Czech forest ecosystem classification

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ABSTRACT: Forest classification, made up by PLIVA and PRŮŠA (PLÍVA 1971), has been used in the Czech Republic since 1970. This classification is based on ecological factors of the environment. Edaphic conditions are at the first position, then climatic conditions follow (by their vertical [altitudinal] distribution mainly). These two factors form the basic construction called ecological grid (Table 1).

Keywords: forest classification; Czech Republic; ecological factors

Ecosystem classification of the Czech Republic’s forests belongs to classification systems based on ecological factors of the environment. Forest classification, as a discipline used in practical forestry, was initially developed as a part of forest sociology and forest tree ecology in former Czechoslovakia. Pedological and climatological researchers study habitat factors and their relationships to forest stands. Since an ideal combination of plant sociology and ecology is rather difficult to make, classification of forests is connected either with the frame of phytocenology or it is built on a pedological basis into society reconstructions as a “stand typology”. These two different approaches have influenced forest classification.

TYPOLOGICAL SYSTEM

“Typological System of Forest Management Planning Institute” is the official name of recently established forest classification. Taking into consideration the extensive changes of forest cover, resulting in changed phytocenoses and soil humus properties, respectively (degradation stages), the classification system proceeds, and methods alike, from the permanent environmental conditions. Besides humus form and phytocenosis, it also concentrates on determination of potential production (quality yield class). A forest site is the basic unit of growing conditions. Its definition is according to ZLATNÍK (1956) – “The forest site is an aggregate of natural geobiocenosis and all geobiocenoses originating from it, from the viewpoint of development, and partly geobiocenoses (geobiocenoids) changed to a certain extent, including development stages” (RANDUŠKA 1982, p. 162).

This typological forest classification, established by PLÍVA and PRŮŠA (PLÍVA 1971), has been used in Czech forestry since 1970. As the main part of natural forests has been changed to Norway spruce (Picea abies) monocultures for about 200 years, ecological habitat factors have been put in focus necessarily, firstly the soil properties and secondly altitudinal climatic zonality expressed by forest vegetation zones. These two dimensions make up so called ecological grid (Table 1).

The first dimension is made up by so called ecological series (groups). Each series is divided into several edaphic categories. The series has only one characteristic category – the basic category – the other are either secondary (insignificant) or transitional ones. Series are grouped into two big groups by their relation to soil water.

1. Edaphic series without significant soil water influence

(B) series – nutrient – rich (mesotrophic)

basic category: B – nutrient – rich

secondary categories:

H – loamy; deep loamy soils and loess
F – slope-stony; soils with ferns in the herb layer
C – water-deficient; soils on basalts
W – limestone; similar to C, but only on limestone

transitional category: S – nutrient-medium; transitional between (B) and (K) series

(K) series – acidic (oligotrophic)

basic category: K – acidic; grasses are abundant in the herb layer across all zones

secondary categories:

I – compacted acid; Luvisols
N – stony-slope; nutrient-poor soils; similar to F category
<table>
<thead>
<tr>
<th>Series</th>
<th>Categoria</th>
<th>Forest vegetation (altitudinal)zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>xerothermica</td>
<td>0X³ - Pi de (x)</td>
<td>1 Quercus - Quercus</td>
</tr>
<tr>
<td>humilis</td>
<td>0Z - Pi re</td>
<td>2 Fagus - Fagus</td>
</tr>
<tr>
<td>saxatilis</td>
<td>0Y - Pi sax</td>
<td>3 Quercus - Fagus</td>
</tr>
<tr>
<td>oligotrophica</td>
<td>M - (Q) Pi olig</td>
<td>4 Fagus - Fagus</td>
</tr>
<tr>
<td>acidophila</td>
<td>K - (QF) Pi acid</td>
<td>5 Abies - Fagus</td>
</tr>
<tr>
<td>illimerosa acidophila</td>
<td>I - (C)Q il acid</td>
<td>6 Picea - Picea</td>
</tr>
<tr>
<td>lapidosa acidophila</td>
<td>N - PPi; PiP lap (lap acid)</td>
<td>7 Fagus - Picea</td>
</tr>
<tr>
<td>mesotrophica</td>
<td>S - (C) Q mtrph</td>
<td>8 Picea</td>
</tr>
<tr>
<td>subxerothermica</td>
<td>C - Pi serp</td>
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<tr>
<td>illimerosa trophica</td>
<td>H - C Q il troph</td>
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<tr>
<td>trophica</td>
<td>B - F Q troph</td>
<td></td>
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<tr>
<td>calcaria</td>
<td>W - F Q cal</td>
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</tr>
<tr>
<td>deluvia</td>
<td>D - C Qac del</td>
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<tr>
<td>acerosa lapidosa</td>
<td>A - A CQ ac lap</td>
<td></td>
</tr>
<tr>
<td>saxatilis acerosa</td>
<td>J - C Ac sax</td>
<td></td>
</tr>
<tr>
<td>aluvialis</td>
<td>L - U Q alluv</td>
<td></td>
</tr>
<tr>
<td>vallidosa</td>
<td>U - Q Po alluv</td>
<td></td>
</tr>
<tr>
<td>humida</td>
<td>V - C Qfr hmd</td>
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</tr>
</tbody>
</table>

Table 1. Forest site complexes in ecological grid of Typological System of Forest Management Institute
<table>
<thead>
<tr>
<th>Series</th>
<th>Category</th>
<th>Categ.</th>
<th>Pinus sylvestris</th>
<th>Quercus</th>
<th>Fagus</th>
<th>Abies</th>
<th>Picea</th>
<th>Pinus mugo</th>
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<tbody>
<tr>
<td>variohumida</td>
<td>mesotrophica</td>
<td>O</td>
<td>0O - P</td>
<td>varhmd-troph</td>
<td>10 - TQ</td>
<td>varhmd-troph</td>
<td>2O - AFO</td>
<td>varhmd-troph</td>
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<tr>
<td>variohumida</td>
<td>acidophilia</td>
<td>P</td>
<td>0P - P</td>
<td>varhmd acid</td>
<td>1P - BQ</td>
<td>varhmd acid</td>
<td>2P - QA</td>
<td>varhmd acid</td>
</tr>
<tr>
<td>variohumida</td>
<td>oligotrophica</td>
<td>Q</td>
<td>0Q - P</td>
<td>varhmd olig</td>
<td>1Q - BQ</td>
<td>varhmd olig</td>
<td>2Q - QA</td>
<td>varhmd olig</td>
</tr>
<tr>
<td>paludosa</td>
<td>oligotrophica</td>
<td>T</td>
<td>0T - BPi (pal olig)</td>
<td>1T - BAl (pal olig)</td>
<td>2T - AQp (pal olig)</td>
<td>3T - AQP (pal olig)</td>
<td>4T - QAQp (pal olig)</td>
<td>5T - AQP pal olig</td>
</tr>
<tr>
<td>paludosa</td>
<td>mesotrophica</td>
<td>G</td>
<td>0G - PPi pal (mtroph)</td>
<td>1G - Sal</td>
<td>2G - QA pal mthrop</td>
<td>3G - AQP pal mthrop</td>
<td>4G - QAQP pal mthrop</td>
<td>5G - AQP pal mthrop</td>
</tr>
<tr>
<td>turfosa</td>
<td>turfosa</td>
<td>R</td>
<td>0R - Pi turf</td>
<td>3R - Pr turf</td>
<td>4R - Pre turf</td>
<td>5R - PiP turf</td>
<td>6R - P turf mthrop</td>
<td>7R - P turf mthrop</td>
</tr>
</tbody>
</table>

**see Appendix**
(e.g. ‘bohatá dubová bučina’ for the complex 3B which can be translated into English as a ‘nutrient-rich oak-beech forest’ or into Latin as Querceto-Fagetum mesotrophicum (Table 1 + Appendix). Each forest site complex contains several forest site types that are usually called according to a dominant, edaphic indicator plant (herb) species. Thus the final code for forest site type includes three characters, e.g. 3B2, which means ‘bohatá dubová bučina mařinková’ in Czech, a ‘nutrient-rich oak-beech forest with woodruff’ in English, or Querceto-Fagetum mesotrophicum — Galium odoratum in Latin (VIEWEGH 2000). As it may be seen from Table 1, some of the categories are absent; for example in high-elevation forest vegetation zones, acidification occurs even at nutrient-rich sites when climate is cool and wet. Absence of some edaphic categories in low-elevation zones means either their absence in the Czech Republic’s forests or that the categories have features characteristic of some other categories.

All details about forest site complexes (including sites) are described by PLÍVA (1971–1976), PLÍVA (1991), PLÍVA et al. (1991), VIEWEGH (2000) and PRŮŠA (2001), unfortunately in Czech only. But the authors prepare a detail CD with English text and illustrated by many characteristic pictures. This article could contribute to better contacts of Czech foresters with EC foresters.

Appendix

<table>
<thead>
<tr>
<th>FSC</th>
<th>LATIN NAME</th>
<th>Forest site complex</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Categoria xerothermica</strong></td>
<td>Extreme series</td>
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</tr>
<tr>
<td>0X</td>
<td>Pinetum dealpinum (xerothermicum)</td>
<td>Deaipine Pine</td>
</tr>
<tr>
<td>1X</td>
<td>Corneto-Quercetum (xerothermicum)</td>
<td>Cornelian Cherry-Oak</td>
</tr>
<tr>
<td>2X</td>
<td>Corneto-Fagi-Quercetum (xerothermicum)</td>
<td>Cornelian Cherry-(Beech)-Oak</td>
</tr>
<tr>
<td>3X</td>
<td>Corneto-Fagetum (xerothermicum)</td>
<td>Cornelian Cherry-Oak-Beech</td>
</tr>
<tr>
<td>4X</td>
<td>Fagetum dealpinum (xerothermicum)</td>
<td>Deaipine Beech</td>
</tr>
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<td><strong>Categoria humilis</strong></td>
<td>Scrub category</td>
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<td>Pinetum relictum</td>
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<td>Quercetum humile</td>
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<td>Fageto-Quercetum humile</td>
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<tr>
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<td>Fagetum humile</td>
<td>Scrub Beech</td>
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<td>5Z</td>
<td>Abieto-Fagetum humile</td>
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</tr>
<tr>
<td>6Z</td>
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<tr>
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<td>Mughetum</td>
<td>Dwarf Pine</td>
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<td>Ravine Pine</td>
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<td>Fageto-Quercetum saxatile</td>
<td>Skeletal Beech-Oak</td>
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<td>Querceto-Fagetum saxatile</td>
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<td>Fagetum saxatile</td>
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<td>5Y</td>
<td>Abieto-Fagetum saxatile</td>
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<td>6Y</td>
<td>Piceeto-Fagetum saxatile</td>
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<td>7Y</td>
<td>Fageto-Piceetum saxatile</td>
<td>Skeletal Beech-Spruce</td>
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<td>8Y</td>
<td>Piceetum saxatile</td>
<td>Skeletal Spruce</td>
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<tr>
<td>9Y</td>
<td>Arctoalpinum</td>
<td>Skeletal alpine tundra</td>
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<td><strong>SERIES ACIDOPHILUM</strong></td>
<td>Oxylphytic series</td>
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<tr>
<td>2M</td>
<td>Fageto-Quercetum oligotrophicum</td>
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<td>3M</td>
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<td>4M</td>
<td>Fagetum oligotrophicum</td>
<td>Nutrient-very poor Beech</td>
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<tr>
<td>Category</td>
<td>Description</td>
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<td>Nutrient-very poor Fir-Beech</td>
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<td><strong>Piceeteo-Fagetum oligotrophicum</strong></td>
<td>Nutrient-very poor Spruce-Beech</td>
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<td><strong>Fageto-Piceetum oligotrophicum</strong></td>
<td>Nutrient-very poor Beech-Spruce</td>
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<td><strong>Piceetum oligotrophicum</strong></td>
<td>Nutrient-very poor Spruce</td>
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<td>Acidic Oak</td>
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<td><strong>Fageto-Quercetum acidophilum</strong></td>
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<td>Acidic Oak-Beech</td>
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<td>Acidic Beech</td>
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<td><strong>Abieto-Fagetum acidophilum</strong></td>
<td>Acidic Fir-Beech</td>
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<td><strong>Mugheto-Piceetum (acidophilum)</strong></td>
<td>Acidic Dwarf Pine-Spruce</td>
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<td>Spruce-Pine and/or Pine-Spruce</td>
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<td>Water-deficient Hornbeam-Oak</td>
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<td>Water-deficient Beech-Oak</td>
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<td>Talus (Elm-Ash)-Sycamore</td>
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<tr>
<td>Ulmi-Piceeto-Aceretum saxatile</td>
<td>Talus (Elm-Spruce)-Sycamore</td>
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</tbody>
</table>

**SERIES FRAXINOSA**

**Categoria alluvialis**

| 1L | Ulmeto-Quercetum alluviale | Elm floodplain |
| 2L | Fraxineto-Quercetum alluviale | Stream floodplain |
| 3L | Fraxineto-Alnetum alluviale | Ash-Alder |
| 5L | Fraxineto-Alnetum montanum | Montane Ash-Alder |
| 6L | Alnetum incanae | Speckled Alder floodplain |

**Categoria vallidosa**

| 1U | Querceto-Populetum vallidosum | Poplar floodplain |
| 3U | Acereto-Fraxinetum vallidosum | Maple-Ash |
| 5U | Fraxineto-Aceretum vallidosum | Moist Ash-Maple floodplain |

**Categoria humida**

| 1V | Carpineto-Quercetum fraxinosum humidum | Moist to wet Hornbeam-Oak |
| 2V | Fageto-Quercetum fraxinosum humidum | Moist to wet Beech-Oak |
| 3V | Querceto-Fagetum fraxinosum humidum | Moist to wet Oak-Beech |
| 4V | Fagetum fraxinosum humidum | Moist to wet Beech |
| 5V | Abieto-Fagetum fraxinosum humidum | Moist to wet Fir-Beech |
| 6V | Piceeto-Fagetum fraxinosum humidum | Moist to wet Spruce-Beech |
| 7V | Fageto-Piceetum acerosum humidum | Moist to wet Beech-Spruce |
| 8V | Acereto-Piceetum humidum | Moist to wet Sycamore-Spruce |

**SERIES VARIOHUMIDA**

**Categoria variohumida mesotrophica**

| 0O | Pinetum quercino-abietinum variohumidum mesotrophicum | Nutrient-medium Fir-Oak-Pine |
| 1O | Tilio-Quercetum variohumidum mesotrophicum | Nutrient-medium Lime-Oak |
| 2O | Abieto-Fagi-Quercetum variohumidum mesotrophicum | Nutrient-medium Fir-(Beech)-Oak |
| 3O | Abieto-Quercetum variohumidum mesotrophicum | Nutrient-medium Fir-Oak-Beech |
| 4O | Querceto-Abietetum variohumidum mesotrophicum | Nutrient-medium Oak-Fir |
| 5O | (Fageto-) Abietum variohumidum mesotrophicum | Nutrient-medium (Beech-) Fir |
| 6O | Piceeto-Abietetum variohumidum mesotrophicum | Nutrient-medium Spruce-Fir |
| 7O | Abieto-Piceetum variohumidum mesotrophicum | Nutrient-medium Spruce |
| 8O | Piceetum variohumidum mesotrophicum | Nutrient-medium Spruce |

**Categoria variohumida acidophila**

| 0P | Pinetum quercino-abietinum variohumidum acidophilum | Acidic Fir-Oak-Pine |
| 1P | Betuleto-Quercetum variohumidum acidophilum | Acidic Birch-Oak |
| 2P | Quercetum abietinum variohumidum acidophilum | Acidic Oak |
| 3P | Abieto-Quercetum variohumidum acidophilum | Acidic Fir-Oak |
| 4P | Querceto-Abietetum variohumidum acidophilum | Acidic Oak-Fir |
| 5P | Abietum piceosum variohumidum acidophilum | Acidic Fir |
| 6P | Piceeto-Abietetum variohumidum acidophilum | Acidic Spruce-Fir |
| 7P | Abieto-Piceetum variohumidum acidophilum | Acidic Fir-Spruce |
| 8P | Piceetum variohumidum acidophilum | Acidic Spruce |

**Categoria variohumida oligotrophica**

| 0Q | Pinetum quercino-abietinum variohumidum oligotrophicum | Nutrient-poor Fir-Oak-Pine |
| 1Q | Betuleto-Quercetum variohumidum oligotrophicum | Nutrient-poor Birch-Oak |
| 2Q | Quercetum abietinum variohumidum oligotrophicum | Nutrient-poor Oak |
| 3Q | Abieto-Quercetum variohumidum oligotrophicum | Nutrient-poor Fir-Oak |
| 4Q | Querceto-Abietetum variohumidum oligotrophicum | Nutrient-poor Oak-Fir |
**SERIES PALUDOSA**

Wet series

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**Categoria paludosa oligotrophica**

Nutrient-poor wet category

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<td>3T</td>
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**Categoria paludosa mesotrophica**

Nutrient-medium wet category

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**Categoria turfosa**

Peat category

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**Acknowledgement**

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**References**


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Česká lesnická klasifikace

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Český lesnický klasifikační systém je používán od r. 1970. Vychází ze ZLATNÍKOVY (1956) definice lesního typu: „Lesní typ je soubor lesních biocenóz, původních i změněných a jejich vývojových stadií včetně prostředí, tedy geobiocenóz vývojově k sobě patřících.“ Je jednotkou s úzkým ekologickým rozptýlením pro růst dřevin, jejich produkci a obnovu a v důsledku toho i pro žadoucí druhové a prostorové složení porostů s podobnou pěstební technikou.

Lesní typ je tedy část lesa, zahrnující vše, co se nachází na ploše jedné původní geobiocenózy, s jednotnými ekologickými i růstovými podmínkami a s určitým rozptýlením potenciální produkce dřevin původních i nepůvodních. Patří sem se svým prostředím fytocenózy přírodní (dnes již většinou hypotetické), přirozen, hospodářením změněné i fytocenózy věkových stadií včetně pasečního.

V praxi ÚHÚL je lesní typ charakterizován význačnou druhovou kombinací příslušné fytocenózy, půdními vlastnostmi, výskytem v terénu a potenciální bonitou dřevin. Charakteristiku doplňují poznatky o proměnlivosti ve vývoji fytocenóz a degradaci stadiích, poznatky o růstových zákonitostech, vyjádřené růstovými křivkami dřevin podle lesních typů a některé praktické závěry vyplývající z provozního cíle a jeho realizace.

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