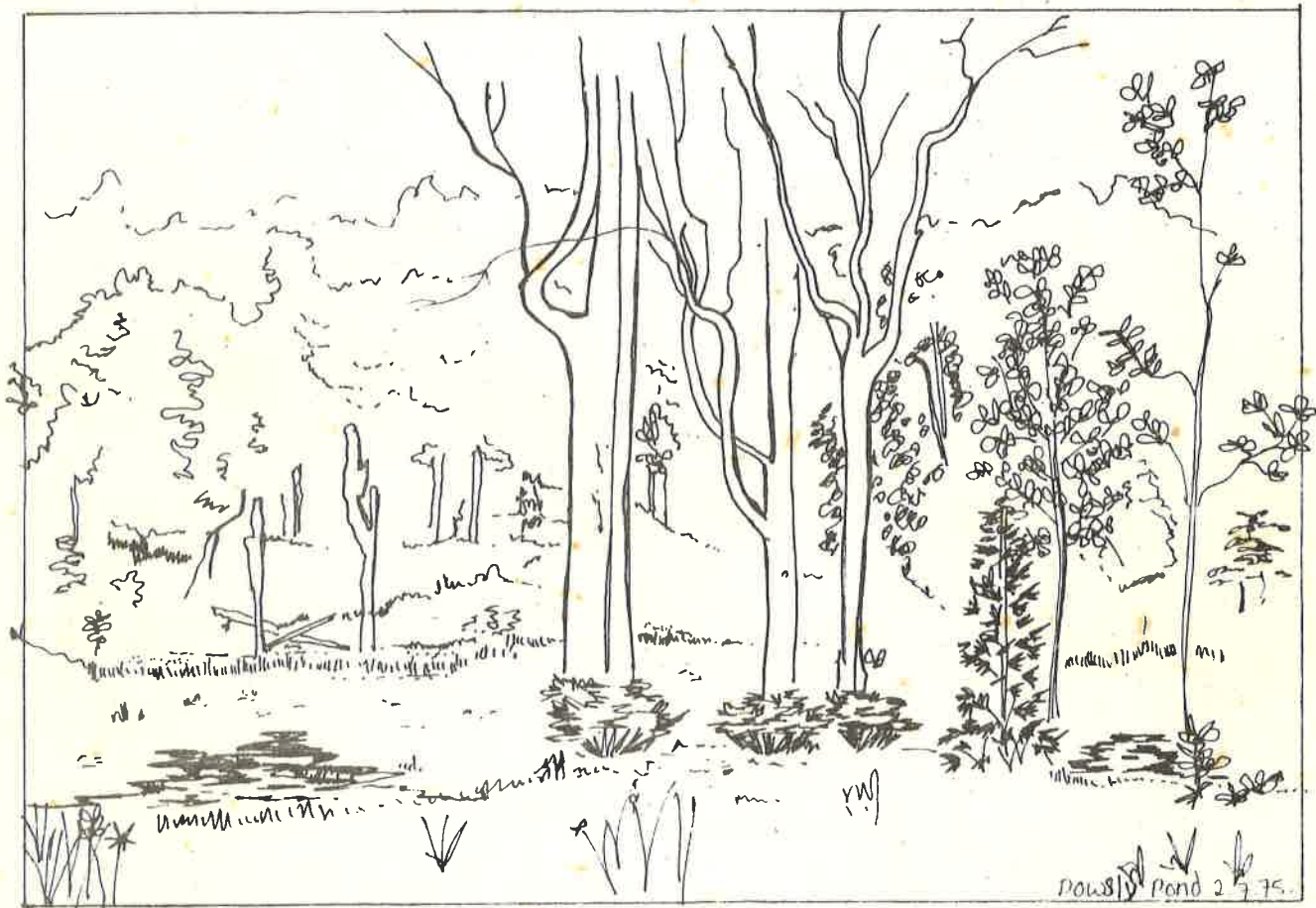


Queen's University Biology Station

1975

Annual Report and Newsletter



Raleigh J. Robertson
Director
January, 1976

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INTRODUCTION

This year's annual report has been expanded into a combination report and newsletter in an effort to provide a vehicle for communicating not only a record of Biology Station use during the year, but also synopses of research projects, publication lists, etc. that should be of interest and value to those who use the Station. I have made an initial step in putting together a complete bibliography of theses and publications that have emanated from work done at the Biology Station. Included in this newsletter are those I know about, largely from Queen's. I would appreciate additions to what I realize must be a very incomplete list. Also, as before, I would like reprints and copies of theses based on Lake Opinicon area research so that a collection of this literature can be maintained in the Field Station Library.

Two years ago it was suggested a bench fee might be instituted so that a portion of the maintenance costs of the Station might be shared by non-Queen's users. A modest fee of \$20.00 per student or staff per month has been added to the 1976 fee schedule (see Table 5). This fee should be chargeable to research grants, and should not impose a hardship on individual student researchers. If current research budgets do not include sufficient funds to pay this fee, it may be waived, but it should be included in future requests to granting agencies for research to be conducted at the Field Station. Other changes in fees include an increase of \$10.00/month for board and room, and a 50 cent per night increase for single night accommodation.

As before, field modules in the Ontario Universities Programme in Field Biology made extensive use of the Station as summarized in Tables 1 and 1.1. Research use is summarized in Table 2 and conference use in Table 3. Many of the resident research students were instrumental in organizing a seminar series this summer, and the list of speakers and topics appears in Table 4.

"NEW LAND"

1000 Acre - Terrestrial Research Tract

During 1975, the "New Land", our recently acquired and still unnamed research tract at the Southern end of Lake Opinicon, became an integral part of the Biology Station. Classes in Plant Ecology, Avian Ecology, and the Ecology of Small Mammals made extensive use of the land as did research projects on Redwinged Blackbirds, Cowbirds, Tree Swallows, Plant Succession, Insect-Goldenrod Interactions, and Bats. A fund raising campaign with the theme "Buy an Acre" (for \$70.00!) has resulted in contributions of from 1/2 to 30 acres from a number of Alumni and Friends of Queen's.

The generous gift from Mrs. G.E. Graham, (Dorothy Dowsley Graham, Arts '27) and Mrs. R.H. Bissell (Marjory Dowsley Bissell, Arts '28) was given in commemoration of their father, William Clinton Dowsley, MA Queen's 1898. An especially beautiful and interesting pond on the new land has been named "Dowsley Pond" in honour of Mr. Dowsley. A sketch of part of Dowsley Pond, by one of our summer student residents, Kathleen Graham, graces the cover of this newsletter.

Following is a list of donors who made contributions for the purchase of land during 1975:

Mrs. M.R. Benson	W. Fred Hampton
Mrs. R.H. Bissell	Charles A. Lewis
Mrs. David H. Brind	Mr. R.D. Lisk
Dr. L.H. Colinvaux	Mrs. M. Eleanor MacMillan
D.W. East	Alan B. McBurney
Miss Mary E. Elliott	Mrs. Norman Miller
Mrs. F.J. Fortune	D.G. Thacker
Mrs. G.E. Graham	Dr. L.K. Weresub
Queen's Alumnae Branch	Kingston Horticultural Society

The staff and students who use the Biology Station are grateful for all of these contributions which have made possible the purchase of this land which is so important to present and future research and teaching in Ecology at Queen's.

Synopses of 1975 Research Projects at QUBS

Colgan, P.W. Studies in Fish Behaviour. Biology Department, Queen's University.

Gross, M. Dynamics of aggression in pumpkinseed sunfish (Lepomis gibbosus) over the nesting phase.

This season's work was a continuation and expansion of that of the previous season on changes in pumpkinseed aggression during nesting. This project is one of several on-going field studies into the motivation of fish behaviour. Nests were marked as they appeared, and the owners were tested daily by presenting a "Normal" painted-wood model of a pumpkinseed and one of the "Subordinate", "Aggressive", "Pike", and "Minnow" models. Data were collected for 49 fish over the entire nesting phase. Analysis showed that the data were free of confounding effects from several possible sources (time of day of testing, individual difference, colony difference, annual differences). Sunfish undergo great changes in aggressive responsiveness over the nesting phase, with aggression being relatively low during the initial territorial and final vacating periods and very high during the intermediate spawning and brooding periods. The test fish treated the models as conspecific or heterospecific. Positive correlations among the four dominant responses recorded (Approach, Retreat, Opercular Spread, and Bite) indicated a unitary intraspecific aggression system. External and internal stimuli combine additively to elicit aggressive reactions.

K. Brown. Preliminary investigation into the behavioural ecology of rock bass, Ambloplites rupestris.

Preliminary experiments were run to investigate the feasibility of studying the behavioural ecology of rock bass, Ambloplites rupestris, in Lake Opinicon. Fish were seined early in the season and held in a large pool and a penned off section of the lake. This was to facilitate observation of nesting and reproductive behaviour. As well, nesting of rock bass in the lake was monitored each day by snorkelling. The results were disappointing as the rock bass in captivity failed to nest for no apparent reason, and only minimal data were obtained from the rock bass nesting in the lake because they occur in such low numbers. It was concluded that Lake Opinicon is not a good study site for rock bass but that perhaps the project would be feasible for a long-term study.

Harmsen, R. Succession of terrestrial ecosystems. Biology Department, Queen's University.

A new project was initiated in 1975. It is a long term project with involvement from several biology staff. Its objective is to follow ecosystem structure and dynamics over a twenty year period, as deserted farmland reverts to forest. Ms. Haywood was hired to execute the surveys of insect populations in several research plots under supervision of Mr. Reid. The vegetation analysis was carried out by Dr. Crowder and students. So far only Solidago communities (old school house site) are being studied, but next year open ground and grassland communities (cemetery site) will be included. Mammalian and Avian population dynamics will be included in the surveys. In 1975 the project was coordinated by Dr. Harmsen. The samples were analysed by Mr. D. Reid and M.S. Davy in Earl Hall

Project 2: Population regulation of tent caterpillars

In May and June, Ms. Haywood executed a series of controlled field experiments, establishing mortality factors of Malacosoma disstria first instar larvae in various habitats and in various population densities. A site near the field station was used.

The results failed to refute our hypothesis of wetland refugia: that M. disstria can suffer low mortality in wetlands and that in dry conditions low population densities suffer more severe mortality than do high density populations.

Keast, J.A. Studies on the Lake Opinicon Fish Fauna, Emphasizing Resource Subdivision. Biology Department, Queen's University.

J. Harker. Prey Selection Relative to Availability and Size: A Comparison of the Feeding of Four Inshore Fish Assemblages in Lake Opinicon, Ontario. M.Sc. thesis.

Four inshore sites were sampled for fish and invertebrates over a 9 month period, May to November. Diet analysis of the 7 major fish species showed that the diet changed both temporally and spatially. Diets were generally more varied in the weedy habitats which hosted a greater and more diverse invertebrate fauna. The seasonal cycles in feeding could be directly related to the body sizes of the food organisms for each species of fish. Fluctuations in Niche Overlap Indices between several fish species were caused by changing prey availabilities and varied according to habitat richness.

The field research for this project was done during the summers of 1973-1974; the final draft of the thesis was completed this past summer, 1975, at the field station.

D. Turnbull and J. Harker. Seasonal Patterns in Odonate Emergence relative to Habitat Type.

Adult Anisoptera and Zygoptera were collected with nets during May, June, and July at 10 different sites around the lake and on the New Land. Tetragoneura spinigera was the most common dragonfly species found, both throughout the sampling period and at all sites. Enallagma boreale was the most abundant damselfly found, occurring at all 10 sample sites. Rare species showed definite habitat preferences. For example, Enallagma hageni was only found in grassy areas on the New Land while Lestes rectangularis occurred only in Cow Island Bay.

These data will later be correlated with the distribution of (aquatic) Odonata nymphs which have been collected in previous summers.

Robertson, R.J. Reproductive Strategies in Birds. Biology Department, Queen's University.

Three somewhat separate, yet inter-related projects on avian ecology were based at the Biology Station in summer 1975. Patrick Weatherhead completed his M.Sc. thesis research on Redwinged Blackbird mating systems. Karen Clark studied the functional role of alarm calling for nesting Yellow Warblers and attempted to determine how nesting density and the response of neighbouring birds to alarm calls influenced nesting success. Since Cowbird parasitism is an important factor determining Yellow Warbler success, this project related closely to the investigation of Defenses Against Brood Parasitism by Hosts of the Brownheaded Cowbird that is being carried out by Richard Norman. Our avian ecology group and a number of other students at the Station were also involved in the Tree Swallow nest box study that was established at Dowsley Pond and Beaver Marsh on the New Land.

This project was greatly aided by Kathleen Graham and Julia Berg, two students from England, who spent the summer working at QUBS. Geoff Holroyd kindly provided the nest boxes, and he, Liz Karen Brown, Frank Phelan, Richard Norman and Pat Weatherhead set up the boxes in early April before the Swallows arrived.

P.J. Weatherhead. The selective advantage of the polygynous mating system of the rewinged blackbird (Agelaius phoeniceus).

The 1975 field work concluded a study initiated the previous summer at Lake Opinicon. Over the two years 381 nests' in 97 male territories were observed. Nest success was found to be directly related to territory quality as determined from nest-site parameters and inversely related to breeding density. Harem size was not correlated to either territory quality or breeding density indicating that females were not always choosing the territories which offered the best chances of successful reproduction. For this mating system to be selectively advantageous it was postulated that females that appeared to have made a poor choice were influenced to do so by the territorial males. Although lowering their chances for reproductive success in the 1st generation they actually gained an advantage by producing male offspring that would inherit their father's ability to procure large harems. Behavioural testing of territorial males conducted in 1975 verified that major behavioural differences existed between males and that these differences were strongly correlated with the males' actual success in recruiting females.

Clark, K. The significance of alarm calling and nesting density in the Yellow warbler.

A pilot study to determine the survival value of the alarm calls given by Passerine birds, with emphasis on the Yellow Warbler (Dendroica petechia), was performed at several areas around Lake Opinicon. The study was concentrated at a 15 hectare plot of land along the shoreline of the North-East Fish Sanctuary. Recordings of the alarm calls of the Yellow Warbler, Robin and Redwing, and the chatter of a female cowbird were played at Yellow Warbler nests. The responses of all species to the tape recordings were scored to give a value for the intensity of the response at a nest to an alarm call, or in the case of the female cowbird chatter, - to the response of a brood parasite. These scores were then related to nesting success, predation pressure, and incidence of brood parasitism. Alarm calling was found to be important in reducing the incidence of brood parasitism. Further experimentation will be necessary to draw any relationships between predation and alarm calling.

Norman, R.F. Behavioural ecology of the Brown-headed Cowbird.

The field experiments conducted in the summer of 1975 completed a 3 year study on the selection relations of host aggression and incidence of parasitism. Experimentation involved testing the aggressiveness of various potential cowbird hosts by placing freeze-dried cowbird mounts beside host nests and scoring host behavior on a scale of aggressiveness. It was found that the most heavily parasitized hosts are most aggressive, and aggression is an effective anti-parasite defense in high density host populations. The experimental results support the notion that host aggression is largely innate, however there is suggestive evidence that a minor learned component is involved. This intriguing possibility and its relation to general anti-predator behavior will be studied in 1976.

The research also included banding and individually marking 50 cowbirds in order to monitor daily activity, home ranges, host densities, and other aspects of the parasite strategy of the Brown-headed Cowbird.

Tree Swallow - Hole-nesting Bird Study

In early spring, a grid of 30 nest boxes was set up through a habitat transition of meadow, wood, marsh at both Dowsley Pond and Beaver Marsh. Another 17 boxes were erected on the Station peninsula. Nest box occupancy nest building, incubation, and brooding were monitored by bi-weekly visits throughout the nesting season in an effort to determine habitat selection and other parameters related to the reproduction of hole-nesting birds. Nest occupancy for this first year of the study was 40% for Beaver Marsh, including 8 Tree Swallows, 2 Eastern Bluebirds, and 2 Blackcapped Chickadees; 30% for Dowsley Pond, including 7 tree Swallows and 3 Eastern Bluebirds; and 41% for Station Grid including 4 Tree Swallows and 3 House Wrens.

Fenton, M.B. Feeding ecology and habitat use - studies of bats and birds. Department of Biology, Carleton University, Ottawa, Canada.

During the summer of 1975, we continued several projects relating to feeding ecology and habitat use by bats and birds. This year, several discrete projects were involved: 1 analysis of prey selected by Myotis lucifugus by examination of feces - B.Sc. Honours Project, J.J. Belwood; 2 testing of light tags as a technique for studying habitat use by bats - B.Sc. Honours Project, M. Harrison; 3 responses of arctiid moths to the sounds of bats, and analysis of the sounds of these moths - M.Sc. project, J.H. Fullard; and 4 feeding ecology of Belted Kingfishers - B.Sc. Honours Project. We also made some attempt to study the responses of bats to fireflies - these were not entirely successful.

Belwood, J.J. Some aspects of prey selection by Motis Lucifugus (Chiroptera Vespertilionidae).

On the basis of quantitative and qualitative comparison of insect remains in bat feces and populations of nocturnal insects, it is obvious that M. lucifugus exhibits great flexibility in the way it selects food. Adult M. lucifugus of both sexes fed mainly on small dipterans, particularly midges, but when populations of these insects were low, also ate moths and caddis flies. In any case, the bats appeared to feed on locally abundant insects, with lactating females apparently selecting large individual prey items. Juvenile bats fed on a greater variety of insects which could reflect a lack of familiarity with good feeding locations. Populations of M. lucifugus in northern Ontario (Dorion) behaved more like juveniles at Chaffey's Locks with respect to feeding, as they fed on a larger variety of insects than adults of this species in southern Ontario.

Harrison, M. An evaluation of light tags as a means of studying bat ecology.

By attaching small glass spheres (10 mm outer diameter) filled with a chemiluminescent fluid to the ventral surfaces of bats (using 'Branding Cement' as a glue), it is theoretically possible to follow the flights of individual bats. This technique is most valuable in areas of good visibility (over water, fields, etc.), but is of limited use in forested areas. The light tags do not appear to severely hamper the bats in their activities, and using a bat detector we were able to establish that tagged bats fed in a 'normal' manner. To effectively use this technique around Chaffey's requires several people, preferably in contact by 'walkie-talkie'. The results of this summer's work will be used as the basis for further research next summer.

Fullard, J.H. Sounds of the Arctiidae (Lepidoptera).

Using a high speed (30 ips) tape recorder and appropriate microphones and amplifiers, I was able to record the sounds of 16 species of arctiid moths, and to determine that another 6 species did not make noise. These data are now being analysed to examine the relationship of the noises produced with the structure of the noise makers. The sounds appear to be part of an aposematic display, directed in at least some instances at bats. Behavioural research of last summer included experiments designed to determine the responses of moths to the noises of conspecifics and others, and the responses of bats and insectivorous rodents to moth sounds,

Allan, J.L. The feeding and breeding ecology of the Belted Kingfisher.

This research was conducted only in part at the Biology Station, the other study sites having been located in and around Ottawa. Ten of 21 nests examined (both active and deserted) were located in artificial settings such as gravel pits and road-cuts, and the rest in natural river banks. Fishing efficiencies, expressed as percentage of successful dives per total dives made, were similar for rural and urban sites, and adults of both sexes had similar performances, with a slight enhancement of efficiency after the fledging of the young. Juveniles were significantly less efficient (14%). Males dive most often making 62% of the observed dive before and during incubation, 88% of the observed dives during brooding, and 76% after fledging of the young. Analysis of perches used for hunting showed that adults preferred overhanging structures without obstructions and are most successful in dives from perches 8 to 10 m above the water. Juveniles use lower perches, and their rates of success decline sharply when roosts greater than 2 m above the water are used.

Barr, D. Taxonomy and ecology of water mites. Associate Curator, Department of Entomology and Invertebrate Zoology, Royal Ontario Museum, Toronto.

During 1975 a project to study water-mites was begun at Lake Opinicon. Under the supervision of Dr. Barr, Nancy Gerrish worked in close conjunction with Pia Pehtla in the project described below.

Gerrish, N. Parasitic strategies of water mites in the genus Arrenurus. M.Sc. research, Univ. of Toronto.

Oliver, D.R. and Ian Smith. Water-mite: Chironomid Interactions. Biosystematics Research Institute, Research Branch, Agriculture Canada, Ottawa.

Pehtla, P. In an M.Sc. programme at Carleton under the Adjunct Professor supervision of Drs. Oliver and Smith of Agriculture Canada, Pia did a study of the host-parasitic relationship between a water-mite genus (Oxus) and chironomids - concentrating on host specificity, resource sharing, and concordance of life-cycles of the two groups.

B.Sc thesis from research done at QUBS

- Allan, L.J. 1975. The feeding and breeding ecology of the Eastern Belted Kingfisher. B.Sc. thesis, Biology Dept., Carleton University. 24 pp.
- Bardach, J.H. 1944. The reptiles of the Lake Opinicon district. Biol. 19 Project report. 21 pp.
- Belwood, J.J. 1975. Some aspects of the feeding habits of Myotis lucifugus (Chiroptera:Vespertilionidae). B.Sc. thesis, Biology Department, Carleton University. 30 pp.
- Dickinson, T.E. 1975. Patterns of resource utilization and certain ecological aspects of brood parasitism shown by the Brown-headed Cowbird. (Moluthrus ater). B.Sc. thesis, Queen's University, Biology Dept. 38 pp.
- Fenton, M.B. 1965. The distribution of small mammals relative to microclimatic factors. B.Sc. thesis. Queen's University, Biology Dept. 67 pp.
- Forsyth, A. 1974. The ecology of Blaesoxipha fletcheri (Diptera:Sarcophagidae). B.Sc. thesis, Queen's University, Biology Dept.
- Gibson, C.G.M. 1974. Seasonal abundance of Cladocera and Copepoda in Lake Opinicon. B.Sc. thesis, Queen's University, Biology Dept.
- Glen, J.R. 1971. Temporal and spatial characteristics of the Zooplankton Community in a small meromictic lake in southern Ont. B.Sc. thesis. Queen's University, Biology Dept.
- Gross, M.R. 1975. Aggressive behaviour of male pumpkinseed sunfish (Lepomis gibbosus). B.Sc. thesis, Queen's University, Biology Dept.
- Haffner, D. 1971. A preliminary report on the relationship of the forest tent caterpillar Malacosoma disstria Hbn. with various host plants in Ontario. B.Sc. thesis, Queen's University, Biology Dept. 60 pp.
- Harrison, T.M. 1975. Chemiluminescent tags as a means of observing nocturnal behaviour of Myotis lucifugus from two summer colonies. B.Sc. thesis, Carleton University, Biology Dept.
- Hawley, A.W.L. 1972. A comparison of representative macrofauna and mesofauna of Island and mainland soil of a freshwater lake. B.Sc. thesis, Queen's University, Biology Dept. 142 pp.
- Horwood, R.H. 1954. Wound infection in sugar maple. B.Sc. thesis, Queen's University, Biology Dept. 10 pp.
- Horwood, R.H. 1954. A study of the microflora of sugar maple (Acer sacharrum M.) B.Sc. thesis, Queen's University, Biology Dept. 21 pp.
- Lisk, R.D. 1956. Effects of temperature and desiccation on the eggs and hatchlings of freshwater turtles. B.Sc. thesis, Queen's University, Biology Dept. 44 pp.
- Martin, B. 1973. A study of some aspects of bat ecology using an automatic ultrasonic sensing system. B.Sc. thesis, Queen's University, Biology Dept. 60 pp.
- McIntosh, D.C. 1945. Forest regeneration on sub-marginal land and wood waste utilization. B.Sc. thesis, Queen's University, Biology Dept. 119.

- Miller, A.G. 1966. Lichen growth and species composition in relation to duration of thallus wetness. B.Sc. thesis, Queen's University, Biology Dept. 83 pp.
- Norman, R.F. 1975. Behavioral ecology of the Brownheaded Cowbird (Molothrus ater) and its hosts. B.Sc. thesis, Queen's University, Biology Dept. 63 pp.
- Segall, S.L. 1971. An investigation of the mortality factors of a Malacosoma disstria Abn. population. B.Sc. thesis, Queen's University, Biology Dept. 32 pp.
- Turnbull, D.A. 1975. The molluscan fauna of Lake Opinicon. B.Sc. thesis, Queen's University, Biology Dept.
- Vittorio, P.U. 1948. Fungi attacking forest trees in the Opinicon area with particular reference to White Pine Blister rust. B.Sc. thesis. Queen's University, Biology Dept. 30 pp.
- Ward, P.S. 1973. The effects of environmental disturbance on species diversity and species-abundance patterns in a taxocene of phytophagous insects. B.Sc. thesis, Queen's University, Biology Dept. 81 pp.
- Webb, D.E. 1964. The structural and functional features related to the food and feeding habits of the fishes of Lake Opinicon. B.Sc. thesis, Queen's University, Biology Dept. 110 pp.
- Weresub, L. 1950. Preliminary work in physiological and ecological studies of vegetation at Queen's University Biological Station, Chaffey's Lock, Ontario. B.Sc. thesis, Queen's University, Biology Dept. 46 pp.

Graduate theses from research done at QUBS.

- Amunrud, J.R. 1970. Ecological interrelationships of the larvae of Perciform fish in Lake Opinicon, Ontario. M.Sc. thesis, Queen's University, Biology Dept.
- Ballantyne, P.K. 1976. Sound production during agonistic and reproductive behavior in the Pumpkinseed (Lepomis gibbosus), the bluegill (L. macrochirus), and their hybrid sunfish. M.Sc. thesis, Queen's University, Biology Dept. 230 pp.
- Brown, S.R. 1952. Some aspects of Lake Soils in relation to the productivity of a lake. M.Sc. thesis, Queen's University, Biology Dept. 61 pp.
- Curtis, C. 1946. The soils of the Queen's University Biological Station. M.Sc. thesis, Biology Dept., Queen's University, 71 pp.
- Emborsky, S.J. 1971. Feeding and growth of the Bluegill Sunfish, Lepomis macrochirus Rafinesque, in Lake Opinicon, Ontario. M.Sc. thesis, Queen's University, Biology Dept. 84 pp.
- Harker, J.M. 1976. Prey selection and availability: A comparison of the feeding of four inshore fish assemblages, Lake Opinicon, Ontario. M.Sc. thesis, Queen's University, Biology Dept.
- Jorgensen, C.R. 1966. The annual reproductive cycle in six Lake Opinicon fishes: Lepomis macrochirus x gibbosus (hybrid population), Ambloplites rupestris, Pomoxis nigromaculatus, Percina caprodes, Perca flavescens, and Esox lucius. B.Sc. thesis, Queen's University, Biology Dept. 71 pp.

- Lewis, C. 1965. The Largemouth Bass Fishery, Lake Opinicon, Ontario. M.Sc. thesis, Biology Dept., Queen's University. 69 pp.
- Thacker, D.G. 1951. Investigations of heart rots of Sugar Maple. M.A. thesis Queen's University, Biology Dept. 81 pp.
- > Thompson, W.K. 1948. Scale reading of Sunfish scale. B.Sc. thesis, Queen's University, Biology Dept.
- Toppett, R. 1963. An investigation into the nature of the layering of deep water sediments in Two Eastern Ontario Lakes. M.Sc. thesis, Queen's University, Biology Dept. 87 pp.
- > vander Kloet, S.P. 1972. The North American Blueberries Revisited: A taxonomic study of Vaccinium section Cyanococcus Gray. Ph.D. thesis, Queen's University, Biology Dept. 165 pp.
- Weatherhead, P.W. 1976. Polygyny in Redwinged Blackbirds (Agelaius phoeniceus): The Selective Advantage of a Polygynous Mating System. M.Sc. thesis, Queen's University, Biology Dept. 99 pp.
- Webber, P.J. 1963. Vegetation gradients in swamp forests of Eastern Ontario. M.Sc. thesis, Queen's University, Biology Dept. 230 pp.
- Wong, P.Y. 1969. Lichen growth in Eastern Ontario. M.Sc. thesis, Queen's University, Biology Dept. 193 pp.

Table 1. Summary of Course Credits (Biology 307/407) Earned at Queen's Biological Station - 1975.

Module Topic	Professor & Affiliation	Dates	Credit/ Student	Queen's	Carleton	York	Ottawa U.	Brock U.	Other	Total Students per module	Total Course Credits
Winter Ecology	Fenton (Carleton)	23 Feb-1 Mar.	1/4	4	6	-	-	-	-	10	5
Plant Populations	Crowder (Queen's)	25-31 May	1/4	4	3	4	-	1	-	12	6
Avian Ecology	Robertson (Queen's)	25-31 May	1/4	5	3	2	2	-	-	12	6
Algology	Munawar (CCIW)	2-16 July	1/2	8	-	-	-	-	1 U. Mich.	9	9
Limnology	Craig (Queen's)	24-30 Aug.	1/4	1	6	1	-	2	-	10	5
Ecology of Odonata	Connor (Univ. Sask)	24-30 Aug.	1/4	4	3	-	-	-	-	7	3.5
Ecology of Drosophila	Carmody (Carleton)	24-30 Aug.	1/4	2	5	-	-	-	-	7	3.5
Cave Biology	Fenton (Carleton)	24-30 Aug.	1/4	1	3	2	1	-	-	7	3.5
Aquatic Vascular Plants	Bristow (Queen's)	31 Aug.-6 Sept.	1/4	4	4	-	-	-	-	8	4
Land Forming Plants	Heath & Heath (York)	31 Aug.-6 Sept.	1/4	1	3	3	-	-	-	7	3.5
Productivity of Freshwater Ecosystems	Dickman (Brock)	31 Aug.-6 Sept.	1/4	2	0	2	-	2	-	6	3
Dominance & Diversity in Terrestrial Plants	Roff (Queen's)	31 Aug.-6 Sept.	1/4	3	5	1	-	-	-	9	4.5
Small Mammal Ecology	Smith (Carleton)	31 Aug.-6 Sept.	1/4	3	4	3	-	-	-	10	4.5
Fish Ecology	Keast (Queen's)	31 Aug.-6 Sept.	1/4	3	2	-	-	1	-	6	3
Total No. Student Weeks				53	47	18	3	6	2	129	11
Half-Course Credit Equivalent				26.5	23.5	9.0	1.5	3.0	1.0		64.5

Table 1.1. Summary of Course Credits in the Ontario Universities Programme in Field Biology Earned at Locations Other Than Queen's Biological Station. Plus Overall Summary of the Ontario Universities Programme in Field Biology for 1975.

Module Topic	Professor & Affiliation	Dates	Location	Credit/Student	Queen's	Carleton	York	Ottawa U.	Brock	Other	Total Students per module	Total Half Course Credits
Terrestrial Natural History	Licht (York)		Algonquin	1/4	3	3	3	-	-	-	9	4 1/2
Forest Ecology	Reed (Ottawa U.)	23-29 Aug	Whitefish Lake	1/4	3	4	3	-	-	-	10	5
Tropical Ecology	Danks, Morris, Dickman, Tracy (Brock U.)	3-17 May	Belize	1/2	4	2	5	-	7	-	18	18
Marine Ecology	Thomas et al (HML)		Huntsman	1/2	6	?	?	?	?	?	6	6
Desert Biomes	Cameron & Lewis (York)	1-15 May	Nevada	1/2	-	-	10	-	-	-	10	10
Total Student Weeks not QUBS					26	11	36	-	14	-	87	43.5
Total Student Weeks at QUBS (from Table 1)					53	47	18	3	6	2	129	64.5
Total Student Weeks in Bio. 307					79	58	54	3	20	2	216	
Total Half Course Equivalents in Biol. 307/407					39.5	29.0	27	1.5	10	1		108

Table 2. Summary of Research Use of Queen's Biological Field Station - 1975

Project Supervisor	Project Description	Students (Queen's unless stated)	Residency
Dr. J. A. Keast	Resource Division Among Freshwater Fish (a) Fish Distribution - Strip Census (b) Feeding Ecology of Fish in Lake Opinicon (c) Odonata distribution Studies	Deb Turnbull Jennifer Harker (M.Sc. thesis) Jennifer Harker & Deb Turnbull	May - Aug. May - Sept.
Dr. P. Colgan	1) Mating Behaviour in Rock Bass 2) Patterns of aggression in nesting sunfish 3) Sound Production in sunfish	Karen Brown (M.Sc. thesis) Mart Gross	Apr - Sept. May - Aug.
Dr. R. J. Robertson	1) Polygyny in Redwinged Blackbirds 2) Behavioural Ecology of Cowbirds & Their Hosts 3) Alarm Calling and its significance to Nesting Yellow Warblers 4) Nesting ecology of Tree Swallows	Bill Nowell Patricia Ballantyne Patrick Weatherhead (M.Sc. Thesis) Richard Norman Karen Clark (B.Sc. Thesis) Karen Clark Julia Berg Kathie Graham	Occasional Apr - Aug. May - Aug. May - Aug. May - Aug. June - Aug. June - Aug.
Dr. J. M. Bristow	Aquatic Invertebrate - Plant Associations	Nancy Gerrish (U of T)	May - Sept.
Dr. M. B. Fenton (Carleton U.)	1) Prey Selection by <u>Myotis lucifugus</u> 2) Light tags as a technique for studying habitat use by Bats. 3) Responses of arctiid Moths to the Sounds of Bats	Jackie Belwood (B.Sc. Thesis - Carleton) Mike Harrison (B.Sc. Thesis - Carleton) Jim Fullard (M.Sc. project - Carleton)	May - Sept. May - Sept. May - Sept.

Table 2. Cont'd.

Project Supervisor	Project Description	Students (Queen's unless stated)	Residency
J.C.E. Riotte (Royal Ontario Museum)	4) Feeding ecology of Belted Kingfishes	Joni Allan (B.Sc. Thesis - Carleton)	Occasional
Dr. D.W. Barr (Royal Ontario Museum)	5) Fire flies & Bats	Megan Hughes (Carleton)	May - Sept.
Dr. D.R. Oliver (Agriculture Canada)	Taxonomy and Collection of Lepidoptera	Liz Perry	Apr - Aug.
	Ecology of Water Mites in Lake Opinicon	Nancy Gerrish (M.Sc. project U. of T.)	May - Sept.
	Host-parasite relationships between water mites (<u>Genus Oxus</u>) and Chironomids	Pia Pehtla (M.Sc. project - Carleton)	May - Sept.
D.H. Dale (Guelph)	Substrate Temperatures in Lake Opinicon	Gord Miller (Guelph)	Occasional
Dr. Sam VanderKloot (Acadia)	Blueberry Habitat Associations and Pitch Pine Distribution	-	June
Dr. P.H. Johansen (Queen's)	Studies of Sunfish Hybrids	Peter Boxall	Occasional Collecting
Dr. R. Harniser (Queen's)	Succession of terrestrial ecosystems and Tent caterpillar population regulation	Jayne Haywood	May - Sept.

Table 3. Summary of Conference, Meeting, and Field Trip Use of Queen's University Biology Station - 1975

Organizer	Function	No. Participants	Duration
Dr. M.B. Fenton (Carleton)	Vertebrate Zoology, Carleton University, Field Trip	25	24-26 January
Drs. R.J. Robertson and R. Harmsen	Population Ecology Class Field Trip (Bio. 439)	40	31 January - 2 February
Drs. R.J. Robertson and D.A. Culver	Biology 202 Field Trip	25	7-9 February
Dr. Reeve (German Dept.)	German Dept. Weekend of Language Practice	27	1-2 March
Dr. Reeve (German Dept.)	German Dept. Week of Language Immersion	23-30	26 April - 4 May
Drs. Dale, Girathe, and Gillespie (Guelph)	Consulting re: Meteorological Station for Opinicon		8-9 June
Dr. R.J. Robertson and Biology Station	Opinicon Open House - Departmental Picnic	50	13 July
Dr. M.B. Fenton (Carleton)	Carleton Univ. Evolution Class	23	19-21 September
Dr. M. Bristow	Aquatic Vascular Plant Course Field Trip	25	26-28 September
Drs. R.J. Robertson and A. Crowder	Biology 202, Field Trips	150	28 September and 4 and 5 October
Dr. J.A. Keast	Biology 428, Field Trip	40	17-19 October
Sgt. Cambell	Militia Training - Camp	40	15 November
Dr. R.J. Robertson	Biology 202, Field Trip	25	21-23 November

Table 4. Seminars at QUES - 1975

Speaker (Affiliation)	Topic	Date
Richard Norman (Queen's)	Behavioural Interactions of Cowbirds and Their Hosts	26 May
Geoff. Holroyd (U. of Toronto)	Foraging Strategies of Sympatric Swallows	28 May
Frank Phelan (Queen's)	Predator Prey Interactions Between Raptors and Small Mammals	29 May
Nigel Lester (Queen's)	Evolution of a Model (for Fish Feeding)	3 June
Raleigh J. Robertson (Queen's)	Fallout Studies and Ecology at Brookhaven Nat'l. Lab	12 June
Dr. Lewellyn Colinvauux (Ohio State)	Autecology of Halimeda (algae)	19 June
Dr. Paul Colinvauux (Ohio State)	Pollen Analysis - Alaska and the Galapagos Islands	19 June
Dr. M.B. Fenton (Carleton)	Bat & Bug Collecting in Arizona	7 July
Patricia Ballantyne (Queen's)	Scaling Behavioural Events	21 July
Jennifer Harker (Queen's)	Resource Division Among Lake Opinicon Fish	22 July
Karen Clark (Queen's)	Alarm Calls and Yellow Warbler Nesting Success	23 July
Dr. Nelson Watson (Canada Centre for Inland Waters)	The CCIW Programme and Invertebrates in the Great Lakes	29 July
Jennifer Harker (Queen's)	Fish Collecting on the Amazon	4 Sept.
Dr. John Terborgh (Princeton)	A Different View of Plant Community Diversity	18 Oct.
Dr. Peter Grant (McGill)	Galapagos Finches	18 Oct.

Table 5. Fee Schedule for 1976

I. Accommodation (Board and Room)		II. Boats
\$90/month	- involves obligation for dish washing or other chores on a rotating schedule.	Fee for exclusive use of boat and motor - includes maintenance and upkeep.
\$130/month	- no obligation for chores.	\$250. - entire summer
\$35/week	- including weekend, e.g. Field Camp - no chores (also includes a lab fee).	\$ 65. - single month
\$30/week	- single week - involves chore obligation	\$ 25. - single week
\$5.00/day	- 24 hour board and room	No charge for occasional or non-exclusive use of boats and motors.
\$1.00/meal	- breakfast or lunch, meal only	III. Bench Fee
\$2.00/meal	- dinner; meal only	\$ 20. - month - per non-Queen's student or staff.
\$1.00/person	- for weekend use by groups who provide and prepare their own food	
\$1.00/person	- overnight accommodation - no food	

