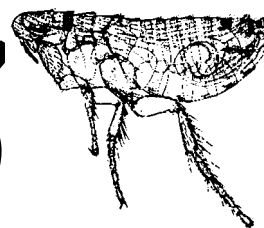


flea

NEWS

55



Department of Entomology

Iowa State University, Ames, Iowa 50011

Table of Contents

Flea Species.....	648
Literature	651
Material Request.....	647
Miscellanea.....	641

FLEA NEWS is a biannual newsletter devoted to matters involving insects belonging to the order Siphonaptera (fleas) and related subjects. It is compiled and distributed free of charge by Robert E. Lewis <relewis@iastate.edu> in cooperation with the Department of Entomology at Iowa State University, Ames, IA, and a grant in aid from **Wellmark International**.

Flea News is mainly bibliographic in nature. Many of the sources are abstracting journals and title pages and not all citations have been checked for completeness or accuracy. Additional information will be provided upon written or e-mail request. Further, recipients are urged to contribute items of interest to the profession for inclusion herein.

This newsletter is now available in electronic format. The preferred method of accessing the electronic version is through the WorldWide Web at the following Universal Resource Locator: <<http://www.public.iastate.edu/~entomology/FleaNews/AboutFleaNews.html>> or through either Gopher or anonymous FTP: <gopher.ent.iastate.edu> in the "Publications" directory. Electronic

versions are available for No. **46**, July, 1993; No. **47**, December, 1993; No. **48**, July, 1994; No. **49**, December, 1994; No. **50**, June, 1995; No. **51**, December, 1995; No. **52**, June, 1996, No. **53**, December, 1996; No. **54**, June, 1997 and this number.

In late May of 1997, California-based Central Garden and Pet Company acquired the former Sandoz Agro Inc.'s Animal Health and Pesticide operations, including its flea and tick control manufacturing, research and development facilities in Dallas, TX. The name has since been changed to **Wellmark International**, and the company has exclusive rights to market patented flea collars, powders and shampoos in the United States and Canada. Corporate offices are situated at 1000 Tower Lane, Suite 245, Bensenville, IL 60106 and the following two consumer hotlines are supported: **Specialty Products** 1 (800) 248 7763 and **Zodiac Products** 1 (800): 950 4783. Its Technical Services Manager is Dr. Janet A. Lorenz, (630) 227 6034.

MISCELLANEA

Following is a report on the Third International Symposium on Fleas, held 15-16-October-1997 at Baicheng, Jilin Province, China, filed By Dr. V. S. Ageev, Almaty, Kazakhstan. Excluding Dr. Ageev there were 12 delegates in attendance, all from various institutions in China. Tuesday, 14-October-1997 was registration, at which all participants received copies of the presentations, 9 from China (one lacking an English title), 6 from Kazakhstan and 4 from Russia. In the evening dinner was served in

the hotel restaurant during which Dr. GAO Chong-hua, Director of the Chinese Centre for Treatment and Prophylaxis of Plague and Brucellosis delivered an impromptu speech formally opening the Symposium.

The opening address was delivered by Dr. GAO Chong-hua and described the accomplishments of the Chinese Center in flea research. The importance of comprehensive studies on the epizootic and epidemic potentials of fleas in their natural plague foci was stressed, and it was emphasized that bubonic plague from the bites of infected fleas is still a serious public health problem in China. The following papers were then either delivered or summarized during the scientific session:

Ageev, V.S., S.B. Pole & A.A. Sludsky. On the epizootic role of fleas in the Gissar Range (Tadjikistan). pp. 1-4.

Antonova, L.N. The flea fauna of the Norway rat occupying new territories. pp. 5-6.

Serzhan, O.S., A.O. Sheikin & L.N. Antonova. Fauna, taxonomic structure and host complexes of fleas in Kazakhstan and Central Asia. pp. 7-10.

Sheykin, A.O. Fleas of a few rare mammal species in Central Asia. pp. 11-12.

Necrasova, L.E., A.M. Aikimbaev, T.V. Meka-Mechenko, V.F. Dernovaya, A.G. Dernovoy & I.N. Tsepko. Ectoparasites of synanthropic and wild rodents as possible carriers of microbes pathogenic to man. pp. 13-16.

Serjan, O.S. & A.O. Sheykin. Ecological and physiological peculiarities of *Xenopsylla* in different phases of sunspot cycles and the role of these fleas in the dynamics of plague epizootics and epidemics. pp. 17-18.

Chumakova, I.V., L.I. Belyavtseva & N.V. Ermolova. To the problem of ecological classification in the order Siphonaptera. pp. 19-20.

Evchenko, Yu.M., L.I. Belyavtseva, M.P. Grigoriev, G.M. Grizhebovsky, YANG Gui-rong, B.I. Levchenko, SONG Zhi-zhong, L.N. Marchukova & XU Cheng. Specification of *Citellophilus tesquorum* parasitism under the conditions of central Caucasian plague natural focus. pp. 21-22.

Brukhanova, G.D., A.P. Beyer, G.M. Grizhebovsky & I.V. Chumakova. The systemic effect of Decis on *Yersinia pestis* in the organism of *Xenopsylla cheopis*. p. 23.

Kuznetsov, A.A. & A.N. Matrosov. Investigation of passive migration of fleas by means of individual labeling. pp. 24-32.

QI Yi-ming & HE Jing-hou. Morphological description of the larvae of two plague vector fleas. pp. 33-38.

LIU Jun. Inner Mongolia fleas and their vector effects in the epidemiology of plague. pp. 39-44.

MA Li-ming. Some physiological and environmental factors influencing the feeding activities of *Neopsylla bidentatiformis* and *Citellophilus tesquorum sungaris*. pp. 45-53.

ZHANG Rong-guang, WU De-qiang, ZHANG Hong & DENG Kai-ze. Species and distribution of vertebrates and arthropods naturally infected with plague in the Qinghai-Tibet plateau *Marmota himalayana* plague focus. pp. 54-59.

LI Zhi-lin, LIANG Jian-ning LIU Xan-ming & YIAO Shen-fu. Investigation of the fleas parasitizing *Citellus alashanicus* Büchner and analysis of their epidemiology at the Nan-hua mountain area in Ningxia. pp. 60-65.

LU Miao-gui, QUI Shen-ping, ZHANG Xiao-he & LI Mei-fe. Description of two new subspecies of fleas of *Ctenophthalmus* (*Sinoctenophthalmus*) found in Zhejiang Province, China. pp. 66-80.

(*Ctenophthalmus (S.) taiwanus zhejiangensis* LU & QUI, *Ctenophthalmus (S.) breviprojiciens zhejiangensis* LU, ZHANG & LI)

WAN Shen-rong, ZHOU Fang-xiao & LIU Xiao-qian. A new subspecies of *Oropsylla alaskensis* (Siphonaptera: Ceratophyllidae). pp. 84-86. (*Oropsylla alakesnsis qinghaiensis* WANG, ZHOU & LIU)

It was resolved that the Third International Symposium on Fleas was well organized and a truly successful event in the scientific life of Chinese Medical Entomologists. It was also announced that the Fourth International Symposium on Fleas would be held in Almaty, Kazakhstan, in 1999.

□□*□*

Recently, Mrs. N. F. Darskaya, now retired and living in Moscow, sent some reprints among which was a 110 page volume entitled "*An entertaining essay about the activities and personnel of the antiplague system in Russia and the Soviet Union*". Most of the volume deals with Mrs. Darskaya's reflections on the contributions of Il'ya Grigor'evich Ioff and Ol'ga Ivanovna Scalon, two of her colleagues at the Antiplague Institute of the Caucasus at Stavropol. Following are the authors, titles and pagination of the contents, translated into American English:

Darskaya, N.F. 1996. Il'ya Grigor'evich Ioff (on the 100th anniversary of his birth). pp. 111-205.

Darskaya, N.F. 1996. Ol'ga Ivanovna Scalon. pp. 206-212.

Labuni, N.F. & A.G. Reitblat. 1996. A study of the life of Ol'ga Ivanovna Scalon (1905-1980) pp. 213-219.

Levi, M.I. 1996. Lev Ivanovich Leshkovich - fate and life. p. 220.

I. G. Ioff (25-June-1897 * 7-April-1953) was a pioneer in the study of sylvatic plague and its vectors until his death at the age of 56.

A detailed obituary was published in *Ektoparazity* 3: 3-20 (1956) by A. H. Formozov, and both this and the Darskaya étude contains detailed bibliographies of his works.

□□*□*

Attention is called to the availability of a cumulative index for volumes 1-10 (1987-1996) of **Medical and Veterinary Entomology**. This 34 page compendium was prepared by A.R. Pittaway of CAB International and is available, free of charge from:

Dr. G. B. White, Editor
Medical & Veterinary Entomology
Royal Entomological Society
105 Breamwater Gardens
Ham, Richmond
Surrey TW10 7SG, U.K.

Also, copies of the **Proceedings of the 4th International Symposium on Ectoparasites of Pets** are now available. Checks for \$25.00 US, made out to the Regents of the University of California should be sent to:

Dr. Nancy C. Hinkle
Veterinary Entomologist
Department of Entomology
University of California,
Riverside, CA 92521
<nhinkle@citrus.ucr.edu>

Following is a listing of the contents.

Hinkle, N.C. Forward. xiii-xv.

Donahue, W.A. Jr. History of the symposium on ectoparasites of pets. xvii-xviii.

Hinkle, N.C. Ectoparasites of pets. xix-xxii.

Rust, M.K. Fleas: Their biology, behavior and control. 3-9.

Tacal, J.V. Ectoparasites of pets: The Public Health perspective. 11-13.

Lobetti, R. & L. Jacobson. *Babesia canis*: Presenting features and complications of the virulent form of the disease. 15-18.

Craig, S. Average flea load on dogs and cats over a period of 96 hours after infestation with 100 fleas. 19.

Seidman, M. A natural means of insect control by suffocation. 21-23.

Thomas, R.E., V.V. Ozols, N. Hausser & G.M. Silver. The biology of cat fleas, *Ctenocephalides felis*, reared on an *in vitro* feeding system. 25.

Murphey, M., L. Moran & M. Dryden. Establishment of a colony of *Ctenocephalides canis* on dogs. 27.

Miletic, G. & M. Tesic. *In vivo* cytogenetic characterization of the effects of Permethrin in BALB/c mice. 29.

Davis, R..M. Use of an orally administered insect development inhibitor (Lufenuron) as a flea control agent in the California ground squirrel, *Spermophilus beecheyi*. 31-32.

Dryden, M.W. Past sins and future directions in flea control. 33-36.

Metzger, M.E. & M.K. Rust. Studies exploring the overwintering mechanisms of cat fleas. 37-38.

Bossard, R., A.B. Broce & M. Dryden. Insecticide resistance of cat fleas, *Ctenocephalides felis felis*, in the United States. 39.

Moyses, E.W. A comparative study of two laboratory insecticide bioassays for the cat flea. 41.

Miller, R.J., M.W. Dryden, A.B. Broce & D. Suiter. Susceptibility of *Ctenocephalides felis* pupae to insecticides in various carpet types. 43-45.

Reiersen, D.A., M.K. Rust & J. Hampton-Beesley. Activity in carpet of

adulticides and insect growth regulators to control cat fleas. 47.

Broce, A.B. & M.W. Dryden. Commercialization of the KSU flea trap. 49-50.

Meo, N.J., B.B. Dunavent, D.M. Keister, P. Jeannin & M.N. Romano. An exploration of factors that may influence flea control in the dog. 51.

Goffaux, V.M. & P.J. Boyd. To count a flea: a comparative analysis of four experimental techniques. 53-55.

Silver, G.M., P.J. Gaines, R.E. Thomas & N. Wisniewski. Biochemical characterization and molecular cloning of an immunoglobulin degrading *Ctenocephalides felis* gut serine protease. 57.

Vaughan, J.A., R.E. Thomas & A.F. Azad. Passage of host IgG from bloodmeal to hemolymph: implications for vaccine design. 59.

Jarvis, E.E., G.M. Silver & N. Wisniewski. Cloning of genes encoding serine protease inhibitors containing constant and variable domains from the cat flea, *Ctenocephalides felis felis*. 61.

Meola, R. & K. Meier. Effects of Pyriproxyfen in the blood diet on adult survival, egg viability and larval development of the cat flea. 63.

Miller, T.A. & B.L. Blagburn. Titration of Pyriproxyfen collars on cats to determine the duration of flea ovicidal efficacy. 65-66.

Miller, T.A. & L.L. Caruthers. Titration of Pyriproxyfen delivered in shampoo formulations to pets to determine the relationship between dose applied and duration of flea ovicidal efficacy. 67-68.

Miller, T.A. & B.L. Blagburn. Titration of Pyriproxyfen on pets to determine the relationships between dose applied and duration of flea ovicidal efficacy. 69-70.

Ewald-Hamm, D., K.J. Krieger, E. Schein & H. Dorn. Efficacy of Advantage (Imidacloprid) against fleas in naturally infested dogs and cats. Results of two European field studies. 71.

Arther, R.G., J. Cunningham & R. Everett. Evaluating the effects of shampooing or repeated water exposure on the residual efficacy of Advantage (Imidacloprid) for flea control on dogs. 73-74.

Paul, A.J., C.J. Jones & R.G. Arther. Comparative evaluation of Advantage (Imidacloprid) and Program (Lufenuron) for flea control on dogs in a controlled simulated home environment. 75.

Richman, D.L. & P.G. Koehler. Effect of temperature and the synergist piperonyl butoxide on Imidacloprid toxicity to cat fleas (*Ctenocephalides felis felis*). 77-79.

Postal, J.M., F. Longo, P. Jeannin, J.S. Hunter, III, P. Tanner, D.M. Keister & M. Romano. Efficacy against fleas (*Ctenocephalides felis*) in cats of two topical formulations of Fipronil (Frontline Spray and Frontline Top-spot) under experimental infestation: An overall analysis of various studies. 81-82.

Hunter, J.S., III, D.M. Keister & P. Jeannin. The effect of Fipronil treated dog hair on the survival of the immature stages of the cat flea, *Ctenocephalides felis*. 83-84.

Postal, J.M., F. Longo, P. Jeannin, J.S. Hunter, III, P. Tanner, D.M. Keister & M. Romano. Efficacy against fleas (*Ctenocephalides felis*) in dogs of two topical formulations of Fipronil (Frontline Spray and Frontline Top-spot) after experimental infestation: An overall analysis of various studies. 85-86.

Tanner, P.A., D.M. Keister & P. Jeannin. A study to determine the effects of Frontline Spray treatment and Frontline Spot treatment on fecundity of the cat flea, *Ctenocephalides felis*, on dogs. 87-88.

Weil, A., P. Birckel, F. Bosc & A.M. Huet. Cutaneous distribution of C-Fipronil following a Spot-on administration to the dog and to the cat. 89.

Silver, G.M., J.D. Maddux, K.S. Brandt, R.E. Thomas & N. Wisnewski. Purification and characterization of the cat flea juvenile hormone esterases. 91.

Dean, S.R. & R.W. Meola. Effects of Lufenuron on larval progeny of the cat flea. 93.

Sifferman, R.L. & M. Groh. A retrospective evaluation of the effects of Lufenuron (Program) on flea allergy dermatitis (FAD) in dogs and cats. 95--96.

Mencke, N., H. Asskildt, D. Ewald-Hamm & H. Dorn. Efficacy of a Spot-on application with Imidacloprid (Advantage) against natural lice infestations in dogs. 97.

Pennington, R.G; & W.B. Warner. Efficacy of Bio-spot (45% Permethrin and 5.0% Pyriproxyfen) for control of fleas, flea ova, ticks and mosquitoes on dogs. 99-100.

Tanner, P.A., M.N. Romano & P. Jeannin. An investigative study to evaluate the effects of medicated shampoos on flea and tick efficacy of Frontline spray treatment on dogs. 101.

Maupin, G. Comparative susceptibility of nymphal *Ixodes scapularis*, the principal vector of Lyme Disease, to Fipronil and Permethrin. 103.

Postal, J.M., F. Longo, P. Jeannin, J.S. Hunter, III, P. Tanner, D.M. Keister & M. Romano. Efficacy against ticks (*Rhipicephalus sanguineus*) in dogs of two topical formulations of Fipronil (Frontline Spray and Frontline Top-spot) after experimental infestation: An overall analysis of various studies. 105-106.

Hinkle, N. C. Economics of pet ectoparasites. 107-109. (**Note below**)

Donahue, W.A., Jr. Meeting wrap-up and summary. 113-114.

Due to the currency of the article by Dr. Hinkle discussing the economics of pet ectoparasites and the general interest in the subject, Dr. Hinkle has graciously allowed me to include the complete text of her presentation below.

"The cat flea is the primary pest of dogs and cats in California. Other arthropod pests of companion animals include lice, mites, ticks and mosquitoes. These arthropods are considered primary pests, as well as vectors of disease organisms. These five pests and their associated medical conditions account for over \$402 million in veterinary expenditures by California pet owners each year.

"There is the additional public health cost of zoonoses transmitted from pets to humans, including rare conditions like plague, tularemia, ehrlichiosis and cat scratch fever. These costs were not considered in this study. Nor were costs of over-the-counter products or services or products provided by pest control companies. Only products or services purchased from veterinary clinics are included in these data.

"California veterinary practices were surveyed using a questionnaire designed to determine weekly numbers of cases and charges for treatment of various arthropods and their attendant disease conditions. California's regional veterinary medical associations assisted in conducting this study by including survey forms in their mailings. In regions where the associations did not collaborate, direct mailings were made to clinics listed in area business directories.

"Mean values were used to extrapolate to statewide values, based on numbers of veterinary clinics in California. According to American Veterinary Medical Association statistics, over 1,600 California veterinary clinics focus on companion animal veterinary care. Very conservative estimates were used, based only on clinics classified as small animal predominantly or exclusively. Thus, all values underestimate the actual significance of these pests to California veterinary health.

"Expenditures for flea-related veterinary conditions include flea control

products (for both animal and home), corticosteroids for flea allergy dermatitis, and antibiotics for attendant secondary infections and anthelmintics. Over \$320 million is spent annually at California veterinary clinics by pet owners for flea control, therapy for flea allergy dermatitis and tapeworm treatment.

"Pet owners spend \$53 million in small animal practices for treatment and prevention of *Dirofilaria immitis*. This includes annual heart worm testing, heart worm prophylaxis, and treatment of adult heart worm infestations. Even non-eventful treatment of extant infestations can cost several hundred dollars per case. While *Dirofilaria immitis* infections are still relatively rare on the West Coast, veterinarians have 10% of their patients on heart worm prophylaxis.

"Various mite infestations of both dogs and cats, including ear mites and mange, necessitate veterinary intervention. California pet owners spend over \$20 million each year on mite-associated infestations and diseases. The main mite genera affecting dogs and cats include *Demodex*, *Sarcoptes*, *Notoedres*, *Otodectes* and *Cheyletiella*.

"Because almost all products registered for ticks also list fleas on the label, it is difficult to identify strictly tick-associated expenditures. For purposes of this survey, an indirect measure of tick significance was used - the incidence of tick-borne diseases. While Lyme disease is still relatively rare in California, especially compared with the eastern seaboard, California veterinarians apparently consider risk to pets sufficiently significant to justify vaccinating almost 4% of their patients for Lyme disease. Treatment to prevent Lyme borreliosis and ehrlichiosis cost California pet owners over \$9 million per year. Because this survey method does not identify expenditures for vector control, tick-associated expenditure estimates are substantially underestimated.

"The majority of products used to treat for lice are also labeled for fleas, so, again, it is challenging to factor out the portion of insecticides that are purchased for louse control. Louse infestations are sufficiently rare in dogs and cats that their economic significance is probably minor, totaling less than a million dollars per year in

California. While an individual infestation may be costly, there are relatively few cases identified in veterinary practice.

"Over one third of pet dogs and cats in California visit veterinarians annually regarding some ectoparasite or associated condition. Treatment of pet ectoparasites and their associated medical conditions account for over half the annual gross income of the typical small animal veterinary practice in California.

"These results are based entirely on responses from small animal veterinary clinics in California. However, the veterinary component of ectoparasite suppression is only one part of the management of these pests. They do not include pet-owner efforts (over-the counter or mail order products), groomers, or pest control services. In an attempt to get a broader view of flea suppression, in particular, estimates were made of economic contributions of these other flea control components.

"It is estimated, for instance, that the typical pet owner spends over \$38 attempting to treat flea infestations (on the animal and in the home, exclusive of yard treatments) before seeking services of a professional, either a pest control company or a veterinarian. If these additional expenses were added into the equation it would be apparent that pet ectoparasites contribute significantly more to California's economy than the \$402 million expended in veterinary clinics.

"Extrapolating from these data, we can estimate that nationwide approximately \$1.7 billion is spent at veterinary clinics each year for flea control. Another \$938 million is spent on flea allergy dermatitis, and \$184 million for tapeworm treatments. Data for groomers providing flea dips is based on a phone survey and is more tentative, but estimates are that flea dipping by groomers nationwide accounts for another \$1.6 billion. Assuming that only half of the 53.3 million pet-owning U.S. households attempt flea control on their own, over a billion dollars a year would be spent in this market.

"An ancillary study has shown (Hinkle, unpublished data) that, nationwide, flea accounts produce approximately \$348 million annually for U.S. pest control

companies. A phone survey of pest control companies in 11 regions of the U.S. in fall of 1996 revealed that flea accounts were down in all except one of these regions (New England). This decline was attributed to various factors including weather, extensive insect growth regulator use, homeowner applications (especially of borate products), and the shift toward veterinary services for flea suppression.

"Estimates nationwide for flea-related control and treatment efforts, in summary, amount to \$2.822 billion (veterinary clinics), \$1.6 billion (groomers), \$348 million (pest control companies), and \$1.01 billion (pet-owners), for an annual total of \$5.78 billion. Control costs of other ectoparasites would increase this sum." Nancy Hinkle.



A REQUEST FOR MATERIAL

The following request for preserved flea larvae has been submitted by Dr. Robert Elbel and Theodore Gurney, Department of Biology, University of Utah, Salt Lake City, UT 84112.

A morphological classification of flea adults has been developed over the years, but flea larvae have been neglected. Elbel (1991 in F. Stehr (ed.), *Immature Insects*. Volume 2. Kendall/Hunt Publishing Company, Dubuque, IA) examine 52 larvae of the ~264 species of fleas of North America north of Mexico. Compared to adults, larvae have fewer morphological characters: Mandibular shape and number of teeth, setal number, position, length and shape of the head capsule, body segments and terminal anal segment. Due to the paucity of morphological characters, we are developing techniques to test flea larvae for DNA similarities. Studies to date on flea DNA have been limited to adults and our interests are in comparing larval and adult classifications. At the present, based on morphological similarities, our larval classification differs somewhat from that of the adults.. The use of DNA characters may help to resolve these current differences.

Our goal is to obtain and describe as many different flea larvae as possible and

devise a classification that fits both the larvae and the adults. Flea larvae reared from known adults and with associated adults should be killed in and preserved in 95% ethanol, in rubber or plastic stoppered plastic or microfuge tubes. Rodent nests and bat guano should be placed immediately into 95% ethanol in tightly sealed plastic jars in the field. Vials, tubes and jars should be sealed with parafilm to prevent evaporation which can destroy the DNA when the water content rises to 50%. DNA is desolved by water, so water cannot be used in processing. Also, mounted specimens cannot be removed from slides for study because prior clearing in KOH, rinsing in water and the lower percentages of ethanol has destroyed the DNA.

Freshly engorged adults and larvae may give false positives due to the presence of the host's blood. While larvae feed mainly on dried blood and other organic detritus, they may imbibe liquid blood from the anus of the adults or from an injured host. However, the digestive system soon dissolves host DNA.

Flea larvae and adults will be identified individually while in 95% ethanol with a compound microscope. Larvae that do not fit in the 1991 key will be characterized and voucher specimens set aside for mounting. Remaining specimens will be removed from the 95% ethanol, dried, ground individually or preferably in lots of 10 or more in pronase SDS for one hour at 45 C, then extracted with phenol-chloroform and 95% ethanol. The resulting precipitate will be chilled for two hours at -20 C, centrifuged, washed in 75% ethanol, dried, dissolved in low tris pH 8 and tested for DNA using PCR. R.E. Elbel.

FLEA SPECIES

Not since the December 1994 issue of Flea News (49:559) have I included a complete listing of new taxa known to me, along with their data. Following is a listing for 1993 through 1997, although it is unlikely that the more recent years are yet complete. Readers knowing of additional taxa described but not

included in the following list are urged to contact me with their particulars. Where possible, abbreviations for the institutions where the primary types are deposited follow Arnett et al., 1993, *The insect and spider collections of the world*.

1993

atlantidis Beaucournu. *Leptopsylla algira*. Bulletin de la Société Française de Parasitologie 11(2): 259-263. Ex. *Crocidura canariensis*, Canary Islands, Montana Clara, 29.18N 13.33W, 2.V.1990, R. Hutterer & O. Molina leg. Holotype male, ZFMK

xiensis WANG Dun-qing & LIU Jing-yuan. *Ctenophthalmus (Sinoctenophthalmus)* Acta Zootaxonomica Sinica 18(4): 490-492, Ex. *Rattus norvegicus*, China, Hubei Province, Shennongjia Forest Region, ~31.75N 110.67E, 8.V.1989. Holotype male, IPDH

lopesi Guimaraes & Linardi. *Hechtiella*. Memórias Instituto Oswaldo Cruz 88(4): 547-550. Ex. *Proechimys* sp., Brazil, Sao Paulo State, Salesopolis (Ecological Station of Boraceia), 12.VIII.1973, E. Dente leg. Holotype male, MZSP

siboi YE Rui-yu & YU Xin *Neopsylla*. Acta Entomologica Sinica 36(3): 371-374. Ex. *Cricetulus migratorius*, China, Xinjiang Province, Bole, 44.55N 82.05E, 30.X.1989. Holotype male, XIED

zhengi XIE Bao-qi, HE Jin-hou & CHAO Zhong-jie. *Chaetopsylla*. Acta Zootaxonomica Sinica 18(1): 105-107, Ex. *Paguma larvata*, China, Yunnan Province, Jianchuan County, ~2500-2700 m, III-IV. 1977. Holotype male, RIED

1994

australiaca Beaucournu & Kock. *Lagaropsylla mera*. Annales de la Société Entomologique de France 30(2): 201. Ex. *Tadarida jobensis*, Australia, Western Australia, Mount Hart, 16.55S 125.05E, 11.IX.1976, Kimberly Expedition leg. Holotype female, BMNH

changi WU Hou-yong, ZHAO Qi-fi & LI Zhen-hai. *Wagnerina*. Researches on Fleas, pp 84-87. Ex. *Trogopterus xanthipes*, China, Hebei Province, Yuxian County ~39.51N 114.30E, X.1985 & XI.1990. Holotype male, AMMS

heishuiensis LI Kuei-chen & LIU Lian-zhu. *Hystrichopsylla* (*Hystrocera*). Entomomtaxonomia 16(4): 269-271. Ex. *Niviventer confucianus*, China, Sichuan Province, Heishui, ~29.02N 108.48E, 9.VIII.1960. Holotype male, GMCC

iberica Ribeiro, Lucientes, Osacar & Calvete. *Echidnophaga*. Journal of Medical Entomology, 31(6): 887-889, Ex. *Oryctolagus cuniculus*, Spain, Zaragoza Province, Saragoça, 14.XII.1992, J. Lucientes leg. Holotype male, JLCC

intermedium GUO Tian-yu, LIU Quan & WU Hou-yong. *Paradoxopsyllus*. Researches on Fleas, pp. 96-98, Ex. *Ochotona gloveri*, China, Sichuan Province, Danba County, 30.08N 101.09E, 12.V.1988. Holotype male, AMMS

liae GUO Tian-yu, LIU Quan & WU Hou-yong. *Paradoxopsyllus*. Researches on Fleas, pp. 99-101, Ex. *Rattus niviventer*, China, Sichuan Province, Kangding County, 30.00N 101.09E, V.1988. Holotype male AMMS

liui GUO Tian-yu, LIU Quan & WU Hou-yong. *Frontopsylla*. Researches on Fleas, pp. 93-95, Ex. *Apodemus lantorum*, China, Sichuan Province, Luding County, 29.09N 102.20E, IV & V.1988. Holotype male, AMMS

malayana Beaucournu & Kock. *Lagaropsylla*. Senckenbergiana biologica 73(1-2): 67-75, Ex. *Tadarida plicata*, Malaysia, Negeri Sembilan Province, Kuala Pilaln, 02.44N 102.15E, A.J. Beck leg. 29.XI.1966. Holotype male SMF Si.3.1992.1&2.

mengdaensis CAI Li-yun & WU Wen-zhen. *Hystrichopsylla* (*Hystrocera*). Acta Entomologica Sinica 37(2): 225-228, Ex. *Eothenomys eva*, China, Qinghai Province,

Xunhua County, Mongdo Tian-chi, ~35.48N 102.35E. Holotype male, RIED

peninsularis Lewis. *Thrassis*. Journal of the New York Entomological Society 101(4): 536-541 (1993), Ex. *Ammospermophilus leucurus*, Mexico, Baja California, 9 km NW Rancho Santa Inez, 29.46N 115.09W, 15.I.1984, E. Yensen leg. Holotype male, USNM 104870.

polyspina LIU Quan, WU, Hou-yong & LI Xiao-lan. *Amphipsylla*. Researches on Fleas, pp. 88-92, Ex. *Myospalax fontaniere*, China, Ningxia Huizu A.O., Guyuan County, 36.00N 106.20E. Holotype male AMMS.

subulisppina CAI Li-yun, WU Wen-zhen & LI Zhi-lum. *Wagnerina* (*Anarcuata*). sg. nov. Acta Entomologica Sinica 37(2): 225-228 Ex. *Petaurista xanthotis*, China, Qinghai Province, Nanggen County, ~3.800 m, IX.1989. Holotype male, RIED.

1995

andersoni George & Beaucournu. *Orthopsylloides*. Bulletin de la Société Entomologique de France 100(2): 169-172, Ex. *Melomys rufescens*, New Guinea, Baiyer River Wildlife Sanctuary, ~05.35S 144.10E, VIII-IX.1985, T. Anderson leg. Holotype male, BMNH.

baiyerensis George & Beaucournu. *Orthopsylloides abacetus*. Bulletin de la Société Entomologique de France 100(2): 169-172, Ex. *Rattus ruber*, New Guinea, Baiyer River Wildlife Sanctuary, ~05.35S 144.10E, 4.IX.1985, T. Anderson leg. Holotype male, BMNH.

grenieri Beaucournu & Rodhain. *Ctenocephalides*. Parasite 2: 297-300, Ex. *Procapra rufipes* [=capensis], Cameroun, Ngaoundéré, 07.19N 13.35E, VII.1960, J. Mouchet leg. Holotype male, JCBC.

liae ZHANG Rong-guang, WU De-qiang & LI Bao-su. *Monopsyllus*. Acta Entomologica Sinica 38(2): 234-236, Ex. *Eutamias sibiricus*, China, Gansu Province,

Longxi & Huning Counties, Lingtai, IV-VIII.1965. Holotype male, AIGS.

lui LI Kuei-chen. *Syngenopsyllus*. Acta Zootaxonomica Sinica 20(1): 102-106, Ex. "squirrel", China, Sichuan Province, Mt. Emei, 25.VII.1955, LI J.-y. *leg.* Holotype male, GMCC.

1996

angustiproceria WU Hou-yong, GUO Tian-yu & LIU Quan. *Xenodaeria*. Liuxingbingxue Diaocha Jikan 2: 77-82, Ex. *Soriculus nigrescens*, China, Tibet, Tsona County, 13.VI-9.VII.1993, 2,500-4,300 m. Holotype male, AMMS.

breviprocera WU Hou-yong, GUO Tian-yu & LIU Quan. *Palaeopsylla*. Liuxingbingxue Diaocha Jikan 2: 83-86, Ex. *Rattus niviventer*, China, Tibet, Lhuntse County, Bangqi, VI.1994, 2,600 m. Holotype male AMMS.

heishuiensis LI Kuei-chen. *Macrostylophora*. Acta Zootaxonomica Sinica 21(2): 239-243, Ex. *Apodemus* sp., China, Sichuan Province, Heishu, 32.00N 103.00E, IX.1960, CHEN Ning-yu *leg.* Holotype male, GMCC.

hohuana LEIN Jih-ching & WENG Ming-hui. *Chaetopsylla*. Journal of the Taiwan Museum 49(1): 105-110, Ex. *Mustela sibirica*, Taiwan, Nantou County, Hohuan Pass, 3,000 m, 15.XI.1994, LEIN J.-c. & WENG M.-h. *leg.* Holotype male IPPM.

jingdongensis LI Kuei-chen. *Macrostylophora*. Acta Zootaxonomica Sinica 21(2): 239-243, Ex. *Dremomys rufigenis*, China, Yunnan Province, Caoling, 24.00N 101.00E, X.1965, LI Z.-x. *leg.* Holotype male, GMCC.

laxiproceria WU Hou-yong, GUO Tian-yu & LIU Quan. *Xenodaeria*. Liuxingbingxue Diaocha Jikan 2: 77-82, Ex. *Soriculus nigrescens*, China, Tibet, Lhuntse County, 20-27.VI.1994, 2,500 m. Holotype male AMMS.

microphthalma Beaucournu & Kock. *Ctenophthalmus*. Senckenbergiana Biologia 75(1-2): 159-162, Ex. *Beamys hindei*, Tanzania, Kisarawe District, Kivu Forest Reserve, 06.48S 38.39E, 27.II.1991, Frontier Tanzania Field team *leg.* Holotype female, SMF Si.2.2995.

postsinusa LIU Quan, GUO Tian-yu & WU Hou-yong. *Amphipsylla*. Liuxingbingxue Diaocha Jikan 2: 87-93, Ex. *Microtus* sp., China, Tibet, Yadong County, 27.04N 88.09E, 16.V.1992. Holotype male AMMS.

tutatoides LIU Quan, GUO Tian-yu & WU Hou-yong. *Amphipsylla*. Liuxingbingxue Diaocha Jikan, Ex. *Pitymys irene*, China, Tibet, Yadong County, 27.04N 88.09E, 31.V.1992. Holotype male AMMS.

xui WU Hou-yong, GUO Tian-yu & LIU Quan. *Callopsylla* (*Callopsylla*). Liuxingbingxue Diaocha Jikan 2: 70-76, Ex. *Pitymys sikimensis*, China, Tsona County, Gongri, 14-25.VI.1993. Holotype male AMMS.

zhang WU Hou-yong, GUO Tian-yu & LIU Quan. *Callopsylla* (*Callopsylla*). Liuxingbingxue Diaocha Jikan 2: 70-76, Ex. *Pitymys sikimensis*, China, Lhuntse County, Bangqi, 24.VI.1994. Holotype male AMMS.

1997

larimerius Lewis & Grimaldi. *Pulex*. American Museum Novitates 3205: 1-9. Host unknown. In Lower Miocene amber from the Dominican Republic. Holotype female AMNH DR-14-1140.

qinghaiensis WANG Shen-rong, ZHOU Fang-xiao & LIU Xiao-qian. *Oropsylla alaskensis*, III International Symposium on Fleas, X.1997: 84, Ex. *Marmota himalayana*, China, Qinghai Province, Dulan County. Holotype male, deposition unknown.

zhejiangensis LU Miao-gui, QIU Sheng-ping. *Ctenophthalmus* (*Sinoctenophthalmus*). III International Symposium on Fleas, X.1997: 69, Ex. *Rattus norvegicus*, China,

Zhejiang Province, Jingning (Lianchuan).
Holotype male ZPAHS.

zhejiangensis LU Miao-gui, ZHANG
Xiao-he & LI Mei-fe. *Ctenophthalmus*
(*Sinoctenophthalmus*) *breviprojiciens*. III
International Symposium on Fleas, X.1997:
73, Ex. *Apodemus agrarius*, China, Zheji-
ang Province, Yongjia (Jieken). Holotype
male ZPAHS.

SIPHONAPTERA LITERATURE

Although it may not be obvious from the
titles, citations included here pertain to fleas
and the zoonoses associated with them. No
particular effort has been made to search the
medical and veterinary literature and the
emphasis here is on the taxonomy, system-
atics and general biology of the order.

1989 (List 12)

Darskaya, N.F. & B.K. Kotty. The
use of artificial shelters in forests for shrews
with the aim of studying the mode of life of
their fleas. *Parazitologiya* 23(4): 328-333.

1993 (List 9)

**Galloway, T., J.C. Beaucournu & A.
Estrada-Peña.** Deux puces nouvelles pour
les Canaries (Siphonaptera: Ischnopsyllidae).
*Bulletin de la Société Française de Parasitolo-
gie* 11(1): 159-162.

**Nayak, M.K., S.S. Sehgal & V.
Baweja.** Morphometric variation within
and between two natural populations (from
plague endemic areas) and a pure-line labor-
atory strain of oriental rat flea *Xenopsylla*
cheopis (Siphonaptera: Pulicidae). *Bulletin*
of Entomology (New Delhi) 34(1/2): 132-
141.

1994 (List 7)

**Ageev, V.S., A.O. Sheykin & O.S.
Serzhanov.** Zoogeographical analysis of
the fauna of mammal's fleas of the mountains

of Central Asia and Kazakhstan. *Selvinia*
1994(4): 21-26.

**CAI Kui-zheng, LI Zuo-min, BAO
Jai-ming, SUN Rong-bin, LI Chang-
cai, ZHANG Yong-sen & ZHAO
Gong-qiang.** Preliminary investigations of
ectoparasite infestation in domestic rabbits.
*Chinese Journal of Veterinary Science and
Technology* 24(4): 16-17.

Reichardt, T.R. & T.D. Galloway.
Seasonal occurrence and reproductive status
of *Opisocrostis bruneri* (Siphonaptera:
Ceratophyllidae), a flea of Franklin's ground
squirrel, *Spermophilus franklini* (Rodentia:
Sciuridae) near Birds Hill Park, Manitoba.
Journal of Medical Entomology 31(1): 105-
113.

Schelvis, J. Caught between the teeth. A
review of Dutch finds of archaeological
remains of ectoparasites in combs. *Proceed-
ings of the Section Experimental and Applied
Entomology of the Netherlands Entomolog-
ical Society* 5: 131-132.

**Sheykin, A.O., O.S. Serzhanov,
B.M. Jakunin, V.S. Ageev & J.U.
Akbutaev.** A faunal genetic analysis of
specific species of Palaearctic fleas of gerbils.
Selvinia 1994(2): 28-33.

1995 (List 6)

Alekseev, A.N. Disease agents and zoo-
notic vectors: A system with new features.
*Bulletin of the Scandinavian Society for
Parasitology* 5(3): 3-14.

Asmat, G.S.M. The ectoparasites of the
lesser bandicoot rat, *Bandicoota bengalensis*
Gray in Chittagong, Bangladesh. *Bangla-
desh Journal of Entomology* 5(1/2): 49-52.

Chilton, G. & T.D. Galloway. Fleas
(Siphonaptera: Ceratophyllidae) from nests of
white-crowned sparrows (*Zonotricha leuco-
phrys*) in southwestern Alberta, Canada.
Canadian Entomologist. 127: 443-444.

Cloudsley-Thompson, J. On being
bitten and stung. *Antenna (London)* 19(4):
177-180.

GUO Tian-yu, XU Rong-man, YAN Ge & WU Hou-yong. Flea survey of Longzi county, Tibet, China. pp. 70-4. In: XU Rong-man, ZHANG Qi-en & HUANG Xiang-rui (Eds.). Contributions to epidemiological survey in China. Volume 1. Beijing, China. Military Medical Science Press.

GUO Tian-yu, XU Rong-man, WANG Da-lin & WU Hou-yong. Flea survey of Cuona county, Tibet, China.. pp. 70-74. In: XU Rong-man, ZHANG Qi-en & HUANG Xiang-rui (Eds.). Contributions to epidemiological survey in China. Volume 1. Beijing, China. Military Medical Science Press.

GUO Tian-Yu, XU Rong-man, WU Hou-yong & YAN Sheng-rang. Flea survey of Yadong county, Tibet China. 63-69. In: XU Rong-man, ZHANG Qi-en & HUANG Xiang-rui (Eds.). Contributions to epidemiological survey in China. Volume 1. Beijing, China. Military Medical Science Press.

Heeschen, K. New compounds and methods for control of fleas on dogs. Thesis, Tierarztliche Hochschule Hannover, Hannover, Germany. 169 pp.

HUANG Jia-liang et al. An investigation of small mammals and their ectoparasites in the mountainous areas of southern Hainan Province. Chinese Journal of Vector Biology and Control 6(1): 37-41.

HUANG Zheng-mei & BA Wen-fe. Survey of rats and their fleas in rural homes in Yuxi, Yunnan. Chinese Journal of Vector Biology and Control 6(1): 46-49.

Moshier, S.E., R.A. Watkins & A.J. Pinter. Parasites of small mammals in Grand Teton National Park. *Babesia* and *Hepatozoon*. 19th Annual Report, 1995, National Park Service Research Center. H.J. Harlow & M. Harlow (eds.) pp. 67-69.

Scheykin, A.O., O.S. Serzhanov, B.M. Jakunin, V.S. Ageev, J.U. Akbutaev & B.D. Taschenov. Taxo-

nomie structure and the ways of evolution of faunal complexes in Palaearctic gerbil fleas. *Selvinia* 1995(1): 29-35.

Stanko, M. Current status of knowledge on ectoparasites (Siphonaptera: Anolpura: Ixodida: Mesostigmata) of the small mammals in the Biosphere Reserve in the east Carpathians. *Natura Carpatica* 36: 61-70.

Sunityoso, S., M. Sudomo & F.M.L. Simanjuntak. Ectoparasites of *Rattus* spp. captured in the area of Manggarai and its surroundings, south of Jakarta. *Jurnal Biologi Indonesia* 1(3): 51-57.

WANG Shen-rong et al. Studies on experimental plague vector efficiency of *Citellophilus tesquorum sungaris* at different temperatures. *Chinese Journal of Vector Biology and Control* 6(1): 50-53.

1996 (list 4)

Ageev, V.S. & S.B. Pole. Fleas of the marmots in the plague enzootic areas of the Tien Shan and Pamiro-Altai mountains. pp. 89-94. In: M. LeBerre, R. Ramousse & L. Guelte (eds.). Biodiversity in marmots. International Marmot Network. Moscow, Lyon.

Ageev, V.S., S.B. Pole, V.S. Arakelyanz & N.T. Kunitskaya. Marmot fleas and their role in the maintenance of plague focality in the north-east of central Tien Shan (the Kokpak plague mesofocus). p. 91. Abstract II. International Conference on Marmots. Cheboksary, Chuvash Republic, Russia, 9-13 September 1996.

Alhaidari, Z., T. Olivry & J.P. Ortonne. Acquired feline hair shaft abnormality resembling trichorrexis nodosa in humans. *Veterinary Dermatology* 7(4): 235-238.

Anonymous. An entertaining essay about the activities and personnel of the antiplague system in Russia and the Soviet Union. "Informika", Moskva. pp. 111-220.

- Atwell, R., J.M. Postal, M. Fitzgerald, K. Kendall, C. Kidd, B. Howlett, C. Jensen, I Johnstone & V. Menrath.** Clinical field assessment of a topical preparation of Fipronil in domestic cats with application by their owners. *Australian Veterinary Practitioner* 26(3): 154.
- Bardt, D. & E. Schein.** Drug resistant flea populations and problems with therapy. *Kleintierpraxis* 41(8): 561-570.
- Bazanov L.P. & M.P. Maevskii.** Duration of survival of the plague microbe in *Citellophilus tesquorum altaicus*. *Meditinskaya Parazitologiya i Parazitarnye Bolezni* (1996) No. 1: 45-48.
- Berdal, B.P., R. Mehl, N.K. Meidell, A.M. Lorentzen-Styr & O. Scheel.** Field investigations of tularemia in Norway. In: First International Congress on Tularemia, Umea, Sweden, 23-25 August 1995. G. Sandström, A. Sjöstedt & A. Tärnvik (eds.). *FEMS Immunology and Medical Microbiology* 13(3): 191-195.
- Blades, D.C.A. & C.W. Maier.** A survey of grassland and montane arthropods collected in the southern Okanagan region of British Columbia. *Journal of the Entomological Society of British Columbia* 93: 49-73.
- Butler, J.M. & T.J. Roper.** Ectoparasites and sett use in European badgers. *Animal Behaviour* 52(3): 621-629.
- Carlotti, D.N.** Dermatology of dogs and cats. II. Allergy testing *in vivo*: Flea bite allergic dermatitis, atopy and food allergy. *Revista de Medicina Veterinaria (Buenos Aires)* 77(5): 358-371.
- Clyde, V.L.** Practical treatment and control of common ectoparasites of exotic pets. *Veterinary Medicine* 91(7): 634-637.
- Darskaya, N.F. & V.M. Malygin.** On the fleas of mammals from the Ucayali River basin, Peruvian Amazonia. *Parazitologiya* 30(2): 187-190.
- Donahue, W.A. & R. Young.** Assessing the efficacy of (S)-methoprene collars against flea egg hatch in pets. *Veterinary Medicine* 91(11): 1000-1005.
- Dryden, M.W.** A look at the latest developments in flea biology. *Veterinary Medicine (Supplement)* 91(6): 3-9.
- Dryden, M.W.** Epidemiology and control of fleas infesting dogs and cats. *Veterinary Quarterly* 18 (Supl. 1): S44-S45.
- Dufva, R.** Sympatric and allopatric combinations of hen fleas and great tits: A test of the local adaptation hypothesis. *Journal of Evolutionary Biology* 9(4): 505-510.
- Dufva, R. & K. Allander.** Variable effects of the hen flea *Ceratophyllus gallinae* on the breeding success of the great tit *Parus major* in relation to weather conditions. *Ibis* 138(4): 172-177.
- Ehrentreich, L. & H.H. Wrieg.** Antihistaminics and polyunsaturated fatty acids in the management of canine pruritus. *Kleintierpraxis* 41(11): 829 ... 838.
- Elbel, R.E.** Significance of larval classification of fleas (Siphonaptera) as related to the adults (an update). Proceedings of the 49th Annual Meeting of the Utah Mosquito Abatement Association, 29 September / 1 October 1996. pp. 16-22.
- Eremina, O.Yu., S.A. Roslavl'tseva, E.I. Bakanova, A.E. Shipov, G.V. Zhadanova, T.A. Mastryukova & M.I. Kabachnik.** Karesan as a selective inhibitor of carboxylesterases in arthropods and worms. *Biology Bulletin of the Russian Academy of Sciences* 23(2): 187-194.
- Fedorov, K.P., A.G. Mirzaeva, V.A. Marchenko & V.F. Sapegina.** On the history of development of parasitological studies at the Institute of Biology of the Siberian Branch of the Russian Academy of Sciences. *Siberian Journal of Ecology* 3-4(1996): 35-360.
- Franc, M. & M.C. Cadiergues.** Value of the systemic insect growth regulator

Lufenuron, administered orally in the control of *Ctenocephalides felis*. Parasite 3(3): 277-282.

Galloway, T.D. & J.E. Christie. On the occurrence of *Chaetopsylla lotoris* (Stewart) (Siphonaptera: Vermipsyllidae) on raccoons, *Procyon lotor* (L.) in Manitoba. Proceedings of the Entomological Society of Manitoba 52: 18-19.

Genchi, C. The dog and cat flea: An unidentified host? Obiettivi e Documenti Veterinari 17(5): 27-29.

GONG Zheng-da, XIE Bao-qi & LIN Jia-bing. The ecology and flea fauna of Mt. Gaoligong in Yunnan. Zoological Research 17(1): 59-67.

Hopkins, T.J., C. Kerwick, P. Gyr & I. Woodley. Efficacy of Imidacloprid to remove and prevent *Ctenocephalides felis* infestations on dogs and cats. Australian Veterinary Practitioner 26(3): 150-153.

Hopkins, T.J., I. Woodley & P. Gyr. Imidacloprid topical formulation: larvicidal effect against *Ctenocephalides felis* in the surroundings of treated dogs. Australian Veterinary Practitioner 24(4): 210-214.

HUANG Jia-liang, et al. Investigation of murine-like animals and their external parasites in the Xisha Isles. Chinese Journal of Vector Biology and Control 7(1): 25-28.

Jacobs, D.E., M.J. Hutchinson, K.J. Krieger & D. Bardt. A novel approach to flea control on cats using Pyriproxyfen. Veterinary Record 139(2): 559-560.

Jones, C.J. Immune responses to fleas, bugs and sucking lice. pp. 150-174. In: S.K. Wikel (ed.). The immunology of host-ectoparasitic arthropod relationships. Oxford University Press, New York.

Kononova, I.M. Ectoparasite fauna of *Microtus oeconomus* in the Prilukskii reserve in Belarus. Parazitologiya 30(1): 27-31.

Krieger, R.I., T.M. Dinoff & J. Peterson. Human disodium octaborate

tetrahydrate exposure following carpet flea treatment is not associated with significant dermal absorption. Journal of Exposure Analysis and Environmental Epidemiology 6(3): 279-288.

Kristofík, J., P. Masán & Z. Sustek. Ectoparasites of the bee-eater (*Merops apiaster*) and arthropods in its nests. Biologia (Bratislava) 51(5): 557-570.

Krylov, D.G. Flea fauna of small mammals in the Kostroma region. Parazitologiya 30(1): 19-26.

LI Chao & WU Wen-zhen. A new record of *Ceratophyllus* in China (Siphonaptera: Ceratophyllidae) Acta Zootaxonomica Sinica 21(1): 61.

LI Gui-zhen, CENG Ya-chun & CENG Fan-zhen. Description of three new subspecies of Ctenophthalmi (Sinoctenophthalmus) and discussion (Siphonaptera: Hystrichopsyllidae). Animal Taxology 21(1): 110-117.

LI Gui-zhen, LI Kuei-chen, ZENG Ya-chun, ZENG Fan-zhen & PAN Bo-hong. On three new species of *Ctenophthalmus* (*Sinoctenophthalmus*) with discussions of some pertinent problems (Siphonaptera: Hystrichopsyllidae) Acta Zootaxonomica Sinica 21(1): 110-117. *C. jixiensis*, *C. xinganensis* & *C. xinyiensis* (paper not seen).

LIEN Jih-ching & WENG Ming-hui. A new species of flea (Siphonaptera: Vermipsyllidae) from Taiwan. Journal of the Taiwan Museum 49(1): 105-110.

LIN Dia-hua et al. Study on blood-sucking activity of *Xenopsylla cheopis* at high and low temperatures with 125I labelled method. Chinese Journal of Vector Biology and Control 7(1): 22-24.

LIU Quan, GUE Tian-yu & WU Hong-yong. Description of two species of genus *Amphipsylla* in China (Siphonaptera: Leptopsyllidae) Liuxingbingxue Diaocha Jikan 2(1996): 87-93.

- Makundi, R.H., B.S. Kilonzo & C.A. Sabuni.** Laboratory evaluation of the efficacy of Permethrin impregnated overalls for protection against *Xenopsylla cheopis* (Rothschild) (Siphonaptera: Pulicidae). *International Pest Control* 38(2): 56-57.
- Medvedev, S.G.** Fleas from the family Ischnopsyllidae (Siphonaptera) in Russia and adjacent countries. *Entomologicheskoe Obozrenie* 75(2): 438-454.
- Mei, M.** Nuovi dati corologici su alcuni Sifonatteri della fauna Italiana. *Fragmenta Entomologica, Roma* 27(2): 525-553.
- O'Dair, H.A., P.J. Markwell & I.E. Maskell.** An open prospective investigation into aetiology in a group of cats with suspected allergic skin disease. *Veterinary Dermatology* 7(4): 193-202.
- Onishi, T., H. Inokuma & Y. Uzuka.** Effects of Diazinon 20% Spot-on on the flea and tick infestation in dogs and cats. *Journal of the Japanese Veterinary Medical Association* 49(9): 641-644.
- Putsintseva, L.S. & V.P. Dremova.** Insecticidal activity of a new combined dust Malkord. *Meditsinskaya Parazitologiya i Parazitarnye Bolezni* (1996) No. 1: 34-36.
- Putsintseva, L.S., V.P. Dremova, T.Z. Rysina & Yu.V. Ermishev.** Insecticidal activity and toxicity of a novel pyrethroid insecticide, Bistar. *Meditsinskaya Parazitologiya i Parazitarnye Bolezni* (1996) No. 4, 26-28.
- Rendell, W.B. & N.A.M. Verbeek.** Are avian ectoparasites more numerous in nest boxes with old nest material? *Canadian Journal of Zoology* 74(10): 1819-1825.
- Reimann, U.** Alternative methods of rearing and breeding haematophagous arthropods with a new contribution to rearing fleas (*Ctenocephalides felis*). Thesis, Tierärztliche Hochschule Hannover. Hannover, Germany. 177 pp.
- Rodhain, F.** Insects know no border. *Proceedings of the 5th Colloquium on the Epidemiology of Infectious Diseases, Institut Pasteur, Paris, France.* 26 April 1996. *Medecine et Maladies Infectieuses* 16(Special): 408-414.
- Roman, P., S. Martinez, F.J. Dotl, J.A. Greco & A Romano.** Control of *Ctenocephalides* ssp. on dogs with an application of Imidacloprid Spot-on 10%. *Revista de Medicina Veterinaria (Buenos Aires)* 77(6): 406 ... 411.
- Ruiz, A., A.M. Navarro, E. Vargas, J. Sánchez, A. Sato & E. Escobar.** Bubonic plague in Peru: A multisectorial focus of control. *Boletín de la Oficina Sanitaria Panamericana* 121(4): 363-367.
- Saxena, V.K. & T. Verghes.** Ecology of flea transmitted zoonotic infection in Mamma village, Beed District [India?]. *Current Science* 71(10): 800-803.
- Skírnisson K. & Á.Á. Jónsson.** Parasites and ecology on the common eider in Iceland. *Bulletin of the Scandinavian Society for Parasitology* 6(2): 126-127.
- Stanko, M. & J. Fricova.** A contribution to the knowledge of the small mammals (Insectivora, Rodentia) and their ectoparasites in the environs of Plavecske strkoviska. *Ochrana Prorody* 14L 143-151.
- Stanko, M. & L. Mosanskí.** Summary of the small mammal fauna (Insectivora, Rodentia) and their ectoparasites in the National Nature Reserve at Sivec (Cierna Hora Mountains). *Natura Carpatica* 27: 201-208.
- Thomas, R.E.** Fleas and the agents they transmit. In: B.J. Beaty & W.C. Marquardt (eds.). *The biology of disease vectors.* University of Colorado Press.
- Togerson, P. & R. Breathnach.** Flea dermatitis and flea hypersensitivity: The current situation in Ireland. *Irish Veterinary Journal* 49(7): 426-434.
- Vashchenok, V.S.** Species composition of Siphonaptera in northwestern Russia. *Parazitologiya* 30(5): 410-424.

Veraldi, S., S. Comozzi & G. Scarbelli. Tungiasis presenting with sterile pustular lesions on the hand. *Acta Dermatovenereologica* 76(6): 495.

Viraben, R. Papular urticaria. A cutaneous sensitivity reaction to environmental arthropods. *Annales de Dermatologie et de Vénérologie* 123 (11): 751-756.

WANG Dun-qing & LIU Jing-yuan. A new species of *Rhadinopsylla* from Shennongjia of Hubei Province, China (Siphonaptera: Hystrichopsyllidae). *Acta Zootaxonomica Sinica* 21(3): 371-373.
R. (Actenophthalmus) eothenomus (paper not seen).

Wikel, S.K., D.K. Bergman & R.N. Ramachandra. Immunological-based control of blood-feeding arthropods. pp. 290-315. In: S.K. Wikel (ed.). *The immunology of host-ectoparasitic arthropod relationships*. Oxford University Press, New York.

WU Hou-yong, GUO Tian-yu & LIU Quan. Two new species of *Callopsylla* Wagner, 1934 (Siphonaptera: Ceratophyllidae). *Liuxingbingxue Diaocha Jikan* 2(1996): 70-76.

WU Hou-yong, GUO Tian-yu & LIU Quan. Descriptions of two new species of *Xenodaeria* Jordan, 1932 (Siphonaptera: Hystrichopsyllidae). *Liuxingbingxue Diaocha Jikan* 2(1996): 77-82.

WU Hong-yu, GUO Tian-yu & LIU Quan. A new species of *Palaeopsylla* Wagner, 1903 (Siphonaptera: Hystrichopsyllidae). *Liuxingbingxue Diaocha Jikan* 2(1996): 83-86.

Yensen, E., C.R. Baird & P.W. Sherman. Larger ectoparasites of the Idaho ground squirrel (*Spermophilus brunneus*). *Great Basin Naturalist* 56(3): 237-246.

Yoshizawa, M.A.C., J.L. Sousa & D. Baggio. Ectoparasites of *Rattus norvegicus* in the Distrito Federal, Brazil. *Revista Brasileira de Parasitologia Veterinaria* 5(1): 39-42.

1997 (List 2)

Ageev, V.S., S.B. Pole, V.S. Arakelyanz & V.I. Sapozhnikov. On the history of a discovery and biocenose structure of the Kokpak mesofocus of plague. Abstracts of the III International Conference on Marmots, Cheboksary, Chuvash Republic, Russia, 25-30 August 1997. pp 114-115.

Aikimbayev, A.M., V.S. Ageev & S.B. Pole. Additional information on plague in the central Tien Shan. Abstracts of the III International Conference on Marmots, Cheboksary, Chuvash Republic, Russia, 25-30 August 1997. pp 115-116.

Anonymous. Advantage against fleas. *Irish Veterinary Journal* 50(6): 337.

Arther, R.G., J. Cunningham, H. Dorn, R. Everett, L.G. Herr & T. Hopkins. Efficacy of Imidacloprid for removal and control of fleas (*Ctenocephalides felis*) on dogs. *American Journal of Veterinary Research* 58(8): 848-350.

Bell, G. Introducing Advantage - The last word in flea control. *Irish Veterinary Journal* 50(6): 375-380.

Bell, G.D. Tiguvon Spot-on and flea control in dogs and cats. *Veterinary Record* 140(6): 159.

Bille, N. (ed.). *Arsberetning Annual Report - 1996*. Danish Pest Infestation Laboratory Annual Report 1996. 99 pp.

Carlotti, D.N., E. Guaguère, S. Terrier & D. Legeay. The benefit of Spot-on Permethrin solution in the treatment of flea allergy dermatitis in dogs. A prospective study of 24 cases. *Pratique Médicale & Chirurgicale de l'Animal de Compagnie* 32(1): 83-89.

Clark, F., D. Deadman, M. Greenwood & K.S. Larsen. A circadian rhythm of locomotor activity in newly emerged *Ceratophyllus sciurorum*. *Medical and Veterinary Entomology* 11: 213-216.

Clark, J.M., D.D. Heath & M. Stankiewicz. The ectoparasites of the brushtail possum *Trichosurus vulpecula* in New Zealand. *New Zealand Journal of Zoology* 24: 199-204.

Darr, S. Structural IPM successes at NASA's Ames Research Center. *IPM Practitioner* 19(2): 1-11.

Dean, S.R. & R.W. Meola. Effect of juvenile hormone and juvenile hormone mimics on sperm transfer from the testes of the male cat flea (Siphonaptera: Pulicidae). *Journal of Medical Entomology* 34(4): 485-488.

Durden, L.A., C.W. Banks, K.L. Clark, B.V. Belbey & J.H. Oliver, Jr. Ectoparasite fauna of the eastern woodrat, *Neotoma floridana*: Composition, origin and comparison with ectoparasite faunas of western woodrat species. *Journal of Parasitology* 83(3): 374-381.

Durden, L.A. & T.M. Kollars, Jr. The fleas (Siphonaptera) of Tennessee. *Journal of Vector Ecology* 22(1): 13-22.

Durden, L.A. & C.L. Wisseman, Jr. Robert Traub, Ph.D. (1916-1996). *Tropical Medicine and Hygiene News* p. 38.

Eckerlin, R.P. In memoriam. Robert Traub (1916-1996). *Journal of the Helminthological Society of Washington* 64(2): 302.

Eckerlin, R.P., S.G. Perez & T.J. McCarthy. Fleas (Siphonaptera) of small mammals from Sierra de las Minas, Guatemala. Abstract of a paper presented at the VII International Theriological Congress, Acapulco, Mexico, 8 September 1997. 1 p.

Fei, A.C.Y., S.M. Young & H.P. Huang. Effects of the single dose of Lufenuron on the eggs of fleas of dogs and cats for experimental prevention. *Asian Seasonal Report on Environmental Microbiology* 5(3): 95-99.

Foretz, M., D. Postic & G. Baranton. Phylogenetic analysis of *Borrelia burgdorferi sensu stricto* by arbitrarily primed PCR and

pulse-field gel electrophoresis. *International Journal of Systematic Bacteriology* 47(1): 11-18.

Franc, M. & M.C. Cadiergues. Mode of contamination of dogs by adult fleas (*Ctenocephalides felis*) in different controlled environments. *Revue de Medecine Veterinaire* 148(1): 27-29.

Franc, M. & M.C. Cadiergues. Use of injectable Lufenuron for treatment of infestations of *Ctenocephalides felis* in cats. *American Journal of Veterinary Research* 58(2): 140-142.

Gage, K.L., G.O. Maupin, J. Monteneri, J. Piesman, M. Dolan & N.A. Panella. Fleas (Siphonaptera: Ceratophyllidae, Hystrichopsyllidae) and tick (Acarina: Ixodidae) control on wood rats using host-targeted liquid Permethrin in bait tubes. *Journal of Medical Entomology* 34(1): 46-51.

George, R.S. The bat fleas (Siphonaptera: Ischnopsyllidae) of Dorset, V.C. 9. *Recording Dorset* 7: 35-36.

GUO Tian-yu, WU Hou-yong XU Rong-man, Wang Da-lin & YAN ge. On the flea fauna of the southern slope of the Himalaya Mountains. *Acta Parasitology and Medical Entomology Sinica* 4(1): 45-51.

Hastriter, M.W. Establishment of the tungid flea *Tunga monositus* (Siphonaptera: Pulicidae) in the United States. *Great Basin Naturalist* 57(3): 281-282.

Hastriter, M.W. & N.E. Peterson. Notes on some fleas (Siphonaptera) from Amazonas and Bahia States, Brazil. *Entomological News* 108(4): 290-296.

Herrmann, R. Controlling flea infestations with Frontline in dogs with flea allergy dermatitis. *Kleintierpraxis* 42(5): 396-407.

Hinkle, N.C. (ed.). Papers presented at the IV International Symposium on Ectoparasites of Pets. 6-8 April 1997. University of California, Riverside. 126 pp.

Hinkle, N.C., M.K. Rust & D.A. Reiersen. Biorational approaches to flea (Siphonaptera: Pulicidae) suppression: Present and future. *Journal of Agricultural Entomology* 14(3): 309-321.

HUANG Hui-pi, LEIN Yu-hsin, CHIANG Yuh-fang, YANG Heng-leng, LIANG Sai-ling, CHEN Kwang-yang & FEI Changyoung. Clinical field trial and side effects of Lufenuron in flea-infested pet cats. *Asia Seasonal Report of Environmental Microbiology* 6(2): 41-47.

Hurka, K. New data on taxonomy and distribution of Palaearctic, Oriental and Neotropical Ischnopsyllidae (Siphonaptera), Nycterbiidae and Streblidae. *Acta Societatis Zoologicae Bohemoslovenicae* 61: 23-33.

Jacobs, D. E., M.J. Hutchinson & K.J. Krieger. Duration of activity of Imidacloprid, a novel adulticide for flea control against *Ctenocephalides felis* on cats. *Veterinary Record* 140(10): 259-260.

Kambhampati, S., R. Brossard & M.W. Dryden. Rapid assay for the detection of esterases in the cat flea *Ctenocephalides felis* (Siphonaptera: Pulicidae). *Journal of the Kansas Entomological Society* 70(2): 129-132.

Larsen, K. S. The squirrel flea *Ceratophyllus sciurorum sciurorum*. p. 60. *In*: Bille, N. (ed.). *Arsberetning Annual Report - 1996*. Danish Pest Infestation Laboratory Annual Report 1996.

Larsen, K.S. The cat flea *Ctenocephalides felis*. p. 61. *In*: Bille, N. (ed.). *Arsberetning Annual Report - 1996*. Danish Pest Infestation Laboratory Annual Report 1996.

Larsen, K.S. & J. Lodal. Rodent biology in integrated pest management in agriculture and public health in East Africa [*X. cheopis*]. p. 60. *In*: Bille, N. (ed.). *Arsberetning Annual Report - 1996*. Danish Pest Infestation Laboratory Annual Report 1996.

Larson, O.R. North Dakota fleas. X. An atlas of the state's siphonapterans. Institute for Ecological Studies, University of North Dakota. Research Report No. 47. 77 pp.

Lee, S.E., L.A. Jackson & J.P. Opdebeek. Salivary antigens of the cat flea, *Ctenocephalides felis felis*. *Parasite Immunology* 19(1): 13-19.

Lewis, R.E. & D. Grimaldi. A pulicid flea in Miocene amber from the Dominican Republic (Insecta: Siphonaptera: Pulicidae). *American Museum Novitates* 3205: 1-9.

Linardi, P.M., M. Maria & J.R. Botelho. Effect of larval nutrition on the postembryonic development of *Ctenocephalides felis* (Siphonaptera: Pulicidae). *Journal of Medical Entomology* 34(4): 494-497.

Lindsay, L.R. & T.D. Galloway. Seasonal activity and temporal separation of four species of fleas (Insecta: Siphonaptera) infesting Richardson's ground squirrels, *Spermophilus richardsoni*, (Rodentia: Sciuridae) in Manitoba, Canada. *Canadian Journal of Zoology* 75(8): 1310-1322.

Madon, M.B., J.C. Hitchcock, R.M. Davis, C.m. Meyers, C.R. Smith, C.L. Fritz, K.W. Emery & W. O'Rullivan. An overview of plague in the United States and a report of investigations of two cases in Kern County, California, 1995. *Journal of Vector Ecology* 22(1): 77-82.

Maurin, M., R. Birtles & D. Raoult. Current knowledge of *Bartonella* species. *European Journal of Clinical Microbiology and Infectious Diseases*. 16(7): 487-506.

Mears, S. & K.S. Larsen. The effects of rat host, *Rattus rattus*, age and gender upon the behaviour of the oriental rat flea, *Xenopsylla cheopis*. p. 61. *In*: Bille, N. (ed.). *Arsberetning Annual Report - 1996*. Danish Pest Infestation Laboratory Annual Report 1996.

Metzger, M.E. & M.K. Rust. Effect of temperature on cat flea (Siphonaptera: Pulicidae) development and overwintering. *Journal of Medical Entomology* 34(2): 173-178.

Michelsen, V. A revised interpretation of the mouthparts in adult fleas (Insecta: Siphonaptera). *Zoologischer Anzeiger* 235(3-4): 217-224.

Novara, A. J. *Pseudalopax culpaesus*. *Mammalian Species* 558: 1-8.

Otake, O., K. Maehara & S. Imai. Massive infestation of fleas in dairy rearing calves. *Journal of the Japan Veterinary Medical Association* 50(2): 92-94.

Palma, R.L., R.L.C. Pilgrim & J.S. Aguilar. Ectoparasites from the Balaeric shearwater, *Puffinus yelkouan mauritanicus*. *Seabird* 19: 51-53.

Pittaway, A.R. Medical and Veterinary Entomology. Index. *Medical and Veterinary Entomology*, CAB International pp. 401-434.

QI Yi-ming. A study on comparison of esterase isoenzyme on different strains of *Xenopsylla cheopis* (Rothschild). *Journal of the Guiyang Medical College* 22(2): 103-105.

QI Yi-ming & HE Jin-hou. Morphological description of the larva of *Neopsylla specialis specialis*. *Entomologica Sinica* 4(1): 59-66.

Robbins, R.G. & R.P. Eckerlin. Robert Traub (1916-1996): An appreciation. *Proceedings of the Entomological Society of Washington* 99(3): 588-590.

Rust, M.K. & M.W. Dryden. The biology, ecology and management of the cat flea. *Annual Review of Entomology* 42: 451-473.

Sapegina, V.F., N.L. Gershkovich, Yu.V. Drosdova, I.V. Luk'yanova & Yu.S. Ravkin. Fleas (Siphonaptera) of the northeast and northern Altai. *Entomologicheskoe Obozrenie* 76(1): 127-134.

Sheffield, S.R. & H.H. Thomas. *Mustela frenata*. *Mammalian Species* 570: 1-9.

Sleeman, D.P. Fleas from bank voles and field mice, including *Malareus penicilliger mustelae* (Dale) and abundant *Rhadinopsylla pentacantha* (Rothschild). *Irish Naturalist's Journal* 25(9): 339-340.

Smart, N. Marketing a successful flea control strategy. *Veterinary Business Journal* (1997)(18): 5 ... 9.

Smith, F.A. *Neotoma cinerea*. *Mammalian Species* 564: 1-8.

Song, M.D. An update on flea control. *Veterinary Medicine (Supplement)* 92(6): 27.

Stanko, M. Fleas (Siphonaptera) of small mammals (Insectivora, Rodentia) in the south part of the Kosicka kotlina basin. *Natura Carpatica* 38: 77-84.

Tripet, F. & H. Richner. Host responses to ectoparasites: Food compensation by parent blue tits. *Oikos* 78(3): 557-561.

Wall, R., S.E. Shaw & J.

Penaliggon. The prevalence of flea species on cats and dogs in Ireland. *Medical and Veterinary Entomology* (4): 404-406.

Watkins, R.A., S.E. Mosier & A.J. Pinter. *Hepatozoon* sp. infections in three newly recognized North American mammal hosts (*Microtus montanus*, *M. pennsylvanicus*, *Thomomys talpoides*) and the flea *Megabothris abantis* identified as an invertebrate host in *M. montanus* infestations. Abstract 12. Program Guide and Abstracts for the 72nd Annual Meeting of the American Society of Parasitologists. Nashville, TN. 24-28 June 1997.

Yensen, E. & P.W. Sherman. *Spermophilus brunneus*. *Mammalian Species* 560: 1-5.

**BELATED BEST
WISHES FOR THE NEW
YEAR**