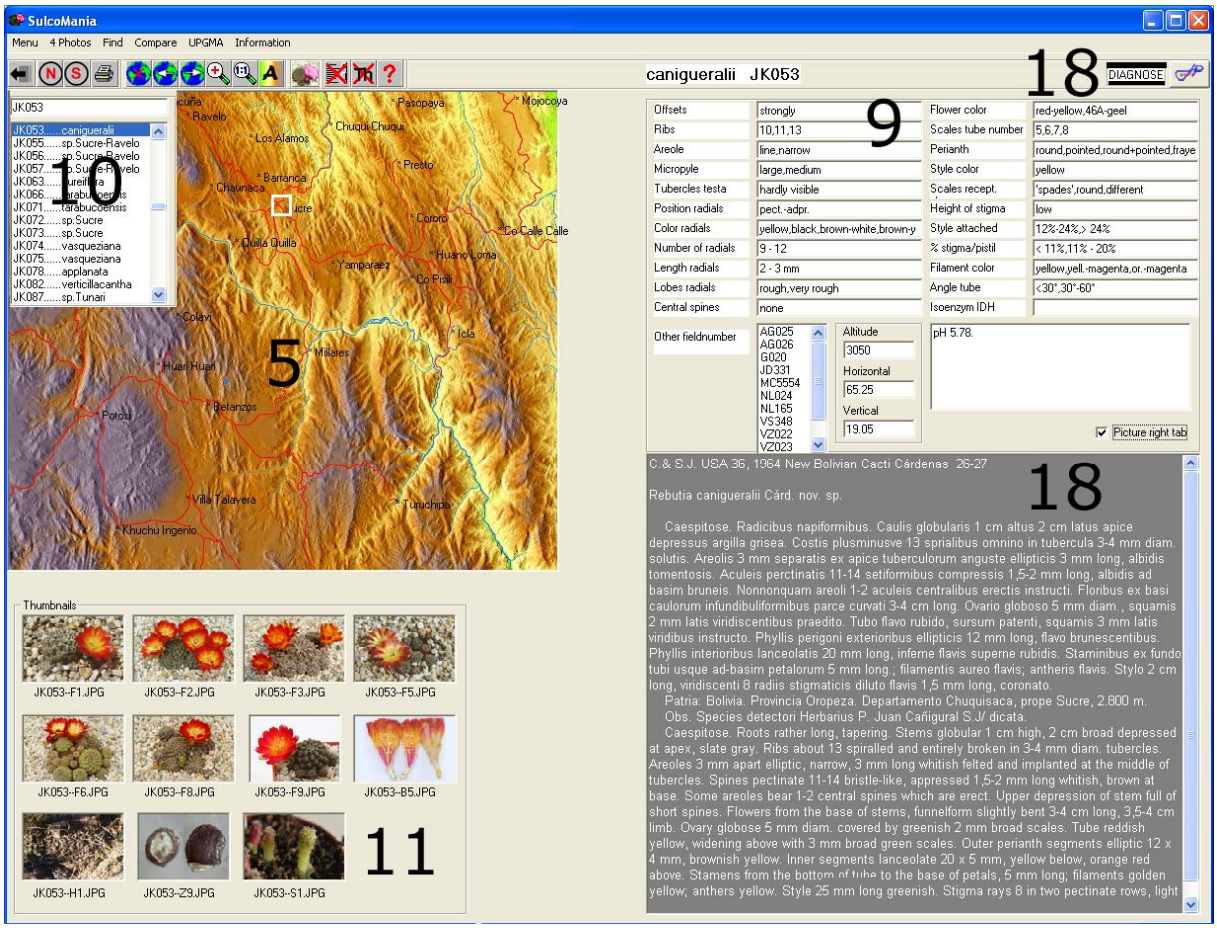
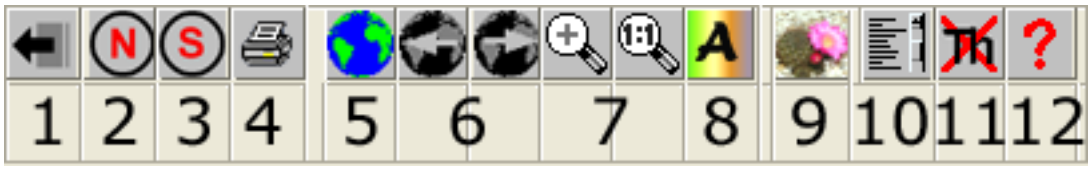
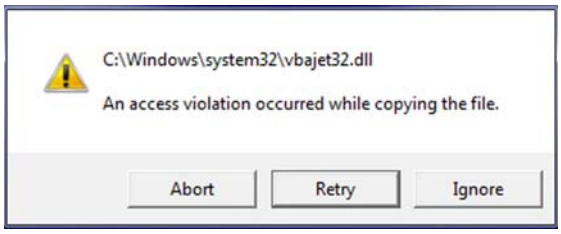
SULCOMANIA





Install:

(program Cactus)
Click on START,
Click on EXECUTE,
Click on BROWSE,
Select the DVD-device,
Select the folder INSTALCACTUS,
Doubleclick on SETUP.exe.
N.B. While installing the program with with Windows 7 there will be a warning against copying certain files, which however are indespensable using Windows XP. Click on "Ignore". The files are skipped.



Main menu

Click on  to choose another language.

SulcoMania is based on **field numbers**. In many cases the chosen names are arbitrary, but they are used frequently.
You can select a name or a field number. By default the program starts with a list of names [1].

If you prefer to select immediately a field number, you click on  [2]

Move the cursor to the left upper corner of the screen. A list of names or field numbers appears. Select a name and then a field number [1] or immediately a field number [2].

Frame with thumbnails

At the bottom left of the screen a frame with small pictures (= thumbnails) appears.
Click on a thumbnail: the picture is shown.
Click on the picture: the picture disappears.

Names of the pictures

The first 7 characters are reserved for the field number.
Then a character follows that indicates the type of picture:

- *F = photo of a flowering plant*
- *P = photo of a plant without a flower*
- *H = photo of a plant in its natural habitat*
- *B = picture of a flower section, usually made by a photo scanner*
- *Z = picture of a seed, taken with a microscope*
- *S = photo of a seedling, usually with an age of 4 months*
- *D = macro-picture of a radial spine, sometimes with areole*

The frame with the thumbnails disappears with a click on the frame or on  .

The panel with the thumbnails is shown again by clicking on  .

Frame with characteristics

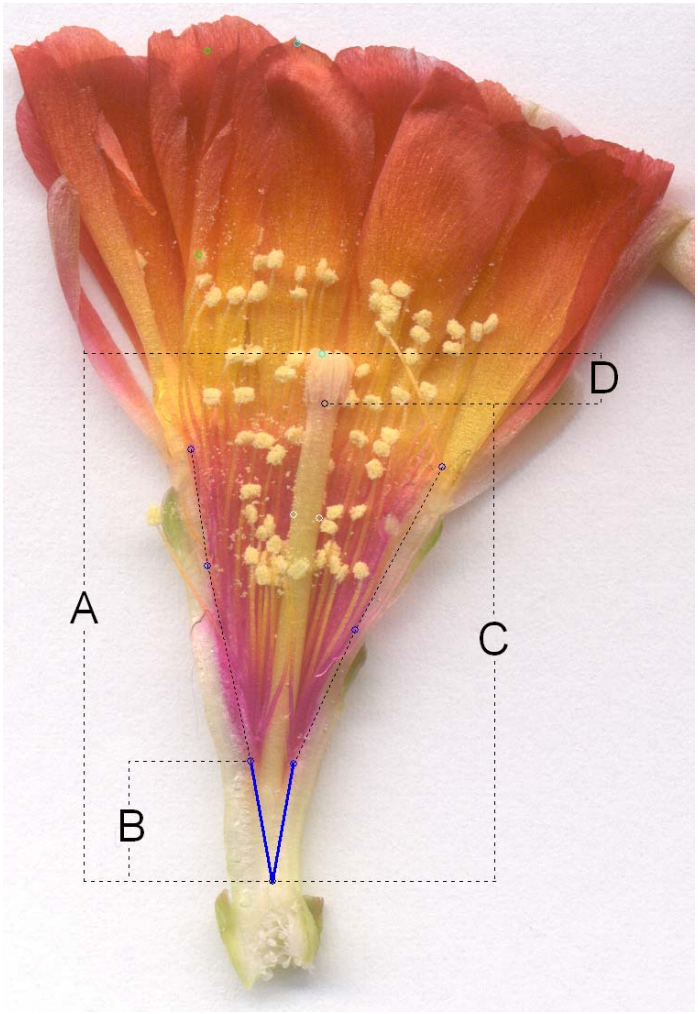
In the right upper corner a frame containing a table with 22 characteristics appears.

1. *Body offsetting* — *strongly: more than 1 offset pro year*
3. *Areol Form* — *line = no felt*; *narrow = oblong with felt*; *elliptical*

6. *Position radial spines (pointing) down-adpr(essed)*
7. *Colour radial spines brown-white = white with brown foot*; *brown-yellow = yellow with brown foot*; *light + dark tip = light with dark tip*
10. *Lobes radials*

smooth *rough* *false lobes*

12. *Flower colour* — *red-yellow = perianth red in top and yellow at the bottom, see picture of flower*
sometimes a code is indicated by R.H.S. Colour Chart of The Royal Horticultural Society LONDON.
16. *Scales recept(acle) shape 1. form of spade*
2. round
3. different
18. *Style attached*
see picture of flower: B / A
19. *% stigma/style*
see picture of flower: D / C
21. *Angle tube*
see picture of flower:
dark blue lines



The **altitude** of the habitat is arithmetically rounded to the nearest 25 m.
The **coordinates** are written as decimal numbers, rounded to the nearest 0,05°. The real habitat is situated in a rectangle of approximately 5,5 km length and width.

In an **Info** window additional information can possibly be found.

If ***Picture right tab*** has been selected, the picture will be shown against the right edge.

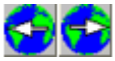
Click on an item in the list of “Other field number”. This record is selected.
N.B. Field numbers of the same area must not belong to the same taxon. Therefore in SulcoMania, various populations are called “species of a place”.

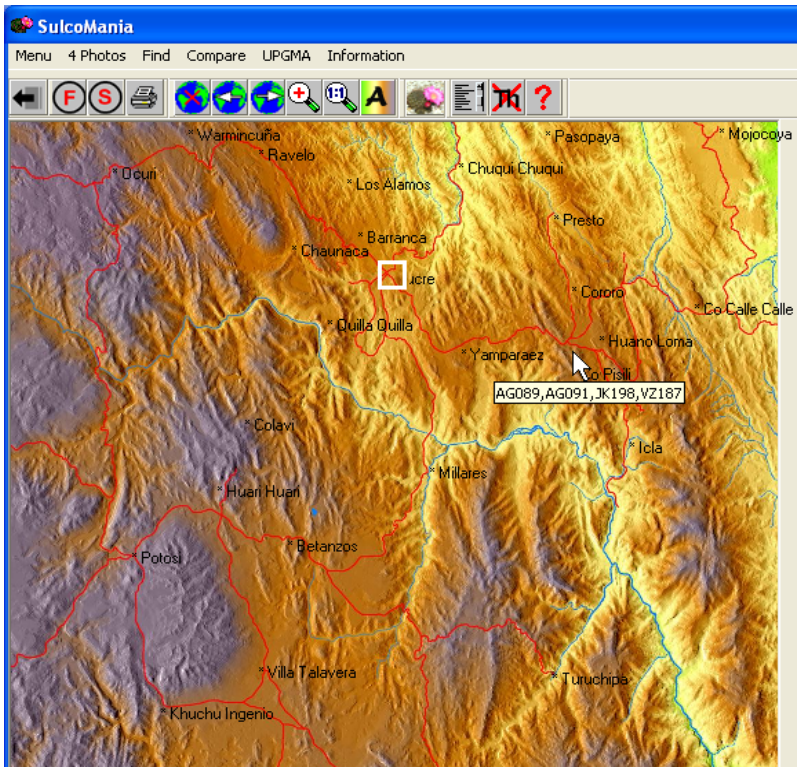
The frame with characteristics disappears with a click on the frame.

The frame with characteristics is made visible again by a click on  .

 If the habitat of the selected field number is known, the icon with the globe will be shown in colour. Click on it to display a map. The name of the map is found in the frame with characteristics.

Click on  to enlarge the map or to shrink it to the original format.

Click on  to move the map to the left or to the right.



Click with the right mouse button on the map. If available a list with alternative maps will be shown. Click on the name of a map in this list.

If the cursor above the map is paused and weingartia’s / sulcorebutia’s have been discovered on that site, the field number will be displayed, see the cursor on the map.

The colours of the map indicate the altitude.

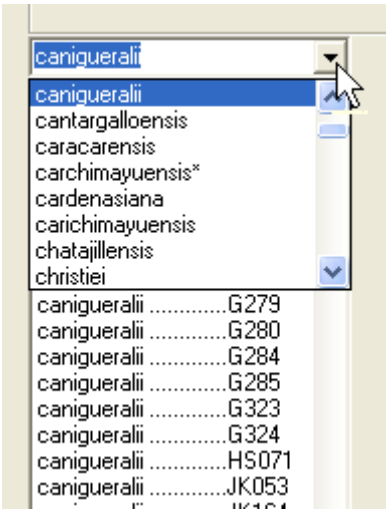
Click on  to see the relation between colour and altitude.

Click on the map to hide it.

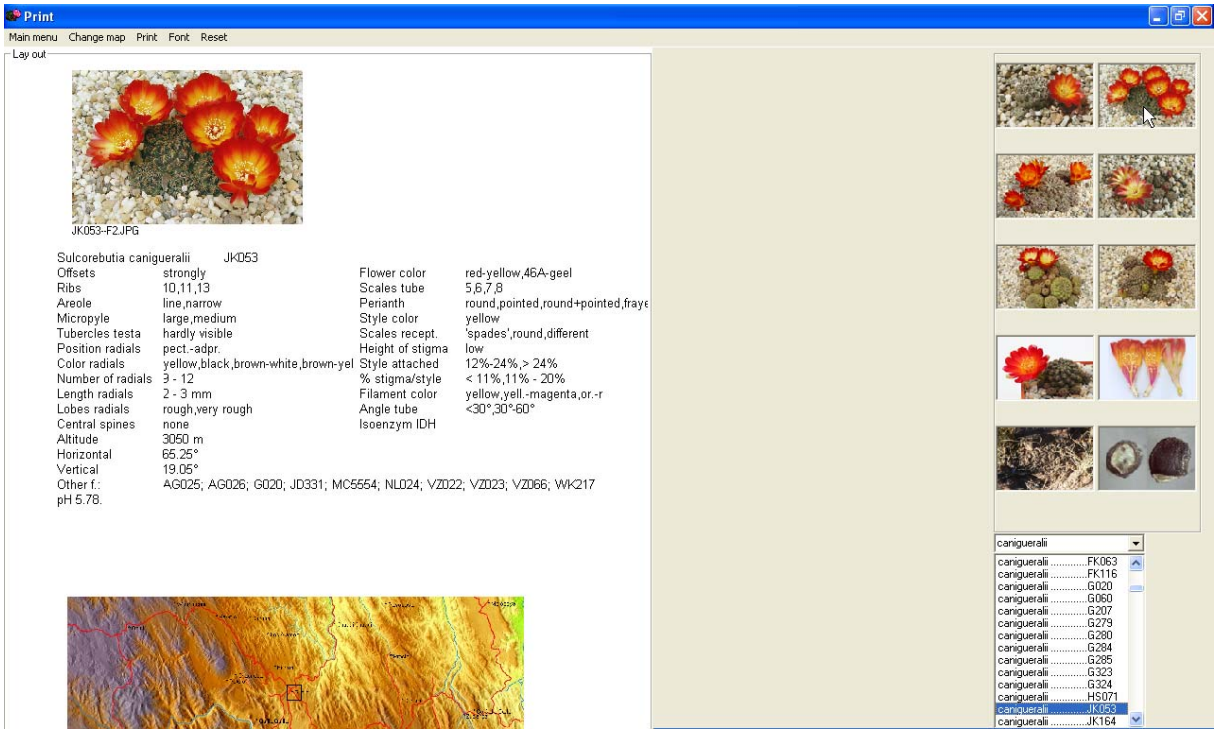
If a first description of the name is available, then DIAGNOSE appears at the top right of the screen. If the text is outlined in red, the type of plant was a member of the population of the selected field number.

Click on DIAGNOSE: the text of the first description appears. Click on the text: the text of the first description disappears.

Print

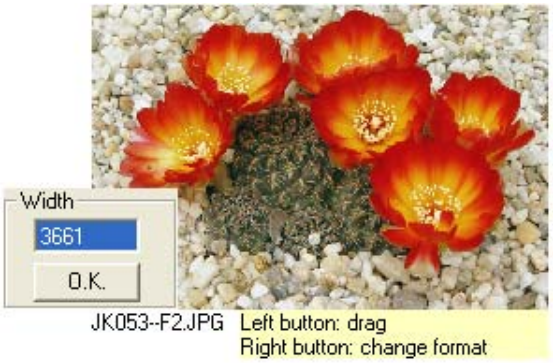


The list has been based on names.
Click on to select a name. A list appears.
Select an item of this list.
In the Lay-out, the characteristics and the text of the field with additional information appear.
Below this you will see a map. The height of this map is determined by the available space on the page (A4).
Above the list the thumbnails belonging to the selected field number appear.
Select one or more photos by clicking on the thumbnails.
By adding pictures the space for the map will shrink. It is possible, that after selecting many pictures the height of this space becomes negative. The consequence will be a Run-time-error.



To move a photo: click with the left mouse button on the photo, keep the button down and drag to the the desired position.

To enlarge or reduce a photo: click with the right mouse button on the picture. Enter a new width and click on O.K.

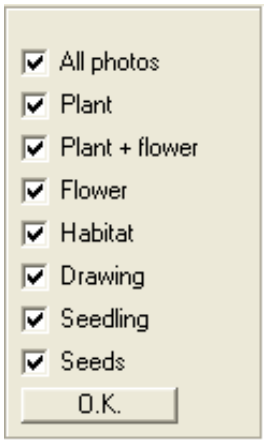


4 Photos

Click on an item of the list. The mouse icon changes into  .

Keep the left mouse button pressed and drag to one of the four frames. The mouse icon changes into  .

Release the left mouse button above the desired frame. The picture appears in the format of the frame: the height is adjusted.
Click on the picture to see the original format.
Click on the original picture to hide.



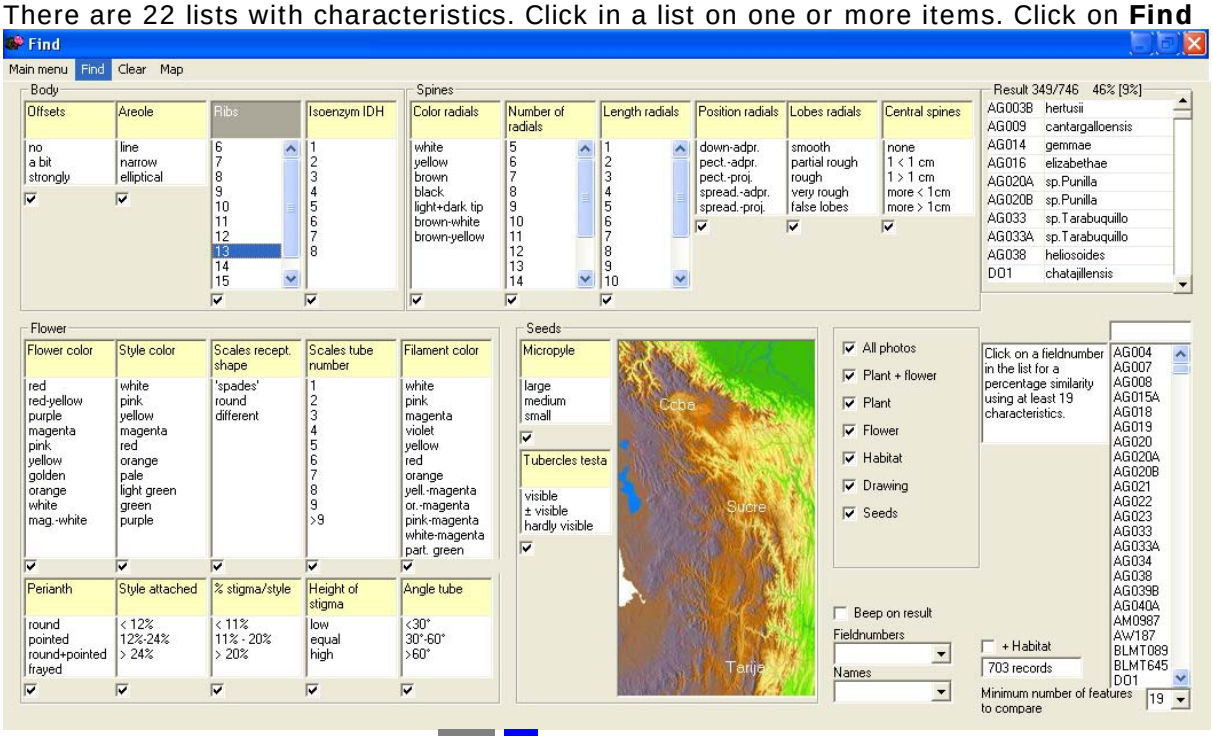
The program offers the overall list of the pictures. One can exclude a part of the list or limit to a certain category of pictures.

Find

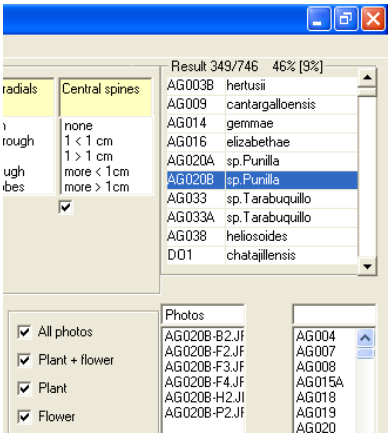
There are various options.
- find field numbers with a selected characteristic or a combination of selected characteristics.
- find all field numbers with a selected acronym.
- find all field numbers with a selected name.
- find field numbers with a high degree of similarity in characteristics with those of a selected field number.

Find field numbers with a selected characteristic or a combination of selected characteristics

There are 22 lists with characteristics. Click in a list on one or more items. Click on **Find**



In the example in characteristic Ribs 13 is selected.
*Plants of a field number may have different numbers of ribs. If one of them is 13, the field number is included in **Result**.*

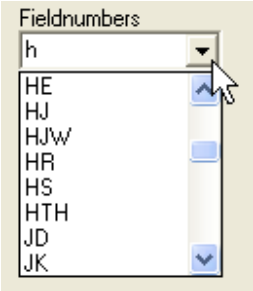


This result appears in the top right of the screen. Above the obtained field numbers you find "Result 349/746 46%[9%]". The number of ribs has been found in 746 records In 349 of these the number 13 was found. This is 46% of 746. If the numbers of ribs of ranging from 6 to >15 had been distributed equally, the result would have been 9%.
Obviously 13 occurs relatively often. Perhaps this is not surprising since 13 is a number of the Fibonacci sequence..
Click on a item in the list of **Result**.
A list with pictures belonging to the selected field number appears.
Click on a item of this list. The picture appears. Click on the picture and it disappears.
Left of this list you can select the type of picture to be displayed ("All photo's", "Plant + flower", and so on.)

Map: a map is displayed. On this map there is an indication of where the results occur.
Click with the right mouse button to select another map.
Click on Print to print the map.

More items per characteristic can be selected.
More characteristics can be selected.

Clear: all selections in the list of the characteristics are cleared.



Find all field numbers with a selected acronym

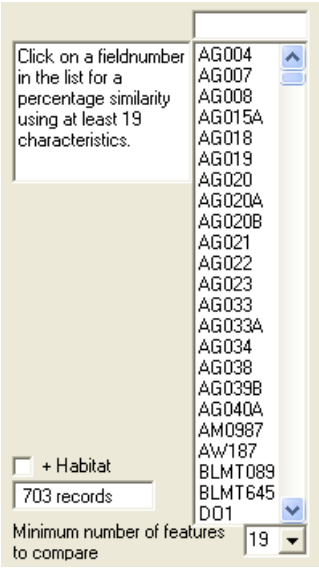
Click on ▼ of the combibox of Field numbers.
Select an acronym.
Click on **Find**.
Keep the mouse cursor above the textbox for 1 second, after selecting an acronym. The meaning of the acronym is displayed in a "Tooltiptext", if known.

Find all field numbers with a selected name

Click on ▼ of the combibox of Names.
Select a name.
Click on **Find**.

Find field numbers with a high degree of similarity in characteristics with these of a selected field number

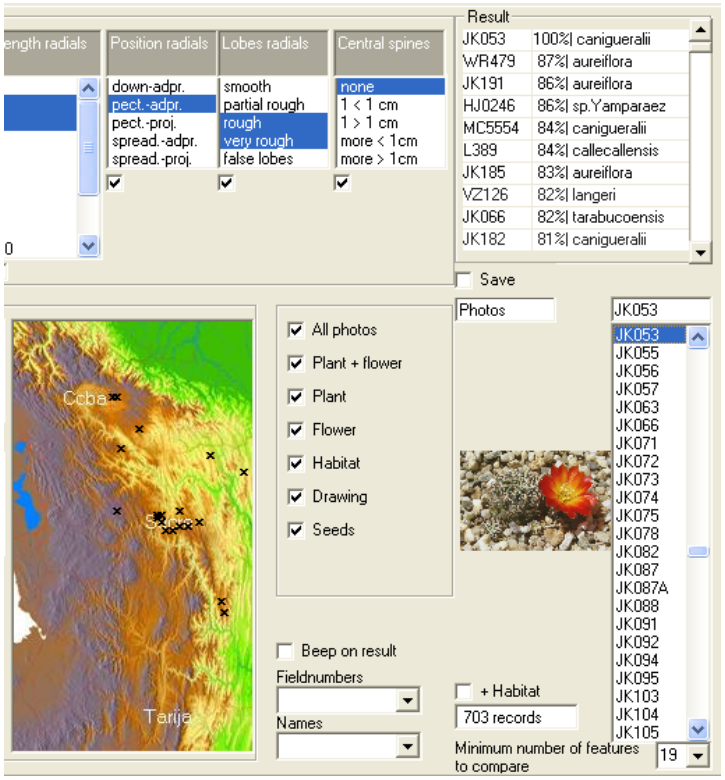
Of all field numbers in the list 19 or more characteristics have been provided with data.



To change the number of 19 you click on ▼ of the combibox under the list.

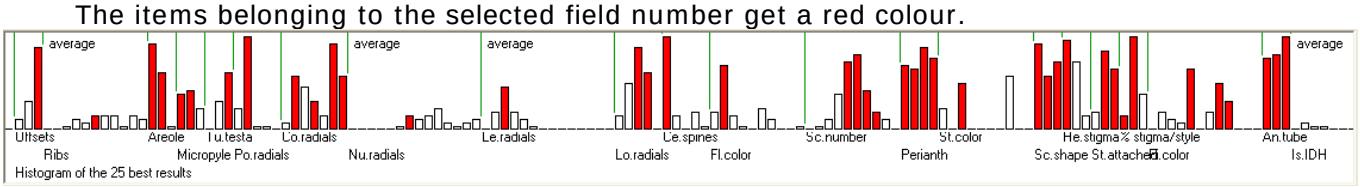
Select a field number.

In the tabel **Result** (right picture right in top) your find the filed num-bers sorted according to the percen-tage of similarity.
N.B. As the number of features used is lower, the colour of the character will be lighter. This will be noticeable if 'Minimum number of features to compare' is set much lower.



The map shows the habitats of the 25 field numbers with the highest percentage.

At the bottom of the screen a histogram is displayed for these 25 field numbers with the highest percentages of similarity.
Every item (possible value) of every characteristic is represented by a column.
The height of the column is determined by the number of times this item occurs in the 25 "best" results.
The items belonging to the selected field number get a red colour.

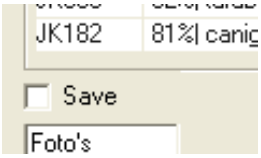


In this example the shape of scales on the tube has little meaning, as all of the colums are red.
Calculation:
Compared is a characteristic of field number A and field number B.
- characteristic$_A$ = red, characteristic$_B$ = red: *similarity = 1*
- characteristic$_A$ = red, characteristic$_B$ = red, yellow: *similarity = 0,8*
- characteristic$_A$ = red, characteristic$_B$ = orange: *similarity = 0,5*
(The last example illustrates treatment of unclear choices. It is applied in Lobes radial spines, Flower colour and Style colour)

The percentage of similarity is calculated by $\frac{\text{sum favorable outcomes}}{\text{number of characteristics with data}}$.

Some people believe, that populations growing close together must be more related. Therefore if +Habitat is activated, the habitat will be used as a 23^e characteristic.
Using the coordinates the *distance* between habitats is calculated.
Then the percentage similarity is calculated by:

$$\frac{\text{sum favorable outcomes} + 0{,}0625 \times (4 - \textit{distance})^2}{\text{aantal characteristicen met gegevens} + 1}$$



If Save is activated, Result is saved as a text file (.txt) and the small map as a bmp-file (.bmp) in the folder *C:\SulcoMania*.

Below you see a part of the results up to 81%, belonging to this example. The number of used characteristics is displayed between [].

+Habitat off

100% JK053	canigueralii[21]
87% WR479	aureiflora[21]
86% JK191	aureiflora[21]
86% HJ0246	sp.Yamparaez[21]
84% MC5554	canigueralii[21]
84% L389	callecallensis[21]
83% JK185	aureiflora[21]
82% VZ126	langeri[19]
82% JK066	tarabucoensis[21]
81% JK182	canigueralii[19]
81% JK063	aureiflora[21]

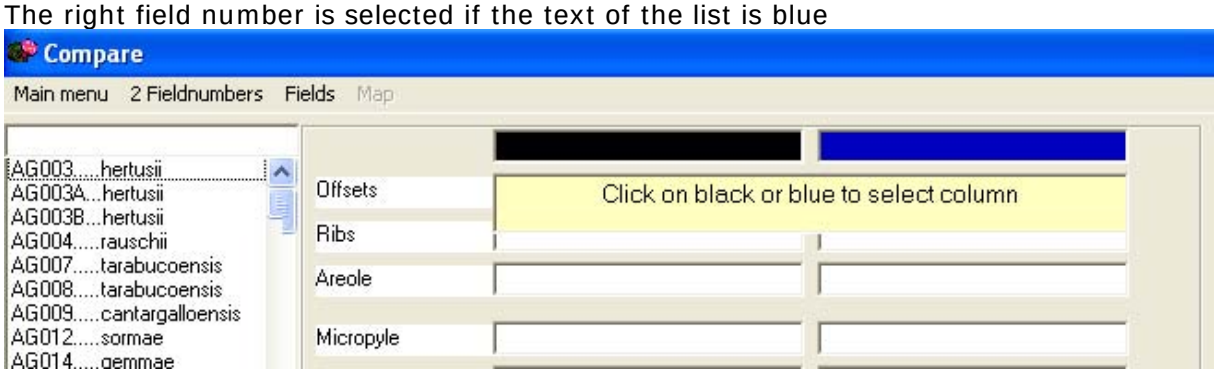
+Habitat on

100% JK053	canigueralii[22]
87% WR479	aureiflora[22]
86% JK191	aureiflora[22]
86% HJ0246	sp.Yamparaez[22]
85% MC5554	canigueralii[22]
84% JK185	aureiflora[22]
83% L389	callecallensis[22]
82% JK066	tarabucoensis[22]
81% WK217	canigueralii[22]
81% JK182	canigueralii[20]
81% JK063	aureiflora[22]
81% HS071	canigueralii[22]
81% EH06253	sp.Yamparaez[20]

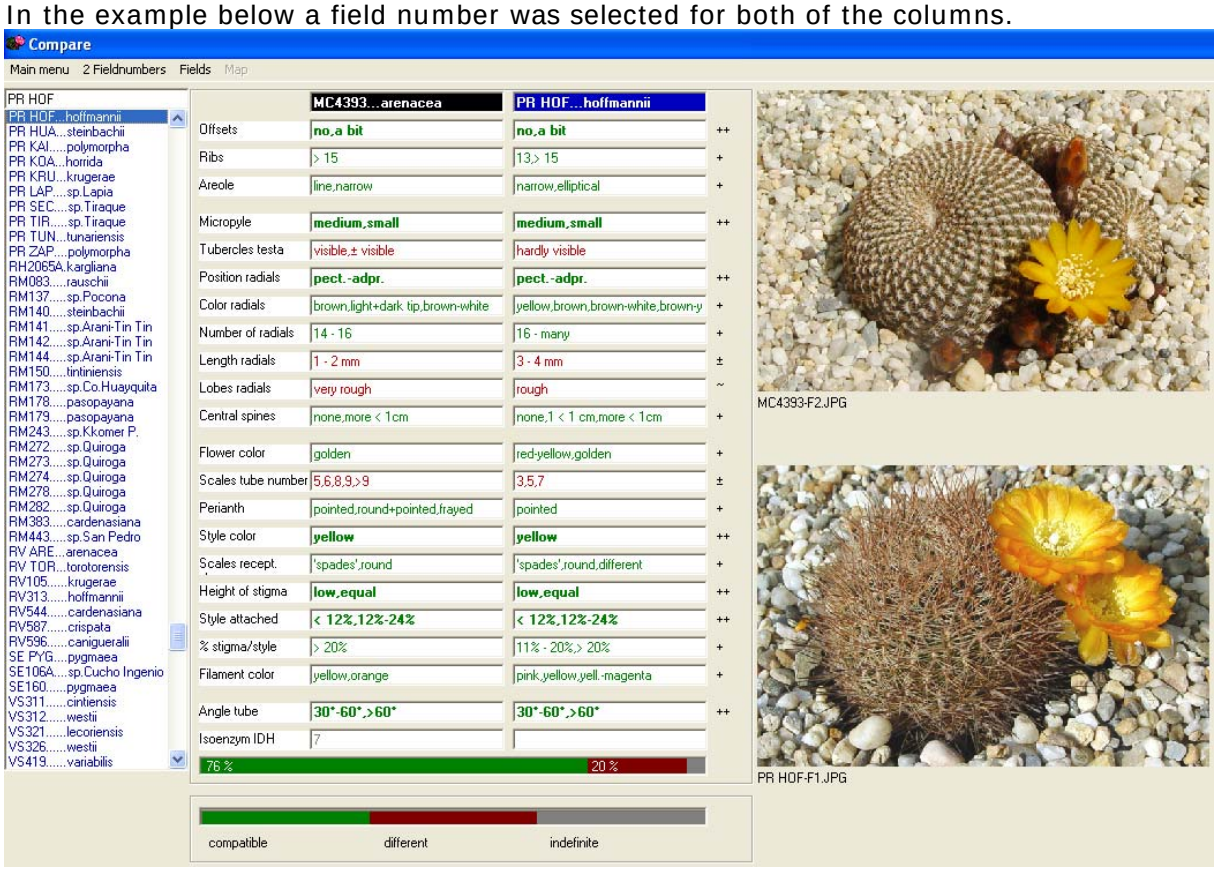
Compare

2 Field numbers

The left field number is selected if the text of the list is black.
The right field number is selected if the text of the list is blue



Click on the black or blue window to select the column.
In the example below a field number was selected for both of the columns.



Characteristic in both of the columns equal: printed green, **++** (value 1)
Characteristic in both of the columns partially equal: printed green, **+** (value 0,8)
Characteristic in both of the columns fully unequal: printed red (value 0)

For the characteristics Lobes radial spines, Flower colour and Pistil colour it is possible that:
Characteristic in both of the columns are almost equal: printed red, **~** (value 0,5)

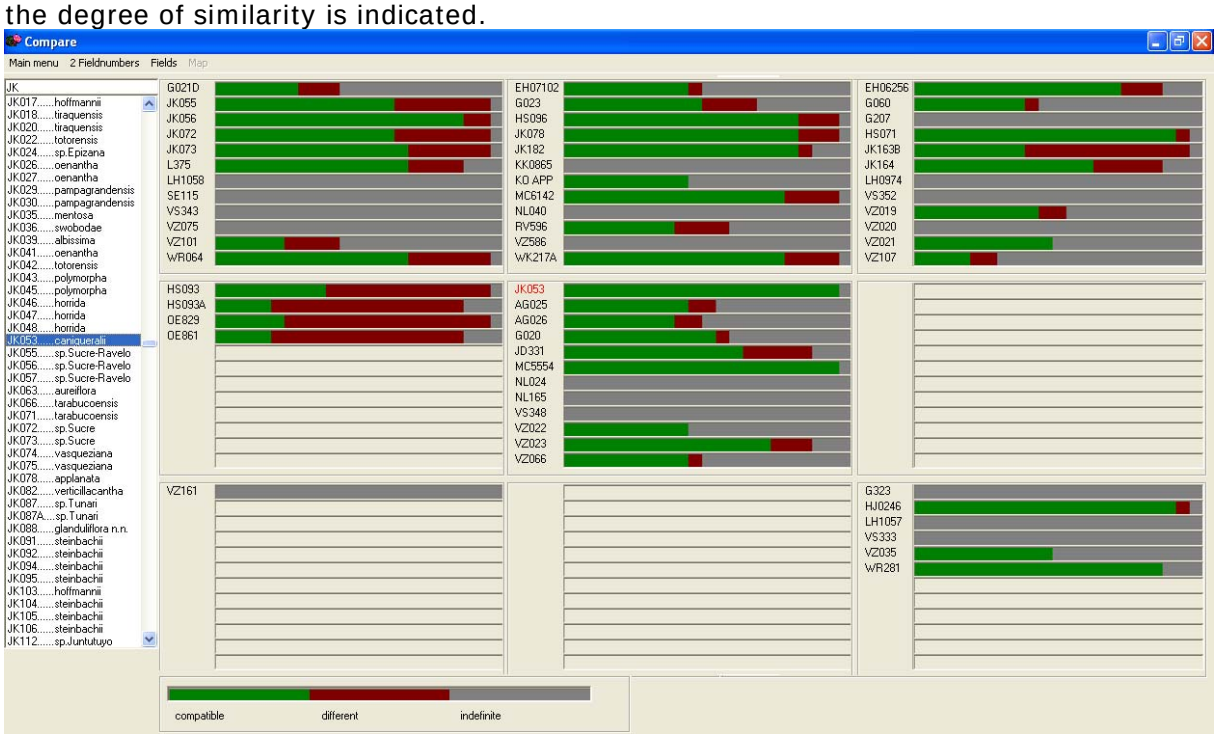
For the characteristics Ribs, Number of radial spines, Length of radials and Scales tube number the quotient of the averages is calculated. (value quotient)
If the quotient <0,8: printed red, **±**

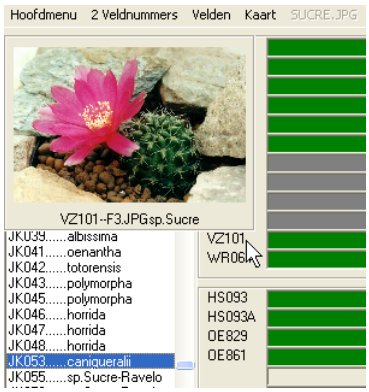
Under the columns there is a strip with green, red and grey colour.
Green = (sum of the values) × 100 / 22 [76%]
Grey = (sum of the lines in which a characteristic is empty) × 100 / 22 [4 %]

Red = 100 – 76 – 4 = 20%.

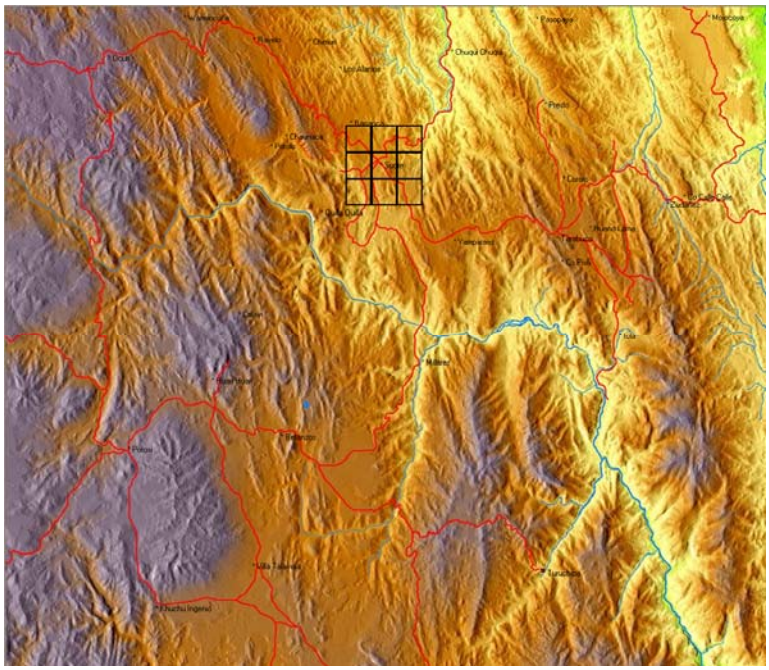
Of all items of the list for **2 Field numbers** at least some data for the characteristics is available.
In the list for **Fields** you will find *all* items, including those for which no data is available.

Fields
The goal is to see what field numbers are close to a selected field number. Therefore a square is divided into 9 sections. Every section represents a part of the map of ± 5,5 × 5,5 km.
Click on an item in the list. This field number is put in the central section, printed in red.
If available in every section, 10 field numbers will be shown.
If characteristics of the *selected* field number are known, they will be compared with these of the other shown field numbers. Again, using the colours green, red and grey, the degree of similarity is indicated.

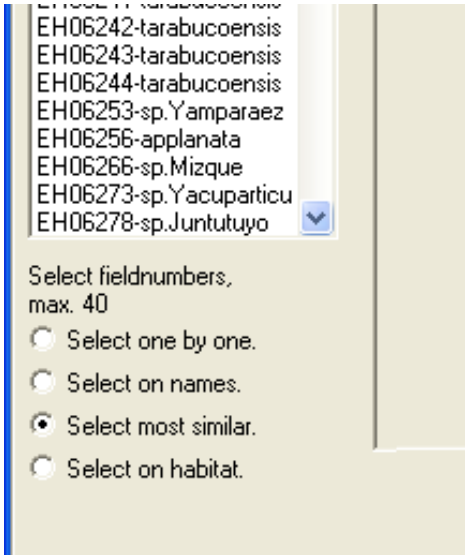




Click on a field number to see a picture.
Click on **Map** to see the map, on which the square with 9 sections is displayed.



UPGMA



The method is used to pair together field numbers with very similar plants.

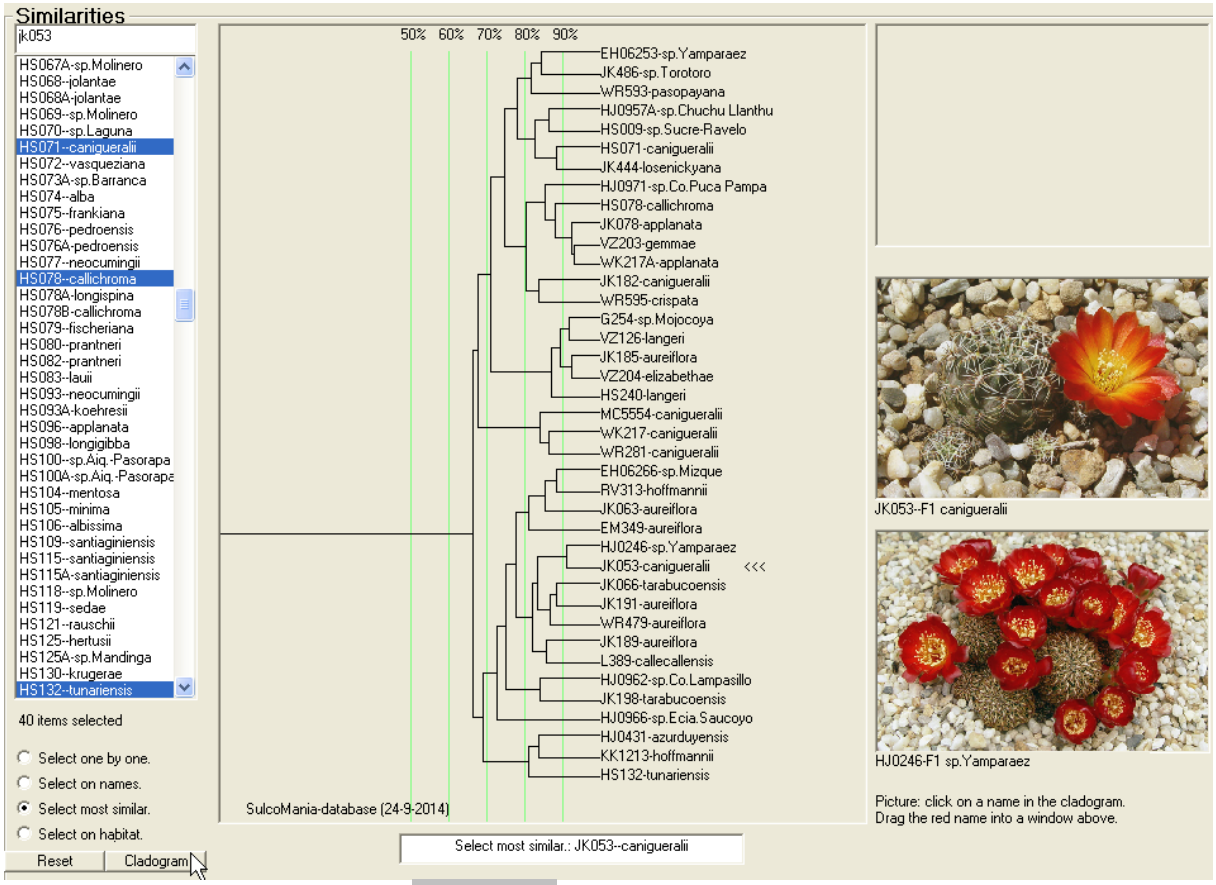
Click on an option to make a selection of field numbers.
Select:

- **one by one**: any desired item is clicked in the list manually.
- **on names**: all plants having the name of the selected item are marked.
- **most similar**: of all field numbers in de list, characteristics are compared with those of the selected item. The 39 items with the highest similarity are marked.
- **on habitat**: items with the same coordinates are marked. If the number is lower than 40, nearby field numbers will be looked for.

See **Compare - Fields**.

All field numbers in this list contain data of the following characteristics:

Offsets	Length radials	Perianth
Areole	Lobes radials	Style attached
Position radials	Central spines	% stigma/style
Colour radials	Flower colour	Filament colour
Number of radials	Scales tube	



Selected item JK053. Click on Cladogram and the cladogram is calculated.
Click with the left mouse button on a field number in the cladogram. The mouse icon changes into a small cactus and the text becomes red. Keep the left mouse button down

and drag to one of the three frames right of the cladogram. If a picture is available, it is displayed in this frame.

Click with the right mouse button on the cladogram. The cladogram is printed.

Information

***Manual*.** A summary manual of the program is displayed. Click on Exit to close the window.

***Sulcorebutia*.** This text dates from 1996, the year that the first edition of SulcoMania was prepared. If you follow the literature, you will know that various views have been changed.
Click on Exit to close the window.

Acknowledgements. Annually the database of images is improved and enhanced by the participation of a great number of people. This is not only gratifying, but it also encourages me to develop this project further.

Click on Exit to close the window.

I would like to thank Jim Gras for proof reading the English translation.

24. of September 2014

Johan Pot
Gagarinstraat 17
1562 TA Krommenie
e-mail: j.pot@tip.nl