gold

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Often people will be concerned that experimentation is conducted in situations which do not represent the real world. The reason for this is that depending on the hypothesis being tested, it may be best to use what is known as a reductionist approach. That means we try to reduce the number of variables to a level that can be easily handled. One example of this is if the efficacy of a termiticide is being evaluated, it may be best to perform the test several times in situations where everything is the same (soil type, temperature, construction type, etc.) with the only variable being the different termiticides. The alternative to this approach is to test the termiticide on as many structures as possible under varying conditions. In that situation, it would be necessary to conduct hundreds or thousands of tests in order to insure that the results are due to the treatment rather than to differences in construction, environment or application. Usually both types of research are done, but it takes many years of testing and data collection to get definitive answers.

The other factor which must be considered is the cost of the experimentation. In general, it is much less expensive to do testing on mini-sites than on full-scale buildings because of the time, labor and equipment required. If the mini-sites are used, the data and resulting conclusions will be as valid as if larger scale work were done. Usually initial evaluations are done in the laboratory on a small scale, and then the work is moved to the field under actual conditions. If this work is performed correctly, there will be no differences between the conclusions that can be drawn.

Data that are collected as part of scientific experiments are subjected to statistical analysis to insure that the effects seen have a high probability of being correct. Most scientific work utilizes a probability level of 5 percent, which means that the results seen are due to the treatment and not to some other factors at least 95 percent of the time. In this case, there would be only a 5 percent chance of an error.

Pest control operators are concerned about receiving different information from different research groups. This has been the case with information about termiticides. As you analyze the way the tests were conducted, you can

see that different approaches were taken. Perhaps the testing was done on local soils or under different environmental conditions, or with different chemicals, or with different chemicals or with different application techniques. This does not mean one test is better than another. You must find out what the test conditions were, and how the research was conducted before you can draw any conclusions from the data.

Pest control operators have been concerned, as have researchers, that there is very little scientific data on non-chemical alternatives for termite control. There are reasons for this, including the fact that some approaches are difficult to test scientifically. In other situations, the manufacturers will not submit their equipment/technique to testing, or they refuse to allow independent evaluation by university scientists. The major problem is that scientific testing is expensive and many small companies cannot afford to have their devices tested in an appropriate way. As unfortunate as it may be, university researchers do not have the financial resources to do this testing without funding from the inventor or manufacturer. Many consider it an unfortunate situation that the federal government does not require efficacy data be reviewed before devices or technologies are marketed. Perhaps in the future all products or technologies will have to be screened at either the federal or state level before being sold.

Mr. Clark and others have raised the issue of whether the research that is being conducted is relevant to today's situations, and whether the results of the research are truthful. I can only respond to this from my personal perspective and indicate that the university scientists I know take this matter very seriously and are doing the best work possible with the resources at their disposal. We are almost totally reliant on funding from industry to support our work with termiticides, but the results that are being reported are truthful and are based on actual data which has been collected and analyzed with the best equipment and people available. We report only what we believe is correct. If people are so concerned about the fact that the research is funded by the pesticide manufacturers, then they need to help us to develop independent sources of funding. Nonetheless, I can assure you that funding sources have nothing to do with the results of the testing. In many cases funding does determine which products, devices or technologies are tested, but it does not determine the

results that are eventually reported by university researchers.

SOME FRIENDLY ADVICE. The pest control industry is very concerned about legal problems associated with termite control. The best way to protect oneself in these difficult times is to be armed with the truth. If a pest control operator has assured himself that the best products are being used for their specific situation, and that applications are made in a manner that is consistent with label directions, then the problems will be minimal. Based on the data we have examined here at Texas A&M University, the currently available termiticides should give adequate control for at least one year and beyond. Our work is continuing, and it is our intent to keep the industry advised of our progress in evaluating pesticide products and application techniques.

I think it is advisable to review current information on termiticides and to make any necessary changes in products, application techniques, warranties or service contracts that meet your needs. Those companies that are using the same application techniques as they did 20 years ago are going to have problems, but when you understand the limitations on available products it is possible to solve termite problems and make a profit in doing so.

There are, unfortunately, no magic bullets that will solve every problem. Termite control continues to be hard work, and right now is based on the principle of establishing or re-establishing a protective barrier around structures. In the future, approaches may be different, but for now I would advise that maximum label rates of the termiticides that are most effective for your soil types be used to establish a continuous barrier. This approach, coupled with sanitation, including the removal of wood-to-soil contact, will be effective. Perhaps the major difference between the approaches taken today than in the past is that you will have to make more frequent and thorough inspections to detect problems before major damage occurs. It also appears that more frequent reapplications of termiticides will be made in situations where the products are broken down, tied up or lost to environmental factors. This actually represents a profit opportunity for the industry if your business is structured accordingly. **PCT**

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