



[Index for A Place to Browse - The Food Insects Newsletter](#)

[Home](#)

THE FOOD INSECTS NEWSLETTER

JULY 1989

VOLUME II, NO. 2

International Conference Scheduled on Insects as Food and Animal Feed

Next December would be a good time to head for San Antonio, Texas. That will be the site, December 10-14, of the 100th Anniversary Meeting of the Entomological Society of America. And, thanks to funding support from the U. S. Agency for International Development (USAID), it will be the site of a two-session conference on "Insects as a Food Resource - Now and in the Future," to be presented as part of the ESA program.

The conference will bring together as program participants an interdisciplinary mix of entomologists, nutritionists and ethnobiologists and provide for the first time an opportunity for many of those who have done relevant research to meet and exchange information and ideas. As part of the centennial meeting of the ESA, it will offer an excellent opportunity for getting the attention of a wider audience of entomologists, the biologists who are best-equipped for developing more efficient and cost effective methods of harvest and mass-production. Hopefully, the conference will stimulate broader research interest, not only in developing better production methods (both large- and small- scale), but in addressing a host of other questions that are of

relevance in maximizing the nutritional, agro-ecological, and economic benefits derivable from edible insects. The conference will also offer an opportunity to look ahead and consider the desirability of a possible follow-up at the next International Congress of Entomology, scheduled for 1992 in China.

If sufficient additional funding can be found, the program presentations will be published as a proceedings of the conference. That is a very unresolved matter, however, at the present time.

ESA members will be receiving general information from the ESA on the San Antonio meetings, including registration, program, highlights, hotels, etc. in July. For interested readers who are not ESA members, this information can be had by writing or calling: Kathryn Meckley, 9301 Annapolis Road, Lanham, Maryland 20706-3115. Telephone: (301) 731-4535.

The two-session conference program is detailed on page 5.

Cutting Down on the Pesticides:

Meat and Egg Producing Animals as Bio-Control Agents

In a paper that will be published in *The Journal of Economic Entomology*, B. D. Glofcheskie and G. A. Surgeoner of the University of Guelph, describe the use of Muscovy ducks in an integrated program for the control of house flies (*Musca domestica*) on farms in Canada. This represents a biological approach that has probably received too little attention.

The ducks go after the adult flies. Chickens may use a different tactic - going for the fly larvae, or possibly for both the larvae and adult flies. In a study in 1972 at the University of Wisconsin Electric Research Farm, Dr. W. L. Gojmerac (UW extension entomologist) observed the activity of leghorn cockerels that were fenced in on a free-drop cattle manure stack and on a blower stack (Project 1763 Final Report: Manure Handling as Related to Fly Control [mimeograph]). The fly population (*Musca domestica*) on the farm had been very high the preceding summer. The chickens appeared to aggressively work the stacks, scratching for maggots and possibly also for corn that had passed through the cattle (the cattle were on a corn silage and ground ear corn diet). The chickens were given a small amount of additional feed once daily, in the evening.

Numerous inspections indicated that the chickens, numbering 300 initially and about 225 later, kept the free-drop stack

essentially free of maggots throughout the summer. In midsummer 75 of the chickens were moved to the blower stack, where treatment with the insecticide dimethoate was not providing satisfactory fly control. Maggots, although reduced in number, continued to be found on occasion in this stack, suggesting that the chicken population was too low. The late start may also have contributed.

Most research aimed at using fly larvae or pupae as a high protein source for poultry has envisioned recycling manure by rearing larvae under controlled conditions. The above results on ducks and chickens suggest that more research on management schemes involving the controlled use of these animals as predators is warranted.

Also, might this be a viable approach to "mining" some of the other kinds of agricultural wastes that occur in the tropics? In recent correspondence, Professor J.J. Castro mentions for example that coffee pulp and cacao husks are among the waste accumulations in Colombia that favor the growth of numerous insects. (See late addition, p. 8.)

ENTOMOPHAGY IN THE MOVIES

James W. Mertins
2808 Greensboro Drive
Ames, Iowa 50010

In the article by Brickey and Gorham (Newsletter 2(1):1-2), I

features a mutiny aboard a warship, the immediate trigger for which is the officers' insistence on serving maggot-infested meat to the crew.

1931 *Dracula*

The earliest talkie I've seen with entomophagy in it deals at times with the ravenous cravings of Bela Lugosi's servant Renfield, who likes ants, flies, and especially spiders as food.

was especially interested by the note presented as a question (on page 1, column 2) about entomophagy in the movies. The general topic of the portrayal of arthropods in the movies has interested me for years, and recently, I published a survey of the subject (Mertins 1986). This interest plus my concurrent interest in using insects as food, seems to qualify me to offer some comments in answer to the question posed. In fact <i>Urban Cowboy</i> (1980) and <i>Poltergeist II</i> (1986) are far from the only commercial films to deal with entomophagy. Restricting the subject to "deliberate" entomophagy would limit the number of qualifying films, but it's not such an easy distinction to make; that is, the amount of 'deliberation' involved varies across a wide spectrum in the various films, as does the post-consumption reaction. Therefore, I will enumerate a series of film scenes that relate to this subject and allow the readership to decide where to draw the line. These movies are only the ones I've personally seen and merely represent what is probably a much larger group of films that have been made to show entomophagy. 1925 <i>Potenpkin (aka Battleship Potenpkin; silent; Russian)</i> The earliest film (of which I'm aware) to touch on the subject	(I suspect that this aspect of Renfield's persona probably is highlighted in every succeeding Dracula film clone in which the character occurs, although I can verify only the two 1979 versions at present). 1944 <i>National Velvet</i> Liz Taylor's little brother claims he recently caught an ant and ate it. 1963 <i>Who's Minding the Store</i> Jerry Lewis, working in the gourmet department of a big store, is urged by his boss to sell "roasted grasshoppers" and "roasted black ants." Both men then sample the latter morsels, the boss with great relish and enthusiasm, but Jerry with great reticence and many histrionics. 1968 <i>Night of the Living Dead</i> In one scene, an old woman zombie seems to walk up to a tree, pick an insect off its trunk and eat the tidbit with loud, crunching sounds. 1973 <i>Papillion</i> Steve McQueen, in solitary confinement on Devil's Island, is reduced to eating cockroaches and centipedes for a protein source. 1975 <i>Rancho Deluxe</i> Two reservation Indians are fishing, when one (Sam Waterson) pops a grasshopper from the bait can into his mouth, crunches on it, and pronounces it "not bad." 1976 <i>The Missouri Breaks</i> A quirky hired gunman (Marlin Brando) puts a live cricket (?) into the gaping mouth of a sleeping horse thief (Randy Quaid), who coughs and sputters over the action. SEE ENTOMOPHAGY, p. 6
--	---

EDITOR'S CORNER

IS IT TIME TO GET ORGANIZED?

If interest in the study and use of insects as food is on its way to becoming recognized as a valid disciplinary specialty, the San Antonio conference certainly ranks as a landmark event in its short history. The proposed conference became a reality as the result of wide support within the USAID, e. g. Warren Rush (Science and Technology), Walter Knausenberger (Africa Bureau), John Daly (Coordinator with the National Academy of Sciences), and Carroll Collier (Office of Agriculture) as well as Noel Vietmeyer at the NAS. The USAID funds will cover a significant proportion of the travel expenses of conference participants. The one regrettable note is that a number of individuals who could make valuable contributions to the program won't be there. Several who were contacted were unable to participate for one reason or another; several who were to be contacted were not contacted when time and funding restraints became obvious. The time constraints were imposed as a result of being part of the larger ESA program. The logical next step may be to use the meeting in San Antonio as a springboard for planning Pan-Asia and Pan-Africa conferences that would allow wider participation from each region and more detailed focus on regional research needs.

Perhaps the time is ripe to begin thinking about the desirability of organizing some kind of international society for the study of insects as food, with regional sections. Public awareness of insects as traditional foods and interest in exploring their full potential appears to be extraordinarily high at the present time. While *The Food Insects Newsletter* has served well as an initial linking mechanism, a more broadly based organizational structure will be needed in order to assure permanence and to build on the current momentum. The December conference in San Antonio will offer an excellent opportunity for across-the-table discussion as to how this might best be accomplished. Any thoughts and suggestions sent to the Editor will be carried to San Antonio for consideration.

The SUSTAINING PATRON'S CLUB, founded (apparently with too little fanfare) in the last issue of the Newsletter, now has 14 members. The contributions from these individuals are very much appreciated, and we hope the club will become less exclusive. You can become a member by contributing \$5.00 to help cover the printing and distribution costs of the Newsletter. Make checks payable to Board of Regents, University of Wisconsin, and designate "Newsletter."

GRD

Hunter-gatherers were sometimes very labor-efficient

A Grasshopper in Every Pot

David B. Madsen. *Natural History* (New York). July 1989, pp. 22-25.

In the spring of 1985, "millions" of grasshoppers (the migratory grasshopper, *Melanoplus sanguinipes*) were found lying along the eastern shore of the Great Salt Lake. Madsen, state archaeologist in the Antiquities Section of Utah's Division of State History, says, "enormous numbers of the insects had flown or been blown into the salt water and had subsequently been washed up, leaving neat rows of salted and sun-dried grasshoppers stretched for miles along the beach." The hoppers, coated with a thin veneer of sand, were in as many as five rows in some

places, with the widest rows ranging up to more than six feet in width and nine inches thick and containing up to 10,000 grasshoppers per foot.

A year earlier, while digging in Lakeside Cave which is at the western edge of the Great Salt Lake, Madsen and co-workers had discovered thousands (and estimated millions) of grasshopper fragments in the various strata of the cave floor. The hopper fragments, in a matrix of sand, were also found in the majority of samples of dried human feces found in the cave. The connection between beach and cave was obvious. Lakeside Cave has been visited by Great Basin hunter-gatherers intermittently for the past 5,000 years. It served only as a temporary base because it is far from fresh water. Obviously, the cave was used as a winnowing site for removing sand from the grasshoppers which were scooped up at the beach and most of which were then hauled elsewhere.

Madsen and colleagues found that one person could collect an average of 200 pounds of the sun-dried grasshoppers per hour. At 1,365 calories per pound (compared with about 1,240 calories per pound of cooked medium-fat beef and about 1,590 calories per pound of wheat flour), this amounted to an

A Letter from Louisiana State University -
"It Takes Real Men..."
(printed by permission)

Dear Dr. DeFolliart:

I enjoyed the short article on insect snacks in the <i>USA Weekend Magazine</i> the week of January 27, 1989. During the summer of 1986, I trained a 4-H Entomology Demonstration team whose topic was "Cooking with Insects." The girls, both seniors in high school, placed first in the state and earned a trip to Pensacola, Florida for a week of sun and fun. Although I am sure you are familiar with all of the information, I am enclosing a copy of the demonstration for your interest [Space limitations prevent duplication but see quiche recipe on p. 7-ed.] Among the six entomologists judging the demonstration, there was mixed reaction. One turned a sickly green, another ate two helpings. The Head of the Entomology Department at LSU asked for the extra quiche which he shared with other staff members and entomology students. An Extension Entomologist was quoted as saying, "Hell, I suck crawfish heads, this is nothing!" The next day the team was asked to prepare another quiche for a Home Economics class on International Foods. All in all, this demonstration caused quite a stir all over the LSU campus and in the dormitory where the girls prepared for the demonstration. We felt the use of the meal worms in insect flour was especially practical, since most doubters would never know they were there if they failed to read the label. The quiche was actually very good (even if you leave out the mealworms). In this case, we assure you, it took "real men to eat quiche." Sincerely, Michele A. Cooper Home Economist (4-H)	average return of 273,000 calories per hour of effort invested. According to Madsen, "Even when we took a tenth of this figure, to be conservative, we found this to be the highest rate of return of any local resource. It is far higher than the 300 to 1,000 calories per hour rate produced by collecting most seeds (such as sunflower seeds and pine nuts) and higher even than the estimated 25,000 calories per hour for large game animals such as deer or antelope." Madsen also investigated the rate of return per unit of effort expended in collecting Mormon crickets (<i>Anabrus simplex</i>), another food of early Native Americans. Crickets were collected from bushes, grass, etc., at rates of 600 to 1,452 per hour, an average of nearly two and one-third pounds or, at 1,270 calories per pound, an average of 2,959 calories per hour. The crickets often reach greatest densities along the margins of streams or other bodies of water which lie in their line of march and which they will attempt to cross. In two such situations, they were collected at the rates of 5,652 and 9,876 per hour, an average of nearly 18 1/2 pounds of crickets or 23,479 calories per hour. The first number (2,959 calories per hour) surpasses the return rate from all local resources except small and large game animals, while the latter compares favorably even with deer and other large game. Madsen places cricket collecting in a modern context by saying, "One person collecting crickets from the water margin for one hour, yielding eighteen and one-half pounds, therefore, accomplishes as much as one collecting 87 chili dogs, 49 slices of pizza, or 43 Big Macs." He concludes, "Our findings thus showed that the use of insects as a food resource made a great deal of economic sense."
--	--

Recently in the Popular Press

The first article reprinted below, by Cecilia Tenorio of Reuter News, was one of several articles on Mexico in the May 25, 1989 Travel Section of the *Seattle Post-Intelligencer*. The second article, by Katherine Ellison of Knight-Ridder Newspapers, appeared less than a month later and is reprinted from the front page of the June 19th *Wisconsin State Journal* (Madison).

Mexico still paradise ...

Mexico City -The table is richly set: a dish of tiny worms, another of crisp roasted grasshoppers, some delicate ant eggs and a heap of nondescript black bugs.

"And this is just for starters," boasts Leopoldo Ortega, co-owner of a popular restaurant specializing in pre-Colombian food. "After this, you can taste our iguana, our venison, our armadillo and our rattlesnake."

Mexico, with its pervasive Aztec Indian roots routinely visible in ruins, typical garb and music, is seeing a revival of traditional fare.

In crowded restaurants in the center of the capital, residents and tourists alike can probe an ancient cuisine whose main ingredients are exotic animals, insects, flowers and roots.

... In Mexico's pre-Hispanic civilizations, these dishes were seen as delicacies and were served to the mighty.

Like the tortilla - a Mexican staple of thin-rolled corn flour - insects remain a common ingredient in many regions of the country.

What does the escamol ant look like? Ortega delicately scoops aside the eggs to reveal a small black ant in a tiny pond of melted butter, surrounded by parsley.

"It's not just any ant," he says. You must be able to tell them apart, just as not any worm will do-it has to be the one that lives in the heart of the maguay."

The worms are eaten roasted. Their mild flavor vanishes under a tomato or avocado sauce.

The maguay, a cactus with plump fleshy limbs, hosts the worms and provides the raw material for pulque, a strong alcoholic beverage. It was traditionally used also as a source

small but increasingly vocal school of health-conscious gourmets who swear by a back-to-basics diet, Aztec style.

"Today, young people want the hamburger, the hot dog, something quick but not so healthy," said Don Chon chef Fortino Rojas Contreras, whose considerable girth hints at a one-man assault on the insect world. "They know nothing of the rich sources of protein enjoyed by their ancestors."

Yet pre-Hispanic cuisine is drawing new attention at a time of growing public concern about how Mexicans eat. Recently, the leading newspaper *Excelsior* reported 70 percent of the nation suffers from a poor diet, causing early deaths and serious mental and physical illnesses in young children.

Government agronomist Hilda Mendoza said such problems could be eased by turning back to old dietary standbys, including about 240 species of edible insects, larvae, eggs and worms.

"We must lose our modern prejudices," she said. "We think of flies as dirty because they hang around the garbage, but of course not all insects are flies. What's so dirty about a bee?"

In fact, not all bugs bear the lowly fly 's scorn. The maguay worm - the critter found in bottles of some brands of tequila - is regarded widely in this country as a delicacy.

Jumiles - flying bedbugs - are so beloved in Guerrero state that whole families crowd the hills to hunt them when they are in season. The tiny bugs are eaten raw or cooked with salsa and revered each November with a Day of the Jumil, with music and dance and the annual selection of a new Jumil Queen.

Mexico has no monopoly on insect consumption, which is practiced throughout the hinterlands of South America, Asia and Africa. Bug eating is less common in the cities, because bugs are less available and thus treated as a delicacy, said Harvard social anthropologist Richard Grinker.

"In fact there are very few places in the world where people haven't eaten insects," he said. "Locusts and ants in Thailand are used as condiments. The Plains Indians used to eat grasshoppers."

What is different in Mexico is those who hope to re-create awareness of such protein-rich fare often underscore their plea with a nationalistic argument.

All the same, the advocates' efforts have made hardly a dent in modern Mexico's diet.

of sugar. ... Ortega's restaurant opened 35 years ago. Then it catered to farmers from outlying regions. Although most of the patrons are Mexican, gourmet tourists in search of a culinary thrill have begun to drift in. "Aren't you going to try the roasted chapulines?" asks the eager chef. 'Me crisp grasshoppers, about an inch long, are eaten whole, legs and all. Their taste is as mild as that of the worms, and here, too, a sauce dominates.	Mendoza said she believes more Mexicans would be eating bugs were it not for decades of ad campaigns by international companies pushing white bread and Spam.
More salsa.... Mexico City - On a rainy afternoon at the Fonda Don Chon, senoras slapped tortillas out in front, balladeers sang around the back, and at a corner table, two pistol-packing state cops munched on worms. Nearby, a large table full of bureaucrats wolfed down ant eggs, while a pair of professors chatted over toasted grasshoppers and guacamole. The typical fare at this crowded cafe and a half-dozen others in the capital is crunchy evidence of a Mexican tradition - bug eating - and a	Acknowledgement: Thanks are due to Joyce A. Keesy and Catherine W. Howley for the word processing and layout of the <i>Newsletter</i>. Reminder. . . Short articles and other items of current or historical interest are solicited for the <i>Newsletter</i>. REPRINT AVAILABLE Dr. John Ledger will be happy to send a reprint of his article, "The eighth plague returneth! The Locusts are Coming!" to anyone who requests it. A brief summary appeared in the last <i>Newsletter</i>. Dr. Ledger's address is: Endangered Wildlife Trust Private Bag X11 Parkview 2122 Transvaal, South Africa

**IMPORTANT NOTICE
PLEASE READ - RESPONSE NEEDED**

One of the goals in initiating *The Food Insects Newsletter* was to develop a directory of persons having an interest of one sort or another in insects as food or animal feed. For many months the target date for issuing the first Directory has been July, 1989. We greatly regret that, as this issue of the *Newsletter* and the Directory were being readied for the printer, a last-minute decision was made to postpone issuance of the Directory.

A bit of historical perspective may be in order. In the first issue of the *Newsletter*, on page 1, it was stated: "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.'" The first issue of the *Newsletter* was mailed in July, 1988 to approximately 100 people; the mailing list has since grown to a total of about 450 names.

We were happily assembling these 400-plus names in directory form for inclusion with this July mailing when the unhappy thought occurred to us that some people who are on the mailing list may not necessarily wish to be included in the Directory. It occurred to us that we have never asked. And, furthermore, the anticipated mailing list/directory connection hasn't been mentioned since Newsletter Volume 1, Number 2, meaning that many of the more recent additions to the mailing list have undoubtedly never heard about it. Thus, to put the Directory on a firmer basis and to avoid any unwanted invasions of privacy, mailing is being postponed until November when it will be included as a Supplement to Volume II, number 3.

Inclusion in the Directory will be based on positive response, not default. The Address Form has been slightly revised to include Directory preference (by checking "yes" or "no"). This means, unfortunately, that those who have previously returned a completed address form will need to repeat the process in order to be included in the Directory.

Inasmuch as we are going to be involved in this operation, it seems an opportune time to see whether the mailing list needs pruning. The mailing list is composed (about 98%) of names from the following sources: 1)Those who have published research or other material of relevance; 2)Those who have written requesting the *Newsletter*; 3)Those who have written for information or reprints on insects as food/feed and were sent *the Newsletter* among other materials; 4)Those who have been helpful to the Editor at one time or another on this subject, and; 5)Those recommended by one of the above.

Up to now, it has been automatically assumed that names from all of the above sources have a more or less confirmed interest in the *Newsletter* even though fewer than half have returned a completed address form as requested on the back page of the *Newsletter*. It was not considered a problem because when it comes to being a procrastinator in returning forms, any kind of form, the Editor ranks as world-class. So do many of the people he knows, including, obviously, some who are on the mailing list. Nevertheless, it seems desirable in terms of cost-efficiency to determine if excess baggage is being carried on the mailing list. Thus we urge you to return a completed Address Form now. The November Newsletter and the Directory will be sent only to those for whom a completed address form is on file.

This mailing list confirmation exercise offers an opportunity to obtain the TELEX and/or FAX numbers of those who wish to supply them. These technologies are now widely available and can save a lot of time, especially in international communications.

**INFORMAL CONFERENCE
INSECTS AS A FOOD RESOURCE, NOW AND IN THE FUTURE**

Probable afternoon session 1:30 Introduction and overview. G. R. DeFoliart, Dept. Entomol., Univ. Wisconsin, Madison, WI 53706, USA 1:40 Insects as food in Mexico. J. Ramos-Elorduy, Dept. of Biol., Nat. Auton. Univ. of Mexico, Apartado Postal 70-153, 04510 Mexico, D. F. 2:05 Insects, especially caterpillars and termites, as food in Zaire. F. Malaisse, Fac. Sci. Agron., B5800	5:10 Questions and panel 5:30 End Evening session 7:00 FDA policies and regulations as they affect imported and domestic insect food products. J. R. Gorham, Food and Drug Admin. HFF-237, 200 C. St. SW, Washington, DC 20204, USA 7:25 Evaluation of the protein quality of various insect
---	---

Gembloux, Belgium	species when fed to rats. M. D. Finke, ALPO Pet Foods, P. O. Box 2187, Allentown, PA 18001, USA
2:30 Insects as food in Thailand. P. Puwastien, Inst. Nutrition, Mahidol Univ./Salaya Campus, Nakorn Chaisri, Nakorn Pathom, 73170, Thailand	7:50 Insects as manure converters to animal feed. A. R. El Boushy, Dept. Animal Nutrition, Agric. Univ., Marijkeweg 40, Postbus 338, 670 PG Wageningen, The Netherlands
2:55 Insects as food in Brazil. D. Posey, Nucl. de Etnobiol. Mus. Paraense Emilio Goeldi, CP 399, 66040 Belem, Para, Brazil	8:15 Break
3:20 Break	8:25 Fly and beetle recycling of coffee pulp for animal feed production. G. Lardé, Inst. Salvadoreno de Investigaciones del Café, Final Primera Ave. Norte. Nueva SanSalvador. CP 04108, El Salvador
3:30 Future sources of non-conventional animal proteins in India. B. Prasad, Life Sciences Dept., University of Manipur, Imphal 795003, India.	8:50 Harvesting terminal lagoon biomass as animal feed. K. Schurr, Dept. of Biol. Sci., Bowling Green St. Univ., Bowling Green, Ohio 43403, USA
3:55 Use of insects as food by Tukanoan Indians in Colombia. D. Dufour, Dept. of Anthropology, Univ. of Colorado, Campus Box 233, Boulder, CO. 80309, USA	9:15 Insects, especially the lake fly, as food/animal feed in Uganda. J. Okedi, Makerere University, Kampala, Uganda
4:20 Insects as food in Papua New Guinea and the Australian Region. V. B. Meyer-Rochow, Dept. of Biol. Sci., Waikato Univ., Private Bag, Hamilton, New Zealand	9:40 Questions and panel
4:45 Traditional food insects in Japan. J. Mitsuhashi, Fac. of Agric., Tokyo Univ. Agric. & Technol., Saiwaicho, Fuchu, Tokyo 183, Japan	10:00 End

The Food Insects Newsletter

Page 6

Entomophagy

from page two

1976 *SilentMovie*

One of two films using literal variations on the old joke, "Waiter, what's this fly doing in my soup?"

1979 *Dracula*

This time, Frank Langella's henchman, Renfield, elicits a big audience reaction in the scene where he dramatically and graphically devours his favorite food - live cockroaches.

1979 *Love at First Bite*

George Hamilton spoofs Dracula movies and is assisted by Arte Johnson as Renfield, who prevents his boss from accidentally stepping on his dinner, a big black beetle. Later, Renfield discusses his lunch menu - bugs, hairy caterpillars, earthworms, black widow spiders and scorpions; he swats and eats a fly and, in one scene, seeks hungrily after an imaginary centipede.

1981 *Gallipoli* (Australian)

Soldiers in the trenches are shown eating fly-covered hardtack; also, one soldier picks a louse from his clothes and says to his companion, "Here's one-are you hungry?"

1981 *The Earthling* (Australian)

William Holden and Ricky Schroder cook and eat their freshly caught fish with grubworms from under a log. Schroder reacts negatively when he learns what he has eaten.

1982 *Friday the 13th, Part III*

A man samples some commercial fish food, then reads the label and is disgusted to find mayfly eggs as a listed ingredient.

1982 *Quest for Fire*

The very first scene draws immediate audience response when a caveman grabs and devours a large moth with relish and suitable crunches. Less dramatic are several scenes wherein people pick and eat lice from their own and others' bodies.

1982 *Victor Victoria*

A cockroach appears in a restaurant salad.

1983 *Never Cry Wolf*

There is a dialog reference to "iceworm cocktails."

1994 *Iceman*

A cryopreserved/revived Neanderthal man convinces a woman to eat a beetle before she realizes what she is doing.

1984 *Greystoke: The Legend of Tarzan, Lord of the Apes*

In closeup, we see a hungry man devouring live termites.

1984 *Indiana Jones and the Temple of Doom*

A platter of large scarab beetles is served and savored at a maharajah's banquet

1985 *King Solomon's Mines*

A woman trapped in a flooding mine complains and gasps, "I've swallowed a bug," to which her companion (Richard Chamberlain) replies, Good ... at least it'll keep your strength up."

1985 *Baby: Story of the Lost Legend* William Katt eats a tribal jungle gruel containing living and dead ants.

1985 *A View to a Kill* (British)

A second filmic reference to a fly in the soup at a restaurant.

1985 *Bad Medicine*

An American student at a second-rate Mexican medical school visits a remote village where he enjoys a large green

1986 *Blue Velvet*

At movie's end, a woman watches a parental robin feed a beetle to a nestling, and says, "I could never eat a bug."

1987 *Overboard*

Goldie Hawn, riding in the back of a pickup, complains, "I just ate a bug."

This list should provide an idea of the range of filmic reference to entomophagy. As I hope you can discern, entomophagy is not shown on screen in a very positive light. Rather, it is used as a source of humor or for its shock value. Very often, when I've seen these films in theaters with a large audience, the biggest audible response during the show comes during the entomophagy scene(s). The observation I made in 1986 still seems to hold true, that is, entomophagy seems to be on the increase in more recent films. Finally, I've dealt only with commercial, live-action feature films, but other categories of film also are probable showplaces for entomophagy (e.g., animated films, as listed by Leskosky and Berenbaum 1988).

REFERENCES

Leskosky, R.J., and M.R. Berenbaum. 1988. Insects in animated films- not all "bugs" are bunnies. *Bull. Entomol. Soc. Am.* 34:55-63.

Mertins, J.W. 1986. Arthropods on the screen. *Bull. Entomol. Soc. Am.* 32:85-90.

[Editor's note. We are pleased to say that the *Newsletter* can provide additional taxonomic detail for the movie "Greystoke." According to Professor D. Keith McE Kevan of Canada's. McGill University, "It might be assumed that a species of *Cubitermes* was involved as the mushroom-shaped termitaria are visible in the background."

Professor Kevan also provides some additional story detail: "The young Greystoke (Tarzan) is shown imitating the apes by eating termites. Later in the film, he feeds termites to the lost, starving and wounded Pierre Gaston, the Belgian 'guide' (who eventually gets Tarzan back to Greystoke in Scotland), so saving his life There is a close-up of a termite being put into Pierre's mouth - probably more for the 'horrific' effect than to advertise the admirable nutritive properties of the insects!"

Speaking of movies, actors, and actresses, brings to mind other celebrities and an important point. We have it on good authority that none other than Bryant Gumble, host of NBC-TV's *Today Show* was persuaded to partake of wax moth larvae during a 1984 edition of the show. Our authority for this is none other than Professor Murray Blum, University of Georgia, who, while being interviewed on the show, provided the necessary leadership.

Murray was obviously practicing the tenets of N. W. Pirie* who said an "introduction should proceed from the privileged towards the underprivileged rather than *vice versa*. . . . A stigma, however acquired, is not easily rubbed off. It follows from this that a novelty should never be used at first in orphanages, prisons, or refugee camps."

grasshopper roasted on a skewer. 1986 Vamp The master-of-ceremonies at a vampire nightclub casually snacks on live cockroaches from a candy dish.	*Pirie, N. W. 1969. Food Resources, Conventional and Novel. Baltimore: Penguin Books, p. 172
---	--

The Food Insects Newsletter

Page 7

Mealworm Quiche

Michelle A. Cooper
Louisiana State University

Pastry:

1 1/4 cups flour
1/4 cup mealworm flour*
1/2 cup shortening
1/2 teaspoon salt
4 Tablespoons water

Mix flour, mealworm flour and salt. Cut in shortening with pastry blender. Sprinkle with water, adding one tablespoon at a time. Mix with a fork until moistened. Form an 8-inch piecrust.

* Dry roast clean or frozen mealworms on a paper towel on a cookie sheet. Bake at 200 degrees for 1-2 hours until desired state of dryness is reached. Blend in an electric blender into a delicate flour. One cup mealworms yields approximately 3/4 cup flour.

Filling:

1/4 pound bacon
1/4 cup chopped mealworms
3/4 cup diced Swiss cheese
1/3 cup chopped green onions
4 ounces sliced mushrooms
5 eggs
2 cups cream
3/4 teaspoon creole seasoning
1/4 teaspoon Tabasco
2 Tablespoons chopped fresh parsley

Cut bacon into one-inch strips and cook bacon and mealworms in a heavy skillet until bacon is almost crisp. Drain meat well on paper towels. Sprinkle bacon, insects, Swiss cheese, onions and mushrooms in pie shell.

Beat together: eggs, cream, creole seasoning, Tabasco, and parsley. Pour custard mixture into pie shell. Bake at 375 degrees for 35-45 minutes until top is golden brown. Serve hot. Makes six servings.

The Food Insects Newsletter

Page 8

Pesticides**from page one**

--- late addition---

Just as this issue of the *Newsletter* had been finalized for the printer, Dr. Gordon Surgeoner called attention to a paper by Rodriguez and Riehl (1962) describing the control of flies by the use of cockerels on commercial poultry ranches in southern California. The investigators reported reductions to zero, in some cases, of fly larvae and pupae (*M. domestica*) in chicken manure under cages with a raised wire mesh floor when cockerel chicks were released on the ground.

Control was maintained with ratios of 20 to 100 hens in cages per one cockerel on the ground. The authors describe management practices favorable to successful fly control by the chicks.

in the laboratory, baby chicks only 1-2 days old were found to peck instinctively at larvae and pupae although they were unable to pick them up. At 3 days of age the chicks ate 100 larvae or pupae per chick per day and by 15 weeks of age were averaging 8,000 or more per day. The consumption of flies (200 grams/day) was higher than the consumption of mash or grain on a free-choice basis. Under ranch conditions, feed was supplied in the evening for the first few days but not thereafter unless fly breeding was completely eliminated.

At a rabbitry with 175 rabbits, control of fly larvae and pupae was obtained with one cockerel per five rabbits.

Rodriguez, J. L. and L. A. Riehl. 1962. Control of flies in manure of chickens and rabbits by cockerels in southern California. *J. Econ. Entomol.* 55:473-477.