

Psocid News

The Psocidologists' Newsletter

No. 3 (Aug. 20, 2002)



Larva of *Amphipsocus japonicus*

STUDY ON THE MANAGEMENT OF LIPOSCOLIDIDS IN CHINA

Jin-Jun Wang (Southwest Agricultural University, China)

In collaboration with Prof. Zhimo Zhao and Dr. Wei Ding, my research mainly focuses on the management of liposcelidid pests that infest stored products. Currently my research group include one Ph. D. student, four MSc. students and one technicians.

Current Research

- Resistance monitoring and management of *Liposcelis bostrychophila* and *L. entomophila* to fumigants and controlled atmosphere (Funded by NSFC, MOE and F.Y.T. Foundation).
- Comparative toxicology of *Liposcelis bostrychophila* and *L. entomophila* in relation to their management (Funded by SWAU).
- Control of psocids using plant materials and IGRs (Funded by CQ STC).
- Molecular markers of psocids resistant to fumigants and CA (Funded by EPCL).

List of Publication

1. In English

- Wang Jinjun, Zhao Zhimo, Li Lungshu 1998 Studies on bionomics of *Liposcelis entomophila* (Psocoptera: Liposcelididae) infesting stored products. *Entomologia Sinica* **5**(2): 149-158.
- Wang Jinjun, Zhao Zhimo, Li Lungshu 1999 Induced tolerance of the psocid, *Liposcelis bostrychophila* Badonnel (Psocoptera: Liposcelididae), to controlled atmosphere. *International Journal of Pest Management* **45**(1): 75-79.
- Wang Jinjun, Zhao Zhimo, Li Lungshu 1999 Selection of resistance strains in *Liposcelis bostrychophila* Badonnel to CO₂-enriched atmospheres. *Entomologia Sinica* **6**(1): 45-52.
- Wang Jinjun, Zhao Zhimo, Li Lungshu 1999 Some biochemical aspects of resistance to controlled atmosphere in *Liposcelis bostrychophila* Badonnel (Psocoptera: Liposcelididae). *Entomologia Sinica* **6**(2): 178-186.
- Wang Jinjun, Zhao Zhimo, Li Lungshu 1999 Study on tolerance to oxygen deficiency, genetic stability and ecological fitness of psocid, *Liposcelis bostrychophila* Badonnel (Psocoptera: Liposcelididae). *Zoological Research* **20**(2): 104-110.
- Wang Jinjun, James H. Tsai, Zhao Zhimo, Li Lungshu 2000 Development and reproduction of the psocid *Liposcelis bostrychophila* (Psocoptera: Liposcelididae) as a function of temperature. *Annals of the Entomological Society of America* **93**(2): 261-270.

- Wang Jinjun, Zhao Zhimo, James H. Tsai 2000 Resistance and some enzyme activities in *Liposcelis bostrychophila* Badonnel (Psocoptera: Liposcelididae) in relation to carbon dioxide enriched atmosphere. *Journal of Stored Product Research* **36**: 297-308.
- Wang Jinjun, James H. Tsai, Zhao Zhimo, Li Lungshu 2001 Interactive effects of temperature and controlled atmosphere at biologically relevant levels on development and reproduction of the psocid, *Liposcelis bostrychophila* Badonnel (Psocoptera: Liposcelididae). *International Journal of Pest Management* **47**(1): 55-62.
- Wang Jinjun, James H. Tsai, Ding Wei, Zhao Zhimo, Li Lungshu 2001 Toxic effects of six plant oils alone and in combination with controlled atmosphere on *Liposcelis bostrychophila* (Psocoptera: Liposcelididae). *Journal of Economic Entomology* **94**(5): 1296-1301.
- Ding Wei, Wang Jinjun, Zhao Zhimo, James H. Tsai 2002 Effects of controlled atmosphere and DDVP on population growth and resistance development by the psocid, *Liposcelis bostrychophila* Badonnel (Psocoptera: Liposcelididae). *Journal of Stored Product Research* **38**: 229-237.
- Wang Jinjun, Zhao Zhimo 2002 Comparison of reserves and utilization of triacylglycerol and polysaccharides among *Liposcelis bostrychophila* populations selected for resistance to carbon dioxide, and the unselected population. *Journal of Applied Entomology* (in Press).

2. In Chinese with English abstract

- Wang Jinjun, Zhao Zhimo 1994 Acute lethal effects of controlled atmosphere on *Liposcelis entomophila* at different temperatures. *Journal of Southwest Agricultural University* **7**:70-74.
- Wang Jinjun, Zhao Zhimo, Guo Yiquan 1996 Effects of temperature and humidity on development and reproduction of *Liposcelis entomophila*. *Acta Phytophycacica Sinica* **23**:147-152.
- Wang Jinjun, Zhou Yihong, Zhou Chenxi 1996 The experiment life table of *Liposcelis entomophila* at different temperatures. *Journal of Zhengzhou Grain College* **17**: 79-83.
- Wu Shiyuan, Wang Jinjun, Zhao Zhimo 1997 The acute toxicity of carbon dioxide and deltamethrin on *Liposcelis bostrychophila* at different temperature. *Journal of the Chinese Cereals and Oils Association* **12**:5-9.
- Wang Jinjun, ZhaoZhimo, Li Lungshu, Deng Xingping, Wu Shiyuan 1998 On the interactions among CO₂ and O₂ concentration, temperature and fumigation of Tanaka oil to *Liposcelis bostrychophila*. *Journal of the Chinese Cereals and Oils Association* **13**:55-58
- Wang Jinjun, ZhaoZhimo, Li Lungshu 1999 An ecological study on the laboratory population of psocid, *Liposcelis bostrychophila* Badonnel (Psocoptera: Liposcelididae). *Acta Entomologica Sinica* **42**: 277-283.
- Wang Jinjun, ZhaoZhimo 1999 Effects of different foods on development and reproduction of *Liposcelis bostrychophila* Badonnel. *Entomological Knowledge* **36**: 95-97
- Wang Jinjun, ZhaoZhimo, Li Lungshu 1999 Effect of CA and citrus oil on *Liposcelis bostrychophila* at different temperatures. *Grain Storage* **28**: 3-9.
- Wang Jinjun, ZhaoZhimo, Li Lungshu 2001 Studies on the resistance of *Liposcelis bostrychophila* to controlled atmosphere and its ecological fitness. *Acta Entomologica Sinica* **44**: 67-71.
- Wang Jinjun, ZhaoZhimo, Li Lungshu 2001 Life table of experimental population of *Liposcelis bostrychophila*. *Chinese Journal of Applied Ecology* **12**: 83-85.
- Ding Wei, Wang Jinjun, ZhaoZhimo 2001 Culture techniques of *Liposcelis bostrychophila* and *L. entomophila*. *Journal of Southwest Agricultural University* **23**: 304-306.

Ding Wei, E. Shaaya, Wang Jinjun, Zhao Zhimo, Gao Fei 2002 The lethal effects of two IGRs on *Liposcelis entomophila*. *Zoological Research* **23**:173-176.

3. Conference papers

Wang Jinjun, Zhao Zhimo, Li Lungshu 1999 Biochemical mechanisms of *Liposcelis bostrychophila* Badonnel (Psocoptera: Liposcelidae) resistant to controlled atmospheres. In Jin Z. X. et al. (eds). *Stored Product Protection, Proceedings of the 7th International Working Conference on Stored Product Protection*. Sichuan Publishing House of Sciences and Technology. 1: 160-701.

Wang Jinjun, Zhao Zhimo, Li Lungshu 1999 Resistance of psocid, *Liposcelis bostrychophila* Badonnel (Psocoptera: Liposcelidae) and the stability to controlled atmosphere. In Jin Z. X. et al. (eds). *Stored Product Protection, Proceedings of the 7th International Working Conference on Stored Product Protection*. Sichuan Publishing House of Sciences and Technology. 1: 160-701.

Wang Jinjun, Zhao Zhimo, Li Lungshu 1999 Ecological fitness of CA resistant and susceptible strains of *Liposcelis bostrychophila* Badonnel (Psocoptera: Liposcelidae). In Jin Z. X. et al. (eds). *Stored Product Protection, Proceedings of the 7th International Working Conference on Stored Product Protection*. Sichuan Publishing House of Sciences and Technology. 1: 160-701.

PSOCID POPULATIONS ASSOCIATED WITH AUSTRALIAN GRAIN STORAGE SYSTEM: INVESTIGATIONS OF POPULATION STRUCTURE USING MOLECULAR MARKERS

Katarina M. Mikac (CSIRO Division of Entomology/ University of Canberra, Australia)

I am a first year Ph.D. student, new to the wonderful world of psocids. My interest in psocids stems from my fascination of invasion/pest ecology. During the past decade psocids have become a serious pest of stored grain in Australia. There is a variety of research being conducted on psocids at the Stored Grain Research Laboratory (SGRL), please visit our web site to find out more (<http://sgrl.csiro.au/>).

Current Research

I will be using molecular methods to examine the genetic structure of three psocid species, *Liposcelis bostrychophila*, *L. decolor* and *L. entomophila*, that infest grain bulk storage facilities throughout Australia. As there is currently no known nucleotide sequence information on these three species, molecular techniques such as microsatellites and Randomly Amplified Polymorphic DNA (RAPDs) are being used to investigate their genetic structure and general molecular ecology. Outcomes from this work will determine the extent of gene flow among *Liposcelis* populations infesting bulk grain storage systems in Australia. In addition, this work will help characterise and monitor changes in the genetic diversity of psocid populations, while gaining a greater understanding of the origin and movement of *Liposcelis* species within Australian bulk grain handling systems. The Australian bulk handlers association is providing full financial support for this study.

CAVE PSOCIDS

Charles Lienhard (Geneva Natural History Museum, Switzerland)

The editor of the "Encyclopaedia Biospeologica" asked me to prepare a revised version of the Psocoptera chapter (Badonnel & Lienhard, 1994) for a new edition of Volume I. So I tried to make a list of all species mentioned from caves in the literature. Some of them are true

cavernicolous animals, some others are litter dwellers which sometimes can be found in the entrance zone of caves, some others are domestic species which are often found in caves regularly visited by humans.

In the following you find my provisional and probably incomplete list. I would be happy if you could let me know if you are aware of published cave records of other psocid species. Perhaps you know also about noteworthy additional references concerning the species mentioned in my list. Please send me an e-mail with the name of the species and the bibliographical reference(s) of corresponding cave record(s). My deadline for the manuscript is December 2002. Thank you very much in advance for your help.

My e-mail address: charles.lienhard@mhn.ville-ge.ch

List of psocid species mentioned from caves in the literature

(c. r. = cave record; reference according to the bibliography of Lienhard & Smithers, 2002)

Trogiomorpha

Lepidopsocidae

Parasoa haploneura Thornton (c. r.: cf. Badonnel & Lienhard, 1994)

Perientomum sp. (c. r.: Deharveng & Leclerc, 1989)

Soa flaviterminata Enderlein (c. r.: Badonnel, 1977f)

Trogiidae

Lepinotus inquilinus Heyden (c. r.: Altherr, 1938)

Lepinotus reticulatus Enderlein (c. r.: Altherr, 1938)

Psyllipsocidae

Dorypteryx pallida Aaron (c. r.: Mockford, 1993a)

Psocathropos lachlani Ribaga (c. r.: Badonnel, 1977f; Deharveng & Leclerc, 1989; Ashmole & Ashmole, 1997)

Psyllipsocus batuensis Thornton (c. r.: cf. Badonnel & Lienhard, 1994)

Psyllipsocus decui Badonnel (c. r.: cf. Badonnel & Lienhard, 1994)

Psyllipsocus dubius Badonnel (c. r.: cf. Badonnel & Lienhard, 1994)

Psyllipsocus hirsutus Thornton (c. r.: cf. Badonnel & Lienhard, 1994)

Psyllipsocus orghidani Badonnel (c. r.: cf. Badonnel & Lienhard, 1994)

Psyllipsocus ramburii Selys-Longchamps (c. r.: cf. Badonnel & Lienhard, 1994; Ashmole & Ashmole, 1997)

Psyllipsocus yucatan Gurney (c. r.: cf. Badonnel & Lienhard, 1994)

Prionoglarididae

Prionoglaris dactyloides Lienhard (c. r.: cf. Badonnel & Lienhard, 1994)

Prionoglaris stygia Enderlein (c. r.: cf. Badonnel & Lienhard, 1994; Lienhard, 1996b, 1998a)

Sensitibilla strinatii Lienhard (c. r.: Lienhard, 2000b)

Speleketor flocki Gurney (c. r.: cf. Badonnel & Lienhard, 1994)

Troctomorpha

Protoctopsocidae

Philedaphia hauseri (Lienhard) (c. r.: Lienhard, 1988b)

Protoctopsocus enigmaticus Mockford (c. r.: Mockford, 1967b)

Amphientomidae

Amphientomum aelleni Badonnel (c. r.: cf. Badonnel & Lienhard, 1994)

Liposcelididae

Belapha sp. (c. r.: Deharveng & Leclerc, 1989)

Belaphotroctes ghesquierei Badonnel (c. r.: Badonnel, 1977f)

Liposcelis bostrychophila Badonnel (c. r.: Badonnel, 1977f; Deharveng & Leclerc, 1989)

Liposcelis decolor (Pearman) (c. r.: Badonnel, 1973d)

Liposcelis entomophila (Enderlein) (c. r.: Badonnel, 1977f, g; Deharveng & Leclerc, 1989)

Liposcelis meridionalis (Rosen) (c. r.: Badonnel, 1973d)

Liposcelis orghidani Badonnel (c. r.: Badonnel, 1973d)

Liposcelis spp. (not identified) (c. r.: Altherr, 1938; Badonnel, 1977f)

Troglotroctes ashmoleorum Lienhard (c. r.: Lienhard, 1996b; Ashmole & Ashmole, 1997)

Pachytroctidae

Pachytroctes sp. (c. r.: Deharveng & Leclerc, 1989)

Tapinella picticeps Badonnel (c. r.: Badonnel, 1977f)

Sphaeropsocidae

Sphaeropsocopsis myrtleae Lienhard & Ashmole (c. r.: Lienhard & Ashmole, 1999)

Psocomorpha

Epipsocidae

Bertkauia lucifuga (Rambur) (c. r.: Decou & Negrea, 1969; Lienhard, 1998a)

Mesepipsocus mobilis (Hagen) (c. r.: Badonnel, 1977f)

Cladiopsocidae

Spurostigma jimenezi Badonnel (c. r.: Badonnel, 1977g)

Ectopsocidae

Ectopsocus sp. (c. r.: Badonnel, 1977f)

Elipsocidae

Palmicola vinai Badonnel (c. r.: Badonnel, 1977g)

WORLD CATALOGUE AND BIBLIOGRAPHY

Charles Lienhard (Geneva Natural History Museum, Switzerland)

Courtenay N. Smithers (Australian Museum, Sydney)

Lienhard, C. & Smithers, C. N. (2002) *Psocoptera (Insecta): World Catalogue and Bibliography*. Instrumenta Biodiversitatis 5: xli+745 pp. Muséum d'histoire naturelle, Genève.

The book came out some weeks ago. It is sold by the Geneva Natural History Museum (Price: 180 Swiss Francs + handling and postage) and can be ordered at the following e-mail address (Mrs Eva Bucher): eva.bucher@mhn.ville-ge.ch

Unfortunately no free copies are available for distribution. A few colleagues have been asked to write a review, all the others will have to buy the book. Sorry for this, nevertheless we hope that buying this book will pay off.

All colleagues listed in the Psocid News directories will receive a publicity flyer from the Geneva Museum.

Here some general information on this book:

The Catalogue (492 pp.) lists the 41 families, 371 genera, 4408 species of Psocoptera described up to the end of the year 2000. The chronological discovery of species diversity is graphically analysed (figure), and in a synoptic table (15 pp.) the classification down to genus level is presented with numbers of known species per taxon for each main biogeographical region of the world. Contrary to most published catalogues the present one gives not only a complete list of taxonomic references for all species, but also cites almost all other known references pertaining to their geographical distribution, morphology, biology, ecology, etc. Several new names, synonymies, combinations, and status designations are proposed. All taxonomic names are listed in a complete index (81 pp.).

The Bibliography (172 pp.) contains the complete scientific literature (a total of about 3200 references) published on the Psocoptera from 1688 up to the end of the year 2000, including also the papers on applied research concerning domestic and stored product psocids.

This publication is addressed to all entomologists interested in the taxonomy, biogeography, and bionomics or pest status of Psocoptera as well as to the scientific libraries with interest in biodiversity and systematics.

Find other entomological publications on the Geneva Museum's home page:

<http://www.ville-ge.ch/musinfo/mhng/page/p-ento.htm>

ANNOUNCING AN IMPORTANT NEW PUBLICATION ON LICE

Kevin P. Johnson (Illinois Natural History Survey, USA)

The Chewing Lice: World Checklist and Biological Overview by Roger D. Price, Ronald A. Hellenthal, Ricardo L. Palma, Kevin P. Johnson, and Dale H. Clayton. Illinois Natural History Survey Special Publication 24.

Contents

K. P. Johnson and D. H. Clayton. The Biology, Ecology, and Evolution of Chewing Lice.

R. D. Price, R. A. Hellenthal, and R. L. Palma. Chewing Lice of the World with Host Associations.

This work includes the third checklist of world chewing lice, following those of Harrison (1916) and Hopkins and Clay (1952). Sucking lice (Anoplura) have been recently been treated by Durden (1994). This work will contain up-to-date information on chewing louse biology, ecology, systematics, and evolution. It also includes the first comprehensive published list of host-louse associations as well as generic keys and illustrations for the 253 recognized genera of chewing lice. Chewing lice comprise 90% of species in the order Phthiraptera and encompass the suborders Amblycera, Ischnocera, and Rhynchophthirina. As obligatory ectoparasites of most birds and mammals, they are of significant economic importance to the poultry and livestock industries and have been the subject of numerous studies on host-parasite coevolution and cospeciation.

Major features of the checklist include

- 1) All louse species (> 4350 species) and subspecies names by family, genus, and subgenus
- 2) Complete list of bird and mammal host species with associated lice
- 3) Literature citation for each published host-louse association
- 4) 700 previously unpublished host-louse associations
- 5) > 200 new specific and generic synonymies

6) Bibliography of 1,400 references

7) Nearly 600 illustrations

Ordering information will be provided at the time of publication on the INHS Publications web site (<http://www.inhs.uiuc.edu/chf/pub>) under "New Publications". To receive email notification when publication is available, send an email request to (Ronald.A.Hellenthal.1@nd.edu).

CURIOUS REFERENCE

Courtenay N. Smithers (Australian Museum, Sydney)

I have noticed that a recent part of the Zoological Record (Vol. 137: 13, 407) lists the paper on Irish Psocoptera which I published with O'Connor and Peters in 1999 as having the senior author as "Bocak, Ladislav". I have no idea who he is or how he came to be quoted as the senior author of the paper. There must have been an error in their computer entry. The correct entry for the paper is:

Smithers, C. N., O'Connor, J. P. & Peters, J. V. (1999) A list of Irish Psocoptera (Insecta) (Booklice, Barklice, Psocids). *Irish Naturalists Journal* 26(7/8): 228-235.

SOME CORRECTIONS TO YOSHIZAWA'S AMPHIPSOCID PAPER

Kazunori Yoshizawa (Hokkaido University, Japan)

I recently published a paper on the systematics of Japanese Amphipsocidae (Yoshizawa, K. 2001. Systematic study of Amphipsocidae in Japan (Psocodea: 'Psocoptera': Caeciliusetae), with comments on higher classification within the family. *Insecta Matsumurana, New Series* 58: 1-25). In the paper, I made some mistakes or inappropriate citations which are corrected here. I thank Dr C. N. Smithers who kindly pointed out some of my mistakes.

• **Synonymy among *Kodamaius brevicornis* and *K. pilosus***

K. pilosus was once treated as a synonym of *K. brevicornis*, but Yoshizawa (2001) considered these two are good species. Yoshizawa (2001) and Mockford (2000) mentioned that the synonymy of these two species was first proposed by Smithers (1967). However, it is not correct, and actually the synonymy was originally proposed by Enderlein (1908). Therefore, remarks given under the description of *K. pilosus* should be corrected, and the following synonymy should be added to *K. pilosus*.

Kodamaius pilosus Okamoto

Kodamaius brevicornis: Enderlein, 1908: 766 (partim).

• **Synonymy among *Dasypsocus japonicus* and *Amphipsocus rubrostigma***

Yoshizawa (2001) treated *A. rubrostigma* as a new junior synonym of *D. japonicus* (= now *A. japonicus*). However, earlier, Takahashi (1938) had already mentioned a possibility of this synonymy as follows: "..... *Dasypsocus japonicus* (Enderlein, 1906) and *Amphipsocus rubrostigma* Okamoto (1910) may be one and the same species". I think the statement cannot be considered as an official act of synonymy, but Takahashi's (1938) statement should have been cited in Yoshizawa (2001).

• **Label data of identified specimens of *Matsumuraiella radiopicta***

The original description of *M. radiopicta* is based on the material collected at Tomakomai in 1903. Yoshizawa (2001) mentioned that label data of some identified *M. radiopicta* specimens stored in Hokkaido University exactly agree with the original description. Therefore, although the specimens are not syntypes, these specimens are considered to be collected with the type series of *M. radiopicta*. However, label data of two specimens shown in Yoshizawa (2001) are

spelled as Tomakami (probably misspelling of Tomakomai). The followings are photographs of other identified specimens of *M. radiopicta* correctly labeled as Tomakomai, 1903.



Ref.

- Enderlein, G. 1908. *Zool. Anz.* **33**: 759-782.
Mockford, E. L. 2000. *Trans. Am. Entomol. Soc.* **125**: 325-417.
Okamoto, H. 1907. *Trans. Sapporo Nat. Hist. Soc.* **2**: 113-147.
Smithers, C. N. 1967. *Aust. Zool.* **14**: 1-145.
Takahashi, R. 1938. *Mushi* **11**: 11-15.

PSOCIDOLOGISTS' DIRECTORIES - UPDATES

P. J. Collins. E-mail: Pat.Collins@dpi.qld.gov.au.

N. Golub. E-mail: res@zin.ru.

Otakar Holusa, Bruzovska 420, CZ-738 01 Frydek-Mistek, Czech Republic. E-mail: holusao@seznam.cz.

M. K. Nayak. E-mail: manoj.nayak@dpi.qld.gov.au.

Klaus Reinhardt, Centre for Biodiversity and Conservation, School of Biology, The University of Leeds, Leeds, LS2 9JT, UK. E-mail: bgykr@leeds.ac.uk.

Web: <http://www.biology.leeds.ac.uk/staff/kr/start.htm>

Jin-Jun Wang, Key Laboratory of Entomology and Pest Control Engineering, Department of Plant Protection, Southwest Agricultural University, Chongqing 400716, China. E-mail: jjwang7008@yahoo.com.

EDITORIAL

Next issue

About Feb 2003. Please let me have all contributions by Jan 31 2003 if possible. I look forward to hearing from you.

Editorial address

Psocid News is edited by Kazu Yoshizawa at the Systematic Entomology, Faculty of Agriculture, Hokkaido University, Sapporo, 060-8589 JAPAN.

Telephone: +81-11-706-2424

Facsimile: +81-11-706-4939

E-mail: psocid@res.agr.hokudai.ac.jp

Web page: <http://insect3.agr.hokudai.ac.jp/psoco-web/psoco-net/index.html>