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ATLAS OF THE DISTRIBUTION OF ALPINE PLANTS IN HOKKAIDO

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Preface

Upto the present, the senior author has published papers^{1)~6)} on the alpine plants of Northern Japan. But an atlas of the distribution of alpine plants has not yet been published. The materials of the present study were mostly based on specimens preserved in the Herbarium of the Agriculture, Hokkaido University.

This atlas should elucidate the character of the distribution of alpine plants in Hokkaido. For convenience, the scientific names of the species mostly follow OHWI's Flora of Japan, English edition.

We must express our sincere thanks to Prof. Dr. Toshio ISHIKAWA and Prof. Dr. Yoshio KATSUI in the Geological Institute of the Faculty of Science, Hokkaido University for their valuable help in supplying data concerning the geological composition of Hokkaido.

Physiography

Hokkaido known under the name of "Yezo" from olden times, extends from Lat. 41°24'N. to 45°31'N., and from Long. 139°45'E. to 145°49'E. It

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- 1) TATEWAKI, M.: Taxonomical study of plants growing in the alpine belt in Yezo. I. Journ. Sapporo Agr. & Forest. 26-(120). 1~45. (1934); II. *ibid.* 28-(131). 21~48. (1936); III. *ibid.* 29-(143). 1~26. (1938). (in Japanese)
 - 2) —————: Phytosociological study on the alpine plants in Yezo. Ecol. Rev. 13. 101~112. (in Japanese). (1935).
 - 3) ————— and SAMEJIMA, J.: Alpine plants of the central mountain district, Hokkaido, Japan. 1~70. (in Japanese). Bot. Inst. Fac. Agr. Hokkaido Univ. (1959).
 - 4) —————: Alpine plants in Hokkaido. Sci. Rep. Tohoku Univ. Ser. IV (Biol.) 29. 165~188. (1963).
 - 5) —————: Distribution of alpine plants in Northern Japan. Arctic and alpine environments (H. E. WRIGHT, Jr. and W. H. OSBURN, eds.). 119~136. Indiana Univ. Press. (1967).
 - 6) —————: The geobotanical relationship between Beringia and Northern Japan, with special reference to the arctic-alpine flora of the latter. Journ. Fac. Agr. Hokkaido Univ. 57-3. 340~348. (1974).

is almost rhombic in outline, with a fish tail shaped extension called the Oshima Peninsula on the southwest and two small bifurcate arms called the Shiretoko and Nemuro Peninsulæ at the east end. Its maximum length from south to north and its greatest width from east to west are about 386 km in each direction, and it has an area of 77,900 square kilometers. Hokkaido, separated on the south from Honshu by the Tsugaru Strait and on the north from Sakhalin by the Sôya Strait, is surrounded by the Sea of Japan on the west, the Sea of Ochotsk on the north, and the Pacific Ocean on the south. As Hokkaido is situated at the conjunction of the elongational lines of the mainland of Japan, Sakhalin and the Kurils, the distribution of the alpine plants under consideration occupies a very important place in respect to their phytogeographical positions and their interesting relationships to the flora of the mainland.

From physiographical and geological points of view, Hokkaido may be divided into four, viz. the southwestern, the central, the northwestern and the eastern parts running parallel to the former three in a longitudinal direction (J. SUZUKI, 1952 and 1958; Geol. Surv. Japan, 1967). The northwestern and the central parts from the southwestern part are distinctly separated by a median depression, extending from the Ishikari plain to the vicinity of Tomakomai on the Pacific coast, though the eastern and central parts are not so sharply delimited. The depression zone is now deeply buried under alluvial deposits.

Southwestern Part: The whole surface of southwestern Hokkaido is mountainous, though high peaks are not numerous. It consists of the Neogene Tertiary, the basement rocks of pre-Cretaceous age, and various kinds of plutonic and volcanic rocks. The basement rocks which include the fossiliferous limestones of Carboniferous and Jurassic periods, is represented in the mountain group of the Matsumae district at the southwestern side. On the eastern side, there are, however, many active and extinct volcanoes belonging to the extension of the Nasu volcanic belt and extending from south to north, of which the following are noted: —Mt. Komagatake (1133 m); Mt. Yôtei (1893 m), Mt. Nisekoan-nupuri (1309 m), Mt. Usu (725 m), Mt. Tarumae (1024 m), and Mt. Eniwa (1320 m). The highest peak is Mt. Yôtei, otherwise known as Yezo-fuji from similarity in a graceful shape to the famous Fuji in Honshu. The alpine flora of this mountain is under the protection of the natural monument regulation.

Central Part: The Central Mountain System (the so-called Yezo Mountain System) situated in central Hokkaido, forms the backbone of the main island, trending in a south-south-east to north-north-west direction from

near Cape Erimo to Cape Sôya. It comprises the most prominent mountain ranges consisting of many high mountain chains and having a very complex construction. These mountains are made up partly of the pre-Cretaceous sediments, partly of plutonic and metamorphic, and partly of volcanic rocks. The six mountain groups are defined from south to north, viz. the Apoi Massif, the Hidaka Range, the Yûbari Range, the Central Plateau, the Uryu Massif and the Kitami Range.

The Hidaka Range occupies the southern part of the Yezo Range. Comparatively high peaks, a few of which exceed 1900 m in height, are located in this range. It is mostly composed of rocks of the Hidaka supergroup, regional metamorphic rocks, and granitic and other plutonic rocks. The summits are densely covered with straggling dwarf pine and its alpine flora is comparatively poor in species. Slight traces of glaciers were recently discovered, though there are no glaciers at present in our district. It is believed that the presence of the glacial features indicates a former glaciation probably contemporaneous with that of Pleistocene time in Hokkaido.

The Apoi Massif, a disjunctive small mountain group, is situated in the western part of the southernmost Hidaka Range. It is composed of peridotite belonging to Mesozoic time and connected to the northwest with the Yûbari Range. Only two mountains, namely Mt. Apoi (811 m) and Mt. Pinneshiri (958 m) are prominent. In spite of the rather low altitude, the Apoi Massif has a wonderful alpine flora including many endemic and rare plants. At present it is kept under the protection of the natural monument regulation.

The Yûbari Range is located on the northwestern side of the Hidaka Range and on the southwestern side of the Central Plateau, extending from south to north. It is mostly of the Mesozoic, with peaks towering to a height of 1900 m. The alpine meadows of the Yûbari Range are well known in Japan as a vast treasury of the alpine plants and have a deep significance for the phytogeographer.

The elongation of the serpentine district is seen in the western part of the central Hokkaido, namely the Uryu Massif. Mt. Shiratori (776 m) has the representative alpine flora.

The Central Plateau, the highest mountain group in northern Japan, lies near the central part of Hokkaido. There are found the highest peaks in Hokkaido, having an elevation of about 2000 m. Alpine meadows and bogs are plentiful, with many interesting boreal plants. Nowhere in northern Japan are there more extensive alpine meadows so rich in species. Volcanic rocks developed in this group are composed of liparitic, andesitic, basaltic,

and their pyroclastic rocks. The Central Plateau consists of about 20 main peaks, among which Mt. Asahi (2290 m) and Mt. Tokachi (2077 m) are the representative volcanoes.

The Central Mountain System forks and becomes gradually lower to the north in the Kitami Ranges. It is partly of Paleozoic rocks. The highest peak of the cluster, Mt. Horonupuri, has a height of 839 m and has an interesting alpine flora.

Northwestern Part: The Kabato Massif is mainly composed of the pre-Cretaceous sediments, in the southern part, while of Pleistocene andesite in the northern part. There are Mts. Matsuneshiri (1100 m) and Kumane-shiri (971 m) in the former part and Mts. Syokanbetsu (1491 m) and Hamamasu (1258 m) in the latter.

Off the northern end of Hokkaido, Rishiri and Rebun islands are isolated, and they are one of the northern treasures of alpine and subalpine species. The former is a typical volcanic island with a peak, Mt. Rishiri (1719 m), and is made up mainly of Pleistocene basalt and andesite associated with their pyroclastics. The latter is, on the contrary, generally hill with the altitudes of 200~300 m, excepting with Mt. Rebun (490m), and consists mainly of Neogene Tertiary rocks, partly of the Cretaceous.

Eastern Part: Eastern Hokkaido is made up of low hills or uplands of Tertiary and Mesozoic formations with subordinate amounts of the Hidaka group. In the northeastern part, there is a chain of extinct and active volcanoes, running eastward to the extremity of the Shiretoko Peninsula. It extends from northeast to southwest and is recognised as a member of the southwestern extreme of the volcanic belt of the Kurils. Mt. Iwô (1563 m), Mt. Rausu (1661 m), Mt. Syari (1545 m), Mt. Oakan (1371 m) and Mt. Meakan (1499m) are well known, and are composed mostly of andesitic rock. Among them, the alpine flora of Mt. Oakan and Mt. Meakan in the Akan National Park has been protected. The alpine vegetation of each peak differs from the other, showing the interesting contrast between flora of extinct and active volcanoes.

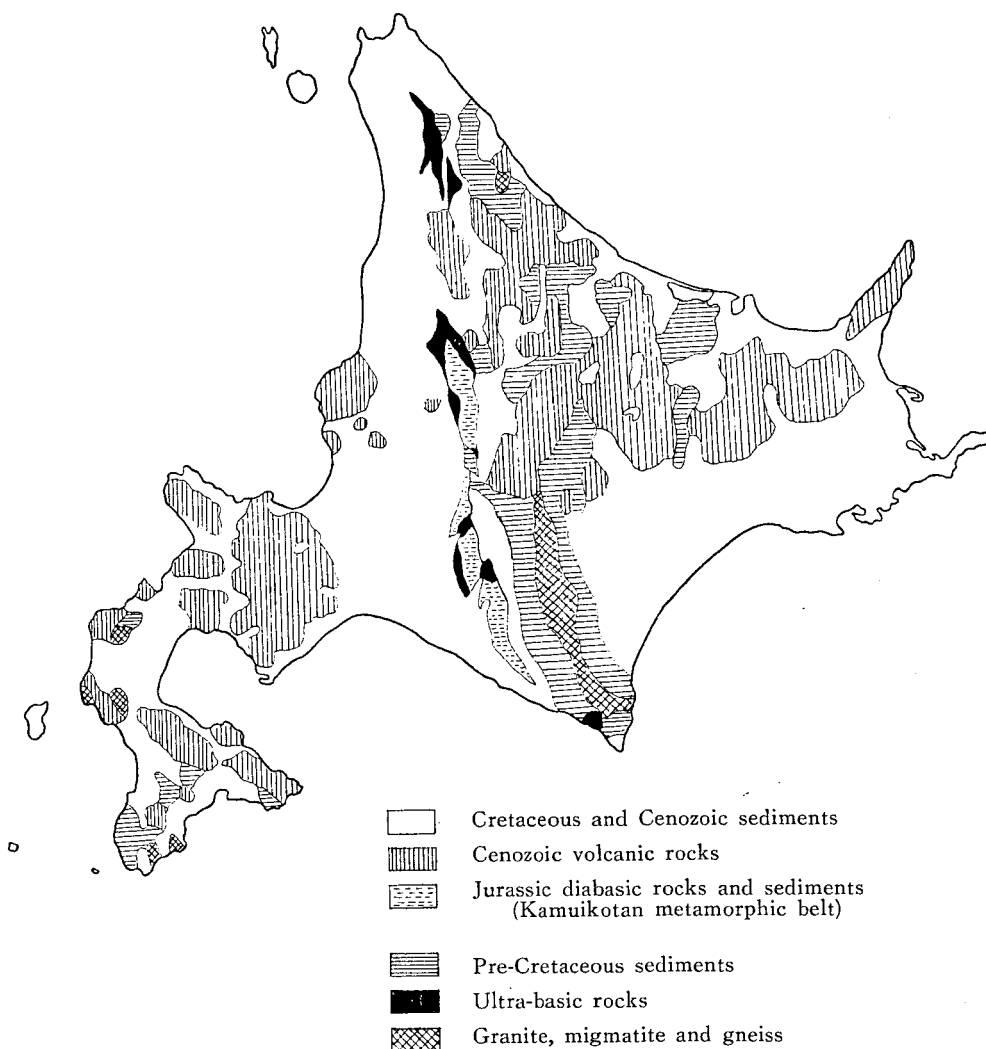
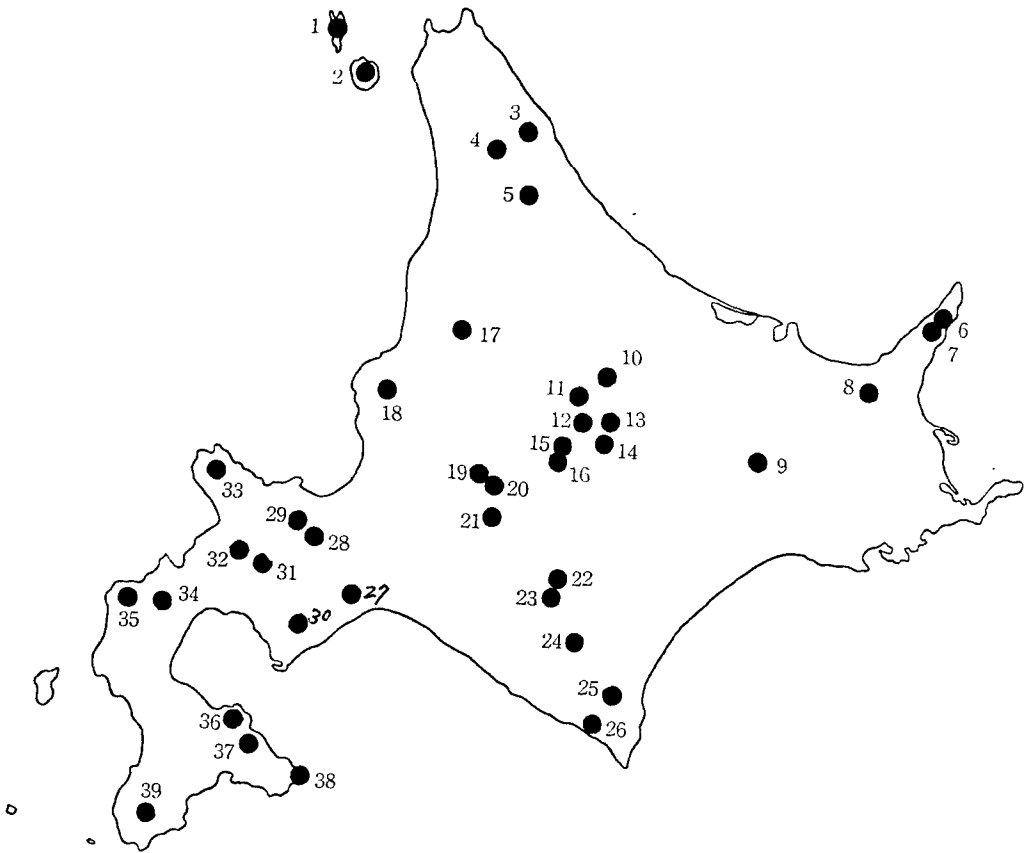


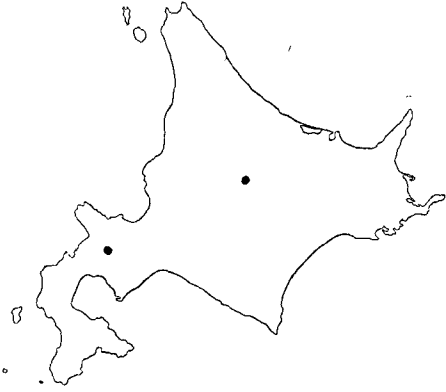
Fig. 1. Geological sketch map of Hokkaido
(simplified from Prof. Dr. J. SUZUKI, 1952*)

* SUZUKI, J.: Ultrabasic rocks and associated ore deposits of Hokkaido, Japan. Journ. Fac. Sci. Hokkaido Univ. Ser. IV. 8. 175~210. (1952).

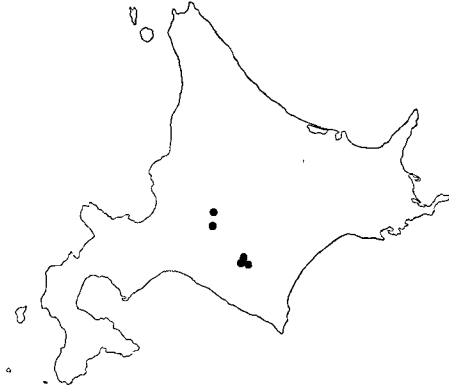


- | | | | | | |
|-------------------------|----------|-------------------------|----------|---------------------|----------|
| 1. Mt. Rebun | (490m), | 2. Mt. Rishiri | (1719m), | 3. Mt. Horonupuri | (839m), |
| 4. Mt. Panke | (632m), | 5. Mt. Hakodake | (1129m), | 6. Mt. IWô | (1563m), |
| 7. Mt. Rausu | (1661m), | 8. Mt. Syari | (1545m), | 9. Mt. Meakan | (1499m), |
| 10. Mt. Niseikausyuppe | (1879m), | 11. Mt. Asahi | (2290m), | 12. Mt. Tomuraushi | (2141m), |
| 13. Mt. Ishikari | (1962m), | 14. Mt. Nipesotsu | (2013m), | 15. Mt. Tokachi | (2077m), |
| 16. Mt. Furano | (1912m), | 17. Mt. Shiratori | (776m), | 18. Mt. Syokanbetsu | (1419m), |
| 19. Mt. Kirigishi | (1073m), | 20. Mt. Ashibetsu | (1727m), | 21. Mt. Yûbari | (1668m), |
| 22. Mt. Pipairo | (1917m), | 23. Mt. Poroshiri | (2052m), | 24. Mt. Petegari | (1736m), |
| 25. Mt. Rakko | (1472m), | 26. Mt. Apoi | (811m), | 27. Mt. Tarumae | (1024m), |
| 28. Mt. Zyozankei-tengu | (1145m), | 29. Mt. Yoichi | (1488m), | 30. Mt. Orofure | (1231m), |
| 31. Mt. Yôtei | (1893m), | 32. Mt. Nisekoan-nupuri | (1309m), | 33. Mt. Syakotan | (1255m), |
| 34. Mt. Ôhira | (1191m), | 35. Mt. Kariba | (1520m), | 36. Mt. Komagatake | (1133m), |
| 37. Mt. Yokotsu | (1167m), | 38. Mt. Esan | (618m), | 39. Mt. Daisengen | (1072m). |

Fig. 2. Important mountains, Hokkaido



1. *Lycopodium alpinum* Linn.



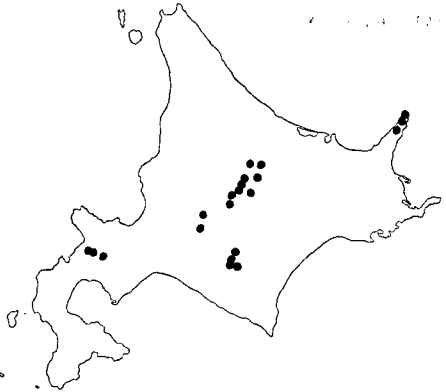
4. *Selaginella selaginoides* Link



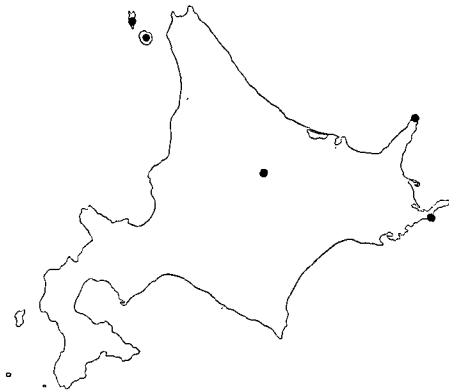
2. *Lycopodium selago* Linn. var. *appressum* Desv.



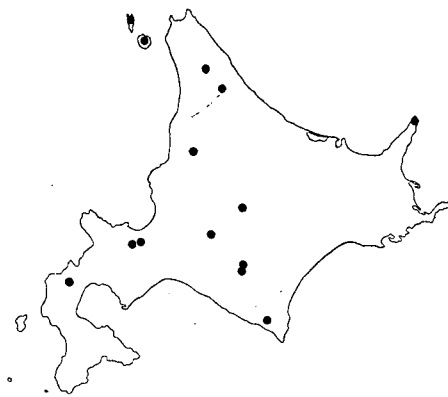
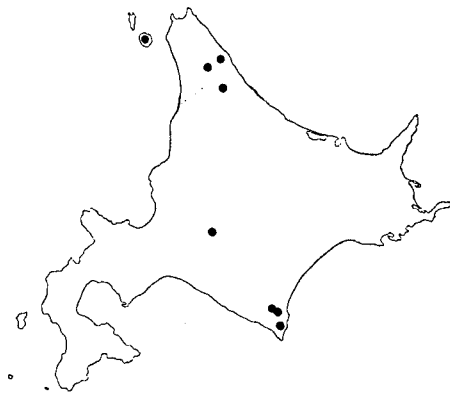
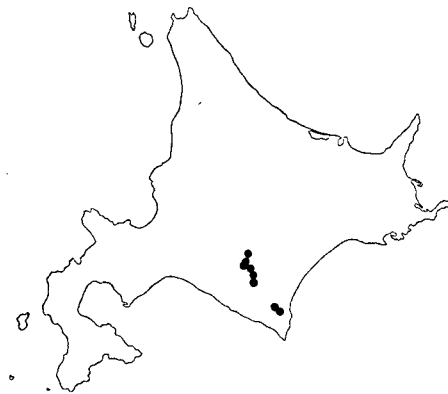
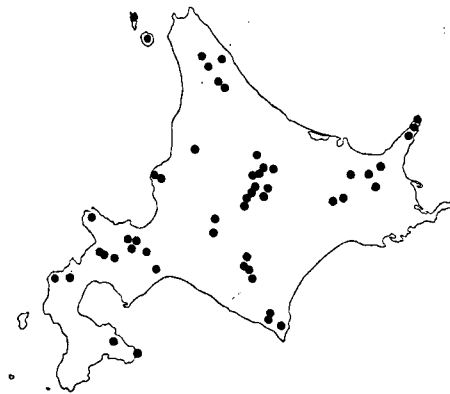
5. *Botrychium lanceolatum* Angstr.



3. *Lycopodium sitchense* Rupr. var. *nikoense* Takeda

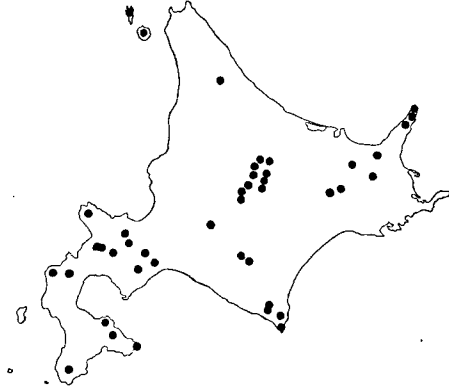


6. *Botrychium lunaria* Swartz

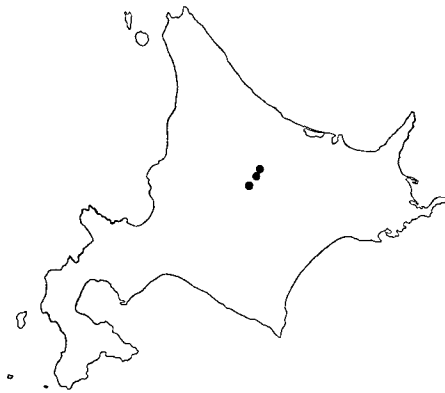
7. *Athyrium alpestre* Rylands10. *Juniperus communis* Linn. var. *montana* Ait.8. *Cryptogramma crispata* R. Br.11. *Salix hidaka-montana* Hara9. *Pinus pumila* Regel12. *Salix hidewoi* Koidz.



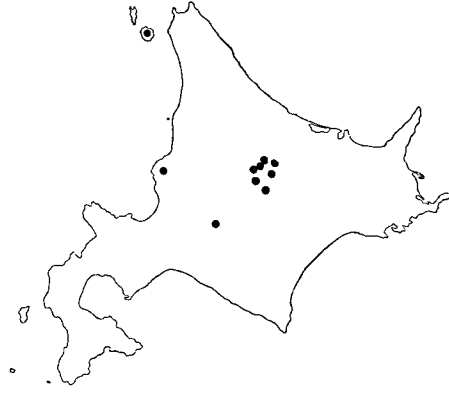
13. *Salix paludicola* Koidz.



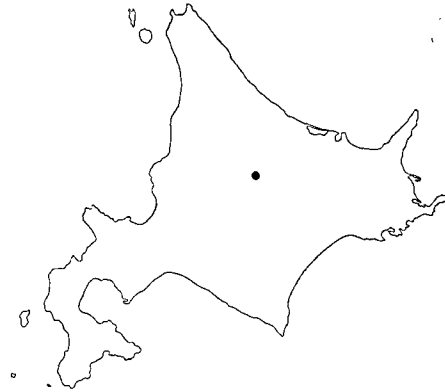
16. *Salix reinii* Franch. et Savat.



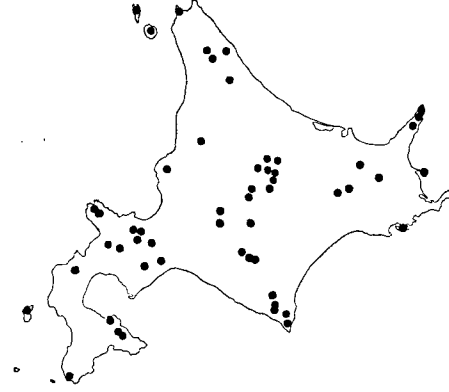
14. *Salix pauciflora* Koidz.



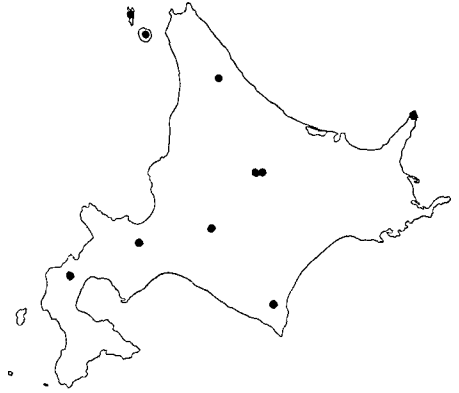
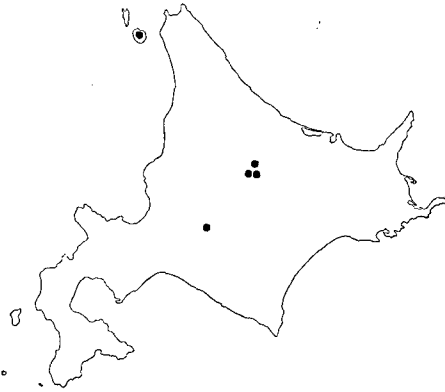
17. *Salix yezoalpina* Koidz.

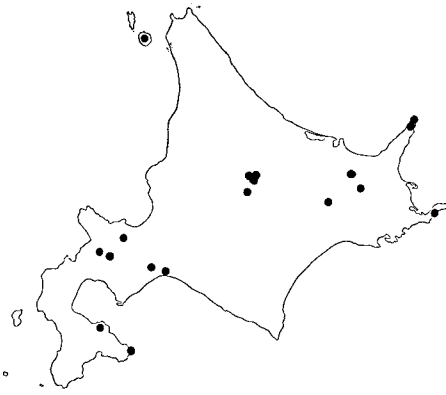


15. *Salix pseudo-paludicola* Kimura

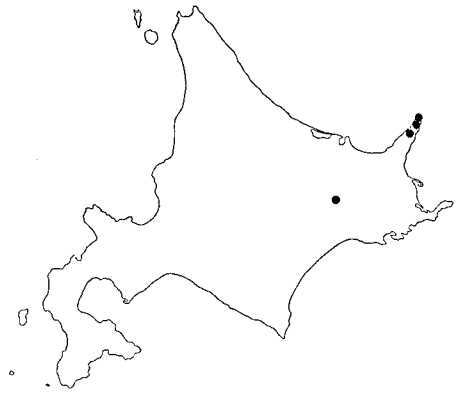


18. *Alnus maximowiczii* Callier

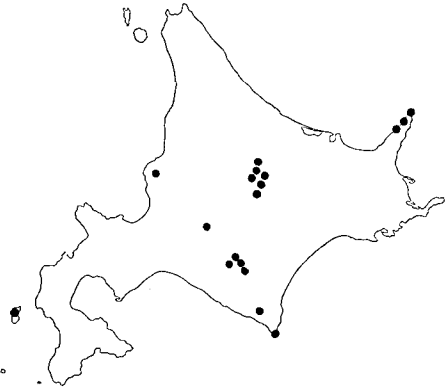
19. *Betula apoiensis* Nakai22. *Polygonum bistorta* Linn.20. *Oxyria digyna* Hill23. *Polygonum nakaii* Ohwi21. *Polygonum ajanense* Grig.24. *Polygonum viviparum* Linn.



25. *Polygonum weyrichii* Fr. Schm.



28. *Arenaria merckioides* Maxim.



26. *Rumex montanus* Desf.



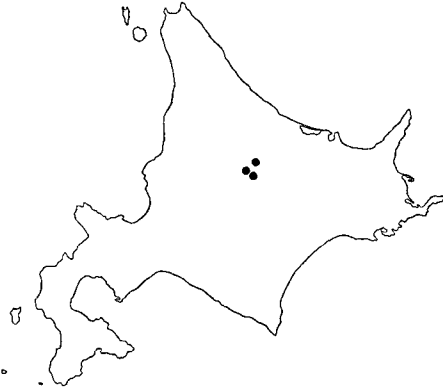
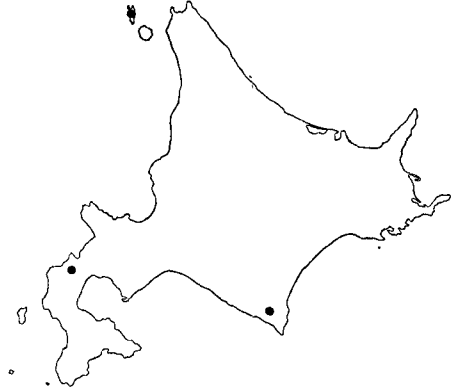
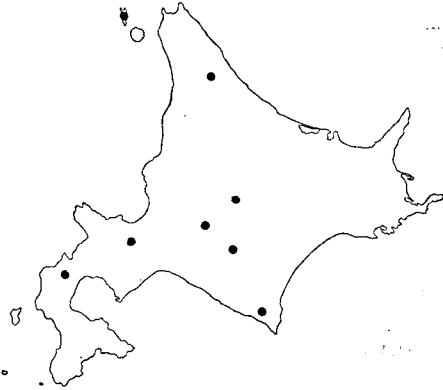
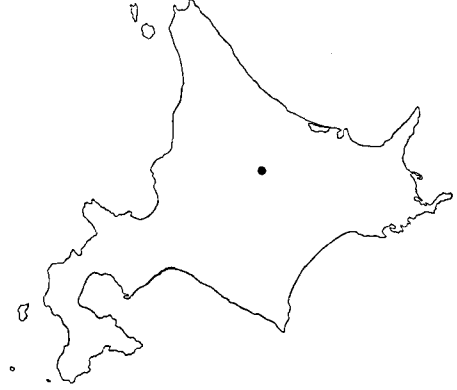
29. *Melandryum hidaka-alpinum* Miyabe et Tatew.

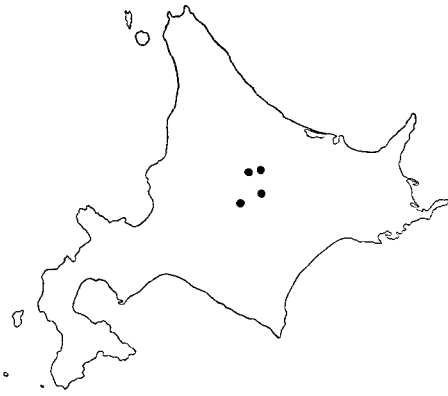


27. *Arenaria katoana* Makino
 ● var. *katoana*, ▲ var. *lanceolata* Tatew.

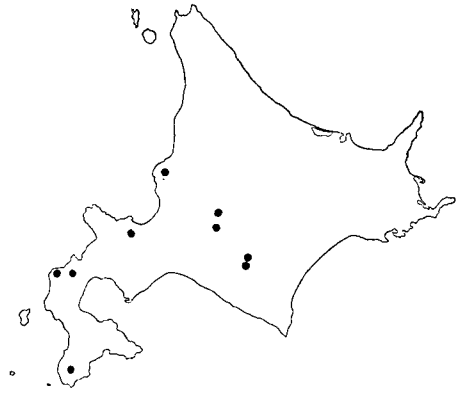


30. *Minuartia arctica* Aschers. et Graebn.

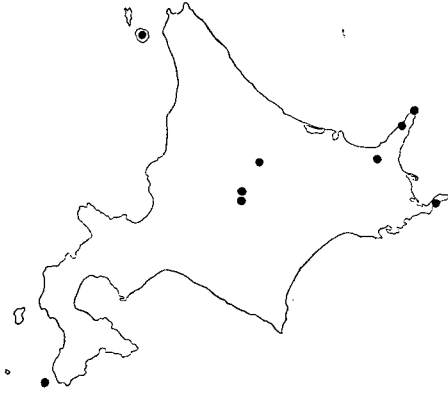
31. *Minuartia macrocarpa* Ostenf. var. *minutiflora* Hult.34. *Silene repens* Pers.32. *Minuartia verna* Hiern: var. *japonica* Hara35. *Stellaria calycantha* Bongard33. *Sagina saginoides* Karsten36. *Stellaria nipponica* Ohwi var. *yezoensis* Hara



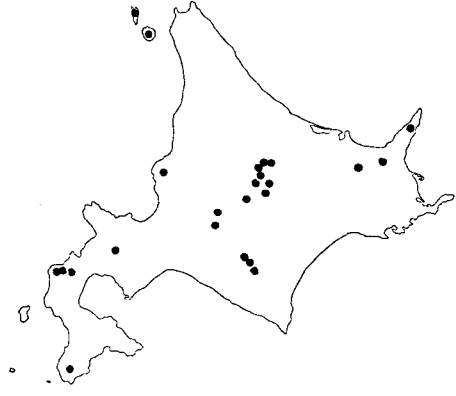
37. *Stellaria pterosperma* Ohwi



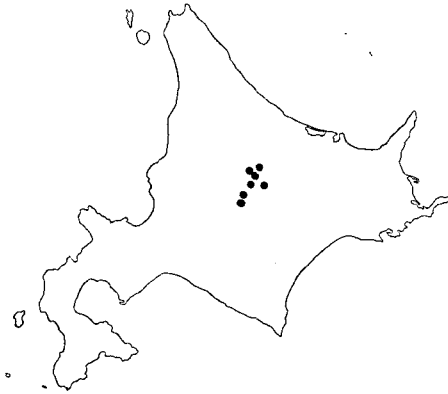
40. *Aconitum yuparense* Takeda



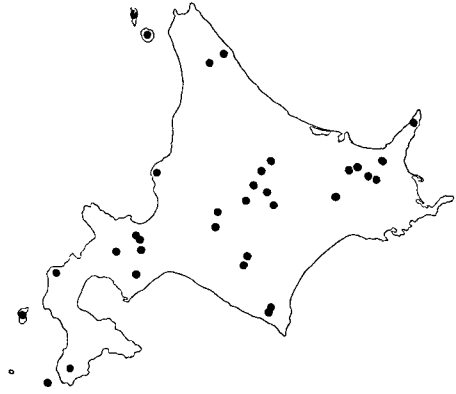
38. *Stellaria ruscifolia* Willd.



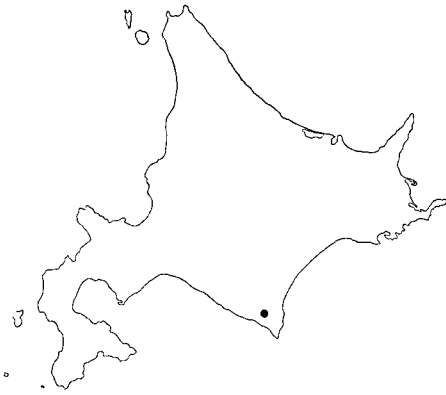
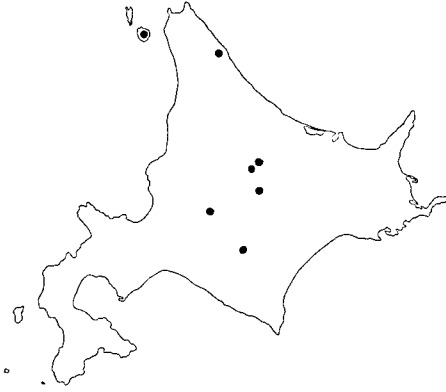
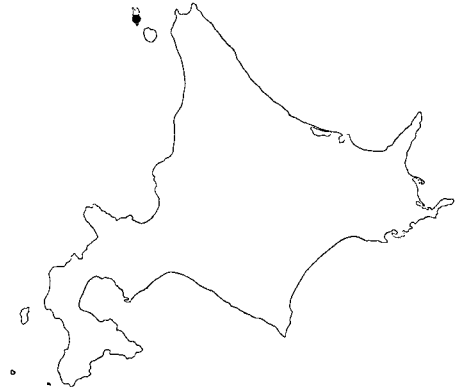
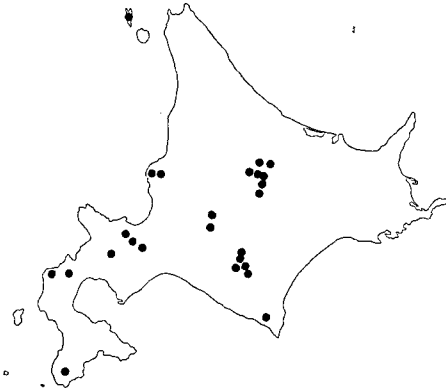
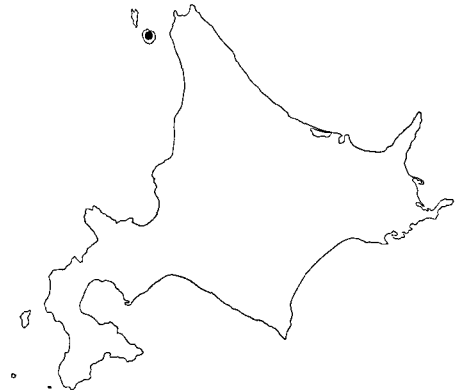
41. *Anemone narcissiflora* Linn.



39. *Aconitum yamazakii* Tamura et Namba

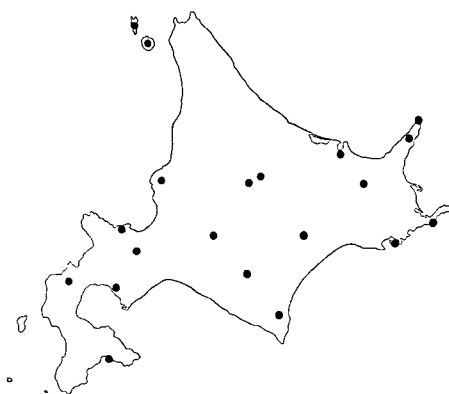


42. *Aquilegia flabellata* Sieb. et Zucc. var. *pumila* Kudo

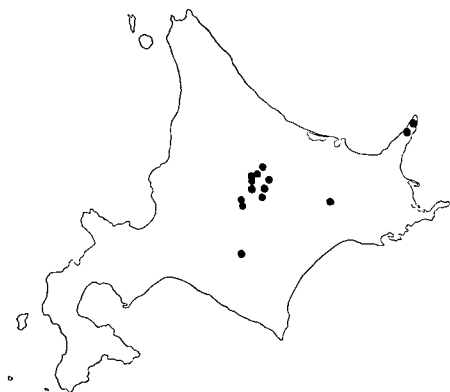
43. *Callianthemum miyabeanaum* Tatew.46. *Trollius citrinus* Miyabe44. *Pulsatilla nipponica* Ohwi47. *Trollius ledebourii* Reichenb. var. *polysepalus* Regel45. *Ranunculus acris* Linn. var. *nipponicus* Hara48. *Trollius pulcher* Makino



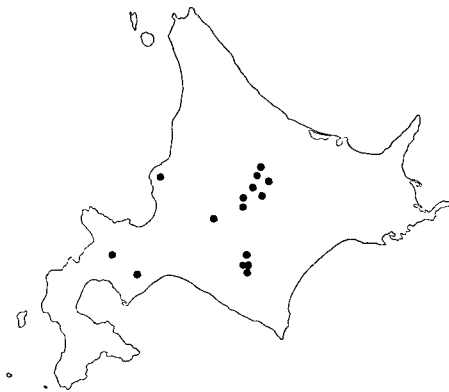
49. *Trollius riederianus* Fischer et Meyer
(incl. var. *japonicus* Ohwi)



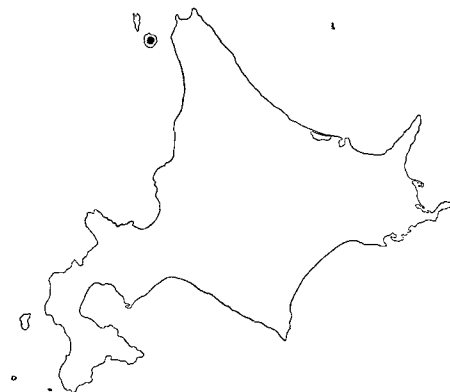
52. *Arabis lyrata* Linn. var. *kamschatica* Fischer



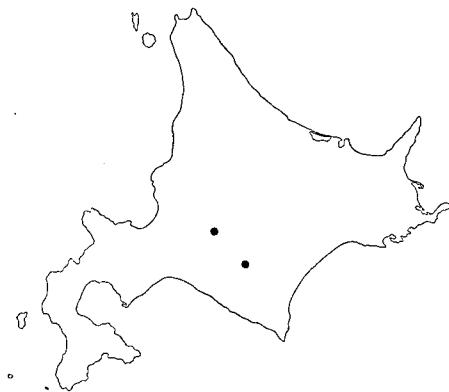
50. *Dicentra peregrina* Makino



53. *Cardamine nipponica* Franch. et Savat.



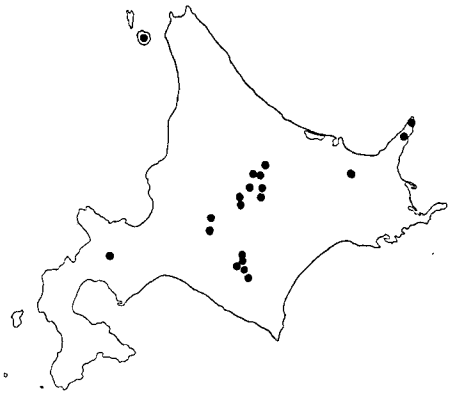
51. *Papaver fauriei* Fedde



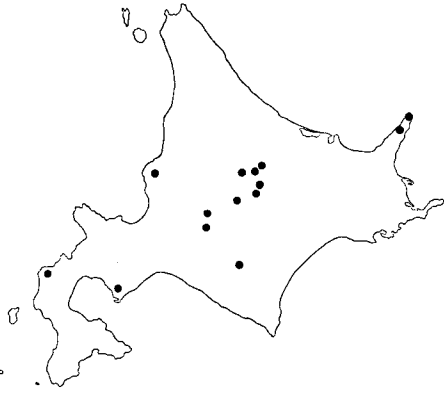
54. *Draba japonica* Maxim.



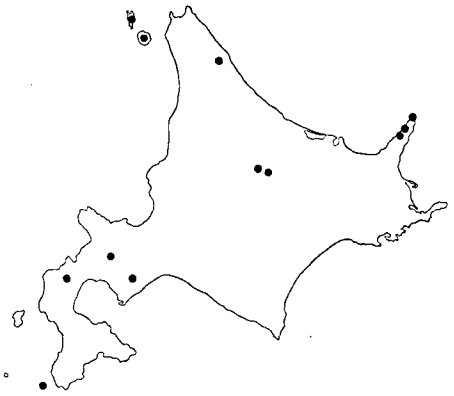
55. *Draba mongolica* Turcz.



58. *Sedum ishidae* Miyabe et Kudo



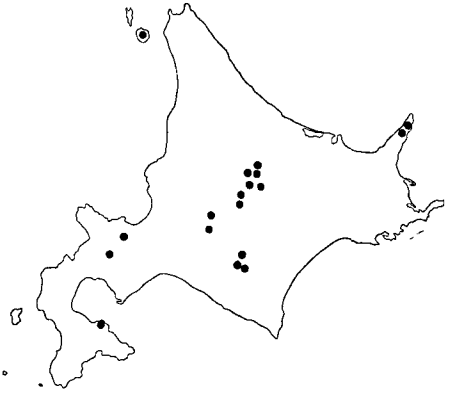
56. *Macropodium pterospermum* Fr. Schm.



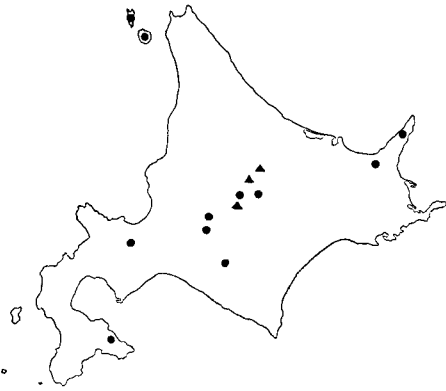
59. *Sedum rosea* Scop.



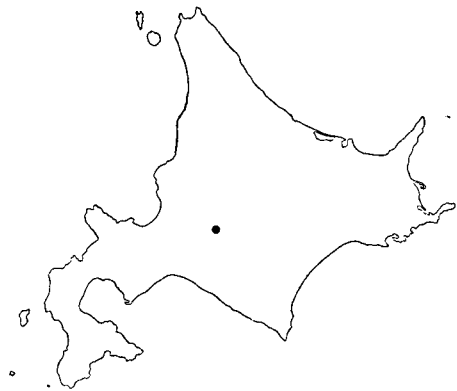
57. *Thlaspi japonicum* H. Boiss.



60. *Boykinia lycoctonifolia* Engler



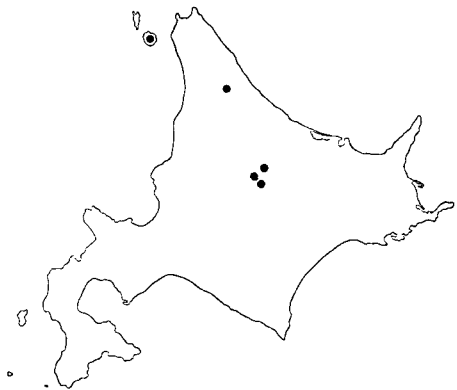
61. *Saxifraga cherlerioides* D. Don
 ● var. *rebunshirensis* Hara, ▲ form. *togakushiensis* Ohwi



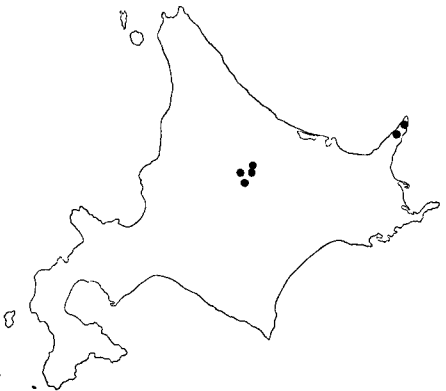
64. *Saxifraga nishidae* Miyabe et Kudo



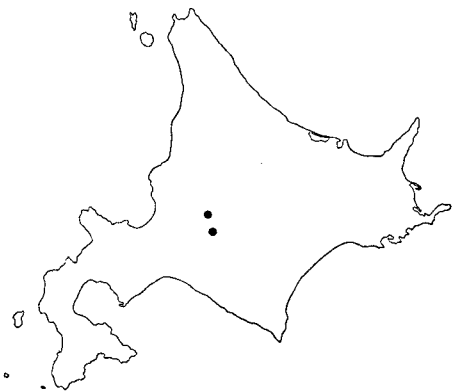
62. *Saxifraga laciniata* Nakai et Takeda



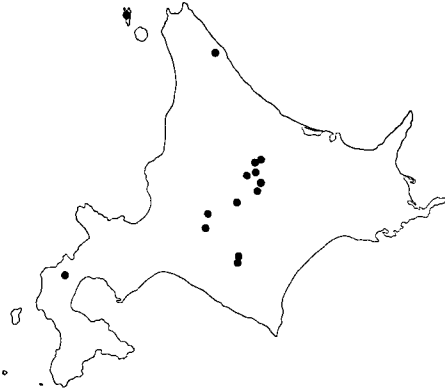
65. *Saxifraga reniformis* Ohwi



63. *Saxifraga merkii* Fischer var. *merkii*



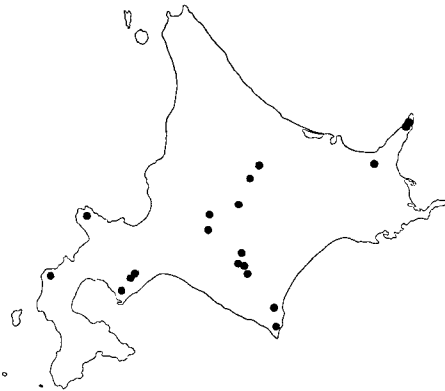
66. *Alchemilla japonica* Nakai et Hara



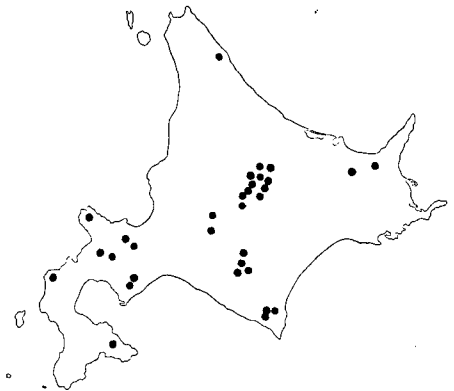
67. *Dryas octopetala* Linn. var. *asiatica* Nakai



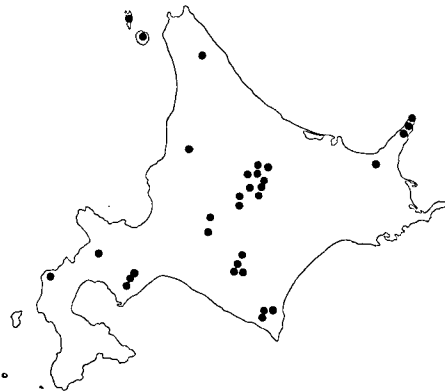
70. *Potentilla fruticosa* Linn.



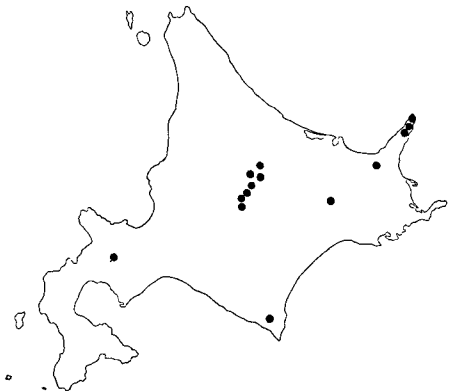
68. *Geum calthaefolium* Smith var. *nipponicum* Ohwi



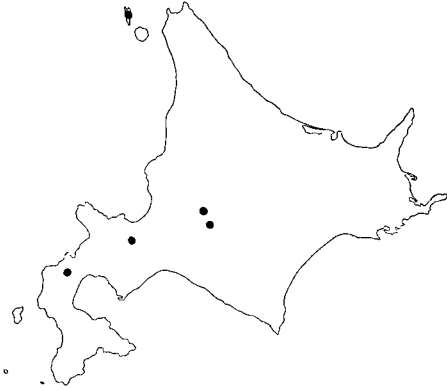
71. *Potentilla matsumurae* Th. Wolf



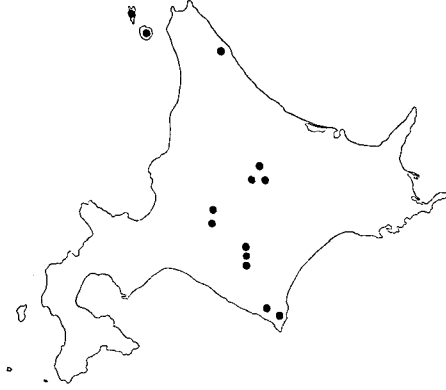
69. *Geum pentapetalum* Makino



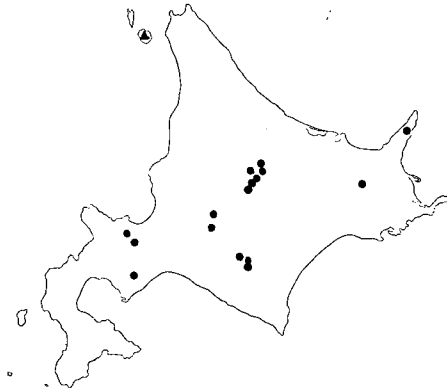
72. *Potentilla miyabei* Makino



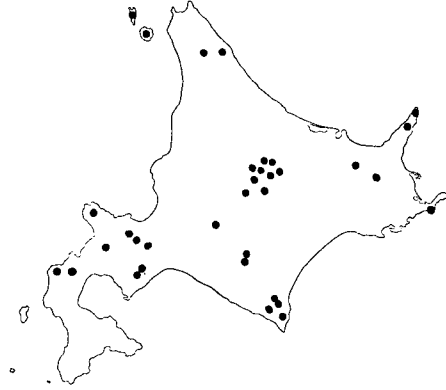
73. *Potentilla nivea* Linn.



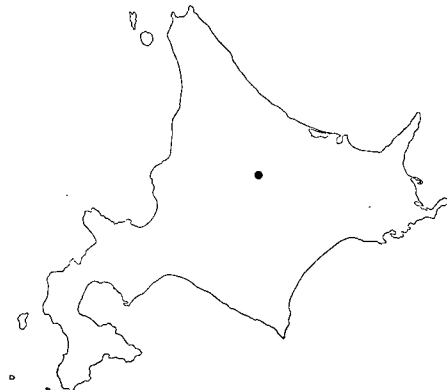
76. *Sorbus pseudogracilis* Koehne



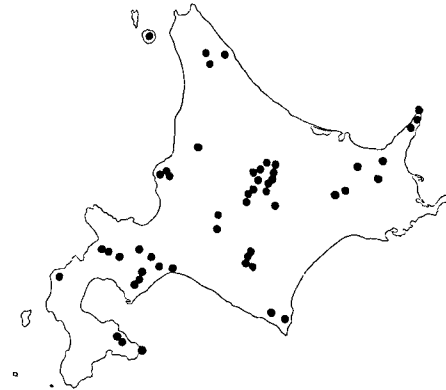
74. *Sanguisorba stipulata* Rafin.
 ● var. *stipulata*, ▲ var. *riishirensis* Hara



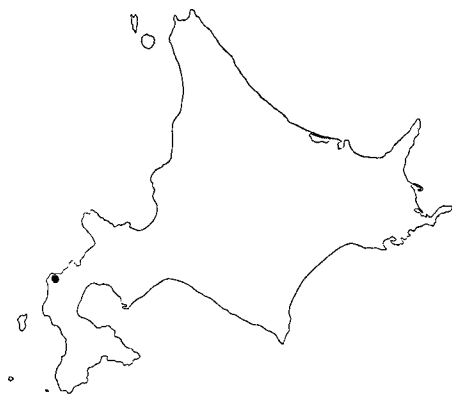
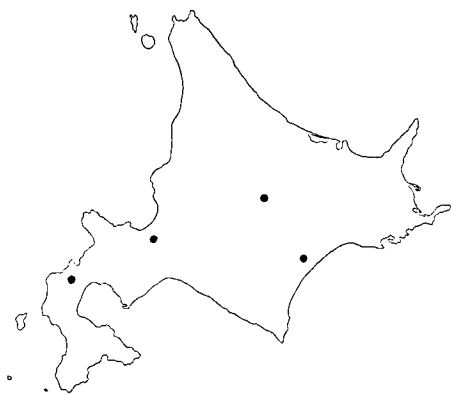
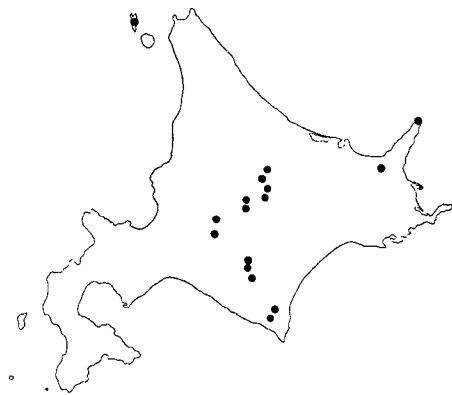
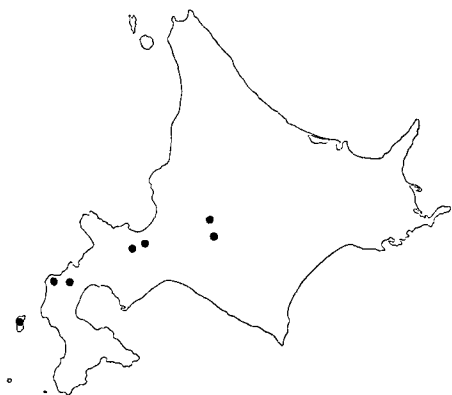
77. *Sorbus sambucifolia* Roem.

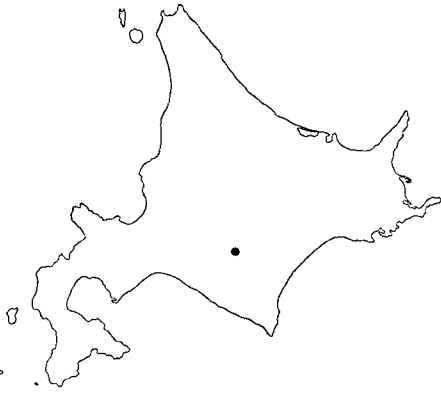


75. *Sibbaldia procumbens* Linn.

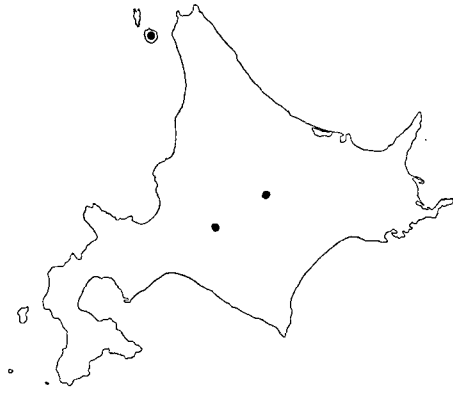


78. *Spiraea betulifolia* Pall. (incl. var. *aemiliana* Koidz.)

79. *Astragalus adsurgens* Pall.82. *Astragalus yamanotoi* Miyabe et Tatew.80. *Astragalus membranaceus* Bunge var. *obtusus* Makino83. *Hedysarum hedysaroides* Schinz et Thell.81. *Astragalus secundus* DC.84. *Hedysarum vicioides* Turcz.



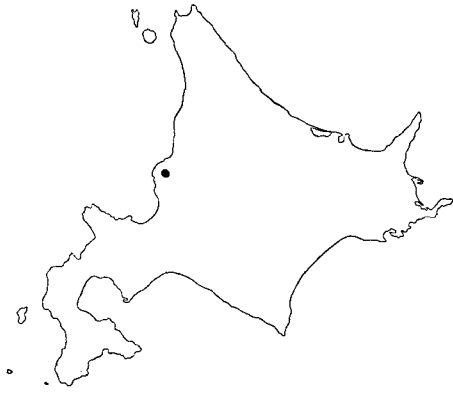
85. *Oxytropis hidaka-montana* Miyabe et Tatew.



88. *Oxytropis rishiriensis* Matsum.



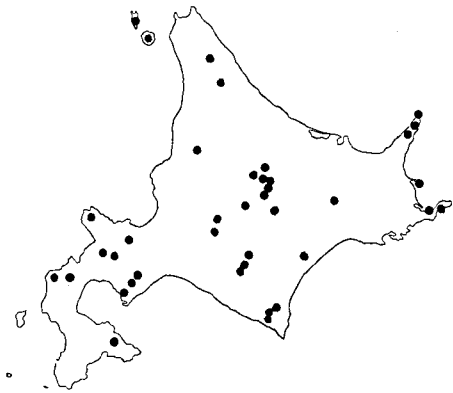
86. *Oxytropis japonica* Maxim. var. *sericea* Koidz.



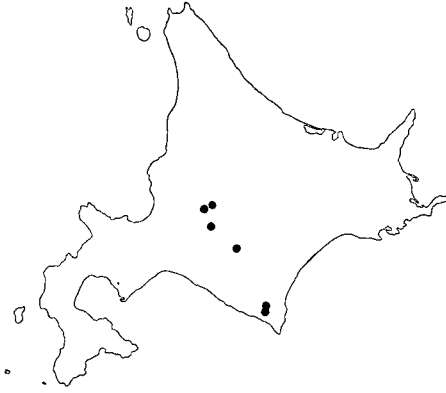
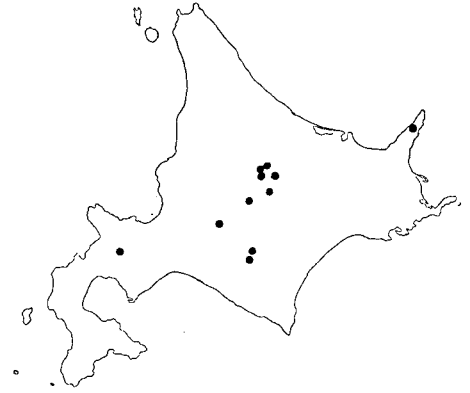
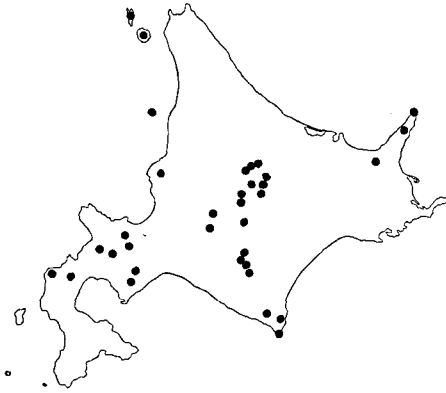
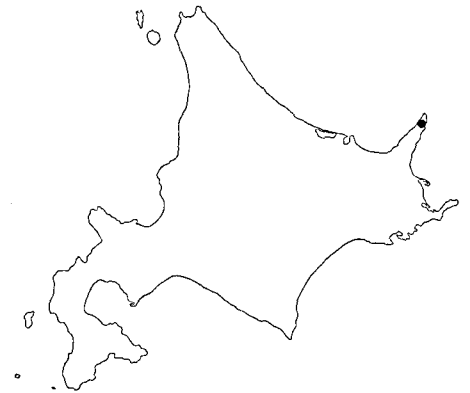
89. *Oxytropis shokanbetsuensis* Miyabe et Tatew.

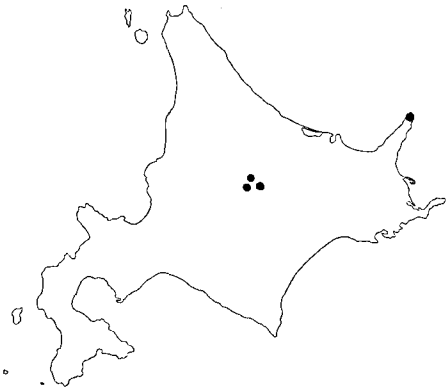


87. *Oxytropis kudoana* Miyabe et Tatew.

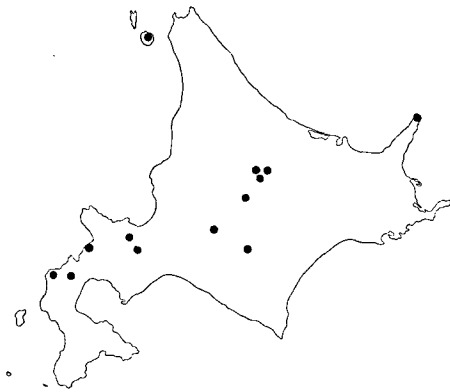


90. *Geranium erianthum* DC.

91. *Empetrum nigrum* Linn. var. *japonicum* K. Koch94. *Viola allariaefolia* Nakai92. *Rhamnus ishidaei* Miyabe et Kudo95. *Viola crassa* Makino93. *Hypericum kamschaticum* Ledeb.96. *Viola kitamiana* Nakai



97. *Viola repens* Turcz.



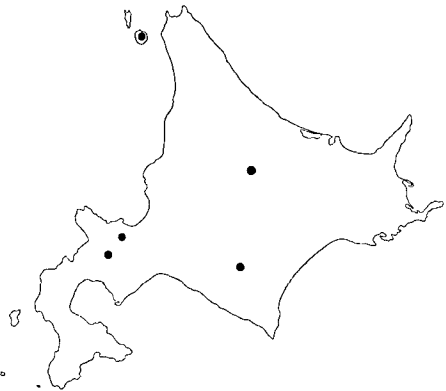
100. *Epilobium foucaudianum* Léveillé



98. *Viola yubariana* Nakai



101. *Epilobium shiroumense* Matsum. et Nakai



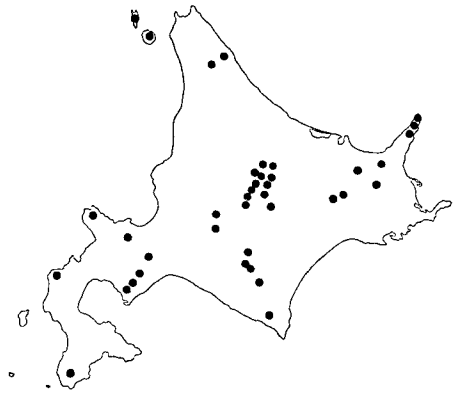
99. *Epilobium dielsii* Léveillé



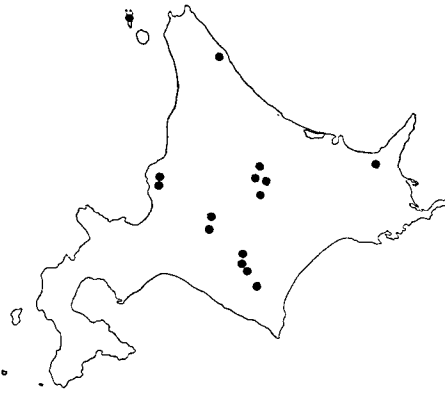
102. *Angelica stenoloba* Kitagawa



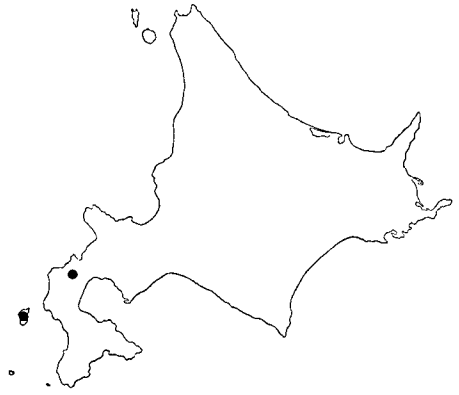
103. *Bupleurum nipponicum* Koso-Poliansky
var. *yesoense* Hara



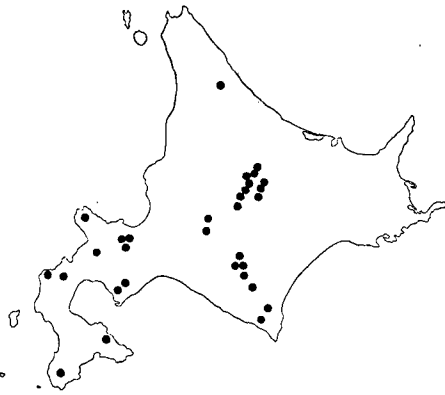
106. *Tilingia ajanensis* Regel



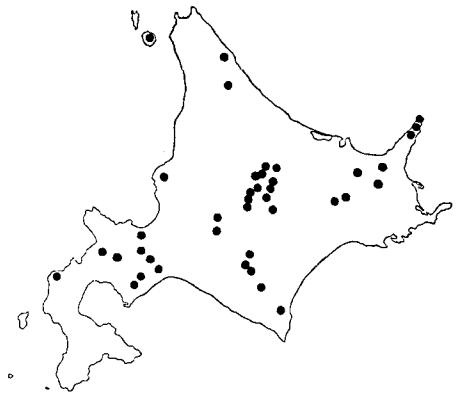
104. *Bupleurum triradiatum* Adams



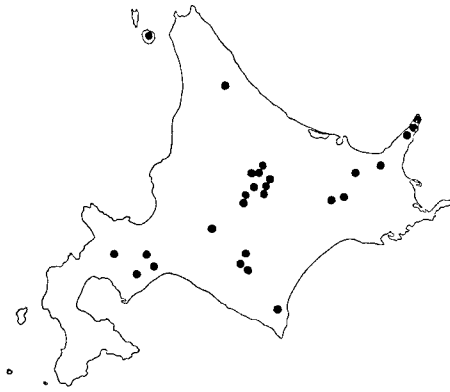
107. *Tilingia tachiroei* Kitagawa



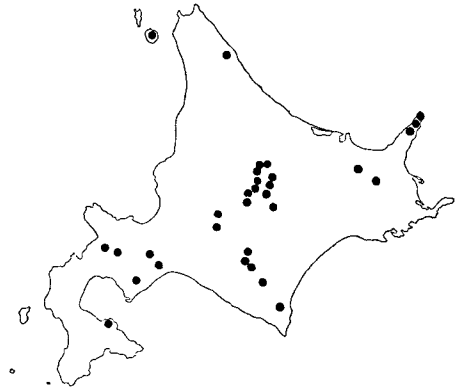
105. *Peucedanum multivittatum* Maxim.



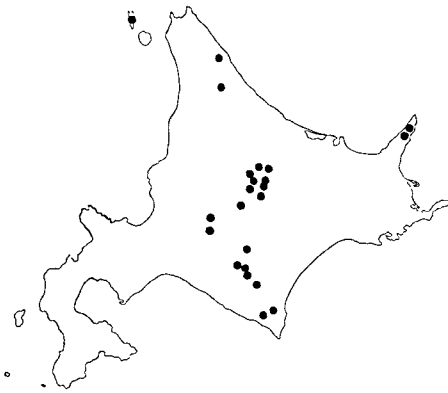
108. *Diapensia lapponica* Linn. var. *obovata* Fr. Schm.



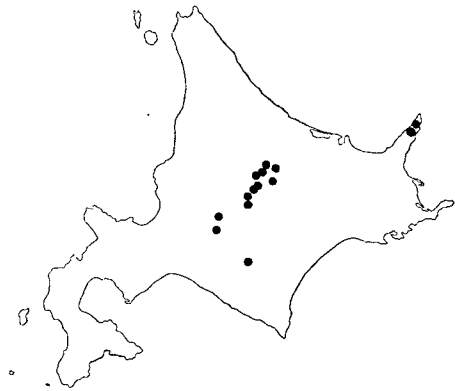
109. *Arctericia nana* Makino



112. *Cassiope lycopodioides* D. Don



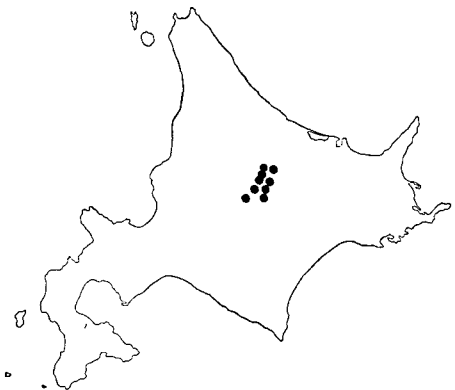
110. *Arctous alpinus* Niedenzu var. *japonicus* Ohwi



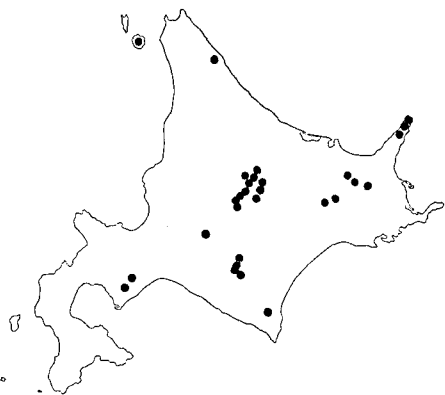
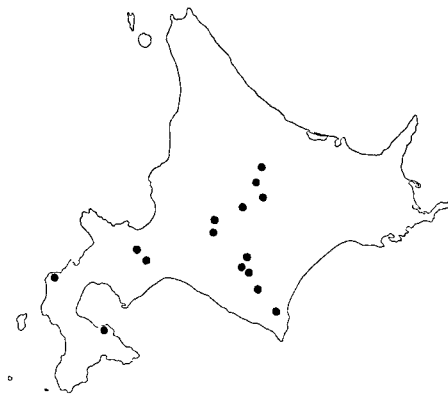
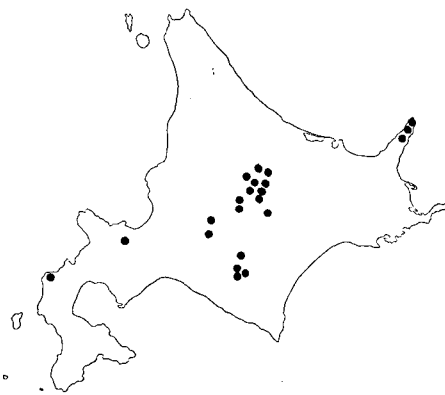
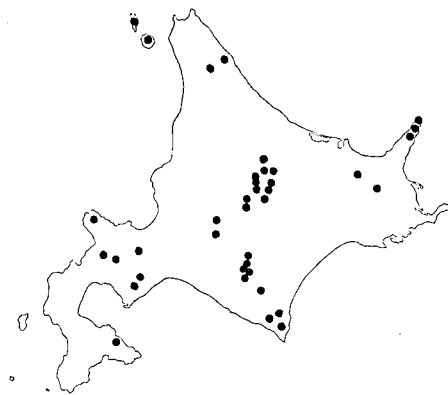
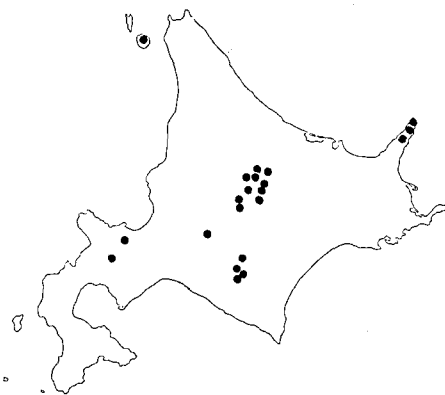
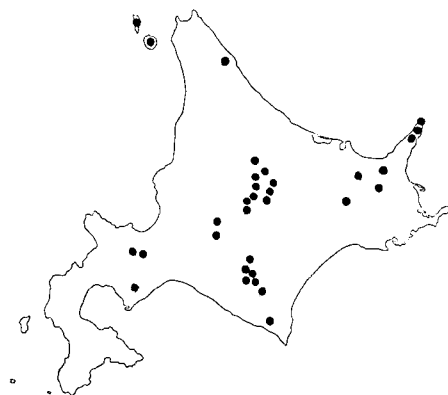
113. *Harrimanella stelleriana* Coville

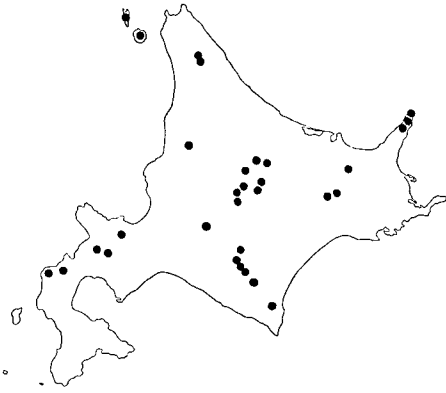


111. *Bryanthus gmelinii* D. Don

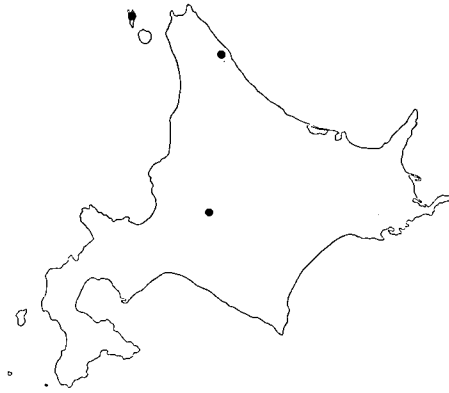


114. *Ledum palustre* Linn. var. *decumbens* Ait.

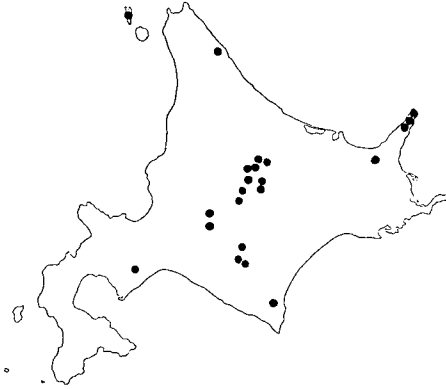
115. *Loiseleuria procumbens* Desv.118. *Phylloce nipponica* Makino
var. *oblongo-ovata* Toyokuni116. *Phylloce aleutica* A. Heller119. *Rhododendron aureum* Georgi117. *Phylloce caerulea* Babington120. *Rhododendron camtschaticum* Pall.



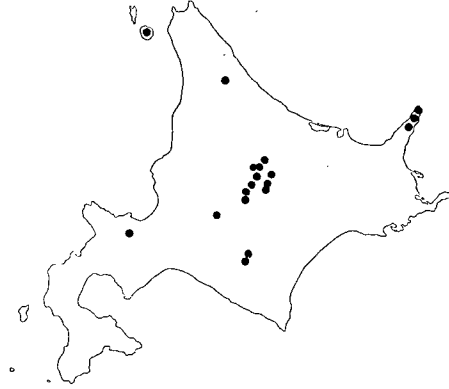
121. *Vaccinium ovalifolium* J. E. Smith
(incl. var. *coriaceum* H. Boiss.)



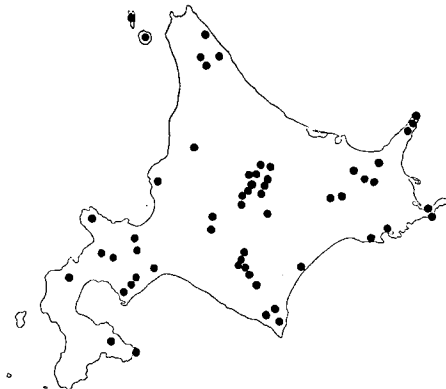
124. *Androsace lehmanniana* Spreng.



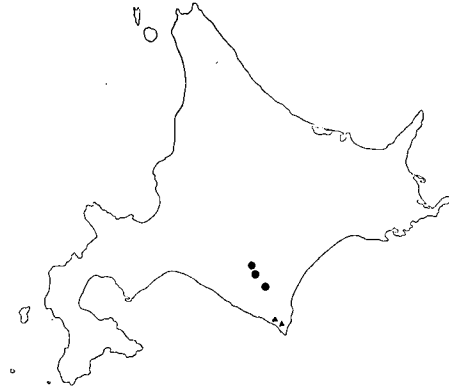
122. *Vaccinium uliginosum* Linn.



125. *Primula cuneifolia* Ledeb.



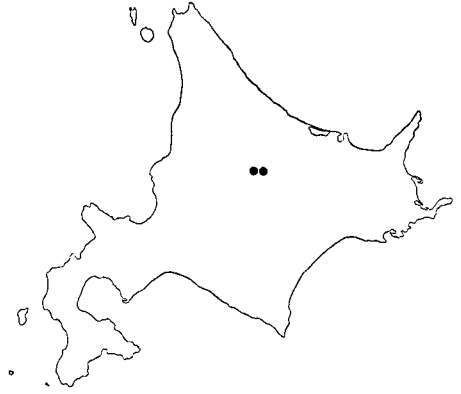
123. *Vaccinium vitis-idaea* Linn.



126. *Primula hidakana* Miyabe et Kudo
▲var. *hidakana*, ●var. *kamuiana* Hara



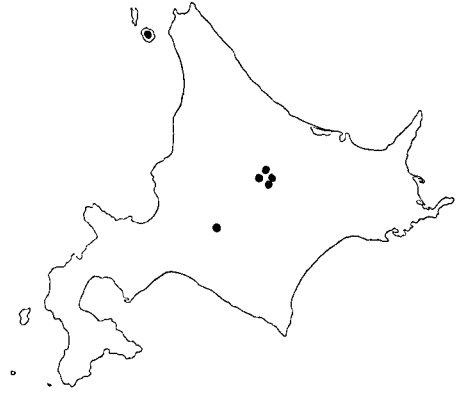
127. *Primula yuparensis* Takeda



130. *Gentiana glauca* Pall.



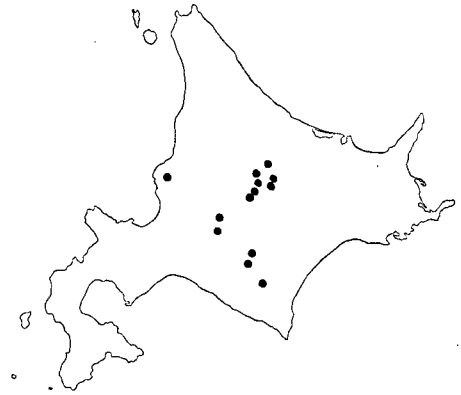
128. *Fauria crista-galli* Makino



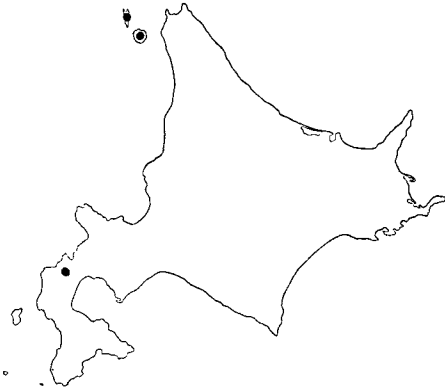
131. *Gentiana jamesii* Hemsl.



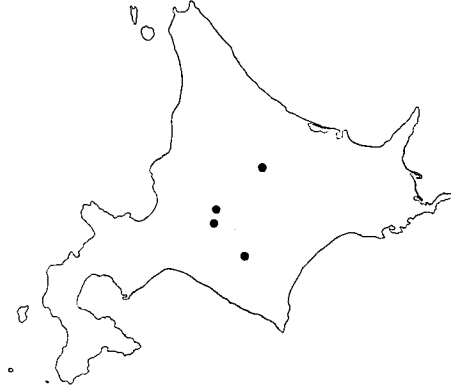
129. *Gentiana algida* Pall. var. *igarashii* Miyabe et Kudo



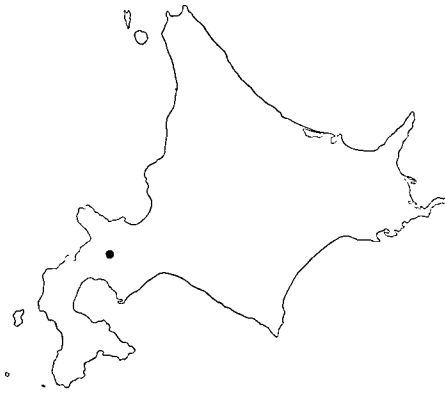
132. *Gentiana nipponica* Maxim.



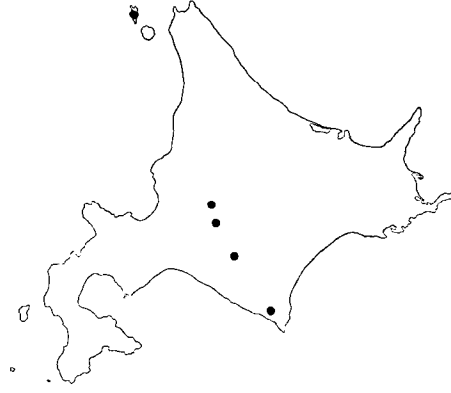
133. *Gentianella auriculata* Gillett



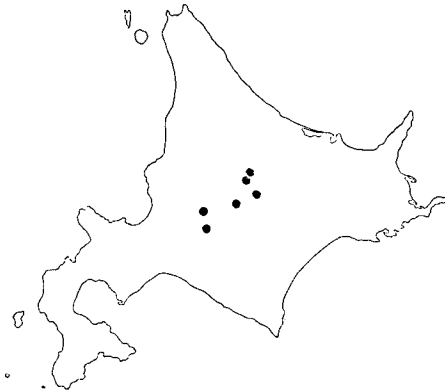
136. *Swertia cuspidata* Kitagawa



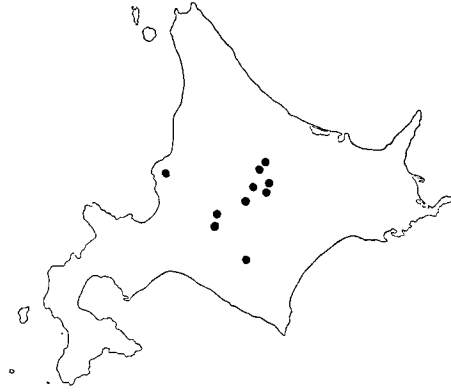
134. *Gentianella takedae* Satake



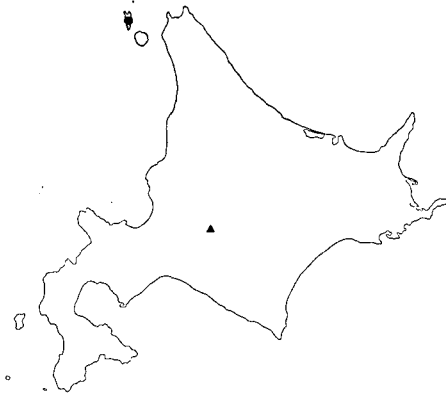
137. *Eritrichium nipponicum* Makino var. *albiflorum* Koidz.



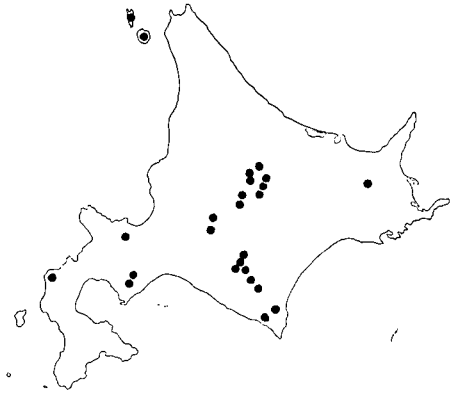
135. *Gentianella yuparensis* Satake



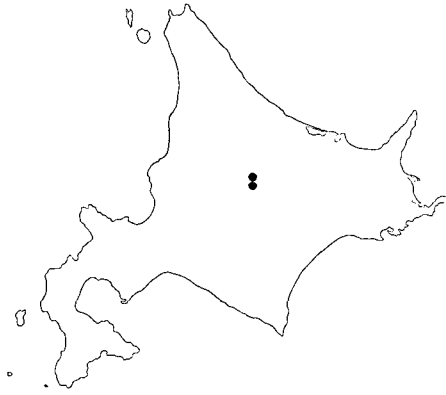
138. *Mertensia pterocarpa* Tatew. et Ohwi
var. *yezoensis* Tatew. et Ohwi



139. *Lagotis glauca* Gaertn.
 ● var. *glauca*, ▲ var. *takedana* Kitamura



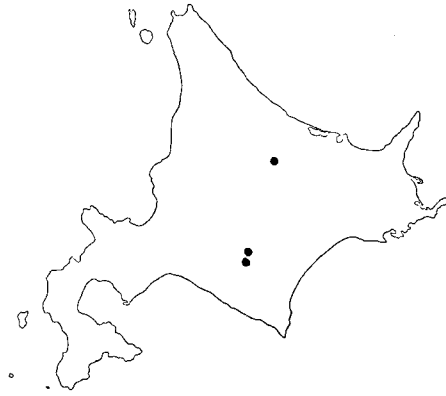
142. *Pedicularis chamissonis* Stev. var. *japonica* Maxim.



140. *Lagotis stelleri* Rupr. var. *yesoensis* Miyabe et Tatew.



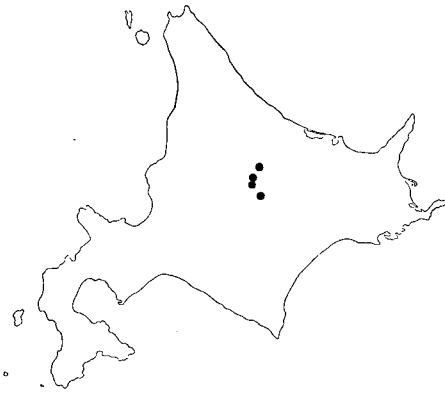
143. *Pedicularis koidzumiana* Tatewaki et Ohwi



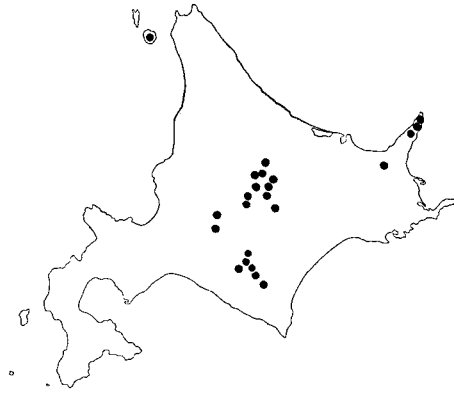
141. *Pedicularis apodochila* Maxim.



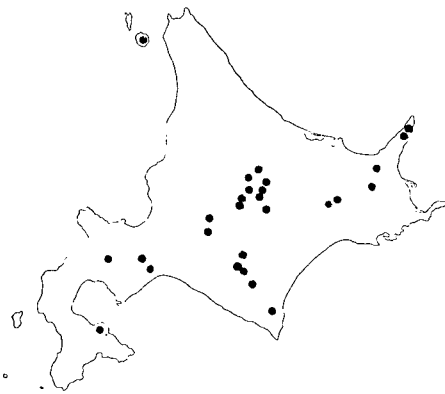
144. *Pedicularis oederi* Vahl



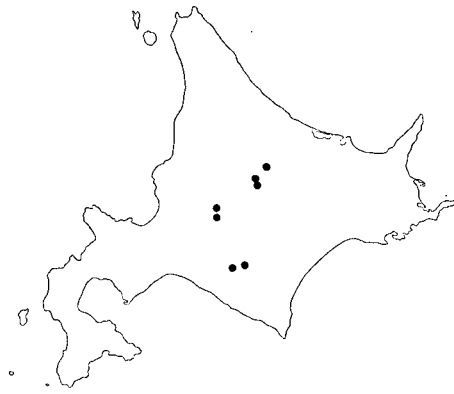
145. *Pedicularis verticillata* Linn.



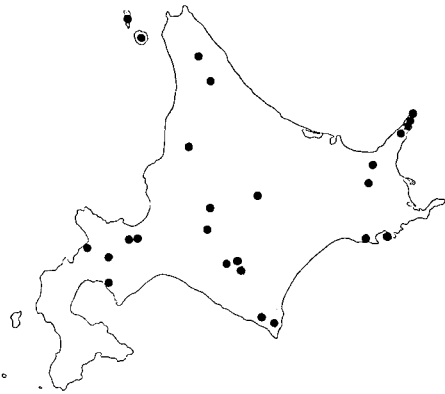
148. *Veronica stelleri* Pall. var. *longistyla* Kitagawa



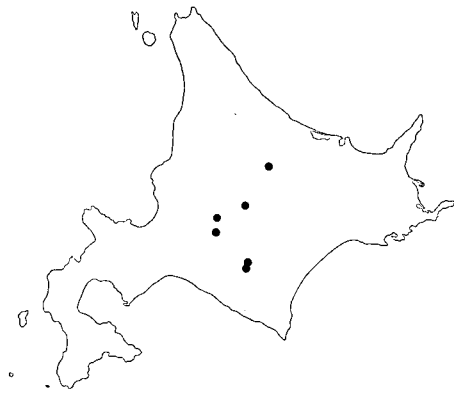
146. *Pentstemon frutescens* Lamb.



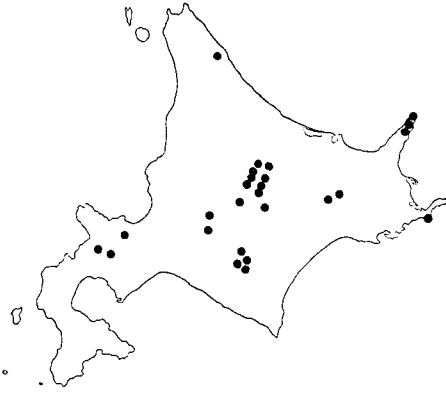
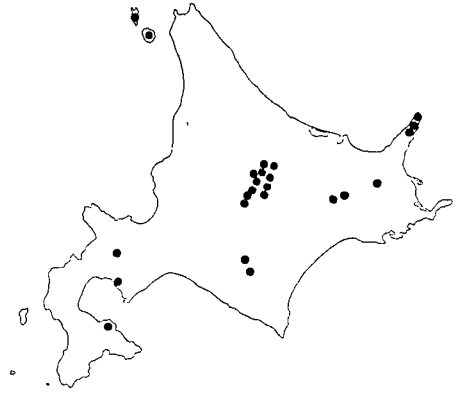
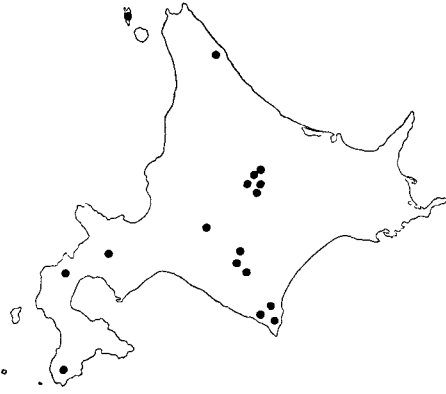
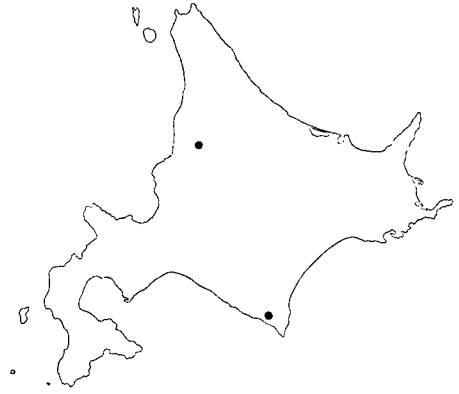
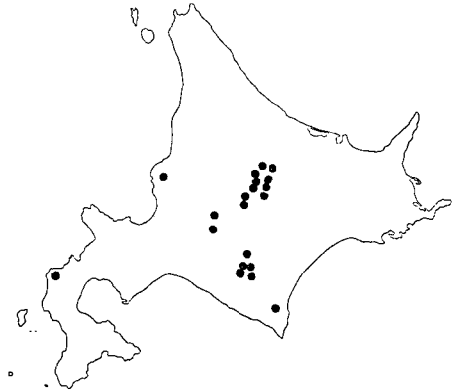
149. *Boschniakia rossica* Fedtsch. et Flerov

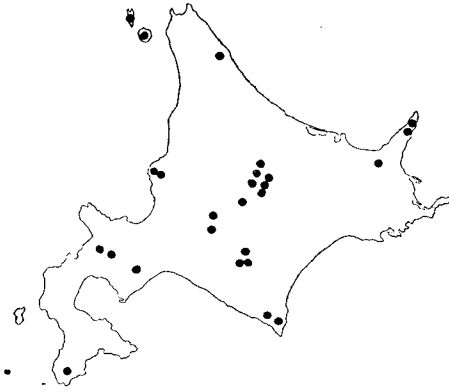


147. *Veronica schmidtiana* Regel

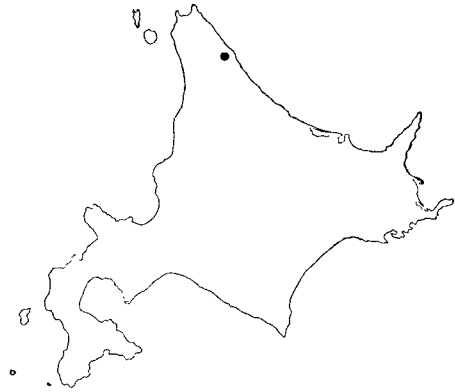


150. *Pinguicula vulgaris* Linn. var. *macroceras* Herder

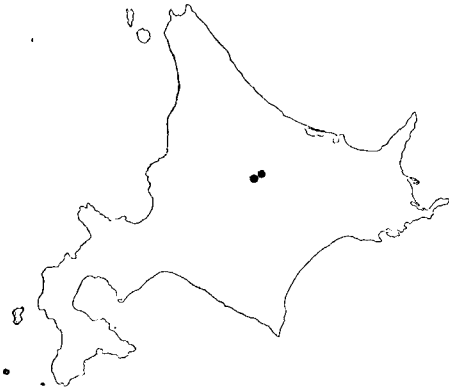
151. *Linnaea borealis* Linn.154. *Campanula lasiocarpa* Cham.152. *Patrinia sibirica* Juss.155. *Anaphalis alpicola* Makino153. *Campanula chamissonis* Fedorov156. *Arnica unalascensis* Less.
(incl. var. *tschonoskyi* Kitam. et Hara)



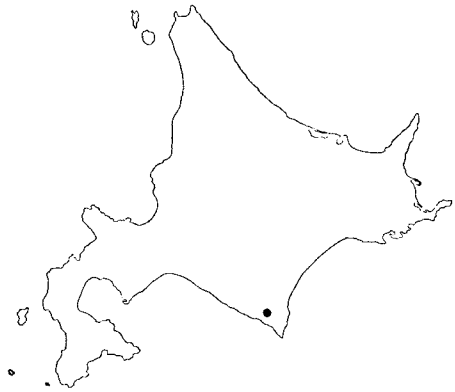
157. *Artemisia arctica* Less.



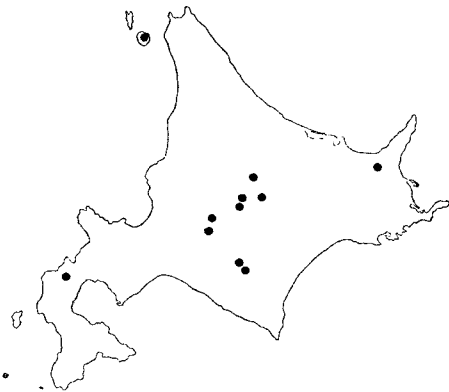
160. *Erigeron miyabeanus* Tatew. et Kitam.



158. *Artemisia trifurcata* Steph., ex Spreng.
var. *pedunculosa* Kitam.



161. *Hypochaeris crepidioides* Tatew. et Kitam.



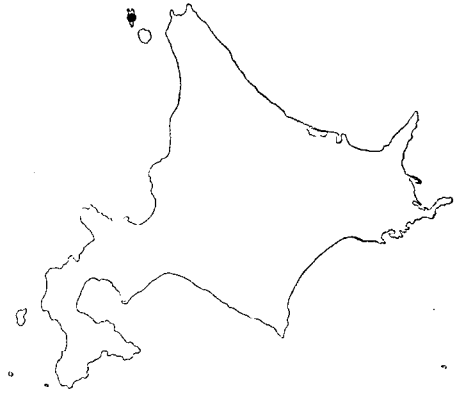
159. *Crepis hokkaidoensis* Babcock



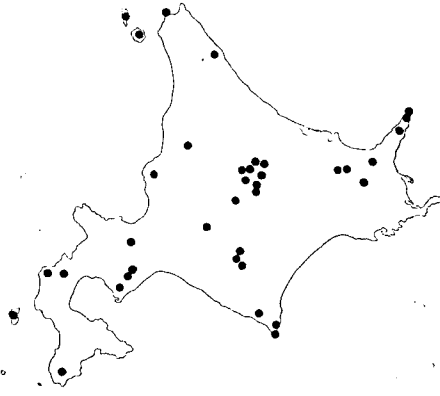
162. *Leontopodium hayachinense* Hara et Kitam.
var. *miyabeanum* S. Watanabe



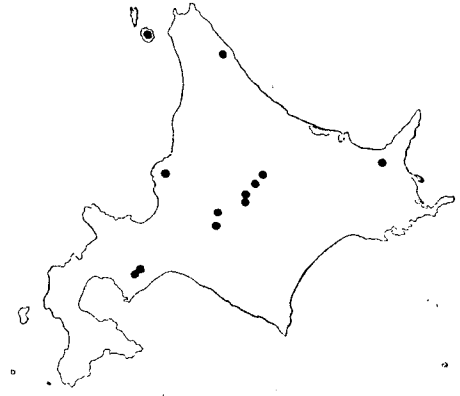
163. *Saussurea chionophylla* Takeda



166. *Scorzonera rebunensis* Tated. et Kitam.



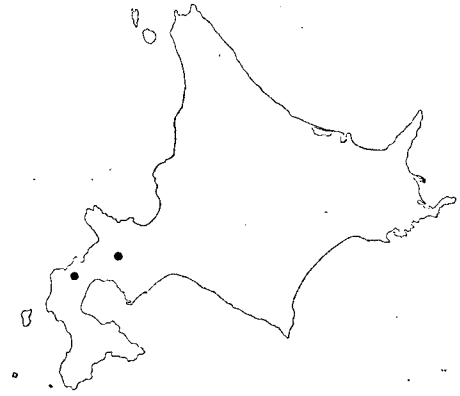
164. *Saussurea riederi* Herder var. *yezoensis* Maxim.



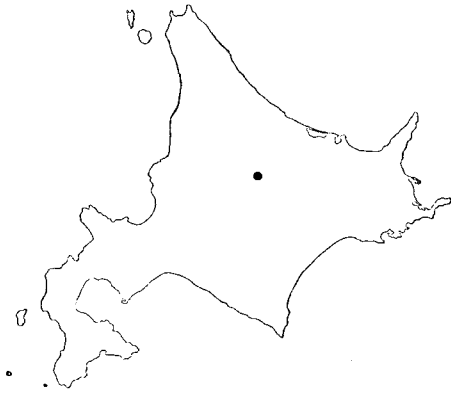
167. *Senecio kawakamii* Makino



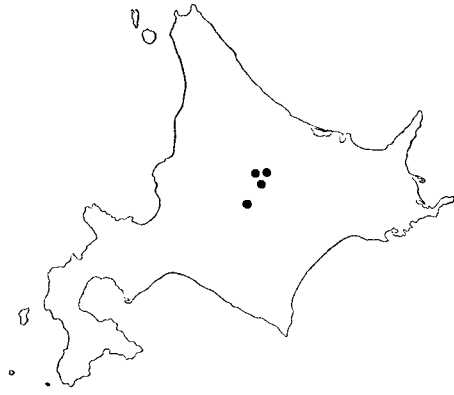
165. *Saussurea yanagisawae* Takeda



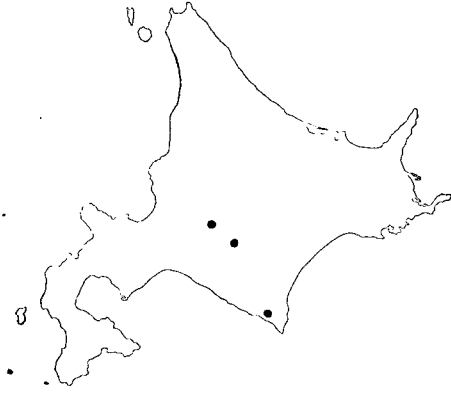
168. *Taraxacum platypecidum* Diels



169. *Taraxacum trigonolobum* Dahlst.



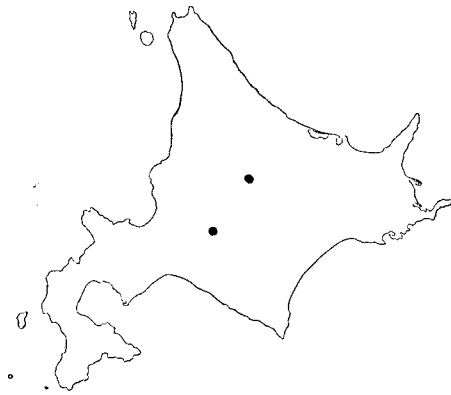
172. *Sparganium hyperboreum* Laest.



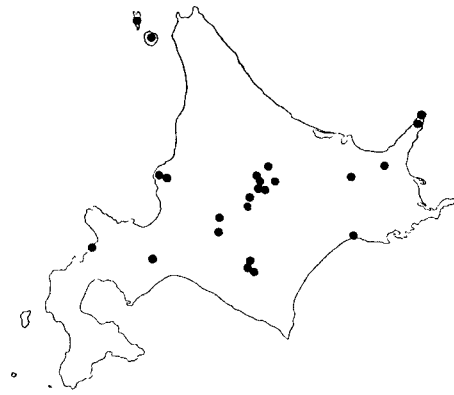
170. *Taraxacum yuparense* H. Koidz.



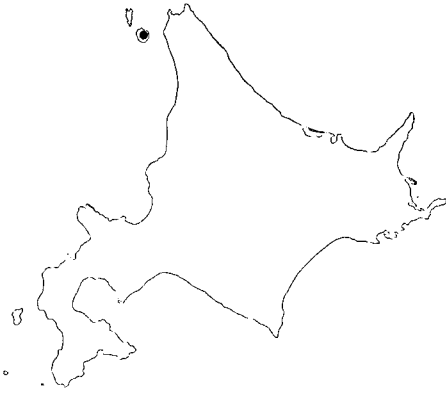
173. *Agrostis borealis* Hartn.



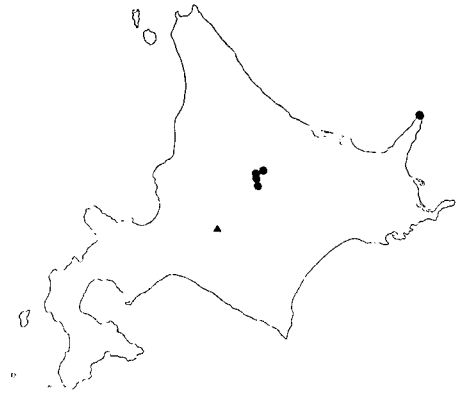
171. *Sparganium angustifolium* Michx.



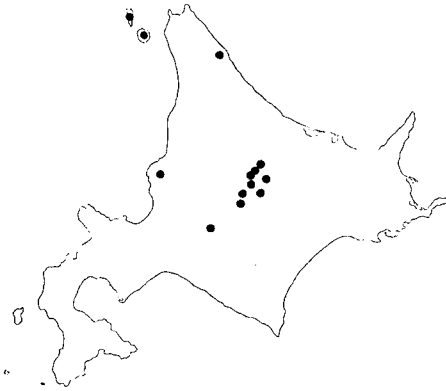
174. *Agrostis flaccida* Hack.



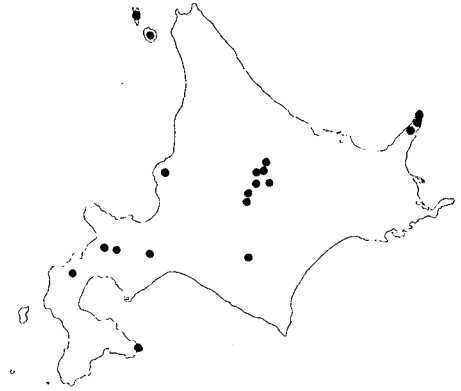
175. *Anthoxanthum odoratum* Linn. var. *furumii* Ohwi



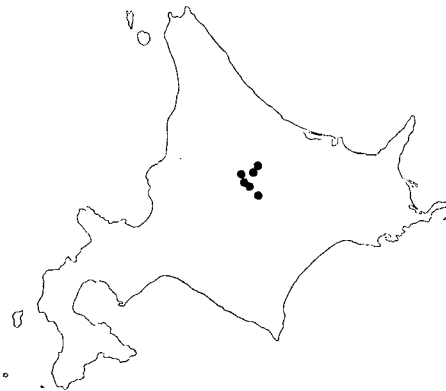
178. *Deschampsia caespitosa* Beauv.
● var. *festucaefolia* Honda, ▲ var. *levis* Ohwi



176. *Calamagrostis purpurascens* R. Br.



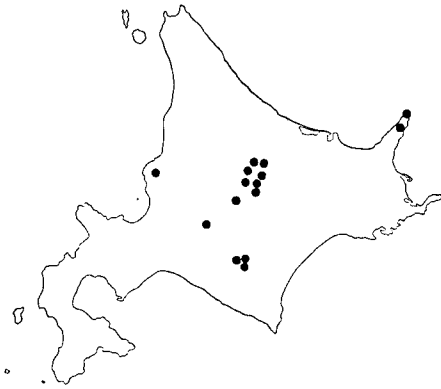
179. *Deschampsia flexuosa* Trin.



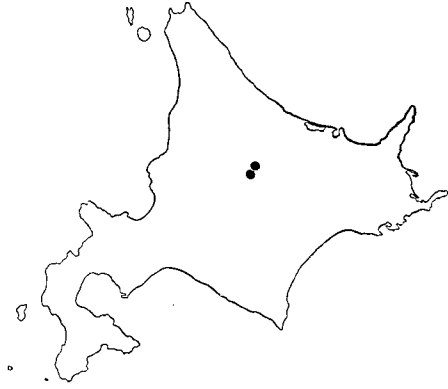
177. *Deschampsia atropurpurea* Wahlenb.
var. *paramushirensis* Kudo



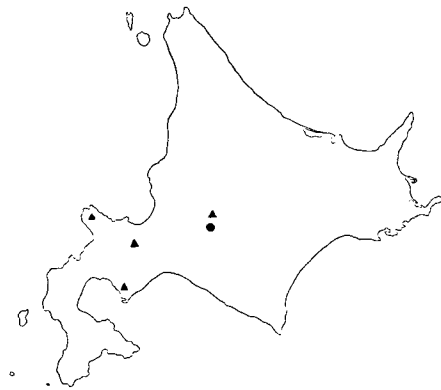
180. *Elymus yubaridakensis* Ohwi



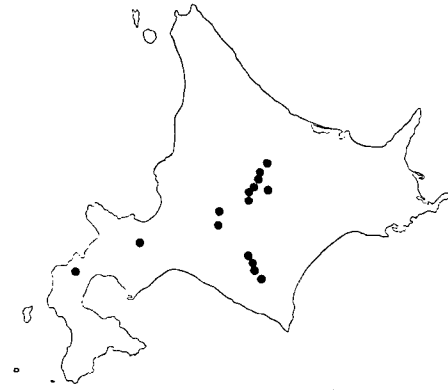
181. *Hierochloa alpina* Roem. et Schult.



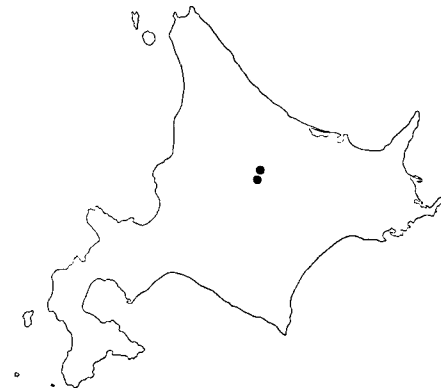
184. *Poa hakusanensis* Hack.



182. *Hierochloa pluriflora* Koidz.
● var. *pluriflora*, ▲ var. *intermedia* Ohwi



185. *Poa hayachinensis* Koidz.



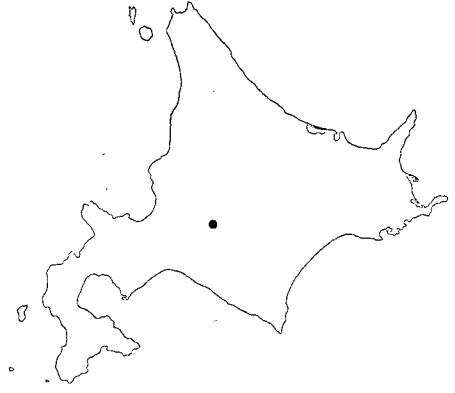
183. *Phleum alpinum* Linn.



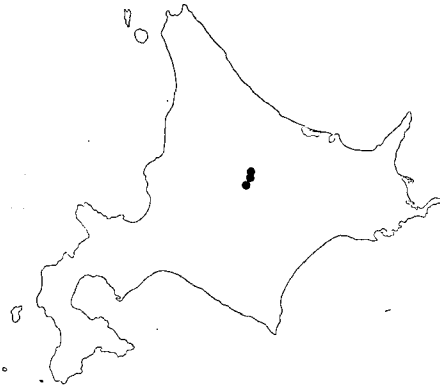
186. *Trisetum spicatum* Richt.



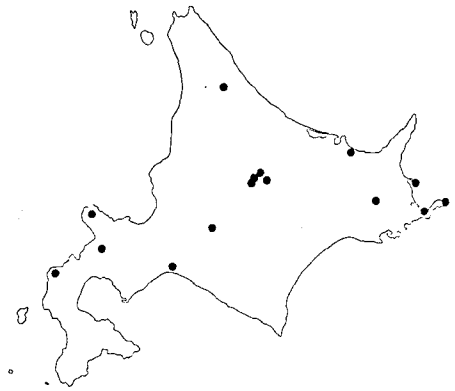
187. *Carex bigelowii* Torr.



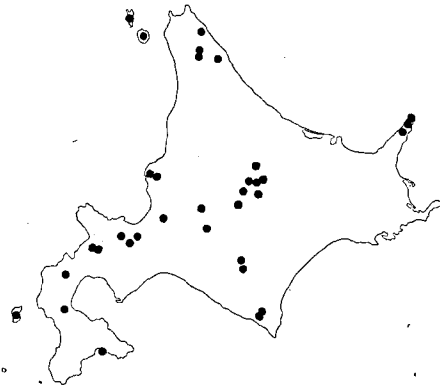
190. *Carex capillaris* Linn.



188. *Carex bipartita* All.



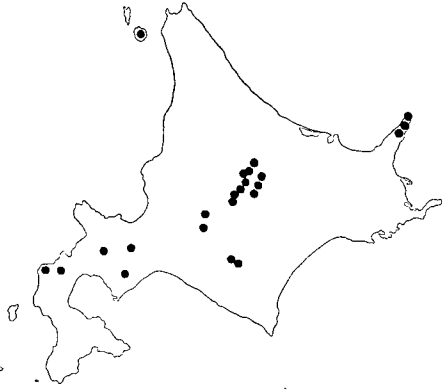
191. *Carex curta* Gooden.



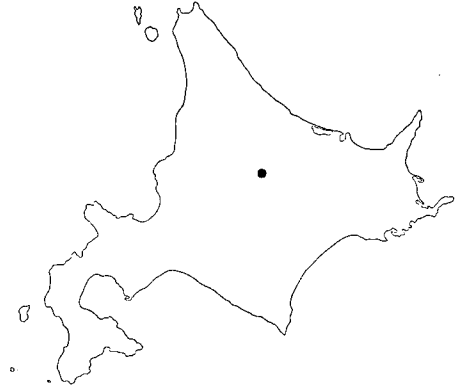
189. *Carex blepharicarpa* Franch.



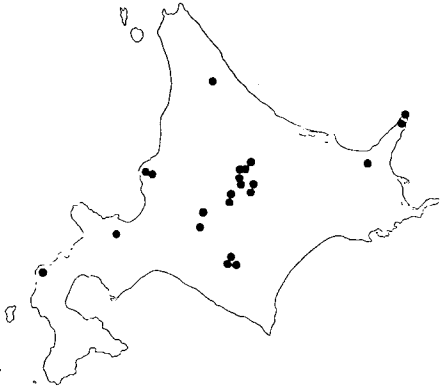
192. *Carex eleusinoides* Turcz.



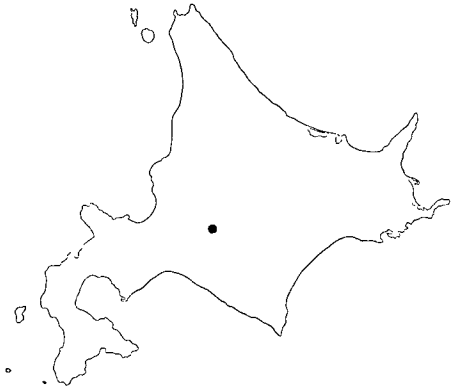
193. *Carex flavocuspis* Franch. et Savat.



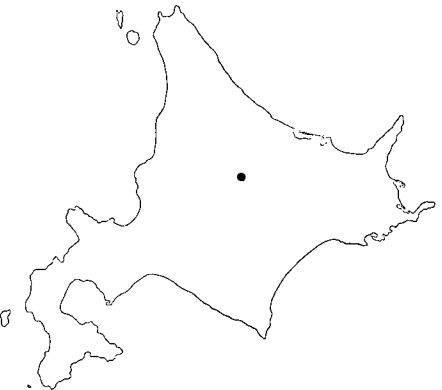
196. *Carex livida* Willd.



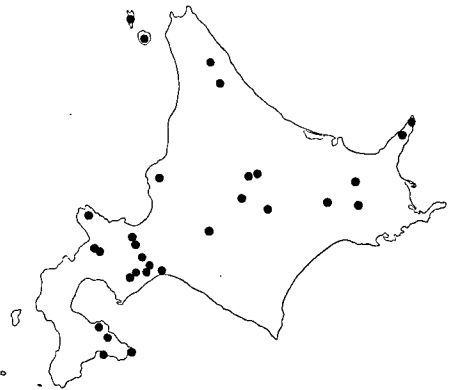
194. *Carex hakkodensis* Franch.



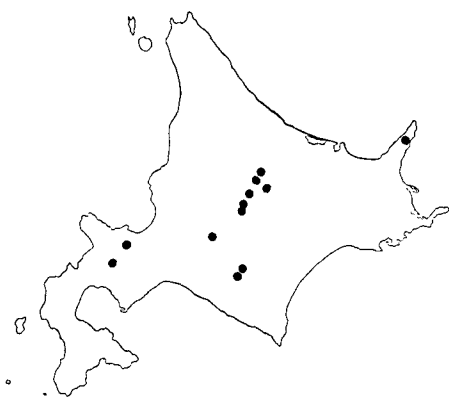
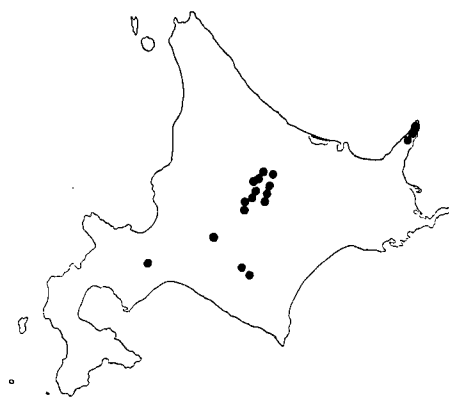
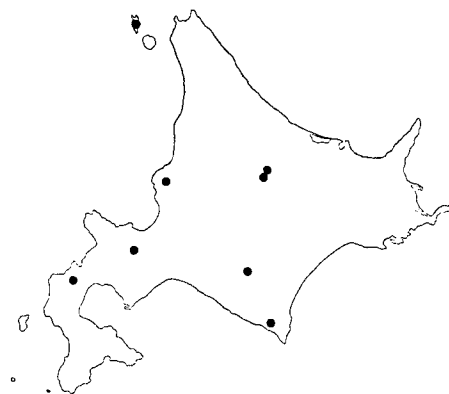
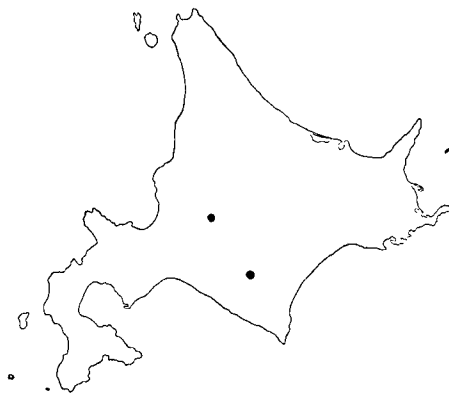
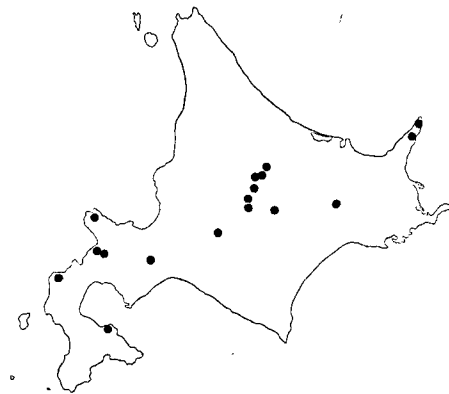
197. *Carex melanocarpa* Cham.

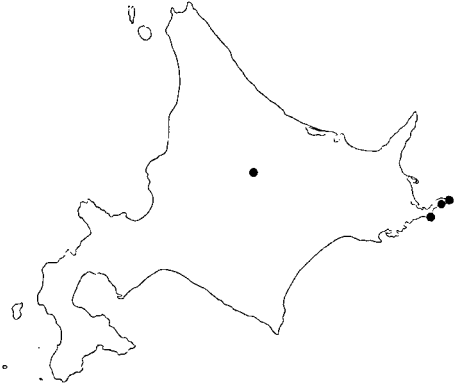


195. *Carex kabanovii* V. Krecz.

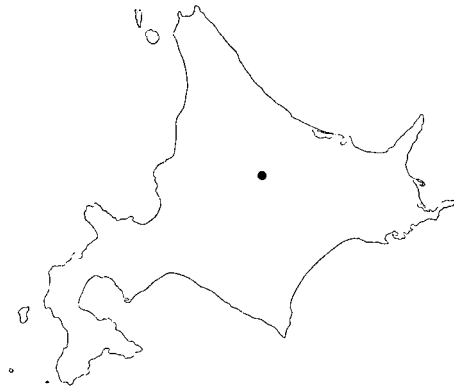


198. *Carex oxyandra* Kudo

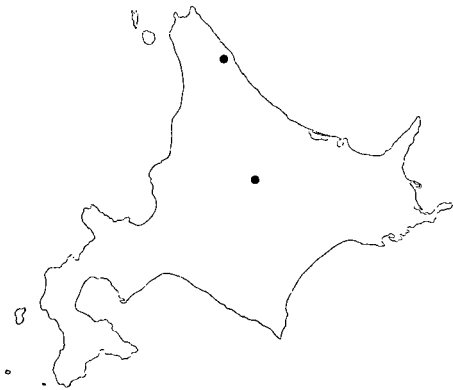
199. *Carex pyrenaica* Wahlenb.202. *Carex stenantha* Franch. et Savat.
var. *taisetsuensis* Akiyama200. *Carex scita* Maxim. var. *riishirensis* Kükenth.203. *Carex tenuiformis* Lévet. et Vant.201. *Carex rupestris* Bell. ex All.204. *Carex mertensii* Presc. var. *urostachys* Kükenth.



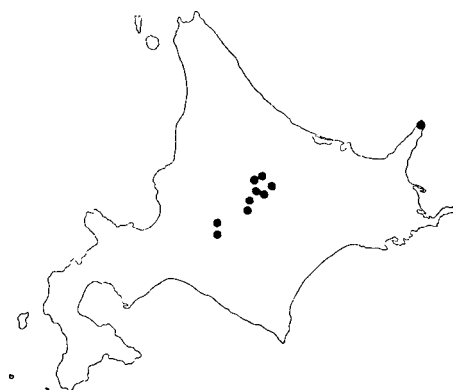
205. *Carex vaginata* Tausch



208. *Kobresia bellardii* Degland



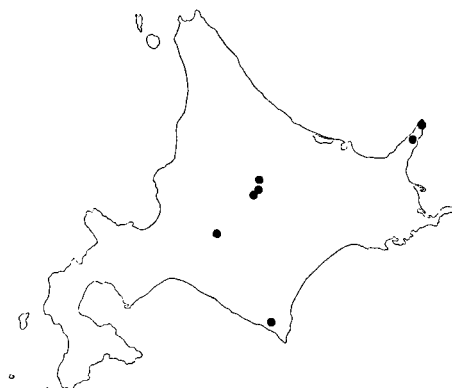
206. *Carex vanheurckii* Müll. Arg.



209. *Scirpus caespitosus* Linn.



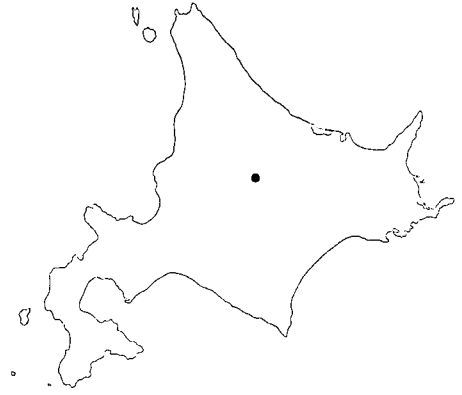
207. *Eriophorum scheuchzeri* Hoppe var. *tenuifolium* Ohwi



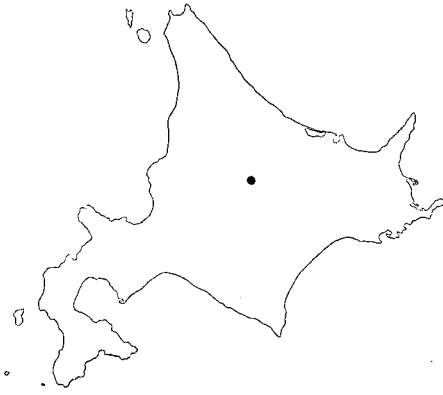
210. *Scirpus maximowiczii* C. B. Clarke



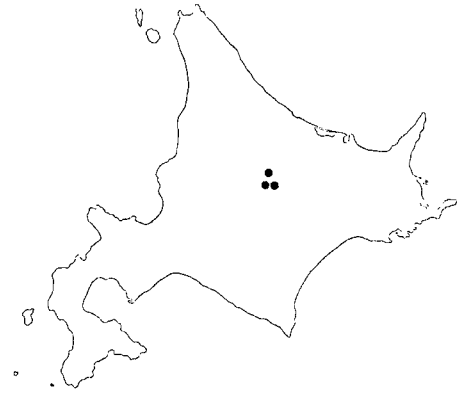
211. *Juncus beringensis* Buchen.



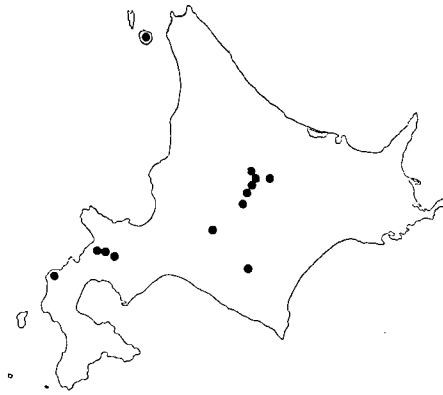
214. *Juncus kamtschatscensis* Kudo



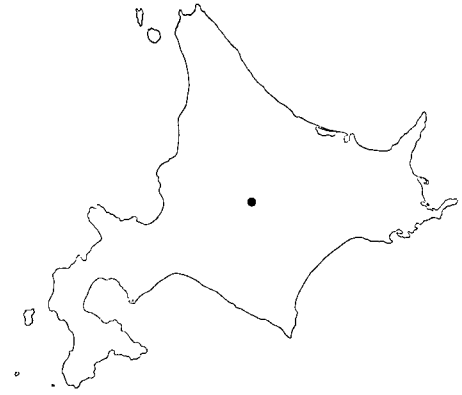
212. *Juncus fauriensis* Buchen.



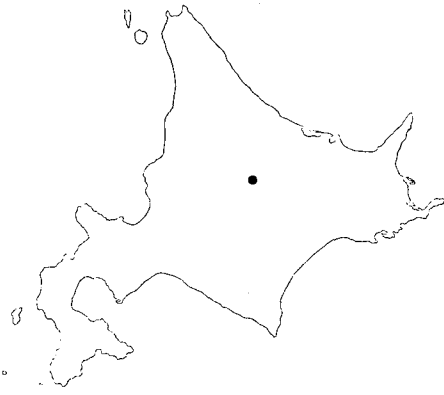
215. *Juncus mertensianus* Bong.



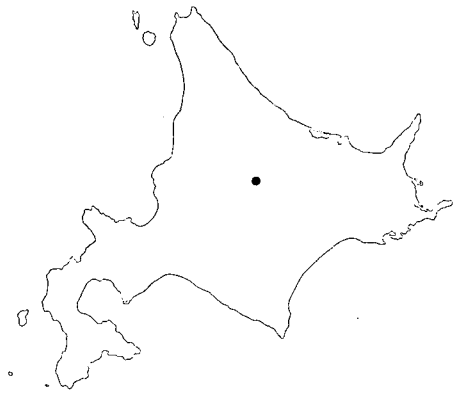
213. *Juncus filiformis* Linn.



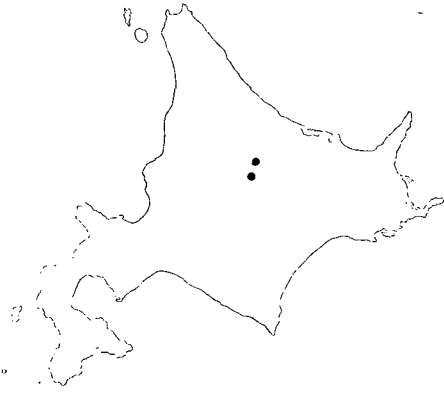
216. *Juncus potaninii* Buchen.



217. *Juncus triceps* Rostk.



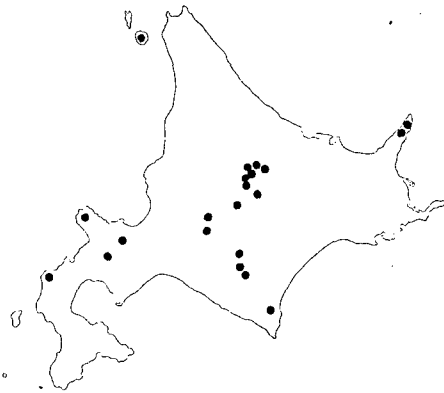
220. *Luzula parviflora* Desv.



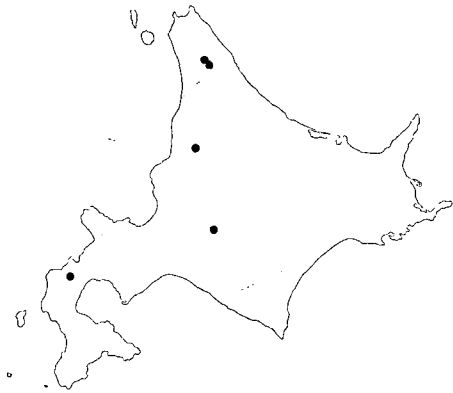
218. *Juncus triglumis* Linn.



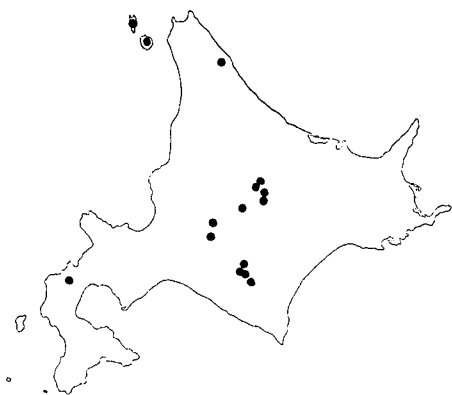
221. *Luzula wahlenbergii* Rupr.



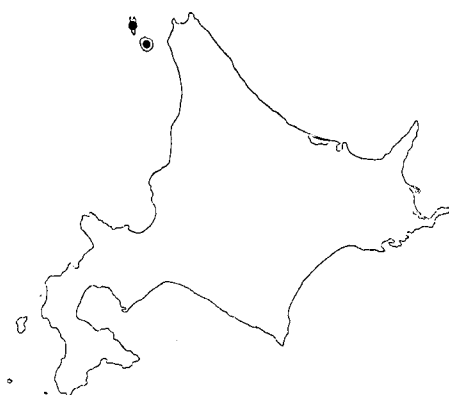
219. *Luzula oligantha* G. Sam.



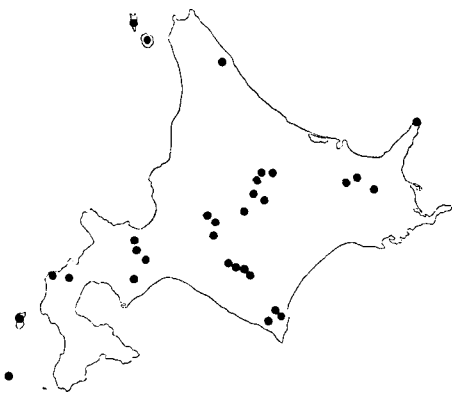
222. *Allium maximowiczii* Regel



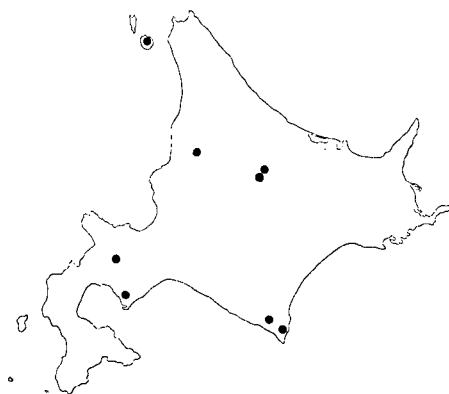
223. *Lloydia serotina* Reichenb.



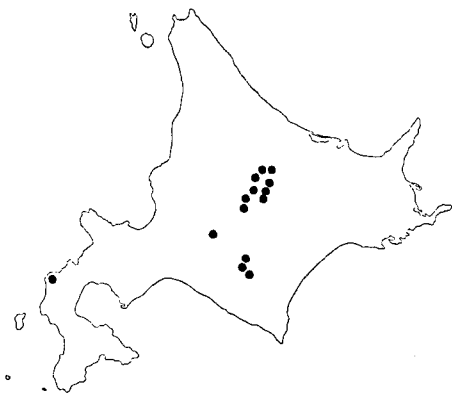
226. *Zygadenus sibiricus* A. Gray



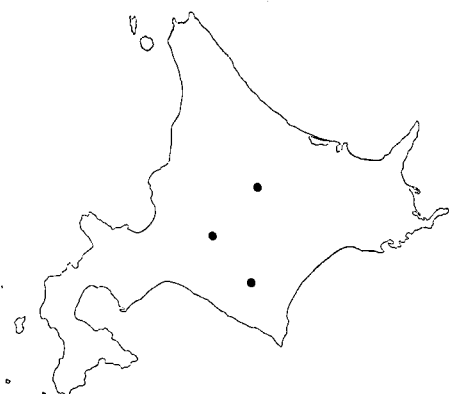
224. *Tofieldia coccinea* Richards.



227. *Platanthera chorisiana* Reichb. fil.



225. *Tofieldia okuboi* Makino



228. *Platanthera hyperborea* Lindl.