A user's guide
to
PHYLIP drawtree and drawgram

Introduction

PHYLIP (the PHYLogeny Inference Package) is a package of programs for inferring phylogenies (evolutionary trees). It is available free over the Internet, and written to work on as many different kinds of computer systems as possible.

The installation process is simple:

```
$ sudo apt-get install phylip
```

Once it installed, the package can be accessed in the following way:

```
$ phylip
Usage: /usr/bin/phylip <program>
  Existing programs are:
clique   contrast   dnainvar   dnamove   dollop    drawgram   fitch
mix         pars    promlk     restdist  seqboot   consense   dnacomp
dnaml    dnapars    dolmove    drawtree  gendist   move       penny
protdist   restml   treedist   contml    dnadist   dnamlk     dnapenny
dolpenny   factor   kitsch     neighbor  proml     protpars   retree
```
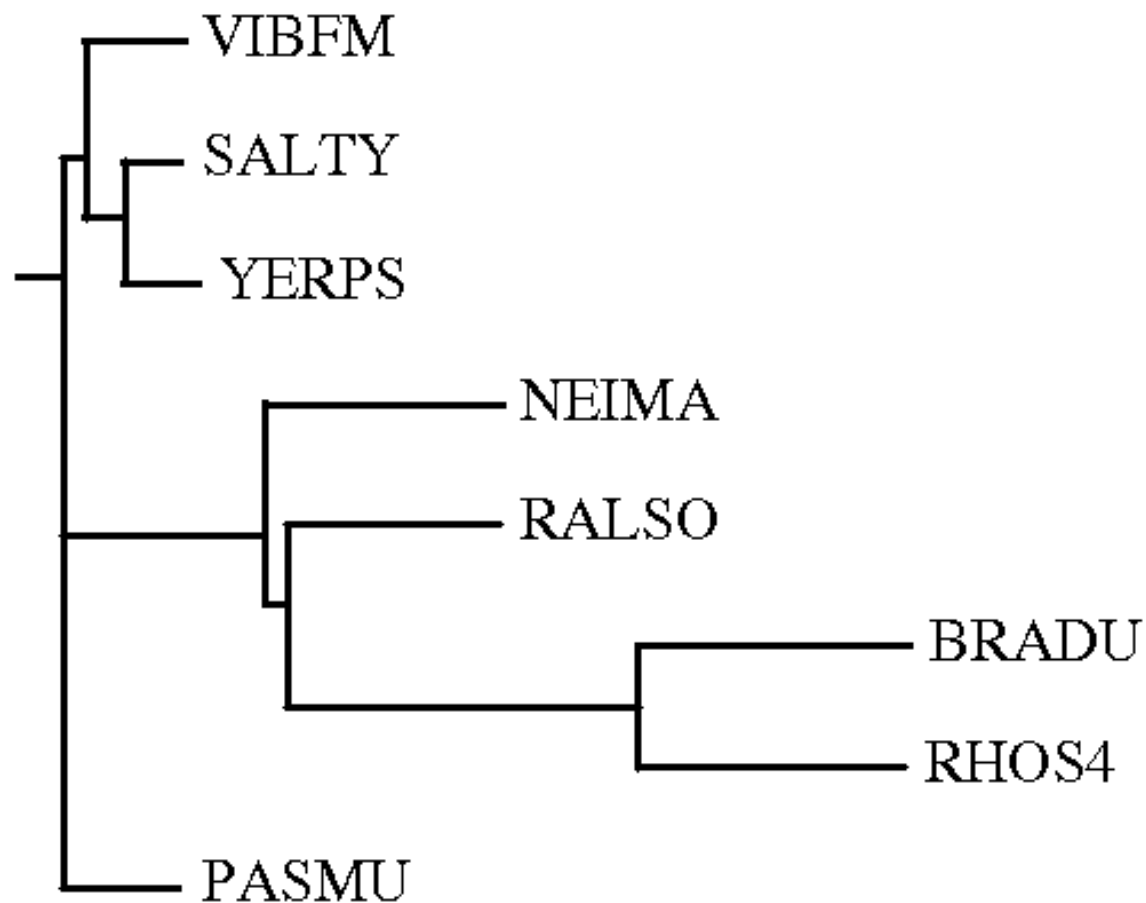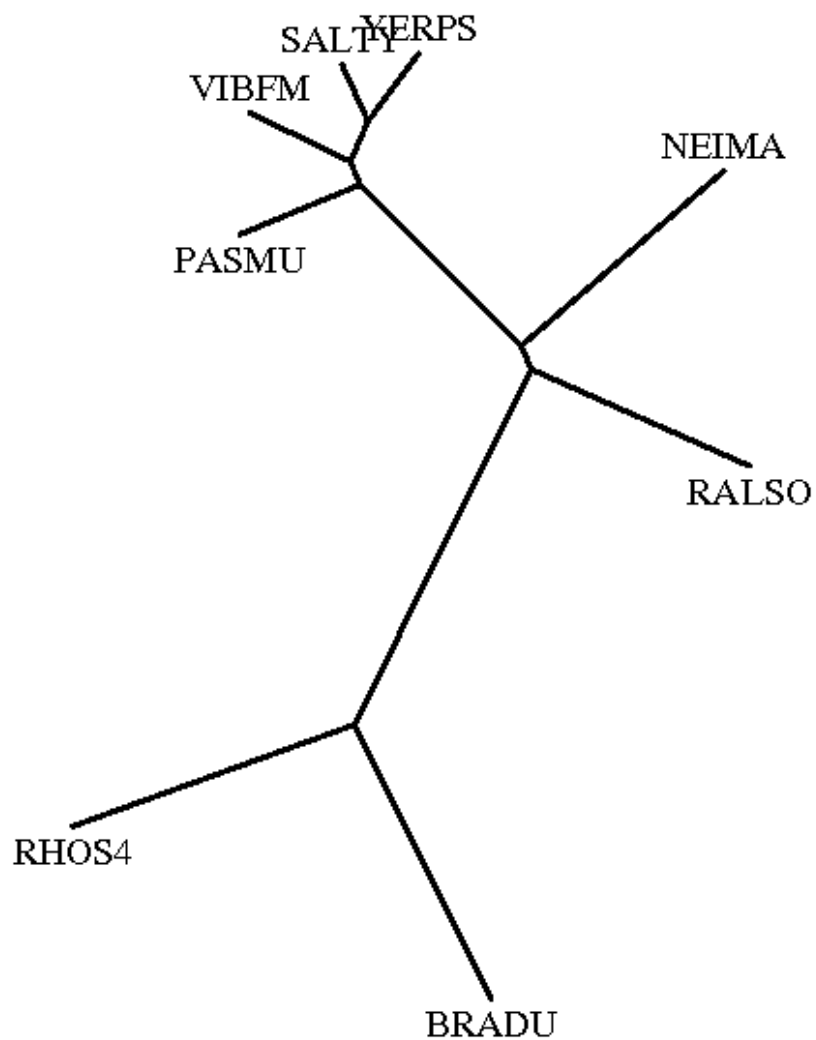
We are interested in programs `drawtree` and `drawgram`.

Trees and trees

drawtree plots **unrooted** trees...

VIBFM
SALTY YERPS
NEIMA
PASMU
RALSO
RHOS4
BRADU

VIBFM
SALTY
YERPS
NEIMA
RALSO
BRADU
RHOS4
PASMU

... whereas drawgram plots **rooted** trees.

Part 1. drawtree

drawtree dialog

Being called, the program enters interactive mode and asks to enter a tree in **Newick** format:

```
  Please enter a new file name> tree.tre
```

Next come the settings with **default** values:

```
  0   Screen type (IBM PC, ANSI)?   ANSI
  P         Final plotting device:  Postscript printer
  B             Use branch lengths:  Yes
  L               Angle of labels:  branch points to Middle of label
  R              Rotation of tree:  90.0
  I       Iterate to improve tree:  Equal-Daylight algorithm
  D  Try to avoid label overlap?   No
  S         Scale of branch length:  Automatically rescaled
  C   Relative character height:   0.3333
  F                         Font:   Times-Roman
  M           Horizontal margins:   1.65 cm
  M             Vertical margins:   2.16 cm
  #          Page size submenu:    one page per tree


  Y  to accept these or type the letter for one to change
```

drawtree settings

The **tree** can be obtained in such a way: **multiple alignment** is put through `protdist` to calculate **distance matrix** and then through `neighbor` to make a tree in Newick format.

Basic settings (almost all of the list) for an average user are described in this book.

```
  0   Screen type (IBM PC, ANSI)?   ANSI
```

Some settings are disregarded due to their unnecessity of changing from defaults.

```
  P        Final plotting device:   Postscript printer
```

Postscript printer returns a .ps image. It can be printed to `.png` with `ps2png` program in `tth-common` package:

```
  $ ps2png image.ps image.png
```

The device can be changed to Windows bitmap so that output images are `.bmp` files.

Branch length

By **default**, branches are calculated based on lengths from Newick formula.
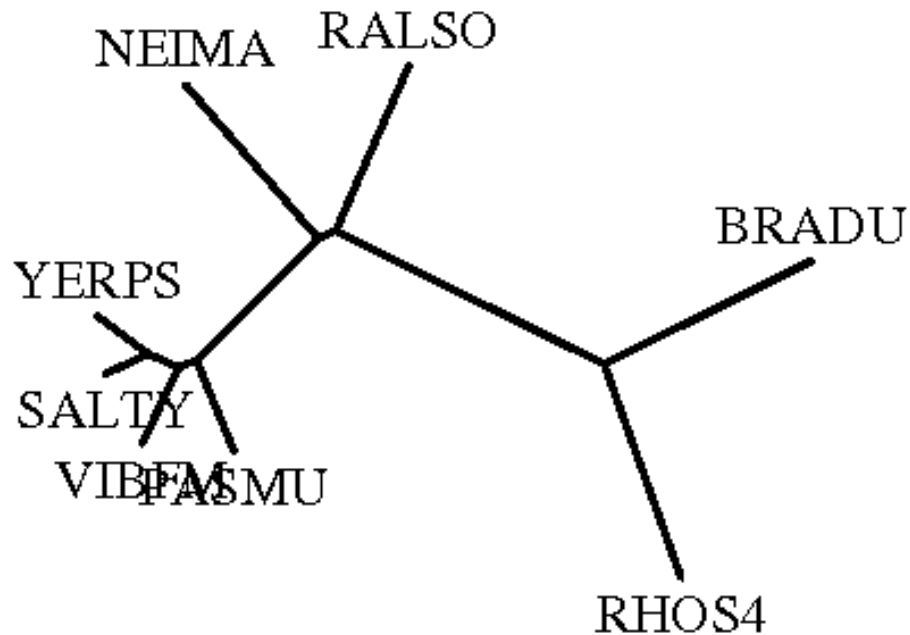
Not using branch length results in equidistant tree.
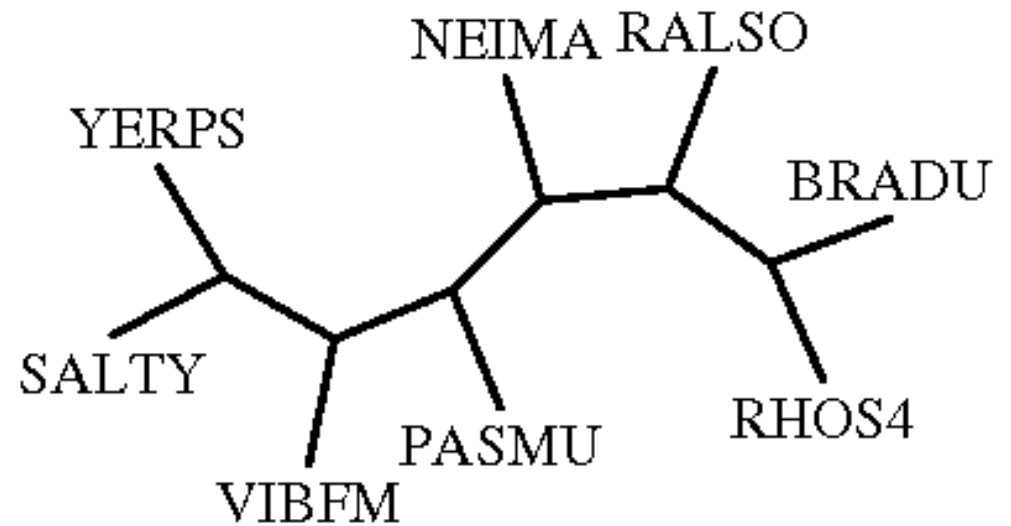
The equidistant tree looks prettier due to nice layout and may be used in case the length is unnecessary.
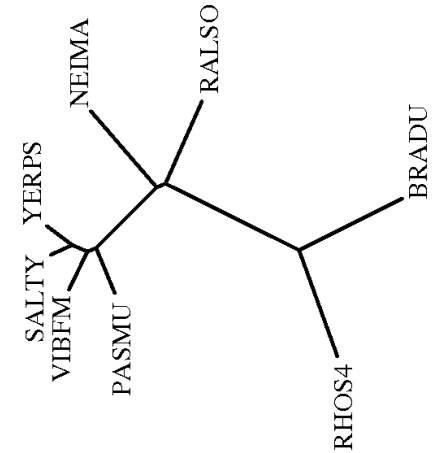
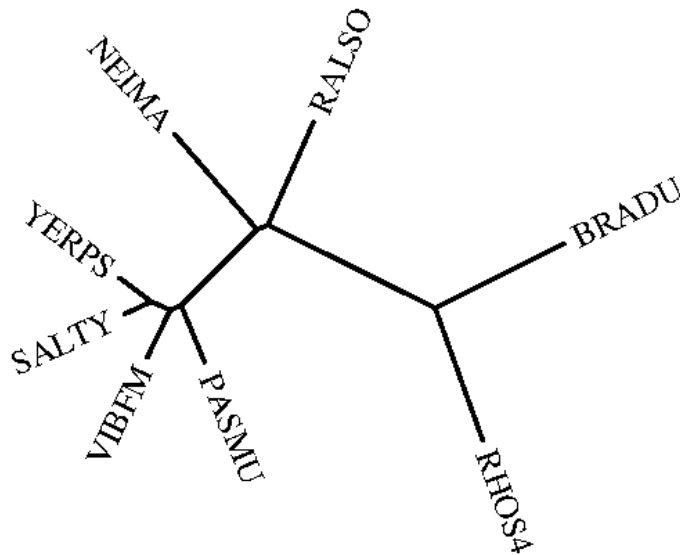# Label positioning

Allows to fine-tune label position.

The **default** value points to the **middle** of labels.
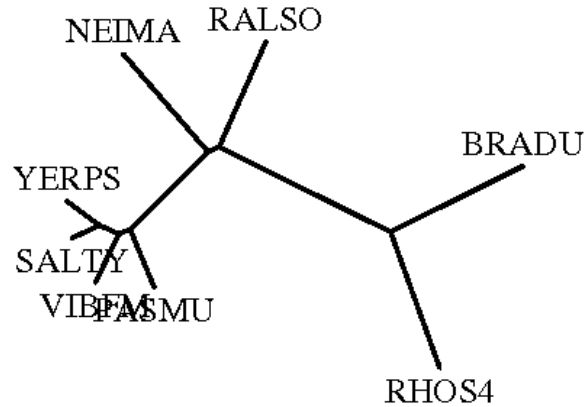
Custom angle can be set, like 90 degrees.
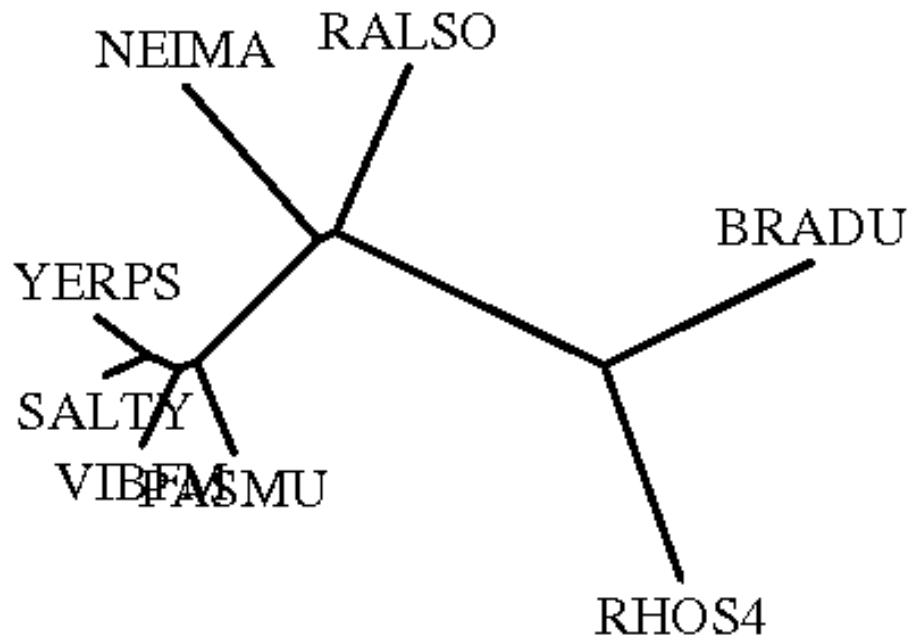

Along placement. Possibly the **best** value of angle.

Radial placement:
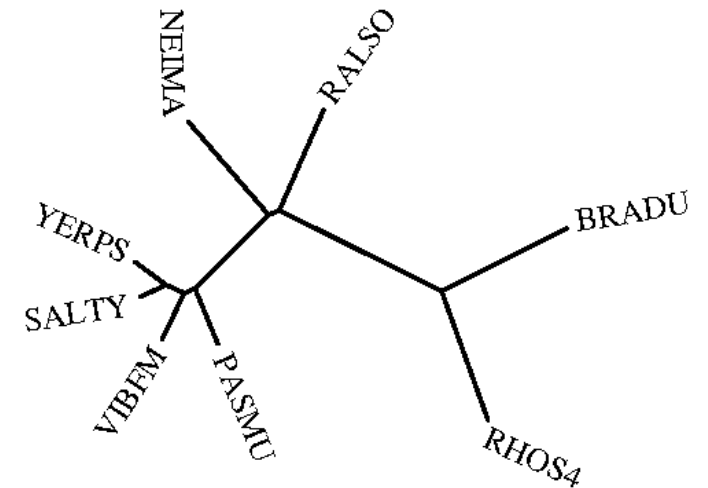
Tree rotation

Default, the tree is rotated on **90** degrees.

NEIMA RALSO

YERPS

SALTY

VIBFM PASMU

BRADU

RHOS4

Spin it round.

But you can set **any angle** from -90 to 90.
Here is 0.

SALTY YERPS

VIBFM

NEIMA

PASMU

RALSO

RHOS4

BRADU

Tree improvement

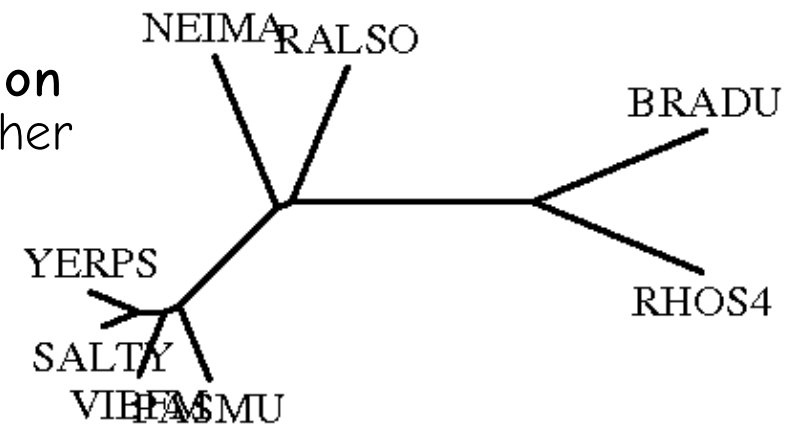This is used to improve branch angles and prevent lines crossing.

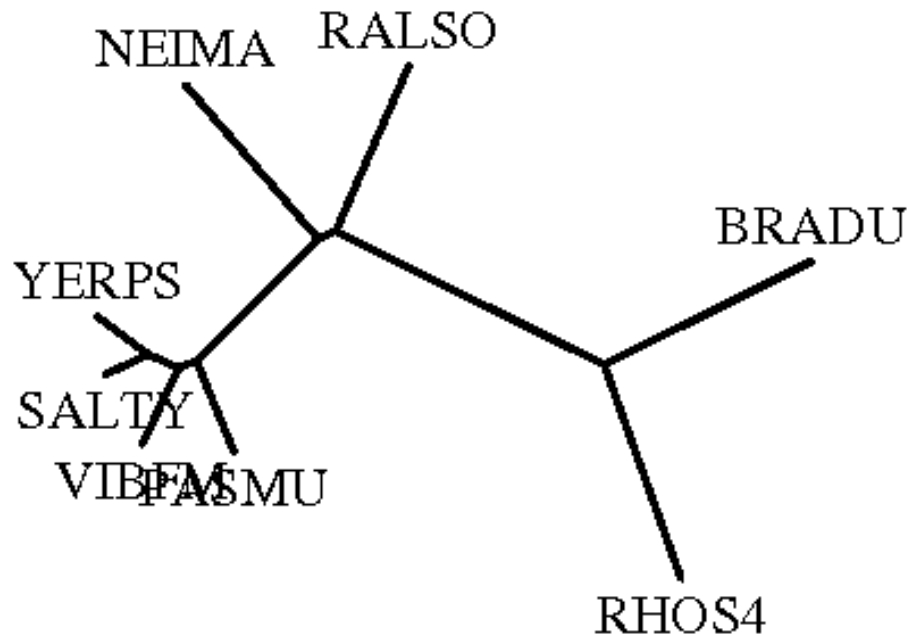Default is **Equal-Daylight** algorithm.
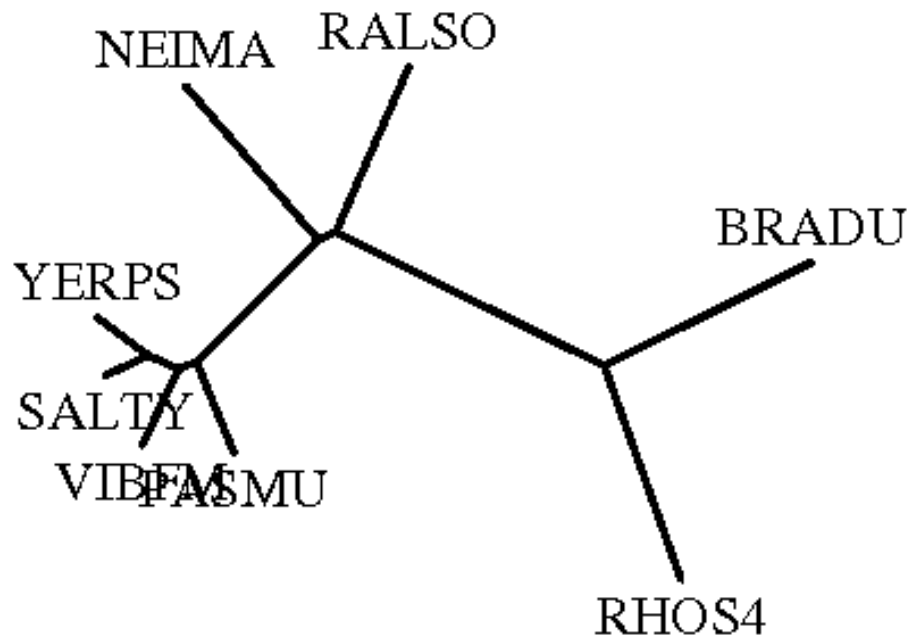
The **n-Body** looks different.
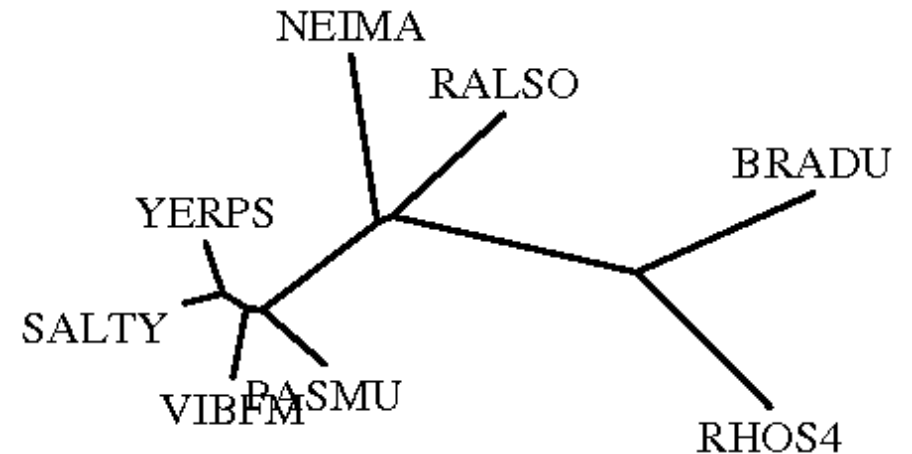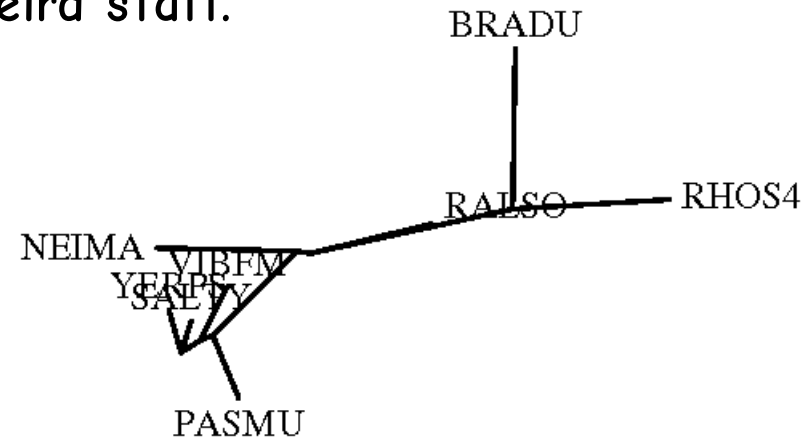

No iteration uses another algorithm from PLOTREE.

Overlapping labels

Default, labels may overlap. But it's almost **okay.**

When **avoiding**, the program does some **weird staff.**

Do **not avoid** overlap. Better use positioning of labels.

And also use **autorescaling** of branch length if you want to discern anything.

1 cm per branch unit.

Other settings

These are better left unchanged.

```
C     Relative character height:   0.3333
F                         Font:   Times-Roman
M           Horizontal margins:   1.65 cm
M             Vertical margins:   2.16 cm
#           Page size submenu:    one page per tree
```

Part 2. drawgram

drawgram dialog

The program also requires a tree file. Settings list is somehow different from drawtree.

```
0   Screen type (IBM PC, ANSI):  ANSI
P         Final plotting device:  Postscript printer
H                   Tree grows:  Horizontally
S                   Tree style:  Phenogram
B           Use branch lengths:  Yes
L             Angle of labels:  90.0
R       Scale of branch length:  Automatically rescaled
D         Depth/Breadth of tree:  0.53
T       Stem-length/tree-depth:  0.05
C       Character ht / tip space:  0.3333
A               Ancestral nodes:  Weighted
F                         Font:  Times-Roman
M           Horizontal margins:  1.65 cm
M             Vertical margins:  2.16 cm
#             Pages per tree:  one page per tree


Y  to accept these or type the letter for one to change

   _
```
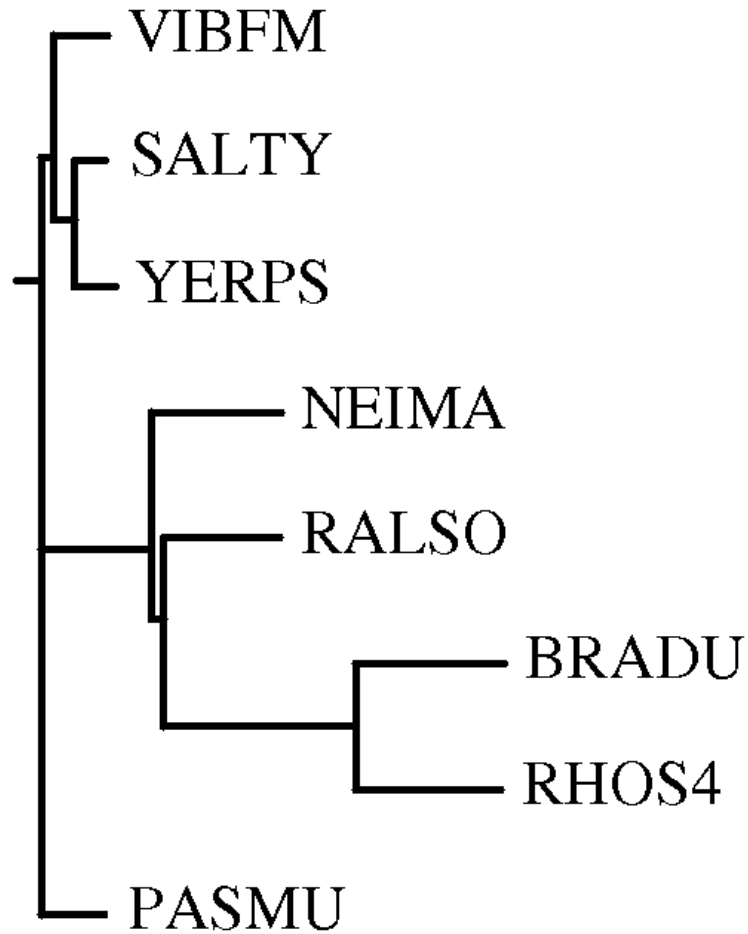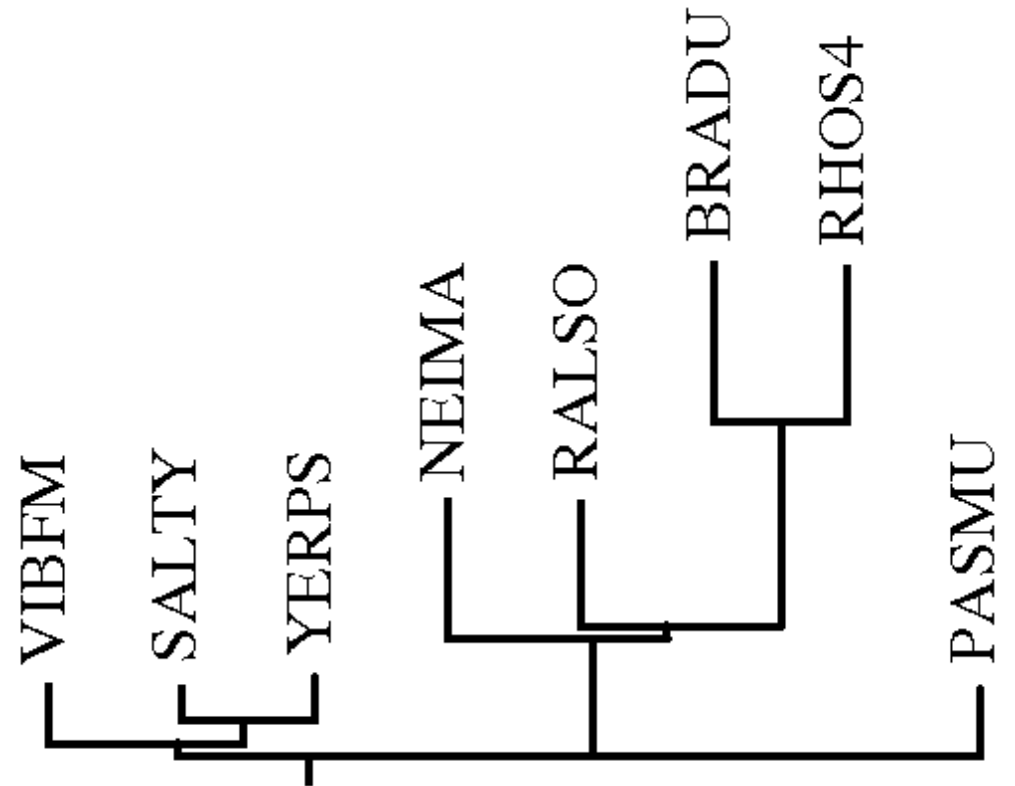
Tree direction

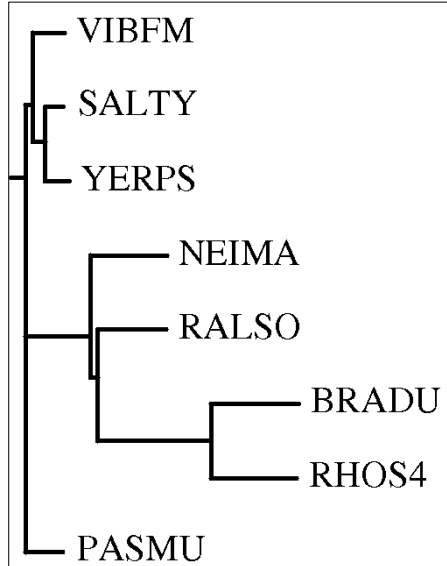| The tree can grow horizontally.	And vertically.

Various styles

S	Tree style: Phenogram

Phenogram

```
       ┌─ VIBFM
      ┌┤
      ││ ┌ SALTY
      └┤ └ YERPS
       │
       │  ┌── NEIMA
       │ ┌┤
       └─┤└ RALSO
         │
         │ ┌─── BRADU
         └─┤
           └── RHOS4
       └─ PASMU
```

Curvogram

```
       ┌─ VIBFM
       │ ┌ SALTY
       │ └ YERPS
       │
       │  ┌── NEIMA
       │ ┌┤
       └─┤└ RALSO
         │ ┌─── BRADU
         └─┤
           └── RHOS4
       └─ PASMU
```

Circular

SALTY YERPS
VIBFM   NEIMA
PASMU   RALSO
RHOS4   BRADU

Eurogram

```
       ┌─ VIBFM
      ┌┤ SALTY
      └┤ YERPS
       │
       │  ┌── NEIMA
       │ ┌┤ RALSO
       └─┤
         │ ┌─── BRADU
         └─┤ RHOS4
       └─ PASMU
```

Swoopogram

```
       ┌─ VIBFM
       │ SALTY
       │ YERPS
       │  ┌── NEIMA
       │ ┌┤ RALSO
       └─┤
         │ ┌─── BRADU
         └─┤ RHOS4
       └─ PASMU
```

Cladogram

```
        VIBFM
        SALTY
        YERPS
        NEIMA
        RALSO
        BRADU
        RHOS4
       PASMU
```
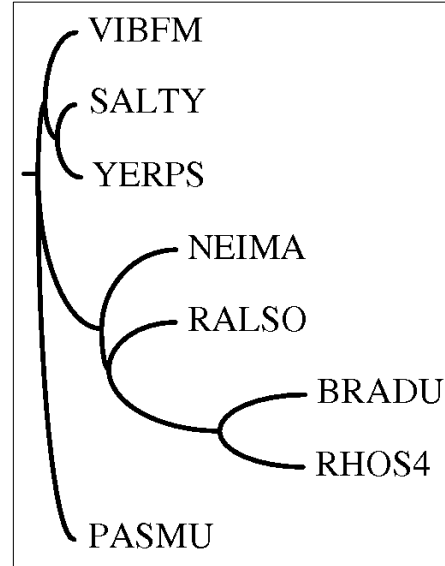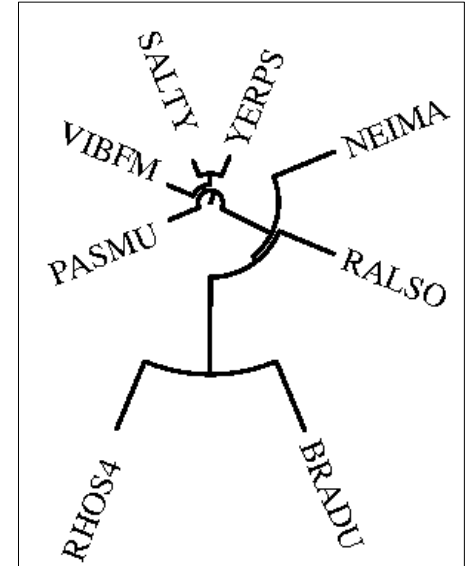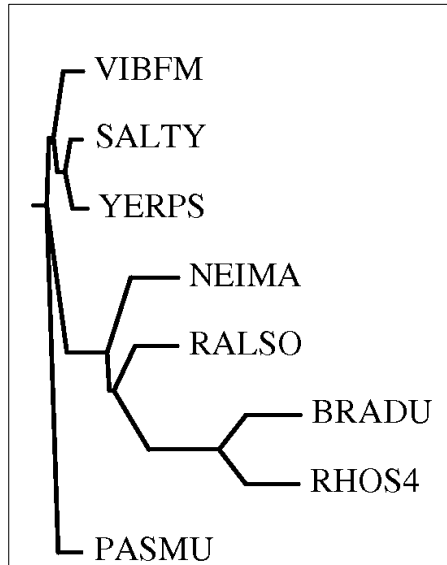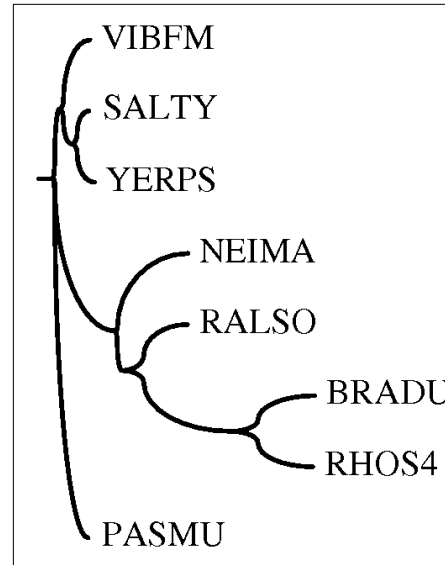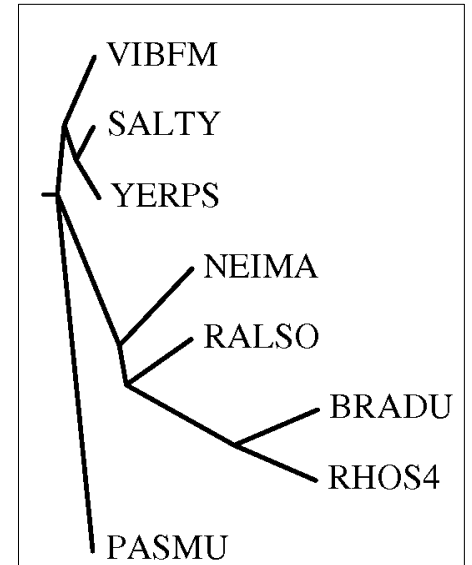
Depth of tree

D   Depth/Breadth of tree: 0.53

Less	Default	Greater
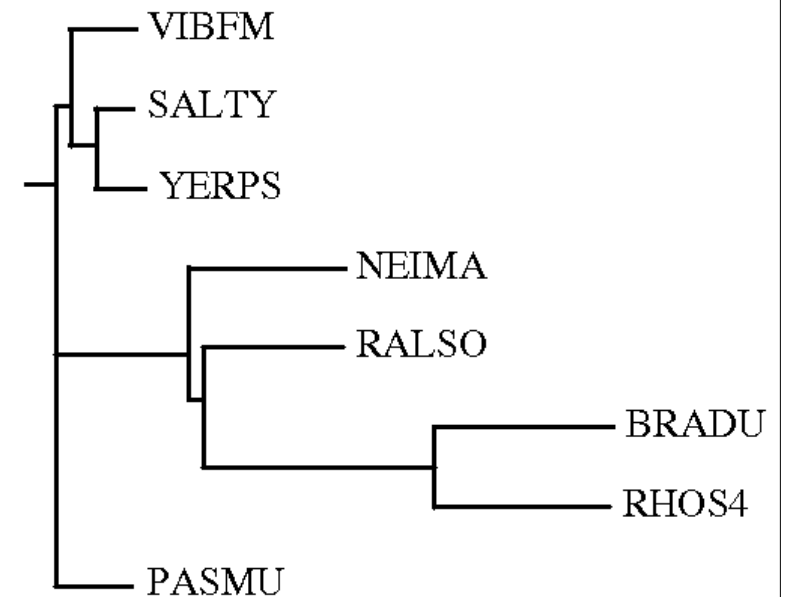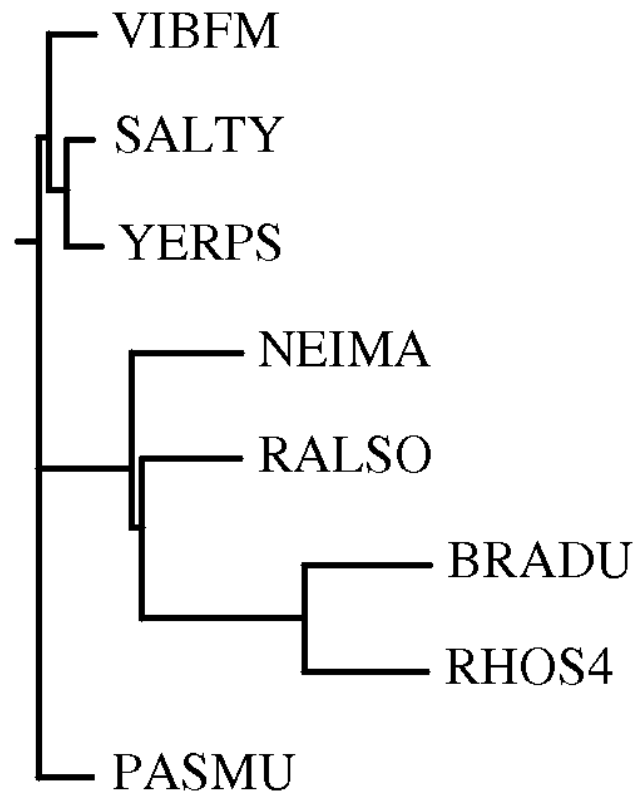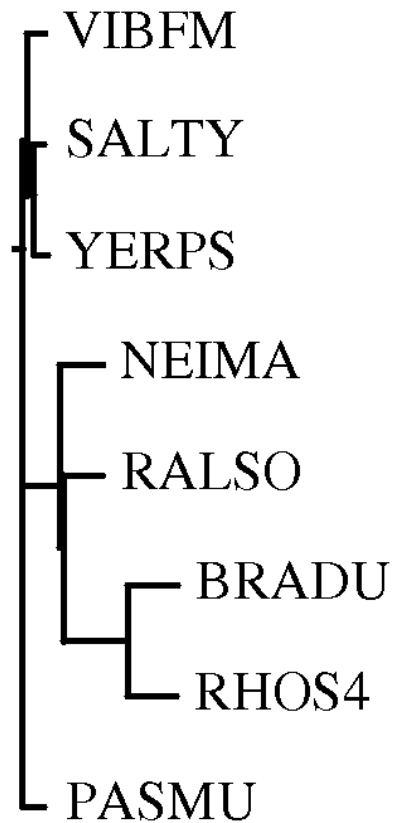
The greater variant looks prettier out of them all. But needs other adjustments.

Stem length

Less	Default	Greater

Indeed, root length needs some enlargement.

Character size

Less	Default	Greater
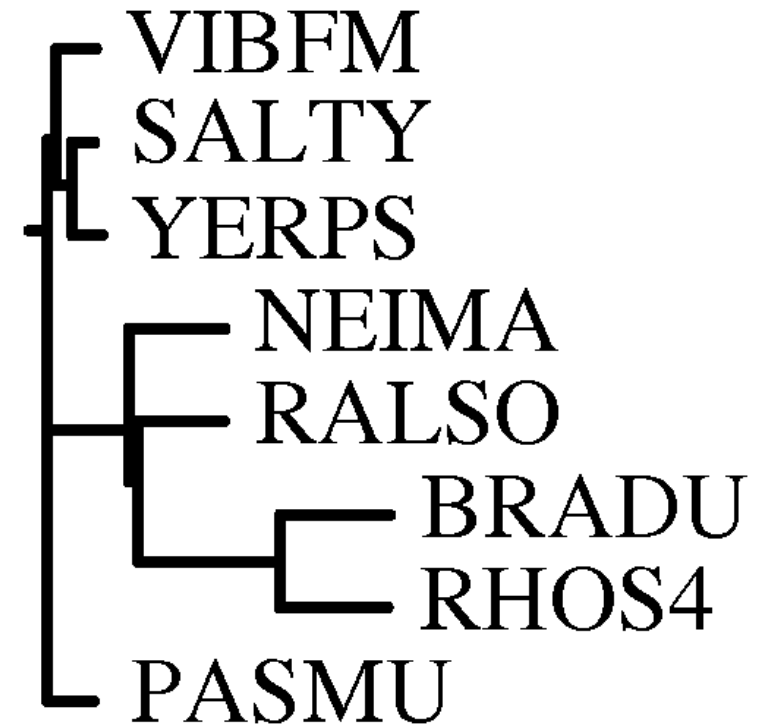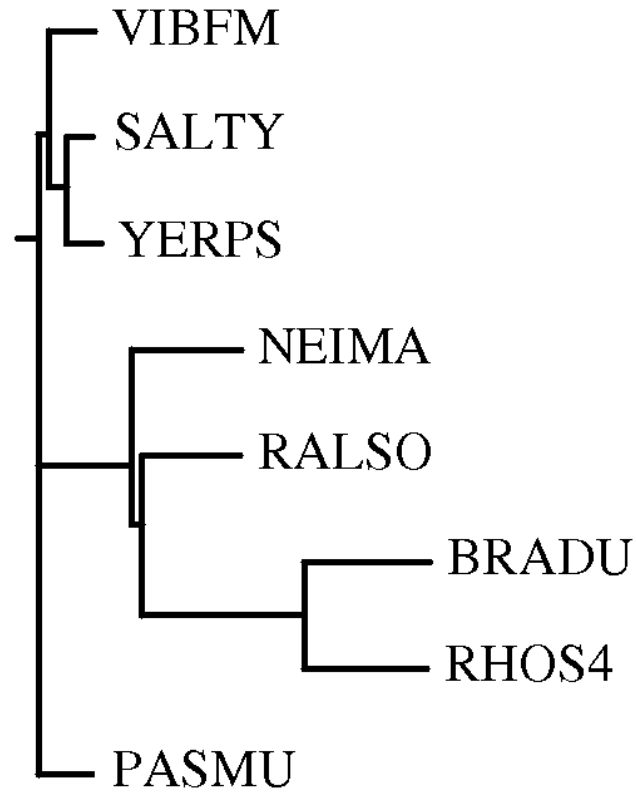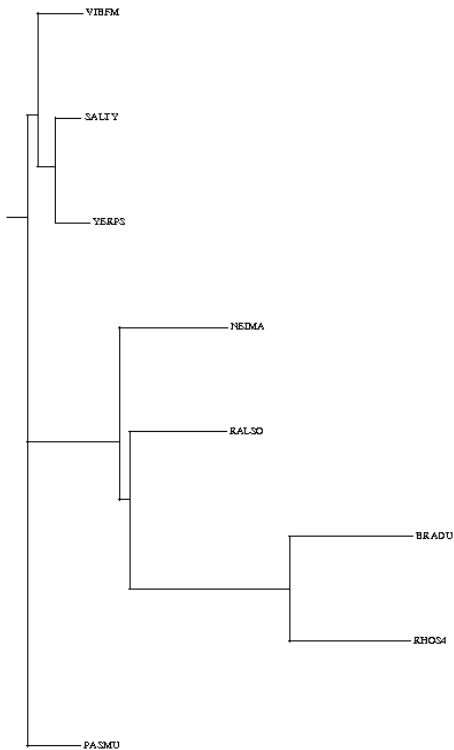
Better left default.

Node positions

Centered	Weighted	Intermediate	Innermost
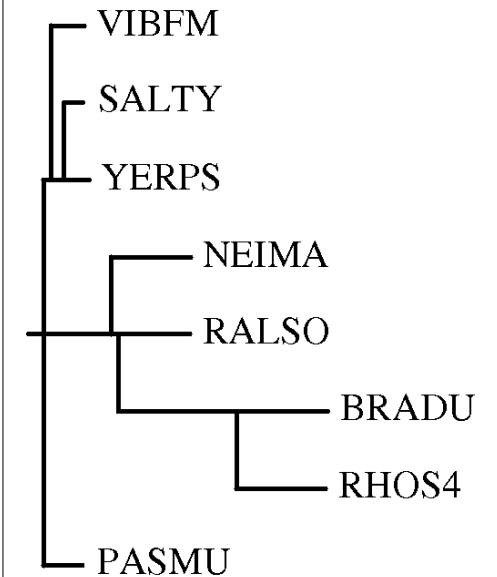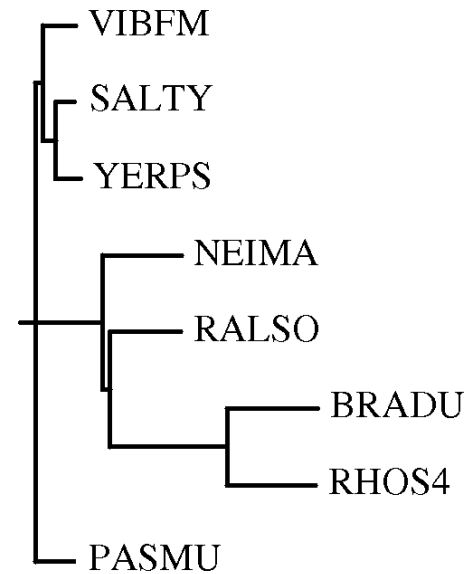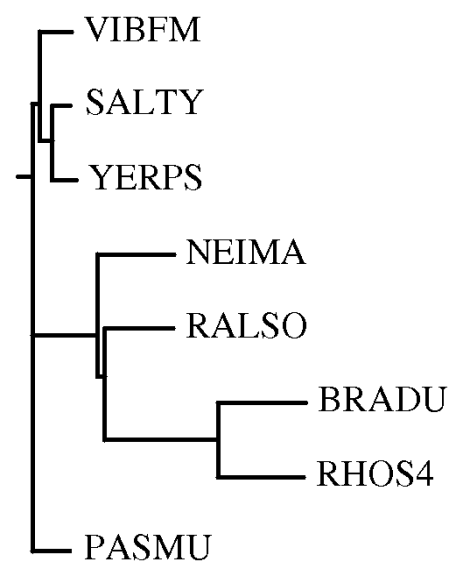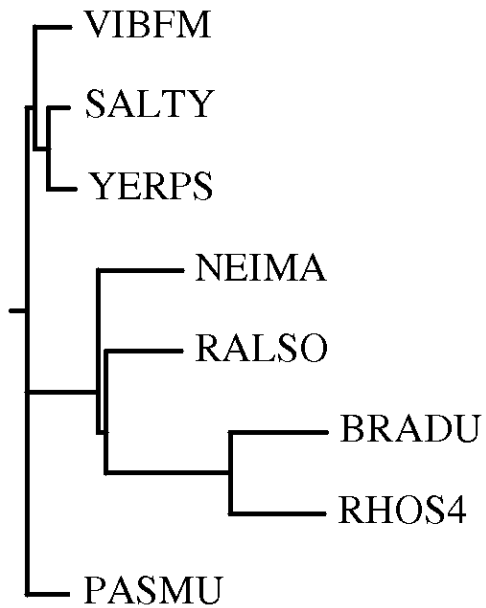
Intermediate looks fine but weighted reflects distances between tips.

That's all, folks!

About

Made by Dmitry Mylarshchikov, FBB MSU student.

E-mail: dmitrymyl@gmail.com
Website: kodomo.fbb.msu.ru/~dmitrymyl
Available online on: kodomo.fbb.msu.ru/~dmitrymyl/term04/phylip

Used fonts are Comic Neue and Source Code Pro Light both available under SIL Open Font License.