

REPORTS AND REVIEWS

Has the Tropical Bed Bug, *Cimex Hemipterus* (Hemiptera: Cimicidae), Invaded Australia?

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This article provides the first published record of C. hemipterus in Australia and describes a dual infestation of bed bugs involving two species in a backpackers' hostel. The implications of the introduction of this pest into Australia are discussed.

Key words: Tropical Bed Bug; Australia

Bed bugs are haematophagous arthropods known to attack humans. Reactions to their bites vary; some individuals do not notice the bite whereas others report intense local pain, which might disrupt sleeping patterns. Following the bite, large wheals may be produced accompanied by itching and inflammation, swelling, and occasionally blistering of the skin (Tharakaram 1999). Bed bugs have cryptic habits; they usually feed during the night and hide on and under mattresses, bed frames and various crevices in walls and room furnishings during the day. Often infestations are not readily apparent and the bites may be attributed to other blood sucking arthropods, with inappropriate control attempts ensuing.

Bed bugs as a group have a wide distribution. The human pest species are the common bed bug (*Cimex lectularius*) and the tropical bed bug (*Cimex hemipterus*). In Australia, scientific literature regarding the incidence and distribution of bed bugs is notably absent, although their presence is well known among pest controllers, and the accommodation industry who often find themselves with this uninvited guest. The occurrence of *C. lectularis* has long been recognised in Australia (Lee 1975; van Dyck 1995). This article provides the first

published record of *C. hemipterus* in Australia and describes a dual infestation of bed bugs involving both species in a backpackers' hostel. The implications of the introduction of this pest into Australia are discussed.

In May 1998, the Department of Medical Entomology at ICPMR received samples of bed bugs from the Australian Quarantine and Inspection Service for species confirmation. The identity of these bed bugs was confirmed as *C. hemipterus*, with differential diagnosis being based on the lack of an upturned lateral flange on the thorax in *C. hemipterus*, which is present in *C. lectularius*, as well as other taxonomic features (Ghauri 1973). This was believed to be the first record of the tropical bed bug in Australia. The bed bugs were collected from a cafe in Bundaberg, following complaints from patrons who reported being bitten while dining. Upon inspection, bed bugs were found in wooden slats within the chairs and behind nearby skirting boards. Several chemical treatments were required before the bed bugs were fully exterminated. The origin of the Bundaberg infestation remains unknown; however, the cafe is situated in close proximity to backpacker hostels and inspections of these revealed several with

Reports and Reviews

active bed bug infestations (although the species of *Cimex* was not determined). As mentioned, it is not known how the bed bugs came into the country, but it is speculated that they might have been transported to the cafe from one or more of the hostels via backpacks, as travellers were observed placing them beside and on the chairs at the cafe. If this is in fact what happened, then the potential for the bugs to be widely dispersed within Australia should be recognised.

In early July this year, a pest inspection of a backpackers' hostel on the Queensland Sunshine Coast (for confidentiality, the town is not given), conducted by one of the authors as part of a preventative maintenance program, revealed an infestation of bed bugs. Live bed bugs were found in several rooms and mainly on, or in close association with, bed mattresses. Following submission to Medical Entomology, ICPMR, identification of the samples revealed a mixed infestation of both *C. lectularius* and *C. hemipterus*. Samples from each room were not kept separate, and so it was impossible to ascertain if both species were cohabiting but the presence of both bed bug species within the same premises is the first report of a dual infestation for Australia. As with the previous case, the source of the infestation was not identified, nor could the duration of the infestation be determined. Advice on how to recognise and control the infestation was provided to the owner.

Overseas, *C. hemipterus*, as its common name suggests, has a tropical distribution but it is also found in the subtropics, whereas *C. lectularius* occurs mainly in temperate regions and the species overlap towards the edge of their temperature preference (Burgess 1990). As both species have now been identified in Australia, the risk of potential infestation must cover a greater geographical area than previously assumed. In areas where the two species are sympatric, cohabitation is known to occur (Newberry et al. 1987). However, the behaviour and

habits of the two species appear not to differ so that control strategies do not have to be specifically tailored. This may change in light of recent reports from overseas of chemical resistance to the synthetic pyrethroids in *C. hemipterus* (Myamba et al. 2002). As the main chemical of choice for control in Australia is permethrin (a synthetic pyrethroid), control failures may well occur. This would be especially confounding in those locations where both species coexist if identification to the species level was not attempted.

The introduction of the tropical bed bug, *C. hemipterus*, into Australia is perhaps not unexpected, as there appears to be a current resurgence of bed bugs worldwide (Krueger 2000; Paul & Bates 2000). This has been largely attributed to an increase in international travel, with the bed bugs being carried in clothing, luggage and bedding, and the movements of infested furniture and furnishings. Changes in the pest control industry are also thought to have inadvertently favoured bed bugs, as control for cockroaches has moved away from traditional methods of chemical application towards specific baits and insect growth regulators, which do not impact on bed bugs as former methods have done (Koehler & Harlan 2001). It is quite possible that *C. hemipterus* has been introduced into Australia previously, but as most pest controllers do not attempt to determine bed bugs to the species level in an infestation prior to treatment, the identity of *C. hemipterus* would have gone undetected. There also exists the likelihood that the *C. hemipterus* infestations described in this report have arisen not via travellers from overseas, but through local spread of the pest. The possibility that the species is now established in Australia cannot be excluded.

Traditionally in developed nations, backpacker hostels have been at the greatest risk of infestation, although recent trends have also included more "up-market" hotels and even urban homes (Krueger 2000). It is unlikely that bed bugs will reach the high

level of infestations seen in the past. However, a lack of recognition of the pest and its status in Australia among health managers and pest controllers, along with an increase in international tourism, will ensure that bed bugs will be an ongoing

problem, especially for the accommodation industry. This identification and reporting of a new bed bug species that might have become established in Australia will it is hoped raise the profile of these nuisance pest species.

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A Fresh Approach to Food Safety Assessment: Introducing the AIEH Food Safety Standard of Practice and Australian Food Safety Assessment

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The recent implementation of nationally uniform Food Safety Standards demonstrated a real need for an approach to food safety assessment that is nationally uniform and consistent with the legislative standards. The Food Safety Standard of Practice (FSP) and Australian Food Safety Assessment (AFSA) were developed with the aim of providing both an assessment tool and a standard of practice for Environmental Health Practitioners (EHPs) undertaking food safety assessments. AFSA is a comprehensive assessment tool, which can be used to determine risks associated with food handling operations and to adjust assessment frequency accordingly. The Food Safety Standard of Practice is professional guidance document aimed at promoting consistency and accountability in the work practices of environmental health practitioners. The development of the FSP and AFSA followed an extensive consultation period. Each State and Territory was surveyed to assess the status of food law reform. Additional consultation was carried out with organisations including Food Safety Australia & New Zealand, the Department of Health & Ageing and the Australian Local Government Association. The Food Safety Standard of Practice and the Australian Food Safety Assessment are initiatives of the South Australian and Victorian Divisional Food Safety Special Interest Groups. Funding was provided by the South Australian Department of Human Services.

A constant criticism from the food industry has been the variation between authorities in the application of legislation. The recent implementation of the Food Safety Standards (Chapter 3 of the *Food Standards Code*) across Australia highlighted the need for a nationally consistent approach to food safety assessment.

The Australian Institute of Environmental Health's Strategic Plan (2003-2004) states one of the organisation's goals to be: "Professional Development: To ensure professional excellence in the science and practice of environmental health".

In fulfilling its leadership and educational role, the Australian Institute of Environmental Health has published its first professional practice standard, which

addresses assessment of food safety. The Food Safety Standard of Practice and Australian Food Safety Assessment (AFSA) aim to provide objective, non-prescriptive and nationally consistent professional guidance and tools for Environmental Health Practitioners (EHPs) who are currently dealing with the many changes to food safety surveillance.

Special Interest Groups Collaborate

After discovering similar and complementary initiatives, the South Australian and Victorian Divisional Food Safety Special Interest Groups worked in partnership with the aim "to develop an approach for the assessment of food safety

Reports and Reviews

that is nationally uniform and consistent with legislative standards". Seeing merit in the concept, funding was provided by the South Australian Department of Human Services.

To ensure accuracy and relevance of the final products, project methodology included research of the current status of food law reform and consultation with key stakeholders. Key food safety representatives from each State and Territory were surveyed about issues such as timelines for the introduction of the Food Safety Standards, assessment frequency requirements, notification/registration/licensing and food safety program/auditing requirements. Due to the variation in administrative arrangements relating to these issues, it was necessary for the practice standard and assessment tool to be flexible in the manner it may be applied.

At least twenty enforcement agencies from South Australia, Tasmania and Victoria were involved in a trial of the draft practice standard and assessment tool over a period of one month during May 2003. Comment was provided via a questionnaire and the draft material further refined prior to consultation with Food Safety Australia New Zealand, Department of Health and Ageing and Australian Local Government Association. Feedback from consultation confirmed that the aims and objectives of the project had been met and that the final products will be useful to Environmental Health Practitioners when assessing food safety.

Purpose of the Food Safety Standard of Practice

The Standard of Practice aims to meet several purposes:

- To provide guidance to EHPs in the assessment of outcome based standards, responding to non compliance (in particular serious non compliance) and allocation of resources on a risk management basis.

- To promote consistency in the assessment of all food handling activities by EHPs against the Food Safety Standards.
- To provide a tool that enables comprehensive assessment of all food handling activities by EHPs.
- To inform the food industry of the minimum standards against which food handling activities are assessed.

It should be noted that the Food Safety Standard of Practice has no legal standing and is not a substitute for proper evidentiary processes and professional judgement taking into account the circumstances of each situation.

Food Safety Policy

An important part of the Standard of Practice is the food safety policy within the document, which is designed to guide EHPs in their decision making. In summary the policy states:

- Professional EHPs must conduct themselves in a consistent and accountable way.
- The assessment of food safety by EHPs must focus on whether food businesses are achieving or able to achieve the required food safety outcomes.
- Enforcement agencies have a legal responsibility to administer and implement the legislation and ensure that food businesses are meeting their obligations.
- Proprietors and operators of food businesses have a legal responsibility to ensure all food they sell is safe and suitable for human consumption. Food businesses should be able to demonstrate that they are managing the food safety risks at any time.

- Food businesses should be able to choose a method for achieving compliance that is most appropriate for their business.
- A food safety program is a documented way that food businesses can demonstrate that they are complying with the Food Safety Standards
- Food businesses are responsible for ensuring any non-compliance is resolved.

An Outcome Based Approach

The National Food Safety Standards that have been adopted in Australia specify food safety outcomes that must be achieved, rather than setting prescriptive requirements. This means that a food business is able to achieve compliance through a number of ways.

The assessment of food premises should be based on the business demonstrating compliance with the required food safety outcomes.

As mentioned earlier, inconsistency is a constant criticism of Environmental Health Practitioners. Why is this the case? Why is there inconsistency when the same standards are being enforced? In developing the Standard of Practice this issue has been considered.

Previously inconsistency occurred when EHPs mandated how the business must achieve the required outcome. This could vary from one enforcement agency to the next depending on the differing interpretation and preferences of that agency. Many examples of this are seen in the way structural requirements are enforced between different authorities.

Structural requirements are in place so that food safety outcomes can be achieved such as keeping the premises clean, preventing access by pests and ultimately protecting food from contamination. This

concept is reinforced in the Purpose of Standard 3.2.3 "Food Premises and Equipment".

Because the food safety outcomes are clearly set in the Food Safety Standards, the basis for improved consistency in assessment is provided.

Australian Food Safety Assessment

Australian Food Safety Assessment (AFSA) is a tool to encourage comprehensive assessment for compliance with safe food outcomes in a uniform and consistent manner using the Food Safety Standards as the framework for the assessment.

The key feature of AFSA is the food safety checklist. AFSA assesses all food handling processes that are undertaken in a food business including:

- Receiving
- Storage
- Processing
- Display/Serving
- Packaging
- Transportation
- Food recall/disposal

Activities that support food safety are also assessed such as:

- Health, hygiene and knowledge of food handlers
- Premises hygiene and maintenance
- Temperature measuring and recording.

AFSA has been developed in the form of a duplicate pad, which offers many benefits including the ability to provide immediate written feedback to the business operator where food safety risks are not effectively controlled.

Reports and Reviews

AFSA is suitable for use in any type of food business, including temporary food premises or businesses using a food safety program or other quality system. The Food Safety Standards apply to all types of premises where obligations and outcomes required are the same. The difference when dealing with, for example temporary premises, is that compliance may be achieved in a different way and not all risks are present in the business. A business with a food safety program or other quality system would keep records or may have access to its own scientific data and evidence in order to demonstrate compliance with food safety outcomes.

The Standard of Practice includes an Explanation Guide that is intended to be given to proprietors/operators to inform them of what is considered during an assessment and possible options for demonstrating compliance. It can also be used by EHPs to obtain clarification of the intent of the individual prompts on the assessment form. The need for EHPs to refer to the Explanation Guide will reduce with time as they become familiar with the issues and standards behind the prompts. The Explanation Guide is not intended as a comprehensive checklist.

To promote the basics of food safety to business operators and food handlers, advisory information is printed on the reverse side of the AFSA assessment form. An added benefit of using AFSA will be that comparable data about food business compliance can be collected from enforcement agencies. The results can be used to develop various national and local strategies to obtain better compliance and improved food safety.

Prioritising Non-Compliance

AFSA and the Standard of Practice identify two levels of non-compliance to assist EHPs to prioritise food safety risks. A serious non-compliance is defined as "a non-compliance that poses an immediate risk of unsafe food being sold or if allowed to continue will

result in unsafe food being sold". The Standard of Practice also provides examples of situations that might be serious non-compliance.

It is the responsibility of the food business to determine the corrective action that they need to take to rectify any non-compliance. EHPs have a wealth of knowledge and experience, and are in a position to give guidance to a business but should empower the business to make the determination of how they will achieve compliance.

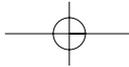
The Standard of Practice and AFSA do not suggest the way in which non-compliance must be enforced. Different legal sanctions apply across Australia. However, AFSA does give the enforcement agency a consistent food safety risk basis for any enforcement action.

Risk-Based Determination of Assessment Frequency

The Food Safety Standard of Practice and AFSA advocate a risk-based approach to determine the frequency of assessment, where frequency is not prescribed by statute. Two factors determine assessment frequency - the nature of the business (intrinsic risk) and the level of compliance. The Priority Classification System for Food Businesses (Food Standards Australia New Zealand), provides a method of assigning a classification to a business, which takes into account the intrinsic risk. This classification is used to establish the "starting point" frequency of assessment. The Standard of Practice builds upon the Priority Classification System and offers a model for adjusting assessment frequency based on the level of compliance.

The benefits of the Assessment Frequency Adjustment Model, in conjunction with the Priority Classification System, are that it provides enforcement agencies with a means of:

1. Objectively determining business assessment frequency in an open and



Reports and Reviews

transparent manner that is consistent with national best practice; and

2. Allocating resources required for food safety assessment on the basis of risk.

Conclusion

The Food Safety Standard of Practice and AFSA provide EHPs with the opportunity to enhance their professional status by taking a consistent and progressive approach to food safety assessment.

The Food Safety Standard of Practice can be easily accessed by downloading a copy

from the Australian Institute of Environmental Health website at www.aieh.org.au. Further information about AFSA and ordering details can also be found on the website.

Due to the new and evolving national food safety laws, the Food Safety Standard of Practice and AFSA will undergo regular review. Environmental Health Practitioners, either individually or collectively (for example, through your Food Safety Special Interest Group), are encouraged to provide feedback.

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Common Ground and Common Sense: Community-Based Environmental Health Planning

R. Nicholson, P. Stephenson, V.A. Brown and K. Mitchell (Eds)

Commonwealth of Australia, 2002, 152 pp. ISBN 0 642 820297, \$19.90 (paperback)

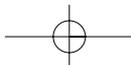
Common Ground and Common Sense: Community-based Environmental Health Planning is a handbook developed at a workshop comprising multi-sector, multi-disciplinary participation in Canberra in 2001. The workshop was facilitated by Peter Cuming (Sustainable Futures Australia); the handbook follows the "Planning Web" framework proposed by Cuming. The Community-Based Action for Environmental Health (CEHAP) Action Web becomes the guiding structure for the handbook using six sections: people caring for place, communities in action, community as partners, multiple alliances, place-based planning, and future-directed action. This process is intended for environmental managers and health officers, public health officials, and community action groups who seek change in the environmental health of local communities. The handbook is designed to support action in: "linking the community commitment of voluntary programs to the legislative power of government; bridging the existing divide between health and environment; and bringing together the wide range of activities and resources from community, expert, and government practice".

The handbook is concise and well written, using stepwise, simple outline format with robust real-world examples of implementation of each CEHAP Action Web section. The major strength of this handbook is the tap to local communities

and stress on integration of perspective, skills, and disciplines in approaching community-level action plans. Coming from the perspective of an American working in the public health arena, I found this a refreshing perspective, as the connection, interest, and empowerment of local communities is often overlooked in federal and state level planning. The handbook also provides multiple exercises to engage the individual reader as well as groups actively using the handbook to plan a community action. One example exercise helped this reviewer discover his ecological footprint - that of a consummate devil, shared by most Americans.

There are a few concerns with the handbook, which stem from the reviewer's American perspective. Industry is a major force of resistance in action plans to better environmental health. The handbook acknowledges the role of industry as a force to contend with but does not provide clearer statements that encourage engagement of community and industry up-front.

This said, the handbook is a highly valuable resource for community-level planning and is applicable to national level planning for environmental health. This reviewer, reading the handbook from an American point of view, saw much broader application of the CEHAP Action Web towards multi-sector, multi-disciplinary collaboration in the ever-evolving global village where public health issues that demand local participation have become major concerns to the international community.



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