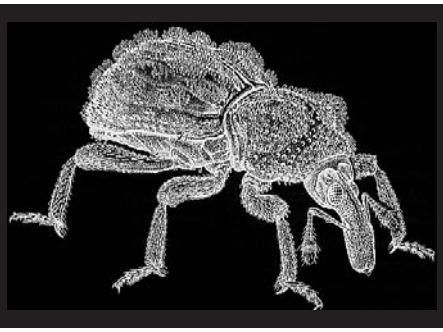

CURCULIO

An International Newsletter for Curculionoidea Research

Volume 49 September 2004

CONTENTS

Featured Researcher

Roberta Valente

Biology Department, Universidade Federal do Pará & Museu Paraense Emílio Goeldi, Brazil

(Roberta Valente at the Museu Paraense Emílio Goeldi)

Academic Background

Bachelor of Biology, Universidade Federal do Pará, Brazil: "Biologia e descrição dos imaturos de *Conotrachelus imbecillus* Fiedler (Coleoptera: Curculionidae: Molytinae) em frutos de *Inga heterophylla*" - 1993

Master of Biology, Zoology, Universidade Federal do Pará/ Museu Paraense Emílio Goeldi, Brazil: "O Gênero *Microstrates* Lacordaire (Curculionidae: Baridinae): sistemática, filogenia e evolução da associação com palmeiras hospedeiras" - 1997

Doctor of Philodophy, Zoology, Universidade de São Paulo, Brazil: "O gênero *Celetes* Schoenherr, 1836 (Curculionidae: Erirhininae): filogenia, sistemática e evolução com palmeiras hospedeiras" - 2000 to present

Professor and Researcher, Biology Department, Universidade Federal do Pará, Brazil - 1998 to present

Visiting Researcher, Entomology, Museu Paraense Emílio Goeldi, Brazil - 1998 to present

Curatorial Associate of the Coleoptera Collection at the Museu Paraense Emílio Goeldi, Brazil - 2002 to present

Research Interests

Systematics, biology, and evolution of weevils and their host plant associations, with a special interest in weevils inhabiting palms.

My interests in insects began already when I was child. Our father carried my two sisters along with me through the woods of Mosqueiro, an island located at a distance of 60 km from Belém, Estado do Pará, Brazil. There I collected and fixated insects in alcohol, returning them for study in Belém. Later I decided to become a biologist. During my first semester as an undergraduate student, I visited the Museu Paraense Emílio Goeldi and met with Dr. Inocêncio de Sousa Gorayeb to inquire about a possible career in entomology under his supervision.

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Editorial Comments

I am honored to present you with another strong, international issue of CURCULIO. This time the spotlight is on the Phytophaga Symposium which took place in August during the XXII International Congress of Entomology in Brisbane, Australia (page 8). Rolf Oberprieler and Catherine Duckett deserve our recognition for organizing perhaps the most concerted effort to understand the phylogeny of both weevils and leaf beetles to date. A timely publication schedule for the Symposium Proceedings has already been laid out. The meetings were inspiring to all participants. They also clarified an important issue: in order to carry the momentum on to the next venue, we need to renew our lines of communication and make efficient use of the internet. To this end Miguel Alonso-Zarazaga, Chris Lyal, and colleagues are pushing hard to complete the Electronic Catalogue of Weevil Names (http://wtaxa.csic.es/index.aspx; see also page 11). They are similarly involved in setting up an internet-based Phytophaga Character Bank, where interested researchers may display and discuss their assessments of taxa and homologies relevant to the larger evolutionary picture (page 12). In short, we are moving well ahead in a number of areas critical to our community's standing and development in the foreseeable future.

Beyond the borders of Brisbane, we have received valuable contributions from younger and more established readers. Roberta Valente is our featured researcher on the front page. Horace Burke has prepared another scholarly appraisal of the past weevil specialist Charles Schaeffer (page 5). Elizabeth Beers supplied a detailed account of past and present studies on North American weevils attacking tree fruits (page 13). Peter Stüben and Christoph Bayer report on the Third International Conference of the European Curculio Institute in Poland (page 18), and Roger Beaver reviews a new book on Indian bark beetles (page 22). Last not least, Murray Upton and Rolf Oberprieler remember the life and work of one of the world's outstanding weevil systematists, Dr. Elwood C. Zimmerman, who passed away recently. He left an unmatched legacy (page 20). Thanks as always to everyone who contributed to the current issue of CURCULIO.

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Roberta Valente (continued)

He accepted me and soon thereafter I became very fascinated with holometabolous insects, especially the larvae of Coleoptera.

At the research campus of Museu Goeldi there are many specimens of the legume ingá-xixica (*Inga heterophylla*). I remembered my childhood collections of beetle larvae from the fruits of this tree in Mosqueiro. And so I went on to collect many more infested fruits and identified the corresponding larvae as members of the Curculionidae. I reared them until the adult stage and sent some specimens to Dr. Charles O'Brien (Florida A & M University, United States) who identified the weevils as *Conotrachelus imbecillus.* I then described the immature stages and studied the reproductive biology of *C. imbecillus* during my time as an undergraduate. Eventually I came in contact with Dr. Sergio Antonio Vanin, a weevil specialist at the Universidade de São Paulo.

For my Masters degree under the supervision of Dr. Gorayeb and Dr. Vanin, I intended to conduct a systematic analysis of a suitable weevil taxon. Dr. Vanin suggested I revise *Microstrates,* a genus of Baridinae associated with palm inflorescences. I accepted the research proposal and in the process discovered two new species of *Microstrates* - both from the Estado do Pará. These represented the first records for the genus in the Amazonian region. I also completed a revision, phylogeny, and evolutionary analysis of *Microstrates* and its interactions with several palm host genera.

In 1998 I was appointed as a professor at Universidade Federal do Pará. That year I was also invited to work as a visiting researcher at the Museu Goeldi. Until 2000 I led a project "Palmeiras da Região de Caxiuanã (Pará, Brasil): aspectos sócio-econômicos e insetos associados," financed by the government of the Pará state, and further supported by the Universidade Federal do Pará and the Museu Goeldi. In the course of the project, I had the opportunity to study more deeply the associations of weevils with palms, as well as the ecological relationships of native human populations with palms and with the insects inhabiting them. I supervised an undergraduate student, Márcio Luís Leitão Barbosa. Together we investigated *Mauritinus seferi*, a baridine weevil whose larval stages live in the fruits of the murity palm, *Mauritia flexuosa.* Now Márcio has finished his Masters thesis at the Instituto Nacional de Pesquisa da Amazônia, Manaus, Brazil. He worked on the systematics and phylogeny of *Belopoeus,* another weevil genus associated with the inflorescences of palms.

The aforementioned project led me to realize that weevils of the genus *Celetes* are very abundant on palm inflorescences and also rather difficult to identify. There were 32 species recorded for South America and six more species in Central America. Considering that among the 29 species of *Celetes* I collected in Caxiuanã only one was identifiable, the remaining weevils had to represent new taxa. Although the genus had never been revised, over time it gradually accumulated more species as well as three generic synonymies. Thus I decided

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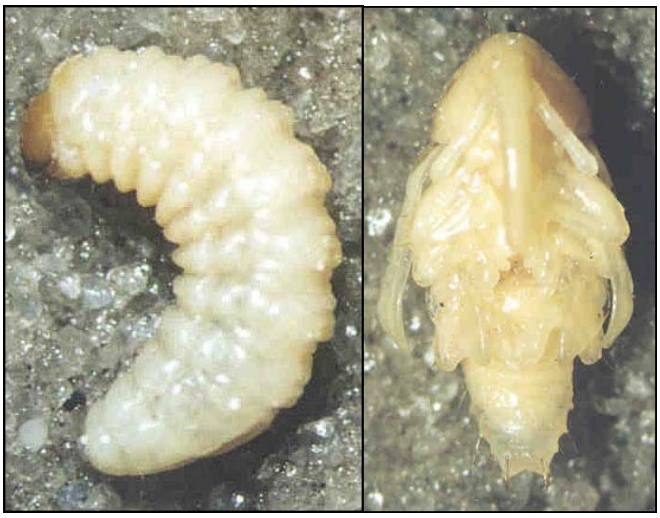
Roberta Valente (continued)

with Dr. Vanin to focus on the systematics, phylogeny, and host plant evolution of *Celetes* for my dissertation work.

I am in the final year of my doctoral research; this is a very complex and challenging group. My preliminary results indicate that *Celetes* is non-monophyletic. I described 48 species in total, 15 of which are new to science. According to consensus tree there are two monophyletic species-groups, the *binotatus*-group and *faldermanni*-group. In the former, plesiomorphic associations are posited to exist with either *Attalea* or *Syagrus;* at the moment this hypothesis cannot be defined further. In the latter, interactions with *Attalea* are plesiomorphic. Associations with *Polyandrococos* are apomorphic, yet those with *Allagoptera*, *Astrocaryum*, *Euterpe*, and *Mauritia* represent independent colonizations. Most of the host plant records, especially those of undescribed species of *Celetes*, are new.

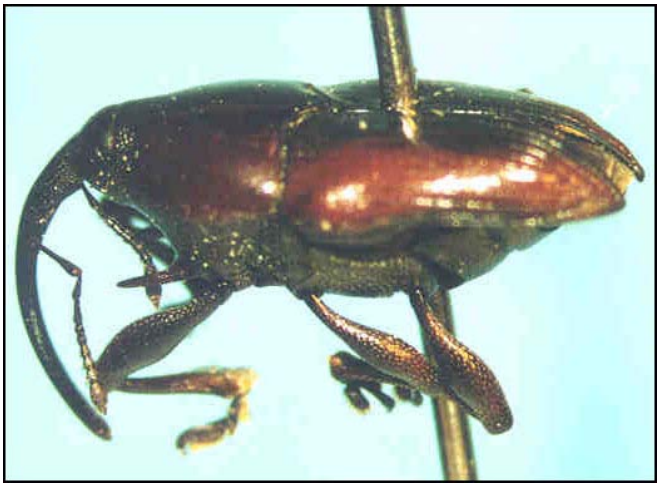
Project Abstract - Bionomy, Description of Immature Stages and Redescription of Adults of *Mauritinus seferi*

The genus *Mauritinus* and its only species, *M. seferi*, were described by Bondar in 1960, based on 4 larvae reared from fruits of murity palm (*Mauritia flexuosa* L.) which were collected in the Cametá Municipality, Estado do Pará, Brazil. Following Bondar's work, no further information about this beetle has been published in the literature.



Mauritinus seferi, last instar larva (left) and pupa (right), photos by R. Valente

Mature larvae of *Mauritinus seferi* were collected and reared in the laboratory to observe their development and the damage caused to fruits of the murity palm. Last instar larvae and pupae are described for the first time and adults are redescribed. Collections were carried out in two localities in the Estado do Pará, Brazil: Pedrinhas, São João de Pirabas Municipality; and at the Estação Científica Ferreira Penna (ECFPn), Caxiuanã, Melgaço Municipality. To observe whether the adults of *M. seferi* visiting palm inflorescences, 16 species of palms were sampled in Caxiuanã. However, the adults of *M. seferi* were not collected on any them, including the inflorescences of the murity palm. Therefore, the host plant association of the adults remains unknown.



Mauritinus seferi, adult male, lateral view, photo by R. Valente

Aborted, mature, and rotten fruits of the murity palm were collected. Immatures of *M. seferi* were not found in the aborted green fruits, whereas in the ripened fruits only final instar larvae were found. Larvae of earlier instars or pupae were absent.

The larvae of *M. seferi* we observed in the dissected fruits construct galleries and feed on the mesocarp, rendering the fruits useless for human consumption (specifically, the production of juices and sweets). We always located two larvae of *M. seferi* per fruit. Other species of insects (immatures or adults) were absent. These results do not appear arbitrary, but rather suggest that females lay precisely two eggs into the berries. They may leave a type of chemical signal to prevent conspecifics and other species from causing secondary infestations. Similar kinds of behaviors have already been observed in other species of Curculionidae. They seem to be very important in reducing competition for space, food, and also to prevent the deterioration of fruits prior to pupation (see Anderson 1993, Memoirs of the Entomological Society of Canada 165: 197-232).

Since we did not find larvae of other stages, it is probable that the females of *M. seferi* oviposit into fruits that are just beginning to mature. These fruits already have a developed mesocarp, thus providing food for the larvae. The development of the larval instars is synchronized with the maturing of the fruits: when the fruits fall to the ground, the larvae are in their final stages and may then initiate the process of pupation in the soil. Other authors (Bondar 1941, 1943; Valente and Gorayeb 1994) have also noted the developmental synchronization among immature stages of Curculionidae and the fruits of their hosts.

(continued page 4)

Roberta Valente (end)

Publications

Barbosa, M. L. L., and R. M. Valente. 2003. *Mauritinus seferi* Bondar 1960: bionomy, description of immature stages and redescription of adult (Coleoptera: Curculionidae). Revista Brasileira de Entomologia 47: 81-88.

Costa, C., S. Ide, G. H. Rosado-Neto, M. Galileu, C. R. V. Fonseca, R. M. Valente, and M. A. Monné. 2000. Diagnóstico del Conocimiento de las Principales Coleciones Brasilenãs de Coleoptera [Pp. 115-136]. *In:* Hacia un Proyecto Cyted para el Inventario y Estimación de la Diversidad Entomológica en Iberoamérica (F. Martín-Piera, J. J. Morrone, and A. Melic, editors). PrIBES-2000, vol. 1, Zaragoza.

Valente, R. M. 2000. Os insetos e os gorgulhos das palmeiras de Caxiuanã. Manual para professores. 1ª ed., MCT/CNPQ/MPEG, Belém. 53 pp.

Valente, R. M. 2002. As palmeiras e as comunidades [Pp. 165-177]. *In:* Caxiuanã: populações tradicionais, meio físico e diversidade biológica (P. L. B. Lisboa, editor). Belém.

Valente, R. A., and S. S. Almeida. 2001. As Palmeiras de Caxiuanã: Informações Botânicas e Utilização por Comunidades Ribeirinhas. MCT/CNPQ/MPEG, Belém. 56 pp.

Valente, R. M., and S. S. Almeida. 2002. As palmeiras (Arecaceae) - adições e atualização taxonômica [Pp. 379]. *In:* Caxiuanã: populações tradicionais, meio físico e diversidade biológica (P. L. B. Lisboa, editor). Belém.

Valente, R. M., and I. S. Gorayeb. 1994. Biologia e descrição dos imaturos de *Conotrachelus imbecillus* Fiedler (Coleoptera: Curculionidae: Molytinae) em frutos de *Inga heterophylla*. Boletim do Museu Paraense Emílio Goeldi (Belém , Pará) 10: 263-272.

Valente, R. M., and S. A. Vanin. 2002. Curculionidae (Coleoptera) em inflorescência de *Attalea maripa* (Aubl.) Mart. (Arecaceae [Pp. 483-502]. *In:* Caxiuanã: populações tradicionais, meio físico e diversidade biológica (P. L. B. Lisboa, editor). Belém.

Research Activities and Requests for Specimens

Fernando Angelini (Italy: angelinifer@tiscali.it). Has studied the Curculionidae of the Palearctic region (systematics, evolution, and ecology), and is now interested in North American weevils. **Willing to exchange weevils** to this end, and able to e-mail a list of taxa available in his personal collection.

Sarah Boulter (Australia: s.boulter@griffith.edu.au). Preparing a manuscript on the derelomines associated with the palm *Normanbya normanbyi*, an endemic to northern Queensland. Apparently the abundant weevils only visit the male flowers of the monoecious inflorescences.

Nico Franz (USA: franz@nceas.ucsb.edu). Recently submitted a manuscript on the systematics of derelomine flower weevils (Curculionidae: Derelomini). Has been busy with his postdoc working on biodiversity informatics, but will soon begin revising the monotypic *Cotithene* Voss, for which several new species are at hand.

Robert Hamilton (USA: rhamilt@orion.it.luc.edu). Continuing to work on New World Attelabidae and Rhynchitidae. Recently published a paper (with A. Novinger) on the eugnamptine weevils of La Selva, Costa Rica. Now revising the *Omolabus* species (Attelabidae) of North and Central America. Also interested in Central American eugnamptine weevils; has already accumulated a large number of specimens but could always use more for a revision. **Looking for a Masters degree student to jointly work on these projects.** Lastly, in possession of series of weevils from Costa Rica and Mexico in subfamilies he does not work on. Willing to offer these for **loan to qualified researchers** (especially rich in Costa Rican Cryptorhynchinae).

Lawrence Kirkendall (Norway: lawrence.kirkendall@zoo.uib.no). In the process of reanalyzing the *Xyleborus ferrugineus* complex; has now seen much of the type material. Able to separate at least four good species currently being treated as *X. ferrugineus*, although the geographic coverage is spotty. Would like to sequence specimens from throughout its natural range in North, Central and (especially) South America plus the Caribbean Islands, and **in need of well-preserved specimens for DNA extraction.** Also in need of material to check his morphological discriminations. Requesting anyone with relevant material to contact him now (can supply photos on request). These are very abundant and easy-to-recognize ambrosia beetles.

Analia Lanteri (Argentina: alanteri@fcnym.unlp.edu.ar). **Requesting material of Entiminae, Naupactini in 100% ethanol** for molecular phylogenetic studies, **and of *Anthonomus grandis*** (Curculioninae, Anthonomini) for phylogeographic analyses. In the latter case it is important to collect at least 10 specimens from each locality, throughout the range of the species.

Michail Mandelshtam (Russia: michail@MM13666.spb.edu). Specializing in the taxonomy of Scolytidae. Currently revising the Palaearctic *Thamnurgus* Eichh. species. Also working on

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Research Activities (end)

Trypophloeus Fairm. of the world fauna, and preparing checklists of the bark beetles of the Russian fauna. Has a **personal website** in English at http://www.zin.ru/animalia/coleoptera/eng/mandelst.htm

Márcio Leitão Barbosa (Brazil: marciolb@inpa.gov.br). Interested in the taxonomy and phylogeny of Curculionidae, especially those pertaining to the subfamilies Baridinae and Dryophthorinae in the Neotropics. Continuing his doctoral thesis research on the phylogenetic systematics of the Neotropical tribe Optatini (Curculionidae: Baridinae). **Requesting specimens of the following taxa:** *Agalmatus* Kuschel, 1958; *Costovia* Casey, 1922; *Eurypages* Pascoe, 1892; *Lydamis* Pascoe, 1889; *Macroptatus* Heller, 1906; *Optatus* Pascoe, 1889; *Parasyprestia* Casey, 1922; *Pardisomus* Pascoe, 1889; *Pistus* Faust, 1894; *Pseudoptatus* Champion, 1907; *Sympages* Pascoe, 1889; *Telemus* Pascoe, 1889; and *Tripestes* Casey, 1922. **Also in need of suitable outgroup taxa in the Baridinae and Molytinae:** *Ambates caecus* Chevrolat, 1833 (Ambatini); *Anopsilus bonvouloirii* Kirsch, 1870 (Anopsilini); *Baris artemisiae* Herbst, 1795 (Baridini); *Madarus corvinus* (Fabricius), 1801 (Madarini); *Madopterus talpa* Gyllenhal, 1836 (Madopterini); *Nertinus mannerheimi* (Boheman), 1844 (Nertinini); *Pantoteles tenuirostris* Boheman, 1845 (Pantotelini); *Peridinetus irroratus* (Fabricius) 1787 (Peridinetini); and *Conotrachelus diaconitus* (Klug), 1829 (Molytinae, Conotrachelini).

Antoine Mantilleri (France: amantill@mnhn.fr). Continuing to work on the Brentidae Stereodermini at the MNHN in Paris, France. **In search of specimens of Stereodermini** (whole world) **for study.**

Helio Pierotti (Italy: hpierotti@notariato.it). Interested in **determining, exchanging, and purchasing Palearctic and Nearctic Peritelini** (Curculionidae: Entiminae).

María del Pilar Aguirre (Columbia: casiopea3140@hotmail.com). Studying in the graduate program at the Universidad del Valle in Calí, Columbia. Interested in weevil taxonomy and **in need of literature** relevant to the identification of weevils in the South-Western Columbian region.

Jiri Skuhrovec (Czech Republic: jirislav@email.cz). Completing a Ph.D. program on weevils at the Charles University in Prague, Czech Republic. **Interested in particular in acquiring Hyperini (Hyperinae) from the United States,** including *Hypera eximia* and *H. postica* from various localities. More detailed requests and offers will appear in CURCULIO 50.

Wesley Oliveira de Sousa (Brazil: wos@ufpr.br). Recently completed his Masters degree at the Universidade Federal do Paraná (UFPR), in Curitiba, Brazil, entitled "Revision of the genus *Sternechus* Schoenherr, 1826 (Curculionidae, Molytinae, Sternechini)." Now continuing as a Ph.D. student at the UFPR on the project "Ecology and biological aspects of the weevils associated with aquatic macrophytes in the wetlands of Poconé-MT and Central Amazonia, Brazil." The project is supervised by Dr. Germano H. Rosado-Neto (UFPR), and co-supervised by Dra. Marinêz I. Marques (UFMT, Cuiaba-Brazil) and Dr. Joachim Adis (Max Planck Institute, Plön-Germany). **Requesting literature relevant to these matters.**

Antonio Velázquez de Castro (Spain: velazquezdecastro@wanadoo.es). Studying the food plants and phylogeny of *Sitona* weevils.

Notable Weevil Specialists of the Past

By Horace R. Burke (USA: hrburke@tamu.edu)

Where to next? This is the question I asked myself after writing about the weevil work of William G. Dietz in CURCULIO 48. The possibilities are many. My present sideline interest in the early insect collectors of the Lower Rio Grande Valley of Texas led me to select Charles Schaeffer, a coleopterist who was among the first to make extensive collections in this subtropical area. His collections there were so extensive that they can almost be considered as a turn-of-the-20th Century baseline for the Lower Rio Grande beetle fauna. Although not a weevil specialist in the strict sense, Schaeffer did collect many species of weevils in southern Texas and the Huachuca Mountain area of Arizona, describing about 50 new species in various curculionoid families. His name is frequently cited in revisions as the source of specimens studied. Not much has been written biographically about Schaeffer, but his long list of publications attest to his dedication to the study of Coleoptera.

Charles Frederick August Schaeffer (1860-1934)

Charles Schaeffer was born in London, England, June 12, 1860. Apparently when Charles was quite young, his German family returned to their homeland. According to Davis (1942),

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Charles Schaeffer (continued)

Schaeffer's formal education was completed in Germany in 1876. As is the case with many of our early naturalists, little is known about the activities of Schaeffer during his youth. Although he seems to have become interested in insects at a young age, it was not until 1889 that his entomological activities were brought to the attention of a wider audience. The particulars of his life during the 13-year period between completion of education in Germany and the first notice of entomological pursuits in the United States are unknown to me. It is obvious though that at some time during this period he emigrated to the United States where he soon became acquainted with other beetle enthusiasts. When the New York Entomological Society was organized in 1892, Schaeffer, then 32 years old, became one of its first members. The Society proved to be his entomological "home" and he was deeply involved in its activities for the remainder of his life. For many years there was hardly a meeting of the Society at which he did not exhibit interesting specimens and/or present a talk about his collecting experiences.

In 1898, Schaeffer accepted the position as assistant to curator William Beutenmüller at the American Museum of Natural History. This was his first employment in entomology. He served in this position until 1902, at which time he became curator of Coleoptera at the Brooklyn Museum Institute of Arts and Sciences. Immediately upon joining the staff of the Brooklyn Museum, Schaeffer began an active collecting program. For the next three years he made extended collecting trips to Mt. Mitchell, North Carolina, as well as to the Lower Rio Grande Valley of Texas and the Huachuca Mountains of Arizona. The latter two areas were favorites of Schaeffer's. According to colleagues he talked much about his collecting experiences there. His favorite collecting site in the Lower Rio Grande Valley was the Esperanza Ranch located a few miles east of Brownsville, TX. Many species of Coleoptera, as well as members of other orders, have the Esperanza Ranch site as their type locality. Unfortunately, this entomologically important site of original dense shrubs and woods along the Resaca de la Palma has succumbed to urbanization and exists no more as a viable biological entity. Perusal of most of Schaeffer's early papers also readily documents his strong attraction to the beetles of the Huachuca Mountains of southern Arizona.

Taxa of many families of Coleoptera received the attention of Schaeffer. His favorite were the Chrysomelidae, but he also described new genera and species in the Cerambycidae, the Buprestidae, and several other families. He was a true beetle generalist. For example, his 1909 paper on Arizona Coleoptera contains descriptions of new species belonging to nine families. Other papers were comparably as broad in coverage, although sometimes he published on a single family or genus. His papers consist primarily of descriptions of new species and genera, with notes on others. Synoptic tables (or tables) in the form of dichotomous keys were occasionally included. In some taxa these keys are still the only ones available. His descriptions are reasonably detailed. The diagnoses are useful in distinguishing closely related species, but rarely (as usual for the time) were his papers illustrated.

Schaeffer's publications on curculionoids covered a relatively brief period of his career. His first paper involving weevils (in 1904) contained descriptions of two new species of Curculionidae, and five new species of Anthribidae collected in the Lower Rio Grande Valley of Texas. He also described a new anthribid genus which is now considered to be a synonym (Valentine 1998). Schaeffer had a special attraction for anthribids. In his 1906 paper on new species of this group he stated: "The family is exceedingly well represented in Brownsville, Texas, if we take in consideration the small number of species within the limits of the United States. From this interesting semitropical region twenty-one species are known, of which seven are new. The Anthribid fauna of the Huachuca Mts., Arizona, as far as known, is in comparison with the Brownsville fauna not as rich, but every species taken there proved to be new." Schaeffer described 21 species of anthribids, 19 of which are still considered valid. Of the three genera he described in the family, only one (*Araeoderes*) continued to be recognized as valid. According to Valentine (1998), there are 88 described species of Anthribidae in the Nearctic region. Schaeffer described about 22% of these, a significant contribution to the descriptive taxonomy of the family.

In addition to the paper on anthribids, Schaeffer published three others exclusively on "Rhynchophora." The first of these (1906) included descriptions of four species of the genus *Conotrachelus* from Arizona and Texas, with a key to the new ones and nine previously described species. The second paper in this series dealt with *Myrmex* (then labeled as *Otidocephalus*), wherein four species (also from Arizona and Texas) were described as new while notes were presented on others. His key is still the most complete one available for identification of species of the genus. The 1908 paper on "Rhynchophora" included descriptions of new species in what are now considered 14 separate genera of rhynchitids and curculionids. Of particular emphasis was "*Pandeletejus,*" for which four new species were described and a key for identification of the known species was provided. Schaeffer also briefly ventured into the world of scolytines with descriptions of four species in the 1908 paper. As well, Schaeffer is credited with describing the belid *Rhopalotria slossonae* (originally named *Allocorynus slossoni*), one of only two species of this family occurring in the United States. Schaeffer's only contribution (1915) to the Brentidae came about through description of *Heterobrenthus*

(continued page 7)

Charles Schaeffer (end)

texanus from the Lower Rio Grande Valley of Texas and providing a key to the genera and species of what were at the time considered the representatives of the family in North America.

Davis (1942) mentioned Schaeffer's dread that he might create a synonym. It will be left up to others to decide whether Schaeffer had much to worry about regarding the creation of synonyms among the many species of other Coleoptera he described. But in the Curculionoidea he had a very good "batting average." As mentioned above, 19 of the 21 species of anthribids described by Schaffer are still considered valid. Of the 33 other species of Curculionoidea described by him, only four are now treated as synonyms. Overall, approximately 90% of the curculionoid species he described have withstood the test of time. Two of his four genera survive. Quite a few of Schaeffer's species have been transferred to other genera, but this is to be expected after the passing of almost 100 years. Although his total output of curculionoid species was not large compared to that of many other students of weevils, it should be remembered that this was only one of many groups he covered. Schaeffer did not designate types; his type series are deposited in the USNM.

As a descriptive taxonomist, Charles Schaeffer contributed significantly to the knowledge of Coleoptera of the United States. Although a relatively small amount of his production was devoted to weevils, approximately 50 species were made known by him through diligent collecting and careful descriptive work. He is truly representative of the often self-taught and dedicated entomologists of his era.

Charles Schaeffer's Publications on New Weevil Taxa

1904. New genera and species of Coleoptera. Journal of the New York Entomological Society 12: 197-236.

1905a. Additions to the Coleoptera of the United States with notes on some known species. Brooklyn Institute Museum, Science Bulletin 1(6): 123-140.

1905b. Some additional new genera and species of Coleoptera found within the limits of the United States. Brooklyn Institute Museum, Science Bulletin 1(7): 141-179.

1906a. New Anthribidae. Transactions of the American Entomological Society 32: 267-278.

1906b. New Rhynchophora. Canadian Entomol. 38: 339-344.

1907. New Rhynchophora. - II. Journal of the New York Entomological Society 15: 75-80.

1908. New Rhynchophora. - III. Journal of the New York Entomological Society 16: 213-222.

1909. New Coleoptera chiefly from Arizona. Brooklyn Institute, Science Bulletin 1(15): 375-386.

1915. New Coleoptera and miscellaneous notes. Journal of the New York Entomological Society 23: 47-55.

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From left to right: Rolf Oberprieler, Miguel Alonso-Zarazaga, and Chris Lyal - the 2004 Phytophaga Symposium is up next...

Phytophaga Symposium - ICE Brisbane 2004

A Report of the Proceedings

Nearly four years of planning and arrangements came to their fruition on August 19, 2004, when the Phytophaga Symposium was held at the XXII International Congress of Entomology in Brisbane, Australia. As reported in previous issues of CURCULIO, the theme of the Symposium was: **"Evolution's Greatest Success: the Evolutionary History of the Coleoptera Phytophaga."** The Symposium chair Dr. Rolf Oberprieler and co-convenor Dr. Catherine Duckett put together an international line-up of collaborating speakers who informed us about the broad-scale evolutionary picture of chrysomeloids and curculionoids. To my knowledge such a synthesis had never been attempted, although the 1988 Curculionoidea Symposium in Montreal, Canada, came close (see R. S. Anderson and C. H. C. Lyal [editors]. 1995. Biology and Phylogeny of Curculionoidea. Memoirs of the Entomological Society of Washington 14: 1-174). In this sense the new papers constitute an important update.

The Symposium occupied all of Thursday's afternoon session (14:00 to 17:30 p.m.). The topics of the twelve 15-minute presentations were evenly split between weevil and leaf beetle experts. Two introductory papers read by Catherine Duckett and Chris Lyal provided an overview of the combined available morphological and molecular evidence for the higher-level relationships within each group. They were succeeded by increasingly closer looks at the phylogeny and host plant associations of particular lineages, among them the Brentidae *sensu lato* (Alonso-Zarazaga *et al.*), the Brachycerinae *sensu lato* (Oberprieler), the Oxycoryninae (Lyal *et al.*), and the derelomine flower weevils (Fanz and Valente). Not part of the original line-up but nevertheless relevant to it was a paper by Dr. Marek Wanat reanalyzing the homologies among weevil terminalia. It will be included in the Symposium Proceedings as well (see details on page 11). The afternoon ended with a summary of major evolutionary trends in chrysomeloids and curculionoids in light of the current phylogenetic schemes. Rolf Oberprieler ably depicted a number of significant parallels among the two lineages, for instance the colonization of monocots, wood, and aquatic habitats. The abstracts for all weevil-related papers are attached here. They offer insights into a series of strong contributions which will be published soon.

I personally came away with the conclusion that the Symposium was a unique effort in our taxonomic history. There is no question that the morphological evidence used to classify weevils, although carefully checked and expanded over the past ten years (i.a. due to the work of Dr. Adriana Marvaldi), is still mostly inherited from Willy Kuschel's seminal 1995 analysis (see reference above). As for the molecules, 18S ribosomal DNA offers a fair amount of resolution among the oldest weevil lineages (see Marvaldi *et al.* 2002. Systematic Biology 51: 761-785). Yet it appears neither strong enough to overturn the signal from morphology, nor clean enough to untangle the links among the younger subfamilies and tribes of Curculionidae *sensu stricto*. Dr. Miguel Alonso-Zarazaga and collaborators are among the first moving towards additional markers.

We are not yet at a stage where authors are so confident in their analyses as to propose new ranked classifications. Some of us were therefore a little skeptical about the Symposium's ambitious theme. In retrospect, I think the organizers were redeemed. *Someone* had to make a start, however bumpy it may turn out to be. **Together with the published Proceedings, the Symposium will both display and create a new sense of focus within the weevil community.** It will assist in the formulation of future joint research projects, and help us attract the support to follow them through.

We have seen that other systematic communities are able to provide more opportunities for the individual once they have demonstrated their ability to work together. Hopefully, then, the organizers of the next ICE (to take place in South Africa) will continue the rigorous agenda set out in 2004. This would make the current Symposium an even larger inspiration and success.

- Abstracts of Weevil-Related Papers -

1. Review of Morphological and Molecular Evidence on the Phylogeny of Curculionoidea

C. H. C. Lyal, A. E. Marvaldi, M. Barclay, R. S. Anderson, R. G. Oberprieler, and A. P. Vogler (contact: c.lyal@nhm.ac.uk)

The contribution of three main sources of evidence to the higher phylogeny of the weevils (Coleoptera: Curculionoidea) is reviewed. The data sets come from morphology of both adult and larval stages and from nucleotide sequences of 18S rDNA. The availability of sequence data for a larger taxon sample than hitherto available, as well as novel morphological information, allows a re-evaluation of weevil relationships. Results of the combined analysis corroborate recognition of the seven major (family) lineages in the superfamily. Addi-

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Phytophaga Symposium (continued)

tional larval and molecular synapomorphies contribute to a clearer delimitation of the two largest families, Brentidae and Curculionidae. The microcerines and ithycerines are not curculionids but brentids, and representatives of the ocladiines, brachycerines, erirhinines and raymondionymines occupy a close and basal position within the Curculionidae *s. l.* A preliminary natural classification of the Curculionidae into subfamilies is proposed, but their interrelationships are weakly supported and still obscure or even ambiguous in certain areas of the phylogeny.

2. An Overview of the Phylogeny of the Brentoid Complex (Col.: Curculionoidea)

M. A. Alonso-Zarazaga, A. Sforzi, and M. Wanat (contact: zarazaga@mncn.csic.es)

The so-called Brentoid Complex includes a group of taxa which are thought to be evolutionarily intermediate between the "lower" weevils (Nemonychidae to Attelabidae) and the "higher" weevils (Brachyceridae to Curculionidae). The complex seems to have originated in Gondwana. The status of the included groups is much disputed: Ithyceridae, Brentidae (+ Cyladinae), Eurhynchidae, Apionidae (+ Antliarhininae) and Nanophyidae. Carina has also been related to this group. While most of these groups seem to be clearly monophyletic on morphological grounds, their relationships inside this complex or even whether this complex is monophyletic are not clear. Current analyses of morphology and DNA sequences are contradictory. Wanat (2001), after a thorough cladistic analysis of morphological data, concluded that the families Brentidae (including Cyladinae), Caridae, Nanophyidae, Eurhynchidae and Apionidae (incl. Antliarhininae) are well supported. Ithyceridae have been placed (Marvaldi and Morrone 2000) as a subfamily of Curculionidae. Oberprieler (2000) and Marvaldi (2002) exclude the Carinae from the Brentidae. Nanophyidae were related by Zimmerman (1993) to the most primitive of the "higher" Curculionoidea (his Heteromorphi). However, promising preliminary molecular data by the senior author relate Caridae to Nanophyidae as part of this complex. The internal phylogeny of the diverse family Apionidae is also matter of debate.

3. Phylogeny and Evolution of the Brachycerinae *sensu lato* (Coleoptera: Curculionidae)

R.G. Oberprieler (contact: rolf.oberprieler@csiro.au)

In weevils (Curculionoidea), the phylogeny at family level is reasonably well understood, but in the largest and most derived family, Curculionidae, natural subfamilies and phylogenetic relationships are still obscure. A number of groups characterized by "orthocerous" type of male genitalia are indicated to represent basal lineages in the family. The results of a phylogenetic analysis of the principal taxa of these groups (Erirhinini, Stenopelmini, Aonychusini, Ocladiini, Cryptolaryngini, Brachycerini, Byrsopini and Raymondionymini, together forming the Brachycerinae *s. l.*) is presented, including also representatives of the main groups of Dryophthorinae (likely a monophylum and adelphic of Brachycerinae) and, as outgroups, primitive taxa of Brentidae (Ithycerini, Microcerini, Eurhynchini). The resulting phylogeny is correlated with the fossil record, host associations and distribution pattern of the taxa, in an attempt to reconstruct their evolution. It appears that these primitive lineages of Curculionidae represent the first evolutionary radiation of the family, which is indicated to have occurred alongside that of monocotyledonous angiosperms in the Upper Cretaceous and to antedate the major, later radiation of modern weevils (Curculioninae *s. l.*) on eudicots.

4. Phylogeny of the Oxycoryninae *s. l.* (Coleoptera Phytophaga) and Evolution of Plant-Weevil Interactions

A. E. Marvaldi, C. H. C. Lyal, R. G. Oberprieler, R. S. Anderson, and T. Bradbury (contact: c.lyal@nhm.ac.uk)

Phylogenetic relationships among the Oxycoryninae *sensu lato* (Curculionoidea, Belidae) are reconstructed on the basis of adult and larval morphology. Representative species of the genera of Oxycoryninae are included as terminals in a cladistic analysis, plus several outgroup taxa in the sister subfamily Belinae, the Nemonychidae and chrysomeloid Palophaginae. Based on the phylogenetic tree, shifts in larval feeding habits (concerning host plant taxa and tissues consumed) are traced. The association with conifers is ancestral and retained by *Oxycraspedus,* whereas the other groups of genera evolved associations with angiosperms (palms, Balanophoraceae and some other dicot angiosperms). Evidence suggests that secondary host shifts occurred from root-parasitic Balanophoraceae onto Hydnoraceae (*Hydnorobius*) and Zamiaceae (*Rhopalotria* and *Parallocorynus*) in the New World, and perhaps from palms onto Celastraceae (*Afrocorynus*) and Vitaceae (*Hispodes*) in the Old World. Larval development in vegetative tissues of reproductive organs is apparently ancestral in the oxycorynine clade and is conserved in all or most groups of genera, but development in rotting wood characterizes the Aglycyderini. Structural, chemical and/or ecological similarities of the plant organs consumed apparently play a major influence in the colonization of different plant taxa by this group of weevils.

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Strength in Diversity
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5. Evolutionary Trends in Derelomine Flower Weevils: from Associations to Homology

N. M. Franz, and R. de Melo Valente (contact: nmf2@cornell.edu)

Derelomine flower weevils (Curculionidae: Derelomini) have longstanding, remarkably specialized associations with palms and other plants such as members of the Neotropical family Cyclanthaceae. Recent morphological phylogenetic analyses, particularly of taxa related to *Phyllotrox* Schoenherr and *Celetes* Schoenherr, are starting to provide a context within which these life histories can be analyzed and explained. The results send a mixed, though exciting message. Host plant associations - understood at an appropriately deep level - are often as informative phylogenetically as other traits. Yet the picture emerging from natural history studies is more complex. Certain lineages of weevils are not only restricted to a limited set of related host plants. They also display an array of morphological, ecological, and behavioral adaptations that are *correlated* with phylogenetic transformations in inflorescence morphology and phenology. A truly adequate language for these phenomena requires that we regard "host plant associations" merely as a starting point for evolutionary analyses. More in-depth studies of selected interactions should aim at making narrower homology statements, and view the plants as entities that have come up with their own responses to a range of beneficial or detrimental interactors. In the case of derelomine flower weevils, this approach will probably teach us more.

6. Are Male Genitalia in the Weevils (Curculionoidea) and Other Beetles (Coleoptera) Homologous with Abdominal Segments 10 and 11?

M. Wanat (contact: wanatm@biol.uni.wroc.pl)

Genital segments of all major weevil groups were studied in detail, particularly the genital sheath folds, intersegmental membranous connections and position of the anus. Several novel characters have been found, e.g. in Nemonychidae, Urodontinae, Aglycyderinae, Rhynchitinae, Apionidae, Erirhininae, which should be taken into account in phylogenetic studies and higher classification of the weevils. The tegminal plate (= parameres) was found two-layered, composed of the 10th tergite (ventral) and modified fold of the 9th tergite's membrane (dorsal and partly ventral). Consequently, a revised terminology for parts of the weevil tegmen is proposed. Basic differences in development of genital sector of the male abdomen have been revealed in studied beetle superfamilies. In Curculionoidea, followed by Chrysomeloidea and Cucujoidea, there are two telescoping folds, and the parameres develop from the membrane of the 9th tergite. In Cleroidea and Tenebrionoidea one more fold of genital sheath occurs, and the parameres develop from the membrane of the 10th sternite. Other explanations for the extra-tegminal plates, earlier considered as belonging to the 10th abdominal segment in some Coleoptera (e.g. Lymexylidae, Colydiinae), are proposed. Consequently, a hypothesis of the homology of the beetle tegmen and the aedeagus (median lobe) with the respective 10th and 11th abdominal segments, is discussed.

7. Phylogeny of the Coleoptera Phytophaga

A. E. Marvaldi, C. N. Duckett, C. H. C. Lyal, and C. A. M. Reid (contact: catherineduckett@hotmail.com)

A phylogeny of the Coleopteran Phytophaga is presented and discusssed. Characters from adult, larval morphology and ribosomal DNA sequences from 18S and for a reduced taxon set 28S, are used to reconstruct a phylogeny of the Phytophaga, using exemplars from taxonomically critical lineages. The inclusion of outgroup taxa representing other polyphagan beetles allows a test on the monophyly of Phytophaga and the sister group relationship of Curculionoidea and Chrysomeloidea, providing clues about their evolutionary origin and which could be the closest relatives of Phytophaga.

8. Evolutionary History of the Coleoptera Phytophaga

R. G. Oberprieler, C. N. Duckett, and A. E. Marvaldi (contact: rolf.oberprieler@csiro.au)

The results of the Symposium are summarized into a reconstruction of the evolution of the Coleoptera Phytophaga, the largest and most successful group of beetles. The combined phylogeny of the group is correlated with its fossil record, host associations and distribution pattern into a reconstruction of the likely events of diversification and extinction, niche shifts and geographical radiations that shaped the evolution of this beetle group. It appears that the Phytophaga originated in the late Mesozoic (perhaps the early Jurassic), experienced a first diversification event in association with conifers in the late Jurassic, underwent a significant lineage turnover event (extinction of older lineages and evolution of new, more advanced forms) in the late Early Cretaceous in correlation with the floristic turnover from gymnosperms to angiosperms, diversified again in the Late Cretaceous in association with monocotyledons and underwent their most phenomenal radiation on eudicots in the Tertiary. Reverse host shifts from angiosperms to conifers and other gymnosperms, and from eudicots to monocots, have occurred frequently. Indications are that the differentiation between chrysomeloids and curculionoids has been driven by a fundamental difference in larval biology (ectophyty *versus* endophyty), which appears to have evolved early in the evolutionary history of the group.

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Phytophaga Symposium (continued)

- The Evening Whorkshop -

Following the oral presentations we had organized an Evening Workshop (19:30 to 22:00 p.m.) **to further discuss our results and other activities.** More than 30 participants stayed until the end. The agenda ended up being rather mixed; it is reviewed here in some conceivable order of significance.

1. Publication of the Symposium Proceedings

The Workshop was attended by Dr. Camilla Myers, the Managing Editor of the Journal ***Invertebrate Systematics*** (CSIRO Publishing, see http://publish.csiro.au/nid/120.htm). It has been arranged that **the Symposium papers will jointly appear as a Special Issue.** At least ten author teams immediately agreed to this format. In keeping with the scope of the Symposium, they will discuss their results in a broad evolutionary context. *Invertebrate Systematics* is eager to publish all papers **within about a year** of the Symposium, for instance in the October 2005 Issue (Volume 19[5]). A time-table was set to have all pertinent manuscripts submitted by the end of February, 2005. They will then be peer-reviewed within a one-month period yet according to the regular standards of the Journal. Dr. Myers is prepared to make an exception and provide free copies of the Special Issue to author teams who abide by the schedule , and thus facilitate a smooth production.

2. The ICE 2008 Venue

The XXIII International Congress of Entomology will take place on July 6 to 12, 2008, in **Durban, South Africa** (see website at http://www.ice2008.org.za). A follow-up of the 2004 Phytophaga Symposium seemed highly desirable. Elizabeth Grobbelaar is a possible local co-convenor and will be contacted for this purpose by Catherine Duckett.

3. An International "Ethanol Collection" for Weevils

Miguel Alonso-Zarazaga, Catherine Duckett, and other attending specialists who sequence DNA would like to establish an internal network aimed at collecting, storing, and exchanging suitable taxa for higher-level analyses of the Phytophaga. The rationale is that, by coordinating the collecting efforts, we reduce the load for everyone working in a particular region. Naturally, many taxa critical to the overall phylogenetic picture can be collected with reliability in certain spots and at certain times, but are missing elsewhere. We are also in need of agreement as to what taxa are repeatedly used in analyses, in order to achieve continuity among studies and make progress. Therefore, Miguel and Catherine will work to towards an internet-based forum to manage **a list of "focal taxa" for DNA analyses of the Phytophaga.** It will be maintained by molecular workers who will document their local (actual or easily obtainable) specimen holdings on-line. We must also agree on **protocols for specimen collection and preservation** (see Duckett, C. N., and Z. Swigonová. 2000. Preservation of Chrysomelidae for molecular study. Chrysomela 38/39: 11; and Sequeira, A. S., and B. D. Farrell. 2002. On weevil DNA studies. Curculio 45: 4-6). The willingness of colleagues to collaborate on this global project is essential.

4. WTaxa - the On-Line Weevil Species Catalogue

Miguel Alonso-Zarazaga and Chris Lyal have received two grants from the Spanish Ministerio de Educación y Ciencia (MEC - BOS2002-01205) and from the Global Biodiversity Information Facility (see http://www.gbif.org) to **expand the 1999 Curculionoidea Cataloque to the level of species.** Their team is well into the process of working through the historical cataloques and finding duplicate records. The overwhelming majority of names should be availablity by the end of this year. A lot of information will be rax, however, and must be validated which will take several more months. The checking and correcting of original references has been initiated as well. **Assistance from everyone in the weevil community is strongly requested!**

Here are some specifics on the emerging Catalogue:

- scolytids and platypodids are included, yet the archostematan Obrieniidae are excluded
- **URL: http://wtaxa.csic.es**
- over 60,000 records are already on-line, with information about the names, references, and synonymies; the species names are mostly Junk's at present
- the search capabilities are being expanded; the current output is a list, and the option to show synonyms is in progress; so are bibliographic searches
- the system and information will be accessible for peer review soon
- versioning has been implemented, in order to document the adding of information and make referencing more precise
- it is planned to display recent and developing systematic views, i.e. to move away from the static, "eclectic view"
- in the more distant future: PDFs of important legacy literature will be made available

5. A Phytophaga Character Bank

Chris Lyal reported on plans to establish a "Character Bank" to advance the communication about and study of the higher-level relationships within the Phytophaga. For further details please refer to his article on page 12. WINoW - a World Information Network on Weevils could play this and additional roles (i.e. represent an open-source collection of Phytophaga information), once it is established.

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Phytophaga Symposium (end)

6. Miscellaneous Other News

Among the other activities reported at the Workshop, Caroline Chaboo informed us about her new editorship of CHRYSOMELA (http://www.coleopsoc.org/nwslttrs.shtml). She is planning to reach out more to non-taxonomists, and possibly to students of the Cerambycidae. Rolf Oberlprieler distributed brochures for the new book on the Brentidae of the World, edited by Alessandra Sforzi and Luca Bartolozzi (see also the Bulletin Board, page xx). Pierre Jolivet had prepared a short presentation on the taxonomy of *Eupales* (Chrysomelidae: Eupolminae). Anne Howden announced an available position to work on the molecular phylogenetics of sweet potato weevils at North Carolina State University (United States, contact: clyde_sorenson@ncsu.edu). Finally, Nico Franz showed a series of short video recordings on the reproductive behavior of derelomine flower weevils in Costa Rica and Venezuela.

NMF

Phytophaga Character Bank

By Christopher Lyal (United Kingdom: c.lyal@nhm.ac.uk)

Those of us who, up until the last minute, were working on joint papers to be presented at the Phytophaga Symposium, found the process incredibly stimulating. The exchange of ideas and data was absolutely great. It also highlighted a problem that seems to be holding back the progress of our studies on Phytophagan phylogeny. We had discussions (somewhat hindered by being spread across almost the maximum possible number of time zones) on character distribution, character identification (*what* did s/he mean by that?), and homologies. We had to marry character statements made at the family level with what was known of individual species. We also had to decide which of the multitude of species for which we had at least *some* characters we should include or exclude. The final matrix had a depressing number of question marks in it. At the end of all this we realized we have a problem. We also realized that we wanted a way of solving it. The way of solving it we have termed the Phytophaga Character Bank (PCB).

The PCB is **a cooperative effort** being set up **to accelerate and facilitate the development of a phylogeny of the Phytophaga.** The authors will, at least in the first instance, be drawn from participants in the ICE 2004 meeting. The PCB will serve to illustrate, retrieve and analyze characters, which can then be used - with proper acknowledgement or in joint authorship - in papers produced by members of the community. Thus the purpose of the Character Bank is, primarily, to accelerate the compilation of cladograms of the Phytophaga, and of other taxonomic research. It will do this, we hope, by:

- making the pool of characters used by the community more reliable and extensive;
- reducing the potential confusion and misunderstandings on the identity and nature of characters and character states;
- enabling community discussion and consensus on the validity and appropriateness of character states;
- providing a lasting resource for researchers of Phytophaga and other Coleoptera;
- providing a repository for morphological characters analogous to GenBank (see http://www.ncbi.nlm.nih.gov).

To achieve this, we plan to develop (or use, if there is one available) a website that will host a community discussion on characters, enabling us to upload illustrations of relevant structures, and jointly compile a character matrix for the Phytophaga. In this way we can work towards an agreement on the characters we have been using over the past years to compile cladograms. We might also agree on the critical species terminal for future analyses, and attempt together to produce a data matrix for them.

Although much of the work will be accomplished openly, clearly there are smaller research teams that may wish to collaborate on projects and keep their information confidential until publication. If we can manage multiple passwording, this should be possible. Although I have emphasized morphological characters above, molecular characters are equally important, and will be included in the development of the website.

The software problems in implementing this are, it turns out, far from simple. In the first instance we are talking to the developers of MorphoBank (see http://www.morphobank.org; and also http://www.morphobank.org/about/articles/morphobank_workshop_report.pdf). We are investigating one or two other initiatives, such as the TDWG Structure of Descriptive Data team (see http://efgblade.cs.umb.edu/twiki/bin/view/sdd/webhome), as well as the developers of JPEG 2000 (see http://www.jpeg.org/jpeg2000), which was demonstrated in Brisbane. We may start off with a Wiki page, which is a tool developed by the bioinformatics community to enable internet-based discussions.

The first activities of the PCB will be focused on the morphological and molecular characters used in the development of the presenations at the ICE 2004, and in the recently published papers on the higher-level classification of the Phytophaga. Watch this space!

Curculionids and Pacific Northwest Tree Fruits: Past and Present

By Elizabeth Beers (USA: ebeers@wsu.edu)

Curculionids are one of the least important pests of tree fruits in North America, boasting only one major pest in the past century, the plum curculio *Conotrachelus nenuphar* Herbst. However, if we define "crop pest" in its broadest sense (any organism using a given plant as a host in a damaging manner), there have been many species of weevils associated with tree fruits since the late 1800s. A reasonably complete listing (more than 50 species) is provided by Beers *et al.* (2003). Only a few incidences from the Pacific Northwest will be highlighted here: (1) those involving weevils associated with arid-zone native habitats, especially sagebrush, and (2) introduced otiorhynchids.

Sagebrush Weevils.[1] Commercial tree fruit plantings began in the arid interior districts of the Pacific Northwest in the late 1800s. The rapid expansion in acreage was made possible by two major factors: rail transportation of products to urban markets in the Midwest and east, and the availability of irrigation water (largely from the Columbia River and its tributaries). Fruit orchards were planted along the banks of the rivers, clearing away the first riparian habitat close to the river bank, and gradually extending up the slope into native sagebrush-steppe. This first brought tree fruits into contact with weevils whose primary host was sagebrush, *Artemisia tridentata* (Asteraceae). Additional native host plants that are abundant include the arrowleaf balsamroot, *Balsamorrhiza sagittata* (Asteraceae); the bitterbrush, *Purshia tridentata* (Rosaceae); and lupines, *Lupinus* spp. (Fabaceae).

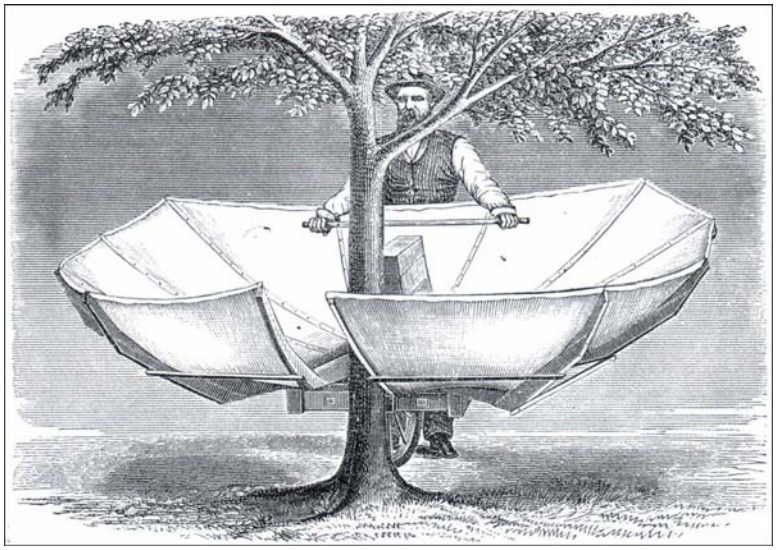

Fig. 1. Dr. Hull's Curculio Catcher (source: American Entomologist 1: 220; 1869).

One of the first written reports of sagebrush weevils attacking tree fruits was in 1897, when Dr. Cordley (of Cordley Hall fame, Oregon State University) documented *Thricolepis inornata* Horn attacking the foliage of prune trees in Oregon in an early Experiment Station Bulletin (Cordley 1897), referring to a still earlier unpublished report of an attack in 1891 in Corvallis. A few years later, a letter published in the Oregon Agriculturist and Rural Northwest (Cordley 1899) documents a second instance of attack on prune, this time on the buds of grafts. Professor Cordley commiserates with the tree's owner, a Dr. Sharples, and discusses a few of the remedies available at the time: *Paris Green* (copper aceto-arsenite), an emulsion of whale oil soap and carbolic acid, trunk banding (with printer's ink), orjarrring.

Weevils reared their head again in 1909, this time in the fruit growing districts of Washington State. During the 7th Annual Meeting of the Washington State Horticultural Association, a grower from Prosser, Washington relates an anecdote about weevils attacking apple orchards in Grandview, Washington, in 1909 and 1910. He recounts that extensive damage was done, with up to 16,000 trees affected. Weevil specimens were sent to A. L. Melander of Washington State College (now University) in Pullman, who returned a verdict of *Evotus naso* (LeConte). Melander's comments and control recommendations drew laughter from the audience,[2] viz.: shaking the trees over an inverted umbrella, so that the weevils would drop and be caught. However, Melander was not joking; he drew his information from eastern and mid-western fruit-growing states, where "Curculio Catchers" had been recommended for at least 30 years (see Editors 1869, Slingerland 1898; as well as Figs. 1 and 2). A second set of specimens was sent to C. W. Bunn of Minnesota, and returned with an identification of *Dyslobus* [*Amnesia*] *alternata* Horn. Further aspersions were cast on the competence of land-grant university personnel, culminating with the advice that growers might do better to find their own remedies. Clearly, the tension between producers and land-grant universities was just as fraught 100 years ago as it is now.

Apparently, the public gibes caught the attention of entomologists at Washington State College. Within weeks of the meeting in mid-January, M. A. Yothers, then Assistant Entomo-

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Weevils on Tree Fruits (continued)

logist, began a research project investigating weevils attacking tree fruits. This study was conducted in 1911 to 1912, and published as a bulletin in 1916 (Yothers 1916). Yothers can be forgiven the slight delay in publication, since two of the species he discovered were new to science. These two species, *Ophyrastes* [*Tosastes*] *cinerascens* Pierce, and *Dyslobus* [*Melamomphus*] *nigrescens* Pierce, were named by Pierce in 1913 from speciems sent by Yothers. The 1916 publication provides a list of weevil species (see Table 1), some biological notes, and control recommendations. An interim report was given at the 11th Annual Washington State Horticultural Meeting in 1914 (Yothers 1915) based on the same study. Yothers polled tree fruit growers to obtain an idea of what control methods worked the best, and most pesticidal remedies were considered ineffective. The most reliable method was to place a paper cone around the tree trunk to prohibit the beetles from ascending the trunk. This had the advantage of working on all ages of trees, and was effective throughout the season, needing no repeat applications. Although some of the cases of weevil attacks were on older trees, most of the attacks were associated with orchards newly planted on land that was primarily sagebrush the previous year. Yothers noted that where alfalfa or some other crop was grown on former sagebrush land a year or two before planting tree fruits, few weevil problems were experienced.

Fig. 2. A Curculio Catcher (source: Slingerland 1898).

"The investigations were discontinued in 1912, when satisfactory control measures were discovered."

This was (and is) the fate of biological studies for many of the minor pests. The interest in their biology drops precipitously as soon as an effective remedy is found. Yothers contributed two more studies to our knowledge of tree fruit-attacking weevils, one on *Evotus naso* in 1928, and one on *Dyslobus tanneri* Van Dyke in 1941. Interestingly, neither of these species was listed by Yothers in his 1916 study. However, Yothers had first found *D. tanneri* in 1916, but the species was not named by Van Dyke until 1933. By this time, much of the prime tree fruit acreage had been planted, and broad-spectrum spray programs were widely used. Little is heard from the family Curculionidae in Washington orchards for the next 50 years.

Fast forward to the year 2000, to a newly planted cherry orchard in Arlington, Oregon. Sagebrush had been cleared the previous year, and into this virgin soil young cherry trees were planted, obtained from a nursery located in Washington's Columbia Basin. When the grower complained of weevil attacks, the orchard was visited by State Department of Agriculture as well as land-grant university personnel, and specimens sent to C. W. O'Brien (Florida A&M University, USA). They were designated *Lepesoma* [*Dyslobus*] sp. nov. The question thus arose: what was the *origin* of the weevils? Did they come from the Washington nursery, transported on the trees, or were they Oregon sagebrush residents, deprived of their rightful food? All the potential evidence had been destroyed; the trees were all planted, and a double application of pyrethroid to the block and orchard borders eliminated the weevils *in situ*. Further searches in 2001 found no weevils, either in the cherry trees, or in the surrounding sagebrush habitat. The primary clue was the publications from the first half of the previous century, outlining the association of weevils and sagebrush, with emphasis on attacks on newly planted trees. The obvious conclusion from the previous studies was that weevils (whose native host is sagebrush or one of the other native plants) overwintering in the soil emerge in the spring to find their native host removed, and feed on whatever green tissue is nearby. It is just an unhappy coincidence for the grower that it happens to be his fruit trees. [Coincidentally, a cherry orchard just to the north of the affected one had been planted to alfalfa for a year, and suffered no weevil damage. History repeats itself.]

Meanwhile, back in Washington, two cases of weevil infestations were reported within weeks of each other in the spring of 2001. One was near Bray's Landing, on the east side of the Columbia River north of Orondo, Washington, the second in

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Weevils on Tree Fruits (continued)

the Columbia Basin, near Quincy, Washignton. The Bray's Landing site was a newly planted cherry orchard high up on a slope above the Columbia (Fig. 3). The block had been under cultivation about 20 years ago, but had gradually returned to native habitat since that time. Pre-planting soil preparations were minimal; the sage had been mowed down, and trees planted in furrows sliced by a tree planter. Evidence of sagebrush was still visible in the spring of 2001.

Weevils and their damage could be seen throughout the block (Fig. 4). Most of the damaged consisted of neat, round holes chewed in the side of the bud, although in some cases, the tip had been chewed. The dominant species was *Stamoderes lanei* (Van Dyke) (Fig. 5), followed by a chrysomelid beetle, *Glyptoscelis artemisiae* (Blake) (Fig. 6). Another curculionid, *Ophryastes cinerascens*, was present, although in smaller numbers. This speces was also found in a block of cherries just west of the affected block, which was in the process of being planted. Individuals of *O. cinerascens* was found in the tree planting holes (Fig. 7), and tumbling down the sides of a trench dug recently to lay irrigation pipe (Fig. 8). If Hatch's assessment is correct, and the *Mimetes setulosus* listed by Yothers in 1916 was actually *S. lanei* (Table 1), then two of the three beetles found in 2001 were the same as found in 1911; and the third was a closely related species of *Glyptoscelis.*

The Quincy site was also being attacked by multiple weevil species. In this case, the damage was potentially more serious, as the trees had been bud-grafted the previous fall, and the weevils were feeding on the sole bud that would become the varietal scion. In some cases, the bud was completely destroyed. Two of the species here overlapped the Bray's Landing site, viz.: *S. lanei* and *O. cinerascens*, but with one additional species, *Mesagroicus elongellus* Emden. The plant species composition of the Columbia Basin is similar to that along the Columbia River. However, at the Quincy site, no sagebrush was found in the native habitat near the orchard border.

Fig. 3. Bray's Landing site (sagebrush in foreground, orchards in middle ground, Columbia River in distance).

Fig. 4. Feeding damage to cherry bud, Bray's Landing orchard.

Fig. 5. *Stamoderes lanei,* feeding on cut stem of cherry tree.

Fig. 6. *S. lanei* and *G. artemisiae* on cut stem (note damaged bud).

Fig. 7. *O. cinerascens* in soil, Bray's Landing orchard.

Fig. 8. Soil trench for irrigation line.

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Weevils on Tree Fruits (continued)

Introduced Otiorhynchids. Four unrelated incidences of weevil attacks were reported in 2001 to 2002. All were found to be weevils in the genus *Otiorhynchus*, and were not previously documented as tree fruit pests in Washington. All four species were introduced from Europe, and tend to have very broad host ranges. The populations had doubtless been in place for many years, but reports had not made it into the literature.

The first incidence was reported in 2001 in a commercial apple orchard near Bridgeport, Washington. Specimens were identified as *O. meridionalis* Gyllenhal. About ten acres of the ranch were affected, with marginal leaf notching the only visible damage (Fig. 9). The second incidence was near Othello, Washington (Columbia Basin), in a 40-acre apple orchard. Marginal leaf notching was noted throughout the orchard, with foci of intense feeding damage. Damage extended from ground level to about 2 meters in height. Jarring weevils onto a ground cloth yielded hundreds of specimens inside a few minutes. All were identified as *O. meridionalis*. The third incidence was an organic apple orchard in East Wenatchee, Washington. Some marginal leaf notching was evident, but only low in the trees, confined mainly to root suckers. Although only five specimens were collected, three species were represented: *O. meridionalis*, *O. rugosostriatus* (Goeze), and *O. ovatus* (L.). A pear block next door was free from damage and weevils.

The fourth was an isolated 1,000 acre apple ranch near Vantage, Washington. The ranch is sandwiched between the Columbia River to the east and basalt cliffs to the west. The pest management consultants who worked on the ranch had previously reported weevil infestations, especially *O. ovatus*. More extensive collections in 2002 revealed two additional species were present in the orchards, *O. sulcatus* (F.), the black vine weevil, and *O. meridionalis*. Unlike the other locations, this ranch experienced fruit stem girdling damage (Fig. 10) in addition to marginal leaf notching. Based on previous experience with *O. meridionalis*, the petiole damage is likely attributable to either or both of the other species present.

The findings on these otiorhynchid weevils raise some questions. Does the presence of these species on tree fruits represent an adaptation to new a host, *or* an expansion of geographic range? Have they previously been excluded by the relatively intensive pesticide programs used on tree fruits? Washington tree fruit pest management has experienced a major shift over the past decade, with over half the apple acreage using mating disruption for the key lepidopteran pest, the Codling Moth *Cydia pomonella* (L.; Lepidoptera: Tortricidae). There has been a concomitant reduction in use of broad-spectrum insecticides, and replacement with more selective materials (often specific to Lepidoptera). It has long been suggested that more selective programs could lead to greater diversity in the array of arthropods able to use tree fruits as hosts. The paucity of coleopteran pests in western fruit orchards means few or no insecticides currently in use are toxic to them. Despite this, it seems unlikely that weevils will ever be more than locally important as pest species.

Fig. 9. Marginal leaf notching caused by *O. meridionalis*.

Fig. 10. Fruit stem girdling by *Otiorhynchus* weevils.

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Weevils on Tree Fruits (cont.)

Table 1. Selected list of weevils found attacking tree fruits in Washington in 1911 to 1912, according to Yonkers 1916, with updated names (see Wibmer and O'Brien 1982) and comments.

Name (Yonkers vs. current)	Page	Notes on Biology and Distribution
Cercopeus artemisiae Pierce = *Cercopedius artemisiae* (Pierce)	53	Lesser sagebrush weevil, bud weevil, artemisia weevil. Native host is probably sagebrush, also feeds on apple peach cherry, and pear. Most often associated with bud injury by adults to young fruit trees planted just after native sagebrush has been cleared off (northwestern United States and southwestern Canada). It also can be found feeding on sap from newly cut shoots (heading back, or cutting off, nursery trees immediately after planting is a common practice). It is a diurnal feeder and will drop to the ground if disturbed. On sagebrush, it pierces tiny holes in the leaves.
Cleonus lobigeriunus Casey = *Cleonis lobigerinus* (Casey)	74	Reported as especially destructive to apricot buds in Okanogan in the spring of 1909.
Cleonus quadrilineatus Chevrolat = *Cleonis quadrilineatus* (Chev.)	75	Found on apple trees and lupine near Brewster, Washington, in April 1912, although causing little damage to apple buds.
Melamomphus luteus Horn = *Dyslobus lutea* (Horn)	62	While Yothers refers to the report by Chase (1911) in connection with this species, Chase only refers to two species in his report: *Evotus naso,* and *Dyslobus* (*Amnesia* [sic. *Anesia*]) *alternata* Horn. However, Yothers notes that the males and females differ greatly in appearance, doubtless the cause of confusion and misidentification (Horn originally placed them in different genera, according to Pierce).
Melamomphus nigrescens Pierce = Dyslobus nigrescens (Pierce)	62	Listed in Yothers (1915, 1916) as *Melamomphus nigrescens* Pierce. Specimens were taken from Riparia, Washington, in March of 1911, reported as destroying buds of young peach and apple trees. Pierce named the new species from the Washington material in 1913.
Mimetes setulosus Schoenherr = *Amotus setulosus* (Schoenherr)	47	Probably a misidentification of *Stamoderes lanei.* Based on Hatch's (1971) assessment, this was the more important species encountered by Yothers (1916), yet misidentified in the latter as *Mimetes setulosus* (van Dyke described *S. lanei* in 1936). Suggested candidate for rare and endangered species (Anderson 1998).
Mylacus saccatus Leconte = *Omias saccatus* (LeConte)	50	Reported as feeding on buds and leaves of 1- to 2-year-old apple trees in 1911 to 1912, near Brewster, Washington. Probably the native host is sagebrush, also found on arrowleaf balsamroot (also known as wild sunflower, *Balsamorrhiza sagittata*).
Panscopus aequalis Horn = *Panscopus aequalis* (Horn)	62	Adults found feeding on buds from 1-year-old apple trees in Tonasket, Washington (near Canada), in April of 1911 (first report; found at other sites also); in addition, it feeds on sap oozing from freshly cut shoots. Adults fall to the ground if disturbed. At least one report of feeding on fruit tree buds on land under cultivation for more than seven years.Distribution: Wyoming, Utah, Washington, California.
Sitona apacheana Casey = *Sitona prominens* v. *apacheanus* (Casey)	45	Taken on 1-year-old trees at Brewster, Washington. This was also considered a variety of *S. prominens* Casey; both are now junior synonyms of *S. californicus.*
Tosastes cinerascens Pierce = *Ophryastes cinerascens* (Pierce)	64	Considered by Yothers to be the most economically damaging of the weevil species (mostly sagebrush associates) in his 1916 study. Adults feed on buds of 1- to 2-year old fruit trees. Described by Pierce in 1913 from material sent by Yothers.
Tricolepsis sp. = *Thricolepis* sp.	51	Possibly *Thricolepis inornata* Horn, as reported by Cordley. O'Brien & Wibmer (1982) list only three species in this genus; only *inornata* occurs in Washington. Yothers gives but brief paragraph on this species, reported as feeding on prune trees (same as Cordley) in Washougal, Washington (across the Columbia River).
Tychius lineellus Leconte = *Tychius lineellus* Leconte	118	Yothers reports he collected this species on young apple trees, but doing "little or no damage."

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Endnotes

[1] The host plant range of some of the species mentioned here is poorly known, thus the term "sagebrush weevils" may not be accurate in some cases.

[2] In the early 1900s, all speech, including questions and answers at the meeting was recorded in the Proceedings, including parenthetical notes of [laughter].

Author's Note: I am indebted to C. W. O'Brien for identification of all weevil specimens mentioned in the 2000-2002 reports. Current names are taken from O'Brien and Wibmer (1982). If I have missed important citations concerning weevil pests of North American tree fruits, please contact me. I would be happy to have my knowledge enlarged.

European Curculio Institute - 3rd International Conference

Report on Meetings in Ochotnica Górna (Poland), August 2004

By Peter Stüben (Germany: p.stueben@t-online.de) **and Christoph Bayer** (Germany: webmaster@weevil.de)

Impressive Hosts

The Third International Conference of the European Curculio Institute was held in the Western Carpathians, Poland, from August 1st to 7th, 2004. Our East European Office, fouded in March 2003, organized the Meetings perfectly. Dr. Stanislaw Knutelski (Cracow) led the Conference masterfully. The mountain field station in Ochotnica Górna (Department of Entomology, Jagiellonian University) proved an ideal laboratory and Conference center for participants from Poland, the Czech Republic, France, Germany, Italy, Japan, and Switzerland.

A short visit to Prof. Boguslaw Petryszak's residence in the forests of the northern Tatra Mountains impressed the delegates; he vividly recalled several inspiring field trips together with the famous Lothar Dieckmann (Germany) in the 1970s and 1980s.

The Polish colleagues are not only skilled planners. A fire in the early morning of the final Meeting day damaged the Natural Sciences Faculty building of the Jagiellonian University in Cracow. Thanks to quick rearrangements by Dr. Knutelski, the Conference nevertheless continued. Prof. Dr. Zbigniew Dabrowski (Department of Physiology), a colleague, offered "private scientific asylum" to the participants. By moving closer together, the final session of the Conference could proceed.

A visit at the end to the famous Old City of Cracow was the cultural highlight for the international group of weevil researchers. The diversity of languages was not an insurmountable obstacle, but rather a valuable addition to our discussions.

Collecting "Monophagously" - Thinking "Polyphagously"

The Meetings could be summarized as one week of waking up early, going on intensive field trips while utilizing as many collecting methods as possible, and sometimes working to the point of exhaustion. The *Weevil News* (see http://www.curci.de/inhalt.htm) will feature a separate publication on the results of our faunistic studies of the Tatra Mountains region, authored by Stanislaw Knutelski and Peter Sprick. This is an opportunity to convey our experiences and new observations to the public - beyond just hopping from one lecture to another lecture at a sterile scientific conference. Usually scientists plan field trips alone, focusing solely on actively studied weevils and their respective host plants. It is uncommon to exchange new experiences or interesting observations at a campfire or in the Conference laboratory right after they were made. Learning from each other without worries of embarrassment or recurrent aims to solidify one's academical position - where can one experience that nowadays?

Of course there were also short and openly discussed presentations. For instance, we had a discussion on the topic of "species description on the internet." It is important to realize that internet-based descriptions are on the verge of becoming a reality (P. Stüben). We should no longer ask ourselves if, but rather *how* to validate such publications and also ensure their persistence (Ch. Bayer). A further issue question was how to achieve stability and intersubjective control without restricting scientific progress. We do not need more "law and order," but should instead channel all creative powers towards resolving the new digital challenge.

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Weevil Meeting Poland (continued)

As was further presented, the confusion about the "higher-level systematics of weevils" is disturbing to some (E. Colonnelli). To others some it is not: "members of species are able to mate, genera have never been observed engaging in such behaviors" (M. Kostal). Using some Far Eastern wisdom one may also progress: "instead of debating too much we better start to work intensely" (H. Yoshitake). And that means pushing forward phylogenetic and biogeographic research.

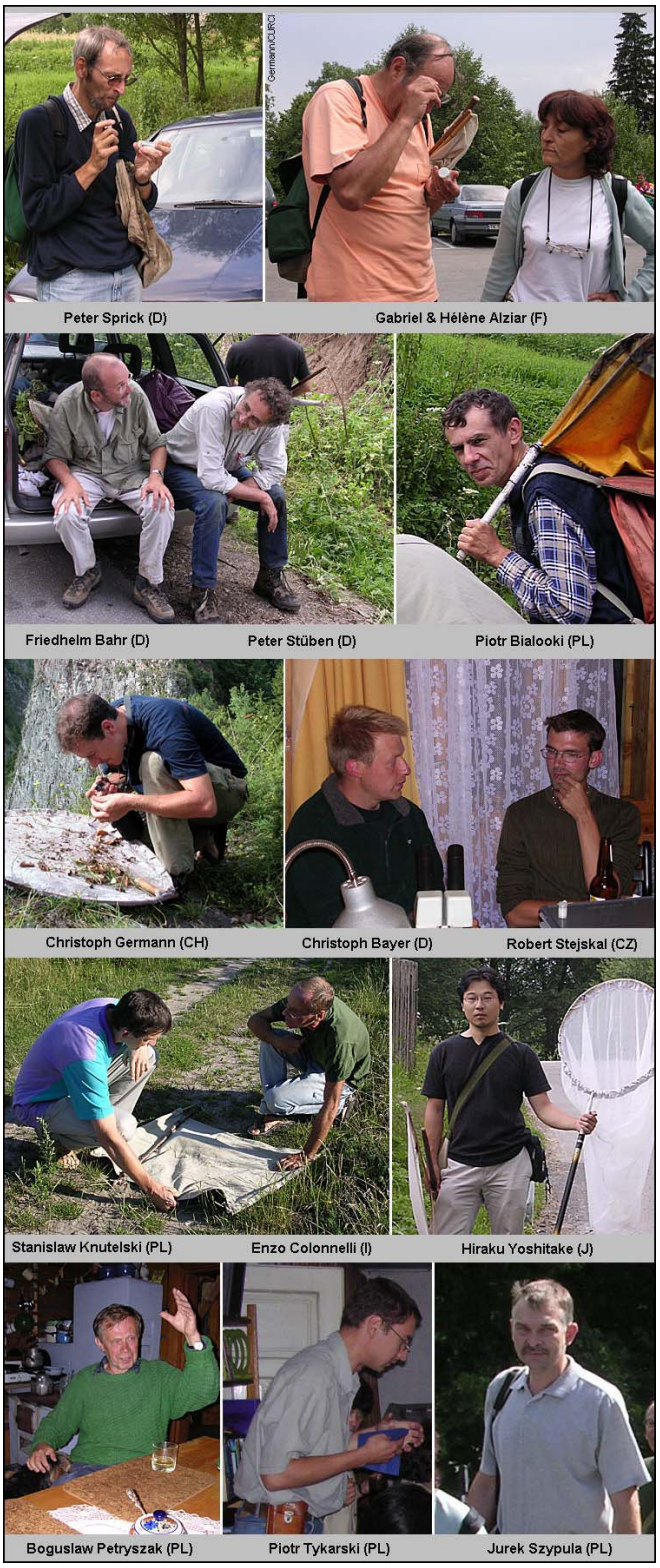
Sometimes seemingly simple practical questions turn into problems, for example if nobody can determinate your weevil specimens from Cyprus (G. Alziar). Yet now there is still a promising solution: "just finish your annotated list of species and also depict all specimens lacking determination" (P. Stüben). Where to publish? - why not in the *Weevil News?* (P. Sprick) This would play to the curiosity of the specialists who might eventually look for new species more regurlarly on the internet than in the field. "Specialists will find your digital photographs of specimens and aedeagi more quickly than you are able to travel from Nice to Cyprus."

A few evening discussions became entomo-political. Some endorsed the creation of "Red Lists" for forcing governments to adopt a more ecological point of view (P. Sprick). But at times entomologists also suffer from environmental protection laws in a paradoxical ways. Newly protected areas might become dangerous to those without a collecting permit. In a worst-case scenario, they might be emprisoned.

In light of all passionate discussion one must nevertheless acknowledge: the atmosphere amongst us "phytophagous weevils" was always peaceful and relaxed.

Next Time the University is on Fire, Transport It into Your Living Room

Much has been written about the role of burnt offerings in the Old Greek civilization: they bring about a purification of the senses and thoughts, and focus our attention on the essential parts. But what is essential? Is it a Society growing continuously, and welcoming new members each year while releasing others who refuse to pay? Or a Society creating something new every year with the publication of *Snudebiller?* (Ch. Bayer and P. Stüben) Peter Stüben compiled a presentation for the members of the Curculio Institute. In the near future, everyone will be able to show the work of the Curculio Institute to the public whenever the opportunity presents itself. Weevils (and pictures) learn to walk, scrolling pictures evolve into an infinite papyrus, and browsing through the taxonomic menu service of the *Snudebiller* list of contents means having a lot of fun doing weevil taxonomy. Maybe it is not just pure science; didactics also play an important role. In the end we do not wish to become a sort of "living fossil,"



Participants of the 3rd International Conference of the European Curculio Institute in Poland, August 2004.

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Weevil Meeting Poland (end)

therefore - always think of the coming generations!

The next generation of weevil researcher will finally transport the Academy into the living room. The presentation on the "Phylogenetic framework for the tribe Phytobiini" by Hiraku Yoshitake - the youngest member of the Curculio Institute - was impressive. There was a critical remark that dried material is not usable for molecular analyses (P. Tykarski). With Japanese politeness, Hiraku Yoshitake requested that those who must use fresh material for this purpose need help, in his case to find living specimens of European Phytobiini, e. g. *Pelenomus velaris.* Please do not forget to store them in ethanol.

Piotr Tykarski presented on a database project on the weevils of the Tatra Mountains and Poland. Today's large-scale faunistic projects can only be realized with the aid of digital technology and some inventiveness. If there is a lack of cooperation such projects are endangered of stalling half-way.

The "raunchy end" of the Meetings will remain unforgettable to all participants. A quick glance at the wide open eyes of computer freaks and photographers of the *Snudebiller* was sufficient - nobody had seen something like this before. Marek Kozlowski presented a masterful talk on "Male and female weevils - a look at sexual conflicts and reproductive tactics." We all went home in a pensative mood. Watching the fantastic screen-presentation, we realized: we are neither working on "weevil material" - holo- and paratypes - nor on simple "objects" of our academic curiosity. Is it of any use to describe species which might become extinct in the near future? What will it mean when our children marvel at species represented solely by holotypes in a museum? In his documentary Marek Kozlowski tells us: "you are working on 'individual beings' and are therefore a good advocate for your group, the weevils. You shall take over their case!" We got the message.

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Conclusion

The Meetings in the Tatra Mountains and in the City of Cracow were memorable and successful in all respects. Not not least: all members of the European Curculio Institute, please join our next International Meeting in April 2006! The promising suggestion for a venue are The Canary Islands, Tenerife. The Curculio Institute will prepare the logistics in cooperation with the local colleagues.

Participants

Gabriel & Hélène Alziar (France), Friedhelm Bahr (Germany), Christoph Bayer (Germany), Piotr Bialooki (Poland), Enzo Colonnelli (Italy), Christoph Germann (Switzerland), Stanislaw Knutelski (Poland), Michael Kostal (Czech Republic), Boguslaw Petryszak (Poland), Peter Sprick (Germany), Robert Stejskal (Czech Republic), Peter Stüben (Germany), Jurek Szypula (Poland), Piotr Tykarski (Poland), and Hiraku Yoshitake (Japan).

Elwood Curtin Zimmerman[1]

World Authority on Weevils, XII-08-1912 to VI-18-2004

By Murray S. Upton (Australia) **and Rolf Oberprieler** (Australia: rolf.oberprieler@csiro.au)

On Wednesday 23 June 2004 CSIRO Emeritus Fellow Elwood Curtin Zimmerman, "Zimmie" to all who new him, was buried at sea off the continental shelf in the ocean around which he had spent his entire professional life. There was no ceremony. He had, he claimed, come into the world quietly and that was the way he wished to leave it.

[1] AM, BSc (Berkeley), DIC, PhD, D.Sc (London)

Zimmie, who became one of the world's outstanding taxonomic entomologists, was born at Spokane, Washington, United States, on 8 December 1912 to Ernest and Ethel Zimmerman, but the family soon moved to Oakland, California. Seen as a budding great naturalist he became known as "Bugs" Zimmerman at High School, from which he graduated in June

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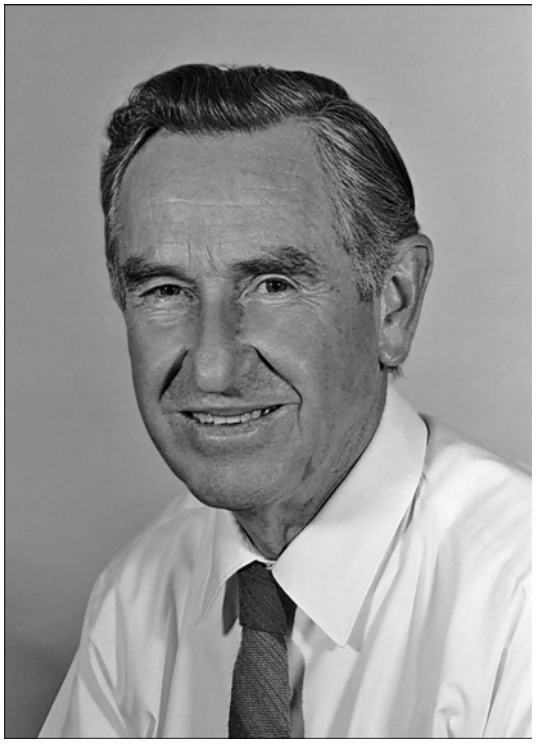
Elwood Zimmerman (continued)

1931. The suggestion by a Berkeley University Professor that he study weevils set him on a course he was to follow for the rest of his life. While still at High School his enthusiasm for insects led him to be employed by the Pacific Entomological Survey in 1930, and his first paper describing a new species of weevil he had collected as a Boy Scout was published in 1932.

He entered the University of California, Berkeley, on a scholarship, but his studies were interrupted when, due to his growing entomological reputation, he was selected for the position of Entomologist on the Hawaiian, Bishop Museum Mangarevan Expedition to some 50 Polynesian Islands. This expedition, led by Dr. Charles Montague Cooke, who became a "father figure" to the young Zimmerman, had a profound effect on him and his interest in the Pacific never left him. Zimmie's career as a professional entomologist, which was to last for 70 years, began in April 1934 when he boarded the expedition's converted sampan, the "Islander," at Tahiti.



Elwood Curtin Zimmerman, AM, PhD, D.Sc

Following his graduation in 1936 he gained a permanent position with the Bishop Museum in Hawaii and commenced work on what he saw as his major project in life, to publish a series of volumes dealing with all the insects of Hawaii. He also lectured at the University of Hawaii from 1936 to 1937 and from 1940 to 1941.

While studying Hawaiian insect collections at Harvard for his project in 1941, he met and married Hannah Louise Bond before returning to Honolulu. Zimmie and his "bride" were to become inseparable and without Hannah's devotion his phenomenal output would have been seriously lessened.

By 1946 he had become Curator of Entomology and in 1948, having produced the first five volumes of "Insects of Hawaii," he gained a Fulbright Fellowship to study the Hawaiian insect collections at the British Museum of Natural History, where he became an Honorary Associate. He also served as Associate Entomologist for the Hawaiian Sugar Planters Experiment Station. For the next twenty years, as a Research Associate and Entomologist with the Bishop Museum, Zimmie spent much of his time in England working on his "Insects of Hawaii." He was a National Science Foundation Fellow 1954-1956; 1958; 1966-1967, and 1969-1973. For his work, he received a DIC his degree from the Imperial College, London, and a Ph.D. from the University of London in 1956. He later received his D.Sc. from London in 1980.

With a dedication that never faltered, Zimmie produced a further three volumes of the "Insects of Hawaii" in 1957 to 1958. However due to financial and administrative problems his ninth volume, issued as two books, did not see the light of day until 1978. Despite the fact that he had already produced 4,893 pages in the nine volumes, it was to his permanent regret that the 15 volumes he originally envisaged to complete his project never eventuated.

In 1972, with funds and support for his project all but gone, Zimmerman, after discussions in London with Dr. D. F. Waterhouse, Chief of CSIRO's Division of Entomology, made a momentous decision. He would abandon the "Insects of Hawaii" and move to the other side of the Pacific and commence another incredibly ambitious project. At 60 years of age he came to Australia to tackle the continent's vast and complex weevil fauna that had always attracted him. He took up the position of Senior Research Fellow with the CSIRO Division of Entomology in 1973 and set about his task with enthusiasm. However, the immensity of the project and the severe limitations that were to continually plague him soon became apparent. The demand on his time from other institutions to identify weevils from throughout the world continually interfered with the amount of time he could spend on the Australian weevils that were already proving to be far more complex than had hitherto been realised. One of his first reports stated: "The work load is staggering, and the difficulties facing us are almost overwhelming." That situation never changed. By 1977 Waterhouse wrote that "in spite of his prodigious energy, the completion of the work will take a further five years." In November 1982, aged 70, he advised Max Whitten, Chief of the Division, that "I am not retiring. The fact that my salary ceases does not mean my work is completed - I have only just begun!" His 1986 report stated that he had worked full time for the past year. "No holidays were taken - neither Sundays nor Christmas. At my age one works continuously against time." As well as working on his Australian Weevil project, Zimmie was still carrying out identifications for institutions through-

(continued page 22)

Elwood Zimmerman (end)

out the world; work he felt he could not refuse.

However, the first few volumes of "Australian Weevils" were now close to publication and to ensure their publication Zimmie and Hannah contributed over $100,000 towards them. Volumes 5 & 6 containing the coloured plates appeared in 1991-1992, and volumes 3, 1, and 2 came out shortly thereafter in 1993-1994. A further 3,690 pages to his credit. With 225 scientific papers also to his name, Zimmie had produced more than 10,000 pages altogether, a world record for a single scientist. Volume 4 is currently in preparation. Zimmie was still actively working at his bench, examining specimens on 16 June, when he collapsed with a stroke from which he never recovered. He died in the early hours of 18 June 2004 at the beginning of his 71st working year.

From his arrival in Australia and up to 1992 when he moved to his new home at Tura Beach, New South Wales, Zimmie successfully ran a small farming property near Yass, New South Wales. This he ran "in his spare time!" He was an unstoppable workaholic.

Elwood Curtin Zimmerman won the Hawaiian *Author of the Year* prize in 1948; the Lepidopterist's Society *Karl Jordan Medal* in 1983; a *Special Award* from the American Entomological Foundation in 1992, the CSIRO *Special Medal* in 1995; the Pacific Science Association and Bishop Museum's *Herbert Gregory Medal* in 1995; a *Commendation* on behalf of the People of the State of Hawaii, and the University of Hawaii's *Regent's Medal* in 1998; also in 1998 Zimmie was awarded the *Order of Australia* (AM) for service to entomology, particularly through scientific research in Australia and the Pacific region and the philanthropic support of this research. In 2003 he was made an "Emeritus Fellow" of the CSIRO Division of Entomology for his significant contributions to science throughout his career.

Zimmie was an active member of many societies and associations: The Pacific Coast Entomological Society, San Francisco, since 1929 (Elected Foreign Honoured Member 1993); American Association for the Advancement of Science, since 1940 (Elected Fellow 1951 and Life Fellow 1957); Hawaiian Entomological Society (Life membership 1987 and Lifetime Excellence Award 1995); Entomological Society of America (Elected a Fellow in August 1986 in recognition of his contributions to entomology); Hawaiian Botanical Society (Honour Award on its 50th Anniversary, 1974); Coleopterist's Society; Association of Tropical Biological Research; Member of the Pacific Science Board of the U.S. National Research Council in 1950s; Society for Systematic Zoology; Society for the Study of Evolution; The Australian Entomological Society; and was Life Fellow of the Royal Entomological Society of London; Life Fellow of the Linnean Society of London; Life Fellow of the Zoological Society of London. He was a Patron of the California Academy of Science (Elected Honorary Fellow 1995).

In 1990 Ernst Mayr wrote that Zimmie was "One of the few taxonomists left who appreciates the extreme importance of taxonomic monographs and does them superbly" and Edward O. Wilson claimed Elwood C. Zimmerman was the "Doyen of insect systematics and biogeography." He was certainly one of the greatest. He is survived by his wife, Hannah.

Book Review - Fauna of India: Scolytidae/Xyleborini

P. K. Maiti & N. Saha

By Roger A. Beaver (Thailand: robeaver@loxinfo.co.th)

P. K. Maiti, and N. Saha. 2004. Fauna of India and the Adjacent Countries. Scolytidae: Coleoptera (Bark- and Ambrosia-Beetles) Volume 1, Part 1. Introduction and Tribe Xyleborini. Zoological Survey of India, Kolkata. 268 pp.

This new volume in the Fauna of India series is welcome because there has been never been a general taxonomically-based account of the species of bark and ambrosia beetle of the Indian subcontinent. It is based primarily on the large collection at the Forest Research Institute in Dehra Dun, much of which was accumulated during the colonial period by entomologists such as C. F. C. Beeson and E. P. Stebbing, although substantial additions have since been made by a number of Indian entomologists. Beeson (1961) published a very useful account of the biology and host trees of many species, and earlier had described a number of species, but never produced a taxonomic overview, including keys and species descriptions. The present authors, both of whom have worked for many years for the Zoological Survey of India, have now started to produce such an overview of the fauna. Despite the fact that much of their work for the Zoological Survey has been concerned with termites, both have managed to make significant contributions to knowledge of the scolytines of India. Their first volume provides a general introduction to the subfamily, and a review of the tribe Xyle-

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Indian Scolytids (continued)

borini. This is the largest tribe in terms of number of species in India, as elsewhere in the Oriental region. The volume includes all the species that have been recorded from India, but not those known only from neighbouring countries such as Sri Lanka and Myanmar. Some of these may yet be found in India.

The authors follow the classification of Wood (1986) and Wood and Bright (1992), considering the Scolytidae and Platypodidae as separate families, although more recent molecular and morphological evidence (e.g. Kuschel 1995; Kuschel *et al.* 2000; Marvaldi *et al.* 2002) suggests that they should be considered only as subfamilies within the Curculionidae, and that the platypodines may have originated from within the scolytine subfamily (Kuschel *et al.* 2000). They also follow Wood's (1986) generic division of the Xyleborini. Of this, more later. Following the introduction, Maiti and Saha give a general account of scolytine morphology, biology and ecology, and then discuss the economic importance (which they consider to be generally minor in India), and direct and indirect control of the beetles. This is followed by a useful, though brief, account of Indian zoogeography, with maps of the main physiographic divisions, climatic conditions and forest types present, and a short discussion of the scolytine faunas of the different physiographical divisions. There is no specific discussion of the biology of the tribe Xyleborini.

There follows a key to the genera, and then detailed accounts of each genus and its included species, including keys to and descriptions of most of the species known from India, and figures of the majority of species. The male is described where known. Details of synonymy, distribution and host trees are given for each species. No new species are described, but some species are omitted from the keys and, usually, the descriptive sections also, because of a lack of material in the Dehra Dun collections. The omitted species are not listed anywhere, but have to be disinterred from the introductory accounts of each genus.

So far so good, but the devil is in the details. At least two species appear to have been misidentified, possibly because the relevant types have not been examined. Within the genus *Cnestus, C. cruralis* is described and illustrated. However, examination of the holotype has shown that this species belongs in the genus *Coptodryas* (Beaver 1998). A different species of *Cnestus* has been included. The species described and illustrated under the name *X. difficilis* is not that species, and its specific identity is uncertain. *Xylosandrus difficilis* has the same humped profile as *Xylosandrus morigerus*, and is closely related to that species.

There is some confusion over type material. In the genus *Coptodryas*, the holotypes of the following species described by Sampson are stated to be in the Forest Research Institute, Dehra Dun: *alpha, elegans, perparvus, recidens*, and *undulatus*. The Wood and Bright (1992) Catalogue states that the holotypes are in the Natural History Museum, London. The authors do not attempt to explain the discrepancy. In fact, Sampson did not state where the types of these species were deposited, nor the number of specimens from which he described the species. It seems that the "holotypes" are in fact syntypes, and that lectotypes will need to be designated. Under *Webbia turbinatus*, it is stated that the holotype female is deposited in the F.R.I., Dehra Dun and in the Zoological Survey of India, Calcutta. The original description makes it clear that it is in Dehra Dun.

One problem is that the authors have attempted to "shoehorn" species into the genera established by Wood (1986), even though they do not "fit." Two examples. *Xyleborus sundaensis* is transferred to the genus *Ambrosiodmus*, because it is related to two species *dihingensis* and *lantanae* currently placed in that genus in the Wood and Bright (1992) Catalogue, but these three species, and others in the "*insulindicus*" group which currently remain in *Xyleborus*, seem not to be closely related to the majority of species placed in *Ambrosiodmus*, and probably deserve their own genus. *Xyleborus improbus* is transferred to the genus *Cyclorhipidion*, but it, and two other species *hirtum* and *lineatum* currently placed in that genus in the Wood and Bright (1992) Catalogue, have a median tuft of hairs at base of the pronotum, indicating the opening of the mycangium, and probably belong in the genus *Xylosandrus*. Points such as these indicate the need for further revisionary work on the tribe Xyleborini. To be fair to the authors, they do recognize the problem exists (p. 102). It may be noted that none of the new combinations in the volume are indicated by comb. n., and the changes are likely to be missed by cataloguers.

Users may have some problems with the keys. For example, in the key to genera, *Ambrosiodmus* is stated to have "pronotal asperities extending almost up to the basal margin." As the authors note in the text, but not in the key, this does not apply to species such as *A. apicalis* and *A. consimilis*. *Xyleborinus speciosus* is supposedly excluded from the key to species of *Xyleborinus* (footnote on p. 169), but it appears to be included under the name *X. subspinosus*, a name which is a synonym of *X. saxesenii*, as the authors correctly indicate on page 178. There are other discrepancies between keys and descriptions. For example, the body length of *Xyleborus corpulentus* is given as 2.0-2.15 mm in the key, but as 2.9-3.05 mm in the description. The latter is correct. The body length of *Xylosandrus discolor* is given as 2.3-2.4 mm in the key, but 1.9-2.0 mm in the description. Again the latter is correct. *Euwallacea malloti* is described as "the smallest species of the genus," but the key to the genus shows that two smaller species (*E. piceus* and *E. bicolor*) occur in India.

(continued page 24)

Indian Scolytids (end)

The figures are one of the most useful parts of the volume. Dorsal and lateral views of most species are shown, sometimes with details of elytral sculpture, antenna and tibiae. These give a good overall view of the appearance of the species, and help considerably with identification. But again there are a few problems. The top of figure 31 has been cut off by the printer. In figure 56 (*Webbia pabo*), the lateral view mentioned in the caption is simply not there, and the dorsal view is rather inaccurate. In figure 62, there is a dorsal view (Fig. 62e) of a species that is unidentified in the caption.

The authors have been ill-served by their printers, and presumably were not able to check galley-proofs. There are literally hundreds of typographical errors throughout the volume. Sometimes, these are easily detected, but when they affect scientific names, they may cause problems to users. For example, on page 26, the second paragraph mentions 9 generic and 7 specific names. Of these, 4 generic and 3 specific names are misspelled. Among the species (including synonyms) misspelled in the main taxonomic part of the work are: *Arixyleborus malayensis* (as *malayansis*), *Cyclorhipidion nutans* (as *C. nutens*), *Xyleborus pseudobarbatus* (as *pseudoberbatus*), *Tosaxyleborus* (as *Tosoxyleborus*), *Xyleborus dispar* (as *disper*), *Xyleborus melancranis* (as *malancranis*). And what are "adpest" asperities (p. 236, p. 240)? The index lists the species, not in a purely alphabetical order, but under the genera in which they now are, or in which they were originally described. This makes it difficult to locate specific names. In theory, synonyms are given in *italics*, and valid names in normal type. However, further errors seem to have been introduced by the printers into both this sytem, and into the page numbers, which may refer you to a page in the bibliography, or to a page which has no mention of the species you are trying to locate.

Despite all these problems - welcome the volume! There is no other which deals with the Indian Xyleborini as a whole. It is cheaply priced at ca. US $ 30.00, and you can buy it, as I did, over the internet (see e.g. https://www.vedamsbooks.com/zoo.htm; for publication in the Fauna of India series). Have some sympathy for the authors working in isolation from the main museums and collections, and admire their devotion to their task. But use the volume with caution, and hope that when Part 2 appears, the printer's devils that have plagued this volume will have been exorcised.

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The Bulletin Board

News About Weevils

Maxwell Barclay (United Kingdom: m.barclay@nhm.ac.uk) is the (new-ish) weevil curator at the British Museum for Natural History.

Roberto Caldara (Italy: r.caldara@tin.it) reports that the **American weevil *Lissorhoptrus oryzophilus* has now reached Europe.** He recently had the opportunity to study adults of the American rice water weevil, *Lissorhoptrus oryzophilus* Kuschel (Erirhinidae), collected in the provinces of Milano and Pavia (Lombardia, northern Italy), in the Po Valley (see the new publication by Caldara and co-authors on page 25). This appears to represent the first record of the species in Europe. The weevils are an important pest of *Oryza sativa*, and seem to be native to the southern United States. They are also known from the remainder of North America and from Cental America. Around the year of 1980, parthenogenetic populations of *L. oryzophilus* were introduced into Japan as well as North and South Korea. Very recently they also entered China and now seriously damage rice cultivations there. The European spe-

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The Bulletin Board (end)

cimens (about 50 females) were first collected in March and April by sifting *Calluna vulgaris*, and then spontaneously by sweeping Poaceae and Cyperaceae that occur near rice fields, prior to the growth of the rice plants. The locally active Phytopathological Observatory has been informed about the occurrence *L. oryzophylus* in Lombardia, and is presently investigating the possible damage for the rice plants by this weevil. It is worth noting that the western Po Valley (Lombardia, Piemonte) constitutes the main rice-producing region not just for Italy but for all of Europe. Therefore it is discernible how significant a menace *L. oryzophilus* might come to represent in these agricultural zones.

Caroline Chaboo (USA: tortoisebeetles@excite.com) has recently taken over the **editorship of CHRYSOMELA** and has now published the Newsletter's Volume 43, available at http://www.coleopsoc.org/nwslttrs.shtml. She also informs that **preregistration is now possible for the VIIIth European Congress of Entomology** to be held **in Izmir, Turkey, from September 17th to 22nd, 2006.** Please refer to the Congress website at www.ece2006.org for further details.

Chris Johnson (Germany: postmaster@entomoforum.de) announces the opening of a **new international forum** for entomology - Coleoptera and Lepidoptera in particular. The discussion board is accessible at http://www.entomoforum.de. The forum is interactive and has free membership. All threads are published instantly. Personal pictures may be uploaded as well. The preferred languages are English, German, and French.

Alessandra Sforzi (Italy: alessandra@unifi.it) announces the sale of the **new book "Brentidae of the World (Coleoptera, Curculionoidea)"** edited by Alessandra Sforzi and Luca Bartolozzi, available from the Museo Regionale di Scienze Naturali, via Giolitti, 36, 10123 Torino, Italy; e-mail: biblioteca.mrsn@regione.piemonte.it; fax: 011 432 073 01. The price is • 50.00 + postage (shipment via air-mail is possible); payments must be made on receipt of the pro forma invoice. To complete orders indicate the date, name, street, city/state and country, e-mail and fax.

Peter Sprick (Germany: psprickcol@t-online.de) reports that some pieces of the work on the genus ***Protapion*** **by Mark Russell** can now be seen in the Curculio Instute's Gallery (see http://www.curci.de/html/kunstler.html). Moreover, **on November 1st, 2004, volume 5 of the Snudebiller will be published.** Non-members (• 40.00 per year) of the Curculio Institute or non-subscribers of the Snudebiller (• 35.00 per volume), please contact the publishers at curculio@t-online.de.

Recent Publications on Curculionoidea

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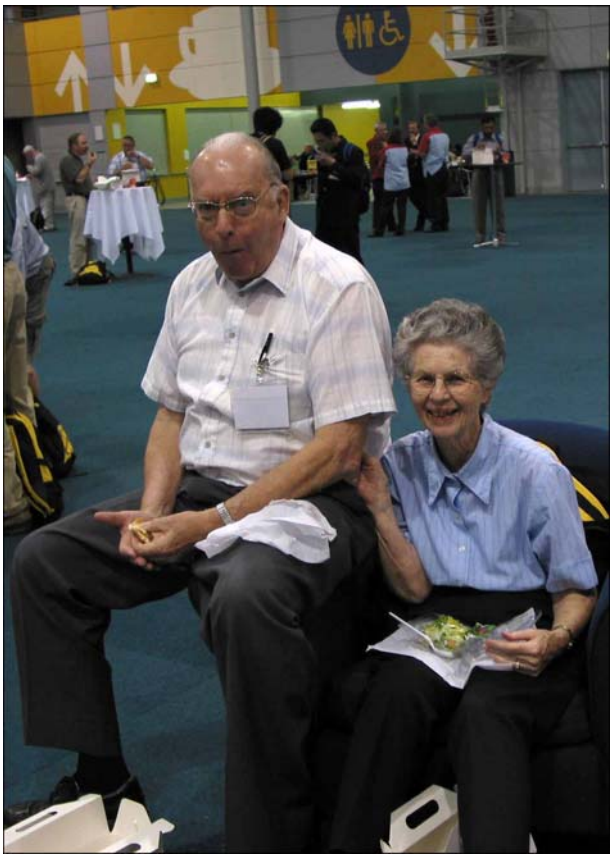

Henry and Anne Howden enjoying lunch at the ICE Australia.

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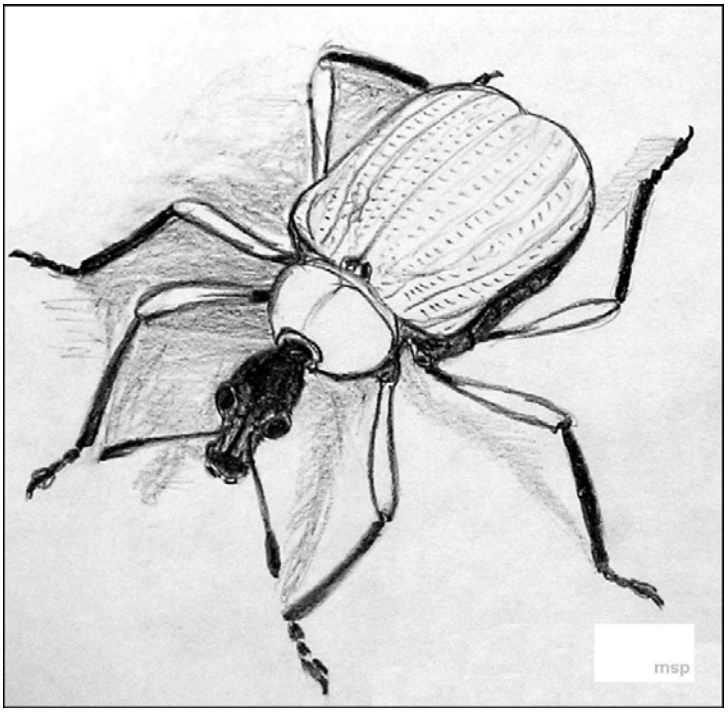

Drawing of the hazel leaf-roller *Apoderus coryli* (Attelabidae) by Serban Proches.