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APPLICATION OF VEGETATION SIMILARITY MEASURE TO ASSESS HABITAT NATURALNESS: A DESCRIPTION OF PLANT STAND SYNGENESIS AS A MANAGEMENT QUALIFIER

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This article is dedicated to the memory of Emil Hadač (1914-2003) – leading person in Central-European geobotany and its applications in landscape ecology, and Jaroslava Zittoví-Kurková (1951-1982) who determined substantial part of bryophytes in this study

ABSTRACT

This paper represents an extension of a previously published wider conceptual article (Kovář 2007). It introduces an original approach of how to assess the naturalness of a habitat, in connection with the landscape ecological framework and surveillance and monitoring of biodiversity of habitats in Central Europe (Bunce *et al.* 2005, Bunce *et al.* 2007). Initially, it was referred to in an oral presentation by the author within the BioHab (Biodiversity and Habitats, EU Fifth Framework programme) workshop, held in Prague (Kovář 2004a).

The degree of plant stand similarity, as an expression of different naturalness/syngenesis indicated by the Jaccard index, is used to describe forest management history. This management qualifier can be used especially in countries possessing good phytosociological traditions in vegetation science, with experience in applying habitat classifications and land use planning.

Key words: phytocenological relevés, field recording, landscape ecological framework, habitat, biodiversity, management qualifier, degree of naturalness, plant cover syngenesis, Jaccard index of similarity

MANAGEMENT QUALIFIERS REFLECTING PLANT COVER SYNGENESIS: DEGREE OF NATURALNESS

Variability of managament practices requires a more detailed system of qualifying the particular influences on both fragmented and contiguous natural or semi-managed components within a landscape. Significant differences in management indication and future needs are clear in e.g. forests (forest floor is artificially changed or not), herb communities (weeds are eliminated or not), hedgerows (they are directed as functional barriers against pollution and erosion) or plant assemblages on industrial deposits (assisted vegetation succession is influenced by substrate toxicity) – e.g. Kovář *et al.* 1997, Kovář 2004b.

In the context of additional habitat qualifying, at a regional level a list of phytosociological units (associations, and in some cases, alliances) becomes suitable for indicating the state of the habitat (habitat maturity, habitat naturalness, habitat genesis). This is also applicable for the Czech Republic and, generally, for Central Europe, where classical phytosociology was traditionally developed (Braun-Blanquet 1928; Tüxen 1937). It offers good and relatively detailed knowledge of potential natural conditions in nearly all of the area (Neuhäuslová *et al.* 1998). For examples of products derived from/directed to nature conservation and habitat classification for land use planning, see Moravec *et al.* 1995 and Chytrý *et al*. 2001. While a highly-formalised approach (using the COCKTAIL method for classification of communities) is superior for large-scale vegetation surveys (Bruelheide et Jandt 1997, Chytrý 2000) it loses indicative values because most of the species characteristic of that community exhibit significant variations in ecological behaviour at a continental scale. Informal approaches typical for studies of smaller areas (e.g. river basin, mountain range or political district) can be compensated by very good field knowledge of vegetation variability and the relationships between basic vegetation units and environmental properties, by their authors. Basic vegetation units resulting from classical procedure in the relevant frame of 1 km^2 areas could serve as a good site qualifier (plant life-forms suitable for GHC identification – General Habitat Categories in the sense of Bunce et al. 2007 - across the scale of continents, e.g. Europe, are not enough to distinguish fine-scale habitat features which can be highly teritorially specific). In semi-natural or artificial plant assemblages, such as forests with planted trees or meadows with sown dominants, we can use phytosociological indices of similarity (syngenetic approach to naturalness) as management qualifiers to be consistent in the method applied to this level (Hadač et Sofron 1980). The application of this method in the context of surveillance and monitoring of habitats has not been published (it was initially presented orally in the BioHab Prague workshop (Kovář 2004b).

From the viewpoint of macroclimatic conditions, the Czech Republic represents a forested landscape typical of Central Europe (open vegetation formations such as alpine meadows, azonal steppes or peatlands are of negligible size). A map of potential natural vegetation of this area (Neuhäuslová et al. 1998) shows highly structured mosaics of the original vegetation cover. High diversity of ecosystems is significantly influenced by the diverse chemistry and physical properties of the geological substrate (sedimentary and volcanic rocks, basiphilous and acidic material), diverse relief in landforms (an altitudinal range from 200 to 1600 m), with a dense river network on the hydrological „roof of Europe“, and climatic features (from suboceanic to semi-continental conditions).

Neolithic impact of mankind is dated approximately to 6500 B.P. and consists of deforestation, cultivation of crop plants and forest grazing, as well as present-day environmental pollution and expansion of alien species, introduced both artificially (*Quercus rubra, Pseudotsuga menziesii, Abies grandis, Pinus nigra* etc.) and spontaneously (*Robinia pseudoacacia, Ailanthus altissima, Acer negundo* etc.). It is estimated that actual forested cover of the Czech Republic occupies one-third of the whole area; approximately 80 % of these woody stands consist of plantations. Over the last 150 years, the silvicultural practice of replacing the autochthonous/native (mainly broad-leaved) trees with Norway Spruce and Scots Pine, has caused impacts such as fragmentation of forest ecosystems as well as increased storm damage and pest population outbreaks.

Through fieldwork, we are able to identify forests of similar plant composition but with different history (syngenesis). The problem of interpretation is how to express different syngenesis of forests when high phytocoenological identity and/or similarity is achieved. The authors Hadač et Sofron (1980) stated that managed/plantation forests can contain plant communities which are typically associated with native semi-natural forest stands. As the differences between plantation and native forests may be on various hierarchical levels (in the sense of classical European phytosociology: facies, variant, subassociation, association, alliance…) and of a different degree, it is desirable to take this fact into account.

There are three possibilities:

1. climax community (like *Quercus petraea* in *Potentillo-Quercetum* or *Picea excelsa* in *Calamagrostio villosae-Piceetum*),

2. planted trees are of the same species as the original species, or locally planted trees belong to other species, but with similar character, e.g. mesotrophic deciduous tree species, planted instead of other deciduous species, or conifers instead of other conifer species,

3. planted trees belong to species of quite different ecological character (like *Picea excelsa* or *Robinia pseudacacia* versus *Carpinus betulus* or *Quercus robur*).

Point 1 means only a few or no changes in the composition of the shrub and herb layer, and such communities are usually incorporated in the „natural“ system of plant communities (it corresponds with relatively high ecosystem stability). Second and third cases deviate gradually more and more from the natural climax community, with a decreasing degree of ecological stability. Hadač et Sofron (1980) suggested to use the Jaccard index of similarity as a formal descriptor of the relative naturalness:

$$Q_j = \frac{c}{a + b - c} \times 100$$

a - number of species in relevé 1
b - number of species in relevé 2
c - number of common species

Vegetation ecologists know that communities belonging to the same association typically possess a Jaccard index greater than 45 (often over 50). Stands belonging to different associations, but to the same alliance, usually have an index of 20-35, and communities with a lower index usually belong to different orders.

We can thus compare the studied forest communities with the nearest similar natural community, despite the fact that individual trees grow in regular arrangements of rows and lines (they are planted out). If we know that our landscape types with their plant species diversity and plant species abundance correspond more-or-less with the phytocenological level of alliance and/or group of associations, the Czech Republic scores a value in the middle of the Jaccard index. Hence we have a simple quantitative description for the assessment of the forest naturalness.

In other words, it is useful to apply this parameter as another important management qualifier (**qualifier of syngenesis**) within recording sheets for the forest land cover, e.g., in the following way:

degree of naturalness	Jaccard index
1	more than 45
2	20 - 45
3	less than 20

To distinguish in practice between structurally similar but syngenetically different ecosystems, Hadač et Sofron (1980) suggested a nomenclatural solution - the prefix „culti" in the latin name of a phytocenological unit (with planted dominant), e.g. *Vaccinio myrtilli-culti-Piceetum* (analogically: *-culti-Quercetum, -culti-Alnetum*, etc.). It is now necessary to transfer this into the formal nomenclature of habitat (landscape) classification.

Suggestion for evaluating:

degree of naturalness		nomenclature	abbreviation
1	high	cultural habitat (landscape) of high naturalness	CN
2	medium	cultural habitat (landscape) of semi-naturalness	CS
3	low	cultural habitat (landscape) of low naturalness	CL

The rare effectively protected or untouched forests (more frequent, for instance, in the Ukrainian Carpathians) which could be declared as truly (syngenetically) natural ones, might be called natural forests (N).

The same principles could be used for the other habitats systematically influenced and/or managed by humans, e.g. meadows with sown of preferred species.

Original examples: We take three sets of phytocoenological records with the minimum number of relevés (5 per each of them) randomly chosen from the higher amount of data – the subject is represented by alder forests, primarily with original dominant species of (1) lowland woody stands (*Alnus glutinosa*) recently often (2) invaded by *Alnus incana* in Central Europe which is frequently (3) planted in typically designed geometry (individual trees in narrow lines and/or rows). We can test impacts of the artificial (3) and spontaneous (2) changes in the dominant tree on the herb and shrub floors. The second case can be considered as a consequence of the first one; *Alnus glutinosa* is the autochtonous species of prevailing altitudes in the region; *Alnus incana* behaves as the expansive species supported in its dispersal by silvicultural planting. The following datasets with recorded species in relevés include total cover of the stand floors, classes of constancy, variations of abundance. Locations and dates of recording are added below:

(1) Natural forest dominated by *Alnus glutinosa (86 species of the set)*:

E3 (total cover: 60 – 90 %): *Alnus glutinosa* V(4 – 5), *Salix caprea* I(+), *Padus racemosa* I(2), *Salix pentandra* I(2), *Salix fragilis* I(r), *Betula pendula* I(r)

E2 (total cover: 5 – 30 %): *Alnus glutinosa* V(+ - 1), *Frangula alnus* II(1 - 3), *Salix triandra* I(2), *S. pentandra* I(2), *S. caprea* I(2), *S. cinerea* I(+), *S. repens* I(+), *Padus racemosa* II(1), *Viburnum opulus* I(+), *Rubus idaeus* I(+), *Sambucus nigra* I(+)

E1 (total cover: 95 – 100 %): *Filipendula ulmaria* V(1 - 3), *Lysimachia vulgaris* V(r - 3), *Caltha palustris* IV(+ - 2), *Lycopus europaeus* IV(1 - 3), *Poa palustris* IV(1 - 3), *Carex acutiformis* III(1 - 4), *Crepis paludosa* III(1 - 2), *Cirsium oleraceum* III(1 - 2), *Angelica sylvestris* III(+ - 2), *Galium palustre* III(r - +), *Aegopodium podagraria* III(+ - 1), *Scirpus sylvaticus* III(r - +), *Phragmites australis* III(+ - 1), *Cirsium rivulare* III(+ - 1), *Urtica dioica* III(+ - 2), *Colchicum autumnale* III(+), *Carex elongata* II(+ - 2), *Carex gracilis* II(2 - 4), *Juncus effusus* II(r - +), *Deschampsia caespitosa* II(+ - 1), *Geum rivale* II(+ - 1), *Valeriana officinalis* II(r - +), *Primula elatior* II(+ - 1), *Senecio ovatus* II(r - +), *Ficaria verna* II(r - +), *Lythrum salicaria* II(r - +), *Phalaris arundinacea* II(+ - 2), *Lychnis flos-*

cuculi I(r - +), *Ranunculus auricomus* II(r - +), *Calamagrostis canescens* I(5), *Anemone nemorosa* I(3), *Lysimachia nummularia* I(2), *Menyanthes trifoliata* I(2), *Carex brizoides* I(2), *Molinia coerulea* I(1), *Myosotis nemorosa* II(+), *Solanum dulcamara* II(1), *Scutellaria galericulata* I(1), *Ajuga reptans* I(1), *Galium aparine* I(1), *Polygonum bistorta* I(+), *Alopecurus pratensis* I(+), *Equisetum sylvaticum* I(+), *E. palustre* I(+), *E. fluviatile* I(+), *Athyrium filix-femina* I(+), *Mentha longifolia* I(+), *Cirsium palustre* I(+), *Ranunculus repens* I(+), *Milium effusum* I(+), *Tephroseris crispa* I(+), *Stellaria nemorum* I(+), *Symphytum officinale* I(+), *Valeriana dioica* I(+), *Pimpinella major* I(+), *Cruciata laevipes* I(+), *Succisa pratensis* I(r), *Dryopteris filix-mas* I(r), *Impatiens noli-tangere* I(r), *Pulmonaria officinalis* I(r), *Listera ovata* I(r), *Dactylis glomerata* I(r), *Lapsana communis* I(r), *Chaerophyllum hirsutum* I(r), *Sanguisorba officinalis* I(r), *Lotus uliginosus* I(r), *Alchemilla acutiloba* I(r)

E0 (total cover: 1 – 10 %): *Lemna minor* I(1), *L. trisulca* I(1), *Elodea canadensis* I(+), *Aulacomnium palustre* I(+), *Calliergonella cuspidata* I(+)

Localities of relevés: 1 – forested wetland along the brook N Nový rybník-pond, 1.5 km W village Opatov near the town Svitavy, 49°50'3.040"N, 16°28'56.527"E, Northern Moravia, Czech Republic, 25.7.1977; 2 - forested wetland on the bank of pond near the railway station Česká Třebová, close to the seedling estate Borek, 49°52'50.894"N, 16°27'15.029"E, Eastern Bohemia, Czech Republic, 7.7.1977; 3 – forested wetland along the brook Husí krk, 0.5 km SE village Hrádek near the town Ústí nad Orlicí, 49°57'59.329"N, 16°20'34.284"E, Eastern Bohemia, Czech Republic, 17.6.1979; 4 – forested wetland in the depression along railway between villages Semanín and Opatov, 1 km W fishpond Hvězda, 49°50'39.071"N, 16°28'34.395"E, Czech-Moravian Highlands, Czech Republic, 14.6.2006; 5 – forested wetland in the valley Tichá Orlice at small village Zářecká Lhota near the town Choceň, 49°59'58.299"N, 16°15'3.642"E, Eastern Bohemia, Czech Republic, 26.7.1978.

(2) Semi-natural forest invaded by *Alnus incana* (spontaneous substitution of the original *Alnus glutinosa*)*(114 species of the set)*

E3 (total cover: 60 – 80 %): *Alnus incana* V(4 – 5), *Alnus glutinosa* II(1 – 2), *Abies alba* I(2), *Fagus sylvatica* I(1), *Salix pentandra* I(2), *Picea excelsa* I(+), *Acer pseudoplatanus* I(r)

E2 (total cover: 5 – 30 %): *Alnus incana* IV(+ - 2), *Alnus glutinosa* V(+ - 1), *Sambucus racemosa* III(r - 1), *Rubus idaeus* II(r – 2), *Fraxinus excelsior* II(r - +), *Viburnum opulus* I(1), *Picea excelsa* I(1), *Carpinus betulus* I(+), *Acer campestre* I(r), *Acer pseudoplatanus* I(r), *Euonymus europaea* I(r)

E1 (total cover: 70 – 100 %): *Stachys sylvatica* IV(r - +), *Filipendula ulmaria* III(+ - 2), *Lysimachia vulgaris* I(+), *Oxalis acetosella* III(+ - 3), *Carex remota* III(r - +), *Caltha palustris* II(+), *Poa palustris* III(+ - 1), *Chaerophyllum hirsutum* IV(r - 3), *Crepis paludosa* II(+), *Cardamine amara* II(+ - 1), *Cirsium oleraceum* II(1), *Angelica sylvestris* II(r - +), *Galium palustre* II(r - +), *Aegopodium podagraria* II(r - 1), *Cerastium lucorum* II(+ - 1), *Polygonatum verticillatum* II(+ - 1), *Lamium maculatum* II(1 – 2), *Scirpus sylvaticus* I(+), *Urtica dioica* IV(+ - 2), *Festuca gigantea* II(r - 1), *Tussilago farfara* II(r), *Juncus effusus* I(r), *Deschampsia caespitosa* II(+), *Geum rivale* I(2), *Primula elatior* I(+), *Senecio ovatus* II(+ - 1), *Galeobdolon montanum* II(+ - 2), *Anemone nemorosa* I(3), *Lysimachia nummularia* I(1), *Molinia coerulea* I(+), *Myosotis nemorosa* III(r - +), *Ajuga reptans* II(+), *Equisetum sylvaticum* II(+ - 1), *E. palustre* III(+ - 1), *Roegneria canina* II(+ - 1), *Glechoma hederaceum* (r – 2), *Athyrium filix-femina* II(r - +), *Circaea lutetiana* II(+), *Mentha longifolia* II(+), *Cirsium palustre* II(r - +), *Ranunculus repens* III(+ - 2), *Melica nutans* II(r - +), *Brachypodium sylvaticum* II(+ - 1), *Milium effusum* I(+), *Impatiens parviflora* I(+), *Stellaria nemorum* II(+), *Cardamine impatiens* II(r), *Carex brizoides* I(4), *Succisa pratensis* I(r), *Veronica montana* I(3), *Galium odoratum* I(2), *Campanula trachelium* I(1), *Prunella vulgaris* I(r), *Carex sylvatica* I(r), *Alnus incana* juv. I(+), *Abies alba* juv. I(+), *Stellaria alsine* I(+), *S. holostea* I(+), *Galeopsis bifida* I(+), *Equisetum telmateia* I(+), *Dryopteris filix-mas* I(+), *D. dilatata* I(+), *Geranium phaeum* I(+), *G. robertianum* I(+), *Impatiens noli-tangere* I(+), *Rubus* sp. div. I(+), *Pulmonaria officinalis* I(+), *Euphorbia dulcis* ¨I(+), *Leucojum vernum* I(+), *Asarum europaeum* I(1), *Viola reichenbachiana* II(+), *Picea excelsa* juv. II(+), *Carex digitata* II(+), *Hypericum maculatum* I(+), *Chaerophyllum aromaticum* I(+), *Epilobium palustre* I(r), *Geum urbanum* I(r), *Aruncus sylvestris* I(r), *Ranunculus lanuginosus* I(r), *Cuscuta epithymum* I(r), *Rorippa sylvatica* I(r), *Carduus crispus* I(r), *Veronica beccabunga* I(r)

E0 (total cover: 1 – 80 %): *Plagiomnium undulatum* II(+ - 2), *Brachythecium velutinum* I(4), *Pohlia nutnas* I(2), *Polytrichum commune* I(1), *Dicranum scoparium* I(1), *Dicranella heteromala* I(+), *Pleurozium schreberi* I(+), *Lophocolea heterophylla* I(+), *Eurhynchium hians* I(+)

Localities of relevés: 1 – linear forested wetland along the brook 0,3 km SW settlement Presy, near village Přívrat, district Ústí nad Orlicí, 49°55'44.638"N, 16°23'7.444"E, Eastern Bohemia, Czech Republic, 18.6.1977; 2 – forested wetland along the brook approx. 1.5 km NW Černý rybník-pond near village Opatov, district Svitavy, 49°49'35.816"N, 16°27'36.808"E, Northern Moravia, Czech Republic, 23.7.1977; 3 – forested wetland in the Vecha river floodplain 1 km W Volovets, approx. 50 km W Uzhhorod, 48°43'00"N, 23°11'00"E, Ukraine, 21.7.1998; 4 – forested wetland 2 km NE Huklyvyi in marginal area of the village Skotarske, 48°44'00"N, 23°16'00"E, Ukraine, 18.7.1998; 5 – forested wetland 1 km W village Dolní Libchavy near the hill Horka, district Ústí nad Orlicí, 49°59'50.964"N, 16°22'25.895"E, Eastern Bohemia, Czech Republic, 23.6.1979.

(3) Plantation of *Alnus incana* on the site of original wetland with *Alnus glutinosa* *(77 species of the set)*

E3 (total cover: 70 – 90 %): *Alnus incana* V(4 – 5), *Alnus glutinosa* I(+), *Salix caprea* II(r - 1), *Picea excelsa* I(1), *Fagus sylvatica* I(r)

E2 (total cover: 5 – 30 %): *Alnus incana* V(+ - 3), *Salix caprea* IV(r – 1), *Salix cinerea* III(+ - 1), *Rubus idaeus* II(+), *Picea excelsa* III(r - 1), *Acer pseudoplatanus* II(+), *Sorbus aucuparia* I(+)

E1 (total cover: 60 – 95 %): *Cirsium oleraceum* IV(+ - 3), *Filipendula ulmaria* IV(1 - 2), *Caltha palustris* III(4 - 5), *Athyrium filix-femina* IV(r - +), *Chaerophyllum hirsutum* III(+ - 2), *Juncus effusus* III(r - +), *Myosotis nemorosa* IV(+), *Deschampsia caespitosa* IV(+ - 1), *Mentha longifolia* III(r), *Equisetum palustre* II(r - +), *Poa palustris* III(+), *Valeriana simplicifolia* II(1 – 2), *Lysimachia vulgaris* II(1 – 2), *L. nummularia* II(+), *Crepis paludosa* II(+), *Equisetum sylvaticum* II(r - +), *Cirsium palustre* II(r - +), *Ranunculus repens* II(+ - 1), *Geum rivale* II(+ - 2), *Hypericum maculatum* II(r - +), *Carex rostrata* I(+), *Valeriana officinalis* I(+), *Cardamine amara* I(+), *Carex sylvatica* I(+), *Lycopus europaeus* II(+), *Equisetum fluviatile* I(+), *Paris quadrifolia* I(+), *Dryopteris dilatata* I(1), *Glechoma hirsuta* I(r), *Alnus incana* juv. I(+), *Abies alba* juv. I(r), *Symphytum cordatum* I(r), *Glyceria plicata* I(+), *Galium palustre* I(r), *Epilobium palustre* I(r), *Urtica dioica* II(+), *Anemone nemorosa* II(1 – 2), *Festuca gigantea* II(+ - 1), *Brachypodium sylvaticum* II(1 – 2), *Calamagrostis canescens* I(2), *Ajuga reptans* II(+), *Poa nemoralis* I(2), *Stachys sylvatica* I(1), *Alchemilla acutiloba* I(r), *Scrophularia nodosa* I(+), *Rubus idaeus* juv. I(1), *Primula elatior* II(+), *Angelica sylvestris* I(1), *Impatiens parviflora* I(+), *Galeobdolon montanum* I(2), *Milium effusum* I(1), *Heracleum sphondylium* I(+), *Geranium robertianum* I(r), *Veronica chamadrys* I(+), *Knautia drymeia* I(1), *Fragaria moschata* I(+), *Melica nutans* I(+), *Cirsium rivulare* I(+), *Senecio ovatus* I(+), *Tephroseris crispa* I(+), *Geum urbanum* I(+), *Ficaria verna* I(+), *Molinia coerulea* I(r), *Colchicum autumnale* I(r), *Trifolium medium* I(r)

E0 (total cover: 0 – 20 %): *Climacium dendroides* III(r – 2), *Plagiomnium undulatum* II(+ - 2), *Pleurozium schreberi* I(+), *Cirriphyllum piliferum* II(+), *Rhytidiadelphys squarrosus* I(+)

Localities of relevés: 1 - forest plantation, 2 km NW village Přívrat near the town Česká Třebová, 49°55'57.511"N, 16°23'3.198"E, Eastern Bohemia, Czech Republic, 14.6.2006; 2 - forest plantation, 1.5 km W village Opatov near the town Svitavy, at the brook parallel to the railway, 49°49'42.966"N, 16°28'25.879"E Northern Moravia, Czech Republic, 20.6.2002; 3 – forest plantation, coast of the lake Sinevir, 50 km NE the town Khust, 48°29'18"N, 23°37'42"E, Ukraine, 20.7.1998; 4 – forest plantation, plain close to mountain range, 5 km E Mukachrevo, 48°27'00"N, 22°43'00"E, Ukraine, 18.7.1998; 5 – forest plantation, lowland 5 km S Maishofen, 47°22'00"N, 12°48'00"E, Austria, 11.8.2001.

Calculation of Q_j (Jaccard index) in the case of comparison (1) and (2) – i.e., natural elder forest with Alnus glutinosa, and transformed wetland forest invaded by Alnus incana is 25. (number of common species: 40). Value of Q_j when we compare invaded stand with plantation of the same dominant Alnus incana is 39 (number of common species: 54), and comparison of cultural forest (originated by human handling with seedlings of *Alnus incana* on places of the original forest with *Alnus glutinosa)* and natural wetland forest exhibits 31 (number of common species: 39).

Using the above mentioned scheme in the naturalness categories both comparisons of influenced forest stands with natural woody wetlands take places within „medium cultural habitat“ (Q_j is 25 – spontaneous ivasion of *Alnus incana* and 31 – plantation). I seems to be curious because of logical assumtion that artificial human impact, i. e., planting of alochtonous seedlings of *Alnus incana* is deeper intervention for the ecosystem than spontanous proces of invasion. In spite of this assumption the value of Jaccard index of similarity is higher at plantation compared. The reason could consist in practice of foresters: on the average, they doun´t select always the optimal ecotopes for the introduced *Alnus* and original herb layer survives without radical changes (we can analogize according to Hadač et Sofron 1980: *Culti-Alnetum incanae).* The opposite case could be represented by spontameous expansion of *Alnus incana* introduced into the landscape as described above. „Landscape archipelagos“ of wetlands being occupied by this species could serve as sources of penetration into the most suitable microhabitats and „natural“ choice of the optimal conditions for next spreading may result in partial extinction of the original species pool of herbal storey (and consequently in lower value of Jaccard similarity in relation to original communities). When we compare both types of secondary forest dominated by *Alnus incana* the highest value of Q_j is logical consequence of the presence of the same woody dominant, however, it doesn´t exceed the frontier of the expected close similarity which indicates the difference between both ways of the stand syngenesis.

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