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Usnea capillaris Mot., *U. rugulosa* Vain., *U. scabrata* Nyl. and
U. scrobiculata Mot. in Europe

Usnea capillaris Mot., *U. rugulosa* Vain., *U. scabrata* Nyl. i *U. scrobiculata* Mot.
w Europie

In the first part of the studies on the distribution and variability of species on the genus *Usnea*, being the result of documentary works on the *Usneaceae* collection in the Herbarium of Plant Taxonomy Department (LBL-L), the localities of *U. prostrata* Vain. were listed and taxonomic value of *U. plicata* (L.) Mot. was estimated. The present study refers to several further species, very distinct and easily distinguishable but differently grasped despite detailed diagnoses. All attempts at diminishing the importance of these species have no grounds, they do not belong to the group of so-called critical species. The features exposed in diagnoses, especially those regarding ornamentation on bark and habitat, including the ramification of thalli allow for correct identification. This statement is based on detailed analysis of types and specimens quoted in list of localities of *Lichenum* generis *Usnea* (3).

Abbreviations used in the list of localities: the author gives full names only while quoting them for the first time, then he gives abbreviations limited to the first letter of the name. Also the names of trees are abbreviated: *Abies alba* — Aa, *Acer pseudoplatanus* — Ap, *Carpinus betulus* — Cb, *Fagus sylvatica* — Fs, *Picea abies* — Pa, *Pinus cembra* — Pc, *Pinus sylvestris* — Ps, *Sorbus aucuparia* — Sa.

In the collection of *Usnea* LBL-L *Usnea capillaris* is listed under the numbers from 1.101 do 250.101, *U. rugulosa* from 1.82 to 95.82, *U. scabrata* ssp. *scabrata* from 1.80 to 45.90, *U. scabrata* ssp. *nylnaderiana* from 1.80.1 to 32.80.1, *U. scrobiculata* from 1.79 to 250.79. In the list of species only the first figure is quoted.

Usnea capillaris Mot., Lich. gen. *Usnea* 185. 1936 (diagn., distr., Holotypus LBL-L, 1.101!). Flora polska. Porosty (*Lichenes*) 5. 2: 241. 1962.

U. capillaris is characterized by a very big thallus 30 (40) cm), fixed to the substrate with a distinct base, main twig long, blackened from the base, main primary and secondary twigs thin, about 0.5–0.8 mm in diameter, regularly getting thinner, capillary at endings with hardly any side twigs. Primary and secondary twigs are cylindrical, irregularly rimose, covered with rarely distributed big tuberculae devoid of bark. Younger twigs are distinctly rugose in places and shallow-foveolate, the youngest twigs — capillary thinned and cylindrical, with hardly any papillae and only with tuberculae on which soralia with needle-shaped soredia are formed. Medulla distinctly reddens from KOH. The examined specimens of *U. capillaris* do not show variability in diagnostic features.

Considerable differences can be noticed in the length of thallus and degree of primary twig blackening. In some specimens sparse side twigs of unequal length occur. The number of soralia differs and the habit varies, but exclusively in the specimens hung over twigs, torn from the substrate. *U. capillaris* is a peculiar species. It is the closest related to *U. scrobiculata*, despite a distinct and long blackened basal part characterizing the section *Dasypoga*.

U. capillaris has been described from the Hala Kalatówki in the Tatras where it commonly grows on spruces. In herbaria there are specimens from numerous localities in the Tatra mountains, primarily from the oldest spruce forests in the proximity of mountain forest border. Particularly abundant on the twigs, mostly together with some other species of *Usnea*, numerous species of *Bryoria*, *Evernia*, *Pseudevernia*. The species most frequently tangled among the thalli of *U. capillaris* were: *Alectoria sarmentosa*, *Bryoria nadvornikiana*, *Br. implexa*, *Br. subcana*, *Br. fuscescens*, *Evernia divaricata*, *Pseudevernia furfuracea*, *Usnea rugulosa*, *U. longissima*, *U. subfloridana* whereas *Hypogymnia physodes* and *H. vittata* nearly always grew on the thalli as epilichenophytes. Together they created associations difficult to disentangle but without secondary base at the end of twigs. *U. capillaris* is very common in the East Carpathian Mountains, growing most often, too on the twigs of trees, also deciduous ones (*Fagus sylvatica*). The specimens of *U. capillaris* from the Białowieża Forest are identical with the type. Also the specimens coming from Scandinavia hardly differ from the type.

Distribution of the examined specimens: POLAND: the East Tatras: loco dicto Hala Kalatówki, alt. ca. 1200 m, Pa, 1926 Motyka (1.101, holotypus, 2–4.101 syntypus); below the glade at the Czuba Goryczkowa Mt., Pa, 1926 M. (153), 1959

Bystrek (65); the ski-trail from Goryczkowa Valley, *Pa*, 1957 B. (91); Kondratowa Valley old spruce forest 1929 M. (49); the Wyznia Miętusia Mt., *Pa*, 1957 B. (197); Hala Pisana, *Pa*, 1951 Rydzak (99); the spruce forest over Wąwóz Kraków, 1957 B. (147); near Wincenty Pol shelter-home, *Ap*, 1949 M. (146); at the tourist trail to Smreczyński Staw, *Pa*, 1951 R. (129); the Twardy Uplaz Mt., *Pa*, 1925 M. (76.); on the road to the Pyszna Mt., *Pa*, 1951 R. (138), 1958 B. (96), 1959 M. (133); the Kominy Tylkowe Mt., *Pa*, 1951 R. (111, 112); Miętusia Valley: Wantule, *Pa*, 1951 R. (121); spruce forest, numerously on the tree branches on the slope of the Ornak Mt., 1951 R. (137); Hala Ornak, *Pa*, at the road to the Pyszna Mt., 1962 B. (143); the forest at Przełęcz Iwaniacka, *Pa*, *Sa*, 1949 M. (58), 1951 R. (114), 1957 B. (145), 1960 Tatariewicz (159); *Piceeto primitivo* ad viam turisticam the Ornak Mt. — Chocholowska Valley 1951 R. (50); Polana Chocholowska, *Pa*, 1951 R. (172); Jarzącza Wyznia Valley, *Pa*, 1958 B. (85); Starobociańska Valley, *Pa*, at the road to the Starobociański Wierch Mt., 1958 B. (110); the Kopa Królowa Mt., *Pa*, 1948 M. (94), 1949 Waksmundzki (74), 1959 B. (159). The High Tatras: Hala Gąsienicowa, *Pa*, 1949 M. (57); the forest at "Murowaniec" shelter-home, *Pa*, 1949 M. (64 cum typo identica), *Pa*, 1951 R. (130); Dubrawiska, *Pa*, 1957 B. (75 et 83); Dubrawiska, *Pa*, in the association *Usneetum longissimae*, 1957 B. (87); The Żółta Turnia Mt., *Pa*, 1927 M. (108); Sucha Woda Valley, *Pa*, the Kobyła Mt., *Pa*, 1957 B. (130), Psia Trawka glade, 1958 B. (135), on the road to Waksmundzka Valley, 1969 B. (151); Waksmundzka Valley 1250 m, *Pa*, 1956 T. (79), Pańszczycza Valley, *Pa*, 1951 R. (171); the Wołoszyńskie Szczoty, *Pa*, Mt., 1951 R. (155); Roztoka Valley, at the tourist route from Roztoka Valley to Pięć Stawów Polskich Valley, *Pa*, 1951 R. (117), 1957 B. (54), 1964 B. (77 for.); Morskie Oko Valley, *Pa* and *Pc*, 1947 M. (134), *Pa*, 1949 M. (88), 1957 T. (86), 1957 B. (140), Polana Włosienica, *Pa*, 1959 B. (59, 60); Stare Szalasiska, *Pa*, 1968 Kiszka (161). The Gorce mountains: Potok Kamienica Valley 870 m, *Pa* and *Aa*, 1959 Glanc (10, 11). The Białowieża Forest, National Park, *Cb*, 1949 R. (180). UKRAINE: The East Carpathians: Czarnohora Mts: Pożyżewska Mt., *Pa*, 1934 M. (179, 194 for. acced. ad *U. bicolor* (Mot.) Bystr.); Foreszczenka Valley *Alnus incana*, upon a stream, 1934 M. (192); Worochta Valley, 1990 Mułenko (189). The Central Gorgany Mts.: Łomnica Valley, reservation with *Pinus cembra*, 1939 Sulma (31); spruce forest with *Fs* and *Aa*, on *Pa* branch, 1939 S. (39); spruce forest on the slope of the Jala Mt, 1939 S. (43); spruce forest on the slope of Malachów Mt., S. (48, 178); the Mały Gorgan Mt. and Taupiszyrka Mt., *Pa* and *Fs*, 1927 Borkowski (40, 211); the Rozarynia Mt., *Fs*, 1939 S. (42); Młody Valley, *Fs*, 1939 S. (45). The Czywczyn Mts: the Różasz Wielki Mt., 1330 m, forest with *Pc*, 1935 S. (12), *Fs* and *Ap*, 1935 S. (17 et 31); the Ladeskul Mt., 1230 m, *Pa*, 1935 S. (35); eastern slope of the Palenica Mt., 1410 m, *Pa*, 1935 S. (14); the Kopilasza Mt., 1380 m, 1935 S. (15); the Prełuki Mt., NE slope, 1380–1500 m, *Pa*, 1935 S. (16); Popadynec Valley, at the mouth of the stream to the river Czeremosz, *Pa*, 1935 S (19); Czarny Czeremosz Valley, 980 and 1020 m, *Pa*, 1935 S. (19, 23, 26 and 27); Strimka, left tributary of the Biały Czeremosz, 1050 and 1550 m, 1935 S. (24, 33); the Czorny Dił Mt., under the peak, *Pa*, S. (28); upper the Perkałub Mt., *Pa*, 1934 S. (30). SLOVAKIA: The Tatras: Trzy Studnie, 990 m, 1958 T. (152); the Polana pod Wysoką Mt., *Pa*, 1961 T. (157); the Koperszady Zadnie Mt., 1350 m, *Pa*, 1963 T. (174). BULGARIA: The Riła Mts, 1700 m Żelezowa (186 and 188); Sokolec Mt., *Aa*, 1955 M. (184). FRANCE: Haute Savoie, Arrondissement de Bonneville Vall'ee du Reposoir, 800 m, 1934 Ramoud (181 det. M.). GERMANY: Stübenwasen, 1200 m, 1962 Wilmans (185). NORWAY: Nord Frondelag, Klinga nd Fjårbotn. grau i granskog, 1934 Degelius (182).

Usnea rugulosa Vain, Medd. Soc. Fauna Fl. Fenn. 48:172. 1924 (Turku, holotypus!). Mot., Lich. gen. *Usnea* 149. 1936 (diagn. synonym. distr.), Flora polska. Porosty (*Lichenes*) 5. 2: 218. 1962.

Vainio described *U. rugulosa* on the basis of a specimen collected by himself from northern Karelia. His diagnosis was completed by Motyka (3) and he accepted the following features as diagnostic: a very simple structure of the thallus, dichotomic ramification, lack of side twigs, and especially very distinct deformation of the bark by rugae arranged in different directions, often over the whole surface, on twigs of any thickness. Due to a specific ornamentation of the bark the twigs are densely foveolate. Moreover, *U. rugulosa* is characterized by the grey, vivid-green, rarely pale-green, loosely hanging down thallus, fixed to the substratum with an indistinct, hardly darkened base and mostly obtuse endings of the twigs. It does not form soralia. Apotheciae are produced sporadically, it is most often found in barren state. Medulla initially stains from KOH distinctly yellow, then orange or red. PFDA stains medulla distinctly orange. The author has seen specimens staining indistinctly from KOH. *U. rugulosa*, on account of its specific bark ornamentation and almost complete lack of side twigs, is an easily recognizable species, even to the beginning lichenologist. It does not show a closer relationship with any species. The close relationship with *U. scabrata* Nyl., suggested by Motyka, is seeming and regards the features of an inconsiderable diagnostic significance. *U. scabrata* is always covered with big and numerous papillae and tuberculae, despite the rugae on some of the twigs. The structure of the bark puts *U. rugulosa* close to *U. scrobiculata*, ornamentation of the bark is different.

U. rugulosa is the Atlantic species. It is reported from the Scandinavian Peninsula, the Białowieża Forest, the Central Roztocze, the Carpathians, the Alps and the Pyrenees. It is an epiphytic species. It mostly grows on tree branches, often with other species: *Usnea* and *Bryoria*.

For. *rugulosa*. *Typica forma speciei*. *Thallus sordidulo sat obscure viridis, opacus*.

Distribution of the examined specimens: POLAND: The Tatras: on the branches, more rarely trunks of *Pa*, *Pc* and *Sa* in spruce forest and on *Pa* on glades: Chochołowska Valley: Jarzabcza Wyżnia Valley, *Pa*, 1962 B. (20); at the tourist trail to the Trzydniowiański Wierch Mt., *Pa*, 1962 B. (17); and to Iwaniacka Przełęcz, 1951 R. (42); Iwaniacka Przełęcz, at the entrance to the peak of the Ornak Mt., 1957-1960 B. (28, 50, 64). Kościeliska Valley, *Pa*, the slope of the Kamienista Mt., 1959 B. (52); Hala Smreczyńska, 1951 R. (34, 47); 1960 B. (19); Polana Smytnia, 1923 M. (30 det. M.) Goryczkowa Valley, the Pośredni Goryczkowy Wierch Mt., 1928 M. (23), the Kopa Królowa Mt., withering spruces at the forest border, 1949 M. (43), Hala Gąsienicowa, the spruce forest beneath the PTTK shelter-home and on Dubrawiska, commonly on branches

and trunks of spruces, 1957–1958 B. (27, 40, 44, 45), Sucha Woda Valley, Psia Trawka, *Pa*, 1958 B. (35), Roztoka Valley, 1957 B. (24), at the entrance to Roztoka Valley, *Sa*, 1959 B. (29 for.). Biała Woda Valley 1927 M. (32 for. cum apoth.); 1947 M. (32.82), the Żabie Mts, *Pc*, 1929 M. (41), the Lublin Region: Roztocze, Susiec, *Pa*, 1962 Krygler (16), the Roztocze National Park, res. Czerkies, *Aa*, 1962 B. (62), the Białowieża Forest National Park, *Pa*, 1960 B. (67), forest inspectorate Narcewka, *Pa*, 1957 R. (66). The Olsztyn Region: the environs of Mrągowo, div. 176, in the mixed forest, 1956 Hutorowicz (15). UKRAINE: The East Carpathians: Czarnohora Mts: Pożyżewska Mt, *Pa* and *Sa*, 1934 M. (2 for. det. M., 3); on the slopes of the Bereskuł Mt., *Pa*, 1933 Mađalski (12 for. acced. ad *U. scrobiculata*); reser. Dancerz, 1934 M. (14). The Central Gorganes: Łomnica Valley, res. with *Pc*, 1339 S. (7). The Czywczyn Mts: the Pyrie Mt., *Pa*, 1933 S. (1); the Czorny Dił Mt., *Pa*, 1934 S. (4 cum apoth., 9); the Kaminiec Preluczny Mt., 1310, *Fs*, S. (13); the Mokryn Mt., 1500 m, *Pa*, S. (65). FINLAND: Tuusula, Rustinkyla, *Pa*, 1929 M. (62 det. M). SWEDEN: Hälsingland, Alfta Ulvamyrsers, *Ps*, 1933 Lindman (61, det. M.) Patria, Angermania, Kaltjärnberg, *Pa*, 1933 Nilson (60. 82, det. M.). FRANCE: the Pyrénées, Gavarnia, Ravins du Rousseau de Palha, 1730 m, *W exp. Abies pectinata*, 1950 Frey (54, 82 minus typica). SWITZERLAND: Räthien, Preda, am Albula, 1800 m (cum *Evernia divaricata* and *Letharia vulpina*), 1933 Frey (55, det. M. *U. scabrata* ssp. *scabrata*); Berner Oberland, Beatenberg, inter Burgfeldstand, 1800 m, *Picea*, 1933 F. (56 det. M.); Haslital, Schatenhalb, Kaltenbrunnentalp, Gyrensprung, 1800 m, *Picea* F. (58); Mittelland, Gurnigel bei Bern, Bergkamm zwischen Selibühl und Schüpfenluh, 1640 m, F. (57). GERMANY: Allgauer Alpen, Rossberg Wetterfichte zwischen Wisser Jöchl u. Pfrontner Hütte, 1952 Wilmans (63 for.). AUSTRIA: Karnten, Maltatal, Klampfereralm Standort, 1800 m, *Larix*, 1931 F. (67, *U. scabrata* det. M.). BULGARIA: the Pirin Mts, 1800 m, 1956 Żelezowa (53 for. acced. ad *U. scabrata* ssp. *nylanderiana*).

For. *ochroleuca* Bystr., nova for. *Thallus ochroleucus vel pallide viridis*. (holotypus! LBL-L 27).

Specimens examined: POLAND: The Tatras: Hala Gašenicowa, on the branch of an old spruce, 1957 B. (27 locus classicus); 1949 M. (26); the Kopa Królowa Mt., *Pa*, 1949 M. (36 and 37); Morskie Oko Valley: Polana Włosienica, *Pa*, 1959 B. (25).

Usnea scabrata Nyl., Flora, 58: 103. 1875, Mot., Lich. gen. *Usnea* 145. 1936 (diagn., synonym., exs., distr. holotypus in herb. Nyl.) *U. scabrata* var. *scabrata* Mot., Flora polska. Porosty (*Lichenes*) 5. 2: 216. 1962.

Nylander described *U. scabrata* on the basis of specimens collected by Arnold in the Tyrolean Alps. Despite diagnostic features it is a little known species. Small interest resulted from the fact that Nylander himself debased its significance in 1885 and he put it as var. in *U. dasypoga*. Vainio acted likewise, but he transferred it to *U. barbata*. The significance of the species was restored by Motyka (3) who broadened the diagnosis and gave detailed distribution. Motyka examined Nylander's type, he also saw specimens identified by Vainio. He admitted the specific shaggy habit of the plant, dichotomic ramification, lack of side twigs and numerous, long, sharpened tuberculae and papillae distributed regularly, thicker on young twigs in places uniting in rugal or folds to be basic distinguishing features.

Moreover, *U. scabrata* is characterized by numerous and long secondary twigs, loosely hanging, ramified at acute angle. In the studied specimens no soralia were found. *U. scabrata* forms fructifications very rarely. These are apothecia up to 1 cm in diameter, with long ciliae hanging down, thallus margin devoid of bark. In the typical form the medulla stains red from KOH and PFDA.

U. scabrata belongs to more imposing species among the European *Usnea*. There are known specimens over 40 cm long, with twigs exceeding 1.5 mm in diameter. The mutability of the species is small and is within the limits of individual variability. It concerns the size of thalli, thickness of twigs, density and size of tuberculae (papillae) as well as the number of rugae. However, chemical properties are different.

U. scabrata is an easily recognizable species in the section *Scabrata* because of big and regularly distributed tuberculae. Its relationship with *U. rugulosa* is beyond any doubt, but there are very few features in common. The rugae occurring on the bark of *U. scabrata* are different from those in *U. rugulosa*. There also occur distinct differences between *U. scabrata* and *U. scrobiculata*, which can be seen in the habit and ornamentation of the bark surface. *U. silvatica* also has different bark ornamentation.

U. scabrata is the montane species, specially common in coniferous forest, it can be included in the group of Alpine-Balkan-Carpathian species. It is the common species among the oldest standing timber in the East Carpathians. It is also known from the Balkan Peninsula, the Alps, the Pyrenees, and scanty localities in the Tatras, single localities in Central Roztocze, the Białowieża Forest and in Scandinavia.

Ssp. scabrata. Mot., Flora polska. Porosty (*Lichenes*) 5.2:217.1962. Subspecies typica, medulla KOH et PFDA aurantiaca.

Distribution of the examined specimens: POLAND: The Białowieża Forest, at the road to the aurochs reservation, 1964 B. (1, 40 for.). The Lublin Region: Central Roztocze, Roztocze National Park, Aa in reserv. Obrocz, 1965 B. (39). The Tatras: Tomanowa Valley: the slope of the Kamienista Mt., Pa, 1959 B. (2), the Pośredni Goryczkowy Wierch Mt., Pa, 1928 M. (3). Hala Gąsienicowa, Pa, 1958 B. (4). Roztoka Valley, Pa., 1967 B. (5 for.). Morskie Oko Valley, Pa 1947 M. (6). The Świętokrzyskie Mts, Łysica Mt., Aa, 1962 B. (40). UKRAINE: The East Carpathians: the Czarnohora Mts: the Maryszewska Mt., 1400 m, Pa, 1934 M. (12). The Central Gorganes, forest on the Jala Mt., Aa, 1939 S. (13). The Czywczynes: the slope of the Popadyniec, Fs, 1934 S. (7); the Popadia Mt., Fs an *Abieteto-Piceetum*, 1934 S. (8); N slope of the Kaminiec Preluczny, Fs, 1934 S (10); the Czorny Dił Mt., 1400 m Pa, 1934 S, (11). BULGARIA: The Stara Płanina Mts.: the Etropolski Balkan Mt., Witina, 950 m Fs, 1955 M. (14); The Riła Mts.: the Borowec Mt., Pa, 1955 M. (16 for.): The Rodopes Mts, Pa, 1956 Żelezowa (17). SWITZERLAND: The Alps: Grunigel bei Bern, Bergkamm zwischen Selibühl, chupfenfluh, 1640 m, 1928 Frey (21). Kt. Graubünden, Müwstertal, Cierfs,

Wald südöstlich des Dorfes, N-Fontana grossa, 1960 m, *Usneetum alpinae*, 1949 F. (25 and 28); Davos Fusse, 1720 m F. (26 det. M.); Rhätien, Preda am Albula, 1800 m, cum *Letharia vulpina*, 1933 F. (27 det. M.); Berner Oberland, Bezirk, Oberh. im Schwarzwald am Reichenbache, 1510 m, *Pa*, 1949 F. (32); Wengeralp, ad limitem silvae, 1850 m, *Pa*, 1924 G r u h m a n n (22 det. M.); Engadin, Berninagebiet, Val Roseg, 1900 m, *Larix* 1946 (40 for.); Unterengadin, Scarl. Ravitschana, lichtet durchweidetes, Piccetum, 1750 m, 1947 F. (34); Strassenwald bei St. Moritz, 1835 Leand P c, 1930 F. (35 det. M.); Flüchl.-Sörenberg, Salwiden, *Pa*, 1948 F. (29). AUSTRIA: Südtirol, Platten (Bruneck), 1972 Bibinger (33); Dolomiten Hange am Augrlbach, 1800 L e, 1955 P u t z l e r (21). GERMANY: The Alpes Oztaler Alpen Leierstral 5-Hang, 1950, P c, 1966 K a l b (20). FRANCE: Mont Louis, col. de la Quailange, 1720 m 1950 F. (23). The Pyrénées, Gavarnie, Coureylha da Palha, 1800 m *Pinus montagne patur'e arbres isol'es*, 1950 F. (36 for.). ITALY: Bardonechia, *Larix*, 1950 Solari (19). SWEDEN: Stockholm, Varmdon, Lof fberga, 1909 M a l m e (80 det. M.). FINLAND: Nyl., Tuusula, Ruotsinkyla, ad *Pa*, 1929 M. (37 det. M.). RUSSIA: Syberie, the Sajjan Mts, ad flumen Abakau, 1927 Reverdatto (3 det. M.).

Ssp. *nylanderiana* Mot., Lich. gen. *Usnea* 148. 1936. Flora polska. Porosty (*Lichenes*) 5. 2:218. 162. Holotypus LBL-L! (1.80.1, syntypus LBL-L 3.80.1).

Distribution of the examined specimens: FRANCE: Isère, versus la Redoute, supra Bourg St. Maurice, 1931 Offner (locus classicus 1.1.80 and 3.1.80). Savoie, Vallée de Haute Luce pentes de la rive gauche du torrent vers, 1200 m sur *Picea*, 1933 Burolet (17.1 det. M. minus typica). Basses Alpes, Forêt de St. Vincent-les-Fort, 1300 m, sur Méléze, 1933 Dughi et Ducos (5.1). Versant Français, Col. du Petit St. Bernard, ca. 1500 m, 1958 Duval (4.1). Alpes Maritimes, Vallée de la Tonée. St. Delmos, 2000 m, Forêt de Méléze an sud village, leg. Schmidt (9.1). Haute Loire, St. Julien-Chapteuil, 1938 Tremolière (6.1 det. M.). Pyrénées or., Forêt de Font Romel, pres l'Ermitage, 1850 m, *Pinus uncinulata*, 1931 Des Abbayes (17.1 det. M.). SWITZERLAND: Lac de Barberine, 1800 m près de Chablard terrain sileceux, sur Méléze, 1935 Malm e (12.1 for.). Katschberypass, 1600 m, 1930 F. (13.1). Col du Simplon, Versant Nord, 1957 Duval (8.1). Gruigel bei Bern, Berkamm zwischen Schibühl und Schüpfenfluh, 1640 m, *Pc* and *P. montana*, 1938 F. (7.1). Jura, col du Marchandise, 1933 Meylan (16.1 M. 1936). Berner Oberland, Saanemöser, Hubelialp, 1600 m, ad *Picearum magnorum truncos*, 1930 F. (10.1). Lac Champex prope Martigy supra Ossieres, 1460 m, Maheu (11.1 M. 1936). YUGOSLAVIA: Galicica, 1500 m, ad arbores 1979 Murati (18.1). Korytink, *Pa*, 1986 Murati (19.1). Jakupica, Solunska glava-Dunja, 1850 *Fs*, 1986 Murati (20.1). POLAND: The Tatras: Hala Smreczyńska, *Pa*, 1959 B. (14.1); Sucha Woda Valley, *Pa*, 1958 B. (15.1).

Montane subspecies, common in the Alps, reported from the Balkan Peninsula, it reaches the Pyrenees to the west. Occasional in the Tatras. The author has not seen specimens from Siberia. The specimens from the Tatras have smaller tuberculae (papillae) on the bark. Plants collected by Murati from the mountains of former Yugoslavia belong to the most imposing specimens.

U. scabrata var. *scabrata* and var. *nylanderiana*; it grows on trees, mostly in the crowns, in the oldest natural standing timber. It is susceptible to

atmospheric pollution, just like previous species. In Poland it is on the red list of extinct species.

Usnea scrobiculata Mot., Lich. gen. *Usnea* 144. 1936 (diagn., distr. holotypus! LBL-L 1.70), Flora polska. Porosty (*Lichenes*) 5. 2:215. 1964.

U. scrobiculata is characterized by long thallus (25–30 cm), rigid, but fixed to the substrate with a very indistinct base, usually not blackened, occasionally only slightly darkened, densely dichotomic (forked) on its whole length, with curved twigs, bent in a distinctly snake-like way in places. Primary twigs up to 1.5 mm in diameter, secondary ones regularly growing thinner, capillary endings bent in a crispy way, cylindrical twigs irregularly rimose and segmented on their whole length, segments mostly narrowed. Cortex ornamentation differs, twigs are distinctly cruised (wrinkled? rugose) in place, nodose and foveolate, in places covered with small papillae, in places smooth and similar to the twigs of *U. cavernosa*. Medulla distinctly reddens from KOH and stains flaving red from PFDA. It occurs only in barren condition. Soralia and apothecia not found by the author.

U. scrobiculata differs from *U. capillaris* in cortex ornamentation, lack of basis, stiff thallus and other features. *U. scabrata* is covered with big, regularly distributed tuberculae (papilla), whereas *U. rugulosa* has quite a different habit and ornamentation of bark surface.

Distribution of the examined specimens: POLAND: The West Tatras: Kondratowa Valley: the Pośredni Goryczkowy Wierch Mt., 1926 M. (86.79 locus classicus, 63.79); the ski-trail from the Goryczkowy Wierch Mt., 1967 B. (150.); the Łopata Mt., spruce forest, 1927 M. (48); Hala Kalatówki, *Pa*, 1927 M. (75); Olczyńska Valley, *Pa*, 1949 M. (102); Karczmiško, *Pa*, 1500 m, 1956 T. (117); Miętusia Valley, *Pa*, 1951 R. (159); Strążyska Valley, *Aa*, 1927 M. (175) and *Pa*. M. (177); the Łysanki Mt., under the peak, *Pa*, 1924 M. (176); Kościeliska Valley, 1949 M. (50); Polana Smytnia, 1100 m, *Pa*, 1924 M. (44 det. M.); the Stoły Mt., 1951 R. (168); Hala Pisana, 1951 R. (61), Hala Smreczyńska, R. (77); Tomanowa Valley, 1957 B. (146), 1959 B. (55, together with *Bryoria flexuosa*; at a tourist route Ornak, below Iwaniacka Przełęcz and on Iwaniacka Przełęcz, commonly: M., B., R., (50, 57, 59, 95); at a tourist route from Iwaniacka Przełęcz to Chochołowska Valley, commonly on *Pa*, 1957 B. (67); Chochołowska Valley, 1250 m, 1960 T. (137); Jarzącza Wyżnia 1958 B. (107); Siwe Turnie, 1951 R. (187). The High Tatras: Dubrawiska and Hala Gąsienicowa: on trunks and branches of spruces, very commonly, B., M., R., T. (71, 83, 87, 96, 118, 169, 175, 179); the Żółta Turnia Mt., *Pa*, 1927 M. (87), Sucha Woda Valley: Psia Trawka glade, *Pa*, 1956 B. (73); the Kobyla Mt., *Pa*, 1957 B (79); below Stawy Toporowe, 1956 B. (100);, Sucha Woda Valley, at a tourist route to Olczyńska Valley, 1957 B. (105); and at the way to Polana Waksmundzka, 1957 B. (121); the Wołoszyńskie Szczoty Mt, 1951 R. (160), B. (76); Roztoka Valley, at a tourist route to Pięć Stawów Polskich 1957 et 1959 B. (101 and 106); Waksmundzka Valley, 1947 W a k s m u n d z k i (123); environs of Morskie Oko, 1947 M. (131); Vallis Biała Woda, ad pedem ac in cacumine montis Żabie ad lacum Morskie Oko, 1450–1500 m, *Pa* et *Pc*, 1928 M. (135); between Roztoka Valley and glade Włosienica, *Pa*, 1959 et 1963 B. (62 et 148); Zakopane: Alley in Kuźnice, on ash

bark, 1947 M. (127) The Babia Góra Mt., 1350 m, *Pa*, 1927 M. (120 det.M.); 1957 R. (17); Beskid Sądecki Mts., Izby, ad fontes rivuli Biała, Aa 1928 M. (181). UKRAINE: The East Carpathians: the Czarnohora Mts.: the Pożyżewska Mt., 1934 M. (18); the Maryszewska Mt., 1400 m, *Pa*, 1934 M. (21); the Foreszczenka Mt., 1934 M. 30). The Gorganes: the Doboszanka Mt., 1190 m, *Fs*. 1927 Borkowski (23); the Piekun Mt., 1400 m, *Pa*, 1927 Borkowski (25); slope Taupiszyrka, 1927 Borkowski (31); the Mały Gorgan Mt., *Pa*, 1927 Borkowski (33); Łomnica Valley, reservation of *Pinus cembra*, 1939 S. (19.79). The Czywczyny: the Kopilas Mt., 1380 m, 1935 S. (20); the Bereskuł Mt., *Pa*, 1933 Mądalski (28). SLOVAKIA: the Mala Fatra Mts: the Suchy Wierch Mt., *Pa*, 1931 leg.? (47). the Koperszady Mts, 1930 m, *Pa*, 1956 T. (88). GERMANY: Jura, Forêt de la Navel, 1929 Meylan (7 det. M). BULGARIA: The Rila Mts., the Borovec Mt., *Pa*, 1957 Żelezowa (7). the Pirin Mt., 1600 m, *Pa*, 1957 Żelezowa (6). FRANCE: Granges de Ste Croix, 1100 m, 1933 Meylan (1, 2).

Usnea scrobiculata is an epiphytic species, commonly growing on trunks and tree branches. It is a montane species, characteristic of subalpine element. In the Tatra Mountains it is very common in the upper forest border. Also common in higher parts of the East Carpathians. Its range covers the Carpathians, the Balkan Peninsula and the Alps. In Poland it can be found on the list of dying out species.

REFERENCES

1. Bystrek J.: *Usnea plicata* and *U. prostrata* (*Lichenes, Usneaceae*) in Europe. Ann. Univ. Mariae Curie-Skłodowska, sectio C 47, 119–123 (1992).
2. Bystrek J.: Studien über die Flechtengattungen *Usnea* in Europa. Wydawn. UMCS, Lublin 1994.
3. Motyka J.: Lichenum generis *Usnea* studium monographicum, Pars systematica. Leopoli 1936.
4. Motyka J.: Porosty (*Lichenes*). Flora polska, rośliny zarodnikowe Polski i ziem ościennych. 5, 2. (*Usnea*). PWN, Warszawa 1962.

STRESZCZENIE

U. capillaris, *U. rugulosa*, *U. scabrata* i *U. scrobiculata* to gatunki dawno wyróżnione, lecz różnie ujmowane przez taksonomów mimo wyczerpujących diagnoz i wyraźnie różnicujących cech diagnostycznych. Wszystkie badane okazy dały się łatwo identyfikować na podstawie zewnętrznych cech, bez uciekania się do dodatkowych metod badawczych. Należą one do jednych z łatwiejszych do identyfikacji gatunków w rodzaju *Usnea*. Na uwagę zwraca fakt, że zmienność poszczególnych gatunków nie dotyczy cech diagnostycznych. Tylko w przypadku *U. rugulosa* podajemy diagnozę nowego taksonu: *U. rugulosa* for. *ochroleuca* B y s t r. nova for. Rozmieszczenie badanych gatunków oparto wyłącznie na materiałach zgromadzonych w naszym zielniku, podano także numer, pod którym znajduje się cytowany okaz.

