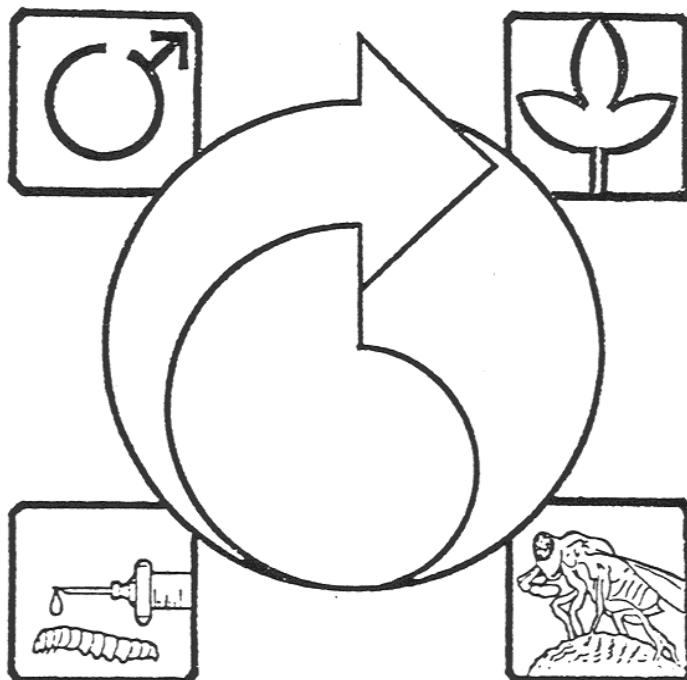


**F R A S S**

**newsletter**



LUCKEY 71

**INSECT REARING GROUP**

**VOL. 7**

**NO. 2**

**1981**

FRASS is published twice a year by the Insect Rearing Group, with this issue coming to you by the courtesy of David Grant, Zoecon Corporation, Palo Alto, CA. The newsletter is provided free to scientists interested in insect rearing.

The quality of this newsletter depends upon the support of its readers. Keep your colleagues informed by sending comments, news of upcoming publications, and other communications pertinent to insect rearing. Your requests are published. Promote the Insect Rearing Group and keep informed by supporting FRASS with your input!

*David*

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#### In This Issue:

1. Future Meeting Schedules
2. Article: PIFON
3. Article: Artificial Nutritive Diets
4. Article: Microcapsulated Artificial Diet
5. Publications List
6. Article: Handbook of Insect Rearing
7. Membership List
8. Requests, Comments, and Frass.

## FUTURE MEETINGS

### National ESA meeting \*

November 29 - December 3, 1981  
Town and Country Hotel  
San Diego, CA

### Southeastern Branch

January 26 - 28, 1982  
Mobile Hilton  
Mobile, AL

### Southwestern Branch

February 8-10, 1982  
Downtown Holiday Inn  
El Paso, TX

### North Central Branch

March 23-25, 1982  
Ramada Inn  
Sioux Falls, SD

- \* The Formal Conference for the Insect Rearing Group is scheduled for Wednesday evening, December 2. Topics include: computers & insect populations, tick biology, a special newsletter, cockroach resistance and fire ant rearing.

The IRG's short business meeting will follow. See you all there!

## PIFON, a new Permanent International File of Naturalists

An international register of naturalists, their interests, collections, and exchange desires called PIFON, an acronym for "Permanent International File of Naturalists" now contains data on over 10,000 persons representing every country in the world. The file is housed and maintained by the Oxycopis Pond Research Station, a new institution established in 1980 in upstate New York in a wooded area not far from the Hudson River.

In addition to the file, which is used to compile new editions of the Naturalists' Directory, a complete set of the 43 editions of the Directory and its Supplements, is available. The first edition of the Directory was published in 1877 and has been issued on the average of every two years since. Thus, the PIFON file is the world's most complete listing of naturalists, past and present. This wealth of data is available for the use of any person registered in PIFON.

A unique coding system enables the compilers of the Directory to provide accurate lists of naturalists by speciality in the most up to date form possible. In addition, due to the spontaneous registration in PIFON, current data is available for use with computer speed and accuracy.

To be registered in PIFON it is only necessary to send the following to the editor, in block letters or typed: 1) name (last or family name underlined; include Dr., Prof., Mr., Mrs., etc.); 2) mailing address; 3) phone number; 4) group of main interest, area of specialization (e.g. family group name, etc.) and kind of interest (e.g., collecting, exchanging, systematics, ecology, etc.); 5) geographical area of greatest interest; 6) short statement giving interest details (not over 25 words); 7) if a taxonomist, list groups willing to identify for others; 8) signature and date. These data will be coded and entered into the file. No person is listed unless these data are supplied by that person. The right to edit all listings published in the Directory is reserved.

The first part of the new 44th edition of the Naturalists' Directory is entitled "The Naturalists' Directory of Insect Collectors and Identifiers (International)." This part includes persons interested in insects, spiders, and other terrestrial invertebrates. The deadline for the receipt of new listings is OCTOBER 1, 1981. Hundreds of listings are now in the PIFON file.

The additional parts will list plant collectors and identifiers, bird watchers, field biologists and rock, mineral, and fossil collectors. The final part will consist of subject, geographical, and name indexes for the entire edition.

Each part of the Directory is compiled from data obtained from PIFON and contains an alphabetical list of names, addresses, interest statements, and code numbers for data retrieval. Societies and their publications, and annotated lists of new books are added as appropriate for the subject of each part. These completely self-contained parts are cross indexed in the final section for those using the complete edition.

The purpose of PIFON and these directories remains unchanged in the 104 year history, namely, in the words of its founder, Samuel Cassino: "To further international exchange of natural history specimens and information." Each person, amateur or professional, who responds to this request for registration will be entered in PIFON. To purge the file of changes and incorrect entries, users are requested to send corrections when they are noted.

The Directories are sold by the publisher, Flora and Fauna Publications, by subscription only. Separate parts may be subscribed to, or the entire edition may be obtained at a reduced rate. Only a small back stock is maintained for libraries.

The wealth of data in the PIFON file is open for the use of persons registered in PIFON. Information about specialists listed in out of print editions as well as those not yet printed in the Directories but coded in PIFON may be requested. Search for suitable listing will be made upon request and a photocopy of the file on a specific subject will be mailed to the person requesting the information. These data of course have considerable historical value as well. The only charge (to those registered) is \$1.00 (payment by draft or US or foreign postage) to cover the mailing costs.

For sale notices are not accepted for listings, but classified and display ad space is available at the end of each part.

Send registration and/or requests for further information to the editor, Dr. Ross H. Arnett, Jr., Oxycopis Pond Research Station, 90 Wallace Road, Kinderhook, NY 12106 USA, Telephone (518)758-7219.

NEW APPROACH TO ELABORATION OF ARTIFICIAL NUTRITIVE DIETS FOR MASS REARING OF ENTOMOPHAGOUS INSECTS. OPTIMIZATION OF NUTRITIVE DIETS BY THE SIMPLEX LATTICE METHOD.

(From Biochemistry and Physiology of Insects, Kishinev, Shtiintsa, USSR, 1979, p. 29-35)

A. Nepomnyastchaya, E. Mencher, I. Yazlovetsky

Composition: Casein (.93), wheat germ extract (1.74), brewer's yeast extract (.67), sucrose (1.50), soybean oil, sunflower lecithin, cholesterol, sodium phosphate, choline chloride, vitamin B<sub>12</sub>, ascorbic acid (all less than .03). Distilled water added up to 30 ml.

For details of extracts see: I. Yazlovetsky, E. Mencher, A. Nepomnyastchaya, V. Sumenkova "New approach to elaboration of artificial nutritive diets for mass rearing of entomophagous insects" in "Isvestiya" Academy of Sciences of the Moldavia SSR, ser. biol. & chem. sci., 1979, N1, p. 55-63.

Preparation: Ingredients mixed and ready diet microcapsulated. For details of preparation see: certificate of authorship of the USSR, N 688161, 1979.

Development: Application of simplex lattice method is proposed to aid the development diets for mass rearing of beneficial insects. Larvae reared mass-individually on diet from hatching to the 2-nd stage at 25±1.5°C, 70-80% R. H. and 16h-photoperiod, in 4-5 days. Average Survival: 81%.



MICROCAPSULATED ARTIFICIAL DIET  
(From Zashcita rasteny, 1974, vol. 3, p 32)  
A. Abashkin, I. Yazlovetsky

Composition: Basis - liquid diet, consisting of proteins, carbohydrates, fats, vitamins, mineral salts. Microcapsules cover is composed of paraffine and bee wax. Droplet diameter is 300-600 microns. Cover thickness is 15-25 microns.

Preparation: No details. Efficiency of special apparatus for micro-capsulation is 500 droplets/h.

Development: Four generations of Chrysopa carnea were bred on this diet the first instar larvae being fed with Sitotroga cerealella eggs. Larvae development was 10-13 days, the adults yield being 72-80%.

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Return to: R.E. Wheeler, Chevron Chemical Co., 940 Hensley St., Richmond, CA 94804

### Publications List

1. A Reliable Technique for Rapid Colonization of *Anopheles-Albimanus*. Bailey, D. L.; Lowe, R. E.; Kaiser, P. E. MOSQ News 40 (3). 1980.
2. Development of the Elm Spanworm on Artificial Diet. Fedde, V. H. Ann. Entomol. Soc. Amer. 73(6): 668-670. 1980.
3. Long-Term Cold Storage of Host Eggs and Reproduction in Them of Egg-Parasites of Insect Pests. Gennadiev, V. G.; Khlistovskii, E. E. Zhurnal Obshchei Biologii; 41; 2; 314-319. 1980.
4. Pink Bollworm Mating Reproduction and Longevity of Laboratory Reared Native Strains. Henneberry, T. J.; Clayton, T. Ann Entomol Soc Am 73 (4). 1980.
5. Anti-Microbial Agents in a Semi-Synthetic Diet for the Diamondback Moth. Hou, R. F.; Hsiao, J.H. Plant Prot Bull 21 (3). 1979.
6. Methods for Rearing Queen Bees of Good Quality at the End of the Summer. Mitev, B.; Stoilov, N. Zhivotnov'd Nauki 16 (5). 1979.
7. Rearing of the White Spotted Longicorn Beetle on an Artificial Diet. Murakoshi, S.; Aono, N. JPN J Appl Entomol Zool 25 (1). 1981.
8. Rearing the Egyptian Cotton Leafworm on a Practical Calcium Alginate Diet. Navon, A.; Keren, S. Phytoparasitica 8 (3). 1980.
9. Rearing the Western Tussock Moth on Artificial Diet with Application to Related Species. Peterson, L. J. USDA Forest Service Research Paper. Pacific Northwest Forest and Range Experiment Station: No. PNW-239; 5 pp. 1978.
10. A Method of Improving the Recipe for Semisynthetic Nutrient Media for Rearing Insect Plant Pests. Starets, V. A.; Mencher, E. M. Zoologicheskii Zhurnal: 59; 5; 771-776. 1980
11. Method for the Optimization of Formulations for Semisynthetic Nutrient Media for the Rearing of Noctuids. Starets, V. A.; Mencher, I. M. Zool. Zh. (Zolzat) 59 (5) 771-6. 1980.
12. Rearing of Texas USA Tabanidae Diptera. Thompson, P. H.; Hogan, B. F.; Del Var Petersen, H. Southwest Entomol 5 (3). 1980
13. *Hylemya-Antiqua* Longevity and Oviposition in the Laboratory. Vernon, R. S.; Borden, J. H. J Entomol Soc B C 76 (0). 1979.
14. Relative Humidity Effects at 20°C on Eggs of the Olive Fruit Fly Reared on Artificial Diet. Tsitsipis, J. A.; Abatzis, C. Entomol Exp Appl 28 (1). 1980.

RELEASE FOR FRASS

Dr. Pritam Singh, Entomology Division, DSIR, Auckland, New Zealand and R. F. Moore, USDA-SEA/AR, Florence, SC plan to publish a "Handbook of Insect Rearing". This is a concept originated by Dr. Singh and developed with Dr. Moore at the Insect Rearing Conference which was held in Atlanta, GA in March 1980.

The "Handbook" is intended to provide a practical guide (cookbook style) for insect rearing in the laboratory. It will contain a collection of rearing techniques contributed by specialists who have had several years experience in rearing the species.

A tentative table of contents and list of species is given below. It is requested that the membership of FRASS examine the list and suggest additional species of widespread importance that may have been omitted and also possible contributors who would be expert in rearing the proposed species.

Please send your suggestions to: R. F. Moore, Cotton Production Research Unit, P. O. Box 2131, Florence, SC 29503, USA and Pritam Singh, Entomology Division, DSIR, Private Bag, Auckland, New Zealand.

Preface.....
Acknowledgments.....
Introduction.....
Guidelines for genetic diversity in colony establishment and maintenance.....
Principles of formulating diets for insects...
General or multi-species diets.....
Parasite/predator rearing.....
Microbial control and disease recognition in laboratory colonies.....
Establishment and maintenance of environmental conditions for insect rearing.....
Recognition and prevention of health hazards associated with insect rearing.....
Insectary design and equipment.....
Species rearing methods (approximately 100)...

**Orthoptera**

- Blattella germanica (German cockroach)
- Leucophaea maderae (madeira cockroach)
- Periplaneta americana (American cockroach)
- Acheta domesticus (house cricket)
- Locusta migratoria
- Melanoplus bivittatus (two-striped grasshopper)
- Schistocerca gregaria (grasshopper)

**Hemiptera**

- Aphids
- Aphytis melinus
- Lygus hesperus
- Oncopeltus fasciatus (large milkweed bug)
- Pyrrhocoris apterus
- Rhodnius prolixus
- Triatoma protracta

**Neuroptera**

- Chrysopa carnea

**Lepidoptera**

- Agrotis ipsilon (black cutworm)
- Agrotis segetum (cutworm)
- Argyrotaenia velutinana (redbanded leafroller)
- Bombyx mori (silkworm)
- Chilo suppressalis (Asiatic rice borer -stem)
- Chilo zonellus (sorghum stem borer - maize stem borer)
- Choristoneura fumiferana (Eastern spruce budworm)  
and/or C. occidentalis (Western spruce budworm)
- Diatraea grandiosella (Southwestern corn borer)
- Diatraea saccharalis (sugarcane borer)
- Estigmene acrea (saltmarsh caterpillar)
- Galleria mellonella (greater wax moth)
- Grapholitha molesta (oriental fruit moth)
- Heliothis virescens (tobacco budworm)
- Heliothis zea (bottworm/corn earworm)
- Hyalophora cecropia (cecropia moth)
- Laspeyresia pomonella (codling moth)
- Lymantria dispar (gypsy moth)
- Mamestra brassicae
- Manduca sexta (tobacco hornworm)
- Orgyia pseudotsugata (Douglas fir tussock moth)
- Ostrinia nubilalis (European corn borer)
- Pectinophora gossypiella (pink bollworm)
- Phthorimaea operculella (potato tuberworm)
- Pieria brassicae (cabbage worm)
- Platella xylostella (diamondback moth)
- Plodia interpunctella (Indian meal moth)
- Sitotroga cerealella (angoumois grain moth)
- Spodoptera exigua (beet armyworm)
- Spodoptera frugiperda (fall armyworm)
- Spodoptera littoralis (cotton leafworm)
- Tineola bisselliella (webbing clothes moth)
- Trichoplusia ni (cabbage looper)

Coleoptera

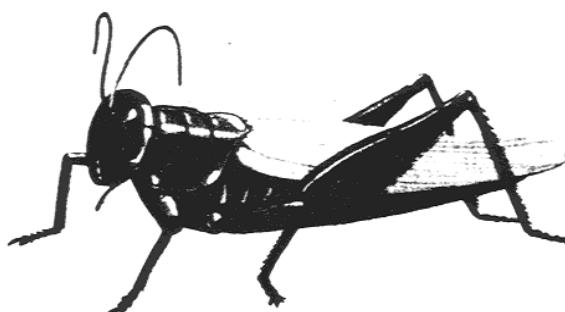
- Anthonomus grandis grandis (boll weevil)  
Cerambycidae family (longhorned beetle or roundheaded wood borer)  
Coccinellids (several spp.)  
Cryptolaemus spp.  
Diabrotica spp. (rootworm)  
Hypera postica (alfalfa weevil)  
Leptinotarsa decemlineata (Colorado potato beetle)  
Orzaephilus surinamensis (saw-tooth grain beetle)  
Popillia japonica (Japanese beetle)  
Sitophilus granarius (granary weevil)  
Tenebrio molitor (yellow mealworm)  
Tribolium castaneum or I. confusum (red-flour beetle or confused flour beetle)  
Trogoderma spp.  
Xyleborus ferrugineus (ambrosia beetle)

Hymenoptera

- Encarsia formosa  
Spalangia endius and other fly parasites  
Trichogramma spp. (egg parasites)

Diptera

- Anastrepha suspensa (Caribbean fruit fly)  
Calliphora erythrocephala (blowfly)  
Cochliomyia hominivorax (screwworm)  
Drosophilidae  
Fannia canicularis (little house fly)  
Glossina morsitans  
Haematobia irritans (horn fly)  
Hylemya antiqua (aphid)  
Lixiphaga diatreiae  
Lucilia cuprina (blowflies)  
Mosquitoes, general  
Musca autumnalis (face fly)  
Musca domestica (house fly)  
Phormia regina (blowfly)  
Sarcophaga bullata  
Simuliidae family  
Stomoxys calcitrans (stable biting fly)  
Tephritidae family



REQUESTS, COMMENTS AND FRASS

William S. Todaro requests articles concerning the colonization of insect species as supplemental sources of proteins for any species of animals including fish. If you know of any publication of this sort, please contact Todaro at the Vector Control Program, 1727 Blvd. of Allies, Pittsburgh, PA. 15219.

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David K. Reed of the Fruit and Vegetable Insects Research Lab, sends in this offer:

"We have on hand 11 boxes of 5,000 each of the Thunderbird No. 111, 1 oz. plastic cups and 20 boxes of the 2500 each of the Thunderbird 250, 1½ oz. plastic cups. Since our rearing requires the use of 9/16 oz. cups, we would like to trade. If you need either size mentioned, let us know and we will try to work out a trade which will be mutually beneficial. Our address is USDA, ARS, P.O. Box 944, Vincennes, IN., 47591, and our phone number is (812) 882-4942.

\*\*\*                    \*\*\*                    \*\*\*

A new reference slide collection is available from the ESA: The Ries Memorial Slide Library consists of over 1500 color slides available for nonprofit, educational use, (\$2.00 each), or for reproduction in publications (\$25.00 each). For more information contact: Curator, Ries Slides, ESA National Office, 4306 Calvert Rd., College Park, MD., 20740.

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Patrick Greary, research entomologist at Harvard, sends the following information:

"I have come across a unique protein supplement that has been quite useful to me in preparing liquid media for insects. It is a soluble casein (as you probably know, most casein products are insoluble at normal pH values). It forms a stable colloidal suspension rather than a true solution, but for most purposes, this is not an important distinction. This suspension is stable even after autoclaving (unlike albumin solutions, which yield a protein precipitate upon autoclaving).

This material was used successfully for rearing mosquitoes by Dr. Rex Dadd (pp. 199-209, In: Insect and Mite Nutrition, J.G. Rodriguez, Ed. North Holland Pub. Co. (1972). I have found it useful in rearing tachinid fly larvae on liquid media. According to Dadd, it contained sufficient sterol to meet

the sterol requirement for mosquito larvae (it contains 1.5% lipid). It is also available in a fat-free form, and in a vitamin- and fat free form from the Gallard-Schlesinger Chemical Mfg. Corp., 584 Mineola Ave., Carle Place, New York, 11514 (516)333-5600. The non-defatted version sells for ca. \$25.00 for 500 g (product no. 44016 4 R). The fat free version, product no. 44017 4T, is \$50.00 for 500 g. They also sell Hammarsten casein (no. 44020 3H), at \$25.00 for 100 g. This is a completely soluble casein.

These are all products of the British Drug Houses, for whom Gallard-Schlesinger distributes in the U.S. In addition to these products GS also sells a variety of other nutritional supplements".

As Gallard-Schlesinger did not respond to my request for further information on such products, I do not include them in the Diet-Source List, but please contact them if you are interested in the above described supplements.

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The publication of the 1980 Insect Rearing Conference (March, 1980, Atlanta, Ga.) is progressing, with publishing in 1982 anticipated. Approximately 60% of the manuscripts have been edited by the Southern Region Information Office of the USDA-SEA-AR. The rest should be completed by December. Edited manuscripts will be returned for acceptance of editorial changes, and the book will be sent to Washington for printing. (From Ray Moore)

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"God in His wisdom  
Invented the fly  
And then forgot  
To tell us why".

(By Ogden Nash)



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