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THE FOOD INSECTS NEWSLETTER

JULY 1988

VOLUME I, NO. 1

EDITOR'S CORNER: *WHAT IS THE FOOD INSECTS NEWSLETTER?*

The "Editor's Corner" is located front and center in this first issue in order to explain why you are receiving *The Food Insects Newsletter*. In correspondence during the summer of 1987 with a number of people who have conducted research on insects as food in tropical countries, I asked whether such use continues to be widespread or is rapidly diminishing in the face of acculturation, environmental alteration, and agricultural progress (using the term "progress" somewhat loosely). The individuals contacted (and countries where their studies were conducted) were Dr. Julieta Ramos Elorduy de Conconi (Mexico), Dr. Francois Malaisse (Zaire), Dr. John Phelps (Zimbabwe), Dr. Darrell Posey (Brazil) and Dr. Kenneth Ruddle (Colombia).

A second question asked was whether a periodically issued newsletter might be a useful tool in establishing better communication among those of us who are interested in this subject, including insects as animal feeds. A third question was whether it would be a good idea to begin thinking in terms of organizing an international symposium on insects as human and animal food, to be held in the not too distant future. Assuming a favorable response to the second question, I offered to serve as editor of the newsletter for at least a year or two.

Responses to the first question plus recent information from other sources reveal that edible insects are indeed still widely used as food throughout the rural tropical world. In fact, the prevailing opinion among those most knowledgeable about the situation in specific regions is that edible insects not only continue to be nutritionally important but could make an even greater contribution to human nutrition if supplies were increased or better distributed seasonally. Responses regarding the newsletter and symposium were favorable. Thus this attempt to launch a newsletter.

A newsletter is only as interesting and informative as its readers make it. So please send in items that may be of use or interest to your colleagues in this subject area. Or, simply raise questions that are of interest to you. Someone out there may have an answer or useful information. Suggestions as to newsletter content and format are, of course, welcomed, and in fact solicited. I anticipate that there will be three to four issues per year, depending on the supply of "news" from readers. Considering the relative isolation in which most of us have worked or thought in this subject area, almost anything will be considered news worth printing!

If you wish to receive future issues of the *Newsletter*, please return the form on page 7 with your name and address as you want it on the mailing list. It is anticipated that by early next year, the mailing list can be distributed to newsletter recipients for use as a "directory." Thus, it would be helpful if you would identify as briefly as possible the focus of your food feed insects interest, e.g., "Insects as food in Zambia," "Insects as food for zoo animals," "Studies on nutritional value of insects," "Bio-availability of insect minerals," "Edible insects in general," "Mass production of saturniid larvae as food," etc. This first issue is being sent to approximately 100 persons listed [omitted from the Website] plus a number of unlisted recipients in Madison. If there are others whom you think would like to receive future issues, please jot their names and addresses and send them to the editor.

Address mail relative to the *Newsletter* to:

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The Food Insects Newsletter
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Ethnobiology Congress in Brazil

Delays in mailing the *Newsletter* have converted this former "Announcement" to merely a matter of recording an event of interest. Nevertheless, the First International Congress of Ethnobiology will be (or was, depending on when you receive the *Newsletter*) held in Belem, Brazil, 19 to 24 July, 1988. According to Congress chairman, Dr. Darrell Posey, who, incidentally, has published several papers on entomophagy in South America, scheduled symposia include "World Potential for Little Known Native Plant and Animal Food Sources" (with at least one paper on insects as food), and "Natural Insecticides, Fertilizers, and Pest Control Techniques in Traditional Agricultural Systems." The focal symposium of the Congress is "Native Peoples and Their Struggles to Conserve Their Natural Resources." Organization of the new International Society of Ethnobiology is also scheduled to take place during the Congress.

More information about either the Congress or ISE can be obtained by writing to:
Dr. Darrell A. Posey, Chairman
First International Congress of Ethnobiology
Nucleo de Etnobiologia
Museu Paraense Emilio Goeldi
C.P. 399
66.040 Belem, Para, Brazil
Telex: (091)1419

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A PROGRAM PROFILE:

THE FOOD INSECTS RESEARCH AND DEVELOPMENT PROJECT AT THE UNIVERSITY OF WISCONSIN

As there is plenty of space in this first issue of the *Newsletter*, some of it is used here to describe relevant activities at the University of Wisconsin. It is anticipated that similar profiles on other programs will appear in future issues.

Current research at the UW on the nutritional value of insects

and safety of select insects; and 10) Insects as food for long-term space flight.

Several research projects, some of them cooperative with researchers outside the UW, have been initiated under the above objectives. One tangible educational accomplishment so

<p>began in 1978 with a small project on the protein quality of the Mormon cricket (<i>Anabrus simplex</i>: Family Tettigoniidae) when fed as the high protein source in broiler chick diets. These studies were later extended to include feeding trials involving weanling rats and the results have been published in a series of papers (DeFoliart et al. 1982, J. Econ. Entomol. 75:848 to 852; Finke et al.1985,Poult. Sci.64:708 to 712; and Finke et al.1987, J. Nutrition 117: 1740 to 1750). The cricket, <i>Acheta domesticus</i> (a real cricket, Family Gryllidae), and several species of lepidopteran larvae were subsequently included in the study's high protein sources for broilers and/or rats (Landry et al.1986, J. Econ. Entomol.79:600 to 604; Nakagaki et al.1987, Poult. Sci. 66:1367 to 1371; Finke et al.1988 in press). These studies were, of necessity, kept as a small sideline project because of commitments to other research.</p>	<p>far is the initial offering this past spring semester of a one credit course, "The Human Use of Insects as Food and as Animal Feed," here at the UW. Another educational highlight was a series of three seminars presented during a six weeks stay on the Madison campus in 1986 by Dr. Julieta de Conconi who directs the large research program on edible insects at the National Autonomous University of Mexico. The seminars proved highly interesting to students. Also visiting from the Mexican program was Mr. Jose Pino in 1987. Both visits were sponsored by the U.S. Agency for International Development.</p>
<p>What is called the Food Insects Research and Development Project (FIRDP) grew out of the above work. It was organized in 1986 with the goal of bringing about wider recognition of the nutritional importance and unexplored potential of insects as human food and as animal feeds. Despite its long name, the FIRDP is, as yet, little more than a paper organization with a set of objectives. Some areas of interest, among others, are: 1) Development of a stronger global voice of advocacy by establishing better communication and mutual support among scientists and others interested in the human use of insects as food and/or animal feed; 2) Advocacy for stronger support of those in developing countries who are interested in maximizing the nutritional contribution of their indigenous food insect resources; 3) Development of economical mass harvest methods for potential food/feed insects that are attracted to light or to chemically baited traps; 4) Development of controlled mass production of food insects indigenous to developing countries; 5) Development of insect recycling systems to convert organic wastes and underused substances into high protein feed supplements for poultry, swine and pond fish production; 6) Development of mass harvest strategies for migratory locusts, grasshoppers, the Mormon cricket and other major pest species that form destructive aggregations in nature; 7) Education of the American public as to the palatability and nutritional quality of insects and their importance as food in much of the rural developing world; 8) Development, as small farm enterprises, of controlled mass production methods for certain insects as snack items on the U.S. market, 9) Conduct in-depth studies on the food quality</p>	<p>The FIRDP has no long-term base funding, but resources include a food insects laboratory in the Department of Entomology and approximately 25 faculty and research staff members in various other university departments who are kept informed as to Project objectives and developments and are available as advisors in their areas of special expertise. They are also potential research collaborators when and as funding opportunities arise.</p>

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RECENT BOOKS

Los insectos como fuente de proteínas en el futuro.
Julita Ramos Eldorduy de Conconi.. Editorial Limusa, S. A. (Balderas 95,Primer piso, Mexico 1, D.F) 1982. 144 pp. (In Spanish; paper back, price not known).

The translated title of this book is *Insects as a Source of Protein in the Future*. The author presents in tabular form a list of 71 species of insects that are consumed in Mexico, listing them by order and family and giving the developmental stage(s) that are eaten and the geographical location [states] where eaten. A feature of the book is the 94 photographs of edible insects, most of them in color. Eight additional tables list edible insects of the world by order and family, giving the country or continent where recorded. The listings include approximately 129 spp. of Coleoptera (beetles), 99 of Hymenoptera (bees, ants, wasps), 48 of Lepidoptera (butterflies and moths), 68 of Orthoptera (grasshoppers, crickets, etc.), 32 of Hemiptera (true bugs), 28 of Homoptera (cicadas, leafhoppers, etc.), 10 of Diptera (flies, gnats), 17 of Isoptera (termites), and 10 species in miscellaneous other orders bringing the total to approximately 441 species (for some of which only the identity of the genus is known.) Unfortunately, literature citations are not given for the tabular records.

Additional tables provide data on the crude protein content of 18 Mexican species, digestible protein of 9 species, amino acid content of 10 species, and lists of Mexican foods, including insects, that are high in protein, fat, minerals or vitamins, respectively. The bibliography lists 81 titles, about one third of which pertain directly to Mexico.

dominant animal group on earth, they are adapted to a wide variety of ecological conditions, and many have high reproductive capacity and short life cycles. Relative to their acceptability as food, a survey taken in the Federal District (Mexico City) revealed that 75% of the population is aware that there are edible insects in Mexico, 93% considered "industrialization" a viable project, 39% responded that they would use the resulting products, 29% that they could use them once in awhile, and 19% that they would try them only as a curiosity.

Analyses of samples from Mexico have revealed a protein content (dry weight) between 31% and 72% in most species. Most amino acids (including Iysine) surpass FAO standards, but in keeping with generally obtained results from elsewhere, most insects are low in methionine and tryptophan. The author notes the need for more data on bioavailability, particularly when insects are used in conjunction with other common foods in the rural diet. Little information is given on insects as sources of energy, vitamins or minerals, although a few data are included in the tables.

Some of the most interesting information in the book is to be found in the unique collection of photographs and the legends that accompany them: for example, grasshopper collectors with their nets, lake scenes showing the harvest of "ahuauhtle" or "Mexican caviar" (composed of the eggs of several species of aquatic Hemiptera); a rural worker cultivating "madrone worms" (larvae of *Eucheria socialis*); and numerous market scenes with closeups of edible larvae or other edible life stages. In addition to their prominence in the rural marketplace, several species command high prices in Mexico City and other urban areas where they are purchased by people of various economic levels and are sold as delicacies in the finest

<p>The text is divided into a Prolog and six chapters. The first three chapters are primarily a general discussion of the scope of world hunger and malnutrition (particularly protein deficiency), factors responsible for their wide occurrence, and the advantages and disadvantages of various methods currently being explored to improve the situation. According to the author, "Mexico can be described as a country where there is so much hunger that the country doesn't feel it." She states that in some areas of the State of Oaxaca and in some arid regions of the country, insects are the only significant source of protein.</p> <p>The last three chapters are a discussion of the attributes of insects as a more exploitable food source, their nutritive value, and their acceptability as food in Mexico. The author proposes that the "industrialization" of insects (the establishment of small industries in the countryside for the mass culture of insects as food) would work both to the benefit of rural economies and better nutrition in the country as a whole. Relative to their exploitable attributes, it is pointed out that insects are the</p>	<p>restaurants. The author mentions that in 1981, the demand for "escamoles" (immature stages of the ant, <i>Liometopum apiculatum</i>) was so great that the price per kilogram went up to 1,000 pesos (more than \$2 at the then prevailing exchange rate). "In Tlaxcoapan . . . they are sold in restaurants like El Prendes, Las Meninas, Delmonicos, and Bellinghaussen, where 2 tacos with 50 grams of ants cost 300 pesos. They are served fried or with black butter, but the best way is fried with onions and garlic."</p> <p>Examples such as the preceding lend strong support to Dr. de Conconi's belief that edible insects can make an economic difference as well as a nutritional difference in rural Mexico. Her thesis, in a nutshell, is that if insects were awarded the respectability and research attention they deserve, it would lead not only to improved nutrition, but to new opportunities for employment and entrepreneurship, thus helping to improve rural economies and slow the migration to the cities. Studies elsewhere suggest that what is true for Mexico is probably true in many cases in other countries where food insect use is traditional.</p> <p style="text-align: center;">SEE BOOKS, P. 4</p>
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BOOKS

from page three

Edible Insects of the World, Jun Mitsuhashi. Published in Japan (Publisher not known) 1984. 270 pp. (In Japanese; hardcover, price not known)

The author, Dr. Mitsuhashi, wrote in March 1987 that there are no plans, presently at least, for an English language edition. For the small bit of information that we have on the contents of the book, we are indebted to Dr. Ralph Howard of Kansas State University and Shaohua Liu of UW Department of Entomology. Dr. Howard prevailed upon Japanese colleagues at the Forestry and Forest Products Research Institute in Ibaraki for the following "very free translation" of the Table of Contents:

Preface (pp. 1-13)

Chapter 1. General introduction (pp. 14 -17)

Chapter 2. Customs of eating insects, i.e., insects as traditional native foods (pp.18 to 52): 1) by country and region, 2) in Japan

Chapter 3. Descriptions of insects by order and family (pp. 54 to 116): 1) edible insects, 2) toxic or bad tasting insects, 3) edible portions of the insect, 4) edible products of insects, disgusting looking but edible insects

Chapter 4. Cooking methods and nutritional values (pp. 118 to 149): 1) ways of cooking insects and their effects on resulting tastes (many recipes), 2) nutritional values of insects (protein, fat, vitamin, etc.)

Chapter 5. Medically useful insects (pp. 152 to 214): 1) survey of insects by order and family, 2) use of insects for treating diseases

Chapter 6. How to collect a lot of insects (pp. 216 to 242): 1) field collecting (light traps, smokers, sugaring, bait animals, unusual methods), 2) rearing methods (nine species)

Chapter 7. Insects as food of the future (pp. 244 to 253): 1) optimization for nutritional aspects, 2) space food

References cited (pp. 254 to 270)

Chapter 2 is further broken down into regions as follows: Oceania Pacific Islands), Australia (pp. 22 to 28); Africa (pp. 28-31); Middle East (pp. 31 to 34); Asia (pp. 34 to 39); North and Central America (pp.39-42); South America (pp. 43-44); Europe (pp. 44 to 45); Japan (pp. 45 to 52). Within each region there is a further breakdown into areas that are more ecological than geopolitical. There are several tables that list the insects by regions. (A more detailed review would be welcomed if someone with the necessary language

Recently in the popular press:

Dr. John Phelps of the University of Zimbabwe, Harare, sent the two articles reproduced below. They appeared in the *Zimbabwe Herald* April 12 and April 15, 1988, respectively:

April 12: Caterpillars find their way to city restaurants

Bulawajo caterpillars, better known as macimbi or madora (the larva of the saturniid, *Gonimbrasia belina*, also widely known as the "mopanie worm, have wriggled their way into the menus of some small city restaurants and the trend appears to be establishing itself in areas where they do not naturally occur.

If the wave of popularity of the protein rich caterpillars is anything to go by, macimbi are likely to become a feature in similar establish meets in places as far north as Mutare and Chipinge.

In fact, the managing director of a company specializing in dried foods, Mr. Abraham Jassat, is adamant that the caterpillars have always been a popular gourmet item even for people in areas where they do not occur.

"Everyone eats them," said Mr. Jassat whose company has been packaging the caterpillars for the past six years. He showed our correspondent nearly 90 tonnes of the caterpillars which he bought from villagers. "The season was good for them because of the rains," he said.

Mr. Jassat, who faces stiff competition from small scale traders, said he was receiving orders from as far off as Mutare, Mt. Darwin, Chinhoyi, Harare and Chiredzi. "In fact we supply the whole country."

The caterpillars occur in large numbers in a belt stretching from Lupane, along the Botswana border down to Gwanda. Processing involves squeezing out the roughage and boiling them in salted water before drying them in the sun.

April 15th: Harvest from the sky: joy as hopper swarms arrive

Meat will be abundant in Dzivaresekwa during the forthcoming independence celebrations thanks to the grasshoppers ["conenose" grasshoppers, Family Tettigoniidae] which swarmed the area yesterday.

Residents in the high density suburb had been worried by the shortage of meat in butcheries caused by the increased demand for meat throughout the country. They were relieved early yesterday when they awoke and found that grasshoppers had raided the suburb in their thousands. Housewives abandoned their domestic chores to fetch buckets, bottles and tins to fill them with the delicious insects.

The grasshoppers started swarming by 7 am and were still being collected by late afternoon yesterday. By nightfall the swarms had spread over most of Harare including the city centre.

proficiencies would like to volunteer.)

News Travels Fast.....

As evidenced by the following excerpt from the May issue of the Michigan Entomological Society Newsletter (furnished by Jeff Beehler, UW Dept. of Entomology):

Domboshawa, Zimbabwe - White ants were out of season but caterpillars, locusts and flying ants substituted nicely in a contest for cooks demonstrating how to feed a family of five for less than a dollar. First prize was a bicycle. The piece de resistance was sauteed matsimbi [mopanie worms again], yellow and black caterpillars four inches long, served with the national staple called sadza, ground corn cooked into a stiff porridge.

Zhinji Nyikadzino won the bicycle for a stew of home grown greens, tomatoes and onions seasoned with dovi, a version of peanut butter, and served with the ubiquitous sadza. She accompanied it with a nutritious drink made of rapoko greens.

Still speaking of mopanie worms . . .

A beautifully illustrated article by Heather Brandon on mopanie worms in Botswana appeared in the March/April 1987 issue of *International Wildlife*. It's titled "The Snack That Crawls," and features several large color photographs of the caterpillars both on the tree and processed. One company is experimenting with grinding the caterpillars into a protein rich powder.

LLoyd Schaad, who lived in Botswana from 1971 to 1980 mentioned to the editor awhile back that dried mopanie are exported to Zambia by the tons. Similarly, Dreyer and Wehmeyer (1982. So. Afr. J. Sci. 78:33 to 35) reported that a mopanie cannery had been established at Pietersburg in northern Transvaal and that the South African Bureau of Standards estimated that annual sales through agricultural cooperative markets totaled approximately 1600 metric tons.

Thailand and Nepal

There is a relative abundance of names from Thailand and Nepal on the mailing list. The editor recently (April and May) spent some time in these countries, and there is interesting research activity in both. In Thailand, the focus is on human consumption inasmuch as edible insects are considered to be of nutritional importance in the north and northeastern parts of the country. In Nepal, the focus is on insects as high protein feeds for poultry and pond fish. Possibly, more detail can be included in a later issue of the *Newsletter*.

Research Request Department: Is it possible to obtain non-diapausing strains of the silkworm, *Bomby Bombyx mori*? *xmori*? *If so, where? Please send any information to the Editor.*

FINAL QUOTE: *As said by UW nutritionist, Professor N. J. Benevenga, when he heard that the first issue of The Food Insects Newsletter would soon be in the mail: "The first issue is bound to have bugs in it!"*

Acknowledgement: *Thanks are due to Joyce A. Keesy, UW Department of Entomology, for the word processing and layout that went into this first issue of the Newsletter.*