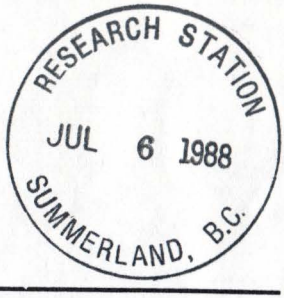
ENTOMOLOGICAL SOCIETY OF CANADA

Bulletin



SOCIÉTÉ ENTOMOLOGIQUE DU CANADA

Vol. 20 June-juin 1988 No. 2

Entomological Society of Canada
Société des Entomologistes du Canada

Bulletin

Vol. 20 June-juin 1988, No. 2

R. B. Aiken: Bulletin Editor

Cover Design: M. A. Sydor

Published by:
The Entomological Society of Canada,
1320 Carling Avenue, Ottawa, Ontario K1Z 7K9

LETTERS TO THE EDITOR

Dear Sir:

Though the upcoming issue of four butterfly stamps may be "the first time insects have appeared on Canadian stamps" OFFICIALLY, this is not so in hard fact. Ahh certainly, one might have to search for them a wee bit, as so often in real life, also much as in real life they might not have all six feet by the time they are brought to light and permanently restrained. For example: I am scanning the recent issue commemorating Fraser's "Returning from the Pacific," and behold—a mosquito!

Oh happy turn of events! For not only are we at long last joining the World Entomo-aesthetic Majority with our own contribution of that most popular group the Lepidoptera, we have meanwhile managed to sneak by at least one "ugly" insect with hardly anyone noticing.

We may well be ahead of the pack!

O. K.-Saar
P.O.Hfx.North Box 1201
Halifax, N.S.
Canada B3K 3B0

DISEASES AND INSECTS OF VEGETABLES IN CANADA

An ESC steering committee has now been formed to work with the Canadian Phytopathological Society in the production of a joint publication on the diseases and insect pests of vegetable crops grown in Canada.

The target date for completion of this publication is 1989 or early 1990.

Crops to be covered include artichoke, asparagus, beans, beets, broccoli, Brussels sprouts, cabbage including Chinese varieties, cantaloupe, carrot, cauliflower, celery and celeriac, chicory, chives, cucumber, eggplant, garlic, kale, kohlrabi, leek, lettuce, marrow, mint, onion, parsley, parsnip, peas, peppers, potato, pumpkin, radishes, rhubarb, rutabaga, salsify, shallots, spinach, squash, sweet corn, Swiss chard, tomato, summer turnips and zucchini, as well as alfalfa and bean sprouts, fiddleheads, mushrooms including Pleurotus, spices, potherbs and condiments such as ginger and ginseng.

The overall arrangement of the publication is still open but there is agreement that it be grouped by crops, with the diseases and insect pests being listed first for each crop. For some insects, it may only be possible, or sufficient, to illustrate them photographically. Other insect pests will be treated to whatever extent is possible, in which case further details are now available for the format to be used when writing the text.

Contributors and other collaborators are still needed from all areas of Canada. Members and other interested persons are invited to contact Drs. R. S. Vernon (Vanc. Res. Sta.), W. J. Turnock (Wpg. Res. Sta.), R. P. Jaques (Harrow Res. Sta.), Guy Boivin (St. Jean Res. Sta.), L. S. Thompson (Charlottetown Res. Sta.), or J. A. Garland (ESC, Ottawa).

J. A. Garland
Chairman, ESC Steering Committee

LES MALADIES ET INSECTES NUISIBLES DES PLANTES POTAGÈRES DU CANADA

La Société a maintenant crée un comité directeur pour collaborer avec la Société canadienne de phytopathologie dans la preparation commune d'une publication intitulée Les maladies et insectes nuisibles des plantes potagères du Canada, ou plus brièvement "Les maladies et insectes des légumes au Canada."

La date finale pour terminer cette publication sera en 1989, ou au commencement de l'année 1990.

La liste des cultures couvertes par ce reportage inclut: l'ail, l'artichaut, l'asperge, l'aubergine, le betterave, le brocoli, le cantaloup, la carotte, le céleri et céleri-rave, les champignons incluant les Pleurotes, la chicorée, le chou incluant les variétés chinoises, le choux de Bruxelles, le chou feuillu, le chou-fleur, le chou-rave, la ciboulette, la citrouille, le concombre de champs et de serre, la courge zucchini et la courgette, les échalotes, l'épinard et l'épinard Suisse, les haricots (verts, grimpants, à rames, mange-tout, gourgane, fève de lima et fèverole), la laitue de champs et de serre, le maïs sucré, le melon d'eau et le melon musqué, la menthe, les oignons, le panais, le persil, le piment de champs et de serre, le poireau, les pois, le poivron doux, les pommes de terre, le radis incluant les types orientaux, la rhubarbe, les rutabagas incluant le navet d'été ou rabiole, le salsifis et la scorsonère, la tomate de champs et de serre, aussi bien que les pousses de la luzerne et les germes de haricots, les têtes de fougères (crosses de violon), des épices et herbes potagères, et des condiments comme le gingembre et le ginseng.

L'organisation en général de cette publication projetée n'a pas été choisie mais elle sera rangée définitivement par toutes les cultures représentées, avec les maladies et les insectes nuisibles dans une liste au commencement de chaque chapitre pour différent légumes. Dans le cas des quelques insectes rassemblés, il sera seulement possible ou suffisant, de les énumérés avec des photographies. Autrement, on propose que la publication contiendra des informations techniques dans la mesure du possible, dans ce cas les détails sont actuellement disponibles sur le format pour l'écriture du texte.

Le comité invite des membres ainsi que des autres entomologistes intéressés à collaborer, qui doivent faire parvenir leurs noms au Dr R.S. Vernon (Sta Rech, Vanc), Dr W.J. Turnock (Sta Rech, Wpg), Dr R.P. Jaques (Sta Rech, Harrow), Dr Guy Boivin (Sta Rech, St-Jean), Dr L.S. Thompson (Sta Rech, Charlottetown), ou Dr J.A. Garland (Bureau de la SEC, Ottawa).

J.A. Garland
Chef du comité directeur de la SEC

DISEASES AND INSECTS OF VEGETABLES IN CANADA

A joint publication
by the
Canadian Phytopathological Society
and the
Entomological Society of Canada

Tentative format for contributors for each disease or insect pest:

Production areas affected in Canada An account of the distribution of the disease or insect pest in the main areas of commercial production in Canada, with optional remarks about its wider geographic range and occurrence in greenhouses.

Life history An outline of the biology of the disease or insect pest in Canada, with remarks about regional differences and its biology in greenhouses.

Hosts A list of alternate, secondary or winter hosts of the disease or insect pest in Canada, including other crops and pathways for spread in commerce.

Field recognition A brief description of the appearance of the disease or insect pest in Canada, with a summary of diagnostic characters of value in the field, including photos or line drawings.

Damage symptoms An account related to the crop and plant parts (root, stem, leaf, bud, flower, fruitlet, green fruit and ripe fruit) affected by the disease or insect pest in Canada, including photos, with comments on seasonality.

Disease epidemiology/transmission For diseases, a list of known or suspected insect vectors in Canada; and, for insect pests, a list of diseases known to be transmitted throughout Canada.

Pesticide resistance An account of resistance of the disease or insect pest to groups of pesticides in Canada.

Management strategies An account of strategies used or recommended to avoid or reduce the disease or insect pest in Canada, with alternatives to a strict reliance on pesticides.

Monitoring procedures An account of techniques used to monitor for the disease or insect pest in Canada.

Control procedures A list of alternatives to chemical control of the disease or insect pest in Canada, with any biocontrol agents that have already been released.

Economic thresholds An account of procedures now used to establish the "spray trigger" for the disease or insect pest in Canada, with optional remarks about greenhouses.

LES MALADIES ET INSECTES DES LÉGUMES AU CANADA

Une publication commune
par
La Société canadienne de phytopathologie
et
La Société d'entomologie du Canada

Format tentative pour l'écriture pour chaque maladie ou insecte ravageur.

Régions de la production affectées Compte de la répartition de la maladie ou du ravageur dans les régions de la production principale au Canada avec remarques facultatives sur la répartition plus étendue et sur l'occurrence dans les serres.

Cycle biologique Compte rendu sur la biologie de la maladie ou du ravageur au Canada avec notes sur des différences régionales et sur la biologie dans les serres.

Plantes-hôtes Liste des hôtes alternatifs, peu importants ou de l'hiver pour la maladie ou du ravageur au Canada, incluant des autres cultures et les routes de la diffusion commerciale.

Reconnaissance Description brève de l'apparition de la maladie ou du ravageur avec un compte des traits d'une valeur diagnostique au champs, incluant photos ou illustrations.

Dégâts et symptômes Compte rendu des parties de la plante affligées (racine, tige, feuille, bouton, fleur, petit fruit, fruit vert et fruit mûr) avec la distribution saisonnier, incluant photos.

Épidémiologie/transmission Pour les maladies, compte des insectes transmetteurs connus ou soupçonnés au Canada. Pour les ravageurs, compte des maladies transmises partout dans le Canada.

Résistance Compte rendu par groupe des pesticides dans le cas de resistance manifestée par la maladie ou du ravageur au Canada.

Stratégies pour conduire Compte rendu des stratégies en fait ou recommandées pour éviter ou réduire la maladie ou du ravageur au Canada avec alternatives à la confiance rigide en pesticides.

Stratégies de surveillance Compte rendu des techniques en fait pour la surveillance habituelle de la maladie ou du ravageur au Canada, incluant des phéromones.

Stratégies de la lutte Compte rendu des alternatives de la lutte chimique contre la maladie ou du ravageur au Canada avec des agents déjà en fait pour la lutte biologique.

Tolérance économique Compte rendu des procédures en fait pour établir le besoin des pulvérisations contre la maladie ou du ravageur au Canada avec remarques facultatives concernant les serres.

INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE

Bulletin of Zoological Nomenclature, Volume 44 (1987) Parts 3 and 4

OPINIONS

Opinion 1448 *Dryophthorus* Germar, 1824 (Insecta, Coleoptera): conserved

Opinion 1449 *Cholus* Germar, 1824 (Insecta, Coleoptera): conserved

Opinion 1450 *Zygops* Schoenherr, 1825 (Insecta, Coleoptera): conserved

Opinion 1451 *Lachnopus* Schoenherr, 1840 (Insecta, Coleoptera): conserved

Opinion 1452 *Nemocestes* Can Dyke, 1936 (Insecta, Coleoptera): conserved and *Geoderces incomptus* Horn, 1876 designated as type species.

Opinion 1453 *Strongylaspis* Spaeth, 1936 and *Strongylocassis* Hincks, 1950 (Insecta, Coleoptera): *Cassida atripes* LeConte, 1859 designated as type species

Opinion 1454 *Nomadacris* Uvarov, 1923, (Insecta, Orthoptera): conserved

APPLICATIONS

Comment or advice on these applications is welcomed for publication in the *Bulletin* and should be sent to the Executive Secretary, ICZN, c/o British Museum (Natural History), Cromwell Road, London SW7 5BD, U.K.

***Chelonus* Panzer, 1806 (Insecta, Hymenoptera) and *Anomala* Samouelle, 1819 (Insecta, Coleoptera): proposed conservation**

C. van Achterberg
Rijksmuseum van Natuurlijke Historie, Postbus 9517, 2300 RA Leiden, The Netherlands

Abstract. The purpose of this application is to conserve the name *Chelonus* Panzer, 1806 for a braconid wasp. It is threatened by a junior subjective synonym, *Anomala* von Block, 1799, unused since its proposal, which is also a senior homonym of a large coleopteran genus, *Anomala* Samouelle, 1819. Conservation of the latter is also requested.

***Curculio assimilis* Paykull, 1792 (currently *Ceutorhynchus assimilis*; Insecta, Coleoptera): proposed conservation of the specific name**

Hans Silfverberg
Universitetets Zoologiska Museum, Entomologiska Avdelningen, N. Järnsvägsgatan 13, SF-00100, Helsingfors 10, Finland

Abstract. The purpose of this application is the conservation of the weevil name *Curculio assimilis* Paykull, 1792, a junior homonym of *Curculio assimilis* Fabricius, 1775 (unused since 1840). The former has long been considered the type species of *Ceutorhynchus* Germar, 1824 and the present author has requested in a previous application that it be formally designated as such (see BZN **36**: 252–256).

***Dytiscus cinereus* Linnaeus, 1758 (currently *Graphoderus cinereus*; (Insecta, Coleoptera): proposed replacement of neotype**

A. N. Nilsson
Department of Animal Ecology, University of Umea, S-901 87, Umea, Sweden

G. N. Foster
20 Angus Avenue, Prestwick, Ayrshire KA9 2HZ, Scotland

Abstract. The purpose of this application is to designate a suitable neotype for *Dytiscus cinereus* Linnaeus, 1758, a common water diving beetle. The previous specimen designated as neotype is actually a specimen of *Graphoderus bilineatus* (De Geer, 1774).

***Dytiscus ater* De Geer, 1774 (currently *Ilybius ater*) and *Dytiscus planus* Fabricius, 1781 (currently *Hydroporus planus*; Insecta, Coleoptera): proposed conservation of the specific names**

Anders N. Nilsson
Department of Animal Ecology, University of Umea, S-901 87 Umea, Sweden

Abstract. The purpose of this application is the conservation of the name *Dytiscus ater* De Geer, 1774 for a species of water diving beetle. It is threatened by *Dytiscus ater* Forster, 1771, an unused senior homonym of the De Geer name which is also an unused senior synonym of another commonly used beetle name, *Dytiscus planus* Fabricius, 1781 (currently *Hydroporus planus*).

***Parasigara* Poisson, 1957 (Insecta, Heteroptera): proposed confirmation of *Corisa transversa* Fieber, 1848 as type species**

Antti Jansson
Zoological Museum, P. Rautatiekatu 13, SF-00100 Helsinki, Finland

Abstract. The purpose of this application is the confirmation of the nominal type species of the waterboatman genus *Parasigara* Poisson, 1957 as *Corisa transversa* Fieber, 1848, despite a misidentification by Poisson.

***Dacus parallelus* Wiedemann, 1830 (currently *Anastrepha parallela*; Insecta, Diptera): proposed replacement of lectotype**

Allen L. Norrbom
Systematic Entomology Laboratory, USDA, c/o National Museum of Natural History, NHB 168, Washington, D.C. 20560, U.S.A.

Abstract. The purpose of this application is the replacement of the lectotype designation by Hardy (1968) for the fruit fly *Dacus parallelus* Wiedemann, 1830. The male syntype chosen by Hardy cannot be determined as to species, but it is not that traditionally called *parallelus*. To conserve usage it is requested that the female lectotype chosen later by Zucchi (1979) be made the valid designation.

***Pararatus* Ricardo, 1913 (Insecta, Diptera): proposed designation of *Pararatus ricardoae* Daniels, 1987 as type species**

G. Daniels
Department of Entomology, University of Queensland, St. Lucia, Queensland, Australia 4067

Abstract. The purpose of this application is to designate a type species for the robber fly genus *Pararatus* Ricardo, 1913 (family ASILIDAE) which, at present, has the misidentified type species *Blepharotes macrostylus* Loew, 1874. It is proposed that the new species *P. ricardoae* Daniels, 1987 be designated type species of *Pararatus*.

Glabellula Bezzi, 1902 (Insecta, Diptera): proposed designation of _Platygaster arcticus_ Zetterstedt, 1838, as type species

Neal L. Evanhuis

J. Linsley Gressitt Center, Department of Entomology, Bishop Museum, Honolulu, Hawaii 96817, U.S.A.

Abstract. The purpose of this application is to designate *Platygaster arcticus* Zetterstedt, 1838, as the type species of *Glabellula*, a genus of minute flies (family BOMBYLIIDAE), and to confirm that this generic name is a replacement name for *Platygaster* Zetterstedt, 1838.

ETHMIIDAE Busck, 1909 (Insecta, Lepidoptera): proposed precedence over AZINIDAE Walsingham, 1906

J. A. Powell

Department of Entomological Sciences, University of California, Berkeley, CA 94720, U.S.A.

Abstract. The purpose of this application is to conserve the long established and widely used moth family name ETHMIIDAE Busck, 1909. The older name AZINIDAE Walsingham, 1906, intended for some species now considered to be congeneric with the type genus of ETHMIIDAE, has not been used since its original publication.

JEUX LINNÉENS/LINNEAN GAMES

Jeux Linnéens à la Réunion annuelle de la Société d'entomologie du Québec

Chaque fois que j'ai la chance d'assister à la réunion annuelle de l'Entomological Society of America, je ne rate pas l'occasion d'assister aux traditionelles "Linnean Games." Animées par le très habile Skip Jubb, il s'agit d'un jeu qui met en vedette les étudiants des universités américaines. L'essence du jeu est similaire à celle de notre émission "Génie en herbes" (Canal 2, Radio-Canada, Montréal), à la différence que les questions ne sont que d'ordre entomologique.

Daniel Coderre, responsable de l'organisation de la prochaine réunion annuelle à Saint-Michel des Saints, s'est dit favorable à adapter ce jeu pour la prochaine réunion annuelle de la SEQ. Une des différences notable entre la version SEQ et celle de l'ESA, sera que chez nous les professionnels pourront affronter les étudiants et les amateurs. Ceci est en partie du au fait que nous n'avons pas les effectifs de l'ESA. Les membres de la Société d'entomologie du Canada désireux de participer à ce jeu mais qui ne pourront assister à la réunion annuelle peuvent le faire en dressant une liste de questions (et les réponses . . .) concernant les différents domaines connexes à l'entomologie, y compris l'acarologie, l'histoire de l'entomologie, la physiologie, la systématique, etc. Envoyez votre liste de questions au soussigné.

Linnean Games at the Entomological Society of Quebec

Every time I have the chance to attend the annual meeting of the Entomological Society of America, I do not miss the traditional Linnean Games. The students of several American universities participate in the game under the mastership of the skillful Skip Jubb. In essence, the game is similar to the popular TV quiz "Reach for the Top" (CBC 6, Montreal), but the questions are all related to entomology.

Daniel Coderre, responsible for the coming annual meeting of the Entomological Society of Quebec (at Saint-Michel des Saints, Sept. 1988) is willing to schedule a modified version of the Linnean Games. One sensible difference with the ESA edition is that students will play with (or against) professionals. This is partly because the ESQ do not have the membership of the ESA. Members of the Entomological Society of Canada who would like to participate in the game but will not be able to attend the meeting are invited to send their questions (and answers...). The questions may relate to all fields of entomology, including acarology, history of entomology, physiology, systematics, etc. Please send your questions to:

Charles Vincent
Station de recherches, Agriculture Canada
C.P. 457, Saint-Jean-sur-Richelieu
Québec J3B 6Z8
Tél. (514) 346-4494

PERSONALIA

Roy Ellis

Roy Ellis recently resigned as City Entomologist in Winnipeg to open a private consulting business, Prairie Pest Management. Specializing in urban pest management, he will conduct research on new methods, materials and equipment used in urban pest control; assist in designing and assessing pest management programs; and teach training seminars and courses for industry, government and universities.

Co-Winner — Best Graduate Student Paper (1987)

Scott Salom, currently a Ph.D. student in the Faculty of Forestry at U.B.C., was a co-winner of the Best Graduate Student Paper award at the E.S.C. meeting in Penticton in October, 1987. His paper was entitled "The influence of a host attractant and aggregation pheromone on the flight and attack behaviour of *Trypodendron lineatum* (Oliver) (Coleoptera: Scolytidae)."

BOOK REVIEWS

Miller, P. L. (plates by R. Lee) 1987. Dragonflies. Naturalists' Handbooks 7, Cambridge University Press, Cambridge, U.K., New York, etc. 84 pp. Hard cover, US $24.95.

Here is a terrific little book on the biology of dragonflies, the best I have seen in English that handles the subject briefly (yet with scientific detail) in a semi-popular style and format. Peter Miller is a zoology professor at Oxford, and he brings his extensive, up-to-date knowledge of dragonflies to the writing of this slender volume.

This is one of a series for naturalists, high school students, and others interested in biology who may have the "inclination to study natural history but lack the knowledge to do so in a confident and productive way," as the editors put it. The encouragement of, and suggestions for, amateur studies is a major accomplishment of the book. Also significant is the inclusion of new knowledge from very recent research, usually not the sort of thing found in such treatments.

About 60 percent of the book details dragonfly biology, and sections range from their aesthetic appeal to evolution, from thermoregulation to the structure of the wing and the dynamics of flight. Vision, feeding behavior, larval ecology, territorial behaviour, oviposition, and the new and fascinating discoveries concerning copulation and sperm competition are a few of the many topics discussed.

The rest of the text is a handbook to the British fauna, with illustrated keys to adults and larvae, colour plates of selected species, annotated checklists and diagrams of phenology. In addition, examples from British species are used to illustrate points raised in the general sections on biology. Although the book is aimed at the British reader, and only a little more than half the book is relevant to the North American student, those parts that are of general interest are lucid and useful, alone well worth the price of the whole book.

Line drawings accompanying the text are excellent. The plates are colorful, but technically leave something to be desired. The rendering of the wing venation, especially, is cumbersome; that combination of strength and delicacy characteristic of dragonfly wings is missing.

The book is rounded out by discussions of relevant techniques for field and home study; conservation topics are not omitted. Useful addresses for equipment, literature and activities are listed, and the reference list introduces the reader to literature ranging from introductory texts to original research papers.

The book is directed primarily at the student and amateur, but anyone wishing an introduction to a group of insects particularly suitable for studies in evolutionary biology, ecology, behaviour, and physiology cannot go wrong with this book.

Robert A. Cannings
Royal British Columbia Museum
Victoria, B.C.

Scott, J. A. 1986. The Butterflies of North America. Stanford University Press, Stanford, California. 583 pp.+64 color plates. Hard cover, US $49.95.

The purpose of this book is to provide complete natural history information for all the species of North American butterflies, including skippers. The preface presents it as an "original work" of "scientifically accurate form," which does not exclude anything that would be expected of a field guide. I find the book to be flawed as a scientific work, but of some value as a butterfly guide.

The book is divided into three parts. The first is a 110-page review of the biology of butterflies, which makes it more comprehensive than comparable sections of other field guides. The morphology, behavior and evolution of butterflies are explored in detail, while butterfly conservation receives short shrift. The second part, at 33 pages, is valuable and new. It includes keys to the subfamily level for first-instar larvae, mature larvae, and pupae of North America, as well as for adults worldwide. The third part includes all the species accounts and comprises the bulk of the book. Small range maps are conveniently placed in the margin beside the text. Identification is aided by 64 excellent color plates, including 5 of immature stages. A useful subject index and hostplant list, and a somewhat idiosyncratic glossary, are included at the back.

This book is replete with information, much of it new. Unfortunately that information is not fully accessible. The references consist of peoples' names sprinkled through the text, with only a token attempt at a bibliography. Scientific names reveal a strong bias toward lumping, both at the species and genus level. This is by no means a bad thing in the present climate of nomenclatorial inflation, but it means that people unfamiliar with the names will have to work hard at sorting out how they correspond to those used in other books. Many of the common names for butterflies are newly coined and hence redundant to pre-existing ones, which simply contributes to the confusion. The longer species accounts are difficult to read, with a single paragraph often extending over more than a page of text. The numbering system of plates and some figures takes a while to sort out. In short, Scott's book is not easy to use, though it does include more natural history information than any other.

The scientific value of The Butterflies of North America is substantially less than it could have been. Though I suspect that many of Scott's new taxonomic cchanges are sound, he provides far too little background for anyone to judge most of the examples for themselves. Without proper references, we just have to trust Scott's judgement. This may be standard form for field guides, but it may also be the main reason butterfly names have become such a nomenclatorial morass. There are similar problems with the laboriously compiled lists of hostplants and other ecological information. Perhaps it is not too late to issue a complete bibliography as a supplement?

I recommend The Butterflies of North America for libraries and people with a serious interest in the subject, but not for anyone just starting to get interested in butterflies.

Felix Sperling
Ecology & Systematics, and Entomology
Cornell University, Ithaca, N.Y.

Harris, A. C. 1987. Fauna of New Zealand No. 12. Pompilidae (Insecta: Hymenoptera). DSIR Science Information Publishing Centre, Wellington, New Zealand. 154 pp. Soft cover, US $39.95.

This treatment of the New Zealand spider wasps is a remarkably complete account of the eleven species occurring there. Based on the author's observations, rearings and collection of 30,500 specimens from all regions of the country, the topics of morphology, geographical variation, mimicry, nesting behaviour, faunal relationships and evolutionary relationships are considered. In addition the author presents keys to genera and species for adults and larvae, and provides a key to species based on adult nesting behaviour. Descriptions of adult males and females, descriptions of final-instar larvae, variation within species, biology and distribution maps are presented for each species. Colour variation is presented using graphic illustrations coupled with maps indicating collection sites of the respective variants. The biogeography of species and variants are discussed with respect to past and present geographical barriers.

One of the strengths of this book is its organization, allowing for quick reference and comparison of any of its sections. In the section on biology, for each species, the author considers hunting behaviour, paralysis, prey carriage, nest construction and structure, life history, and cocoons as well as emergence and copulation. A nidification formula is provided for each species and a table listing host records for the New Zealand species is provided. The author's use of behavioural characters to supplement morphological charcters when discussing relationships is commendable. The keys are well written with the appropriate illustration appearing opposite its respective couplet. In addition to those illustrations used to supplement the keys, there are 236 illustrations or photographs depicting morphology, behaviour and nest structure.

This book is recommended for systematists and students of behavioural ecology both for its content and as a model for presentation of systematic in combination with behavioural data.

Albert T. Finnamore
Invertebrate Zoology
Provincial Museum of Alberta
Edmonton, Alberta

Julien, M. H. (Ed.). 1987. Biological Control of Weeds. A World Catalogue of Agents and their Target Weeds. 2nd ed. CAB Wallingford, UK. 150 pp. Order from CAB International Sales Div., Wallingford, Oxon, OX10 8DE (UK). Soft cover, US $23.50.

One reason for the rapid expansion of biocontrol of weeds around the world is "Julien's Catalogue." It includes a sentence or two by country on the impact of each agent that has been tried, on the research organization involved and major references. The second edition is a third larger than the first (published 1982) and includes new agents, synonyms of both agent and weed, and the text is easier to scan and read. It is an essential reference for those in biocontrol of weeds and for others researching impacts or the reasons why some projects are more successful than others. Oh for something similar on the biocontrol of insect pests!

The inevitable problem in a catalogue of this type is being current. The Canadian entries reflect the situation of 1985; but there have been dramatic changes since. For example, the leafy spurge flea beetle, *Aphthona nigriscutis*, is listed as "not established in Manitoba." However, by 1987 there were 287 beetles/m^2 at the release site and the density of flowering spurge stems had declined by over 90%. Similarly the fungus *Colletotrichum gloeosporioides* f. sp. *malvae*, which is in the registration process for the control of mallow in Canada, is not listed. To obtain the latest information on any current project, start with the catalogue and then check with the research organization.

Peter Harris
Agriculture Canada Research Station
Regina, Saskatchewan

Brent, K. J. and R. K. Atkin (Eds). 1987. Rational Pesticide Use. Cambridge University Press, Cambridge, New York, Melbourne. 348 pp. Hard cover, US $49.50.

This book is a collection of 24 papers presented at the Ninth Long Ashton Symposium — 'Rational Pesticide Use'. The editors have selected their contributors and subject matter with care such that the book represents a coherent logically organized view of pesticides. The subject matter focuses primarily on European research and covers herbicides, fungicides and insecticides.

The book has been divided into four major sections: 1) pesticides and their relation to the environment (5 papers), 2) pesticide application technology (5 papers), 3) resistance management (5 papers), and 4) forecasting and pest management (9 papers). It also contains a fascinating inaugural lecture by D. Willis looking at the 'Natural Selection Factors Affecting Pesticide Development and Usage'.

This book would be of value to any entomologist involved with insecticides, resistance management, integrated pest management and pesticide regulatory affairs. Since many of the contributors are plant pathologists, weed scientists, economists and system scientists it provides a holistic evaluation of the rational use of pesticides.

Perhaps the greatest value of the book is that it provides a perspective on how non-entomologists are approaching the concept of rational pesticide use including diverse topics such as Decision Theory and the Economics of Crop Protection, and Rationality in Pesticide Use and the Role of Forecasting. Chapters examine social and psychological factors (i.e. risk analysis by farmers) that affect the rational use of pesticides. I personally found the book valuable primarily because of the diversity of the authors and the topics traditionally not considered by entomologists.

G. A. Surgeoner
Department of Environmental Biology
University of Guelph
Guelph, Ontario

Barbosa, T. and J.C. Schultz (Eds). 1987. Insect Outbreaks. Academic Press, San Diego, Toronto, etc. 578 pp. Hard cover, US $75.

Insect pest populations that reach unusually high levels at intervals produce "outbreaks", the subject of this interesting book. The book endeavours to review relevant literature in order to present new ideas and syntheses that might stimulate advances in thinking and experimentation. Therefore, its 20 chapters contain as much speculation and dissent as observation and analysis.

Several chapters introduce the theory and background of outbreaks, and several others consider outbreaks in relation to community structure, especially as this may differ between natural and man-made systems. Various authors then examine possible reasons for outbreaks (including weather, pathogens, parasitoids and predators, host-plant nutrition, drought stress, and induced host-plant resistance). Finally, several chapters discuss evolutionary perspectives related to host-plant use, phenotypic plasticity, genetic change and ecological strategies. A few of the discussions introduce simple mathematical models.

The chapters, as in all multi-author volumes, differ in approach and in the amount of real content — ideas or facts — that they contain (I found a few chapters to be very disappointing). Collectively, however, they provide a valuable synopsis of available hypotheses for outbreaks, including some of the weaknesses of existing theories and the limitations of previous experimental approaches. From this synopsis the reader becomes aware that substantial amounts of information have been collected for relatively few species. Even when extensive and long-term studies have been made on a species, moreover, very few unassailable conclusions emerge. The reader will probably conclude that one or more of a wide range of factors might therefore be responsible for the outbreak of a given species in a given time or place. Consequently, a broader view of ecosystems, advanced here for example in a chapter on "non-outbreak" forest Lepidoptera, is especially valuable.

The chapters contain about 40 to 280 references each, so that the book serves also as a very useful bibliography. Subject and taxonomic indexes are provided. Errors, chiefly minor typographical ones, are infrequent enough not to detract appreciably from the book, although the taxonomic index has more than its share of misspellings (and one table places the moth *Manduca sexta* in the Orthoptera).

Readers who hope to find clear explanations for outbreaks will be disappointed. However, the fact that we cannot yet explain these events satisfactorily challenges us to understand outbreak species as part of complex ecological and insect-plant systems. This book helps to clarify the challenge. Most ecologists, and many entomologists interested in insect-plant relationships, will find it useful.

H. V. Danks
Biological Survey of Canada
(Terrestrial Arthropods)
National Museum of Natural Sciences
Ottawa

Weiderholm, T. (Ed.). 1987. Chironomidae of the Holarctic region. Keys and diagnoses. Part 2. Pupae. Entomologica Scandanavia Supplements. Sandby, Sweden. 482 pp. US $73.

Chironomid pupae have been neglected in the past mostly because entomologists could not put names on them. Recent works demonstrated that not only were the pupae useful in the study of the taxonomy of the family, but they could also be used as well in ecological or phenological studies, or in monitoring water quality. Biologists, aquatic entomologists, and taxonomists will be delighted to see this second volume of a series of three. The first dealt with the larvae, the present one treats the pupae, and the third will describe the adults.

This book is of medium-sized format and has an attractive yellow hard cover. The text is printed on good glossy paper. Its presentation was obviously carefully done. The judicious utilization of bold face, capitals and other typography facilitates the access to different parts of the text, and makes reading pleasant. The illustrations are excellent, numerous, and grouped alphabetically at the end of each chapter. There is a plate for each genus treated in the book, except when material was not available for study. Galley proofs were evidently meticulously read since mistakes are very rare. The book is divided into 12 chapters: 3 chapters for introduction, references, and index, and 9 for the taxonomic treatment of subfamilies.

The introduction gives a short historical review and summarizes important and ecological features of the pupae. The potential of the pupae in taxonomic and ecological studies is also briefly pointed out. A few paragraphs explain the scope of the book. Users may be upset by the lack of a glossary and will have to refer to a previous paper written by a contributor. I understand that tight restrictions are usually imposed on the preparation of such books, but I believe that a few pages devoted to a glossary would have contributed significantly to this work.

Chapter 2 corresponds to the subfamily key. The key will appear forbidding to the non-expert due to the length of couplets and the specialized terminology. As explained by the authors, couplets are necessarily long because several taxa, in different subfamilies, superficially resemble one another.

Chapters 3 and 4 describe rare genera (Telmatogetoninae and Podominae) which are easily recognized simply with the aid of the illustrations.

The Tanypodinae of Chapter 5 get more complicated with 48 genera 3 keyed out, and additional keys to subgenera and species-groups in the large genus *Procladius*. The extensive use of characters of the thoracic horn and of the anal lobes stresses the importance of meticulous preparation of specimens. The common use of the "male genital sac" in the last part of the key involves a preliminary accurate sexing of the pupae, not explained in the book but discussed in the separate paper on the pupal terminology.

There is only one genus in the rare Buchonomyiinae (Chapter 6), which are easily recognized by its unusual habitus.

In the Diamesinae (Chapter 7), a key to the world tribe is given, in addition to the usual generic key.

The Prodiamesinae (Chapter 8), another small subfamily with only 4 genera (1 still unknown), should not create special problems.

The main achievement of this book is found in Chapter 9, on the Orthocladiinae, the largest subfamily. Seventy-three genera are treated (14 unknown), plus several keys to subgenera and species-groups. The authors deserve my admiration for this excellent synthesis of previous works and new data. The numerous couplets of the key (125) are surprisingly concise for such a diverse group. Users should be pleased to see for the first time a whole view of this important subfamily with many terrestrial genera.

Chapter 10 covers the Chironominae, a large subfamily (67 genera treated), particularly difficult to key out. Fortunately, crosschecking of the key with diagnoses and illustrations helps the user to get to the right answer.

References are listed in Chapter 11. The index (Chapter 12) includes all taxa treated in the book.

There is no doubt that this important contribution adds to the list of classical works in entomology. General entomologists, biologists, and ecologists should have it in their personal library. At $73.00 US the price is fair for a book of this quality with hard cover, good paper quality, and numerous illustrations.

L. LeSage
Biosystematics Research Centre
Ottawa
K1A 0C6

BOOK NOTICES

Schefter, P.W. and G.B. Wiggins. 1986. A Systematic Study of the Nearctic Larvae of the *Hydropsyche morosa* group (Trichoptera: Hydropsychidae). R. Ont. Mus. Life Sci. Misc. Publ. 94 pp. Soft cover, $14.25.

This publication develops a system of taxonomic characters based on primary and secondary setae of caddisfly larvae of the *Hydropsyche morosa* (formerly *bifida*) group. Larval chaetotaxy appears to be less variable geographically than the traditional characters of colour, and is generally concordant with adult genitalic characters. Diagnoses of final instar larvae of 23 North American species (3 of them unnamed) are provided; seven species remain unassociated in the larval stage. Distributions are reported and a key to larvae is given. 87 figures illustrate salient characters.

Culot, J. 1917–1920, reprinted 1987. Noctuelles et géomètres d'Europe. 2. Géomètres, vols. III, IV. Reprint edition: Apollo books, Lundbyvej 36, DK-5700, Svendborg, Denmark. Vol. III, 269 pp.+37 col. pl.; vol. IV. 167 pp.+33 col. pl. Hard cover, DK 1.380,00 (vols. III-IV) [Vols. I-II (Noctuelles) are available for DK 1.380,00 and the complete set for DK 2.550,00.].

This reprinted edition provides the text and colour plates of a work long unavailable but still very valuable for reference, especially because of the numerous plates. The present volumes cover the geometrids, the Geometrinae, Sterrhinae and a large part of the Laurentinnae in vol. III, and the remainder in vol. IV: 1403 half-specimens are illustrated in colour.

NEW JOURNAL

Journal of Production Agriculture, vol. 1, no. 1, Jan.-Mar. 1988, pp. 1-92. Published by the American Society of Agronomy, the Crop Science Society of America and the Soil Science Society of America (ASA, CSSA, SSSA, 677 South Segoe Road, Madison, Wisconsin 53711.) Outside U.S.A., US $33.00 per year.

The Journal of Production Agriculture offers production-orientated information from a variety of agricultural fields, including agronomy, crop science, soil science, economics, forages, pastures, animal science, range management, weed science, plant pathology, horticulture, forestry and entomology. The journal appears 4 times per year. It will include original research, reviews, book reviews, and other items. Of entomological relevance in the first issue are one paper related to insect resistance and one on pesticide regulations.

ENTOMOLOGICAL SOCIETY OF CANADA
LA SOCIÉTÉ D'ENTOMOLOGIE DU CANADA
Executive Council-Conseil Exécutif

Trustees-Fiduciaires

Directors-Administrateurs

Contributions and correspondence regarding the Bulletin should be sent to: R. B. Aiken, Department of Biology, Mount Allison University, Sackville, N.B. E0A 3C0. Telephone (506) 364-2509. Inquiries about subscriptions and back issues should be sent to the Entomological Society of Canada, 1320 Carling Avenue, Ottawa, Ont. K1Z 7K9.

Bulletin Deadline

The deadline for the next issue, Vol. 20, No. 3 is July 15, 1988.

OFFICERS OF AFFILIATED SOCIETIES

Entomological Society of British Columbia

President:	B. Roitberg
President-Elect:	M. Isman
Secretary-Treasurer:	L. Humble, Biology Department, University of Victoria, Victoria, B.C. V8W 2Y2
Editor (Journal):	H. R. MacCarthy
Regional Director to ESC:	I. Otvos

Entomological Society of Alberta

President:	C. R. Hergert
Vice-President:	G. Pritchard
Secretary:	J. Acorn, Department of Entomology, University of Alberta, Edmonton, Alta. T6G 2E3
Treasurer:	G. Hilchie
Editor (Proceedings):	E. Mengerson
Regional Director to ESC:	J. Spence

Entomological Society of Saskatchewan

President:	K. Moore
Vice-President:	D. Peschken
Secretary-Treasurer:	G. B Neill, PFRA Tree Nursery, Indian Head, Saskatchewan S0G 2K0
Editor (Proceedings):	D. Peschken
Regional Director to ESC:	P. W. Riegert

Entomological Society of Manitoba

President:	N. J. Holliday
President-Elect:	D. Dixon
Secretary:	N. D. G. White, Agriculture Canada Research Station, 195 Dafoe Road, Winnipeg, Manitoba R3T 2M9
Treasurer:	G. H Gerber
Editor (Proceedings):	I. Askevold
Regional Director to ESC:	J. C. Conroy

Entomological Society of Ontario

President:	R. P. Jaques
President-Elect:	H. Goulet
Secretary:	R. C. Plowright, Department of Zoology, University of Toronto, Toronto, Ont. M5S 1A1
Treasurer:	S. A. Marshall
Managing Editor (Proceedings):	P. G. Kevan
Regional Director to ESC:	R. P. Jaques

Société d'entomologie du Quebec

Président:	C. Vincent
Vice-Président:	R. M. Duchesne
Secrétaire:	M. Mailloux, 472, rue Maisonneuve, St-Jean-sur-Richelieu, Qué. J3B 1G2
Trésorier:	C. Bouchard
Editeur (Revue d'entomologie du Québec):	D. J. Lewis
Representant à la SEC:	C. Vincent

Acadian Entomological Society

President:	E. Osgood
Vice-President:	D. Moirs
Secretary-Treasurer and Editor:	H. W. Houseweart, College of Forest Resources, 227 Nutting Hall, University of Maine, Orono, Maine 04469
Regional Director to ESC:	D. Larson