PCAM PEST INFO

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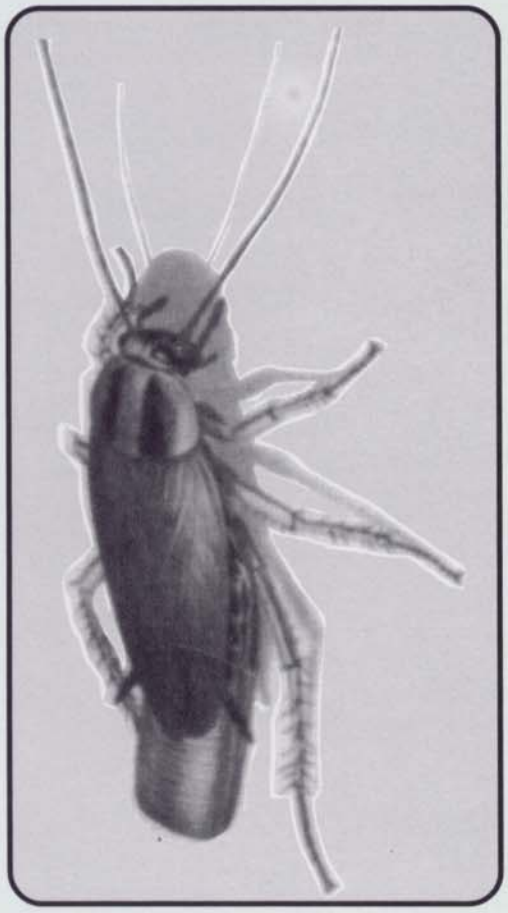
(For members only)

A Newsletter of the Pest Control Association of Malaysia



FOCUS ON COCKROACHES

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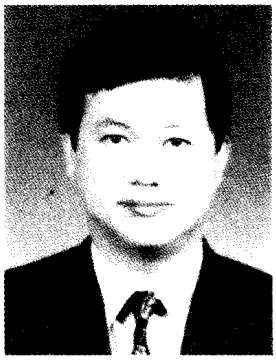


President's Message

Ti e really flies. Our present term of office for 2 years term will be ending in April 1999.Indeed, it's a great challenging experience for me and the whole Executive Committee to serve you. - Our esteemed fellow members of PCAM.

We want to apologize for not having any Pest Info issue for the year 1998. However, we have kept the communication by sending out the Pest Bulletin, twice last year. We felt that with the economic slowdown, we have to keep our cost really down and furthermore, we would not like to tax our Allied members who have always been supporting us. Given the above scenario, we will be having 2 issues a year. I would like to thank my VP of Communication, Mr Fred Lim for his dedication and contribution as our Editor.

I can foresee that 1999 is going to be a very tough and challenging year for the Pest Control Industry. You will see great changes in the business environment, Legislation and etc. with the recent draft of the Pesticides (Pest Control Operation) Rules 1998. PCAM is in full support and recognise the need to amend the Pesticide (PCO) Rules 1998 for the continued development of this service-orientated industry with regards to accountability in the areas of standards, quality and responsibility. The PCAM will work very closely with the Pesticide Board so as to ensure the Pest Control Industry is protected. I strongly urge the entire fellow PCO to be well prepared for the changes, as we can no longer be what we are today. We need to move forward with the rapid changes in the market place. We would like to assist you in anywhere we can and would appreciate your feedback.

We trust that the Pest Info will be of great benefit to you.

Thank you.

Stephen Liu

PCAM President

Editor's Note

We are now at the end of the millennium. Before we move on to a new millennium, it's good to reflect on the progress and achievement of the pest control industry.

On the whole, the industry has come a long way since the last forty years or more. It is indeed very fortunate that the industry enjoys strong support from the manufacturers, suppliers and members of the academic institutions, both local and foreign. All of them are very willing to enlighten members of the pest control industry and share with us their expertise and knowledge on their respective fields through the various training seminars and workshops held over the years. Thus, in this way they have contributed to make this industry more professional.

Generally, most PCOs (albeit a few bad apples who give the industry a bad image) have always strive to make it their policy to be professional at all times. They are committed to upgrading themselves on the latest information pertaining to method and technique as well as new chemicals and their usages. Their objectives are to provide the best pest control services to their clients ensuring safety towards the environment, public health and the applicators. We certainly hope that such good practices will continue.

Last year, there were complaints from consumers to the Pesticide Board of Malaysia of errant PCOs. Hence, the Pesticide Board of Malaysia has come up with a draft of the Pesticides Act 1974 Pesticides (Pest Control Operator) Rules 1998 to protect the rights of the consumers and ensure that pest control jobs and treatment are carried out professionally by PCOs. The Pesticide Board of Malaysia has pro-actively approached the relevant government agencies and PCAM on the draft for purpose of getting a mutual consensus before implementing it. The draft was circulated among members of the PCAM and also some non-member PCOs for their attention and feedback. Armed with the feedback, the PCAM has approached the Pesticide Board of Malaysia to discuss the concerns of its members.

Recently a workshop was organised for PCAM members to express their concerns on the key issues of the proposed Pesticides Act Pesticides (Pest Control Operator) Rules 1998. It was held on January 28, 1999 at the Seasons Hotel, Kuala Lumpur. Mr. Tan Soo Hian, Secretary of the Pesticide Board of Malaysia and his assistant, Puan Hajah Samsiah graced the workshop. Puan Hajah Samsiah was very kind to present the proposed Pesticide Board Rules to the participants and was there to answer to queries from the floor. Thereafter, the participants was divided into groups to further discuss their views and recommendation concerning the issues of the Pesticide Board Rules if implemented. Each group then make a presentation of their points which was duly compiled and recorded by the organising committee for further presentation to the Pesticide Board of Malaysia.

I would like to take this opportunity to remind all fellow PCOs that while day-to-day operation is vital to your business, do take a few moment of your previous time to study the proposed Pesticide Board Rules and the effects of its implementation on long term. Do not wait until 'nasi sudah jadi bubur' before you act. It will then be too late. On this note and on behalf of the PCAM I would like to express our appreciation to all participants of the workshop for their attendance and support.

Thank You.

Fred Lim

Vice President-Communication

Congratulatory Message to Prof. Yap Han Heng

The Pest Control Association of Malaysia would like to congratulate its Honorary Member, Professor Yap Han Heng who was recently awarded the Malaysian Toray Science Foundation (MTSF) Science and Technology Award 1998. He received the award from Minister of Science, Technology and Environment, Datuk Law Hieng Ding in an event held in Kuala Lumpur on 9 December 1998. Professor Yap who was the Coordinator of Vector Control Research Unit, Universiti Sains Malaysia, is an authority in the field of medical entomology, particularly in vector control. He started his scientific career in 1960s researching on the circadian rhythms of mosquitoes, followed by use of enzyme indicators for detecting aquatic pollution. After his Ph.D. and post-doctorate in USA, he joined Universiti Sains Malaysia as a Lecturer in 1972 and began his research on mosquito biology and control. During the 1980s, Professor Yap had conducted numerous research on biological control for mosquito vectors, particularly use of microbial agents and mosquito predators. He has also contributed tremendously to the development of better and safer household insecticide products in this region. To date, Professor Yap has published more than 120 scientific papers in local and international journals.

Professor Yap has been admitted in the World Health Organization's Advisory Panel for Vector Biology and Control since 1978. He is also a honorary member of WHO/CTD Global Collaboration for Development of Pesticides for Public Health since 1977. Professor Yap has also helped in the development of 30 Malaysian Standards (SIRIM) for various household insecticide products. He is also instrumental in the establishment of a new Malaysian Standard for termiticide specification which is of huge interest to the Malaysian pest control industry.

Japanese Encephalitis (JE)

Contributed by Prof. Yap Han Heng,
Vector Control Research Unit,
School Of Biological Sciences,
Universiti Sains Malaysia,
Minden Heights, 11800 Penang

Pathogen: *Japanese Encephalitis virus*
Family Flaviviridae (Previously Togaviridae)

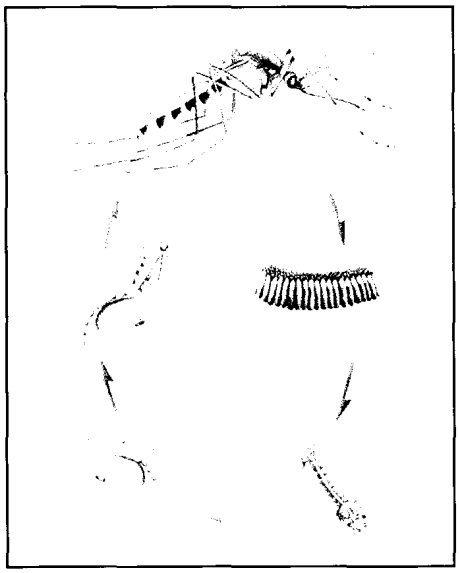
Vector Of Japanese Encephalitis

1. Culex tritaeniorhynchus (Giles)
2. Culex gelidus (Theobald)
3. Culex vishnui (Theobald)
4. Culex pseudovishnui (Colless)
5. Culex fuscocephala (Theobald)

Japanese Encephalitis Vectors
Mosquitoes from genus Culex: Culex tritaeniorhynchus, Cx. gelidus and Cx.vishnui groups

Distribution :
Widely distributed in the subtropical & tropical Asia.

Biology :
Adults are active at night (peak biting at 2100 to 0200 hours). Able to perform long-distance flight (above 2km radius). Breeding occurs in polluted organic water (ie in drains, septic tanks, Oxidation ponds & animal farms including pig sties) and paddy fields.



Japanese Encephalitis Virus

- Disease : Japanese encephalitis (JE,JBE)
- Pathogen : A virus, Togaviridae, Flavivirus.
- Victim : Humans.
- Vectors :

Mosquitoes, Culex tritaeniorhynchus in Japan and mainly this species & certain other Culex elsewhere.

- Reservoirs : Uncertain, may include birds. Pigs are amplifying hosts.
- Distribution :

From eastern Siberia westward across Asia to India.

- Importance :

Epidemics irregular with a minimum of 30% mortality from the total clinical cases. Permanent impairment know.

Control Approaches For Japanese Encephalitis Vector Mosquitoes *(Culex Species)*

1.0 Conventional Approaches

(a) Sanitation/Sewage disposal - Proper drainage waste water treatment (Oxidation pond)

(b) Chemical Control - Space Spray Thermal Fogging

Formulation	Remark
Resigen[1]	Water-based (adult & larvae)
Sumithion L-40S[1]	Diesel-based (adult & larvae)
Malathion[1]	Diesel-based (adult Only)
Pesguard 102[2]	Water-based (adult Only)
Biovectrol[2]	Water-based (adult & larvae)

1 Registered with Pesticide Board of Malaysia
2 Registration with Pesticide Board of Malaysia in process

(c) Larvicides

- Fenthion (Baytex)
- Cyfluthrin (Responser)
- Chlorpyrifos (Dursban)

2.0 Community Oriented Approaches

(a) Use of household Insecticide Products (Mosquito Coils, mats, liquid vaporiser & aerosol) - *Indoors*
(b) Use Of Personal Repellent - *Outdoors*
(c) Netting of Premises
(d) Proper drainage

EXECUTIVE COMMITTEE ORGANIZATION CHART 1997/1998

1.	President	Stephen Liu	Ridpest Sdn Bhd
2.	Deputy President	Richard Ng	Syarikat General Pest Control
3.	Vice President-Membership	S F Yoong	Anti Pest Sdn Bhd
4.	Vice President-Communication	Fred Lim	Okin Pest Management
5.	Vice President-Project Development	Ang Tan Loong	Stopest (M) Sdn Bhd
6.	Honorary Secretary	Raymond Lee	Pest Dynamics (M) Sdn Bhd
7.	Honorary Treasurer	Chong Yee Seng	Wood Pecker (M) Sdn Bhd
8.	Executive Member	David Sikhdev Singh	RMR Enterprise
9.	Executive Member	Chris Lim	CWS Hygiene Sdn Bhd
10.	Executive Member	Johnny Kang	Fog Master Sdn Bhd
11.	Executive Member	Teoh Lee Cheng	Flick Pest Control Sdn Bhd

Understanding Resistance in The German Cockroach

Part 2 : How to manage insecticide-resistant German cockroaches

LEE CHOW YANG, PhD, BCE

Introduction

"Whereas the presence of resistance was a rare phenomenon during the early 1950s, it is the fully susceptible populations that is rare at present (G.P. Georghiou)."

In the previous issue of PCAM Pest Info (1997: Issue 5), the topic of how resistance develops and the various mechanisms involved had been addressed. Several Malaysian pest control operators had expressed great interest in the subject and had sent live German cockroach specimens to me to be screened for insecticide resistance due to control failure. Out of the five strains that were sent to me, only one strain showed insecticide resistance. When I asked operators whether they can verify whether the treatment was being done properly, almost all answers were negative.

What to do when you have control failure?

What should a pest control operator do when a control failure is encountered? First, check whether the insecticide used was from fresh stock. Certain insecticide formulations such as emulsifiable concentrates (EC) will lose some of their activity when left overnight. Next, verify whether the insecticide has been properly diluted. It is extremely important to use only the recommended concentration for treatment to ensure the best performance of that formulation. The operator will also need to ensure that the insecticide had been properly and thoroughly applied to all cockroach harbourages. Some tough-to-reach harbourages can be difficult to locate and will serve as the reservoir for further infestation. To locate harbourages, use flushing agents. If control failure still persist despite all precautions, the PCO can confirm insecticide resistance by sending the cockroaches to the author (please refer to the author's address at the end of this article). The author would be more than happy to run toxicity and biochemical assays at no cost.

Managing insecticide resistant German cockroaches

If insecticide resistance has developed in the population, there are basically three main approaches to tackle the problem, namely, rotation, mixture and use of insecticidal baits.

I. Rotation method

In this method, the pest control operator rotates the groups of insecticide that he uses. For example, when he faces resistance problem to carbamates (eg. propoxur, bendiocarb), he switches to pyrethroids (eg. permethrin, lambdacyhalothrin, cyfluthrin, deltamethrin, alpha-cypermethrin, cypermethrin, fenvalerate). After a few services, he switches back to carbamates or organophosphates (eg. chlorpyrifos, fenitrothion) and then back to pyrethroids again after a few rounds. The cycle then continues. With this method, the carbamate-resistant cockroaches will be killed when pyrethroid is being used. Before pyrethroid resistance develops, we then rotate back to organophosphates or carbamates. This method has been proven very useful on many occasions. In Kuala Lumpur, a four-star luxury hotel which earlier showed high carbamate resistance in 1993 was managed with a pyrethroid followed by an organophosphate. The pest control operator had obtained an extremely good population reduction when he switched to pyrethroid and organophosphate. Up to today, he is still managing the population using the rotation method (carbamate→pyrethroid→organophosphate) and of course still getting his contract renewed every year!!! (CY Lee, unpublished).

Another good example on the use of the rotation method was reported in Virginia, USA. A public housing block which had a chlorpyrifos-resistance German cockroach population was first treated with cypermethrin in 1981; a quick 90% reduction in cockroach population was obtained. Cypermethrin resistance problem gradually occurred and in 1990 with only a 20% reduction was obtained in the pest population (Robinson & Zhai 1990; *Pest Control Technology 18(10): 26-28*). Cypermethrin was then replaced with chlorpyrifos for three years. In 1993, when cypermethrin was re-used again, it showed excellent performance again (>80% reduction) (Robinson & Zhai 1994; *Pest Control Technology 22(9); 64, 66, 98*).

2. Mixture with synergist or IGR

In this method, an insecticide is mixed or integrated with an insect growth regulator (IGR) or synergist. IGR, whether in the form of juvenile hormone (JH) mimic (eg. pyriproxyfen, fenoxycarb, hydroprene) or chitin synthesis inhibitor (CSI) (eg. lufenuron, triflumuron, hexafluron, diflubenzuron, flufenoxuron) will kill at high concentration; at lower concentration, it will interrupt the normal development processes in immature insects. JH mimic can also sterilize adult insects at low dosages. On the other hand, a synergist (eg. piperonyl butoxide or PBO) will increase the toxicity of an insecticide (particularly pyrethroid) by inhibiting the activity of insecticide-detoxifying enzymes in the insect body. If a cockroach shows insecticide resistance due to high levels of detoxifying enzymes in its body, the use of synergists can enhance the performance of an insecticide by destroying these enzymes.

When using an insecticide with IGR, the insecticide will get rid of the insecticide susceptible individuals and the IGR will kill the resistant ones. A recent successful field example of this method had been reported by Scharf et al. (1997; *Journal of Economic Entomology 90: 38-48*) where lambda-cyhalothrin (pyrethroid) was integrated with pyriproxyfen (IGR) to control insecticide resistant field populations; excellent population reduction was obtained. The authors also reported similar findings when the pyrethroid was combined with piperonyl butoxide (synergist) and pyriproxyfen. Right now there is no registered product in the local market which provides pre-mixed insecticide-IGR formulation, while only one product which combines insecticide and piperonyl butoxide is available. If a pest control operator wants to adopt the insecticide-IGR mixture method, he will have to mix both chemicals according to the recommended rate and this may increase the treatment cost. However, it is anticipated that a new pre-mixed insecticide-IGR formulation will be introduced soon in the Malaysian market.

3. Insecticidal baits

The use of cockroach baits to control insecticide resistant populations is gaining popularity in the recent years. With the advances in the development of fast-acting bait formulations, many pest control operators in the USA are adopting this method and have obtained good results. The common bait active such as hydramethylnon in gel and bait station formulations have been marketed in Malaysia.

In a laboratory evaluation, the author had obtained very good results when using hydramethylnon-based gel formulation against insecticide resistant cockroaches collected from various hotels and restaurants in Malaysia (CY Lee, unpublished). Most of these cockroaches were killed within the time required to kill susceptible individuals. In a field experiment, the author also reported excellent performance of hydramethylnon-based bait stations against insecticide resistant German cockroaches in five coffee shops in Penang, Malaysia (Lee 1998; *Tropical Biomedicine:* In press).

The use of bait formulation should be encouraged for managing insecticide resistant German cockroaches as it minimizes pesticide exposure in the human environment and also saves money in the long-term through not using high insecticide dosages for the control of resistant cockroaches. So far, there had not been any reports published on cockroaches developing physiological resistance to bait actives.

It is hoped that with this two parts series of 'Understanding resistance in the German cockroach', an insight into the problem of German cockroach resistance to insecticide and its proper management strategies will be provided. Of course, many important details were not addressed in these two short communications.

Interested readers are always welcome to contact the author should they have any questions or need further details.

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