Supplementary material (Appendix 1) to the article:


Herbarium vouchers:

2n=40: pages 2–15;
2n=60: pages 16–18;
2n=80: pages 19–42.
Dactylorhiza fuchsii (Druce) Soó

Murmansk Region, Pechenga District, Pechenga, a kind of
park in the city, meadow-like vegetation with sparse birches, N
66°33', E 31°14'

Collected by: P.G. Efimov, G.Yu. Konechnaya and M.B.
Shtudyakova 5.7.2021

(K) plant no. 45

Karyological voucher. 2n=40

Estimated by E.O. Punina by eye after samples of dividing cells
from root meristem.

**Dactylorhiza fuchsii (Drue) Soó**

Murmansk Region, Zaozersk District, ca 12 km W from Zaozersk, meadow places in birch-pine forest along the trail, N 66°41’ E 32°10’

Collected by P.G. El'minov, G.Yu. Konechnaya and M.B. Shelud'ko 5.7.2021

Plant no. 48

Karyological voucher. 2n=40

Estimated by E.O. Punina by eye after samples of dividing cells from root meristem.


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**Dactylorhiza fuchsii (Drue) Soó**

Murmansk Region, Zaozersk District, ca 12 km W from Zaozersk, meadow places in birch-pine forest along the trail, N 66°41’ E 32°10’

Collected by P.G. El'minov, G.Yu. Konechnaya and M.B. Shelud'ko 5.7.2021

Plant no. 37

Karyological voucher. 2n=40

Estimated by E.O. Punina by eye after samples of dividing cells from root meristem.

Dactylorhiza fuchsii (Drude) Soó

Murmansk Region, Zaozero District, ca. 12 km W from Zaozero, mire places in birch-pine forest along the trail, N 69°41', E 32°10'.
Collected by: P. G. Efimov, G. Yu. Konechnaya and M. B. Shevudyakova 5.7.2021

Karyological voucher: 2n = 40

Karyological voucher: 2n = 40

**Dactylorhiza fuchsii (Drude) Soó**

Murmansk Region, Kola District, slope of the Kola Bay between Mshukovo and Belokamenka, birch woodland on the rocky slope, N 69°07', E 33°06'.

Collected by P.G. Efimov, G.Yu. Konechnaya and M.B. Sheleudyakova 5/7/2021

Plant no. 72

Karyological voucher. 2n=40

Estimated by E.O. Puzina by eye after samples of dividing cells from root meristem.

Dactyloctenium fuchsii (Druce) Soó

Murmansk Region, Pechenga District, 5-10 km NNE from Staraya Tlivoska village, on the road to Tredny Peninsula, wet roadside. N 69°31'; E 31°57'

Collected by: P.G. Efimov, G.Yu. Konechnaya and M.B. Shevudyakova 1.7.2021

Plant no. 3

Karyological voucher. 2n=40

Estimated by E.O. Punina by eye after samples of dividing cells from root meristem.


Dactyloctenium fuchsii (Druce) Soó

Murmansk Region, Pechenga District, 5-10 km NNE from Staraya Tlivoska village, on the road to Tredny Peninsula, wet roadside. N 69°31'; E 31°57'

Collected by: P.G. Efimov, G.Yu. Konechnaya and M.B. Shevudyakova 1.7.2021

Plant no. 3

Karyological voucher. 2n=40

Estimated by E.O. Punina by eye after samples of dividing cells from root meristem.

Herbarium of the Komarov Botanical Institute (L).

Dactylorhiza fuchsii (Druece) Soó

Murmansk Region, Pechenga District, a pass on the road from Staraya Titovka village to Sredniy Peninsula, moist place on the roadside, N 69°35'E 31°58'

Collected by: P.G. Efimov, G.Yu. Kornechnaya and M.B. Sheludyakova 1.7.2021

Karyological voucher. 2n=40

Estimated by E.O. Purina by eye after samples of dividing cells from root meristem.

Herbarium LE

LE 91239433
Dactylorhiza fuchsii (Druce) Soó

Murmansk Region, Pechenga District, a pass on the road from Storaya Iluava village to Snegyly Peninsula, moist place on roadside, N 69°35', E 31°58'.

Collected by P.G. Efimov, G.Yu. Kornechukaya and M.B. Shevudyakova 1.7.2021

Plant no. 34

Karyological voucher. 2n=40

Estimated by E.O. Purina by eye after samples of dividing cells from root meristem.

Dactylorhiza fuchsii (Druce) Soó

Murmansk Region, Pechenga District, a pass on the road from Staraya Tolvka village to Sedivy Peninsula, mossy place on the roadside, N 69°35', E 31°58'


Plant no. 39

Karyological voucher. 2n=40

Estimated by E.O. Purina by eye after samples of dividing cells from root meristem.
**HERBARIUM OF THE KOMAROV BOTANICAL INSTITUTE (LE)**

**Dactylorhiza fuchsii (Druce) Soó**

Murmansk Region, Pechenga District, Sredny Peninsula, the former settlement Murmansk (Zherekiyanka), just W from the mouth of the Vyatka river, old quarry, moist community at the bottom, N 60°45' E 31°56'


Plant no. 17

Karyological voucher. 2n=40

Estimated by E.O. Punina by eye after samples of dividing cells from root meristem.


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**HERBARIUM OF THE KOMAROV BOTANICAL INSTITUTE (LE)**

**Dactylorhiza fuchsii (Druce) Soó**

Murmansk Region, Pechenga District, Sredny Peninsula, the former settlement Murmansk (Zherekiyanka), just W from the mouth of the Vyatka river, old quarry, moist community at the bottom, N 60°45' E 31°56'


Plant no. 13

Karyological voucher. 2n=40

Estimated by E.O. Punina by eye after samples of dividing cells from root meristem.

Dactylonhiza fuchsi (Druce) Soó

Murmansk Region, Pechenga District, ca. 2.5 km ESE from Sputnik village, near the military shooting range, roadside of the highway, N 69°30', E 31°23'.


Karyological voucher: 2n=40

Estimated by E.O. Punina by eye after samples of dividing cells from root meristem.

Dactylorhiza fuchsii (Druece) Soó

Murmansk Region, Pechenga District, slope of the Pechenga Bay between Trilinnovoi and Pechenga on the road to Likhobramti, birch woodland on the rocky slope, N 69°35′32″, E 31°14′35″

Collected by: P.G. Efimov, G.Yu. Konechnaya and M.B. Shenyukhova 5.7.2021

Karyological voucher. 2n=40

Estimated by E.O. Purnina by eye after samples of dividing cells from root meristem.

Dactylorhiza fuchsii (Druce) Soó

Murmansk Region, Pechenga District, Pechenga, a kind of park in the city, meadow-like vegetation with sparse birches. N 68°37', E 31°14'


Plant no. 26

Karyological voucher. 2n=40

Estimated by E.O. Punina by eye after samples of dividing cells from root meristem.

Daetylorhiza fuchsi (Druce) Soó ×
D. maculata / D. psychrophila

Determ. Efimov P.G.

Herbarium of the Komarov Botanical Institute (LE)

2023
Dactylorhiza fuchsii (Druce) Soó ×
D. maculata / D. psychrophila

Determ. Efimov P.G.
Herbarium of the Komarov Botanical Institute (LE)

2023

Dactylorhiza maculata (L.) Soó

Мурманская область, Терский район, правый берег реки Умба в нижнем течении, пересохшее сообщество на границе с водой

N. 66.895168° E. 34.279221° (WGS-84) 30 м н. ур. моря

Murmansk Region, Tersky District, the right bank of the Umba River in the lower flow, the heath community on the border with water

12.07.2017 Coll.: Коннин Е.И., Боровачев Е.А.
Det.: Коннин Е.И., Боровачев Е.А.

HERBARIUM OF THE KOMAROV BOTANICAL INSTITUTE (LE)

Dactylorhiza fuchsii (Druce) Soó ×
D. psychrophila (Schlr.) Aver.

Determination by P.G. Efimov, 2023

Karyological voucher. Plant no. 1-5, 2n=60

Estimated by D.A. Kirienko by eye after samples of dividing cells from root meristems.
Dactylorhiza maculata (L.) Soó

Мурманская область. Кировский район, Памятник природы регионального значения "Энтрофное болото южного Прихибинья". Южное подножие Хибинских гор, к юго-востоку от горы Льсяна. Долина ручья, ключевое болото.

Осьяново (Carex chordorrhiza, C. pauciflora, C. rostrata-morozkovkovo (Rabues chamaemorus) сфагновое болото с Pinus sylvestris

N 67°54'57" E 33°79'876" (WGS-84) 254 м н. ур. моря

Murmansk Region, Kirovsk District, the protected area of regional importance "Eutrophic mire of southern Prihishina". The southern foothills of the Khibiny Mountains, to the southeast of Mountain Lyudya. The valley of the stream, the spring fen with dominance of sedges (Carex chordorrhiza, C. pauciflora, C. rostrata) - cloudberry (Rabues chamaemorus), Shagya and with Pinus sylvestris

15.07.2017 Col.: Колпец Е.И., Боровичев Е.А.
Det.: Колпец Е.И., Боровичев Е.А.
**Dactylophiza maculata (L.) Soó**

*Murman Region, Apatity District, environs of Apatity, the sloping mire in the valley of unnamed river between the Nivastrovskoe Lake and the Tik-Guba bay of Imandra Lake. Open pine forest with *Moreyana* trifoliata, sedges and sphaignum mosses.

N: 67.53937° E: 33.516935° (WGS-84)

Karyological voucher. Plant no. 4-1. 2n=80

*Herbarium of the Komarov Botanical Institute (LE)*

Dactylophiza psycrophila (Schild) Aver.

*Determin. P.G. Efimov, 2023*

*Herbarium of the Komarov Botanical Institute (LE)*

Dactylophiza psycrophila (Schild) Aver.

*Determin. P.G. Efimov, 2023*

*Herbarium of the Komarov Botanical Institute (LE)*

*Plants: Khoromsky by eye after samples of dividing cells from root meristem.*

*To be published in Efimov et al. 2023. Bot. Pacifica (submit).*
Dactylorhiza maculata (L.) Soó
OR D. pseudocyrtostegia (Schn.) Aver.

Determination by P.G. Efimov, 2023

Karyological voucher. Plant no. 4-1. 2n=80
Estimated by D.A. Tsvankin by eye after samples of dividing cells from root meristem.
Dactylorhiza maculata (L.) Soó

OR D. psychrophila (Schltr.) Aver.

Determ. Efimov P.G. 2023
Herbarium of the Komarov Botanical Institute (LE)

Murmansk Region, Monchegorsk District, the protected area of regional importance "Ekostrovskoe kintishiche", dirt road through sedge-sphagnum bog

N: 67.636025° E:32.760189° (WGS-84)
**Dactylorhiza maculata** (L.) Soó

**Dactylorhiza psychrophila** (Schlr.) Aver.

**Determination by P.G. Efimov, 2023**

**Karyological voucher. Plant no. 63. 2n=80**

Estimated by D.A. Kirienko by eye after samples of dividing cells from root meristem.


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**Poljarno-Alpskij Botanicheskij Sady-Instytut Im. N.A. Avrora Kolskogo NPI (PABG)**

**Dactylorhiza maculata** (L.) Soó

Murmansk Region, Monchegorsk District, the protected area of regional importance “Ekstrovskoe klintischë”, trail through the boggy horsetail-sphagnum pine forest

**Coll.:** Borovichen E.A.
**Det.:** Borovichen E.A.

**24.07.2017**

**Dactylorhiza maculata** (L.) Soó
OR **D. psychrophila** (Schlr.) Aver.

**Determ.** Efimov P.G. 2023

Herbarium of the Komarov Botanical Institute (LE)
**Herbarium LE**

**Docyniorhiza psychrophila (Schlr.) Aver.**

**Herbarium LE**

**Dactylorhiza maculata (L.) Soó**

**OR D. psychrophila (Schlr.) Aver.**

Determ. Efimov P.G.
Herbarium of the Komarov Botanical Institute (LE)

**Karyological voucher. Plant no. 6-4. 2n=40**

Estimated by D.A. Kivenko by eye after samples of dividing cell from root meristem.


**MURMANSK REGION, MONCHEGORSK DISTRICT, PROTECTED AREA OF REGIONAL IMPORTANCE “EKOSTROVSKOE KINTISHEHE”, TRAIL THROUGH THE BOGGY HORESETAL-SPHAGNUM PINE FOREST**

**Coll.: Borynovich E.A.**

**Det.: Borynovich E.A.**

24.07.2017
Dactylorhiza maculata (L.) Soó

Murmansk Region, Kirovsk district, the planned protected area of regional importance ("Limestone Plant", a former lime plant in the 1940s). Quarry with almost vertical walls and reproduction of Betula subarctica. Moist community with Dactylorhiza maculata at the bottom of the quarry.

02.08.2017
Coll.: Конина Е.И.
Det.: Конина Е.И.
Dactylorhiza maculata (L.) Soó
OR D. psychrophila (Schltr.) Aver.

Determ. Efimov P.G. 2023
Herbarium of the Komarov Botanical Institute (LE)

Murmansk Region, Apatity District, environs of Apatity, the sloping mire in the valley of unnamed river between the Nivastronovskoe Lake and the Tik-Guba bay of Imandra Lake. Sedge (Carex lasiocarpa, C. dioica, C. cespitosa) bog with Pinus sylvestris

N: 67.546646° E: 33.494366° (WGS-84)

11.08.2017
Cell.: Химич Ю.Р.
Det.: Разумовская А.В., Ковалева Е.И.
Dactylorhiza maculata (L.) Soó
OR D. psychrophila (Schlr.) Aver.

det. Efimov P.G.
Herbarium of the Komarov Botanical Institute (L)

Мурманский область, Апатитский район, левый берег р. Умба, за лесом под п. Шучьего. Мезо-олиготрофное осоко-кустарничковое сфагновое болото с сосной.

N: 67.470819° E: 34.262115° (WGS-84)

Murmansk Region, Apatity District, left bank of the Umbe river, nearby the lake Schuchye. Meso-oligotrophic bog with *Pinus sylvestris*

15.08.2017
Coll.: Рыжковская А.В.
Det.: Рыжковская А.В.
Dactylorhiza maculata (L.) Soó
OR D. psychrophila (Schltr.) Aver.

Determ. Efimov P.G. 2023
Herbarium of the Komarov Botanical Institute (LE)
Dactylorhiza maculata (L.) Soó
OR D. psychrophila (Schltr.) Aver.

Determ. Efimov P. G. 2023
Herbarium of the Komarov Botanical Institute (LE)

Karyological voucher. Plant no. 11-2, 2n=80

Estimated by D.A. Kvenko by eye after samples of dividing cells from root meristem.

Dactylorhiza maculata (L.) Soó

Murmannsk region, Kirovsk District, moraine of Kukivumcher mountain, moist herbs-dominated community on the south-western slope

16.08.2017 Col.: Копенна Е.И.
Det.: Копенна Е.И.
Dactylorhiza psychrophila (Schlr.) Aver.

Determination by P.G. Efimov, 2023

Karyological voucher. Plant no. 11-6, 2n=80

Estimated by D.A. Krivenko by eye after samples of dividing cells from root meristem.

Dactylorhiza psychrophila (Schlfr.) Aver.

Determination by P.G. Efimov, 2023

Karyological voucher. Plant no. 775. 2n=80

Estimated by D.A. Kivenko by eye after samples of dividing cells from root meristem.

Dactylorhiza maculata (L.) Soó
OR D. psychrophila (Schlfr.) Aver.

Determ. Efimov P.G.
Herbarium of the Komarov Botanical Institute (LE) 2023

Murmansk Region, Kirovsk District, moraine of Kuksivumchor mountain, moist herbs-dominated community on the south-western slope

16.08.2017 Coll.: Koschina E.I.
Det.: Koschina E.I.
Dactylorhiza psychrophila (Schlt.) Aver.

Murmansk Region, Zaozerka District, ca 12 km W from Zaozerka, mires in birch-pine forest along the trail, N 66°41', E 33°10'.


Karyological voucher: 2n=80

Estimated by E.O. Punina by eye after samples of dividing cells from root meristems.


Herbarium LE 01229463
Dactylorhiza maculata (L.) Soó
OR D. psychrophila (Schltr.) Aver.

Detm. Efimov P.G.

Herbarium of the Komarov Botanical Institute (LE)

Dactylorhiza psychrophila (Schltr.) Aver.

Murmansk Region, Pechenga District, Sredny Peninsula, Malaya Volokovaya Bay, coast of small lake in tundra, wet meadow with Salix shrubs, N 69.70073°, E 31.787168°
Collected by: A.V. Razumovskaya 30.7.2018  Plant no. p1

Karyological voucher. 2n=80
Estimated by D.A. Kvenken by eye offer samples of dividing cells from root meristem.

Dactylorhiza psychrophila (Schltr.) Aver.

Murmansk Region, Pechenga District, Sredny Peninsula, Malaya Volokovaya Bay, coast of small lake in tundra, wet meadow with Salix shrubs, N 69.70073°, E 31.787168°
Collected by: A.V. Razumovskaya 30.7.2018  Plant no. p3

Karyological voucher. 2n=80
Estimated by D.A. Kvenken by eye offer samples of dividing cells from root meristem.
Dactylorhiza psychrophila (Schlthr.) Aver.

Murmansk Region, Severomorsky District, near Tersibki village, Lodeynaya Bay, sea terrace, disturbed meadow along the road and wet tundra under the rocks, N 69°16', E 35°12'

Collected by: A.V. Razumovskaya 22.7.2018

Karyological voucher. 2m=80

Estimated by D.A. Klivenko by eye after samples of dividing cells from root meristem.


Dactylorhiza maculata (L.) Soó

OR D. psychrophila (Schlthr.) Aver.

Dterm. Efimov P.G.
Herbarium of the Komarov Botanical Institute (LE)

2023

HERBARIUM OF THE KOMAROV BOTANICAL INSTITUTE (LE)

Dactylorhiza psychrophila (Schlthr.) Aver.

Murmansk Region, Severomorsky District, near Tersibki village, Lodeynaya Bay, sea terrace, disturbed meadow along the road and wet tundra under the rocks, N 69°16', E 35°12'

Collected by: A.V. Razumovskaya 22.7.2018

Karyological voucher. 2m=80

Estimated by D.A. Klivenko by eye after samples of dividing cells from root meristem.

Dacryorhiza psycrophila (Schlr.) Aver.

Murmasn Regio, Kandahakha District, Miskev Island, edge of the buggy pine forest, N 66.704102', E 33.005360'.

Collected by: E.A. Barovichov 7-7-2019

Plant no. 03

Kayological voucher: 2n=80

Estimated by D.A. Kirienko by eye after samples of dividing cells from root meristem.

Dacryorhiza maculata (L.) Soo

OR D. psycrophila (Schlr.) Aver.

Determin. Efimov P.G. 2023

Herbarium of the Komarov Botanical Institute (LE)
Dactylorhiza psychrophila (Schlfr.) Aver.

Murmansk Region, Lovozero District, NW and W slopes of Matyl Punktavuy, sparse b.Qhitch woodland, N 67.73°, E 35.03°

Karyological voucher. 2n=80

Estimated by D.A. Klenenko by eye after samples of dividing cells from root meristem.

Dactylorhiza maculata (L.) Soó
OR D. psychrophila (Schlfr.) Aver.

Determ. Efimov P.G.
2023
Herbarium of the Komarov Botanical Institute (LE)
Dactylorhiza maculata (L.) Soó
OR D. psychrophila (Schlr.) Aver.

Determ. Efimov P.G.
2023
Herbarium of the Komarov Botanical Institute (LE)