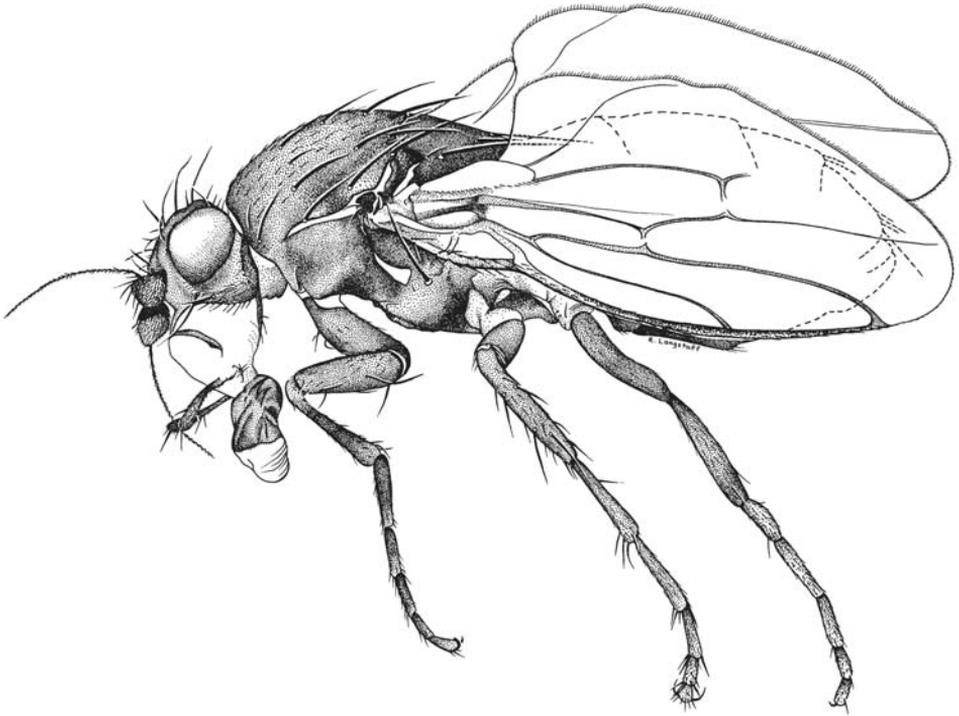


Sphaerocerid flies of the Yukon



FRONTISPIECE. The Holarctic sphaerocerid *Leptocera finalis* (Collin), widespread in wet-tundra riparian habitats in the Yukon. Length about 2 mm.

Sphaerocerid Flies (Diptera: Sphaeroceridae) of the Yukon

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Abstract. Distributional data are given for the 59 species in the family Sphaeroceridae which are now known to occur in the Yukon. The habitats, origins, and relationships of these species are discussed as far as possible. Even though the sphaerocerid fauna of Palaearctic Beringia is largely unknown, most of the Yukon's Sphaeroceridae can be shown to occur either in the Palaearctic region (24 species) or have closer relatives in the Palaearctic region than elsewhere (8 species). Many of those species found in both the Yukon and the Palaearctic region are restricted to the northwest in the Nearctic part of their range (7 species). Other species show marked disjunctions between the northwestern Nearctic and eastern Nearctic parts of their ranges (7 species). Of the 11 species restricted to the Yukon and adjacent areas, only two belong to Nearctic clades.

Résumé. *Les sphéroceres (Diptera: Sphaeroceridae) du Yukon.* On trouvera ici des données sur la répartition des 59 espèces de Sphaeroceridae connues du Yukon. Les habitats, les origines et les liens de parenté de ces espèces sont examinés. Bien que la faune des sphéroceres de la Béringie paléarctique soit encore mal connue, la plupart des espèces du Yukon semblent être paléarctiques (24 espèces) ou avoir des liens de parenté avec des espèces paléarctiques plus étroites qu'avec tout autre groupe d'espèces (8 espèces). Plusieurs des espèces qui se retrouvent à la fois au Yukon et dans la zone paléarctique sont restreintes au nord-ouest de la zone néarctique (7 espèces). Les autres espèces ont une répartition discontinue et se retrouvent dans le nord-ouest et dans l'est de la zone néarctique (7 espèces). Des 11 espèces confinées au Yukon et aux régions adjacentes, seulement 2 appartiennent à des clades néarctiques.

Introduction

The acalyptrate fly family Sphaeroceridae is among the most ubiquitous groups of arthropods, abundant in moist terrestrial environments from the arctic coastal plain to the antarctic islands. Pan traps or pitfall traps invariably take large numbers of sphaerocerids, making them an easily surveyed group. Other techniques used to survey Sphaeroceridae include aspirators, flight intercept traps, sweep samples, and baited traps.

Because several species are attracted to dung, carrion, fungi, or decaying vegetation, appropriately baited traps are both effective and specific. An unusually large percentage of the Yukon's sphaerocerid fauna seems to be associated with the runs and nests of small mammals.

Several recent papers dealing with sphaerocerid systematics show that sphaerocerids often are habitat specific, show interesting patterns of endemism, and are good subjects for phylogenetic analyses (Marshall 1985*a, b*, 1986, 1987, 1989; Marshall and Smith 1990, 1992, 1993; Norrbom and Kim 1985*a, b*). Most of the major taxa of the Yukon have been revised recently, and there are keys, distributional data, and phylogenetic information for all northwestern genera except *Opacifrons* and *Leptocera* (both genera are under revision by the author). The catalog of Nearctic Diptera (Stone et al. 1965) lists only 7 of the 59 species of Sphaeroceridae found in the Yukon, the balance having either been described as new or recorded from North America since then, mostly in the last 15 years.

Most records listed below are from two trips to the Yukon made by the author between late June and early August of 1985 and of 1987. Most specimens were collected either in roadside traps, especially along the Dempster Highway, or in the immediate vicinity of a

field camp in the northern Richardson Mountains at 67°48'N, 136°29'W; thus the records are mainly from the northern part of the Yukon. Special effort was made to sample in peatlands, mammal runs, and debris along waterways. Other significant collections of Yukon Sphaeroceridae are those made by S.G. Cannings (University of British Columbia Collection), R.E. Leech (Canadian National Collection), S.B. Peck (University of Guelph Collection) and D.M. Wood (Canadian National Collection). Some additional specimens were found in the collections of the Royal Ontario Museum, United States National Museum, and the California Academy of Sciences.

Several species in addition to the 59 recorded from the Yukon occur in adjacent areas and are expected in the Yukon, and some species could not be enumerated because they belong to inadequately studied genera or species complexes. The total sphaerocerid fauna of the Yukon is probably more than 100 species.

Distribution, Biology and Relationships of Yukon Sphaeroceridae

The following listing of 59 species, in alphabetical order within each of the three subfamilies of Sphaeroceridae known from the Yukon, summarizes knowledge on distribution, biology and relationships of each species and is followed by discussion of an additional 15 species expected to occur in the Yukon. The proportional distribution of species within the three subfamilies (47:9:3) is close to that expected anywhere in the Holarctic region, and the total number of species for the Yukon is close to that recorded for single sites or habitat types in eastern North America. Table 1 below gives a general overview of the distribution, relationships and habitat preference of Yukon sphaerocerids.

Distributions are summarized below by Yukon ecogeographic region (see Scudder 1997); detailed collection data are listed in Appendix 1.

Subfamily Limosiniinae

Genus *Aptilotus* Mik. Most members of this genus are associated with green leaf litter, such as the foliage of fallen trees or low branches of evergreens (Marshall 1983).

1. *Aptilotus luctuosus* (Spuler)

Distribution: *Aptilotus luctuosus* had been recorded from Alaska, British Columbia, Washington, Oregon, Idaho, and Wyoming, and has now been collected in the Yukon.

Yukon records: This species is known in the Yukon only from 3 widely separated localities, one near Klwane (Shakwak Trench) and 2 sites along the Dempster Highway (Eagle Plains and Ogilvie Mountains).

Taxonomic notes: *Aptilotus luctuosus* was previously known only from macropterous specimens. The Yukon specimens are all markedly brachypterous, with the wing not extending as far as tergite 4. This western species is of isolated phylogenetic position, with no easily recognised sister group.

2. *Aptilotus spatulatus* Marshall

Distribution: *Aptilotus spatulatus* is known from Alaska, Yukon, Alberta, Saskatchewan and New Mexico, as well as from high elevations in New Hampshire and Vermont.

Yukon records: One locality near Whitehorse.

Taxonomic notes: The series of 18 specimens from the Yukon ranges from brachypterous to macropterous. Previous records have included specimens of a single wing type only, macropterous or brachypterous, from any one area. *Aptilotus spatulatus* and the closely related western Nearctic species *A. parvipennis* (Spuler) belong to a well defined monophyletic group that also includes one macropterous species from Nepal (*A. bimotatus* Marshall) and an apterous species known only from high elevations in the Smoky Mountains of North Carolina (*Aptilotus pulex* (Richards)).

Genus *Gonioneura* Rondani

3. *Gonioneura spinipennis* (Haliday)

Distribution: This is a common, synanthropic, Holarctic species.

Yukon records: The only records from the Yukon are from a dead wolf near Dawson City.

Genus *Leptocera* Olivier. The genus *Leptocera* is the most commonly collected genus of sphaerocerid, probably because specimens are easily taken by sweeping wet areas. The genus includes a large number of undescribed New World species.

4. *Leptocera (Leptocera) finalis* (Collin)

Distribution: Holarctic.

Yukon records: Specimens of this species of the cosmopolitan genus *Leptocera* have been collected throughout the Yukon, the first record of *L. finalis* in North America.

Biological information: Records from the Yukon indicate that, like other *Leptocera* species, *L. finalis* is mostly riparian.

Taxonomic notes: *Leptocera* is the least known genus of Sphaeroceridae in North America.

Genus *Minilimosina* Roháček. *Minilimosina* is a large group of small to minute sphaerocerids characterized by a telescoping female abdomen, presumably associated with oviposition in soft substrates such as fungi. The Nearctic species were revised by Marshall (1985b).

5. *Minilimosina (Minilimosina) accinta* Marshall

Distribution: First described on the basis of a single specimen from Utah, this highly distinctive species has since been collected in the Queen Charlotte Islands, British Columbia, and in the Yukon.

Yukon records: Collected 33 km north of Whitehorse.

Biological information: *M. accinta* was collected on carrion in the Queen Charlotte Islands, and in a pan trap on a dry slope in the Yukon. Nothing is known of its biology.

6. *Minilimosina (Minilimosina) gemella* Roháček

Distribution: This is a rarely collected Holarctic species, originally described on the basis of 2 males from Austria, but now known from across Canada, Michigan, West Virginia, and Alaska.

Yukon records: Ogilvie Mountains and Klondike Plateau.

Biological information: Collected in boreal forest and wetland habitats in the Yukon.

7. *Minilimosina (Minilimosina) nasuta* (Spuler)

Distribution: This western species is known from Alaska, Yukon, British Columbia, Washington, Arizona and New Mexico.

Yukon records: The only specimen known from the Yukon was collected in the Yukon/Tintina region.

Biological information: *M. nasuta* is common on decaying mushrooms in boreomontane habitats. The Yukon specimen was taken in a mushroom-baited trap in a stand of poplar trees.

8. *Minilimosina (Minilimosina) parva* (Malloch)

Distribution: This is an extremely common species throughout eastern North America. It is less common in the west, but has been collected in Alaska, Washington, Texas, Arizona, and British Columbia, as well as the Yukon.

Yukon records: Ogilvie Mountains.

Biological information: *M. parva* is usually found on mushrooms. The Yukon specimens were taken in dung, carrion, and mushroom traps.

Taxonomic notes: *Minilimosina parva* is frequently found in the same collections as the very similar *M. parvula* (species 9).

9. *Minilimosina (Minilimosina) parvula* (Stenhammar)

Distribution: This Holarctic species is common throughout Canada and the northern United States.

Yukon records: Taken at almost every collecting site in the Yukon.

Biological information: Usually associated with mushrooms.

10. *Minilimosina (Minilimosina) zeda* Marshall

Distribution: This is a rarely collected northern Nearctic species known from Alaska, Yukon, Northwest Territories and Alberta.

Yukon records: There are only three scattered records (Eagle Plains, Ogilvie Mountains, Yukon/Tintina region).

Taxonomic notes: *Minilimosina zeda* forms a close sister-species pair with *M. hispidula* Roháček, from Sweden.

11. *Minilimosina (Svarciella) dissimilicosta* (Spuler)

Distribution: This northern species is known from Alaska, Yukon, British Columbia, and high elevations in Colorado, New Mexico and Utah.

Yukon records: Yukon specimens are from the Yukon/Tintina region and the Ogilvie Mountains.

Biological information: This species is fungivorous. All 11 specimens known from the Yukon are females; however, males have been collected in Alaska and northern British Columbia (Marshall 1985b).

Taxonomic notes: *Minilimosina dissimilicosta* belongs to an otherwise Palearctic clade, and has an extremely close sister species in *M. unica* (Papp) from Mongolia, Finland, and Sweden.

12. *Minilimosina (Svarciella) vitripennis* (Zetterstedt)

Distribution: This Holarctic species is especially common in the north, but occurs throughout North America.

Yukon records: Ogilvie and Richardson Mountains.

Biological information: All but one of the 20 specimens known from the Yukon are females, and most were taken in mushroom-baited traps.

Taxonomic notes: *Minilimosina vitripennis* belongs to a well defined, otherwise New World, clade, and is the sister group to a clade of 4 southeastern or Neotropical species.

Genus *Nearcticorpus* Roháček and Marshall**13. *Nearcticorpus canadense* Roháček and Marshall**

Distribution: Originally described from eastern Canada, this species is now known from across Canada, Alaska, California, Idaho, West Virginia, Tennessee, New York, Georgia and North Carolina.

Yukon records: Near Dawson City and 210 km south of Dawson City.

Biological information: *N. canadense* is usually associated with mushrooms and was collected in the Yukon from mushroom-baited traps and carrion traps.

Taxonomic notes: The only other species in the genus, *N. pecki* Marshall and Roháček, is known only from California and New Mexico.

Genus *Phthitia* Enderlein. The North American species of this genus were known as *Kimosina* prior to a revision of the genus by Marshall and Smith (1992). Most *Phthitia* species are associated with shoreline debris.

14. *Phthitia digistylus* Marshall

Distribution: This Beringian species is found in Alaska, Yukon and the Northwest Territories.

Yukon records: Recorded from the Shakwak Trench, Ogilvie Mountains, Porcupine Plain and Yukon/Tintina regions.

Taxonomic notes: *Phthitia digistylus* belongs to the large, Holarctic, phylogenetically unresolved *glabrescens* species group.

15. *Phthitia lineasterna* Marshall

Distribution: Yukon and Alberta.

Yukon records: This species is known only from Moose Creek Campground in the Yukon/Tintina region.

Taxonomic notes: Like *P. digistylus*, *P. lineasterna* belongs to the difficult *glabrescens* species group. Its closest relative appears to be the western North American *P. levifrons* Spuler.

16. *Phthitia quadricercus* Marshall

Distribution: Across Canada and the northern United States (Marshall and Smith 1992).

Yukon records: Ogilvie Mountains and Shakwak Trench regions.

Biological information: This species is associated with peatlands.

Taxonomic notes: *Phthitia quadricercus* and the Palearctic species *Phthitia spinosa* (Collin) together form a distinctive species group. Both are northern, peatland species.

Genus *Pseudocollinella* Duda. This genus was formerly treated as part of *Opacifrons*. Species of *Pseudocollinella* are usually associated with wet, decaying vegetation.

17. *Pseudocollinella abhorrens* (Roháček)

Distribution: First described from Sweden, this species is now known from the Yukon, Alaska, the Northwest Territories, Manitoba (Churchill), and a bog near Edmonton, Alberta.

Yukon records: Summit Lake, Richardson Mountains.

Taxonomic notes: See comments under *P. attractans* (20).

18. *Pseudocollinella aquilifrons* (Stenhammar)

Distribution: Yukon and Alaska.

Yukon records: *Pseudocollinella aquilifrons* is known from several tributaries of the Yukon River, both in Alaska and the Yukon (Shakwak Trench and Ogilvie Mountains regions), as well as from one specimen from the Firth River in the British Mountains.

Taxonomic and biological notes: This species, plus the northern Palearctic *P. septentrionalis* (Stenhammar) and the Nearctic *P. caelobata* (Spuler), form a group of very similar, closely related species (the *septentrionalis* group) usually associated with flood debris along waterways (Marshall and Smith 1993).

19. *Pseudocollinella arctopellucida* Marshall

Distribution: Southeastern Alaska, Yukon, and across the western Northwest Territories (Ft. McPherson, Bathurst Inlet, Yellowknife, Ft. Simpson).

Yukon records: Ogilvie Mountains.

Taxonomic notes: *P. arctopellucida* is the single northwestern member of the western Nearctic *P. pellucida* group. This species group does not occur in the Palearctic region.

20. *Pseudocollinella attractans* Marshall

Distribution: *Pseudocollinella attractans* is known only from the Yukon and Northwest Territories (Ft. Simpson, Yellowknife).

Yukon records: Ogilvie Mountains and Richardson Mountains regions.

Taxonomic notes: The type series of about 50 specimens of this species was taken at Summit Lake, in the north Richardson Mountains. The same collection included one specimen of the very similar, northern Holarctic, *P. abhorrens*.

21. *Pseudocollinella caelobata* (Spuler)

Distribution: This species is widespread in northwestern North America and is also known from a few specimens in northeastern North America. The two Yukon records are widely separated from the main range of the species. All records of this species group from the intervening area (the southern two-thirds of the Yukon) are of the very closely related Yukon-Alaska species *P. aquilifrons* (18).

Yukon records: Porcupine Plain and Richardson Mountains.

22. *Pseudocollinella flavilabris* (Hackman)

Distribution: *Pseudocollinella flavilabris* is known from Yukon, Alaska, the Kola Peninsula of the former USSR, and Finland.

Yukon records: Yukon records are from the northern Richardson Mountains and the Ogilvie Mountains.

Taxonomic notes: *Pseudocollinella flavilabris* plus *P. attractans* and *P. abhorrens*, all of which occur in the Yukon, comprise the *flavilabris* species group.

Genus *Pteremis* Rondani. *Pteremis* species are normally associated with mammal runs, often in *Sphagnum*, and exhibit varying degrees of brachyptery.

23. *Pteremis wirthi* Marshall

Distribution: This northern species is also found in Alaska and across northern Canada, with a few records from bogs as far south as Kenora, Ontario.

Yukon records: Yukon records are from the Ogilvie and Richardson Mountains and the Eagle Plains.

Taxonomic notes: *Pteremis wirthi* is the only Nearctic species in the genus. The other species of *Pteremis* are found in Europe, Mongolia, and the Canary Islands.

Genus *Pullimosina* Roháček. *Pullimosina* is divided into the typical, speciose subgenus *Pullimosina* and the aberrant subgenus *Dahlimosina*, with only 3 species. Most species of the typical subgenus are northern, and most are associated with decaying plant material such as shoreline debris or mammal nests. The apparent absence of *Pullimosina* subgenus *Pullimosina* in the Yukon therefore is remarkable.

24. *Pullimosina (Dahlimosina) dahli* (Duda)

Distribution: This Holarctic species is the most characteristic species of kettle bogs in eastern Canada (Marshall 1986). It appears to be quite common in Alaska and the Yukon.

Yukon records: Eagle Plains, Ogilvie Mountains, Yukon/Tintina region, Shakwak Trench.

Biological information: *P. dahli* is associated with *Sphagnum*.

Taxonomic notes: There are 2 other North American *Dahlimosina*, the northwestern *P. yukonensis* Marshall and the northeastern *P. hirsutiphallus* Marshall.

25. *Pullimosina (Dahlimosina) yukonensis* Marshall

Distribution: Yukon.

Yukon records: This species is known only from the type locality, at km 155 on the Dempster Highway.

Genus *Rachispoda* Lioy. Most of the New World *Rachispoda* species were revised by Wheeler (1995) and Wheeler and Marshall (1995). Species of this genus are usually associated with muddy shorelines.

26. *Rachispoda hoplites* (Spuler)

Distribution: *Rachispoda hoplites* is a widespread Nearctic species, recorded from Alaska south to Oregon, east to the Northwest Territories and Manitoba and with a disjunct record from southern Quebec.

Yukon records: Porcupine Plain, Yukon/Tintina region, Southern Lakes region, Eastern Plateau, Shakwak Trench, and Ogilvie Mountains.

27. *Rachispoda lutosa* (Stenhammar)

Distribution: This is a northern Holarctic species, with published records from much of the Nearctic region and confirmed records for Alaska south to British Columbia, Northwest Territories and northern Ontario.

Yukon records: Porcupine Plain, Yukon/Tintina region, Shakwak Trench, and the Southern Lakes region.

Taxonomic notes: Many published records are misidentifications of related species.

28. *Rachispoda suberecta* (Sabrosky)

Distribution: This western Nearctic species is known from Yukon south to California, and west to Alberta, Montana, Colorado and Nevada.

Yukon records: Southern Lakes, Yukon/Tintina, and Eastern Plateaus regions.

29. *Rachispoda vespertina* Wheeler

Distribution: This species is known from Alaska south to southern California, and east to Northwest Territories, northern Ontario, North Dakota, South Dakota, Colorado, and Nevada.

Yukon records: Shakwak Trench, Porcupine Plateau, Ogilvie Mountains, Eagle Plateau, Eastern Plateaus.

30. *Rachispoda* undescribed sp. 1

Distribution: This undescribed western species occurs from the Yukon south to Oregon and east to Manitoba, Montana and Wyoming.

Yukon records: Yukon records are from the Eastern Plateau, Porcupine Plateau, Southern Lakes, and Shakwak Trench regions.

31. *Rachispoda* undescribed sp. 2

Distribution: This primarily northwestern species is known from as far east as Saskatchewan and as far south as British Columbia.

Yukon records: Porcupine Plateau, Cassiar Mountains, and Southern Lakes regions.

32. *Rachispoda* undescribed sp. 3

Distribution: This widespread Nearctic species is known from Alaska, Yukon, Alberta, Oregon, Colorado, Indiana, Ohio, and New York.

Yukon records: Yukon/Tintina region.

Genus *Rudolfina* Roháček

33. *Rudolfina digitata* Marshall

Distribution: This species is known from Alaska and Yukon and high elevations in Alberta, Wyoming, Colorado, and New Mexico, as well as from the top of Mt. Washington in New Hampshire (Marshall 1991).

Yukon records: Ogilvie Mountains.

Biological information: The 7 Yukon specimens are all from dung traps.

Taxonomic notes: The most closely related species, *Rudolfina rozkosnyi* (Roháček), the only Old World species of this large, primarily Neotropical genus, also shows a disjunct alpine-arctic distribution, occurring in montane central Europe and the Kola Peninsula of the former USSR.

Genus *Spelobia* Spuler. *Spelobia* is the most common genus of sphaerocerid in the Nearctic region, where it includes 44 species associated with a variety of microhabitats. Although this genus includes some of our most ubiquitous, generalist sphaerocerids, such as *S. clunipes* (37) and *S. luteilabris* (40), it also includes many species of restricted distribution and specialized microhabitat.

34. *Spelobia algida* Marshall

Distribution: *S. algida* has also been collected in Alaska, Yukon, Ontario, and New Hampshire (Marshall 1989).

Yukon records: Ogilvie Mountains.

Biological information: This species is associated with spring fens. It was collected in dung traps in the Yukon.

Taxonomic notes: The closest Nearctic species to *S. algida* is *S. multihama* Marshall, a northeastern species. There is an undescribed species from Nepal which is very similar to *S. algida*.

35. *Spelobia bispina* Marshall

Distribution: *Spelobia bispina* is known from Sweden, Russia (Lake Baikal), Alberta, Nova Scotia (Cape Breton), Manitoba (Churchill), Quebec, New Hampshire, and Alaska (Marshall 1985a).

Yukon records: Collected from the Shawkak Trench region in the southwest to the Richardson Mountains in the north.

Biological information: This species is usually associated with peatlands, where it is most commonly collected in mammal runs. It was collected in the Yukon in a variety of microhabitats.

36. *Spelobia bumamma* Marshall

Distribution: A transboreal species common throughout much of Canada and at higher elevations in the northern states.

Yukon records: Yukon/Tintina and Southern Lakes regions.

Biological information: *Spelobia bumamma* is the transboreal member of a species group associated with mushrooms. In the Yukon it was collected at mushroom baits in boreal habitats.

37. *Spelobia clunipes* Meigen

Distribution: This is an Holarctic, normally synanthropic fly extremely common throughout most of North America. Its presence at a remote field camp in the Yukon suggests that it is naturally distributed across the Holarctic region.

Yukon records: North Richardson Mountains.

38. *Spelobia frustrilabris* Marshall

Distribution: Originally described from eastern North America, this species is now also known from a single specimen in the Northwest Territories (Yellowknife) and from three Yukon specimens.

Yukon records: Collected at widely separated localities in the Ogilvie and Richardson Mountains.

39. *Spelobia ibrida* Roháček

Distribution: This is the only Nearctic record of *S. ibrida*, previously known from Finland and Czechoslovakia.

Yukon records: Tombstone Mt. Campground, near the southern end of the Dempster Highway.

Biological information: Most known specimens of *S. ibrida* have been collected in bogs. The Yukon specimen is from a mushroom.

Taxonomic notes: This species is closely related to, and easily confused with, *S. luteilabris* (40) and the very similar *S. rufilabris* (Stenhammar).

40. *Spelobia luteilabris* (Rondani)

Distribution: This is a common, synanthropic, Holarctic species particularly common throughout the northwest.

Yukon records: Many localities.

Biological information: Virtually every carrion trap set in the Yukon took some specimens of this primarily necrophagous species.

41. *Spelobia nana* (Rondani)

Distribution: This is the only Nearctic record for *Spelobia nana*, previously known only from Europe.

Yukon records: North Richardson Mountains to as far south as the beginning of the Dempster Highway.

Biological information: In Europe this species has been most frequently collected in bogs. The Yukon records of this species range from bogs in the south to a dry slope in the Richardson Mountains.

Taxonomic notes: *Spelobia nana* plus the eastern North American *Spelobia brevipteryx* Marshall and the western North American *Spelobia rimata* Marshall make up a distinctive monophyletic group.

42. *Spelobia ordinaria* (Spuler)

Distribution: This western North American species is common from British Columbia to California, but known from only a single specimen in the Yukon.

Yukon records: Southern Lakes.

43. *Spelobia peltata* Marshall

Distribution: This inadequately known species is recorded from the Yukon, British Columbia, Manitoba, and Labrador.

Yukon records: One locality in the Ogilvie Mountains.

44. *Spelobia* sp. near *semioculata* (Richards)

Distribution: Unknown.

Yukon records: Collected in several localities from Whitehorse and Kluane to the Richardson Mountains.

Biological information: Almost every ground squirrel burrow carefully excavated by the author during visits to the Yukon in 1985 and 1987 yielded sphaerocerids which markedly resemble *Spelobia semioculata*, a species previously known only from eastern North America. Some specimens were also taken in habitats outside mammal burrows.

Taxonomic notes: Specimens from the Richardson Mountains differ in detail of the distiphallus from specimens from the southern Yukon, and these in turn differ from specimens taken from outside burrows. Available material is inadequate to decide whether these distiphallus differences reflect intraspecific variation or interspecific difference. For the purposes of this list, all northwestern specimens in this possible complex are treated as a new species near *S. semioculata*. The closest relative to the *semioculata* complex is *S. tenebrarum* (Aldrich), restricted to caves in unglaciated eastern North America.

Genus *Telomerina* Roháček. *Telomerina* is an Holarctic genus characterized by very small eyes. Individuals of the genus are frequently found under the droppings of large mammals.

45. *Telomerina beringiensis* Marshall

Distribution: This species is known only from Alaska and the Yukon.

Yukon records: Southern Ogilvie Mountains and Klondike Plateau.

Biological information: Collected in the Yukon on bear and fox faeces.

Taxonomic notes: *Telomerina beringiensis* belongs to a clade including a species from Mongolia, a species from northern Europe, and two species from eastern North America. Its most probable sister species is *T. cana* Marshall and Roháček, from the southeastern United States.

Genus *Terrilimosina* Roháček. *Terrilimosina* is a primarily Palaearctic genus, with 2 Holarctic and one Nearctic species.

46. *Terrilimosina schmitzi* (Duda)

Distribution: This is an abundant northern Holarctic species.

Yukon records: Widely distributed.

Biological information: *T. schmitzi* is most frequently collected in association with decaying vegetation in wooded areas (Marshall 1985c). The Yukon records are almost all from willow thickets.

Taxonomic notes: The related Nearctic *T. pexa* Marshall is common in Alaska and eastern North America, and can be expected from the Yukon.

Genus *Trachyopella* Duda. *Trachyopella* is a speciose, cosmopolitan genus of minute, inadequately known sphaerocerids.

47. *Trachypella bovilla* Collin

Distribution: This is a northern Holarctic species, described from Iceland and since recorded from northern Europe, across Canada, Oregon, and Alaska (Roháček and Marshall 1985).

Yukon records: Yukon/Tintina region.

Biological information: The only Yukon specimen was taken in a carrion trap among willow and spruce trees.

Subfamily Copromyzinae

Genus *Copromyza* Fallén. Species of this small Holarctic and Afrotropical genus often are associated with rodent burrows.

48. *Copromyza neglecta* (Malloch)

Distribution: Known from Alaska, Yukon, Northwest Territories, Labrador and as far south as North Carolina, Nebraska and southern California.

Yukon records: Pelly Mountains, Shakwak Trench, Eagle Plains, and Ogilvie Mountains.

Taxonomic notes: According to Norrbom and Kim (1985a) this species is closely related to *C. parastercoraria* Papp from Mongolia. There is some doubt as to whether *neglecta* and *parastercoraria* are really separate species.

49. *Copromyza stercoraria* (Meigen)

Distribution: This species occurs across the northern Palaearctic region, and the western Nearctic from Alaska to California.

Yukon records: Northern Richardson Mountains, Yukon/Tintina region, Ogilvie Mountains, and the Pelly Mountains.

Taxonomic notes: According to Norrbom and Kim (1985a), the sister species is the European *C. pseudostercoraria* Papp.

Genus *Crumomyia* Macquart. This genus is characteristic of high latitudes and high altitudes, where many species are found in small mammal burrows.

50. *Crumomyia gelida* (Hackman)

Distribution: This Holarctic species was previously known from Alaska, the Northwest Territories, Finland and Mongolia.

Yukon records: Ogilvie Mountains, Yukon/Tintina, Shakwak Trench, Richardson Mountains, and Southern Lakes regions.

Taxonomic notes: According to Norrbom and Kim (1985b), this is the sister species to *C. subaptera* (Malloch) which is known only from the northwestern Nearctic (see below).

51. *Crumomyia pollinodorsata* (Papp)

Distribution: *Crumomyia pollinodorsata* is a northern Holarctic species, known from Mongolia and Yukon.

Yukon records: Ogilvie Mountains.

Taxonomic notes: Norrbom and Kim (1985b) suggest that *C. pollinodorsata* is the sister species of the Himalayan species *C. deemingi* (Hackman). However, they present no synapomorphies in support of this hypothesis.

52. *Crumomyia pruinosa* (Richards)

Distribution: This is a northern Holarctic species found in northwestern and montane North America, north Europe and Mongolia.

Yukon records: The only Yukon record is from near Whitehorse.

Taxonomic notes: The most closely related species are the northern Holarctic *C. annulus* (Walker) and *C. nipponica*, known only from Japan.

53. *Crumomyia setitibialis* (Spuler)

Distribution: This is a northern Holarctic species known from Mongolia, Finland, Switzerland, Alaska, Yukon, Northwest Territories, Alberta, New Hampshire, New Brunswick and Quebec.

Yukon records: The only Yukon record is from near Whitehorse.

Taxonomic notes: The closest relatives to *C. setitibialis*, *C. pilosa* Norrbom and *C. nigra* (Meigen), form a closely related northwestern Nearctic-northern Europe pair.

54. *Crumomyia subaptera* (Malloch)

Distribution: This species is known from across the northern Nearctic from Labrador to the Pribilof Islands, with no records below 55°N.

Yukon records: Ogilvie and Richardson Mountains.

Biological information: Almost all of the Yukon records are from mammal runs.

Taxonomic notes: The sister species of *C. subaptera* is the Holarctic *C. gelida* Hackman (50).

Genus *Norrbomia* Papp. The Nearctic species of *Norrbomia*, most of which belong to a southern clade kleptoparasitic on dung beetles, were formerly placed in *Borborillus* Duda (Marshall and Norrbom 1992). The species found in the Yukon belong to a northern, Holarctic species group.

55. *Norrbomia fumipennis* (Stenhammar)

Distribution: This species is recorded from Alaska, Yukon, Northwest Territories, British Columbia, Manitoba, Labrador, Quebec, Colorado, Utah, Wyoming, New Mexico, and much of the northern Palaearctic region.

Yukon records: Ogilvie Mountains.

Taxonomic notes: Closely related to *N. costalis* (see notes under *N. yukonensis* (56)).

56. *Norrbomia yukonensis* Marshall and Norrbom

Distribution: Yukon.

Yukon records: Richardson Mountains.

Taxonomic notes: This species, recently described from the Yukon, is closely related to *N. costalis* (Zetterstedt), which ranges across the Palaearctic region, and the very similar *N. cryptica* (Papp), from Mongolia. Although the males of this new species are distinctive, the females show a range of variation including forms indistinguishable from *N. costalis* as well as forms indistinguishable from *N. cryptica*. This situation is further compounded by the difficulty of separating females of *N. costalis* from those of another closely related Holarctic species, *N. fumipennis*. *Norrbomia fumipennis*, *costalis*, *cryptica*, and *yukonensis* appear to form a monophyletic group with Old World affinities.

Subfamily Sphaerocerinae

Genus *Ischiolepta* Lioy. *Ischiolepta*, the most northerly genus in the Sphaerocerinae, includes coprophagous species and species associated with decaying vegetation.

57. *Ischiolepta micropyga* (Duda)

Distribution: This is an Holarctic species, less synanthropic and less often collected than *pusilla*.

Yukon records: Southern Lakes region, Yukon/Tintina region, Eagle Plains, and the Ogilvie Mountains.

58. *Ischiolepta pusilla* Fallén

Distribution: This is a common, Holarctic, synanthropic species.

Yukon records: The only Yukon record is from Dawson City.

Biological information: *I. pusilla* is almost invariably found in garden refuse such as lawn clippings or compost.

59. *Ischiolepta scabra* (Spuler)

Distribution: This is a northern Nearctic species, less common than *pusilla* or *micropyga*.

Yukon records: Yukon/Tintina region and the Ogilvie Mountains.

Additional Species Expected

60. *Aptilotus borealis* Malloch. Alaska and northern British Columbia, mostly coastal forest.

61. *Aptilotus parvipennis* (Spuler). Alaska and northern British Columbia, mostly coastal forest.

62. *Opacifrons convexa* (Spuler). Northern British Columbia, Alaska and the Northwest Territories.
The genus *Pseudocollinella*, here treated as a separate genus diverse in the north, was previously included in *Opacifrons*.

63. *Phthitia occinosa* Marshall. Northwest Territories, Alaska, British Columbia, Utah, Arizona.

64. *Pullimosina (Pullimosina) woodi* Marshall. Alaska and northern British Columbia.

65. *Rachispoda barbata* Sabrosky. A widespread Nearctic species, recorded from Alaska.

66. *Rachispoda michigana* Sabrosky. A widespread Nearctic species, recorded from Alaska.

67. *Rachispoda limosa* (Fallén). An Holarctic species present in northern British Columbia.
68. *Spelobia hirsuta* Marshall. A western species known from Saskatchewan to California to Alaska and British Columbia.
69. *Terrilimosina pexa* Marshall. Alaska and eastern North America.
70. *Crumomyia annulus* (Walker). A northern Holarctic species, known from Alaska, Alberta, Manitoba, Quebec, Japan and Russia.
71. *Crumomyia maculipennis* (Spuler). A western Nearctic species, known from California to Alaska.
72. *Crumomyia pilosa* Norrbom. This species, closely related to the European *C. nigra*, is known from Alaska, British Columbia, and Alberta.
73. *Sphaerocera curvipes* Meigen. Alaska, Cosmopolitan.
74. *Sphaerocera tuberculosa* Kim. Alaska, British Columbia, Idaho, Oregon, Washington.
75. *Ischiolepta barberi* Han and Marshall. Known from peatlands in Alaska and Ontario.

Zoogeography of Yukon Sphaeroceridae

Table 1 lists the habitat, microhabitat, distribution and zoogeographic affinities of each species of Yukon Sphaeroceridae, and Table 2 summarizes the distributions of species characteristic of each habitat. Tables 3 and 4 summarize the distributions and sister groups of the species associated with the major habitats, boreal forest (Table 3) and wet tundra (Table 4). Tables 5 and 6 summarize the close relationships between species and populations in the Yukon and the Palaearctic region. "Habitat" is divided into four broad types: boreal forest, wet tundra, dry tundra, and steppe. All the species collected primarily in treed areas are treated as "boreal-forest" species, and species collected primarily in habitats dominated by shrubs, mosses and sedges are treated as "wet-tundra" species. There is, of course, a great deal of overlap in species composition between these habitats. Dry-tundra species, mostly from the slopes of the Richardson and Ogilvie Mountains, and steppe species, mostly from the southern Yukon, make up a small part of the Yukon sphaerocerid fauna.

Boreal-forest Species. Of the 59 species of Sphaeroceridae recorded from the Yukon, 37 can be described as boreal-forest species (Table 2), although they also occur in wet tundra. Lafontaine and Wood (1988) found a similar preponderance of such species in the Beringian noctuid fauna, with 56% of the fauna recorded from boreal forest.

Twelve of these 37 boreal-forest sphaerocerids occur in both the Nearctic and Palaearctic regions, with most of these species also occurring in wet tundra. Three species (Table 1; species 17, 50, 52) occur in the Palaearctic and northwestern Nearctic only, with the other 9 species (Table 1; species 6, 9, 12, 28, 46, 47, 53, 55, 57) more widely distributed and considered to have an Holarctic distribution.

The remaining 25 of the 37 boreal-forest species are not known from the Palaearctic region. Eleven of them, generally more southern in distribution, occur in both eastern and western North America. Most of these species have their closest known relatives in the Nearctic region (Table 3). *Nearcticorpus canadense* (13), for example, has its only known congener in western North America. Similarly, *Spelobia bumamma* (36) belongs to a Nearctic species group of fungivorous species, with members throughout North America. Three of the 11 widespread Nearctic boreal-forest species are thought to have Palaearctic sister groups, but in 2 of those taxa there is some doubt as to the identity of the sister group. *Copromyza neglecta* (48) was treated as the sister group of *C. parastercoraria* by Norrbom and Kim (1985a), but the identity of the latter species needs to be clarified. *Pseudocollinella caelobata* (21) and the apparent Beringian endemic *P. aquilifrons* (18) form a monophyletic group with the northern Palaearctic *P. septentrionalis* (Stenhammar), but there is little evidence that *P. caelobata* is more closely related to *P. septentrionalis* than to *P. aquilifrons*.

TABLE 1. Distribution, zoogeographic affinity, and habitat preference of Sphaeroceridae recorded from the Yukon. Abbreviations: N, Nearctic; H, Holarctic; P, Palaearctic; e, East; n, North; w, West; nw, Northwest; U, Unknown.

Taxon	Yukon habitat	Microhabitat	Distribution	Distribution of sister taxon
Limosiinae				
1. <i>Aptilotus luctuosus</i> (Spuler)	Boreal forest	Mammal runs	wN	H
2. <i>Aptilotus spatulatus</i> Marshall	Boreal forest	Vegetation	wN, eN	wN
3. <i>Gonioneura spinipennis</i> Haliday	Synanthropic	Various	H	wN
4. <i>Leptocera finalis</i> (Collin)	Wet tundra	Riparian	H	U
5. <i>Minilimosina (Minilimosina) accinta</i> Marshall	Boreal forest	Carrion	wN	wN
6. <i>Minilimosina (M.) gemella</i> Roháček	Boreal forest	Fungi	H	U
7. <i>Minilimosina (M.) nasuta</i> (Spuler)	Boreal forest	Fungi	wN	N
8. <i>Minilimosina (M.) parva</i> (Malloch)	Boreal forest	Fungi	N	N
9. <i>Minilimosina (M.) parvula</i> (Stenhammar)	Boreal forest	Fungi	H	N
10. <i>Minilimosina (M.) zeda</i> Marshall	Boreal forest	Unknown	nwN	P
11. <i>Minilimosina (Svarciella) dissimilicosta</i> (Spuler)	Boreal forest	Fungi	wN	P
12. <i>Minilimosina (S.) vitripennis</i> (Zetterstedt)	Boreal forest	Fungi	H	N
13. <i>Nearcticorpus canadense</i> Roháček and Marshall	Boreal forest	Fungi	N	wN
14. <i>Phthitia digistylus</i> Marshall	Boreal forest	Riparian	nwN	H
15. <i>Phthitia lineasterna</i> Marshall	Boreal forest	Unknown	wN	N
16. <i>Phthitia quadricercus</i> Marshall	Boreal forest	Peatlands	eN, wN	P
17. <i>Pseudocollinella abhorrens</i> (Roháček)	Boreal forest	Riparian	wN, nP	Yukon
18. <i>Pseudocollinella aquilifrons</i> (Stenhammar)	Boreal forest	Riparian	nwN	wN + P
19. <i>Pseudocollinella arctopellucida</i> Marshall	Boreal forest	Riparian	nwN	H
20. <i>Pseudocollinella attractans</i> Marshall	Wet tundra	Riparian	Yukon	H
21. <i>Pseudocollinella caelobata</i> (Spuler)	Boreal forest	Riparian	wN, eN	P
22. <i>Pseudocollinella flavilabris</i> (Hackman)	Wet tundra	Riparian	Yukon, nP	U
23. <i>Pteremis wirthi</i> Marshall	Wet tundra	Mammal runs	nN	P
24. <i>Pullimosina (Dahlimosina) dahli</i> (Duda)	Wet tundra	Peatlands	H	N
25. <i>Pullimosina (D.) yukonensis</i> Marshall	Dry tundra	Unknown	Yukon	eN
26. <i>Rachispoda hoplites</i> (Spuler)	Boreal forest	Riparian	N	U
27. <i>Rachispoda lutosa</i> (Stenhammar)	Boreal forest	Riparian	H	U
28. <i>Rachispoda suberecta</i> (Sabrosky)	Boreal forest	Riparian	wN	U
29. <i>Rachispoda vespertina</i> Wheeler	Boreal forest	Riparian	N	wN
30. <i>Rachispoda</i> undescribed sp. 1	Boreal forest	Riparian	wN	U
31. <i>Rachispoda</i> undescribed sp. 2	Boreal forest	Riparian	nwN	U
32. <i>Rachispoda</i> undescribed sp. 3	Boreal forest	Riparian	N	U
33. <i>Rudolfina digitata</i> Marshall	Wet tundra	Unknown	wN, eN	wP
34. <i>Spelobia algida</i> Marshall	Wet tundra	Spring fens	nwN, eN	eN
35. <i>Spelobia bispina</i> Marshall	Wet tundra	Peatlands	nH	U
36. <i>Spelobia bumamma</i> Marshall	Boreal forest	Fungi	N	N
37. <i>Spelobia clunipes</i> Meigen	Synanthropic	Various	H	U
38. <i>Spelobia frustrilabris</i> Marshall	Wet tundra	Unknown	nwN, eN	U
39. <i>Spelobia ibrida</i> Roháček	Wet tundra	Unknown	nwN, wP	U
40. <i>Spelobia luteilabris</i> (Rondani)	Synanthropic	Various	H	H
41. <i>Spelobia nana</i> (Rondani)	Wet tundra	Unknown	nwN, wP	N
42. <i>Spelobia ordinaria</i> (Spuler)	Boreal forest	Dung	wN	U
43. <i>Spelobia peltata</i> Marshall	Wet tundra	Unknown	nN	U
44. <i>Spelobia</i> near <i>semioculata</i> (Richards)	Steppe	Burrows	nwN	neN
45. <i>Telomerina beringiensis</i> Marshall	Boreal forest	Unknown	nwN	eN
46. <i>Terrilimosina schmitzi</i> (Duda)	Boreal forest	Various	H	H
47. <i>Trachyopella bovilla</i> Collin	Boreal forest	Various	H	sH
Copromyzinae				
48. <i>Copromyza neglecta</i> (Malloch)	Boreal forest	Mammal runs	N	Mongolia
49. <i>Copromyza stercoraria</i> (Meigen)	Wet tundra	Mammal runs	wN, nP	wP
50. <i>Crumomyia gelida</i> (Hackman)	Boreal forest	Mammal runs	nwN, P	nwN
51. <i>Crumomyia pollinodorsata</i> (Papp)	Wet tundra	Mammal runs	nwN, eP	eP
52. <i>Crumomyia pruinoso</i> (Richards)	Boreal forest	Mammal runs	nwN, P	nH

TABLE 1. (continued)

Taxon	Yukon habitat	Microhabitat	Distribution	Distribution of sister taxon
53. <i>Crumomyia setitibialis</i> (Spuler)	Boreal forest	Mammal runs	H	nH
54. <i>Crumomyia subaptera</i> Malloch	Wet tundra	Mammal runs	nN	nH
55. <i>Norrbonnia fumipennis</i> (Stenhammar)	Boreal forest	Mammal runs	nH	nH
56. <i>Norrbonnia yukonensis</i> Marshall and Norrbom	Wet tundra	Mammal runs	Yukon	P or H or wN
Sphaerocerinae				
57. <i>Ischiolepta micropyga</i> (Duda)	Boreal forest	Fungi?	H	U
58. <i>Ischiolepta pusilla</i> Fallén	Synanthropic	Synanthropic	H	U
59. <i>Ischiolepta scabra</i> (Spuler)	Boreal forest	Mammal runs	N	U

TABLE 2. Numbers of species of Sphaeroceridae in different habitats in the Yukon, arranged by distributional pattern.

Habitat	Nearctic and Palaearctic	East and West Nearctic	West Nearctic	Northwest Nearctic	Total
Boreal forest	12	11	8	6	37
Wet Tundra	8	5	1	2	16
Dry Tundra	0	0	0	1	1
Steppe	0	0	0	1	1
Synanthropic	4	0	0	0	4
Total	24	16	9	10	59

TABLE 3. Distributions of species associated with boreal forest in the Yukon, and their sister groups (species numbers as in Table 1).

Yukon species	Sister taxa				
	West Nearctic	Nearctic	Palaearctic	Holarctic and Unknown	East Nearctic
Holarctic	17	9, 12	50	6, 27, 46, 47, 52, 53, 55, 57	
Nearctic	2, 13, 29	8, 36	16, 21, 48	26, 32, 59	
West Nearctic	5	7, 15	11	1, 30, 28, 42	
Northwest Nearctic		19	10	14, 18, 31	45

TABLE 4. Distributions of species associated with wet tundra in the Yukon, and their sister groups (species numbers as in Table 1).

Yukon species	Sister taxa				
	West Nearctic	Nearctic	Palaearctic	Holarctic and Unknown	East Nearctic
Holarctic		23, 41		4, 22, 35, 39, 49, 51	
Nearctic			33, 23	38, 43, 54	34
West Nearctic					
Northwest Nearctic				20, 56	

TABLE 5. Species or species pairs found in the Palaearctic and western Nearctic (species numbers as in Table 1).

Species	Habitat/microhabitat
<i>Pteremis wirthi</i> Marshall (23) and <i>P. fenestralis</i> (Fallén)	Wet tundra/peatlands
<i>Rudolfina digitata</i> Marshall (33) and <i>R. rozkosnyi</i> (Roháček)	Wet tundra/alpine meadows
<i>Norrbomia fumipennis</i> (Stenhammar) (55)	Boreal forest/mammal burrows
<i>Crumomyia seitibialis</i> (Spuler) (53)	Boreal forest/mammal burrows
<i>Phthitia quadricercus</i> Marshall (16) and <i>P. spinosa</i> (Collin)	Boreal forest/peatlands
<i>Pseudocollinella caelobata</i> (Spuler) (21) and <i>P. septentrionalis</i> (Stenhammar)	Boreal forest/riparian
<i>Copromyza neglecta</i> (Malloch) (48) and <i>C. parastercoraria</i> Papp	Boreal forest/mammal burrows
<i>Spelobia bispina</i> Marshall (35)	Wet tundra/peatlands
<i>Pullimosina dahli</i> (Duda) (24)	Wet tundra/peatlands

TABLE 6. Species or species pairs found in the Palaearctic and northwestern Nearctic (species numbers as in Table 1).

Species	Habitat/microhabitat
<i>Pseudocollinella abhorrens</i> (Roháček) (17)	Boreal forest/riparian
<i>Pseudocollinella flavilabris</i> (Hackman) (22)	Wet tundra/riparian
<i>Crumomyia pollinodorsata</i> (Papp) (51)	Wet tundra/mammal runs
<i>Crumomyia gelida</i> (Hackman) (50)	Boreal forest/mammal runs
<i>Crumomyia pruinosa</i> (Richards) (52)	Boreal forest/mammal runs
<i>Copromyza stercoraria</i> (Meigen) (49)	Wet tundra/mammal runs
<i>Spelobia ibrida</i> Roháček (39)	Wet tundra/unknown
<i>Spelobia nana</i> (Rondani) (41)	Wet tundra/unknown
<i>Minilimosina dissimilicosta</i> (Spuler) (11) and <i>M. unica</i> (Papp)	Boreal forest/fungi
<i>Minilimosina zeda</i> Marshall (10) and <i>M. hispidula</i> Roháček	Boreal forest/unknown

Only one transcontinental boreal-forest sphaerocerid, *Phthitia quadricercus* (16), forms an unequivocal monophyletic group with a Palaearctic sister species, *Phthitia spinosa* (Table 5).

The remaining 14 of 37 boreal-forest species are restricted to western North America, and most exhibit a boreomontane distribution. Two of these species have Palaearctic sister species, and for both pairs the sister-group relationship is extremely close. *Minilimosina dissimilicosta* (11) has a virtually identical Palaearctic sister species, *Minilimosina unica* (Papp), known from Mongolia, Finland and Sweden. Similarly, *Minilimosina zeda* (10) is extremely close to *M. hispidula* from Sweden. Some of the boreal-forest species occurring in the northwest, such as two species of *Rachispoda*, appear to belong to western clades and have their sister taxa in the Cordillera.

Wet-tundra Species. Most of the 16 species of Sphaeroceridae recorded from wet tundra in the Yukon occur either in both the Nearctic and Palaearctic regions, or occur in both western and eastern North America (Table 2). Of the 7 species found in both Nearctic and Palaearctic regions, 5 (Table 1; species 22, 39, 41, 49, 51) are apparently restricted to northwestern North America in the Nearctic part of their range. One of these species, *Crumomyia pollinodorsata* (51), is known only from Mongolia and the Yukon, but the others are more widely distributed in the Palaearctic part of their range.

Three (Table 1; species 4, 20, 56) of the wet-tundra species are apparently restricted to western or northwestern North America. One of these, *Norrbomia yukonensis* (56), is in a species group apparently associated with mammal runs. This species is known only from the northern Yukon and belongs to a group including a Palaearctic, an eastern Palaearctic, and an Holarctic species. Its closest relative is probably the widespread Palaearctic species.

Another example of close relationships between Nearctic and Palaearctic species among sphaerocerids associated with wet tundra is found in *Pteremis*, a small genus of brachypterous Limosiniinae (Table 3). There is only one Nearctic species, the northern *P. wirthi* (23), in this otherwise Palaearctic genus.

Another apparent distributional pattern among the wet-tundra species is a pattern of disjunct distributions between wet tundra of the northwest and peatlands of eastern North America. *Spelobia algida* and *S. frustrilabris* (34, 38) each show such apparent disjunctions. A similar distributional pattern is exhibited by *Rudolfina digitata* (33; Table 5), which is found in Beringia, in alpine meadows of the western Cordillera, and high on Mt. Washington in the east. The sister species to *digitata* is a European species which shows a similar arctic-alpine disjunction.

Dry-tundra Species. Lafontaine and Wood (1988) emphasised the high degree of endemism of Noctuidae in dry-tundra habitats of Beringia, and linked that endemism to the long-term stability of such habitats. Sphaeroceridae are not usually associated with dry habitats, but one species, *Pullimosina yukonensis* (25), is known only from 2 specimens taken in a pan trap placed in dry tundra. The closest relative to *P. yukonensis* is probably *P. hirsutiphallus* Marshall, from eastern North America.

Steppe Species. Only one species is known that may be characteristic of Yukon's southern steppe. An apparent new species (44) closely related to the eastern North American *Spelobia semioculata* is abundant in ground-squirrel burrows in the southern Yukon, and similar specimens are known from as far north as the Richardson Mountains. Members of the *S. semioculata* species complex are normally associated with mammal burrows, but are occasionally collected outside burrows. This complex is in need of further study based on more extensive collections from across the country, but the data currently available suggest that the Yukon specimens represent the sister group to the eastern North American *S. semioculata*. The sister species to the complex is *Spelobia tenebrarum* (Aldrich), a species restricted to caves in unglaciated eastern North America.

The samples on which this work is based have a distinct northern bias. The southern Yukon fauna, which is most likely to include steppe elements, remains inadequately known.

Synanthropic Species. Four species of Yukon sphaerocerids are considered synanthropic (Table 1; species 3, 37, 40, 58). Two of these species were collected only in the vicinity of towns, but 2 widespread, generally synanthropic species (*Spelobia clunipes* (37) and *Spelobia luteilabris* (40)) were collected in large numbers throughout the Yukon, including a remote field camp in the north Richardson Mountains. These successful generalist species are common in a wide range of habits and habitats throughout the Holarctic, but it is surprising that one of them (*Spelobia luteilabris*) is one of the most common species in even the extreme environment of the northern Yukon.

Discussion. The above data on distribution and relationships of Sphaeroceridae in the Yukon reveal a number of recurring patterns. One of the prevailing patterns, in both boreal-forest and wet-tundra habitats, is that of species or monophyletic pairs of species found in both the Palaearctic and the northwestern Nearctic regions (Table 6), and it is likely that further collecting in the eastern Palaearctic will reveal that many more northwestern Nearctic species also occur in the Palaearctic. Records of sphaerocerids from the northeastern Palaearctic in particular may help to clarify the origins and relationships of the Yukon fauna. The presence of Palaearctic species which extend their ranges into the Yukon reflects the past association of the Yukon with the Palaearctic region and its corresponding isolation from the rest of the

Nearctic. The prevalence of Holarctic distributions among species occurring in wet tundra reflects the relative continuity of this habitat across Beringia until the relatively recent development of a water barrier. Both of the clades that include a northwestern North American species and a closely related Palaearctic sister species are associated with boreal forest (Table 6). The specific differentiation of these two boreal-forest lineages, contrasted with the conspecificity of most tundra lineages that show comparable distributions (Table 6; species 22, 39, 41, 49, 51), presumably reflects a discontinuity in the boreal-forest environment at some earlier time; however some northwestern boreal-forest species are shared with the Palaearctic region (Table 6; species 17, 50, 52).

A close relationship also seems to exist between some trans-Nearctic species and their Palaearctic conspecifics or sister groups (Table 5). The best supported examples of northern sister groups occur in wet-tundra or peatland habitats, and involve the species pairs *Rudolfina digitata* + *rozkosnyi* and *Phthitia quadricercus* + *spinosa*. Both of these species pairs are isolated clades of 2 species only, and both show disjunct intraspecific ranges with some populations restricted to southern refugia in isolated peatlands or mountaintops. The spread of the Nearctic components across North America, and their subsequent restriction to refugia in the south and east must have occurred after the division of these lineages into Palaearctic and Nearctic isolates.

Seven of the Nearctic species found in the Yukon are also known from disjunct localities in eastern North America (Table 1; species 2, 16, 21, 23, 33, 34, 38). Species showing this kind of disjunction today probably were distributed across North America prior to the last glaciation. The northwestern populations probably reflect Pleistocene survival in an ice-free Beringian refugium, while southern populations survived in refugia south of the continental glaciation. In some instances these refugia are restricted to a few known localities, such as high mountaintops, but in many others the boundary between disjunct and widely distributed species is more difficult to define. Peatland species in particular may prove to be more widely distributed as the peatlands of central Canada are studied more carefully. Many of the widely distributed Nearctic species in the Yukon are the result of postglacial movement from southwestern or southeastern refugia, and most of these species, which now have widespread boreomontane or trans-Nearctic distributions, differ from most of the more narrowly distributed northwestern species in having closer phylogenetic affinities to the Nearctic than to the Palaearctic region.

The above conclusions are generally consistent with those of Lafontaine and Wood (1988) for the Beringian Noctuidae, although the Sphaeroceridae are not as well known as the Noctuidae. Most of the Yukon Sphaeroceridae are known from only two brief collecting trips by the author, so many habitats and regions are still entirely unknown for this group. Further collecting in neglected parts of the Yukon, study of material from the eastern Palaearctic region, and systematic study of currently unworkable groups such as *Leptocera* are necessary to put flesh on the skeletal patterns presented here as a first description of the Yukon sphaerocerid fauna.

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Appendix 1. Collection records for Yukon Sphaeroceridae.

Collections are by the author unless otherwise indicated, including the abbreviations: SP, S. Peck; ROM, Royal Ontario Museum; SC, S. Cannings; RL, R. Leech; DMW, D.M. Wood.

Sufamily Limosiniinae

Genus *Aptilotus* Mik

1. *Aptilotus luctuosus* (Spuler)

Dempster Hwy. km 141, dung trap in *Sphagnum* (1); Eagle R. Crossing, mammal runs under Juniper (2); Alaska Hwy. km 1660, Bear Cr. Pass (near Kluane), pan traps in Black Spruce (1).

2. *Aptilotus spatulatus* Marshall

Whitehorse, Wolf Cr. Campground, flight intercept trap, moss, *Equisetum* under Black Spruce (18).

Genus *Gonioneura* Rondani3. *Gonioneura spinipennis* (Haliday)

Dawson City, on dead wolf among birch, poplar, 13.vii.1985 (1).

Genus *Leptocera* (s. str.)4. *Leptocera finalis* (Collin)

Dempster Hwy. km 141, Blackstone R. trap in *Carex-Equisetum*, 6–11.vii.1985 (34); Dempster Hwy. km 147, fen, willow and spruce, dung trap 6–11.viii.1985 (13); Dempster Hwy. km 172, mushroom pan in creek gravel, 6–11.vii.1985 (5); Dempster Hwy., Tombstone Mts., flood debris/river gravel, 3.vii.1985 (8); Dempster Hwy. km 165, Sulphur Spring at Engineer Cr., pan trap (fish guts), 27.vi–11.vii.1987 (25); Dempster Hwy. km 172, mushroom pan in sedge, 6–11.vii.1985 (17); Dempster Hwy., Eagle R. Crossing, mushroom trap in spruce and *Sphagnum*, 7–10.vii.1985 (2); Klondike Hwy. km 562, Moose Cr. Campground, malaise trap 63°30'N, 137°01'W, 18–20.vi.1979 (ROM field party) (1); Richardson Mts., Base Camp, Erebia Cr., 67°58'N, 136°29'W, carrion trap by creek, 10.vii.1987 (3); Alaska Hwy. km 1251, Morley R., 50 mi E Teslin, sedge/mammal runs, 14.vii.1987 (2); Summit L., pan traps, by lake, fish-head bait, 3–9.vii.1987 (2); Klondike Loop, km 300, Wordenskiold R. debris, 14.vii.1987 (2); Mammal runs, flood plain of Erebia Cr., 5.vii.1987 (4); Koidern, flood debris, 18.vi.1987 (2); Rampart House, 2.vi.1951 (C.C. Loan) (3); Takhini Hot Springs, 31.v.1981, L. Vasington and SC (2); Kluane, mushroom trap near lake, 21–23.vii.1985 (1); Dawson City, flight interception trap in hydro cut, 9–12.vii.1985 (2); Klondike Hwy. km 300, carrion trap 23.vi–14.vii.1987 (1); Dempster Hwy, Tombstone Mt. Campground, mushroom trap in *Sphagnum*, lichen, 6–12.vii.1985 (1); Dempster Hwy. km 28, pan in edge of pond, 5–11.vii.1985 (2); Engineer Cr., Sulphur Springs, 26.vi.–12.vii.1987, pan trap, cool-spring sedge pond (SC) (9).

Genus *Minilimosina* RoháčekSubgenus *Minilimosina*5. *Minilimosina (Minilimosina) accinta* Marshall

Klondike Loop, 33 km N Whitehorse, dry slope, pan trap, 27.vi–14.vii.1987 (1).

6. *Minilimosina (Minilimosina) gemella* Roháček

Dawson City, on dead wolf, 11.vii.1985 (5); Dempster Hwy. km 45, Tombstone Mt. Campground, mushroom trap in *Sphagnum*, 6–12.vii.1985 (1); km 95, mushroom trap near raised bog, 6–11.vii.1985 (4); km 141, Blackstone R., pan trap in *Carex*, 6–11.vii.1985, 27.vi–13.vii.1987 (2); km 172, mushroom trap in bog, 6–11.vii.1985 (1); km 375, Eagle R. Crossing, mushroom trap in *Sphagnum*, spruce, 7–10.vii.1985 (1); Klondike Hwy. km 300, dung traps, carrion traps among willow and spruce, 23.vi–14.vii.1987 (6).

7. *Minilimosina (Minilimosina) nasuta* (Spuler)

Moose Cr. Campground, on mushroom among *Populus*, 3.vii.1985 (1).

8. *Minilimosina (Minilimosina) parva* (Malloch)

Dempster Hwy. km 45, Tombstone Mt. Campground, mushroom trap in *Sphagnum*, 6–12.vii.1985 (4); km 147, dung trap in fen, 6–11.vii.1985 (2); km 141, Blackstone R., pan trap under dead grouse, 6–11.vii.1985 (3); km 172, pan trap in bog, 6–11.vii.1985 (2); km 205.5, dung trap in fen palsa, 6–10.vii.1985 (2).

9. *Minilimosina (Minilimosina) parvula* (Stenhammar)

Dempster Hwy. km 45, Tombstone Mt. Campground, mushroom traps in *Sphagnum*, 6–12.vii.1985 (40); km 95, mushroom trap near raised bog, 6–11.vii.1985 (35); km 141, Blackstone R., bear faeces, mushroom, 6–11.vii.1985 (5); km 125, mushroom trap in bog, 6–11.vii.1985 (2); km 155, carrion trap, 27.vi–11.vii (3); km 161, pan trap in limestone scree, 6–11.vii.1985 (3); km 172, mushroom trap in bog, 6–11.vii.1985 (45); km 205, mushroom trap in fen palsa, 6–10.vii.1985 (30); km 375, Eagle R. Crossing, mushroom trap in *Sphagnum*, 7–10.vii.1985 (11); Moose Cr. Campground, on mushrooms among *Populus*, 3.vii.1985 (50); Dawson City, mushroom, dead wolf, 11.vii.1985 (3); Snag, bog at Small L., dung traps, 18–21.vi.1987 (7); Klondike Hwy. km 300, dung traps, 23.vi–14.vii.1987 (1); Klondike Loop, 33 km N Whitehorse, 23.vi–14.vii.1987 (2); North Richardson Mts., Summit L., fish-head baited traps near lake, 3–9.vii.1987 (20); Wolf Cr. Campground, S Whitehorse, flight intercept trap, 17.vi–14.vii.1987 (1).

10. *Minilimosina (Minilimosina) zeda* Marshall

Dawson City, Forestry Camp, bear dung, lawn clippings, 13.vii.1985 (2); Klondike Hwy. km 90, mushroom trap in bog, 3–12.vii.1985 (1); Dempster Hwy. km 231.9, Eagle Plains Hotel, on hotel window, 6.vii.1985 (1).

Subgenus *Svarciella* Roháček11. *Minilimosina (Svarciella) dissimilicosta* (Spuler)

Dempster Hwy. km 45, Tombstone Mt. Campground, mushroom trap in *Sphagnum*, 6–12.vii.1985 (3); km 95, mushroom trap near raised bog, 6–11.vii.1985 (1); km 141, pan trap in *Carex* and pan trap under dead grouse, 6–11.vii.1985 (6); Moose Cr. Campground, on mushroom in aspens, 3.vii.1985 (1).

12. *Minilimosina (Svarciella) vitripennis* (Zetterstedt)

Dempster Hwy. km 45, Tombstone Mt. Campground, mushroom trap in *Sphagnum*, 6–12.vii.1985 (1); km 95, mushroom trap near raised bog, 6–11.vii.1985 (1); km 141, Blackstone R., pan trap in *Carex* and pan trap under dead grouse, 6–11.vii.1985 (5), km 172, mushroom baited pan trap in creek gravel, 6–11.vii.1985 (10), km 205,

mushroom baited pan trap in fen-palsa, 6–10.vii.1985 (1); North Richardson Mts., 67°58'N, 136°29'W, base camp, 10.vii.1987, carrion trap near creek (2).

Genus *Nearcticorpus* Roháček and Marshall

13. *Nearcticorpus canadense* Roháček and Marshall

Dawson City, km 90, Klondike Hwy., mushroom trap in bog, 3–12.vii.1985 (1); Klondike Hwy. km 300, carrion trap, 23.vi–14.vii.1987.

Genus *Phthitia* Enderlein

14. *Phthitia digistylus* Marshall

Koidern, flood debris, 18.vi.1987 (13); Dawson City, 23.vi.1987, debris along Klondike R. (1); Tombstone Mt., flood debris near ice over river (2).

15. *Phthitia lineasterna* Marshall

Klondike Hwy. km 562, Moose Cr. Campground, malaise trap, 18–20.vi.1979, #7910506, Royal Ontario Museum field party (1).

16. *Phthitia quadricercus* Marshall

Marshall Cr., Alaska Hwy. km 974.9, 10 km W Haines Jct., mud along pond, 27.vi.1987 (1); Dempster Hwy. km 206.5, mammal runs in *Sphagnum* and *Carex*, 6.vii.1985 (1).

Genus *Pseudocollinella* Duda

17. *Pseudocollinella abhorrens* (Roháček)

Summit L., North Richardson Mts., debris along lake, 3.vii.1987 (1).

18. *Pseudocollinella aquilifrons* (Stenhammar)

Dempster Hwy., Tombstone Mt. Campground, flood debris under ice, 4.vii.1985 (12); Koidern, flood debris, 18.vi.1987 (2); Firth R., 31.vii.1956, E.F. Cashman; Glacier Cr., vicinity Kluane L., Alaska Hwy., 6.viii.1978, P.H. Arnaud Jr. (1).

19. *Pseudocollinella arctopellucida* Marshall

Koidern, flood debris, 18.vi.1987; Dempster Hwy., Tombstone Mt., flood debris in river gravel, 3.viii.1985.

20. *Pseudocollinella attractans* Marshall

Summit L., North Richardson Mts., debris along lake, 3.vii.1987; Engineer Cr., Sulphur Springs, pan trap near cool spring in mud among sedge, 28.vi–12.vii.1987, SC.

21. *Pseudocollinella caelobata* (Spuler)

Dempster Hwy. km 461, 28.vi.1987 (1); Rampart House, 28.v.1951, C.Loan (1).

22. *Pseudocollinella flavilabris* (Hackman)

Summit L., North Richardson Mts., debris along lake, 3.vii.1987; North Fork Crossing, mi 43, Peel Plt. Rd., 3500 ft, 3.vii.1962, RL.

Genus *Pteremis* Rondani

23. *Pteremis wirthi* Marshall

Dempster Hwy. km 128, mammal runs near bog pond and pan trap in pond margin (10); km 206, mammal runs through *Carex* (2); Eagle R. Crossing, mammal runs on bog edge (3); northern Richardson Mts., Summit L., muskrat runs; Northern Richardson Mts., mammal runs near small creek (7).

Genus *Pullimosina* Roháček

Subgenus *Dahlimosina* Roháček

24. *Pullimosina (Dahlimosina) dahli* (Duda)

Dempster Hwy. km 45, Tombstone Mt. Campground, dung and mushroom traps (41); km 95, mushroom trap near raised bog (20); km 125, mushroom trap in bog (1); km 141, Blackstone R., mushroom trap in *Sphagnum* (3); km 161, mushroom trap in limestone scree (1); km 172, mushroom trap in bog (25); km 268, Eagle Plains, carrion trap in ridgetop tundra, SP (1); Klondike Hwy. km 45, flight intercept trap in hydro cut (3); km 90, mushroom trap in bog (17); Snag, Small L., bog, dung traps, 18–21.vi.1987 (1).

25. *Pullimosina (Dahlimosina) yukonensis* Marshall

Dempster Hwy. km 155, pan trap, DMW (2).

Genus *Rachispoda* Lioy

26. *Rachispoda hoplites* (Spuler)

Rampart House, 2.vi.1951 (C.C. Loan); Rampart House, 17.vi.1951 (J.E.H. Martin); Takhini Hot Springs, 16.viii.1962 (P.J. Skitsko); Takhini Hot Springs, 31.v.1981 (L. Vasington and SC) (1); Tenas Cr., 5 km E on N Canol Rd., 62°02'N, 132°14'W, 11.vi.1981 (C. Guppy); Dempster Hwy., Tombstone Mts., flood debris/river gravel, 3.vii.1985 (1); 30 mi E Old Crow Blue Bluffs, shore of Porcupine R., 6.vii.1987 (5).

27. *Rachispoda lutos* (Stenhammar)

Rampart House, 20.vi.1951 (J.E.H. Martin); 17.vi.1951 (J.E.H. Martin); 2.vi.1951 (C.C. Loan); Dawson, 21.vi.1949 (W.W. Judd); Takhini Hot Springs, Klondike Loop J-3.6, 8.viii.1978 (P.H. Arnaud Jr.); Long's Cr., Alaska Hwy. DC 1155.5, 6.viii.1978 (P.H. Arnaud Jr.).

28. *Rachispoda suberecta* (Sabrosky)

Dawson, 21.vi.1949 (W.W. Judd); Takhini Hot Springs, Klondike Loop J-3.6, 8.viii.1978 (P.H. Arnaud Jr.); Lone Tree Cr. Alaska Hwy. DC 816.5, 9.viii.1978 (P.H. Arnaud Jr.); Dragon L., 62°33'N, 131°46'W, 11.vi.1981 (C. Guppy) (4); Kusawa L. Rd., 1 km S Alaska Hwy., 60°46'N, 136°03'W, 26.vi.1981 (C. Guppy) (1).

29. *Rachispoda vespertina* Wheeler

Rampart House, 2.vi.1951 (C.C. Loan); Rampart House, 20.vi.1951 (J.E.H. Martin); Dawson, 14.vi.1949 (W.W. Judd); Takhini Hot Springs, 19.viii.1962 (RL); Takhini Hot Springs, 31.v.1981 (L. Vasington and SC) (1); Ross R., 132°30'W, 61°56'N, 3000 ft, 20.vi.1960 (J.E.H. Martin); Yukon R. Campground opposite Dawson, 6.vii.1978 (P.H. Arnaud Jr.); Kluane Nat. Pk., Slims R. delta, 18.viii.1979 (SC) (3); Kusawa L. Rd., 1 km S Alaska Hwy., 60°46'N, 136°03'W, 26.vi.1981 (C. Guppy); Dempster Hwy. km 105, debris by roadside pond, 3.vii.1985 (1); Takhini Hot Springs, Klondike loop J-3.6., 8.viii.1978 (P.H. Arnaud Jr.); Alaska Hwy. km 1706, Slims R. delta along Sheep Cr. Rd. mudflat, 10–12.vi.1979 (ROM field party); Kluane Nat. Pk. dry salt pond, 23.vii.1985 (1).

30. *Rachispoda* undescribed sp. 1

Ross R., 3000 ft, 21.vi.1960 (J.E.H. Martin); Rampart House, 2.vi.1951 (C.C. Loan); Ross R., 132°30'W, 61°56'N, 3000 ft, 21.vi.1960 (J.E.H. Martin); Takhini Hot Springs, 31.vi.1981 (L. Vasington and SC) (1); 30 mi E Old Crow, Blue Bluffs, shore of Porcupine R., 6.vii.1987 (1); Alaska Hwy., Marshall Cr., mud along pond, 27.vi.1987 (2).

31. *Rachispoda* undescribed sp. 2

Yukon Territory: Alaska Hwy. km 1251, Morley R., 50 mi E Teslin, 14.vii.1987, sedge-mammal runs (1); Rampart House, 20.vi.1951 (J.E.H. Martin); Rampart House, 2.vi.1951 (C.C. Loan); same data except 28.v.1951; Lone Tree Cr., Alaska Hwy. mi 816.5, 9.viii.1978 (P.H. Arnaud).

32. *Rachispoda* undescribed sp. 3

Yukon Territory: Klondike Hwy. km 300, dung traps, 23.vi–4.vii.1987; Klondike Loop, km 300, Nordenskiöld R., 14.vii.1987, debris (1).

Genus *Rudolfina* Roháček33. *Rudolfina digitata* Marshall

Dempster Hwy. km 128, dung traps near pond, dwarf birch (7).

Genus *Spelobia* Spuler34. *Spelobia algida* Marshall

Dempster Hwy. km 28, tundra near pond, dwarf birch, dung trap, 6–11.vii.1985 (1); km 141, Blackstone R., dung trap in *Sphagnum*, 6–11.vii.1985 (5).

35. *Spelobia bispina* Marshall

Dempster Hwy. km 0.2, Klondike R. at Dempster Hwy., mouse runs in moss, 13.vi.1987 (1); km 128, mammal runs in bog near pond, 3.vii.1985 (1); km 172, mushroom pan in sedge, 6–11.vii.1985 (2); km 206, mammal run in *Carex*, 6.vii.1985 (1); km 375, Eagle R. Crossing, 8 km past Eagle Plains, mammal runs, 9.vii.1985 (11); km 465, pan trap, 10–22.vii.1982, DMW (1); Alaska Hwy. km 1251, 50 mi E Teslin, Morley R., sedge, mammal runs, 14.vii.1987 (1); Koïdern, flood debris, 18.vi.1987 (2); North Richardson Mts., 67°58'N, 136°29'W, mammal runs near creek, 5.vii.1987 (7); Summit L., North Richardson Mts., debris along lake, 3.vii.1987 (1).

36. *Spelobia bumamma* Marshall

Dempster Hwy. km 44.8, flight interception trap along stream, 17.vi–13.vii.1987 (1); Dawson City, on *Boletus*, hydro cut through aspens, 13.vii.1985 (2); Dawson City, on decaying *Coprinus*, 12.vii.1985 (9); km 90, Klondike Hwy., mushroom baited pit trap in bog, 8–12.vii.1985 (4); Whitehorse, 10 km S, Wolf Cr. Campground, flight interception trap, 17.vi–14.vi.1987, spruce, *Equisetum* (2).

37. *Spelobia clunipes* Meigen

Dempster Hwy. km 45, Tombstone Mt. Campground, mushroom baited trap in *Sphagnum*, 6–12.vii.1985; km 141, Blackstone R., on bear faeces and in pan trap under dead grouse, 6–11.vii.1985 (4); North Richardson Mts., 67°58'N, 136°29'W, dung traps, mammal runs, and carrion traps near creek, 5–10.vii.1987 (8); Whitehorse, Wolf Cr. Campgrounds, flight interception trap, 17.vi–14.vii.1987 (1); Klondike Hwy. km 300, carrion trap, 23.vi–14.vii.1987, willow, spruce (7).

38. *Spelobia frustrilabris* Marshall

Dempster Hwy. km 172, mushroom baited pan trap in sedge, 6–11.vii.1985 (1); km 455, pan trap in wet tundra, 27.vi–11.vii.1987 (1); North Richardson Mts., 67°58'N, 136°29'W, 10.vii.1987 (1).

39. *Spelobia ibrida* Roháček

Dempster Hwy. km 45, Tombstone Mt. Campground, vacuumed from mushroom, 3.vii.1985 (1).

40. *Spelobia luteilabris* (Rondani)

Dawson City, on dead wolf among birch, poplar, 13.vii.1985 (100+); Dawson City, on bear dung and lawn clippings at forestry camp, 13.vii.1985 (100+); Dempster Hwy. km 45, Tombstone Mt. Campground, dung and mushroom baited traps in lichen among willow, 6–12.vii.1985 (20); km 95, mushroom trap near raised bog, 6–11.vii.1985 (6); km 125, mushroom baited pan trap in bog, 6–11.vii.1985 (3); km 141, Blackstone R., pan trap under dead grouse, 6–11.vii.1985 (50); km 151, pan traps on slope, dry tundra, 1–11.vii.1987 (3); km 155, carrion trap, 27.vi–11.vii.1987 (3); km 165, sulfur springs, carrion, 27.vi–11.vii.1987; km 172, mushroom baited pan trap in sedge, 6–11.vii.1985 (50); km 205, carrion trap in fen palsa, 6–10.vii.1985 (1); km 375, Eagle R. Crossing, mushroom trap among spruce, in *Sphagnum*, 7–10.vii.1985 (1); Moose Cr. Campground, on mushrooms among aspen, 3.vii.1985; Carmacks, Tatchun L. Junction, 17.vi–30.viii.1984, flight interception trap, SP (1); Whitehorse, Wolf Cr. Campground, flight interception trap, 17.vi–14.vii.1987, spruce, *Equisetum* (35); North Richardson Mts., 67°58'N, 136°29'W, base camp, 10.vii.1987, carrion near creek (6); Summit L., pan traps by lake, fish-head bait, 3–9.vii.1987 (15); Klondike Loop, 33 km N Whitehorse, pan trap on dry slope, 27.vi–14.vii.1987 (4); Klondike Hwy. km 300, carrion, 23.vi–14.vii.1987, willow, spruce (15).

41. *Spelobia nana* (Rondani)

Dempster Hwy. km 28, tundra near pond, dwarf birch, dung trap, 6–11.vi.1985 (1); km 45, Tombstone Mt. Campground, mushroom and dung traps, 6–12.vii.1985 (2); km 172, pan trap in bog, 6–11.vii.1985 (1); km 465, 10–22.vii.1982, DMW (2); North Richardson Mts., 67°58'N, 136°29'N, dung traps on dry, rocky slope, 7–9.vii.1987 (1); North Richardson Mts., Summit L., pan traps by lake, fish-head bait, 3–9.vii.1987 (1).

42. *Spelobia ordinaria* (Spuler)

Whitehorse, Wolf Cr. Campground, flight interception trap in spruce, *Equisetum*, 17.vi–14.vii.1987 (1).

43. *Spelobia peltata* Marshall

North Fork Crossing, mi 42 Peel Plt. Rd., 3500 ft, P.J. Skitsko, RL (3).

44. *Spelobia* sp. near *semioculata* (Richards)

Dempster Hwy. km 141, carrion in tundra near cliff, 1–13.vii.1987 (3); km 155, burrow, 25.vi.1987 (9); km 461, 27.vi.1987, burrow (5); North Richardson Mts., 67°58'N, 136°29'N, carrion trap (1); Alaska Hwy., Burwash Cr., ground squirrel burrow, 21.vi.1987 (2); Klondike Hwy. km 224, 33 km N Whitehorse, L. Laberge, 14.vii.1987, in burrows (9 plus another 20 in nearby pan traps); Whitehorse, Wolf Cr. Campground, flight interception trap, 17.vi–14.vii.1987 (1); Kluane, ground squirrel burrow, 21.vii.1985 and SC (30).

Genus *Telomerina* Roháček45. *Telomerina beringiensis* Marshall

Dawson City, forestry camp, bear dung (1); hydro cut near Dawson city, dead wolf (1); Dempster Hwy. km 141, Blackstone R., on bear dung (1); Tombstone Mt. Campground, in copula on fox faeces (2); Moose Cr. Campground, on mushrooms among *Populus* (1).

Genus *Terrilimosina* Roháček46. *Terrilimosina schmitzi* (Duda)

Dempster Hwy. km 45, Tombstone Mt. Campground, flight intercept trap in willow scrub, 5–11.vii.1985 (2), km 141, Blackstone R., pan trap under dead grouse, 6–11.vii.1985 (1); Dawson City, flight intercept trap under hydro line on Klondike Hwy. among *Salix*, *Equisetum*, 5–12.vii.1985 (1); Wolf Cr. Campground, S Whitehorse, 17.vi–14.vii.1987 (12); Klondike Hwy. km 300, 23.vi–14.vii.1987, carrion trap among willow and spruce (2).

Genus *Trachyopella* Duda47. *Trachyopella bovilla* Collin

Klondike Hwy. km 300, carrion trap among willow and spruce, 23.vi–14.vii.1987 (1).

Subfamily Copromyzinae

Genus *Copromyza* Fallén48. *Copromyza neglecta* (Malloch)

Alaska Hwy. km 1251, sedge, 14.vii.1987 (1); Koidern, flood debris, 18.vi.1987 (1); Rose L., 61°35'N, 133°5'W, campground (1); Dempster Hwy., Eagle R. Crossing, dung trap in *Carex* (5); km 205.5, carrion trap in fen palsa (1).

49. *Copromyza stercoraria* (Meigen)

Northern Richardson Mts., 67°58'N, 136°29'W, base camp, pan trap under cliff, dung traps in wet tundra, mammal runs in sedge, 1–10.vii.1987 (8); Klondike Hwy. km 300, carrion trap, 23.vi–14.vii.1987 (1); Dempster Hwy. km 89.5, SC (1); km 95, dung trap in raised bog (1); km 141, Blackstone R., dung traps in lichen (3); km 45, Tombstone Mt. Campground, dung traps (3); Rose L., campground (1).

Genus *Crumomyia* Macquart50. *Crumomyia gelida* (Hackman)

Northern Richardson Mts., Summit L., pan trap along eroded lakeshore, 3–9.vii.1987 (1), Alaska Hwy., near Haines Jct., 11–18.vi.1987, flight interception trap, Alder thicket (1); Dempster Hwy. km 45, Tombstone Mt. Campground,

mushroom traps (1); km 141, pan trap in dry tundra, 27.vi–13.vii.1987 (2); Whitehorse, Wolf Cr. Campground, flight interception trap, 17.vi–14.vii.1987 (1).

51. *Crumomyia pollinodorsata* (Papp)

Ogilvie Mts., North Fork Pass, 4100 ft, 11.vi.1962 (CNCI); Dempster Hwy. km 95, mushroom trap near raised bog (1); km 172, mushroom trap in sedge (1).

52. *Crumomyia pruinoso* (Richards)

Wolf Cr. Campground, conifer duff, pitfall traps near spring, 17.vi–14.vii.1987 (3).

53. *Crumomyia setitibialis* (Spuler)

Wolf Cr. Campground, flight interception trap, 17.vi–14.vii.1987 (1).

54. *Crumomyia subaptera* (Malloch)

Northern Richardson Mts., 67°58'N, 136°29'W, base camp, mammal runs near creek, mammal runs in sedge, surface mouse runs in dwarf willow, 2–10.vii.1987 (12), northern Richardson Mts., Summit L., muskrat run, debris around lake, 3.vii.1987 (5); Ogilvie Mts., North Fork Pass, 4300 ft, 19.vi.1962; Dempster Hwy. km 128, mammal runs and dung trap near bog pond (5); km 45, Tombstone Mt. Campground, mushroom trap in *Sphagnum* (1).

Genus *Norrbomia* Papp

55. *Norrbomia fumipennis* (Stenhammar)

Dempster Hwy. km 95, mushroom trap near raised bog, 6–11.vii.1985 (1); km 45, Tombstone Mt. campground, mushroom traps, 5–11.vii.1985 (1); km 172, mushroom pan in sedge, 6–11.vii.1985 (1 female, possibly *N. costalis*).

56. *Norrbomia yukonensis* Marshall and Norrbom

Northern Richardson Mts., Erebia Cr. base camp, 67°58'N, 136°29'W, dung cups and carrion traps in wet tundra, mammal runs near creek, 1–8.vii.1987 (11).

Subfamily Sphaerocerinae

Genus *Ischiolepta* Lioy

57. *Ischiolepta micropyga* (Duda)

Klondike Hwy. km 300, carrion trap among willow and spruce, 23.vi–14.vii.1987 (7); Klondike Loop, 33 km N Whitehorse, dry slope, pan traps, 23.vi–14.vii.1987 (3). Dawson City, on dead wolf (1); Lone Tree, campground (3); Dempster Hwy., North Fork Crossing, 3500 ft, RL (1); km 125, mushroom trap in bog (1); km 172, mushroom trap in bog (1); km 205, mushroom trap in *Sphagnum* (1); km 375, Eagle R. Crossing, mushroom trap under spruce tree (1); Klondike Hwy. km 230, Moose Cr. Campground, on mushroom (1); Whitehorse, Wolf Cr. Campground, flight interception trap, 17.vi–14.vii.1987 (1).

58. *Ischiolepta pusilla* Fallén

Dawson City, lawn clippings at forestry camp, 12.vii.1985 (7).

59. *Ischiolepta scabra* (Spuler)

Klondike R. at Dempster Hwy., mouse runs in moss, 13.vi.1987 (1); North Fork Crossing, mi 43 Peel Pt. Rd., 3500 ft, 3.vii.1962, RL.