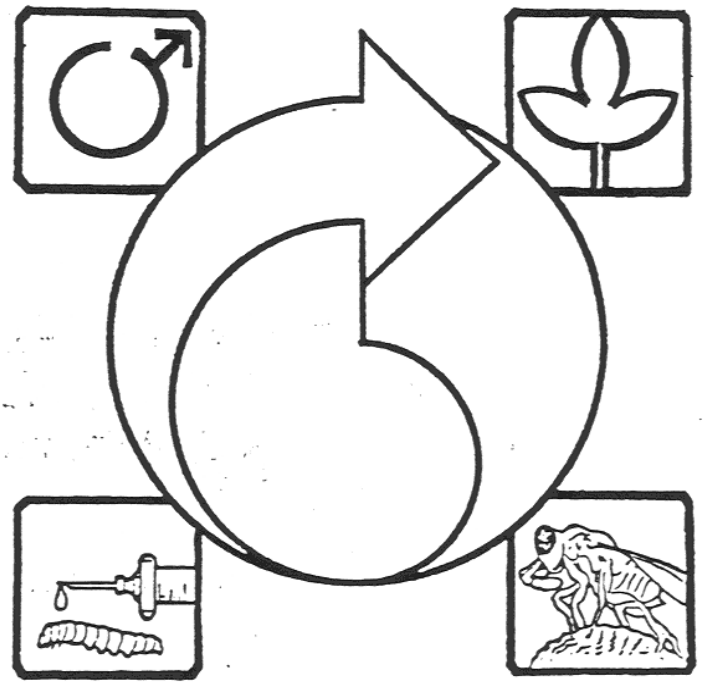
IRAS newsletter



INSECT REARING GROUP

VOL. 6 NO. 1 1980

April 8, 1980

EDITED BY

Ronald E. Wheeler

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Richmond, California 94804
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EDITORS' NOTE

The "Frass" Newsletter is published bi-annually by the Insect Rearing Group, which is currently composed of 540 scientists involved in insect rearing programs throughout the world. The subscription to Frass is free; publication costs are borne by the editor's employer.

The Frass Newsletter is a cooperative effort designed to provide a vehicle for communication among scientists involved in all aspects of insect rearing. The effectiveness of the Frass Newsletter depends on the continuous input of its subscribers. Your input is very important for keeping the Insect Rearing Group informed on the current state of the art and to promote its advancement. Give your support by sending comments, information requests, and abstracts of publications, etc., to the editor.

* *

ESA SUB-SECTION STATUS

At the recent Insect Rearing Conference held in Atlanta, there was considerable interest and discussion regarding obtaining sub-section status for Insect Rearing. The main reason for seeking sub-section status was two-fold: first, to obtain E.S.A. recognition of the science of insect rearing and the Insect Rearing Group; and secondly, to obtain an E.S.A. meeting time allocation and program listing for presenting scientific papers concerning most phases of insect rearing.

There are disadvantages in obtaining sub-section status. An Insect Rearing sub-section would be scheduled during the daytime hours and would run concurrently with other sections of mutual interest to members of the Insect Rearing Group. Also, we would not necessarily have control over the scheduling of the sub-section.

There is another option which will be available for the first time at the National E.S.A. meeting this year and which our group will be using at that meeting. The E.S.A. reorganization committee has established a new program classification called a "Formal Conference" which will be held in the evenings. Papers for the "Formal Conference" will be scheduled, numbered, and their titles and authors listed in the program. The main advantage for use of the "Formal Conference" is that there would be the minimum of conflict with concurrent sessions. A possible disadvantage is the obvious time limitation of a night meeting (about 3 hours); however, it is feasible to have a "Formal Conference" on consecutive nights. A minor disadvantage is that a "Formal Conference" would have to be requested each year rather than be automatically scheduled as is a sub-section.

If the Insect Rearing Group wishes to establish sub-section status, the matter must be brought before the appropriate Section preliminary business meeting at the National E.S.A. meeting and then voted upon on the final business meeting of the Section.

So that we may act on this matter at this year's annual E.S.A. Meeting, please use the attached form to indicate your preference (e.g. Sub-Section status vs. Formal Conference status) and return to the Frass Editor.

* *

FRASS NEWSLETTER LOGO

During the five year existence of the "Frass" Newsletter, various editors have employed several artistic logos for the newsletter. Your editor this year is employing the logo (by Lockley) utilized at the 1980 Insect Rearing Conference. All members are invited to submit their ideas for a permanent "Frass" Newsletter logo for consideration by the general membership. Submit your proposals to the "Frass" editor.

* *

Please note that the feature article in this issue, "Insect Allergy Survey Results," includes a new survey form. Please fill it out, even if you participated in the 1979 Survey!

1980 MEETINGS

Pacific Branch ESA:

June 24 - 26
Rodeway Inn
Boise, Idaho

Eastern Branch Meeting:

September 23 - 26
Baltimore Hilton
Baltimore, Maryland

Will include a symposium on Insect Rearing moderated by Dave Pincus of FMC.

National ESA:

November 30 - December 4
Atlanta Hilton Hotel
Atlanta, Georgia

Formal Conference (Tuesday, December 2, 7:30 p.m.) moderated by Ronald E. Wheeler. The program will consist of two invitational papers on Insect Rearing Quality Control, followed by regular 10 minute paper presentations on insect rearing in general.

NOTE:

For those who wish to present a paper on insect rearing or related techniques at the Formal Conference, please refer to the necessary programming form on page 73 of the March 1980 (Vol. 26) issue of the Bulletin of the Entomological Society of America. The form and synopsis must be completed and returned to the "Frass" editor (R. E. Wheeler) on or before May 19, 1980, and not to Dr. John All. The "Frass" editor will schedule the papers for the conference and submit to Dr. John All.

The submission of a 50-word synopsis will be particularly important this year since the program committee is planning to publish them in a booklet to accompany the program schedule.

PREFERENCE SURVEY: Insect Rearing Group Status at E.S.A. meetings. We are currently placed in Section C, but are not considered a sub-section, thus insect rearing papers are not scheduled in a single block of time.

HOW DO YOU WISH TO HAVE INSECT REARING PAPERS SCHEDULED?

_____ Sub-Section

_____ No sub-section status

_____ Formal conferences (ESA MEMBERS PLEASE RESPOND)

_____ Informal conferences

WHAT SECTION DO YOU THINK THE SUBJECT MATTER OF INSECT REARING SHOULD BE PLACED?

_____ Section (A, B, C, D, E, or F)

The Insect Rearing Group membership list will be published in the 2nd issue of the 1980 FRASS. For those new members who wish to have a copy of this list at a prior date, please make such a request of the Frass Editor.

REQUEST FORM

(circle one)

Membership list. Address Correction. New Subscription. Delete Subscription.

NAME: _____

ADDRESS (as short as possible):

_____

_____

_____ ZIP _____

Forward to Frass Editor

Ronald E. Wheeler
Chevron Chemical Co.
940 Hensley St.
Richmond, CA 94801

INSECT REARING CONFERENCE

Ray Moore
Program Coordinator

The Insect Rearing Conference, sponsored by U.S. Department of Agriculture and the Insect Rearing Group, was held in Atlanta, Georgia on March 4 - 6, 1980. Forty invited papers were given in the areas of colony establishment, diets, engineering, microbial contamination, insect production, and management of insect rearing systems. The papers demonstrated the many advances that have been made and the problems which remain to be solved. Approximately 105 persons from industry, state and federal government registered for the meeting.

The papers will be published as a USDA publication by the Government Printing Office. Deadlines have been developed and it should be available at a reasonable cost in about one year. When available, notification will be directly to those who attended the Conference, and to others by notice in Frass, ESA Newsletter and Bulletin of ESA.

RECENT PUBLICATIONS

1. Griffin, J. G.; J. Robertson; and O. L. Malone, 1980. Boll Weevil Development in Mass Rearing: Effects of Temperature. Envir. Ent. 9:72-74.

2. Griffin, J. G. and O. H. Lindig, 1979. Emergence Cabinet for Mass Rearing of Boll Weevils. U.S.D.A. AAT-S-10/Oct. 1979, 6 p.

3. Foott, W. H. and P. R. Timmins, 1979. The Rearing and Biology of Glischrochilus quadrisignatus (Coleoptera: Nitidulidae) in the Laboratory. Canadian Entomol. 3:1337.

4. Fye, R. E. and R. L. Carranza, 1980. A Simplified Method of Feeding Large Numbers of Individual Mantids. J. Econ. Entomol. 72:83-84.

5. Lindig, O. H.; W. E. Poe; and P. A. Hedin, 1980. Essential Amino Acids in Dietary Protein Sources and the Nutritional Status and Oviposition of Boll Weevils. J. Econ. Entomol. 73:172-175.

6. MacGown, M. M. and P. P. Sikorowski, 1980. Histopathology of Midgut of Mass Reared, Irradiated Boll Weevils Contaminated with Staphylococcus aureus and Streptococcus sp. J. Econ. Entomol. 73:81-87.

7. Miller, J. A.; C. D. Schmidt; and J. L. Eschle, 1979. Mass Rearing of Horn Flies on a Host. U.S.D.A. AAT-S-8/Oct. 1979. 12 p.

8. Nettles, W. C.; C. M. Wilson; and S. W. Ziser, 1980. A Diet and Methods for the in vitro Rearing of the Tachinid Eucelatoria sp. Ann. Entomol. Soc. Am. 73:180-184.

8. Sikorowski, P. P.; A. D. Kent; O. H. Lindig; G. Wiygal; and J. Robertson, 1980. Laboratory and Insectary Studies on the use of Antibiotics and Antimicrobial Agents in Mass-Rearing of Boll Weevils. J. Econ. Entomol. 73:106-110.

IN PRESS

Dickerson, W. A.; J. D. Hoffman, E. G. King; N. C. Leppa; and T. M. O'Dell. Arthropod Species in Culture in the United States and Other Countries 1978 - 1979. E.S.A. Special Publication. College Park, Maryland, U.S.A. (Available in April, 1980)

REQUESTS

Needs information on rearing pseutoscorpions.
Donna Wood, P.O. Box 02453, Portland, Oregon 97202.

INSECT ALLERGY SURVEY RESULTS - A PRELIMINARY REPORT

Robert A. Wirtz, Ph.D. *
Division of Cutaneous Hazards
Letterman Army Institute of Research
Presidio of San Francisco, CA 94129

An insect allergy survey (IAS) was conducted in 1979 in response to a request from the Entomological Society of America (ESA), Section B, to examine the problem of health hazards associated with occupational exposure of individuals to insects and other arthropods. Dr. S. B. Vinson 1979, Section B Chairman, was instrumental in the formation of the IAS Committee, and we sincerely appreciate his efforts and support. Members serving on the committee were: W. A. Brindley, J. R. Gorham, A. M. Hammond, J. D. Hoffman, M. H. Weiden, and R. A. Wirtz, Chairman.

One of the goals of the IAS Committee was to conduct a pilot survey and report the results to the Section B Committee at the 1979 ESA meetings. The results were also presented at the Arthropod Rearing Society meeting, held in conjunction with the ESA, where it was decided to publish the relevant data in the next issue of the Society's Newsletter. This would insure rapid distribution of the survey results to individuals with special interests in arthropod rearing. The complete IAS results are scheduled to appear in the September 1980 ESA Bulletin.

Insect allergy surveys were mailed to 136 educational, government, and private research institutions in the U.S. Selections were made from the Arthropod Rearing Society Newsletter mailing list in an attempt to survey institutions actively involved in arthropod rearing. Eighty-two (60.3%) of the institutions contacted responded, with 48 (58.5%) reporting at least one individual with an allergy coinciding with occupational exposure to an arthropod, host animal, or diet. Thirty-two institutions (39.0%) reported no allergies, and two institutions (2.4%) reported no occupational exposure.

A total of 113 individuals, 18 to 79 years of age, reported allergies. Approximately one-third of those responding were women and two-thirds men. The number of arthropod species encountered ranged from 1 to 76, with the mode being two species (28.8%). Individuals at institutions reporting allergies used some type of protective equipment on a "routine" basis 25% of the time and on an "as-needed" basis 60% of the time. The protective equipment included gloves (35%), respirators/face masks (37%), head nets (15%), and other types of equipment, e.g., clothing, exhaust hoods, etc. (13%).

The sources of the reported allergies were divided into nine general categories (Table 1). The Lepidoptera were by far the predominant source of allergenic material reported by the individuals surveyed. The majority of allergies were reactions to the scales of the moths or butterflies. The species of Lepidoptera frequently implicated as sources of occupational allergies are listed in

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* The opinions or assertions contained herein are the private views of the author and are not to be construed as official or as reflecting the views of the Department of the Army or the Department of Defense.

Table 2. Of the 13 Coleoptera causing allergies, 5 were weevils, while 9 of the 11 allergic reactions to Orthoptera were due to cockroaches. Honey bees were reported in 8 of the 11 allergic reactions to Hymenoptera, and mosquitoes were responsible for 5 of the 8 allergies to Diptera. As with the moths, most of the reported allergies were due to scales from the adult mosquitoes. Eight of the allergies to the Acarina were attributed to mites and 1 to ticks. Most of the diet allergies were due to the dry ingredients used in artificial rearing media. All host animal allergic reactions were to rodents (Table 1).

Over 68% of the responding individuals had a daily exposure to the arthropod causing the allergy, while 12.4% reported weekly exposure. Although 8 individuals reported observing symptoms upon first contact, and one person reported exposure for 20 years before developing an allergic reaction, most estimates ranged from 1 week to 7 years with a mode of 12 months (20.8%). The suspected origins of the allergic responses are listed in Table 3, and the types of reaction are given in Table 4. The majority of the responses (77%) attributed to airborne material (Table 3), as well as the allergic reactions of sneezing, runny nose (68%), and eye irritation (62%) (Table 4), are reflections of the large number of allergies attributed to the scales of Lepidoptera and Diptera (Table 1).

Of the 113 persons reporting arthropod allergies, 69% stated that it had been necessary to stop work or transfer personnel because of this problem. Forty-nine percent of those responding had consulted a physician concerning their arthropod allergy, and 47% stated that the allergy had required some type of medication or medical treatment. Self-treatment (e.g., over-the-counter antihistamines) was reported by 24% of those responding, while 25% of the individuals were receiving prescription drugs, and 4% desensitization inoculations. Breathing difficulties, reported by 34% of those responding (Table 4), or strong allergic reactions of any type are potentially serious and warrant consultation with a knowledgeable physician. Anaphylactic shock, a life-threatening reaction, was reported by 3 individuals (2.7%, Table 4). Individuals considering desensitization inoculations for stinging Hymenoptera should have their attending physician examine "Insect Allergy: The State of the Art," by L. M. Lichtenstein et al., in J Allergy Clin Immunol, 64(1):5-12, July 1979. The Canadian Honey Council has endorsed the venom immunotherapy treatment of sensitive individuals discussed in this article.

The IAS results document an occupational health hazard that has been obvious to many, suspected by others, and ignored by a few. The problem of occupational arthropod allergies and the legal and ethical questions which arise must be addressed by entomologists and colleagues in related areas.

A major goal of the 1980 IAS Committee is to conduct a more extensive survey to identify specific potential health hazards associated with arthropod rearing. To that effect, a survey form is included at the end of this report. Please fill it out, even if you participated in the 1979 IAS, and mail it to the address printed on the reverse side of the survey form. Additional information on specific problem areas or procedures and guidelines used in your laboratories to reduce exposure would be appreciated.

Acknowledgements: The author thanks the Insect Allergy Committee members and Dr. G.H.G. Eisenberg, Chief, Division of Cutaneous Hazards, for their comments on the content and format of this manuscript and survey form.

Table 1. Allergies were attributed to:

Category	No.	%*
Lepidoptera	69	61.1
Coleoptera	13	11.5
Orthoptera	11	9.7
Hymenoptera	11	9.7
Acari	9	8.0
Diptera	8	7.1
Diets	6	5.3
Host animals	6	5.3
Other	13	11.5
Total	146	

Table 2. Sources of lepidopteran allergies and the number of times reported in the survey:

Species	No.
Gypsy moth	32
Tobacco hornworm	8
Pink bollworm	4
Tobacco budworm	3
Silkworm	3
Greater wax moth	3
Moths unspecified	4
Seven other species were reported 1 2 times each	12
Total	69

Table 3. Allergic responses were attributed to:

Response was to	No.	%*
Airborne material	87	77.0
Contact	72	63.7
Sting	8	7.1
Bite	4	3.5
Other	4	3.5
No response	5	4.4
Total	180	

Table 4. Type of allergic reaction:

Reaction	No.	%*
Sneezing, runny nose	77	68.1
Skin irritation	70	61.9
Eye irritation	70	61.9
Breathing difficulty	38	33.6
Anaphylactic shock	3	2.7
Other (e.g. fever)	4	3.5
Total	262	

* Multiple responses from 113 individuals

INSECT ALLERGY SURVEY

Please fill out the following survey if you have an occupational allergy to an arthropod, host animal, or arthropod diet and return no later than 1 June 80.

1. Age: _____ years 2. Sex: _____ Male _____ Female

3. Do you: (a) have a history of allergies? ____ Yes ____ No. (b) smoke? ____ Yes ____ No.

4. How many species of arthropods are you exposed to on an occupational basis?
_____ Number of species.

5. The allergy is to: (a) An arthropod - Order: _____
Family: _____ Common name: _____
Genus & species: _____
(b) Host animal - Name: _____
(c) Diet - Name: _____

6. How frequent was the exposure before the allergy developed?
____ Daily ____ Seasonal, ____ times/yr ____ Unknown _____
____ Weekly ____ Other: _____

7. How long did it take to develop the symptoms to the allergy?
____ Weeks, number of ____ Immediately _____ Unknown
____ Months, number of ____ Other: _____
____ Years, number of _____

8. The allergic response is to (8 & 9, check all that apply):
____ Airborne material ____ Sting
____ Contact ____ Unknown
____ Bite ____ Other: _____

9. Type of allergic reaction:
____ Sneezing, runny nose ____ Difficulty breathing
____ Skin irritation ____ Anaphylactic shock
____ Eye irritation ____ Other: _____

10. Do you use protective equipment when working? ____ No ____ Yes, ____ % of time.
If "Yes", which of the following are used?
____ Face mask ____ Gloves ____ Head net ____ Protective clothing
____ Hood (laminar flow/exhaust) ____ Other: _____

11. Has it been necessary for you to stop work or be transferred to another project/job because of this allergy? ____ Yes ____ No

12. Has a physician been consulted concerning this allergy? ____ No
____ Yes, what was his advice? _____

13. Was/ is this allergy requiring medication or medical treatment? ____ No
____ Yes, self-treatment (e.g., over-the-counter antihistamines)
____ Yes, prescription drugs - Name: _____
____ Yes, desensitization inoculations - Contents and/or source: _____
_____

Comments: _____
_____
_____
_____

Name: _____

Dept/Division: _____

Institution: _____

Address: _____

City, State: _____

Country/Zip: _____

Phone: ( ) _____

FOLD

Stamp

Commander
Letterman Army Institute of Research
Division of Cutaneous Hazards
ATTN: SGRD-ULC/CPT Robert A. Wirtz
Presidio of San Francisco, CA 94129

FOLD

DIET INGREDIENT SOURCE AND PRICE LIST

Item	Description	Source	Cost
Agar	fine	Morehead & Co. 14801 Oxnard St. Van Nuys, CA 91401 8-213-873-6640	$5.04/lb They pay shipping on 200 lb. or more
Alfalfa	meal	Nutrilite Products P. O. Box 98 Lakeview, CA 92353 714-521-3900	$55.00/cwt
Aureomycin	chlorotetracycline soluable powder 64 g/lb (25.6 gm act./6.4 oz. pkg)	Ozark Supply Co. American Cyanamid 1614 Wyoming Kansas City, MO 816-229-6100	$2.55/6.4oz.
Alphacel	non-nutritive, bulk	Nutritional Biochemicals, Inc., 26201 Miles Road Cleveland, OH 44128 216-662-0212	$110.00/cwt
Ascorbic Acid		Roche Chemical Division Hoffman-LaRoche, Inc. Nutley, NJ 07110 201-235-5000	$4.56/lb in 1-5 lb guant. $4.31/lb in 6-10 lb quant. $4.08/lb in 11-25 lb quant.
Calcium alginate	Kelgin HV	Kelco Co. 20 N. Wacker Drive Chicago, IL 60606 312-372-1352	$212.00/cwt
Gelcarin	HWG	Marine Colloids, Inc. 2 Edison Place Springfield, NJ 201-379-6620	$5.00/lb under 200 lbs $3.75/lb in 200-800 lb quant. $3.25/lb in 800-1000 lb quant. (50 lb min. odr.)
Casein	crude, 80 mesh loctic, 30-40 mesh .70/lb	Milk Specialities P. O. Box 278 Dundee, IL 60118 8-312-426-3411	$1.25/lb 25 kg bag (55 lb)
CSM		Krause Milling Co. 4222 W. Burnham St. P. O. Box 1156 Milwaukee, WI 53215 414-272-6200	exact price unavailable

ETOH		U. S. Industrial Chem. Co., Box 7157 Louisville, KY 40207 502-426-6100	$412.50/55 gal drum
Formaldehyde	40%	Fisher Scientific 1241 Ambassador Blvd. St. Louis, MO 63132 314-991-2400	$25.85 /5 gal GSA contract $21.40/5 gal others
KOH	45%	Fisher Scientific	$64.80 /5 gal GSA contract $40.50/5 gal others
Linseed Oil	raw	GSA	$30.00/5 gal
Mehtyl-p	methyl-para hydrosybenzoate, technical	Tenneco Chemicals, Inc. Organics & Polymers Div Turner Place, Box 365 Piscataway, NJ 08854 201-981-5000	$3.07/lb in 100 lb quant. $3.17/lb in 50 lb quant. $3.27/lb in 25 lb quant.
Paper towels (Rolls)		GSA 8540-00-291-0391 (25 rolls/case)	
Pinto beans	whole	Bemhem & Co. c/o South Western Sales Assoc. P. O. Box 2948 Jacksonville, FL 32203 904-356-8535	$19.05/cwt
Potassium Sorbate, powder	Sorbistat K	Pfizer Corp. 6460 W. Courtland St. Chicago, IL 60635 c/o J. M. Dugger, Res. Mgr. 312-381-9500	$240.00/cwt
Salt mix (W)	Wesson	ICM Pharmaceuticals 26201 Miles Cleveland, OH 44128 216-831-3000	$10.05/5 lb $34.75/25 lb
Soy Protein	Supro 610 100 mesh	Ralston Purina Co. Checkerboard Square St. Louis, MO 63188 314-982-0111	$.74/lb Min. 50 lb
Tenox	PG	Eastman Chemical Prod. Inc., Order Services Kingsport, TN 37662 615-246-2111	$8.95/5 lb

Vitamin Pre-mix	#26862	Roche Chemical Div. Hoffman-LaRoche, Inc. Nutley, NJ 07110 201-235-5000	$2.90/lb
Wheat germ	raw	Earthwonder 1735 E. Trafficway Springfield, MO 65802	$.43/lb
Wheat Germ	toasted, regular toasted, flaked use flaked	Kretchmer Products Inter. Multifoods Corp. 1200 Multifoods Bldg. Minneapolis, MN 55402 612-340-3300	$.50/lb
Wheat germ	raw (flaked)	Niblack Foods 555 Flint St. Rochester, NY	$39.50/cwt $.3525/lb 2000 lb lots
Wheat germ		Arrow Head Mills	$.50/lb 300 lb min.
WSB (wheat soy blend)		source unknown	
Yeast-torula		St. Regis Paper Co. Lake States Division 603 W. Davenport St. Rhinelander, WI 54501 715-369-4100	$.34/lb in drum $.32/lb in sack

Containers & Other Supplies

Cups-plastic	1 oz.	Thunderbird Container Corp. P. O. Box 12033 El Paso, TX 79012 915-584-1151	$33.85/5000 (case)
Lids-loz.	paper (press in) 1.476 diam.	Standard Cap & Seal P. O. Box 80336 Chamblee, GA 30341 404-457-6332	$20.00/10,000
Tray	50 cell #J-2	Trend Mfg. of America 1663 N. McDuff Ave. P. O. Box 6915 Jacksonville, FL 32205 904-388-6525	$63.15 1 case = 500 trays
Mylar	lidding for 50 cell tray	Champion Package 15 Spinning Wheel Road Hensdale, IL 60521	$80.00/rl (4500 ft)

Assorted paper towels		Scott Paper Co. Bob Shell, Production Manager Scott Plaza Philadelphia, PA 19113	$17.42/30 unit case (25 cases minimum
Cell-Pac (CP-25)	Autoclavable holders for Thunderbird 1 oz. cups	Diamond National P. O. Box 697 Phoenix, AZ 85001	$9.64/case (400 pks/case)
Choline Chloride	Crystals	ICM Pharmaceuticals 26201 Miles Raod Cleveland, OH 44128	$2.30/200 gm bottle
Hexcell	Expanded resin-coated honeycomb HRH-10	Hexcell Corp. 6151 W. Century Blvd. Suite 1114 Los Angeles, CA 90045 213-776-8740	

Recent Additions to list:

Whole wheat flour	Ashland Roller Mills, Inc. Ashland, Virginia 23005	$17.25/cwt
cornmeal		$16.00/cwt

****

FOOD SOURCE FOR PREDACEOUS INSECTS. By J. Ziegler

Eggs and larvae of the confused flour beetle, Tribolium confusum, are now available from Nutri-Ent, Inc., P.O. Box 1045, Lafayette, CA 94549 (415) 938-9497.

Tribolium eggs are excellent for rearing early instars of the green lacewing and most other species of predaceous insects. Larvae may be substituted for eggs when feeding later instars and predaceous adults. Tribolium larvae are small and tender, 5 - 6 mm in length. There are approximately 250,000 individuals per pound, live weight.

Live eggs and larvae survive several weeks at 45 - 55°F (7 - 13°C), and remain fresh indefinitely when stored in the freezer. Eggs are also available freeze-killed in air-tight zip-loc bags. Larvae may be purchased in dehydrated form for storage at room temperatures. Live larvae are shipped in a small quantity of flour to maintain freshness. The flour is easily removed with a sieve.

Prices: Eggs (live or freeze-killed) - $25.00/ounce; Live larvae - $16.00/pound; Dehydrated larvae - $32.00/pound.

****

20 Liter self-contained steam jacketed Kettle: Made by Groen

BioServ Inc. P.O. Box BS — $1,470.00
Frenchtown, NJ 08825
(201) 996-2155

Engineering Sales Assoc. — $1,200.00
380 Lincoln Ave
San Rafael, CA 94901
(415) 456-5631