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## Nomenclatural Notes on the *Pinus mugo* Complex in Central Europe

By

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### Summary

BUSINSKÝ R. & KIRSCHNER J. 2006. Nomenclatural notes on the *Pinus mugo* complex in Central Europe. – *Phyton* (Horn, Austria) 46 (1): 129 – 139. – English with German summary.

Selected names in the genus *Pinus* are analyzed. The neotype of the name *P. uncinata* var. *pseudopumilio* WILK. is replaced by a lectotype (PR). The name *P. uliginosa* NEUMANN in WIMM. is shown to be the correct donor of the epithet for the bog pine at the rank of subspecies and a new combination is proposed [*P. uncinata* RAMOND ex DC. subsp. *uliginosa* (NEUMANN) BUSINSKÝ comb. nova]; the taxonomic conclusions are mainly based on the studies of Polish authors on this taxon. The name *P. hartenbergiensis* LIEBICH is analysed; a neotype is selected from the locus classicus population in W. Bohemia. The name is correct for the bog pine at the rank of species. The name *P. rotundata* LINK was published as early as 1827, its neotype is shown to be in full accordance with the protologue. A field study of the neotype population shows that the name does not represent a hybrid or intermediate between *P. mugo* and *P. uncinata*, nor it can be used for the bog pine. It represents intermediates between *P. uncinata* subsp. *uncinata* and subsp. *uliginosa*, closer to the former taxon. The name *P. obliqua* REICHENB. was neotypified in conflict with the protologue; therefore, a new neotype is selected and the name again represents intermediates between *P. uncinata* subsp. *uncinata* and subsp. *uliginosa*, closer to the former taxon.

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### Zusammenfassung

BUSINSKÝ R. & KIRSCHNER J. 2006. Notizen zur Nomenklatur im *Pinus mugo*-Komplex in Mitteleuropa. – Phytion (Horn, Austria) 46 (1): 129 – 139. – Englisch mit deutscher Zusammenfassung.

Einige wissenschaftliche Namen in der Gattung *Pinus* werden analysiert und taxonomisch bewertet. Der Neotypus für den Namen *P. uncinata* var. *pseudopumilio* WILLK. wird durch einen Lectotypus (PR) ersetzt. Der Name *P. uliginosa* NEUMANN in WIMMER ist das korrekte Basionym für die Moor-Spirke im Rang der Unterart [*P. uncinata* RAMOND ex DC. subsp. *uliginosa* (NEUMANN) BUSINSKÝ, comb. nova]; die taxonomischen Schlußfolgerungen basieren hauptsächlich auf den Arbeiten polnischer Autoren über dieses Taxon. Für den Namen *P. hartenbergiensis* LIEBICH wurde ein Neotypus aus der Population am locus classicus ausgewählt; dieser Name wäre für die Moor-Spirke im Artrang korrekt. Der Name *P. rotundata* LINK wurde schon 1827 publiziert; der bisherige Neotypus stimmt voll mit dem Protolog überein. Eine Feldstudie der Neotyp-Population hat gezeigt, daß es sich weder um Hybriden oder Intermediäre zwischen *P. mugo* und *P. uncinata* handelt, noch um die Moor-Spirke, sondern Intermediäre zwischen *P. uncinata* subsp. *uncinata* und subsp. *uliginosa*, die dem erstgenannten Taxon näher stehen. Der bisherige Neotypus von *P. obliqua* REICHENB. steht im Widerspruch zum Protolog, daher wurde ein neuer Neotypus festgelegt; der Name bezieht sich ebenfalls auf Intermediäre zwischen *P. uncinata* subsp. *uncinata* und subsp. *uliginosa*, die dem erstgenannten Taxon näher stehen.

### 1. Introduction

The genus *Pinus* has always attracted the attention of European taxonomists – it is economically important, widespread and taxonomically intricate. The taxonomic uncertainties are always followed by nomenclatural problems; this is particularly the case of the group of taxa related or similar to *Pinus mugo* TURRA, a group revised or checklisted several times in the recent literature (e.g., CHRISTENSEN 1987a, FARJON 1998, 2001). We have found a few names, publication details or omissions and typification mistakes in the latter works, requiring comments; selected nomenclatural adjustments and corrections are presented in what follows.

The taxonomic and nomenclatural revision published by CHRISTENSEN 1987a includes a great number of new typifications; most of them are made through references to the type (neotype) collection number in the herbarium C only. K. I. CHRISTENSEN was so kind as to send us basic information and details of type localities, sometimes even photographs of original trees or shrubs in the field. Most of our nomenclatural comments are also based on the analysis of original populations from where the type specimens were sampled. The terminology used mostly follows that of CHRISTENSEN 1987a; other papers of CHRISTENSEN extending the data given in, e.g., 1987b, CHRISTENSEN & DAR 1997, are also taken into account.

2. The Problem of the Name *Pinus uncinata* var. *pseudopumilio* WILLK. 1861

*Pinus uncinata* var. *pseudopumilio* WILLK., Jb. Königl. Sächs. Akad. Forst- u. Landwirtsch. Tharandt 40: 218 (1861); *Pinus pseudopumilio* (WILLK.) BECK, Ann. Naturhist. Hofmus. Wien 3: 77 (1888); *Pinus mugo* subsp. *pseudopumilio* (WILLK.) HOLUBIČKOVÁ, Preslia 37: 286 (1965), nom. inval. (Art. 33.3, Note 1). – Lectotype, designated here (supersedes the neotypification by CHRISTENSEN 1987a: 392): [Czech Republic, the Krušné hory Mts.] In der Kieferhaide ... Hauensteiner Rev. Hft [= Herrschaft] Hauenstein [now Horní Hrad near Stráž nad Ohří], Apr 1836, [P. M.] OPIZ (PR 18120). Residual syntype: Torfsumpf bei Gottesgab im Erzgebirge, 1833, HOFFMANN (PR 18030). – Taxonomic interpretation: *P. mugo* TURRA s. str.

The original material of *Pinus uncinata* var. *pseudopumilio* almost exclusively consists of elements coming from the summits of the Czech part of the Erzgebirge / Krušné hory Mts. Two specimens are cited explicitly, both seen by WILLKOMM in the Prague National Museum herbarium (herbarium OPIZ), now PR: „auf Torfmooren um Gottesgabe bei c. 3000 (974 m) p. F. Höhe“ and „Hauensteiner Revier“. Furthermore, WILLKOMM 1861 mentions material found by him in Upper Bavaria and near Zinnwald (Cínovec, again the Krušné hory Mts.) but the wording „eine Form der *P. uncinata*, welche ich hierher rechnen möchte“ ranks the latter two elements lower in the hierarchy of syntypes; the same holds for some material from South Bohemia mentioned as „ähnliche“ [Form].

WILLKOMM 1861 many times cited a manuscript sent him by T. HARTIG of Braunschweig; an unpublished text with many new names (cf. FARJON 2001, under *Pinus mugo*) was given at WILLKOMM's disposal, together with a rich collection of cones. Three invalid names, *P. uncinata* vars. *sanguinolenta*, *capuzina* and *zonata* HARTIG ex WILLK., are definitely included as elements of the protologue of var. *pseudopumilio*. Two of them are based on cones from „böhm. Erzgebirge“ (i.e., again the Czech part of the Krušné hory Mts.), one came from „Wiener Garten“ (cultivated in Vienna, origin unknown).

After having summarized the original material information, we should mention basic morphological features of *Pinus uncinata* var. *pseudopumilio* given in the protologue. First, WILLKOMM 1861: 201–205 characterizes his *P. uncinata* correctly by zygomorphic cones (using unequal development of apophyses as a criterion) but clearly states that the taxa covered by the epithets *uncinata*, *pumilio* and *mughus* include many intermediate forms when cone shape is considered. As regards the protologue features of var. *pseudopumilio* itself, it is characterized by prostrate frutescent habit, slightly unequal development of apophyses and small cones (about one inch only).

CHRISTENSEN 1987a, after an unsuccessful search of the herbarium PR and PRC, designated a neotype of the name *Pinus uncinata* var. *pseudopumilio*. It is a specimen from Raxalpe, Niederösterreich, Austria, collected by G. BECK, 28 Jun 1889 (PRC).

We located two syntypes of that name in the herbarium PR (where the main part of the herbarium of P. M. OPIZ is deposited). One of them bears the label „In der Kieferhaide ... Hauensteiner Rev. Hft [= Herrschaft] Hauenstein, 4/1836, Opiz“ and notes of M. WILLKOMM: „*P. uncinata* (f. *irregularis* Htg. [= HARTIG]) c. *Pseudopumilio* Wk. WILLKOMM also annotated the other syntype („Torfsumpf bei Gottesgab im Erzgebirge“, 1833, HOFFMANN, herb. OPIZ), but did not give a label name, only wrote „Herbarium Opitzii, böhm. Erzgebirge“, which is repeated in the publication from 1861. The latter syntype is a branchlet fragment without cones, the former one consists of two cones and a branchlet.

As two of the original syntypes of this name are extant, the neotype designated by CHRISTENSEN 1987a must be superseded by a lectotype. We select the Hauenstein syntype as the lectotype. The specimen is relatively complete, it is distinct in having very small cones (due to undeveloped seeds), the cones are almost actinomorphic, otherwise fully corresponding to the protologue, and the specimen bears the name written by its author.

Taxonomically, the specimen is believed to belong to *Pinus mugo* TURRA, which fully corresponds to the situation in the populations at the syntype localities in the Krušné hory Mts., Czech Republic. The name was variously interpreted in the literature: BECK 1888 elevated it to the species rank (but says „dürfte vielleicht nur eine Form der *Pinus pumilio* ... darstellen“). Recent Czech sources, HOLUBIČKOVÁ 1965 and SKALICKÝ 1988, partly also BUSINSKÝ 1998, interpreted it as hybrids, both old and recent, between *P. mugo* and *P. uncinata* subsp. *uliginosa*. Although this hybrid combination occurs in the region of W Bohemia, the plants dominating the summit area of the Krušné hory Mts. are in all respects very close to *P. mugo* from other regions.

### 3. Comments on *Pinus uliginosa* NEUMANN in WIMMER

*Pinus uncinata* RAMOND ex DC. subsp. *uliginosa* (NEUMANN) BUSINSKÝ, comb. nova. – Basionym: *Pinus uliginosa* NEUMANN in WIMM., Uebersicht Arbeiten Veränd. Schles. Ges. Vaterl. Cult. 1837: 98 (1838); *Pinus mughus* var. *uliginosa* (NEUMANN) K. KOCH, Flora 23: 669 (1840); *Pinus mugo* subsp. *uliginosa* (NEUMANN) O. SCHWARZ, Mitt. Thüring. Bot. Ges. 1: 86 (1949). – Neotype (designated by CHRISTENSEN 1987a:393): [Poland, Śląsk, Kłodzko, Góry Stolowe – Mt. Szczeliniec, Radków, Wielkie Torfowisko Batorowski] Grosser See auf der Heuscheuerb. (Wünschelburg), 5 Sep 1842, REICHENBACH fil. s.n. (W 1889–273942).

Monocormic arborescent forms are not always recognized as an entity (or entities) specifically distinct from the prostrate or prostrate-ascending frutescent form within the *Pinus mugo* complex. There are several works that show that non-hybrid monocormic arborescent forms should be understood as a taxon separate from *Pinus mugo* s. str. The most important ones were published by Polish authors who dealt with material under the names of *P. uncinata* and/or *P. uliginosa*, bog pine, from localities far from those of *P. mugo*, and compared it with the other members of the complex (BORATYŃSKA & BOBOWICZ 2001, BORATYŃSKA & al. 2003 – needle characters, KRZAKOWA & al. 1984 – seed characters and isozymes, SIEDLEWSKA & PRUS-GŁOWACKI 1995, LEWANDOWSKI & al. 2002 – isozymes).

In the Central European botanical literature, a taxon usually called 'bog pine' (Moor-Spirke in German, blatka or borovice blatka in Czech and sosna blotna in Polish) is frequently recognized. It is significant that the Polish authors in their numerous studies (see, e.g., a representative study of PRUS-GŁOWACKI & al. 1998, with relevant references, or later LEWANDOWSKI & al. 2000, 2002, BORATYŃSKA & al. 2003, BORATYŃSKI & al. 2003) accept the bog pine as a separate species (under the name *Pinus uliginosa*) because the bog pine represents a very conspicuous population and ecological entity in the absence of intermediates between *P. uncinata* subsp. *uncinata* and the bog pine in Poland (BORATYŃSKI 1994). In the recent Czech works, e.g. SKALICKÝ, 1988, and BUSINSKÝ, 1998, 2002, the authors reached the same conclusion but use the name *P. rotundata* for the same taxon).

Although not all the pine specialists accept the bog pine as a separate taxon, we rely on the results of numerous studies documenting its status and modify the nomenclature of the group accordingly.

Within the assemblage of monocormic arborescent forms, the ecogeographical extremes are linked by numerous intermediates and we believe that an appropriate treatment of the taxa involved is at the rank of subspecies. When the bog pine is treated at the subspecies level, the epithet of *uliginosa* has the priority. The nomenclatural changes also result from the fact that the neotype population of *P. rotundata* was studied in the field, which led to a new interpretation of the name (see chapter 5).

The name *Pinus uliginosa* was published by F. WIMMER, an editor of the proceedings from the sessions of the botanical section of „Schlesische Gesellschaft für Vaterländische Kultur“. WIMMER 1838 was sent the *Pinus* contribution from „Herrn Apotheker Neumann zu Wünschelburg“, read it on April 10, 1837, and used it in the preparation of the proceedings. Thus, the name must be cited as NEUMANN in WIMMER. All the localities in the protologue are found in the „Grafschaft Glatz“ [Glatz County, now Kłodzko Region, Poland], a region characterized by the absence of native *P. mugo*. The habitat is characterized as „in den tiefsten Sümpfen der hö-

heren Gebirgsregion“. One of the localities, „auf dem grossen See (2200 F)“, is identical with the neotype locality (CHRISTENSEN 1987a), and now is known as the nature reserve of Wielkie Torfowisko Batorowskie, a depression peatbog SE of Mt. Szczeliniec (919 m), at 711–715 m a.s.l. near Radków village in the Kłodzko Region. The neotype population itself, in spite of a rather poor health condition, is composed of well developed trees, without apparent hybridization influence from *P. sylvestris*. In all respects, including the remote geographical position from the transition zone of the two subspecies of *P. uncinata* and the cone morphology, the neotype is a very good representative of the peatbog arborescent form, and the name *P. uliginosa* thus has a safe taxonomic interpretation.

At the rank of subspecies, it is therefore necessary to publish the combination *Pinus uncinata* subsp. *uliginosa*. It was HOLUBIČKOVÁ (e. g., 1980: 16, 1982: 94) who introduced the combination and repeatedly used it in the literature. However, she failed to validate the combination (basionym not cited), thus the formal validation is done above.

#### 4. *Pinus hartenbergiensis* LIEBICH, a Name Referable to the Peatbog Arborescent Form

*Pinus hartenbergiensis* LIEBICH, Allg. Forst- u. Jagd-J., Prag, 2: 43 (1832). – Neotype, designated here: W Bohemia, Sokolov District, Horní Studenec near Oloví, woodland peatbog in “V rašelinách” Nat. Res. NW of the settlement, 673 m, 50°15'47"N, 12°30'58"E (WGS-84), [Tree: 11 m high, 68 cm trunk circumfer. at 1.3 m height, more than 50 years old.], 15 Nov 2005. R. BUSINSKÝ CS 05/3-02 (PR; isoneotypes: PRA, PRC, BM, G). – Taxonomic interpretation: *P. uncinata* subsp. *uliginosa*.

At the species level, the oldest name of the peatbog arborescent form (bog pine) is *Pinus hartenbergiensis*. It was described by LIEBICH 1832 from the vicinity of Oloví (peaty forest of Gesär between Studenec and Liboc) in western Bohemia (see also SKALICKÁ & SKALICKÝ 1987).

We have failed to find the authentic material collected by LIEBICH (herbaria PR and PRC were searched) but the very exact type locality in the protologue makes it possible to collect an appropriate neotype. A facsimile of the protologue and a photograph of the neotype are available on request from the second author.

The locus classicus (and neotype) population represents a relic occurrence of *P. uncinata* subsp. *uliginosa* near the westernmost part of the Erzgebirge / Krušné hory Mts. The habitat is a woodland water-divide transitional peatbog (at 660–680 m a.s.l.) surrounded by *Picea abies* and *Pinus sylvestris* plantations, locally also by cultivated *Larix decidua* (a part of *Pinus sylvestris* growths is probably an offspring of a local relic population). The core part of the peatbog pine population (in the western part of the peatbog), with scattered spontaneous spruce trees, is composed

of a few dozen old *P. uncinata* subsp. *uliginosa* trees (age category approximately 150–220 years), trees of medium age (50–150 years) are less frequent, while the youngest trees (up to 50 years) are very common. The oldest trees belong to the tallest representatives (20–25 m) of this taxon in the Czech Republic. In the core part of the population, the traces of hybridization with *P. sylvestris* are negligible but at the eastern margin of the site, hybrids are quite common. Nowadays, the locality represents a part of a nature reserve (“V rašelínách”); in 2001, 42 selected trees of *P. uncinata* subsp. *uliginosa* were marked and their cuttings form a part of the registered germplasm collection at the Forestry Division Kraslice, Czech Republic.

### 5. The Name *Pinus rotundata* LINK

*Pinus rotundata* LINK, Flora (Regensburg) 10/1 (no. 14): 218 (14 Apr 1827) [see also LINK, Abh. Königl. Akad. Wiss. Berlin 1827: 168 (1830)]. – Neotype (designated by CHRISTENSEN 1987a: 392): Austria, Mt. Zwieselberg, lake Plansee, 47° 29' N, 10° 50' E, 1100 m, 6 Jul 1981. CHRISTENSEN A4–2 (B; isoneotype: C). – Taxonomic interpretation: Intermediate forms between *P. uncinata* subsp. *uncinata* and subsp. *uliginosa*, closer to subsp. *uncinata*.

In most sources, the name is reported as published in 1830. However, as noted by SKALICKÝ 1988, there is an earlier publication by LINK mentioning the name (Flora 10(1): 218, 1827). In fact, both publications were written or prepared at the same time (early in 1827) but one of them was delayed (and supplemented with many notes and corrections) and appeared as late as 1830. The earlier publication was examined from the point of view of the validity of the name. In accordance with the contemporary habits, the paper has a rather belletristic form as a report from an excursion to the Innsbruck vicinity. However, the name appears there in the form of *P. rotundata*, is accepted as a species, and there are numerous morphological notes fully acceptable as a validating diagnosis. There is a concluding sentence (p. 219) that might raise some doubts about the accepted rank [„So wechseln die Arten – oder wenn man will Abarten – der Tanne auf eine merkwürdiger Weise ...“] but similar expressions are frequently found in older botanical literature and should not threaten the accepted status of the name at the given rank. Thus, we conclude that the name *P. rotundata* was published validly in 1827.

The epithet *rotundata* has been widely used in the literature for peatbog pines distributed from northern promontories of the Alps northwards. However, the taxonomic concept varied considerably: some authors recognized *Pinus rotundata* as a separate species (SKALICKÝ 1988, PRUS-GŁOWACKI & al. 1998, LEWANDOWSKI & al. 2000, BUSINSKÝ 1998, 2002), most authors treated these peatbog forms as hybrids or hybridogenous deriva-

tives of the *P. mugo* and *P. uncinata* parentage (ZOLLER 1981, CHRISTENSEN 1987a, GAUSSEN & al. 1993, SCHUBERT & VENT 1994, POLATSCHKEK 1997, WISSKIRCHEN & HAEUPLER 1998, DÖRR & LIPPERT 2001, JÄGER & WERNER 2002, FISCHER 2005), mostly at the rank of nothospecies or nothosubspecies, sometimes as subspecies or variety. Most authors characterize their 'rotundata' pines as peat-bog low trees or shrubs with zygomorphic cones and rounded to hooded apophyses.

In the absence of original material, CHRISTENSEN 1987a designated a neotype of *Pinus rotundata* LINK (Austria, Tirol, Mt. Zwieselberg above lake Plansee). The neotype is in full agreement with the protologue: it comes from the region with the most common occurrence of the taxon according to LINK, it has an arborescent habit and has relatively rounded apophyses (see also CHRISTENSEN 1987a: 388, fig. 2, B1). Importantly, LINK 1830: 169 emphasizes the habitat of his new pine: „Er liebt die höhern und trocken Stellen in den Alpen, steigt aber nicht bedeutend über die Meeresebene in die Höhe“. This fully correspond to the scree habitats of *P. uncinata* subsp. *uncinata*.

R. BUSINSKÝ visited the neotype locality and analysed the pine populations there. Along with *Pinus sylvestris* (quite common) and *P. mugo* (scattered on the rocks at higher altitudes, the scree sites and foots of cliffs at the locality are dominated by an arborescent form characterized by cone characters on average intermediate between *Pinus uncinata* subsp. *uncinata* and subsp. *uliginosa*. In particular, the cones are zygomorphic, have medium elevated, almost rounded and hooded apophyses. In the ecological preference, it is close to B (*P. uncinata* s. str.). Geographically, the Plansee population belongs to the transition zone between the southwestern range of subsp. *uncinata* and northeastern range of subsp. *uliginosa*.

We can conclude that the neotype of the name *Pinus rotundata* represents an intermediate between subsp. *uncinata* and the peatbog subsp. *uliginosa*, and cannot be assigned to either of the two (although it may be considered as much closer to the former). In no respect it approaches *P. mugo* s. str. The name *P. rotundata* LINK therefore is a taxonomic synonym of *P. uncinata* s. lat.

#### 6. A Note on the Name *Pinus obliqua* SAUTER ex REICHENB. 1831

*Pinus obliqua* SAUTER ex REICHENB., Fl. Germ. Excurs. 1(2): 159 (1831). – Neotype, designated here (replaces the neotype designation by CHRISTENSEN 1987a: 293): Austria, Tirol (border of Germany), Karwendel Mts., upper Issar valley about 1.5 km SE of Scharnitz; pine wood on alluvium of limestone screes along a mountain brook, 1000 m, 17 Oct 1993. R. BUSINSKÝ 38116 (PR; isoneotypes: PRA, PRC, BM, G, P). – Taxonomic interpretation: An intermediate between *P. uncinata* subsp. *uncinata* and *P. uncinata* subsp. *uliginosa*, closer to the former.



The name *Pinus obliqua* was described from the region described as „An Vorbergen an den Seiten wasserreicher tiefer Gebirgsthaler bei Zierl und Telfs (?) in Tyrol“, i. e. from the slopes or scree alluvia in the valley of Inn River between Zirl and Telfs in the western vicinity of Innsbruck. The locality is situated in the transition zone between the two subspecies of *P. uncinata*. The protologue (REICHENBACH 1831) explicitly describes the plants as quite robust trees (“Truncus a basi jam erectus distincte conicus, 30–50 ped. alt 1 ped crassus”). The protologue therefore clearly points to the arborescent form close to *P. uncinata* subsp. *uncinata* or an intermediate between the two subspecies of this species. It should be noted that the epithet *obliquus* is derived from the shape of cones (“... strobilis ex ovato oblique conicis”), and not from the general habit.

Authentic material (syntypes) of *Pinus obliqua* has not been located, and CHRISTENSEN 1987a: 293 designated a neotype. The neotype (REICHENBACH, Fl. Germ. Exsicc., no 2144) comes from the region between „Oberwiesenthal und Gottesgabe“, i.e. the border region between Oberwiesenthal, Germany, and Boží Dar, Czech Republic, in the summit region of the Erzgebirge / Krušné hory Mts. (at about 1000 m a.s.l.). At the locality, however, no arborescent form has ever been recorded, and the region is totally dominated by prostrate to suberect (ascending) frutescent forms substantially different from the protologue. The neotype is therefore in serious conflict with the protologue, although the neotype specimen (fragment) itself does not give any clue to the general habit of the plant.

We therefore reject the neotype selected by CHRISTENSEN 1987a and replace it by a newly designated neotype corresponding to the protologue of *Pinus obliqua* both morphologically and geographically.

## 7. Acknowledgements

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