

**Zeitschrift:** Veröffentlichungen des Geobotanischen Institutes der Eidg. Tech. Hochschule, Stiftung Rübel, in Zürich

**Herausgeber:** Geobotanisches Institut, Stiftung Rübel (Zürich)

**Band:** 130 (2002)

**Artikel:** Alpine vegetation of the Teberda Reserve, the northwestern Caucasus = Die Alpine Vegetation des Teberda Reservates, Nordwest-Kaukasus

**Autor:** Onipchenko, V.G.

**Bibliographie**

**DOI:** <https://doi.org/10.5169/seals-308994>

### **Nutzungsbedingungen**

Die ETH-Bibliothek ist die Anbieterin der digitalisierten Zeitschriften auf E-Periodica. Sie besitzt keine Urheberrechte an den Zeitschriften und ist nicht verantwortlich für deren Inhalte. Die Rechte liegen in der Regel bei den Herausgebern beziehungsweise den externen Rechteinhabern. Das Veröffentlichen von Bildern in Print- und Online-Publikationen sowie auf Social Media-Kanälen oder Webseiten ist nur mit vorheriger Genehmigung der Rechteinhaber erlaubt. [Mehr erfahren](#)

### **Conditions d'utilisation**

L'ETH Library est le fournisseur des revues numérisées. Elle ne détient aucun droit d'auteur sur les revues et n'est pas responsable de leur contenu. En règle générale, les droits sont détenus par les éditeurs ou les détenteurs de droits externes. La reproduction d'images dans des publications imprimées ou en ligne ainsi que sur des canaux de médias sociaux ou des sites web n'est autorisée qu'avec l'accord préalable des détenteurs des droits. [En savoir plus](#)

### **Terms of use**

The ETH Library is the provider of the digitised journals. It does not own any copyrights to the journals and is not responsible for their content. The rights usually lie with the publishers or the external rights holders. Publishing images in print and online publications, as well as on social media channels or websites, is only permitted with the prior consent of the rights holders. [Find out more](#)

**Download PDF:** 26.03.2026

**ETH-Bibliothek Zürich, E-Periodica, <https://www.e-periodica.ch>**

## REFERENCES

- AKATOV V.V., 1989: On syntaxonomy of high mountain fens and wet meadows of the West Caucasus. VINITI (Manuscript n\_ N 7472-B89), Moskva. 29 p. (in Russ.).
- AKATOV V.V., 1991: Structure and dynamics of acidotrophic lake vegetation in the Western Caucasus. Byull. Mosk. o-va ispyt. prir. otd. biol., 96(3), 82-87 (In Russ.).
- ALEKSEEVA E.P. 1992: Archaeological monuments in Karachaevo-Cherkessia. Nauka, Moscow. 216 p. (In Russ.).
- ANTIPOV-KARATAEV I.N., ANTIPOV-KARATAEV T.F. & SIMAKOVA L.T., 1936: Mountain-Forest and Mountain-Meadow soils of the Teberda district of the northern Caucasus. Proceedings of the Dokuchaev Soil Institute. Izd-vo AN SSSR, Moscow-Leningrad, 13, 367-398 (In Russ.).
- ARCHIBOLD O.W., 1995: Ecology of World vegetation. Chapman and Hall, L. e. a., 280-318.
- BEDOSHVILI D.O., 1988a: Classification of alpine grasslands in Trusoi and Dar'yal subdistricts (Kazbegi district) with use of groups of correlated species. Vestnik Gruzinskogo Bot. obshchestva, 8, 91-101 (IRuss.).
- BEDOSHVILI D.O., 1988b: Classification of alpine grasslands of the Lagodekh State Reserve. Botanicheskiy Zhurnal, 73(10), 1438-1446.
- BLINNIKOV M.S., 1994: Phytolith analysis and Holocene dynamics of alpine vegetation. Veröffentlichungen des Geobotanischen Institutes der ETH, Stiftung Rübel, Zürich, 115, 23-40.
- BLISS L.C., 1985: Alpine. In: CHABOT B.F. & MOONEY H.A. (eds.), Physiological ecology of North American plant communities. Chapman and Hall, N.Y. et L., 41-65.
- BORLAKOV K.H.U. & SABLINA B.P. 1985: *Rhododendron* shrubs of the North-Western Caucasus. In. POLIVANOVA N.N. (ed.), Ecological investigations on the Northwestern Caucasus. [Ekologicheskie issledivaniya na severo-zapadnom Kavkaze] .Moscow, 165-175 (In Russ.).
- BOUMA J., HOEKS J., PLAS VAN DER L. & SCHERRENBURG VAN B., 1969: Genesis and morphology of some Alpine Podzol Profiles. Journal of soil science, 20, 384-398.
- BOUMA J. AND PLAS VAN DER L., 1971: Genesis and morphology of some Alpine Pseudogley Profiles. Journal of soil science, 22, 81-93.

- BRAUN-BLANQUET J., 1921: Prinzipien einer Systematik der Pflanzengesellschaften auf floristischer Grundlage. Jahrb. St. Gallischen Naturwiss. Ges. St. Gallen, 57(2), 305-351.
- BRAUN-BLANQUET J., 1975: Die Schneebodengesellschaften (Klasse der Salicetea herbaceae). Fragmenta Phytosociologica Raetica 1. Chur, Bd. 195/196, 42-71.
- BUSH N.A., 1935: Plant geographical essay of the Caucasus. Izd-vo AN USSR, Moscow, Leningrad. 107 p. (In Russ.).
- BUSLIK V.A., 1990: Ecological and floristic classification of subalpine meadows in the Baksan valley. Trans. High Mountain Geophys. Inst., 79, 116-142 (in Russ.).
- COSTIN A.B., 1955: Alpine soils in Australia with reference to conditions in Europe and New Zealand. Journal of soil science, 6(1), 35-50.
- COSTIN A.B., HALLSWORTH E.G. & WOOD M., 1952: Studies in pedogenesis in New South Wales. III. The Alpine Humus Soils. Journal of Soil Science, 3(2), 190-218.
- CEREPANOV S.K. 1995: Vascular plants of Russia and adjacent states (the former USSR). Cambridge Univ. Press, Cambridge. 516 p.
- DAVIS P.H. (ed.) 1965-1980: Flora of Turkey and the East Aegean Islands, 1-10. Edinburgh Univ.Press, Edinburgh.
- DIERSSEN K., 1982: Die wichtigsten Pflanzengesellschaften der Moore NW-Europas. Conservatoire et Jardin botanique, Geneve. 382 p.
- DIERSSEN K., 1984: Vergleichende vegetationskundliche Untersuchungen an Schneeböden. Ber. Deutsch Bot. Ges., 97, 359-382.
- DINESMAN L.G. (ed.) 1992: Historical ecology of wild and domestic ungulates: History of pasture ecosystems. Nauka, Moskva. (in Russian).
- ELLENBERG H., 1988: Vegetation ecology of Central Europe. 4 ed. Cambridge Univ. Press, Cambridge e.a. 731 p.
- ELLMAUER TH., 1993: Calluno-Ulicetea. In: MUCINA L. *et al.* (eds.), Die Pflanzengesellschaften Österreichs, Teil 1. Gustav Fischer, Jena e.a., 402-419.
- ENGLISCH T., 1993: Salicetea herbaceae. In: MUCINA L. & GRABHERR G. (eds.), Die Pflanzengesellschaften Österreichs, Teil 2. Gustav Fischer, Jena e.a., 382-401.
- ENGLISCH T., VALACHOVICH M., MUCINA L., GRABHERR G. & ELLMAUER T., 1993: Thlaspietea rotundifolii. In: MUCINA L. & GRABHERR G. (eds.), Die Pflanzengesellschaften Österreichs, Teil 2. Gustav Fischer, Jena e.a., 276-342.

- FOMIN S.V., ONIPCHENKO V.G. & SENNOV A.V., 1989: Feeding and digging activities of the pine vole (*Pitymys majori* Thos.) in alpine coenoses of the Northwestern Caucasus. *Byull. Mosk. o-va ispyt. priir. otd. biol.*, 94(3), 6-13. (In Russ.).
- Gadzhiev V.D., Evstratova O.I. & Efendiev P.M., 1986: *Rhododendron* shrubs in high mountain zone of the Great Caucasus (Azerbaijan). In: Plant cover of high mountains [Rastitel'nyy pokrov vysokogoriy] . Nauka, Leningrad, 103-113.
- GALUSHKO A.I., 1978-1980: Flora of the North Caucasus. *Izd-vo Rostov Univ.*, Rostov-na-Donu, 1-3. (In Russ.).
- GRABHERR G., 1989: On community structure in high alpine grasslands. *Vegetatio*, 83, 223-227.
- GRABHERR G., 1993a: *Carici rupestris-Kobresietea bellardii*. In: GRABHERR G. & MUCINA L. (eds.), *Die Pflanzengesellschaften Österreichs.*, Teil 2. Gustav Fischer, Jena e.a, 373-381.
- GRABHERR G., 1993b: *Caricetea curvulae*. In: GRABHERR G. & MUCINA L. (eds.), *Die Pflanzengesellschaften Österreichs*, Teil 2. Gustav Fischer, Jena e.a., 343-372.
- GRABHERR G., 1993c: *Loiseleurio-Vaccinietea*. In: GRABHERR G. & MUCINA L. (eds.), *Die Pflanzengesellschaften Österreichs*, Teil 2. Gustav Fischer, Jena e.a., 447-467.
- GRACANIN Z., 1972: Die Böden der Alpen. In: GANSEN R. & GRACANIN Z. (eds.), *Bodengeographie mit besonderer Berücksichtigung der Böden Mitteleuropas*. Koehler, Stuttgart, 172-191.
- GRISHINA L.A., ONIPCHENKO V.G., MAKAROV M.I. *et al.*, 1986: Composition and structure of alpine heath biogeocoenosis [Sostav i struktura biogeocenofov alpijskih pustoshei] . Moscow Univ.Press, Moscow. 88 p. (In Russ.).
- GRISHINA L.A., ONIPCHENKO V.G., MAKAROV M.I. & VANYASIN V.A., 1993: Changes in properties of Mountain-Meadow alpine soils of the Northwestern Caucasus under different ecological conditions. *Eurasian Soil Science*, 25(9), 1-12.
- GROSSGEIM A.A., 1948: Plant cover of the Caucasus. *MOIP*, Moscow, new serie, 4(12). 268 p.
- GROSSGEIM A.A., 1949: Keybook for the Caucasian plants [Opredelitel rasteniy Kavkaza]. *Sovetskaya nauka*, Moscow. 747 p.
- GULISASHVILI V.Z., MAKHATADZE L.B., PRILIPKO L.I., 1975: Vegetation of the Caucasus. *Nauka*, Moscow. 234 p. (In Russ.).

- HEISELMAYER P., 1982: Die Pflansengesellschaften des Tappenkars (Radstadter Tauern). *Stapfia*, 10, 161-202.
- IGNATOV M.S. & AFONINA O.M., 1992: Check-list of mosses from the former USSR. *Arctoa*, 1(1-2), 1-85.
- IGNATOVA E.A., VANA J. & VOROB'eva F.M.: 1990: Bryoflora of the Teberda Reserve. *Transactions of Teberda State Reserve [Trudy Teberdinskogo Gos. Zapovednika.]*. Stavropol, 12, - 40. (In Russ.).
- ISDA M. 1985: Die Vegetation der Schlossalm bei Bad Hofgastein (Salzburg). *Veröff. Österr. Mass-Programms. Österr. Akad. Wiss.*, 9, 175-199.
- IVANOV A.L., 1988: Floristic composition of *Rhododendron caucasicum* communities. *VINITI (Deponir. rukopis N 6439-B88)*, Moscow. 25 p.(In Russ.).
- JOHNSON D.D. & CLINE A.J., 1965: Colorado mountain soils. *Advances in agronomy. Acad. Press, New York and London*, 17, 233-281.
- JULVE PH., 1993: Synopsis phytosociologique de la France (communautes de plantes vasculaires). *Lejeunia*, 140, 1-160.
- KARNER P. & MUCINA L., 1993: Mulgedio-Aconitetea. In: GRABHERR G. & MUCINA L. (eds.), *Die Pflanzengesellschaften Österreichs, Teil 2*. Gustav Fischer, Jena e.a., 468-505.
- KEDDY P.A., 1989: *Competition*. Chapman and Hall, London. 198 p.
- KEDDY P.A., 1990: Competitive hierarchies and centrifugal organisation in plant communities. In: GRACE J.B. & TILMAN D. (eds.). *Perspectives on plant competition*. Academic Press, San Diego e.a., 265-290.
- KIMERIDZE K.R., 1963: On study of one of the alpine sedge fen in the Great Caucasus. *Soobtscheniya AN GSSR, Tbilisi*, 30(3), 311-318 (In Georg.).
- KIMERIDZE K.R., 1985: Alpine grasslands in the Inguri and Tskhenistskali areas. In: *Flora and vegetation of Svaneti [Flora i rastitelnost Svanetii]*. Metsniereba, Tbilisi, 220-239 (In Georg.).
- KIMERIDZE K.R. & MARDALESHVILI T.K., 1980: On study of one alpine Geranium-grassland in the Great Caucasus. *Vestnik Gos. Muzeya Gruzii. Tbilisi*, 30A, 43-70 (In Georg.).
- KONONOV V.N., 1957: Vegetation of the Teberda Reserve. *Transactions of Teberda State Reserve [Trudy Teberdinskogo Gos. Zapovednika.]*. Stavropol, 1, 85-112 (In Russ.).
- KONSTANTINOVA N.A., POTEKIN A.D. & SHLYAKOV A.N. 1992: Check-list of liverworts and anthocerotae from the former USSR. *Arctoa*, 1(1-2), 87-127.

- KOROTKOV K.O., 1990: Some communities of high mountain springs of the Great Caucasus. *Biological Sciences [Biologicheskije Nauki]*, 2, 92-98. (In Russ.).
- KOROTKOV K.O. 1994. Great Caucasus high mountain vegetation survey. *Colloques Phytosociologiques*, 23, 519-530.
- KOSENKO I.S., 1970: Flora of vascular plants of the Northwestern Caucasus and Predkavkaze (handbook). Kolos, Moscow. 613 p. (In Russ.).
- KOVACH W.L., 1995: MVSP - A MultiVariate Statistical Package for IBM-PCs, ver. 2.2. Kovach Computing Services, Pentraeth, Wales, UK.
- KRAHULEC F., 1983: Zur Nomenklatur der höheren Einheiten der mitteleuropäischen Pflanzengesellschaften der Ordnung Nardetalia s.l.: Berichtigungen und Typisierungen. *Folia Geobotanica et Phytotaxonomica*, 18, 207-210.
- KRAHULEC F., 1988: Nomenclature remarks on the association names of *Nardus stricta*-rich communities in central Europe. *Folia Geobotanica et Phytotaxonomica*, 23, 173-179.
- KRAHULEC F. & MORAVEC J., 1995: Nardo-Callunetea. In: MORAVEC J. *et al.* (eds.), Red list of plant communities of the Czech Republic and their endangerment. 2nd ed. Severoceskou Přírodou, Litoměřice, 81-86.
- LEINSOO T.N., ONIPCHENKO V.G., LEINSOO T.A. & VELIKANOV L.L., 1991: Patterns of soil microfungi biomass in alpine communities of the Northwestern Caucasus. *Mikologia i Fitopatologia*, 25(3), 206-212 (In Russ.).
- LUKSCHANDERL L., 1983: *Rettet die Alpen*. ORAC, Pietsch, Wien. 218 p.
- MAKAROV M.I., MALYSHEVA T.I., HAUMAIER L., ALT H.G. & ZECH W., 1997: The forms of phosphorus in humic and fulvic acids of a toposequence of alpine soils in the northern Caucasus. *Geoderma*, 80(1), 61-73.
- MATUSZKIEWICZ W., 1981: *Przewodnik do oznaczenia zbiorowisk roslinnych Polski*. Warszawa. 298 p.
- Mikeladze R.M., 1960: On study of "alpine carpets" in Southern Oseti. *Problems of botany [Problemy botaniki]*, 5, 170-181 (In Russ.).
- MIRKIN B.M. & ROZENBERG G.S., 1978: *Phytocoenology: principles and methods*. Nauka, Moscow. 212 p. (in Russ.).
- MIRKIN B.M., SOLOMESHCH A.I., ISHBIRDIN A.R. & ALIMBEKOVA L.M., 1989: List and diagnostic criteria of the higher syntaxa of USSR's vegetation. Moscow. 46 p.
- MORAVEC J. *et al.*, 1983: *Rostlinna společenstva České socialistické republiky a jejich ohrožení*. Severoceskou přírodou, Litoměřice. 146 ..

- MOSER W., BRZOSKA W., ZACHHUBER K. & LARCHER W., 1977: Ergebnisse des IBP-Projekts "Hoher Nebellkogel 3184". Sitzungsberichte der Österr. Akademie der Wissenschaften, math.-naturwiss. Kl., Abt.1, 186(6-10), 387-419.
- MUCINA L., 1993a: *Asplenietea trichomanis*. In: GRABHERR G. & MUCINA L. (eds.) Die Pflanzengesellschaften Österreichs, Teil 2. Gustav Fischer, Jena e.a., 241-275.
- MUCINA L., 1993b: *Polygono-Poetea annuae*. In: MUCINA L. *et al.* (eds.) Die Pflanzengesellschaften Österreichs, Teil 1. Gustav Fischer, Jena e.a., 82-109.
- MUCINA L. 1997. Conspectus of classes of European vegetation. *Folia Geobotanica et Phytotaxonomica*, 32(2), 117-172.
- MUCINA L. *et al.* (eds.) 1993: Die Pflanzengesellschaften Österreichs, Teil 1-3. Gustav Fischer, Jena e.a.
- Müller M., 1987: Bodenbildung auf Silikatunterlage in der Alpen Stufe des Oberengadins (Zentralalpen, Schweiz). *Catena*, 14, 419-437.
- NAKHUTRISHVILI G.SH. & GAMTSENIDZE Z.G., 1984: Plant life in extremal high-mountain environment (the Central Caucasus). Nauka, Leningrad. 123 p.(In Russ.).
- NARINYAN S.G., 1962: Alpine "carpets" of the Caucasus as a specific type of vegetation. *Trudy Bot. Inst. AN ArmSSR. Erevan*, 13, 5-27 (In Russ.).
- NESTROY O., 1984: Aspekte der Bodenentwicklung unter Almen der Ostalpen. *Wien.geogr.Schr.*, 59-60, 67-72.
- OBERDORFER E. 1977: *Süddeutsche Pflanzengesellschaften*, 2 Aufl., Teil 1. Gustav Fischer: Jena, 311 p.
- OBERDORFER E. 1978: *Süddeutsche Pflanzengesellschaften*, 2 Aufl., Teil 2. Gustav Fischer: Jena. 355 p.
- OBERDORFER E. 1983: *Süddeutsche Pflanzengesellschaften*, 2 Aufl., Teil 3. Gustav Fischer: Jena. 455 p.
- OBERDORFER E. 1992: *Süddeutsche Pflanzengesellschaften*, 2 Aufl., Teil 4 Gustav Fischer, Jena. 282 p.
- ONIPCHENKO V.G., 1985: The structure, phytomass and production of alpine lichen heaths. *Byull. Mosk. o-va ispyt. priro. otd. biol.*, 90(1), 59-66. (In Russ.).
- ONIPCHENKO V.G., 1990: Phytomass of the alpine communities in the Northwestern Caucasus. *Byull. Mosk. o-va ispyt. priro. otd. biol.*, 95(6), 52-62 (In Russ.).

- ONIPCHENKO V.G., 1994: The spatial structure of the alpine lichen heaths: hypothesis and experiments. *Veröffentlichungen des Geobotanischen Institutes der ETH, Stiftung Rübel. Zürich*, 115, 100-111.
- ONIPCHENKO V.G., 1994: The structure and dynamics of alpine plant communities in the Teberda Reserve, the Northwestern Caucasus. *Oecologia Montana*, 3(1), 40-50.
- ONIPCHENKO V.G. & GOLIKOV K.A., 1996. Microscale revegetation of alpine lichen heath after wild boar digging: fifteen years of observation on permanent plots. *Oecologia Montana*, 5(1), 35-39.
- ONIPCHENKO V.G. & IGNATOVA E.A., 1996: New vascular plants and bryophytes for the flora of Teberda state reserve. *Byull. Mosk. o-va ispyt. prirodoznan. otd. biol.*, 101(5), 92-98 (In Russ.).
- ONIPCHENKO V.G., LUBEZNOVA N.V., POKARZHEVSKAYA G.A. & RABOTNOVA M.V., 1992: Syntaxonomy of alpine plant communities in the Teberda reserve. Class *Salicetea herbaceae* BRAUN-BLANQUET 1947. *VINITI (Deponir. rukopis N 2828-B92)*, Moscow. 20 p. (In Russ.).
- ONIPCHENKO V.G., MINAEVA T.Y. & RABOTNOVA M.V., 1987: On syntaxonomy of alpine plant communities of Teberda reserve. *VINITI (Deponir. rukopis N 1675-B87)*, Moscow. 33 p. (In Russ.).
- ONIPCHENKO V.G. & POKARZHEVSKAYA G.A., 1994: "Mass-effect" in alpine communities of the Northwestern Caucasus. *Veröffentlichungen des Geobotanischen Institutes der ETH, Stiftung Rübel. Zurich*, 115, 61-68.
- ONIPCHENKO V.G. & RABOTNOVA M.V., 1994: Natural "gaps" in alpine meadows and plant population strategies. *Veröffentlichungen des Geobotanischen Institutes der ETH, Stiftung Rübel. Zürich*, 115, 83-88.
- ONIPCHENKO V.G. & SEMENOVA G.V., 1988: Floristic richness of some alpine communities in the Northwestern Caucasus. *Vestnik Mosk. Univ., ser. 16 Biology*, 3, 42-45 (In Russ.).
- ONIPCHENKO V.G. & SEMENOVA G.V., 1995: Comparative analysis of the floristic richness of alpine communities in the Caucasus and the Central Alps. *Journal of Vegetation Science*, 6(2), 299-304.
- ONIPCHENKO V.G. & SENNOV A.V., 1992: Syntaxonomy of *Rhododendron caucasicum* - communities in the Teberda reserve (the Northwestern Caucasus). *Biol. nauki*, 4, 14-22 (In Russ.).
- ONIPCHENKO V.G., VERTELINA O.S. & MAKAROV M.I., 1998: Spatial heterogeneity high-altitude phytocoenoses and soil properties. *Eurasian Soil Science*, 31(6), 622-628.

- OVCHINNIKOV I.L. & ONIPCHENKO V.G., 1992: A new program "Syntaxon" for the table proceeding of relevés. Byull. Mosk. o-va ispyt. priro. otd. biol., 97(6), 52 (In Russ.).
- PAVLOVA I.V. & ONIPCHENKO V.G., 1992: Holocene dynamics of the Northwestern Caucasus alpine vegetation. In: DINESMAN L.G. (ed.), Historical ecology of wild and domestic ungulates: History of pasture ecosystems. [Istoricheskaja ekologija dikih i domashnih kopytnyh. Istorija pastbitznych ekosistem.] Nauka, Moscow, 109-122. (In Russ.).
- PEPPLER C., 1992: Die Borstgrasrasen (Nardetalia) Westdeutschlands. Dissertationes Botanicae 193. J.Cramer, Berlin, Stuttgart. 406 p.
- PIGNATTI W.E., PIGNATTI S. & TARTAGLINI N., 1990: Zur Gliederung des Rhododendro-Vaccinion in den Südlichen Ostalpen. Kazpr. Razr. naravosl. vede. SAZU, 31, 209-235.
- POLIVANOVA N.N., 1990: Teberda State Reserve. In: SOKOLOV V.E. & SYROECHKOVSKIY E.E. (eds.), Zapovedniki Kavkaza. Mysl', Moscow, 18-34 (In Russ.).
- POSCH A., 1977: Bodenkundliche Untersuchungen im Bereich der Glocknerstrasse in den Hohen Tauern (2300-2600 m MH). In: CERNUSCA A. (ed.), Alpine Grasheide Hohe Tauern. Ergebnisse der Ökosystemstudie. Innsbruck, 1, 111-121.
- POTT R., 1995: Die Pflanzengesellschaften Deutschlands. 2. überarb. Auflage. Eugen Ulmer, Stuttgart. 622 p.
- PYSEK P. & SRUTEK M., 1989: Numerical phytosociology of the subalpine belt of the Kazbegi region, Caucasus, USSR. Vegetatio, 81(1-2), 199-208.
- RABOTNOV T.A. (ed.), 1987: Biogeocoenoses of alpine heaths (NW Caucasus). Nauka, Moscow. 76 p. (In Russ.).
- RETZER J.L., 1956: Alpine soils of the Rocky Mountains. Journal of soil science, 7(1), 22-32.
- RETZER J.L., 1974: Alpine soils. In: IVES J.D. & BARRY R.G. (eds.), Arctic and alpine environments. Methuen and Co., London, 771-802.
- SANDRA V., POPESCU A. & PEICEA I., 1988. Les associations de la classe Salicetea herbaceae BRAUN-BLANQUET 47 des Carpates roumaines. Rev. roum. biol. S`er. biol.veg, 33(2), 93-102.
- SCHIBLER W., 1937: Flora von Davos. Verzeichnis der Gefässpflanzen der Landschaft Davos und der angrenzenden Gebiete. Bischofberger & Co, Chur. 216 p.

- SHIFFERS E.V., 1953: Vegetation of the North Caucasus and its natural pastures [Rastitel'nost Severnogo Kavkaza i ego prirodnye kormovye ugod ya] Izd-vo AN SSSR, Moscow-Leningrad. 400 p. (In Russ.).
- SEMAGINA P.N., 1992: On syntaxonomy of high-mountain grasslands of the Caucasian Biosphere Resrtve. VINITI (Deponir. rukopis N 2831-B92), Moscow. 29 p. (In Russ.).
- SEMENOVA G.V & ONIPCHENKO V.G., 1994: Soil seed banks. Veröffentlichungen des Geobotanischen Institutes der ETH, Stiftung Rübel. Zürich, 115, 69-82.
- SENNOV A.V. & ONIPCHENKO V.G., 1994: Experimental research of alpine communities with use of reciprocal transplantations. Veröffentlichungen des Geobotanischen Institutes der ETH, Stiftung Rübel. Zürich, 115, 41-60.
- SEREBRYAKOV A.K., 1957: Soils of the Teberda State Reserve. Transactions of Teberda State Reserve [Trudy Teberdinskogo Gos. Zapovednika.]. Stavropol, 1, 51-84 (In Russ.).
- SHAL'NEV V.A., SEREBRYAKOV A.K. & CHIKALIN A.N., 1977: Mountain-Meadow soils of the Malaya Khatipara range. Transactions of Teberda State Reserve [Trudy Teberdinskogo Gos. Zapovednika.]. Stavropol, 9, 88-104 (In Russ.).
- SHCHERBAKOVA E.M., 1973: Pleistocene glaciation of the Great Caucasus [Drevnee oledenenie Bol'shogo Kavkaza]. Moscow Univ. Press, Moscow (In Russ.).
- SHTINA E.A., ONIPCHENKO V.G. & RAZRAN L.M., 1995: Soil algae in alpine plant communities of the Teberda Reserve (the Northwestern Caucasus). Algologia, 5(1), 17-28 (In Russ.).
- SOKOLOV V.E. & TEMBOTOV A.K., 1993: Mammals: Ungulates (Vertebrates of the Caucasus) [Pozvonochnye Kavkaza]. Nauka, Moscow. 528 p. (In Russ.).
- STEINER G.M., 1993: Scheuchzerio-Caricetea fuscae In: GRABHERR G & MUCINA L. (eds.), Die Pflanzengesellschaften Österreichs, Teil 2. Gustav Fischer, Jena, 131-165.
- STEPANOV A.L. & ONIPCHENKO V.G., 1989: Assessment of respiration rate and nitrogen-fixing and denitrifying activity in high-meadow alpine soils of Northwestern Caucasus. Vestn. Mosk. Univ., ser. 17, 44(2), 55-56.
- TANFIL'EV V.G., DZYBOV D.S., DUDAR' Y.A., 1979: Dominants and species richness of steppes and mountain grasslands in Stavropol region.

- Izvestiya Sev. Kavkas. nauchnogo tsentra vyssh.shkoly, estest.nauki., 1, 89-92 (In Russ.).
- TILMAN D., 1988: Plant strategies and the dynamics and structure of plant communities. Monographs in population biology 26. Princeton Univ.Press, Princeton, New Jersey. 360 p.
- TSEPKOVA N.L., 1986: An ancient agriculture and grazing ecosystems in the Central Caucasus. Trans. High Mountain Geophys. Inst., 68, 82-96 (in Russ.).
- TSEPKOVA N.L., 1987: On the syntaxonomy of grasslands of the Central Caucasus. Trans. High Mountain Geophys. Inst., 64, 47-65 (in Russ.).
- TUMADZHANOV I.I., 1960: On typology of subalpine elfin woods in the Teberda Reserve. Transactions of Teberda State Reserve [Trudy Teberdinskogo Gos. Zapovednika.]. Stavropol, 2, 63-105 (In Russ.).
- TUSHINSKIY G.K., 1962: Rythms in glaciation and snowness in Teberda State reserve. Transactions of Teberda State Reserve [Trudy Teberdinskogo Gos. Zapovednika.]. Stavropol, 4, 57-71 (In Russ.).
- VLACHOVIC M., DIERSSEN K., DIMOPOULOS P., HADAC E., LOIDI J., MUCINA L., ROSSI G., TENDERO F.V. & TOMASELLI M., 1997. The vegetation of screes a synopsis of higher syntaxa in Europe. Folia Geobotanica et Phytotaxonomica, 32(2), 173-192.
- VLADYCHENSKIY A.S. & GRISHINA L.A., 1987: Soils of the Teberda Reserve. In: L.A.Grishina (ed.), Dynamics and structure of soils and modern soil processes. (Sbornik nauchnyh trudov TsNIL Glavokhoty RSFSR). Moscow, 65-87 (In Russ.)
- VOROB'EVA F.M., 1977a: Flora of subnival zone of the Teberda Reserve. Transactions of Teberda State Reserve [Trudy Teberdinskogo Gos. Zapovednika.]. Stavropol, 9, 3-26 (In Russ.).
- VOROB'EVA F.M., 1977b: Vegetation of the alpine zone of the Teberda Reserve. Transactions of Teberda State Reserve [Trudy Teberdinskogo Gos. Zapovednika.]. Stavropol, 9, 37-87 (In Russ.).
- VOROB'EVA F.M. & KONONOV V.N., 1991: Flora (vascular plants). Transactions of Teberda State Reserve [Trudy Teberdinskogo Gos. Zapovednika.]. Stavropol, 13, - 137. (In Russ.).
- VOROB'EVA F.M., ONISHCHENKO V.V., ONIPCHENKO V.G., MALYSHEV A.A. & KHRAMTSOVA N.F., 1986: Green cover of Teberda. In: POLIVANOVA N.N. (ed.), Zapovednaya Teberda. Knizh. izd-vo, Stavropol, 50-72 (In Russ.).
- VOSKANYAN V.E., 1977: On flora and vegetation of upper part of alpine zone, Mt.Kaputdzukh. Biolog. Zhurnal Armenii, 30(12), 33-36 (In Russ.).

- WALLNOFFER S., 1993: Vaccinio-Piceetea. In: MUCINA L. *et al.* (eds.) Die Pflanzengesellschaften Österreichs, Teil 3. Gustav Fischer, Jena e.a., 283-337.
- WALTER H. & BRECKLE S.-W., 1986: Ökologie der Erde. Spezielle Ökologie der Gemässigten und Arktischen Zonen Euro-Nordasiens. Gustav Fischer, Stuttgart. 587 p.
- WALTER H., HARNICKELL E. & MUELLER-DOMBOIS D., 1975: Klimadiagramm-Karten. Gustav Fischer, Stuttgart. 36 p.
- WIRTH V., 1980: Flechtenflora. Ulmer, Stuttgart. 552 p.
- YASHINA A.V., 1981: Influence of snow cover on altitude zone structure in the Great Caucasus. *Izvestiya AN SSSR, ser.georg.*, 3, 117-126 (In Russ.).
- ZECHMEISTER H., 1993: Montio-Cardaminetea. In: GRABHERR G. & MUCINA L. (eds.), Die Pflanzengesellschaften Österreichs, Teil 2. Gustav Fischer, Jena e.a., 213-240.

Address of the author:

V.G. Onipchenko

Department of Geobotany

Biological Faculty

Moscow State University

119899 Russia Moscow

vonipchenko@herba.msu.ru