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TRANSACTIONS OF THE

Illinois State Academy of Science

Supplement to Volume 95

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NEW YORK
BOTANICAL GARDEN



94th Annual Meeting
April 19 –20, 2002
SOUTHERN ILLINOIS UNIVERSITY
Edwardsville, Illinois

PROGRAM AND ABSTRACTS
OF THE
ILLINOIS STATE ACADEMY OF SCIENCE
94th ANNUAL MEETING

APRIL 19 – 20, 2002



SOUTHERN ILLINOIS UNIVERSITY
EDWARDSVILLE, ILLINOIS

**The Illinois State Academy of Science
wishes to thank the following offices
for their kind and generous support
of the 2002 annual meeting:**

**Office of the Chancellor
Southern Illinois University Edwardsville**

**Office of the Provost and Vice Chancellor
for Academic Affairs
Southern Illinois University Edwardsville**

**Office of the Dean, College of Arts and Sciences
Southern Illinois University Edwardsville**

**Office of the Dean, Graduate Studies and Research
Southern Illinois University Edwardsville**

**Office of Conferences and Institutes
Southern Illinois University Edwardsville**

**Department of Biological Sciences
Southern Illinois University Edwardsville**

**Environmental Science Program
Southern Illinois University Edwardsville**

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ILLINOIS STATE ACADEMY OF SCIENCE

FELLOW

<u>NAME</u>	<u>YEAR</u>	<u>SCHOOL</u>	<u>AREA</u>
Anderson, Roger C.	1988	ISU	Botany
Bartke, Andrzej	1998	U.Kansas	Zoology
Bjorklund, Richard G	1984	Bradley	Zoology
Browning, Ronald A.	1986	SIU -C	Physiology
Buhse, Jr., Howard E.	2001	UI - C	Cell Biology
Changon, Stanley	1993	Il State Water Survey	Geology
Cordell, Geoffrey	1991	UI - C	Chemistry
Dhaliwal, Amrik	1990	Loyola	Biology
Dickerson, Donald R.	1984	IL State Geol. Survey	Geology
Duty, Robert C.	1985	ISU	Chemistry
Ebinger, John E.	1988	EIU	Botany
Farnsworth, Norman R.	1984	UI -C Med Ctr.	Pharmacology
Fraunfelter, George	1991	SIU	Geology
Geer, Billy	1995	Knox	Biology
Gershbein, Leon	1990	NW Inst Med Res	Chemistry
Goodrich, Michael A.	2000	EIU	Zoology
House, James E.	1984	ISU	Chemistry
Kaplan, Harold M.	1984	SIU -C	Physiology
Keating, Richard C.	1984	SIU -E	Botany
King, James E.	1984	IL State Museum	Paleobotany
Klimstra, Willard D.	1984	SIU -C	Zoology
Lambert, Joseph	1992	Northwestern	Chemistry
Leary, Richard L.	1986	IL State Museum	Geology
Lewis, William, M.	1984	SIU -C	Zoology
Matten, Lawrence C.	1995	SIU -C	Botany
McMillan, R.Bruce	1992	IL State Museum	Anthropology
Mohlenbrock, Robert H.	1984	SIU -C	Botany
Monoson, Herbert L.	1996	Bradley	Botany
Princen, Lambertus H.	1984	USDA,N.Reg Res Lab	Chemistry
Rands, David G.	1984	SIU -E	Chemistry
Reeves, John	1990	WIU	Biology
Seigler, David S.	1986	UI - Urbana	Botany
Sipiera, Paul P.	1996	Wm Rainey Harp	Geology
Smith, Marion	1996	SIU -E	Botany
Styles, Bonnie W.	2000	IL State Museum	Anthropology
Sundberg, Walter J.	2002	SIU - C	Plant Biology
Troll, Ralph	2001	Augustana College	Biology

**ILLINOIS STATE ACADEMY OF SCIENCE
94th Annual Meeting**

April 19-20, 2002

**Southern Illinois University Edwardsville
Edwardsville, Illinois**

REGISTRATION

Participants are urged to pre-register for the ISAS annual meeting by returning the enclosed registration form (see form for fee schedule). The deadline for receipt of pre-registration forms is March 28, 2002. Tickets for the ISAS Luncheon, ISAS Banquet, and SIUE Parking (and Academy Reception if a non-member/guest) should be reserved when you pre-register. You will be able to pick up your tickets at the registration table in the Morris University Center outside the Conference Center on Friday, April 19, 2002.

On-site registration will be conducted on both Friday and Saturday. On-site registration fees are significantly higher than pre-registration fees (see form for fee schedule).

Host institution (SIUE) students (who are not authors or co-authors of meeting presentations) are invited to attend oral paper and poster sessions free of charge. Host institution (SIUE) students must register as a "non-member guest host institution student." "Non-member guest host institution students" may purchase tickets to the Luncheon, Reception, and Banquet - and are encouraged to do so when pre-registering.

PLEASE NOTE that there are two new spaces on the registration form for contributions to the Academy - one earmarked for the ISAS general fund and one earmarked for the ISAS Student Grants Program. The ISAS Council appreciates in advance your consideration of a donation.

TRAVEL INFORMATION

Southern Illinois University Edwardsville is located in Edwardsville, Illinois. The closest airport is Lambert Field in St. Louis, MO.

Parking: Visitor parking is available in the visitor lot (Lot B - see map) adjacent to the Morris University Center (building 5) for \$2.00 on Friday (all day pass) April 19th. Please purchase this pass on your registration form. On Saturday morning, parking in the same lot is FREE for conference attendees. Fines at SIUE are stiff for illegal parking so please use the designated visitor's lot. The speed limit on campus is 25 miles per hour and campus police are registered Illinois Troopers and often issue tickets.

WWW Campus Map: Go to <http://www.admis.siu.edu/tour/> and click on *Printable Map* for an online SIUE campus map. The Morris University Center is building 5, Parking Lot B (visitor parking) is west of the building, Birger Hall (building 12) is north across campus, and the Lovejoy Library (building 7) is directly across the quad from the Morris University Center.

Driving directions to campus from the Comfort Inn:

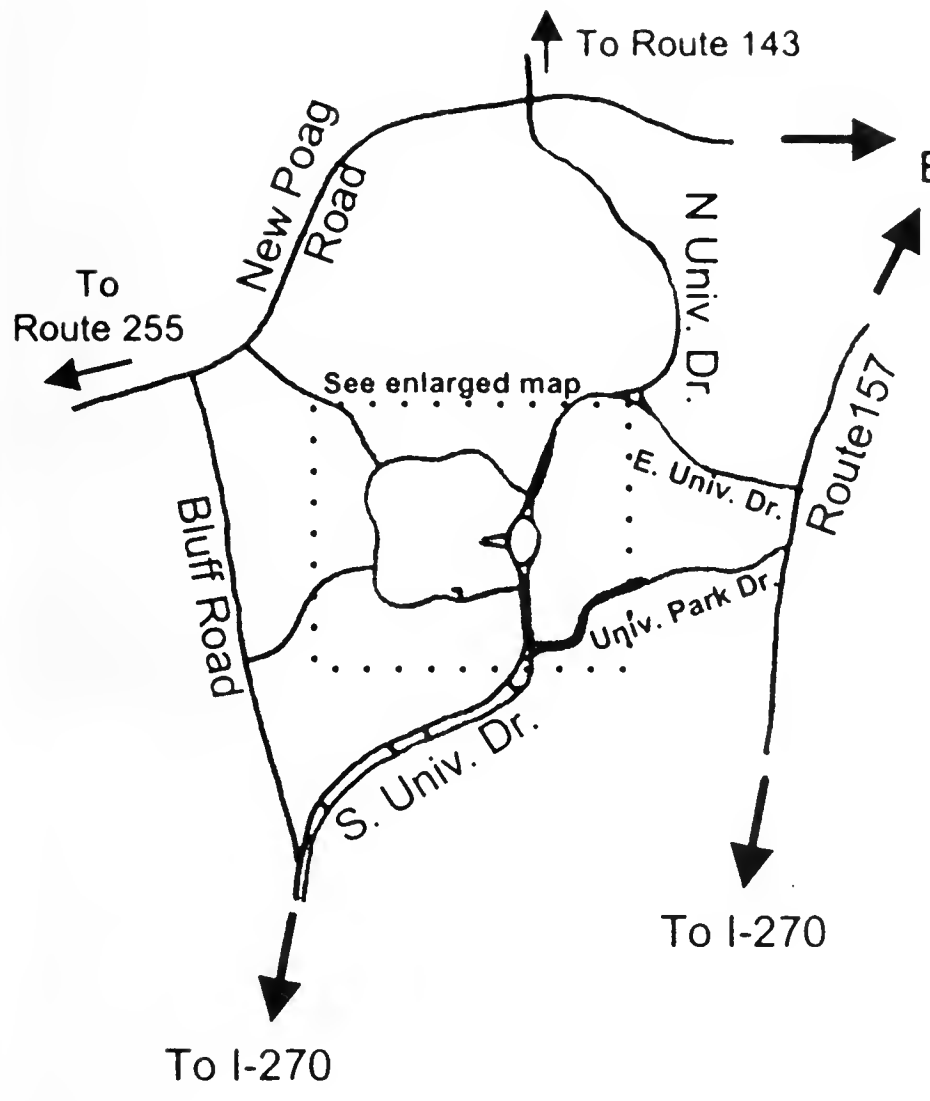
Take a right out of the Comfort Inn Parking lot onto IL 157. At the intersection of IL 157 and East University Drive (red light with U-Haul Dealer on your right and SIUE lighted sign on your left), take a left onto East University Drive. Follow East University to North University (first red light) and make a left onto North University Drive. Follow North University Drive to the traffic circle and the road becomes South University Drive. Make a right off South University Drive onto Circle Drive South (another SIUE lighted sign will be in front of you in the median on University Drive). Follow Circle Drive to the second right (second stop sign) - turn right into Parking Lot B Visitor Parking. The Morris University Center is to your right from this parking lot - come inside and register to receive your parking pass.

Driving directions to campus on IL 157 from the North:

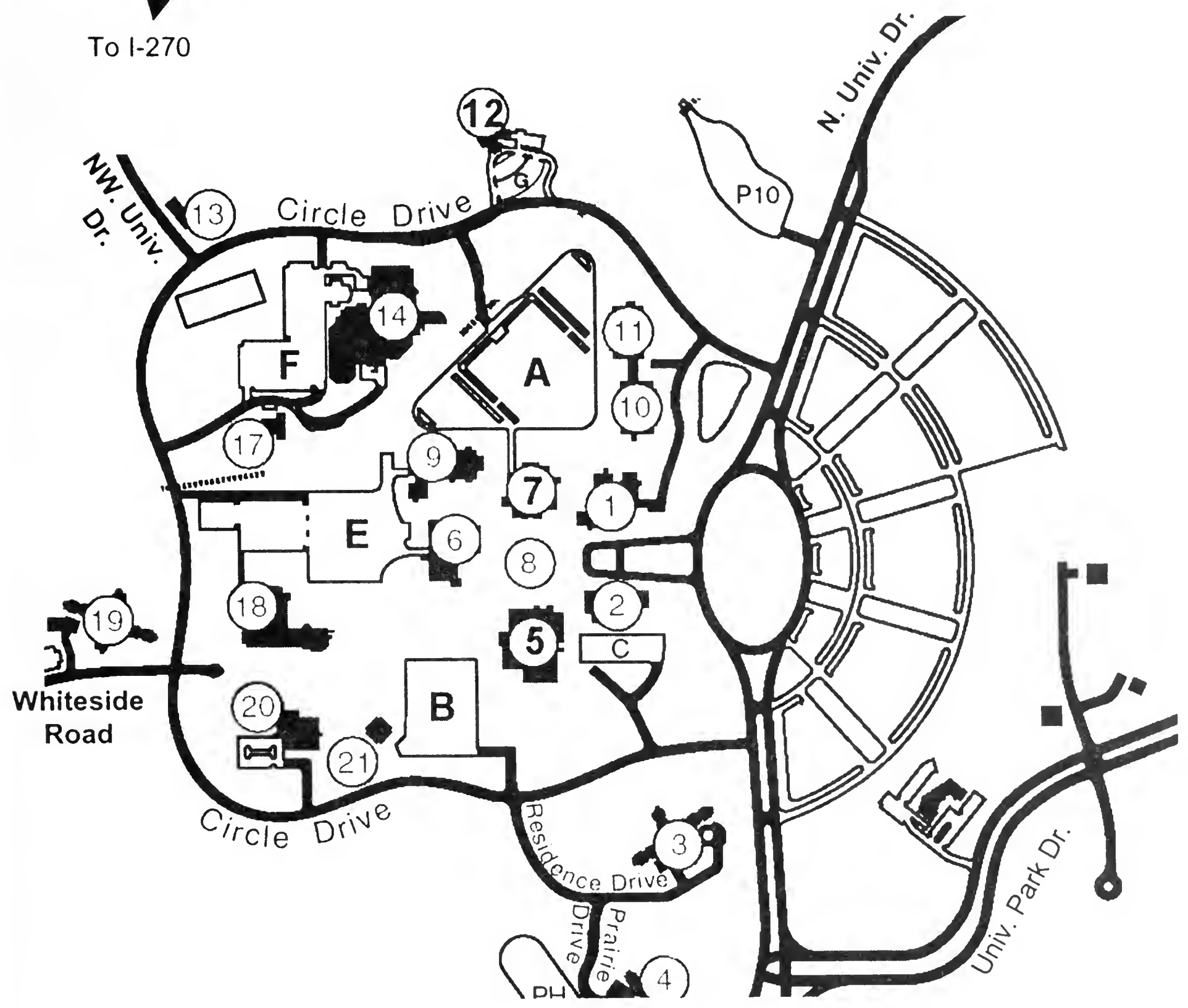
At the intersection of IL 157 and East University Drive (red light with U-Haul Dealer on your left and SIUE lighted sign ahead on your right), take a right onto East University Drive. Follow East University to North University (first red light) and make a left onto North University Drive. Follow North University Drive to the traffic circle and the road becomes South University Drive. Make a right off South University Drive onto Circle Drive South (another SIUE lighted sign will be in front of you in the median on University Drive). Follow Circle Drive to the second right (second stop sign) - turn right into Parking Lot B Visitor Parking. The Morris University Center is to your right from this parking lot - come inside and register to receive your parking pass.

Driving directions to campus from Interstate 270 (from Super 8 and Ramada Limited).

After exiting (Exit 9 - IL 157) from I-270, turn north onto IL 157. At the stoplight DO NOT turn right onto IL 157, but continue straight on South University Drive. Follow South University Drive up the bluff and take a left across the median just past the SIUE lighted sign and Circle Drive South (a u-turn back onto South University Drive). At the intersection with Circle Drive, turn right off South University Drive onto Circle Drive. Follow Circle Drive to the second right (second stop sign) - turn right into Parking Lot B Visitor Parking. The Morris University Center is to your right from this parking lot - come inside and register to receive your parking pass.



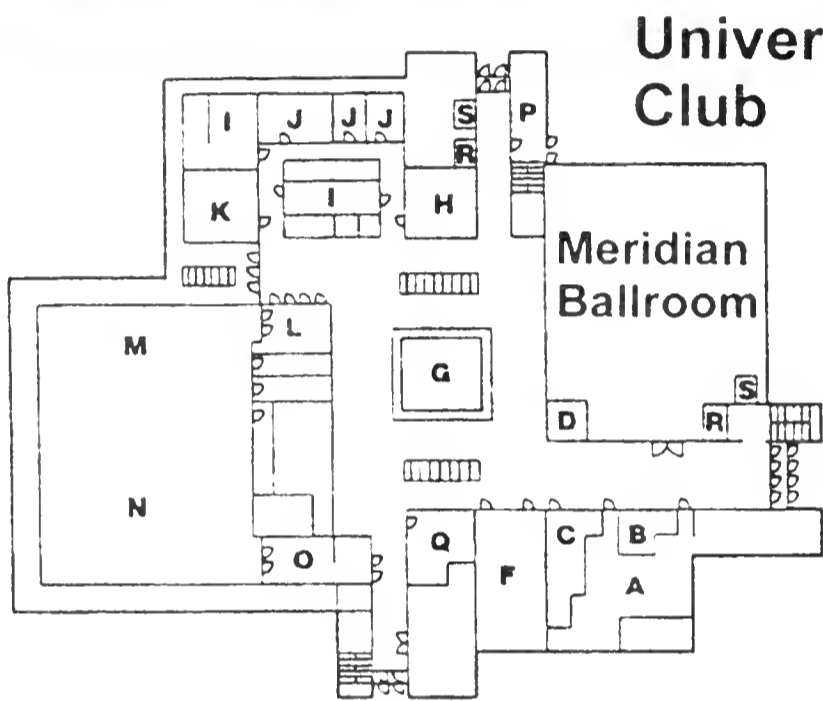
- ISAS Areas of Interest**
- B – Parking lot B
 - 5 – Morris University Center
 - 7 – Lovejoy Library
 - 12 – B. Barnard Birger Hall





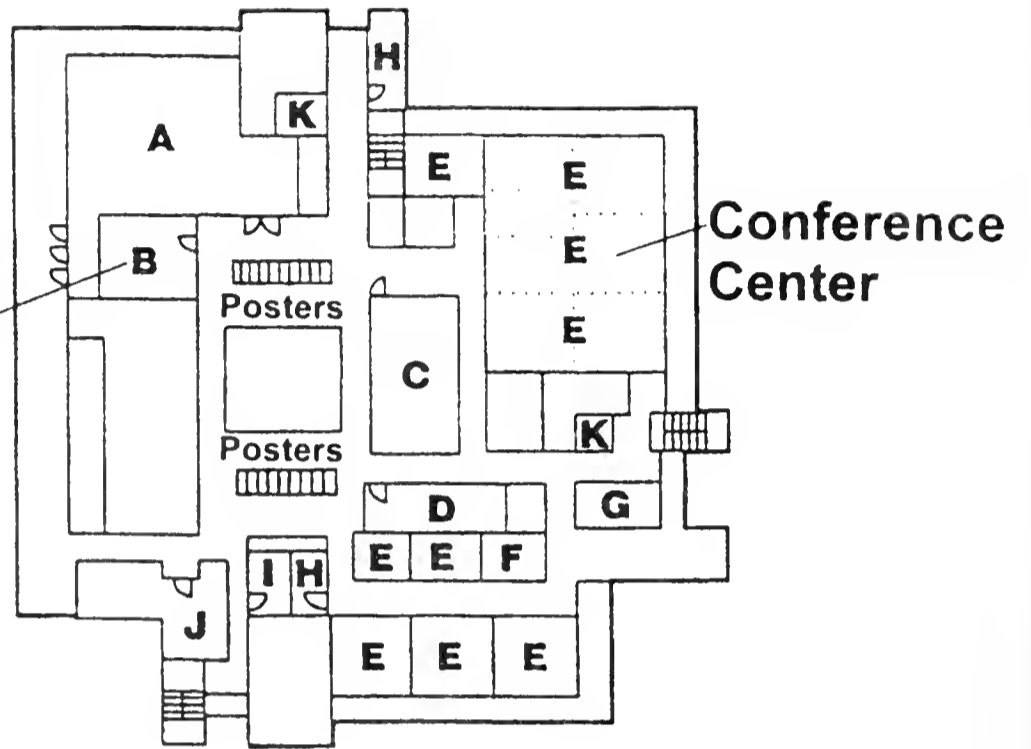
UNIVERSITY CENTER

Building Floor Plans



↑FIRST FLOOR

- A - Administrative Offices
- B - Union Station
- C - Information Center
- D - Banking Facilities
- E - Bookstore
- F - Opapi Lounge
- G - Goshen Lounge
- H - Print & Design
- I - Carol Kimmel Student Leadership Development Center
- J - Student Organization Offices
- K - Student Government Office
- L - Six Mile Lounge
- M - Meridian Hall - Madison Room
- N - Meridian Hall - St. Clair Room
- O - Big Prairie Lounge
- P - Men's Room
- Q - Women's Room
- R - Elevator
- S - Public Phones

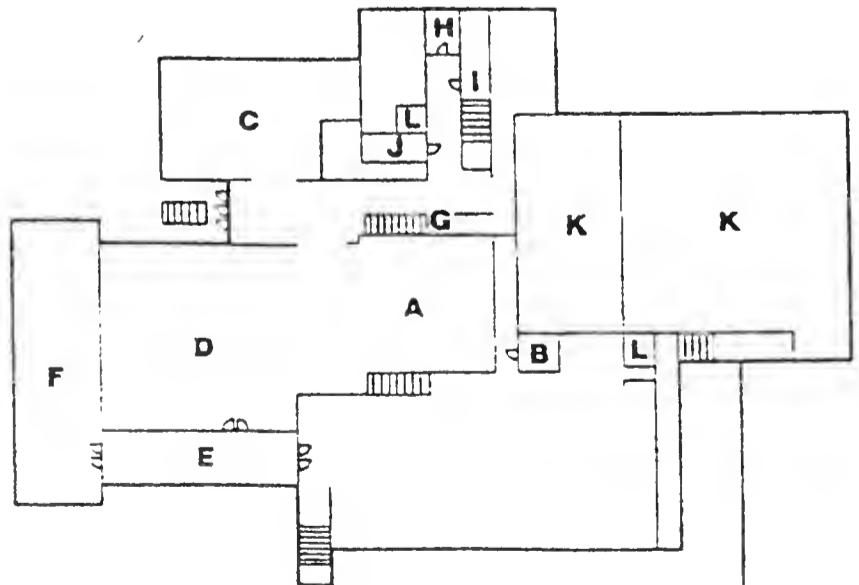


↑SECOND FLOOR

- A - University Restaurant
- B - Centennial Room
- C - Art Gallery
- D - Office of Conference and Institutes
- E - Conference & Catering Areas
- F - International Student Services
- G - Student Organization Offices
- H - Men's Room
- I - Women's Room
- J - Alestle Newspaper
- K - Elevator

↓GROUND FLOOR

- A - Food Court
- B - Dining Service Offices
- C - Cougar Den
- D - Piankasaw Dining Area
- E - Cahokia Dining Room
- F - Piasa Dining Room
- G - Vending Area
- H - University Hair
- I - Men's Room
- J - Women's Room
- K - Recreation Area
- L - Elevator



Recommended Lodging

Please register for lodging early – rooms will **ONLY** be held until dates indicated below. Be sure to identify yourself as an ISAS conference participant. **ALL** three motels have additional rooms available on a space available basis.

Comfort Inn: IL 157 (Exit 9 off I-270) – 2 miles to campus. 50 rooms held until April 4th - after that on a space available basis. Rates (plus tax): \$57 for 1-2 guests, \$62 for 3 guests, and \$67 for 4 guests. Indoor pool available - bring swim trunks. (618) 656-4900

Ramada Limited: IL 111 (Exit 6a off I-270) – 5 miles to campus. 20 rooms held until 4pm on April 1st - after that on a space available basis. Rates (plus tax): \$64 for up to 4 guests. (618) 797-2727

Super 8 Motel: IL 111 (Exit 6a off I-270) – 5 miles to campus. 10 rooms held until April 17th - after that on a space available basis. Rates (plus tax): \$46.69 for 1 guest, \$51.19 for 2 guests, and \$60.19 for 3-4 guests. (618) 931-8808

LUNCHEON

The ISAS luncheon/business meeting will be held in the B. Barnard Birger Hall Conference Room from 11:45 AM to 1:15 PM. Birger Hall is located across campus from the Morris University Center - a 10-minute walk. Parking for conference attendees is NOT available at Birger Hall - bring your walking shoes and dress appropriately. Luncheon tickets must be purchased by pre-registration (see form for fees). A small number of tickets will be available at on-site registration for a substantially higher cost. There are **ONLY** 90 tickets available for the luncheon so please reserve your spot early.

Dean Kent Neely will highlight recent accomplishments of the SIUE College of Arts and Sciences at the luncheon. In addition, Student Research Grants award winners will be acknowledged at the luncheon.

The luncheon menu will consist of an Express Deli Buffet - sliced turkey, ham, and cheese sandwiches, chips, pasta salad, brownie, and tea.

Those who do not plan to attend the luncheon may wish to visit the University Union Food Court (downstairs from the Conference Center). Food is available on a per unit cost basis at this facility.

BANQUET

The ISAS banquet will take place in the Meridian Ballroom of the SIUE Morris University Center. The banquet will be preceded by a reception in honor of the Academy Keynote Speaker (Dr. Luther Williams), which will be held at the banquet location. Banquet tickets should be purchased by pre-registration. As with the luncheon, a small number of tickets will be available at on-site registration for substantially higher cost. Purchasing your banquet ticket guarantees front row seating for the Keynote Address.

The banquet will be a Buffet with a choice of parmesan baked chicken breast, stir fry beef and vegetables, or fettucini alfredo (vegetarian) main dishes, accompanied by herbed rice, green beans almondine, lemon peppered broccoli, garden green salad, Italian salad, Waldorf salad, coffee, tea, and dessert.

POSTER SESSION

The formal poster session will be held from 3:30-5:30 PM on the 2nd floor in the Morris University Center adjacent to the Conference Center. Presenters should plan to hang their posters up before the first oral session in the morning. **Posters are to remain up all day** - attendees are encouraged to view posters during conference breaks (refreshments will be served at all breaks adjacent to the poster viewing area) and visit with poster authors during the formal poster session.

Presenters are expected to stand by their poster from 3:30 until 5:30 PM. Judges from each Academy Division, where applicable, will be reviewing posters at this time for award judging.

Poster easels and cardboard backing will be provided - PLEASE bring your own thumbtacks to attach your poster to the backing (no tape permitted).

Poster size is limited to 36 inches high by 48 inches wide - no exceptions.

The afternoon break with refreshments will occur during the poster session.

KEYNOTE ADDRESS

Environmental Education in the 21st Century

Southern Illinois University Edwardsville and the Academy are pleased to welcome Dr. Luther Williams as this year's Keynote Speaker. Dr. Williams is Senior Advisor for Education at the Missouri Botanical Garden. Before accepting the position at the Missouri Botanical Garden, Dr. Williams was the Assistant Director for Education and Human Resources at the National Science Foundation. Dr. Williams will speak on the recent efforts by the Missouri Botanical Garden to make the Garden's one of the nation's leading centers for science education. The Keynote Address will be held in the SIUE Meridian Ballroom (in the Morris University Center), immediately following the Academy Banquet. The address will be open to the public - doors will open to the public at 7:45 PM after the banquet is over. Banquet attendance guarantees front row viewing of Keynote Address.

BANQUET RECEPTION

The Academy Reception will precede the Banquet and Keynote Address in the Meridian Ballroom. Registered conference attendees will receive tickets for 2 complimentary alcoholic beverages (wine/beer) - a cash bar will also be available during the reception and the banquet. Hors d'oeuvres will be available during the reception. Dr. Williams will attend the reception to allow Conference Attendees the opportunity to meet with him.

ISAS 94th ANNUAL MEETING
Southern Illinois University Edwardsville
April 19-20, 2002

SCHEDULE OF EVENTS

Friday April 19 - Morris University Center (MUC) Conference Center (building 5 on map, 2nd floor)

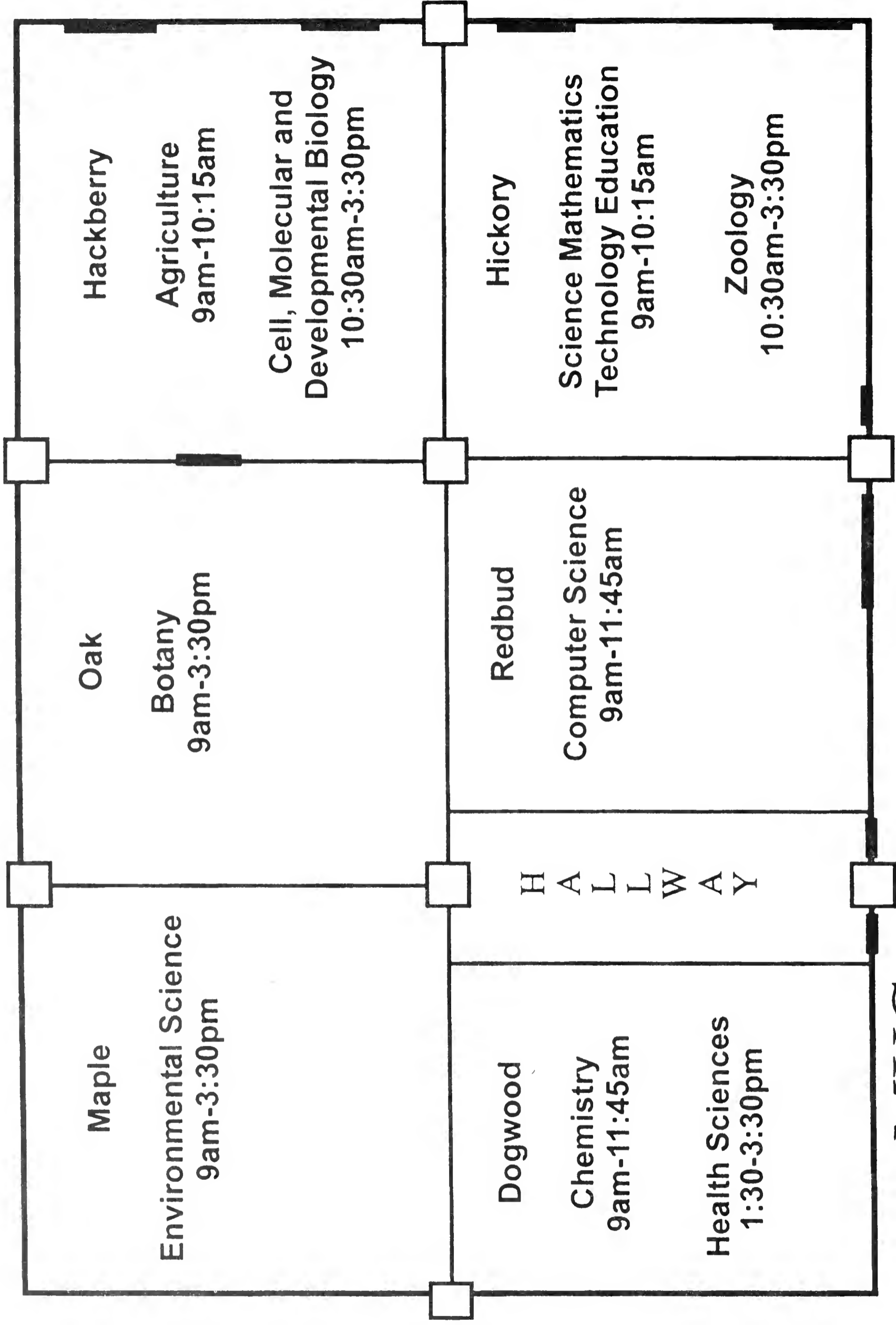
7:30 AM - Registration Opens, MUC Conference Center
 7:30 AM - Posters may be put up in the MUC (to remain up all day)
 7:30 - 8:45 AM - ISAS Council Meeting, University Club, MUC
 8:50 AM - Sessions call to order, MUC Conference Center
 9:00 - 10:15 AM - First Oral Sessions, MUC Conference Center
 10:15 - 10:30 AM - Morning Break (posters may be viewed)
 10:30 - 11:45 AM - Second Oral Sessions, MUC Conference Center
 11:45 AM - 1:15 PM - Buffet Lunch, Birger Hall
 1:30 - 3:30 PM - Final Oral Sessions, MUC Conference Center
 3:30 PM - Afternoon Break (will continue throughout poster session)
 3:30 - 5:30 PM - Poster Session, MUC
 5:30 - 6:30 PM - Reception, Meridian Ballroom, MUC (wine/beer and hors d'oeuvres)
 6:30 - 7:45 PM - Banquet, Meridian Ballroom, MUC (cash bar - wine/beer)
 7:45 PM - Meridian Ballroom MUC doors open to general public
 8:00 - 9:30 PM - Keynote Address - Dr. Luther Williams, Meridian Ballroom, MUC

Saturday April 20 - Lovejoy Library - Abbott Auditorium (building 7 on map, basement - follow signs)

8:00 AM - Registration Opens, outside Abbott Auditorium, Lovejoy Library
 8:50 AM - Sessions call to order, Lovejoy Library - Abbott Auditorium
 9:00 - 10:15 AM - First Oral Sessions, Lovejoy Library - Abbott Auditorium
 10:15 - 10:30 AM - Morning Break, Lounge outside Abbott Auditorium
 10:30 AM - Noon - Second Oral Sessions, Lovejoy Library - Abbott Auditorium
 Noon - 94th ISAS Meeting Adjourned

ISAS 94th Annual Meeting Contact (2002 ISAS Vice President)

Dr. Bill Retzlaff
 Environmental Science
 Box 1099 SIUE
 Edwardsville, IL 62026-1099
 618/650-2728 (ph)
 618/650-3174 (FAX)
WRETZLA@siue.edu



MUC Conference Center

PAPER SESSIONS

AGRICULTURE DIVISION

Division Chair:
Mari Loehrlein
 Department of Agriculture
 Western Illinois University
 1 University Circle
 Macomb, IL 61455

SESSION 1 – Friday, April 19

PRESIDING: Mari Loehrlein

TIME PAPER #

LOCATION: Hackberry Room
MUC Conference Center

- | | | |
|----------|---|---|
| 9:00 AM | | OPENING REMARKS |
| 9:15 AM | 1 | COMMON MILKWEED PRODUCTION. <u>W.B. Phippen</u> ,
Western Illinois University, Macomb. |
| 9:30 AM | 2 | STUDY OF COREOPSIS ROSEA BREEDING SYSTEM. <u>S.</u>
<u>Sequeira</u> and <u>M.M. Loehrlein</u> , Western Illinois
University, Macomb. |
| 9:45 AM | 3 | GAS EXCHANGE AND YIELDS OF BT RESISTANT
MAIZE WITH EUROPEAN CORN BORER INFESTATION.
<u>S.A. Mallady</u> and <u>J.M. Coons</u> , Eastern Illinois University,
Charleston; <u>J.A.Parrish</u> , Millikin University, Decatur; and
<u>K. Montgomery</u> , Central Golden Harvest Research,
Clinton. |
| 10:00 AM | 4 | EVALUATION OF TOMATO CULTIVARS FOR EARLY
BLIGHT, <i>ALTERNARIA SOLANI</i> . <u>M.M. Loehrlein</u> ,
Western Illinois University, Macomb. |



BOTANY DIVISION

Division Chair:
Henry R. Owen
Department of Biological Sciences
Eastern Illinois University
600 Lincoln Avenue
Charleston, IL 61920

SESSION I - Friday, April 19

PRESIDING: Henry R. Owen

TIME

PAPER #

LOCATION: Oak Room
MUC Conference Center

- | | | |
|----------|---|--|
| 9:00 AM | | CALL TO ORDER AND ANNOUNCEMENTS |
| 9:15 AM | 5 | VEGETATION OF FOREST COMMUNITIES AT THE SAND PRAIRIE-SCRUB OAK NATURE PRESERVE, MASON COUNTY, ILLINOIS. <u>W.E. McClain</u> , Illinois Dept of Natural Resources, Springfield; <u>S.D. Turner</u> and <u>J.E. Ebinger</u> , Eastern Illinois University, Charleston. |
| 9:30 AM | 6 | THE INTERESTING DISTRIBUTION OF EASTERN LEATHERWOOD (<i>DIRCA PALUSTRIS</i>); THE REGENERATION NICHE MEETS FOREST HISTORY. <u>K.E. Schulz</u> , <u>T. Marriage</u> , <u>K. Manar</u> , <u>C. Jones</u> and <u>S. Albrecht</u> , Southern Illinois University, Edwardsville and <u>J.C. Zasada</u> , North Central Forest Experiment Station, Grand Rapids, MN. |
| 9:45 AM | 7 | RESPONSE OF PRAIRIE FORBS TO WHITETAIL DEER BROWSING. <u>R. Anderson</u> , <u>D. Nelson</u> and <u>M. Rickey</u> , Illinois State University, Normal. |
| 10:00 AM | | BREAK |
| 10:15 AM | 8 | <i>SCIRPUS</i> AND RELATED GENERA (CYPERACEAE) IN ILLINOIS. <u>G.C. Tucker</u> , Eastern Illinois University, Charleston. |
| 10:30 AM | 9 | ANATOMICAL TRENDS OF SPECIALIZATION IN LEAF STRUCTURE OF THE MONOCOT FAMILY ARACEAE, AND THEIR RELATION TO CLASSIFICATION. <u>R.C. Keating</u> , Missouri Botanical Garden, St. Louis, MO. |

- 10:45 AM 10 IMPACT OF CADMIUM-ZINC INTERACTIONS ON METAL ACCUMULATION IN THE HYPERACCUMULATOR *THLASPI CAERULESCENS*. N. Small and S. Ebbs, Southern Illinois University, Carbondale.
- 11:00 AM 11 THE EFFECT OF CADMIUM AND ZINC ON GERMINATION OF *BOLTONIA DECURRENS*. M. Smith, S. Vissa and M. Schwegel, Southern Illinois University, Edwardsville.
- 11:15 AM 12 A TEST OF FLORISTIC QUALITY ASSESSMENT (FQA) IN MEASURING NATURAL AREA QUALITY: ASSESSING THE WETLANDS AND GRASSLANDS OF ILLINOIS. G. Spyreas, B. Molano-Flores, C. Carroll and J. Ellis, Illinois Natural History Survey, Champaign.
- 11:30 AM 13 THE ROLE OF INSECT FLOWER HERBIVORY IN NATIVE AND RESTORED PRAIRIES. B. Molano-Flores and C. Ollier, Illinois Natural History Survey, Champaign.
- 11:45 AM ISAS LUNCHEON AND BUSINESS MEETING
- 1:15 PM 14 WHITE-TAILED DEER BROWSING ON WOODY VEGETATION AT CEDAR GLEN NATURE PRESERVE, HANCOCK COUNTY AND ARGYLE LAKE STATE PARK, MCDONOUGH COUNTY. T.J. Williamson and R.V. Gessner, Western Illinois University, Macomb, and A.K. Moorehouse, Illinois Nature Preserves Commission, Colchester.
- 1:30 PM 15 VEGETATION PATTERNS AT DIFFERENT SCALES IN THE SHAWNEE NATIONAL FOREST. S. Chandy, D.J. Gibson and P.A. Robertson, Southern Illinois University, Carbondale.
- 1:45 PM 16 INSECT VISITS TO FLOWERS OF *STYLISMA PICKERINGII* (CONVOLVULACEAE), AN ENDANGERED PLANT OF ILLINOIS SAND PRAIRIES. B.L. Todd, H.R. Owen, J.M. Coons, Eastern Illinois University, Charleston and D.W. Webb, Illinois Natural History Survey, Champaign.
- 2:00 PM 17 EFFECTS OF ZINC TOLERANCE IN THE FLOODPLAIN SPECIES, *POPULAS DELTOIDES*. S. Biswas, K. Johnson, W. Retzlaff and M. Smith, Southern Illinois University, Edwardsville.

- 2:15 PM 18 THE EFFECT OF SOIL NITROGEN ON SEVERITY OF INFECTION BY FUSARIUM SOLANI IN GLYCINE MAX. N.L. Wentworth, J.A.D. Parrish, C.S. Toepfer, Millikin University, Decatur.
- 2:30 PM BREAK
- 2:45 PM 19 ADAPTATION IN LONG-TERM CULTURES OF THE BASIDIOMYCETE FUNGUS SCHIZOPHYLLUM COMMUNE. T.A. Clark and J.B. Anderson, University of Toronto, Canada.
- 3:00 PM 20 EXAMINATION OF THE GENETIC DIVERSITY PRESENT IN ILLINOIS POPULATIONS OF CALAMAGROSTIS PORTERI SUBSP INSPERATA USING ISSR MOLECULAR MARKERS. T. Marriage, E. Esselman and D. Lewis, Southern Illinois University, Edwardsville.
- 3:15 PM 21 REPRODUCTION AND HERBIVORY IN AGALINIS AURICULATA (SCROPHULARIACEAE), A THREATENED ILLINOIS PRAIRIE PLANT. C.R. Mulvaney, D.W. Whitman, Illinois State University, Normal, and B. Molano-Flores, Illinois Natural History Survey, Champaign.
- 3:30 PM 22 SEED GERMINATION AND PRODUCTION OF RE-GROWTH IN DIPSACUS LACINIATUS, CUT-LEAFED TEASEL. A.J. Musser and J.A.D. Parrish, Millikin University, Decatur.

POSTER SESSION -Friday, April 19 Location: MUC Conference Center
3:30 – 5:30 PM

POSTER #

- 82 EXAMINING PHYSIOLOGICAL INTEGRATION IN CLONAL PLANTS WITH SAXIFRAGA STOLONIFERA (SAXIFRAGACEAE). L. Corradin and E. Ribbens, Western Illinois University, Macomb
- 83 PHAEOPHYSCIA LEANA – A LICHEN SPECIES AT THE EDGE. R.N. Gillespie and A.S. Methven, Eastern Illinois University, Charleston.

- 84 IMPACT OF CADMIUM ON GROWTH AND DEVELOPMENT OF PLANTS. J. Long, D. Kosma and S. Ebbs, Southern Illinois University, Carbondale.
- 85 VENTRAL APPENDAGE VARIATION OF THE METZGERIIDAE (MARCHANTIOPHYTA). A.J. Kinser, Southern Illinois University, Carbondale.
- 86 COMPARATIVE MORPHOLOGY OF THE SIMPLE THALLOID LIVERWORTS, *JENSENIA* LINDB. AND *PALLAVICINIA* GRAY (PALLAVICINIACEAE) S. Schuette and B.Crandall-Stotler, Southern Illinois University, Carbondale.
- 87 MODIFYING DISTANCE METHODS TO ESTIMATE HISTORICAL TREE DENSITY FROM GOVERNMENT LAND OFFICE SURVEY RECORDS. S.L. Sauer, R.C. Anderson, R. Swigart, J. Fralish and A. Carver, Illinois State University, Normal and Southern Illinois University, Carbondale.
- 88 CHARACTERIZATION OF THREE *PHRAGMITES AUSTRALIS* SITES AND POPULATIONS THROUGH SOIL ANALYSIS AND PHOTOSYNTHESIS MEASUREMENTS. M.A. Rickey and R.C. Anderson, Illinois State University, Normal.
- 89 GALLERY OF ILLINOIS PLANTS WEBSITE. D. Busemeyer, Illinois Natural History Survey, Champaign.
- 90 INTERSPECIFIC HYBRIDS OF *FLAMMULINA*. A.S. Methven and M.E. Mort, Eastern Illinois University, Charleston.
- 91 OCCURRENCE OF VESICULAR ARBUSCULAR MYCORRHIZAL ASSOCIATIONS IN SPECIES OF *AEONIUM* FROM THE CANARY ISLANDS. T.L. Cervený and A.S. Methven, Eastern Illinois University, Charleston.
- 92 ANALYSES OF PRAIRIE RESTORATIONS AT ROCK SPRINGS ENVIRONMENTAL CENTER, DECATUR, ILLINOIS. J.A. Ward, G.C. Tucker, J.E. Ebinger and S.J. Meiners, Eastern Illinois University, Charleston.
- 93 THE EFFECT OF CUTTING ON SPECIES RICHNESS AND PERCENT COVER OF HERBACEOUS SPECIES, CHAUTAUQUA LONG-TERM RESEARCH SITE, CARBONDALE, ILLINOIS. B. Phillips, Southern Illinois University, Carbondale.

- 94 BASELINE FLORAL SURVEY OF THE WATERSHED NATURE CENTER. J.A. Moe and E.J. Esselman, Southern Illinois University, Edwardsville.
- 95 SEEDBANK VIABILITY IN *SCHOENOPLECTUS HALLII*, HALL'S BULRUSH. B. Meinardi, M. Smith and S. Ammann, Southern Illinois University, Edwardsville.
- 96 INTERACTION OF PROTRACTED SUMMER FLOODING AND SHADE IN THE ESTABLISHMENT OF UNDERSTORY ACER *SACCHARINUM* SEEDLINGS. C. Deutsch, K.E. Schulz, K. Jamison, K. Manar and K. Kahl, Southern Illinois University, Edwardsville and U.S. Army Corps of Engineers, St. Louis, MO.
- 97 USING PALENOLOGY TO DETERMINE A CULTURE HORIZON AT HORSEHOE LAKE IN MADISON COUNTY, ILLINOIS. J.J. Martin and R. Brugam, Southern Illinois University, Edwardsville.
- 98 EFFECTS OF CADMIUM ON THE PHYSIOLOGY OF *POPULUS DELTOIDES* BARTR. EX MARSH, AND ITS POTENTIAL USE IN PHYTOREMEDIATION. D. Shrestha, M. Smith, K. Johnson and W. Retzlaff, Southern Illinois University, Edwardsville.
- 99 SEED VIGOR OF *LESQUERELLA LUDOVICIANA* AS AFFECTED BY COLONY AND MATURITY. S.E. Beach, M.A.L. Smith, J. M. Coons, University of Illinois, Urbana, and H.R. Owen and B.L. Todd, Eastern Illinois University, Charleston.

SESSION II – Saturday, April 20

PRESIDING: Henry R. Owen

TIME PAPER #

LOCATION: Abbott Auditorium
Lovejoy Library

- 9:15 AM 23 AN ASSESSMENT OF THE ECOLOGICAL REQUIREMENTS OF *SCHOENOPLECTUS HALLII* (HALL'S BULRUSH). P. Mettler, Southern Illinois University, Carbondale, and M. Smith, Southern Illinois University, Edwardsville.
- 9:30 AM 24 VASCULAR FLORA OF THE HOOPER BRANCH SAVANNA NATURE PRESERVE, IROQUOIS COUNTY, ILLINOIS. L. Phillippe, D. Busemeyer, M. Feist, K. Hunter, R. Larimore, P. Marcum and J. Ebinger, Illinois Natural History Survey, Champaign.

- 9:45 AM 25** EXOTIC UPLAND FOREST SUCCESSION IN SOUTHERN ILLINOIS. W.C. Ashby, Southern Illinois University, Carbondale.
- 10:00 AM 26** VASCULAR FLORA OF THE IROQUOIS COUNTY CONSERVATION AREA, IROQUOIS COUNTY, IL. L.R. Phillippe, M.A. Feist, R. Larimore, D. Busemeyer, P. Marcum, C. Carroll, K. Hunter and J. Ebinger, Illinois Natural History Survey, Champaign.
- 10:15 AM** BREAK
- 10:30 AM 27** A COMPARATIVE STUDY OF 27- AND 56-YEAR-OLD ABANDONED AGRICULTURAL FIELDS WITH REMNANT PRAIRIE AT THE SAND PRAIRIE-SCRUB OAK NATURE PRESERVE IN MASON COUNTY, ILLINOIS. W.E. McClain and T.A. Strole, Dept of Natural Resources, Springfield, and J.E. Ebinger, Eastern Illinois University, Charleston.
- 10:45 AM 28** VEGETATION SURVEY OF DEAN HILLS NATURE PRESERVE, FAYETTE COUNTY, ILLINOIS. M.A. Feist, L.R. Phillippe, D.T. Busemeyer and J.E. Ebinger, Illinois Natural History Survey, Champaign.
- 11:00 AM 29** THE VASCULAR FLORA OF GREEN WING ENVIRONMENTAL LABORATORY. B. Dziadyk, Augustana College, Rock Island.



CELL, MOLECULAR & DEVELOPMENTAL BIOLOGY DIVISION

Division Chair:
 Howard E. Buhse, Jr.
 Department of Biological Sciences
 University of Illinois at Chicago
 Chicago, IL 60607-7060

SESSION I - Friday, April 19

PRESIDING: Howard Buhse

TIME PAPER #

LOCATION: Hackberry Room
MUS Conference Center

- | | | |
|----------|----|---|
| 10:30 AM | 30 | INVESTIGATION OF THE POSSIBLE PRESENCE OF AN ANALOG OF PEPTIDYLGLYCINE ALPHA-AMIDATING MONOOXYGENASE (PAM) IN PLANTS. <u>Z.R. Walden</u> and <u>M.G. Bolyard</u> , Southern Illinois University, Edwardsville. |
| 10:50 AM | 31 | PROMOTER ANALYSIS OF AN ANIONIC PEROXIDASE GENE IN TOBACCO. <u>S. Nelson</u> and <u>N. Jacob</u> , Knox College, Galesburg. |
| 11:10 AM | 32 | THE EXPRESSION OF INTERSECTIN mRNA AND PROTEIN IN <i>XENOPUS LAEVIS</i> OOCYTES. <u>E.M. Mandel</u> and <u>J.M. Thorn</u> , Knox College, Galesburg. |
| 11:30 AM | 33 | CONSTRUCTION OF AN EXPRESSION VECTOR FOR THE FUSION OF GREEN FLUORESCENT PROTEIN WITH CERATO-ULMIN, A DUTCH ELM DISEASE TOXIN. <u>O.N. Shikapwashya</u> and <u>M.G. Bolyard</u> , Southern Illinois University, Edwardsville. |
| 11:45 AM | | ISAS LUNCHEON AND BUSINESS MEETING |
| 1:30 PM | 34 | CONSTRUCTION OF VECTORS FOR EXPRESSION OF FIBRINOGEN USING A BACULOVIRUS EXPRESSION SYSTEM. <u>M.A. Gitcho</u> and <u>M.G. Bolyard</u> , Southern Illinois University, Edwardsville. |
| 1:50 PM | 35 | INVESTIGATING THE FUNCTION OF MOESIN IN THE DEVELOPMENT OF <i>XENOPUS LAEVIS</i> . <u>K.M. Lipe</u> and <u>J.M. Thorn</u> , Knox College, Galesburg. |

- 2:10 PM 36 INHIBITION OF APOPTOSIS BY PROSTAGLAND E₂ AND I₂ IN HUMAN ENDOTHELIAL CELLS. S.J. Sawyer and F.M. Pavalko, Southern Illinois University, Edwardsville.
- 2:30 PM 37 MORPHOLOGICAL DEVELOPMENT, OOGENESIS, AND BEHAVIORAL CHARACTERISTICS OF A PARTHENOGENETIC FEATHERWING BEETLE (Coleoptera: Ptiliidae). J.P. MacDonald, G.A. Langrana and L.K. Dybas, Knox College, Galesburg.
- 2:50 PM 38 THE EFFECT OF P-FLUORO-L-PHENYLALANINE ON DIFFERENTIATION IN *TETRAHYMENA vorax*. M. Sharpe, M. Verma, J. Reyes and H.E. Buhse, Jr., University of Illinois, Chicago.
- 3:10 PM 39 PROTEIN SYNTHESIS AND TELOTROCH FORMATION IN *Vorticella convallaria*. S. Pylawka and H.E. Buhse, Jr., University of Illinois, Chicago.
- 3:30 PM DIVISION BUSINESS MEETING

POSTER SESSION -Friday, April 19 Location: MUC Conference Center
3:30 - 5:30 PM

POSTER #

- 100 MORPHOLOGICAL RESPONSES EXHIBITED IN *HYDRA* DUE TO EXTRACELLULAR ATP EXPOSURE. H.R. FitzHenry and V.L. Burgholzer, Illinois Mathematics and Science Academy, Aurora.
- 101 THE FMRFAMIDE RECEPTOR IN THE EARTHWORM CROP-GIZZARD. K.G. Krajniak and S.D. Klohr, Southern Illinois University, Edwardsville.
- 102 CATECHOLAMINE REGULATION OF THE ISOLATED EARTHWORM CROP-GIZZARD. C.A. Corley and K.G. Krajniak, Southern Illinois University, Edwardsville.
- 103 INOSITOL PHOSPHOGLYCANS CONTAINING MYOINOSITOL AND CHIROINOSITOL ARE PURIFIED FROM NORMAL HUMAN PLASMA THROUGH GEL-FILTRATION CHROMATOGRAPHY. D. Albracht and G. Galasko, Southern Illinois University School of Dental Medicine, Alton, and T. Korves and P. Wanda, Southern Illinois University, Edwardsville.

- 104 EXTENSIVE VARIATION AMONG LISW RETROTRANSPOSON LINEAGES WITHIN TELEOST FISH-GENOMES CONTRADICTS THE "MASTER" MODEL. K.A. Miller and D.D. Duvernell, Southern Illinois University, Edwardsville.
- 105 USING THE ZEBRA FISH GENOME DATABASE TO EXPLORE LISW RETROTRANSPOSON DIVERSITY IN TELEOST GENOMES. S.M. Adams and D.D. Duvernell, Southern Illinois University, Edwardsville.
- 106 COMPARITIVE RESULTS OF THE CYTOPATHIC EFFECTS OF MEASLES VIRUS AND CANINE DISTEMPER VIRUS IN RESPECT TO APOPTOSIS. J.H. Irlam and P. Wanda, Southern Illinois University, Edwardsville.
- 107 SEQUENCING PARTS OF THE LACTOBACILLUS AMYLOVORUS GENOME. C.Clark and S.A. McCommas, Southern Illinois University, Edwardsville.
- 108 V_{3A} INDUCES MITOGENESIS IN VERO CELLS AND CHICK EMBRYO FIBROBLASTS. T. Korves, A. Bradshaw, D. Albracht, P. Wanda and G. Galasko, Southern Illinois University, Edwardsville and Southern Illinois University School of Dental Medicine, Alton.
- 109 EFFECT OF PHAGOCYTOSIS ON PROGRAMMED CELL DEATH IN RETINAL PIGMENT EPITHELIAL CELLS. M.D. Rauser and A. Baich, Southern Illinois University, Edwardsville.
- 110 GENE EXPRESSION OF CULTURED HUMAN BONE CELLS. J. Allen, S. McCommas and B. Whitson, Southern Illinois University, Edwardsville.
- 111 MOLECULAR CLONING OF A FULL-LENGTH BOVINE EUKARYOTIC INITIATION FACTOR-5A cDNA. J.K. Huang, G.H. Huang, V.C. Sershon, J.C. McDonald, P.G. Gowda and L. Wen, Western Illinois University, Macomb.

CHEMISTRY DIVISION

DIVISION CHAIR:

Michelle Fry
 Department of Chemistry
 Bradley University
 Peoria, IL 61625

SESSION I - Friday, April 19
PRESIDING: Michelle Fry

<u>TIME</u>	<u>PAPER #</u>	<u>LOCATION: Dogwood Room</u> <u>MUC Conference Center</u>
9:00 AM	40	CAPILLARY ELECTROPHORESIS ANALYSIS OF THIAMIN DERIVATIVES. <u>J.A. Sutton</u> and <u>M. Shabangi</u> , Southern Illinois University, Edwardsville.
9:15 AM	41	OPTIMIZATION OF SOLID-PHASE MICROEXTRACTION TECHNIQUES FOR ANALYZING MTBE. <u>G.J. Domski</u> and <u>R.A. Wanke</u> , Augustana College, Rock Island.
9:30 AM	42	TWO-DIMENSIONAL NMR IN THE UNDERGRADUATE CURRICULUM. <u>J. Yu</u> , <u>J. Snyder</u> and <u>B. Andersh</u> , Bradley University, Peoria.
9:45 AM	43	TOTAL CORRELATION SPECTROSCOPY IN THE UNDERGRADUATE CURRICULUM. <u>T. Hathway</u> , <u>T. Gimbert</u> and <u>B. Andersh</u> , Bradley University, Peoria.
10:00 AM	44	CHEMISTRY CLUB ON CAMPUS AND IN THE COMMUNITY: ACTIVITIES OF THE 2001-2002 SIUE STUDENT AFFILIATES CHAPTER. <u>R. Buen</u> , <u>J. Schaefer</u> , <u>V. Ezeji</u> , <u>M. Shabangi</u> , <u>M. Shaw</u> and <u>K. Johnson</u> , Southern Illinois University, Edwardsville.
10:15 AM		BREAK
10:30 AM	45	SYNTHESIS OF SUBSTITUTED 2-2'-BIPYRIDINES AS POTENTIAL LIGANDS FOR DNA AND PHOSPHATE RECOGNITION AND CLEAVAGE. <u>R.P. Dixon</u> , Southern Illinois University, Edwardsville.

- 10:45 AM 46 CLEAVAGE OF CHEMICAL WARFARE AGENTS AND INSECTICIDES USING TRIS-BIPYRIDYL LIGAND COMPLEXES. H. Hiltebrenner and R.P. Dixon, Southern Illinois University, Edwardsville.
- 11:00 AM 47 SYNTHESIS AND OXIDATION REACTIONS USING A WATER-SOLUBLE HYPERVALENT IODINE REAGENT. T.K. Vinod and A.P. Thottumkara, Western Illinois University, Macomb.
- 11:15 AM 48 NOVEL *m*-TERPHENYL DERIVATIVES AS BUILDING BLOCKS FOR THE ASSEMBLY OF MOLECULAR SOLIDS. R.S. Wright and T.K. Vinod, Western Illinois University, Macomb.
- 11:30 AM 49 SYNTHESIS AND CONFORMATIONAL BEHAVIOR OF NOVEL AMIDE BRIDGED CYCLOPHANES. T.K. Vinod and C.C. Khine, Western Illinois University, Macomb.

POSTER SESSION -Friday, April 19 Location:MUC Conference Center
3:30 – 5:30 PM

POSTER #

- 112 CLEAVAGE OF CHEMICAL WARFARE AGENTS AND INSECTICIDES USING TRIS-BIPYRIDYL LIGAND COMPLEXES. M. Ozkok, L. Richardson, A. Branson and R. Dixon, Southern Illinois University, Edwardsville.
- 113 SYNTHESIS OF TETHERED PRIMARY AMIDE AS POTENTIAL SITE SPECIFIC BINDING MOTIFS FOR DNA AND RNA RECOGNITION AND CLEAVAGE. C.A. Bukovac, R.P.Dixon and C. Cassidy, Southern Illinois University, Edwardsville.
- 114 SYNTHESIS OF TETHERED GUANIDIUMS AS POTENTIAL SITE SPECIFIC BINDING MOTIFS FOR DNA AND RNA RECOGNITION AND CLEAVAGE. K.L. Felty, R. P. Dixon and S. R. Ross, Southern Illinois University, Edwardsville.
- 115 COMPOSITION AND ORGANIZATION OF THE ERYTHROCYTE PLASMA MEMBRANE: DEVELOPMENT OF AN UNDERGRADUATE BIOCHEMISTRY EXPERIMENT. J. Passman and M.R. Fry, Bradley University, Peoria.

COMPUTER SCIENCE DIVISION

DIVISION CHAIR:

Dennis M. DeVolder
 Department of Computer Science
 Western Illinois University
 Macomb, IL 61455

SESSION I - Friday, April 19

PRESIDING: Dennis DeVolder

TIME PAPER

LOCATION: Redbud Room
MUC Conference Center

- | | | |
|-----------------|-----------|---|
| 10:30 AM | 50 | SPEED EFFICIENT SEARCHING OF LARGE, PERSISTENT DATA SETS. <u>M. Litman</u>, Western Illinois University, Macomb. |
| 10:45 AM | 51 | SECURITY RISK ASSESSMENT OF ASSOCIATION MINING. <u>T. Johnsten</u> and <u>K. Hill</u>, Western Illinois University, Macomb. |
| 11:00 AM | 52 | CURRENT STATE OF ADOBE ATMOSPHERE AS A VW TOOL FOR EDUCATORS. <u>L.H. Tichenor</u>, Western Illinois University, Macomb. |
| 11:15 AM | 53 | BUILDING A SQL COOKBOOK. <u>M. Maskarinee</u>, <u>D. DeVolder</u>, <u>J. Covert</u> and <u>L. Dong</u>, Western Illinois University, Macomb. |
| 11:30 AM | 54 | A DATABASE FOR THE MANAGEMENT OF GRADUATE STUDENT RECORDS. <u>V. Agarwal</u>, <u>K. Saw</u> and <u>D. DeVolder</u>, Western Illinois University, Macomb. |

EARTH SCIENCE DIVISION

DIVISION CHAIR:

Vincent P. Gutowski
 Department of Geology & Geography
 Eastern Illinois University
 Charleston, IL 61920

POSTER SESSION -Friday, April 19 Location:MUC Conference Center
3:30 – 5:30 PM

POSTER #

116 SOURCES OF THE ESCUINTLA AND LA DEMOCRACIA DEBRIS
 AVALANCHES, GUATEMALA. C.G. Schiek and C.A. Chesner,
 Eastern Illinois University, Charleston.

117 MAPPING THE EFFECTS OF BENDWAY WEIR
 IMPLEMENTATION, EMBARRAS RIVER, CUMBERLAND
 COUNTY, IL. S.M. DiNaso, Village of Downers Grove, IL,
V.P. Gutowski, Eastern Illinois University, Charleston and
D.J. Osterman, NRCS, Toledo, IL.



ENGINEERING AND TECHNOLOGY DIVISION

DIVISION CHAIR:

C. J. Hatziadoniu
 Department of Electrical Engineering
 College of Engineering and Technology
 Southern Illinois University
 Carbondale, IL 62901-6603

POSTER SESSION -Friday, April 19 Location:MUC Conference Center
3:30 – 5:30 PM

POSTER #

- 118 MAXIMIZING THE SIGNAL TO NOISE RATIO OF NUCLEAR MAGNETIC RESONANCE (NMR) RADIO FREQUENCY (RF) COILS IN SAMPLES OF MICROSCOPIC SIZE. M.D. Hoadley, Illinois Math and Science Academy, Aurora.

ENVIRONMENTAL SCIENCE DIVISION**DIVISION CHAIR:**

Kevin A. Johnson
 Department of Chemistry
 Southern Illinois University
 Edwardsville, IL 62026

SESSION I - Friday, April 19**PRESIDING: Kevin A. Johnson****TIME PAPER #****LOCATION: Maple Room
MUC Conference Center**

- | | | |
|---------|----|---|
| 9:00 AM | 55 | SOME VASCULAR PLANTS OF A TALL GRASS PRAIRIE IN GRUNDY COUNTY, ILLINOIS. <u>J.R. Rastorfer</u> and <u>I. Mansaray</u> , Chicago State University, Chicago and <u>J.B. Rastorfer</u> , Rich South High School, Richton Park. |
| 9:15 AM | 56 | THE GOOD, THE BAD, AND THE MARGINAL-SITE SELECTION FOR THE CRITICAL TRENDS ASSESSMENT PROJECT. <u>R. Jack</u> and <u>S. Gallo</u> , Illinois Natural History Survey, Champaign. |
| 9:30 AM | 57 | REFERENCE STREAMS IN THE NORTHEASTERN MORAINAL NATURAL DIVISION OF ILLINOIS. <u>R.E. DeWalt</u> , Illinois Natural History Survey, Champaign. |
| 9:45 AM | 58 | THE RESPONSE OF MACROINVERTEBRATE COMMUNITIES TO RIPARIAN ZONE CHANGES. <u>R.W. Widinski</u> , Eastern Illinois University, Charleston. |

- 10:00 AM 59 SURVEY OF THE FRESHWATER MUSSELS (MOLLUSCA: BIVALVIA: UNIONIDEA) OF THE EMBARRAS RIVER BASIN, ILLINOIS. N. Owens, J. Laursen, Eastern Illinois University, Charleston and B. Szafoni, Illinois Department of Natural Resources, Charleston.
- 10:15 AM BREAK
- 10:30 AM 60 FLUCTUATING ASYMMETRY IN TWO ORDERS OF SMALL MAMMALS ALONG AN URBAN-RURAL GRADIENT. S.M. Fletcher and J. Yunger, Governors State University, University Park.
- 10:45 AM 61 THE VARIED EFFECTS OF ROADS ON SMALL MAMMAL POPULATIONS AND THE IMPLICATIONS FOR THE FRANKLIN'S GROUND SQUIRREL IN ILLINOIS. M.J. Starr, Southern Illinois University, Edwardsville.
- 11:00 AM 62 THE POTENTIAL USE OF AN ALTERNATIVE SAMPLING METHOD FOR CONTAMINANT CHARACTERIZATION AND SITE-SPECIFIC TOXICITY OF CONTAMINATED SOILS. C.C. Friedel and K.A. Johnson, Southern Illinois University, Edwardsville.
- 11:15 AM 63 CADMIUM ACCUMULATION AND INTERACTION IN INDIAN MUSTARD (*BRASSICA JUNCEA*). R. Sankaran and S.D. Ebbs, Southern Illinois University, Carbondale.
- 11:30 AM 64 THE EFFECTIVENESS OF MANAGEMENT PRACTICES ON THE EFFICIENCY OF VEGETATIVE FILTER STRIPS IN REDUCING NON-POINT SOURCE POLLUTION. T.C. Parker, T. Schmitt, J. Houpis and K.A. Johnson, Southern Illinois University, Edwardsville.
- 11:45 AM ISAS LUNCHEON AND BUSINESS MEETING
- 1:30 PM 65 SIMULATING THE GROWTH OF LOBLOLLY PINE IN RESPONSE TO ELEVATED TEMPERATURE AND CO₂ CONCENTRATION. C.C. Fan and W.A. Retzlaff, Southern Illinois University, Edwardsville.
- 1:45 PM 66 THE CLIMATOLOGY OF OZONE EXCEEDANCES IN THE METROPOLITAN ST. LOUIS REGION. M.L. Hildebrandt, Southern Illinois University, Edwardsville.

2:00 PM DISCUSSION

2:15 PM BUSINESS MEETING

POSTER SESSION -Friday, April 19 Location:MUC Conference Center
3:30 – 5:30 PM

POSTER #

- 119 Bt-CORN DETRITUS IMPACTS ON LARVAL CADDISFLIES (*Lepidostoma liba* Ross). R. Ahsan, C. Campbell, M.C. Romano, M.R. Whiles, and B. Middleton, Southern Illinois University, Carbondale.
- 120 A CLAY-MATION INTERPRETATION OF ENVIRONMENTAL POLLUTION. J. Maloff and D.M. Jedlicka, Columbia College, Chicago.
- 121 HARMFUL EFFECTS ON WHALES AND DOLPHINS BY ULTRA LOW FREQUENCY WAVES. N. Czech and D.M. Jedlicka, Columbia College, Chicago.
- 122 EFFECTS OF PRAIRIE RESTORATION METHODS ON SMALL MAMMAL SEED PREDATION. R.M. Key, D.M. Gohde, K.A. Lindee and M.E. Carrington, Governors State University, University Park.
- 123 STABLE ISOTOPIC ANALYSIS TO ESTIMATE NITRATE CONTAMINATION IN HORSESHOE LAKE. I. Bala, B. Vermillion R. Brugam and W.A. Retzlaff, Southern Illinois University, Edwardsville.
- 124 PHOSPHATE, BIOGENIC SILICA, AND HEAVY METAL CONCENTRATION IN SEDIMENT CORES FROM HORSESHOE LAKE, MADISON COUNTY, ILLINOIS. B. Vermillion, I. Bala, R. Brugam and W.A. Retzlaff, Southern Illinois University, Edwardsville.
- 125 UPTAKE OF CADMIUM BY *PINUS TAEDA*. S. Vissa, R. B. Brugam, W.A. Retzlaff, K.A. Johnson, J.L.J. Houpis and R. Sankaran, Southern Illinois University, Edwardsville.
- 126 USING STABLE ISOTOPES TO EVALUATE EFFECTIVENESS OF A FILTER STRIP. C.L. Cole, J.L.J. Houpis, K.A. Johnson and W.A. Retzlaff, Southern Illinois University, Edwardsville.

HEALTH SCIENCES DIVISION

DIVISION CHAIR:
Dennis J. Kitz
Department of Biological Sciences
Southern Illinois University
Edwardsville, IL 62026-1651
SESSION I - Friday, April 19
PRESIDING: Dennis Kitz
TIME PAPER #
**LOCATION: Dogwood Room
MUC Conference Center**

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|---------|----|--|
| 1:30 PM | 67 | THE PITUITARY-TESTICULAR AXIS IN BRATTELBORO RATS. <u>A.G. Amador</u> , ReproGen, Springfield. |
| 1:45 PM | 68 | FECAL CORTICOIDS TO MEASURE CHRONIC ADRENAL ACTIVITY IN RATS. <u>T.K. Whitney</u> , <u>P.M. Klingensmith</u> , Governors State University, University Park, and <u>S.A. Cavigelli</u> , <u>M.K. McClintock</u> , University of Chicago, Chicago. |
| 2:00 PM | 69 | METHODS FOR TRANSDUCING B-GALCTOSIDASE IN MICE USING ULTRASOUND AND ALBUMIN SHELLLED MICROSPHERES. <u>D.J. Davidson</u> and <u>S.B. Feinstein</u> , Rush University, Chicago. |
| 2:15 PM | 70 | FLUCONAZOLE ENHANCES MURINE CONTACT SENSITIVITY. <u>C.M. Lee</u> , <u>B.M. Riling</u> , <u>R.E. Letourneau</u> , <u>D.J. Kitz</u> , Southern Illinois University, Edwardsville. |
| 2:30 PM | 71 | FOUR HUNDRED FIFTY YEARS OF MEDICAL AND SCIENTIFIC EDUCATION: UNDERGRADUATE STUDIES. <u>A.G. Amador</u> , ReproGen, Springfield. |
| 2:45 PM | 72 | FOUR HUNDRED FIFTY YEARS OF GRADUATE HEALTH SCIENCES EDUCATION. <u>A.G. Amador</u> , ReproGen, Springfield. |
| 3:00 PM | | BUSINESS MEETING |



POSTER SESSION -Friday, April 19
3:30 – 5:30 PM

Location:MUC Conference Center

POSTER #

- 127 IN VITRO ENHANCEMENT OF IMMUNE RESPONSE IN MICE BY MACROLIDE DRUGS. R. Childs, D. Bush, S. Knebel, J. Knolhoff, S. Khazaeli, D.J. Kitz, Southern Illinois University, Edwardsville.
- 128 LINCOSAMIDE ANTIBIOTICS INFLUENCE IMMUNE RESPONSE IN MICE. C. McLaurin, S. Martinez, M. Rehkemper, S. Khazaeli, D.J. Kitz, Southern Illinois University, Edwardsville.

MICROBIOLOGY DIVISION

DIVISION CHAIR:

Dara Wegman-Geedey
Department of Biology
Augustana College
Rock Island, IL 61201

POSTER SESSION -Friday, April 19
3:30 – 5:30 PM

Location:MUC Conference Center

POSTER #

- 129 CAN THE INSECTICIDE, DICHLORVOS (DDVP), INDUCE MUTATIONS IN *ESCHERICHIA COLI* STRAIN K, COMMONLY FOUND IN THE HUMAN DIGESTIVE TRACT? E.A. Alton and S.A. McCommas, Southern Illinois University, Edwardsville.
- 130 NODULATION OF COMMON AND ENDANGERED LEGUMES BY SYMBIOTIC NITROGEN-FIXING BACTERIA PRESENT IN ILLINOIS PRAIRIE SOILS. S.B. Marousek, G. Pollard and S.L. Daniel, Eastern Illinois University, Charleston.
- 131 MICROBIAL DEGRADATION OF OXALATE, GLYOXYLATE AND GLYCOLATE IN THE HUMAN GUT. C. Brueck, M. Lehtinen, M. Flanagan, P. Bade and S.L. Daniel, Eastern Illinois University, Charleston.

- 132 ANTIBIOTIC SUSCEPTIBILITY OF BACTERIA ISOLATED FROM SOIL SAMPLES OBTAINED FROM A CATTLE PEN. S. Nandyala, E. Delany and K. Keudell, Western Illinois University, Macomb.
- 133 UTILIZATION OF OLIGOSACCHARIDES BY COLONIC BACTERIA. C.M. Miller-Fosmore, S.M. Holt, Western Illinois University, Macomb, and G.L. Cote, NCAUR, Peoria.
- 134 IMPACT OF CARBON SOURCE ON GROWTH AND OXALATE BIOSYNTHESIS BY *SCLEROTINIA SCLEROTIORUM*, THE CAUSATIVE AGENT OF SCLEROTINIA STEM ROT OF SOYBEAN. J. Schweighart, T. Hatinen, N.C. Furumo and S.L. Daniel, Eastern Illinois University, Charleston.
- 135 POTENTIAL RISKS FROM ENVIRONMENTAL SOURCES OF ANTIBIOTIC RESISTANT *STAPHYLOCOCCUS*. M. Gresk and J. McGaughey, Eastern Illinois University, Charleston.
- 136 FACTOR FROM *KLUYVEROMYCES MARXIANUS* NRRL Y-8281 ENHANCES BIOTRANSFORMATION OF OLEIC ACID TO 7, 10-DIHYDROXY-8(E)-OCTADECENOIC ACID BY *PSEUDOMONAS AERUGIONSA* (WIU-JS). A.M. Kuhrts, J.K. Huang, R.V. Gessner and K. C. Keudell, Western Illinois University, Macomb



SCIENCE, MATHEMATICS AND TECHNOLOGY EDUCATION DIVISION

DIVISION CHAIR:

James A. McGaughey
Department of Biological Sciences
Eastern Illinois University
Charleston, IL 61920

SESSION I - Friday, April 19

PRESIDING: James McGaughey

TIME PAPER

LOCATION: Hickory Room
MUC Conference Center

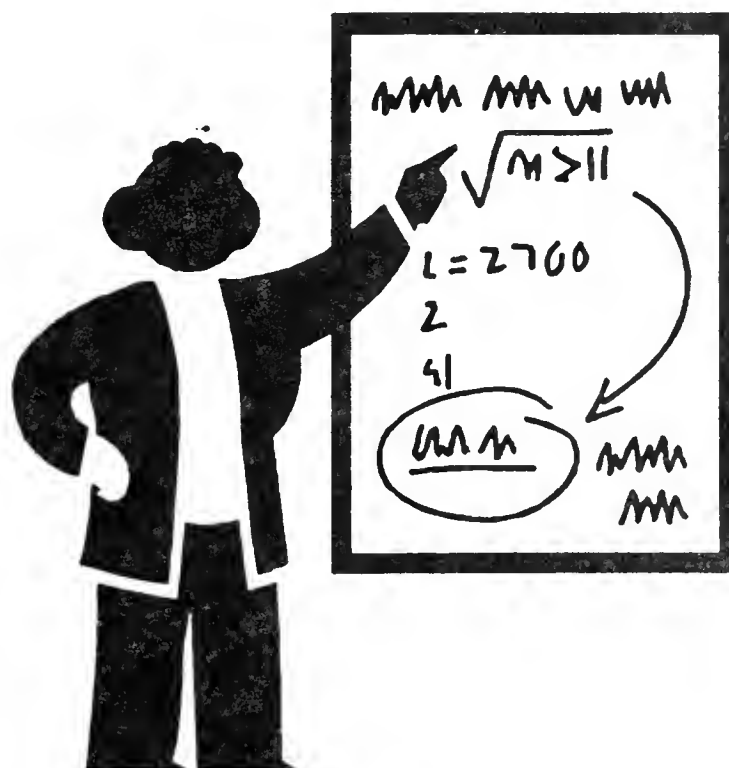
9:00 AM 73 FOUR HUNDRED FIFTY YEARS OF GRADUATE
SCIENTIFIC EDUCATION. A.G. Amador, ReproGem.
Springfield.

POSTER SESSION -Friday, April 19 3:30 – 5:30 PM

Location:MUC Conference Center

POSTER

137 THE UNITS CONVERTER. Y. Chen, M. Traverso, C. Harper,
M. Quinn and A. Lyle, Illinois Mathematics and Science
Academy, Aurora.



ZOOLOGY DIVISION

DIVISION CHAIR:

Robert U. Fischer, Jr.
 Department of Biological Sciences
 Eastern Illinois University
 Charleston, IL 61920

SESSION I - Friday, April 19
PRESIDING: Robert U. Fischer, Jr.
TIME
PAPER #
LOCATION: Hickory Room
MUC Conference Center

- | | | |
|----------|----|--|
| 10:20 AM | | WELCOME |
| 10:30 AM | 74 | MOLECULAR PHYLOGENETICS OF LYMNAEIDAE (MOLLUSCA: GASTROPODA): EVOLUTION OF SUSCEPTIBILITY TO <i>FASCIOLOIDES MAGNA</i> INFECTION. <u>S. Joyce</u> and <u>J. Laursen</u>, Eastern Illinois University, Charleston. |
| 10:45 AM | 75 | REGIONAL DISPERSAL OF <i>DAPHNIA LUMHOLTZI</i> IN NORTH AMERICA INFERRED FROM ISSR GENETIC MARKERS. <u>G.M. Groves</u> and <u>C.L Pederson</u>, Eastern Illinois University, Charleston. |
| 11:00 AM | 76 | EFFECTS OF PRESCRIBED BURNING ON SPIDER ABUNDANCE AND DIVERSITY: YEAR II. <u>A. Knop</u>, University of St. Francis, Joliet. |
| 11:15 AM | 77 | PHYLOGEOGRAPHY OF <i>HOLBROOKIA MACULATA</i> ASSESSED USING mtDNA AND MORPHOMETRIC VARIATION. <u>R. Blaine</u>, <u>R. Axtell</u>, <u>D. Duvernell</u>, <u>J. Lemos Espinal</u>, <u>J. Schaefer</u>, <u>S. McCommas</u>, Southern Illinois University, Edwardsville. |
| 11:45 AM | | ISAS LUNCHEON AND BUSINESS MEETING |
| 1:30 PM | 78 | GENETIC DIVERSITY, PHYLOGEOGRAPHY AND CONSERVATION OF <i>DESMOGNATHUS MONTICOLA</i> (FAMILY : PLETHODONTIDAE). <u>E.D. Casey</u>, <u>M. Mort</u> and <u>R. Fischer</u>, Eastern Illinois University, Charleston. |

- 1:45 PM 79 COMPOSITION AND DEMOGRAPHICS OF BEAVER COLONIES IN ILLINOIS. S. McTaggart and T. Nelson, Eastern Illinois University, Charleston.
- 2:00 PM 80 CYCLOMORPHOSIS OF *DAPHNIA LUMHOLTZI* IN RESPONSE TO SPATIAL HETEROGENEITY IN LAKE TAYLORVILLE. K.K. Schnake and C.L. Pederson, Eastern Illinois University, Charleston.
- 2:15 PM 81 THE PHYSIOLOGICAL EFFECTS OF NAPHTHALENE BIOACCUMULATION IN *RANA PIPIENS*. D. Giczewski, and K. Maillacheruvu, Bradley University, Peoria.
- 2:30 PM DIVISION MEETING

POSTER SESSION -Friday, April 19 Location:MUC Conference Center
3:30 – 5:30 PM

POSTER #

- 138 DOES THE FEMALE PINK-SPOTTED LADYBEETLE, *COLEOMEGILLA MACULATA FUSCILABRIS* (COLEOPTERA: COCCINELLIDAE), UTILIZE A SEX PHEROMONE? J.R. Martin, M.W. Robertson and C.S. Toepfer, Millikin University, Decatur.
- 139 THE EFFECTS OF EXPOSURE TO MULTIPLE MALES DURING MATING IN *DROSOPHILA MELANOGASTER*. E. Ellinger and J. Gumm, Millikin University, Decatur.
- 140 FORAGING BEHAVIOR BY *TENODERA ARIDIFOLIA SINENSIS* (MANTODEA, MANTIDAE) REARED UNDER HIGH AND LOW PREY DENSITIES. D.L. Lanckton, B.J. Becker and M. Robertson, Millikin University, Decatur.
- 141 THE RICHNESS, DIVERSITY, AND ABUNDANCE OF ANURANS AT GREEN WING ENVIRONMENTAL LABORATORY, AMBOY, ILLINOIS. S.B. Hager, Augustana College, Rock Island.
- 142 LACK OF EVIDENCE FOR CHEMICALLY MEDIATED POND WATER DISCRIMINATION IN PAINTED TURTLES (*CHRYSEMYS PICTA*). N. Smith, T. Haas, E. Woolsey and S.B. Hager, Augustana College, Rock Island.

- 143 MOTHER-CUB RELATIONSHIPS IN POLAR BEARS (*Ursus maritimus*): THE SIGNIFICANCE OF IMPRINTING. K. Eder and D.M. Jedlicka, The School of the Art Institute of Chicago, Chicago.
- 144 FORAGING PREFERENCES IN THE RING-BILLED GULL (*Larus delawarensis*) WITH RESPECT TO DISTANCE AND FOOD SIZE. E. Joanis and D.M. Jedlicka, The School of the Art Institute of Chicago, Chicago.
- 145 ART STUDENTS CAN COLLECT VALID FIELD DATA, WITH A FLARE! D.M. Jedlicka, The School of the Art Institute of Chicago, Chicago.
- 146 INFLUENCE OF CYCLOMORPHOSIS IN CLADOCERAN ZOOPLANKTON ON RELATIVE RATES OF PREDATION BY *GAMBUSIA AFFINIS*. B.A. Metzke and C.L. Pederson, Eastern Illinois University, Charleston.
- 147 THE EFFECTS OF DISTANCE TO VEGETATION ON BIRD ABUNDANCE AT FEEDERS. D.J. Horn, M. Abdallah, M.K. Bastian, J.R. DeMartini and R.M. Wilhelmi, Aurora University, Aurora.
- 148 THE EFFECTS OF TEMPERATURE ON SEED CHOICE BY BIRDS THAT USE FEEDERS. D.J. Horn, G.W. Bell, D.N. Helm, S.E. Hoth, D.J. Johnson, E.V. Kingsbury, J.A. Kraft, J.M. Leifheit, T.M. Mikalauskas, J.D. Stubis, S.R. Sully, D. L. Swanson and R. Turks, Aurora University, Aurora.
- 149 EFFECTS OF HUMAN ACTIVITY ON BIRD DISTRIBUTION IN AN ILLINOIS NATURE PRESERVE. V. Hedrick and P. Brunkow, Southern Illinois University, Edwardsville.
- 150 RELATIONSHIPS BETWEEN SHELL AND FOOT MORPHOLOGY IN A FRESHWATER SNAIL. K. Weiss, P. Brunkow and L. Bauer, Southern Illinois University, Edwardsville.
- 151 GENETIC VARIATION FOR PHENOTYPIC PLASTICITY IN A FRESHWATER SNAIL. A. Manuel and P. Brunkow, Southern Illinois University, Edwardsville.
- 152 THE STABILITY OF PLASA CREEK FISH ASSEMBLAGE. J.R. Kerfoot and J.F. Schaefer, Southern Illinois University, Edwardsville.

- 153 THE INFLUENCE OF LAND USE ON THE FISH COMMUNITY IN A MIDWESTERN DRAINAGE. C. Funderburg, S. Zacha and J. Schaefer, Southern Illinois University, Edwardsville.
- 154 THE USE OF BEHAVIORAL OBSERVATIONS TO PREDICT PRIMARY BREEDING FEMALES IN THE EUSOCIAL NAKED MOLE RAT. S.W. Margulis, Brookfield Zoo, Brookfield and J.L. Youngblood, Augustana College, Rock Island.



POSTER SESSION

Friday, April 19
3:30 – 5:30 PM

Location: MUC Conference Center

POSTER

- 82 EXAMINING PHYSIOLOGICAL INTEGRATION IN CLONAL PLANTS WITH *SAXIFRAGA STOLONIFERA* (SAXIFRAGACEAE). L. Corradin and E. Ribbens, Western Illinois University, Macomb
- 83 *PHAEOPHYSCIA LEANA* – A LICHEN SPECIES AT THE EDGE. R.N. Gillespie and A.S. Methven, Eastern Illinois University, Charleston.
- 84 IMPACT OF CADMIUM ON GROWTH AND DEVELOPMENT OF PLANTS. J. Long, D. Kosma and S. Ebbs, Southern Illinois University, Carbondale.
- 85 VENTRAL APPENDAGE VARIATION OF THE METZGERIIDAE (MARCHANTIOPHYTA). A.J. Kinser, Southern Illinois University, Carbondale.
- 86 COMPARATIVE MORPHOLOGY OF THE SIMPLE THALLOID LIVERWORTS, *JENSENIA* LINDB. AND *PALLAVICINIA* GRAY (PALLAVICINIACEAE) S. Schuette and B.Crandall-Stotler, Southern Illinois University, Carbondale.
- 87 MODIFYING DISTANCE METHODS TO ESTIMATE HISTORICAL TREE DENSITY FROM GOVERNMENT LAND OFFICE SURVEY RECORDS. S.L. Sauer, R.C. Anderson, R. Swigart, J. Fralish and A. Carver, Illinois State University, Normal and Southern Illinois University, Carbondale.
- 88 CHARACTERIZATION OF THREE *PHRAGMITES AUSTRALIS* SITES AND POPULATIONS THROUGH SOIL ANALYSIS AND PHOTOSYNTHESIS MEASUREMENTS. M.A. Rickey and R.C. Anderson, Illinois State University, Normal.
- 89 GALLERY OF ILLINOIS PLANTS WEBSITE. D. Busemeyer, Illinois Natural History Survey, Champaign.

- 90 INTERSPECIFIC HYBRIDS OF *FLAMMULINA*. A.S. Methven and M.E. Mort, Eastern Illinois University, Charleston.
- 91 OCCURRENCE OF VESICULAR ARBUSCULAR MYCORRHIZAL ASSOCIATIONS IN SPECIES OF *AEONIUM* FROM THE CANARY ISLANDS. T.L. Cervený and A.S. Methven, Eastern Illinois University, Charleston.
- 92 ANALYSES OF PRAIRIE RESTORATIONS AT ROCK SPRINGS ENVIRONMENTAL CENTER, DECATUR, ILLINOIS. J.A. Ward, G.C. Tucker, J.E. Ebinger and S.J. Meiners, Eastern Illinois University, Charleston.
- 93 THE EFFECT OF CUTTING ON SPECIES RICHNESS AND PERCENT COVER OF HERBACEOUS SPECIES, CHAUTAUQUA LONG-TERM RESEARCH SITE, CARBONDALE, ILLINOIS. B. Phillips, Southern Illinois University, Carbondale.
- 94 BASELINE FLORAL SURVEY OF THE WATERSHED NATURE CENTER. J.A. Moe and E.J. Esselman, Southern Illinois University, Edwardsville.
- 95 SEEDBANK VIABILITY IN *SCHOENOPLECTUS HALLII*, HALL'S BULRUSH. B. Meinardi, M. Smith and S. Ammann, Southern Illinois University, Edwardsville.
- 96 INTERACTION OF PROTRACTED SUMMER FLOODING AND SHADE IN THE ESTABLISHMENT OF UNDERSTORY *ACER SACCHARINUM* SEEDLINGS. C. Deutsch, K.E. Schulz, K. Jamison, K. Manar and K. Kahl, Southern Illinois University, Edwardsville and U.S. Army Corps of Engineers, St. Louis, MO.
- 97 USING PALENOLOGY TO DETERMINE A CULTURE HORIZON AT HORSEHOE LAKE IN MADISON COUNTY, ILLINOIS. J.J. Martin and R. Brugam, Southern Illinois University, Edwardsville.
- 98 EFFECTS OF CADMIUM ON THE PHYSIOLOGY OF *POPULUS DELTOIDES* BARTR. EX MARSH, AND ITS POTENTIAL USE IN PHYTOREMEDIATION. D. Shrestha, M. Smith, K. Johnson and W. Retzlaff, Southern Illinois University, Edwardsville.
- 99 SEED VIGOR OF *LESQUERELLA LUDOVICIANA* AS AFFECTED BY COLONY AND MATURITY. S.E. Beach, M.A.L. Smith, J. M. Coons, University of Illinois, Urbana, and H.R. Owen and B.L. Todd, Eastern Illinois University, Charleston.

- 100 MORPHOLOGICAL RESPONSES EXHIBITED IN *HYDRA* DUE TO EXTRACELLULAR ATP EXPOSURE. H.R. FitzHenry and V.L. Burgholzer, Illinois Mathematics and Science Academy, Aurora.
- 101 THE FMRFAMIDE RECEPTOR IN THE EARTHWORM CROP-GIZZARD. K.G. Krajniak and S.D. Klohr, Southern Illinois University, Edwardsville.
- 102 CATECHOLAMINE REGULATION OF THE ISOLATED EARTHWORM CROP-GIZZARD. C.A. Corley and K.G. Krajniak, Southern Illinois University, Edwardsville.
- 103 INOSITOL PHOSPHOGLYCANS CONTAINING MYOINOSITOL AND CHIROINOSITOL ARE PURIFIED FROM NORMAL HUMAN PLASMA THROUGH GEL-FILTRATION CHROMATOGRAPHY. D. Albracht and G. Galasko, Southern Illinois University School of Dental Medicine, Alton, and T. Korves and P. Wanda, Southern Illinois University, Edwardsville.
- 104 EXTENSIVE VARIATION AMONG LISW RETROTRANSPOSON LINEAGES WITHIN TELEOST FISH-GENOMES CONTRADICTS THE "MASTER" MODEL. K.A. Miller and D.D. Duvernell, Southern Illinois University, Edwardsville.
- 105 USING THE ZEBRA FISH GENOME DATABASE TO EXPLORE LISW RETROTRANSPOSON DIVERSITY IN TELEOST GENOMES. S.M. Adams and D.D. Duvernell, Southern Illinois University, Edwardsville.
- 106 COMPARITIVE RESULTS OF THE CYTOPATHIC EFFECTS OF MEASLES VIRUS AND CANINE DISTEMPER VIRUS IN RESPECT TO APOPTOSIS. J.H. Irlam and P. Wanda, Southern Illinois University, Edwardsville.
- 107 SEQUENCING PARTS OF THE LACTOBACILLUS AMYLOVORUS GENOME. C.Clark and S.A. McCommas, Southern Illinois University, Edwardsville.
- 108 V_{3A} INDUCES MITOGENESIS IN VERO CELLS AND CHICK EMBRYO FIBROBLASTS. T. Korves, A. Bradshaw, D. Albracht, P. Wanda and G. Galasko, Southern Illinois University, Edwardsville and Southern Illinois University School of Dental Medicine, Alton.

- 109 EFFECT OF PHAGOCYTOSIS ON PROGRAMMED CELL DEATH IN RETINAL PIGMENT EPITHELIAL CELLS. M.D. Rauser and A. Baich, Southern Illinois University, Edwardsville.
- 110 GENE EXPRESSION OF CULTURED HUMAN BONE CELLS. J. Allen, S. McCommas and B. Whitson, Southern Illinois University, Edwardsville.
- 111 MOLECULAR CLONING OF A FULL-LENGTH BOVINE EUKARYOTIC INITIATION FACTOR-5A cDNA. J.K. Huang, G.H. Huang, V.C. Sershon, J.C. McDonald, P.G. Gowda and L. Wen, Western Illinois University, Macomb.
- 112 CLEAVAGE OF CHEMICAL WARFARE AGENTS AND INSECTICIDES USING TRIS-BIPYRIDYL LIGAND COMPLEXES. M. Ozkok, L. Richardson, A. Branson and R. Dixon, Southern Illinois University, Edwardsville.
- 113 SYNTHESIS OF TETHERED PRIMARY AMIDE AS POTENTIAL SITE SPECIFIC BINDING MOTIFS FOR DNA AND RNA RECOGNITION AND CLEAVAGE. C.A. Bukovac, R.P. Dixon and C. Cassidy, Southern Illinois University, Edwardsville.
- 114 SYNTHESIS OF TETHERED GUANIDINIUMS AS POTENTIAL SITE SPECIFIC BINDING MOTIFS FOR DNA AND RNA RECOGNITION AND CLEAVAGE. K.L. Felty, R. P. Dixon and S. R. Ross, Southern Illinois University, Edwardsville.
- 115 COMPOSITION AND ORGANIZATION OF THE ERYTHROCYTE PLASMA MEMBRANE: DEVELOPMENT OF AN UNDERGRADUATE BIOCHEMISTRY EXPERIMENT. J. Passman and M.R. Fry, Bradley University, Peoria.
- 116 SOURCES OF THE ESCUINTLA AND LA DEMOCRACIA DEBRIS AVALANCHES, GUATEMALA. C.G. Schiek and C.A. Chesner, Eastern Illinois University, Charleston.
- 117 MAPPING THE EFFECTS OF BENDWAY WEIR IMPLEMENTATION, EMBARRAS RIVER, CUMBERLAND COUNTY, IL. S.M. DiNaso, Village of Downers Grove, IL, V.P. Gutowski, Eastern Illinois University, Charleston and D.J. Osterman, NRCS, Toledo, IL.

- 118 MAXIMIZING THE SIGNAL TO NOISE RATIO OF NUCLEAR MAGNETIC RESONANCE (NMR) RADIO FREQUENCY (RF) COILS IN SAMPLES OF MICROSCOPIC SIZE. M.D. Hoadley, Illinois Math and Science Academy, Aurora.
- 119 Bt-CORN DETRITUS IMPACTS ON LARVAL CADDISFLIES (*Lepidostoma liba* Ross). R. Ahsan, C. Campbell, M.C. Romano, M.R. Whiles, and B. Middleton, Southern Illinois University, Carbondale.
- 120 A CLAY-MATION INTERPRETATION OF ENVIRONMENTAL POLLUTION. J. Maloff and D.M. Jedlicka, Columbia College, Chicago.
- 121 HARMFUL EFFECTS ON WHALES AND DOLPHINS BY ULTRA LOW FREQUENCY WAVES. N. Czech and D.M. Jedlicka, Columbia College, Chicago.
- 122 EFFECTS OF PRAIRIE RESTORATION METHODS ON SMALL MAMMAL SEED PREDATION. R.M. Key, D.M. Gohde, K.A. Lindee and M.E. Carrington, Governors State University, University Park.
- 123 STABLE ISOTOPIC ANALYSIS TO ESTIMATE NITRATE CONTAMINATION IN HORSESHOE LAKE. I. Bala, B. Vermillion, R. Brugam and W.A. Retzlaff, Southern Illinois University, Edwardsville.
- 124 PHOSPHATE, BIOGENIC SILICA, AND HEAVY METAL CONCENTRATION IN SEDIMENT CORES FROM HORSESHOE LAKE, MADISON COUNTY, ILLINOIS. B. Vermillion, I. Bala, R. Brugam and W.A. Retzlaff, Southern Illinois University, Edwardsville.
- 125 UPTAKE OF CADMIUM BY *PINUS TAEDA*. S. Vissa, R. B. Brugam, W.A. Retzlaff, K.A. Johnson, J.L.J. Houpis and R. Sankaran, Southern Illinois University, Edwardsville.
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- 127 IN VITRO ENHANCEMENT OF IMMUNE RESPONSE IN MICE BY MACROLIDE DRUGS. R. Childs, D. Bush, S. Knebel, J. Knolhoff, S. Khazaeli, D.J. Kitz, Southern Illinois University, Edwardsville.

- 128 LINCOSAMIDE ANTIBIOTICS INFLUENCE IMMUNE RESPONSE IN MICE. C. McLaurin, S. Martinez, M. Rehkemper, S. Khazaeli, D.J. Kitz, Southern Illinois University, Edwardsville.
- 129 CAN THE INSECTICIDE, DICHLORVOS (DDVP), INDUCE MUTATIONS IN *ESCHERICHIA COLI* STRAIN K, COMMONLY FOUND IN THE HUMAN DIGESTIVE TRACT? E.A. Alton and S.A. McCommas, Southern Illinois University, Edwardsville.
- 130 NODULATION OF COMMON AND ENDANGERED LEGUMES BY SYMBIOTIC NITROGEN-FIXING BACTERIA PRESENT IN ILLINOIS PRAIRIE SOILS. S.B. Marousek, G. Pollard and S.L. Daniel, Eastern Illinois University, Charleston.
- 131 MICROBIAL DEGRADATION OF OXALATE, GLYOXYLATE AND GLYCOLATE IN THE HUMAN GUT. C. Brueck, M. Lehtinen, M. Flanagan, P. Bade and S.L. Daniel, Eastern Illinois University, Charleston.
- 132 ANTIBIOTIC SUSCEPTIBILITY OF BACTERIA ISOLATED FROM SOIL SAMPLES OBTAINED FROM A CATTLE PEN. S. Nandyala, E. Delany and K. Keudell, Western Illinois University, Macomb.
- 133 UTILIZATION OF OLIGOSACCHARIDES BY COLONIC BACTERIA. C.M. Miller-Fosmore, S.M. Holt, Western Illinois University, Macomb, and G.L. Cote, NCAUR, Peoria.
- 134 IMPACT OF CARBON SOURCE ON GROWTH AND OXALATE BIOSYNTHESIS BY *SCLEROTINIA SCLEROTIORUM*, THE CAUSATIVE AGENT OF SCLEROTINIA STEM ROT OF SOYBEAN. J. Schweighart, T. Hatinen, N.C. Furumo and S.L. Daniel, Eastern Illinois University, Charleston.
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- 137 THE UNITS CONVERTER. Y. Chen, M. Traverso, C. Harper, M. Quinn and A. Lyle, Illinois Mathematics and Science Academy, Aurora.
- 138 DOES THE FEMALE PINK-SPOTTED LADYBEETLE, *COLEOMEGILLA MACULATA FUSCILABRIS* (COLEOPTERA: COCCINELLIDAE), UTILIZE A SEX PHEROMONE? J.R. Martin, M.W. Robertson and C.S. Toepfer, Millikin University, Decatur.
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- 148 THE EFFECTS OF TEMPERATURE ON SEED CHOICE BY BIRDS THAT USE FEEDERS. D.J. Horn, G.W. Bell, D.N. Helm, S.E. Hoth, D.J. Johnson, E.V. Kingsbury, J.A. Kraft, J.M. Leifheit, T.M. Mikalauskas, J.D. Stubis, S.R. Sully, D. L. Swanson and R. Turks, Aurora University, Aurora.
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ABSTRACTS

1

COMMON MILKWEED PRODUCTION. W.B. Phippen, Agriculture Department, Western Illinois University, 1 University Circle, Macomb, IL 61455. In response to declining commodity prices and the need for crop diversification, WIU has developed a new breeding and production research program aimed at introducing alternative crops to the Mid-west region. One crop of particular interest is common milkweed (*Asclepias syriaca*) for the production of industrial fibers, oils, latex, and a potent nematicide. Research is focused on developing planting strategies, field maintenance guidelines, and equipment for the harvesting, drying, and cleaning milkweed pods. First year experiments have addressed planting methods, densities, and effects of coal dust on plant establishment. Second year studies will address planting times, row spacing and herbicide trials. Long-term objectives for the milkweed project will be focused on improving yields, developing auto-fertile varieties, and developing machinery for handling the milkweed harvest. Preliminary results have indicated that this perennial crop has tremendous potential as an alternative for farmers looking to expand their production with minimal costs. This program is also working to generate sufficient supplies of milkweed floss and seed for the development of value-added products.

2

STUDY OF COREOPSIS ROSEA BREEDING SYSTEM. S. Sequeira and M.M. Loehlein, Western Illinois University, Macomb, IL 61455. *Coreopsis rosea* is an herbaceous perennial, native to the eastern United States and belonging to the Asteraceae family. It is a pink-flowered relative of *Coreopsis*, or tickseed (*Coreopsis grandiflora*). Members of the Asteraceae are reported to have varying degrees of self-incompatibility. In order to develop *C. rosea* as a more useful landscape plant, an increased knowledge and understanding of seed its production is required. Therefore, crosses were made between three different *C. rosea* genotypes as follows: 1. no-pollination, 2. self-pollination, 3. cross-pollination with plant *a*, cross pollination with plant *b*, and cross pollination with plant *c*. Ten (10) flowers were bagged prior to anthesis for each treatment. The results indicate varying levels of compatibility between the three plants tested, and a high level of self-incompatibility in each genotype. When open pollinated, plants showed varying degrees of compatibility with all the other potential pollinators growing in the same field plot.

3

GAS EXCHANGE AND YIELDS OF BT RESISTANT MAIZE WITH EUROPEAN CORN BORER INFESTATION. S.A. Mallady and J.M. Coons, Eastern IL Univ. Charleston IL 61920; J.A. Parrish, Millikin Univ. Decatur IL 62522; K. Montgomery, Central Golden Harvest Research, Clinton, IL 61727. Seed companies have developed transgenic maize (*Zea mays* L.) hybrids resistant to the European corn borer (ECB) [*Ostrinia nubilalis* (Hübner)]. However, how this *Bt* (*Bacillus thuringiensis*) gene affects other plant processes is unknown. In 1997 and 1999, a study at Golden Harvest in Clinton, IL was focused on how the *Bt* gene affects gas exchange and yields of maize with and without ECB. *Bt* and non-*Bt* maize isogenic pairs were planted in plots with or without nets and/or insecticides to eliminate natural infestation of ECB, and with or without manual infestation of ECB (i.e. at early whorl and at post ear development). Photosynthesis and transpiration were not significantly different between *Bt* and non-*Bt* plants regardless of ECB infestation. In 1999 yields were not significantly different for *Bt* and non-*Bt* plants, but were significantly higher in plants with nets or insecticide compared to no nets or insecticides. In 1997 kernel sizes were significantly different between *Bt* and non-*Bt* plants with 26.7 and 28.6 g, respectively. In 1999 kernel sizes were not significantly different between *Bt* and non-*Bt* plants, however all plants with insecticide had significantly larger kernels (35.9 g) than those with no insecticide (32.4 g). Thus, the *Bt* gene had no significant effects on gas exchange or yields regardless of ECB infestation, but a significant effect on kernel size in 1997.

4

EVALUATION OF TOMATO CULTIVARS FOR EARLY BLIGHT, *ALTERNARIA SOLANI*.
M.M.Loehrlein, Willinois University, Macomb, IL 61455.

Fifteen cultivars of were evaluated for *Alternaria solani* under field conditions. Cultivars were evaluated when approximately 50% of the fruit were ripe, and then again 10 days later. Stem, leaf, fruit, and whole-plant evaluations were conducted. Varying levels of tolerance to *A. solani* were observed. In whole-plant evaluations, cultivars showing the greatest tolerance to the pathogen included 'Mountain Fresh' and 'Better Boy'. Those showing the least tolerance were 'Red Rider' and 'Sunstart'. Whole-plant and leaf evaluations yielded similar results. Fruit were not severely affected in either case, except for 'Red Rider', 'Mountain Spring', and 'Fabulous'. Of these three, 'Red Rider' was most severely affected. 'Sunrise' had the greatest tolerance in stem evaluations, while 'Red Rider' was least tolerant.

5

VEGETATION OF FOREST COMMUNITIES AT THE SAND PRAIRIE-SCRUB OAK NATURE PRESERVE, MASON COUNTY, ILLINOIS. W.E.McClain, Illinois Department of Natural Resources, Springfield, IL 62706; S.D.Turner and J.E.Ebinger, Eastern Illinois University, Charleston, IL 61920. Sand Prairie-Scrub Oak Nature Preserve, is a 590 ha preserve that contains extensive sand prairie and sand forest communities. Black oak dominates the forests with importance values of 148 to 196 (200 possible), and 260 to 468 stem/ha. Other overstory species included blackjack oak, black hickory, and mockernut hickory. Many oaks were multiple-stemmed with 2-5 stems from near the base. The ground-layer vegetation was dominated by Eupatorium rugosum (white snakeroot), Carex pensylvanica (Pennsylvania sedge), Tradescantia ohioensis (smooth spiderwort), Parthenocissus quinquefolia (Virginia creeper), and Rubus pensylvanicus (Pennsylvania blackberry). The woody understory species were more common in areas that had not been subjected to recent burns.

6

THE INTERESTING DISTRIBUTION OF EASTERN LEATHERWOOD (*DIRCA PALUSTRIS*): THE REGENERATION NICHE MEETS FOREST HISTORY. K.E. Schulz¹, J.C. Zasada², T. Marriage¹, K. Manar¹, C. Jones¹, and S. Albrecht¹. ¹Southern Illinois University Edwardsville, Edwardsville, IL 62026 and ²North Central Forest Experiment Station, Grand Rapids, MN 55744. Leatherwood is a small (< 2.5 m), long-lived, shade tolerant shrub of eastern NA. In western Great Lakes hardwood stands its abundance varies widely from stand to stand. We examined the distribution of leatherwood populations and aspects of its reproduction and growth in *Acer-Tsuga* stands in the Ottawa NF, Michigan. Leatherwood populations are strongly aggregated within stands. This probably reflects proliferation around a founder rather than colonization of canopy openings. Seed dispersal is limited by heavy seeds, a lack of dispersers, and intense seed predation by rodents. Seedlings are clustered beneath putative parent shrubs. Flower production is higher under open canopies, but shrub size is a far greater determinant of reproduction. Leatherwood is less abundant and more aggregated in unmanaged second growth maple stands. Mechanical damage and competition from sugar maple regeneration after logging ca. 1910 seems to have reduced local population sizes. Limited dispersal ability has prevented recruitment to depopulated stands across the landscape.

RESPONSE OF PRAIRIE FORBS TO WHITETAIL DEER BROWSING. R. Anderson, D. Nelson, and M. Rickey, Illinois State University, Normal, IL 61790. We examined the response of prairie forbs to deer browsing by counting stems of forbs in plots protected from deer browsing and unprotected plots at Goose Lake Prairie State Park. Sampling of the plots occurred in 1992, 1993, 1994, 1997, 1999, 2000, and 2001. Using Detrended Correspondence Analysis we ordinated plot data using the data collected each year from protected and unprotected plots as separate samples. The first axis of the ordination separated the samples along a deer browsing intensity gradient. Sample scores decreased as length of time the plots were protected from deer browsing increased. Stem count data for species was regressed against sample scores. Species sensitive to deer browsing had significant negative correlations, whereas species that increased as browsing intensity increased had significant positive correlations. Forb diversity (H') of protected and unprotected plots changed over time. Initially, the diversity of unprotected plots increased but then it declined as browse sensitive species increased in abundance causing a decline in evenness (J).

SCIRPUS AND RELATED GENERA (CYPERACEAE) IN ILLINOIS. G.C. Tucker, Eastern Illinois University, Charleston, IL 61920. An important wetland genus, *Scirpus* includes 25 species in Illinois. Several species are state-listed rarities, such as *S. hattorianus* in northeastern Illinois and *S. verecundus* in southern Illinois. Recent field and herbarium studies document several additional taxa. The hybrid *S. atrovirens* × *S. georgianus* occurs in Effingham County. The primarily coastal species, long known as "*S. olneyi*" but correctly called *Schoenoplectus americanus*, was found in 2000 at a wetland in Jasper Co. The adventive Eurasian *S. mucronatus*, has spread to Jasper and Shelby cos. since first noted in Mason Co. by John Schwegman in the 1970s. *Scirpus* is being divided into *Schoenoplectus*, *Trichophorum*, and *Scirpus* in the narrow sense, based on spikelet morphology, vegetative features, embryology, and DNA evidence. The upcoming Flora of North America will have 3 genera for Illinois species included in *Scirpus* by Jones, Mohlenbrock, and Cronquist in recent floras. The federally listed Hall's bulrush, is now called *Schoenoplectus hallii*.

ANATOMICAL TRENDS OF SPECIALIZATION IN LEAF STRUCTURE OF THE MONOCOT FAMILY ARACEAE, AND THEIR RELATION TO CLASSIFICATION. R. C. Keating, Missouri Botanical Garden, P. O. Box 299, St. Louis, MO 63166. The Araceae comprise 106 genera and over 2000 species, arranged in 9 subfamilies. Of these, 400 species and a nearly complete generic sample were available for light microscopical investigations. The results were compared with current classifications and results available from two genetic sequencing studies. Family-wide trends were few although many diagnostic characters were available at the generic and subfamily level from epidermis, stomata, mesophyll, vascular bundles, laticifers, sclerenchyma, collenchyma and raphide crystals. The best family-wide trend, previously unrecognized, is the transition from banded collenchyma in the early branching lines to stranded types in the most specialized subfamily, Aroideae. Raphide crystal cells and their crystal bundles demonstrate the most extraordinary diversity found among the flowering plants but nearly defy recognition of pattern trends.

IMPACT OF CADMIUM-ZINC INTERACTIONS ON METAL ACCUMULATION IN THE HYPERACCUMULATOR *THLASPI CAERULESCENS*

Nathan Small and Stephen Ebbs, Southern Illinois University-Carbondale, Carbondale, IL, 62901

Heavy metals such as Cd and Zn are generally toxic to plants, except for those that are hyperaccumulators. Hyperaccumulators are not only tolerant to heavy metals but accumulate high concentrations of these elements in the leaves. For example, leaf Zn and Cd concentrations in the hyperaccumulator *Thlaspi caerulescens* can reach as high as 40,000 ppm and 4,000 ppm, respectively. We have been comparing populations of *Thlaspi caerulescens* from different locations in Europe and found that there are significant differences in their ability to hyperaccumulate either Cd or Zn. Since these two elements are chemical analogs and are typically found together in contaminated soils, we are examining the impact of Cd-Zn interactions on the accumulation of these two metals using radiotracer uptake studies. The results have implications for phytoremediation and metal transport in plants.

THE EFFECT OF CADMIUM AND ZINC ON GERMINATION OF *BOLTONIA DECURRENS*. M. Smith, S. Vissa and M. Schwegel, Southern Illinois University Edwardsville, Edwardsville, IL 62026. *Boltonia decurrens* is a threatened floodplain species endemic to the Illinois River valley. One hundred years ago, *B. decurrens* inhabited a 400 km stretch along the Illinois River from LaSalle, IL to the area of confluence with the Mississippi River. It is hypothesized that alteration and destruction of habitat have been responsible for the observed decline in population number and size. In the past 100 years, contamination by a variety of heavy metals has altered the quality of the floodplain soils. A concentration gradient of heavy metal contamination exists on the Illinois River from north to south, but "hot spots" exist all along the river in areas where mines, smelters and ore-processing plants were located. As no previous work has examined the effects of heavy metals on any aspect of the life history of this species, we elected to study the effects of cadmium and zinc on germination. We hypothesized that contact with these metals may be contributing to the threatened status of *B. decurrens*; therefore, we measured germination of seeds exposed to four concentrations of cadmium (0, 2, 10 and 20ppm) and zinc (0, 400, 800 and 1600ppm). Results indicated that germination was negatively associated with increasing concentrations of metals. It was concluded that heavy metals in the floodplain could be a contributing factor in the decline of this and other native species.

A test of Floristic Quality Assessment (FQA) in Measuring Natural Area Quality: Assessing the wetlands and grasslands of Illinois. G. Spyreas, B. Molano-Flores, C. Carroll, and J. Ellis, Illinois Natural History Survey, Champaign, IL, 61820. The need for, and difficulty of, quantifying the level of 'naturalness' of vegetative communities embedded within our highly disturbed landscape is well recognized. Floristic Quality Assessment has become a popular tool for monitoring success of restorations, identifying preservation worthy natural areas, and indicating levels of degradation for remnant vascular plant communities within the Midwest. Few published studies rigorously validating FQA at any scale exist. To address this concern, we analyzed data from 205 grasslands and wetlands, randomly selected throughout Illinois as part of the Critical Trends Assessment Program (CTAP). We sought to address 4 questions: Does FQA accurately measure habitat degradation? Are scores comparable between community types? Are CC values inherently biased? How are non-native species best incorporated into FQA? It was found that FQA was an excellent metric for measuring degradation compared to other measures. FQA was highly negatively correlated with invasion by non-native taxa. The data suggest that FQA is not comparable between community types, as its architects intended, thereby, substantially limiting its use. However, low sample size for most high quality communities leaves this question unresolved. We suggest that FQA is a powerful analytical tool, while qualifying its use.

THE ROLE OF INSECT FLOWER HERBIVORY IN NATIVE AND RESTORED PRAIRIES. B. Molano-Flores and C. Ollier. Illinois Natural History Survey, 607 E. Peabody Dr., Champaign, IL 61820. Restorationists are always looking for ways to measure the success of their restorations. In an ongoing study, we are investigating a plant-herbivore interaction to determine its role in the success of prairie restorations. In particular, we are studying the presence or absence of insect flower herbivores in the inflorescences of *Eryngium yuccifolium* Michx. (Apiaceae) in native versus restored prairie. Although thought to be a conservative species, *E. yuccifolium* can become very abundant in some native prairies and weedy in some restored prairies. We are investigating a connection between this phenomenon and the lack of flower herbivores. Our main objective is to determine if the presence or absence of these herbivores has an impact on the reproductive output of *E. yuccifolium* and therefore the size of *E. yuccifolium* populations. Preliminary data suggest that fewer flower herbivores and damaged flower heads are found on *E. yuccifolium* in restored prairies than in native prairies. The data suggest that this plant-herbivore interaction has not been achieved in the restored prairies we have studied.

WHITE-TAILED DEER BROWSING ON WOODY VEGETATION AT CEDAR GLEN NATURE PRESERVE, HANCOCK COUNTY AND ARGYLE LAKE STATE PARK, MCDONOUGH COUNTY. T. J. Williamson¹, A. K. Moorehouse², and R. V. Gessner¹, ¹Western Illinois University, Macomb, IL 61455 and ²Illinois Nature Preserves Commission, Colchester, IL 62326. Deer browsing at Cedar Glen Nature Preserve (CGNP) at the Alice L. Kibbe Life Sciences Station, Western Illinois University and Argyle Lake State Park (ALSP) were studied to provide baseline data to be used to manage the nature preserve and park. Deer foraging on woody vegetation was determined during 2000 and 2001 from 36 (50 m x 2 m) transects of 30 cm to 2.5 m high woody vegetation. The highest browse rates were found at CGNP during 2000 (23 - 81%, 63% mean). The lowest browse rates were at the non-hunted site at ALSP during 2001 (9 - 40%, 22% mean). Significant differences were found when site and year and site and transect were compared. The most highly browsed plants were hackberry, black locust, greenbrier, multiflora rose, rough leaf dogwood and coralberry. Native tree species were browsed at lower rates. Habitat type, vegetation density, vegetation succulence, and site disturbance appear to be factors that affect browse rates.

VEGETATION PATTERNS AT DIFFERENT SCALES IN THE SHAWNEE NATIONAL FOREST. S. Chandy, D.J. Gibson and P.A. Robertson, Southern Illinois University, Carbondale, IL 62901-6509. The USDA Forest Service Research Natural Area (RNA) program has allowed the establishment of permanent study plots in forest systems across the eastern deciduous forest. Vegetation data from these plots provide a baseline for documenting future changes in forest health and productivity. In southern Illinois, over 390 permanent plots have been established and sampled in 1996-1998 from 10 RNAs encompassing over 3500 ha. In this study, we were concerned with whether or not vegetation-environment relationships were consistent at multiple spatial scales. A landscape scale ordination based on the tree DBH from all RNAs indicates a predominant gradient from dry, xeric *Quercus stellata* - *Q. marilandica* dominated plots to those dominated by mesic species, including *Liquidambar styraciflua* - *Platanus occidentalis* - *Acer negundo*. Where individual RNAs were ordinated, 9 of 10 first axis site scores from separate ordinations of each RNA were correlated (Spearman's rank) with the first axis of the regional ordination.

INSECT VISITS TO FLOWERS OF *STYLISMA PICKERINGII* (CONVOLVULACEAE), AN ENDANGERED PLANT OF ILLINOIS SAND PRAIRIES. B.L. Todd¹, H.R. Owen¹, J.M. Coons^{1,2}, and D.W. Webb³. ¹Eastern Illinois University, Charleston 61920; ²University of Illinois, Urbana 61801; ³Illinois Natural History Survey, Champaign 61820. Although sand prairies are limited throughout Illinois, many unique species are found in this habitat. During the summers of 1999 and 2000, three insects previously unreported in Illinois (*Heterostylum croceum*, *H. robustum* and *Neorhyncocephalus volaticus*), as well as a variety of other insects, were observed visiting flowers of *S. pickeringii*. The purpose of this study was to determine which insects visit flowers of *S. pickeringii* over the summer and at different times of the day. Studies were conducted at a site in Mason Co., Illinois where *S. pickeringii* is abundant. Insects visiting flowers within 1m² plots for one hour were collected starting at 12:30 pm June to August and also at 10:00 am, 12:30 and 3:00 pm in July during peak flowering. Number of insect visits was recorded. Over 15 insect species visited *S. pickeringii* flowers. *Apis mellifera* and *H. croceum* were the most frequent visitors (42 and 24%, respectively). Midday visits peaked during July, peak flowering of *S. pickeringii*. *A. mellifera* was the most frequent visitor to *S. pickeringii* flowers during midday (44%). More insects visited *S. pickeringii* flowers at 10:00 am (45%) than at 12:30 (25%) or 3:00 pm (30%). In summary, *A. mellifera* and *H. croceum* are the most frequent visitors to *S. pickeringii* flowers, more insects visit during peak flowering and flower visitation is most abundant in the morning.

EFFECTS OF ZINC TOLERANCE IN THE FLOODPLAIN SPECIES, *POPULAS DELTOIDES*.

Suparna Biswas, Kevin Johnson, William Retzlaff and Marian Smith, Southern Illinois University, Edwardsville, IL 62026. An increase in emissions of heavy metals from anthropogenic activities has led to a growing concern to remediate these contaminants from the environment. Phytoremediation is an innovative and cost-effective approach to clean up the environment. Previous studies in phytoremediation have been successful using herbaceous species; however, woody species have a higher capacity for metal uptake due to their greater biomass and longevity. Present research in phytoremediation is focused on developing screening tools for identifying and selecting indigenous woody species that have high growth rate, low maintenance, long lifespan and a high proportion of metal allocation to woody tissue. The objective of this study is to determine the effects of zinc on key physiological characteristics (chlorophyll, stomatal conductance, transpiration and chlorophyll fluorescence) that could be used to assess the potential of *Populus deltoides* for use in future phytoremediation projects. A decrease in chlorophyll fluorescence, stomatal conductance and chlorophyll content has been found with increasing levels of zinc treatment. Heavy metal analysis has also determined that the accumulation of zinc in all leaf, stem and root tissues increased with increasing levels of zinc in the soil.

THE EFFECT OF SOIL NITROGEN ON SEVERITY OF INFECTION BY *FUSARIUM SOLANI* IN *GLYCINE MAX*.

N.L. Wentworth, Dr. J.A.D. Parrish, Dr. C.S. Toepfer, Millikin University, Decatur, IL 62522

Sudden Death Syndrome (SDS), caused by strains of *Fusarium solani*, is an important disease of *Glycine max*. We hypothesized that higher soil nitrogen levels would result in increased ability of plants to withstand the stress caused by SDS infection. Two groups, SDS-inoculated and non SDS-inoculated, contained two nitrogen treatments (low and high) of 70 plants each. An additional 40 plants in each group were grown and harvested 42 days after emergence. Root and shoot biomass allocation, root disease severity, and number of nodules were measured in the early-harvested group. Shoot biomass, seed number, and seed weight were measured in the late-harvested group. No significant differences in root and shoot biomass and number of nodules between SDS-inoculated and non SDS-inoculated plants or among nitrogen treatments were found for the early-harvested group. SDS-inoculated root disease severity was significantly higher than non-SDS inoculated root disease severity grown in the high nitrogen treatment, but not in the low treatment. There were no differences ($P < 0.05$) in parameters measured for the late-harvested groups, but seed number and seed weight approached significance between nitrogen treatments in the SDS-inoculated plants. SDS-inoculated plants at the low nitrogen treatment yielded more seeds with a greater seed weight. We concluded that nitrogen fertilization may reduce yields of soybeans infected with sudden death syndrome.

ADAPTATION IN LONG-TERM CULTURES OF THE BASIDIOMYCETE FUNGUS *SCHIZOPHYLLUM COMMUNE*. Travis A. Clark and James B. Anderson Department of Botany, University of Toronto, Mississauga L5L 1C6 Canada. The impact of ploidy on the rate of adaptation in an organism is an important question in evolutionary biology. The basidiomycete dikaryon is functionally equivalent to a diploid, but maintains the two gametic genomes in separate nuclei. Experimental populations of *Schizophyllum commune* were founded to address two questions: (i) Do dikaryotic and monokaryotic mycelia adapt to a novel environment under natural selection for increased growth? (ii) Do the haploid components of the dikaryon adapt reciprocally to one another's presence? The progenitor for all cultures was a single dikaryotic cell. Six dikaryotic and six monokaryotic lines (three of each nuclear type, recovered from the progenitor) were serially transferred on a minimal medium every two weeks over a period of twenty months. The dikaryons diverged substantially in growth rates. In addition to small incremental changes, at least two nuclear mutations causing a large increase in growth rates were observed in two of the dikaryotic lines. No significant change in growth rate occurred in any of the monokaryotic lines. Matings have been performed among haploids recovered from: the evolved dikaryons, the evolved monokaryons, and the progenitor dikaryon. Evidence for co-adaptation of two nuclei was observed in one dikaryotic line. The two nuclei that evolved together produced the most adapted phenotype only when paired together.

EXAMINATION OF THE GENETIC DIVERSITY PRESENT IN ILLINOIS POPULATIONS OF *CALAMAGROSTIS PORTERI* SUBSP *INSPERATA* USING ISSR MOLECULAR MARKERS. T. Marriage, E. Esselman and D. Lewis, Southern Illinois University, Edwardsville, IL 62026. *Calamagrostis porteri* Gray subsp. *insperata* (Swallen) C. Greene is a grass species that is listed as threatened in Illinois and called a 'species of concern' by the U.S. Fish and Wildlife Service. This grass species is highly clonal, rarely flowers and has low seed set. The amount of genetic variability within and between Illinois populations of *C. porteri* subsp. *insperata* is not known. Three ISSR primers will be used to determine the amount of genetic variability present within and between five Illinois populations of *C. porteri* subsp. *insperata*, and to detect the presence of somatic mutations. Preliminary results indicate that very little ISSR marker diversity is present within and between Illinois populations of *C. porteri* subsp. *insperata*.

REPRODUCTION AND HERBIVORY IN *AGALINIS AURICULATA* (SCROPHULARIACEAE), A THREATENED ILLINOIS PRAIRIE PLANT. C.R. Mulvaney, D.W. Whitman, Illinois State University, Normal, IL 61790, and B. Molano-Flores, Illinois Natural History Survey, Champaign, IL 61820. We studied reproductive output and impact of herbivory on reproduction in two populations of the threatened Illinois prairie plant, *Agalinis auriculata*, at the Midewin National Tallgrass Prairie, near Wilmington, Illinois. We collected data on flower phenology, breeding system, fruit and seed set, pollinators, and herbivores. *Agalinis auriculata* is an annual that exhibits a hermaphroditic reproductive system. Individual plants flowered between one to two weeks during late August to mid-September. Flower buds typically opened between 0530 and 0630 hours with the corolla abscising between 1000 and 1200 hours. Floral visitors included both flies (Syrphidae) and Hymenoptera (Apidae, Colletidae, and Halictidae). Breeding system data combined with pollinator observations from both 2000 and 2001 suggests the species typically outcrosses but readily self-pollinates in the absence of an appropriate pollen vector. Deer were the primary herbivores during the 2001 season. Crickets (Gryllidae) fed on flowers, and larvae of an unidentified moth and an unidentified Hymenopteran caused extensive damage to the seeds. Our data is suggesting that although this species can successfully reproduce (i.e., fruit and seed set), this successful reproduction can be offset by the negative impact of herbivores.

SEED GERMINATION AND PRODUCTION OF RE-GROWTH IN *DIPSACUS LACINIATUS*, CUT-LEAFED TEASEL. A.J. Musser & J.A.D. Parrish, Millikin University, Decatur, IL 62522.

Cut-leafed teasel, *Dipsacus laciniatus* is an invasive plant from Europe that has colonized roadsides and disturbed areas from Maine to California (Lorenzi & Jeffery 1987). Teasel is commonly managed by mowing (Caylor 1998). Therefore we are studying plant re-growth after cutting and seed germination at two teasel patches at Mascoutin Recreation Area outside of Clinton, IL. Mowing occurs early when flowering stalks are short to prevent seed set. If teasel is mowed too early the plant will produce additional flowering stalks (Glass 1991) so we cut plants just before flowering and observed the amount of re-growth and flowering heads produced. Cutting must be done before flowering because seed heads cut when partly flowering can produce viable seeds (Solecki 1989). We cut 785 flowering stalks and found 393 of these plants produced re-growth with 84 producing flowering stalks. This is a marked reduction in flowering stalks and therefore seed production. Additionally we are studying seed germination in heads cut at different stages of seed maturity. We cut heads in the bud, partial flowering, completely flowering, post flowering, and mature stages. We conducted germination tests of these seeds at one and seven months. Currently seeds have germinated from partially flowering cut heads supporting that cutting teasel after it has begun to flower is inadvisable because of possible viable seed production even in cut heads.

AN ASSESSMENT OF THE ECOLOGICAL REQUIREMENTS OF *SCHOENOPLECTUS HALLII* (HALL'S BULRUSH). P. Mettler¹ and M. Smith^{2, 1}, ¹ Department of Plant Biology, Southern Illinois University, Carbondale, IL 62901, (618) 536-2331, pmettle@siu.edu, ²Department of Biological Sciences, Southern Illinois University, Edwardsville, IL 62026. In the struggle to understand the decline of a species, it is imperative to ascertain the basic biological constraints of the species related to its' population dynamics. *Schoenoplectus hallii* is a state endangered wetland species that continues to decline in number of states and populations within its range. The purpose of our study was to gain an understanding of the habitat conditions (soil type, soil moisture, groundwater fluctuation, vegetation patterns), monitor and mark individuals of *S. hallii* to determine life stages and survival probabilities and develop a life cycle model of *S. hallii* with data collected at a population site in Scott County, MO. In October 1999, four, 50-m transects were established on a parallel elevation gradient to the ephemeral pond and four, 1-m² vegetation sampling plots were randomly located on each transect for a total of 16 plots. Groundwater wells were placed on each transect and surface to depth of groundwater, soil moisture, and vegetation were monitored monthly. We determined that *S. hallii* does not survive below 14% soil moisture, establishes in significantly lower diversity communities and may have a more complex life cycle than previously considered. The advance and retraction of groundwater appears to dictate the distribution and survival of *S. hallii*.

VASCULAR FLORA OF THE HOOPER BRANCH SAVANNA NATURE PRESERVE, IROQUOIS COUNTY, ILLINOIS. L. Phillippe, D. Busemeyer, M. Feist, K. Hunter, R. Larimore, P. Marcum, & J. Ebinger, Illinois Natural History Survey, Champaign, IL 61820

The vascular flora of the Hooper Branch Savanna Nature Preserve, Iroquois County, IL was studied during the 2001 growing season. A total of 334 taxa were found: nine pteridophytes, 90 monocots, and 235 dicots. The families with the largest number of taxa included the Poaceae (52), the Asteraceae (46), and the Cyperaceae (21, of which 13 were *Carex*). An overstory and groundlayer analysis of five mature second growth dry sand savanna sites and one mature second growth sand flatwoods was also undertaken. In the five dry sand savanna sites, tree density averaged 157 stems/ha, with an average basal area of 11 m²/ha. In the overstory, *Quercus velutina* Lam. ranked first with an average importance value (IV) of 178.8 (out of 200). Associated species included *Q. alba* L., *Prunus serotina* Ehrh., *Q. palustris* Muenchh.. In the ground layer, *Carex pensylvanica* Lam. ranked first with an IV of 62.8. Associated species included *Q. velutina*, *Schizachyrium scoparium* (Michaux) Nash, and *Cassia fasciculata/nictitans*, all with IV's of >10. In the sand flatwoods, tree density averaged 302 stems/ha, with an average basal area of 25.7 m²/ha. In the overstory, pin oak ranked first with an IV of 188.6. Associated species included *Nyssa sylvatica* Marsh. and *Q. alba*. In the ground layer, *Carex haydenii* Dewey ranked first with an IV of 50.8. Associated species included *Q. palustris* seedlings and *Calamagrostis canadensis* (Michaux) Beauv, with IV's >25.

EXOTIC UPLAND FOREST SUCCESSION IN SOUTHERN ILLINOIS. W. Clark Ashby, Southern Illinois University, Carbondale, IL 62901. Typical succession 40 years ago on abandoned commonly eroded old fields in southern Illinois was broomsedge to sassafras-persimmon to mixed hardwoods. Exotic species widespread then and now were tall fescue and multiflora rose on abandoned pastures and Japanese honeysuckle associated with developing shrubby vegetation. Kudzu and sericea lespedeza could be found. Autumn olive by the 1970s-80s spread widely into pastures and early successional woodlands. Similarly to planted pines it filled an empty niche in forest succession. The ongoing impact of these exotic invaders has varied. Closed tall fescue has been remarkably persistent and kudzu has overwhelmed further local areas. Japanese honeysuckle will persist chiefly as a ground layer and multiflora rose and autumn olive gradually disappear with developing shade during the pioneer tree stage of forest succession. Early tree stands are now being invaded by bush honeysuckle and garlic mustard. Differences in secondary forests developed on fields abandoned in the 1960s and 70s from those abandoned in the 1930s and 40s can be associated among others with changes in native plant potential for dispersal, in animal populations especially deer, and in climate. A short-term role of many exotics is already apparent. An unknown long-term impact on succession of exotics now coming in under shade may be much greater.

VASCULAR FLORA OF THE IROQUOIS COUNTY CONSERVATION AREA, IROQUOIS COUNTY, IL L.R. Phillippe, M.A. Feist, R. Larimore, D. Busemeyer, P. Marcum, C. Carroll, K. Hunter, and J. Ebinger, Illinois Natural History Survey, Champaign, IL 61820. The vascular flora of the Iroquois Co. Conservation Area was studied during the 2001 growing season. A total of 553 taxa were found: 15 fern and fern-allies, one gymnosperm, 153 monocots, and 384 dicots. Nine of the species are listed as threatened or endangered by the Illinois endangered species protection board (IESPB). The families with the largest number of taxa were the Asteraceae with 78 taxa, the Poaceae with 66, and the Cyperaceae with 48, of which 26 were of the genus *Carex*. A survey of the ground layer vegetation was conducted on four community types. In a Grade C sedge meadow *Carex haydenii* Dwey and *Carex stricta* Lam. (taken together) ranked first with an importance value (I.V.) of 113.4 (out of 200). The most important taxa in a Grade B shrub sand prairie (I.V. >10) were two shrubs, *Spiraea tomentosa* L. and *Rubus hispidus* L., two sedges, *C. haydenii* and *C. stricta*, one grass, *Schizachyrium scoparium* Michx., and three forbs, *Potentilla simplex* Michx., *Euthamia graminifolia* (L.) Salisb., and *Liatris aspera* Michx. The most important taxa in a Grade B wet-mesic sand prairie were two shrubs, *R. hispidus* and *Rubus setosus* Bigel, one sedge, *Carex* sp., two grasses, *Sorghastrum nutans* (L.) Nash and *S. scoparium*, and three forbs, *E. graminifolia*, *P. simplex*, and *Solidago canadensis* L. The most important taxa in a Grade B dry sand prairie were two shrubs, *R. hispidus* and *Vaccinium angustifolium* Ait., one sedge, *Carex pensylvanica* Lam., two grasses, *S. scoparium* and *S. nutans*, and one forb, *Aster simplex* Willd.

A COMPARATIVE STUDY OF 27- AND 56-YEAR-OLD ABANDONED AGRICULTURAL FIELDS WITH REMNANT PRAIRIE AT THE SAND PRAIRIE-SCRUB OAK NATURE PRESERVE IN MASON COUNTY, ILLINOIS. William E. McClain and Todd A. Strole, Department of Natural Resources, Springfield, IL 62701, and John E. Ebinger, Eastern Illinois University, Charleston, IL 61920. The Sand Prairie-Scrub Oak Nature Preserve is a 590 ha site in Mason County that contains remnant prairie, sand savanna and forest, and large abandoned agricultural fields. Since being acquired by the State of Illinois in 1969, the entire site has been managed by prescribed burning, but no planting of any plant materials has occurred. In order to develop management guidelines for the site, the herbaceous vegetation of the 27- and 56-year-old fields was compared to remnant prairie to determine differences in species composition and community structure. Although native sand prairie taxa characterized all vegetation types, the old fields were characterized by *Eragrostis trichodes* (Nutt.) Wood, while remnant prairie was characterized by *Schizachyrium scoparium* (Michx.) Nash., *Tephrosia virginiana* (L.) Pers., *Dicanthelium oligosanthes* (Schult.) Gould., and *Ambrosia psilostachya* DC.. Despite fire management and the passage of several decades, the vascular plant species composition of abandoned fields differs greatly from remnant prairie, suggesting that their species diversity could be enhanced by the seeding of native sand prairie species.

VEGETATIONAL SURVEY OF DEAN HILLS NATURE PRESERVE, FAYETTE COUNTY, ILLINOIS. M.A. Feist, L.R. Phillippe, D.T. Busemeyer, and J.E. Ebinger. Illinois Natural History Survey, Champaign, IL 61820. A study of the vascular flora of Dean Hills Nature Preserve was undertaken in order to document the composition and structure of the vegetation. This information will be useful for the future management of the site. This nature preserve occurs on a glacial kame and has a rugged ridge and ravine topography. Seven community types occur within the preserve: mature good quality mesic and dry-mesic upland forest, mesic and wet-mesic floodplain forest, seep, eroding bluff, and successional field. A total of 313 species in 85 families and 204 genera were collected within the 30-hectare preserve. One Illinois threatened species, *Carex prasina* Wahl., was found. Quantitative sampling of the woody vegetation was carried out within the mesic and dry-mesic upland forest communities. Analysis of this data suggests that without disturbance, the shade intolerant species (i.e., the oaks) may not successfully regenerate and the shade tolerant species (i.e., sugar maple) will increase in dominance. Management, including prescribed burning, is recommended for the site.

THE VASCULAR FLORA OF GREEN WING ENVIRONMENTAL LABORATORY.

Bohdan Dziadyk, Augustana College, Rock Island, IL 61201. Green Wing Environmental Laboratory, a biological station of Augustana College, is located in Lee County, north-central Illinois. The 170 hectare field station is a mosaic of upland and lowland biotic communities. Previous use of the property have resulted in abandoned agricultural fields, a prairie restoration, introduced pine groves and a small pond. Relatively undisturbed communities consist of black and bur oak forest, willow and cottonwood tracts, sedge meadows, and small pot-holes and streams. The current estimate of the vascular flora includes a total of 432 species in 89 families including 14 species of pteridophytes in six families, six species of gymnosperms in three families and 412 species of flowering plants in 80 families. The largest families are the Asteraceae (57 species), Poaceae (48 spp), Cyperaceae (25 spp), Rosaceae (21 spp), and Lamiaceae (20 spp).

INVESTIGATION OF THE POSSIBLE PRESENCE OF AN ANALOG OF PEPTIDYLGLYCINE ALPHA-AMIDATING MONOOXYGENASE (PAM) IN PLANTS. Z. R. Walden and M. G. Bolyard, Southern Illinois University, Edwardsville, IL 62026. It is known that there are a number of mammalian peptide hormones whose biological activity is dependent on the α - amidation of glycine extended precursors. This amidation reaction is performed by the enzyme Peptidylglycine Alpha - amidating Monooxygenase (PAM). There has been little data to support the possibility of α - amidation in plants until a tripeptide, pyroGlu-Tyr-Pro amide, very similar to Thyrotropin Releasing Hormone (TRH), was isolated from alfalfa. TRH is also amidated and requires this modification for its biological activity. Knowing this, our goal is to investigate the possibility of an analog of PAM existing in plants. RT-PCR was performed on total RNA from a variety of plants, including alfalfa, using degenerate primers based on conserved regions of the PAM gene. The cDNA obtained was cloned in *E. coli* and subjected to colony lift hybridization using a PAM probe. Putative positive colonies were identified and their plasmids harvested for DNA sequencing. The sequencing information may reveal the existence of conserved motifs of the PAM gene. Another approach to this investigation is to isolate alfalfa enzymes and test for PAM activity in the extracts. We also plan to analyze the enzymes by SDS-PAGE, followed by Western blot analysis, probing the filters with antibodies to PAM. It is hoped that the findings from these analyses will enable further research into the functioning of the PAM analogs in plants.

PROMOTER ANALYSIS OF AN ANIONIC PEROXIDASE GENE IN TOBACCO. Scott Nelson and Dr. Nitya Jacob. Department of Biology, Knox College, Galesburg, IL 61401.

Tobacco (*Nicotiana tabacum*) contains two functional anionic peroxidase genes, *Spod* and *Tpod*, each from a different ancestor. Past studies have shown that these two genes are differentially regulated although their coding sequences are highly homologous. Regulatory elements found in the promoter region of *Spod* have been already characterized. In this on-going study, a PCR-based cloning method is being used to obtain a genomic clone for *Tpod*. The 3' portion of the gene possessing 3 exons and 2 introns has recently been cloned, and a 5 KB PCR product has been obtained that is likely to contain the *Tpod* promoter. The sequences of these products will be scanned for known regulatory elements. Promoter sequence and promoter deletion analysis of *Tpod* will be compared to that of *Spod* to understand the differences in their regulation of expression and their evolutionary significance.

THE EXPRESSION OF INTERSECTIN mRNA AND PROTEIN IN *XENOPUS LAEVIS* OOCYTES. E.M. Mandel and J.M. Thorn, Knox College, Galesburg, IL 61401. Caused by the inheritance of all or part of an extra copy of chromosome 21, Down Syndrome is one of the most common chromosomal disorders, and while it affects roughly 0.13% of the population, the causative gene(s) has yet to be determined. However, a recently identified protein termed intersectin, among other genes, is suspect. The gene coding for intersectin is located on human chromosome 21 and homologues are found in *Drosophila*, rodents, *Xenopus* and *C. elegans*. It has been characterized as having 2 EII domains, 5 SH3 domains and an α helix region and plays an important role in both endocytosis and cell signaling. In this study, the expression of the intersectin mRNA and protein were examined in the oocytes of *Xenopus laevis* using northern and western blotting techniques. It was found that intersectin mRNA and protein are both present in *Xenopus* oocytes. The mRNA was found in transcripts of 9.3 kb, 5.7 kb and 3.1 kb and the protein was found in isoforms of 165 kD and 236 kD.

CONSTRUCTION OF AN EXPRESSION VECTOR FOR THE FUSION OF GREEN FLUORESCENT PROTEIN WITH CERATO-ULMIN, A DUTCH ELM DISEASE TOXIN. O.N. Shikapwashya and M.G. Bolyard, Illinois University, Edwardsville, IL 62026. Cerato-ulmin (CU) is a fungal toxin produced by *Ophiostoma ulmi*, the pathogen that causes Dutch elm disease (DED) in elm trees. The destructive properties of DED have been unmatched by any single plant pathogen in history. Within 46 years of the first confirmed diagnosis, DED caused a 56% loss in the American elm population. Efforts to control DED have had a limited effect. Understanding molecular interactions between *Ophiostoma ulmi* (*O. ulmi*) and elm tissue provides researchers with a better understanding for genetic manipulations that could promote DED resistance in elm trees. Current research indicates that CU plays a substantial role in disease transmission and may have the same pathotoxic effects independent of the intact *O. ulmi* pathogen. This research focuses on producing a GFP-CU fusion protein that will be used to determine the role that CU plays in DED pathogenesis. The advantage associated with producing recombinant CU is that its toxic effects can be observed in the absence of other DED toxins. Understanding the pathogenicity of CU can help researchers find methods of limiting or eliminating the effects of DED on elm trees.

CONSTRUCTION OF VECTORS FOR EXPRESSION OF FIBRINOGEN USING A BACULOVIRUS EXPRESSION SYSTEM. M.A. Gitcho and M.G. Bolyard, Southern Illinois University, Edwardsville, IL 62026. Fibrinogen is a heterodimer that contains two copies each of the alpha, beta, and gamma chains linked by 29 disulfide bonds. The purpose of our research is to construct two vectors, one containing α , β , and γ chains and the other containing α , β , and γ' chains. Construction will be completed through the addition of the β chain by cutting the existing vectors with a unique endonuclease and inserting a linker through blunt-end ligation. This allows insertion of modified β chains within the completed pBac $\alpha\gamma$ and pBac $\alpha\gamma'$ vectors. Orientation of each chain will be verified through the polymerase chain reaction. These vectors will be expressed in the Baculovirus Expression System by co-transfection with *Autographa californica* nuclear polyhedrosis virus in *Spodoptera frugiperda* (Sf9) insect cells. Our purpose is to develop a quick, efficient, and productive system for producing biologically active fibrinogen. The production of recombinant fibrinogen will later be used to obtain a clear picture of how structure/function relationships are affected by variation of individual chains.

INVESTIGATING THE FUNCTION OF MOESIN IN THE DEVELOPMENT OF *XENOPUS LAEVIS*. Kelsea M. Lipe and Judith M. Thorn, Knox College, Galesburg, IL, 61401. The cortical actin cytoskeleton lies directly beneath the inner surface of the cell's plasma membrane. Composed of actin filaments and actin binding proteins, it is an important part of each cell's structure and function, and figures prominently in signal transduction process by relaying signals from the surface to the interior of the cell. These processes modulate numerous cellular changes, ranging from modifications of the cytoskeleton structure to cell migration and adhesion. To determine the molecular mechanisms and events associated with cortical changes in early development, we have examined *Xenopus* moesin, a member of the ezrin/radixin/moesin (ERM) family of the actin binding proteins. Moesin is distributed in actin-rich cell surfaces linking the actin cytoskeleton to the plasma membrane. The ERM proteins are thought to exhibit functional redundancy in most vertebrates, making it difficult to isolate the specific function of moesin. Fortunately, moesin has been cloned and characterized from *Xenopus laevis* and is the only ERM protein expressed (Thorn *et al.*, 1999). Thus, *Xenopus* provides an ideal model for investigating moesin's role in early embryogenesis. We have begun investigating the role of moesin in *Xenopus laevis* using an antisense approach to deplete protein levels (Heasman *et al.*, 2000).

INHIBITION OF APOPTOSIS BY PROSTAGLANDIN E_2 AND I_2 IN HUMAN ENDOTHELIAL CELLS. S.J. Sawyer and F.M. Pavalko, Southern Illinois University, Edwardsville, IL 62026. Endothelial cells have a dual function; they act as a barrier between the blood vessel lumen and also regulate vascular tone. Fluid shear stress induces release of prostaglandins known to regulate vascular tone. Tumor necrosis factor α (TNF α) is known to disrupt endothelial barrier function and we show that TNF α caused an increased release of both prostaglandin E_2 and I_2 (PGE $_2$ and PGI $_2$) from human umbilical vein endothelial cells (HUVEC). TNF α also caused a 2-fold increase in cell death by apoptosis in HUVEC when compared to control cells. The addition of either 10 μ M PGE $_2$ or 10 μ M PGI $_2$ along with TNF α returned levels of apoptosis to that of the control cells. These results suggest in addition to the role that prostaglandins have in regulating vascular tone, they also have a role in maintaining barrier function.

MORPHOLOGICAL DEVELOPMENT, OOGENESIS, AND BEHAVIORAL CHARACTERISTICS OF A PARTHENOGENETIC FEATHERWING BEETLE (Coleoptera: Ptiliidae). J. P. MacDonald, G. A. Langrana, and L. K. Dybas, Department of Biology, Knox College, Galesburg, IL 61401. Featherwing beetles, measuring only 0.5-1.2mm, are the smallest and possibly least known of all beetles. The majority of featherwing beetles reproduce sexually; however, many species reproduce parthenogenetically, supporting the hypothesis that these beetles have reached the evolutionary limit in size. In this study, a wingless and eyeless, parthenogenetic species has been kept in culture and its life cycle from egg to adult has been followed. The spermatheca, or sperm storage organ is visible in all specimens although its position, fixed in biparental species, is quite variable in this species suggesting that this species evolved from biparental ancestors. Morphological features of the stages of the life cycle were documented using a Scanning Electron Microscope. Behavioral characteristics were captured using a Wild dissecting microscope equipped with a video camera. The stages of oogenesis and early development were followed in 1um thick sections through plastic embedded specimens.

THE EFFECT OF P-FLUORO-L-PHENYLALANINE ON DIFFERENTIATION IN *TETRAHYMENA vorax*. M. Sharpe, M. Verma, J. Reyes, and H. E. Buhse, Jr. University of Illinois at Chicago, Chicago, Il 60607. In the presence of stomatin, a transforming principle released by a potential prey, saprozoically feeding *Tetrahymena vorax* microstomal cells transform into the potentially carnivorous macrostomal cell types. Large cell populations are induced to differentiate synchronously within 5-6 hrs. Macrostomal differentiation occurs by the process of oral replacement (OR) in which the smaller microstomal oral apparatus is resorbed and replaced by one of larger dimensions. Following completion of OR, formation of the cytopharyngeal pouch, a large prey receptacle, occurs. When a prey organism is captured, the pouch seals off from the cytostome forming a food vacuole where digestion occurs. In the presence of 2 mM p-fluoro-L-phenylalanine (p-fpa), stomatin-induced differentiation is prevented. p-fpa is an analog of the amino acid phenylalanine and is believed to block protein synthesis by preventing correct protein folding. Simultaneous addition of 21 mM phenylalanine to pfpa-treated cells reverses the inhibition.

Protein Synthesis and Telotroch formation in *Vorticella convallaria*. S. Pylawka and H. E. Buhse, Jr., University of Illinois at Chicago, Chicago, Il. *Vorticella convallaria* is a polymorphic sessile peritrich ciliate. The two predominant forms are the feeding trophont form that is attached to the substrate by a long contractile stalk and the motile non-feeding telotroch form propelled by a wreath of aboral cilia. Synchronous transformation from the trophont to the telotroch can be achieved by activating a phospholipase C signalling system. This transformation can be blocked by addition of cycloheximide (5 mg/ml). Following removal of the drug, transformation resumes at the same or at an accelerated rate. Cycloheximide prevents some early stages of transformation and the later stage of stalk elongation following telotroch attachment. This concentration of cycloheximide also reduces incorporation of ³⁵S-methionine into acid precipitates presumed to be proteins and is correlated with inhibition of transformation. At least two proteins resolved on 1D SDS-PAGE of approximately 25 and 45 kDa are expressed in transforming cells but not in attached cells.

CAPILLARY ELECTROPHORESIS ANALYSIS OF THIAMIN DERIVATIVES
J. A. Sutton and M. Shabangi, Southern Illinois University, Edwardsville, IL 62026

Vitamins, such as thiamin, are essential to aid the normal functioning of our bodies. They help to regulate metabolism, aid in the conversion of fats and carbohydrates into energy, and assist in the formation of bone and tissue. Currently the most common means of determining thiamin derivatives involves the use of HPLC. Separation analysis of free thiamin, thiamin monophosphate, and thiamin pyrophosphate was performed using capillary electrophoresis as an alternative technique to HPLC. The average migration times of 2.1, 3.7, and 4.5 minutes were obtained for free thiamin, thiamin monophosphate, and thiamin pyrophosphate respectively. A detection limit was determined to be 0.07 mM with a sensitivity of 20,823 peak area·mM⁻¹. The method was validated by quantifying the amount of free thiamin in a vitamin B supplement pill. The concentration of thiamin in the pill was found experimentally to be 17.46 mM in 100mL of borax buffer solution as compared to the actual value of 17.6 mM. Capillary electrophoresis proves to be a superior separation technique for the analysis of thiamin derivatives compared to HPLC.

Optimization of Solid-Phase Microextraction Techniques for Analyzing MTBE. G.J. Domski and R.A. Wanke, Augustana College, Rock Island, IL 61201. MTBE (methyl t-butyl ether) is a gasoline additive designed to reduce smog and help meet the clean air standards proposed by the 1990 Clean Air Act. MTBE has arisen to become one of the highest volume industrial chemicals produced. Recently, however, MTBE has come under attack as a water pollutant. Solid-Phase microextraction is new analytical chemistry technique for conveniently sampling and concentrating pollutants, such as MTBE, for analysis by GC or GC/MS. In order to utilize solid-phase microextraction, proper instrument conditions were outlined and the sample equilibration time, analysis precision and linearity were defined. The addition of salt to the sample matrix has been shown to increase MTBE extraction and the resulting detection. To improve extraction efficiency, ammonium chloride was tried instead of the old standby, sodium chloride. Ammonium chloride did not offer the anticipated improvement and only proved to be 25% as effective as sodium chloride at enhancing detection of MTBE. Future work centers on understanding the key parameters contributing to the salting-out effect and investigating other more highly charged salts, such as, aluminum chloride.

TWO-DIMENSIONAL NMR IN THE UNDERGRADUATE CURRICULUM. Jose Yu, Jeff Snyder, and Brad Andersh. Department of Chemistry, Bradley University, Peoria, IL 61625. Unfortunately, most published synthetic experiments for undergraduate laboratories use spectroscopy only to confirm product identity. Although this is a valuable skill, students also need to develop "Qual Organic" skills. Toward this goal, we are developing synthetic experiments that emphasize the use of 2-D NMR for identifying unexpected products. One such experiment deals with slight variations to a known procedure for the preparation of 2-propenyloxybenzaldehyde. The variations lead to different products, which were identified by correlation spectroscopy (COSY) as well as 1-H NMR, IR, and MS. In addition to serving as a challenging spectral problem, this experiment shows students the importance of writing detailed experimental procedures.

TOTAL CORRELATION SPECTROSCOPY IN THE UNDERGRADUATE CURRICULUM. Tim Hathway, Tim Gimbert, and Brad Andersh. Department of Chemistry, Bradley University, Peoria, IL 61625. The total correlation spectroscopy (TOCSY) pulse sequence excites all coupled protons (spins) simultaneously leading to a 2-D NMR spectrum that shows correlation (resonances) for all-coupled protons within an entire spin set. TOCSY is commonly used for determining peptide structure because each amino acid in a peptide is an isolated spin set. Therefore, analysis of the TOCSY spectrum provides a more straightforward assignment of each amino acid than does correlation spectroscopy (COSY). Despite the fact that TOCSY is covered in most undergraduate biochemistry textbooks, few laboratory experiments have been disseminated in this area. Results for a set of experiments that we are developing for the undergraduate biochemistry laboratory will be presented.

CHEMISTRY CLUB ON CAMPUS AND IN THE COMMUNITY: ACTIVITIES OF THE 2001-2002 SIUE STUDENT AFFILIATES CHAPTER. Ritamarie Buen, John Schaefer, Vivian Ezeji, Masangu Shabangi, Mike Shaw, and Kevin Johnson. Southern Illinois University Edwardsville, Edwardsville, IL 62026

The SIUE Student Affiliates had an exciting year of service, professional, and social activities. These include tours to a Crime Laboratory, Sigma Chemicals and Washington University's Human Genome project in St. Louis. In addition, the Chem Club celebrated the National Chemistry Week, sponsored departmental parties, assisted with Regional Science Olympiad and Regional Science Fair, and participated at the ACS Meeting in Chicago, IL. Club members designed and silk-screened Club t-shirts for members, faculty and staff. Fund-raising projects for this year included a SIUE bake and book sale, Chemistry laboratory notebook sales, t-shirt sales, and monetary awards from the SIUE Student Senate to co-sponsor the visit of Dr. William R. Heineman (Probst Lecture). Finally we aided in the organization and setup for the annual St. Louis Undergraduate Research Symposium sponsored by the St. Louis Section. This up-coming year the Club will continue working with our neighboring Chemistry Clubs at St. Louis University, Principia College and the University of Missouri St. Louis.

SYNTHESIS OF SUBSTITUTED 2-2'-BIPYRIDINES AS POTENTIAL LIGANDS FOR DNA AND PHOSPHATE RECOGNITION AND CLEAVAGE. Robert P. Dixon, SIU Edwardsville,

Edwardsville, IL 62026-1652. This talk will discuss; 1. A unique approach to selectively binding and oxidatively cleaving phosphate and phosphonate pollutants/toxins using substituted 2-2'-bipyridines ligands. 2. A potential new method to probe the sequence and structure of DNA and RNA by synthesizing substituted 2-2'-bipyridines ligands with functionalities similar to protein-DNA interactions seen in nature.

CLEAVAGE OF CHEMICAL WARFARE AGENTS AND INSECTICIDES USING TRIS-BIPYRIDYL LIGAND COMPLEXES.

Heather Hillebrenner, Dr. Robert P. Dixon, Southern Illinois University, Edwardsville, IL 62026-1652

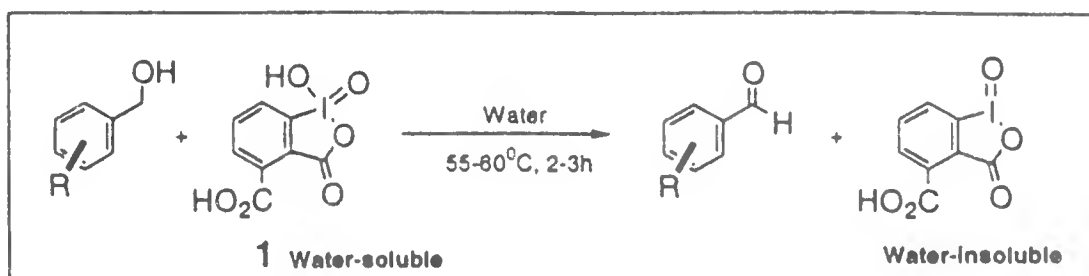
This presentation describes a method to photo-cleave chemical warfare agents and insecticides using bipyridyl metal complexes. The complexes have the potential to selectively bind and then oxidatively cleave these compounds. Selective removal of these pollutants and toxins from mixtures of compounds is due to the ability of these receptors to photo-cleave specific functionalities.

SYNTHESIS AND OXIDATION REACTIONS USING A WATER-SOLUBLE HYPERVALENT IODINE REAGENT.

Thottumkara K. Vinod* and Arun P. Thottumkara, Western Illinois University, Macomb, IL 61455.

Selective oxidation of allylic and benzylic alcohols to the corresponding aldehydes have been observed with **1**, a water-soluble derivative of *o*-iodoxybenzoic acid.

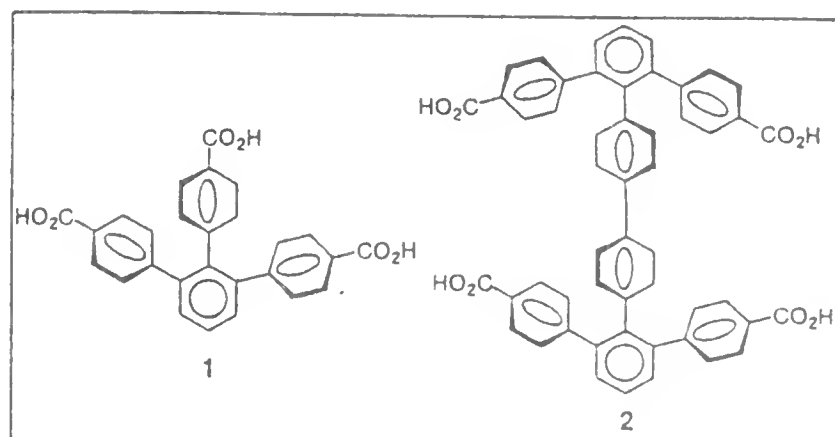
The synthesis of **1** and the mechanism of oxidation of allylic and benzylic alcohols involving a single electron transfer (SET) step will be discussed.



NOVEL *m*-TERPHENYL DERIVATIVES AS BUILDING BLOCKS FOR THE ASSEMBLY OF MOLECULAR SOLIDS.

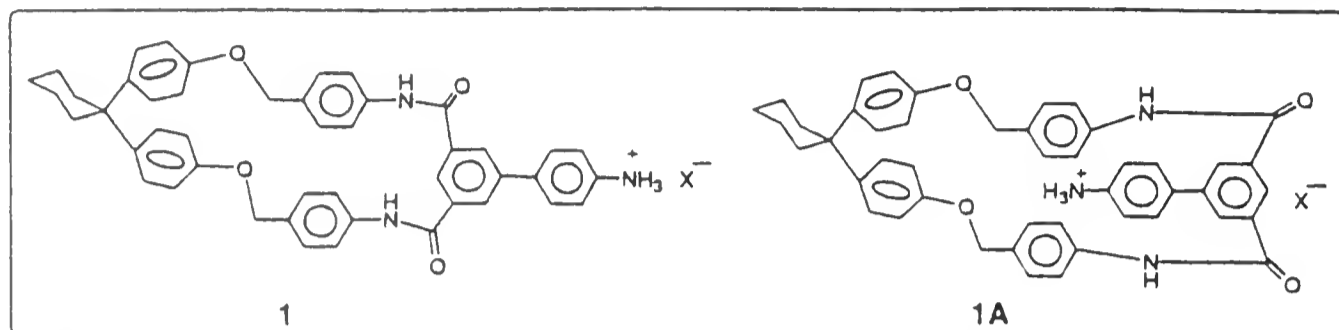
Ryan S. Wright* and Thottumkara K. Vinod,
Department of Chemistry, Western Illinois University,
Macomb, IL 61455

The supramolecular assembly of organic and inorganic molecules into functional solids with tunable properties, for example, pores (voids) of defined size, shape have attracted the attention of chemists and material scientists lately. The synthesis of *m*-terphenyl based tectons (building blocks) **1** and **2** required for the construction of nanoporous molecular solids will be discussed.



SYNTHESIS AND CONFORMATIONAL BEHAVIOR OF NOVEL AMIDE BRIDGED CYCLOPHANES. Thottumkara K. Vinod and Cho-Cho Khine*, Western Illinois University, Macomb, IL 61455.

The synthesis and conformational aspects of cyclophane **1** with amide bridges will be discussed. The presence of hydrophilic amide bridges and the ammonium moiety render cyclophane **1** water-soluble, allowing us to investigate the conformational behavior of **1** in aqueous as well as non-aqueous polar media. The folded conformation, **1A** is expected to prevail in aqueous and other hydrophilic media to derive the maximum favorable aromatic-aromatic as well as π -cation interactions.



SPEED EFFICIENT SEARCHING OF LARGE, PERSISTENT DATA SETS. Mike Litman, Western Illinois University, Macomb, IL 61455. A hash-based search that requires the data to be sorted in a specific manner. The search environment is done in a sparse array of Strings, and it can be adapted to any data-type or object as long as some means of comparison exists. The maximum and minimum number of comparisons for each search (after sort is complete) is ideally, exactly one. This algorithm would be suitable for a large data-set where there is a desire to make exact matches. Results will show that on specific datasets, in specific applications the search is more efficient than other searches of both similar and dissimilar type, and that the performance benefits may outweigh the additional resource consumption.

SECURITY RISK ASSESSMENT OF ASSOCIATION MINING. Tom Johnsten and Kevin Hill, Western Illinois University, Macomb, IL 61455. Association mining algorithms can be used to discover sensitive knowledge from non-protected data that are voluntarily released for mining purposes. To address this issue, we have developed a risk assessment procedure designed to eliminate the security and privacy threats presented by association mining. The proposed assessment procedure is based upon a new data analysis process that we call Knowledge Hiding in Databases (KHD) that is analogous to Knowledge Discovery in Databases (KDD). The goal of KHD, in contrast to KDD, is the non-trivial hiding of potentially sensitive knowledge in data. The proposed assessment procedure has been implemented as part of the Association Mining Risk Assessment Tool (AMRAT).

CURRENT STATE OF ADOBE ATMOSPHERE AS A VW TOOL FOR EDUCATORS. L.H. Tichenor, Western Illinois University, Macomb, IL 61455. The idea of a virtual room as a teaching tool has intrigued learning professionals for a number of years. A meeting place for distant learning or a reservoir for course resources are only two of the many possibilities proposed for these environments. Adobe Atmosphere is a new product under beta release which attempts to fill the role of an all-in-one tool for modeling, publishing, and running a virtual world. The current release, although functional, is far from able to perform many of the tasks required at a level needed to create interesting worlds. Unfortunately, too, the complexity associated with generating animations and other non trivial attributes of a virtual environment will put this tool beyond the capabilities of many faculty members.

BUILDING A SQL COOKBOOK. M. Maskarinec, D. DeVolder, J. Covert, L. Dong, Western Illinois University, Macomb, IL, 61520. This project is to develop a tool by which learners anywhere in the world could learn and become proficient in SQL. SQL (or Structured Query Language) is the primary language used to manipulate data in relational databases; while standards exist, each software manufacturer has its own "idiosyncrasies" which must be made known to the learner. This presentation discusses our plan for implementation: we plan to first develop a text-based module to present the information to the learner, and then augment this with exercises with predefined answers; finally we plan to implement a full SQL parser to help the learner understand their mistakes and provide help with common errors. We also plan to be able to track a learner's progress and suggest exercises based on their progress.

A DATABASE FOR THE MANAGEMENT OF GRADUATE STUDENT RECORDS. V. Agarwal, K. Saw, and D. DeVolder, Western Illinois University, Macomb, IL 61455. While perfectly adequate for long-term storage, the paper-based record-keeping system for tracking graduate students in Computer Science is cumbersome at best for daily use. This database project provides quick and easy access from virtually anywhere to information that is needed on a daily basis, while the paper file continues to serve as long-term storage of the full student record. Along with design and implementation details, we discuss security issues regarding access to the information kept and access to outside information that would enhance the functionality of the system.

SOME VASCULAR PLANTS OF A TALL GRASS PRAIRIE IN GRUNDY COUNTY, ILLINOIS. James R. Rastorfer (a), Judith B. Rastorfer (b), and Isatu Mansaray,(a), (a) Chicago State University, Chicago, IL 60628, (b) Rich South High School, Richton Park, IL 60471. Long term observations were made of the responses of *Polytrichum commune* (Bryophyta) subsequent to burns at the Goose Lake Prairie Natural Area, Grundy County, Illinois. In addition to observing the moss in a selected stand, over two hundred seventy five voucher specimens were collected to document the composition of flowering plants in the stand and its vicinity. About one hundred species were identified from the collection. Furthermore, voucher specimens of several species confirmed their occurrence in Grundy County.

The Good, the Bad, and the Marginal-Site Selection for The Critical Trends Assessment Project.

R. Jack and S. Gallo. Illinois Natural History Survey, Champaign, IL 61820. The Critical Trends Assessment Project's professional monitoring team has surveyed for birds, plants, and insects in 140 Forest, 139 Wetland, and 128 Grassland townships in Illinois from 1997-2001. The sites are chosen using randomly ranked township maps of the State with each habitat type having its own type of land cover information. The township maps are used in the order they are randomly ranked. Within each township map, the target habitat type meeting the baseline requirements is randomly numbered. When selecting a site to survey, the lowest numbered site that fits our minimum habitat requirements and that we gain permission for is used. Our goal is to survey a site in 30 townships for each habitat each year for a 5-year total of 150. From 1997-2001 we threw out 15.3% of selected Forest townships, 40.2% of selected Wetland townships, and 5.2% of selected Grassland townships. These townships did not possess suitable sites of the target habitat to survey. Additionally, in order to attain suitable sites to survey within the townships that were used, we threw out 110 Forest sites, 154 Wetland sites, and 852 Grassland sites. Reasons to throw out sites include: habitat destruction, failure to meet minimum requirements, denial of access by landowners, or limited access. These data show that the amount of ecologically functional forests, wetlands, and grasslands are likely much less than has been calculated. In particular, our data show problems with the lack of discrimination by the land cover information for grasslands, as it does not differentiate between mowed roadsides, CRP grasslands, yards, prairies, etc.

REFERENCE STREAMS IN THE NORTHEASTERN MORAINAL NATURAL DIVISION OF

ILLINOIS. R. E. DeWalt, Illinois Natural History Survey, 607 E. Peabody Dr., Champaign IL 61820.

Absence of reference stream data prevents the placing of impaired sites into the context of best regional biotic potential. Recently, ten "least-impacted" stream reaches were identified and characterized within the Northeastern Morainal Natural Division of Illinois. Using Illinois Critical Trends Assessment Program (CTAP) stream protocols, significant differences were found between regional reference and random stream reaches for cumulative Ephemeroptera (mayfly), Plecoptera (stonefly), and Trichoptera (caddisfly) taxa richness (EPT richness) and habitat quality assessment scores. Additionally, it appeared that distance from urbanization seemed to decrease Hilsenhoff Biotic Index (HBI) values, an index of organic pollution. Additionally, the HBI score decreased with stream size, while EPT richness increased with stream size. These correlations suggested that conditions were best in larger reference streams. This study demonstrates that reference quality streams exist in the Northeastern Morainal Division and are capable of providing a regional context for CTAP stream monitoring.

THE RESPONSE OF MACROINVERTEBRATE COMMUNITIES TO RIPARIAN ZONE CHANGES.

R.W. Widinski, Eastern Illinois University, Charleston, IL 61920. Aquatic fragmentation in stream ecosystems occurs when a change in the surrounding landscape causes a lack of connectivity between upstream and downstream populations or sites, which renders some in-stream habitats unsuitable for a diversity of aquatic organisms. These changes in prevailing riparian vegetation can also be expected to bring about changes in the abiotic and biotic nature of the aquatic system. Abiotic changes, such as increased sedimentation and water temperature, and decreased dissolved oxygen content and habitat heterogeneity, may influence the success of individual species, as well as, the richness and composition of the biotic community as a whole. One such community that may be affected by stream habitat fragmentation is the benthic invertebrate assemblage. These communities are comprised of integrating populations whose structure and function reflect the underlying abiotic and biotic conditions of stream ecosystems. The fact that benthic invertebrates can provide valuable information about the abiotic and biotic components of a stream system has led to their use as indicator species of environmental perturbations and for determining overall lentic habitat quality. By investigating the community metrics of benthic invertebrates one can make assumptions as to the overall "health" of a stream or even an entire riverine system. Therefore, in this study, I determined 1) the relationship between habitat fragmentation and biotic integrity (metrics) in a riverine system and 2) the amount of connectivity needed to maintain a diverse river basin.

SURVEY OF THE FRESHWATER MUSSELS (MOLLUSCA: BIVALVIA: UNIONIDEA) OF THE EMBARRAS RIVER BASIN, ILLINOIS. NICK OWENS¹, BOB SZAFONI², and JEFF LAURSEN¹, Eastern Illinois University, Charleston IL 61920, ²Illinois Department of Natural Resources, Charleston IL 61920. Throughout Illinois history, our aquatic habitats have supported a very diverse, and rich mussel fauna. The last major survey done on the Embarras River basin occurred in 1986-1987 and because of land use change and its potential impact on aquatic systems there is a need to resurvey. The objectives of this survey are to determine the present distribution and status of the freshwater mussels of the Embarras River in Illinois, and to compare the present fauna with that of the past. Thirty-four mussel species were collected from 33 sites in the Embarras River drainage, one of which (*Alasmidonta viridis*, slippershell) is newly reported for the drainage. The 2001 data, combined with the historical collections, brings the total number of mussel species documented from the Embarras River drainage to 45, eleven of which are currently listed as threatened or endangered by the state of Illinois. Of the 34 species collected in 2001, 21 were found alive and 13 were represented by shells only. The top five species in order of abundance were pimpleback (*Quadrula pustulosa*), round pigtoe (*Pleurobema sintoxia*), Deertoe (*Truncilla truncilla*), plain pocketbook (*Lampsilis cardium*), and pistolgrip (*Tritogonia verrucosa*). Together they comprised 52% of the living mussels collected.

FLUCTUATING ASYMMETRY IN TWO ORDERS OF SMALL MAMMALS ALONG AN URBAN-RURAL GRADIENT. S.M. Fletcher and J. Yunger, Governors State University, University Park, IL 60466. Fluctuating asymmetry (FA) has been used to measure the environmental stress on species stability during embryonic development. This study used nine bilateral morphological metrics on the cranial and mandibular skeletal material from two orders of small mammals, Insectivora (*Blarina brevicauda*) and Rodentia (*Peromyscus leucopus*). Seventy sites were sampled along an urban-rural gradient of Chicago, Illinois, during the fall of 1998 and 1999. Sites were divided into four categories, Urban, Suburban, Agricultural, and Rural, with each site characterized by 12 environmental measures of anthropogenic disturbance. Morphometrics were analyzed for significant differences in FA among the regions and correlated to the 12 variables. Significant FA in *P. leucopus* was found in the region with the greatest degree of anthropogenic disturbance, the urban region. Two measures for *B. brevicauda* were found to be marginally significant with the region furthest from the urban center exhibiting the smallest degree of FA. For *P. leucopus* and *B. brevicauda* there was a strong correlation between FA and patch isolation. These results support the exploration of individual morphological measurements as indicators of environmental stress, and specifies the relative impacts of multiple anthropogenic stressors in the environment.

THE VARIED EFFECTS OF ROADS ON SMALL MAMMAL POPULATIONS AND THE IMPLICATIONS FOR THE FRANKLIN'S GROUND SQUIRREL IN ILLINOIS. M.J. Starr, Southern Illinois University, Edwardsville, IL, 62026.

Roads have been shown to create significant barriers to dispersal for many small mammals, especially if the edges are regularly mowed. In addition to such habitat fragmentation, roads also create zones of high mortality for small and large species alike. However, other studies suggest that at least a few species may actually prefer road edges for dispersal or for their home range, especially during lean years. The Franklin's Ground Squirrel (*Spermophilus franklinii*) is an example of the latter type, preferring the sloping sides of raised roadway berms for their burrows, if there is dense plant cover on the slope. Such berms make up the bulk of suitable FGS habitat remaining in Illinois due to the previous large-scale conversion of prairies into agricultural land. Though such conversion has diminished during the last 20 years, FGS populations are still declining, in part due to habitat alteration along these rights-of-way. Therefore, appropriate management techniques such as reduced mowing and herbicide use, must be implemented along road edges if the Franklin's Ground Squirrel is to remain viable in Illinois.

THE POTENTIAL USE OF AN ALTERNATIVE SAMPLING METHOD FOR CONTAMINANT CHARACTERIZATION AND SITE-SPECIFIC TOXICITY OF CONTAMINATED SOILS. C.C. Friedel and K.A. Johnson, Southern Illinois University, Edwardsville, IL 62026. Organochlorinated (OC) insecticides have been banned in the U.S. for many years; however, they still pose a threat to humans and wildlife. As a result, understanding contaminant behavior in the terrestrial environment is extremely important. The primary objectives of our studies are to determine if an alternative/passive sampling device (PSD) can be used as a biological surrogate to determine the potential bioavailability of OCs at contaminated sites. Previous studies have shown that the devices can be used to accurately estimate soil chemical concentrations. Time and cost savings associated with PSDs allow for a high sampling frequency, providing a more thorough site characterization than traditional methods. We hope to extend the sampling technique to help evaluate contaminant bioavailability. To achieve this, we have evaluated changes in dieldrin (our model OC) toxicity and passive sampler uptake over time. To measure toxicity, standardized 14-day toxicity tests were conducted with earthworms. To monitor bioavailability, standard batch desorption techniques and PSD extractions were performed. Each study was conducted at multiple time points to evaluate the effects of contaminant aging on each measure of bioavailability. At each time point (days 0, 90, and 800), we have seen decreased toxicity as well as decreased contaminant uptake in the PSDs. This indicates that PSDs may, in fact, prove useful in determining both contaminant distributions and their bioavailability.

CADMIUM ACCUMULATION AND INTERACTION IN INDIAN MUSTARD (*BRASSICA JUNCEA*).

R. Sankaran and S.D. Ebbs, Southern Illinois University, Carbondale, IL 62901.

Global industrialization has accelerated the release of heavy metals into the soil, water and atmosphere. These contaminants can enter the food chain and have toxic effects on plants and animals, disrupting natural ecosystems. Indian mustard (*Brassica juncea*) is an important commercial food and oil crop plant species known to accumulate cadmium and other toxic metals. We have observed significant interactions between cadmium and copper in this species. Since cadmium and zinc frequently occur together in soils, a significant interaction between these metals is likely as well. The current objective of our study is to examine the accumulation of cadmium in vegetative tissue and seeds as a function of cadmium concentration, time, and interaction with zinc. Heavy metal interactions with cadmium have significant repercussions for phytoremediation, human and wildlife exposure to heavy metals, and the utilization of contaminated soils.

The Effectiveness of Management Practices on the Efficiency of Vegetative Filter Strips in Reducing Non-point Source Pollution. Parker, Tully C.; Schmitt, Tyler; Houpis, J.; and Johnson, K. A. Southern Illinois University Edwardsville, Edwardsville, IL 62026. Non-point source pollution was recognized as a significant threat to our nation's surface and subsurface water resources in the middle 1980's. The Clean Water Act Amendments of 1987 directed states to assess their waters, determine which were adversely affected by non-point source pollution, and develop and implement measures to effectively manage non-point source pollution. Vegetative filter strips (VFS) have enjoyed broad acceptance as best management practices because they are comparatively inexpensive instruments of pollution control. However, our recent research has indicated a decline in VFS effectiveness over time. Previous research on a thirteen-year-old VFS indicated that while this strip was effective in reducing total suspended solids (TSS), it was ineffective for reducing nitrate in run-off (it actually behaved as a *source*). We decided that the VFS, which had previously not been managed in the thirteen years of use, should in fact be managed. Two years after the strip was burned and harvested we repeated our original study. Water was pumped through a settling basin and over the strip. Prior to monitoring, Fluorescein was added to the leading edge of the strip to monitor water flow over the plot. Samples were collected at several time points at varying distances along four transects. Again we saw a decrease in TSS with distance. However, the nitrate levels were mixed, and could not be explained using the water flow pattern over the strip. A second sampling event of the VFS revealed further inconsistencies.

SIMULATING THE GROWTH OF LOBLOLLY PINE IN RESPONSE TO ELEVATED TEMPERATURE AND CO₂ CONCENTRATION. C.C. Fan and W.A. Retzlaff, Southern Illinois University Edwardsville, Edwardsville, IL 62026. Using the TREGRO model, I simulated the response of individual trees of different genotypes of loblolly pine (*Pinus taeda* L.) exposed to two climatic conditions: increased concentrations of atmosphere CO₂ and increased temperature. Simulations were conducted for each loblolly pine genotype for each of two scenarios of CO₂ increase and temperature change, including a baseline scenario of current climate data. I began the simulations (at tree age 4) with present-day climate conditions and extended the simulation to age 6 and identified the key assumptions leading to differences in simulated responses to climate change scenarios. The parameter and meteorological data necessary for the proposed climate change simulation exercise came from experimental data previously collected from loblolly pine trees of different genotypes growing at a field site in Scotland County, NC. Increased CO₂ concentration and temperature altered stem biomass, carbon allocation, and growth rate of different genotypes of loblolly pine. Results presented from this study represent the first simulation of different genotypes of individual loblolly pine tree response to future climate change.

THE CLIMATOLOGY OF OZONE EXCEEDANCES IN THE METROPOLITAN ST. LOUIS REGION. Mark L. Hildebrandt, Southern Illinois University, Edwardsville, 62026-1459. The climatological conditions associated with lower atmospheric ozone exceedances in metropolitan St. Louis are an ongoing concern. Analyses of the climatological conditions associated with surface ozone exceedances on 42 days from 1992-2001 were performed. The results suggest that high ozone days occurred most frequently when the daily maximum temperature (T_{max}) was greater than 90°F; relative humidity values reached as low as 45%; dew points were greater than 69°F; surface wind speed remained below 7 miles per hour; wind direction was variable; and a dome of high pressure dominated the central United States on a synoptic scale. The results of this study may aid efforts to improve ozone forecasts as further urban growth in the St. Louis area may potentially lead to higher pollution levels that are detrimental to the inhabitants of this area.

THE PITUITARY-TESTICULAR AXIS IN BRATTELBORO RATS. A.G. Amador, ReproGen, Springfield, IL 62704.

Pituitary and testicular endocrine status was determined in arginine vasopressin-deficient Brattelboro rats (*di/di*), in heterozygote (*Di/di*) animals, and in normal controls (*Di/Di*). Pituitary lutropin (LH) and prolactin (PRL) levels were obtained using liquid-phase radioimmunoassays (RIAs), whereas testicular progesterone (P_4), hydroxyprogesterone (OHP) and testosterone (T) levels were determined by solid-phase RIAs. The presence of a *di* allele was associated with reduced pituitary levels of LH and PRL. This was also associated with reduced testicular weight and reduced testicular P_4 , OHP and T levels. However, homozygote *di/di* rats had even lower testicular OHP and T levels than heterozygote animals. Ratio analysis revealed that *Di/di* rats had increased efficiency of both the P450c17 and the 17 β -OHSD enzymes. This resulted in a partial compensation of the observed hypogonadism in *Di/di* rats. In *di/di* rats, only the efficiency of 17 β -OHSD was increased. This apparently was insufficient to produce any compensation of the hypogonadism affecting these animals.

FECAL CORTICOID TO MEASURE CHRONIC ADRENAL ACTIVITY IN RATS. ¹T.K. Whitney, ²S.A. Cavigelli, ¹P.M. Klingensmith, and ²M.K. McClintock, ¹Governors State University, University Park, IL 60466, ²University of Chicago, Chicago, IL 60637. Chronic activation of the adrenal glands inhibits immune, reproductive, gastrointestinal, cardiovascular, and metabolic function. Repeated blood sampling is prohibitive in small animals and can significantly alter the chronic glucocorticoid response. To understand the deleterious effects of chronic glucocorticoid elevation, repeated sampling using a non-invasive measure is required. This measure must: 1) be sensitive to changes in adrenal activity, 2) not affect the physiological stress response, and 3) allow for frequent long-term sampling of the same individual. We tested a measure that meets these criteria. Fecal corticoids were assayed in socially stable and socially disrupted male rats at 3-hour intervals over 4 days. The circulating glucocorticoid circadian rhythm was replicated in the feces of socially stable animals with a mean peak of 435 ng/g and a mean nadir of 137 ng/g. Socially disrupted animals had acute fecal corticoid elevations following movement to novel housing and exposure to novel group mates, and daily peak and nadir levels were chronically elevated for three days. These elevated levels began to return to those found in socially stable animals on the fourth day. This non-invasive method detects acute and chronic adrenal changes and allows for frequent continuous sampling from the same individual, providing a useful method to evaluate the health risks associated with chronic hypothalamic-pituitary-adrenal axis activation.

METHODS FOR TRANSDUCING B-GALACTOSIDASE IN MICE USING ULTRASOUND AND ALBUMIN SHELLED MICROSPHERES. D. J. Davidson and S. B. Feinstein, Rush University, Chicago, IL 60612. **BACKGROUND-**The efforts to transduce genes *in vivo* have been aided by the use of ultrasound energy and ultrasound contrast agents. This experiment has combined ultrasound energy with microsphere technology to enhance transduction of naked DNA. **METHODS/MATERIALS:** An experimental design was developed where four sets of mice were injected under varying conditions. **RESULTS-** At this time, effective gene transduction has not been achieved because no beta-galactosidase activity has been observed in the cells. **CONCLUSIONS-** (1) It is feasible to inject the tail vein with DNA and microspheres while simultaneously performing ultrasound imaging. (2) At the current ultrasound settings, DNA dose, and time-line, no transduction was observed following these IV injections. **DISCUSSION-** It is difficult to transduce genes intravenously because the DNases in the blood digest the DNA very quickly. To combat this problem microspheres and ultrasound energy were combined to disrupt the cell membranes to permit DNA to enter the cells before it is digested. No beta-galactosidase activity was observed because even a short time in contact with a DNase is enough to disrupt the genetic code.

FLUCONAZOLE ENHANCES MURINE CONTACT SENSITIVITY. C.M. Lee, B.M. Riling, R.E. Letourneau, D.J. Kitz. Southern Illinois University, Edwardsville, IL 62026-1651. Antimicrobial antibiotics have been shown to have many effects on the host including their immune response. We have investigated the ability of the antifungal triazole fluconazole *Pfizer* to influence murine contact sensitivity to the chemical antigen dinitrofluorobenzene (DNFB) *Sigma*. Fluconazole was given intraperitoneally to mice simultaneously with DNFB sensitization on their shaved abdomens on day 0 and day 1 of the assay. On day 13 ear thickness measurements were made on the mice and their right ear painted with DNFB; subsequent ear thickness measurements were made at 24 hour intervals thru 96 hours. Optimal fluconazole dosages and time frame for drug administration relative to DNFB sensitization also were determined for maximum contact sensitivity response. Fluconazole alone had no effect on contact sensitivity. How fluconazole effects contact sensitivity is not known, but may involve enhanced antigen processing and presentation by macrophages or effects on T cell populations. Therefore therapeutic efficacy of fluconazole may be due to enhancement of host immune response in addition to the drugs direct antifungal activity.

FOUR HUNDRED FIFTY YEARS OF MEDICAL AND SCIENTIFIC EDUCATION: UNDERGRADUATE STUDIES. A.G. Amador, ReproGen, Springfield, IL 62704.

When the Spaniards arrived in Mexico in the 16th century, they brought with them a relatively modern medicine and an established medical education, both inherited from the Moors. In Mesoamerica they found very advanced medicine and sciences. After the collapse of the Nahuatl civilization, the Spaniards founded the Real y Pontificia Universidad de Mexico (now the Universidad Nacional Autonoma de Mexico; UNAM) in 1551. Two years later, the oldest medical school in the Americas was founded. Since then the Faculty of Medicine has played an important role in both medical and scientific education. In 1638, a course in Astrology and Mathematics was created. As a consequence Astronomy and Mathematics became independent disciplines. The great interest of the professors in curative plants resulted in the establishment of Biology as a separate field at the UNAM. The Faculty of Medicine is now the largest school in the world, with 5,800 undergraduate students. About 5,000 professors teach at 43 hospitals and on the 9 sq. mi. main campus. The UNAM also has schools of dentistry, veterinary, sciences, nursing, and chemistry, as well as three other professional science schools.

FOUR HUNDRED FIFTY YEARS OF GRADUATE HEALTH SCIENCES EDUCATION. A.G. Amador, ReproGen, Springfield, IL 62704.

In the 16th century, when the Spaniards arrived in Mesoamerica, they found a very advanced medicine, which included many specialties, such as Internal Medicine, Surgery, Obstetrics, etc. After the collapse of the Nahuatl civilization, the Spaniards founded several hospitals dedicated to specific disorders. Dentistry was originally taught at the School of Medicine. In 1926, specialty training started in an informal manner. In 1942, the first residency program was started. In 1960, the Faculty of Medicine of the Universidad Nacional Autonoma de Mexico (UNAM) took over control of postgraduate medical education. It is the largest graduate school in the world with 6,950 graduate students. Around 5,000 professors teach at 77 hospitals and on campus. The Faculty offers 44 specialties, 31 fellowships, 12 M.Sc. programs, a M.Med.Sc. program, a Ph.D. program, and a D.Med.Sc. program. The Faculty of Dentistry, the Faculty of Veterinary & Animal Science, and three other Faculties offer in the health sciences a total of 3 diplomate programs, 22 specialties, 29 M.Sc programs, a M.Dent.Sc. program, 22 Ph.D. programs, and a D.Dent.Sc. program.

FOUR HUNDRED FIFTY YEARS OF GRADUATE SCIENTIFIC EDUCATION. A.G. Amador, ReproGen, Springfield, IL 62704.

Science and engineering were very advanced in Mesoamerica before the arrival of the Spaniards. Extensive knowledge was available in Astronomy, Mathematics, Biology, Pharmacy and Engineering. With the Spanish conquest, all of the educational institutions were closed. Currently, the major institution for scientific education in Mexico is the Universidad Nacional Autonoma de Mexico (UNAM). With an overall student population of almost 270,000, the UNAM is the largest university system in the world. In 1783, the Real Seminario de Minería is chartered, and later evolves into Faculty of Engineering. In 1911, The National School of High Studies was created to teach natural sciences. It would eventually become the Faculty of Sciences. In 1916, the National School of Industrial Chemistry is founded. It would later become the Faculty of Chemistry. The Faculties of Sciences, of Engineering, of Chemistry and three other Faculties, as well as two National Schools for Professional Studies offer among themselves a total of 1 diplomate, 8 specialties, 35 M.Sc. programs, and 23 Ph.D. programs. Investigators from 16 of the research institutes of the UNAM also support these activities.

MOLECULAR PHYLOGENETICS OF LYMNAEIDAE (MOLLUSCA: GASTROPODA): EVOLUTION OF SUSCEPTIBILITY TO *FASCIOLOIDES MAGNA* INFECTION. Sarah Joyce and Jeff Laursen, Eastern Illinois University, Charleston, IL 61920. Lymnaeidae are a group of primarily aquatic, pulmonate snails that are cosmopolitan in distribution, occurring in a variety of ecological habitats. Previous classifications of this group have relied primarily upon shell morphology, reproductive morphology, and radula teeth formulas, along with some emphasis on ecology. However, morphologic characters can exhibit high plasticity in the presence of different environmental conditions, which has resulted in disagreement among available taxonomic keys. We hypothesize that a phylogeny based on molecular data from the ITS region of nrDNA will accurately reflect evolutionary relationships, and will serve as a framework to test the validity of existing taxa. Also, this phylogeny will allow us to test the evolution of susceptibility to parasitic infection. Several species of lymnaeid snails serve as intermediate hosts for *Fascioloides magna*, the deer liver fluke. Susceptibility to *F. magna* may be shared among closely related snails, and thus be a valid character for phylogenetic studies, or may have evolved multiple times throughout the family.

REGIONAL DISPERSAL OF *DAPHNIA LUMHOLTZI* IN NORTH AMERICA INFERRED FROM ISSR GENETIC MARKERS. G. M. Groves and C. L. Pederson, Eastern Illinois University, Charleston, IL 61920. *Daphnia lumholtzi* (African Waterflea) is a cladoceran zooplankter native to Australia, southwest Asia, and Africa. First detected in northern Texas, *D. lumholtzi* has since spread throughout the southeast and midwest regions of the U.S. The particularly long head and tail spines it possesses may make *D. lumholtzi* less vulnerable than native cladocerans to predation by fish and some invertebrates. As a result, introduction of *D. lumholtzi* may alter community structure of native zooplankton, making imperative the understanding of mechanisms and patterns of dispersal. In an effort to shed light on the introductions of populations of *D. lumholtzi* in North America we used intersimple sequence repeat markers (ISSR's) to infer relationships between populations from Illinois, Kentucky, and Tennessee. Genetic similarity between populations suggests a single introduction whereas genetic variations suggest multiple introductions.

**EFFECTS OF PRESCRIBED BURNING ON SPIDER ABUNDANCE AND DIVERSITY:
YEAR II**

Ami Knop, University of St. Francis, Joliet 60435.

A common preservation method used to maintain prairie plant species and eliminate invasive plant species is prescribed burning. However, research is lacking on the effects of prescribed burning on other prairie species such as arachnids. Arachnids, especially spiders, are the dominant invertebrate predator in prairies; therefore it is important to understand just how spiders are affected by prescription burning. If spiders are affected by prescription burning, then abundance and diversity of spider prey will be affected. As a result of the predator-prey dynamics, our data can possibly be used to address further management issues on enhancement of prairie habitats for not only spiders but also a number of other species. Data was collected at 12 sites in 3 Northeastern Illinois counties. These 12 sites represent a wide range of prairie types from dry sand prairies to mesic-wet black soil prairies. Three 200 meter transects were set up at each prairie unit and spiders were collected using a sweep method along each of the transects. Collected spiders were then identified to family and in the case of the Salticidae (jumping spiders) spiders were keyed to species level. Comparisons of spider populations over a two-year period in both burned and unburned prairies will be presented. 7

PHYLOGEOGRAPHY OF *HOLBROOKIA MACULATA* ASSESSED USING mtDNA AND MORPHOMETRIC VARIATION. R. Blaine, R. Axtell, D. Duvernell, J. Lemos Espinal, J. Schaefer, S McCommas; SIU, Edwardsville, Biology Department, Edwardsville, IL. 62026. Population structure within *Holbrookia maculata* was assessed using 500 bp of the ND2 mtDNA gene and 102 morphometric measurements. Of the 500 bp 49 were parsimoniously informative. MtDNA was analyzed for 50 *Holbrookia* sampled from 4 populations from southern New Mexico to central Chihuahua, Mexico. Reciprocal monophyly was found between the northern and southern populations, within clade variation <1% and between clade variation of >6%. Morphometric data was analyzed for 150 samples from the same 4 populations. Morphometric data was analyzed using PC and N-J analysis. Of the 102 morphometric traits 3 traits loaded most heavily on the first principal component differentiating between microhabitat preferences. PCA showed two distinct morphotypes, one found, geographically, throughout the Southwest USA and northern Mexico; whereas morphotype 2 associates geographically with northern and southern Mexico. *H. maculata* shows distinct genetic differences between northern and southern clades and with the southern clade not showing morphological homogeneity but rather microhabitat association, data indicate phenotypic plasticity in the southern clade.

GENETIC DIVERSITY, PHYLOGEOGRAPHY AND CONSERVATION OF *DESMOGNATHUS MONTICOLA* (FAMILY: PLETHODONTIDAE). E. D. Casey, M. Mort and R. Fischer, Eastern Illinois University, Charleston, Illinois 61920. *Desmognathus monticola* is semi-aquatic salamander found throughout the Appalachian Mountains from southwestern Pennsylvania through northern Alabama and Georgia. In addition, a highly disjunct, state-endangered population is located in the coastal plain region of Alabama. Two conflicting hypotheses have been proposed to explain the origin of this southern population: it may be recently derived through multiple introductions, or may represent a relictual population formed through historic glacial events in the Appalachian region. Estimates of genetic diversity within and between populations were inferred from Intersimple Sequence Repeats (ISSRs), representing the first use of this technique in Plethodontid salamanders. In addition, relatedness between the continuous Appalachian range and the coastal plain population was assessed to determine the relative position of each population. Preliminary results are indicating a basal position for the southern Alabama population, supporting its status as a relictual population due to glaciation. Comparisons of the genetic variation of this endangered coastal plain population to those in the continuous range may also shed light on potential strategies for management and conservation.

COMPOSITION AND DEMOGRAPHICS OF BEAVER COLONIES IN ILLINOIS

Stanley McTaggart and Thomas Nelson, Dept. Biological Sciences, Eastern Illinois University, Charleston, IL 61920. Beavers are important because they create wetland habitats, provide economic opportunities to trappers, and can cause serious nuisance problems. Neither population estimates nor direct indices of abundance are available for this species in Illinois. Consequently, we initiated research to evaluate methods for monitoring the relative abundance of beavers statewide. An integral part of this effort is to estimate the size and demographics of individual beaver colonies. During 1999-2001, we trapped 239 beavers including 156 individuals from 28 colonies that were completely trapped-out. Of these, 30% were kits, 19% yearlings, and 51% adults. Ages ranged from 0.5 to 15.5 years old. Colony size averaged 5.6 beavers, ranging from 2-11. The typical colony was comprised of a breeding pair, 1-2 yearlings or subordinate adults, and 2 kits. Reproductive rates were high. The percentage of females breeding and ovulation rates increased with age through 3.5 year olds. Fetal rates of yearlings, 2.5 and ≥ 3.5 year olds were 3.0, 4.0, and 4.1, respectively. It appears that the presence of an older ovulating female suppresses ovulation in younger females of breeding age within the colony.

CYCLOMORPHOSIS OF *DAPHNIA LUMHOLTZI* IN RESPONSE TO SPATIAL HETEROGENEITY IN LAKE TAYLORVILLE. K.K. Schnake and C.L. Pederson, Eastern Illinois University, Charleston, IL 61920. Reservoir zonation occurs longitudinally as water enters from a stream into an impoundment, such as Lake Taylorville, Christian County, Illinois. Inflow areas (or riverine zones) are typified by high flow rate and shallow depth whereas areas near the dam (lacustrine zones) characteristically have decreased flow and greater depth. In a typical reservoir, abiotic variables change more or less predictably along a continuum from the riverine, through a transitional and into a lacustrine zone. For example, concentrations of suspended solids and nutrients decrease across the zones allowing light penetration to increase which can have a significant impact upon the biota within the system. *Daphnia lumholtzi*, a cladoceran which exhibits extreme cyclomorphosis, is an exotic species introduced to North America sometime within the past twenty-five years. We examined the morphology of *D. lumholtzi* in three different zones from Lake Taylorville. Head, body, and tail lengths were determined from field collections made during 1993, 1994, and 1999. Significant morphological differences were observed primarily in individuals taken from riverine and lacustrine sites. We conclude that variation in development of reservoir zones and concomitant changes in abiotic variables on an annual basis significantly influence morphology of *D. lumholtzi* in Lake Taylorville.

THE PHYSIOLOGICAL EFFECTS OF NAPHTHALENE BIOACCUMULATION IN *RANA PIPIENS*. Diana Giczewski, Kris Maillacheruvu, Bradley University, Peoria, IL 61625. Polycyclic aromatic hydrocarbons (PAH) are organic pollutants released into the environment primarily as a result of human activities. PAHs are formed during the incomplete combustion of coal, oil, gas and garbage. They are metabolized by cytochrome P450 (CYP450) - a mixed function oxidase responsible for the breakdown of exogenous and endogenous substances in both terrestrial and aquatic organisms. This study examined: 1) the consequences of naphthalene exposure on CO₂ excretion in the leopard frog; 2) the bioaccumulation of naphthalene in various frog tissues; and 3) the effect of naphthalene accumulation on CYP450 activity in the frog liver. Following PAH exposure, pulmonary CO₂ excretion was reduced, naphthalene accumulated in the liver, lungs, and muscle, and cytochrome P450 was deactivated. Given that our laboratory recently identified PAHs in several sections of the Illinois River, the data from this study suggest that PAH bioaccumulation may be detrimental to the biota in this ecosystem.

EXAMINING PHYSIOLOGICAL INTEGRATION IN CLONAL PLANTS WITH *SAXIFRAGA STOLONIFERA* (SAXIFRAGACEAE). L. Corradin and E. Ribbens, Western Illinois University, Macomb, IL 61455. *Saxifragus stolonifera* (Saxifragaceae) reproduces asexually through vegetative regeneration. Ramets remain attached to the parent through stolons, and these stolons are normally retained post-establishment. Therefore, post-establishment physiological integration, which enables nutrients, water, and/or photosynthates to move from one plant to another, is possible through these maintained connections. We examined the effects of insufficient water to evaluate the extent of physiological integration as expressed by bidirectional flows of water through the stolons. Maternal plants were grown until ramets of a substantial size were present. All but the largest ramet was removed, and the ramets and attached parents were replanted in separate pots while maintaining the stolon connection (as in Salzman and Parker 1985). The parent - ramet partners were then divided into four groups, with each group exposed to a different watering regime: normal water to both, reduced water to both, reduced water to only the parent plant, or reduced water to only the ramet. After one month soil was removed from each plant and the total dry weight for each was determined.

PHAEOPHYSCIA LEANA – A LICHEN SPECIES AT THE EDGE, R. N. Gillespie and A. S. Methven
Eastern Illinois University, Charleston, 61920. *Phaeophyscia leana* (Tuck.) Esslinger, or Lea's Bog Lichen, a very rare and imperiled lichenized fungus with specific habitat requirements, is especially sensitive to landuse patterns associated with riverine corridors. *Phaeophyscia leana* is a potential candidate for the Federal Endangered Species list and the only state endangered lichen in Illinois. The highly disturbed habitat along most midwestern river systems leaves very little suitable riparian area in which this unique lichen can subsist. *Phaeophyscia leana* utilizes the trunks of large cottonwoods (*Populus deltoides*) along a river's edge as well as tree species associated with historical river channel oxbow lakes and backwater sloughs. *Phaeophyscia leana* can be found on corticolous substrates that are often inundated by flood events, a unique habitat for a lichen, and a habitat in which *P. leana* grows virtually without other lichen associates. Recent surveys have documented several new stands of *P. leana*, along both the Ohio and Wabash rivers. Known populations have been revisited to identify disruptions and possible habitats have been identified and surveyed.

IMPACT OF CADMIUM ON GROWTH AND DEVELOPMENT OF PLANTS.

Joel Long, Dylan Kosma, and Stephen Ebbs. Southern Illinois University-Carbondale, Carbondale, IL, 62901.

Cadmium contamination in the environment is a growing concern because of the potential impact on plant growth and development. A wastewater treatment facility at the nearby Crab Orchard National Wildlife Refuge has significantly elevated soil Cd concentrations but supports a wide variety of plant species that provide food sources for wildlife. Foxtail (*Setaria* spp.), one of the grasses on the site, was studied to see if cadmium had an effect on plant morphology. Our observations indicated that there was a negative correlation between Cd content and seed head size, suggesting an effect on reproductive development. We are continuing to examine the effect of Cd on plant growth by conducting more detailed greenhouse studies with other grass species of relevance to wildlife. In addition, we intend to use rapid cycling Brassica plants to examine the effect of cadmium on seed development and cadmium tolerance in subsequent plant generations.

VENTRAL APPENDAGE VARIATION OF THE METZGERIIDAE

(MARCHANTIOPHYTA). Abel J. Kinser, Department of Plant Biology, Southern Illinois University, Carbondale, IL 62901-6509. The Metzgeriidae or simple thalloid liverworts

have ventral "appendages" that are typically clustered near the thallus apex for protection of a single apical cell. As the thallus elongates, these appendages can persist and sometimes form rows. The form and arrangement of the appendage are sometimes used as taxonomic characters for classification. Scanning electron microscopy (SEM) was used on representatives of the major groups within the Metzgeriidae to examine the morphological variation within the subclass. The SEM images show a wide range of variation within the Metzgeriidae but suggest consistent patterns define orders, suborders and families. This preliminary study suggests that ventral appendages, if examined carefully, can be informative in modern classifications of the Metzgeriidae.

COMPARATIVE MORPHOLOGY OF THE SIMPLE THALLOID LIVERWORTS, *JENSENIA* LINDB. AND *PALLAVICINIA* GRAY (PALLAVICINIACEAE) Scott Schuette and Dr. Barbara Crandall-Stotler Department of Plant Biology, Southern Illinois University, Carbondale IL 62901-6509. *Jensenia* Lindb. is a dioicous, dendroid liverwort that superficially resembles some species of *Pallavicinia*. In fact, *Jensenia* is sometimes regarded as a subgenus of *Pallavicinia* Gray. However, several morphological features viewed with SEM clearly distinguish *Jensenia* from *Pallavicinia*. This study compares a suite of morphological characters, including thallus stance, perichaetial and perigonal structures and spore size and morphology, between *Jensenia erythropus* and *Pallavicinia lyellii*. These characters, which are commonly used separate genera, clearly show these two liverworts are distinct from each other.

MODIFYING DISTANCE METHODS TO ESTIMATE HISTORICAL TREE DENSITY FROM GOVERNMENT LAND OFFICE SURVEY RECORDS. S.L. Sauer, R.C. Anderson, R. Swigart, J. Fralish, and A. Carver, Illinois State University, Normal, IL 61790 and Southern Illinois University, Carbondale, IL 62901. Government Land Office (GLO) survey records have been used to determine historic vegetation through the application of the distance methods to the witness tree data. We test the suitability of applying modifications of the random pairs method or the quarter method to GLO records from the Shawnee National Forest Purchase Area in southern Illinois. The witness tree data was evaluated with criteria based on the distribution of the witness trees around the section or quarter section points. As a whole, the data set did not meet all criteria for either method. Data were subdivided into groups meeting specific criteria. For interior points with two witness trees, the random pair method with an exclusion angle of 202.93 degrees provided the best modification of the distance methods to convert witness tree distances to tree density. A new correction factor of 0.74 to convert the mean witness tree distance to the square root of the mean area was determined by regressing exclusion angle against correction factor. Wilcoxon sign-rank tests indicate that there are significant differences in the calculated square root of the mean area based on distance method used (quarter method v. random pairs $S=3665417$, $p<0.001$; random pairs v. new 0.74 correction factor $S=3893716$, $p<0.001$) and depending if tree diameter is included in witness tree distance measurements (with diameter v. without diameter $S=-1349.5$, $p<0.001$).

CHARACTERIZATION OF THREE *PHRAGMITES AUSTRALIS* SITES AND POPULATIONS THROUGH SOIL ANALYSIS AND PHOTOSYNTHESIS MEASUREMENTS. M.A. Rickey and R.C. Anderson, Illinois State University, Normal, IL 61790.

Phragmites australis is an invasive grass that has dramatically increased its distribution and abundance within its geographic range in the past fifty years. Sequence data show that *Phragmites* native haplotypes "E" and "S" and invasive haplotype "M" exist in North America. Three Illinois type M *Phragmites* sites and populations were characterized by soil analysis and photosynthetic measurements in this experiment: Banner, Lincoln, and Herrin. It was hypothesized that there will be differences in soil variables among sites and differences in maximum photosynthetic rates (P_{MAX}) rates among populations. MANOVA yielded significant results (Wilks' Lambda, $F=5.67$, $p>F=0.0006$) and univariate ANOVAs indicated significant differences among sites for total nitrogen, nitrate-nitrogen, organic matter, potassium, magnesium, and phosphorus. The Ryan-Einot-Gabriel-Welsch multiple range test revealed that Banner Marsh was significantly lower than Lincoln and Herrin for all significant response variables. Photosynthetic light response curves and P_{MAX} , and light saturation values were determined for plants from the three populations. Plants had maximum photosynthetic rates of about $16 \mu\text{mol CO}_2 \text{m}^{-2}\text{s}^{-1}$ and achieved light saturation between 1200-1400 $\mu\text{mol PPF} \text{m}^{-2}\text{s}^{-1}$. ANOVA revealed significant differences in P_{MAX} rates among sites ($F=38.14$, $p<0.0001$) and that Lincoln had the highest back-transformed mean P_{MAX} of 21.22.

GALLERY OF ILLINOIS PLANTS WEBSITE

Dan Busemeyer, Illinois Natural History Survey, Champaign, Illinois 61820

A new website which showcases the native and established exotic vascular flora of Illinois has been placed on the Illinois Natural History Survey's Website: <http://www.inhs.uiuc.edu>. This website has photographs of approximately 500 vascular plant species found in Illinois along with a few dozen other species not found in Illinois. The plants are listed alphabetically by Latin name, by common English name, and by family. For each plant there are one to five pictures (including small thumbnail pictures which can be clicked on to see a full size image). There are also links to the Illinois plant identification network (ILPIN) created by Louis Iverson which provide information on Illinois distribution, habitat, life history, and synonymy for each plant. Ultimately the goal for the website is to include pictures and information for as many as possible of the approximately 3000 species of plants found in Illinois.

INTERSPECIFIC HYBRIDS OF *FLAMMULINA*. A.S. Methven and M.E. Mort, Eastern Illinois University, Charleston, IL 61920-3099 and University of Kansas, Lawrence, KS 66045-2106. *Flammulina* (Basidiomycetes, Agaricales, Tricholomataceae) is a popular edible mushroom that has been cultivated for centuries in Japan and marketed worldwide under the name *enoki-take*. Until the 1960's, the epithet *velutipes* was more or less uniformly applied to all collections in the genus whether commercially or naturally produced. Recent investigations have described additional taxa within the genus based on morphology and mating studies. Species designations were subsequently confirmed by comparing restriction digests and DNA sequences for the nuclear ribosomal internal transcribed regions (ITS1 and ITS2) using geographically diverse collections of each taxon. Laboratory generated interspecific hybrids of *Flammulina* were subsequently examined by restriction digests of the nrDNA internal transcribed spacer regions. Digestion with two restriction enzymes, *Hae* III and *Bst* F51, distinguished among the interspecific hybrids and produced distinctive RFLP signatures. Results of these analyses reveal a complicated pattern of ITS evolution; additivity and concerted evolution were observed in the ITS hybrids.

OCCURRENCE OF VESICULAR ARBUSCULAR MYCORRHIZAL ASSOCIATIONS IN SPECIES OF *AEONIUM* FROM THE CANARY ISLANDS. T.L. Cerveny and A.S. Methven, Eastern Illinois University, Charleston, IL 61920-3099. Literature on the occurrence of mycorrhizae in the Crassulaceae is limited. As a result, detailed information regarding colonization status and specific fungal associates in the Crassulaceae is needed. This study examined colonization and the abundance of vesicular arbuscular mycorrhizal (VAM) fungi associated with the roots of *Aeonium* (Crassulaceae) species from the Canary Islands. On a recent trip to the Canary Islands, the roots of *Aeonium* species from different sites on several of the islands were collected and fixed in FAA. After return to the laboratory, plant roots were cleared, stained, and scored for the presence and abundance of VAM associations. Preliminary results demonstrate that VAM fungi colonize more than 80% of the roots of *Aeonium* species.

ANALYSES OF PRAIRIE RESTORATIONS AT ROCK SPRINGS ENVIRONMENTAL CENTER, DECATUR, ILLINOIS. J.A. Ward, G.C. Tucker, J.E. Ebinger, and S.J. Meiners, Eastern Illinois University, Charleston, IL 61920. Rock Springs was acquired in 1969 by the Macon County Conservation District. Prairie restorations, totaling about 30 acres, were established on former farmland starting in 1977. Several tracts were developed as prairie restorations of varying ages (1977, 1979, 1981, 1983, 1986). Original land survey records indicate that the area was open forest with *Carya*, *Quercus*, and *Ulmus* species present. Based on fieldwork during the summers of 1999-2001, 122 species were collected, 56 of which were within the sampling transects. The tracts were summarized for an overall comparison. The highest importance value for any species was 42.6 (out of 100) for *Andropogon gerardii*. The greatest number of species (36) was reached in the 1983 tract. Sorensen's Index of Similarity between tracts ranged from 53.97- 72.97. Coefficient of conservatism ranged from 3.42-4.56 and the floristic quality index from 18.6-25.8, with the older sites having higher values. Results indicate that the tracts are blending together and the quality increases with tract age based on the floristic quality index.

THE EFFECT OF CUTTING ON SPECIES RICHNESS AND PERCENT COVER OF HERBACEOUS SPECIES, CHAUTAUQUA LONG-TERM RESEARCH SITE, CARBONDALE, ILLINOIS. Bill Phillips, Southern Illinois University, Carbondale, Illinois 62901. The experiment involved the study of herbaceous plants at the Chautauqua Nature Site in Southern, Illinois. Species richness and percent cover was calculated for herbaceous plants. Sub-blocks cut in 1994 were contrasted with sub-blocks, which were never cut. The uncut sub-blocks will have more species richness and percent cover than the sub-blocks cut in 1994. The same amount of species was observed to be in the uncut sub-blocks as in the cut sub-blocks.

BASELINE FLORAL SURVEY OF THE WATERSHED NATURE CENTER. Jeannie A. Moe and E. J. Esselman, Southern Illinois University, Edwardsville, Illinois 62026. The watershed Nature Center is a 60 acre nature preserve within the city limits of Edwardsville, Illinois. Originally a sewage lagoon, the property was converted into a nature preserve in 1991. The mission of the Watershed is to educate the public about the importance and natural balance of ecosystems while providing space for recreational activities. Recently the Watershed has received additional funding to improve the biodiversity of the property. The purpose of this research is to establish a baseline floral survey of the Watershed. This information will aid in the continuing restoration efforts by identifying the native plants present that need to be preserved and the invasive plants that need to be removed.

SEEDBANK VIABILITY IN *SCHOENOPLECTUS HALLII*, HALL'S BULRUSH.

B. Meinardi, M. Smith, and S. Ammann, Southern Illinois University, Edwardsville, IL 62026. Hall's bulrush (*Schoenoplectus hallii*) is a medium-sized sedge (ca. 6 inches tall) that is in danger of extinction. Of the remaining states with extant populations, only three have more than one population—MO, OK and IL (McKenzie 1998). The species is listed as endangered in every state in which it occurs, and it is currently under consideration for Federal listing. Very little research has been done on *S. hallii* because of its low occurrence. The objectives of this study were to determine seed viability in the soil seedbank at three Illinois sites and to evaluate the effect of soil depth on viability. We hypothesized that 1. Due to the similarity in site conditions, seed viability would not vary among sites, and 2. Viability would be higher in seeds closer to the surface than in those deeper in the soil matrix. Our data indicated that seed viability varied significantly among sites and soil depths.

INTERACTION OF PROTRACTED SUMMER FLOODING AND SHADE IN THE ESTABLISHMENT OF UNDERSTORY *ACER SACCHARINUM* SEEDLINGS. C. Deutsch¹, K.E. Schulz¹, K. Jamison^{1,2}, K. Manar^{1,2}, and K. Kahl^{1,2}. ¹Southern Illinois University Edwardsville, Edwardsville, IL 62026. ²US Army Corps of Engineers, Riverlands Demonstration Project, St. Louis, MO 63386. The Great Flood of 1993 radically modified Mississippi River bottomland forests near St. Louis, MO. Mature forests were heavily damaged, leaving open stands with few juveniles to replace the canopy. Recruitment of seedlings has been all but non-existent until recently. Previous work has eliminated the effects of shade and competing vines in reproductive failure. A 3 x 2 factorial experiment (control, 30, and 60 day flooding by 100 and 60% sun) was conducted to test for an interaction between flooding and shade in the failure of silver maple seedling establishment. Flood duration and high light intensity had negative simple effects on height. Flood duration reduced the length of the last growth flush in shade plants, but had almost no effect in sun plants. The number of nodes varied significantly, but inconsistently across the flood duration x shade factorial. The poorer performance of seedlings in high light treatment combinations may be related to limited nutrient availability in the planting medium.

USING PALENOLOGY TO DETERMINE A CULTURE HORIZON AT HORSESHOE LAKE IN MADISON COUNTY, ILLINOIS. Jennifer J. Martin and Dr. Richard Brugam, Southern Illinois University, Edwardsville, Illinois 62026. Ragweed (*Ambrosia*) is a common early successional plant. The rise of ragweed pollen in a sediment core indicates the arrival of European/American farmers. A piston core was used to collect 7 samples from Horseshoe Lake, Madison County. The cores were taken to the lab in vertical position and sliced at 1cm intervals. Sub samples from one of the cores were acetolyzed and mounted on microscope slides to count pollen. We noted an increase in *Ambrosia* pollen at 60 cm in the core allowing us to date that level at 1809 AD, the year the first farm was established on the lake. A radiocarbon date of 710± 80 years BP was obtained for the 65 cm level in the core. It is likely that this date is too old because reservoir errors.

EFFECTS OF CADMIUM ON THE PHYSIOLOGY OF *POPULUS DELTOIDES* BARTR. MARSH. AND ITS POTENTIAL USE IN PHYTOREMEDIATION. D. Shrestha, M. Smith, K. Johnson and W. Retzlaff, Southern Illinois University, Edwardsville 62026. In general, plants are able to accumulate Cd from soil at lower concentrations without adverse effects; however, at higher concentrations, plants often exhibit toxic effects. For a plant to be used in the phytoremediation of Cd, it must be able to accumulate higher concentrations of the metal in its tissues without experiencing toxicity. We studied the ability of *Populus deltoides* to accumulate Cd and its effects on the physiology of *P. deltoides*. Individuals of *P. deltoides* grown for 8 months in soil contaminated with concentrations of Cd up to 50 ppm exhibited no significant change in stomatal conductance, chlorophyll fluorescence (Fv/Fm), chlorophyll content or growth. Plants accumulated significantly higher concentrations of Cd in leaf, stem and root tissues at higher soil concentrations; however, the accumulation was not as high as reported in other studies. In trees known to hyperaccumulate Cd, 100 ppm Cd per dry weight in tissues has been reported. The results of this study indicated that *P. deltoides* can be a good candidate for use in Cd phytoextraction, in that Cd does not negatively affect physiology and growth, provided that its ability to absorb Cd from soil can be enhanced.

SEED VIGOR OF *LESQUERELLA LUDOVICIANA* AS AFFECTED BY COLONY AND MATURITY. S.E. Beach¹, J.M. Coons^{1,2}, H.R. Owen², B.L. Todd², and M.A.L. Smith¹, ¹University of Illinois, Urbana, IL, 61801 and ²Eastern Illinois University, Charleston, IL 61920. *Lesquerella ludoviciana* (Nutt.) S. Wats. is an endangered sand prairie plant in Illinois, found in Mason County in three colonies which differ greatly. The North Colony-Lower Bowl is the largest colony (3248 m²) with a plant density of 8.6 plants/m². The North Colony-Upper Bowl (1025 m²) has the lowest plant density with 1.8 plants/m². The South Colony has the smallest area (270 m²) with a density of 4.8 plants/m². Diversity of plant species within colonies increases as density of *L. ludoviciana* decreases. Since flowers bloom first at the bottom of the stalk, seed maturity varies with position upon the stalk. Objectives were to determine the effects of seed maturity and colony on seed vigor. Seed was collected on June 1 and June 16, 2000, and on May 14 and June 6, 2001. Seed was grouped by colony, by date, and by position (early or late) on the flower stalk for the first collection date. Seed was germinated on moist filter paper in petri dishes at 25°C in 24hr light. Germinated seeds were counted every 2-4 days. For 2000 seed, no consistent differences occurred between colonies or maturity levels. For 2001, May 14 seed did not germinate. This lack of germination shows that seed maturity plays a role in germination since May 14 seed was less mature than June 6 seed, which did germinate. For June 6, seed germination for the South Colony was lower than for North Colonies.

MORPHOLOGICAL RESPONSES EXHIBITED IN *HYDRA* DUE TO EXTRACELLULAR ATP EXPOSURE.

H.R. FitzHenry and V.L. Burgholzer, Illinois Mathematics and Science Academy, Aurora, IL 60506.

Stuart Newman (1973) observed a morphological response in *Hydra attenuata* when exposed to extracellular metabolites through their environment. This response was noted by a drastic change towards the extreme ends of the body and a loss of tentacles. Further experiments with ATP were performed to see if hydra could become accustomed to the metabolite solution; signaled by their ability to bud. Using half of Newman's original concentration of ATP, it was noted that their body "stretched" (got longer and thinner), but seemed to do so disproportionately. Using the budding region as an arbitrary point to divide the hydra in half. The gastric (top) and peduncle (bottom) regions were measured using LoggerPro image analysis software. The disproportionate "stretching" of the hydra was quantified through the results of a MANOVA. Disproportionate changes between the two regions is thought to occur because of elevated levels of a purine triphosphate, disrupting the "normal" metabolic gradients found throughout the hydra's body.

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THE FMRFAMIDE RECEPTOR IN THE EARTHWORM CROP-GIZZARD. K.G. Krajniak and S. D. Klohr. Southern Illinois University Edwardsville, IL 62026. FMRFamide increases the rate of contractions in the earthworm gut. Since other FMRFamide related peptides are found in annelids, we used the *Lumbricus terrestris* crop-gizzard assay to determine how changes in the peptide affected the response. The crop-gizzard was removed, attached to a transducer, and exposed to increasing doses of neuropeptide. A log-dose curve was used to determine the EC_{50} . The FMRFamide EC_{50} was 32 nM, while EC_{50} s of FLRFamide and FTRFamide were 320 nM and 3 μ M, respectively. Shortening the peptide to MRamide increased the EC_{50} to 3.2 μ M. When norleucine (nL) was substituted for methionine (M) in nLRFamide contraction rate actually decreased with an EC_{50} of 52 nM. When d-amino acids were substituted for l-amino acids the following EC_{50} values were obtained. For d-FMRFamide it was 32 nM and for FMd-Ramide it was 10 nM, while there were no responses to Fd-MRamide or FMRd-Ramide. The heptapeptide GDPFLRFamide had an EC_{50} of 310 nM, while there was no response to pQDPFLRFamide. These data suggest that the earthworm crop-gizzard receptor prefers a tetrapeptide sequence with MRamide in the C-terminal for full tissue response.

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CATECHOLAMINE REGULATION OF THE ISOLATED EARTHWORM CROP-GIZZARD. C.A. Corley and K.G. Krajniak, Southern Illinois University, Edwardsville, IL 62026. Catecholamines affect the motility of digestive tracts in many animals, therefore we examined the effects of several catecholamines on the isolated crop gizzard of the earthworm, *Lumbricus terrestris*. The crop-gizzard was removed, attached to a smooth muscle transducer, and exposed to various concentrations of catecholamines. Dopamine caused a biphasic response in both contraction rate and amplitude. There was a decrease in contraction rate and amplitude with a threshold of 10^{-6} M and an increase in contraction rate and amplitude with a threshold of 10^{-7} M. Octopamine initiated a biphasic response in rate, characterized by an increase with a threshold of 10^{-10} M and a decrease with a threshold of 10^{-7} M, and a decrease in overall amplitude (threshold at 10^{-8} M). Both epinephrine and norepinephrine initiated increases in amplitude with a threshold of 10^{-8} M and a slight increase in rate. These data suggest that the catecholamines may be involved in regulation of earthworm digestive tract smooth muscle. We are currently examining how the crop-gizzard responds to alpha and beta agonists.

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INOSITOL PHOSPHOGLYCANS CONTAINING MYOINOSITOL AND CHIROINOSITOL ARE PURIFIED FROM NORMAL HUMAN PLASMA THROUGH GEL-FILTRATION CHROMATOGRAPHY. D. Albracht*, T. Korves, Dr. G. Galasko*, and Dr. P. Wanda, Southern Illinois University, Edwardsville, IL 62026 and Southern Illinois University School of Dental Medicine, Alton, IL 62002*. Inositol phosphoglycans (IPG's) are known second messengers of insulin action or insulin mediators. The two putative mediators purified in this work differ in both their chemical composition and biological activity. The chiroinositol-containing mediator activates pyruvate dehydrogenase phosphatase and has a pH of 2.0. The myoinositol-containing mediator inhibits cAMP-dependant protein kinase and has a pH of 1.3. Recent studies have shown that in Type 2 diabetic patients (NIDDM), daily urinary chiroinositol excretion was 30-50 times less than normal, healthy patient chiroinositol levels. Muscle biopsies of healthy and NIDDM patients have reinforced these findings. With these correlations to NIDDM, the purification process of both IPG's is of great value. By using gel-filtration chromatography columns (Sephadex G-25 and G-15), this was accomplished.

EXTENSIVE VARIATION AMONG L1SW RETROTRANSPOSON LINEAGES WITHIN TELEOST FISH GENOMES CONTRADICTS THE "MASTER" MODEL. K.A. Miller and D.D. Duvernell, So. Ill. U., Edwardsville, IL 62026. *Swimmer* is a family of LINE-1 retrotransposons (L1sw) found in teleost fishes that is closely related to the L1 family in mammals. Extensive phylogenetic studies of L1 elements have typically revealed limited sequence diversity within genomes. This is predicted by the "master" model, in which elements arise from only one or a few closely related templates. In contrast, the "random template" model describes an element family in which all copies may replicate with equal probability resulting in a highly branched lineage structure. These alternative models make distinct predictions about the phylogenetic relationships among elements residing within a host genome. To better understand the lineage structure of the L1sw family, a survey of several fish taxa was conducted, using degenerate PCR. Substantial sequence diversity and a complex lineage structure within genomes contradicted the master model in favor of the random template model. The contradictory patterns observed between L1 and L1sw families may reflect regulatory differences among these elements within their respective genomes.

USING THE ZEBRA FISH GENOME DATABASE TO EXPLORE L1SW RETROTRANSPOSON DIVERSITY IN TELEOST GENOMES. S.M. Adams and D.D. Duvernell, So. Ill. U., Edwardsville, IL 62026. Retrotransposable elements (REs) are highly mobile autonomous DNA sequences found in all eukaryotic genomes. The L1 family of REs is the most ubiquitous family in mammals, comprising 15 to 20% of the genome. Other related element families include DRE (Dictyostelium), Zepp (Chlorella), Tal1 (Arabidopsis), Cin4 (Maize), Tx1 (Xenopus) and L1sw (killifishes). Of the elements identified in vertebrates, phylogenetic studies had indicated that teleost L1sw is actually more closely related to mammalian L1 than is amphibian Tx1. This observation suggests that either a) only a subset of the total diversity of REs has been identified in these vertebrate genomes, or b) the relationships among these element families reflects stochastic lineage sorting of REs among modern vertebrate groups. We have utilized on-line searches using BLAST (Basic Local Alignment Search Tool) to identify RE sequences in the zebra fish genome database in order to explore the diversity of sequences in teleost genomes. A phylogenetic analysis of these sequences with L1, L1sw and Tx1 reveals that teleost genomes actually contain a much greater diversity of RE sequences than has been observed in either mammals or amphibians. The relationships among these RE sequences and the implications for the evolution of REs in vertebrate genomes are discussed.

COMPARITIVE RESULTS OF THE CYTOPATHIC EFFECTS OF MEASLES VIRUS AND CANINE DISTEMPER VIRUS IN RESPECT TO APOPTOSIS. J.H. Irlam and P. Wanda, Southern Illinois University, Edwardsville, IL 62026. Measles virus (MV) *Edmonston* strain has been shown to induce apoptosis in Vero cells, while Canine Distemper virus (CDV) *Onderstepoort* strain, was unable to stimulate apoptosis in Vero cells. Alternate strains of both MV and CDV have been obtained, and the apoptotic effects of these strains will be compared with previous studies. Through fluorescent cell staining techniques and gel electrophoresis, the comparison of the cytopathic effects of these different viral strains can be visualized. Extensive study of these different strains of MV and CDV will allow for a generalization of viruses in the Paramyxovirus family to be made in regards to apoptotic activity.

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SEQUENCING PARTS OF THE LACTOBACILLUS AMYLOVORUS GENOME. C. Clark and S. A. McCommas, Southern Illinois Univ., Edwardsville, IL 62026. We hypothesize that by comparing sequences from L. amylovorus's genome to sequences from other bacterial species we will be able to make inferences about their phylogenetic relationships. The L. amylovorus sequences can be obtained by cutting purified, genomic DNA with *Sau3AI* and ligating these fragments into a pUC18 vector with compatible ends. The DNA will be isolated, purified, amplified, and sequenced. L. amylovorus's sequences will be compared to other bacterial species in GenBank.

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V_{3A} INDUCES MITOGENESIS IN VERO CELLS AND CHICK EMBRYO FIBROBLASTS. T. Korves, A. Bradshaw, D. Albracht, P. Wanda, and G. Galasko, Southern Illinois University, Edwardsville, IL 62025, and Southern Illinois University School of Dental Medicine, Alton, IL, 62002. Previous research illustrates that Fraction V₃, an inositol phosphoglycan isolated from human plasma, induces apoptosis in African green monkey kidney cells (Vero cells). However, data from ongoing studies indicates that V_{3a}, another inositol phosphoglycan found in human plasma, is capable of inducing mitogenesis. This effect occurs in a dose-dependent manner and has been demonstrated in Vero cells and chick embryo fibroblasts.

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EFFECT OF PHAGOCYTOSIS ON PROGRAMMED CELL DEATH IN RETINAL PIGMENT EPITHELIAL CELLS. M. D. Rauser and A. Baich, Southern Illinois University, Edwardsville, IL 62026. Age related macular degeneration (ARMD) is a disease of the eye that occurs when the cells of the central visual field degenerate. Clinical observations suggest the retinal pigment epithelium cells (RPE) are lost first, and the neurosensory cells of the retina follow. Broken-off tips of the neurosensory cells are phagocytized by RPE cells. It has been shown that ceramide derivatives at a low concentration induce programmed cell death (apoptosis) of RPE cells. My goal is to determine the effects of ceramine on RPE cells when challenged by rod outer segments (ROS). This experiment will presume that the RPE are performing as they would *in vivo* when challenged by ROS. It is hypothesized that the act of phagocytosis enhances the rate of ceramide induced apoptosis in retinal pigment epithelial (RPE) cells. This research may be beneficial in determining the underlying cause of ARMD.

GENE EXPRESSION OF CULTURED HUMAN BONE CELLS. J. Allen, S. McCommas and B. Whitson, Southern Illinois University, Edwardsville, IL 62026. Throughout life a balance exists between bone formation and bone loss (resorption). In healthy individuals the rate of bone formation and resorption are equal, giving strong bone tissue. In older individuals the rate of resorption starts to exceed the rate of formation leading to porous and brittle bones, a condition known as osteoporosis. Osteoporosis is a significant problem in the United States. It is estimated that more than half of the women who are 50 years or older are likely to have radiologically detectable evidence of decreased bone mass. In order to develop therapies, centered on stimulation bone cell development, we must better understand what growth factors and hormones are involved in bone formation and how they interact with each other. To tackle the first problem we turn to genetics. By determining which genes are being expressed and the amount of expression we develop a picture of what proteins are involved in the production of bone. My research will encompass analyzing the expression profiles of cultured human bone cells, in different stages of growth, through the use of micro-gene array hybridization techniques. It is hoped that the findings from this initial investigation will enable further research into what proteins and receptors are involved in bone cell formation.

MOLECULAR CLONING OF A FULL-LENGTH BOVINE EUKARYOTIC INITIATION FACTOR-5A cDNA. J.-K. Huang, G. H. Huang, V. C. Serushon, J. C. McDonald, P. G. Gowda, and L. Wen, Western Illinois University, Macomb, IL 61455

The mature eukaryotic initiation factor-5A (eIF-5A) is the only protein known to contain the unusual amino acid hypusine, (N^ε-(4-amino-2(R)-hydroxybutyl)lysine) lysine. The synthesis of hypusine, and therefore of mature eIF-5A, is important for the biological activity of eIF-5A. We report here molecular cloning of bovine eIF-5A cDNA using human eIF-5A cDNA as a probe. A total of 2.5 x10⁵ clones from a ZAP ExpressTM/*EcoR I/Xho I* bovine testis cDNA library (a generous gift from Dr. John A. Glomset of University of Seattle) was screened. Putative eIF-5A DNA inserts were obtained from positive clones by polymerase chain reaction (PCR) using T3 and T7 primers. The PCR products were separated on an agarose gel and a Southern blotting was done to confirm the hybridization. The hybridization fragments were digested with *BamHI* and *XbaI* and subcloned into pBluescript. The recombinant DNA containing colonies were selected and DNA sequencing performed. The deduced protein sequence is found identical to that of human eIF-5A.

CLEAVAGE OF CHEMICAL WARFARE AGENTS AND INSECTICIDES USING TRIS—BIPYRIDYL LIGAND COMPLEXES

M.Ozkok, L. Richardson and A. Branson, Dr.R.Dixon, Southern Illinois University, Edwardsville, IL 62026.

This poster describes a method to photo-cleave chemical warfare agents and insecticides using bipyridyl metal complexes. Selective removal of these pollutants and toxins from mixtures of compounds is due to the ability of these receptors to photo-cleave specific functionalities.

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SYNTHESIS OF TETHERED PRIMARY AMIDE AS POTENTIAL SITE SPECIFIC BINDING MOTIFS FOR DNA AND RNA RECOGNITION AND CLEAVAGE.

Charles A. Bukovac, Robert P. Dixon, Clayton Cassidy, SIU Edwardsville Dept. of Chemistry, Edwardsville, IL, 62026-1652

This poster will outline the synthesis of tethered primary amide. This functionality may have the potential to be used as potential site - specific binding motifs for DNA and RNA recognition and cleavage when synthetically placed into tris bipyridyl ruthenium complexes.

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SYNTHESIS OF TETHERED GUANIDINIUMS AS POTENTIAL SITE SPECIFIC BINDING MOTIFS FOR DNA AND RNA RECOGNITION AND CLEAVAGE.

Kenneth L. Felty, Robert P. Dixon, Shalandra R. Ross, SIU Edwardsville Dept. of Chemistry, Edwardsville, IL, 62026-1652

This poster will outline the synthesis of tethered guanidiniums. This functionality may have the potential to be used as potential site - specific binding motifs for DNA and RNA recognition and cleavage when synthetically placed into tris bipyridyl ruthenium complexes.

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COMPOSITION AND ORGANIZATION OF THE ERYTHROCYTE PLASMA MEMBRANE: DEVELOPMENT OF AN UNDERGRADUATE BIOCHEMISTRY EXPERIMENT. J. Passman and M.R. Fry, Dept. of Chemistry, Bradley University, Peoria, IL 61625.

This study involves developing a set of laboratory experiments exploring cell membrane structure and composition for implementation in the junior level Biochemistry laboratory course. In this set of experiments, based on the classic experiment of Gorter and Grendel, the phospholipid and protein composition of porcine erythrocyte membranes is determined to deduce the macromolecular organization of the membranes.

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SOURCES OF THE ESCUINTLA AND LA DEMOCRACIA DEBRIS AVALANCHES, GUATEMALA. C.G. Schiek and C.A. Chesner, Eastern Illinois University, Charleston, IL 61920. Two large debris avalanche deposits occur south of the Fuego Volcanic Complex on the coastal plain of Guatemala. The larger deposit, known as the Escuintla Debris Avalanche (EDA), is 27 km long by 18 km wide and has an estimated volume of 9 km³. The La Democracia Debris Avalanche (LDDA) is 15 km long, 10 km wide and about 2.4 km³ in volume. Previous studies have postulated that the source of the EDA was Meseta volcano, the northernmost vent of the Fuego Volcanic Complex. A steep east-facing scarp on Meseta presumably formed by sector collapse, generating the EDA. The scarp exposes a thick stratigraphic section of lavas and tephra that represent a significant portion of Meseta's eruptive history. The LDDA has been tentatively linked to either the Fuego or Acatenango volcanic complexes, although no obvious collapse scar has been identified. In order to identify the source volcano for each deposit, lava block samples collected from each deposit were compared to lavas sampled at Meseta volcano.

MAPPING THE EFFECTS OF BENDWAY WEIR IMPLEMENTATION, EMBARRAS RIVER, CUMBERLAND COUNTY, IL. S.M. DiNaso, Village of Downers Grove, 60515, V.P. Gutowski, Eastern Illinois University, Charleston, IL 61920 and D.J. Osterman, NRCS, Toledo, IL, 62468. In 1999, bendway weirs were installed along a ½ mile segment of the Embarras River, near Toledo, IL. The weirs are designed to slow streambank erosion by keeping the thalweg near the center of the channel, rather than adjacent to the cutbank. The site was initially monumented and mapped with total stations each year since implementation. It appears as though the weirs have slowed cutbank erosion in some areas but have had little effect in other areas. Other channel responses include changes in the shape, size and location of sandy point bars, as well as fragmentation and shallowing of the scour pools where the weirs are located.

MAXIMIZING THE SIGNAL TO NOISE RATIO OF NUCLEAR MAGNETIC RESONANCE (NMR) RADIO FREQUENCY (RF) COILS IN SAMPLES OF MICROSCOPIC SIZE. M.D. Hoadley, Illinois Math and Science Academy, Aurora, IL 60506. Current NMR techniques analyze samples at the microscopic level with minimal precision. The purpose of this research is to maximize the signal-to-noise ratio (SNR), which corresponds to an improvement in precision for RF coils designed especially for the analysis of very small samples. Coils of 1000 microns in length were designed to spiral very tightly around a given sample, imitating the behavior of concentric circles and theoretically maximizing the SNR. Several such coils are being microfabricated to test and optimize several variables determining the lengths and specifications of the coils' various facets. An optimal production method has been determined by experimentation, and the research continues with the process of inserting the coils into liquid-based samples for NMR analysis and testing.

Bt-CORN DETRITUS IMPACTS ON LARVAL CADDISFLIES (*Lepidostoma liba* Ross)
Rubina Ahsan¹, Colin Campbell¹, Meghan C. Romano¹, Matt R. Whiles², Beth Middleton¹

¹Dept. of Plant Biology, ²Dept. of Zoology, Southern Illinois University, Carbondale, IL 62901

Many Caddisflies (Trichoptera) are leaf-shredders in freshwater ecosystems that can contribute to the initial breakdown of coarse detrital materials, and thus influence material and energy cycling. In this study, *Lepidostoma liba* Ross (Lepidostomatidae) larvae were collected from spring seeps in southern Illinois, reared in the laboratory, and fed either senescent leaves of transgenic corn containing genes of *Bacillus thuringiensis* (Bt), organic corn litter, or silver maple litter. Those that were fed Bt-corn grew 2.2x slower than those fed organic corn or silver maple litter, and this difference in growth rates was significant (ANOVA, $p < 0.05$). Bt-corn is now planted in large acreages in the U.S. and detritus from crop fields can migrate to adjacent stream and wetland ecosystems. Based on our results, Bt-corn detritus could have an adverse effect on caddisfly populations, and thus decomposition processes. While our study is preliminary it indicates that there is a potential for ecosystem-wide effects of Bt-corn usage in landscapes where crop fields are adjacent to aquatic systems.

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A CLAY-MATION INTERPRETATION OF ENVIRONMENTAL POLLUTION. J. Maloof and D.M. Jedlicka, Columbia College Chicago, Chicago IL 60605. The environment is at risk from modern technological advances. Pollution puts stresses on biological systems that are already stressed and are not given time to recover. Water systems and landfills are the primary focus of this project with deciduous forests and grasslands also observed. Using clay-mation animation along with current video footage, a variety of environmental disturbances are examined. Melodrama and music illustrate the risks and results involved with environmental pollution. The clay-mation characterizations give this project an emotional twist supported by the concrete video footage from the modern day Midwest region.

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HARMFUL EFFECTS ON WHALES AND DOLPHINS BY ULTRA LOW FREQUENCY WAVES. N. Czech and D.M. Jedlicka, Columbia College Chicago, Chicago IL 60605. Whales and dolphins are very sensitive to ultra low frequency (ULF) sounds. These ULF sound waves travel well through water. ULF sound waves are emitted from the whale/dolphin and will return to the animal after the waves have reached an object (bounce back after reaching a school of fish). Modern ships, including naval ships contacting submarines and vice versa, are filling the ocean waters with more ULF sound waves which 1) may confuse the interpretation of food sources by the whales/dolphins and/or actually may cause damage to the ear (hearing apparatus). Beaching of whales/dolphins and/or bleeding of the ear could be the results of the increased number of ULF sounds in our oceans. Current literature and personal observations will examine these possibilities.

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EFFECTS OF PRAIRIE RESTORATION METHODS ON SMALL MAMMAL SEED PREDATION. R.M. Key, D.M. Gohde, K.A. Lindee and M.E. Carrington, Governors State University, University Park, IL 60466. Effects of six prairie restoration methods on small mammal seed predation were investigated during November 2001 on the Governors State University campus in Will County, Illinois. The study site was a 50 m x 100 m mowed area in an abandoned agricultural field dominated by smooth brome (*Bromus inermis*). The six treatments established in 18, 1m x 1m plots (15 within the mowed area and three replicate control plots outside the burned area) were 1) mowing; 2) raking and clipping; 3) tilling; 4) tilling and covering seeds with soil; 5) tilling, covering seeds with soil, and tamping soil down; and 6) control. One open (with two 4 cm x 4 cm holes) and one closed hardware cloth cylinder were randomly placed in each plot, and ten sunflower (*Helianthus annuus*) seeds were placed on the soil surface beneath each cylinder, and also were broadcast throughout the plot. Seeds were counted and replaced in each plot every two days for 9 days, until the authors were confident that small mammals had had an opportunity to find the seeds. On the ninth day of monitoring, difference in number of seeds between the closed cylinder and open cylinder was recorded for each plot. More seed predation occurred in the control and mowed treatments than in the raked and clipped, and all tilled treatments. Eight white-footed mice (*Peromyscus leucopus*) were collected on the site during three days of snap-trapping

STABLE ISOTOPIC ANALYSIS TO ESTIMATE NITRATE CONTAMINATION IN HORSESHOE LAKE I.Bala, B.Vermillion, R.Brugam, W.A.Retzlaff, Southern Illinois University, Edwardsville, IL 62026 Industrial development over the last 110 years has contaminated many parts of the American Bottoms, an extensive floodplain of the Mississippi River just east of St. Louis, MO. Industrial and human activities generate a large number and variety of waste products, which are generally discharged into surface or groundwater. The disposal of contaminated wastewater is of widespread national and international concern. Although there is no remaining direct record of past groundwater pollution, there still remains a record of contamination in Horseshoe Lake, a natural lake in the most industrialized portion of the American Bottoms. Core sediments should archive a history of contaminant deposition that dates back to the first establishment of industry in the American bottoms. I have examined sediment cores from Horseshoe lake using stable isotopes of nitrogen (^{15}N), to reconstruct the long-term history of groundwater and surface water contamination. I have observed a drastic increase in the ^{15}N in cores taken at Horseshoe Lake at a depth of 40cm, which clearly indicates post civilization era. Increase in sediment ^{15}N is an indication of human and animal waste deposited in this lake.

PHOSPHATE, BIOGENIC SILICA, AND HEAVY METAL CONCENTRATION IN SEDIMENT CORES FROM HORSESHOE LAKE, MADISON COUNTY, ILLINOIS. B. Vermillion, I. Bala, R. Brugam, and W. Retzlaff, Southern Illinois University, Edwardsville, IL 62026. Horseshoe Lake is part of the American Bottoms, which is a floodplain of the Mississippi River that lies just east of St. Louis, MO. During the latter half of the 19th century the American Bottoms became highly industrialized due to the close proximity of coal deposits, water sources, rail and river transportation. However the environmental impacts of the industrial development were not considered during this time. Effluents from local towns and industries have also been accumulating in Horseshoe Lake along with agricultural runoff and human waste. Agriculture runoff and human waste deposition has exposed Horseshoe Lake to high levels of phosphate, which is the limiting nutrient in freshwater ecosystems. Increased levels of phosphate should increase the number of diatoms in the lake, therefore the level of biogenic silica in the sediment should also increase. Seven sediment cores were collected from Horseshoe Lake. Two of the longest cores have been dated via pollen analysis and ^{14}C dating. Sediment above the cultural horizon, when European settlers arrived at the American Bottoms, shows a drastic increase in phosphate and, therefore, biogenic silica in these cores. Nutrient and metal analysis of these cores allows us to reconstruct the anthropogenic history of Horseshoe Lake.

UPTAKE OF CADMIUM BY *PINUS TAEDA*. Sashirekha Vissa, R.B. Brugam, W.A. Retzlaff, K.A. Johnson, J.L.J. Houpis, and R. Sankaran. Environmental Sciences Program, Southern Illinois University, Edwardsville, IL, 62026.

Contamination of soil and water with heavy metals is an important environmental concern. Phytoremediation, the vegetation-enhanced remediation of soil and water, can be a cost-effective, environmentally sound clean-up technique. Woody species, such as pines, have dense biomass that would enhance the accumulation of heavy metals per ground surface area. The seedlings of *Pinus taeda* (loblolly pine) were grown and treated with cadmium to obtain two nominal levels of soil cadmium: control (0 ppm), and high level (8 ppm). The objectives of this research were: 1) to determine the amount of metal accumulated by seedlings; and 2) to determine if loblolly pines have the potential for phytoremediation of cadmium. Atomic Absorption Spectra (Varian 10) was used to determine the amount of cadmium accumulated in the pine seedlings that have survived the cadmium treatment. Results indicate that on an average, the needles of pines contain approximately 5 times of the amount of metal present in control, while the stem accumulated 3 times, the roots have accumulated 8 times and the soils have accumulated 1.5 times the amount of metal present in the control samples

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USING STABLE ISOTOPES TO EVALUATE EFFECTIVENESS OF A FILTER STRIP. C.L. Cole, J.L.J. Houpis, K.A. Johnson and W.A. Retzlaff. Southern Illinois University Edwardsville, Edwardsville, IL 62026. We identified the pattern of occurrence of natural stable isotope ratios for two key elements, carbon and nitrogen, in soil and plant tissues within the Highland Silver Lake watershed in Madison County, IL. A commercial hog feedlot releases effluent through a vegetative filter strip to a tributary of Highland Silver Lake. Soil and vegetation samples were taken from the filter strip. Soil and tree core samples were taken from the tributary at the outfall of the filter strip. Analysis of the samples showed a distinct Nitrogen signal present in the pollutant source, the soil and vegetation of the filter strip, and in tree ring samples taken from below the filter strip. The nitrogen signal in the soil and vegetation of the filter strip dissipated with soil core depth and distance from the pollutant source. Tree cores taken at the outfall of the filter strip showed the nitrogen signal while those from trees upstream of the outfall did not. Using stable isotope techniques to evaluate long-term effectiveness of non-point source pollution remediation for a vegetative strip provides the opportunity to understand the extent of livestock pollution impact on water supplies and the potential for vegetative strips to mitigate contamination.

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IN VITRO ENHANCEMENT OF IMMUNE RESPONSE IN MICE BY MACROLIDE DRUGS. R. Childs, D. Bush, S. Knebel, J. Knolhoff, S. Khazaeli, D.J. Kitz. Southern Illinois University, Edwardsville 62026-1651.

Macrolide antibiotics are important munitions in the drug arsenal of "magic bullets" used to treat upper respiratory as well as many other types of bacterial infections. We have been investigating the ability of macrolides such as erythromycin *Sigma*, azithromycin *Pfizer* and clarithromycin *Abbott* to influence murine phagocytic cell (neutrophil and macrophage) fungicidal activity. Effects of both in vivo and in vitro drug exposure of phagocytes on their killing of yeasts were examined and microbicidal activity often increased. These drugs were also found to effect organ clearance of candidal yeasts given to mice intravenously, generally correlating with phagocytic cell results. Such immune system enhancement perhaps offsets decreases in colonization resistance in the host due to antibiotic-induced alteration of the normal bacterial flora. This work was supported in part by the Max Baer Heart Fund, Fraternal Order of Eagles.

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LINCOSAMIDE ANTIBIOTICS INFLUENCE IMMUNE RESPONSE IN MICE. C. McLaurin, S. Martinez, M. Rehkemper, S. Khazaeli, D.J. Kitz. Southern Illinois University Edwardsville, IL 62026-1651.

Numerous antimicrobial drugs including clindamycin and lincomycin *Pharmacia-Upjohn* are known to be concentrated by host phagocytic cells (neutrophils and macrophages). Once intracellular these drugs can effect immune responses such as antigen presentation, chemotaxis and antimicrobial activity. We have been studying the exposure of phagocytic cells to lincosamide drugs both in vivo and in vitro to determine their effects on killing *Candida* targets. Phagocytes exposed to drug and yeasts simultaneously in vitro showed enhanced killing, while effects on microbicidal activity of phagocytes exposed to drug prior to yeast exposure were less clear. Drug effects on in vivo organ clearance of intravenously administered candidal yeasts correlated well with in vitro enhancement of yeast killing. Perhaps these drug effects on host immune response may reduce the occurrence or severity of opportunistic yeast infections. This work was supported in part by the Max Baer Heart Fund, Fraternal Order of Eagles.

CAN THE INSECTICIDE, DICHLORVOS (DDVP), INDUCE MUTATIONS IN *ESCHERICHIA COLI* STRAIN K, COMMONLY FOUND IN THE HUMAN DIGESTIVE TRACT? E.A. Alton and S.A. McCommas, Southern Illinois University, Edwardsville, IL 62026. We hypothesize that mutations can be induced in *E. coli* Strain K using DDVP. DDVP is an alkylating agent, and alkylating agents are known to cause mutations in DNA *in vitro*. Methyl Methanesulfonate (MMS) is another alkylating agent and known mutagen and is commonly used as a reference compound by which to compare other alkylating agents for mutagenic activity. By varying concentration of DDVP and MMS and length of exposure of *E. coli* to DDVP and MMS, we can quantify the relationship between the dose of alkylating compound and rate of mutation.

NODULATION OF COMMON AND ENDANGERED LEGUMES BY SYMBIOTIC NITROGEN-FIXING BACTERIA PRESENT IN ILLINOIS PRAIRIE SOILS. S. B. Marousek, G. Pollard, and S. L. Daniel, Eastern Illinois University Charleston, IL 61920. Little information is available on the interaction of prairie legumes and their microbial symbionts or how this symbiosis impacts the competitiveness and survival of leguminous plants in their native habitats. The goal of this project was to study root nodulation and the microbial symbionts present in the nodules of endangered and common prairie legumes in Illinois. The seeds of *Astragalus crassicaarpus* (endangered in Illinois), *Amorpha canescens*, *Lespedeza virginica*, and *Petalostemum candidum* were germinated in sterile potting soil in the greenhouse. Prairie soils collected from sites in Illinois were used to inoculate the potting soil of seedlings. After 4-6 weeks, the root systems of each plant were examined for nodules. All of the *A. crassicaarpus* plants, as well as 1 of 3 plants of *P. candidum*, developed nodules when inoculated with soil from Beaver Dam State Park. Bacteria present in soil from Loxa Prairie did not nodulate *A. crassicaarpus*, *A. canescens*, *L. virginica*, or *P. candidum*; nodules were also not formed by *A. crassicaarpus* or *P. candidum* when exposed to soil from Green River Conservation Area. Microbes in soil from Beaver Dam State Park did not nodulate *A. canescens*. These results indicate a high degree of specificity among microbial symbionts present in prairie soils relative to host plant species.

MICROBIAL DEGRADATION OF OXALATE, GLYOXYLATE AND GLYCOLATE IN THE HUMAN GUT. C. Brueck, M. Lehtinen, M. Flanagan, P. Bade, and S.L. Daniel, Eastern Illinois University, Charleston, IL 61920. Kidney stones affect 10% of the U.S. population and can be painfully debilitating. Oxalate and oxalate precursors (glyoxylate and glycolate) contribute to the synthesis of kidney stones. These organic compounds are synthesized endogenously or are acquired through the diet of an individual. Fruits and vegetables are foods that often contain a high concentration of oxalate and oxalate precursors. This study was performed to determine if there are bacteria within the human gut that can degrade oxalate or oxalate precursors. Fecal samples were collected from five subjects and added to an anaerobic enrichment medium containing 10 mM oxalate, glyoxylate or glycolate. Fecal cultures were incubated at 37°C, and, during incubation, substrate degradation was tracked via high performance liquid chromatography (HPLC). The results after HPLC analysis showed that none of the subjects contained glycolate-degrading bacteria. However, all of the subjects tested positive for glyoxylate degradation, and 40% of the subjects contained oxalate-degrading bacteria. These results indicate that anaerobic oxalate- and glyoxylate-degrading bacteria are present in the human intestinal tract and that these bacteria may impact the formation of kidney stones.

ANTIBIOTIC SUSCEPTIBILITY OF BACTERIA ISOLATED FROM SOIL SAMPLES OBTAINED FROM A CATTLE PEN. S. Nandyala, E. Delany, and K. Keudell, Western Illinois University, Macomb, IL 61455. The ability of pathogens to transfer between animals and humans is a concern among the medical community. The objective of our study was to identify bacteria isolated from the soil from cattle pens and determine the antibiotic susceptibility of these bacteria. Soil samples were collected and diluted. The diluted samples were plated on nutrient agar, eosin methylene blue, and sorbitol-MacConkey agar. Colonies were selected and the isolates characterized for morphology and Gram-stain reaction. Gram-negative bacteria were identified with the Enterotube II system. Antibiotic susceptibility was performed using the Kirby-Bauer disc susceptibility testing procedure and Mueller-Hinton agar plates. Most gram-negative isolates were *Escherichia coli*, others identified were *Enterobacter*, *Morganella*, *Klebsiella*, and *Salmonella*. For gram-negative isolates, 81% were resistant to ampicillin and carbenicillin, 3% were resistant to ciprofloxacin, 0% resistant to gentamicin, 39% resistant to tetracycline, and 3% resistant to amikacin. The results indicate that antibiotic resistance to ampicillin, carbenicillin, and tetracycline is common in bacteria that may be associated with animals. Resistance to ciprofloxacin, gentamicin, and amikacin was not prominent in our isolates. Our previous studies have shown that resistance to tetracycline is prevalent in gram-negative bacteria from the intestines of cattle while sensitivity to the other antibiotics was more common.

UTILIZATION OF OLIGOSACCHARIDES BY COLONIC BACTERIA. C.M. Miller-Fosmore¹, S.M. Holt¹, and G.L. Cote². ¹Western Illinois University, Macomb, 61455 and ²NCAUR, Peoria, 61604. Certain oligosaccharides have been used as prebiotic dietary supplements to selectively stimulate the growth of beneficial colonic bacteria such as bifidobacteria and lactobacilli. In this study, thirteen bacterial species were screened for growth on three oligosaccharide preparations synthesized from alternansucrase (asr; maltose and raffinose acceptors, low mass alternan), and three commercial products (Benefiber, Fibersol-2, Neosugar). Anaerobic growth was determined by OD_{600nm} and acid production. Three lactobacilli strains tested displayed no growth on most of the carbohydrates. *L. casei* showed growth on maltose acceptor and *L. acidophilus* displayed growth on Neosugar. Growth of five bifidobacteria on the carbohydrates was variable and depended on the species tested. *B. adolescentis* and *B. pseudocatenulatum* displayed growth on the maltose and raffinose acceptors. *B. pseudocatenulatum* also displayed growth on low mass alternan. All the bifidobacterial species tested displayed growth on Neosugar. *Bacteroides thetaiotaomicron* displayed growth on low mass alternan, raffinose acceptor, and Neosugar. *Clostridium perfringens* displayed low or medium growth on all the carbohydrates tested except for the raffinose acceptor. *Enterobacter* displayed growth on Neosugar. *E. coli* and *S. typhimurium* displayed no growth on any of the carbohydrates tested. In summary, five bifidobacterial species displayed growth on asr-derived oligosaccharides and three other bacterial genera did not show growth.

IMPACT OF CARBON SOURCE ON GROWTH AND OXALATE BIOSYNTHESIS BY *SCLEROTINIA SCLEROTIUM*, THE CAUSATIVE AGENT OF SCLEROTINIA STEM ROT OF SOYBEAN. J. Schweighart, T. Hatinen, N.C. Furumo, and S.L. Daniel, Eastern Illinois University, Charleston, IL 61920. Sclerotinia stem rot is a serious yield-reducing soybean disease caused by the fungal pathogen *S. sclerotiorum*. The ability of this fungus to infect soybeans and other crops appears to hinge on its ability to produce oxalate. Presently, little is known about the synthesis of oxalate by this organism. The goal of this project was to determine the impact that carbon compounds have on growth and oxalate production by this fungal pathogen. *S. sclerotiorum* Arg-L was grown at 25°C with shaking in an undefined medium (minerals, 0.1% yeast extract) containing 20 mM glucose and one of the following co-substrates (20 mM): acetate, malate, succinate, glyoxylate, pyruvate, or glycolate. Co-substrate concentrations were monitored by HPLC while glucose was determined using an enzyme assay. Growth (dry weight of mycelia) was significantly stimulated by the presence of malate or succinate whereas glycolate and pyruvate slightly repressed growth. Oxalate production was greatest with malate followed by succinate or acetate as co-substrates. Glycolate and pyruvate repressed oxalate synthesis. These results suggest that carbon sources regulate growth and oxalate synthesis by *S. sclerotiorum* and that nutritional factors may impact the virulence of this fungal pathogen.

POTENTIAL RISKS FROM ENVIRONMENTAL SOURCES OF ANTIBIOTIC RESISTANT *STAPHYLOCOCCUS*. Matthew Gresk and James McGaughey, Eastern Illinois University, Charleston, IL 61920-3099. The incidence of pathogenic bacteria demonstrating resistance to currently prescribed antibiotics is increasing. Of particular note are *Staphylococcus* spp that historically show resistance to oxycillin a.k.a. methicillin. These methicillin resistant staph (MRS) may show resistance to other prescribed antibiotics such as vancomycin. The purpose of this study is to determine if final effluent from sewage treatment plants contribute *Staphylococcus* spp. that demonstrate resistance to such antibiotics. Water samples were taken from a treatment plant and sites upstream and downstream from the plant. Heterotroph populations were estimated using PCA. *Staphylococcus* spp. were recovered using membrane filtration and Mannitol Salt Agar. Suspected colonies of *Staphylococcus* were tested for resistance to oxycillin and vancomycin using the Kirby-Bauer method of antibiotic susceptibility. Results suggest that 0.2-0.5% of the total bacterial populations was composed of *Staphylococcus* spp. The majority of the colonies were found to be resistant to oxycillin. To date there have been no staphylococci that have demonstrated resistance to vancomycin.

FACTOR FROM *KLUYVEROMYCES MARXIANUS* NRRL Y-8281 ENHANCES BIOTRANSFORMATION OF OLEIC ACID TO 7,10-DIHYDROXY-8(E)-OCTADECENOIC ACID BY *PSEUDOMONAS AERUGIONSA* (WIU-JS). A. M. Kuhrts, J.-K. Huang, R. V. Gessner, and K.C. Keudell, Western Illinois University, Macomb, Illinois 61455. Biotransformation of oleic acid in a synergistic reaction between *Pseudomonas aeruginosa* (WIU-JS) and *Kluyveromyces marxianus* NRRL Y-8281 has previously been found to produce 7-hydroxy-8-octadecenoic acid after 12 hours incubation and 7,10 dihydroxy-8 (E)-octadecenoic acid after 24 hours incubation. It has been determined from thin layer chromatography that the substance in *Kluyveromyces marxianus* NRRL Y-8281 that enhances the bioconversion of oleic acid in *Pseudomonas aeruginosa* (WIU-JS) is not a protein since the activity still occurred after heat treatment. When the whole cells were subjected to sonification, however, the activity did not take place. It has been found that treatment with Tritone X100 and lysozyme is much more gentle in breaking up the cells. Further tests can now be run with the addition of EDTA to see if the substance in *Kluyveromyces marxianus* NRRL Y-8281 that enhances the bioconversion in *Pseudomonas aeruginosa* (WIU-JS) is a cofactor.

THE UNITS CONVERTER. Y. Chen, M. Traverso, C. Harper, M. Quinn, and A. Lyle, Illinois Mathematics and Science Academy, 1500 West Sullivan Road, Aurora, IL 60506. The construction of an online units converter with detailed histories and explanations for most units appears to be the first and only one of its kind. The units converter, which is easily accessible via the Internet and free of charge, currently has over 200 units in 22 different categories, ranging from length and viscosity to capacitance and energy per mass. It is accessed by thousands of users from around the world monthly, despite the fact that it is not advertised. The units converter remains a continuing project that is being improved upon constantly.

<http://www.educationplus.com/LearningTools/UnitsConverter/framearray2.html>

DOES THE FEMALE PINK-SPOTTED LADYBEETLE, *COLEOMEGILLA MACULATA FUSCILABRIS* (COLEOPTERA: COCCINELLIDAE), UTILIZE A SEX PHEROMONE?

J.R. Martin, M.W. Robertson, and C.S. Toepfer, Millikin University, Decatur, IL 62522.

We studied the possible role of sex pheromones in the female pink-spotted ladybeetle, *Coleomegilla maculata fuscilabris* (Coleoptera: Coccinellidae). We tested for pheromone presence by using a series of behavioral and chemical assays. We subjected males to choice tests between *C. maculata* and *Musca domestica* pupae to determine whether males were more attracted to conspecific pupae, indicating the possible role of a sex pheromone. We also subjected males to choice tests between virgin and non-virgin females to determine whether males were more attracted to virgins than non-virgins. In addition, we performed pheromone extraction techniques on female *C. maculata* and examined male behaviors (crawling, grooming, and stationary activity) in the presence of extracted materials versus a 95% ethanol control. Males do not show a significant preference between *C. maculata* and *M. domestica* pupae, nor do they show a preference between virgin and non-virgin females. Additionally, males do not exhibit a significant difference in behaviors between the ethanol control and the extracted material.

THE EFFECTS OF EXPOSURE TO MULTIPLE MALES DURING MATING IN *DROSOPHILA MELANOGASTER*. E. Ellinger and J. Gumm, Millikin University, Decatur, IL 62522. We examined

whether female clutch size (defined as the number of adult offspring produced) would differ if an additional male was present in the female's arena during courtship and copulation. The control group consisted of a mating pair copulating in the presence of one non-mating male, and the experimental group consisted of an isolated mating pair. Females in the experimental group had a significantly larger clutch size than females in the control group. Therefore, we hypothesize that a physical or chemical interaction between the second male and the first male and/or the female causes the clutch size to decrease.

FORAGING BEHAVIOR BY *TENODERA ARIDIFOLIA SINENSIS* (MANTODEA, MANTIDAE) REARED UNDER HIGH AND LOW PREY DENSITIES. D. L. Lanckton, B. J. Becker, and M. Robertson, Millikin University, Decatur, IL 62522. We observed timed reactions to prey items in laboratory-reared mantids, *Tenodera aridifolia sinensis*, through the first instar to adulthood. *Tenodera aridifolia sinensis* strikes at prey with a rapid thrust from their raptorial forelegs. We collected data from nymphs in all instars. We raised nymphs under two diet conditions: a low fed, prey-deprived treatment, and a high fed, prey-enhanced treatment. Prey-deprived mantids had a significantly faster reaction time to prey and traveled less distance to reach prey than high-fed mantids, indicating that mantids in nature may have faster reaction times during periods of limited food availability. Mantids on a low feeding regime struck a vial containing prey more frequently than mantids on a high feeding regime.

THE RICHNESS, DIVERSITY, AND ABUNDANCE OF ANURANS AT GREEN WING ENVIRONMENTAL LABORATORY, AMBOY, ILLINOIS. S. B. Hager, Department of Biology, Augustana College, Rock Island, IL 61201-2296. Amphibians are declining worldwide in both abundance and diversity. Reasons for these trends are numerous and varied. Assessing declines are difficult because of the paucity of baseline information on the basic population biology for many amphibians. In 2000, I established a long-term monitoring study of the basic ecology of anurans at Green Wing Environmental Laboratory (GWEL), a field station owned by Augustana College that is located in northcentral Illinois. In 2000 and 2001, male breeding choruses were estimated from six aquatic sites at GWEL. Species richness and Shannon diversity were similar between years except at Main Pond (site 2) and Snapper Pond (site 5), where values were higher in 2001 than in 2000. Mean abundance for all six anurans were not significantly different between years. This baseline information will be used in conjunction with future survey data to monitor yearly differences in anuran abundance and diversity at GWEL.

LACK OF EVIDENCE FOR CHEMICALLY MEDIATED POND WATER DISCRIMINATION IN PAINTED TURTLES (*CHRYSEMYS PICTA*). N. Smith, T. Haas, E. Woolsey, and S. B. Hager, Department of Biology, Augustana College, Rock Island, IL 61201-2296. Homing behavior by turtles is thought to be mediated, among other things, by chemical information in the environment. Recently, painted turtles (*Chrysemys picta*) collected from a Michigan lake appeared to prefer the lake water from where they were collected over water from other sources. Given that lakes and ponds vary in several biotic and abiotic factors, we wondered if painted turtles found in ponds could discriminate among several different water sources. We tested the hypothesis that painted turtles can recognize chemical cues from their home ponds and use these cues to discriminate between home pond water and non-home pond water. Turtles were presented with a choice between home pond water and distilled water, pond water without conspecifics, and pond water with conspecifics. We found that turtles spent significantly more time in home pond water than in distilled water; however, turtles failed to show this preference in the other three treatment combinations. Moreover, there were no significant differences in final position for turtles at the end of each preference test. These data suggest that painted turtles from ponds cannot discriminate among home pond water and non-home pond water using chemical cues. Alternatively, if painted turtles from ponds can discriminate among several pond water sources, they do not prefer water from their home pond.

MOTHER-CUB RELATIONSHIPS IN POLAR BEARS (*Ursus maritimus*): THE SIGNIFICANCE OF IMPRINTING. K. Eder and D.M. Jedlicka, The School of the Art Institute of Chicago, Chicago IL 60603. Polar bear females make excellent mothers. The purpose of this project was to prove that imprinting between the female polar bear and her cubs is detrimental to the future development of a mature polar bear. A polar bear mother and her cub were observed for a series of two hour intervals for three days. Interactions were observed and recorded. Cubs need to learn to defend, kill for food, sniff around (use their senses to find out about their surroundings), eventually fight for their mate and raise their own cubs. At the end of this project, the results suggest that imprinting is such an important experience for the cubs of this species that if left without these learned skills from their mother, they would not be able to survive as adult bears.

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FORAGING PREFERENCES IN THE RING -BILLED GULL (*Larus delawarensis*) WITH RESPECT TO DISTANCE AND FOOD SIZE. E. Joanis and D.M. Jedlicka, The School of the Art Institute of Chicago, Chicago IL 60603. This project was conducted on the eastern shores of Lake Michigan, near the Ox Bow properties owned by the Art Institute of Chicago, Saugatuck, Michigan. The ring-billed gull (*Larus delawarensis*) is the most common gull in Southwest Michigan. The shores of Oval Beach allowed for the collecting of distance/food data in the absence of any other humans, with the exception of the researcher. Three different sizes of wheat bread (0.5 g, 2.0 g and 5.9 g) were presented to the gulls. The distance at which the bread was placed ranged from 0.5 m to 2.0 m, with 0.5 m increments in between. The results were that almost all food sizes presented at the distance of 1.0 m and farther were accepted. The 5.8 g of wheat bread was always accepted at each distance except at 0.5 m where 27% was not taken. The average percentage of young birds taking food was 77.5% . Young birds seem to approach unknowns more than adult birds.

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ART STUDENTS CAN COLLECT VALID FIELD DATA, WITH A FLARE! D.M. Jedlicka, The School of the Art Institute of Chicago, Chicago IL 60603. During an intense summer short course, students from the Art Institute of Chicago collected valuable data for a sand dune-forest study. The study site was located in Saugatuck, Michigan at the Art Institute's off campus site "Ox Bow. Ox Bow is approximately 100 acres of beach/dune/and dune forests. Interesting geological features were found along with examples of classical dune succession (Cowles 1899, Poulson 1992). The class collected seedling, sapling, and tree data using nested circular quadrats. Data were collected on dune tops and bottoms. Individual projects were also conducted in order to illustrate the scientific method. Individual projects included turtle location preferences, gull approach distance using foraging theory, house fly life history, and fern locations with respect to moisture and shade. At the end of the session, an open house allowed the students to exhibit what data, conclusions and specimens they had collected. The students were not only capable in the field and lab but also extremely creative in their project approaches and exhibitions.

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INFLUENCE OF CYCLOMORPHOSIS IN CLADOCERAN ZOOPLANKTON ON RELATIVE RATES OF PREDATION BY *GAMBUSIA AFFINIS*. B.A. Metzke and C.L. Pederson, Eastern Illinois University, Charleston, IL 61920. *Daphnia lumholtzi* is an exotic species of crustacean zooplankton that has spread north from Texas into Illinois. This species is unique because of the extreme cyclomorphic features it displays throughout its life history, including elongated head and tail spines. *Daphnia pulex* is a native species that is a common food for planktivorous fish in Illinois. *Gambusia* is an important forage fish that does not undergo a niche shift and remains planktivorous throughout it's entire life. Based on research involving blue gill (*Lepomis macrochirus*), we hypothesize that spines of *D. lumholtzi* could decrease the ability of *Gambusia* to feed, and thus also decrease the overall fitness of the fish. Data were collected in the laboratory by exposing the *Gambusia* to prey communities consisting of *D. lumholtzi* and *D. pulex* either alone or in combination. Our results are compared to previous studies on other planktivores, primarily centrarchids, that undergo ontogenetic niche shifts. This research offers insight into the impact of introduced species on native communities in aquatic systems throughout Illinois.

THE EFFECTS OF DISTANCE TO VEGETATION ON BIRD ABUNDANCE AT FEEDERS. D. J. Horn, M. Abdallah, M. K. Bastian, J. R. DeMartini, and R. M. Wilhelmj, Aurora University, Aurora, IL 60506. When predators are present, birds may be less likely to use feeders. Moreover, when given a choice, birds should choose to visit feeders closest to cover in order to reduce both the probability of predation and energetic costs associated with flight. We are examining the effects of distance to vegetation on bird abundance at feeders. We predict that as distance of a feeder to the nearest tree or shrub increases, the abundance of birds will decrease. The study will be conducted from January-March 2002 at four houses in and around Aurora, Illinois. At each house, four feeders will be placed 0.0, 2.5, 5.0, and 7.5 m, respectively away from the nearest tree or shrub. Two types of feeders, platform and silo, will be used during the study and feeders will be filled with black-oil sunflower. Feeders will be monitored four times per week for 1.5 hours at a time. During each monitoring period, we will record the maximum number of birds that visited each of the four feeders. Results from our study will be presented at the meeting.

THE EFFECTS OF TEMPERATURE ON SEED CHOICE BY BIRDS THAT USE FEEDERS. D. J. Horn, G. W. Bell, D. N. Helm, S. E. Hoth, D. J. Johnson, E. V. Kingsbury, J. A. Kraft, J. M. Leifheit, T. M. Mikalauskas, J. D. Stubis, S. R. Sully, D. L. Swanson, and R. Turks, Aurora University, Aurora, IL 60506. Previous studies have found that both decreasing temperature and snowfall lead to an increase in bird feeding activity. These studies, however, have not examined whether seed choice by birds changes as weather conditions change. We are examining how temperature influences seed choice by birds that use feeders. We predict that as temperature decreases, birds will switch to a seed with a higher fat content so as to meet their increased energetic demands. The study will be conducted from January-March 2002 at 12 houses in and around Aurora, Illinois. At each house, four platform feeders will be placed 3 m apart from one another and from surrounding vegetation. Feeders will be filled with one of four types of seed: black-oil sunflower, white proso millet, whole peanuts, and peanut suet. Feeders will be monitored four times per week for 1.5 hours at a time. During each monitoring period, we will record the maximum number of birds that visited each of the four types of feeders. Results from our study will be presented at the meeting.

EFFECTS OF HUMAN ACTIVITY ON BIRD DISTRIBUTION IN AN ILLINOIS NATURE PRESERVE. V. Hedrick and P. Brunkow, Southern Illinois University Edwardsville, Edwardsville, IL 62026. Agriculture, industrialization, and urbanization have fragmented Illinois forests for the past 150 years. Remnant forest fragments are increasingly developed along their edges and are also subject to increasing use for recreational pursuits by humans. As a result, native and migrant bird species diversity in Illinois has declined sharply, and effective management of remaining forest preserves has become a priority. We report here preliminary results of a study examining effects of human activity on bird distribution in the Carpenter Park Nature Preserve outside Springfield. Study plots were established in the preserve along a gradient of human use (hiking, biking, family outings, etc.) and were visited for 30-minute periods during 5 sampling sessions Summer through Winter 2001. Red-belly and downey woodpeckers, tufted titmouse, blue jay, Northern cardinal, indigo bunting and American robins were commonly observed, several of which are primarily edge species. Interestingly, wood thrush, cerulean warblers and Kentucky warblers, neotropical migrants previously confirmed to have bred within the park, were not observed. Human activity within our plots varied with plot position in the expected fashion, but there was no significant relationship between human activity and either bird species number or number of individuals observed. The preponderance of edge species observed to date, and the lack of a relationship between human use and bird distribution, suggest that this nature preserve is impacted by human activity in such a way that truly interior forest habitat is not perceived by bird species in the region.

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RELATIONSHIPS BETWEEN SHELL AND FOOT MORPHOLOGY IN A FRESHWATER SNAIL. K. Weiss, P. Brunkow and L. Bauer, Southern Illinois University Edwardsville, Edwardsville, IL 62026. Plasticity in development of shell shape is a hallmark of freshwater snails of the genus *Physa*. Shells can range from relatively long and slender to more rotund in shape; such flexibility in shell design is an adaptive response to predator cues. In some habitats, snails are also subject to other forces such as flowing water, which a snail resists by gripping the substrate with its muscular foot. This study examined the relationship between foot morphology and shell morphology in *Physa* to determine if a potential trade-off exists between these two characters in terms of avoiding predation and resisting the force of moving water. Snails were photographed from below while crawling on a transparent substrate. Four shell characters and two foot characters were measured from each photograph. Length and surface area of the foot significantly increased with shell size and aperture size, with aperture size generally explaining more variation in foot size. Relative width of the foot increased significantly as snail size increased, suggesting that larger snails have more symmetrically shaped feet than smaller snails. Shell shape variables (shell aspect ratio and aperture aspect ratio) were not significantly related to either surface area of foot or relative foot width. Thus, it appears that foot size and shape are independent of shell shape, implying that changes in shell shape are not accompanied by compromises in foot performance.

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GENETIC VARIATION FOR PHENOTYPIC PLASTICITY IN A FRESHWATER SNAIL. A. Manuel and P. Brunkow, Southern Illinois University Edwardsville, Edwardsville, IL 62026. Changes in shell shape in response to predator cues are well documented in freshwater snails of the genus *Physa*. Individuals will develop relatively rotund shells in the presence of fish predator cues and will develop relatively slender shells in the presence of crayfish cues. Previous studies have demonstrated that these responses are adaptive as each shell shape lowers the risk of predation by fish or crayfish, respectively. In this study, we raised replicate groups of full siblings (families) in the presence of either no predator cues or crayfish cues. Shell shape was then compared between predator cue treatments among families as well as between each group of siblings within families. Shells were significantly more slender in crayfish treatments, in accord with prior studies. Mean difference in shell shape between no predator and predator treatments also differed significantly between families, suggesting a high degree of genetic variation for phenotypic plasticity in natural populations of this species. Importantly, plasticity of response varied depending upon which descriptor of shell shape was analyzed, and some families actually showed a response to the predator cue opposite to what was predicted. The possibility of determining the heritability of phenotypic plasticity in this organism is also discussed.

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THE STABILITY OF PIASA CREEK FISH ASSEMBLAGE. J.R. Kerfoot and J.F. Schaefer, Southern Illinois University, Edwardsville, IL 62026. A survey of the fishes of Piasa Creek, in Jersey, Madison, and Macoupin counties, west central Illinois, was conducted in 1967 by Thomerson (1969). This survey consisted of 31 sites and 41 collections over 1 year. No stream fish assemblage at any one place can remain stable forever because biological communities are dynamic and fluctuating. Extensive agriculture practices have arisen over the last few decades along Piasa Creek, and this study will address what impact this has had on the assemblage over time. A second survey of the fish assemblage was conducted in the summer/fall of 2001. Collections were made at 25 of the original 31 sites. The changes in fish assemblages are important because they can help to detect any anthropogenic effects on the river system, and also many concepts in ecology rely on the idea that populations achieve stability or that aquatic communities operate in a regular and predictable fashion. Also, in taking an inventory of the abundance of indicator species can help detect changes in the overall system. Data sets like ours that detail changes in assemblages over periods of decades are rare. My hypothesis is that due to anthropogenic changes to the drainage and land use practices changes in assemblage have occurred.

THE INFLUENCE OF LAND USE ON THE FISH COMMUNITY IN A MIDWESTERN DRAINAGE. Funderburg, C., Zacha, S. and Schaefer, J. Southern Illinois University Edwardsville, Edwardsville, IL 62026.

Land use practices have been shown to affect fish community structure through increased sedimentation. Some of the mechanisms thought to be at work here are 1) changing food availability, 2) habitat loss through substrate changes, 3) decreasing light penetration (increased turbidity) and primary productivity and 4) decreased survival of larvae and eggs. The rate of siltation in many drainages has increased steadily in the last 150 years as agricultural land use has increased. The Piasa Creek Watershed covers over 78,000 acres in portions of Jersey, Madison and Macoupin counties. Much of this land is agricultural. To investigate the effects of land use on stream ecosystems we examined fish community structure, habitat complexity and the diet of a common cyprinid species (Creek Chub) at 21 sites in the drainage. We hypothesize that sites impacted by agricultural land use (higher in sediment load) will have different community structure, habitat availability and food availability.

THE USE OF BEHAVIORAL OBSERVATIONS TO PREDICT PRIMARY BREEDING FEMALES IN THE EUSOCIAL NAKED MOLE RAT. S.W. Margulis, Behavioral Research Manager, Brookfield Zoo, Brookfield, Illinois, 60513, and J.L. Youngblood, Augustana College, Rock Island, Illinois, 61201. Naked mole rats (*Heterocephalus glaber*) are eusocial mammals: each colony is composed of a single reproductive female, or queen, multiple breeding males, and numerous subordinate males and females are "workers." Three colonies housed at the Brookfield Zoo, Brookfield, IL, are atypical in that no primary breeding female has been established. Previous research found that hormonal levels are weak indicators of breeding potential in female naked mole rats (Margulis, 1994). As an alternative, behavioral measures may provide better predictions about which female will most likely become queen. The three colonies were observed for approximately two months, and state and event behaviors were measured for individuals of both sexes that were considered potential breeders and non-breeders. Event behaviors, such as ano-genital nuzzling and shoving, suggested that females Purple Rear, Purple Head, and Purple Shoulders will become queen of their respective colonies. Future observations will test the validity of behavioral measures to predict future queens since no colony has established a queen at this time.

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Armando G. Amador, Eli Lilly & Co., D/C 5015, 1400 W. Raymond St., Indianapolis, IN 46221; Office: 317/276-4955; aamador@yahoo.com

James R. Rastorfer, Department of Biological Sciences, Chicago State University, 9501 S. King Dr., Chicago 60628. Office: 773/995-2426; home: 708/748-3682; FAX 773/995-3759; jrastorfer@csu.edu

Robert J. Van Lanen, Department of Science/Chemistry, Saint Xavier University, 3700 W. 103rd. St., Chicago 60655. Office: 773/298-3525; FAX 773/779-9061; home: 708/531-0822; vanlanen@sxu.edu

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home: 618/457-2707; hkaplan@som.siu.edu

and

James R. Rastorfer, Department of Biological Sciences, Chicago State University, 9501 S. King Dr., Chicago 60628. Office: 773/995-2426, home: 708/748-3682; FAX 773/995-3759; j-rastorfer@csu.edu

#Research Grants: William Retzlaff, Environmental Studies Program, Southern Illinois University Edwardsville, Edwardsville 62026-1651. 618/650-2728; wretzla@siue.edu.

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April 19-20, 2002: 94th Annual Meeting, Southern Illinois University at Edwardsville
April 4-5, 2003: 95th Annual Meeting, Illinois State University, Normal

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ILLINOIS STATE ACADEMY OF SCIENCE

Southern Illinois University Edwardsville

April 19-20, 2002

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