

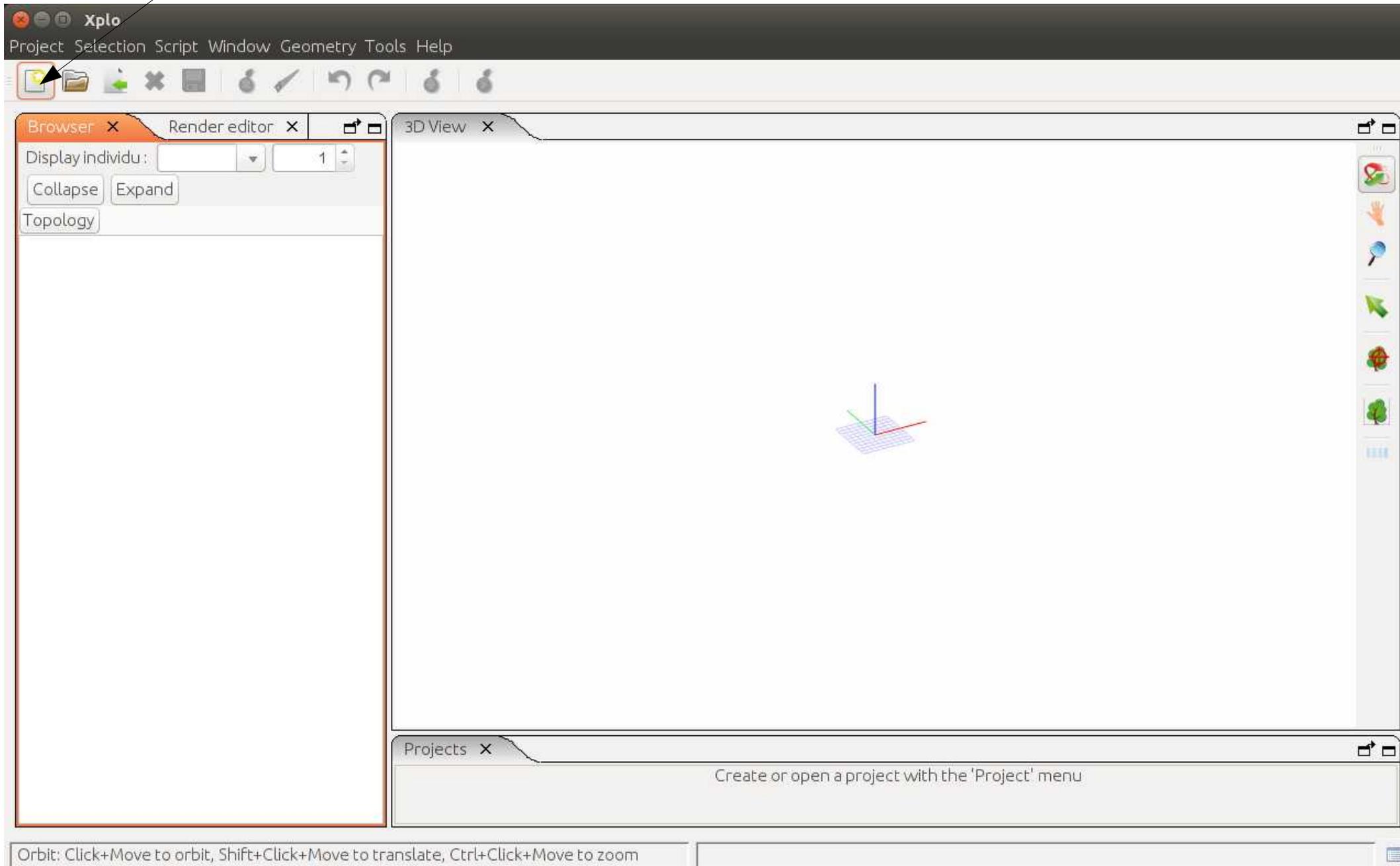
Using DigR interface into Xplo

Before you start

- Check java availability (≥ 1.8) on your machine
- Install Xplo
- Run Xplo !

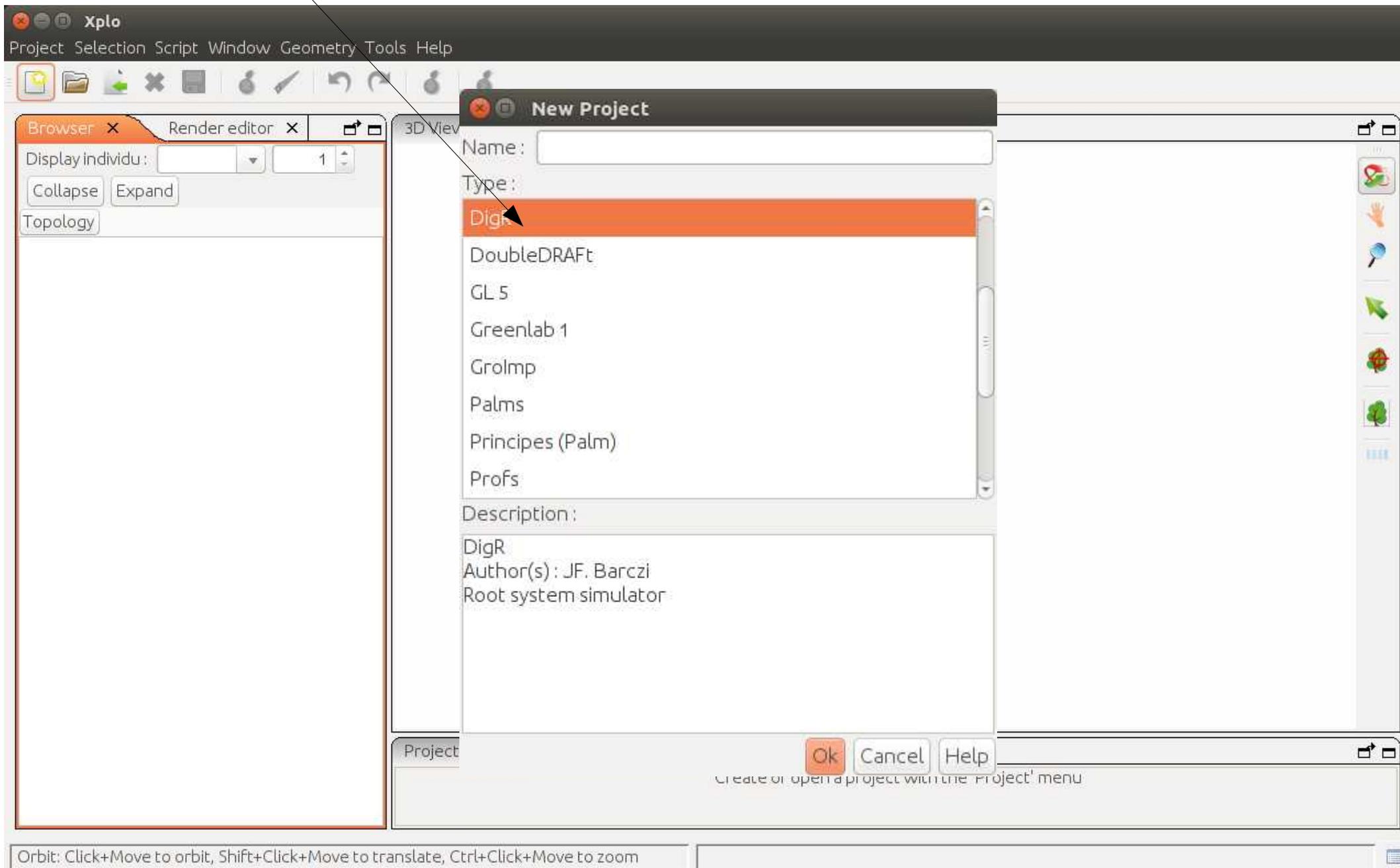
Click

open a DigR project

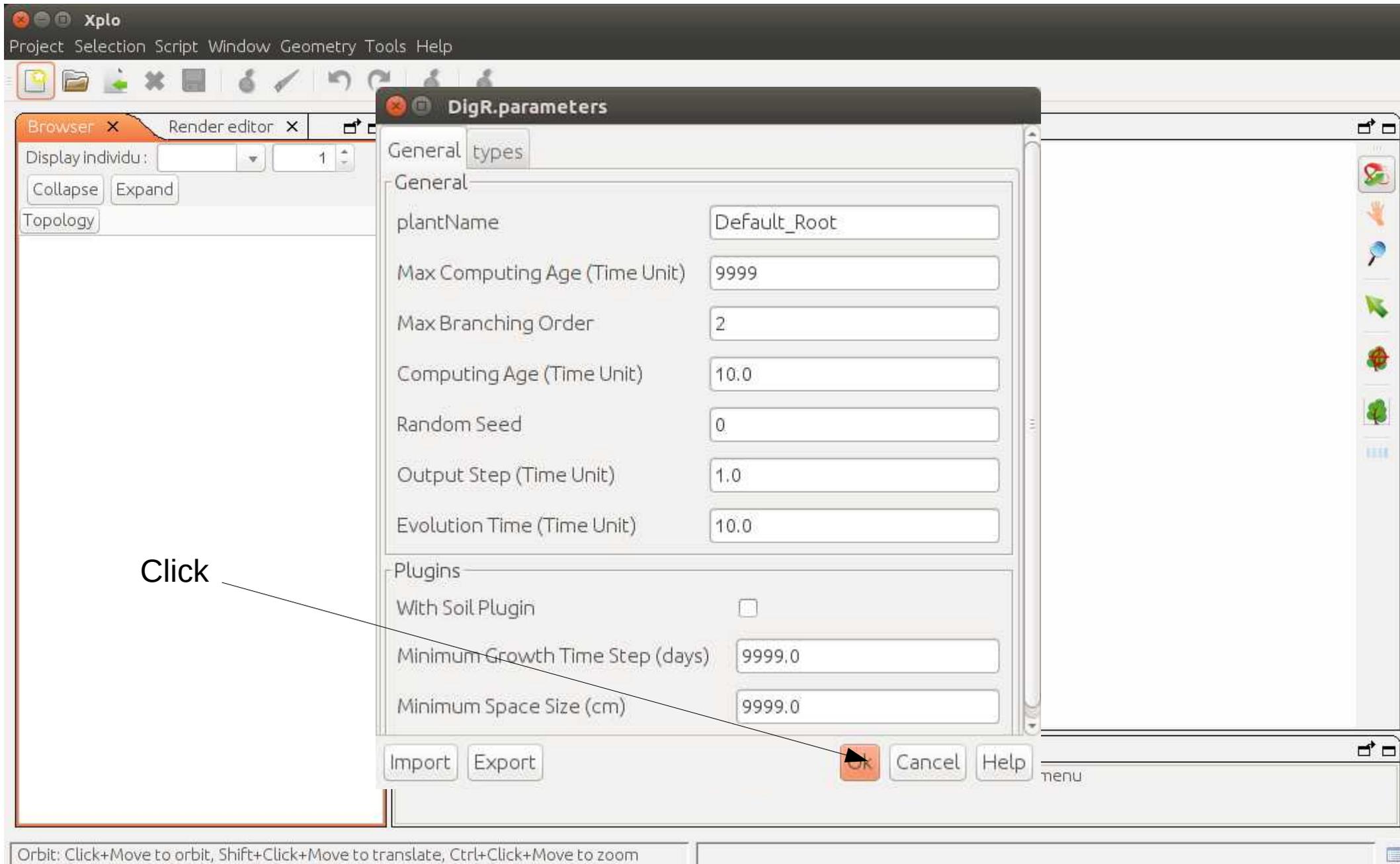


Click

open a DigR project



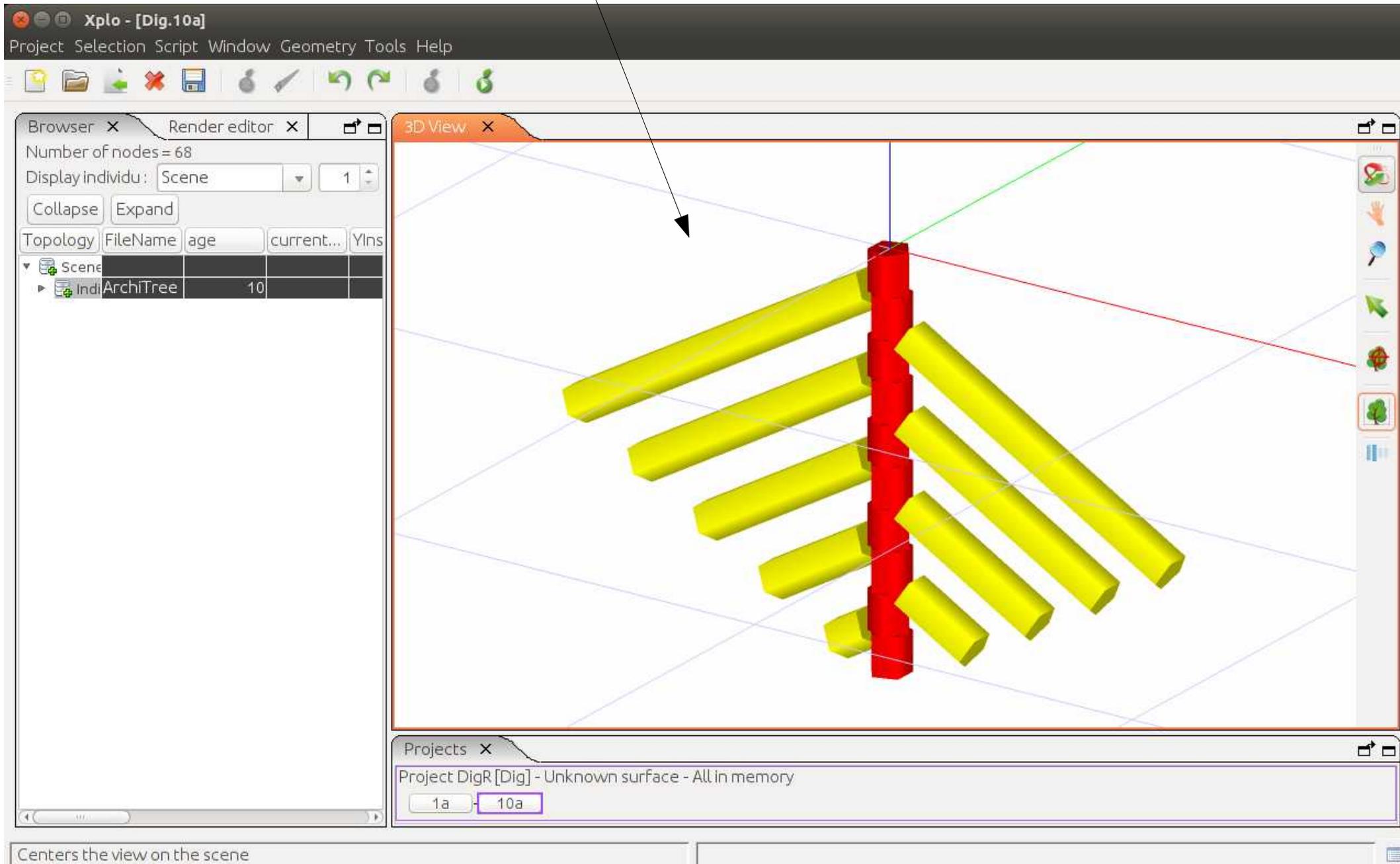
Default Simulation



Click

3D view

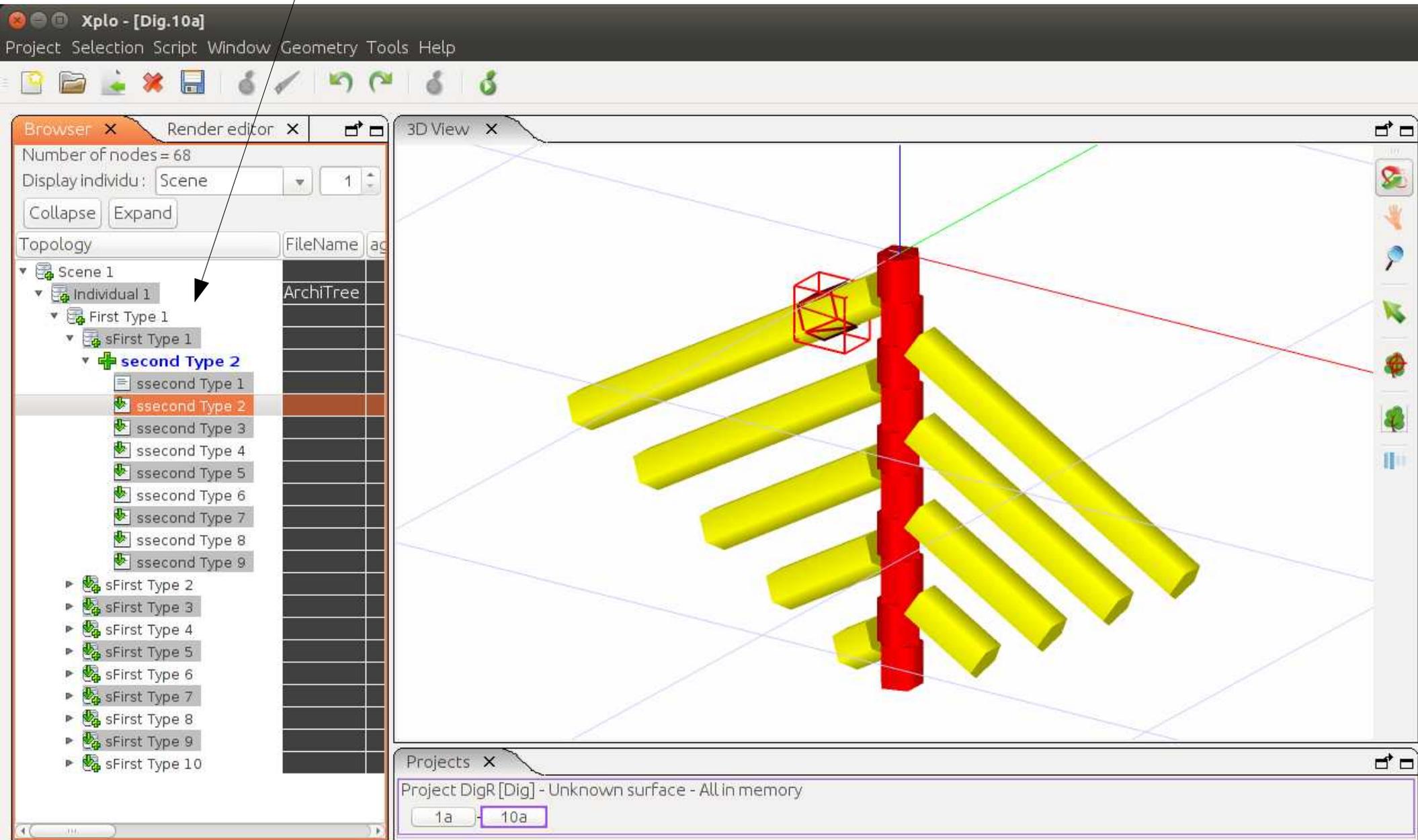
1. left click + drag → turn around
2. Mouse wheel → zoom



Browser view

Click on arrows to open tabs

Selected item is highlighted in a box in the 3D view



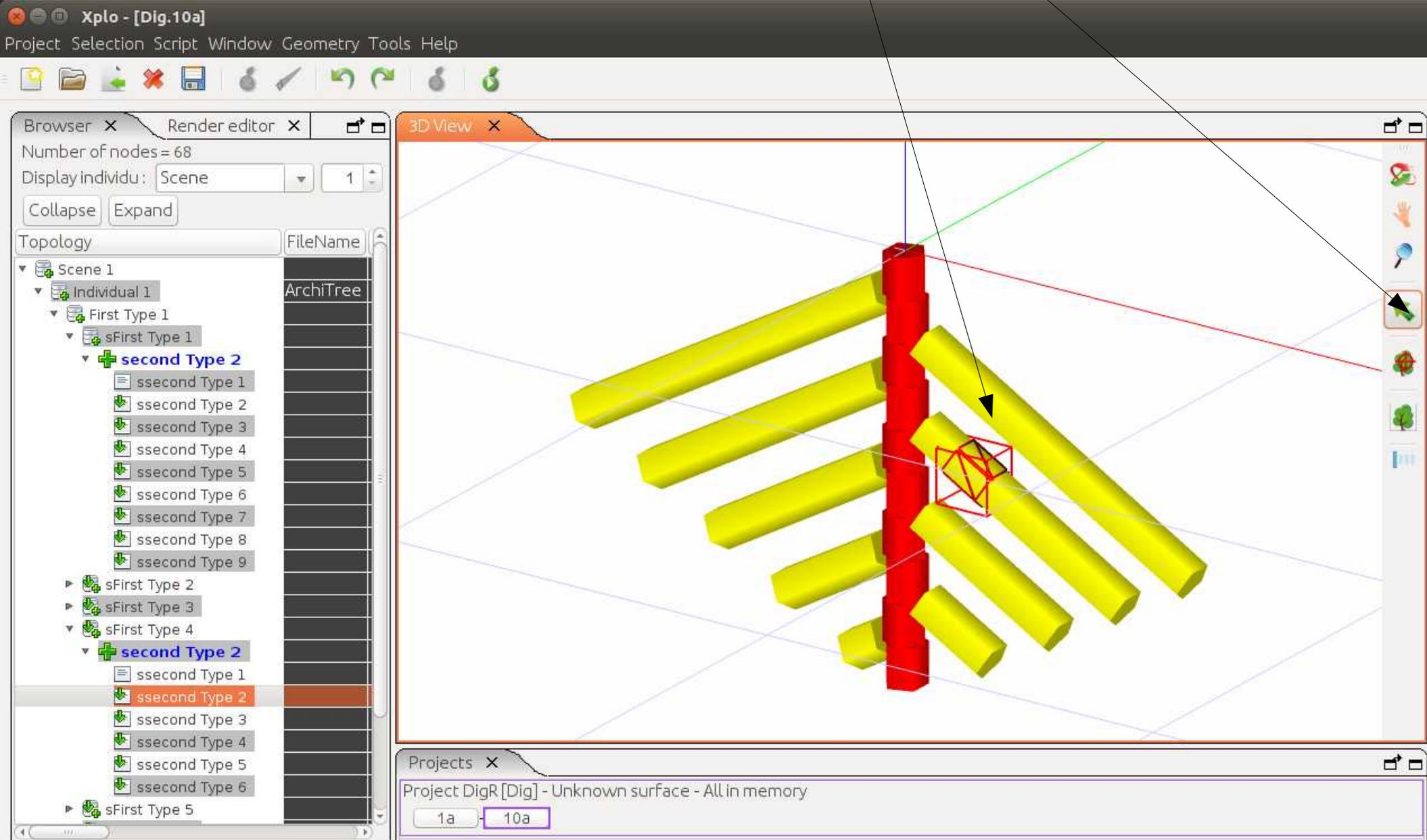
Centers the view on the scene

3D view

1. Select "pick" mode

2. click a component

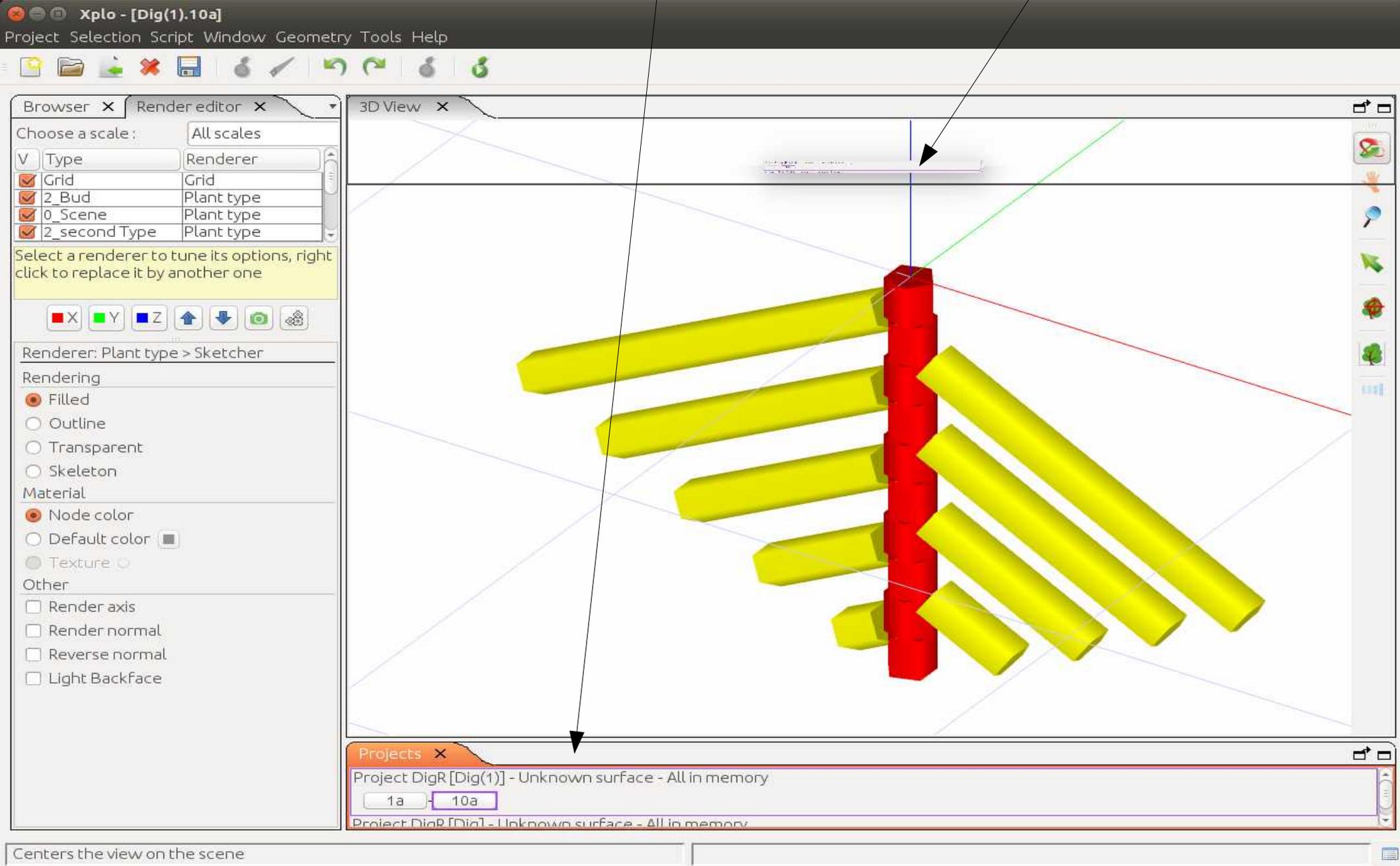
Component is automatically selected in the browser view



Select: Click or Click+Move to select, Ctrl+Click adds to the selection or removes from the selection

Lay out of the windows

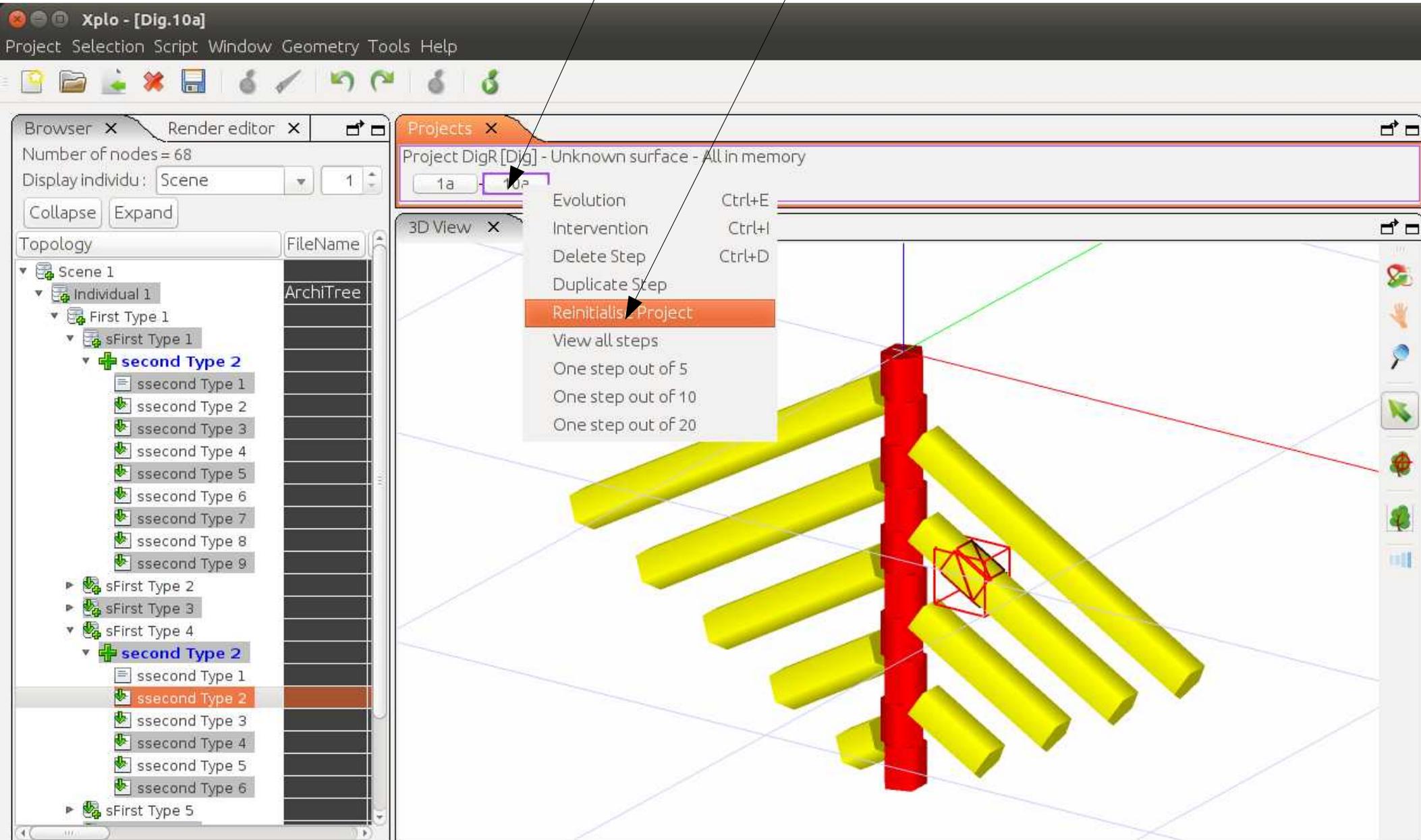
1. Click and drag from here... →
2. ... to there (look at the black rectangles)



Reinitialise project

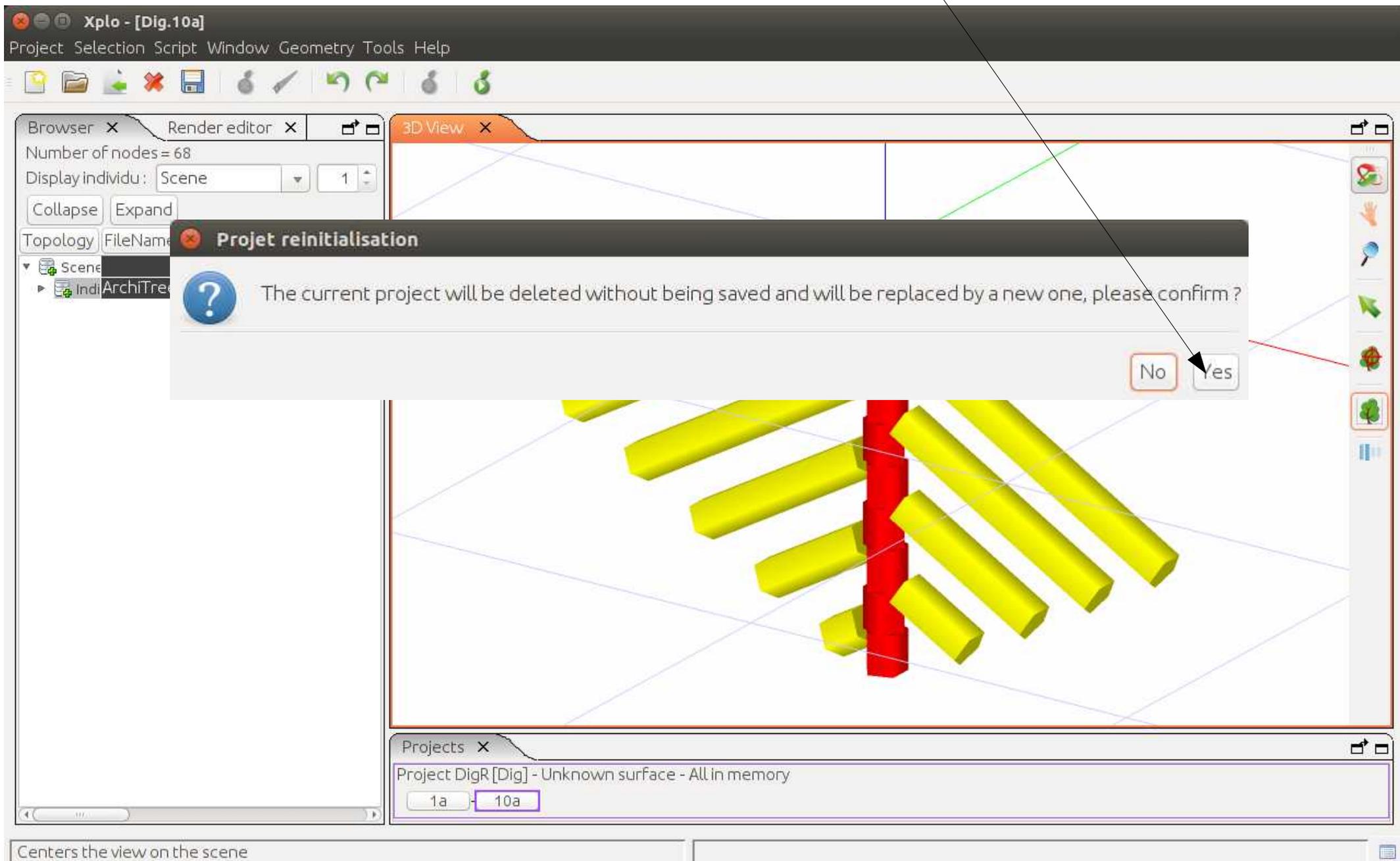
1. right click

2. click



Confirm reinitialisation

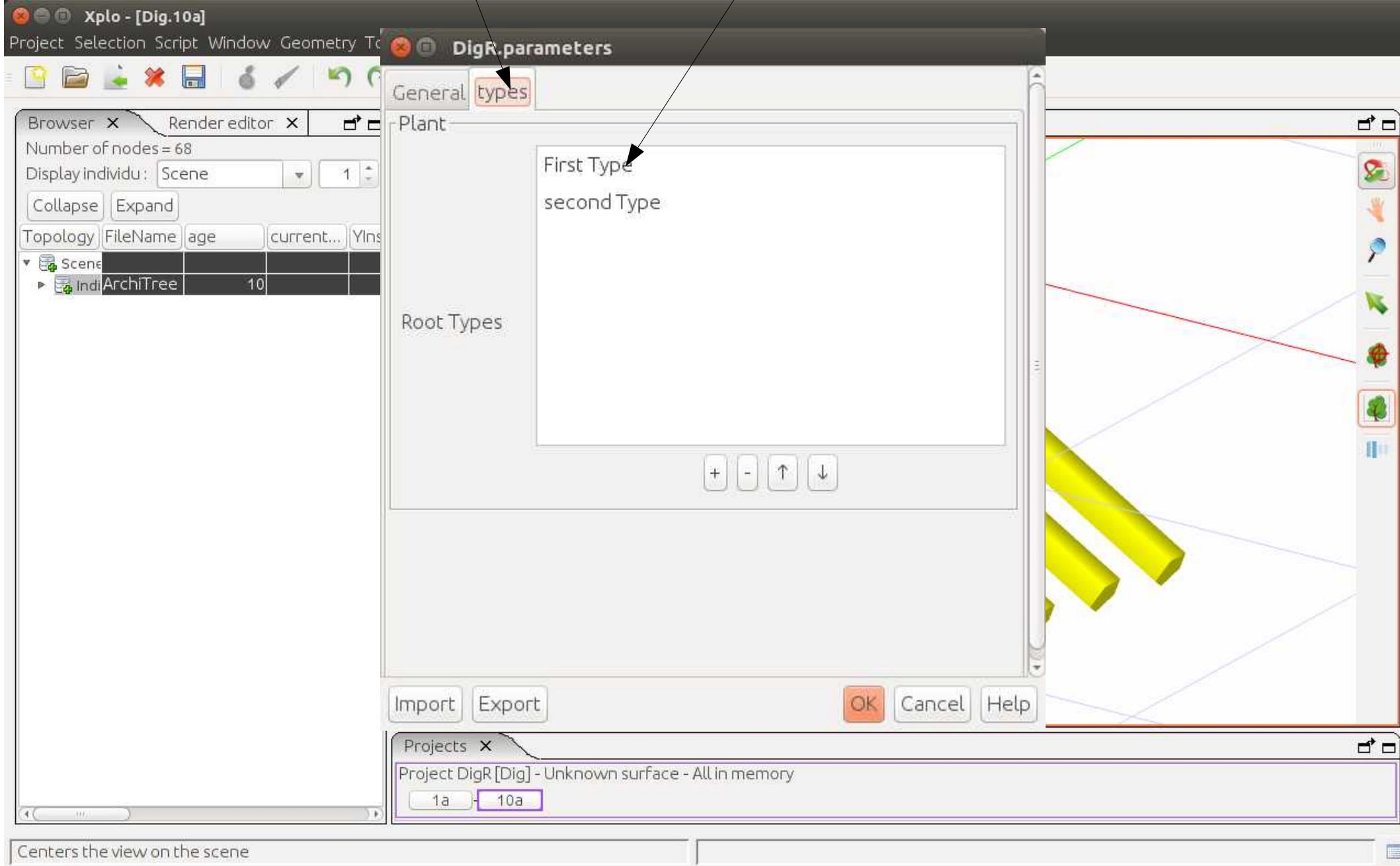
click



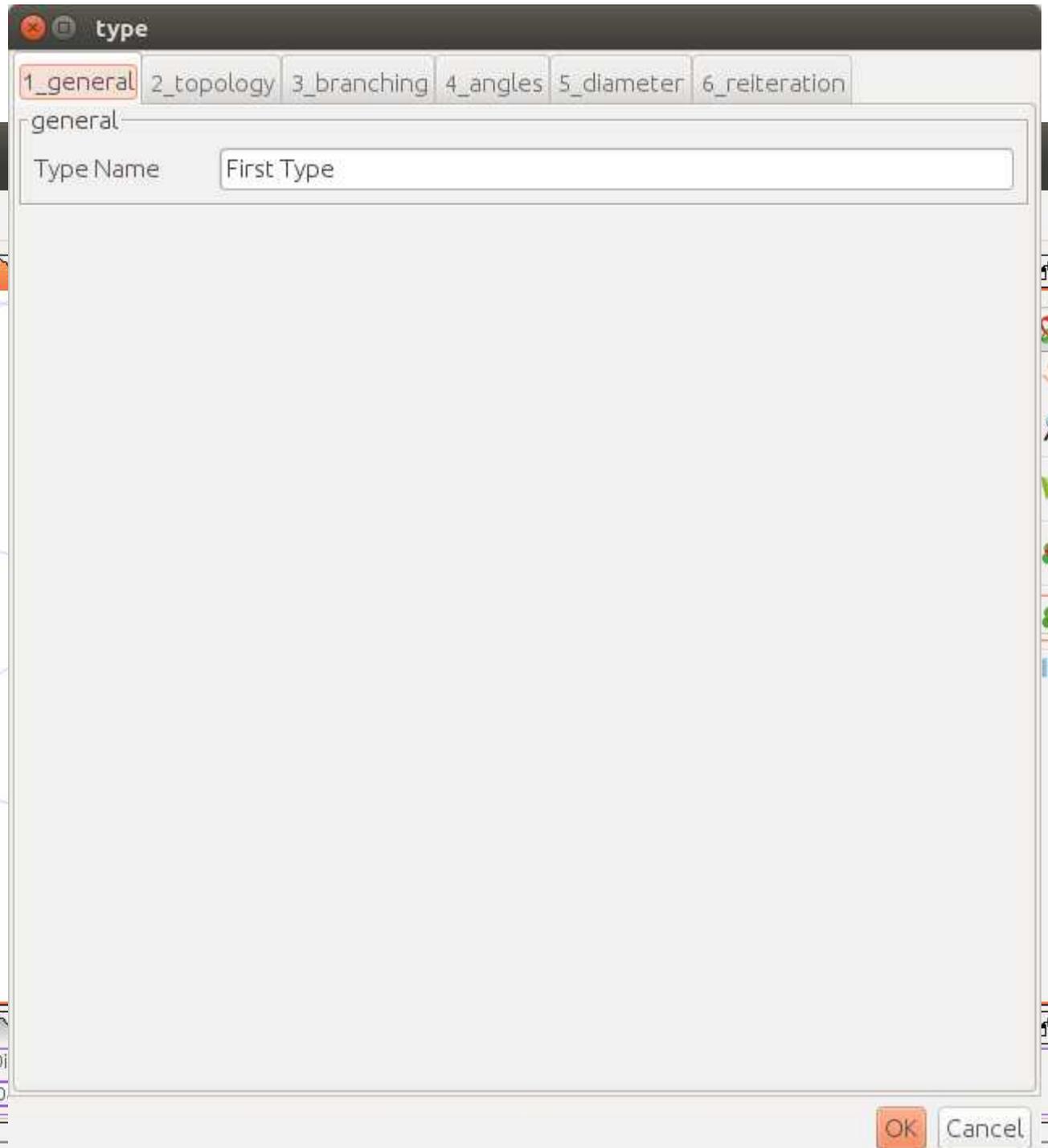
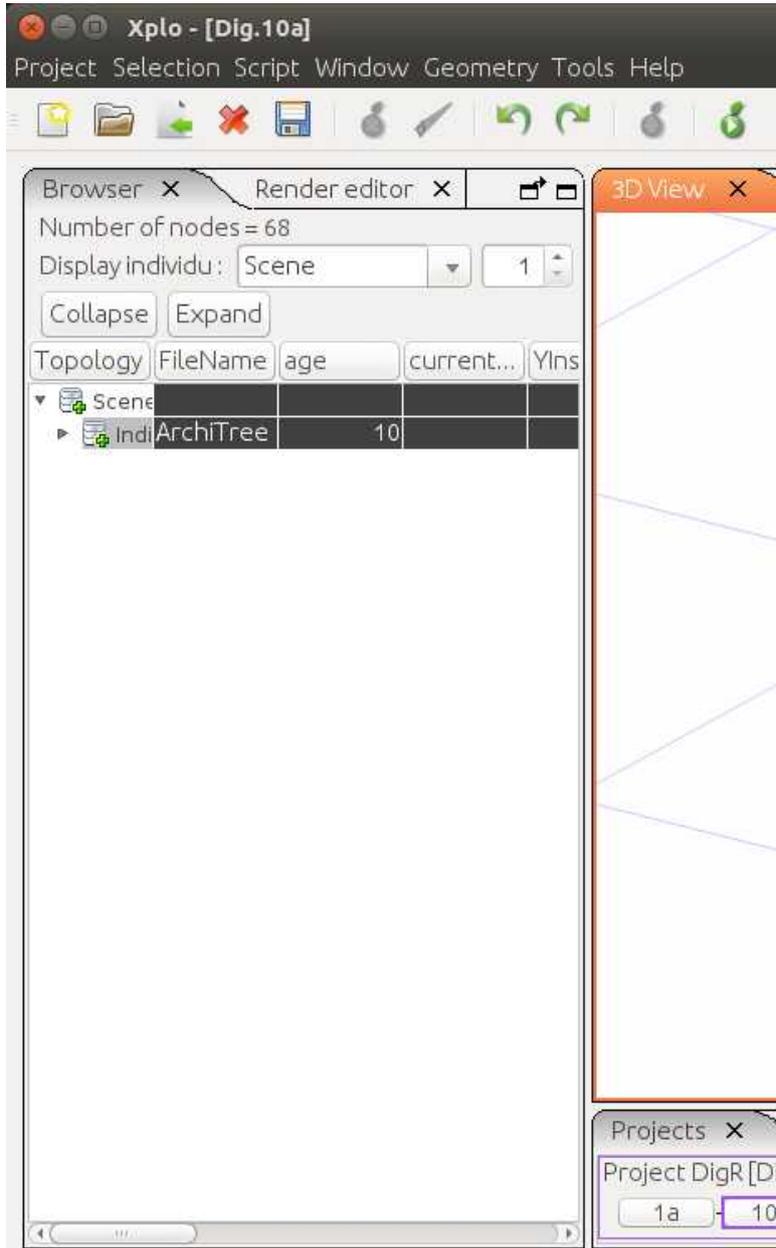
Edit a root type

1. click

2. double click



General tab to provide The type name



Centers the view on the scene

Topology tab

click

Xplo - [Dig.10a]
Project Selection Script Window Geometry Tools Help

Browser x Render editor x 3D View x

Number of nodes = 68
Display individu: Scene

Collapse Expand

Topology	FileName	age	current...	Ylns
Scene				
Indl ArchiTree		10		

Projects x
Project DigR [Dig]
1a 10a

type

1_general 2_topology 3_branching 4_angles 5_diameter 6_reiteration

topology

Potential Number Of Roots: 1
0.0 : 1.0

Probability For Each Root: + - ↑ ↓
0.0 : 0.0

Delay Before Growth (Time Unit): + - ↑ ↓
0.0 : 1.0

Growth Speed (cm/Time Unit): + - ↑ ↓
0.0

Percent Variation On Growth Speed (%): 0.0
0.0 : 0.0

Death Probability: + - ↑ ↓

Lag Before Pruning (Time Unit): 999.0

Standard Deviation On Pruning Lag (Time Unit): 0.0

Percent Not Pruned (%): 0.0

OK Cancel

Centers the view on the scene

Branching tab

click

Xplo - [Dig.10a]
Project Selection Script Window Geometry Tools Help

Browser x Render editor x 3D View x

Number of nodes = 68
Display individu: Scene 1

Collapse Expand

Topology	FileName	age	current...	Ylns
Scene				
Indl	ArchiTree	10		

Projects x
Project DigR [Di]
1a 10

type

1_general 2_topology 3_branching 4_angles 5_diameter 6_reiteration

Branching

Default_set : interRamifDistance (0.0 : 1.0;) typeFrequency (1 : 100.0;)

ramificationSets

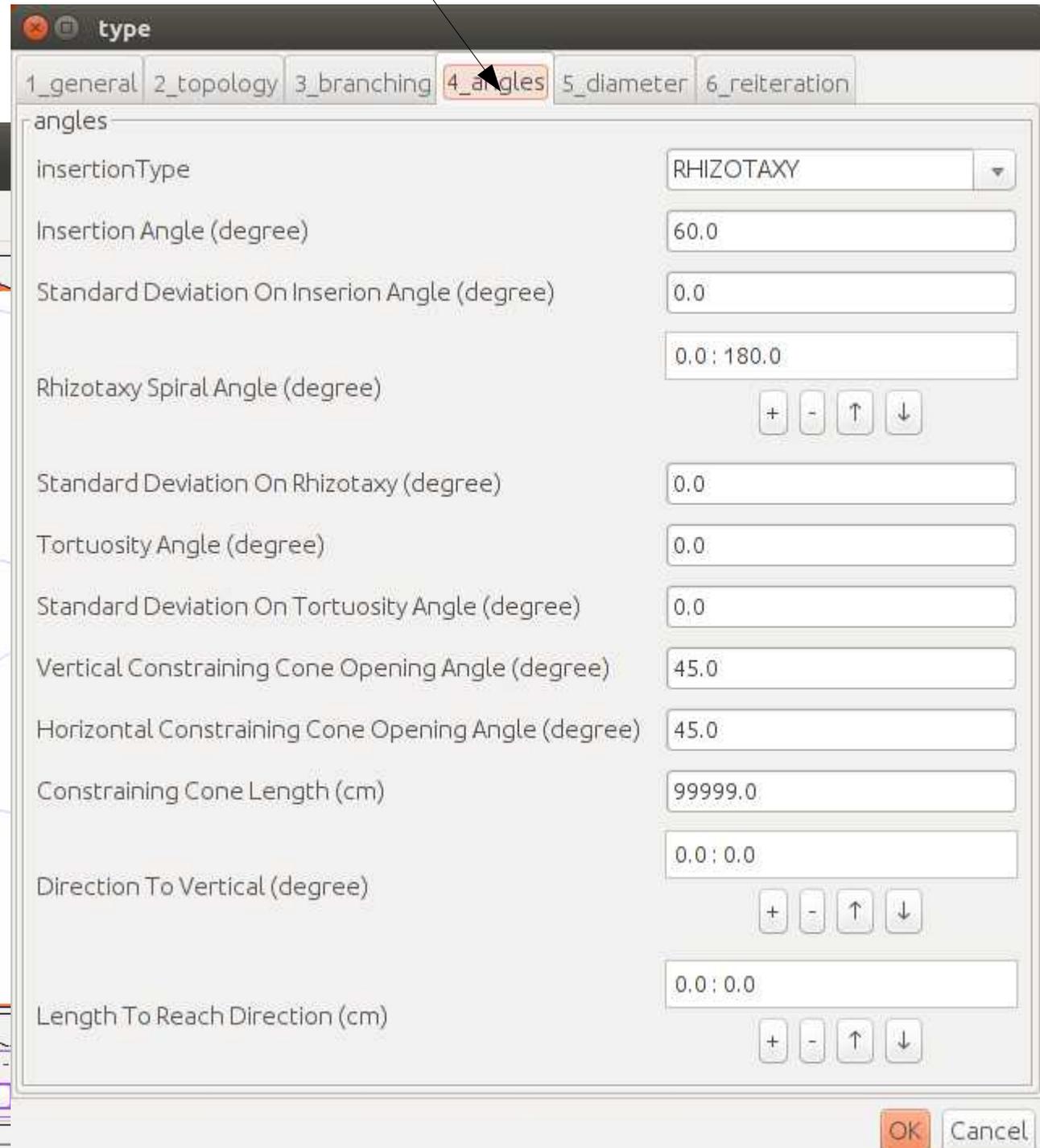
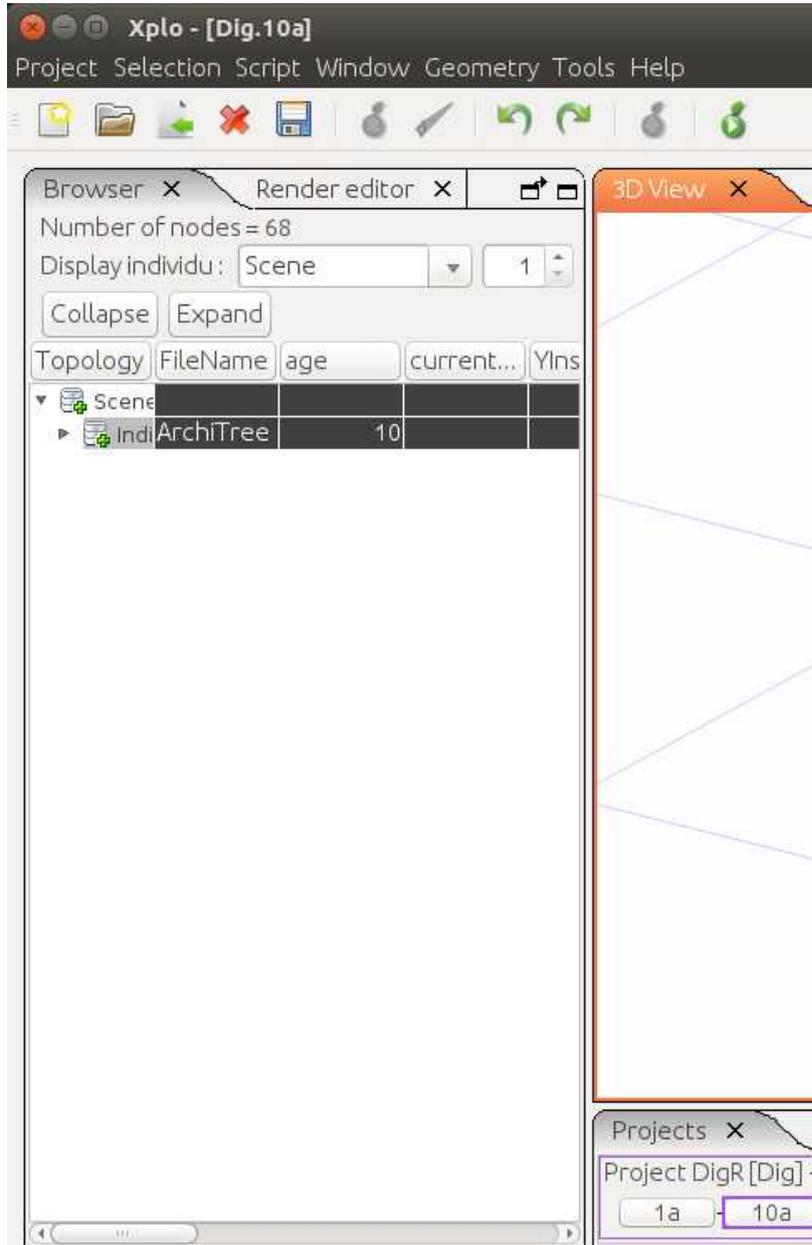
+ - ↑ ↓

OK Cancel

Centers the view on the scene

click

Angles tab



Centers the view on the scene

Diameter tab

click

Xplo - [Dig.10a]
Project Selection Script Window Geometry Tools Help

Browser x Render editor x 3D View x

Number of nodes = 68
Display individu: Scene [v] 1 [±]

Collapse Expand

Topology	FileName	age	current...	Ylns
Scene				
Indl	ArchiTree	10		

Projects x
Project DigR [Dig]
1a 10a

type

1_general 2_topology 3_branching 4_angles 5_diameter 6_reiteration

diameter

Initial Diameter (cm)

Standard Deviation On Initial Diameter (cm)

Diameter Increase Ratio

Diameter Increase Time (time Unit)

Delay Before Diameter Increase (time Unit)

Standard Deviation On Diameter Increase Ratio

Standard Deviation On Diameter Increase Time (time Unit)

Standard Deviation On Delay Before Diameter Increase (time Unit)

OK Cancel

Centers the view on the scene

click

Reiteration tab

Xplo - [Dig.10a]
Project Selection Script Window Geometry Tools Help

Number of nodes = 68
Display individu: Scene

Collapse Expand

Topology	FileName	age	current...	Yins
Scene				
Indl	ArchiTree	10		

3D View

Projects

Project DigR [Dig	
1a	10a

type

1_general 2_topology 3_branching 4_angles 5_diameter 6_reiteration

reiteration

MaxReit: 0

ReitAngle: 30.0

Reitrhizotaxy: 180.0

reitDistance: 0.0 : 1.0

reitFrequency: 0.0 : 100.0

OK Cancel

Centers the view on the scene

Parametrisation of a taproot system

Adjust angles

1. click

2. tortuosity

3. Spatial constraint

type

1_general 2_topology 3_branching 4_angles 5_diameter 6_reiteration

angles

insertionType RHIZOTAXY

Insertion Angle (degree) 60.0

Standard Deviation On Inserion Angle (degree) 0.0

Rhizotaxy Spiral Angle (degree) 0.0 : 180.0

Standard Deviation On Rhizotaxy (degree) 0.0

Tortuosity Angle (degree) 5.0

Standard Deviation On Tortuosity Angle (degree) 2.0

Vertical Constraining Cone Opening Angle (degree) 45.0

Horizontal Constraining Cone Opening Angle (degree) 45.0

Constraining Cone Length (cm) 2.0

Direction To Vertical (degree) 0.0 : 0.0

Length To Reach Direction (cm) 0.0 : 0.0

OK Cancel

Xplo - [Dig.10a]

Project Selection Script Window Geometry Tools Help

Browser x Render editor x 3D View x

Number of nodes = 68

Display individu: Scene

Collapse Expand

Topology FileName age current... Ylns

Scene

Indl ArchiTree 10

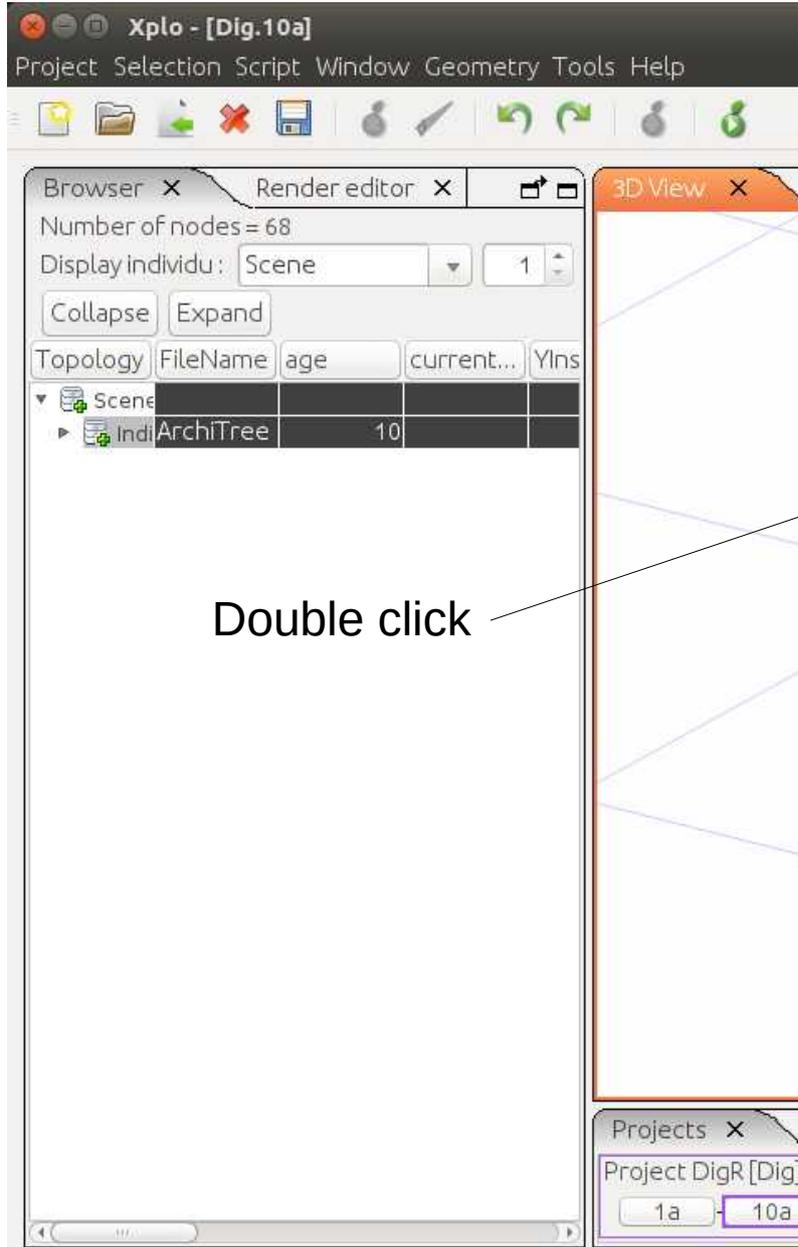
Projects x

Project DigR [Dig] -

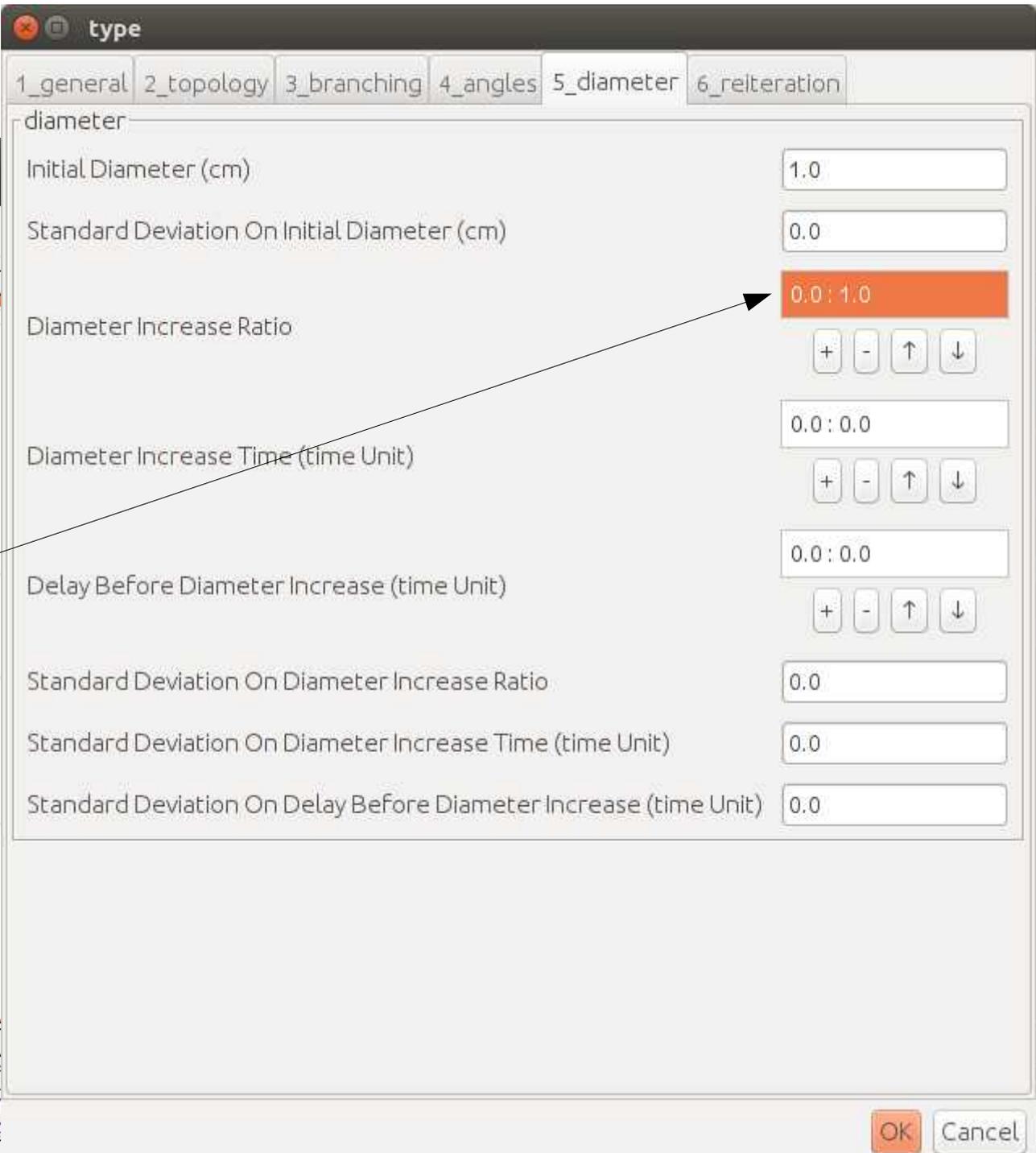
1a 10a

Centers the view on the scene

Adjust diameters



Double click



Adjust diameters

If double-double window is hidden, click anywhere outside the window

Xplo - [Dig.10a]
Project Selection Script Window Geometry Tools Help

Browser x Render editor x 3D View x

Number of nodes = 68
Display individu: Scene

Topology FileName age current... Ylns

Scene
Indl ArchiTree 10

Projects x
Project DigR [Dig]
1a 10a

type

1_general 2_topology 3_branching 4_angles 5_diameter 6_reiteration

diameter

Initial Diameter (cm) 1.0

Standard Deviation On Initial Diameter (cm) 0.0

Diameter Increase Ratio 0.0 : 1.0

Diameter Increase Ti

Delay Before Diameter position 0.0

Standard Deviation C val 40.0

Standard Deviation C

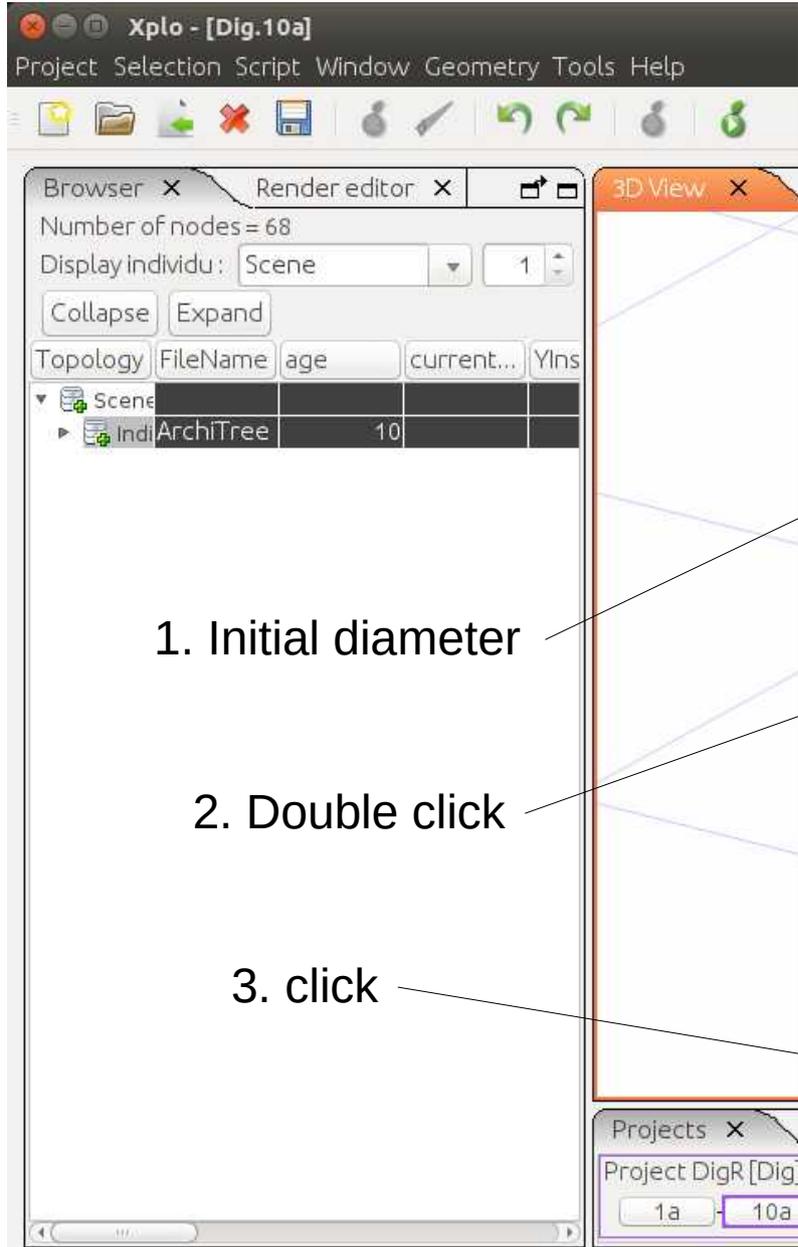
Standard Deviation C

OK Cancel

1. saisie

2. click

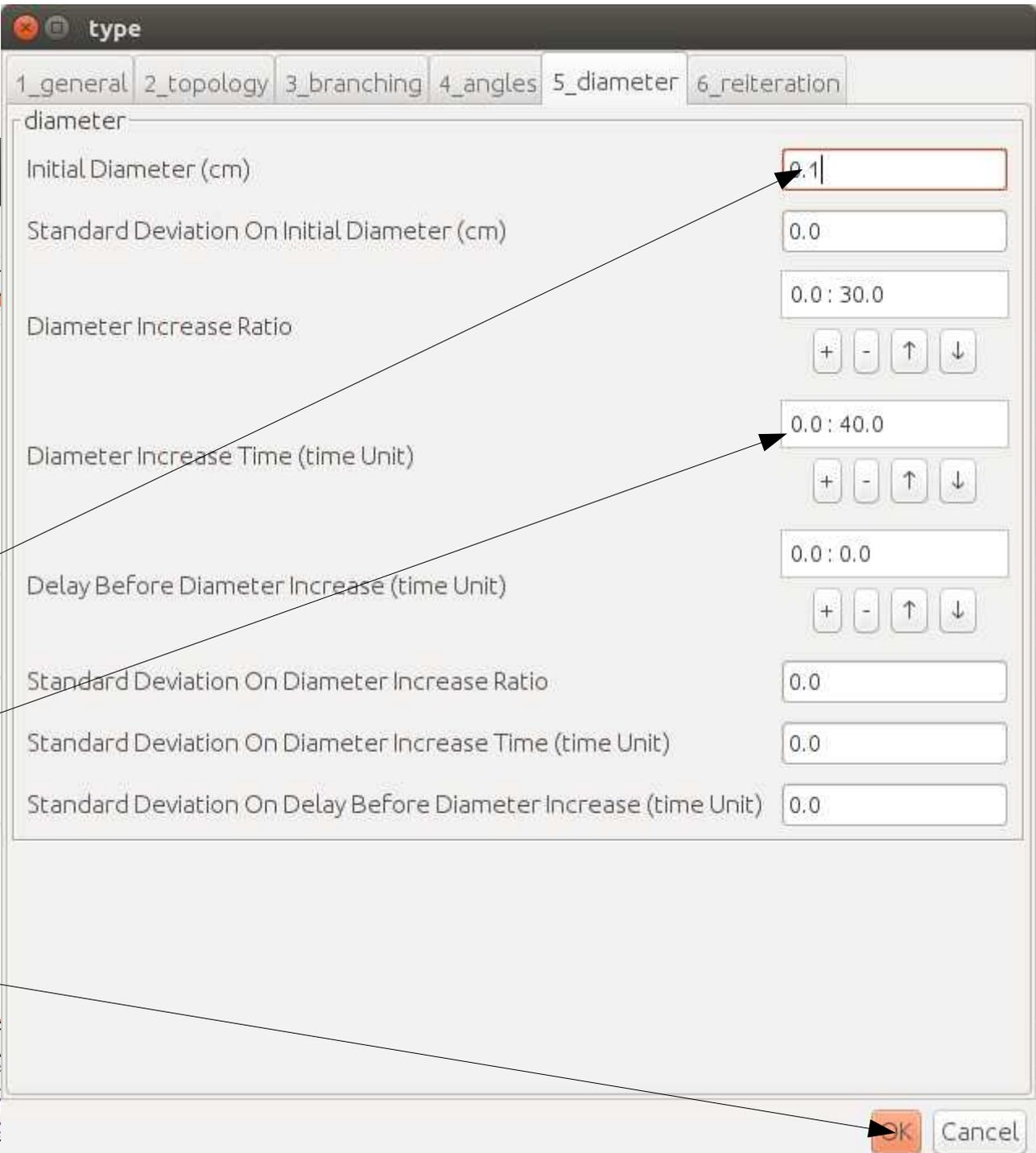
Adjust diameters



1. Initial diameter

2. Double click

3. click



OK Cancel

Adjust simulation parameters, run

1. click

2. adjust

3. adjust

4. click

DigR.parameters

General types

General

plantName Default_Root

Max Computing Age (Time Unit) 9999

Max Branching Order 2

Computing Age (Time Unit) 40.0

Random Seed 2

Output Step (Time Unit) 1.0

Evolution Time (Time Unit) 10.0

Plugins

With Soil Plugin

Minimum Growth Time Step (days) 9999.0

Minimum Space Size (cm) 9999.0

Import Export **Ok** Cancel Help

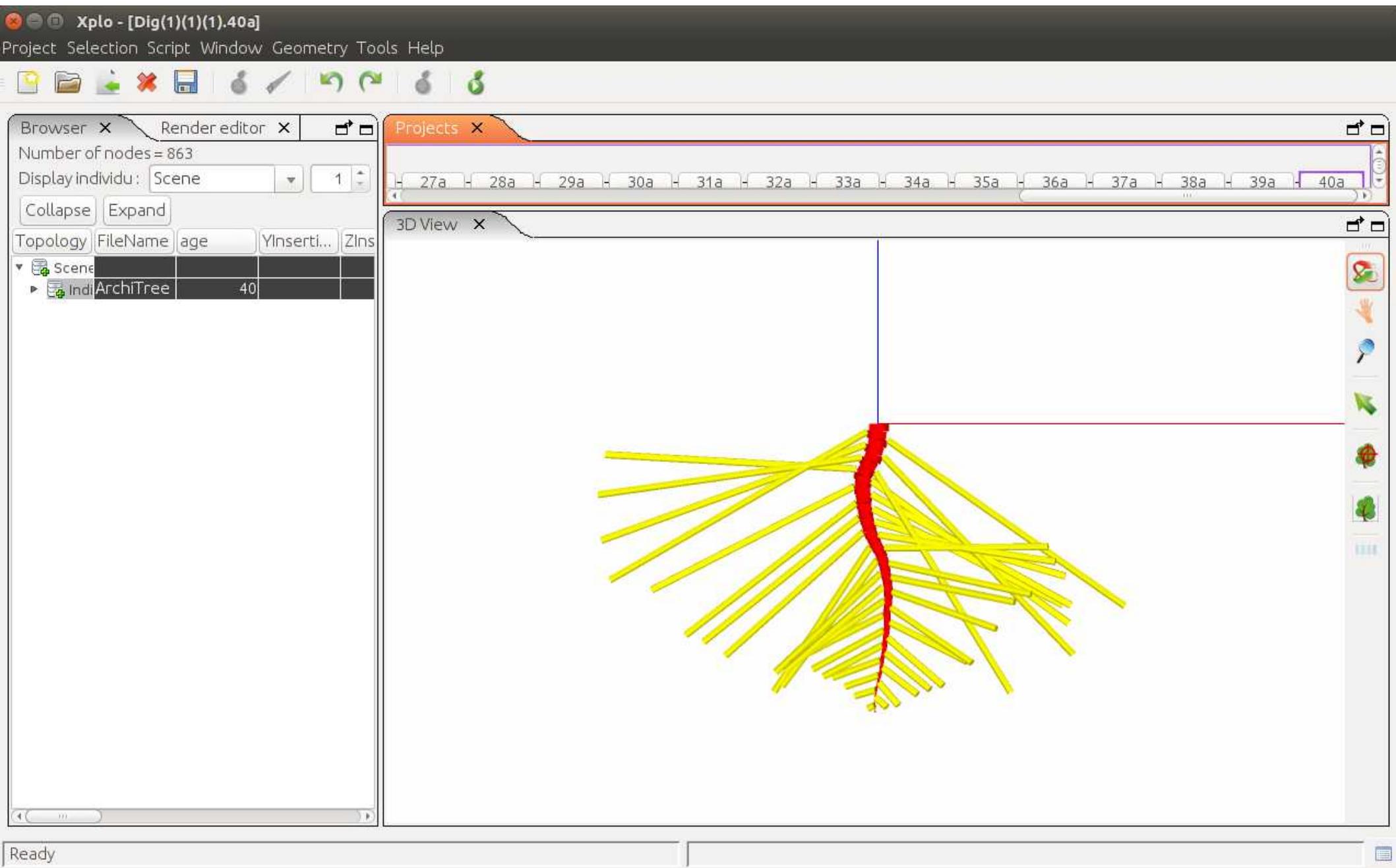
Projects x

Project DigR [Dig] - Unknown surface - All in memory

1a 10a

Centers the view on the scene

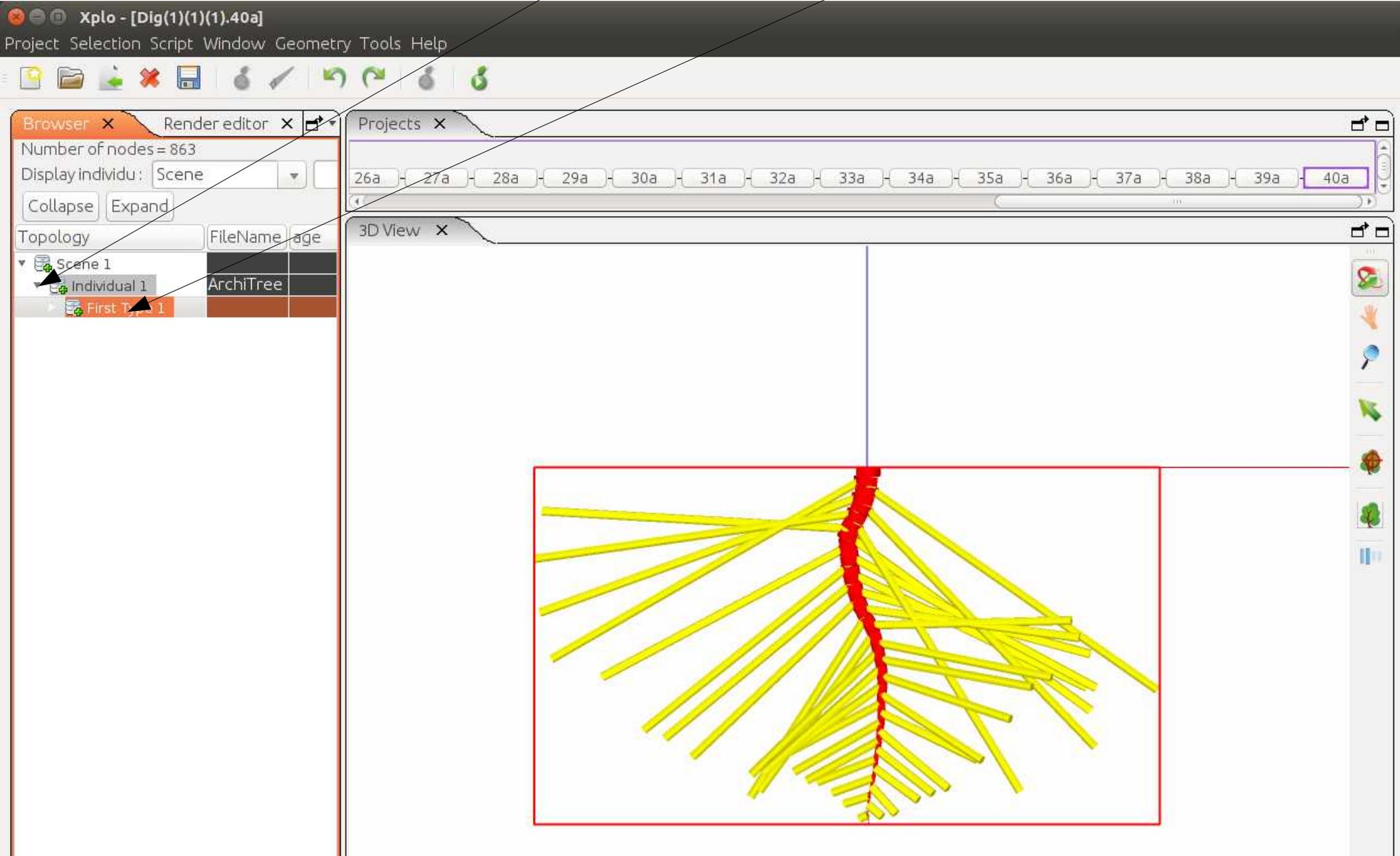
What a nice taproot !



Visualisation of constraint cone

1. click

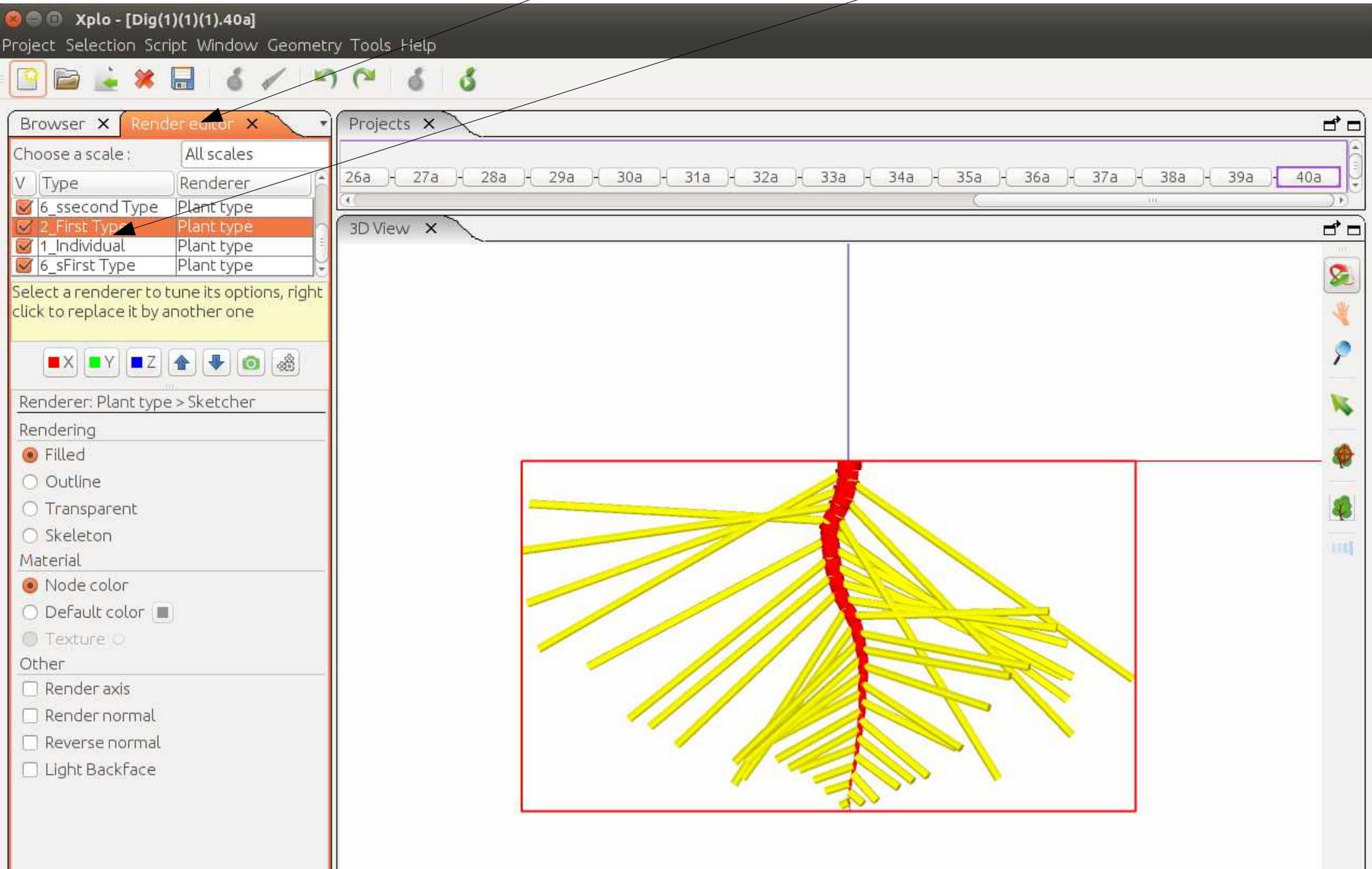
2. Select taproot (First Type)



Visualisation of constraint cone

1. click

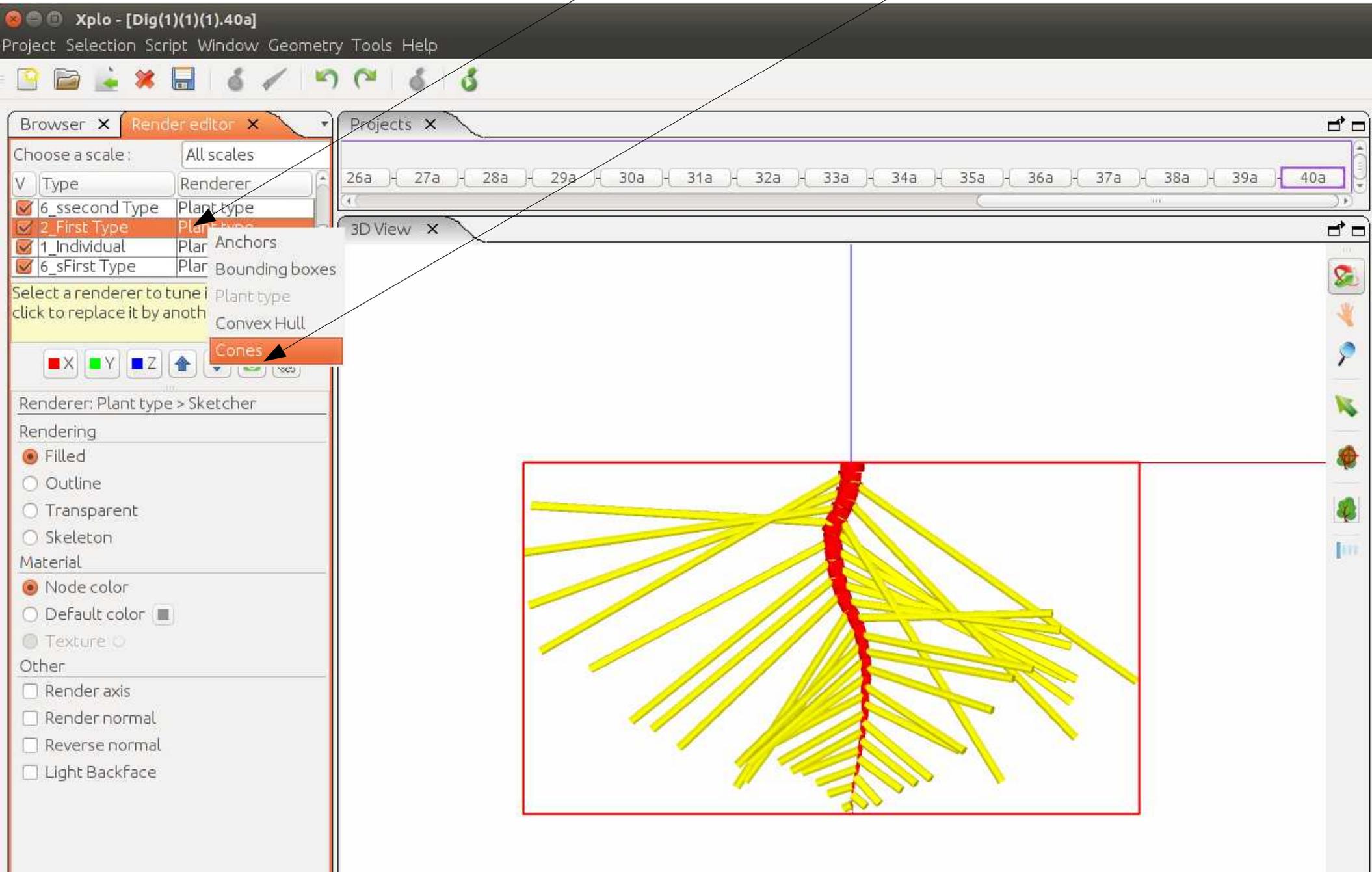
2. Select First Type



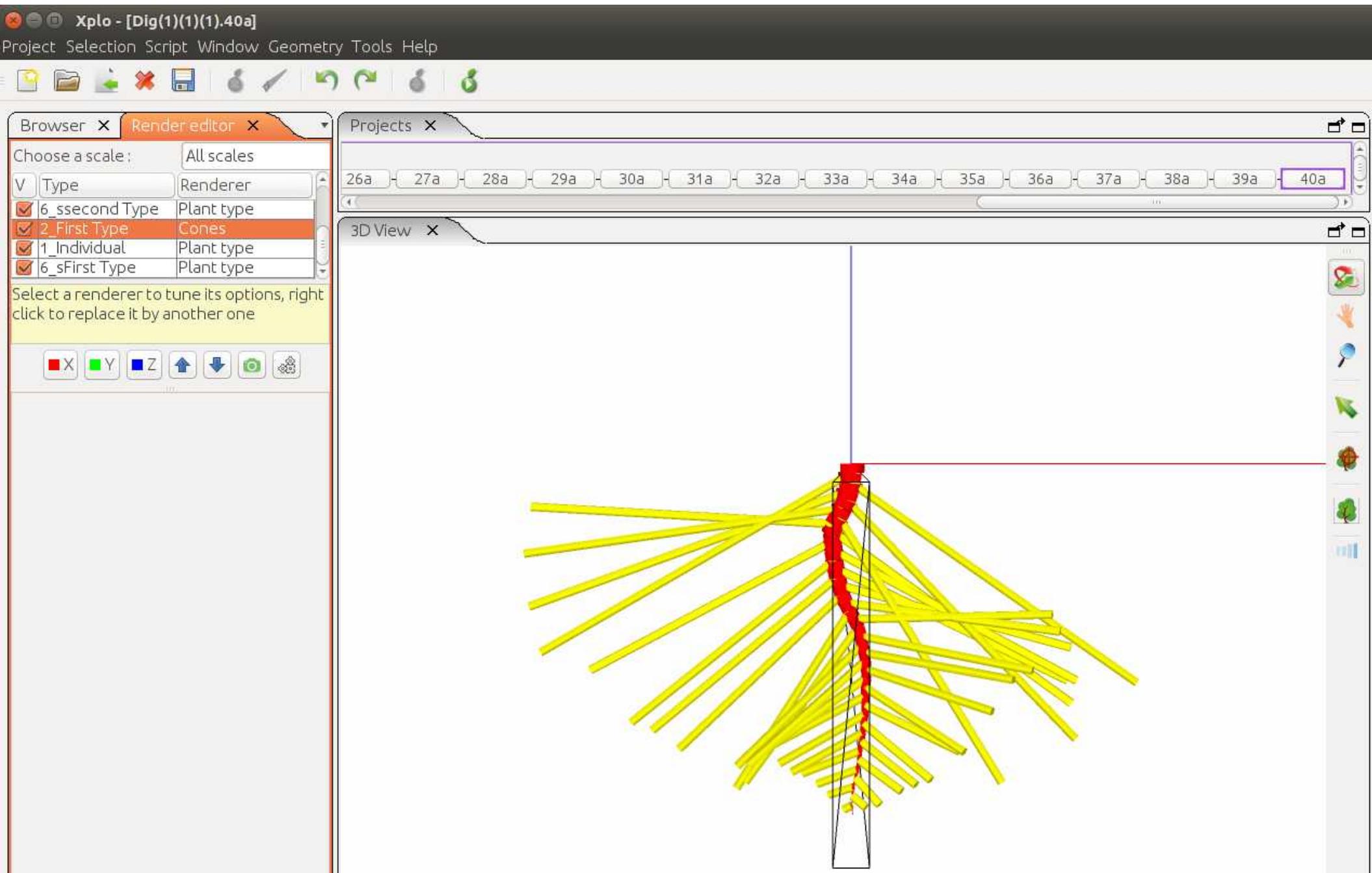
Visualisation of constraint cone

1. Right click

2. Select Cones sketcher



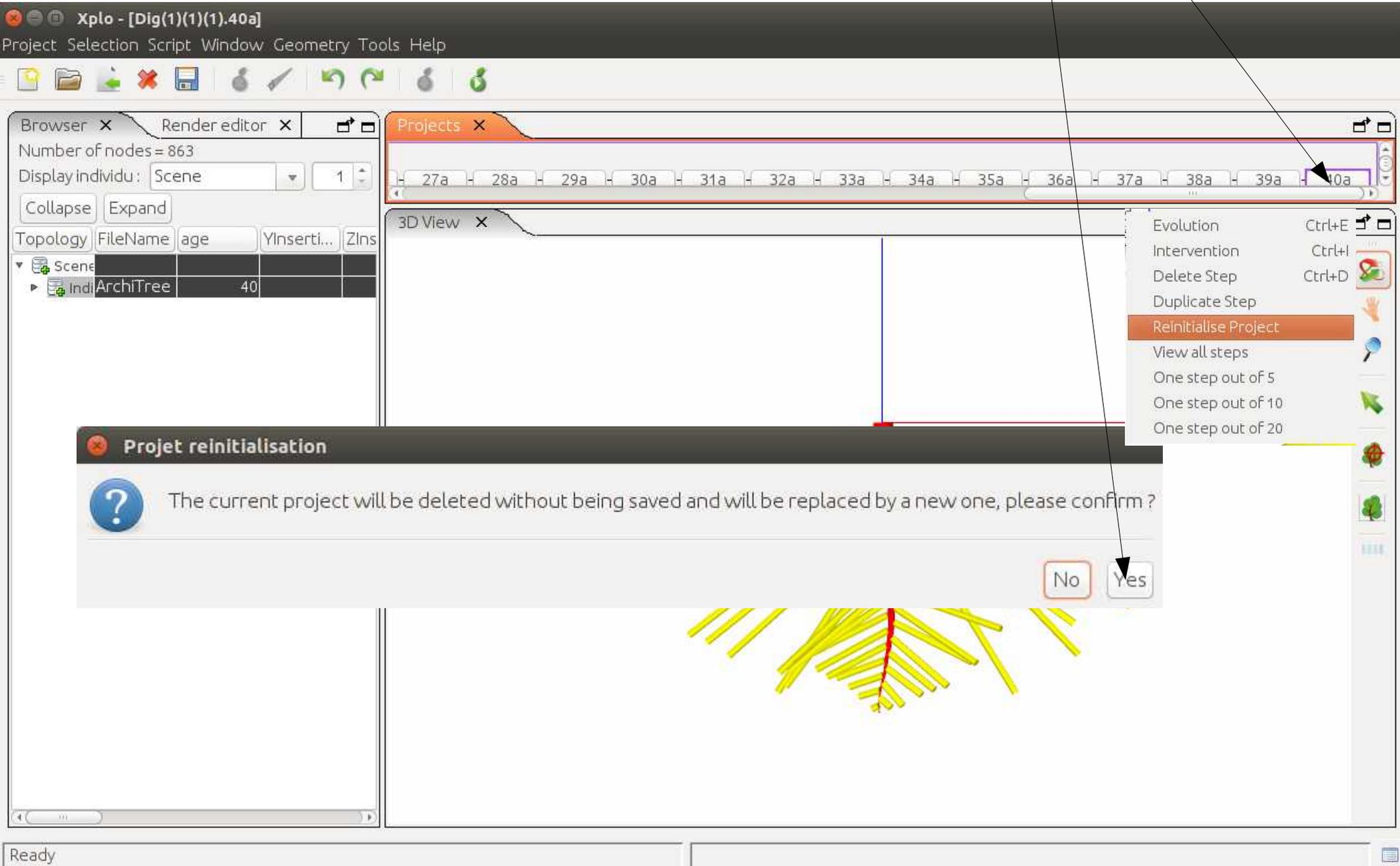
Taproot remains into its constraint cone



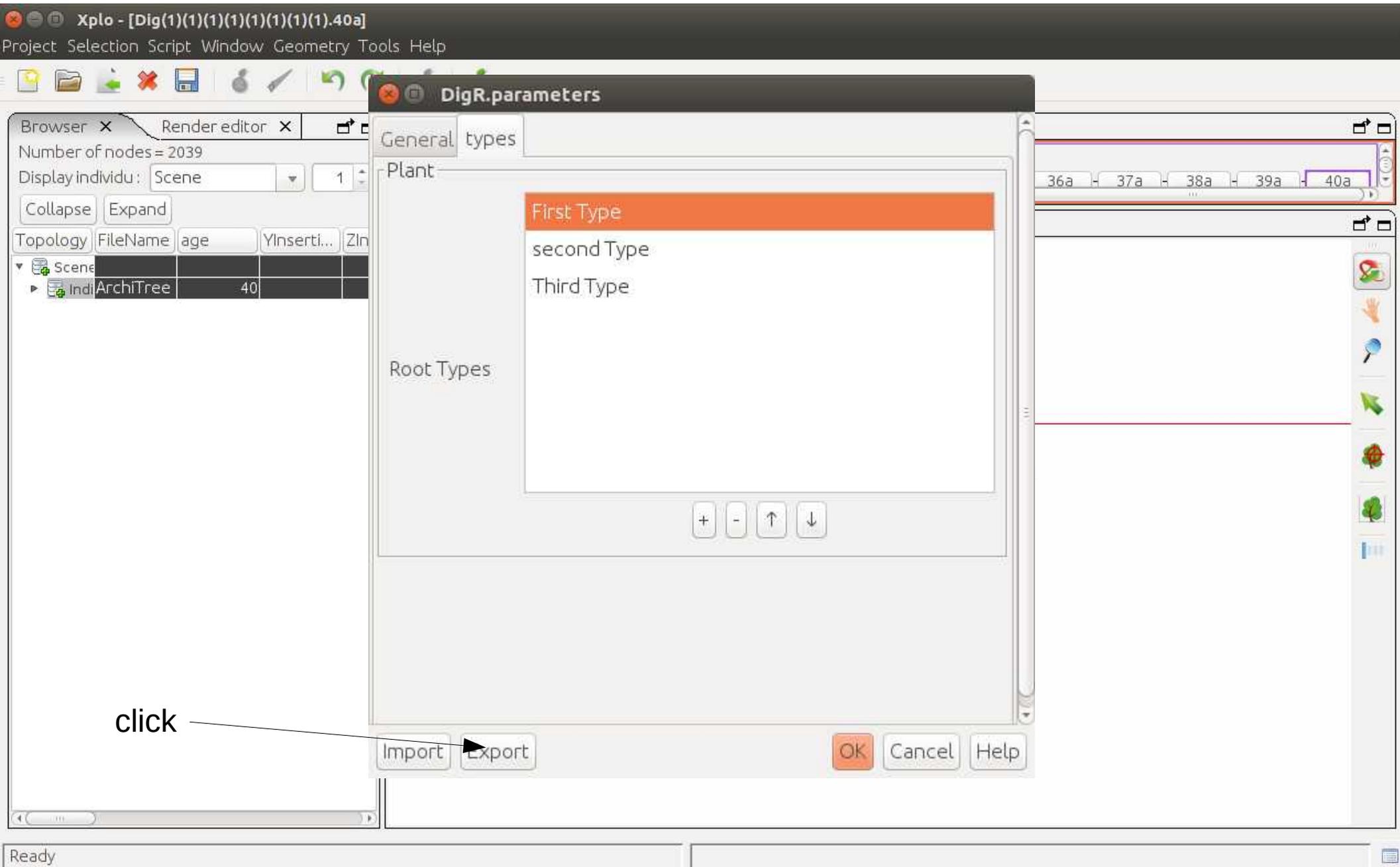
Go back to parameter setup

1. right click

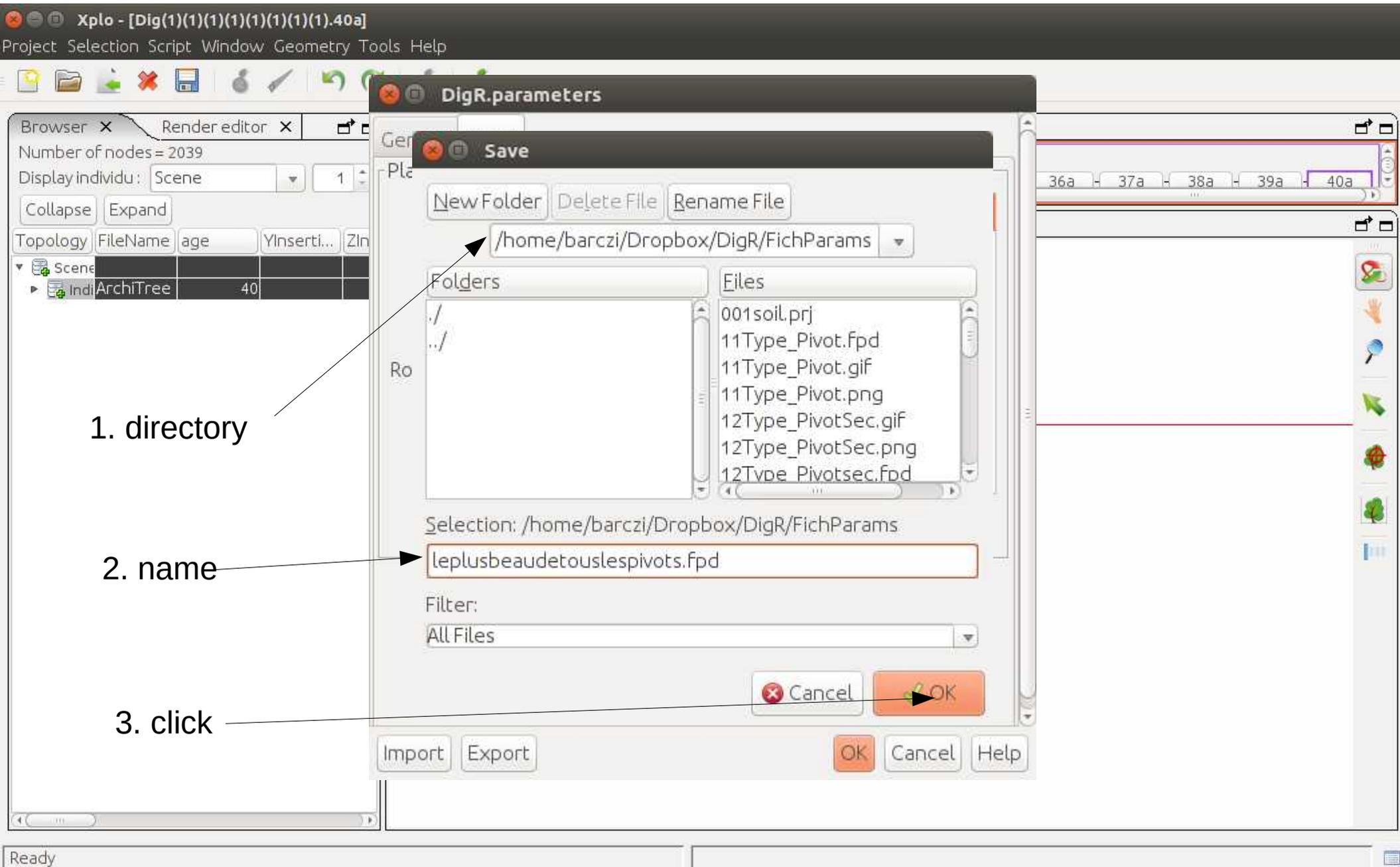
2. click



Save



Save

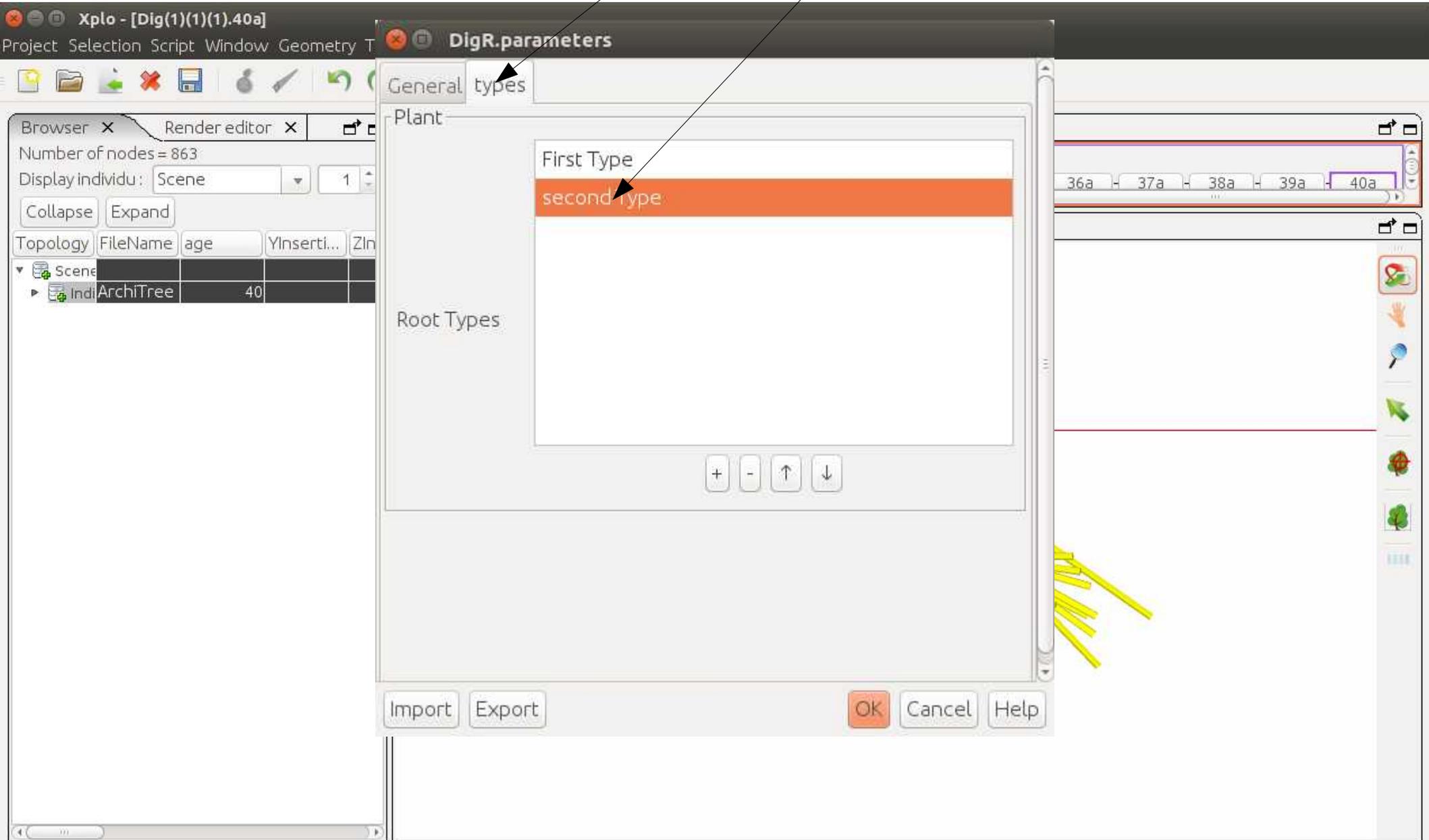


Parametrisation of second type

Select second

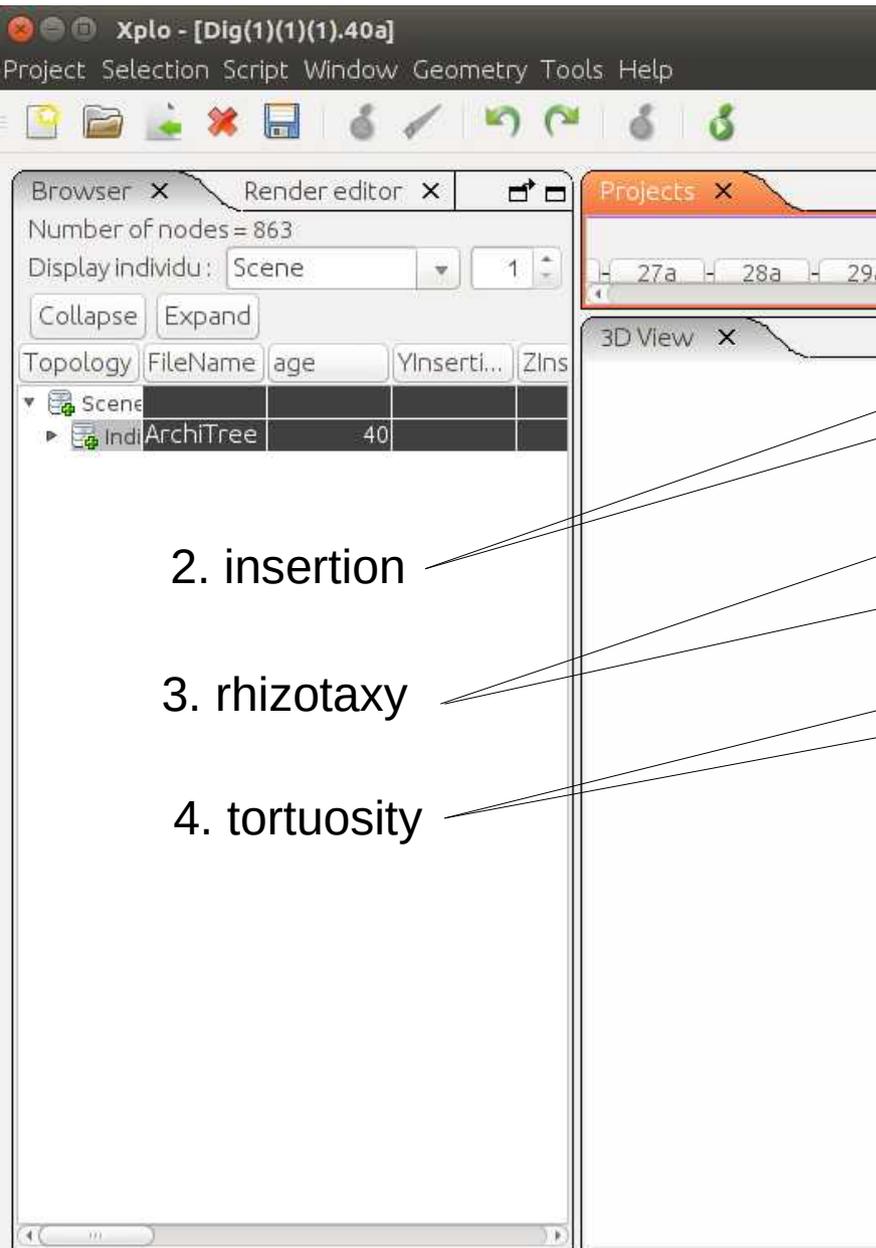
1. click

2. double click



Adjust angles

1. click



2. insertion

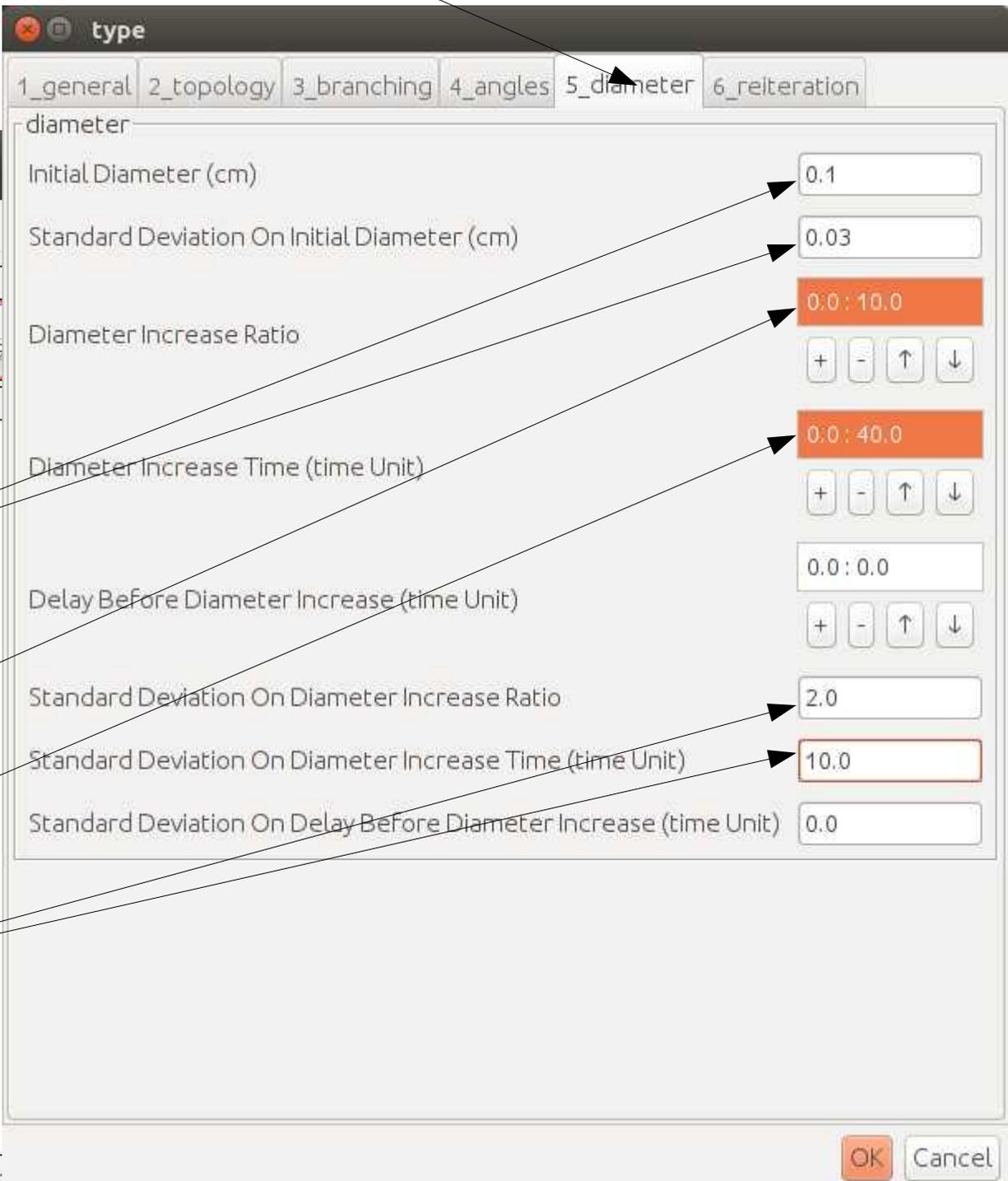
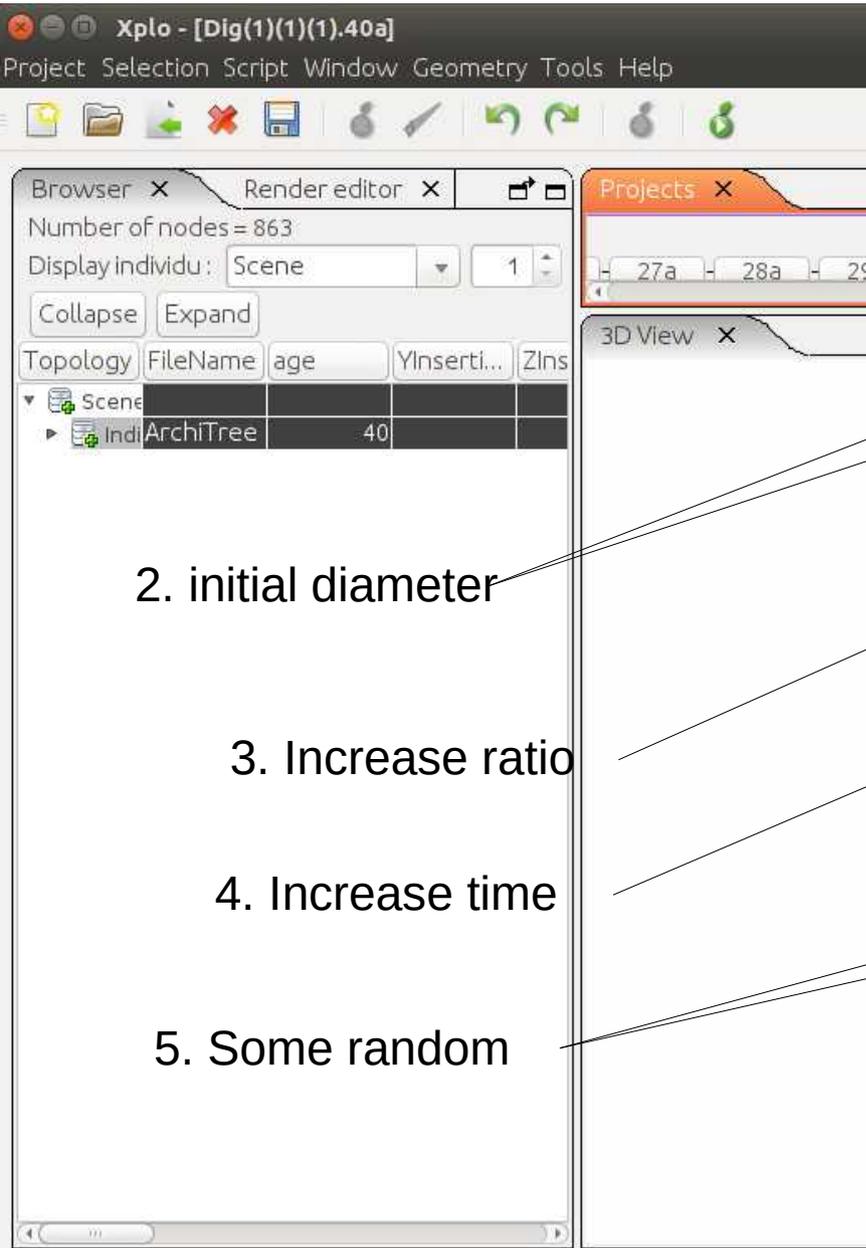
3. rhizotaxy

4. tortuosity



Adjust diameters

1. click



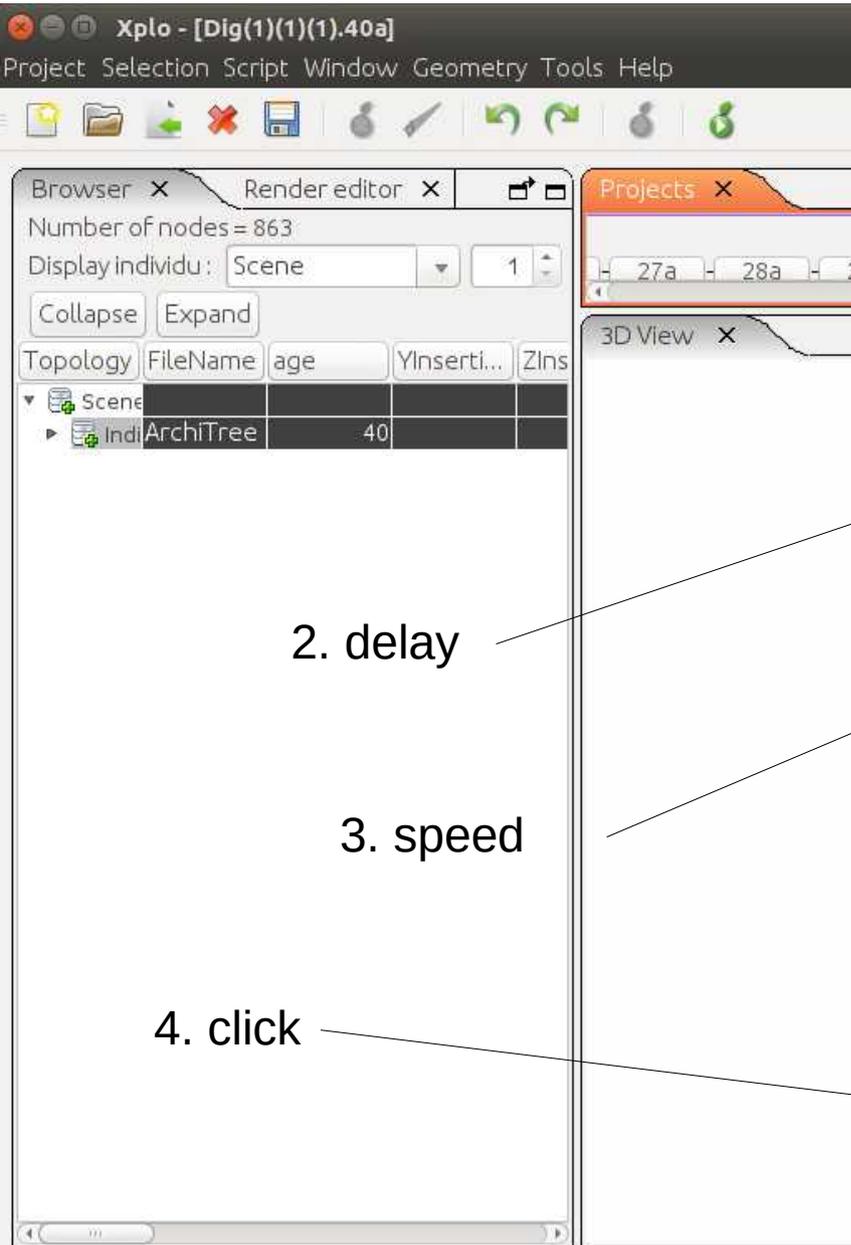
2. initial diameter

3. Increase ratio

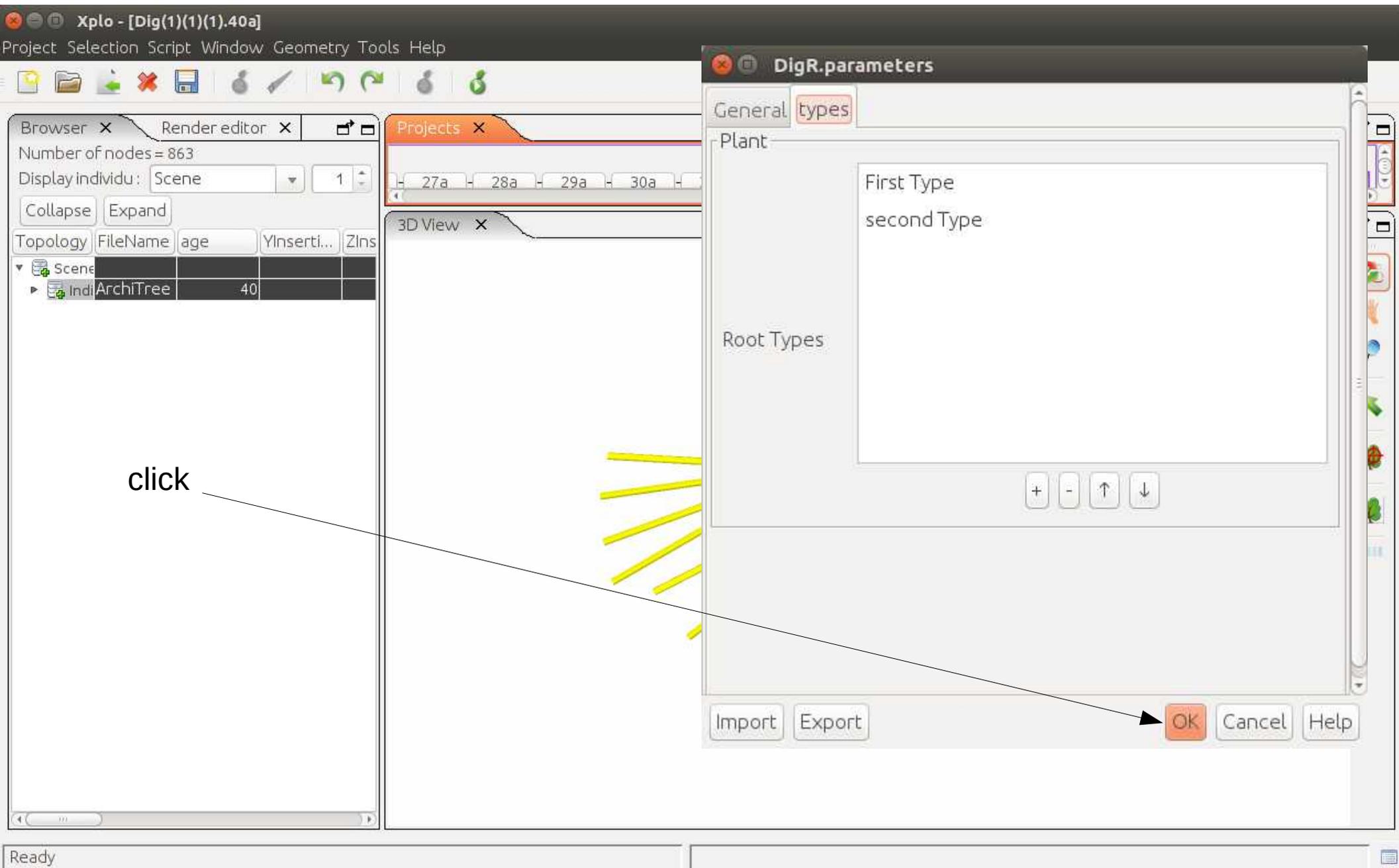
4. Increase time

5. Some random

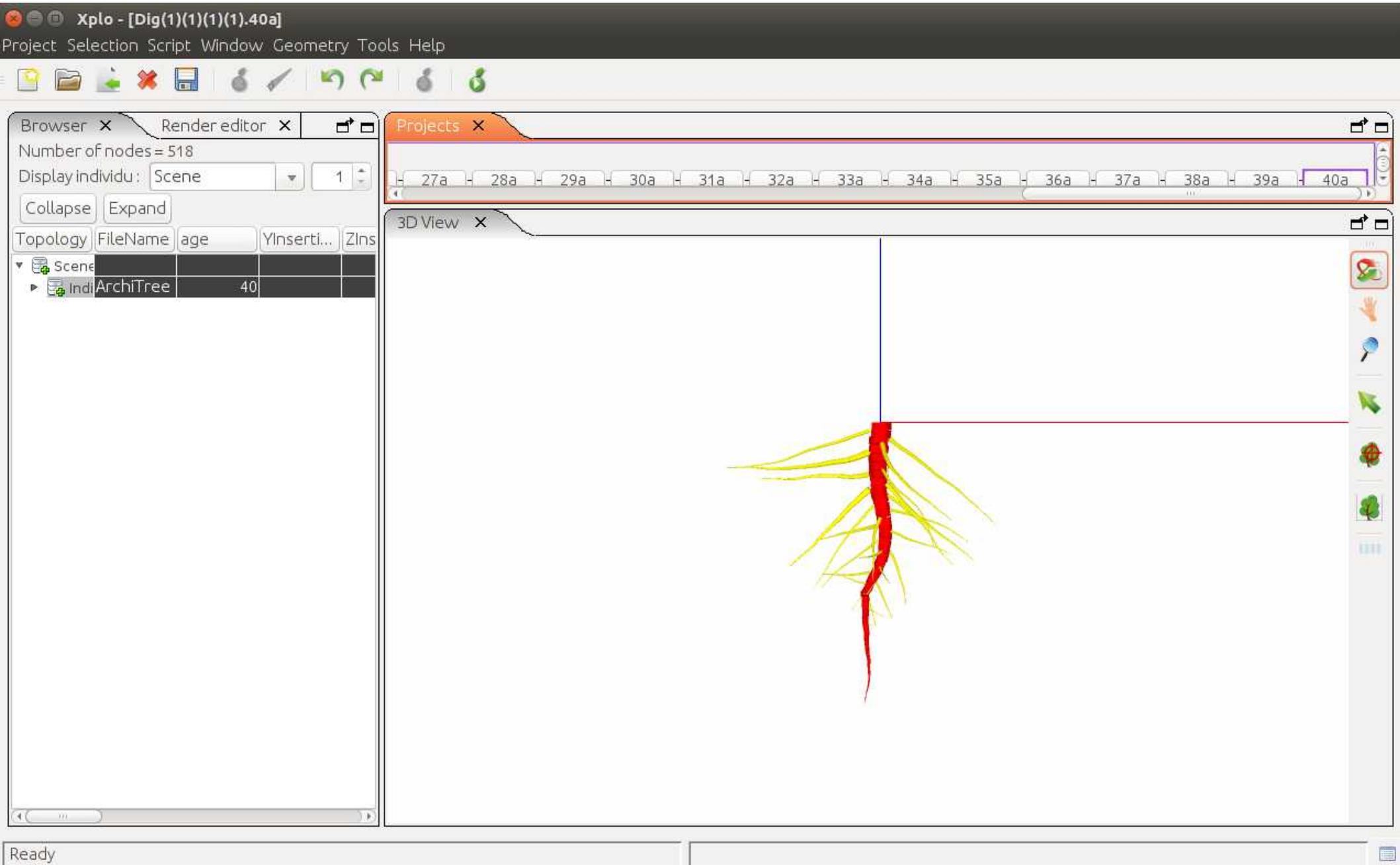
Adjust apical growth



simulation



simulation

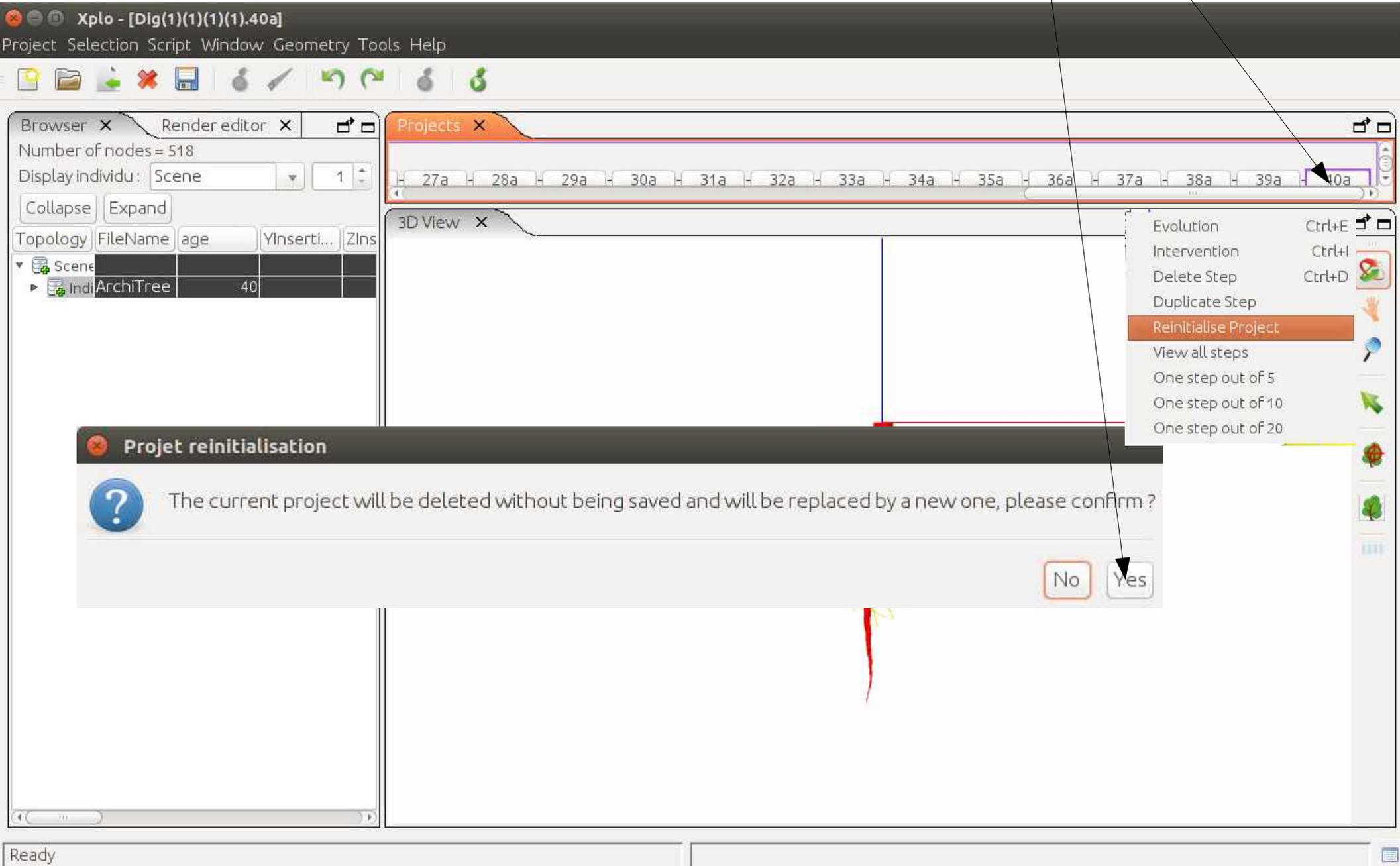


Add and setup third type

Go back to parameter setup

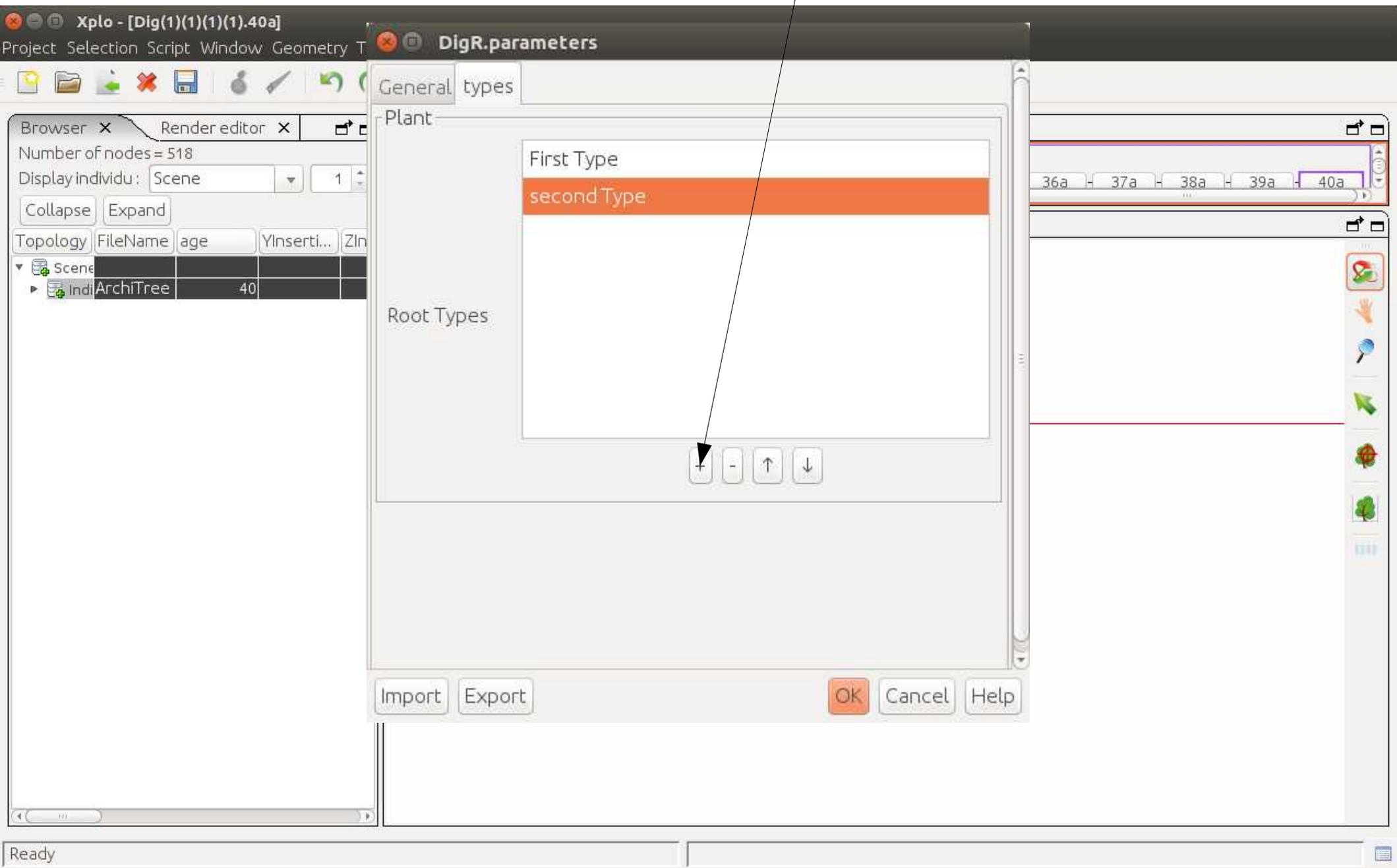
1. right click

2. click



Add a new type

click



Provide a name

Xplo - [Dig(1)(1)(1)(1).40a]

Project Selection Script Window Geometry Tools Help

Number of nodes = 518
Display individu: Scene 1

Collapse Expand

Topology	FileName	age	Yinserti...	ZIns
Scene				
Indi	ArchiTree	40		

type

1_general 2_topology 3_branching 4_angles 5_diameter 6_reiteration

general

Type Name

Ready

OK Cancel

Apical growth

1. click

Xplo - [Dig(1)(1)(1)(1).40a]
Project Selection Script Window Geometry Tools Help

Browser x Render editor x
Number of nodes = 518
Display individu: Scene
Collapse Expand
Topology FileName age Yinserti... ZIns

Scene			
Indi	ArchiTree	40	

Projects x
27a 28a

3D View x

2. Delay

3. Speed

type

1_general 2_topology 3_branching 4_angles 5_diameter 6_reiteration

topology

Potential Number Of Roots: 1

Probability For Each Root: 0.0 : 1.0

Delay Before Growth (Time Unit): 0.0 : 2.0

Growth Speed (cm/Time Unit): 0.0 : 0.5

Percent Variation On Growth Speed (%): 50.0

Death Probability: 0.0 : 0.0

Lag Before Pruning (Time Unit): 999.0

Standard Deviation On Pruning Lag (Time Unit): 0.0

Percent Not Pruned (%): 0.0

OK Cancel

Adjust maximum length

Xplo - [Dig(1)(1)(1)(1).40a]

Project Selection Script Window Geometry Tools Help

Browser x Render editor x

Number of nodes = 518

Display individu: Scene

Collapse Expand

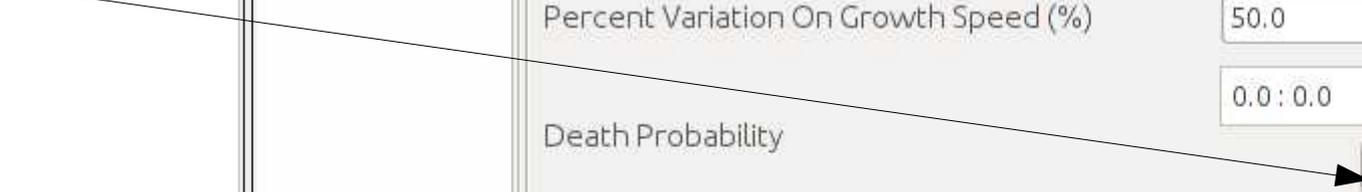
Topology	FileName	age	Yinserti...	ZIns
Scene				
Indi	ArchiTree	40		

Projects x

27a 28a

3D View x

click



type

1_general 2_topology 3_branching 4_angles 5_diameter 6_reiteration

topology

Potential Number Of Roots: 1

Probability For Each Root: 0.0 : 1.0

Delay Before Growth (Time Unit): 0.0 : 2.0

Growth Speed (cm/Time Unit): 0.0 : 0.5

Percent Variation On Growth Speed (%): 50.0

Death Probability: 0.0 : 0.0

Lag Before Pruning (Time Unit): 999.0

Standard Deviation On Pruning Lag (Time Unit): 0.0

Percent Not Pruned (%): 0.0

OK Cancel

Adjust maximum length

Xplo - [Dig(1)(1)(1)(1).40a]
Project Selection Script Window Geometry Tools Help

Browser x Render editor x
Number of nodes = 518
Display individu: Scene
Collapse Expand
Topology FileName age Yinserti... ZIns
Scene
Indi ArchiTree 40

Projects x
27a 28a

3D View x

type

1_general 2_topology 3_branching 4_angles 5_diameter 6_reiteration

topology

Potential Number Of Roots 1
0.0 : 1.0
+ - ↑ ↓

Probability For Each Root

0.0 : 2.0
+ - ↑ ↓

0.0 : 0.5
+ - ↑ ↓

position 2.0
val 0.0 (%)
OK Cancel

Standard Deviation On Pruning Lag (Time Unit) 50.0
0.0 : 0.0
+ - ↑ ↓

999.0
Standard Deviation On Pruning Lag (Time Unit) 0.0
Percent Not Pruned (%) 0.0

1. New position

2. click

Adjust maximum length

Xplo - [Dig(1)(1)(1)(1).40a]
Project Selection Script Window Geometry Tools Help

Browser x Render editor x
Number of nodes = 518
Display individu: Scene
Collapse Expand
Topology FileName age Yinserti... ZIns

Scene
Indi ArchiTree 40

Projects x
27a 28a

3D View x

type

1_general 2_topology 3_branching 4_angles 5_diameter 6_reiteration

2_topology

Potential Number Of Roots: 1
0.0 : 1.0

Probability For Each Root

0.0 : 2.0

0.0 : 0.5

50.0

0.0 : 0.0

999.0

Standard Deviation On Pruning Lag (Time Unit): 0.0

Percent Not Pruned (%): 0.0

1. click
2. New position
3. New value
4. click

double-double

position: 3.0

val: 1.0

OK Cancel

OK Cancel

Adjust maximum length

Xplo - [Dig(1)(1)(1)(1).40a]
Project Selection Script Window Geometry Tools Help

Browser x Render editor x

Number of nodes = 518
Display individu: Scene 1

Collapse Expand

Topology	FileName	age	Yinserti...	ZIns
Scene				
Indi	ArchiTree	40		

Projects x

27a 28a

3D View x

Two new positions
This type will die between 3 and 4 cm long

type

1_general 2_topology 3_branching 4_angles 5_diameter 6_reiteration

topology

Potential Number Of Roots: 1

Probability For Each Root: 0.0 : 1.0

Delay Before Growth (Time Unit): 0.0 : 2.0

Growth Speed (cm/Time Unit): 0.0 : 0.5

Percent Variation On Growth Speed (%): 50.0

Death Probability: 0.0 : 0.0, 2.0 : 0.0, 3.0 : 1.0

Lag Before Pruning (Time Unit): 999.0

Standard Deviation On Pruning Lag (Time Unit): 0.0

Percent Not Pruned (%): 0.0



OK Cancel

Adjust maximum length

Xplo - [Dig(1)(1)(1)(1).40a]
Project Selection Script Window Geometry Tools Help

Browser x Render editor x
Number of nodes = 518
Display individu: Scene
Collapse Expand
Topology FileName age Yinserti... ZIns

Scene			
IndiArchiTree		40	

Projects x
27a 28a

3D View x

- 1. Self pruning
- 2. 50% will never be Self pruned

type

1_general 2_topology 3_branching 4_angles 5_diameter 6_reiteration

topology

Potential Number Of Roots: 1

Probability For Each Root: 0.0 : 1.0

Delay Before Growth (Time Unit): 0.0 : 2.0

Growth Speed (cm/Time Unit): 0.0 : 0.5

Percent Variation On Growth Speed (%): 50.0

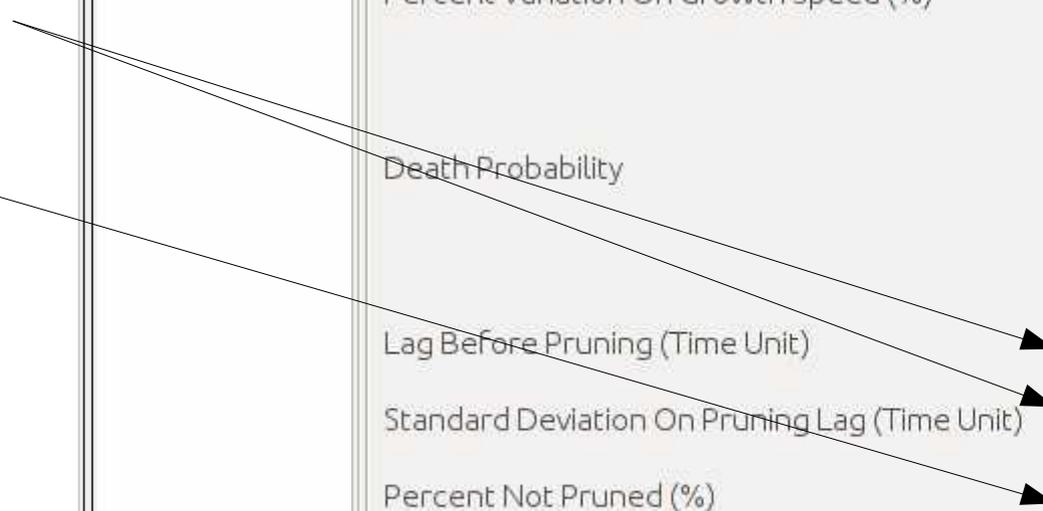
Death Probability: 0.0 : 0.0, 2.0 : 0.0, 3.0 : 1.0

Lag Before Pruning (Time Unit): 2.0

Standard Deviation On Pruning Lag (Time Unit): 1.0

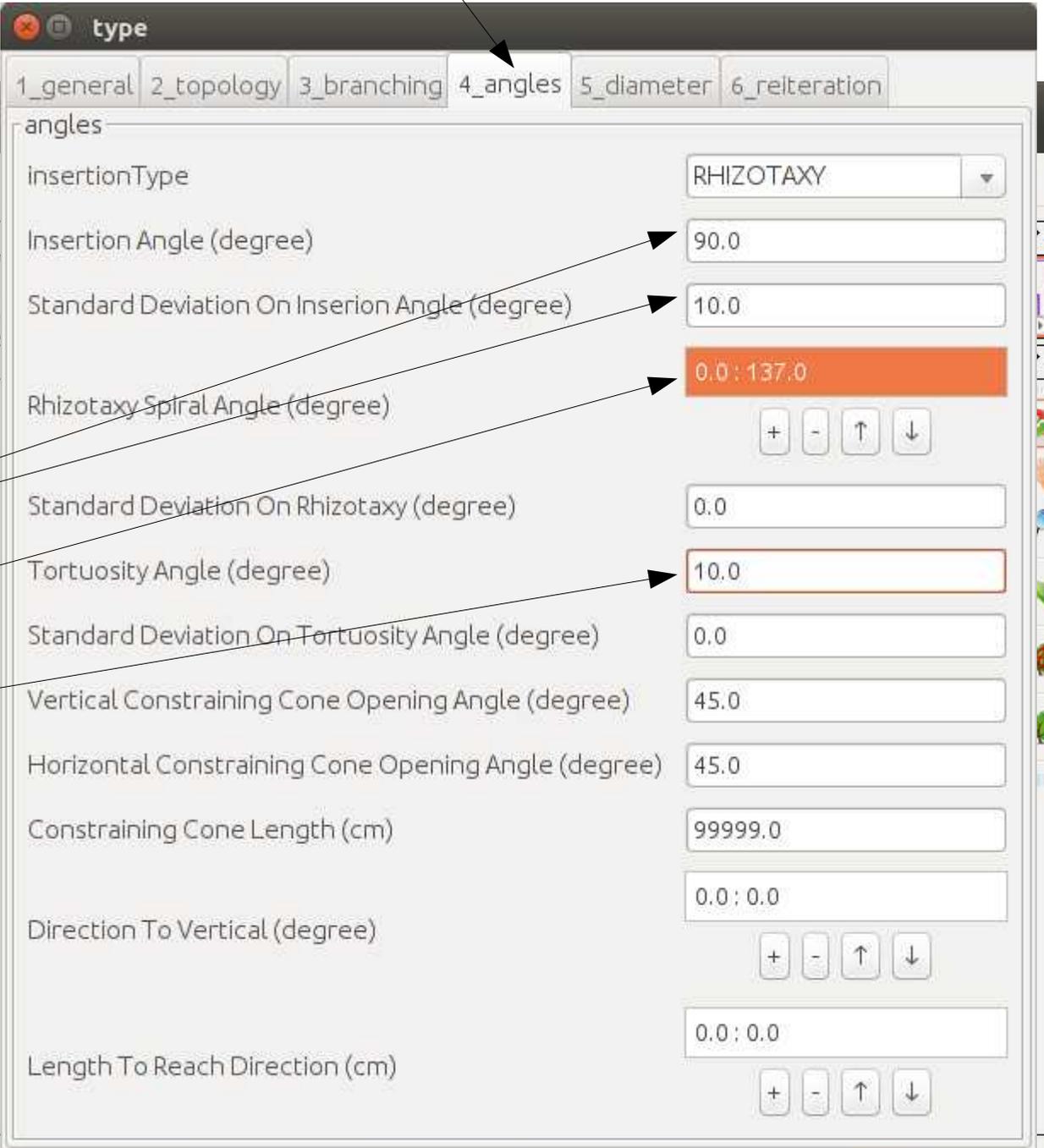
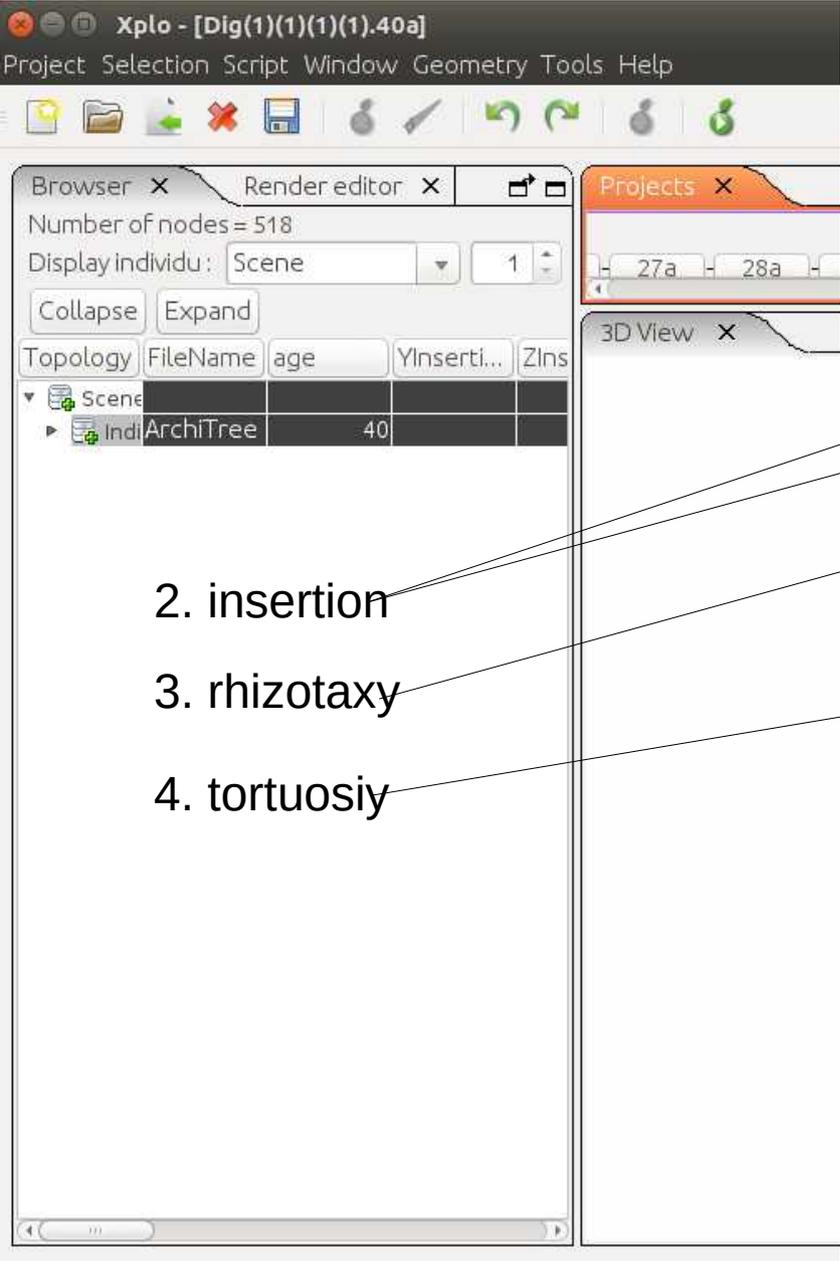
Percent Not Pruned (%): 50.0

OK Cancel



Angles

1. click



2. insertion

3. rhizotaxy

4. tortuosiy

OK Cancel

Diameter

1. click

Xplo - [Dig(1)(1)(1)(1).40a]
Project Selection Script Window Geometry Tools Help

Browser x Render editor x
Number of nodes = 518
Display individu: Scene
Collapse Expand
Topology FileName age Yinserti... ZIns

Projects x
27a 28a
3D View x

Indi ArchiTree 40

2. initial

3. click

type

1_general 2_topology 3_branching 4_angles 5_diameter 6_reiteration

diameter

Initial Diameter (cm) 0.1

Standard Deviation On Initial Diameter (cm) 0.0

Diameter Increase Ratio 0.0 : 1.0

Diameter Increase Time (time Unit) 0.0 : 0.0

Delay Before Diameter Increase (time Unit) 0.0 : 0.0

Standard Deviation On Diameter Increase Ratio 0.0

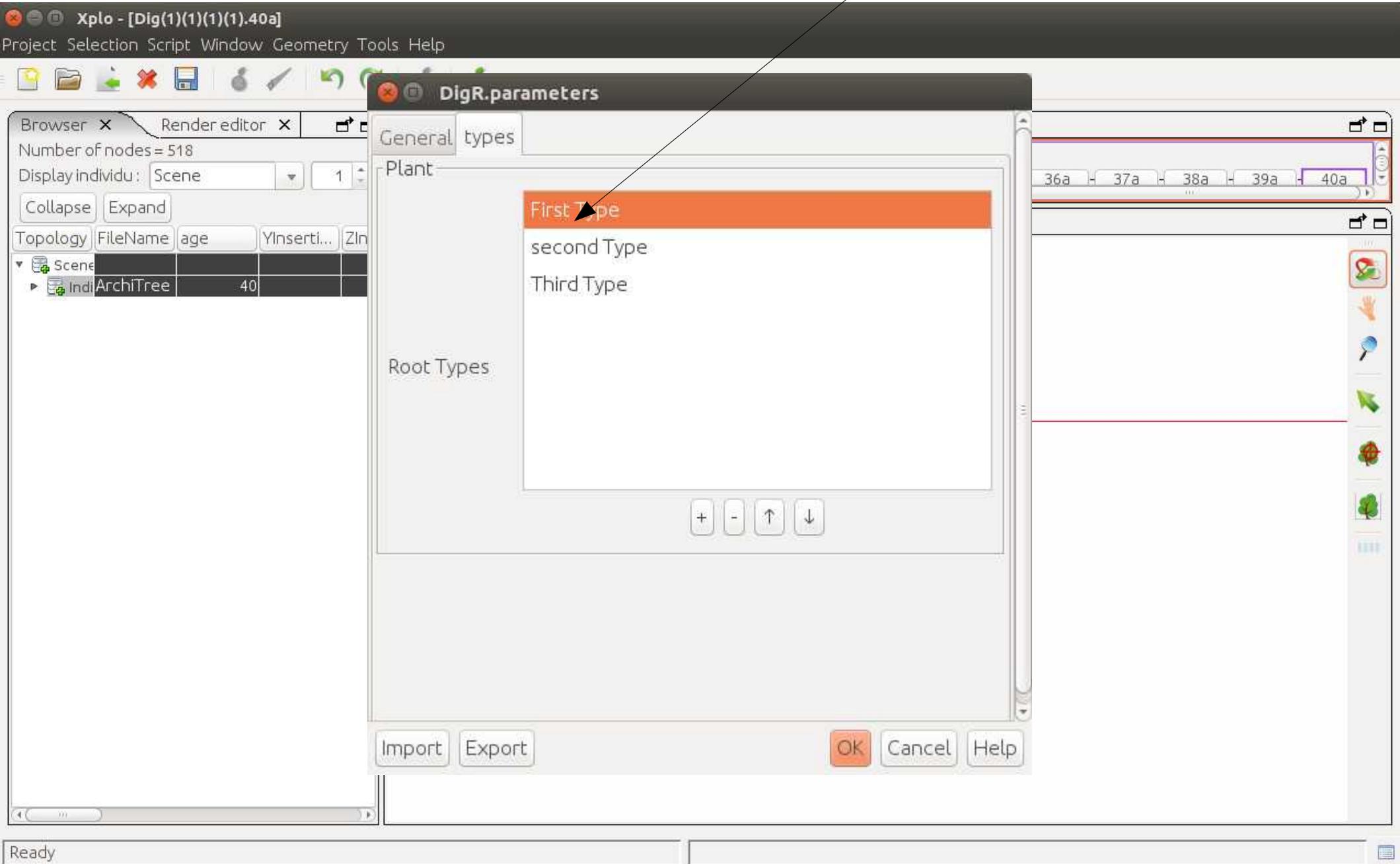
Standard Deviation On Diameter Increase Time (time Unit) 0.0

Standard Deviation On Delay Before Diameter Increase (time Unit) 0.0

OK Cancel

Add type 3 on taproot

Double click



Add type 3 on taproot

1. click

1. click

Xplo - [Dig(1)(1)(1)(1).40a]
Project Selection Script Window Geometry Tools Help

Browser x Render editor x

Number of nodes = 518
Display individu: Scene 1

Collapse Expand

Topology	FileName	age	Yinserti...	ZIns
Scene				
Indi	ArchiTree	40		

Projects x

27a 28a

3D View x

type

1_general 2_topology 3_branching 4_angles 5_diameter 6_reiteration

Branching

Default_set: interRamifDistance (0.0 : 1.0;) typeFrequency (1 : 100.0;)

ramificationSets

+ - ↑ ↓

Add type 3 on taproot

The screenshot shows the Xplo software interface. On the left, the 'Browser' window displays a tree structure with 'IndiArchiTree' selected. The 'Render editor' shows 'Number of nodes = 518' and 'Display individu: Scene'. The 'Projects' window shows '27a' and '28a'. The '3D View' window is partially visible. The 'type' window is open, showing tabs for '1_general', '2_topology', '3_branching', '4_angles', '5_diameter', and '6_reiteration'. The '3_branching' tab is active, displaying a 'Branching' section with a highlighted line of code: 'Default_set : interRamifDistance (0.0 : 1.0;) typeFrequency (1 : 100.0;)'. The 'RamificationSet' dialog box is open, showing the following fields: 'name' (Courtes), 'Type (Index) Frequency (%)' (2 : 100.0), 'Standard Deviation (%)' (0.0), 'Inter Branching Distance (cm)' (0.0 : 1.0), and 'Standard Deviation (cm)' (0.5). The 'OK' button is highlighted. Arrows point from the numbered list on the left to the corresponding fields in the dialog box.

1. branching set name

2. Double click

3. Type with index 2

4. Some random

5. click

Add type 3 on taproot

Xplo - [Dig(1)(1)(1)(1).40a]
Project Selection Script Window Geometry Tools Help

Number of nodes = 518
Display individu: Scene 1

Collapse Expand

Topology	FileName	age	Yinserti...	ZIns
Scene				
Indi	ArchiTree	40		

Projects

27a 28

3D View

Ready

click

type

1_general 2_topology 3_branching 4_angles 5_diameter 6_reiteration

Branching

```
Default_set : interRamifDistance (0.0 : 1.0;) typeFrequency (1 : 100.0;)  
Courtes : interRamifDistance (0.0 : 1.0;) typeFrequency (2 : 100.0;)
```

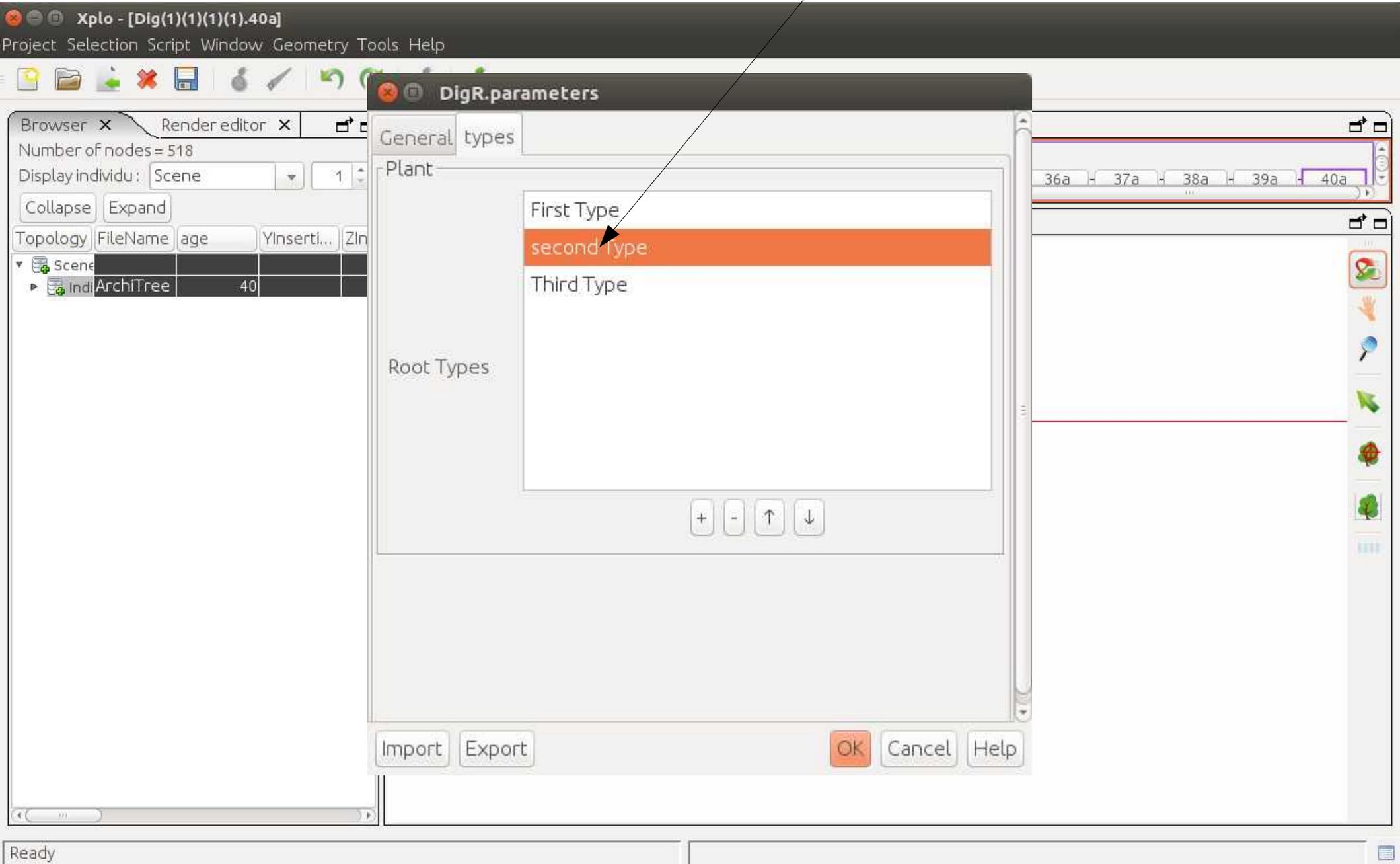
ramificationSets

+ - ↑ ↓

OK Cancel

Add type 3 on type 2

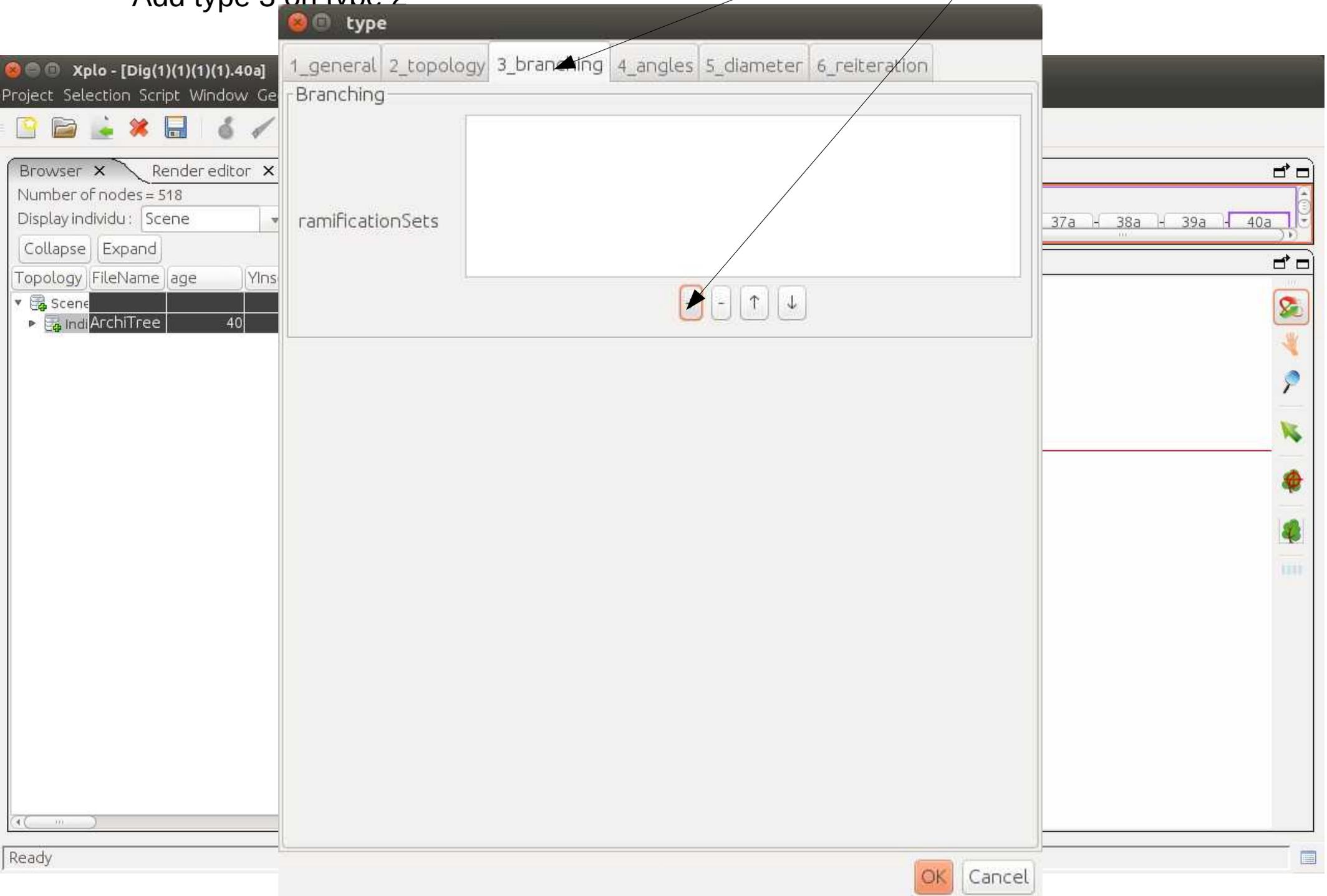
Double click



Add type 3 on type 2

1. click

2. click



Add type 3 on type 2

The image shows a software interface with several windows. The main window is titled 'type' and has tabs for '1_general', '2_topology', '3_branching', '4_angles', '5_diameter', and '6_reiteration'. The '3_branching' tab is active, showing a 'Branching' section and a 'ramificationSets' list. A 'RamificationSet' dialog box is open, showing the following fields:

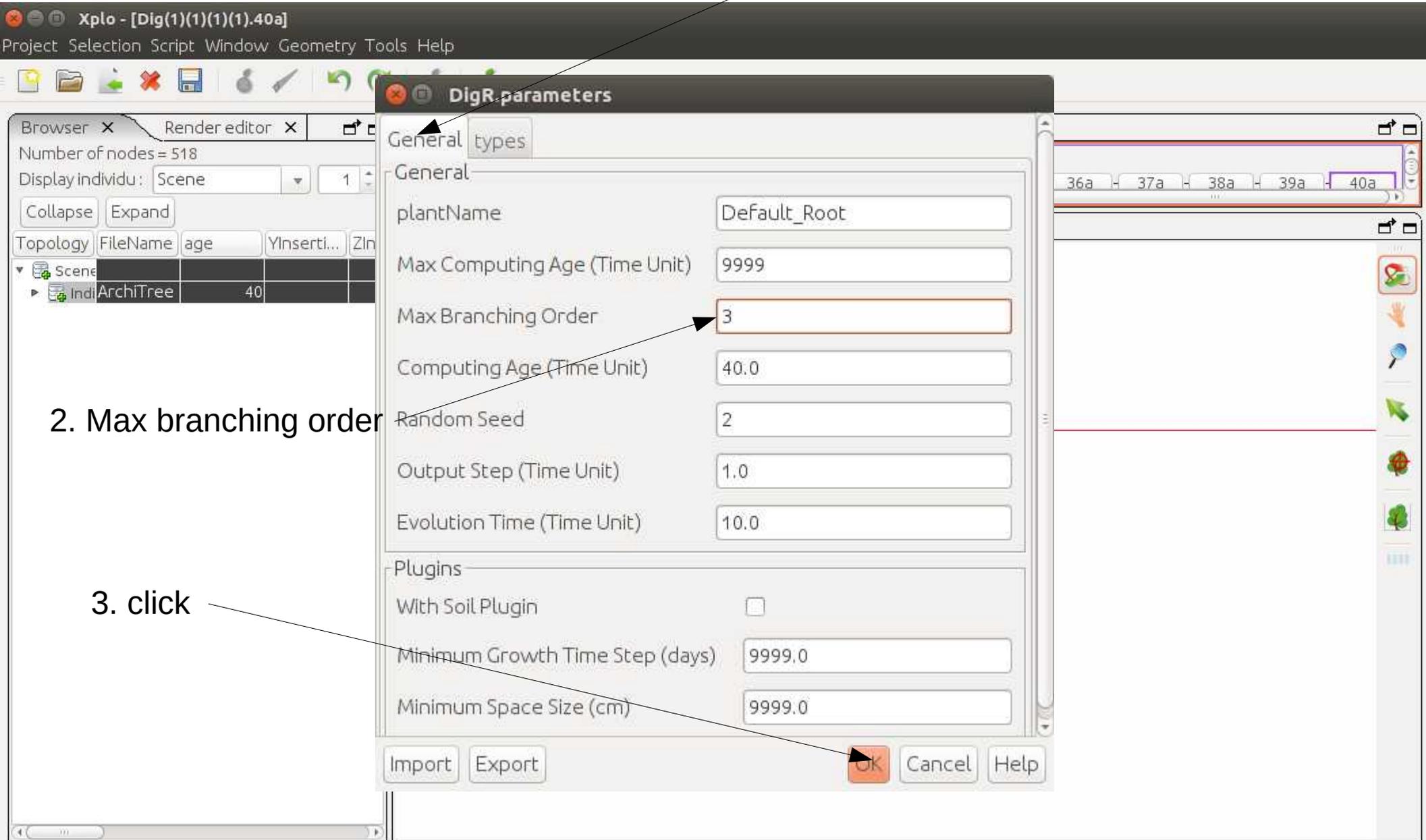
- name: Default_set
- Type (Index) Frequency (%): 2: 100.0
- Standard Deviation (%): 0.0
- Inter Branching Distance (cm): 0.0 : 1.0
- Standard Deviation (cm): 0.5

Arrows point from the following instructions to the corresponding fields in the 'RamificationSet' dialog:

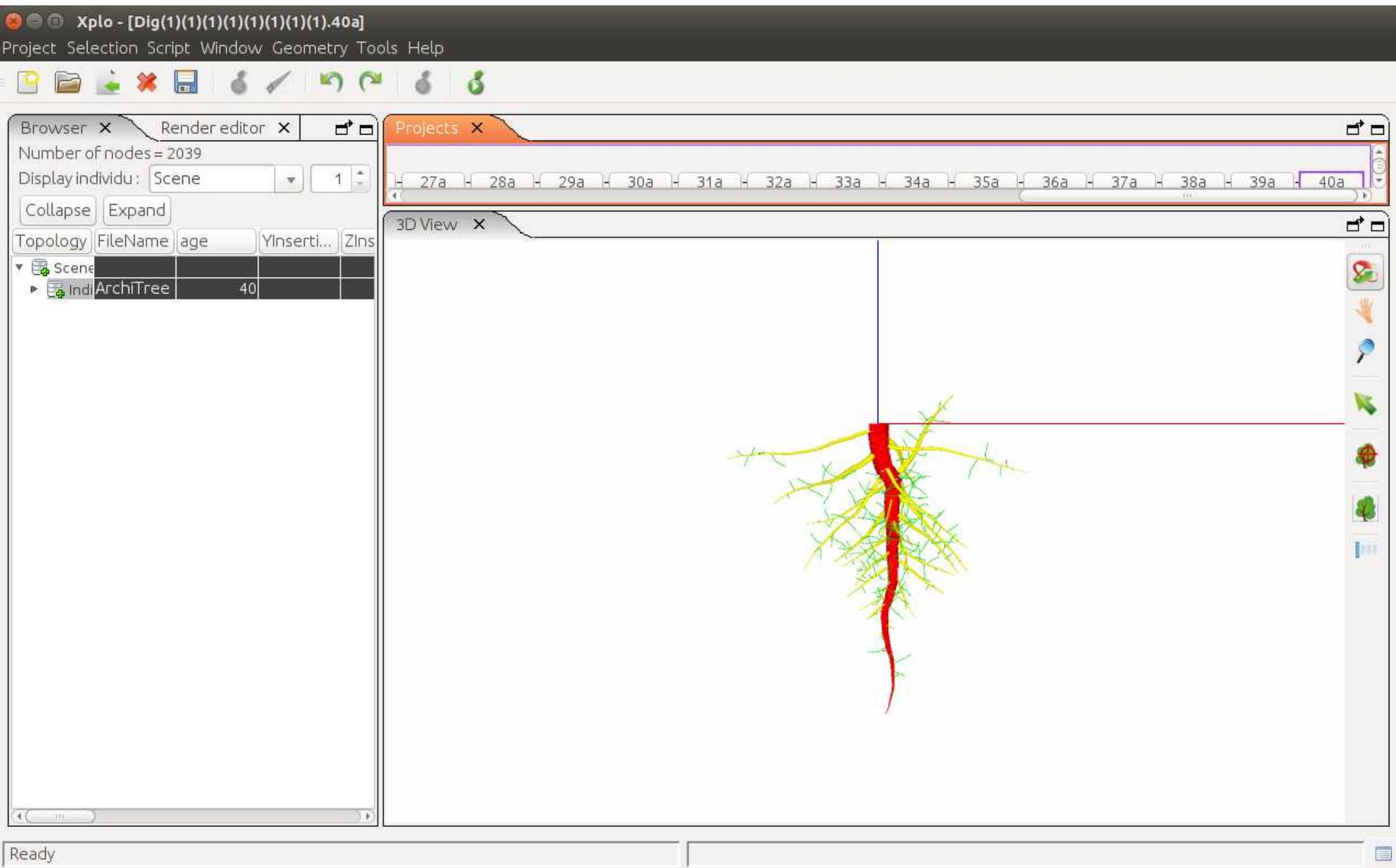
1. Double click (points to the 'name' field)
2. Type with index 2 (points to the '2' in the 'Type (Index) Frequency (%)' field)
3. Some random (points to the '100.0' in the 'Type (Index) Frequency (%)' field)
4. click (points to the 'OK' button)
5. click (points to the 'OK' button at the bottom of the main window)

Simulation

1. click



Waah a much more nice taproot !

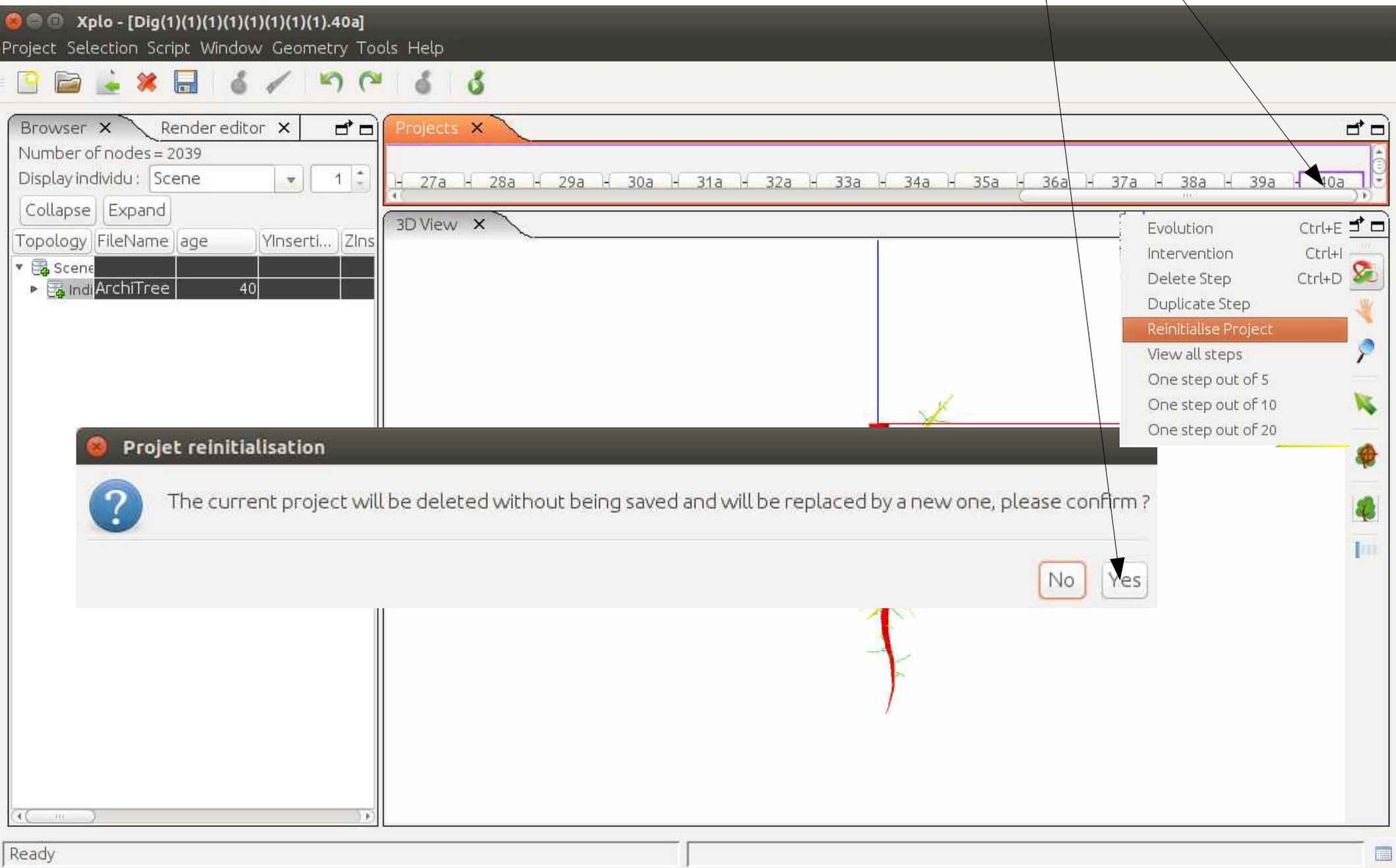


Add taproot reiteration

Go back to parameter input

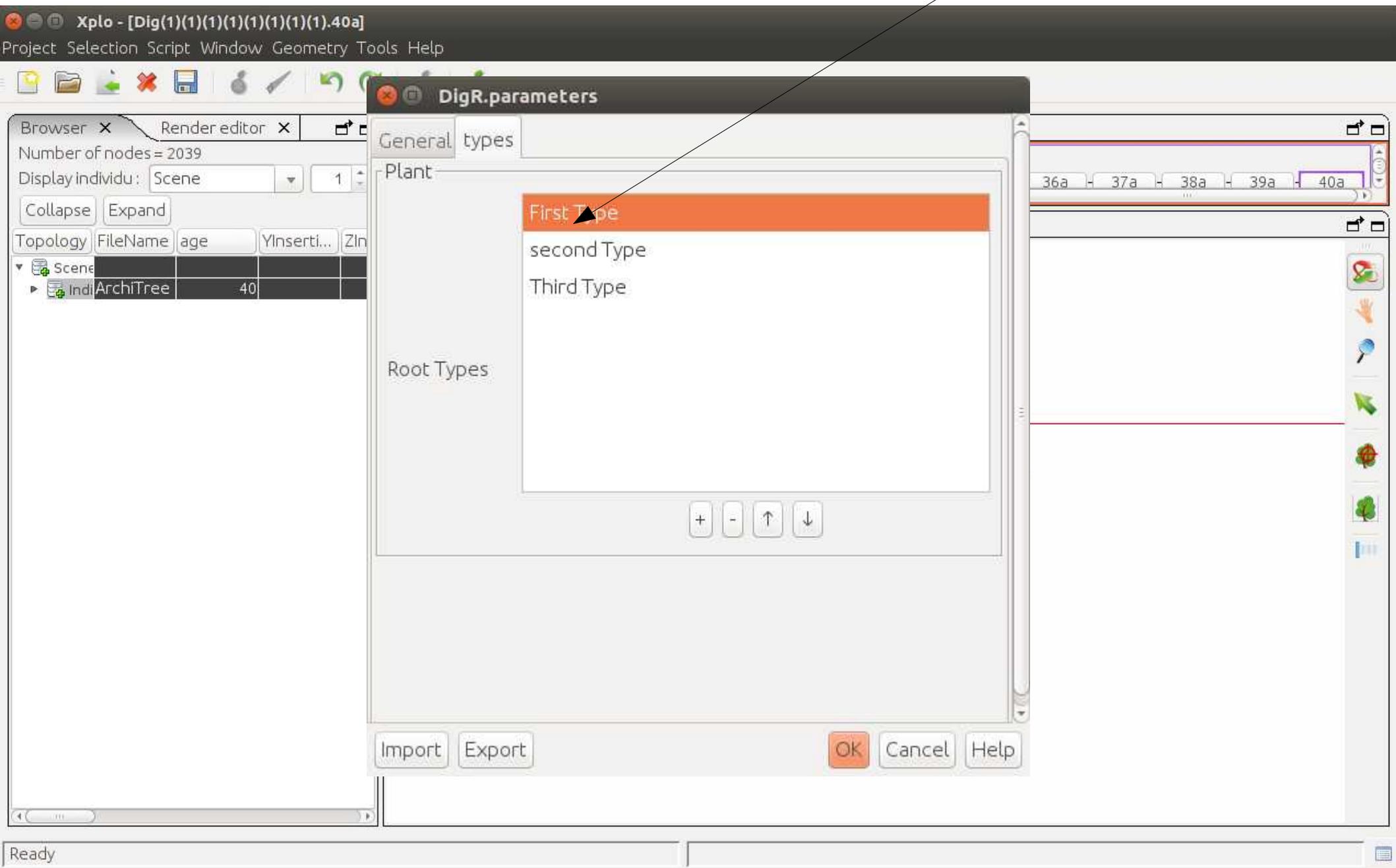
1. right click

2. click



Go back to parameter input

Double click



Reiteration

Xplo - [Dig(1)(1)(1)(1)(1)(1)(1)(1).40a]
Project Selection Script Window Geometry Tools Help

Browser x Render editor x
Number of nodes = 2039
Display individu: Scene
Collapse Expand
Topology FileName age Yinserti... ZIn

Scene			
Indi	ArchiTree	40	

General types
Plant
Root Types
Import Export

type

1_general 2_topology 3_branching 4_angles 5_diameter 6_reiteration

reiteration

MaxReit 1

ReitAngle 30.0

Reitrhizotaxy 180.0

reitDistance 0.0 : 25.0

reitFrequency 0.0 : 100.0

1. click

2. max reit order

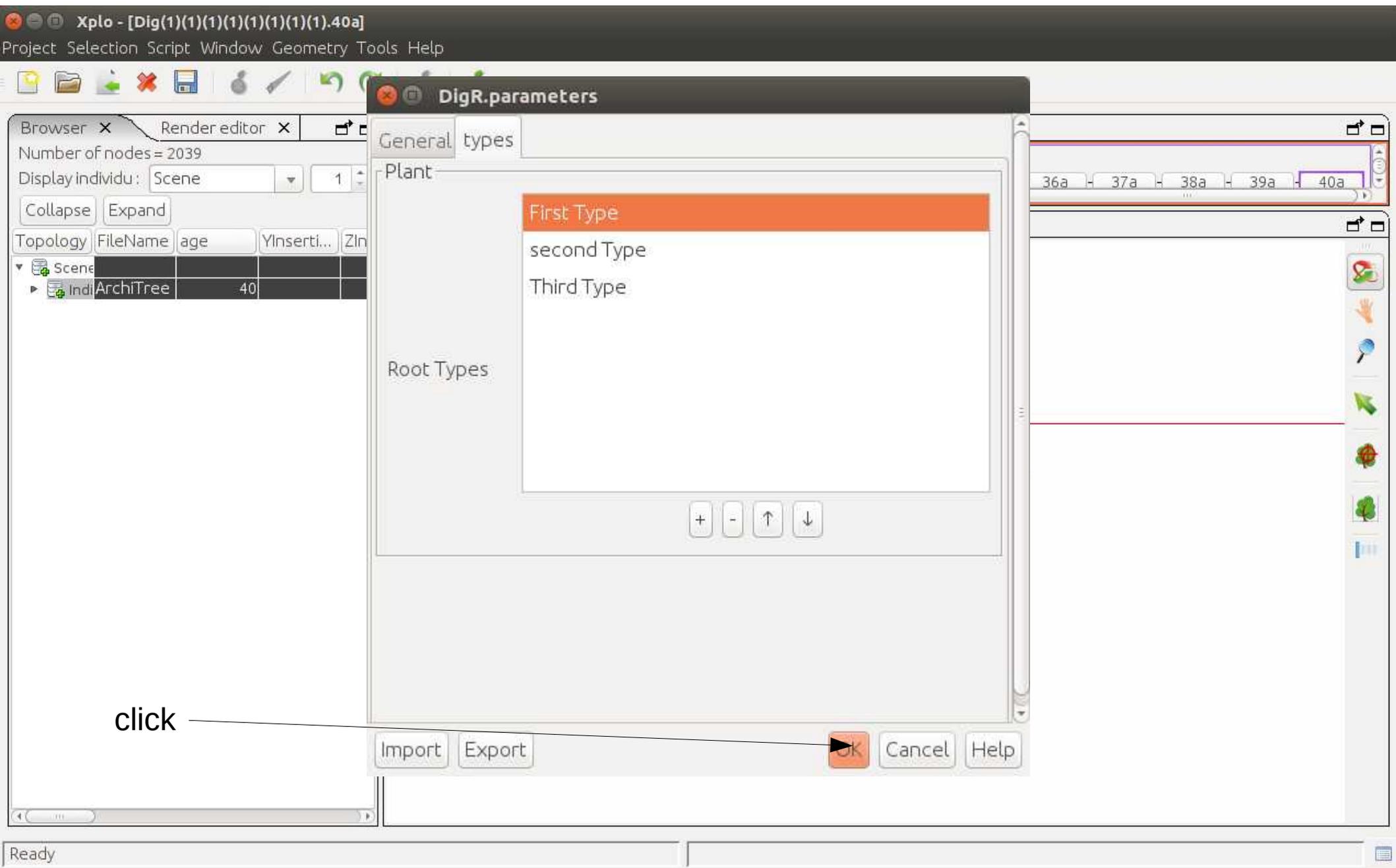
3. angle

4. Distance between reit

5. click

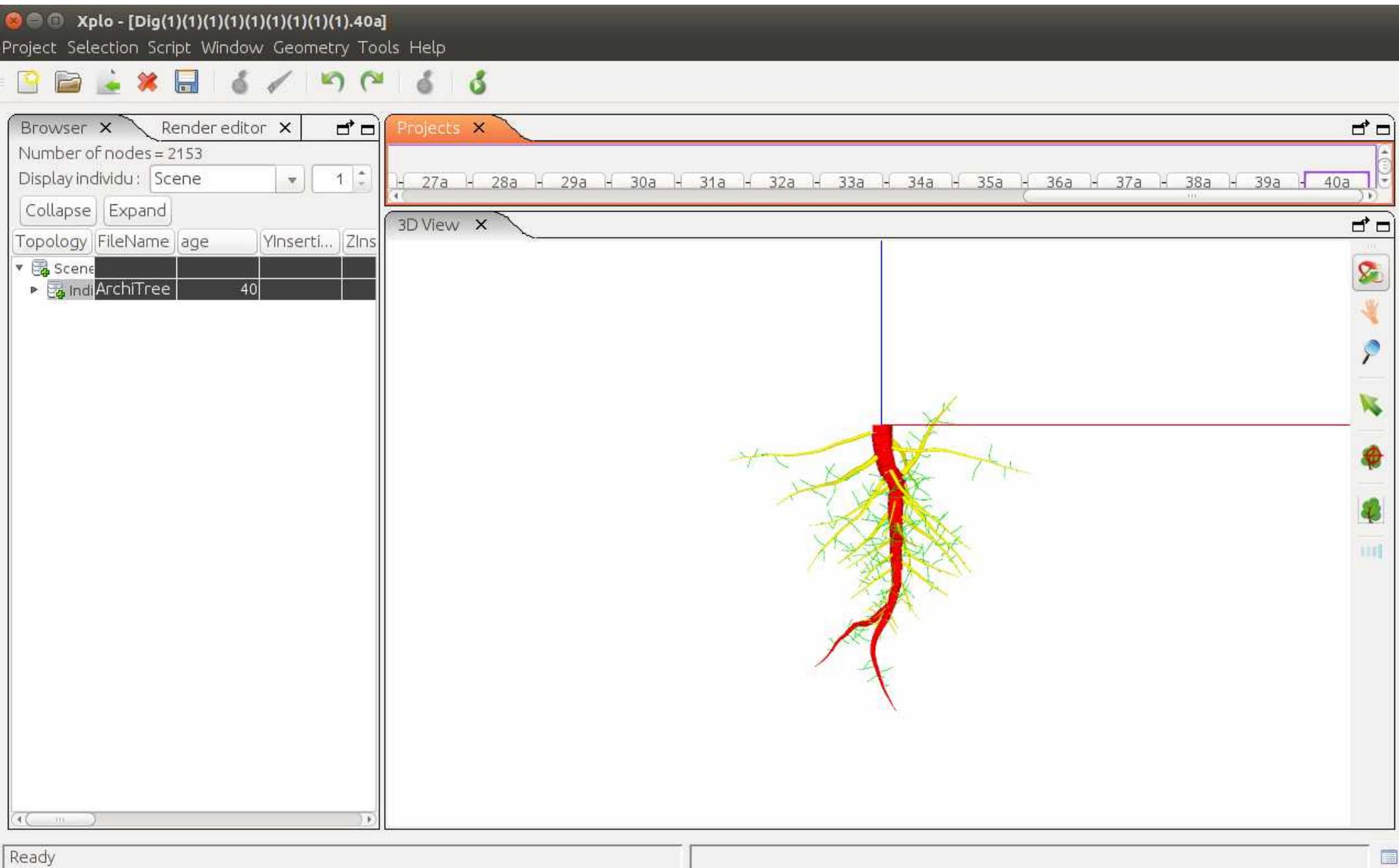
OK Cancel

Simulation

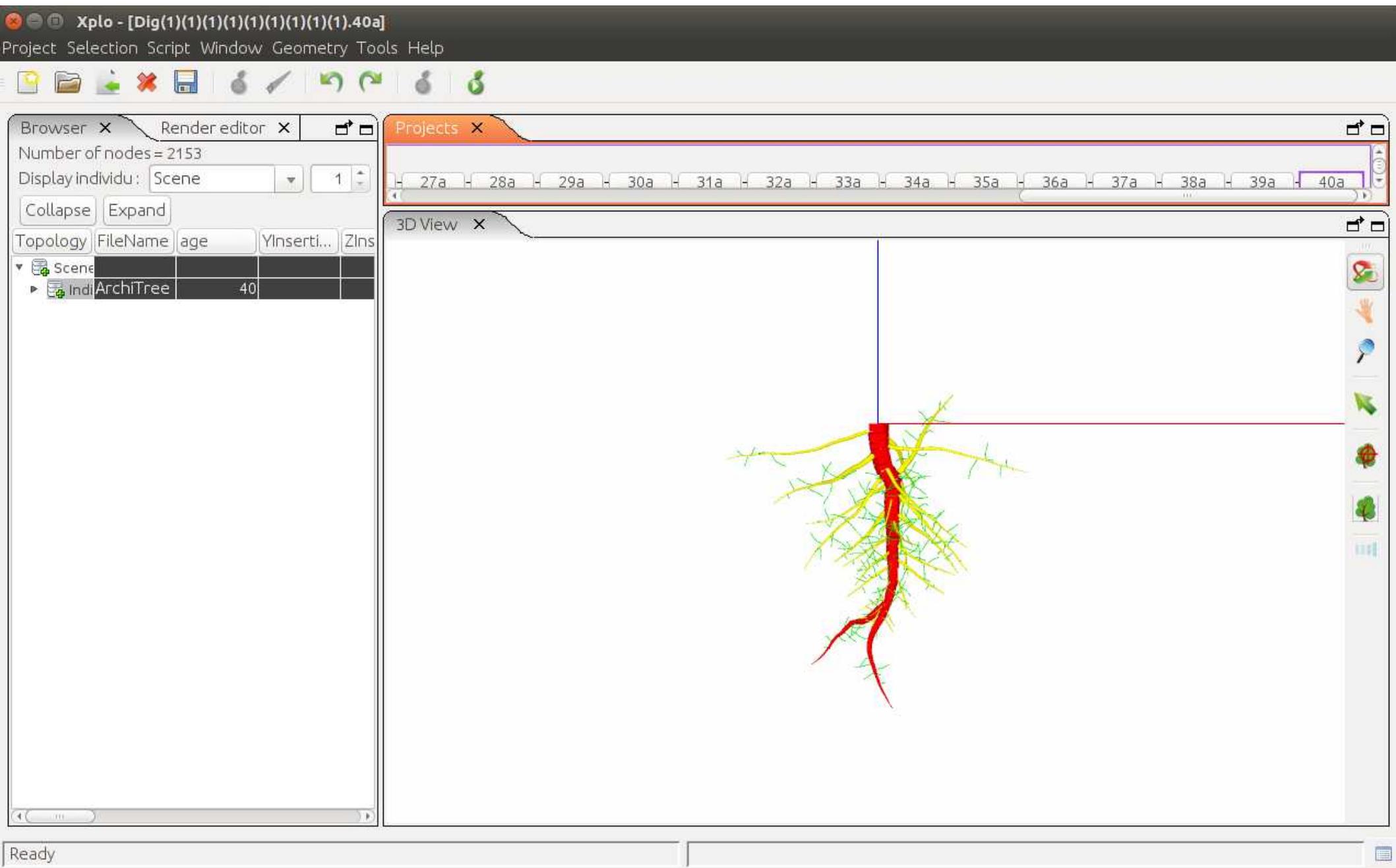


click

Ma che bella !



That's All Folks !



A good way to program into DigR

1. AR-CHI-TEC-TU-RAL A-NA-LY-SIS
2. Create all types
3. For each type
 1. Adjust topology of the type
 2. Adjust branching
 3. Adjust geometry

Think about regular save !