1.1 EuroVegChecklist Expert System

1.1.1 Basic information about the function

JUICE is available to determine defined vegetation units of European vegetation. This function is related to the paper of Mucina et al. (in prep.) 'Vegetation of Europe: Hierarchical floristic classification system of plant, lichen, and algal communities', where main types of vegetation units were described. The program simply allows raw automatic classification of plant community data using some selected target species. All plots are related to some vegetation unit with the highest number (cover) of target species. The main possible problem – nomenclature – is solved partly automatically (the list of target species considers also synonyms), or manually by the nomenclature changes in your source table. For this purpose, the JUICE contains a function, which should help to simplify a modification of species names. As a result, you will obtain an identification of relevés to vegetation classes (saved in Short Headers), as it is shown here:

Relevés 144 Species 427		PPPPPPPPPPPPPPPFFFFFFFFFFFFF OOOOOOOOOAOAAAAAAAAAA
Abies alba	7	
Acer campestre	0	aaba+a+1b.++a+1+
Acer platanoides	0	a+.+++++.+.
Acer pseudoplatanus	0	.1.13.3.111.1r+
Achillea millefolium	6	
Achillea nobilis	6	
Aconitum anthora	6	· · · · · · · · · · · · · · · · · · ·
Aconitum lycoctonum	6	
Aconitum variegatum	6	
Actaea spicata	6	+
Aegopodium podagrari	6	1212221321322
Aethusa cynapium s.l	6	r+
	-	

Short headers contain an abbreviation of vegetation unit with the highest number (cover) of target species.

Such data may be exported to the spreadsheet document, or can be used for relevé sorting and definition of broad vegetation groups useful for the next analyses.

1.1.2 Files with target species and class names

The function needs two text files with a correct structure for the proper identification of vegetation units - *.TXT file with two columns -(1) abbreviation of the vegetation unit and (2) species name. These fields are divided by tabs. See an example:

ES	Acinos alpinus subsp. pyrenaeus
UM	Acinos alpinus var. nebrodensis
AP	Acinos alpinus var. nebrodensis
RUM	Acinos granatensis subsp. aetnensis
AP	Acinos granatensis subsp. aetnensis
TE	Acinos rotundifolius
AG	Aconitum altissimum
IUL	Aconitum altissimum
IUL	Aconitum napellus subsp. hians
IUL	Aconitum napellus subsp. splendens
IUL	Aconitum napellus subsp. tauricum
UR	Aconitum neomontanum
1UL	Aconitum neomontanum

The *.HEA file with a similar structure contains the column with (1) abbreviation of vegetation unit and (2) the full vegetation unit name:

BID	Bidentetea
BRA	Brachypodio pinnati-Betuletea pendulae
BUL	Poetea bulbosae
CAK	Cakiletea maritimae
CAN	Cytiso-Pinetea canariensis
CFR	Charetea
COR	Koelerio-Corynephoretea
CRI	Crithmo-Staticetea
CRY	Crypsidetea aculeatae
CYT	Cytisetea scopario-striati
DAP	Daphno-Festucetea
DRY	Drypetea spinosae

Both files must be stored to the same directory and named by the same name. They are available at the JUICE web page ('Species list for EES 2014.zip' contains two files – ECS5.TXT and ECS5.HEA). ECS5.TXT file is encrypted, but the names are fully visible within the JUICE program.

1.1.3 Initiation of the function

The function can be called from the main JUICE menu 'Analysis' and 'EuroVegChecklist Expert System'. The following window will ask for the previously mentioned ECS5.TXT file and displays an expert system classification tool. Nomenclature unification with the check list of European flora used in ECS5.TXT file is of the main importance before any analysis.



1.1.4 Nomenclature modification

We can identify species names in our table, which are in accordance to the used check list. A selection of virtual button '**Show automatically associated species**' identifies all species, which names were found in the ECS5.TXT file. They will be selected by RED colour (be sure that you removed all red species colours from the table).

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Acer pseudoplatanus	0
Achillea millefolium agg.	6
Achillea nobilis	6
Aconitum anthora	6
Aconitum lycoctonum	6
Aconitum variegatum	6
Actaea spicata	6
Aegopodium podagraria	6
Aethusa cynapium s.lat.	6
Agrostis capillaris	6
Agrostis vinealis	6
Ajuga reptans	6
Alliaria petiolata	6
Allium flavum	6
Allium senescens ssp. montanum	6

Some JUICE table part with identification of species with a proper nomenclature

Taxa with '**ssp**.' are automatically associated with those containing '**subsp**.' Other species must be physically renamed. From this reason, please archive the former table and use its new copy only for the next expert classification. The function '**Manual modification of species nomenclature**' helps you to make fast and efficient changes in nomenclature of your table. The next window will appear:



Upper list contains a list of species in your table with their colours. Bottom list shows check list of species with proper nemonclature. If you need to find some equivalents to species names in yout table, simply move the list of species by buttons with arrows. Every time you will change the selected species in the upper list, bottom list will change automatically the position to the species with the most similar name. This is an advantage, if the species name differs slightly (in subspecies etc.). In case, the name is a synonym with different species, or even genus name, it is better to use the button '**Search species name**'. The searching has two variants -(1) searching from the start of each species name and (2) searching in any part of species name.

The button '**Rename selected species by the name:**' will replace species name in the table highlighted by grey colour (upper list) by a new name from the bottom list (also highlighted by grey colour in the centre of the list).

1.1.5 Class identification for a single relevé

Close the 'Nomenclature Modification' window and get back. While 'EuroVegChecklist Expert System' window is every time on the top, you can simply click to the table and select any relevé. The you will select the button 'One relevé'. A list of species, which were determined within selected relevé, will appear in an upper list. It will contain an information about (1) related class abbreviation, (2) some ratio of species importance (calculated as an inversed number of classes determined by the same species) and (3) species name. Bottom list shows the number (cover etc.) of species, which indicate the same vegetation class. Those species, which were not classified, are considered to the field 'Unclassified records'. A check box 'Save data to Clipboard' works only for a function 'One relevé' and it stores all available information from the bottom list automatically to the Clipboard.



Classification of relevé No. 141 from some table shows a list of species with their relation to vegetation units and the list of the most probable classification.

1.1.6 Class identification for a table (set of relevés)

A set of relevés selected by one highlighted colour will be classified automatically – the result of classification will be stored to **Short headers** as a three letter code of vegetation class. The selected check box '**Show transition**' will identify, if the relevé is transitional and has a value higher than threshold for more than one vegetation unit. Such relevés are marked by a three letter code of vegetation class and a letter code '+'. Relevés, where no vegetation type has higher value than a threshold ('**Cut level**'), will be marked by '*'.



1.1.7 Measures for class identification

Several options are available how to classify a relevé. 'Species frequency' is useful especially for presence/absence data, while 'Sum of power species cover' and 'Weighted sum of PSC' expects available cover data for each species. Rooted species cover decreases an importance of dominants and balances presence/absence information with cover data information. Therefore, there is an option to select some (square-, cubic- etc.) root of all species covers. 'Species frequency' and 'Sum of power species cover' options consider all species with the same weight. However, some target species are related to more than one vegetation type. Such species have lower ratio ('Rat.') in the upper list of this window. This ratio was used as a weight in an option 'Weighted sum of PSC'. Power transformation is also included in that option. Check box 'Relative value (sum = 100%)' can help to remove large differences between species numbers (covers) between relevés.