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INSECT NOTES

THE BIG CHILL - WHAT DID IT KILL?

It seems that every 8-10 years we get a real winter here in Virginia, and the temperature drops to some new record low. Water pipes freeze and split, cars don't start, the cat won't set foot outside, and things are just generally bad for the good guys for a few days. After it all passes there are always a few folks that want to find some good, some benefit in it all [usually a desperate reporter somewhere, looking for a story!]. So the logical thought is..."it must have done something bad to all those nasty insects out there"...right!? Wrong! We get a little cold weather, and this warm-blooded animal that has been walking upright in the woods for only about 1.5 million years gets a little chilly. Those six-legged animals crawling along in the woods, insects, have been around for...well beetles maybe for about 190 million years, flies for about 100 million, and grasshoppers, crickets, and cockroaches for about 350 million years. These six-legged folks are playin' for keeps, they've seen it all--from ice ages to tropical times. A few days and night at a few degrees below freezing is not going to phase them much at all...sorry folks.



Most interest is usually given to the soil inhabiting insects, as it seems they would suffer the most in cold weather. In fact, they probably suffer the least. Consider the immature stages of turf pests, such as white grubs (Japanese beetles, masked chafers, June beetles, etc.). These insects spend the winter three to four inches below the surface of the soil; they tunnel to this depth in response to declining soil

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temperatures in the fall. What probably happens is that the soil near the surface begins to cool, and these grubs migrate to soil that has higher temperatures--which is a few inches deeper.

When winter air temperatures drop below zero degrees F (Blacksburg went to -15 F in 1985, and to about -19 F this year), this should not be confused with the soil temperatures. In general, soil temperatures at 2-3 inches below the surface remain at the freezing point (32 F). When there is a snow cover of a few inches, the soil at the surface will remain close to 32 F (otherwise it will drop a little below that). When you go deeper in the soil, the temperature increases! So, where soil insects spend the winter the temperature very rarely drops below the freezing point of water--and that is not a threat to their survival! Now, some insects can be killed by low temperatures--flies for example. The house fly overwinters as adults, larvae, and pupae in protected locations. This species is very susceptible to cold temperatures, and is easily killed below 32 F. But I don't think we will see much of a difference in the house fly population this spring--I have every confidence that this very successful insect will bounce back with sufficient numbers to annoy us next summer. Cold weather has rarely if ever had any serious impact on the insect pests that have adapted to the human environment--especially soil insects. So, what does that leave us--fire and flood, I guess!

FROM THE MAILBAG THIS MONTH

The winter months bring a nice lull in the household and structural insects that can bother us. However, there are always a few to keep things interesting. Stored food and flour pests are common this time of year. Grain beetles and flour moths are often encountered in the winter months, probably because we are spending more time indoors (ignorance is bliss!). The best control strategies for these pests is to determine the source, the food that is infested, and remove it. Indian meal moths are often associated with dry pet food and with bird seed--check these first if there are small, brown and pale moths flying about the house, or yellowish-pink caterpillars crawling through the kitchen cabinets.

Carpenter ants may make their appearance this month--harbingers of spring! (not really). When these ants are found in February and March, it is a fair sign that there is an infestation/nest in the house. When they are first seen in May and June, that usually indicates that the nest is outdoors and they are just foraging in the house for food.

The recent ice storm and power outages in several regions of the state will result in some folks using their fireplaces and woodstoves a little more. That means a little more firewood in the house, and that may mean a few more bark beetles emerging and flying to lights and windows. These beetles are very small, but can occur in large numbers. Not to worry, they will not infest the house and will die there at the window.

URBAN PEST CONTROL RESEARCH CENTER

This facility is a part of the Entomology Dept., and is located just off campus on Glade Road (down the street from the Marriott--look for the sign out front!). It was built in 1988 with funds (\$200,000) provided by the professional pest control industry, manufacturers of household and structural insecticides, and with some funds from the state. The building is dedicated to research on household and structural insects pests, and the results of this work directly benefit homeowners and the industry. It is where I spend most of my time!

I thought I would use the winter lull in household pests to bring you up-to-date on the projects that are ongoing at the UPCRC--to give you an idea of what it is we are doing, and how it can impact your clients. We are a busy group of 6-7 people here, and there are lots of things going on.

Cockroach Biology and Management. We have nearly 20 years of research on the biology and habits of field populations of German, American, and oriental cockroaches--both here in the U.S. and in China (and a little in Japan and Hong Kong). We still conduct research in this area, but now the emphasis has shifted to the large, *Periplaneta* species and computer-aided decision making models (high tech stuff--by Nonggang Bao, a Ph.D. student with us).

German Cockroach Resistance Monitoring and Management. We have been working for several years on insecticide resistance in field populations of German cockroaches. We have published on development of and methods of measuring pyrethroid insecticide (most of the chemicals in aerosol cans are pyrethroids) resistance, and on the management of pyrethroid resistance in a German cockroach population in Roanoke apartments. This species continues to be a serious household pest throughout the U.S., and chemical control strategies are evaluated regularly.

Biology, Distribution and Management of House Dust Mites
This area of research is about three years old now, and has been guided by Dr. Judy Mollet. We are investigating the dispersal and distribution of dust mite species in the living environment. We have laboratories of several dust mite species and use them for research and insecticide evaluations for the design of management programs. There are some real difficulties working with dust mites--takes a lot of special equipment just to see these critters! Dr. Mollett has considerable experience with mites, however, and has us all convinced that there really is something in her rearing chambers. Dust mites are beginning to be recognized as serious pests indoors, especially to those people with allergies. We are looking for Judy to expand her work in the coming years (once her two boys are in school).

Wood Infesting Beetles and Chemical Protection of Structural Wood.
We have about 20 years research on the biology and habits of the old house borer, and a considerable data base on the penetration and permanence of insecticides applied to structural wood. Current research is involved with the factors that influence the penetration of boron-based products into structural

timber. These products are becoming popular for the "natural control" crowd--and there are some misconceptions on how well they protect structural wood from insect pests.

Termiticide Application Techniques and Bioassay. For several years we have worked with the technology of applying termiticides beneath concrete slabs. We conducted some of the first work on using foam to deliver termiticides [Dr. Claude Thomas was a visiting scientist with us for 9 months and worked in this area]. We still conduct research on application methods and equipment, and now have expanded that to include termiticide bioassay [with the establishment of a termite colony in and outside the UPCRC].

Dose Transfer of Insecticides to Insects. We have a small research project that investigates the mechanism of transfer of a toxic dose of insecticide to the tarsi of cockroaches walking on a treated surface. We have designed and had built for us several pieces of equipment that can make/deliver droplets in the range of 40 to 200 um--one at a time or in any sequence or frequency! (Keep in mind that you can not see droplets that are smaller than 50 um--so some of this work is difficult). This research area is somewhat dormant at this time--waiting for a student.

UPCRC Bibliographic Data-Base. We have a large literature data base here, probably the largest [anywhere] in urban entomology. There are more than 5,000 pieces of literature in the data base; we keep copies of about half of them. We have one computer and a part-time data manager (Lisa Crews) dedicated to this project. This are will continue to expand, and we are looking for better ways of managing the very large and growing urban entomology information explosion. Before long the data base will be available to Agents--but we have to work out some protective details.

Urban Entomology Bulletin Board. We are in the process of establishing a computer bulletin board, to be titled UrbanEnt. We have purchased a 486MB computer system and will finish the programming and installing the phone line by the end of the month. The computer/phone line will be dedicated to this Bulletin Board. On it we intend to allow users access to our research data base on insecticide evaluations for cockroach control, wood protection and application technology. In the near future I will let you know the availability of this data base. Agents with a computer/phone setup will be able to access our research data, publications, and product test results by calling the UrbEnt Bull. Board. [We will not be providing the general public access to our bibliographic data base, but will try to make it available to Agents!]

Household and Structural Insect Pests Publications. We publish 3-4 scientific journal (U.S., Germany, Japan) articles and 4-6 trade journal articles (Pest Control Technology magazine, Pest Management magazine, and others) a year on our research. In addition, we are working on revising the Commercial Applicator Training Manuals for Category 7a and 7b. Insect Notes originates from the UPCRC every month, and before too long you will be able to access the Insect Notes file on the UrbEnt Bull. Board.