

Turboveg in a nutshell

Roskilde, 30-05-2012

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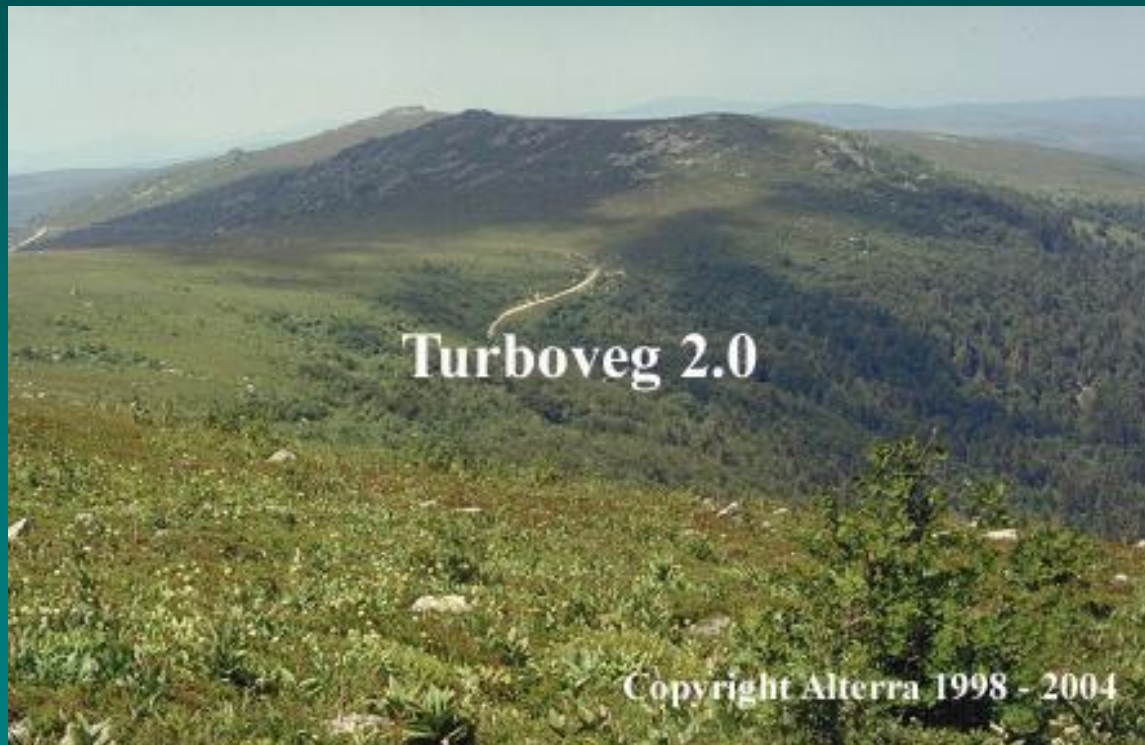
Alterra, Wageningen

The Netherlands



Turboveg

An easy to install and easy to use Windows program for PC for managing vegetation plot data.



<http://www.synbiosys.alterra.nl/turboveg>

A comprehensive local database management system for storing, selecting and exporting vegetation plot data.

- Storage: Single plots, vegetation tables (manual input), Excel tables, XML files, Cornell condensed files (digital input).
- Selection: Selection on (any combination of) databases attributes, including species combination.
- Export: many export filters are included, like MS Access database, Excel files, XML files, CANOCO files, Shapefiles, Google Earth.
- Calculation of mean indicator values (e.g. Ellenberg)
- And more...

Turboveg database structure

- Is simple
- Is extendable
- Three dBase files and corresponding index file compose a database
 - header data
 - species data
 - remarks
- Turboveg can handle multiple databases and multiple species lists
- Connected to the databases a set of lookup tables (e.g. authors, projectc, etc.)

The input and management of vegetation data by using Turboveg

Turboveg for Windows 2.69beta

Database Edit Import Select Export Manage Window Help

Default dictionary

Database: Slovakia

Relevé number

Relevé number	Cover abundance scale	Country code	Biblioreference	No. table in publ.	No. relevé in table	Project code
401705	01	SK	700245	7	1	003
401706	01	SK	700245	7	2	003
401707	01	SK	700245	7	3	003
401708	01	SK	700245	7	4	003
401709	01	SK	700245	7	5	003
401710	01	SK	700245	7	6	003
401711	01	SK	700245	7	7	003
401712	01	SK	700245	7	8	003
401713	01	SK	700245	7	9	003
401714	01	SK	700245	7	10	003
401715	01	SK	700245	7	11	003
401716	01	SK	700245	7	12	003
401761	01	SK	700001	7	56	003
402132	01	SK	700001	-1		
402136	01	SK	700001	-1		
402138	01	SK	700001	-1		
402139	01	SK	700001	-1		
402148	01	SK	700001	-1		
402150	01	SK	700001	-1		
402154	01	SK	700001	-1		
402155	01	SK	700001	-1		
402156	01	SK	700001	-1		
402157	01	SK	700001	-1		
402175	02	SK	700001	-1		
402197	01	SK	700001	-1		
402199	01	SK	700001	-1		
402224	02	SK	700001	-1		

Selected relevés: 60

Releve: 401705

Species	Layer	Cover
Acinus arvensis	-hl	+
Allium flavum	-hl	+
Aster linosyris	-hl	+
Centaurea stoebe ssp. stoebe	-hl	+
Cerastium holosteoides	-hl	+
Cruciata pedemontana	-hl	+
Euphorbia cyparissias	-hl	+
Festuca rupicola	-hl	2
Genista germanica	-hl	+
Helianthemum ovatum	-hl	+
Hieracium bauhini	-hl	+
Koeleria macrantha	-hl	1
Luzula campestris	-hl	+
Lychnis viscaria	-hl	1
Odontites ruber agg.	-hl	+
Phleum phleoides	-hl	+
Poa angustifolia	-hl	+
Poa compressa	-hl	+
Potentilla argentea	-hl	+
Potentilla recta	-hl	+
Pulsatilla pratensis ssp. nigricans	-hl	+
Stipa pennata	-hl	2
Tanacetum corymbosum	-hl	+
Teucrium chamaedrys	-hl	1
Trifolium alpestre	-hl	+

He 1/17910 04/12/2007 c. europe ReadWrite Form edit Species data Rec: 1/28

Press F1 for Help Num Caps Ins 11/04/2008

Data entry for header data

Edit releve 150005

Form 1 Form 2

* Obligated fields

?	* Cover abundance scale:	09	Cover herb layer (%):	90
?	Country code:	44	Cover moss layer (%):	0
?	Biblio reference:	-----	Cover lichen layer (%):	0
	Nr. table in publ.:		Cover algae layer (%):	0
	Nr. relevé in table:		Cover litter layer (%):	0
?	Project code:		Cover open water (%):	0
?	Author code:	0050	Cover bare rock (%):	0
	Date (year/month/day):	/ /	Height (highest) trees (m):	0
?	Syntaxon code:	U12a	Height lowest trees (m):	0
	Relevé area (m2):	0.00	Height (highest) shrubs (m):	0.0
	UTM grid system code:	- - - -	Height lowest shrubs (m):	0.0
	Altitude (m):	1159	Aver. height (high) herbs (cm):	3
?	Aspect (degrees):	315	Aver. height lowest herbs (cm):	0
	Slope (degrees):	10	Maximum height herbs (cm):	0
	Cover total (%):	0	Maximum height cryptogams (mm):	0
	Cover tree layer (%):	0	Mosses identified (y/n):	
	Cover shrub layer (%):	0	Lichens identified (y/n):	

Remarks: Sample no: 21/

Confirm

Next

Previous

Save

Exit

Help

Species entry

Edit species data releve 150005 [Cover scale = Domin]

Abies alba

Species list

Scientific name
Abies alba
Abies grandis
Abies procera
Abies species
Absoconditella celata
Absoconditella delutula
Absoconditella pauxilla
Absoconditella sphagnum
Absoconditella trivialis
Acaena anserinifolia
Acarospora badiofusca
Acarospora fuscata
Acarospora glaucocarpa

Search:

Layer: 2 - Tree layer -middle- (t2) Cover: 1

Selected species: 29

Species name	Layer	Cover
Barbilophozia floerkei		3
Campylopus paradoxus		1
Carex bigelowii		5
Cetraria islandica		3
Cladonia arbuscula		2
Cladonia bellidiflora		2
Cladonia coccifera		1
Cladonia floerkeana		1
Cladonia pyxidata		1
Cladonia uncialis		3
Conostomum tetragonum		1
Deschampsia cespitosa s. alp		1
Deschampsia cespitosa s. ces		1
Dicranum fuscescens		3
Festuca ovina		2

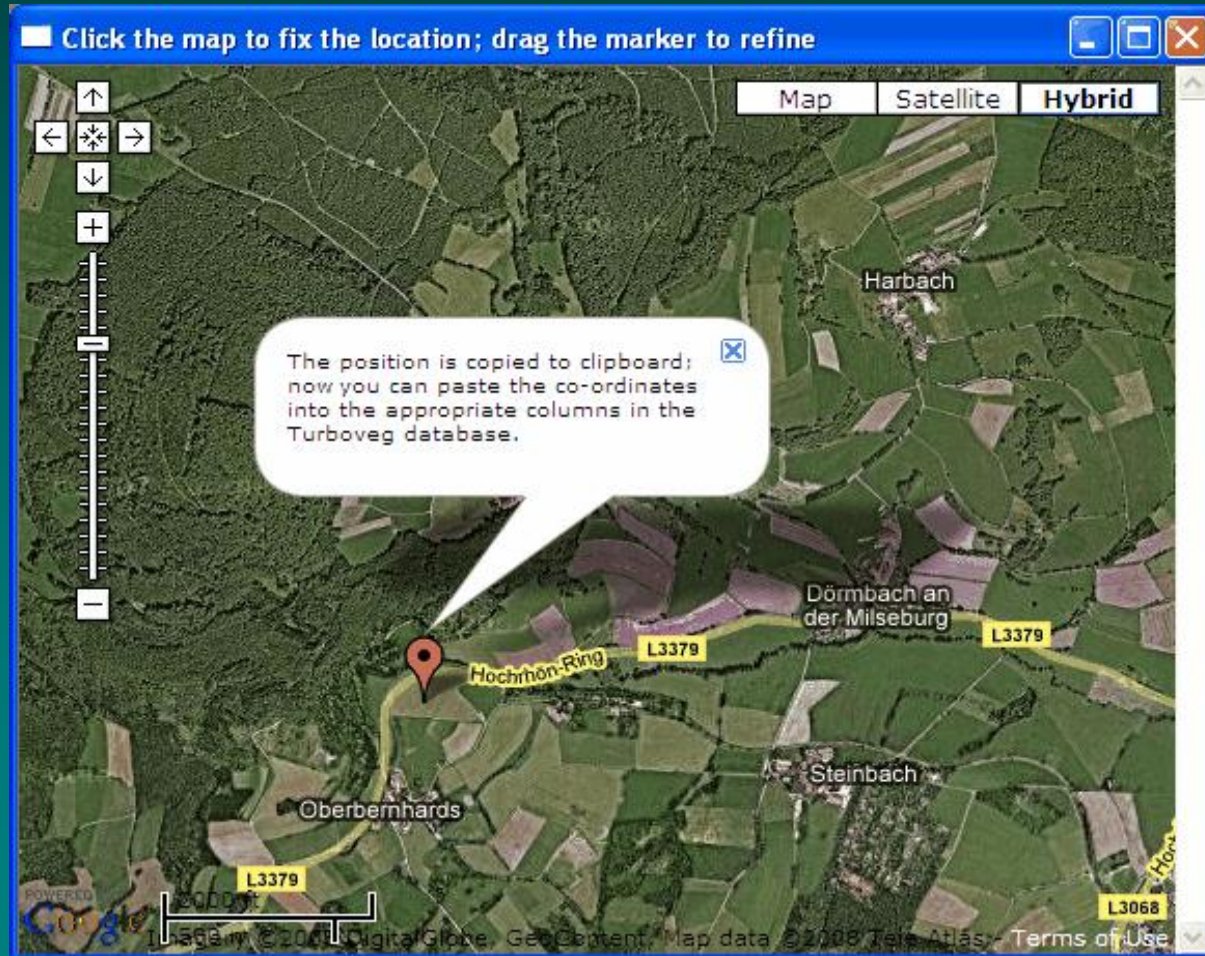
Language

Additional parameters

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Filter Save Cancel Help Remarks

Turboveg can use Google maps for geo-referencing plots



Turboveg provides many export filters

The screenshot displays the Turboveg for Windows 2.72a interface. The 'Export' menu is open, showing various export options. The background shows a data table with columns for 'Relevé number', 'Project code', and 'Author code'. The table contains 33 rows of data, with rows 12 and 13 highlighted in yellow.

TURBOVEG database

- TURBOVEG database
- MS ACCESS database
- Standard XML file
- XML project file for TurbovegCE
- EsVeg compatible XML file
- Cornell condensed species file
- User defined header data file
- Spreadsheet table
- SDF formatted database
- JUICE input files
- ESPRESSO/TAB/TABWIN input file
- MULVA input file
- SYNTAX input files
- SYNTAXON input file
- TAXAL input file
- FUZphy input files
- Species check list
- Herbarium etikettes
- Shapefile
- Mapping file
- Distribution map
- Google Earth
- Releve data sheets

	Relevé number	Project code	Author code
	150010		0050
	150011		0050
✓	150012		0050
✓	150013		0050
	150014		0050
	150015		0050
	150016		0050
	150017		0050
	150018		0050
	150019		0050
	150020		0050
	150021		0050
	150022		0050
	150023		0050
	150024		0050
	150025		0050
	150026		0050
	150027		0050
	150028		0050
	150029		0050
	150030		0050
	150031		0050
	150032		0050
	150033		0050

Export to spreadsheet table

Target directory

Output file

Format

Add species numbers

Export originale species names

Orientation header data

Vertical Horizontal

Species data

Parameter

Original codes Percentages (0-100) Ordinal values (0-9)

Select header data

Relevé number
Country code
Biblio reference
Nr. table in publ.
Nr. relevé in table
Year
Month

Select ecological data

Species_nr
Species_na
Light
Moisture
Reaction
Nitrogen
Salt

Example of an
export filter:
Excel table

The result in Excel

tvexport.xls - Microsoft Excel

Home Insert Page Layout Formulas Data Review View Add-Ins

Clipboard Font Alignment Number Styles Cells Editing

A1 Table number


	A	B	C	D	E	F	G	H	I
1	Table number		1	2	3	4	5	6	
2	Plot number		150012	150013	150014	150015	150016	150017	
3	Country code		44	44	44	44	44	44	
4	Year								
5									
6	Carex bigelowii		3	3	.	3	3	3	Carex bigelowii
7	Deschampsia flexuosa		3	.	2	.	.	.	Deschampsia flexuosa
8	Nardus stricta		10	10	3	7	9	5	Nardus stricta
9	Dicranum fuscescens		2	7	.	.	.	1	Dicranum fuscescens
10	Racomitrium lanuginosum		1	.	1	6	2	2	Racomitrium lanuginosum
11	Ptilidium ciliare		1	4	.	.	.	.	Ptilidium ciliare
12	Cetraria islandica		2	2	3	3	3	3	Cetraria islandica
13	Cladonia arbuscula		3	2	2	3	1	.	Cladonia arbuscula
14	Cladonia bellidiflora		3	3	1	2	3	.	Cladonia bellidiflora
15	Cladonia coccifera		1	.	1	1	.	.	Cladonia coccifera
16	Cladonia metacorallifera		2	1	.	.	.	.	Cladonia metacorallifera
17	Cladonia gracilis		1	2	2	.	1	1	Cladonia gracilis
18	Cladonia rangiferina		1	.	1	.	.	2	Cladonia rangiferina
19	Cladonia uncialis		2	1	4	3	1	2	Cladonia uncialis
20	Lepidozia species		1	.	.	.	.	.	Lepidozia species
21	Cetraria delisei		1	2	.	.	.	.	Cetraria delisei
22	Lophozia species		1	.	.	.	.	.	Lophozia species
23	Deschampsia cespitosa s. cespitosa		.	1	.	.	.	.	Deschampsia cespitosa ssp. c
24	Scirpus cespitosus		.	1	5	5	4	5	Scirpus cespitosus

Turbogev export


Ready 100%

Export to XML (JUICE)

Export to XML file

Target directory 

Output file

Encoding 

Exclude relevés that have no species

Description

Send file as e-mail attachment

Submit data to EURODAT

JUICE, software package for analyzing vegetation data

JUICE 6.5.41

File Edit Species Relevés Table Head Sorting Separators Synoptic Table Indicator Values Analysis Table Simulation Help

Releve: white Species: black Separator hierarchy: 1

Statistics: Pfl coeff. C Total time: 0 days 0 h 16 min 26 sec

```

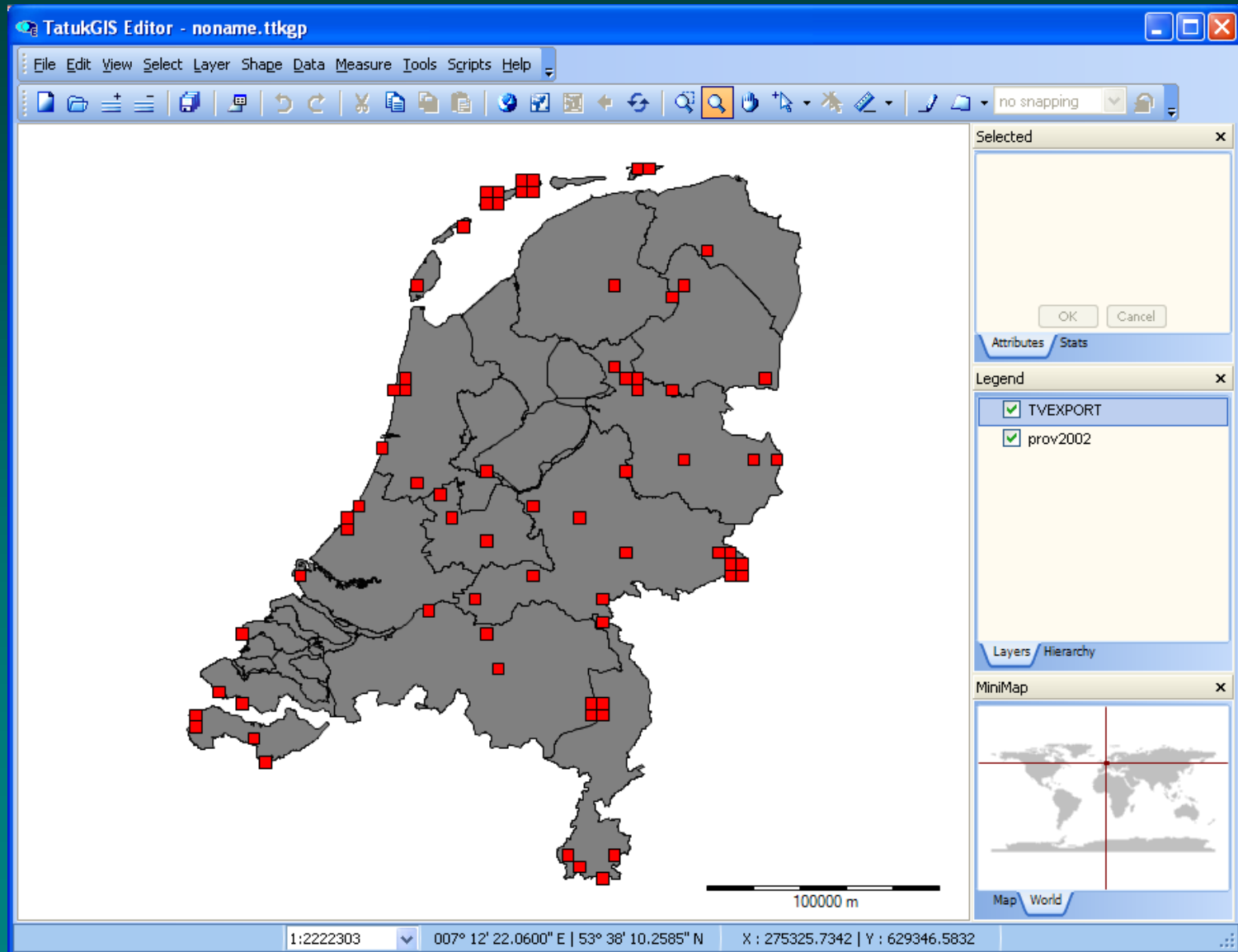
Relevés 52
Species 185
11111111111222222222223333333333344444444445555
12345678901234567890123456789012345678901234567890123456789012

Carex bigelowii      0  22.222.....553.2.4411+.1222222222...22.+12...2222
Deschampsia flexuosa 0  2.1....22222..1....1.52.....+1.2.+....2.222212.122
Nardus stricta      0  5.2352.....1.++1...2+...12+.++..2....2+++1+.2.+
Dicranum fuscescens 0  13...+.....2.....+.....2..1....2.2
Racomitrium lanuginosum 0  +.+311.....1....11.+++.2+...435...2.1..2....2112
Ptilidium ciliare   0  +2.....1+.....2.....221.+1+.211
Cetraria islandica  0  112222.....+.+...++.....+.+.221...2.+212...2221
Cladonia arbuscula  0  2112+.....+2+.+.2....12+1...1.212+.+.3331
Cladonia bellidiflora 0  22+12.....22....+++...2.+1++1.....+.+...+1.1
Cladonia coccifera  0  +.+.1....+.+.+.+.+.2.+.....1.+
Cladonia metacorallifera 0  1+.....
Cladonia gracilis   0  +11.++.....+.+.2+.2+++.+.1+11
Cladonia rangiferina 0  +.+1.....1...+.+.+.2+.2+2.
Cladonia uncialis  0  1+22+1.....+.2+1...1...+112...12++...+212
Lepidoxia species  0  +.....+.....
Cetraria delisei    0  +1.....111+.....+.....
Lophoxia species   0  +.....
Deschampsia cespitosa s. cespitosa 0  +...1....+.212+.31+1..2+.
Scirpus cespitosus  0  +2222.....222.....
Barbillophosia floerkei 0  +.1+.....2....22222.1+222222....1.+2.+...
Cladonia pyxidata  0  .1.1.....+.+.+.+.21..+.1.+...+.1++
Agrostis capillaris 0  ..+.+.+.+.+.2.....+.2....
Calluna vulgaris    0  ..2....+3422.....+.344...+...+2....
Empetrum nigrum s. hexmaphroditum 0  ..22+2.....+.1...1+...231...412111+1434+
Juniperus communis s. communis 0  ..+.
Loiseleuria procumbens 0  ..2+....+.+.+.
Diphasium alpinum  0  ..21.+.....1.....+
Huperzia selago    0  ..+.+.+.1.1.++1.+...+.+.+.
Holinia caerulea   0  ..2.....1.1.....
Marthecium ossifragum 0  ..1.....
Potentilla erecta  0  ..2..1.....11.2...+1....
Vaccinium uliginosum 0  ..2..2.....1.....+3...2.222.

```

Frequency: Relative No.: Row: 11
 Relevé No.: Column:

Export to shapefile as input for GIS



Export to...

- Access data base
- DarwinCore Archive (GBIF)
- Google Earth
- PostgreSQL database (currently only in Dutch version)
- and more...

Where is Turboveg in use?

- In almost every European country.
- Outside Europe in Argentina, Brazil, China, Columbia, Egypt, Japan, Russia, South-Africa, South-Korea, USA, and some more.

Worldwide a few thousand users.

In which countries is Turboveg in use?

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Worldwide about 2000 users

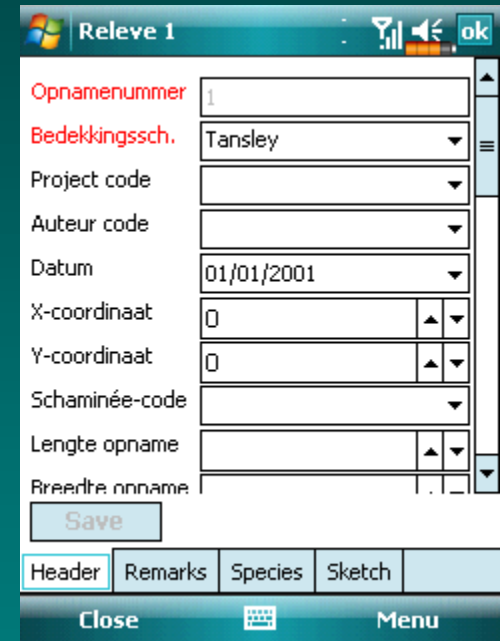
What is not so good in Turboveg

- Only two data types are supported, numerical and alpha-numerical.
- Poor taxon concept model.
- Poor in handling missing values.
- Not possible to store geometries, other than points (polygons, lines).
- No meta data storage.
- No support for nested plots.

- ..but, these issues will be taken care of in the next major release of Turboveg.

TurbovegCE

Turboveg Compact Edition supports GPS/GIS and has a seamless data exchange with TurbovegPC



Data storage in a SQL data base

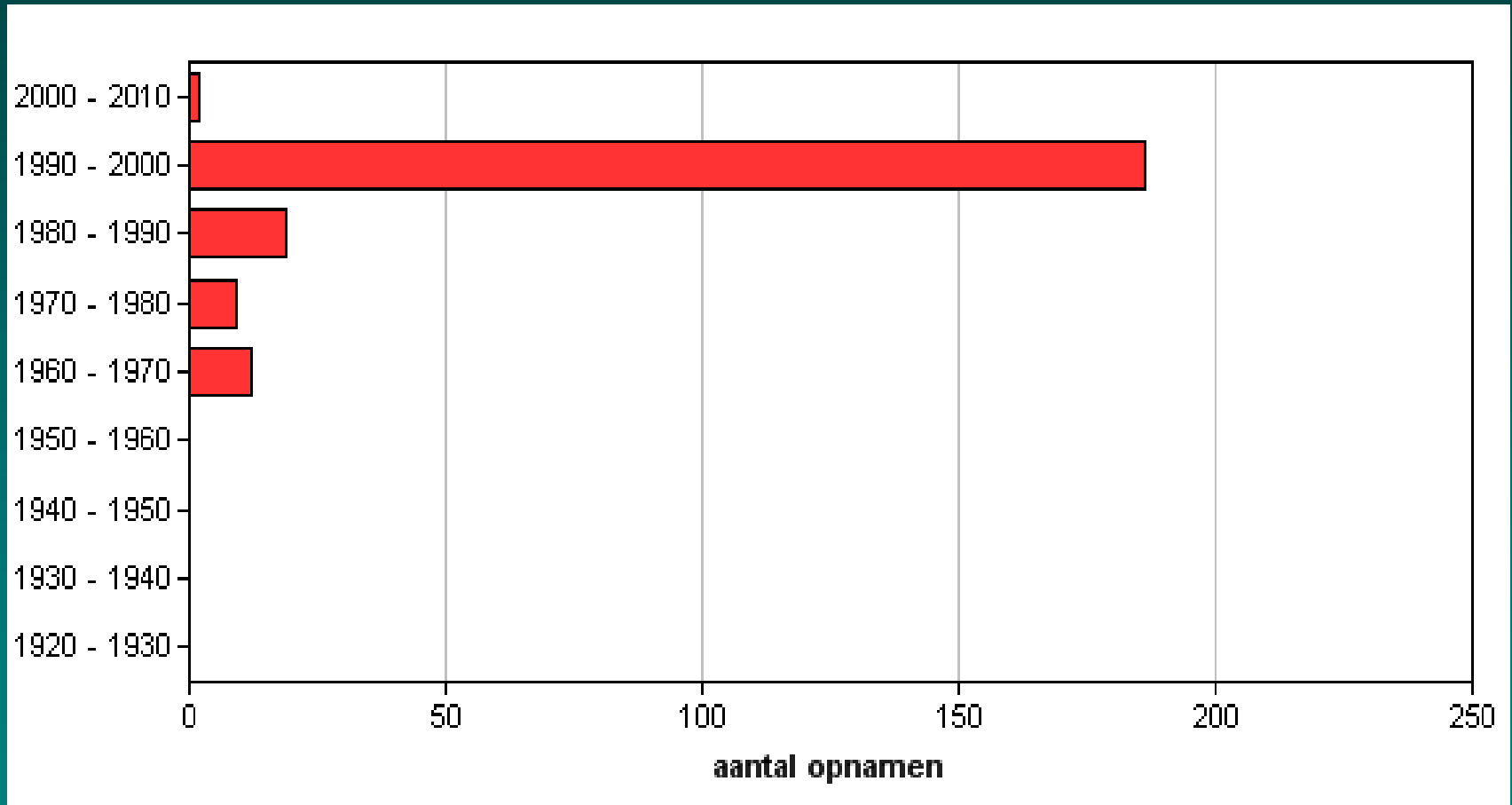
The Dutch National Vegetation Database

- More than 600.000 vegetation plots divided over more than 80 Turboveg database of various size, and exported into an open source SQL database - PostgreSQL/PostGIS.
- The database was set up more than 20 years ago to enable the classification of vegetation of the Netherlands.
- Both classification and database have proven to be a great source for all kind of applications.

Selection of an area of interest using a Google maps web application



Number of plots per decade



Natura 2000 habitat types

Habitattypen

Code	Naam	Periode	Aantal
6410	Grasland met <i>Molinia</i> op kalkhoudende, venige, of lemige kleibodem (Eu-Molinion)	(1979 - 1999)	46
6430	Voedselrijke zoomvormende ruigten van het laagland, en van de montane en alpiene zones	(1997)	2
7140	Overgangs- en trilveen	(1999)	2
91E0	*Alluviale bossen met <i>Alnus glutinosa</i> en <i>Fraxinus excelsior</i> (Alno-Padion, Alnion <i>incanae</i> , Salicion <i>albae</i>)	(1984)	2
Totaal aantal opnamen toegewezen aan habitattypen			52

Plant communities

Plantengemeenschappen

Code	Naam	Periode	Aantal
16AB01	Crepido-Juncetum acutiflori	(1967 - 1999)	42
08RG08	RG Carex acutiformis-[Phragmitetalia]	(1967 - 1997)	17
16AB06	Angelico-Cirsietum oleracei	(1979 - 1997)	10
32AA01A	Valeriano-Filipenduletum calamagrostietosum	(1967 - 1997)	10
16AB05	Scirpetum sylvatici	(1984 - 1997)	7
16RG02	RG Holcus lanatus-Lychnis flos-cuculi-[Molinietalia]	(1979 - 1997)	7
16AA01B	Cirsio dissecti-Molinietum typicum	(1989 - 1997)	5
36AA02B	Salicetum typicum	(1984 - 1997)	5
16RG06	RG Carex disticha-[Calthion palustris]	(1979 - 1997)	4
28AA01B	Cicendietum filiformis juncetosum	(1997)	4

Detailed information of the plots

Vegetatieopnamen

U kunt onderstaande tabel sorteren op verschillende criteria. Kies uit de kopregel een aspect waarop u de tabel wilt sorteren. Kies het opnamenummer voor gedetailleerde informatie.

Geselecteerd aantal opnamen: **228**

▼ Opnamenr.	Bronhouder	Jaar	Code pg.	Naam plantengemeenschap
53157	Staatsbosbeheer	1967	16AB01	Crepido-Juncetum acutiflori
53158	Staatsbosbeheer	1967	32AA01A	Valeriano-Filipenduletum calamagrostietosum
53159	Staatsbosbeheer	1967	32AA01A	Valeriano-Filipenduletum calamagrostietosum
53161	Staatsbosbeheer	1967	32AA01A	Valeriano-Filipenduletum calamagrostietosum
53162	Staatsbosbeheer	1967	32AA01A	Valeriano-Filipenduletum calamagrostietosum
53163	Staatsbosbeheer	1967	08BC03	Caricetum vesicariae
53164	Staatsbosbeheer	1967	08RG08	RG Carex acutiformis-[Phragmitetalia]
53165	Staatsbosbeheer	1967	08RG08	RG Carex acutiformis-[Phragmitetalia]
53166	Staatsbosbeheer	1967	08RG08	RG Carex acutiformis-[Phragmitetalia]
101698	Prov. Gelderland	1981	16RG02	RG Holcus lanatus-Lychnis flos-cuculi-[Molinietalia]

Opnameschaal: Ordinale schaal

Soortnaam	Vegatatielaag	Bedekking
Achillea ptarmica (Wilde bertram)		2
Agrostis stolonifera (Fioringras)		5
Angelica sylvestris (Gewone engelwortel)		2
Cardamine pratensis (Pinksterbloem)		2
Carex disticha (Tweerijige zegge)		5

Short demo of the web tool

- <http://www.synbiosys.alterra.nl/lvd>

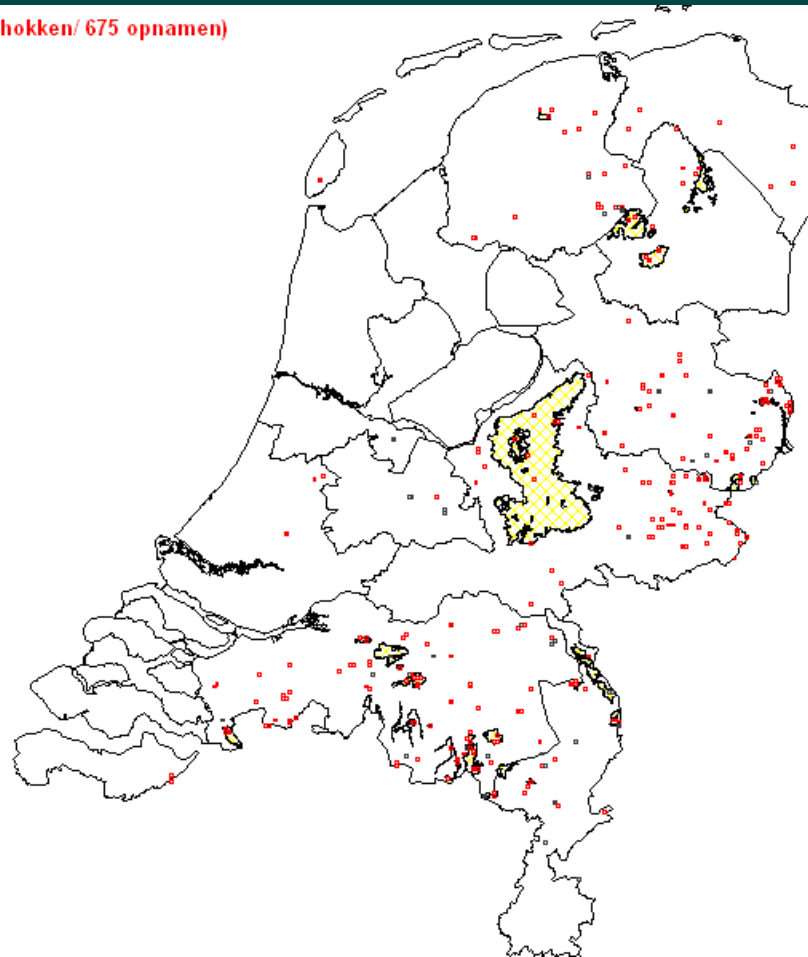
Applications for Natura 2000 using the Dutch National Vegetation Database

1. In a first step each vegetation plot is assigned to a plant community.
2. Then, by means of the assigned plant community type and additional criteria (e.g. GIS layers) each plots is assigned (if possible) to a habitat type.
3. On the basis of plots which have assigned habitat types both distribution and range can computed and reported to the EU.

Applications for Natura 2000

- Actual distribution (1 x 1 km) -

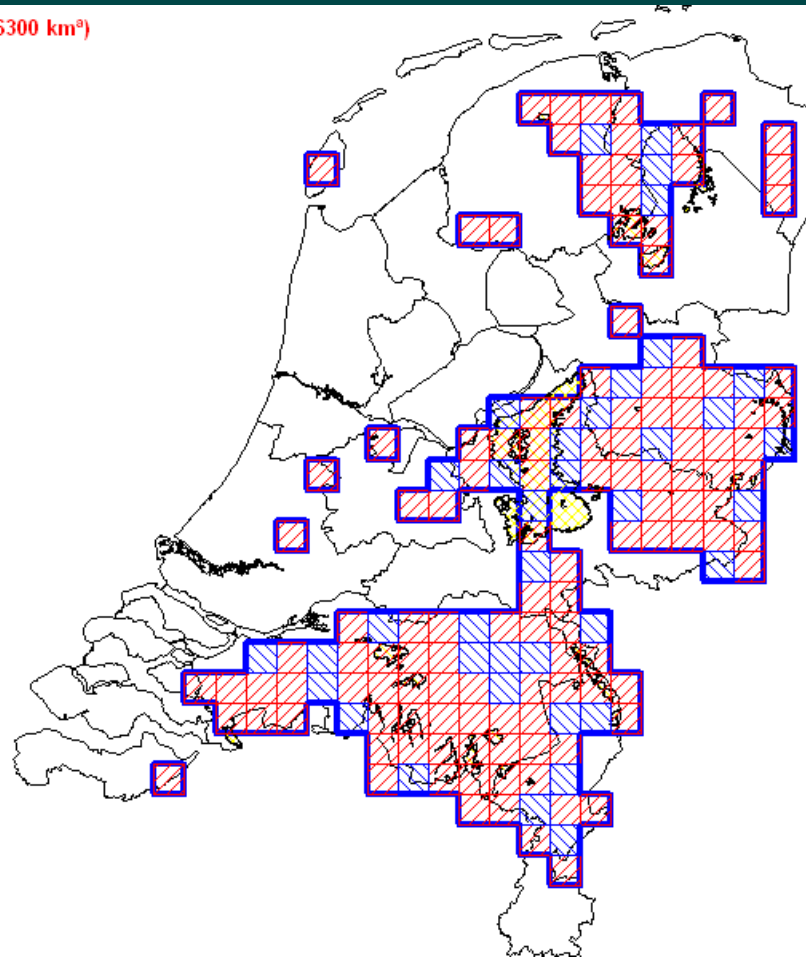
Habitattype: 3130 (277 kmhokken/ 675 opnamen)



Applications for Natura 2000

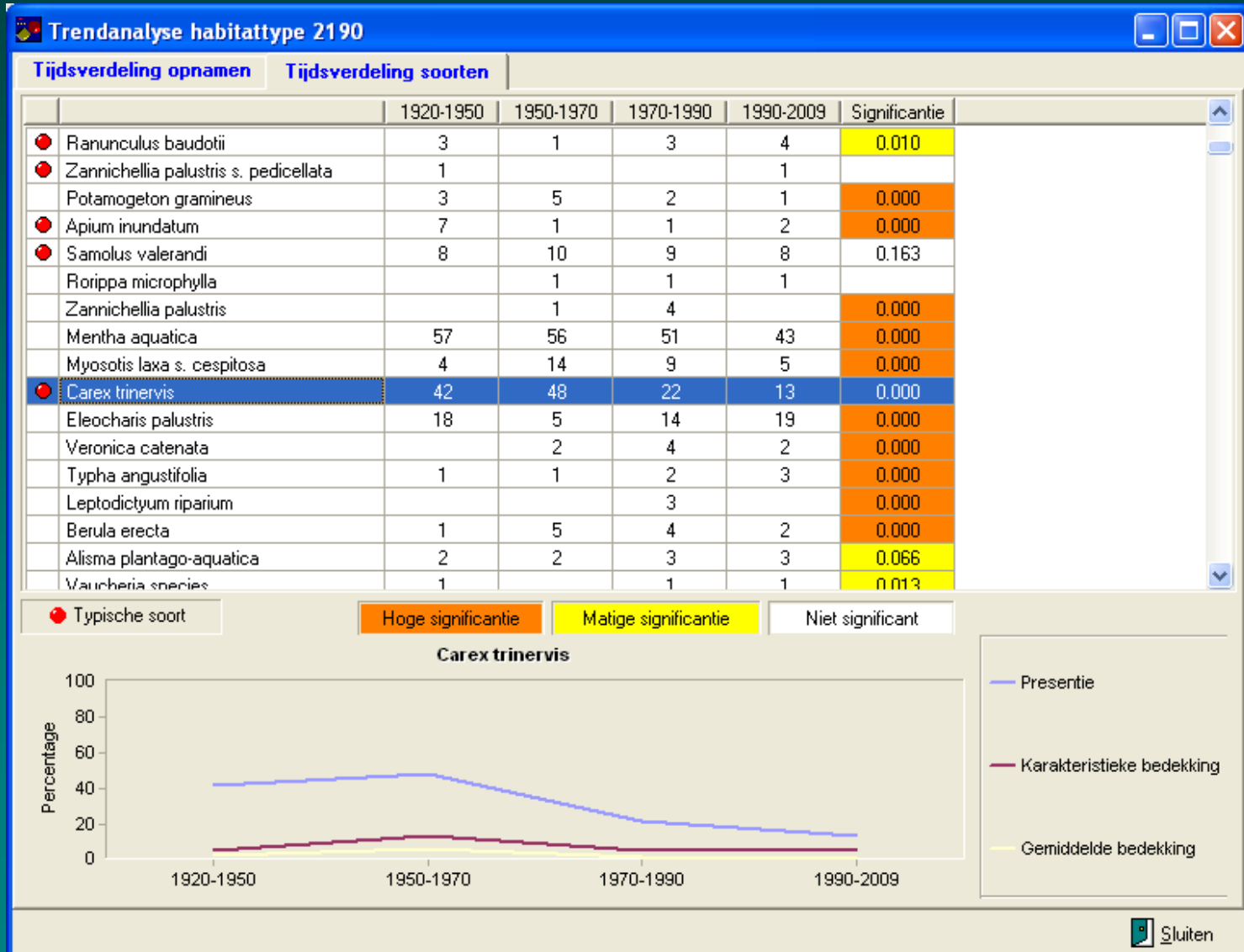
- Distribution range (10 x 10 km) -

Habitattype: 3130 (Opp: 16300 km²)



Applications for Natura 2000

- Trend analysis -



Braun-Blanquet, one of the founders of vegetation research in the 20th century

