ABSTRACTS

Ontario Ecology & Ethology Colloquium

University of Toronto
LM Frost Centre, Dorset
12-14 April, 1985.

NAMES/DAY/TIME/ROOM NUMBER

ALISAUSKAS, R.T. SUN 1420 #2

ALVO, R. SAT 1640 #1

BAKER, R.L. SAT 0900 #2

BALCOMBE, J.P. SUN 1440 #1

BAUER, S.J. & M.B. SOKOLOWSKI POSTER

BENDELL, B.E. & D.K. McNICOL POSTER

BOWERMAN, J.E. SAT 1520 #1

BOONSTRA R., & J.A. HOYLE SAT 0840 #2

BOZIC, L.E. & T.C. HUTCHINSON SAT 1440 #3

BRIGHAM, R.M. SAT 1020 #2

BROWN, W. & ROGER SUFFLING SAT 1620 #2

BRUMELIS, G. & T. CARLETON SAT 1440 #2

CALEY, M.J. SAT 1140 #2

CAPORN, S.J. & T.C. HUTCHINSON SAT 1420 #3

CARLETON, T.J. SAT 1520 #2

CHAMELY, L. SUN 1340 #1

CHOW-FRASER, Patricia SAT 1040 #1

COLLINS, N.C. SAT 0920 #2

CONLIN, T. & A. CROWDER SAT 1540 #3

CWYNAR, L.C. SAT 1540 #2

DUPUIS, H.M.C. SUN 0920 #1

EDMUNDS, S.R. & C.D. ANKNEY SUN 1120 #1

FAHRIG, L. SUN 1320 #2

FALK, J.W. SUN 1320 #1

FALLS, J.B. & E.A. FALLS POSTER

FELTMATE, B.W. SUN 1040 #2

FENTON, M.B. SAT 1040 #2

FISHER, R.M. SAT 1320 #1

FISHER, R.M. SUN 1140 #2

FRANCE, R.L. SUN 0900 #1

FRICK, B.L. & P.B. CAVERS SAT 1400 #2

FULTHORPE, R.R. SAT 0900 #1

GABER, B.A. & T.C. HUTCHINSON SAT 1520 #3

GALBRAITH, D.A. & R.J. BROOKS SUN 1420 #1

GIBO, D.L. SUN 1140 #2

GIRALDEAU, L.-A. SAT 1400 #1

GLOOSCHENKO, V. SAT 1100 #1

GRANT, J.W.A. SAT 0940 #2

HARMSEN, R. & M.E.J. WOOLHOUSE SUN 0820 #2

HAWKE, M.A. & M.A. MAUN POSTER

HICKEY, M.B.C. SAT 1100 #2

KNAPTON, R.W. SUN 0820 #1

KRANNITZ, P.G. & C.K. CAREY POSTER

LEGNER. M. SAT 0920 #1

LITVAK, M.K. SUN 1340 #2

McCAW, P.E. & J.E. ECKENWALDER SUN 0940 #2

MacKAY, R.J. SAT 1120 #1

MARTIN, R.C., & J.D.H. LAMBERT SAT 1420 #2

McCANNY, S. & P.B. CAVERS SAT 1340 #2

McCARTHY, L. POSTER

McNICOL, D.K. & B.E. BENDELL SAT 1620 #3

McQUEEN, D.J. & J.R. POST SAT 0840 #1

MINEAU, P. SAT 1640 #3

MONTGOMERIE, R.D. SUN 1040 #1

MOORE, D.R.J. & P.A. KEDDY SUN 1020 #2

MORRILL, P.K. SUN 1120 #2

MORRIS, G.K. SAT 1340 #1

MORRISON, W.O. & H.G. MERRIAM SUN 1440 #2

NAUMENKO, N., G.M. COURTIN et al. SAT 1600 #2

NERO, R.W. SAT 1540 #1

NOAKES, D.L.G., E.K. BALON, et al. POSTER

PAVONE, L.V. & R. BOONSTRA SAT 0820 #2

POST, J.R. SAT 1020 #1

QUINNEY, T.E. SAT 1420 #1

RAMCHARAN, C.W., W.G. SPRULES et al SAT 1600 #1

REID, M.L. SUN 1100 #1

ROWE, L. & L. HOLLETT SAT 1600 #3

SAGITOV, R. SUN 1400 #2

SAKALUK, S.K. SUN 0840 #1

SCHUT, P.H. SUN 0920 #2

SCHWARZKOPF L. & R.J. BROOKS SUN 1400 #1

SCOTT, M.G. & T.C. HUTCHINSON SAT 1400 #3

SCOTT, M.G. & D.W. LARSON SAT 1320 #2

SEMPERE, A.J. SUN 1020 #1

SHIPLEY, B. & P.A. KEDDY SUN 0840 #2

SOKOLOWSKI, M.B., S.J. BAUER et al. SUN 1100 #2

SOLUK, D. SAT 1140 #1

SPRULES, W.G. & J.E. BOWERMAN SAT 0940 #1

STONEMAN, M.G. SAT 1120 #2

SUFFLING, R. & P. J. HOWARTH POSTER

TAYLOR, M.C. & H.C. DUTHIE SAT 1320 #3

TAYLOR, W.D. SAT 0820 #1

TURNER, P.A.E. & P.M. STOKES SAT 1340 #3

WAI-PING, V. SUN 0940 #1

WEHNER, G. POSTER

WHILLANS-BROWNING, K.V. & J.B. FALLS SAT 1440 #1

WILSON, S.D. & P.A. KEDDY SUN 0900 #2

WONG, C.K., C.W. RAMCHARAN, et al. SAT 1620 #1

R.T. ALISAUSKAS, Dept. Zoology, University Western Ontario, London, Ontario, N6A 5B7

WINTER DISTRIBUTION AND BILL MORPHOLOGY OF LESSER SNOW GEESE

Lesser Snow Geese, Chen caerulescens, traditionally wintered on the Gulf Coast in Texas and Louisiana where they excavated and fed on the rhizomes of marsh plants. The species has recently expanded its range to include 1) rice fields up to 150 km inland where they feed on seeds/grasses (about 25 years ago) and 2) corn field in Iowa (about 15 years ago). I predicted that, because snow goose diets varied greatly among these habitats, bill morphology would vary correspondingly. Thus, I measured 11 morphometric variables from 208 females and 189 males collected concurrently from the 3 habitats in Jan. and Feb. 1983. Uni- and multivariate ANOVAs and discriminant analysis confirmed that geese feeding (excavating) in coastal marshes are characterized by more robust skull morphology. It appears that exploitation of new habitats has relaxed selection which operated historically against lesser snow geese with shorter bills that were inadequate for excavation.

R. ALVO, Dept. Biology, Trent University, Peterborough, Ontario, K9J 7B8

LOON BREEDING SUCCESS IN NORTHEASTERN ONTARIO

Common Loon (Gavia immer) productivity was studied from 1982 to 1984 on small lakes of varying alkalinity from 35 to 135 km of Sudbury Ontario. Strong positive relationships were found between loon breeding success and alkalinity and between loon breeding success and lake area. Chick mortalities occurred more frequently on low alkalinity lakes than on high alkalinity lakes, and a positive relationship was found between the age of disappearance of chicks and alkalinity. Diving success rates of parents feeding their young were lower on low alkalinity lakes than on high alkalinity lakes. These results suggest that the low breeding success on low alkalinity lakes may have been due to insufficient food on these lakes.

R.L. BAKER. Dept. of Zoology, University of Toronto, Erindale College, Mississauga, Ontario L5L 1C6

FOOD LIMITATION AND SPACING BEHAVIOUR OF LARVAL ODONATES

Although larval dragonflies show spacing behaviour under laboratory conditions there is no evidence that such behaviour occurs in the field. I tested for spacing behaviour in the field by analyzing the food limitation of Ischnura verticalis and Enallagma ebrium in a pond in southern Ontario. As predicted by the spacing hypothesis, food limitation, and variation in food limitation, of both species was positively correlated with population density; however, when the various sampling stations were compared there was no correspondence between high population density and high food limitation on any given day. In contrast to my predictions, large larvae suffered as much food limitation as small larvae. Lack of evidence for spacing behaviour may be due to low population density or lack of prey patches.

J.P. BALCOMBE. Dept. of Biology, Carleton University, Ottawa, Ontario K1S 5B6

ECOLOGY OF THE MIDLAND PAINTED TURTLE, CHRYSEMYS PICTA MARGINATA, IN ONTARIO

A total of 437 C. p. marginata was captured in the Wye Marsh area, Midland, Ontario, between May 1978 and October 1983. Juveniles constituted 19% of captured turtles and the adult sex ratio was 1.39F:1M. Sexual maturity is attained at a plastron length of about 89mm for males of the population, and about 126mm for females. The nesting season began in early June and lasted 22 days in 1983. Two females were observed to lay two clutches during June, 1983; internesting intervals were 10 and 11 days. A mean of 7.25 eggs/clutch was determined for eight nests. Predation on nests is heavy. The greatest observed distance travelled, 875 meters, was by a female. Strong evidence for homing ability was observed for 5 recaptured turtles.

S.J. BAUER and M.B. SOKOLOWSKI. Dept. Biology, York University, Downsview, Ontario M3J 1P3

SEX DIFFERENCES IN PUPATION HEIGHT IN DROSOPHILA MELANOGASTER

Pupation height in Drosophila melanogaster was measured as the distance a larva pupated above the surface of the medium. In all strains tested, males tended to pupate higher than females. The possible reasons for these sex differences were explored by measuring the pupation height and developmental time of larvae grown singly and in groups.

B.E. BENDELL and D.K. McNICOL, Canadian Wildlife Service (Ontario Region) Ottawa, Ontario K1A 0E7

FISH PREDATION AND LAKE ACIDIFICATION AS FACTORS IN THE DISTRIBUTION OF BACKSWIMMERS (HEMIPTERA: NOTONECTIDAE)

In order to assess the relative importance of predator-prey interactions and acid stress on populations of backswimmers (Notonecta spp. and Buenos spp.), these insects were sampled during the summer of 1984 from 18 small headwater lakes north of Lake Wanapitei in the Sudbury District. Ten of the lakes were fishless and ranged from pH 4.20 to 8.05. The remaining 8 lakes ranged from pH 4.85 to 7.40 and supported fish populations. Backswimmers were absent or scarce in lakes containing fish, but were abundant in lakes without fish, irrespective of pH.

J.E. BOWERMAN. Dept. of Zoology, University of Toronto, Erindale College, Mississauga, Ontario L5L 1C6

THE RELATIVE IMPORTANCE OF FOOD AVAILABILITY AND PREDATION TO THE JUVENILE SURVIVAL OF *DIACYCLOPS THOMASI*

In situ enclosure experiments conducted to determine the effect of food availability and predation on the juvenile survival of *Diacyclops thomasi* revealed that food limitation due to competition from the grazing assemblage, interspecific predation by *Diaptomus kenai* and intraspecific predation by *D. thomasi* adults could all substantially affect the survival of *D. thomasi* juveniles. Subsequent feeding studies showed that *D. kenai* at lake densities were capable of preying on nauplii at a rate of 20% of the nauplii per predator per day and this feeding rate seemed to account for most of the mortality of *D. thomasi* juveniles in enclosures with *D. kenai*.

R. BOONSTRA. Div. Life Sciences, Scarborough College, Univ. Toronto

J.A. HOYLE. Dept. Biology, Univ. Queen's, Kingston

COMPETITION BETWEEN *ZAPUS HUDSONIUS* AND *MICROTUS PENNSYLVANICUS* IN THE GRASSLANDS OF SOUTHERN ONTARIO

In North America, the distribution of the meadow jumping mouse (*Zapus hudsonius*) is virtually totally sympatric with that of the meadow vole (*Microtus pennsylvanicus*). Both species prefer moist meadow habitat, but whereas *Zapus* is characterized by low densities, *Microtus* is characterized by high but fluctuating densities. From 1978 to 1982, experimental manipulation of *Microtus* resulted in densities of resident voles varying from normal levels (control grid) to zero (removal grid). The numbers of *Zapus* were inversely related to vole densities, with the highest numbers consistently occurring on the vole removal grid. Habitat differences among grids could not explain the results. Thus the presence of resident voles is one of the major factors limiting the abundance of *Zapus*.

L.E. BOZIC and T.C. HUTCHINSON, Dept. Botany, U. of T. Toronto, Ont., M5S 1A1

EFFECTS OF ALUMINUM ON THE GROWTH OF *PINUS BANKSIANA* SEEDLINGS

Acid rain has been proposed to cause forest dieback by increasing Al solubility in soils. Acidic soils collected from northern Ontario jack pine stands had H_2O-extractable Al concentrations of up to 10 mM in the organic horizon and up to 2 mM in the mineral soil layer. The effects of 0, 0.1, 1.0 and 4.0 mM Al on the growth of jack pine seedlings in solution culture were determined. After 68 days of growth, Al significantly decreased primary root length, shoot height, the total number of lateral roots produced and the number of mitotic cells in the meristem of the primary root. Seedling survivorship decreased 52% in 4.0 mM Al compared to the control. This indicates that seedling development and survival can be inhibited by the presence of Al in acidic northern Ontario soils.

R.M. BRIGHAM. Dept. of Biology, Carleton University, Ottawa, Ontario K1S 5B6

THE FUNCTIONAL SIGNIFICANCE OF COMMUNAL ROOSTS TO *EPTESICUS FUSCUS*

I tested 5 hypotheses that attempt to explain the communal roosting behaviour of bats. Eighty-five radio-transmitters were attached to 75 different animals in a village near Ottawa for 539 total nights. My results show no evidence that a limited number of roost sites, ambush predation or information-transfer are important factors. The results indicate that bats may be roosting to minimize commuting costs, but the data are also consistent with an opportunistic foraging strategy. Individuals "evicted" from roost sites before parturition produced fewer young, indicating that roosting together in specific sites may provide optimal conditions for young production.

W. BROWN AND ROGER SUFFLING. School of Urban and Regional Planning, University of Waterloo, Waterloo, Ontario N2L 3G1

HOW WIDE IS AN ECOTONE?

Little has been written about whether ecotones in forest systems are merely boundaries between communities, or clines between communities or are themselves distinct communities. There is no standard method for defining the spatial influence of each neighbouring community, and of the ecotone itself. To investigate these factors in ecotones in S.E. Manitoban boreal forests, we ran transects perpendicular to each ecosystem boundary, with 2x5m woody plant quadrats and 0.5x1.0m herb quadrats at 5 m intervals. Herb frequency, shrub clump density, and tree density and d.b.h. were recorded for each species. Four statistical methods for evaluating ecotone width were developed and tested, using diversity (heterogeneity) indices, ordination, classification and community similarity. The application of the methods will be discussed.

G. BRUMELIS and T. CARLETON. Dept. Botany, University of Toronto, Ontario M5S 1A1

VEGETATION OF LOGGED BLACK SPRUCE WETLAND SITES ON THE GREATER ONTARIO CLAY BELT

Logged black spruce study sites were chosen following a factorial design of age since logging versus soil class. A detailed field survey of existing vegetation and soil attributes at these sites was conducted. A vegetation chronosequence indicates alder dominance on most wetland sites soon after logging. The extent of alder dominance may affect further species invasion. The nutrient status of organic soil horizons changes across the chronosequence. The relationship between vegetation composition, soil attributes and age are examined using Stepwise Multiple Discriminant Analysis.

M.J. CALEY, Dept. of Zoology, University of Guelph, Guelph, Ontario N1G 2W1

SIBLING AND KIN RECOGNITION IN WILD JUVENILE MUSKRATS

Sibling and individual recognition were examined in juvenile muskrats (Ondatra zibethicus) using animals of known kinship in dyadic encounters in a neutral arena. Behavioural development of the study animals occurred in the wild under natural conditions. Distinct behavioural asymmetries were demonstrated between kin and non-kin dyads. Indicies of aggressive and amicable behaviours were calculated from non-kin dyads and were correlated with distance between captures of the members of each dyad. Aggressiveness and amicability increased and decreased, respectively, with increased distance between captures. I suggest that this is the first adequate test of dear enemy recognition in a microtine rodent and that the first assumption of the social fence hypothesis (Hestbeck, 1982, Oikos) is met.

S.J. CAPORN and T.C. HUTCHINSON, Dept. Botany, University of Toronto, Toronto, Ontario, M5S 1A1

THE EFFECT OF ACID RAIN ON THE GROWTH OF CABBAGE

Cabbage (Brassica oleracea cv. Viking Golden Acre) was grown in soil in a glasshouse and sprayed with simulated rains of pH 2.8, 3.0, 3.2, 4.1 and 5.6. Plants received two rain treatments per week, each lasting 30 minutes, equivalent to 9 mm of rain. The effect of pH treatments on plant growth depended on the stage of development of plants. When sprayed at the cotyledon stage, treatment of pH 3.2 and below caused marked and immediate damage to the cotyledons. Within one day of the first spray large areas of necrosis developed on the cotyledons. After 20 days total dry weights of plants sprayed with rains of pH 3.2, 3.0 and 2.8 were 14, 21 and 24 per cent respectively less than those of plants receiving the treatment of pH 5.6. In contrast with the sensitivity of cotyledons, older leaves of cabbage rarely showed signs of damage resulting from the low pH rains. Results will be discussed in relation to effects of acid rain on plant carbon dioxide and water vapor exchange.

T.J. CARLETON. Faculty of Forestry and Department of Botany, University of Toronto, Toronto, Ontario M5S 1A1

SEEDBED EXCLOSURE EXPERIMENTS WITH BLACK SPRUCE

During the spring, 1984, I established 3 full factorial experiments in coniferous boreal forest ranging from lowland black spruce bog to upland mixed jack pine - black spruce. The fate of individual seed were monitored under a variety of microhabitat/treatment combinations including small mammal/bird exclosure. Removal of organic "duff" proved most significant in influencing seedling survivorship. Small mammal/bird exclosure was also highly significant and showed notable interaction with some microhabitat features including shade and the presence of an ash layer. However, a parallel experiment showed that the seed predators could be satiated by a heavy seed rain.

L. CHAMELY. Dept. Biology, Erindale Campus, University of Toronto, Mississauga, Ontario L5L 1C6

OVERWINTERING SURVIVAL AND SUPERCOOLING POINTS OF POLISTES FUSCATUS IN SOUTHERN ONTARIO

Survival of overwintering Polistes fuscatus under modified field conditions was examined in the winter of 1984/85. The wasps were exposed to three different conditions of temperature fluctuations and risk of dessication. The most protected condition, involving smallest temperature fluctuations and least risk of dessication, was associated with the greatest survival. The temperature regime experienced by the wasps appeared to be more important than dessication in determining the survival rate. Supercooling points of the wasps dropped during the experiment and reached minimal values during midwinter. Most of the wasps that survived appeared to supercool rather than tolerate freezing.

Patricia CHOW-FRASER. Dept. of Zoology, University of Toronto, Erindale Campus, Mississauga, Ontario L5L 1C6

A GRAZER-COMPETITION MODEL FOR CLADOCERANS

A competition model, consisting of a combination of filtering rate-length equations and length-weight regressions for six cladoceran species is used to explain the relative importance of the grazer species (in terms of biomass) in herbivore communities of eleven lakes in south central Ontario.

N.C. COLLINS, Dept. of Zoology, Erindale Campus, University of Toronto, Mississauga, Ontario L5L 1C6

EFFECTS OF SOCIAL INTERACTIONS ON GROWTH OF BLUEGILLS (LEPOMIS MACROCHIRUS)

Large wading pools were stocked with one or two bluegills from each of 3 size classes between 75-90mm to produce densities of .64 and 1.3 fish/m^2 (within the natural density range). Fish were fed live brine shrimp that gradually escaped from two containers introduced daily to each pool. Equal amounts of food per gram of fish were allocated to low and high density pools. Growth of all 3 size classes was slower at high than at low density, but inhibition was most severe for small fish. Videotape records show that high density fish tended to swim farther and had much higher rates of interaction with other fish than those at low density. Interaction rates for small fish were more sensitive to density than those for large fish, which may explain the size dependent inhibition of growth.

T. CONLIN and A. CROWDER. Dept. of Biology, Queen's University, Kingston, Ontario K7L 3N6

ROOT AERENCHYMA IN TYPHA LATIFOLIA AND CAREX CF. ROSTRATA AND ITS RELATIONSHIP TO IRON UPTAKE AND TOXICITY

The root aerenchyma of Typha latifolia and Carex cf. rostrata developed in oxic and anoxic culture solutions was examined. Aerenchyma form differed in the two species; however, it was continuous as intercellular air spaces down to the meristematic region in both plants.

The roots of these species were tested for their ability to modify their immediate rhizosphere using 0.75% agar gel and various pH and redox indictors. Typha roots strongly oxidized methylene blue, but Carex did so only along some roots and irregularly. However, neither species oxidized BPDS FE(II) to its trivalent state. Iron-starved Carex reduced iron along the zone of root elongation (FE^{3+} to FE^{2+}), but Typha did not. Typha roots were shown to lower rhizosphere pH regardless of nitrogen source (NH_4^+ or NO_3^-) or status of plant iron nutrition. Carex did not lower its pH at all.

L.C. CWYNAR. Dept. Botany, University of Toronto, Toronto, Ontario M5S 1A1
G.M. MacDONALD. Dept. Geography, McMaster University, Hamilton, Ontario L8S 4K1

VARIATION IN PINUS CONTORTA SSP. LATIFOLIA IN RELATION TO TIME SINCE FOUNDING

We used paleoecological techniques to estimate the time of founding for 15 populations of lodgepole pine (ssp. latifolia) which had previously been studied electrophoretically and morphometrically. We then plotted various genetic and morphologic attributes of each population against its time of founding. The only genetic attribute to show a significant correlation was the log of mean number of alleles per locus, which decreased as founding time decreased. Similarly, seed weight decreased and the ratio of wing length to seed weight increased as time since founding decreased.

H.M.C. DUPUIS. Dept. of Zoology, University of Western Ontario, London N6A 5B7

FACTORS INFLUENCING SPAWNING SUCCESS IN MALE LONGEAR SUNFISH

Most territorial male longear sunfish nest in dense aggregations. This study examined some factors which might affect their reproductive success. Group size, nesting day, nest diameter, position in the group, and male size and age were recorded, along with spawning success and amount of fertilization stealing suffered and performed by each group member.

It was found that nesting early in the spawning period and occupying a large nest in a central position increased a male's spawning success and rate of fertilization stealing. However, it also resulted in much fertilization stealing from nesting neighbours and satellite males. The success of such intrusions is unknown. Whether group membership is reproductively more advantageous than solitary nesting remains uncertain.

S.R. EDMUNDS, and C.D. ANKNEY, Dept. Zoology, University Western Ontario, London, Ontario, N6A 5B7

OFFSPRING SEX RATIO IN MOURNING DOVES

We collected 174 Mourning Dove (Zenaida macroura) broods in SW Ontario in 1984 to determine if offspring sex is non-randomly determined. Overall, there are 4 ways that sex-ratio patterns could depart from random: 1) departures from a binomial distribution, 2) unequal sex-ratios, 3) non-random offspring sex vs egg sequence patterns, and 4) seasonal changes in sex-ratio and/or pattern of sex-ratio vs egg sequence. Our data showed that sex-ratios were equal early in the nesting season, but changed to a predominance of males later in the season. Also, in early nests first eggs produced more males and second eggs more females. This pattern was reversed later in the season. Thus, our data support the hypothesis that offspring sex-determination in birds can be non-random.

L. FAHRIG. Dept. Zoology, University of Toronto, Toronto, Ontario M5S 1A1

ARE CABBAGE BUTTERFLIES ATTRACTED TO CABBAGE?

Infestation levels of imported cabbageworm are difficult to model because adult females are highly mobile and often lay their eggs in several host plant fields. It is therefore necessary to study the factors involved in female host-finding.

Adult females were released near cabbage fields and flight direction was recorded. Analyses revealed that: (i) direction was largely random; (ii) a cabbage field attracted only butterflies which were collected near that field; (iii) distance from the field, cabbage size, and number of large cabbageworms on the plants affected the strength of attraction; (iv) a small cabbage field did not attract butterflies; (v) for butterflies which were not attracted to cabbage, wind affected flight direction.

J.W. FALK, Dept. Zoology, University Western Ontario, London, Ontario, N6A 5B7

SEASONAL REPRODUCTION OF ZAPUS PRINCEPS

Western jumping mice, Zapus princeps, were collected in Kananaskis Valley, Alberta, from May to September (1980-1983) to investigate the influence of age and body condition on reproduction. Body measurements, reproductive status and body composition were determined. Age was determined from annual lines in jawbones. Mean dates of conception, birth and weaning were June 27, July 9 and August 3 respectively. 17% of 1 yr. old females and 43% of 2+ yr. old females showed evidence of reproduction. Body length differed ($p<.05$) between reproductive overwintered (ROW) females ($\bar{x}$=92.0mm) and non-productive overwintered (NROW) females ($\bar{x}$=87.7). There was a marked seasonal variation in fat levels but no difference in the relative fat levels between ROW females ($\bar{x}$=0.25) and NROW females ($\bar{x}$=0.20). Possible reasons for non-breeding in females are considered.

J.B. and E.A. FALLS. Dept. Zoology, University of Toronto, Toronto, Ontario M5S 1A1

SMALL MAMMAL POPULATIONS IN ALGONQUIN PARK

This poster reviews our long-term study of fluctuations of small mammals (especially Peromyscus and Tamias) in several forest types in Algonquin Park. Live-trapping and some dead-trapping have been carried out in a standard manner each summer since 1952. Analysis of data (through 1978) revealed relationships among breeding, weight and numbers of deer mice and implicated tree seed crops as an importnat variable affecting their abundance. Associations involving weather, seed crops, mouse populations and fur bearers have recently come to light. Further trapping and food manipulation experiments are planned. Research has been supported by OMNR and NSERC. Our results are used by OMNR in management of fur bearers and for park interpretation.

B.W. FELTMATE. Dept. of Zoology, University of Toronto, Erindale College, Mississauga, Ontario L5L 1C6

EFFECTS OF PREY, CURRENT SPEED AND SUBSTRATE COMPOSITION ON DISTRIBUTION OF PARAGNETINA MEDIA (WALKER) (PLECOPTERA:PERLIDAE) NYMPHS

Prey distribution (Hydropsyche sparna, H. bronta) did not affect distribution of well-fed or starved (48 hours) Paragnetina media nymphs. However, P. media distribution was significantly influenced by an interaction between current speed and substrate composition. These experiments were performed in a large artificial stream within which I could control current speed and manipulate substrate composition. Laboratory findings were verified by field distributions.

M.B. FENTON. Department of Biology, Carleton University, Ottawa, Canada K1S 5B6

FORAGING AREAS AND ROOSTS: HOME RANGES OF INSECTIVOROUS BATS

Radio-tracking studies have permitted the collection of data about how insectivorous bats use space. The data deal with species which fly continuously in search of flying prey, apparently detecting and reacting to targets at short range (<5m). Two species of abut 20 g, the African Scotophilus viridis and the North American Eptesicus fuscus, regularly forage over an elliptical area with a long axis up to 5 km. Roosts, which may be consistently occupied or unpredictably switched, are located on the edges of the foraging areas. Bats with other foraging strategies may demonstrate different patterns of spatial use.

R.M. FISHER, Dept. Zoology, University of Toronto, Toronto, Ontario, M5S 1A1.

HOST SPECIFICITY AND THE INVASION SUCCESS OF OBLIGATE BUMBLE BEE SOCIAL PARASITES

Species of Psithyrus (Hymenoptera: Apidae) are obligate social parasites of bumble bees (Bombus spp.). A theme of host specificity has been advanced to explain the wide variation in Psithyrus invasion behaviours and host responses to parasitization. Females of Psithyrus ashtoni and P. citrinus (two hosts each) were introduced into laboratory colonies of their host Bombus species. P. ashtoni females cohabited with host bees, and achieved similar invasion success in colonies of both hosts. In contrast, P. citrinus females experienced dichotomous success in usurping colonies of their two hosts. Tests of host specificity showed that P. citrinus appears to be more host-specific than P. ashtoni. The extent of host specificity displayed by a species of Psithyrus may explain the ease with which Bombus colonies are penetrated and usurped.

R.M. FISHER, Dept. Zoology, University of Toronto, Toronto M5S 1A1

ECOLOGY OF SOCIAL PARASITISM IN BUMBLE BEES

Bumble bee queens (Bombus spp.) often attempt to usurp the nests of other queens. Facultative nest parasitism was studied in the laboratory by introducing queens of Bombus affinis into colonies of B. terricola. The usurpation success of introduced queens was quite high (77%) in preworker colonies, but decreased rapidly in colonies which had reared workers. Queens which were successful in usurping a nest achieved similar reproductive success to queens which initiated their own nests. An equilibrium of parasitism is suggested to explain how both nest-starting and nest-usurping behaviours can coexist in bumble bees.

R.L. FRANCE. Institute for Environmental Studies, Univ. of Toronto M5S 1A4

AMPHIPOD AMPLEXUS: THE POTENTIAL PROBLEMS OF PROMISCUITY

Ecotypic variation among lakes in duration of pre-copulatory reproductive behaviour (amplexus) of the amphipod Hyalella azteca was suggested by Strong (1972) to be caused by intensity of predation by visually orienting fish, habitat heterogeneity, or population abundance. No data, however, were provided. As part of a study investigating the life history of Hyalella in Canadian Shield lakes, these hypotheses were critically examined. Variation in amplexus was significantly related to temperature, supportive of some laboratory work, and not to complex evolutionary strategies.

B.L. FRICK and P.B. CAVERS. Dept. of Plant Sciences, Univ. of Western Ontario, London, Ontario N6A 5B7

PARTITIONING VARIATION IN THE LIFE HISTORY OF WHITE COCKLE

White cockle (Silene latifolia Poiret) is a dioecious plant which may behave as an annual, a biennial or a short-lived perennial. We have begun studies aimed at partitioning this variation in life history strategy among populations, families, genotypes and between sexes. We are also looking for evidence of trade-offs between reproduction, survival and future reproduction. Survival and reproduction patterns differed among individuals of a single population transplanted to different habitats. In a common garden experiment, populations differed in both the mean and the variance of the age of first reproduction. The date of first flowering and rate of flowering differed for male and female plants within a population. Some individuals changed gender following disturbance (i.e. transplanting, hail). Two individuals produced both male and female flowers simultaneously.

R.R. FULTHORPE. Dept. of Zoology, University of Toronto, Toronto, Ontario M5S 1A1

SEDIMENTARY ATP AS A LAKE PRODUCTIVITY INDEX

The microbial biomass levels in the sediments of seven central Ontario lakes were estimated using the adenosine triphosphate (ATP) assay. ATP levels were found to be relatively invarible within any given lake, and independent of metabolic constraints such as light levels, oxygen concentration and temperature. The lake average sedimentary ATP levels were highly correlated to phosphorus sedimentation rates, total algal biomass levels, organic carbon concentrations and epilimnetic pH. All these results suggest that sedimentary ATP concentration may be used as an index of lake productivity.

B.A. GABER and T.C. HUTCHINSON. Botany Dept., U of Toronto, Toronto, Ontario M5S 1A1

A COMPARATIVE STUDY OF THE ABILITY OF FIVE BOREAL FOREST SPECIES TO NEUTRALIZE ACID RAIN

It has been suggested that the relative ability of leaf surfaces to neutralize acidic rain drops determines a species' sensitivity to foliar damage. Five common boreal forest species were studied in situ. Simulated acid rain of pH 5.6, 3.8 or 3.2 was sprayed over the plots. Using a microelectrode, the changes in the pH of the drops on the leaves and on parafilm (control) were monitored to the drying point. Cornus canadensis, Acer spicatumn, Betula papyrifera and Mitella nuda increased the Ph of the drops in the two more acidic treatments. Foliar droplet pH was increased to as much as 4.6 when the initial rain pH was 3.8. Aralia nudicaulis leaves were much less able to neutralize the rain. When the experiments were repeated on calcareous and clay soils, the species showed greater foliar neutralizing abilities.

D.A. GALBRAITH and R.J. BROOKS. Dept. Zoology, University of Guelph, Guelph, Ontario N1G 2W1

AGE ESTIMATION IN THE SNAPPING TURTLE, Chelydra serpentina, NEAR ITS NORTHERN LIMIT

Demography of wild turtle populations is seriously hampered by lack of known-age individuals. However, detailed mark-recapture examinations can document between-year changes, and can form the basis for age estimation techniques. Photographs and three-dimensional study replicas allowed between-year comparisons of keratinized carapacial features on recaptured snapping turtles in Algonquin Provincial Park. Measurements of annual changes in scute positions and carapacial winter lines ('growth rings') suggested that at most one winter line is added per year in this northern population. However such addition is associated with carapace growth, and does not necessarily take place every year. Larger individuals often were not growing, and therefore when an age estimation technique was developed using photographic records, larger animals' ages were underestimated. The relative precision of this and conventional field age estimation techniques were compared.

D.L. GIBO. Dept. Biology, Erindale Campus, University of Toronto, Mississauga, Ontario L5L 1C6

SURF'S UP!!....MASS MIGRATION OF MONARCH BUTTERFLIES IN CENTRAL TEXAS ASSOCIATED WITH THE PASSAGE OF A COLD FRONT

Observations of the migratory flight of monarch butterflies, Danaus plexippus, were made in the vicinity of the city of Lockhart Texas from October 13 to 20, 1984. A cold front passed through the study area late in the afternoon on October 16. During its passage, a mass migration was observed. The passage of the cold front caused the wind to shift from SW to N and triggered strong convection currents. The migrating butterflies were flying at least 15 m above the ground and most were soaring. The flight behaviours of the butterflies tended to keep them near the leading edge of the front, the area of strongest updrafts.

L.-A. GIRALDEAU, Dept. Psychology, University of Toronto, Toronto, Ontario, M5S 1A1

FOOD SCROUNGING: AN ECOLOGICAL DETERMINANT OF CULTURAL TRANSMISSION IN PIGEONS

Although pigeons (Columba livia) are known to be able to acquire new foraging techniques by observing demonstrators, such a technique failed to spread within a captive flock of 17 feral pigeons. Only 2 individuals used the skill to produce food, the others scrounged food from these discoveries.

Results from another batch of birds tested individually revealed that only 2/8 birds learn the technique when they can obtain some of the demonstrator's food while 8/8 birds learn the technique when this food is not available. Food scrounging therefore could account for the lack of cultural transmission which was observed in the aviary flock.

VALANNE GLOOSCHENKO (See end of Abstracts)

J.W.A. GRANT, Dept. Zoology, University of Guelph, Guelph, Ontario, N1G 2W1

VARIATION IN SOCIAL STRUCTURE OF JUVENILE BROOK CHARR

Stream resident brook charr (Salvelinus fontinalis) exhibit a variety of social structures including territoriality, dominance hierarchies, and schooling behaviour. I tested the hypothesis that stationariness and agressiveness (i.e. territoriality) should increase as food density increases. Preliminary field observations supported this hypothesis of economic defendability.

R. HARMSEN and M.E.J. WOOLHOUSE. Dept. Biology, Queen's University, Kingston, Ontario K7L 3N6

COMMUNITY DYNAMICS IN A SUB-ARCTIC SALTMARSH

Several plant communities were described for the La Perouse Bay Region in Northern Manitoba. Seven of these communities were studied quantitatively over a three year period. On the basis of the observations and the data, a model was constructed which represents a number of parallel successional developments from shallow aquatic or primary mudflat habitats via a number of grassland systems to a shrub tundra. The effect of grazing by lesser snow geese on the vegetation was studied using goose exclosures. Evidence indicates further support for the positive feed-back model of Jefferies.

M.A. HAWKE & M.A. MAUN. Dept. of Plant Sciences, University of Western Ontario, London, Ontario N6A 5B7

INTRAPOPULATION VARIATION AND NUTRIENT REQUIREMENTS OF SOME ANNUAL AND BIENNIAL INHABITANTS OF A SAND DUNE SYSTEM

Field studies on intrapopulation variation in seed weight, fecundity and the ratio of upper to lower fruits of Cakile edentula var. lacustris were conducted. Plants growing on the upper and lower beach habitats were compared. Preliminary results show that the upper seeds from low beach plants had a greater mean weight than high beach plants. Lower seeds did not differ significantly in mean weight between the two habitats. The mean number of seeds and the ratio of upper to lower fruits per plant were greater on the low beach than on the high beach. The macronutrient requirements of two biennials, Oenothera biennis and Artemisia campestris were tested using a hydroponic method. Both species were affected most by nitrogen deprivation but the former was affected more by a lack of phosphorus and potassium than the latter.

M.B.C. HICKEY. Dept. Biology, Carleton University, Ottawa, Ontario K1S 5B6

OSMETRICHIA IN BATS

Osmetrichia are specialized hairs that protrude from the scent glands of Black-tailed Deer and Mongolian Gerbils and by definition serve to disperse odour. I compared body and gland hairs of 24 species of bats (representatives of the Microchiroptera and Megachiroptera) to see whether osmetrichia were present. The results show that the gland hairs of some species are distinctly different from body hairs. This finding is consistent with the hypothesis that bats possess modified gland hairs specialized to disperse odours. Behavioural experiments are required to confirm the anatomical findings.

R.W. KNAPTON. Dept. Bio. Sci., Brock University, St. Catharines, Ontario L2S 3A1

LEK TERRITORIALITY IN THE CHRYXUS ARCTIC BUTTERFLY

The territorial system of an individually marked population of the satyrid butterfly Oeneis chryxus was studied for three summers in Algonquin Provincial Park. Males defended territories in a dry open clearing in the forest by means of chases and spiral flights with conspecifics. The temporal pattern of territories showed a high degree of consistency from one day to the next. Removal experiments showed that a surplus of non-territorial males did not exist. Defended areas did not evidently contain resources required by females. The territorial and mating systems of O. chryxus resemble lek polygyny, and are more similar to some vertebrate lek systems than to hill topping or landmark territoriality.

P.G. KRANNITZ and C.K. CAREY. Dept. Botany, University of Guelph, Guelph, Ontario N1G 2W1

SEEDLING GROWTH AND SURVIVORSHIP IN SOLIDAGO FLEXICAULIS L.

We studied the interrelationships between seedling size, growth and survivorship in Solidago flexicaulis L, a woodland herbaceous perennial. In herbaceous perennials, the natural selection of seedlings is especially intense, with few seedlings surviving to reproductive maturity. It has been documented that larger seedlings have a lower probability of mortality, but the relationship between seedling growth and survivorship has not been researched. In this study, seedlings at 3 different sites were used with differing results: survivorship was correlated with only initial seedling size at one site, with both initial seedling size and maximum growth rate at another site, and with only max. growth rate at the third site. Transplantation experiments done the following summer indicate that the observed between-site differences in seedling survivorship reflect underlying habitat differences. This study illustrates the difficulty in generalizing about factors associated with seedling mortality and emphasizes the need for controlled multisite experiments to better understand the interactions between seedlings and their environment.

MILOS LEGNER. Dept. Zoology, University of Toronto, Erindale College, Mississauga, Ontario L5L 1C6

SIZE DISTRIBUTION AS A CONSEQUENCE OF POPULATION GROWTH IN UNICELLULAR ORGANISMS

Both theoretical considerations and experimental results of conventional microscopic measurements suggest a relationship between the mode of cell multiplication and the shape of size distributions within cell populations. Automated techniques are required to increase statistical reliability and speed of processing.

M.K. LITVAK, Dept. of Zoology, University of Toronto, Toronto, Ontario M5S 1A1

FOOD HABIT, NICHE BREADTH AND OVERLAP IN A CYPRINID COMMUNITY

Food resource partitioning was examined in a community composed of three cyprinids: Phoxinus eos, P. neogaeus and Pimephales promelas. A new method utilizing Principal Component Analysis was developed to analyze the niche breadth and overlap in this community. Niche breadth and overlap were examined through the calculation of the hypervolume of a rectangular parallelpiped in P.C. space. Phoxinus neogaeus was not greatly overlapped by either of the other two cyprinids. The P. neogaeus niche, however, overlapped each of the other cyprinids extensively. Pimephales promelas was heavily overlapped by Phoxinus eos, however, this accounted for a small proportion of the P. eos niche hypervolume. Chironomid larvae were used as an indicator of prey size partitioning. P. promelas utilized significantly smaller chironomids than the two Phoxinus spp. The two Phoxinus spp. did not differ significantly in chironomid size selection.

McCAW, PATRICIA E. & JAMES E. ECKENWALDER. Department of Botany, University of Toronto, Toronto, Ontario M5S 1A1

GROWTH AND REGENERATION OF BLACK GUM (Nyssa sylvatica Marsh.) IN BACKUS WOODS, SOUTHERN ONTARIO

Within a defined study area, we investigated the structure, regeneration, and growth ecology of a population of Nyssa sylvatica in relation to climatic disturbance. A significant component of Backus Woods is Carolinian flora, including the population we studied which comprises roughly 160 individuals (over 4.0 cm in diameter) in a springflooded swamp section. The average age is 186±2.0 years. Submersion by the temporary swamp usually obliterates the 2nd-year seedlings. High variation of ring-width distributions among individual trees reduces the significance of overall trends and of correlations with meteorological history. Small correlations are found with temperature, degree-days, and precipitation; and a larger correlation is exhibited with snowfall.

R.J. MacKAY. Dept. Zoology, University of Toronto, Toronto, Ontario M5S 1A1

EFFECTS OF SMALL IMPOUNDMENTS ON HYDROPSYCHID CADDISFLY PRODUCTION

Annual production by filter-feeding caddisfly larvae (Trichoptera: Hydropsychidae) was compared in riffles immediately upstream and downstream of small (< 1 ha) impoundments at three sites in Valley Creek, Minnesota. Production was higher (45, 2 and 6 times) in downstream riffles than in upstream riffles. Concentrations of organic seston were low and neither total amounts nor specific size fractions could be correlated with hydropsychid production. Differences in food quality between riffles could be attributed to diatoms at one site and to detritus at another. Inorganic particles in suspension were less in riffles below sand-trap ponds; larvae may have benefitted from reduced abrasion and from healthier growths of moss and algal habitat.

R.C. MARTIN, J.D.H. LAMBERT. Dept. Biology, Carleton University, Ottawa, Ontario K1S 1S7

THE COMPETITIVE AND COMPLIMENTARY EFFECTS OF INTERCROPPING POLE BEANS AND CORN

Four cropping systems(CS), corn(C), intercropped corn and beans planted simultaneously(IS), intercropped corn with bean planting delay(ID) and beans(B) were studied as one main effect in conjunction with another main effect, 3 fertilizer levels(FL) at rates of 0.60, and 120 kgN/ha. The biomass of silage decreased with intercropping but LER advantages of 6-18% were found with treatments of Is-60N, Id-60N and Id-120N. Is-60N had a significantly greater %N in the total silage than C-120 N. The %N of Is-60N and Id-60N was significantly greater than C-60N. C-120N was marginally more cost effective than Is-60N, Id-120N and Id-60N and much more cost effective than the other intercrops. Circumstantial evidence was not indicative of N transfer from beans to corn.

S. McCANNY and P.B. CAVERS, Dept. Plant Sciences, University of Western Ontario, London, Ontario, N6A 5B7

TEMPORAL AND SPATIAL VARIATION IN FITNESS IN AN ANNUAL WEED POPULATION

Six biotypes of the grass Panicum miliaceum were grown under two crop regimes for two years. Under both regimes, the weeds were allowed to disperse seeds and the land was allowed to go fallow during the second year. Fitness was measured during the first year by estimating seed production. The fitness of the same individuals was determined over the fallow growing season by enumerating the adult offspring within the vicinity of the former location of each parent plant. The change in the relative fitness of the six biotypes between the two growing seasons was greater than the differences in fitness between the two fields.

L. McCARTHY, Dept. Biology, Queen's University, Kingston, Ontario, K7L 3N6

INERPOPULATIONAL DIFFERENCES IN FORMATION OF IRON PLAQUE ON TYPHA LATIFOLIA

The amount of iron hydroxide plaque formation on roots of T. latifolia differs in local wetlands. Genetic differences in the roots (i.e. aerenchyma and oxygen production) could be responsible. Thus, individuals from two wetland populations were grown to test their capacity to form iron plaque under laboratory conditions.

D.K. McNICOL and B.E. BENDELL. Canadian Wildlife Service (Ontario Region), Ottawa, Ontario K1A 0E7

WATERFOWL/HABITAT RELATIONSHIPS IN NORTHERN ONTARIO: POTENTIAL EFFECTS OF ACIDIC PRECIPITATION

Trophic relationships were studied on 131 small headwater lakes of varying acidity in northern Ontario to identify the mechanisms by which acidic precipitaiton affects waterfowl productivity. In a heavily-stressed area, simple fish communities, dominated by yellow perch (Perca flavescens), as well as fishless conditions, characterized most acidic lakes (pH $\leq$5.6) sampled. Only 10% of the non-acidic lakes (pH>5.6) sampled were fishless, while 84% contained acid-intolerant cyprinids. Active, free swimming insect taxa, such as Notonecta, Buenoa, Corixidae, Graphoderus and Chaoborus americanus, were associated with fishless lakes, whether acidic or non-acidic. Lake acidification has varied and opposite impacts on different water species, depending on the importance of fish as waterfowl food, or as potential competitors for common insect prey.

D.J. McQUEEN and J.R. POST. Dept. of Biology, York University, 4700 Keele Street, Toronto, Ontario M3J 1P3

TROPHIC RELATIONSHIPS IN FRESHWATER PELAGIC ECOSYSTEMS

Evidence is presented which suggests that in freshwater pelagic communities, trophic level biomass is determined by a combination of producer controlled and consumer controlled regulation. Published regressions show that the effect of the independent variable (producer) on the dependent variable (consumer) weakens by a factor of 2 with every step up the food chain and that the proportion of explained variability decreases by root 3.3. The result is that producer control is strong at the bottom of the food web and very weak at the top. Consumer or predator control has the opposite characteristics. At the top of the food web the effects of planktivores on zooplankton biomass is strong, the effect of zooplankton on phytoplankton biomass is much weaker and the effect of phytoplankton on phosphorus concentration is negligible. When these two models are combined, it becomes clear that almost all of the variability in the empirically derived producer controlled regressions can be explained by consumer controlled regulation.

P. MINEAU. National Wildlife Research Centre, Canadian Wildlife Service, Ottawa, Ontario K1A 0E7

PESTICIDE REGISTRATION AND WILDLIFE

The goal of this presentation is to explain the role played by the Canadian Wildlife Service in the registration of pesticides in Canada. Emphasis will be on the information package currently required for the evaluation of wildlife impacts and on the hazard scenarios which form the core of the evaluation process. I will point out the role that academia can play in filling some of the basic data gaps to ensure that pesticides have as little impact as possible on wildlife populations.

R.D. MONTGOMERIE. Dept. Biology, Queen's University, Kingston, Ontario K7L 3N6

WHY DO BIRDS SING AT DAWN?

The dawn chorus is a feature of virtually all terrestrial habitats occupied by songbirds. To date, three distinct hypotheses have been proposed to explain this peak in song but they have proven to be difficult to test because they all predict a peak in song activity at first light. Lapland longspurs (Calcarius lapponicus) and horned larks (Eremophila alpestris) nesting in the high arctic (Sarcpa L., NWT, Canada; 69°N), however, have a distinct dawn chorus despite 24 h daylight and none of the current hypotheses are adequate to explain either the timing or the variation in intensity of this dawn chorus. Since birds nesting in continuous daylight also spend a few hours of inactivity at 'night', I suggest that the dawn chorus occurs when it is potentially most costly to males, following a period of fasting. Thus, time devoted to singing at 'dawn' is an honest advertisement of male quality which cannot be bluffed by low quality males.

D.R.J. MOORE and P.A. KEDDY. Dept. Biology, University of Ottawa, Ottawa, Ontario K1N 6N5

SEEDLING RECRUITMENT ALONG A WATER LEVEL GRADIENT: SHARED OR DISTINCT PREFERENCES

The objective of this study was to test whether lakeshore plant species have shared or distinct germination patterns along a water level gradient. If distinct responses occur, it is possible that recruitment along the water depth gradient is important in producing the adult zonation patterns characteristic of many lakeshores. However, if shared responses occur, other forces such as interspecific competition, predation and/or wave action, must be more important in producing adult zonation patterns. Species germination patterns were measured by sowing seeds of 24 shoreline species on an artificial water depth gradient using two substrates (sand and organic) in a greenhouse. Those species showing significant treatment effects were then compared using Kendall's coefficient of concordance. It was found that on the sand substrate, species had shared preferences for intermediate water depths ($n=5$; $p.=02$), while on the organic substrate species had distinct germination responses ($n=7$; $p>.50$).

P.K. MORRILL. Dept. Biology, Carleton University, Ottawa, Ontario K1S 5B6

SPATIAL DISTRIBUTION OF HARVESTMEN IN AUTUMN

Harvestmen (Opilionidae) overwinter as adults and have been shown to be active under the snow. I designed this study to test the hypothesis that in autumn when exposed to low temperatures harvestmen would change their spatial distribution, possibly focusing their movements on suitable cover objects on the forest floor. I used pit-traps to follow movement in an 800 square meter grid, as well as movements around possible cover objects separate from the grid. Weekly trap collections were made.

Analysis indicates that a shift in dispersion did occur, and that this shift was correlated with average and minimum weekly temperatures. Further, by late November the harvestmen had developed a significant 'preference' for depressions in the forest floor.

G.K. MORRIS. Dept. of Zoology, University of Toronto, Erindale College, Mississauga, Ontario L5L 1C6

ADAPTIVE SIGNAL STRUCTURE IN THE SONGS OF TROPICAL FOREST KATYDIDS (ORTHOPTERA: TETTIGONIIDAE)

Songs of certain tropical pseudophylline katydids are characterized by sinusoidal carrier frequencies with ultrasonic wavelengths. These calls involve less actual emission time than those of tettigoniids in disturbed habitats. Such acoustic features coincide with morphological modifications in the sound generating and receiving organs. Prominent slit cavities precede the tympana and the acoustic spiracles are much reduced. These features may have evolved in the context of bat predation. Bats exploiting the songs to locate katydids as prey may have given reduction in signalling time a selective advantage. This in turn would compromise the ability of katydid females to localize males. Increased localization efficiency is implied by a recent hypothesis likening the typanal organ to a Helmholtz resonator.

W.O. MORRISON and H.G. MERRIAM. Dept. of Biology, Carleton University, Ottawa, Ontario K1S 5B6

THE USE OF EXPERIMENTAL FENCEROWS BY Peromyscus leucopus

As part of an investigation of between-patch movements of woodland mouse populations, we tested responses of mice to experimental (artificial) fencerows. Experimentally released wild-caught mice used higher complexity fencerows more frequently than lower complexity fencerows. There was no effect of age or sex of mice on fencerow use. There was no significant effect of fencerow complexity on distance travelled by mice in the fencerow.

We found that mice in natural populations will use these artificial fencerows if they are joined to woodlots.

N. NAUMENKO, G.M. COURTIN and T.H. PETERS, Dept. Biology, Laurentian University and INCO Ltd. Agr. Dept.

THE HARDENING-OFF AND PERFORMANCE OF MINE-GROWN CONIFEROUS FORESTRY SEEDLINGS FOR THE PURPOSES OF RECLAMATION OF INDUSTRIALLY DAMAGED LANDS

Since the mid 1970's coniferous forestry seedlings have been grown successfully underground in a mine in Idaho (Pommerening, 1977). Jack pine and Red pine seedlings were grown at the 4600' level at INCO Ltd.'s Creighton Mine. At age 14 weeks the seedlings were subjected to five different temperature regimes for a period of two weeks to determine the treatment that best acclimatized them to harsh environmental conditions. Seedlings were outplanted using a Latin Square design on an ameliorated, industrially-damaged site.

Plants were assessed for survival rate, degree of flushing and overall growth. Treatment effects were then compiled using multiple analysis of variance and covariance statistics. Data presented show the relationship between hardening-off treatments and planting success.

R.W. NERO. Dept. of Zoology, University of Toronto, Mississauga, Ontario L5L 1C6

GLACIAL OPPORTUNIST PREDATORS AND THEIR PREY

We test the hypothesis that in central Ontario lakes containing Mysis relicta, low densities of Cladocera are due to predation by Mysis. Feeding experiments in small enclosures (23.6 L) suggest that in situ clearance rates of Mysis are similar for most Cladocera, and that a scarcity of hypolimnetic Daphnia longiremis and Eubosmina longispina in lakes with Mysis is due to spatial overlap with Mysis rather than differential vulnerability. Clearance rates of Limnocalanus macrurus and Senecella calanoides on D. longiremis and E. longispina are not sufficient to account for low numbers of these cladocerans in lakes. We conclude that low densities of D. longiremis and E. longispina is due to predation by Mysis.

D.L.G. NOAKES, E.K. BALON & S. CRAWFORD. Dept. of Zoology, University of Guelph, Guelph, Ontario N1G 2W1

FRESHWATER FISH COMMUNITIES: AN EXPERIMENTAL APPROACH

We stocked known numbers of 15 native fish species to simulate a natural invasion into two local ponds. After five years, all fish were collected by rotenone poisoning. One pond appeared to be heavily influenced by winter kill, and had a community of only three fish species, known to be resistant to anoxic conditions. The other pond had a community of nine species, including those three found in the first pond. An analysis of the ecomorphological attributes of all 15 species suggests that the nine surviving species were not a random subsample, but may have been a consequence of competitive interactions among the fish.

L.V. PAVONE and R. BOONSTRA, Division of Life Sciences, Scarborough College, U. of Toronto, West Hill, Ontario, M1C 1A4

VARIATION IN THE BEHAVIORS OF MALE AND FEMALE MEADOW VOLES IN FLUCTUATING AND STABLE POPULATIONS.

The behaviors of male and female voles were quantified, every two months, in four populations in southern and south-eastern Ontario, over a period of more than two years. Previous workers had suggested that changes in behavior over time were not simply seasonal phenomena and that they may be related to the driving forces behind the 2-3 year population cycles. Unfortunately, cycles or non-seasonal changes in population size were not presented in their studies. We present results from stable, increasing, and declining populations. In addition, we have examined the behavior of females, which had rarely been considered before. These results were part of a larger study designed to test the polymorphic-behavior hypothesis.

J.R. POST. Dept. of Biology, York University, Toronto, Ontario M3J 1P3

AN INDEPENDENT EVALUATION OF A BIOENERGETICS MODEL

A fisheries bioenergetics model will be presented. Energy consumed is partitioned amongst metabolic costs, waste losses and growth. Gains in both somatic growth and gonad development occur after maintenance costs are covered. Therefore growth provides a record of accumulated consumption above maintenance and is therefore a sensitive indicator of variation in consumption. An independant data set of growth and consumption rates of young-of-the-year yellow perch, Perca flavescens, was used to test the validity of the bioenergetics model. Potential applications of ecological interest will be discussed.

T.E. QUINNEY. Dept. Biology, Carleton University, Ottawa, Ontario K1S 5B6

THE PLASTICITY OF TREE SWALLOW TERRITORIALITY

Nest-box spacing was manipulated to study territoriality in two populations of Tree Swallows Tachycineta bicolor that differed greatly in the amount of food available. Territory size varied with the distribution of nest-sites and food abundance. When nest-boxes were 24 m apart, occupancy was greater than 90%, regardless of location. When boxes were 10 m and 5 m apart, occupancy was high where food was more abundant but low where food was less available. Regardless of food abundance, birds never nested 1 m from one another. Previous hypotheses do not explain these results adequately. I propose a testable alternative; when nest-sites are distributed in a manner favorable to simultaneous defense and food is abundant, males prevent other males from nesting close but accept an additional unmated female. Mated females try to prevent other females from nesting close because of the potential loss of her male's substantial parental care if her mate attempts bigamy. When food is not abundant, females require male assistance and polygyny is unlikely.

C.W. RAMCHARAN, W.G. SPRULES, and R.W. NERO. Dept. of Zoology, University of Toronto, Erindale College, Mississauga, Ontario L5L 1C6

THE TACTILE FEEDING BEHAVIOUR OF MYSIS RELICTA LOVEN

Predation by Mysis relicta appears to be a major biological determinant of zooplankton community structure. Yet, although several authors have studied Mysis' feeding rates and selection of prey, aspects of Mysis feeding behaviour that underlie prey selectivity are unknown. In this study we analyze Mysis prey preferences through measurements of capture and ingestion success, and handling time with different prey. We find that the differential ability of Mysis to capture different prey largely explains prey selectivity. Mysis encounter rate, ingestion success, and handling time with different prey do not strongly influence their choice of prey.

M.L. REID. Dept. Biology, Carleton University, Ottawa, Ontario, K1S 5B6

EFFECTS OF TEMPERATURE ON SONG RATE IN THE "IPSWICH" SPARROW

Song rate has been suggested to be a reliable signal of male quality because it is energetically costly, through direct energy expenditure and/or time away from feeding. If correct, song rate is expected to vary with temperature, since low temperatures cause energy depletion. I tested this prediction in Ipswich Sparrows (Passerculus sandwichensis princeps), whose singing and feeding are temporally and spatially disjunct. Results support the hypothesis: song rate was correlated with current and recent temperatures.

L. ROWE and L. HOLLETT, Dept. Biology, Trent University, Peterborough, Ontario K9J 7B8

EFFECTS OF LOW pH ON WHOLE BODY [Na^+] IN SOME AQUATIC INSECTS

We exposed mayfly and damselfly nymphs to several pH levels (3.5, 4.5, and 6.5) in soft water for 96 hours. Total body [Na^+] was measured by neutron activation of dried nymphs using the McMaster Nuclear Reactor. There was no mortality of damselfly nymphs while exposed to low pH, and there was no significant change in their total body [Na^+]. However, mortality of mayfly nymphs was high in low pH in water with very low calcium (2.5 mg/ℓ), and the nymphs lost massive amounts of their total body sodium. A slight increase in water hardness radically reduced both the mortality and sodium loss of the mayfly nymphs.

R. SAGITOV. Dept. Vertebrate Zoology, Leningrad State University, Leningrad, U.S.S.R. 199164 and Dept. Biology, Carleton University, Ottawa, K1S 5B6

PECULIARITIES OF DUCKS NESTING IN WEST SIBERIAN PRAIRIES

In April-July 1973-76, 265 nests of 7 species of ducks were investigated. It is shown that in some cases ducks prefer to nest near colonies of gulls and shorebirds. In these cases the nest density of ducks was very high. Loss of clutches in these nests was lower than in nests made elsewhere. I hypothesize that nest defence by gulls and shorebirds benefited duck nests made near them.

Mixed clutches, both interspecies and intraspecies were easily found. Mixed clutches were most common where nest density was high. When nest density was increased due to drought restricting all 7 species to a few available nest sites, frequency of interspecies mixed clutches increased. Under normal water conditions, intraspecies clutches became more frequent than mixed species clutches.

S.K. SAKALUK, Dept. of Zoology, Erindale College, University of Toronto, Mississauga, Ontario L5L 1C6

NUPTIAL FEEDING BEHAVIOUR IN THE DECORATED CRICKET

The spermatophore that a male decorated cricket (Gryllodes supplicans) transfers to the female during mating includes a large gelatinous portion (spermatophylax), devoid of sperm, that is removed and eaten by the female after mating. The time taken by females to fully consume the spermatophylax increased linearly with the weight of the spermatophore. Females removed the sperm-containing ampulla soon after consuming the spermatophylax. Males providing inadequately-sized nuptial meals may therefore be penalized in two ways: 1) premature removal of the ampulla may result in the transfer of an insufficient number of sperm to fertilize all of a female's eggs and 2) the overall competitiveness of a male's ejaculate in fertilizing eggs may be reduced relative to that of other males. These results suggest that females are capable of adaptive mate choice.

P.H. SCHUT. Dept. E.R.S., Trent U., Peterborough, Ontario K9J 7B8

EURASIAN MILFOIL: A REASON FOR SUCCESS

Competition between Myriophyllum spicatum and other aquatic macrophytes was studied by environmental manipulations in Lake Opinicon. M. spicatum plants were removed from one area, while in the other, M. spicatum was harvested just above the roots. A third area served as a control. Results and laboratory experiments indicate that dense M. spicatum growth reduces the biomass of other aquatic macrophytes by reducing light available for growth. No alternate methods of competition were observed.

L. SCHWARZKOPF and R.J. BROOKS. Dept. Zoology, University of Guelph, Guelph, Ontario, N1G 2W1

EFFECTS OF INCUBATION AT CONSTANT AND FLUCTUATING TEMPERATURES ON SEX RATIO IN PAINTED TURTLES

Temperature-dependent sex determination was studied in a northern population of painted turtles (Chrysemys picta) both in the laboratory and field. The threshold temperatures (constant temperatures producing 50% males) were estimated at 27.5 and 20.0°C, and were similar to those reported for other populations of C. picta. Nest temperatures fluctuated above and below both thresholds, frequently. Mean nest temperatures were warmer in 1983 than 1984, but were not useful to predict nest sex ratios. The total number of hours each nest spent at male versus female temperatures best predicted sex ratios in the field. Sex ratios of hatchlings in 1983 and 1984 were similar and female biased (0.12 and 0.13, respectively).

M.G. SCOTT and T.C. HUTCHINSON, Dept. Botany, University of Toronto, Toronto, Ontario, M5S 1A1

THE IMPORTANCE OF THE RECOVERY PHASE IN ACID RAIN STUDIES: THE EXAMPLE OF LICHENS.

Although a significant reduction in net photosynthesis occurs in boreal forest lichens following long term spraying with low pH acid rain (pH 2.5 - 3.5), little is known about the effects on lichens of a single severe episode and the potential for recovery following exposure. Therefore, laboratory experiments were designed in which replicate podetial tips were repeatedly analysed (before treatment, immediately following treatment, 3 days and 6 days following rinsing with pH 5.6 'rain') using infrared gas analysis. A control group received pH 5.6 rain instead of a low pH episode. The only significant decline in photosynthesis was measured 3 days after treatment with low pH rain. Following a one week period, some recovery of net photosynthesis was observed in Cladina stellarias which had previously received pH 2.5 or pH 3.0 sprays.

M.G. SCOTT and D.W. LARSON, Dept. Botany, University of Toronto, Toronto, Ontario, M5S 1A1

THE EFFECT OF WINTER FIELD CONDITIONS ON THE LICHEN, UMBILICARIA

This study examined overwintering mechanisms of two species of saxicolous lichen with a mutually exclusive distribution pattern. Using infrared gas analysis, it was found that Umbilicaria vellea thalli (snow-free habitats) showed significantly reduced photosynthetic potential after six months of transplantation to snow-covered Umbilicaria deusta habitats. Transmission electron microscope studies on replicate thalli from the transplant experiment determined that U. deusta algal cells contained significantly more starch and lipid bodies than algal cells of U. vellea. The hypothesis was advanced that U. deusta photosynthesizes at a high rate prior to snowfall and sequesters storage products for use over the winter months. Evidence from laboratory simulations of winter environments indicated that a persistent snow pack rather than frost damage produces reduced net photosynthesis in U. vellea.

A.J. SEMPERE. C.E.B.A.S. (CNRS) Villiers en Bois, 79360 Beauvoir sur Niort (France)

SEXUAL ACTIVITY AND TERRITORIAL BEHAVIOUR IN THE EUROPEAN ROE DEER: THE DELAYED IMPLANTATION AS AN ADAPTIVE MECHANISM.

The seasonal relationship of territorial behaviour of male european roe deer was studied using a radiotracking system as well as investigating the scent marking activity and agonistic behavior in the field. LH, testosterone and progesterone were determined in males living in enclosures (2 ha) and from wild females. Testis activity gradually increased from January-July (breeding period) with a slight decrease in May-June. The antlers were cast in the fall and grew when testosterone levels were low. The polishing of antlers coincides with the increasing levels of testosterone and the beginning of territorial behaviour. Territoriality was observed only in the strongest bucks. The relationship between adult bucks depends on their rank. The relationship between sexual cycle, secondary sexual characteristics and the territorial behaviour in males and the sexual adaptation of the female cycle (such as delayed implantation) are discussed.

B. SHIPLEY and P.A. KEDDY, University of Ottawa, Ottawa, Ontario, Canada K1N 6N5

CLEMENTSIAN OR GLEASONIAN COMMUNITIES? A NEW APPROACH

The Clementsian and Gleasonian community concepts can be stated as falsifiable hypotheses as follows: define 'upper' boundary as that point on the gradient where a species' distribution begins and 'lower' boundary as that point where it ends. Then the Clementsian hypothesis is that both upper and lower boundaries are clustered and that upper and lower boundaries are positively associated. The Gleasonian hypothesis is that both upper and lower boundaries are randomly distributed and that upper and lower boundaries are independent. To test this, 13 randomly chosen transects were established in Breckenridge Marsh, Quebec. Each transect was surveyed to 5 cm. height intervals from 40 cm. below the 24 July water level up to the tree canopy. Presence/absence was recorded for each species. Both upper and lower boundaries were clustered (ANOVA, $P<0.0025$). There was no correlation of upper vs. lower boundaries ($r^2=0.009, p>0.38$) and they were independent ($p>0.75$), (Fisher's Exact Test). Thus, both hypotheses were rejected.

P.G.R. Smith and J.B. THEBERGE. Faculty of Environmental Studies, University of Waterloo, Waterloo, Ontario N2L 3G1

(WITHDRAWN)

ESTIMATING MINIMUM PARK SIZE

We developed a method to estimate the minimum park area required to contain all the vegetation types which occur in a particular region. Samples of varying area are taken from resource inventory maps of the park area and the number of vegetation types is counted in each sample. These data are used to derive regression equations which predict the area needed to contain a certain number of vegetation types. The method was applied to a national park in Ontario and two International Biological Program sites in the Yukon.

MARLA B. SOKOLOWSKI, S.J. BAUER, V. WAI-PING, L. RODRIGUEZ, Dept. of Biology, York University, Downsview, Ontario M3J 1P3

ECOLOGICAL GENETICS AND BEHAVIOUR OF *DROSOPHILA MELANOGASTER* LARVAE IN NATURE

Drosophila melanogaster populations derived from pupae collected from 4 microhabitats (on and under fruit, on and in soil) differed in their proportion of rover and sitter larval forager morphs, a second chromosome based genetic polymorphism (Sokolowski, 1980). 'On-fruit' populations had shorter foraging trails and lower pupal heights (sitters) than 'off-fruit' populations (rovers). In a field assay, sitters pupated significantly more on fruit than rovers. When soil water content was increased, the proportion of larvae pupating on fruit decreased. At 0% soil water content, on-fruit pupae (sitters) showed a higher percentage of adults emerging than off-fruit pupae (rovers). The reverse was true at 100% soil water content. The rover/sitter polymorphism may be maintained in an environment where the soil water content fluctuates.

D. SOLUK. Dept. Zoology, Erindale Campus, University of Toronto, Mississauga, Ontario, L5L 1C6

MACROINVERTEBRATE FAUNA OF SHIFTING SANDS IN RIVERS

Shifting sand areas are one of the dominant habitats in mainstream channels of most lowland rivers. They are characterized by the presence of active sand dunes and are considered to be extremely harsh habitats for benthic organisms. A study of macroinvertebrates in shifting sand areas of the Sand River, Alberta revealed interesting aspects of the biology of species that occur in these areas. Contrary to expectations small chironomids *Robackia demeijerei* and *Rheosmittia* sp. exhibited relatively slow growth rates, whereas the large predaceous mayfly *Pseudiron centralis* grew relatively quickly. Overall, biomass and secondary production was found to be low in shifting sands primarily because of the slow growth of chironomids.

W.G. SPRULES, and J.E. BOWERMAN. Dept. of Zoology, University of Toronto, Erindale College, Mississauga, Ontario L5L 1C6

PROPERTIES OF ZOOPLANKTON FOOD WEBS

Pimm, May, Cohen and others have demonstrated that food webs in nature are, not surprisingly, highly patterned. Food chains tend to be short, omnivory is comparatively rare, and omnivores feed on adjacent, not distant, trophic levels. These analyses are based upon nonuniform datasets from various sources, but we have access to uniformly collected zooplankton species data for over 500 lakes in northeastern North America. This permits a rigorous evaluation of the general theory of food web structure, and its application to aquatic systems in particular. In contrast to the general prediction, we find omnivory to be common and food chains to be long in aquatic plankton communities. We offer comments on some inadequacies of the general theory, and on the possible stabilizing effect of cannibalism in aquatic ecosystems.

M.G. STONEMAN. Dept. of Biology, Carleton University, Ottawa, Ontario K1S 5B6

SENSORY MODALITIES USED IN FOOD LOCATION BY TWO SPECIES OF PHYLLOSTOMID BATS

This is a preliminary report based on experiments on two species of Phyllostomids; Artibeus jamaicensis and Glossophaga soricina. G. soricina are small (9 gm.) nectar feeders while A. jamaicensis are much larger (40 gm.) fructivores. The bats are being trained to perform discrimination tasks designed to test sensory acuity. Manipulations of the experimental conditions are performed to determine which senses the bats are using to locate the target. The relative roles of vision, echolocation, and olfaction will be related to the bats' feeding method.

ROGER SUFFLING and PHILIP J. HOWARTH. Faculty of Environmental Studies, University of Waterloo, Waterloo, Ontario N2L 3G1

TESTS OF METHODS OF LARGE SCALE VEGETATION MAPPING AT PRESQU'ILE PROVINCIAL PARK

The needs of large-scale vegetation map makers and users are being ascertained. Three remote-sensing data sources, several methods of classifying ground training data, and several levels of detail of training data are being used in combinations to produce a series of vegetation maps of Presqu'ile Park on Lake Ontario. After a cost and effectiveness comparison of maps, the systems which best satisfy various user needs will be recommended. The strengths and weaknesses of various mapping methods will be discussed.

M.C. TAYLOR and H.C. DUTHIE, Dept. Biology, University of Waterloo, Waterloo, Ontario N2L 3G1

DISTRIBUTION OF THE DIATOM TABELLARIA IN SOFT-WATER LAKES IN NORTHERN ONTARIO

The genus Tabellaria is often one of the most abundant components of the surficial diatom community in soft-water lakes. Its increase in recent sediments has been identified as a major indicator of lake acidification. In a study of 60 lakes in northeastern Ontario seven species and varieties of Tabellaria were identified. T. binalis and T. quadraseptata were found in lakes of pH less than 5.0 and T. flocculosa strain IV primarily in lakes of pH less than 6.0. Although T. flocculosa strain IIIP was often abundant it showed no clear relationship with pH other than being found in lakes of pH less than 7.0. T. flocculosa var. linearis, T. flocculosa strain III, and T. fenestrata were rarely found in abundance. The implication of these results in paleolimnological pH reconstructions will be discussed.

W.D. TAYLOR, Dept. Biology, University of Waterloo, Waterloo, Ontario, N2L 3G1

HOW DOES ZOOPLANKTON SIZE-DISTRIBUTION AFFECT PHYTOPLANKTON BIOMASS?

Phytoplankton biomass in lakes can be altered by manipulation of fish, and these alterations are linked to changes in zooplankton size-distribution. Mechanisms for this link have been proposed, some involving the idea that small zooplankton recycle nutrients back to the phytoplankton more effectively. Laboratory experiments on phosphorus-limited bacterial cultures demonstrate that ciliated Protozoa crop bacteria to low densities, but only release 30% of the phosphorus they ingest in doing so. Only a fraction of this is mineralized, and the grazers eventually sequester most of the phosphorus in the system. Phosphorus limitation remains severe.

To understand how zooplankton size-distribution affects phytoplankton biomass, we should shift our attention to how the limiting nutrient is partitioned among trophic levels.

P.A.E. TURNER and P.M. STOKES. Inst. Environ. Studies, University of Toronto, Toronto, Ontario, M5S 1A4

THE GROWTH OF FILAMENTOUS ALGAE (MOUGEOTIA SPP.) ISOLATED FROM ACIDIC LAKES GROWN OVER PH GRADIENT 4.5 TO 6.9.

We have brought two clones of filamentous algae (Mougeotia spp.) from Lake Ruth Roy (pH 4.6) and Chub Lake (pH 5.8) into lab cultures to determine the effects of pH on the growth pattern. One isolate from each lake was grown in the three media; a defined inorganic medium, and filtered lake water from the respective collection sites. The isolate from Lake Ruth Roy grew best in all three media at pH 4.5 and 5.6, while the Chub Lake isolate showed better growth at pH 6.7 and 5.6 than at 4.5. The Chub Lake isolate only grew in Ruth Roy water at pH 6.7, suggesting intolerance to the aluminum in this water. The results will be discussed in the context of filamentous algal mats which develop in low pH lakes.

V. WAI-PING. Dept. Biology, Carleton University, Ottawa, Ontario, K1S 2A4

MATE CHOICE BY FEMALE MYOTIS LUCIFUGUS

The mating system of Myotis lucifugus has been described as being random and promiscuous during the active season (as opposed to mating when most bats are hibernating and the recipient is usually torpid). During the active season groups of bats form around an adult male. Mating usually occurs in these groups. During the mating season there appear to be three categories of male weight (greater than, less than or equal to adult female weight). The purpose of this study is to determine the significance of the different male weight categories, and the relative importance of acoustic, olfactory and visual cues to free-flying animals when forming groups. Preliminary results indicate that heavier animals are capable of surviving longer periods without foods.

G. WEHNER. Dept. Biology, University of Waterloo, Waterloo, Ontario N2L 3G1

DIEL CHANGES IN ABUNDANCE, VOLUME, AND VERTICAL DISTRIBUTION OF STROMBIDIUM SP. (CILIOPHORA).

Strombidium sp. underwent dramatic changes in abundance over a 24h period in two diel experiments conducted at Jack Lake, Ontario. It is believed that these changes are due to synchronous cell division and should be inversely related to changes in mean volume. Both changes in mean volume and frequency of division stages were used to identify that division occurs non-randomly in the day.

The vertical migration of the species was investigated with relation to solar radiation. It was found that Strombidium sp. migrates upward early in the day and in the late afternoon. Between these times it was found lower in the water column.

K.V. WHILLANS-BROWNING and J.B. FALLS. Dept. of Zoology, University of Toronto, Toronto, Ontario M5S 1A1

EFFECTS OF MALE REMOVAL ON PARENTAL CARE

White and tan morph male white-throated sparrows were removed from their territories when their young were 6 days old. After male removal, tan and white females increased their feeding rates over those of control females. Tan females compensated for the loss of the male's contribution more quickly than white females. Tan and white females both decreased the time spent at the nest per trip. This decrease was larger for white females than for tan females. The weights of 8 day old young from experimental nests were lower than those from control nests. Young fledged from all experimental nests. Although both tan and white females can raise young without their mates, tan females compensate more fully. These results are consistent with those from another study in which tan females paired with white males contributed more to the care of young than their mate but white females paired with tan males contributed equally.

VALANNE GLOOSCHENKO. Wildlife Branch, Min. of Natural Resources, Toronto, Ontario M7A 1W3

BENTHIC DIVERSITY IN A PROVINCIALLY SIGNIFICANT MARSH

Wetlands in Southern Ontario are currently being rated by the Ontario Ministry of Natural Resources according to their hydrological, social, biological and special features values. Second Marsh, Ontario has been ranked as a provincially significant wetland primarily because of its wildlife habitat. This urban lakeshore marsh receives much sedimentation from feeder streams. A summary of 1980 and 1981 data showed benthic fauna was characterized by the chironomid Chironomus riparius and by the oligochaetes Limnodrilus cervix and L. maumeensis. The number of oligochaetes increased from 177/M^2 for September 1980 to 2,566/M^2 in September 1981. Corixidae (backswimmers) were seen in great abundance in proximity to submerged vegetation. In spite of some deteriorating conditions due to nutrient loading and increased sedimentation, Second Marsh remains an attractive resource for shore birds and migratory waterfowl.

S.D. WILSON and P.A. KEDDY. Dept. Biology, University of Ottawa, Ottawa, Ontario, K1N 6N5

DIFFUSE COMPETITION IS CORRELATED WITH STANDING CROP IN A WETLAND PLANT COMMUNITY.

An important but untested assumption in models describing controls of species richness in plant communities is that diffuse competition is positively correlated with standing crop. We tested this assumption in a field experiment in a shoreline plant community at Axe Lake, Ontario. Ramets of three species were transplanted into experimental plots consisting of cleared treatments and undisturbed controls at eight locations chosen to represent the range of standing crop on the shoreline. Diffuse competition was measured as the difference in biomass of ramets grown in cleared treatments and undisturbed controls. Diffuse competition was significantly correlated with standing crop (r = 0.76, P = 0.02), as well as with substrate organic content, suggesting that physical environmental factors may be the ultimate control of competition intensity in wetlands.

C.K. WONG, C.W. RAMCHARAN and W.G. SPRULES. Dept. Zoology, Erindale Campus, Univ. of Toronto, Mississauga, Ontario, L5L 1C6

THE BEHAVIORAL RESPONSES OF A HERBIVOROUS COPEPOD TO THE PRESENCE OF OTHER SPECIES

The swimming behavior of the herbivorous copepod Diaptomus minutus consists of slow swimming interrupted by short jumps. We found that the jumping frequency decreased in the presence of predators and increased in the presence of Daphnia, another herbivore. D. minutus can feed on algae only while swimming slowly, and is detected by predators only when it jumps. Therefore, we believe that the observed behavioral changes are the results of prey defensive response and interference competition. The results also demonstrate the behavioral flexibility of zooplanktonic organisms.

IBM-compatible software packages for specialized data storage and retrieval. J. H. FULLARD

Two IBM-compatible software packages, SCIMATE (ISI) and pfs:FILE/REPORT (Software Publishing Corp.) are designed for rapid and flexible retrieval of stored blocks of data. The user is allowed to pre-determine the format in which the data is sorted and how it is to be returned. SCIMATE is used, in this demonstration, as a reprint filing system and potential connection to the large lists of titles available via a phone modem (e.g. ISI/BIOMED, SCISEARCH). The pfs:FILE/REPORT package has been used to compile data from approximately 125 papers describing the echolocation calls of bats. This program allows easy and rapid retrieval of data based on the bat species, location, acoustic characteristics, etc. and will generate organized lists of the data in pre-determined formats.

Demonstration of Vegetation Analysis on the IBM/PC

By: Terry Carleton, Faculty of Forestry and Department of Botany, University of Toronto.

Traditionally community analyses have been performed on mainframe computers because of their speed and capacity to process large data matrices. However, with the advent of the 16 bit microcomputer and large memory model compilers to utilize the memory which these machines can address, it is possible to run quite large programs. PCVEG is a suite of programs, written in compiled FORTRAN and BASIC for the IBM/PC, which integrate with the operating system (DOS 1.25 and up) to provide a complete facility for vegetation analysis. This includes data entry and management, using the commercial package dBASE II, species list generation, position dependent or condensed array generation, principal components analysis (PCA), varimax rotation, detrended correspondence analysis (DECORANA), two way indicator species analysis (TWINSPAN), two-dimensional screen plotting (with hard copy output), and three-dimensional onscreen plotting.

Although designed primarily for teaching, this "package" can handle the size of datasets commonly encountered in research work.

S & K Computer Products Ltd. is pleased to announce:

The S & K Portable EVENT RECORDER.

This research device is ideal for field research. It operates on batteries in the field, weighs less than two pounds, and is sturdy. It is programmed to do standard statistical analyses and will print the results on any standard printer. It is also programmed to communicate with any microcomputer, minicomputer, or mainframe computer via either a modum or an RS-232 port. The portable EVENT RECORDER meets the same high standards in research equipment for which the original S & K EVENT RECORDER and LABORATORY INPUT/OUTPUT CONTROL SYSTEM are becoming known throughout North America.

Stop by to see it demonstrated at O.E.E.C. '85.