

The Yukon Project of the Biological Survey of Canada

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The Biological Survey and Its Projects. The Yukon project that resulted in this book stems from the continuing work of the Biological Survey of Canada (Terrestrial Arthropods). This organization was established to enhance and provide national coordination in study of the Canadian arthropod fauna through a variety of clearing-house, scientific and general roles, involving cooperation among the Entomological Society of Canada, the Canadian Museum of Nature and other agencies, and especially individual scientists across the country (e.g. Danks 1993). The main scientific roles of the Survey are to synthesize information in monographs and conference proceedings, and to catalyze selected active scientific work, such as the project on the insects of the Yukon, to help interpret the nature and development of the Canadian fauna.

Origins of the Yukon Project. The insect fauna of the Yukon was one of the earliest interests of the Biological Survey project after its formation in 1977. The Yukon has many diverse habitats and an extensive but inadequately understood insect fauna, and moreover part of the region was unglaciated in Pleistocene time and hence a refugium for organisms. Consequently, the Yukon is a key area within Canada for interpreting the nature and development of the fauna. The idea arose for a cooperative project to develop knowledge about the insects of the area, linked to faunal characteristics, ice-age refugia in general, and wider Beringian, including eastern Eurasian, faunas. Ways to increase entomological research in the Yukon and study of its fauna were sought, and in 1978 G.G.E. Scudder and G.B. Wiggins prepared and submitted a collaborative research proposal to the Natural Sciences and Engineering Research Council (NSERC) for work in the Territory, an initiative that led to NSERC funding for the field seasons of 1981 to 1983.

The project developed continuously over a number of years, but three overlapping phases are conveniently recognized: fieldwork and project development; plans for publication and chapter development; and the final stages leading to the completion and publication of this volume.

Fieldwork and Project Development. Fieldwork with the explicit aim of undertaking research on the insect fauna was initiated in 1979 especially by G.G.E. Scudder at the University of British Columbia and G.B. Wiggins at the Royal Ontario Museum. Supported by the 1981–1984 NSERC grant, and subsequently by widening interest from other individuals and institutions, a number of field parties visited the area. The early work included considerable general collecting, but also focussed on particular groups of interest to the original cooperators, such as grassland and pond insects with specific attention to Heteroptera and Trichoptera.

As the fieldwork proceeded, Survey members discussed and helped to orientate the study. Throughout the 1980's, H.V. Danks (especially in formal and informal presentations at entomological centres across Canada, cf. Danks 1986), J.A. Downes (especially in discussions with scientists at the Biosystematics Research Institute), and G.G.E. Scudder and G.B. Wiggins (especially by inviting participants in fieldwork) encouraged other entomologists to join the project. Consequently, a broader range of interest and involvement developed. Wider sampling and fieldwork was undertaken as more participants became involved over the years (Table 1). Cooperation from the Polar Continental Shelf Project allowed visits to the northern Yukon. Collecting permits were kindly provided by Parks Canada and by the Yukon Department of Tourism, Recreation and Culture.

This widening interest catalyzed additional work using existing collections of Yukon insects. Furthermore, the Yukon and Beringian research promoted some wider investigations, including not only visits to European Museums (e.g. to St. Petersburg by G.B. Wiggins), but also fieldwork in western Beringia and the Russian Far East (e.g. by D.C. Currie and D.M. Wood), and cooperation with scientists from Eurasia (including V.S. Kononenko, Y. Marusik and K. Mikkola).

A Yukon Publication. As the project gathered momentum and as interesting results began to emerge, it became clear that the discoveries should be focussed into a publication on the insects of the Yukon. Such an idea culminated in the preparation of a prospectus and preliminary list of contents for the proposed publication. The original conception of the volume was quite modest, with a small number of taxonomic chapters (those of the original cooperators, with a few additions) accompanied by introductory and concluding sections; G.G.E. Scudder and G.B. Wiggins provisionally would act as editors.

Subsequently, other potential taxonomic chapters were added through contacts made by G.G.E. Scudder and J.A. Downes. G.G.E. Scudder prepared a map summarizing eco-geographic regions of the Yukon to assist in preparation of the taxonomic chapters, and the map (cf. Scudder 1997a) was distributed to potential authors in 1987. Although some initial deadlines for manuscript submission were set, the vast amount of material and the many taxonomic problems encountered by various authors, together with the addition of further chapters, caused these deadlines to be deferred. In 1990, to help in orientating the work, J.A. Downes prepared an introductory essay, which appears, somewhat modified, in this book (Downes 1997).

The book project was therefore poised to proceed. However, in 1991 G.G.E. Scudder had a serious heart attack and was unable to continue as a main editor. In order to keep the project moving, J.A. Downes undertook to work on developing the taxonomic chapters. He received and reviewed a series of chapters from 1991 until early 1996, assisted from time to time by R.S. Anderson and by D.J. Larson. These chapters, including the half dozen already in hand in early 1991, had grown to about 20 chapters in development or more or less completed by 1996. Nevertheless, progress had slowed, working against the timely appearance of the book.

Final Preparations for Publication. In 1996, at the request of the Scientific Committee for the Biological Survey, H.V. Danks agreed to take over the major editing of the whole book and so complete the project. These tasks involved ensuring the submission and review of several remaining taxonomic chapters, and reviewing and coordinating chapters in the introductory part of the book. H.V. Danks also agreed to take the lead in writing the concluding chapter. He undertook to finalize the book format, complete the editing of all chapters including standardizing the contributions to the degree useful or possible, and

TABLE 1. Summary of some Yukon field parties during development of the Biological Survey's Yukon project. Earlier expeditions that collected important insect material are not listed here, but see especially Ball and Currie (1997) and Scudder (1997*b*) for key examples. The Geological Survey worked in the central and northern Yukon from 1975–1986 and during that time carried on intermittent collecting for all groups (especially Coleoptera), and hosted several entomologists at their Old Crow camp in 1981.

Abbreviations for institutions: BCPM, British Columbia Provincial Museum (now Royal British Columbia Museum); BMNH, British Museum (Natural History), London; BRI, Biosystematics Research Centre (now Eastern Cereal and Oilseed Research Centre); GSC, Geological Survey of Canada; MUN, Memorial University of Newfoundland; ROM, Royal Ontario Museum; UBC, University of British Columbia; UoA, University of Alberta; UoG, University of Guelph; UoW, University of Waterloo.

Year	Individual(s)	Institution	Groups collected	Area visited
1979	S.G. Cannings, G.G.E. Scudder	UBC	Esp. grassland and pond, and Hemiptera	Dempster Hwy, southern Yukon
	R. Jaagumagi, E.R. Fuller, B.D. Marshall	ROM	General, esp. Trichoptera	"
	J.A. Downes	BRI	General	"
1980	B.Gill, R.J. Cannings	UBC	General, esp. grassland and pond	Mid-Yukon
	R. Jaagumagi, E.R. Fuller	ROM	General, esp. Trichoptera	"
	D.J. Lafontaine, D.M. Wood	BRI	Esp. Lepidoptera, Tachinidae	
1981	S.G. Cannings, C.S. Guppy, L. Vasington	UBC	Esp. Hemiptera	Mid-Yukon
	R. Jaagumagi, B.D. Marshall	ROM	General, esp. Trichoptera	Old Crow
	J.D. Lafontaine, D.M. Wood	BRI	Esp. Lepidoptera, tachnids	
	C.D. Dondale, D.E. Bright	BRI	General (pan traps), esp. spiders, beetles	Dempster Hwy.
	G.E. Ball, D.R. Maddison	UoA	Esp. Coleoptera	Southern–mid Yukon, Dempster Hwy, Old Crow
	N.E. Stork	BMNH	Esp. Coleoptera	"
1982	S.G. Cannings, L. Vasington, R.A. Moore, G.G.E. Scudder, N.C. Scudder	UBC		Dempster Hwy, southern Yukon
	J. Robinson	UBC		Kluane National Park
	G.G.E. Scudder	UBC	Esp. Hemiptera	Dempster Hwy, southern Yukon
	L.A. Kelton	BRI	Esp. Miridae	"
	R. Jaagumagi, E.R. Fuller, H. Frania	ROM	General, esp. Trichoptera	(and Alaska)
	D.M. Wood	BRI	Lepidoptera, etc.	
1983	R.A. and S.G. Cannings	UBC, BCPM	General, esp. Hemiptera, Odonata	Northern Yukon, Herschel Island, Old Crow
	G.G.E., J. and N.C. Scudder	UBC	Esp. Heteroptera	Dempster Hwy, southern Yukon, esp. south-facing slopes
	L.A. Kelton	BRI	Esp. Miridae	
1984	S.G. Cannings	UBC		Northern Yukon (British Mts.), Old Crow
	D.R. Oliver	BRI	Chironomidae	"
	D.M. Wood, J.M. Campbell, J.D.	BRI	Esp. Coleoptera, Lepidoptera, soil mites	"
	Lafontaine, V.M. Behan-Pelletier			

TABLE 1. (continued)

Year	Individual(s)	Institution	Groups collected	Area visited
1985	J.J. Robinson, E. Krebs	UBC	Heteroptera	South-facing slopes
	E. Bidjemast,	UBC		Dempster Hwy.
	S.G. Cannings			
	S.A. Marshall	UoG	Sphaeroceridae	"
	V.M. Behan-Pelletier,	BRI	Soil mites, Lepidoptera	Ogilvie Mts.
	J.D. Lafontaine [K. Mikkola (Finland)]			
1986	S.G. Cannings, B.A. Macdonald	UBC		Nahanni Range Rd.
1987	S.G. Cannings	UBC	Esp. Heteroptera	Richardson Mts., northern Yukon
	R.G. Footitt, V.M.	BRI	Esp. soil mites, aphids, Lepidoptera	
	Behan-Pelletier, D.M. Wood			
	S.A. Marshall	UoG	Esp. Sphaeroceridae and other Diptera	Richardson Mts., northern Yukon
	D.J. Larson [J.L. and B. Carr (Calgary)]	MUN	Coleoptera, esp. Dytiscidae	Southern Yukon
1988	J. Pilny	UoW	Heteroptera, etc.	

handle copy editing, liaisons with the printer, indexing, and so on. That such tasks could be completed was feasible, like earlier stages in the project, only because of the continued outstanding cooperation of authors. The Biological Survey Foundation, a charitable organization set up in 1988 (on behalf of the Scientific Committee) to support the preparation and publication of items relevant to Survey aims, readily agreed to publish the book. It undertook to seek additional financial support (a task pursued chiefly by L.M. Dossall and H.V. Danks) and to provide bridge-funding for the publication.

Structure and Content of the Book. This volume on the Insects of the Yukon has four kinds of chapters. First, a general introduction notes how the project developed (this chapter) and a scientific introduction outlines its rationales (Downes 1997). Second, two chapters summarize the current environment of the Yukon (Scudder 1997a) and its environmental history (Schweger 1997). The main third part of the book comprises accounts of Yukon species belonging to different taxa; one chapter details insect fossils of all taxa from the Yukon (Matthews 1997). The core of most such chapters is an annotated list of species, from which authors develop faunal interpretations of various sorts, depending especially on the group and the nature of the data available about its Yukon species. The treatment differs when specimens and data are especially deficient or taxonomic difficulties are especially great. The coverage of taxa is substantial, but of course is by no means complete, depending largely on the availability of expertise and interest. Finally, a concluding chapter (Danks et al. 1997) provides some general perspectives about the insect fauna of the Yukon, without attempting to duplicate all of the specific information or conclusions of the many individual accounts.

One clear finding of this work is how different are the different taxa. Such differences appear at all levels, including orders, families and species, which have each had a different history of evolution and dispersal. Therefore, it has not been possible or desirable to regiment the treatment of each group. Choices made by authors have not been overridden, for example

as to how key information, or categories for biological features or types of ranges, would best be presented or balanced for their group. Nevertheless, an attempt has been made to standardize common features, such as labels for the same range types used by different authors, and the order and subdivision of the basic data in annotated lists.

Conclusion. The Yukon project has involved many cooperators in fieldwork, research and preparation of manuscripts. Such cooperation allows more to be achieved than would be possible through independent contributions. Indeed, the history of this long-standing project shows especially clearly how successive people have “handed on the torch” to ensure that the project will continue and that this book will be published. Even so, the current volume, the work of 35 authors, is not in any sense a completion of the project. It is a staging point in our knowledge of the arthropod fauna of the region. The Survey hopes that it provides the basis on which to continue the investigation of the highly significant insect fauna of the Yukon.

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