

Bulletin

Entomological Society of Canada
Société d'entomologie du Canada

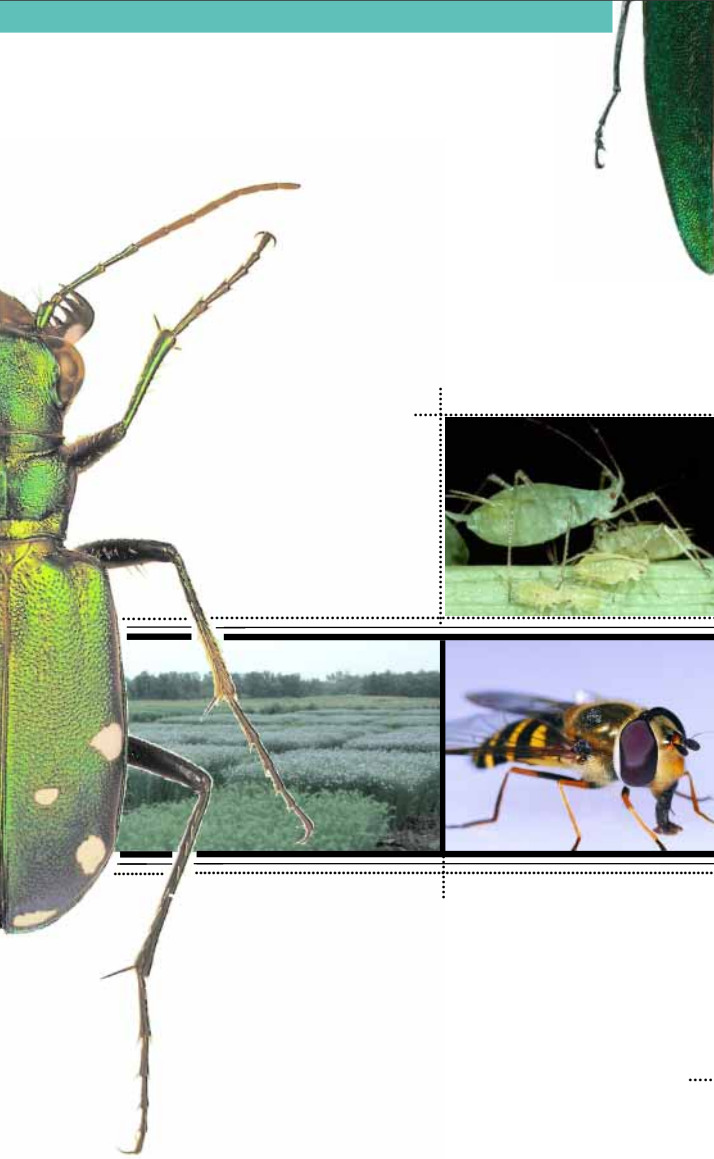
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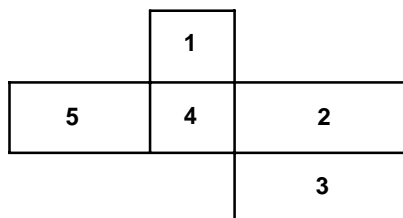
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P. MacKay

Ah, the pleasures of Ottawa in spring!

The mid-term Executive meeting of ESC was the reason for my trip to Ottawa. Leaving Winnipeg in the third week of April was difficult this year: the weather was beautiful, wildflowers were blooming in the garden, mourning cloak and Crompton's tortoiseshell butterflies were about. Ottawa, on the other hand, was 5°C with heavy rain. Of course that didn't stop your faithful executive, pictured hard at work in the ESC office at 393 Winston Avenue. Many of you may not have seen our office building in Ottawa, a renovated house which we own. Office Manager Alexandra (Sandy) Devine and Treasurer Pat Bouchard share desk space on the ground floor with shelf after shelf of ESC publications. The space is not posh, but well laid out, and effectively used. The second floor is an apartment which we rent to an entomologist, to help defray maintenance costs.

Our meeting on Saturday April 23 provided an opportunity to review the audited statement of our ESC finances for 2004, as presented by Pat Bouchard. I know Sandy and Pat have been very busy over the past few weeks assuring that the statement would be ready. Pat has also provided the Executive with very useful retrospective summaries of the financial picture of ESC, to help with the Strategic Review and general financial planning. 2004 was another good year for the finances of ESC, with our net assets rising substantially. Although we may be tempted to take our good financial situation for granted, that would

Ah, les plaisirs d'Ottawa au printemps!

Je me suis rendu à Ottawa pour la réunion de mi-session du Conseil exécutif de la SEC. Quitter Winnipeg durant la troisième semaine d'avril a été difficile cette année : la température était magnifique, les jardins étaient remplis de fleurs sauvages et les papillons comme le morio et la vanesse volaient déjà. À Ottawa par contre, il faisait 5°C avec de fortes pluies. Bien sûr, ça n'a pas arrêté votre dévoué Conseil exécutif de se mettant au travail au bureau de la SEC, situé au 393 avenue Winston. Plusieurs d'entre vous n'ont jamais visité notre bureau à Ottawa, aménagé dans une maison rénovée qui appartient à notre société. Notre gestionnaire de bureau, Alexandra (Sandy) Devine et notre trésorier Pat Bouchard y partagent un espace de travail au rez-de-chaussée, parmi les nombreuses étagères remplies des publications de la SEC. L'endroit n'est pas très luxueux, mais bien aménagé et fonctionnel. Au deuxième étage, on retrouve un appartement que nous louons à un entomologiste, afin de nous aider à défrayer les coûts d'entretien.

La réunion du samedi 23 avril nous a donné l'occasion de revoir les états financiers de la SEC pour l'année 2004, tels que présentés par Pat Bouchard. Je sais que Sandy et Pat ont été très occupés durant les dernières semaines à s'assurer que les états seraient prêts à temps. Pat a aussi fourni au comité exécutif une rétrospection des finances de la SEC, laquelle a été très utile pour la révision stratégique et la planification financière en général. L'exercice financier 2004 a été bon pour la SEC, puisque nos actifs nets ont augmenté de façon substantielle. Même s'il est tentant de prendre notre bonne situation financière pour acquis, ce serait une erreur de le faire. Plusieurs d'entre nous se souviennent des moments où des événements inattendus ont engendré des déficits, quoique temporaires, à la SEC. Récemment, nous nous sommes inquiétés des conséquences financières de la baisse du nombre d'adhésions et des abonnements institutionnels pour *The Canadian Entomologist*, ces derniers constituant notre principale source



Charles Vincent

The Head Office of the Entomological Society of Canada in Ottawa with Gary Gibson and Office Manager, Alexandra Devine. Le siège social du Société d'entomologie du Canada à Ottawa, avec Gary Gibson et Alexandra Devine, le gestionnaire de bureau.

be a mistake. Many of us remember the days when unexpected events put ESC into deficit, albeit temporarily. Lately, we have been concerned about the financial implications of declining memberships and institutional subscriptions for *The Canadian Entomologist*, the latter being our chief source of revenue. Some advocate an increase in membership dues, which have been static for a decade. We can now safely defer any thought of an increase until after the completion of our Strategic Review, because of our solid financial position in 2004.

As an example of how membership dues translate into membership benefits, the total revenue accruing from membership just exceeds the cost of publishing the *Bulletin*, although Paul Fields has done a remarkable job of reducing the publication costs of the *Bulletin* over the past couple of years. In other words, your membership buys you a great *Bulletin*; ESC throws in *The Canadian Entomologist*, the Annual Meeting, the scholarships and travel grants, the Achievement Awards, the grants for public education provided to the regional societies, etc., etc., gratis. Of course this

de revenus. Certains plaidaient en faveur d'une hausse des frais d'adhésion qui sont restés stables depuis dix ans. Nous pouvons maintenant mettre sur la glace toute intention d'une hausse des prix jusqu'à ce que la révision stratégique soit achevée, grâce à notre solide état financier de 2004.

Paul Fields ayant fait un travail incroyable afin de réduire les coûts de publication du *Bulletin* durant les dernières années, les revenus provenant des adhésions viennent tout juste de dépasser les coûts de publication du *Bulletin*. Ceci montre comment les frais d'adhésion se traduisent en avantages pour les membres. En d'autres termes, votre adhésion couvre le superbe *Bulletin* tandis que la SEC vous donne *The Canadian Entomologist*, l'assemblée annuelle, les bourses d'études et de voyage, les prix d'excellence, les bourses pour l'éducation du public remises aux sociétés régionales, etc. Évidemment, cette utilisation incroyablement efficace de vos frais ne pourrait être possible sans le travail bénévole de plusieurs d'entres vous. Je dois cependant dire que le fardeau de nos bénévoles enthousiastes augmente sans cesse avec la baisse des adhésions, puisque

amazingly efficient use of your dues would not be possible without the volunteer labour that many of you contribute. I have to say, however, that the burden on our enthusiastic volunteers continues to rise as our membership declines, simply because the work is spread over fewer and fewer members.

I use the *Bulletin* as an example of a membership benefit because I am hearing a great deal of positive feedback on our *Bulletin*. Congratulations to Editor Paul Fields and Assistant Editor Lucie Royer for expanding the content of the *Bulletin* so dramatically, and finding such interesting contributors. Of course the authors, cartoonists and photographers also deserve our thanks, for generating such novel, entertaining and insightful contributions. Back in Winnipeg yesterday (April 27) I ran into a long-term, now emeritus member whom I hadn't seen in some time. He still subscribes to the *Bulletin*, to keep in touch. His first comment was: "The March issue is the best I have ever seen". I agree. Paul has a special knack for cajoling entomologists to provide really interesting contributions, and filling in himself with articles of use to entomologists. Paul also went to considerable effort to harmonize the cover of the *Bulletin* with the new cover designed for *The Canadian Entomologist*. Thanks to Sandy Devine for her suggestion that we mail out a paper copy to all members, at the first appearance of our new cover. The complete mailing cost a little more, but featuring the changes in the *Bulletin* was worth the extra cost. Another colleague now employed outside of entomology told me that it took her a moment to figure out what this new flashy magazine was when it arrived at her residence.

I am sure you recognize the amount of work that goes into producing a publication like our *Bulletin*, especially when it has undergone a major revamping of format and content. We can't expect our members to contribute their time to such a project indefinitely, especially considering the workloads many entomologists are experiencing in their day jobs. On behalf of ESC, I would like to thank Assistant Editor Lucie Royer who has decided to step down. Also, Editor Paul Fields advises us that he would like to be re-

le travail est partagé entre de moins en moins de membres.

J'utilise le *Bulletin* comme exemple d'avantage pour les membres puisque j'entends beaucoup de commentaires positifs sur notre *Bulletin*. Félicitations à Paul Fields, rédacteur, et à Lucie Royer, rédactrice adjointe pour avoir amélioré de façon incroyable le contenu du *Bulletin* et pour avoir trouvé des contributeurs intéressants. Évidemment, les auteurs, dessinateurs et photographes méritent tout autant nos remerciements pour avoir généré de nouvelles contributions divertissantes. De retour à Winnipeg hier (le 27 avril), j'ai rencontré par hasard un membre de longue date, maintenant émérite, que je n'avais vu depuis longtemps. Il est toujours inscrit au *Bulletin*, question de rester en contact. Son premier commentaire a été : " Le numéro de mars est le meilleur que j'ai vu ". Je suis d'accord. Paul a un don tout particulier pour convaincre les entomologistes de fournir des contributions vraiment intéressantes et pour ajouter lui-même des articles pertinents pour les entomologistes. Paul a également fait des efforts considérables afin d'harmoniser la couverture du *Bulletin* avec la nouvelle couverture de *The Canadian Entomologist*. Merci à Sandra Devine pour sa suggestion d'envoyer une copie imprimée du premier numéro avec notre nouvelle couverture à tous les membres. L'envoi a coûté un peu plus cher, mais la présentation des changements du *Bulletin* en valait le coût. Une autre collègue, maintenant à l'emploi à l'extérieur de l'entomologie, m'a dit qu'il lui avait fallu un moment avant de réaliser ce qu'était ce nouveau magazine voyant quand il est arrivé chez elle.

Je suis certain que vous réalisez la quantité de travail nécessaire pour arriver à une publication telle que notre *Bulletin*, spécialement quand il a subit une aussi grande métamorphose du format et du contenu. Nous ne pouvons demander à nos membres de contribuer de leur temps indéfiniment dans un tel projet, spécialement en considérant les nombreuses tâches que beaucoup d'entomologistes ont déjà dans leur travail de tous les jours. Au nom de la SEC, je voudrais remercier la rédactrice adjointe, Lucie Royer, qui a décidé de se retirer. De plus, Paul Fields, le rédacteur, nous a prévenu qu'il voudrait être remplacé en

placed in 2006, certainly by the end of the year. I suspect that the revamped *Bulletin* will require much less work for the next editorial team, than it did for Paul and Lucy. I hope that some of you will consider coming forward to take over editorial duties. I know Paul will help ease the transition.

Back at the crowded table of the Executive meeting last Saturday, we had a productive day. Rick West did his usual effective job of keeping us on track, to finish in a timely way, and quickly provided comprehensive but focussed minutes. He also managed to sell most of us his latest compact disc of Newfoundland music, which I can recommend highly. I am a bit surprised that he hasn't yet brought his bodhran to the meeting.

An important area for discussion was the Strategic Review. The sub-committees, all chaired by executive members, hope to finish much of their deliberations and provide some concrete recommendations by the next Board Meeting in Canmore. I invite you to send us your thoughts on how to guarantee the future of the ESC. Please refer to the March *Bulletin* for information on the committee structure and contact persons. Feel free to send your ideas directly to me if you wish, and I will pass them along. An early activity was to document key measures of health for ESC (Table 1) with the help of various committee chairs. As

2006, probablement pour la fin de l'année. Je suspecte que le *Bulletin* métamorphosé demandera beaucoup moins de travail pour la nouvelle équipe éditoriale qu'il en a fallu pour Paul et Lucie. J'espère que certains d'entre vous considèrerez de vous impliquer dans certaines tâches éditoriales. Je sais que Paul aidera à faciliter la transition.

Pour revenir à notre réunion du Conseil exécutif samedi dernier, nous avons eu une journée bien productive. Rick West a accompli sa tâche habituelle consistant à nous garder sur la bonne voie, tout en étant compréhensif et efficace, afin de terminer le tout dans les temps. Il s'est également organisé pour vendre à la majorité d'entre nous son dernier disque compact de musique de Terre-Neuve, que je vous recommande d'ailleurs. Je suis plutôt surpris qu'il n'ait pas encore apporté son bodhran à la réunion.

Une partie importante de la discussion a porté sur la révision stratégique. Les sous-comités, tous présidés par des membres du Conseil exécutif, espèrent terminer la plupart de leurs délibérations et fournir des recommandations concrètes pour la prochaine réunion du Conseil d'administration à Canmore. Je vous invite à nous envoyer vos opinions sur la façon d'assurer l'avenir de la SEC. Veuillez consulter le *Bulletin* de mars pour les informations sur la structure des comités et les personnes à contacter. Vous pouvez également

m'envoyer directement vos idées, et je les communiquerai aux personnes concernées. Une des premières étapes était de documenter des éléments de mesure de la santé de la SEC (table 1) avec l'aide des différents présidents de comité. Comme vous pouvez le constater, les finances sont positives, nos réunions conjointes annuelles prospèrent, et *The Canadian Entomologist* continue d'attirer des articles de recherche de qualité. Nos seules inquiétudes sont pour les adhésions et les abonnements institutionnels. Ces deux aspects des affaires de la société seront particulièrement examinés dans la révision, de pair avec les implications de la technologie de l'information. Nous réalisons à quel point les



Bob Lamb / Rick West

The midterm ESC Executive meeting, April 2005. La réunion de mi-session du Conseil exécutif de la SEC, avril 2005. From the left, de la gauche; Dan Quiring, Peggy Dixon, Charles Vincent, Bob Lamb, Rick West, Patrice Bouchard.

you can see, finances are positive, our joint annual meetings are thriving, and *The Canadian Entomologist* continues to attract quality research papers. Only our membership and institutional subscriptions are a worry. These two aspects of society business will be a particular focus of the review along with the implications of information technology. We realize how intricately membership, finances and information technology are inter-related.

Many suggestions and comments have been made:

- Should we increase membership dues to stabilize future finances, and would an increase reduce membership?
- Should we increase institutional subscriptions to *The Canadian Entomologist*, considering that our subscriptions are about half or less those of other similar journals?
- Would a substantial decrease in page charges for members increase membership? If so, how

adhésions, les finances et les technologies de l'information sont inter-reliés.

Plusieurs suggestions et commentaires ont été faits :

- Devons-nous augmenter les frais d'adhésion pour stabiliser les finances dans le futur, et est-ce qu'une telle hausse va diminuer le nombre d'adhésion?
- Devons-nous augmenter les frais d'abonnements institutionnels à *The Canadian Entomologist*, considérant que nos frais sont environ la moitié de ceux des autres revues similaires?
- Est-ce qu'une baisse substantielle des frais de publication par page augmenterait le nombre d'adhésions? Si oui, comment pourrions-nous remplacer les revenus apporter par les frais de page et est-ce que notre groupe de rédaction pourrait faire face à un plus grand influx d'articles?
- Est-ce qu'une baisse des frais par page augmenterait le nombre de pages dans la faune entomologique canadienne, ce qui est clairement un objectif, ou est-ce qu'il en résulterait plutôt une

Table 1. Summary statistics on The Entomological Society of Canada for the past decade, as of April 2005. The data columns are: the calendar year, the number of members, the number of institutional subscriptions for *The Canadian Entomologist* (TCE), the number of pages in the volume of TCE for that year, the Thomson ISI rank and impact factor of TCE relative to other similar journals, attendance at our joint annual meeting, and the annual change in ESC's net worth. Note that both members and subscriptions for 2005 will likely rise by the end of the year, perhaps to 2004 levels.

Table 1. Résumé des statistiques pour la Société d'Entomologie du Canada durant les dix dernières années, jusqu'en avril 2005. Les colonnes de données sont : l'année budgétaire, le nombre de membres, le nombre d'abonnements institutionnels pour *The Canadian Entomologist* (TCE), le nombre de pages par volume dans TCE pour l'année, la cote d'impact Thomson et le rang ISI pour TCE relativement aux autres revues similaires, la participation à notre réunion conjointe annuelle et les changements annuels de la valeur nette de la SEC. Notez que le nombre de membres et les inscriptions pour 2005 vont probablement augmenter d'ici la fin de l'année, peut-être aux niveaux de l'année 2004.

Year	Members	Subscriptions	TCE Pages	ISI rank	ISI impact	Attendance	Annual net gain (\$)
Année	Membres	Abonnement	Pages TCE	Rang ISI	Côte ISI	Participation	Gains annuels net
Source	Sweeney	Devine	TCE	Vincent	Vincent	Shore	Bouchard
2005*	439	426					
2004	475	490	891			237	55,153
2003	518	496	918	31	0.67	300	8,204
2002	519	519	854	33	0.55	200	34,302
2001	566	539	895	32	0.59	279	69,782
2000	591	543	985	35	0.53	ESA/ESC	65,867
1999	526	558	839	24	0.71	155	24,412
1998	548	610	906	24	0.71	318	
1997	553	653	1179	22	0.48	257	
1996	595	696	1237			200	
1995			980			300	

* as of April

would we replace the page charge revenues, and could our editorial group cope with an influx of papers?

- Would reduced page charges increase the number of papers on the Canadian insect fauna, clearly a desirable goal, or cause a reduction as a result of an influx of international submissions seeking low page charges?

- Can we use electronic publishing more effectively? For example, publishing the *Bulletin* only as an electronic version would save ESC a substantial amount of money, but possibly reduce readership because some people are not comfortable reading such a large document on their monitors, assuming of course that all members use computers.

- I suspect that eventually most scientific journals such as *The Canadian Entomologist* will be primarily or exclusively on-line journals. Should we be moving more rapidly in that direction? The advantages would be reduced costs for printing and postage, inexpensive access to colour graphics, increased speed in publishing the journal. We would still have to format and proof submissions, and arrange for suitable archival storage of an electronic journal. Most importantly, how would we fund such a journal because people expect free access to information on the web, and because billing for access to electronic media and control of access are difficult. Few very large commercial organizations have resolved these problems, never mind small volunteer societies such as ours.

- For more routine ESC business, would it make sense to use commercial web-based billing services, or would the associated spam-like advertising put off our members? Should we use a web-based review system for *The Canadian Entomologist*, or is that more trendy than effective at speeding the review process?

The Entomological Society of Canada, like our sister societies around the world, is faced with many interesting, even exciting opportunities over the next few years. Your Executive welcomes suggestions on the directions we should take. A strong and vibrant ESC is good for all Canadian entomology, but particularly for our members.

baisse des soumissions internationales recherchant de bas frais de publication par page?

- Pouvons-nous utiliser la publication électronique de façon plus efficace? Par exemple, ne publier le *Bulletin* qu'en version électronique permettrait d'économiser des montants d'argent substantiels à la SEC, mais pourrait par contre réduire la lecture puisque certaines personnes ne sont pas confortables avec la lecture d'un document aussi long sur leurs écrans, en assumant bien sûr que tous les membres utilisent un ordinateur.

- Je pense qu'éventuellement, la plupart des revues scientifiques comme *The Canadian Entomologist* seront publiés principalement, ou même exclusivement en ligne. Devrions-nous prendre cette direction plus rapidement? Les avantages seraient une réduction des coûts pour l'impression et l'envoi, l'accès abordable à des graphiques couleur et une augmentation de la vitesse de publication. Nous aurions quand même besoin de mettre en page et vérifier les soumissions et de s'assurer d'un système d'archivage adéquat pour la revue électronique. Plus important encore, comment pourrions-nous financer une telle revue puisque les gens s'attendent à avoir un accès gratuit à l'information sur Internet et que la facturation pour l'accès aux médias électroniques et le contrôle d'accès sont plutôt difficiles. Peu de grandes organisations commerciales ont résolu ces problèmes, alors encore moins de petites sociétés telle que la nôtre.

- Pour les affaires plus routinières de la SEC, serait-il approprié d'utiliser un service de facturation commercial sur Internet, ou est-ce que les publicités indésirables associées décourageraient nos membres? Devons-nous utiliser un système de révision électronique pour *The Canadian Entomologist* ou est-ce que ce procédé est plus en vogue que vraiment efficace pour accélérer la révision?

La Société d'Entomologie du Canada, tout comme nos sociétés sœurs à travers le monde, fait face à de multiples opportunités intéressantes, et même excitantes pour les prochaines années. Votre Comité exécutif apprécie toute suggestion concernant les directions que nous devrions prendre. Une SEC forte et vibrante est bonne pour toute l'entomologie canadienne, mais particulièrement pour nos membres.



The aliens among us

Invasive Alien Species! The phrase sounds so threatening (albeit so redundant -- stating that alien species are invasive is akin to saying that native species are residents -- Duh)! And anyway, didn't we already have a term for this phenomenon? Forgive me for dating myself, but weren't these species previously called "exotics"? Exotic species sounded so much more mysterious (which they often are) and certainly less judgmental. Nowadays, these species are aliens invading our country, which for me conjures up mental pictures of little green men and/or excessively salivating creatures issuing forth from John Hurt's stomach. So in the interest of fairness to these diligent, opportunistic pilgrims, I wanted to present a few positive aspects of their inevitable influx into our country. I have focused on the so-called "pest" species; that is to say, I am not considering beneficial invasives except to say to those who don't want any invasives at all -- try consisting on a diet that doesn't rely on the European honey bee for a while (but don't blame me if your teeth fall out from scurvy).

Seven reasons why invasive species are not all bad (I wanted to list ten, but really... invasives aren't that good)!

1. Swarms of soybean aphids in the Sky Dome could, for one night at least, explain why the Blue Jays suck so badly.

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Bruce Gill

Asian longhorned beetle

2. Brown spruce longhorned beetle may be the only animals capable of living in Point Pleasant Park, Halifax since Hurricane Juan trundled through.

3. Emerald ash borer in Southern Ontario should induce formulation of clever bumper stickers (e.g. Kiss your ash goodbye) (this moment of wit courtesy of Bruce Gill, CFIA).

4. Leek moths infesting garlic in Ontario and Quebec could help increase that region's burgeoning vampire tourism industry.

5. Cabbage seedpod weevil on the Prairies should prevent people from these provinces griping that all the invasive species I have included in this list are from other parts of Canada.

6. Asian ladybird beetles tainting Niagara wine makes British Columbians smile.

7. Asian longhorned beetle in Toronto makes all of Canada outside Toronto smile.

So the next time you read about a new, "invasive alien species", stop and think about the possible benefits that this species might have to Canadians. Then get back to filling in your NSERC application that requests big bucks to eradicate the little blighter!

Join me next issue when Moth Balls once again invades the pages of the *Bulletin* of the ESC.

Locust plagues then and now

The desert locust (*Schistocerca gregaria*, Orthoptera: Acrididae) is the world's most notorious insect pest. As these quotes indicate, the desert locust has plagued Western civilization since the dawn of recorded history. Still today, it constitutes a severe threat to both subsistence and commercial agriculture across Africa, the Middle East and Eastern Asia — as testified by the swarms currently ravaging Northern and Western Africa.

In the summer of 2003, the right amount of rain in the right places at the right times led to excellent locust breeding conditions in the Western Sahel and along the Red Sea Coast, two notorious locust breeding zones that have given rise to many outbreaks in the past (Popov 1997) — indeed, Moses' east wind brought locusts from the Red Sea coastal plains. Locust populations grew and gregarised, and raised alarm that outbreaks might be developing. In the winter 2003-2004, the Red Sea locusts were unable to find suitable breeding conditions, and, instead of migrating into Darfur as was feared, they died out, dispersed and disappeared. However, in Western Africa, the swarms formed in the Sahel migrated north to the Mediterranean coast, where vegetation flourishes following the winter rains. Their progeny returned to the Sahel in the summer of 2004 where breeding conditions were once again excellent, and the population exploded. Swarms

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So Moses stretched forth his rod over the land of Egypt, and the Lord brought an east wind upon the land all that day and all that night; and when it was morning the east wind had brought the locusts. And the locusts came up over all the land of Egypt, and settled on the whole country of Egypt, such a dense swarm of locusts as had never been before, nor ever shall be again. For they covered the face of the whole land, so that the land was darkened, and they ate all the plants in the land and all the fruit of the trees which the hail had left; not a green thing remained, neither tree nor plant of the field, through all the land of Egypt. Then Pharaoh called Moses and Aaron in haste, and said, "I have sinned against the Lord your God, and against you. Now therefore, forgive my sin, I pray you, only this once, and entreat the Lord your God only to remove this death from me." So he went out from Pharaoh, and entreated the Lord. And the Lord turned a very strong west wind, which lifted the locusts and drove them into the Red Sea; not a single locust was left in all the country of Egypt.

Exodus 10: 12-19

containing thousands of locusts per square metre and covering tens of square kilometres have been observed last fall leaving the Sahel, moving North towards fruit orchards on the Mediterranean coast and south towards tropical farmland. Each swarm can easily contain billions of individuals and eat more in a day than the entire human population of New York does in a week. This past winter, numerous swarms criss-crossed Morocco and Algeria and raised fears about the onset of a new major plague (Enserink 2004; FAO 2005).

Locust outbreaks are based on a individual-level change from a solitary to a gregarious form (Simpson et al. 1999). So different are these two forms, that they were long considered to be two separate species until Sir Boris Uvarov, in the 1920s, showed that an individual locust could

change from one to the other (Uvarov 1977). At low population density, locusts are in the solitary form: they are green and timid, don't move much, avoid one another and are barely noticed by humans. However, when population density is high, locusts switch to the gregarious form: the most dramatic change is their adoption of bright black-and-yellow stripes. However, more importantly, gregarious locusts are much more active and are attracted to one another. This change in behaviour leads them to aggregate and form large groups that migrate together, destroying all vegetation in their path. The switch between forms is triggered by contact with other locusts (Simpson et al. 2001). So when density is high, contact between individuals increases, locusts start behaving gregariously and aggregate, further increasing contact between individuals. This feedback loop creates a snowball effect that can spiral further and further, generating plague conditions where hundreds of swarms migrate across continents, following weather conditions suitable for breeding (Despland 2004).

Once a locust population has gregarised, it can seed an outbreak if it remains concentrated and multiplies. However, if vegetation in the locust's desert breeding grounds is too sparse and if topography and winds break up developing swarms, the locusts can be decimated and dispersed, and swarms can simply disappear. Both the gregarisation of solitary populations and the further expansion of these gregarious populations into swarms depend on a multitude of environmental

factors at different spatial scales, making locust swarms very difficult to predict (Despland et al. 2004).

Control efforts are currently underway across Northern and Western Africa to halt the progression of swarms: ground and aerial spraying of insecticides, mainly organophosphates, were used to treat 2.2 million ha in November 2004, and an additional 880 000 ha in December (FAO 2005). More environmentally-friendly control agents, including the entomopathogenic fungus *Metarhizium* and insect growth regulators, are being developed, but have not reached the stage where they are used operationally. Widespread spraying against locusts raises concerns not only about risks to non-target organisms including livestock and people, but also about its efficacy. Locust swarms are very mobile and travel in very remote areas, and, during outbreak conditions, it is impossible to find, let alone treat, all swarms. Locust swarms can cover hundreds of kilometers per day with the right winds, and often cross international borders. Control operations therefore require precise up-to-date information on the positions of swarms, good infrastructure from which control efforts can be mounted wherever they are needed, and international cooperation. The history of locust control efforts shows the extent of these logistical challenges.

The last big locust plague occurred in 1986-1989. Gregarious populations appeared in the notorious breeding areas along the Red Sea coast. Pest management was neglected during the Ethiopian-Eritrean war, and locust populations grew unchecked in breeding areas strewn with landmines. Swarms soon spread to 23 countries. Massive control efforts were deployed and 25 million ha were sprayed with insecticide at a cost of US\$ 310 million (Showler 2002). Hindsight now makes it clear that, although insecticide spraying saved valuable crops, the plague was brought to an end, not by control efforts, but by natural conditions. Like in the book of Exodus, swarms were blown out to sea and drowned; others were lost on barren desert sands and poor rainfall impeded further breeding.

Past experience thus suggests that it is next to

The locusts lay their eggs and die in like manner after laying them. Their eggs are subject to destruction by the autumn rains, when the rains are unusually heavy; but in seasons of drought the locusts are exceedingly numerous, from the absence of any destructive cause, since their destruction seems then to be a matter of accident and to depend on luck.

Aristotle (350 B.C.E.) History of Animals, Book V, part 28

impossible to bring severe plagues under control before they run themselves out naturally. Reactive interventions against large swarms are very costly, both financially and environmentally, and are not effective at halting plagues, although they can be critical in protecting valuable crops. Alternative proactive control strategies involve regular monitoring of populations in high risk areas, and spraying gregarious populations when they begin to pose a threat but before they spiral out of control (Showler 2002). These strategies can be effective at halting upsurges before they reach plague level, but require considerable investment on a continuous basis, even in years where locusts are not a threat. Few affected countries can afford to spare these resources on insects that are not causing an immediate problem, when so many other problems (including other pest insects) demand attention.

Some experts therefore advocate abandoning the hope of controlling outbreaks and focussing on protecting high value crops, leaving the locusts free rein with other vegetation (Enserink 2004). Indeed, although locust plagues can be catastrophic locally, the damage they cause is relatively small compared to other agricultural threats such as droughts and endemic pests, and does not have long lasting ecological consequences. A landscape can appear totally desolate after the passage of locusts, but desert vegetation is by nature transient and resilient, and grows back rapidly to its original state if rainfall is suitable. However, under this minimalist reactive approach, crops and pasturelands of low financial value are left to the locusts, and these resources are essential to economically vulnerable subsistence farmers and herders, who then need to be compensated for their losses. In many cases, food aid may be required. In 2004, Mauritania bore the brunt of most locust activity, and the crops that remain are expected to meet only 21% of cereal requirements (FAO 2004). Another 20% have been secured via commercial imports and food aid pledges, but food shortages are occurring in some areas.

The true costs of locust outbreaks are therefore not only financial but also social, political and humanitarian. This makes it particularly difficult to assess the importance of locust damage and to

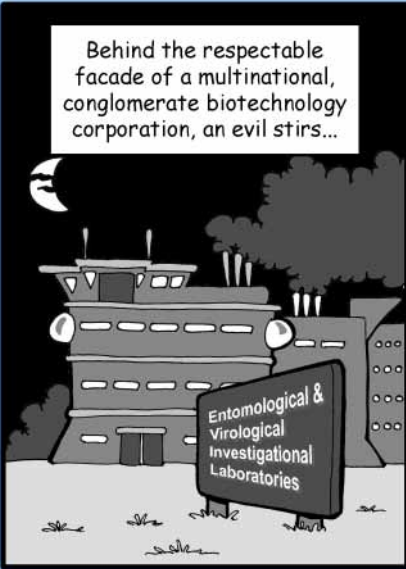
evaluate the relative value of different control strategies. Moreover, the practicality, desirability and effectiveness of locust control strategies remain controversial. Although we are no longer quite as powerless before locusts as were ancient peoples, Aristotle's observation still holds true, that, during a major plague, "their destruction seems then to be a matter of accident and to depend on luck".

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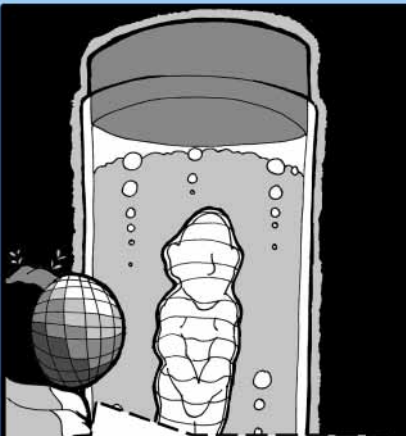
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The Adventures of *Ento-Man*

Behind the respectable facade of a multinational, conglomerate biotechnology corporation, an evil stirs...

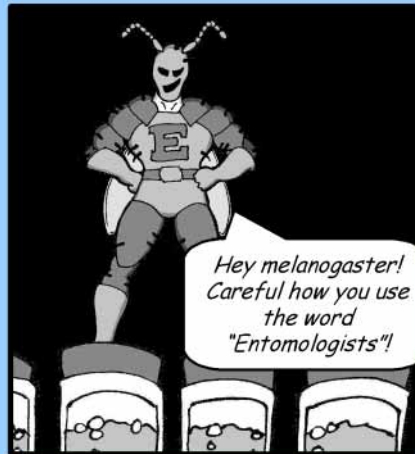


Dr. melanogaster...
The first puparia are ready for your inspection...



My Entomologists have served me well... Soon the perfect amalgamation of fruit fly and human will be achieved and then my children will take their rightful places as CEO's and Presidents... as RULERS OF THE UNIVERSE!!!

Hey melanogaster!
Careful how you use the word "Entomologists"!



Join us next issue when Ento-Man vanquishes *Dr. melanogaster* back to the warm, slightly putrid, fruit fly medium from whence he came.

Text: Andrew Bennett
Drawings: Gaétan Moreau

Developing species-specific PCR primers for insect identification

The development and use of molecular markers based on polymerase chain reaction (PCR) technology is becoming more commonplace in entomological research. This technology has been used for identifying insects to species level as well as for cryptic and subspecies, strains and ecotype designations. The sequence data generated using this technique has also been useful in phylogenetic studies to clarify interrelationships within species complexes, genera and higher order relationships. The variation of DNA sequence between species particularly for the Internal Transcribed Spacer (ITS) region separating the 28S and 18S nuclear rRNA genes and mitochondrial genes such as *cytochrome oxidase I* (COI) has been exploited for development of molecular markers for species identification and parasitoid detection in host insect populations. The usefulness of ITS sequences is based on the fact that there are multiple copies per cell, and sequences are relatively divergent among closely related populations (Alvarez and Hoy 2002). This technology is particularly useful for identification and detection of insect parasitoids

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whose larval stages often have few distinguishing morphological features. As well, traditional rearing methods for insect parasitoid identification can be very labour intensive and time consuming, particularly for those species that undergo an obligate pupal diapause. Host dissection gives rapid estimates of parasitoid incidence, but typically gives no information on species identification which is problematic when parasitoid species complexes attack a common host. Thus our lab has been involved in developing and applying PCR techniques to parasitoid and hyperparasitoid identification and detection in the *Lygus* plant bug system (Fig. 1).

Voucher samples and sample quality

Before molecular markers can be developed, voucher specimens representative of the species of interest must be obtained. The type of specimens available, museum versus field samples, and the method of storage between collection and processing can have a major influence on the yield and quality of DNA that can be extracted. Post et al. (1993) compared the impact of several methods of preservation of blackfly adults on DNA yield and quality. They found that samples stored in ethanol (4°C), frozen in liquid nitrogen or critically dried over silica gave much better results than those from pinned or fixed specimens. We have found that when analyzing our field collected *Lygus* samples for the presence of parasitoids, samples stored frozen at -70°C or stored in 95% ethanol at -20°C give the best results. We have found that the yield and quality of DNA from samples stored in 95% ethanol at room temperature begins to decline significantly after 5 years. The quality and quantity of DNA required for PCR will depend to a degree on the type of DNA target (single copy vs. multiple copy genes) and the size of the DNA fragment amplified by PCR. Regardless of how your samples are collected or stored, it is essential that consideration be given to how voucher specimens will be catalogued so that taxonomic experts and other researchers can access specimens for comparative purposes after your study is completed. This is a point that is

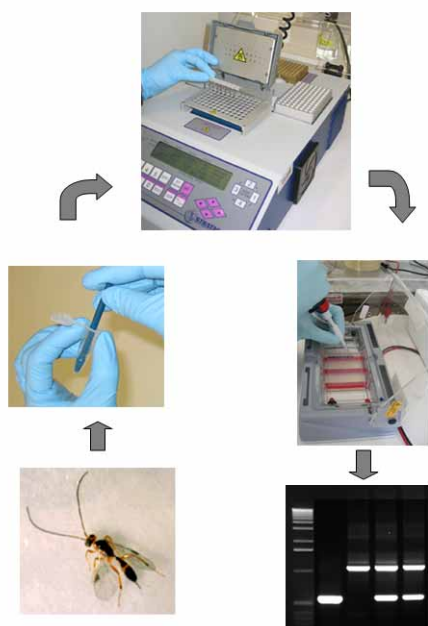


Figure 1. Insect life cycle in a molecular biology lab, PCR based identification of insects. Clock-wise: parasitoid, DNA extraction, PCR thermocycler, agarose gel electrophoresis, gel with distinctive sized PCR products.

often overlooked and collaboration with a taxonomic expert during the inception and progress of study can avert major identification problems that can reduce the impact of your study.

DNA extraction

Perhaps one of the overlooked but critical features in the use of species-specific PCR primers is the development of efficient protocols for DNA extraction from insect tissue that will generate the quality and purity of DNA required for trouble-free PCR reactions. This is particularly the case for high throughput ecological studies. In many cases, insects contain levels of polyphenols and other compounds that decrease the efficiency and fidelity of thermostable DNA polymerases used in PCR reactions. Tanned cuticle in many insects contains high level of these compounds. We have

found that digestion in Lifton buffer and a single phenol-cholorform extraction followed by ethanol precipitation of DNA, consistently gives good quality DNA preparations (Erlandson et al. 2003). Simpler DNA extraction techniques are available, but in some cases give less consistent results. These include heat treatment of crude homogenates followed by centrifugation of precipitated DNA, high salt precipitation of DNA and single step homogenization of tissue samples in PCR reaction buffer. Commercial kits are also available to somewhat simplify the DNA purification procedure; however, these can be expensive and do not always work equally well with all types of insect tissues. The kit systems are typically based on proprietary materials in the form of columns or filters which bind DNA under specific buffer conditions and release DNA in small volumes of "extraction" buffers which strip the DNA from the substrate. The selection of DNA extraction method will depend on the size and type of the insect being investigated and the number of insect samples required to address the research question. Some ecology studies can require processing of a large number of samples which can be expensive and tedious. In some situations preliminary screens with pooled samples may need to be considered to obtain an initial estimate of prevalence. For example, Milks et al. (2004) used this approach to screen fire ant populations for the presence of a microsporidan pathogen.

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Selecting conserved PCR primers for PCR and sequencing

Simon et al. (1994) gives a comprehensive discussion of mitochondrial genes, their use in phylogenetic studies and provides a compilation of conserved PCR primers based on these genes. Loxdale and Lushai (1998) also provides a useful review of the development and use of molecular markers for entomology and they describe the use of nuclear DNA sequences including single copy genes and rRNA "gene" sequences. This review also provides a listing of universal PCR primers for insects that are available from the University of British Columbia (see http://www.michaelsmith.ubc.ca/services/NAPS/Primer_Sets/). We have had good success using PCR primers sets based on conserved regions of rRNA subunit genes that flank the ITS regions of the nuclear rRNA repeat regions. As well, primers targeted at the tRNA regions that flank mitochondrial genes such as *cytochrome oxidase I* give consistent results. The use of these conserved primers allow for analysis of insect species for which virtually no DNA sequence data are available.

PCR protocols

There are several good lab manuals that describe general PCR protocols (eg. Dieffenbach and Dveksler 1995) and are useful resources both when getting started and when troubleshooting later on. However, PCR is a standard technique in many laboratories, and it is often easiest for a novice to obtain assistance from a colleague who uses PCR routinely. Access to the necessary equipment and expertise before expending the resources to set up a PCR infrastructure from scratch can be invaluable. Typical PCR reactions with genomic DNA from organisms involves three basic steps: i) denaturation of double stranded DNA to render the target DNA single stranded, ii) annealing or hybridization of oligonucleotide primers (15-25 nucleotides) to complimentary single stranded target sequences and iii) an elongation step for 5' to 3' extension of the primer by a thermostable DNA polymerase reading off the DNA template. Thus typical PCR thermocycle conditions consist of an initial denaturing step at

94°C for 2-5 min followed by 20-35 cycles (number dependent on the concentration of the target DNA sequence, single vs. multi-copy genes) of the following conditions: 94°C for 1 min (denaturation step), selected annealing temperature (50-65°C) for 0.5 to 1 min, 72°C for 0.5 to 1.5 min (elongation step, duration dependent on the length of anticipated PCR product - 1 min per 1000 nucleotides) and final elongation step at 72°C for 5 min. The PCR reaction mixture consists of a heat stable DNA polymerase, typically *Taq*, $MgCl_2$ (a co-factor for the polymerase enzyme), the four dNTPs required for DNA synthesis, an appropriate reaction buffer, and finally the DNA template and oligonucleotide primers designed to hybridize to opposite strands of the target DNA template in a specific manner. The concentration of each component of the PCR reaction will need to be adjusted and optimized based on the protocol you are using. For example, the concentration of $MgCl_2$ can significantly impact the yield of PCR products as well as the fidelity of the reaction. Similarly, DNA template concentration is critical and too much template DNA can lead either to no authentic PCR product or to significant mispriming and therefore non-specific PCR products. Primer concentration can also be important but standard concentrations of 0.5-2 M are usually sufficient. Some trial and error may be required to determine the optimum annealing temperature for the PCR reaction, although theoretical equations can be used to estimate suitable annealing temperatures based on the melting temperatures (T_m) of the PCR primers selected. As well, PCR reaction conditions cannot always be adopted directly from published protocols as the thermocycling conditions of one make or model of thermocycler may be subtly different than another. This relates largely to the rapidity with which the temperature control blocks transit from one temperature to the next. The volume chosen for PCR reactions (typically from 20 to 100 μ L), the type of PCR tubes, type of thermocycler available (heated lid vs. thermocyclers which require oil overlays on the PCR reaction mixture to minimize evaporation) will all effect the consistency of results and ease of operation.

In our experience, it is also important to aliquot

appropriate sized working stocks of primers, dNTP mixes, and even PCR reaction buffer (provided by commercial source of *Taq* enzyme as 10X buffer stock) for storage at -20°C . Continued freeze-thaw cycles degrade these components and can lead to inconsistent PCR reactions over time. We also find that when running a number of samples with the same primers and PCR reaction conditions, it is useful to make up a master mix containing all the components except the DNA template. This mix can then be aliquoted into the PCR tubes on ice, the DNA template samples are then added to respective tubes and transferred to the thermocycler. There are whole chapters in PCR manuals dealing with strategies to avoid contamination and this is particularly important for diagnostic labs. However, for routine PCR in entomology labs, good laboratory practice is sufficient to minimize the risk. Nonetheless, it is essential to run negative controls, typically water or buffer samples in place of DNA template, in order to monitor for potential contamination. Typically, positive controls are also included; these are generally samples of known DNA which will indicate the efficiency of the PCR reaction. In an ideal situation, each PCR reaction would have an internal positive control to detect the presence of DNA in each reaction; however, this is not always practical.

Once the PCR reaction is complete we typically run 1/10 volume of the PCR reaction on a 1 - 1.5% agarose gel (depending on sizes of expected PCR products) in Tris-Acetate-EDTA buffer system. In some cases information can be derived directly from the size of PCR fragments generated from universal primers. For example, PCR results in Figure 2 show that using the same set of universal primers, different size PCR products are produced from host insect, parasitoid and hyperparasitoid DNA. The results also illustrate that although the PCR conditions are the same, not all DNA templates were amplified with the same specificity (note that there are additional PCR products present in the parasitoid DNA sample). This type of analysis could be potentially used to screen populations of this host for the presence of the parasitoid or hyperparasitoid if the PCR conditions could be optimized so that all three

templates have equal efficiency of amplification, often easier said than done! The utility of a PCR reaction is related to its specificity, efficiency (yield) and fidelity; which of these features is most important often depends on the aim of your study.

Sequencing strategies

Typically the PCR products produced from "voucher" specimens are sequenced in order to design species-specific PCR primers for use in identity and incidence studies. Two basic strategies can be used: i) direct sequencing of the PCR product using universal PCR primers (note that the PCR product may need to be purified via gel extraction prior to sequencing), ii) cloning the PCR product into a specialized cloning vector, such as the pGEM-Teasy series, designed to take up DNA fragments generated by the *Taq* polymerase. The second approach may be used when it is of interest to determine how much in-

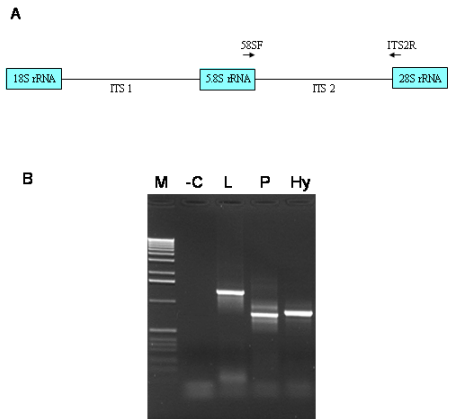


Figure 2. PCR amplification using nuclear rRNA gene region. A) Schematic of the internal transcribed spacer regions (ITS1&2) separating the rRNA coding sequences and the position of universal insect PCR primers 58SF and ITS2R. B) PCR amplification products using 58SF and ITS2R of negative control (-C) and insect DNA samples; *Lygus* host (L), primary parasite (P) and hyperparasitoid (Hy) giving PCR products of approximately 1400, 750, and 800 bp, respectively. DNA size markers (M) on left.

tra-individual variation there may be among the different copies of multi-copy genes or gene regions such as the ITS sequences (see Alvarez and Hoy 2002 for an example of this strategy). Whichever sequencing strategy is selected, it is most cost effective for basic entomology labs to contract with a DNA sequencing lab. Most DNA sequencing services can render good quality DNA sequence for PCR products up to 500 nucleotides in length, and often even longer; thus the size of your PCR product will determine if you will be able to sequence the whole region with confidence. It may be necessary to design internal sequencing primer to complete the sequence of long PCR products. Once the DNA sequence data is obtained it is the usual practice to trim off any cloning vector and primer sequence before further analysis. In our lab we use DNA Star software for this purpose as well as for assembly of multiple sequences into a consensus sequence. To develop species-specific primers, we generally sequence PCR products from at least 5 voucher specimens of the species being studied, and when using the cloning strategy we sequence at least two clones of each PCR product. This gives us a reasonable degree of confidence that we have representative DNA sequence for each species. Our first approach to analyze the DNA sequence is to do a BLAST search of existing DNA databases using the NCBI web site tools (see - <http://www.ncbi.nlm.nih.gov/BLAST/>). Given the amount of sequence data from conserved genetic elements such as mitochondrial genes or nuclear rRNA regions, you should be able to confirm that you have generated the appropriate PCR product based on the universal primers you selected.

Once a consensus sequence is derived for the DNA target of the insect of interest there are several strategies available. Restriction endonuclease enzymes that cleave double stranded DNA at specific nucleotide sequences have been used to digest PCR products produced using universal primers to distinguish between closely related species or cryptic species based on the DNA fragment patterns generated (Fig. 3A; Ashfaq et al. 2004). A potentially more powerful approach is to develop multiple species-specific PCR primers from variable regions within genes to be used

in combination (see below). This second approach requires sufficient DNA sequence information from the species that will need to be distinguished.

Primer design software and developing multiplex PCR strategies

The specificity and efficiency of the PCR amplification are significantly impacted by the design of PCR primer pairs. There are numerous software packages to assist in primer design and we have found that the Primer Select program in DNA Star and Primer 3 available on the Canadian Bioinformatics Resource website (http://cbrmain.cbr.nrc.ca:8080/cbr/jsp/ServicePage_e.jsp?id=81) are quite useful. However, in designing PCR primers to distinguish between related species of insect parasitoids or hyperparasitoids, we have found that preselecting regions with significant sequence variability in ITS regions, then using primer design software to look for potential primers is a better approach than simply letting the software select potential primers along the length of the sequence.

There are a few key factors that should be kept in mind when designing primers and selecting parameters to guide primer design software. Specificity is influenced by the length primers, we typically aim to design primers between 18-24 nucleotides. Specificity is also influenced by annealing (melting) temperatures (T_m), and selecting primers with T_m in the range of 54-62°C seems to give the most consistent results. Sequence data from the 3' end of a potential primer can be critical for specificity. When there are few differences in the sequence for two species of interest, it is often desirable to design the 3' region of the primer to cover this region where sequence differences (however slight) are present. For example, we have been able to design species-specific primers for *Lygus* species in highly conserved COI gene regions in which only 2 nucleotides differed between species; by designing a PCR primer with these two nucleotides at the 3' end we were able to separate the species based on PCR results (Erlandson et al. 2003). However, when such slight differences occur between individuals of the same species (intraspecific variation), designing a primer in this region

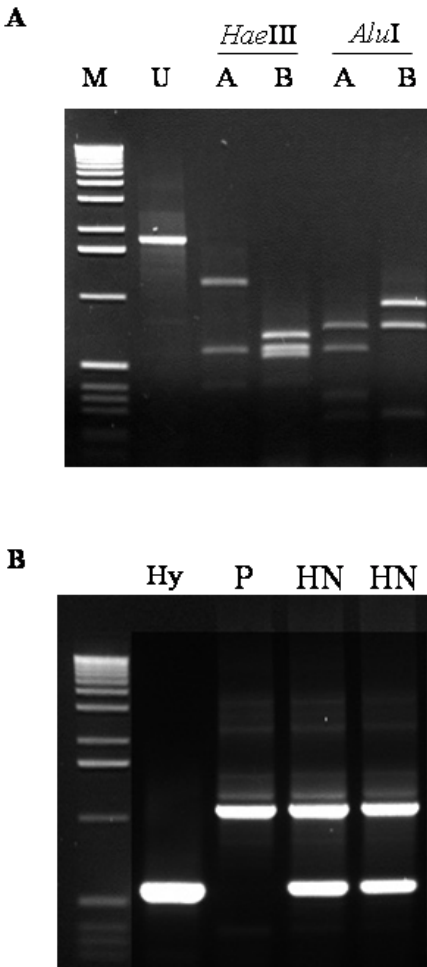


Figure 3. Detection and identification of a hyperparasitoid using PCR. A) The complete ITS region for hyperparasitoid DNA amplified about 1800 bp PCR product (lane U). Two genotypes or cryptic species designated A and B are distinguished by restriction endonuclease digestion (*HaeIII* or *AluI*) of the PCR product giving distinctive banding patterns. A DNA size marker (M) is on the left hand lane. B) Multiplex PCR using a universal primer from the 18S rRNA gene and unique primers from the ITS region for the hyperparasitoid (Hy) and parasitoid (P) species in multiplex resulting in distinct PCR products. Multiplex PCR detected both PCR products in *Lygus* nymphs known to be parasitized by both the parasitoid and hyperparasitoid (HN).

would not be prudent, as it would likely decrease the efficiency and fidelity of this primer. The 3' region of the primer is also most important in avoiding complementary homology between primer pairs. This can lead to primer dimers (when the primers have a higher affinity for each other than for the target DNA) which results in very much reduced efficiency of PCR amplification. You can readily appreciate that this becomes much more complex when multiple primer pairs are used in combination (multiplex PCR). Fortunately, most primer design software helps to avoid this situation. The length of the theoretical PCR product also has an impact on the efficiency of PCR amplification. Generally for the purposes of detecting a specific DNA sequence, PCR products of 150 to 1000 nucleotides are ideal. Amplification of longer PCR products can be less efficient particularly if the quality of the DNA template is not good.

Once species-specific PCR primers have been developed, they can be implemented in a number of ways. As mentioned, our lab focuses on the detection and identification of parasitoids and hyperparasitoids within their insect hosts. When applied in this context, species-specific molecular markers can be used to assess parasitism levels within a host population; this molecular approach not only generates data that is comparable to that obtained using traditional rearing protocols, but also provides these data in a more timely manner. In many cases, we are screening a host population for the presence of several different parasitoid species. In such cases, we often require separate PCR reactions for each parasitoid species we are looking for (i.e. for a single host DNA sample, we require one reaction for each set of species-specific primers in order to detect the different parasitoid species; see Ashfaq et al. 2004). However, the need to run multiple PCR reactions on a single DNA sample is not very elegant, and screening numerous samples for multiple parasitoid species can be rather inefficient. A multiplex PCR assay capable of detecting several parasitoid species simultaneously in a single reaction (by mixing the different species-specific primers together in each reaction) can be much more efficient in terms of cost and time. When

developing a multiplex PCR assay, sequence data must have sufficient variation between the species of interest, the PCR primers must be compatible (i.e. similar *Tm*, limited homology), and the resulting PCR products should be of distinct size for each species so that they can be readily distinguished upon gel electrophoresis. We have developed a simple multiplex system for detecting either or both a primary parasitoid, *Peristenus* sp., and its hyperparasitoid, *Mesochorus* sp., in host *Lygus* nymphs (see Fig. 3B). Even more sophisticated multiplex approaches are being developed and applied to this host-parasitoid system. Garipey et al. (in press) developed a multiplex PCR system to detect three different *Peristenus* species within plant bug hosts with PCR products ranging from 330 to 1060 bp for specific species. Such systems take significant work in terms of sequencing, PCR primer design and PCR reaction optimization in order to give consistent results. However, once developed, such systems can be a powerful tool in insect ecology studies including host-range and distribution assessments.

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Good judgment comes from experience, and a lot of that comes from bad judgment. Will Rogers.

Members in the news / Membres faisant la manchette

Nominations for ESC Governing Board

The following have been nominated and agreed to stand for election in 2005:

Second Vice-President: Terry Shore and Bob Vernon

Director-at-Large: Chris Buddle, Sheila Fitzpatrick and Yvan Pelletier.

Members will receive more detailed information in the mail. The ballots must be mailed to the Elections Committee by July 15th, so vote!



Candidates for Second Vice-President: Terry Shore (left) and Bob Vernon (right).



Candidates for Director-at-Large: Chris Buddle (left), Sheila Fitzpatrick (centre), Yvan Pelletier (right).

Jacques Brodeur has been awarded the NSERC Research Chair in Biological Control. He will be leaving Université Laval to take on his new position at the Université de Montreal in June 2005. His research interests range from host-parasitoid interactions, seasonal biology of invasive species and biological control. He received his BSc from the Université de Québec à Rimouski, his PhD from Université Laval and he had been working at Université Laval since 1992.



Our lab is comprised of people who work on a variety of topics across a broad range of organisms, including: tephritid fruit flies, Anopheline and Aedine mosquitoes, leaf cutter bees, omnivorous bugs, aphids and their predators and parasitoids, entomopathogenic fungi, black widow spiders, weevils and wireworms. What we have in common is that all of us study arthropod behaviour, and its implications for population and community dynamics. Some of us do this by deriving complex nausea-inducing models, others conduct gee-whiz manipulative experiments and others still test hypotheses by working from published data. In the best of all worlds each of us uses a battery of these approaches. If there is a guiding thought it would be: find an interesting question and then figure out what tools are needed; never let the cercus wag the bug.

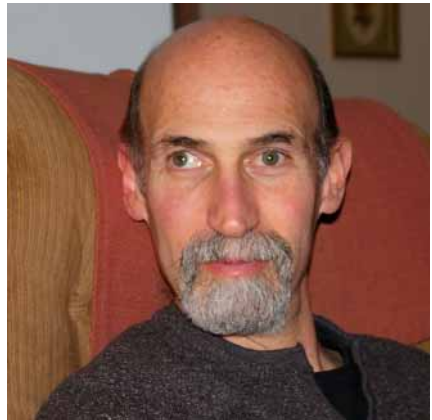
Every Thursday, we meet for a lab discussion. The exact topic doesn't matter but rather we use the time as an opportunity to elucidate some problem as a group. Usually, that begins as a so-called brain storming session where the only tools we use are a whiteboard and marking pens. Throw in a batch of cookies, good-natured bantering and before we know it, we identify The Critical Question. Well, it's not exactly that easy nor that quick but after some time, something clicks, and we agree that step 1 has been completed. Now, we have to decide whether to proceed to step 2 where we actually try to answer the question or go home happy knowing what the question is. Right now, we are working on models for the evolution of omnivory and doing manipulative experiments on the cost of plant feeding to zoophytophages. Moms, don't tell your kids this, but we found that eating your vegetables may not be such a good thing at least if you feed by beak.

Bernie Roitberg: bernard_roitberg@sfu.ca, <http://www.sfu.ca/biology/faculty/roitberg/>

I currently work on two systems, *Anopheles gambiae* (African malaria mosquito) and *Dicyphus hesperus* (omnivore bug). There are two main parts to my work with *A. gambiae*; in Burnaby we use lab experiments to determine the range of behaviours the animal can express and in Ken-

ya (with Woody Foster, Ohio State University) we determine what opportunities there are for expressing those behaviours (mostly host search and host acceptance). With *Dicyphus*, in collaboration with Dave Gillespie (Agriculture and Agri-Food Canada), we are trying to understand what role plants play in intraguild interactions among *Dicyphus* and other biocontrol agents.

I have been interested in science since I was a little boy, although entomology didn't become a passion until my undergrad days. Early on, I thought I might pursue a career in botany, but soon realized that the insects on the plants were more interesting to me than the plants themselves. Also, it wasn't until my PhD studies that I began to incorporate formal theory into my work, but it



Bernie Roitberg

has since paid big dividends. Understanding the underlying theory has made me a much better experimental biologist and vice versa. The downside is that theory never sleeps and it can be consuming. The first thing my partner says as we head off for our daily hike in the woods is, "No differential equations". You get the idea.

Lab members:

Tim Hazard, MSc candidate

I am exploring some aspects of the foraging behaviour of the beneficial zoophytophagous in-

sect predator, *Dicyphus hesperus* (Heteroptera: Miridae). In particular, I am interested in the cues *D. hesperus* uses to orient to plants and prey including olfaction and vision. My research will hopefully provide some insight into methods for the improvement of pest management strategies employing this natural enemy.

Allison Henderson, MSc candidate

My MSc research took me to Central America where I studied the habitat-use and sexual communication of *Exophthalmus jekelianus* (Coleoptera: Curculionidae), an important defoliating pest of coffee in the Turrialba region of Costa Rica. My work contributed valuable knowledge of weevil activity, habitat use and chemical ecology. Having recently defended my thesis, I am currently exploring some of the human social aspects of coffee production in Latin America. I aim to pursue a PhD in agricultural biology in the coming year.

Lee Henry, MSc candidate

The focus of my research is directed at host utility by the generalist aphid parasitoid *Aphidius ervi*. Using a combination of olfactory response, behavioural and larval performance assays I have been able to address factors that facilitate and impede movement towards alternate host species.



Lee Henry



Some (recent) past and present lab members, from left: Brian Ma, Allison Henderson, Maxence Salomon, Jason Peterson, Christy Macdougall and Jen Perry.

More recently my research direction has turned towards host adaptation to novel host species over successive parasitoid generations. Adaptation to alternate host species has been primarily studied using herbivorous insects. A generalist parasitoid system offers a unique look at selection and adaptation in insects confronted with a novel host through changes in adult behaviour and larval performance.

Brian Ma, PhD candidate

Using the mosquito, *A. gambiae*, I hope to gain a better understanding of the links between individual physiology, behaviour and community dynamics. I use a combination of experiments and models to tackle this problem. In the laboratory, I test the impact of individual states such as nutrition, infection and body size, on mosquito behaviour. My research focuses on blood feeding behaviour, but also includes oviposition and sugar feeding decisions. I also build mechanistic models to predict behavioural changes, as well as

changes at the community level. My findings should help us gain a better understanding of vector-borne disease epidemiology.

Conan Phelan, MSc candidate

I am working experimentally with *A. gambiae* mosquitoes to understand patterns of larval growth and development in an adaptive context. I will test the hypothesis that the extensive developmental plasticity in mosquitoes represents an adaptation for managing a trade-off between juvenile survival and adult size and condition. My research will provide insight into how life histories are shaped and possibly identify aspects of the larval ecology relevant for disease epidemiology and control.

Patricia Jaramillo, MSc candidate

I am originally from Medellin, Colombia. There, I studied a BA in history and philosophy at the Latin America Autonomous University and later pursued a BSc in Agricultural Sciences at the National University of Colombia. I am an international student at SFU studying under the supervision of Bernard Roitberg with co-supervision from Dave Gillespie (AAFC) and Mark Goettel (AAFC). My MSc research focuses on intraguild interactions between the predator *Aphidoletes aphidimyza* and the entomopathogenic fungus *Verticillium lecanii*, two natural enemies of the green peach aphid, *Myzus persicae*. Both have been used as successful biological control agents against several aphid species. The results of my research aim to answer fundamental questions regarding the simultaneous use *A. aphidimyza* and *M. persicae* and enhance the effec-



Patricia Jaramillo



Khandaker Jannat

Anopheles gambiae (African malaria mosquito)

tiveness of biological control techniques for *M. persicae* in greenhouse systems.

Maxence Salomon, PhD candidate

For my PhD degree with Bernie, I am investigating the dynamics of coexistence amongst and between native western black widow spiders, *Latrodectus hesperus*, and introduced European house spiders, *Tegenaria* spp. These spiders naturally co-occur in southern B.C. where they exhibit communal behaviours despite their strongly territorial nature. This raises the question of why and how do these spiders partition common resources. My approach to answering this question is both theoretical and empirical; it involves the use of manipulative and observational studies in the lab or in the field to test theoretical predictions about the influence of coexisting individuals on habitat settlement decisions.

Sue Senger, PhD candidate

I work on cherry fruit fly dispersal in structured environments. The key to this work is the use of individual fly behaviour to understand the factors that influence dispersal decisions at a landscape level, including fly flight propensity, tree structure and host quality and quantity. The results have implications for the improvement of pest management techniques for this economically important orchard pest.



Wim van Herk

Wim van Herk, MSc candidate

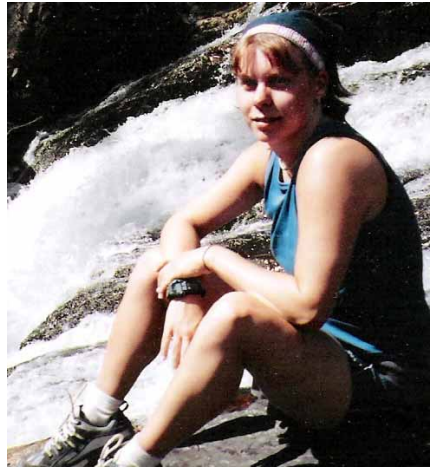
My work involves studying how different classes of insecticides affect the behaviour of wireworms (elaterid larvae). Of particular interest is how wireworms respond to sublethal doses of insecticides in the soil, and what concentrations are required to effectively control them. Complicating factors are the insect's long (four year) larval period, their ability to recover from near-death experiences and their subterranean lifestyle.

Nearly all my work is done out of Bob Vernon's lab at the Pacific Agricultural Research Center in Agassiz, BC. Other projects I'm involved with include identification of wireworm species from Alberta and Saskatchewan and effectiveness of flooding as a cultural control of wireworms in the Fraser Valley, B.C.

Kelly Walker, MSc candidate

I am interested in the nature of the host-parasite relationship. The objectives of my research are to determine the mechanisms of changes in the behaviour and physiology of *A. gambiae* mosquitoes infected with *Plasmodium berghei*, the causative agent of rodent malaria. Determining the

mechanisms behind behavioural and physiological changes in infected vectors will help us determine if such changes are due to active manipulation of the parasite, an adaptation of the vector, or simply a side-effect of infection. I also use multiple stresses such as infection and nutritional deprivation to put our understanding of the effects of *Plasmodium* on its vector into a more ecologically relevant context. This work will also help elucidate some of the trade-offs involved in the response of mosquitoes to infection.



Kelly Walker

Dave Gillespie (AAFC) is an honorary member of our lab who attends weekly lab meetings, co-supervises students and provides baked goods on a regular basis.



Dave Gillespie

Dicyphus hesperus on a flower.

The student wing / L'aile étudiante

By Tonya Mousseau

Greetings! Another reminder that the joint annual meeting of the Entomological Society of Canada (ESC) will be with the Entomological Society of Alberta to be held in Canmore, Alberta. The student symposium will have a new twist this year, being run by the students, for the students. Tyler Cobb and myself have agreed to organize this symposium and would love to see more students apply. Please see the information on page 92-93 for further details.

What else would the students like to see on the student affairs section of the ESC website? Don't forget to create your own webpage with the ESC if you don't have one, or notify me if your page needs updating. Pictures always make a page more inviting as well! If you know someone who has recently defended their thesis in the last year, let me know and I'll post their name, address, supervisor and research.

Have a great field season!



M. Alperyn

Annual photo contest

The Entomological Society of Canada is proud to announce its First Annual Photo Contest, the first conducted for the cover images of *The Canadian Entomologist* and the *Bulletin of the Entomological Society of Canada*. The new covers, with colour images were launched in 2005 for their two publications. These images are intended to represent the breadth of entomology covered by the Society's publications. Images will be changed each year with the first issue of the new volume.

Contest rules are as follows:

1. Photos can be submitted as an electronic file (preferred), a slide, or print (negative will be required if chosen). Digital images must have a resolution of at least 50 pixels/cm.
2. Entrants can submit more than one photo.
3. Photos must be taken by the entrant, or the entrant must own copyright.
4. The copyright of the photo remains with the entrant, but use must be granted to the Entomological Society of Canada for its inclusion on the cover of one volume (i.e. 6 issues) of *The Canadian Entomologist*.
5. The entrant must be a member in good standing of the Entomological Society of Canada.
6. The judging committee will be chosen by the

Chair of the Publications Committee.

7. Photos need not be restricted to insect "portraits". To represent the scope of entomological research we encourage photos of field plots, laboratory experiments, insect impacts, sampling equipment, non-insect arthropods, etc. Please provide a few lines describing the photo.

8. A selection of the entries will be exhibited and the winners announced at the Joint Annual Meeting of the Entomological Society of Canada and Alberta in Canmore, Alberta, 2-5 November 2005.

9. There is no cash award for the winners, but photographers will be acknowledged in each issue the photos are printed.

10. Submissions should be sent by 1 September 2005 to:

Allan Carroll
Chair of the Publications Committee
506 West Burnside Rd
Pacific Forestry Centre
Victoria, BC, Canada V8Z 1M5
Tel: (250) 363-0639, Fax: (250) 363-0775
E-mail: acarroll@pfc.cfs.nrcan.gc.ca

Thanks to Sam Loschiavo for bringing to the Editor's attention that there have been many photo contests at the AGM of the ESC, the first being in 1970.

Application for membership (new members only) Demande d'adhésion (nouveaux membres seulement)

Entomological Society of Canada / Société d'entomologie du Canada

393 Winston Ave., Ottawa, Ontario, Canada K2A 1Y8

Tel: (613) 725-2619, Fax: (613) 725-9349

Name & Address (please print): / Nom & Adresse (lettres moulées SVP) :

Telephone (bus.) / Téléphone (au travail) : () _____

E-mail/courriel : _____ Fax : () _____

Membership is a personal affiliation; publications are the personal property of the individual member. / Cette cotisation s'adresse aux individus; les publications payées ici sont la propriété personnelle du membre.

Membership Dues with / Cotisation avec

The Canadian Entomologist Print/Imprimé Web or/ou or/ou Both/Les deux
and/et *Bulletin* Print/Imprimé

- | | | | |
|---|---|-----------------------------------|-------|
| <input type="checkbox"/> REGULAR / RÉGULIER | Canada: | \$85.60 Cdn (GST/TPS incl.) or/ou | |
| | | \$92.00 Cdn (HST/TVH incl.) | |
| OR | USA & Int'l: | \$74.00 US or/ou \$100.00 Cdn | |
| <input type="checkbox"/> STUDENT / ÉTUDIANT | Canada: | \$42.80 Cdn (GST/TPS incl.) or/ou | |
| | | \$46.00 Cdn (HST/TVH incl.) | |
| | USA & Int'l: | \$36.00 US or/ou \$45.00 Cdn | |
| | <i>The Canadian Entomologist</i> : If print and web | \$10.00 Cdn or/ou \$10 US | |
| | Si imprimé et web | | |

Membership with / Cotisation avec

Bulletin only/seulement Print/Imprimé

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|--------------------|--------------|-----------------------------------|-------|
| STUDENT / ÉTUDIANT | Canada: | \$21.40 Cdn (GST/TPS incl.) or/ou | |
| | | \$23.00 Cdn (HST/TVH incl.) | |
| | USA & Int'l: | \$18.00 US or/ou \$25.00 Cdn | |

Endorsement / Signature du professeur.....

TOTAL PAID / PAYÉ

Official receipt / reçu officiel Yes/Oui

Name and contact information on the ESC Web Membership Directory? Yes/Oui

Nom et vos coordonnées dans l'annuaire Web de la SEC des membres? No/Non

Cheque or money order payable in Canadian or US Funds as detailed above, through Canadian or US Institution to the Entomological Society of Canada.

Chèque ou mandat poste payable (\$ Canadiens ou US, ci-dessus) par établissement canadien ou US à la Société d'entomologie du Canada.

MASTERCARD AMEX or/ou VISA

#..... Exp. Date/..... Signature.....

Credit card payments will be processed using the Canadian dollar amounts

Les frais portés à une carte de crédit seront traités en utilisant les dollars canadiens.

Prix et bourses d'études de la Société d'entomologie du Canada

Annuel

Bourses pour étudiants post-gradués

La Société d'entomologie du Canada (SEC) offre deux bourses d'une valeur de 2000 \$ chacune pour aider des étudiants qui débutent des études post graduées et des recherches en vue de l'obtention d'un diplôme d'études supérieures en entomologie (habituellement une à un(e) étudiant(e) à la maîtrise et l'autre à un(e) étudiant(e) au doctorat). Les bourses seront accordées aux étudiants ou étudiantes en raison des seuls critères de réussite académique. **Date limite : 16 juin 2005**

Subventions de recherche-voyage au niveau des études supérieures

Deux subventions de recherche-voyage, pouvant atteindre 2000 \$, sont offertes pour aider les étudiants et étudiantes à élargir le champ de leur formation supérieure. Les bourses seront accordées aux étudiants ou étudiantes en raison des seuls critères de réussite académique. **Date limite : février 2006**

Bourse étudiante de voyage pour assister à la réunion annuelle de la SEC

Une ou plusieurs bourses de 500 \$ chacune seront offertes pour aider les étudiant(e)s, membres de la SEC, à assister à la réunion annuelle. Pour être admissible, les étudiant(e)s doivent faire une présentation ou présenter une affiche lors de la réunion annuelle. Les bourses seront accordées aux étudiants ou étudiantes en raison des seuls critères de réussite académique. **Date limite :** le cachet de la poste faisant foi 8 juillet 2005. Note : Les récipiendaires seront avisés en août, ce qui leur donnera amplement le temps de planifier leur voyage.

Consulter <http://esc-sec.org/students.htm> pour les détails ou le *Bulletin de la SEC* 2003 35(4) 188-191 ou contacter :

Brian Van Hezewijk

Président Comité des prix aux étudiants de la SEC
Agriculture et Agroalimentaire Canada
Case postale 3000, Lethbridge, AB T1J 4B1
Courriel : VanHezewijkB@agr.gc.ca

Special

Bourse Keith Kevan en systématique

En mémoire du D. Keith McE. Kevan, la Société d'entomologie du Canada offre une bourse d'étude de 1000 \$ pour aider les étudiant(e)s post-diplômé(e)s qui entreprennent des études en taxonomie des insectes. Cette bourse sera accordée, les années impaires, selon des critères d'excellence académique et de la prééminence en taxonomie des insectes. **Date limite : 16 juin 2005**

Bourse John Borden

Créée en 2000, cette bourse a été instituée en l'honneur de John Borden, dont l'enseignement et la recherche en écologie chimique ont influencé internationalement la lutte contre les insectes ravageurs et l'entomologie. Cette bourse de 1000 \$, est offerte aux étudiant(e)s pour souligner une recherche innovatrice en lutte intégrée. **Date limite : Prolongé au 31 août 2005.**



Jennifer Read

Agamerion cleptideum (Westwood) (male)
(Chalcidoidea: Pteromalidae);

Entomological Society of Canada awards and scholarships

Annual

Postgraduate awards

Two postgraduate awards of \$2000 will be offered to assist students beginning study and research leading to a post-graduate degree in entomology (normally one to a MSc, and one to a PhD student). The postgraduate awards will be made on the basis of high scholastic achievement.

Deadline: 16 June 2005

Research-travel scholarship

Two research-travel scholarships of a maximum of \$2000 each will be awarded to help students increase the scope of their graduate training. Applications will be judged on scientific merit. **Deadline: February 2006**

Student conference travel awards

One or more awards of \$500 each to be awarded as financial assistance for travel to the annual meeting by student members of ESC. To be eligible, students must present a paper or poster at the annual meeting. Applications will be judged on academic merit. **Deadline:** Postmarked 8 July 2005. Note: winners will be notified in August, so travel plans can be made.

See <http://esc-sec.org/students.htm> for complete details or *Bulletin ESC* 2003 35(4) 188-191 or contact:

Brian Van Hezewijk
 Chair ESC Student Awards Committee
 Lethbridge Research Centre
 Agriculture and Agri-Food Canada
 P.O. Box 3000
 Lethbridge, Alberta T1J 4B1
 E-mail: VanHezewijkB@agr.gc.ca

Special

Keith Kevan scholarship in systematics

In memory of D. Keith McE. Kevan, the Entomological Society of Canada offers a scholarship of \$1000 to aid students who undertake post-graduate studies in insect taxonomy. This scholarship will be awarded in odd-numbered years, with the selection criteria being academic excellence and taxonomical ability. **Deadline: 16 June 2005**

John Borden scholarship

Created in 2000, this scholarship was established in honour of John Borden, whose teaching and research in chemical ecology is recognized around the world for its impact on pest control and entomology. This scholarship of \$1000 will be offered to students to encourage innovative research in the field of IPM. **Deadline: Extended to 31 August 2005.**



Steve Marshal

Entomological Society of Canada Graduate Student Symposium:

Call for submissions

A Graduate Student Symposium will take place this year in Canmore, Alberta, during the joint Annual Meeting of the Entomological Society of Canada and Alberta Entomological Society, 2-5 November 2004. The symposium is currently scheduled for the morning of Friday 4 November.

The principal goal of the symposium is to give a higher profile to graduating students as they move to the next stage in their careers by providing them a longer time slot to talk about their research.

To be eligible, students must have either defended their theses in the past year or be planning to defend within one year of the meeting. The degree may be either MSc or PhD.

Students from all disciplines are encouraged to submit an abstract. Ideally, the symposium will follow the general theme of the meeting, *Entomology: A celebration of life's little wonders*; however, depending on the submissions a different focus may be selected.

- four presentations will be selected.
- presentations will be approximately 30 minutes in length with 5 minutes for questions.
- papers that are included in the Graduate Student Symposium will **not** be eligible for the Pres-

idents Prize; however, speakers may also submit a paper on a more specific topic to the student competition. See also point 3 below.

If you are eligible and want to be considered for the symposium please submit the following information by 15 June 2005:

1. An **expanded** abstract (200-300 words) describing your proposed presentation and how it relates to the theme of the meeting "Entomology: a celebration of life's little wonders".

2. A **letter (or e-mail) of support** from your principal supervisor that confirms the anticipated or actual date of graduation, and comments on your proposed presentation.

3. Also include a **standard abstract** (70 words) and title. If not selected for the Graduate Student Symposium, your presentation will automatically be included in the President's Prize Competition.

Students who have been selected to speak will be contacted by 31 July 2004. When notified they will receive a list of the other speakers, e-mail addresses and a copy of all initial abstracts to identify points for discussion in the talks and elimination of potential overlap.

Expanded abstracts of chosen speakers will be published in the December issue of the *Bulletin of the Entomological Society of Canada*.

Submission for the graduate student symposium should be sent to:

Tonya Mousseau, tmousseau@ucalgary.ca

Fax: (403) 289-9311

Electronic submission is encouraged and preferred!



Steve Marshak

Symposium des étudiants diplômés de la Société d'entomologie du Canada

Invitation générale

Un Symposium des étudiants diplômés est organisé à l'occasion de l'assemblée annuelle conjointe de la Société d'entomologie du Canada et de la Société entomologique Alberta, qui aura lieu du 2 au 5 novembre 2005, à Canmore, Alberta. Jusqu'à présent, il est prévu que le symposium aurait lieu dans la matinée du vendredi 4 novembre.

Le but premier du symposium est de mettre en lumière les travaux de recherche des étudiants universitaires diplômés avant qu'ils ne passent à la prochaine étape de leur carrière.

Pour être admissible, les étudiants doivent avoir défendu leur thèse au cours de la dernière année ou avoir l'intention de la défendre dans les douze mois qui suivront l'assemblée. Sont admissibles les étudiants à la maîtrise et au doctorat.

Les étudiants de toutes les disciplines sont encouragés à présenter un résumé. Idéalement, le symposium devrait correspondre au thème général de l'assemblée. Toutefois, selon la nature des sujets proposés il sera possible de lui donner une orientation différente.

- Les organisateurs choisiront quatre exposés.
- Chaque exposé doit durer environ 30 minutes, et il faut prévoir cinq minutes pour les questions.
- Les exposés présentés au Symposium des étudiants diplômés ne sont pas admissibles au Prix du président. Cependant, les conférenciers qui le souhaitent peuvent soumettre un exposé

sur un sujet plus précis au concours des étudiants. (Voir le point 3 ci-après.)

Si vous êtes admissible et que vous souhaitez présenter un exposé au Symposium, veuillez nous faire parvenir les documents suivants au plus tard le 15 juin 2005 :

1. Un résumé **élaboré** (de 200 à 300 mots) décrivant l'exposé que vous proposez faire et faisant le lien entre le sujet de l'exposé et le thème de l'assemblée. Voir la page suivante pour une description du thème.

2. Une **lettre (ou un courriel) d'appui** de votre directeur de thèse, confirmant la date réelle ou prévue de la collation des diplômes, et commentant l'exposé que vous prévoyez faire.

3. Un **résumé normal** (70 mots) avec le titre. Si votre exposé n'est pas choisi pour le Symposium des étudiants diplômés, il sera automatiquement inclus dans le concours pour le Prix du président.

Les étudiants dont l'exposé sera choisi pour le Symposium en seront informés au plus tard le 31 juillet 2005. À ce moment-là, nous leur remettrons également la liste des noms et adresses de courriel des autres conférenciers ainsi qu'une copie des résumés déjà choisis afin de leur permettre de se préparer aux discussions et d'éviter les chevauchements éventuels.

Les résumés élaborés des conférenciers seront publiés dans le numéro de décembre du *Bulletin de la Société d'entomologie du Canada*.

Si vous souhaitez présenter un exposé au Symposium des étudiants diplômés, envoyez votre résumé à :

Tonya Mousseau, tmousseau@ucalgary.ca
fac. : (403) 289-9311

Nous préférons nettement les candidatures envoyées sous forme électronique.

The Canadian Entomologist and past issues of the *Memoirs* are available from the Ottawa office, and may be purchased by Mastercard, Visa, cheque or money order.

Joint annual meeting of The Entomological Society of Canada and The Entomological Society of Alberta

Entomology: A celebration of life's little wonders
Radisson Hotel and Conference Centre
Canmore, Alberta, 2-5 November 2005

On behalf of the Entomological Society of Alberta and the Entomological Society of Canada, we are pleased to invite you to the 2005 Joint Annual Meeting which will be held at the Radisson Hotel and Conference Centre in Canmore, Alberta. The theme for the meeting is *Entomology: A celebration of life's little wonders*, and we are confident that the symposia, workshops and submitted papers will combine to create an exciting and informative meeting.

Due to the proximity of the annual meetings of the ESC and the Entomological Society of America (the latter running 6-9 November), we are starting the Canmore meeting earlier than originally planned. The 2005 meeting will thus begin on Wednesday, 2 November and will wrap up on Saturday, 5 November. This should allow members who wish to attend both the ESC and ESA meetings to do so; Canmore's proximity to the International Airport in Calgary should make travel simple.

The 2005 JAM will have a spectacular setting. Canmore is located in the beautiful Rocky Mountains, minutes from Banff National Park, and an hour's drive (100 km) from the international airport in Calgary, Alberta. Banff townsite is only 20 km from Canmore. The Radisson Hotel is a 5-minute walk from downtown Canmore, or a 15-minute walk from a trail-head. The hotel includes 224 guestrooms, each with a mountain view, high-speed wireless internet access, an indoor pool, whirlpool, steam room, fitness centre, restaurant and children's playground. For more information, visit the Local Arrangements website at <http://www.esc-canmore.org>, or go straight to the Radisson reservations page at <http://www.radisson.com/canmoreca/>. The Radisson is offering us a special conference rate for the hotel of \$89.00 per night (for up to two people in a room, plus taxes). Be sure to mention the Entomological Society of Canada Conference when booking to get the conference rate.

If you have queries or suggestions, feel free to contact the chair of the Organizing Committee, John Acorn (janature@compusmart.ab.ca), or one of the Program Chairs, Dave Langor (DLangor@NRCan.gc.ca) and Felix Sperling (felix.sperling@ualberta.ca).

Please visit our webpage for more information and all the news as it develops about the meeting: www.esc-canmore.org.



Dan Johnson

REGISTRATION FORM

Name: _____

Title First Name Last Name

Preferred name for name tag (if different from above)

Affiliation: _____

Address: _____

Phone: _____ Fax: _____ E-mail: _____

(Note: registrations will be acknowledged by e-mail, given a current and legible e-mail address.)

Accompanying Person (there are no fees for accompanying persons; extra banquet tickets may be purchased at the registration desk): _____

Fees:	Before August 1st	After August 1st	Total
Regular ESC or AES member	\$140	\$180	\$ _____
Regular Non-member	\$180	\$220	\$ _____
Student or retired member	\$ 70	\$ 90	\$ _____

Banquet dinner preference: indicate meat/seafood entree or vegetarian

Registration includes: Program (with abstracts) and admittance to meetings, mixer and banquet. Extra banquet tickets may be purchased at the registration desk. No refunds on registration after 15 September 2005.

Payment Details:

Cheque for total (make payable to ESC/ESA 2005) or Credit card:

Name on Credit Card (please print) _____

Credit card type: VISA or Mastercard Credit card Number: _____

Signature: _____ Expiry Date: _____

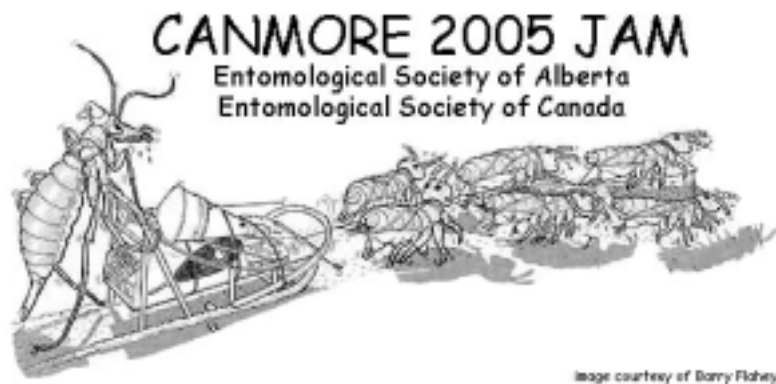
Accommodation: Everyone is encouraged to stay at the Radisson Hotel (rate: \$89.00 for up to two people, if reserved before 2 October 2005). Please indicate when registering that you are with the Entomological Society of Canada conference to get the conference rate, and please reserve as early as you can to allow us to plan for the various events.

Please return this form with fees to:

ESC/ESA registration
 c/o Greg R. Pohl
 Insect I.D. Officer / Museum Curator
 Northern Forestry Centre - Canadian Forest Service
 5320 - 122 St., Edmonton, Alberta
 Canada T6H 3S5
 Phone: (780) 435-7211, Fax: (780) 435-7359
 e-mail: gpohl@nrcan.gc.ca
 ESA Website: www.esc-canmore.org

Hotel Reservations are available from:

Radisson Hotel and Conference Center Canmore
 511 Bow Valley Trail, Canmore, Alberta T1W 1N7
 Phone (403) 678 3625, Fax (403) 678 3765
 Toll Free 1- (800) 333-3333
 e-mail: rhi_cnmr@radisson.com
 Website: <http://www.radisson.com/canmoreca>



2-5 November 2005

Radisson Hotel & Conference Centre Canmore, Alberta

Meeting theme: Entomology: A celebration of life's little wonders

Symposia:

Maintaining arthropods in Northern forest ecosystems

Organizers: John Spence and David Langor

The biology and diversity of Arachnids

Organizers: Heather Proctor, Derrick Kanashiro, Robb Bennett

Arthropods and fire

Organizer: Rob Roughley

Wheat stem sawfly

Organizer: Hector Carcamo

Graduate student symposium

Organizers: Tonya Mousseau and Tyler Cobb

Graduate student symposium

The main goal of this symposium is to profile graduating students moving on to the next stage of their careers, and allow them a longer time slot to feature their research. To be eligible, students must have defended in the last year or plan to defend within one year of the meeting. Ideally, the topic of the presentation should be related to the theme of the meeting: *Entomology: A celebration of life's little wonders*. Current graduate students who participate in this symposium are also eligible to compete for the President's Prize; however, it is required that the symposium topic and President's Prize talk or poster be substantially different.

Help is needed to identify the most promising speakers for this symposium. If you are an eligible student interested in participating, or if you know of someone that would be suitable, please contact Tonya Mousseau (tmousseau@ucalgary.ca). Please reply with your expression of interest and title of your proposed talk by 15 June 2005. Full details will be available at the ESC website in the student section. <http://esc-sec.org/students.htm> and page 92.

CALL FOR SUBMITTED PAPERS AND POSTERS

DEADLINE: Postmarked 8 July 2005

Categories of presentation:

Oral presentation - Regular, President's Prize*

Poster presentation - Regular, President's Prize*

*Students are eligible for the President's Prize (1 per session) if you are:

- Currently enrolled in a degree program or have graduated from a degree program since the last annual meeting (October, 2004)
- Registered at the meeting and have indicated the wish to participate in this category at the time the title and abstract were submitted
- The principal investigator and presenter of the paper or poster

Language: Presentations may be in French or English.

Oral presentation: 12 min + 3 min questions and discussion

Presentations in PowerPoint are encouraged. To minimize potential incompatibilities between the software versions you use to develop, and we use to display these presentations, we recommend limited use of animation, use of common Windows fonts for text and symbol fonts for equations. **Do not mail your presentation**, but bring to meeting on CD-R, after testing this copy on a different PC machine and submit it when you register. If using 35 mm slides, please provide your own carousel. Please indicate method of presentation when submitting your abstract.

Poster presentation:

Posters can be set up on Thursday morning (November 3) and left in place for the duration of the meeting. Presenters are requested to attend their posters in particular during the designated poster session on Friday, November 4, from 15:15 - 16:30.

Information required: Please provide information in this order and with these headings:

1) Author(s) name(s), 2) name of presenter, 3) address, 4) title, 5) abstract, 6) category (Regular or President's Prize), 7) language of presentation, and 8) method of presentation (PowerPoint or 35 mm slide). Please submit this information by e-mail. Abstracts should be 70 words or less. If longer than 70 words, the editors reserve the right to reduce accordingly. **If possible, please provide your information in both French and English. All abstracts will be placed on the website.**

Please submit to:

Felix Sperling
Department of Biological Sciences
University of Alberta
Edmonton, Alberta
Canada T6G 2E9
Tel: (780) 492-3991, Fax: (708) 492-9234
E-mail: felix.sperling@ualberta.ca

Congrès conjoint de la Société d'entomologie du Canada et de la Société d'entomologie d'Alberta

L'Entomologie: Une célébration des petites merveilles de la vie!

Hôtel et centre de conférence Radisson

Canmore, Alberta, 2-5 novembre 2005

Au nom de la Société d'Entomologie de l'Alberta et de la Société d'Entomologie du Canada, nous sommes heureux de vous inviter à la Réunion conjointe annuelle qui se tiendra à l'hôtel et centre de conférence Radisson à Canmore, en Alberta. Le thème de cette réunion est *Entomologie: Une célébration des petites merveilles de la vie!* et nous sommes confiants que les symposiums, ateliers et présentations soumises se combineront pour former une réunion excitante et informative.

À cause de la proximité entre les réunions annuelles de la SEC et de la Société d'Entomologie d'Amérique (cette dernière se déroulant du 6 au 9 novembre), nous débutons la réunion de Canmore plus tôt que ce qui était originalement planifié. La réunion de 2005 commencera donc mercredi le 2 novembre et se terminera le samedi 5 novembre. Ceci devrait permettre aux membres qui veulent assister aux deux réunions de le faire; la proximité de Canmore avec l'aéroport international de Calgary devrait rendre le déplacement facile.

La réunion conjointe annuelle de 2005 aura lieu dans un cadre spectaculaire. Canmore est situé dans les magnifiques montagnes Rocheuses, tout près du Parc National de Banff et n'est qu'à une heure de route (100 km) de l'aéroport international de Calgary en Alberta. La ville de Banff n'est située qu'à 20 km de Canmore. L'hôtel Radisson est à 5 minutes de marches du centre-ville de Canmore, ou à 15 minutes de marche d'un sentier. L'hôtel possède 224 chambres, chacune avec une vue sur les montagnes, un accès à internet haute vitesse, une piscine intérieure, un bain tourbillon, un sauna, un centre d'entraînement, un restaurant et un terrain de jeux pour les enfants. Pour plus d'information, visitez le site internet à <http://www.esc-canmore.org>, ou allez directement à la page de réservation de Radisson à <http://www.radisson.com/canmoreca/>. Le Radisson nous offre un tarif spécial de conférence de 89.00\$ par nuit (jusqu'à deux personnes par chambre, plus taxes). Assurez-vous de mentionner la conférence de la Société d'Entomologie du Canada pour obtenir ce tarif.

Si vous avez des questions ou des suggestions, n'hésitez pas à contacter le président du Comité organisateur, John Acorn (janature@compusmart.ab.ca), ou un des présidents du programme, Dave Langor (DLangor@NRCan.gc.ca) et Felix Sperling (felix.sperling@ualberta.ca).

Visitez notre site web pour plus d'information et les dernières nouvelles concernant la réunion : www.esc-canmore.org.



Paul Fields

FORMULAIRE D'INSCRIPTION

Nom : _____

Titre Prénom Nom

Nom à inscrire sur le porte nom (si différent du nom susmentionné)

Affiliation : _____

Adresse : _____

Téléphone : _____ Fax : _____ Courriel : _____

(Nota : L'inscription sera confirmée par courriel avec une adresse électronique valide et lisible.)

Personne accompagnatrice : (il y n'a pas des frais pour les personnes accompagnatrices ; on peut acheter des billets de banquet supplémentaire à l'inscription.) _____

Coût :	Avant le 1 ^{er} août	Après le 1 ^{er} août	Total
Membre régulier de la SEC ou de la AES	140 \$	180 \$	_____ \$
Non-membre	180 \$	220 \$	_____ \$
Étudiant ou membre retraité	70 \$	90 \$	_____ \$

Préférence pour le banquet : viande/fruits de mer ou plat végétarien

Compris dans les frais d'inscription : Programme (avec les résumés) et participation aux réunions, à la réception et au banquet. Des billets supplémentaires pour le banquet seront en vente au bureau d'inscription. Aucun remboursement après le 15 septembre 2005.

Mode de paiement

Chèque : (payable à l'ordre de la RAC SEC/SEA 2004) Carte de crédit :

Nom inscrit sur la carte de crédit (lettres moulées) : _____

Carte de crédit : VISA ou Mastercard, Numéro de la carte de crédit : _____

Signature : _____ Date d'expiration : _____

Hébergement : Vous êtes encouragés à loger à l'hôtel Radisson (tarif : 89 \$ pour deux personnes, si les réservations sont faites avant le 2 octobre 2005). Pour bénéficier du tarif spécial, au moment de faire votre réservation, veuillez mentionner que vous participez à la Conférence de la Société d'entomologie du Canada. Réservez le plus tôt possible pour nous permettre de planifier les diverses activités.

Retournez le formulaire et votre paiement à :

SEC/SEA Inscription

Greg R. Pohl

Insect I.D. Officer / Museum Curator

Northern Forestry Centre - Canadian Forest Service

5320 - 122 St., Edmonton, Alberta

Canada T6H 3S5

Téléphone : (780) 435-7211, Fax : (780) 435-7359

Courriel : gpohl@nrcan.gc.ca

SEA site web : <http://www.esc-canmore.org>

Hôtel :

Radisson Hotel and Conference Center Canmore

511 Bow Valley Trail, Canmore, Alberta T1W 1N7

Téléphone : (403) 678 3625, Fax : (403) 678 3765

Sans frais : (800) 333-3333

Courriel : rho_cnmr@radisson.com

Site web : <http://www.radisson.com/canmoreca>



image courtesy of Barry Flahey

Entomologie: Une célébration des petites merveilles de la vie!

Colloques

Préserver les arthropodes dans les écosystèmes forestiers nordiques

Organisateurs : John Spence et David Langor

Biology et diversité des arachnides

Organisateurs : Heather Proctor, Derrick Kanashiro, Robb Bennett

Les arthropodes et le feu

Organisateur : Rob Roughley

Le cèpe du blé

Organisateur : Hector Carcamo

Le colloque des étudiants gradués

Organisateur : Tonya Mousseau

Le colloque des étudiants gradués

Ce colloque a pour but premier de mieux faire connaître les étudiants gradués qui progressent à un niveau supérieur de leur carrière, et de leur permettre de présenter leurs recherches de façon plus élaborée. Pour être éligible, les étudiants doivent avoir soumis leur thèse au courant de l'année passée ou bien prévoir de la soumettre au courant de l'année suivant le colloque. Idéalement, le sujet de la présentation doit être en relation avec le thème du colloque: *Entomologie: Une célébration des petites merveilles de la vie!* Les étudiants gradués qui participent à ce colloque peuvent également concourir au Prix du Président; par contre il est nécessaire que le sujet présenté au colloque soit différent de celui de la présentation ou de l'affiche présentée pour le prix.

De l'aide est requise pour sélectionner les meilleurs conférenciers. Si vous êtes un étudiant éligible et intéressé à participer ou si vous connaissez quelqu'un qui pourrait l'être, prière de contacter Tonya Mousseau (tmousseau@ucalgary.ca). Svp, faites nous part de votre intérêt et du titre de votre présentation avant le 15 juin 2005. Tous les détails sont disponibles sur le site Internet de l'ESC dans la section "Affaires étudiantes". <http://esc-sec.org/studentf.htm> et le page 93.

INVITATION À SOUMETTRE DES COMMUNICATIONS ET DES AFFICHES

DATE LIMITE : Le 8 juillet 2005 (le cachet de la poste faisant foi)

Catégories de présentation :

Présentation orale - Ordinaire, Prix du président*
Présentation par affiches - Ordinaire, Prix du président*

*Pour être admissible au Prix du président (1 par séance), vous devez satisfaire aux conditions suivantes:

- Être inscrit à un programme de deuxième ou troisième cycle ou avoir terminé un tel programme après de dernier congrès (octobre 2004)
- Être inscrit à la conférence et indiquer le désir de participer dans cette catégorie lors de la soumission de votre communication
- Être le chercheur principal et le présentateur de l'exposé ou de l'affiche

Langue : Les présentations doivent être en français ou en anglais.

Présentation orale : 12 min + 3 min de questions et discussion

Nous vous encourageons à créer des présentations PowerPoint. Afin de minimiser les chances d'incompatibilités entre la version de programme que vous utiliserez pour créer votre présentation et celle qui sera utilisée pour la présenter, nous vous conseillons de restreindre l'utilisation des animations, d'utiliser des caractères communs d'édition de Windows pour les textes et les caractères symboliques pour les équations. **Ne postez pas votre présentation**, apportez-la au congrès sur un DC après avoir testé votre document à l'aide d'un autre ordinateur PC et la soumettre en arrivant. Si vous utilisez des diapositives 35 mm, veuillez les placer dans un magasin circulaire. Veuillez indiquer la méthode de présentation lors de la soumission de la communication.

Présentation d'affiches :

Les affiches peuvent être placées le jeudi le 3 novembre, et exposées pour toute la durée du congrès. Nous demandons aux présentateurs d'être présents pour répondre aux questions particulièrement pendant la séance prévue à cet effet le vendredi 4 novembre de 15:15 – 16:30.

Informations requises :

SVP donnez nous les renseignements suivantes : 1) Nom(s) de(s) auteur(s), 2) nom du présentateur, 3) adresse, 4) titre, 5) résumé, 6) catégorie, 7) langue de la présentation, et 8) méthode de présentation (PowerPoint ou diapositives 35 mm). SVP soumettez (ordinaire, prix du président) ces informations par courriel. Les résumés ne doivent pas dépasser 70 mots. Si votre résumé dépasse la limite de mots acceptée, les éditeurs se réservent le droit de le couper. Si possible, envoyez ces informations en français et en anglais. Tous les résumés seront publiés sur le site internet.

Veillez soumettre au :

Felix Sperling
 Département de sciences biologique
 Université de Alberta
 Edmonton, Alberta
 Canada T6G 2E9

Téléphone : (780) 492-3991
 Fac : (780) 492-9234
 Courriel : felix.sperling@ualberta.ca

Catalogue of Palaearctic Coleoptera. Volume 2. Hydrophiloidea - Histeroidea - Staphylinoida. Edited by I. Löbl & A. Smetana. Stenstrup, 2004: Apollo Books, 942 pp. Hardback, DKK 1080.

The recognition and understanding of biological diversity would not be possible without taxonomic research, which is the foundation of biological science. Taxonomists combine the theory and practice of identifying, describing and classifying organisms. It helps us to understand the natural world around us. The enormous diversity of life on our planet and the accumulated knowledge on species requires cataloguing in order for the knowledge to be organized and accessible to a wide audience. This knowledge is essential for achieving a universal language in taxonomy that assures proper understanding and organization of biological information. This information constitutes the baseline biological data that have an impact on many other branches of science. The accumulation of knowledge is a dynamic process and the catalogues represent time-restricted information and therefore need to be regularly updated. The first world catalogue of Coleoptera was Gemminger & Harold's *Catalogus Coleopterorum* published from 1868 to 1874, and it was followed by Junk & Schenkling's *Coleopterorum Catalogus* published from 1910 to 1940. The previous catalogue covering all groups of Coleoptera in the Palaearctic region was Winkler's *Catalogus Coleopterorum* covering data from 1924 to 1932. In 2001, a comprehensive work consisting of seven volumes entitled: *World catalog of the Staphylinidae (Insecta: Coleoptera): 1758 to the end of the second millennium* was published by Lee Herman in the *Bulletin of the American Museum of Natural History*. The latter work undoubtedly formed a base to collate the data on Palaearctic staphylinids. However, Herman's work was not cited in the references of Volume 2, and Herman's contribution was not acknowledged. Why this significant omission took place is unclear.

I. Löbl & A. Smetana initiated the very ambitious task of producing the *Catalogue of Palaearctic Coleoptera*, which was badly needed. It is

a collective work involving many authors and will be published in eight volumes. Each volume will treat taxa with respect to the currently accepted classification and will have its own reference section and index. So far two volumes have been published, with the first one treating Archostemata, Myxophaga, Adephaga (2003), and the second one treating Hydrophiloidea, Histeroidea, and Staphylinoida (2004). The second volume consists of several chapters: Introduction, Taxonomic information, Distributional information, Bibliographic information, Acknowledgements, Dedication, Coordinators, Authors, Mailing addresses of the authors, Errata to Volume 1, New nomenclatorial and taxonomic acts and comments, the Catalogue of names, References and Index of families, subfamilies, genera and subgenera. In the distributional information, the editors clearly defined the Palaearctic region as to avoid any potential confusion regarding the limit of the fauna considered and provided a list of countries and their abbreviations used in the text. Russia as well as China are subdivided into provinces, autonomous regions or municipalities and Taiwan. The species are listed according to beetle families, subfamilies, genera, subgenera and species. The species are arranged alphabetically under genera or subgenera when applicable. All genera and subgenera are in bold case and are listed with the original citation only, including year and page number and the type species. The species are listed with the original citations and with the abbreviation list of countries with published geographic records. Synonyms are indented and follow the same manner of presenting data as for the valid species. At the end of Volume 2 there is a full list of references cited in the text and the index of families and tribes followed by the index listing genera and subgenera including synonyms in italics with page references to the main body of the text. The presented data are straightforward and easy to use. I particularly like the fact that only the original citations are presented, which makes the most important data instantly retrievable and cuts down on additional volume. The catalogue is meticulously executed. It is a monumental work and very timely published. We should all be thankful to the editors and the authors for

this magnificent contribution. I highly recommend this and the future volumes to all coleopterists as the basic references on Palaearctic beetles. Congratulations to the authors and particularly the editors regarding the first two volumes for a mission successfully accomplished.

Jan Klimaszewski
Canadian Forest Service,
Laurentian Forestry Centre, Sainte-Foy, Que.

Books to be reviewed

If you are interested in reviewing one of the following books, please contact Allan Carroll, Chair of the Publications Committee.

- Acorn, J. 2004. Damsel flies of Alberta: Flying neon toothpicks in the grass. University of Alberta Press, Edmonton. 156 pp.
- Anderson, N.M., and Weir, T.A. 2004. Australian water bugs: Their biology and identification (Hemiptera-Heteroptera, Gerromorpha & Nepomorpha). Apollo Books, CSIRO Publishing, Australia. 344 pp.
- Ben-Dova, Y., and German, V. 2003. A systematic catalogue of the Diaspididae (armoured scale insects) of the world, subfamilies Aspidiotinae, Comstockiellinae and Odonaspidinae. Intercept Limited, Scientific, Technical and Medical Publishers, Andover, Hampshire, UK. 1111 pp.
- Gullan, P.J., and Cranston, P.S. 2005. The insects: An outline of entomology. Blackwell Publishing, Oxford, UK. 505pp.
- Hajek, A. 2004. Natural enemies: An introduction to biological control. Cambridge University Press, New York, NY. 378 pp.
- Heckman, C.W. 2003. Encyclopedia of South American aquatic insects: Plecoptera. Kluwer Academic Publishers. 329 pp.
- LaFontaine, J.D. 2004. Noctuoidea, Noctuidae (Part): Noctuinae, Agrotini, *In*: Hodges RW (Editor) The moths of America North of Mexico. Fascicle 27.1. The Wedge Entomological Research Foundation, Eugene, OR. 385 pp.
- Neunzig, H.H. 2003. Pyraloidea, pyralidae (Part), phycitinae (Part), *In*: Dominick, R.B. et al. (Editors) The moths of America North of Mexico. Fascicle 15.5. The Wedge Entomological Research Foundation, Eugene, OR. 338 pp.
- Russell, S.A. 2004. An obsession with butterflies. Basic Books, Perseus Books Group, NY. 238 pp.
- van Emden, H.F., and Service, M.W. 2004. Pest and vector control. Cambridge University Press, New York, NY. 349 pp.

Send correspondence concerning book reviews to the Chair of the Publications Committee:

Allan Carroll
506 West Burnside Rd, Pacific Forestry Centre
Victoria, BC, Canada V8Z 1M5
Tel: (250) 363-0639, Fax: (250) 363-0775
E-mail: acarroll@pfc.cfs.nrcan.gc.ca

Meeting announcements / Réunions futures

The 9th International Conference of the Orthopterists' Society

Canmore, Alberta, Canada, 14-19 August 2005
Contact: Dan Johnson, dan.johnson@uleth.ca
<http://www.orthoptera2005.org>

International Symposium on Biological Control of Arthropods

Davos, Switzerland, 12-16 September 2005
<http://www.cabi-bioscience.ch/ISBCA-DAVOS-2005/>

52nd Annual Meeting of the Entomological Society of America

Fort Lauderdale, USA, 6-9 November 2005
http://www.entsoc.org/annual_meeting/2005/index.html

International Symposium: Integrated Pest Management in Oilseed Rape

University of Göttingen, 3-5 April 2006
<http://www.symposium-ipm-oilseed-rape.de>

Alfred Pibus Arthur 1924-2005

Alf Arthur died in Saskatoon on 9 March 2005, six days before his 81st birthday. He is survived by his wife, Betty, six children, 15 grandchildren and a great granddaughter.

Alf was born on the family farm near Knowlton, south-eastern Quebec, 15 March 1924, to Fred and Grace Arthur. As a young child he developed an interest in butterflies, killing and pressing them in the thick, absorbent pages of his ABC book. He continued his fascination for things entomological by studying at Macdonald College (McGill) (BSA, 1949), Michigan State (MSc, 1951), and Ohio State (PhD, 1956). From 1947 to 1972, Alf worked at the Dominion Parasite Laboratory in Belleville, Ontario, initially as a summer student, then as a research scientist. During this period, Alf described the immature stages and habits of several parasitoids of forest pests. He also investigated host-parasitoid relationships, specifically the importance of associative learning and the influence of kairomones on host acceptance and oviposition responses by the ichneumonid, *Itopectis conquisitor*, which uses the prepupal/pupal stages of a wide range of exposed and semi-exposed Lepidoptera.

When the Belleville lab closed in 1972, Alf was transferred to the Canada Agriculture Research Station on the University of Saskatchewan campus, Saskatoon. Here he continued his work on host-parasitoid interactions, but now focused on the parasitoids of bertha armyworm (*Mamestra configurata*) and other oilseed crop pests. In addition, he examined the potential of *Bacillus thuringiensis* as a microbial control agent against these pests. As a result of his studies, the European braconid wasp, *Microplitis mediator*, was released in Alberta and Saskatchewan in the 1990s to enhance the management of bertha armyworm.

By his retirement in March, 1989, Alf had published more than 40 refereed papers and some 50 reports and other articles. In addition he acquired two pheromone patents. As an indication of his standing, two species have been named in his



honour: a sunflower moth, *Cochylis arthuri* Dang 1984 and its braconid parasitoid *Bassus arthurellus* Sharkey 1985.

Alf was an avid collector, not only of insects, but also of rocks and stamps. He was especially interested in stamps portraying insects, accumulating some 4000 of these, including more than 2000 featuring Lepidoptera.

Cedric Gillott
Saskatoon, Saskatchewan



Ralph Underwood

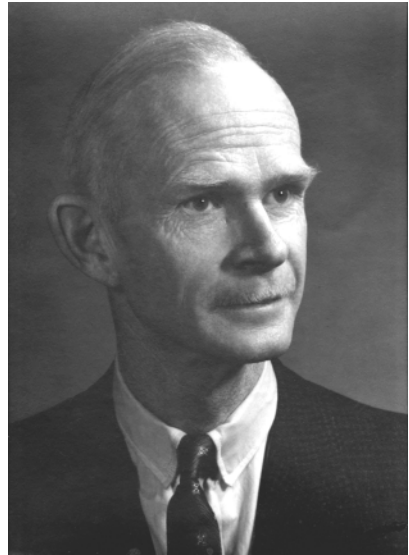
Sunflower moth, *Cochylis arthuri* Dang 1984

Anthony William Aldridge Brown 1911-2005

Anthony Brown, known to friends and colleagues as "Tony", died at Morges, Switzerland on 17 February 2005 in his 94th year. By virtue of his intellectual abilities and disciplined work ethic he enjoyed a distinguished career as an entomologist, researcher, teacher, professor/administrator and as a consultant at home and abroad on the control of mosquitoes and insect vectors of diseases. He served Canada and his discipline with distinction and was awarded an MBE in 1946 for his wartime service in defence research and was elected a Fellow of the Royal Society of Canada in 1961.

He was born in England at Horley in Surrey 18 November 1911 where he obtained his formal schooling culminating in a classical education at Winchester College 1925-1929. Tony emigrated to Canada at age 17 and entered Trinity College at the University of Toronto. Academic life posed no difficulties for him as he was an excellent student. On the other hand supporting himself during the Depression with limited financial resources was not easy but he managed to obtain support from adventurous summers spent "riding the rails" across the Prairies and along the way obtaining farmwork. For all his life thereafter Tony worked hard for all his goals and this paid off in accomplishment doing the science he enjoyed.

The basis for his lifelong study of insect physiology and applied entomology was established by his doctoral studies in the Department of Biochemistry, University of Toronto, where he gained his PhD in 1936 for an investigation of nitrogen metabolism in flesh-flies. He continued this work in the UK in 1936-37 at the London School of Hygiene and Tropical Medicine where he worked in the laboratory of Sir Vincent B. Wigglesworth and was supported by a Research Fellowship from the Royal Society of Canada. He returned to Canada to become Sessional Lecturer in Entomology at Macdonald College, McGill University. In 1938, he accepted a position with the Canada Department of Agriculture where he was appointed as Assistant Entomologist and served as the Di-



rector of the Forest Insect Survey in the Gatineau River region of Quebec from 1938-1942. Throughout this period he maintained a broad interest in nature through his service as Editor of the *Canadian Field-Naturalist* from 1939 to 1942. At that time Canada's involvement in WW II had advanced to include a Directorate of Chemical Warfare in association with the Department of National Defence and the National Research Council; this national effort had by 1941-42 become engaged with their British counterparts in the formation of the Suffield Experimental Station for research in "Chemical Warfare and Smoke" and other matters of military significance including biological warfare and insect vectors of diseases. At this time he joined the Canadian Army as Lieutenant and was assigned to the Department of National Defence where he subsequently rose to the rank of Major in the Directorate of Chemical Warfare (Defence Research Board). He was appointed Head of the Entomological Section of the National Defence Experimental Station in Suffield, Alberta in 1945 where he remained until 1947. With this experience and knowledge of worldly problems, it is not surprising that he became involved in field studies and the application of his knowledge and skills to

solving insect control problems in far off places, such as Sudan, where he acted on behalf of the World Health Organisation.

In 1947, Detwiler at the University of Western Ontario persuaded him to join the Department of Zoology as Associate Professor to undertake entomological research and teaching. There is reason to believe that this relatively senior scientist was hired because of his potential, as he was appointed Head and Professor of Zoology in 1949 on the retirement of Detwiler, a position he would hold until 1968. This initiated a new and active phase of his career in which he took his responsibilities seriously: he became known for encouraging excellence in teaching, developing the strengths of the Department with quality appointments, encouraging the research careers of his colleagues, being productively involved himself in research, and in writing papers and books. The people he worked with at the time remember him as a patient and helpful senior colleague with a strong sense of what the Department was about and what was needed for success. He strongly believed in the principle that individual faculty members should have complete freedom in determining what was included in their courses and how they were taught. His work with insects attracted much attention and served to put the Department of Zoology 'on the map', the result being that the Department of Zoology was one of the first in the University to welcome a large and diverse group of international students.

During his time at UWO his research shifted significantly from insect biochemistry and physiology, especially nitrogen metabolism, to problems involving the attraction of biting insects to human subjects, mechanisms of pesticide action, the ever increasing problem of pesticide resistance, and the use of pesticides in forestry, agriculture, and the control of insect vectors of human diseases. This shift must have been stimulated in part by his army responsibilities concerning troops in areas noted for malaria, dengue fever and the like. These activities are reflected in his papers and particularly in the titles of the books and reviews he wrote in the 50's and 60's: *Insect Control by Chemicals*, *Medical and Veterinary Entomology*, *Insecticide Resistance in Arthropods*, *Mechanisms of Resistance against Insecticides*, and *Factors in the Attractiveness of Bodies for Mosquitoes*. One of the most significant scientific contributions by the Brown lab was the clear demonstration of the genetic basis of insect resistance to insecticides. Brown's research team was the first to identify the chromosomal loci responsible for DDT- and cyclodiene-resistance. Another significant contribution was the use of biochemical studies to determine the mechanism of insecticide resistance. His group was the first to identify the altered carboxylesterase responsible for malathion resistance in several species of mosquitoes. This effort is regarded as one of the earliest studies to employ biochemical genetics and molecular biology techniques for the investigation of insect resistance against insecticides. He was an authority and sought as such by the World Health Organisation who accorded him the position of Biologist while he was on special leave of absence 1956-1958. Following that period in Geneva he returned to the University to continue his researches on toxicity and repellancy of various organic compounds and the resistance of many insects to insecticides then in use. This was the beginning of wider associations and many other consultancies were the result, including the US Public Health Service.

After leaving UWO in 1968 he joined the World Health Organisation where he became Head of the Vector Ecology Section in Geneva, Switzerland. He served in that position from 1969 to 1973 when he was appointed Director of the Pesticide Research Center at Michigan State University and John A. Hannah Distinguished Professor. He was now in the enviable position of having a dedicated research group and more freedom for consultancy on a world scale. This enabled him to expand his interests in the ecology of pesticides and to take advantage of his experience in field problems of choice, distribution, and tactics relevant to large-scale insect control involving aerosols, aircraft, natural features such as rivers, and more. He retired from Michigan State University in 1976 as the John A. Hannah Distinguished Professor Emeritus.

His scientific career brought many honours including the MBE (military) for his wartime

services. He was elected a Fellow of the Royal Society of Canada in 1961 and was awarded the Entomological Society of Canada Gold Medal for Achievement in 1963. He was elected President of the Entomological Society of Canada (1962), the American Mosquito Control Association (1965), the Entomological Society of America (1967), and the Canadian Society of Zoologists (1968). He was made a Fellow of the Entomological Society of Ontario (1969) and held honorary membership in the Entomological Society of America.

In June 1938, following his year at Macdonald College, he married Jocelyn Evill in London, England. They returned to Canada and made their home in Ottawa during his years with Canada Agriculture and the Army service and subsequently in Suffield, Alberta and then in London, Ontario and East Lansing, Michigan. It was at that time that Tony and Jocelyn built a summer cottage on Dwight Bay of Lake of Bays where they spent many happy summer vacations and other occasions with their three daughters (Hilary, Virginia and Kathryn). In home or cottage they welcomed friends and visiting colleagues and were generous, lively and amusing hosts for guests of all ages. Those meeting with them at the lake gained the fruits of Tony's experience as a forester and naturalist which added much to every visit. On retirement they moved to Switzerland, which was more than reasonable considering their many long and short visits to that country and his continuing association with the World Health Organisation after their move. They enjoyed the countryside and the mountains, including skiing in their younger years, and the relative proximity to colleagues and friends in the nearby countries of western Europe. They settled down in the village of Genolier in the Canton of Vaud, about half way between Geneva and Lausanne, in a house with an elegant prospect and in a countryside full of vineyards.

It was a fulfilling, varied and interesting life from beginning to end; a good friend and colleague at every stage of it.

John Steele
London, Ontario
University of Western Ontario

Recently deceased Compiled by Ed Becker

Norman Eugene Alexander (1112 Balmoral Rd., Victoria BC, V8T 1B1) died on 17 December 2004, at age 72. Norman worked as a ranger for the Federal Forest and Disease Survey and later taught for many years at the British Columbia Institute of Technology.

Duncan John McDonald (6955 North Green Lane, Flagstaff AZ 86001-8166, U. S. A.) died on 22 January 2005 at age 85. Duncan was born and raised on the family farm in Glengarry County, Ontario. He graduated from Macdonald College in 1939 in entomology and his primary interest was Lepidoptera. He had various jobs in Asia, Africa, Europe and North America. He finished his career at Middlebury College in Vermont. Duncan went to Oxford University on a Rhodes Scholarship and liked to boast that he beat out a fellow Canadian named Pierre Elliott Trudeau!!! Duncan was the uncle of Marg Mulligan.

Ed Swales, husband of Lois (2011 - 13th Avenue S., Lethbridge AB, T1K 0S4, 403-328-2212) died on 25 April 2005 according to information from Bud McGinnis. Ed was diagnosed with cancer a year ago and underwent chemotherapy, which was difficult for him. Born in Winnipeg, Ed worked at Summerland and Victoria Research Stations before joining Lethbridge Research Station (1947 - 1980). His early work was with greenhouse and market garden pests, particularly the biology and control of cabbage root maggot. Later with cutworm control and use of pheromones for predictions of outbreaks.

Bev Smallman, husband of Sue (364 Emard Street, Kingston ON, K7P 3E1, 613-547-8181) died on 5 May 2005. Bev was born in 1913 and would have been 92 on 11 December. He was a Research Scientist and administrator with Agriculture Canada in Winnipeg and Ottawa, before becoming head of the Biology Department at Queen's University.

David Oswald Greenbank 1924-2005

The last time I saw Dave he was in York Manor, a Fredericton nursing home. He seemed to enjoy my visit, although we were not close, and Dave was always a rather private person. Dave spent his entire working career in Fredericton with the Canadian Forestry Service and its antecedent Forest Biology Division of Agriculture Canada. It was pretty obvious he loved his work because the wall behind his bedside table was adorned with photos of aircraft, radar equipment and colleagues from CFS, Forest Protection Ltd., the Cranfield, England, Inst. of Technology, and other agencies involved in his biggest entomological project. But I get ahead of my story.

Dave was born in Yorkshire, England, 6 August 1924. He lost his mother at a young age, his father remarried, and he was educated in a boarding school, where he excelled at rugby and football (soccer). He emigrated to Canada shortly after the war and graduated from the University of New Brunswick with a BSc in Forestry in 1950. He earned an MScF at University of New Brunswick in 1954.

During World War II, Dave served in the Royal Navy, Fleet Air Arm, in which he piloted aircraft based on carriers. He trained for this in Pensacola, Florida. He didn't speak of actions against Germany, but did tell one story about the aircraft carrier, H.M.S. Venerable, being torpedoed in the Irish Sea, when all the planes were airborne. They had to find places to land in Ireland and Scotland.

His ship was reassigned to the Eastern Theatre where in one sortie the planes were told to make one pass and then return. The commanding officer and the adjutant made a second pass and were shot down, leaving the squadron without a commanding officer until a new one arrived from Britain. He completed his service participating in the occupation of Hong Kong after the Japanese surrender. He took charge of reactivating a brewery that had been idled by the Japanese because they preferred their own to British beer.

When I arrived at "the Lab" Dave was study-



ing the cold hardiness of his fellow immigrant, the balsam wooly adelgid. His results were applicable in the forecasting of the spread of this insect in the Maritimes and the relative incidence of gout (top deformation) and stem attack. The late Reg Salt at Lethbridge was a key contact in this work.

Dave later joined the spruce budworm project where he studied the influence of climate on survival and, in particular, mass flights. He demonstrated that weather systems sustained mass flights such that gravid moths were transported to uninfested stands. This led to the so-called "radar project" which involved the detection of mass flights for purposes of prediction of outbreaks and spread. In the backs of their minds was the possibility of spraying the moths in the air and avoiding the necessity of spraying extensive stands to kill larvae later.

All of this work resulted in a number of publications and reports, including an ESC Memoir on spruce budworm moth flight and dispersal, which reported new understanding from observations in the tree canopy, by radar and from aircraft.

He never lost interest in physical activities: expertise in curling became an obsession, he played a mean game of squash, and he once got a hole-

in-one at golf.

Dave was predeceased by his first wife, Jane, in 1950, and his second wife Jean, in 1997. Surviving are daughters Susan, Cindy and Heather, sons Jonathan and Michael, their spouses, and ten grandchildren.

We retirees see one another less often as time passes. Nonetheless it will take some getting used to Dave not being there any longer.

Douglas Eidt

Frederickton, New Brunswick

(with help from David's former colleagues and his son Michael)

Seeking Assistant *Bulletin* Editor

The Entomological Society of Canada is looking to fill the position of Assistant *Bulletin* Editor. The duties would cover, but not be limited to, finding new material for the *Bulletin*, taking charge of some of the columns and proof-reading galley. The ability to work in both French and English would be an asset. The Assistant *Bulletin* Editor would be a Trustee of the Society and a member of the Governing Board. Please express your interest in the position to *Bulletin* Editor, Paul Fields (for contact details see the inside of the back cover), by **31 July 2004**. The final selection will be made by an ad hoc committee convened by the President of the ESC, Bob Lamb.

À la recherche d'un assistant ou assistante à la rédaction

La société d'entomologie du Canada cherche à combler le poste d'assistant à la rédaction du *Bulletin*. Les tâches comprennent, entre autres, la recherche de matériel neuf pour le *Bulletin*, la responsabilité de certaines sections et la révision la révision des épreuves. La capacité de travailler en français et en anglais serait un atout. L'assistant à la rédaction serait un fiduciaire de la Société et membre du conseil d'administration. Si ce poste vous intéresse, veuillez communiquer avant le **31 juillet 2004** avec le rédacteur du *Bulletin*, Paul Fields, dont les coordonnées figurent à l'intérieur de la page dernière de ce numéro. La sélection finale sera faite par un comité ad hoc convoqué par le président de la SEC, Bob Lamb.

Entomologists at work / Entomologistes au travail

We were after general water beetles living in stream habitats. However, I had noticed some rather large black beetles flying up the middle of the stream channel. So I decided to jump into the pool to try and collect them. It turned out that they were specimens of Elmidae, in the subfamily Larinae known as cascade beetles, and in the genus *Disersus*. These beetles move from cascade to cascade up the stream channel. There are, of course, easier ways to collect them, but probably no way that is more fun than to get into the pool itself on a hot tropical day!

Rob Roughley



Paul Johnson

Rob Roughley in a stream collecting water beetles in Costa Rica.

This is a new column celebrating the crazy, stupid and novel things that we get to do as entomologists. Send me your stories and photos of the lengths that you went to collect a particular insect or run an exceptional experiment.

Editor

Interim meeting of the Executive Council

Rick West, Secretary

Strategic Review

The following sub-committees have been struck and are chaired by members of the Executive Council:

Sub-committee Chairs:

Implications of information technology: Dan Quiring, First Vice-President

Membership: Charles Vincent, Past-President

Finance: Peggy Dixon, Second Vice-President

Progress as a result of 1996 review: Bob Lamb

Members are encouraged to send any comments or suggestions to President Lamb or the sub-committee chairs.

Strategic Review timeline

All subcommittees are expected to have recommendations prepared by the Annual General Meeting; however, further discussion and approval by the Board, and in some cases the membership, will be needed before the recommendations are implemented.

Treasurer

The Society is in good shape financially and a balanced budget is expected for 2006. The NRC contract needs to be renegotiated in 2005 and before the Strategic Review is completed. While a long-term contract is preferred, the Society will only negotiate a one-year contract this year because the Strategic Review is expected to recommend several changes to the present contract.

Bulletin Editor

Lucie Royer has resigned as Assistant Editor. The *Bulletin* Editor will try to find a replacement by the end of June 2005.

Web site

Several improvements have been made including a new look to the main page. The design of the web site is being reviewed by the Strategic Review Committee and the web master. D. Quiring is preparing a list of Criddle Award winners

and will forward this to B. Lyons for posting on the web site. B. Lyons has constructed an awards section with current and past recipients and will add award criteria and nomination processes provided by the Awards Committee.

Publications Committee

With the implementation of the new photo-based format for the covers of both *The Canadian Entomologist* and the *Bulletin*, there is now a requirement for a source of original images for each new volume. The committee has agreed to solicit, screen and select candidate photos from the membership (via the *Bulletin*), to be displayed at the AGM, that represent the breadth of entomology in Canada. Each of the action items identified at the 2004 Annual General Meeting are currently being addressed. On issues of copyright, ongoing consultations with the Editor-in-Chief continue. Lower page charges and higher institutional subscription rates are being considered by the Strategic Review Finance Sub Committee in consultation with the Publications and Finance Committees. By comparison with societies similar to the Entomological Society of Canada, *The Canadian Entomologist* is being subscribed by institutions at bargain rates.

Achievement Awards Committee

Regional Directors are encouraged to ask their societies to nominate outstanding entomologists for the Gold Medal and C. Gordon Hewitt awards.

Bylaws, Standing Rules and Committee Guidelines Committee

The Committee noted that Committee Guidelines contain a range of restrictions concerning committee membership, probably reflecting the historical development of individual committees. As it is increasingly difficult to find, and retain, committee members, guidelines for more of the Society's committees that simply state "One year with no limitations on reappointment" (as is the case, for example, with the Fund Raising and Headquarters Committees) are recommended. Obvious exceptions are those committees where member turn-over is required to ensure a lack of conflict of interest, such as in the Nominating and

Achievement Awards Committees. Less restrictions for some committees would help Chairs hang on to willing and capable committee members. Committee Chairs are asked to advise the Board if changes in terms of appointment for the members of their committee, as written in the Committee Guidelines, need to be changed.

Heritage Committee

D. Quiring will contact C. Gillott for help in completing the list of Criddle Award Winners.

Insect Common Names and Cultures Committee

C. Buddle has been in discussions with Wayne Gall of the Entomological Society of America Common Names Committee who recommends that the ESC's Common Names Committee sit as an *ex-officio* member of the Entomological Society of America's Common Names committee. The Executive Council agrees and recommends that the Chair of the ESC's Common Names Committee sit as an *ex-officio* member of the Entomological Society of America's Common Names Committee.

Membership Committee

Membership numbers appear to be stabilizing. President Lamb will send a letter to lapsed members. The Strategic Review Committee Subcommittee on Membership will work with the Membership Committee and Regional Directors to develop strategies for renewing memberships.

Membership Paid through A-Base and Educational Funding

The Executive Council decided to leave this issue in the hands of the union representing federal scientists. Given that the cost of a membership is less than two day's per diem and a tiny portion of a government worker's salary, ESC regular membership fees are not considered to be onerous.

Free Memberships for Entomologists in Developing Nations

President Lamb received a request for a free membership from a Cuban entomologist and will

contact Sandy Devine regarding a donation of the journal by members who have not opted to receive the printed version of *The Canadian Entomologist*.

Science Policy Committee

The Entomological Society of British Columbia was awarded \$600 to fund 10-15 small grants to school teachers to purchase equipment and supplies for entomological class projects. The Entomological Society of Manitoba was awarded \$200 to assist with the purchase of educational materials and supplies and to upgrade rearing equipment necessary for insect colonies used in school programs. The role of the ESC in the Canadian Academies of Science is still under review. The nomination of ESC members for external awards such as NSERC's Gerhard Herzberg Canada Gold Medal for Science and Engineering has been dropped as an issue as the Society is having difficulty obtaining nominations for its own Awards (Gold Medal and C. Gordon Hewitt). Solicitation of external funding is still under review. President Lamb will donate \$500 from his discretionary fund to the Zoological Trust and work with the Biological Survey of Canada (Hugh Danks) to lobby for international support for the Trust's work (international nomenclature).

Student Affairs

Email reminders and notes in the student section of the *Bulletin* have been placed to encourage students to produce web pages on their entomological research for the ESC website. The student committee and student members have started the task of updating the Directory of Entomological Information in Canada. The Student Affairs Committee will take the lead on raising money for the Scholarships Fund through silent auctions of donated books at annual meetings.

Marketing Committee

A strategy to market the book in the USA is being developed. President Lamb will donate \$200 from his discretionary fund to the Manitoba Naturalists Society in aid of a meeting of 700 of their members. In return he will ask that the ESC be allowed to sell copies of *Diseases and Pests of*

Vegetable Crops (DPVCC) book and memberships at this meeting. P. Fields and President Lamb have access to a quality scanner that can create PDF files and will work with the Marketing Committee and the Canadian Phytopathology Society to produce, price, promote and sell CDs of the French language version of the DPVCC book.

Annual Meeting Committee

The committee is asked to obtain and provide organizing committees with a list of the Entomological Society of America meeting dates. As these dates are set five years ahead of time, JAMs should

be scheduled so as not to coincide with Entomological Society of America conferences. President Lamb will contact John Acorn (ESA) regarding space to sell ESC memberships at the registration desk at this year's JAM.

Entomological Society of America's International Affairs Committee.

Charles Vincent and Felix Sperling sit as members of the Entomological Society of America's International Affairs Committee and would welcome comments and suggestions regarding annual conferences such as the 2005 convention in Fort Lauderdale as well as planning for the International Congress of Entomology to be held in the USA in 2012.

55th Annual General Meeting and Governing Board Meeting

The Annual General Meeting of the Entomological Society of Canada will be held at Radisson Hotel, Canmore Alberta on Friday, 4 November 2005, 17:15-18:30. The Governing Board Meeting will be held at the same location on Wednesday, 2 November 2005 from 8:30 to 16:30. Matters for consideration at either of the above meetings should be sent to Rick West, Secretary of the ESC.

55^e L'assemblée générale annuelle et la réunion du comité directeur

L'Assemblée générale annuelle de la Société d'entomologie du Canada aura lieu au Radisson Hotel, Canmore Alberta, le vendredi, 4 novembre 2005 à 17:15-18:30. La Réunion du comité directeur de la SEC aura lieu au même endroit le mercredi, 2 novembre 2005 de 8:30 à 16:30. Veuillez faire part au secrétaire, Rick West, de tout sujet pouvant faire l'objet de discussion à ces réunions.



Can you name this famous Canadian Entomologist? Please send your answers to Editor, by the end of July, 2005. The answer along with the names of the people that gave the correct answer will be in the next issue of the *Bulletin*. If you have an obscure photo of a Canadian entomologist, please send it along to challenge our readers.

Concours annuel de photographie

La Société d'entomologie du Canada est fière d'annoncer le premier concours annuel de photographie. En 2005, *The Canadian Entomologist* et le *Bulletin de la Société d'Entomologie du Canada* ont lancé un nouveau format pour leurs deux publications, impliquant entre autres des images en couleur sur les pages couvertures. Ces images ont pour but de représenter l'ampleur de l'entomologie couverte par les publications de la Société. Ces images seront changées à chaque nouveau volume.

Les règlements du concours sont les suivants :

1. Les photos peuvent être soumises sous forme de fichier électronique (de préférence), de diapositive ou d'imprimé (le négatif sera requis si la photo est choisie). Les images numériques doivent avoir une résolution minimale de 50 pixels/cm.

2. Les concurrents peuvent soumettre plus d'une photo.

3. Les photos doivent avoir été prises par le concurrent, ou ce dernier doit en posséder les droits d'auteur.

4. Les droits d'auteur de la photo demeurent au concurrent, mais l'utilisation doit être accordée à la Société d'Entomologie du Canada pour son utilisation sur la couverture d'un volume (i.e. 6 numéros) dans *The Canadian Entomologist*.

5. Le concurrent doit être un membre en règle de la Société d'entomologie du Canada.

6. Le jury d'évaluation sera choisi par le président du Comité des publications.

7. Les photos n'ont pas à être restreinte à des " portraits " d'insectes. Afin de représenter l'étendue des recherches en entomologie, nous encourageons les photographies de terrain, d'expériences de laboratoires, d'impacts des insectes, d'équipement d'échantillonnage, d'arthropodes non insectes, etc. S.V.P., fournir quelques lignes décrivant la photographie.

8. Une sélection des candidats sera exposée et les gagnants seront annoncés à la réunion conjointe annuelle de la Société d'entomologie du Canada et de l'Alberta à Canmore, en Alberta, du 2 au 5 novembre 2005.

9. Il n'y a pas de récompense monétaire pour les gagnants, mais les photographes seront remerciés dans chacun des numéros où les photos apparaîtront.

10. Les soumissions doivent être envoyés avant le 1 septembre 2005 à :

Allan Carroll
Président du Comité des publications
506 West Burnside Rd
Pacific Forestry Centre
Victoria, BC, Canada V8Z 1M5
Tél: (250) 363-0639, Fax: (250) 363-0775
Courriel: acarroll@pfc.cfs.nrcan.gc.ca



Steve Marshall

Scholarship Fund

Once again the Society would like to thank and acknowledge the very generous donors to the ESC scholarship fund. Donations to the scholarship fund totaled \$38 349 in 2004. The tax-deductible donations are very important to the Society. The scholarship fund generated \$7530 in interest during 2004, but \$8750 in scholarships and travel grants were awarded. In 2005, \$9000 in awards will be granted. It is only because of your generosity that the scholarship fund is self sustaining. Donations can be made at any time and a receipt for income tax purposes in Canada will be issued. Please make cheques payable to the Entomological Society of Canada.

2004 Scholarship donors

L. Andreassen	D.R. Gillespie
J. Borden	R. Harmsen
J. R. Byers	P. Harris
D. A. Chant	N. J. Holliday
L. Chong	R. P. Jaques
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B. J. Cooke	S.R. Loschiavo
C. Cutler	M. E. MacGillivray
A. T. Drooz	K. Mackenzie
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D. C. Eidt	S. Neff
W. Fairchild	D. Peschken
P. Fields	T. Poland
S. Fitzpatrick	E. B. Radcliffe
R.S. Forbes	L. Rankin
J. Gavloski	B. Roitberg
G. Gibson	J. D. Shorthouse

Fonds de bourses d'étude

La Société voudrait remercier, une fois de plus, les généreux donateurs et généreuses donatrices au Fonds de bourses d'étude de la SEC. Nous avons reçu un total de \$38 349 en 2004. Les dons déductibles d'impôt sont très importants pour la Société. Le Fonds de bourses d'étude a généré \$7530 d'intérêt en 2004, mais \$8750 en bourses d'étude et de voyage ont été attribués. En 2005, \$9000 seront attribués en bourses. C'est seulement grâce à votre générosité que le fonds peut être autosuffisant. Les dons peuvent être faits pendant toute l'année, et un reçu pour fin d'impôt vous sera envoyé. Veuillez libeller votre chèque à la Société d'entomologie du Canada.

Donateurs et donatrices 2004

R. F. Smith
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 J. Sweeney
 D. L. Wood
 P. W. Wood

AgCord
 Bayer Crop Science
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 ESC/ESBC Joint Annual Meeting
 BASF Canada Agricultural Products Inc.
 Photo Research Inc.
 Syngenta Crop Protection Canada Inc.

...and those who preferred to remain anonymous
 ..et ceux et celles qui on donne de façon anonyme



Steve Marshall

**MCCAY, DUFF
& COMPANY LLP**

CHARTERED ACCOUNTANTS

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AUDITORS' REPORT

To the Members,
Entomological Society of Canada.

We have audited the non-consolidated balance sheet of the Entomological Society of Canada as at December 31, 2004 and the non-consolidated statements of revenue and expenditure - General Fund, surplus and cash flows for the year then ended. These financial statements are the responsibility of the Society's management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we plan and perform an audit to obtain reasonable assurance whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation.

The Society accounts for its investment in a joint venture using the cost method. Canadian generally accepted accounting principles require that investments in joint ventures be accounted for using the proportionate consolidation method. Had the proportionate consolidation method been used, assets would have increased by \$1,183 and surplus would have increased by \$21,138.

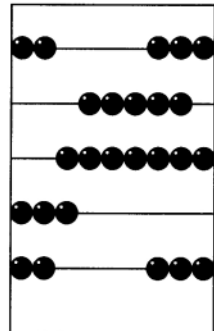
In our opinion, these non-consolidated financial statements present fairly, in all material respects, the financial position of the Society as at December 31, 2004 and the results of its operations and cash flows for the year then ended in accordance with Canadian generally accepted accounting principles, except that they are not prepared on a proportionate consolidated basis as described in note 5. As required by the Canada Corporations Act, we report that, in our opinion, these principles have been applied on a basis consistent with that of the preceding year.

McCay Duff & Company LLP

Chartered Accountants

Ottawa, Ontario,
March 24, 2005.

THOMAS W. HOWARTH, CA
BRYAN E. SULLIVAN, CA
ALBERT G. MONSIEUR, B.ADMN, CA
BLAIR E. DAVIDSON, B.COMM, CFP, CA
G. WARREN TRICKEY, B.COMM, CA
ROBERT D. SHANTZ, B.MATH, CA
MARGARET N. EGAN, B.ADMN, CA, C.I.M.



**ENTOMOLOGICAL SOCIETY OF CANADA
BALANCE SHEET
AS AT DECEMBER 31, 2004**

		ASSETS					
CURRENT	General Fund	Endowment Fund	Building Fund	Scholarship Fund	2004 Total	2003 Total	
Cash	\$ 121,244	\$ 11,618	\$ -	\$ 24,991	\$ 157,853	\$ 175,652	
Term deposit	96,164	-	-	6,679	102,843	120,925	
Accounts receivable	12,998	-	-	-	12,998	15,037	
Accrued interest receivable	3,692	1,431	-	1,845	6,968	6,106	
Prepaid expenses	8,297	-	-	-	8,297	2,208	
	242,395	13,049	-	33,515	288,959	319,928	
INVESTMENTS (note 4)	263,154	65,058	-	143,361	471,573	389,000	
INVESTMENT IN BOOK PROJECT (note 5)	19,955	-	-	-	19,955	25,955	
CAPITAL ASSETS (note 6)	-	-	149,935	-	149,935	154,515	
	<u>\$ 525,504</u>	<u>\$ 78,107</u>	<u>\$ 149,935</u>	<u>\$ 176,876</u>	<u>\$ 930,422</u>	<u>\$ 889,398</u>	
LIABILITIES							
CURRENT	\$ 30,818	\$ -	\$ -	\$ -	\$ 30,818	\$ 28,182	
Accounts payable and accrued liabilities	95,720	-	-	-	95,720	112,485	
Deferred revenue	126,538	-	-	-	126,538	140,667	
	398,966	78,107	149,935	176,876	803,884	748,731	
BALANCE - END OF YEAR	<u>\$ 525,504</u>	<u>\$ 78,107</u>	<u>\$ 149,935</u>	<u>\$ 176,876</u>	<u>\$ 930,422</u>	<u>\$ 889,398</u>	

Approved on behalf of the Board:

Governor

Governor

McCAY, DUFF & COMPANY LLP, CHARTERED ACCOUNTANTS

ENTOMOLOGICAL SOCIETY OF CANADA
STATEMENT OF SURPLUS
FOR THE YEAR ENDED DECEMBER 31, 2004

	<u>General Fund</u>	<u>Endowment Fund</u>	<u>Building Fund</u>	<u>Scholarship Fund</u>	<u>2004 Total</u>	<u>2003 Total</u>
BALANCE - BEGINNING OF YEAR	\$ 376,805	\$ 77,745	\$ 154,515	\$ 139,666	\$ 748,731	\$ 740,527
Net revenue (expenditure) for the year	24,487	362	(6,906)	37,210	55,153	8,204
Interfund transfers	(2,326)	-	2,326	-	-	-
BALANCE - END OF YEAR	<u>\$ 398,966</u>	<u>\$ 78,107</u>	<u>\$ 149,935</u>	<u>\$ 176,876</u>	<u>\$ 803,884</u>	<u>\$ 748,731</u>

ENTOMOLOGICAL SOCIETY OF CANADA
STATEMENT OF REVENUE AND EXPENDITURE - GENERAL FUND
FOR THE YEAR ENDED DECEMBER 31, 2004

	Canadian Entomologist		Society		2004		2003	
	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual
REVENUE								
Regular membership	\$ 14,250	\$ 13,160	\$ 14,250	\$ 13,160	\$ 28,500	\$ 26,320	\$ 28,220	\$ 28,220
Student membership	825	680	1,725	1,440	2,550	2,120	2,560	2,560
Emeritus	-	-	700	420	700	420	460	460
Subscriptions	102,480	98,011	25,620	24,503	128,100	122,514	112,155	112,155
Reprints	11,000	12,810	-	-	11,000	12,810	12,692	12,692
Page charges	33,100	33,510	-	-	33,100	33,510	33,758	33,758
Online fees	-	2,670	-	-	-	2,670	-	-
Back issues/Royalties	-	-	2,500	1,480	2,500	1,480	2,959	2,959
Sales of Memoirs	-	-	2,000	1,040	2,000	1,040	3,489	3,489
Sales of Arctic Arthropods and Bibliography	-	-	100	203	100	203	320	320
Gain (loss) on currency exchange	-	-	-	(662)	-	(662)	1,730	1,730
Translation/Extras	6,750	6,790	-	-	6,750	6,790	10,350	10,350
Office postage	-	-	3,500	2,688	3,500	2,688	2,977	2,977
Miscellaneous	-	-	5,000	5,483	5,000	5,483	172	172
REVENUE - Carry Forward	\$ 168,405	\$ 167,631	\$ 55,395	\$ 49,755	\$ 223,800	\$ 217,386	\$ 211,842	\$ 211,842

McCAY, DUFF & COMPANY LLP, CHARTERED ACCOUNTANTS

ENTOMOLOGICAL SOCIETY OF CANADA
STATEMENT OF REVENUE AND EXPENDITURE - GENERAL FUND
FOR THE YEAR ENDED DECEMBER 31, 2004

	Canadian Entomologist		Society		2004		2003	
	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual
REVENUE - Carried forward	\$ 168,405	\$ 167,631	\$ 55,395	\$ 49,755	\$ 223,800	\$ 217,386	\$ 211,842	
EXPENDITURE								
Publishing and mailing	112,500	101,127	-	-	112,500	101,127	107,145	
Reprint costs	9,000	7,288	-	-	9,000	7,288	8,791	
Bulletin publishing and mailing	-	-	20,000	9,422	20,000	9,422	19,902	
Salaries and benefits	18,425	18,438	18,425	18,438	36,850	36,876	35,794	
Editor's expenses	4,000	2,400	-	-	4,000	2,400	2,689	
Office and bank charges	5,000	5,616	4,500	4,980	9,500	10,596	11,344	
Online access	6,000	5,080	-	-	6,000	5,080	5,775	
Professional fees	2,500	3,700	2,500	3,700	5,000	7,400	4,750	
Prizes, awards, brochure	-	-	1,500	954	1,500	954	1,207	
Honoraria	2,000	2,000	2,750	2,750	4,750	4,750	4,750	
Committees	-	-	1,500	3,998	1,500	3,998	677	
Other organizations/Societies	-	-	1,850	2,432	1,850	2,432	500	
Annual Meetings:								
Grant	-	-	6,000	5,000	6,000	5,000	-	
Honorees	-	-	2,000	-	2,000	-	302	
Governing Board:								
Interim meeting	-	-	2,000	2,042	2,000	2,042	2,591	
Annual meeting	-	-	8,000	6,591	8,000	6,591	7,259	
Other meetings	-	-	1,500	279	1,500	279	373	
President's discretionary expenses	-	-	1,000	725	1,000	725	200	
General	-	-	-	272	-	272	1,366	
	<u>159,425</u>	<u>145,649</u>	<u>73,525</u>	<u>61,583</u>	<u>232,950</u>	<u>207,232</u>	<u>215,415</u>	
EXCESS REVENUE (EXPENDITURE) FROM OPERATIONS	8,980	21,982	(18,130)	(11,828)	(9,150)	10,154	(3,573)	
Interest on investments	-	-	16,050	14,083	16,050	14,083	13,639	
Gain (loss) on sale of investments	-	-	-	250	-	250	(431)	
NET REVENUE (EXPENDITURE) FOR THE YEAR	<u>\$ 8,980</u>	<u>\$ 21,982</u>	<u>\$(2,080)</u>	<u>\$ 2,505</u>	<u>\$ 6,900</u>	<u>\$ 24,487</u>	<u>\$ 9,635</u>	

McCAY, DUFF & COMPANY LLP, CHARTERED ACCOUNTANTS

ENTOMOLOGICAL SOCIETY OF CANADA
STATEMENT OF CASH FLOWS
FOR THE YEAR ENDED DECEMBER 31, 2004

	<u>2004</u>	<u>2003</u>
CASH PROVIDED BY (USED FOR)		
OPERATING ACTIVITIES		
Net revenue (expenditure) for the year		
- General Fund	\$ 24,487	\$ 9,635
- Endowment Fund	362	668
- Building Fund	(6,906)	(8,213)
- Scholarship Fund	<u>37,210</u>	<u>6,114</u>
	55,153	8,204
Items not involving cash		
- amortization	4,580	4,771
- (gain) loss on sale of investments	<u>(640)</u>	<u>431</u>
	59,093	13,406
Net change in non-cash working capital balances related to operations		
- accounts receivable	2,039	(3,244)
- accrued interest receivable	(862)	169
- prepaid expenses	(6,089)	1,344
- accounts payable and accrued liabilities	2,636	(3,247)
- deferred revenue	<u>(16,765)</u>	<u>14,518</u>
	<u>(19,041)</u>	<u>9,540</u>
	40,052	22,946
INVESTING ACTIVITIES		
Purchase of investments	(131,933)	(124,803)
Proceeds on disposal of investments	50,000	92,000
Decrease in Investment in Book Project	<u>6,000</u>	<u>4,600</u>
	<u>(75,933)</u>	<u>(28,203)</u>
INCREASE (DECREASE) IN CASH AND CASH EQUIVALENTS DURING THE YEAR	<u>(35,881)</u>	<u>(5,257)</u>
Cash and cash equivalents - beginning of year	<u>296,577</u>	<u>301,834</u>
CASH AND CASH EQUIVALENTS - END OF YEAR	<u>\$ 260,696</u>	<u>\$ 296,577</u>
CASH AND CASH EQUIVALENTS		
Cash	\$ 157,853	\$ 175,652
Term deposit	<u>102,843</u>	<u>120,925</u>
	<u>\$ 260,696</u>	<u>\$ 296,577</u>

McCAY, DUFF & COMPANY LLP, CHARTERED ACCOUNTANTS

ENTOMOLOGICAL SOCIETY OF CANADA

NOTES TO FINANCIAL STATEMENTS

DECEMBER 31, 2004

1. PURPOSE OF ORGANIZATION

The purpose of the Organization is to study, promote and advance the study of entomology through meetings, symposia and the publication of original research results. Entomological Society of Canada is incorporated without share capital under Part II of the Canada Corporations Act and is exempt from income taxes.

2. SIGNIFICANT ACCOUNTING POLICIES**(a) Accrual Basis of Accounting**

Revenue and expenditure are recorded on the accrual basis, whereby they are reflected in the accounts in the period in which they have been earned and incurred respectively, whether or not such transactions have been finally settled with the receipt or payment of money.

(b) Investments

Investments are recorded at cost, which is not in excess of market value.

(c) Capital Assets and Amortization

Capital assets are stated at cost, less accumulated amortization. Amortization is being claimed on the building at the rate of 4% on the reducing balance basis. All other capital asset additions are expensed as they are incurred.

(d) Volunteer Services

The Organization receives volunteer services, the value of which cannot be reasonably estimated. Therefore, no representation of these costs are reflected in the financial statements.

(e) Fund Accounting

The purpose of each fund is as follows:

General Fund

This fund accounts for the Society's primary operating activities.

Endowment Fund

The direction of the bequest, by which this fund was founded, states that without imposing any legal obligation, hope is expressed that the principal will not be eroded and that the income will be utilized to aid in the publication of the Canadian Entomologist.

McCAY, DUFF & COMPANY LLP, CHARTERED ACCOUNTANTS

ENTOMOLOGICAL SOCIETY OF CANADA

NOTES TO FINANCIAL STATEMENTS

DECEMBER 31, 2004

2. SIGNIFICANT ACCOUNTING POLICIES (Cont'd.)

(e) Fund Accounting (Cont'd.)

Building Fund

This fund was created through an appropriation from the General Fund to recognize the expenses of the building independent of operational expenditures. Prior Board approval has been given to appropriate from the General Fund an amount equal to the current year net expenditure in the Building Fund, excluding amortization on the building.

Scholarship Fund

This fund was created with the objective of awarding scholarships for post-graduate studies in entomology. The fund derives its revenue from donations and from the interest on the invested capital. The money is awarded in three different forms: scholarship for post-graduate studies, travel grant to subsidize student travel expenses incurred in relation to their post-graduate studies; or the Keith Kevan Scholarship which is a scholarship for post-graduate studies oriented toward systematics.

3. FINANCIAL INSTRUMENTS

Interest Rate Risk and Credit Risk

The Society's financial instruments consist of cash, term deposit, accounts receivable, accrued interest receivable, investments, investment in book project and accounts payable and accrued liabilities. Unless otherwise noted, it is management's opinion that the Society is not exposed to significant interest rate or credit risk.

Currency Risk

Currency risk is the exposure to the Society's earnings that arise from fluctuations in exchange rates. The Society is exposed to currency risk through accounts receivable. The Society monitors its foreign subscription rates to minimize its risk.

Fair Values

The carrying amounts reported in the balance sheet for cash and term deposits, accounts receivable, accrued interest receivable, investment in book project and accounts payable and accrued liabilities approximate fair values due to the immediate or short-term maturities of these financial instruments. Investments are recorded at cost with market value reported in note 4.

McCAY, DUFF & COMPANY LLP, CHARTERED ACCOUNTANTS

ENTOMOLOGICAL SOCIETY OF CANADA

NOTES TO FINANCIAL STATEMENTS

DECEMBER 31, 2004

4. INVESTMENTS

	<u>2004</u>	<u>2003</u>
General Fund		
Bonds, at cost (market value 2004 - \$274,740, 2003 - \$213,894)	\$ <u>263,154</u>	\$ <u>203,615</u>
Endowment Fund		
Bonds, at cost (market value 2004 - \$68,509, 2003 - \$69,688)	\$ <u>65,058</u>	\$ <u>64,749</u>
Scholarship Fund		
Bonds, at cost (market value 2004 - \$149,666, 2003 - \$126,052)	\$ <u>143,361</u>	\$ <u>120,636</u>

5. INVESTMENT IN BOOK PROJECT

The Entomological Society has invested in the joint project for the publication of "Diseases and Pests of the Vegetable Crop in Canada" in conjunction with the Canadian Phytopathological Society. Both revenue and expenditure are to be shared in an equitable manner. The investment is recorded using the cost method. For the December 31, 2004 fiscal period, no accrual was made for sales net of costs as it will be recognized as received. The remaining investment is expected to be recovered over the next few years.

6. CAPITAL ASSETS

	<u>2004</u>		<u>2003</u>	
	<u>Cost</u>	<u>Accumulated Amortization</u>	<u>Net</u>	<u>Net</u>
Land	\$ 40,000	\$ -	\$ 40,000	\$ 40,000
Building	<u>202,799</u>	<u>92,864</u>	<u>109,935</u>	<u>114,515</u>
	<u>\$ 242,799</u>	<u>\$ 92,864</u>	<u>\$ 149,935</u>	<u>\$ 154,515</u>

7. BUDGET INFORMATION

The budget figures presented for comparison are unaudited and are those approved by the Directors.

8. COMPARATIVE FIGURES

Certain comparative figures have been reclassified to conform with current financial statement presentation.

ENTOMOLOGICAL SOCIETY OF CANADA
 SCHEDULE OF ENDOWMENT FUND REVENUE AND EXPENDITURE
 FOR THE YEAR ENDED DECEMBER 31, 2004

	<u>2004</u>	<u>2003</u>
REVENUE		
Interest revenue	\$ 3,728	\$ 4,731
Gain on sale of investments	<u>309</u>	<u>-</u>
	4,037	4,731
EXPENDITURE		
Page charges and reprints	<u>3,675</u>	<u>4,063</u>
NET REVENUE FOR THE YEAR	<u>\$ 362</u>	<u>\$ 668</u>

McCAY, DUFF & COMPANY LLP, CHARTERED ACCOUNTANTS

ENTOMOLOGICAL SOCIETY OF CANADA
SCHEDULE OF BUILDING FUND REVENUE AND EXPENDITURE
FOR THE YEAR ENDED DECEMBER 31, 2004

	<u>2004</u>		<u>2003</u>
	<u>Budget</u>	<u>Actual</u>	<u>Actual</u>
REVENUE			
Rental income	\$ 6,700	\$ 6,690	\$ 6,760
EXPENDITURE			
Amortization	4,580	4,581	4,772
Insurance	1,100	1,531	1,227
Property taxes	5,100	5,392	5,012
Repairs and maintenance	2,500	869	1,991
Utilities	<u>2,150</u>	<u>1,223</u>	<u>1,971</u>
	<u>15,430</u>	<u>13,596</u>	<u>14,973</u>
NET RENTAL REVENUE (EXPENDITURE)			
FOR THE YEAR	<u>\$ (8,730)</u>	<u>\$ (6,906)</u>	<u>\$ (8,213)</u>

ENTOMOLOGICAL SOCIETY OF CANADA
SCHEDULE OF SCHOLARSHIP FUND REVENUE AND EXPENDITURE
FOR THE YEAR ENDED DECEMBER 31, 2004

	<u>2004</u>	<u>2003</u>
REVENUE		
Interest revenue	\$ 7,530	\$ 4,891
Donations	38,349	10,248
Gain on sale of investments	<u>81</u>	<u>-</u>
	45,960	15,139
EXPENDITURE		
Scholarship awards and travel grants	8,750	9,000
Service charges	<u>-</u>	<u>25</u>
	<u>8,750</u>	<u>9,025</u>
NET REVENUE FOR THE YEAR	<u>\$ 37,210</u>	<u>\$ 6,114</u>

McCAY, DUFF & COMPANY LLP, CHARTERED ACCOUNTANTS

AUDITORS' REPORT

To the Members,
Entomological Society of Canada.

We have audited the balance sheet of the Entomological Society of Canada - Scholarship Fund as at December 31, 2004. This financial statement is the responsibility of the Fund's management. Our responsibility is to express an opinion on this financial statement based on our audit.

Except as explained in the following paragraph, we conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we plan and perform an audit to obtain reasonable assurance whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation.

In common with many charitable organizations, the Fund derives revenue from donations, the completeness of which is not susceptible to satisfactory audit verification. Accordingly, our verification of this revenue was limited to the amounts recorded in the records of the organization and we were not able to determine whether any adjustments might be necessary to donation revenue, net revenue for the year, assets and surplus.

In our opinion, except for the effect of adjustments, if any, which we might have determined to be necessary had we been able to satisfy ourselves concerning the completeness of donations referred to in the preceding paragraph, this financial statement presents fairly, in all material respects, the financial position of the Fund as at December 31, 2004 and the results of its operations for the year then ended in accordance with Canadian generally accepted accounting principles.

McCay Duff & Company LLP

Chartered Accountants

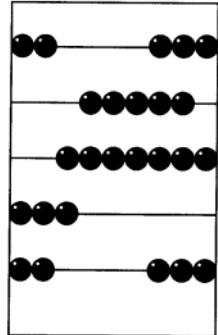
Ottawa, Ontario,
March 24, 2005.

**McCay, Duff
& Company LLP**

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ENTOMOLOGICAL SOCIETY OF CANADA
SCHOLARSHIP FUND

BALANCE SHEET

AS AT DECEMBER 31, 2004

ASSETS		<u>2004</u>	<u>2003</u>
CURRENT			
Cash		\$ 24,991	\$ 16,848
Term deposit		6,679	6,548
Accrued interest receivable		<u>1,845</u>	<u>1,336</u>
		33,515	24,732
INVESTMENTS (note 3)		<u>143,361</u>	<u>120,636</u>
		<u>\$ 176,876</u>	<u>\$ 145,368</u>
LIABILITIES			
CURRENT			
Due to Entomological Society - General Fund		\$ -	\$ 5,702
SURPLUS			
BALANCE - BEGINNING OF YEAR		139,666	133,552
Revenue			
Interest		7,530	4,891
Gain on sale of investments		81	-
Donations		<u>38,349</u>	<u>10,248</u>
		45,960	15,139
Expenditure			
Scholarship awards and travel grants		8,750	9,000
Service charges		<u>-</u>	<u>25</u>
		<u>8,750</u>	<u>9,025</u>
Net revenue for the year		<u>37,210</u>	<u>6,114</u>
BALANCE - END OF YEAR		<u>176,876</u>	<u>139,666</u>
		<u>\$ 176,876</u>	<u>\$ 145,368</u>

Approved on behalf of the Board:

Director

Director

McCAY, DUFF & COMPANY LLP, CHARTERED ACCOUNTANTS

**ENTOMOLOGICAL SOCIETY OF CANADA
SCHOLARSHIP FUND**

NOTES TO FINANCIAL STATEMENT

DECEMBER 31, 2004

1. PURPOSE OF THE FUND

This fund was created with the objective of awarding scholarships for post-graduate studies in entomology. The fund derives its revenue from donations and from the interest on the invested capital. The money is awarded in three different forms: scholarship for post-graduate studies, travel grant to subsidize student travel expenses incurred in relation to their post-graduate studies; or the Keith Kevan Scholarship which is a scholarship for post-graduate studies oriented toward systematics.

2. SIGNIFICANT ACCOUNTING POLICIES

(a) Accrual Basis of Accounting

Revenue and expenditure are recorded on the accrual basis, whereby they are reflected in the accounts in the period in which they have been earned and incurred respectively, whether or not such transactions have been finally settled with the receipt or payment of money.

(b) Volunteer Services

The Fund receives volunteer services, the value of which cannot be reasonably estimated. Therefore, no representation of these costs are reflected in the financial statement.

3. INVESTMENTS

	<u>2004</u>	<u>2003</u>
Bonds, at cost (market value)		
2004 - \$149,666, 2003 - \$126,052	\$ <u>143,361</u>	\$ <u>120,636</u>

4. FINANCIAL INSTRUMENTS

The Organization's financial instruments consist of cash, term deposits, accrued interest receivable and investments. Unless otherwise noted, it is management's opinion that the Organization is not exposed to significant interest rate, exchange rate or credit risks arising from these financial instruments.

Fair Values

The carrying amounts reported in the balance sheet for cash, term deposits and accrued interest receivable approximate fair values due to the immediate or short-term maturities of these financial instruments. Investments are recorded at cost with market value reported in note 3.

5. STATEMENTS OF INCOME AND CASH FLOWS

These statements have not been prepared as all the relevant information is apparent from the other financial statement.

McCAY, DUFF & COMPANY LLP, CHARTERED ACCOUNTANTS

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Editor's note: Society Directors and Officers are reminded to check these lists, and submit corrections, including the names and positions of new officers.

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Bulletin of the Entomological Society of Canada

Editor: Paul Fields
Assistant Editor: Lucie Royer

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The Entomological Society of Canada was founded in 1863 primarily to study, advance and promote entomology. It supports entomology through publications, meetings, advocacy and other activities.

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Bulletin de la Société d'entomologie du Canada

Rédacteur : Paul Fields
Rédactrice adjointe : Lucie Royer

Le *Bulletin de la Société d'entomologie du Canada*, publié depuis 1969, présente trimestriellement des informations entomologiques, des occasions, des renseignements sur les opérations de la Société, des dossiers scientifiques d'importance et des analyses d'ouvrages.

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La Société d'entomologie du Canada a été établie en 1863 principalement pour promouvoir l'étude et l'avancement de l'entomologie. Elle soutient l'entomologie par l'entremise de publications, de réunions et d'autres activités.

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The Buzz / Bourdonnements

Paul Fields, Editor / Rédacteur



I would like to thank Lucie Royer for her help as Assistant *Bulletin* Editor over the last five issues. She has done a great job proofreading the *Bulletin*, she handled the obituaries, and she had the great idea of having cartoons in the *Bulletin*. However, there are only so many hours in the day, and other duties called, so Lucie tendered her resignation. I am now looking to fill the position of Assistant *Bulletin* Editor. See page 109 for details, if you are interested in this position.

There is a new column starting this issue, *Entomologists at work*. Its goal is to celebrate the crazy, stupid and novel things that we end up doing as entomologists. Send me your stories and photos of the lengths that you went to to collect a particular insect or run an exceptional experiment. See page 109, where Rob Roughley is hard at work, waist deep in a tropical stream.

All regular members of the ESC received a copy of the last issue of the *Bulletin* in the mail. For this and subsequent issues, we have returned to mailing the *Bulletin* only to those who request a printed copy. For those of you who receive the *Bulletin* electronically, and would like to receive a paper copy, or vice versa, contact Alexandra Devine, at the Ottawa office. The issues for the last two years are available at the ESC website. To mail and produce the *Bulletin* it costs about \$5/issue for each member. So if you don't read the *Bulletin* (then you can't be reading this) or if you prefer to read it online, you can save the Society about \$20/year, by opting for the electronic only version of the *Bulletin*. Whichever way you decide to read the *Bulletin*, I am always interested in your comments, and I am always looking for items to publish in the *Bulletin*.

J'aimerais remercier Lucie Royer pour son aide comme rédactrice adjointe du *Bulletin* pendant les cinq derniers numéros. Elle a fait un super travail comme correcteur d'épreuves, elle a pris en main les nécrologies et elle a eu l'idée géniale de publier les bandes-dessinées dans le *Bulletin*. Cependant, il y a seulement un nombre limité d'heures dans la journée, et d'autres tâches ont exigé son attention, alors Lucie a dû démissionner du *Bulletin*. Alors, je suis maintenant à la recherche d'un assistant à la rédaction. Si ce poste vous intéresse, veuillez voir page 109 pour de plus amples renseignements.

Il y a une nouvelle section, qui commence avec ce numéro, *Entomologistes au travail*. Son but est de célébrer les choses idiotes, folles et originales qu'on peut faire comme entomologiste. Envoyez-moi vos photos et vos histoires de chasse pour un insecte particulier ou une expérience exceptionnelle. À la page 109, Rob Roughley est en plein travail, au milieu d'un ruisseau tropical.

Tous les membres réguliers de la SEC ont reçu un exemplaire du dernier numéro du *Bulletin* par la poste. Pour ce numéro, et les suivantes, nous retournons à l'ancienne politique d'envoyer le *Bulletin* par la poste seulement aux membres qui l'indiquent. Pour ceux qui le reçoivent par le Web, si vous aimeriez recevoir un exemplaire par la poste ou vice versa, contactez Alexandra Devine, au siège social à Ottawa. Les numéros des deux dernières années se trouvent au site Web du SEC. Pour imprimer et envoyer le *Bulletin*, par la poste, il coûte environ 5\$/numéro pour chaque membre. Alors, si vous ne lisez pas le *Bulletin* (vous ne lirez pas ceci), ou si vous préférez le lire en ligne, vous pouvez épargner à la SEC environ 20\$/année, en choisissant la version sur Web. Peu importe la façon que vous choisissiez de lire le *Bulletin*, je suis toujours intéressé par vos commentaires, et je suis toujours à la recherche d'articles à publier au *Bulletin*.

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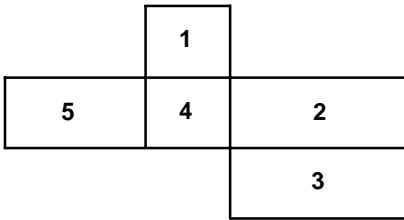
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Images

On the spine: The six-spotted tiger beetle, *Cicindela sexguttata* Fabricius (Cicindellidae), a common predaceous beetle in eastern North America, photo: H. Goulet.

Beside title: The emerald ash borer, *Agrilus planipennis* Fairmaire (Buprestidae), an invasive beetle from Asia that threatens North American ash trees, photo: K. Bolte.

Photos on front cover:

1. *Acyrtosiphon pisum* (Harris) (Aphididae), a species used in studies of seasonality, photo: R. Lamb.

2. Apple sawfly, *Hoplocampa testudinea* (Klug) (Tenthredinidae), trap used to determine population levels in orchards, photo: C. Vincent.

3. Dead lodgepole pine trees killed by mountain pine beetle, *Dendroctonus ponderosae* Hopkins (Scolytidae), in British Columbia, photo: A. Carroll.

4. *Syrphus ribesii* Linnaeus (Syrphidae), a common nectar-feeding hover-fly found in gardens, hedgerows and woodlands, photo: S. Marshall.

5. Research plots used to study the impact of *Macrosiphum euphorbiae* (Thomas) (Aphididae) on flax, photo: R. Lamb.

Back cover: *Ixodes gregsoni* Lindquist, Wu and Redner (Ixodidae), a tick parasite of mustelids, photo: K. Bolte.

Français à l'intérieur de la couverture avant

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