

**Supplementary Data File 6:** This shows the Principal Component Analysis of key traits.

## Principal Component Analysis

### Dataset KeyTraits

This dataset contains 156 individuals and 64 variables, 4 qualitative variables are considered as illustrative.

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#### 1. Study of the outliers

The analysis of the graphs does not detect any outlier.

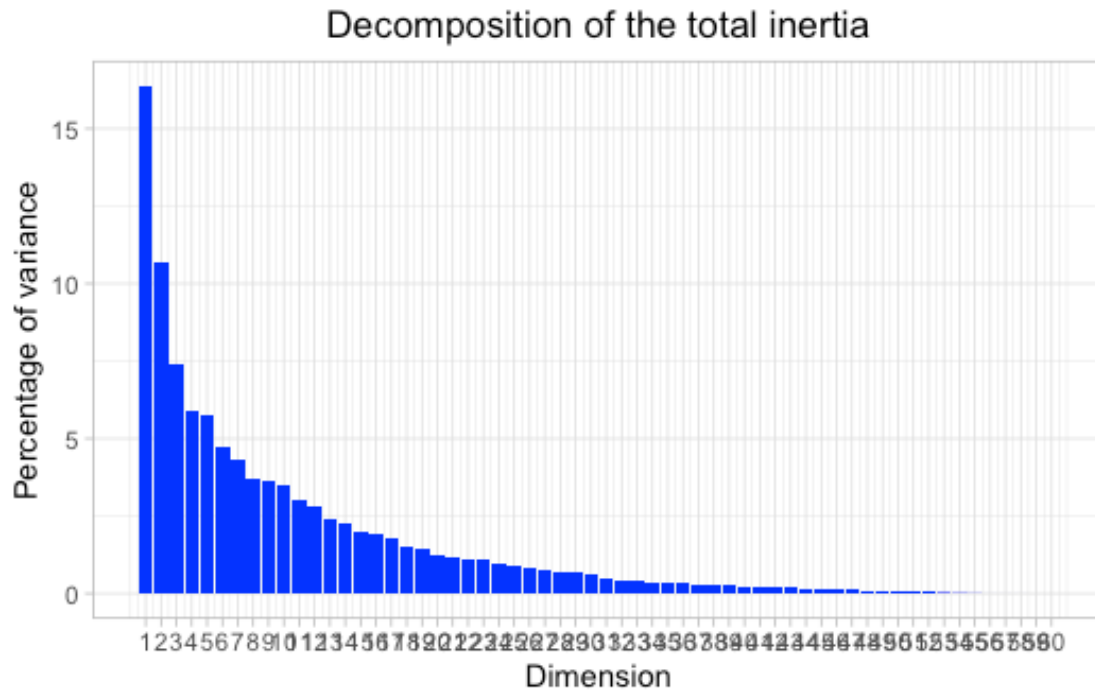
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#### 2. Inertia distribution

The inertia of the first dimensions shows if there are strong relationships between variables and suggests the number of dimensions that should be studied.

The first two dimensions of analyse express **27.03%** of the total dataset inertia ; that means that 27.03% of the individuals (or variables) cloud total variability is explained by the plane. This is a small percentage and the first plane just represents a part of the data variability. This value is greater than the reference value that equals **8.39%**, the variability explained by this plane is thus significant (the reference value is the 0.95-quantile of the inertia percentages distribution obtained by simulating 2417 data tables of equivalent size on the basis of a normal distribution).

From these observations, it is interesting to consider the next dimensions which also express a high percentage of the total inertia.

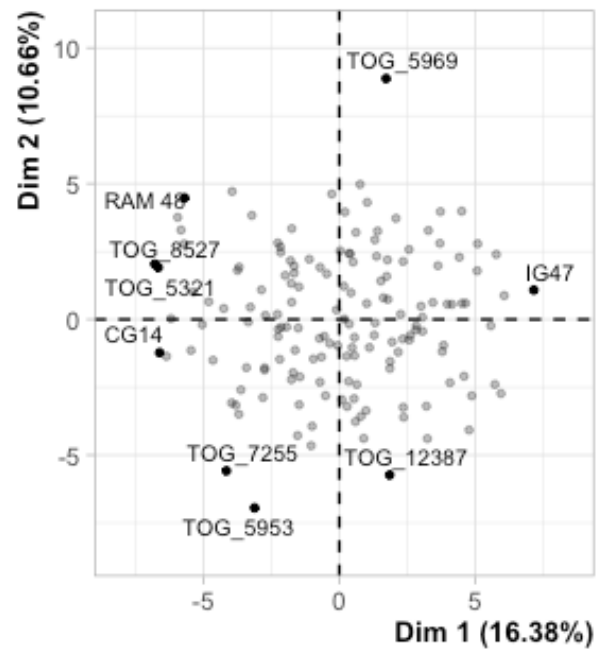


**Figure 2 - Decomposition of the total inertia**

An estimation of the right number of axis to interpret suggests to restrict the analysis to the description of the first 12 axis. These axis present an amount of inertia greater than those obtained by the 0.95-quantile of random distributions (71.77% against 40.27%). This observation suggests that only these axis are carrying a real information. As a consequence, the description will stand to these axis.

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### 3. Description of the plane 1:2

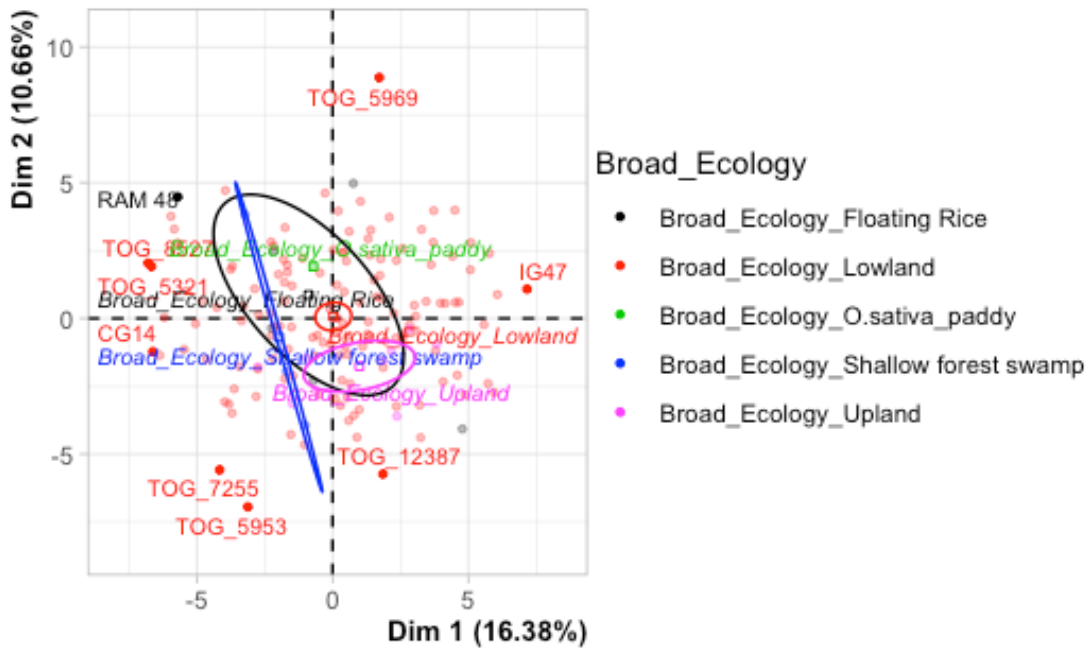


**Figure 3.1 - Individuals factor map (PCA)** *The labeled individuals are those with the higher contribution to the plane construction.*

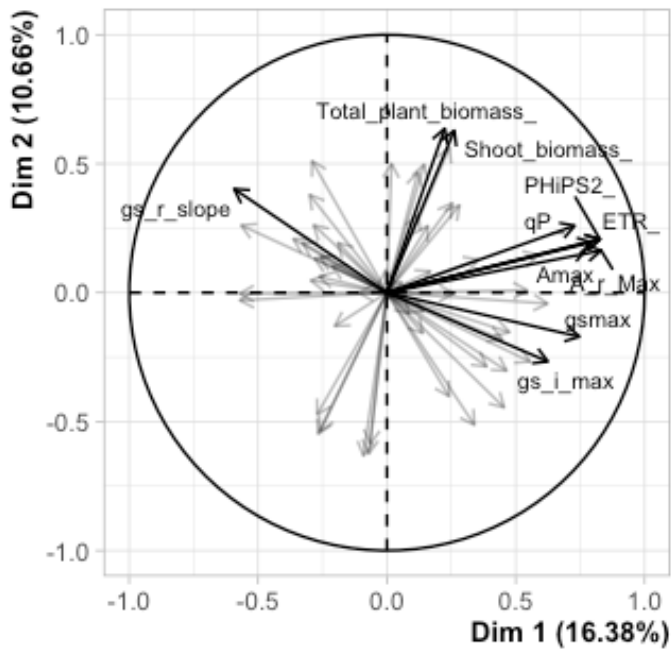
The Wilks test p-value indicates which variable factors are the best separated on the plane (i.e. which one explain the best the distance between individuals).

```
## Broad_Ecology    Country    Ecology African_Region
## 0.2968252    0.5376114    0.6448139    0.9088961
```

The best qualitative variable to illustrate the distance between individuals on this plane is : *Broad\_Ecology*.



**Figure 3.2 - Individuals factor map (PCA)** *The labeled individuals are those with the higher contribution to the plane construction. The individuals are coloured after their category for the variable Broad\_Ecology.*



**Figure 3.3 - Variables factor map (PCA)** *The labeled variables are those the best shown on the plane.*



**Figure 3.4 - Qualitative factor map (PCA)** *The labeled factors are those the best shown on the plane.*

The **dimension 1** opposes individuals such as *IG47* and *TOG\_5969* (to the right of the graph, characterized by a strongly positive coordinate on the axis) to individuals such as *TOG\_8527*, *TOG\_5321*, *CG14* and *RAM 48* (to the left of the graph, characterized by a strongly negative coordinate on the axis).

The group in which the individuals *IG47* and *TOG\_5969* stand (characterized by a positive coordinate on the axis) is sharing :

- high values for variables like *A\_r\_Max*, *ETR\_*, *PHiPS2\_*, *Amax*, *qP\_*, *gsmax*, *Trmmol\_*, *A\_i\_max*, *A\_r\_rate\_PredMean* and *gs\_i\_rate* (variables are sorted from the strongest).

- low values for variables like *NPQ\_*, *NPQ\_r\_max*, *Vpdl\_*, *NPQ\_i\_slope\_*, *NPQ\_i\_90*, *gs\_r\_slope*, *NPQ\_r\_min*, *gs\_i\_10*, *A\_i\_10* and *Ratio\_SD* (variables are sorted from the weakest).

The group in which the individuals *TOG\_8527*, *TOG\_5321*, *CG14* and *RAM 48* stand (characterized by a negative coordinate on the axis) is sharing :

- high values for variables; *gs\_r\_slope*, *Vpdl\_*, *NPQ\_r\_rate*, *NPQ\_*, *NPQ\_r\_max*, *gs\_r\_min*, *A\_i\_10*, *A\_r\_ED90*, *A\_r\_Slope* and *A\_r\_ED50* (variables are sorted from the strongest).
- low values for variables; *gs\_r\_max*, *gs\_i\_max*, *gsmax*, *gs\_r\_50*, *gs\_i\_slope*, *A\_r\_Max*, *Amax*, *gs\_percentage\_rise*, *gs\_r\_90* and *Trmmol\_* (variables are sorted from the weakest).

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The **dimension 2** opposes individuals such as *TOG\_8527*, *IG47*, *TOG\_5321*, *CG14*, *TOG\_5969* and *RAM 48* (to the top of the graph, characterized by a strongly positive coordinate on the axis) to individuals such as *TOG\_5953*, *TOG\_7255* and *TOG\_12387* (to the bottom of the graph, characterized by a strongly negative coordinate on the axis).

The group in which the individuals *TOG\_8527*, *TOG\_5321*, *CG14* and *RAM 48* stand (characterized by a positive coordinate on the axis) is sharing :

- high values for variables like *gs\_r\_slope*, *Vpdl\_*, *NPQ\_r\_rate*, *NPQ\_*, *NPQ\_r\_max*, *gs\_r\_min*, *A\_i\_10*, *A\_r\_ED90*, *A\_r\_Slope* and *A\_r\_ED50* (variables are sorted from the strongest).
- low values for variables like *gs\_r\_max*, *gs\_i\_max*, *gsmax*, *gs\_r\_50*, *gs\_i\_slope*, *A\_r\_Max*, *Amax*, *gs\_percentage\_rise*, *gs\_r\_90* and *Trmmol\_* (variables are sorted from the weakest).

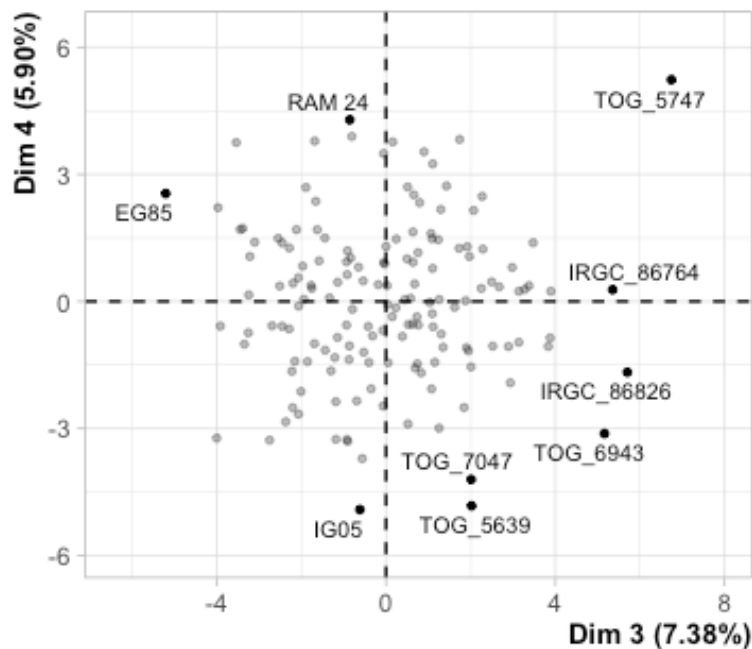
The group in which the individuals *IG47* and *TOG\_5969* stand (characterized by a positive coordinate on the axis) is sharing :

- high values for variables like *A\_r\_Max*, *ETR\_*, *PHiPS2\_*, *Amax*, *qP\_*, *gsmax*, *Trmmol\_*, *A\_i\_max*, *A\_r\_rate\_PredMean* and *gs\_i\_rate* (variables are sorted from the strongest).
- low values for variables like *NPQ\_*, *NPQ\_r\_max*, *Vpdl\_*, *NPQ\_i\_slope\_*, *NPQ\_i\_90*, *gs\_r\_slope*, *NPQ\_r\_min*, *gs\_i\_10*, *A\_i\_10* and *Ratio\_SD* (variables are sorted from the weakest).

The group in which the individuals *TOG\_5953*, *TOG\_7255* and *TOG\_12387* stand (characterized by a negative coordinate on the axis) is sharing :

- high values for the variables *NPQ\_r\_90*, *NPQ\_r\_50*, *NPQ\_r\_slope\_*, *NPQ\_r\_min*, *NPQ\_i\_90*, *NPQ\_i\_slope\_*, *gs\_i\_slope*, *gs\_r\_max* and *gs\_i\_90* (variables are sorted from the strongest).
- low values for variables like *NPQ\_i\_rate*, *Shoot\_biomass\_*, *gs\_i\_rate*, *Total\_plant\_biomass\_*, *NPQ\_i\_10*, *Shoot\_area\_*, *NPQ\_r\_rate*, *qP\_*, *NPQ\_r\_10* and *PHiPS2\_* (variables are sorted from the weakest).

#### 4. Description of the plane 3:4

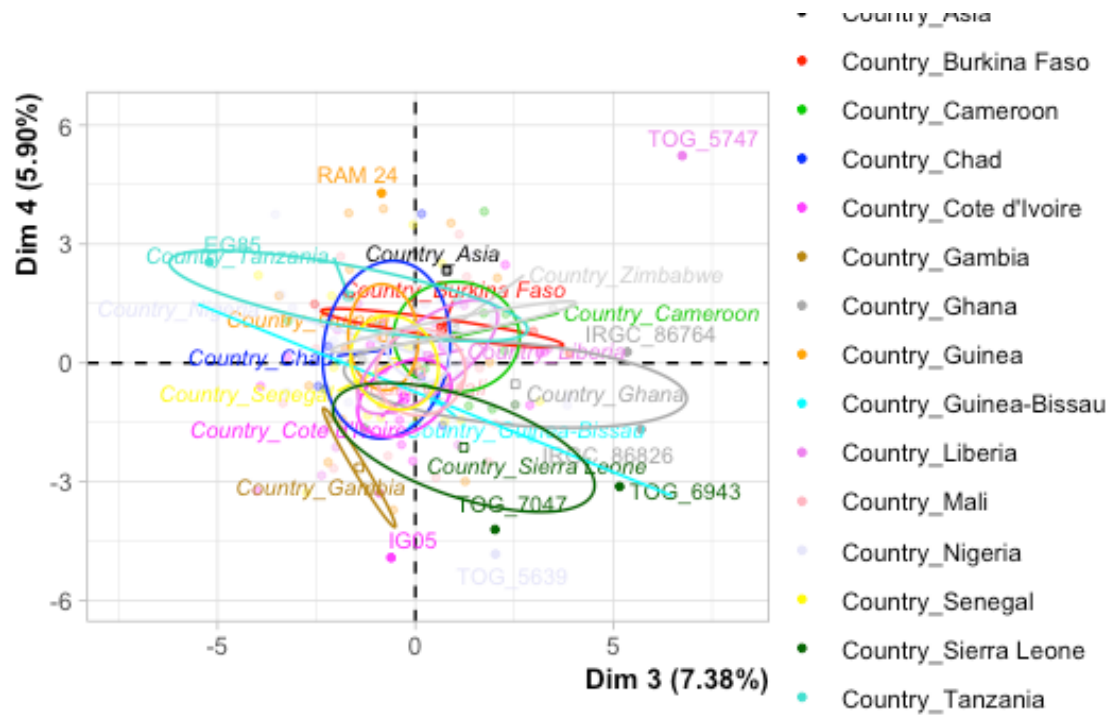


**Figure 4.1 - Individuals factor map (PCA)** *The labeled individuals are those with the higher contribution to the plane construction.*

The Wilks test p-value indicates which variable factors are the best separated on the plane (i.e. which one explain the best the distance between individuals).

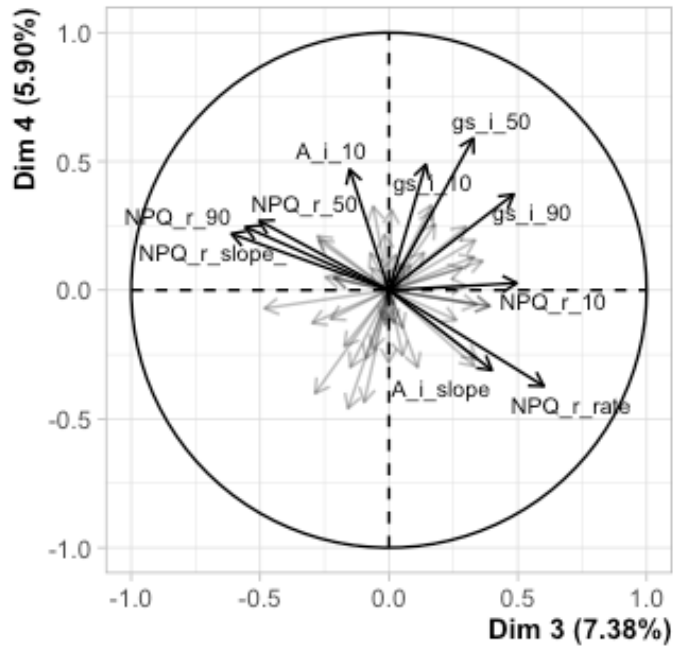
```
## Country Ecology African_Region Broad_Ecology
## 0.01918964 0.23402077 0.53489686 0.89422472
```

The best qualitative variable to illustrate the distance between individuals on this plane is :  
*Country.*

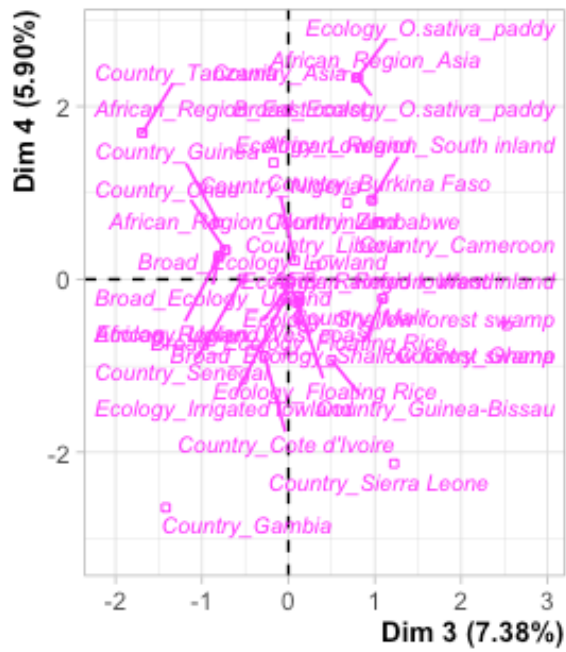


**Figure 4.2 - Individuals factor map (PCA)** *The labeled individuals are those with the higher contribution to the plane construction. The individuals are coloured after their category for the variable Country.*





**Figure 4.3 - Variables factor map (PCA)** *The labeled variables are those the best shown on the plane.*



**Figure 4.4 - Qualitative factor map (PCA)** *The labeled factors are those the best shown on the plane.*

The **dimension 3** opposes individuals such as *TOG\_6943*, *IRGC\_86764* and *IRGC\_86826* (to the right of the graph, characterized by a strongly positive coordinate on the axis) to individuals such as *EG85*, *TOG\_5639*, *TOG\_7047* and *IG05* (to the left of the graph, characterized by a strongly negative coordinate on the axis).

The group in which the individuals *TOG\_6943*, *IRGC\_86764* and *IRGC\_86826* stand (characterized by a positive coordinate on the axis) is sharing :

- high values for variables like *NPQ\_r\_rate*, *NPQ\_r\_10*, *NPQ\_i\_90*, *A\_r\_Min*, *gs\_i\_90*, *NPQ\_r\_max*, *gs\_i\_slope*, *NPQ\_*, *A\_i\_slope* and *NPQ\_i\_slope\_* (variables are sorted from the strongest).
- low values for the variables *NPQ\_r\_slope\_*, *NPQ\_r\_90*, *NPQ\_r\_50*, *A\_i\_rate*, *WUE\_*, *A\_i\_10*, *NPQ\_i\_rate*, *A\_i\_min*, *qP\_* and *NPQ\_i\_10* (variables are sorted from the weakest).

The group in which the individual *EG85* stands (characterized by a negative coordinate on the axis) is sharing :

- high values for the variables *NPQ\_r\_slope\_*, *NPQ\_r\_90*, *A\_i\_rate*, *NPQ\_r\_50*, *A\_i\_min*, *A\_i\_10* and *WUE\_* (variables are sorted from the strongest).
- low values for variables like *A\_i\_slope*, *gs\_i\_slope*, *NPQ\_r\_rate*, *A\_i\_90*, *gs\_i\_max*, *NPQ\_r\_max*, *NPQ\_*, *gs\_percentage\_rise*, *NPQ\_r\_10* and *NPQ\_i\_max* (variables are sorted from the weakest).

The group in which the individuals *TOG\_5639*, *TOG\_7047* and *IG05* stand (characterized by a negative coordinate on the axis) is sharing :

- high values for the variables *A\_r\_Slope*, *A\_r\_ED90*, *gs\_i\_rate*, *gs\_r\_min*, *Trmmol\_*, *gs\_r\_rate*, *NPQ\_i\_rate* and *A\_r\_ED50* (variables are sorted from the strongest).

- low values for variables like *gs\_i\_50*, *gs\_i\_10*, *gs\_i\_90*, *Shoot\_biomass\_*, *Total\_plant\_biomass\_*, *A\_i\_10*, *Shoot\_area\_*, *NPQ\_i\_slope\_*, *Plant\_height\_* and *NPQ\_i\_90* (variables are sorted from the weakest).
- 

The **dimension 4** opposes individuals such as *TOG\_5747*, *EG85* and *RAM 24* (to the top of the graph, characterized by a strongly positive coordinate on the axis) to individuals such as *TOG\_5639*, *TOG\_7047* and *IG05* (to the bottom of the graph, characterized by a strongly negative coordinate on the axis).

The group in which the individual *EG85* stands (characterized by a positive coordinate on the axis) is sharing :

- high values for the variables *NPQ\_r\_slope\_*, *NPQ\_r\_90*, *A\_i\_rate*, *NPQ\_r\_50*, *A\_i\_min*, *A\_i\_10* and *WUE\_* (variables are sorted from the strongest).
- low values for variables like *A\_i\_slope*, *gs\_i\_slope*, *NPQ\_r\_rate*, *A\_i\_90*, *gs\_i\_max*, *NPQ\_r\_max*, *NPQ\_*, *gs\_percentage\_rise*, *NPQ\_r\_10* and *NPQ\_i\_max* (variables are sorted from the weakest).

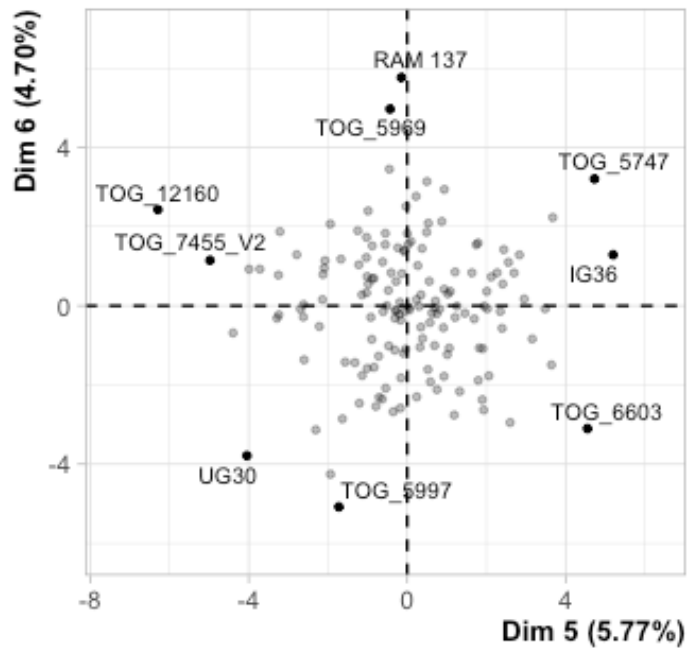
The group in which the individuals *TOG\_5747* and *RAM 24* stand (characterized by a positive coordinate on the axis) is sharing :

- high values for variables like *gs\_i\_50*, *Shoot\_biomass\_*, *Total\_plant\_biomass\_*, *Shoot\_area\_*, *gs\_i\_90*, *gs\_percentage\_rise*, *gs\_i\_max*, *gs\_i\_10*, *A\_i\_50* and *gs\_r\_50* (variables are sorted from the strongest).
- low values for the variable *gs\_i\_rate*.

The group in which the individuals *TOG\_5639*, *TOG\_7047* and *IG05* stand (characterized by a negative coordinate on the axis) is sharing :

- high values for the variables *A\_r\_Slope*, *A\_r\_ED90*, *gs\_i\_rate*, *gs\_r\_min*, *Trmmol\_*, *gs\_r\_rate*, *NPQ\_i\_rate* and *A\_r\_ED50* (variables are sorted from the strongest).
- low values for variables like *gs\_i\_50*, *gs\_i\_10*, *gs\_i\_90*, *Shoot\_biomass\_*, *Total\_plant\_biomass\_*, *A\_i\_10*, *Shoot\_area\_*, *NPQ\_i\_slope\_*, *Plant\_height\_* and *NPQ\_i\_90* (variables are sorted from the weakest).

## 5. Description of the plane 5:6

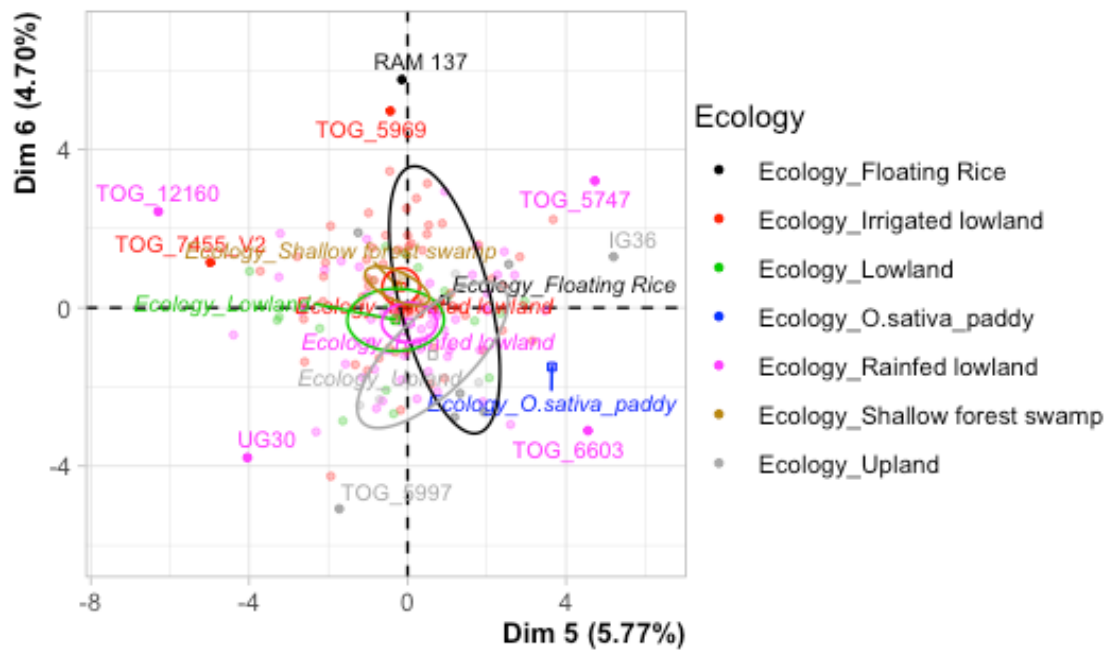


**Figure 5.1 - Individuals factor map (PCA)** *The labeled individuals are those with the higher contribution to the plane construction.*

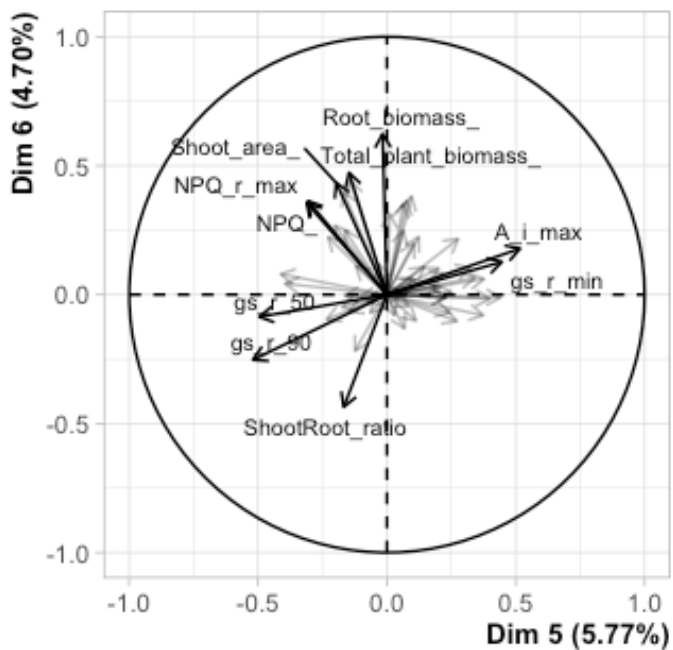
The Wilks test p-value indicates which variable factors are the best separated on the plane (i.e. which one explain the best the distance between individuals).

##	Ecology	Broad_Ecology	Country	African_Region
##	0.05427652	0.27670100	0.75445730	0.75934388

The best qualitative variable to illustrate the distance between individuals on this plane is : *Ecology*.



**Figure 5.2 - Individuals factor map (PCA)** *The labeled individuals are those with the higher contribution to the plane construction. The individuals are coloured after their category for the variable Ecology.*



**Figure 5.3 - Variables factor map (PCA)** The labeled variables are those the best shown on the plane.



**Figure 5.4 - Qualitative factor map (PCA)** The labeled factors are those the best shown on the plane.

The **dimension 5** opposes individuals such as *IG36*, *TOG\_6603* and *TOG\_5747* (to the right of the graph, characterized by a strongly positive coordinate on the axis) to individuals such as *TOG\_12160*, *UG30*, *TOG\_5997* and *TOG\_7455\_V2* (to the left of the graph, characterized by a strongly negative coordinate on the axis).

The group in which the individuals *IG36*, *TOG\_6603* and *TOG\_5747* stand (characterized by a positive coordinate on the axis) is sharing :

- high values for variables like  $A_i_{max}$ ,  $A_i_{50}$ ,  $gs_r_{min}$ ,  $gs_i_{10}$ ,  $A_i_{slope}$ ,  $WUE_{}$ ,  $A_r_{ED90}$ ,  $A_r_{Slope}$ ,  $A_i_{90}$  and  $A_i_{10}$  (variables are sorted from the strongest).
- low values for the variables  $gs_r_{50}$ ,  $A_i_{rate}$ ,  $gs_r_{90}$ ,  $gs_i_{rate}$ ,  $gs_r_{10}$ ,  $NPQ_{}$ ,  $gsmax$ ,  $NPQ_r_{max}$ ,  $Shoot_{biomass}$  and  $Ratio_{SD}$  (variables are sorted from the weakest).

The group in which the individuals *TOG\_12160* and *TOG\_7455\_V2* stand (characterized by a negative coordinate on the axis) is sharing :

- high values for the variables *gs\_r\_50*, *gs\_r\_10*, *NPQ\_*, *A\_i\_rate*, *NPQ\_r\_max*, *NPQ\_r\_min* and *gs\_r\_90* (variables are sorted from the strongest).
- low values for variables like *A\_i\_max*, *ETR\_*, *PHiPS2\_*, *A\_i\_90*, *qP\_*, *A\_i\_50*, *gs\_r\_min*, *A\_i\_slope*, *WUE\_* and *A\_r\_ED90* (variables are sorted from the weakest).

The group in which the individuals *UG30* and *TOG\_5997* stand (characterized by a negative coordinate on the axis) is sharing :

- high values for the variables *ShootRoot\_ratio*, *gs\_r\_90*, *Plant\_height\_*, *gs\_r\_50*, *gs\_r\_max* and *gsmax* (variables are sorted from the strongest).
- low values for variables like *NPQ\_r\_50*, *NPQ\_r\_90*, *NPQ\_r\_slope\_*, *Root\_biomass\_*, *gs\_r\_min*, *gs\_r\_slope*, *WUE\_*, *NPQ\_*, *Shoot\_area\_* and *AbaxialSD* (variables are sorted from the weakest).

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The **dimension 6** opposes individuals such as *RAM\_137* and *TOG\_5969* (to the top of the graph, characterized by a strongly positive coordinate on the axis) to individuals such as *UG30* and *TOG\_5997* (to the bottom of the graph, characterized by a strongly negative coordinate on the axis).

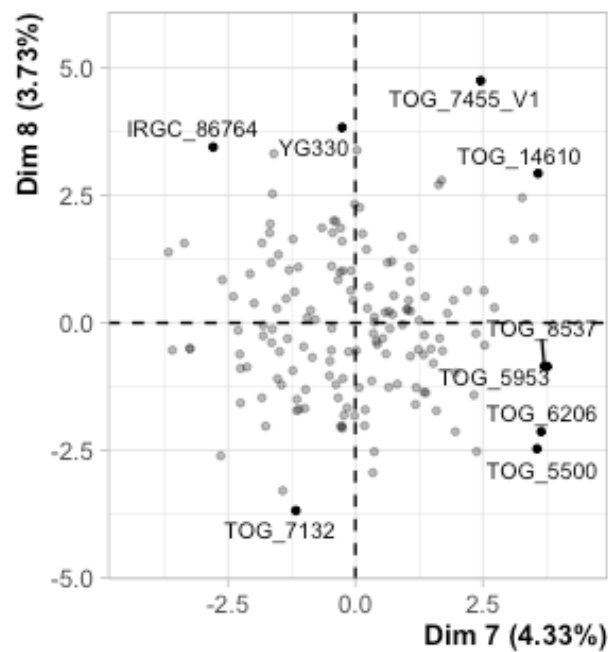
The group in which the individuals *RAM\_137* and *TOG\_5969* stand (characterized by a positive coordinate on the axis) is sharing :

- high values for the variables *Root\_biomass\_*, *Total\_plant\_biomass\_*, *Shoot\_biomass\_*, *Shoot\_area\_*, *gs\_i\_rate*, *NPQ\_*, *NPQ\_r\_max*, *NPQ\_i\_rate* and *gs\_r\_rate* (variables are sorted from the strongest).
- low values for the variable *gs\_r\_max*.

The group in which the individuals *UG30* and *TOG\_5997* stand (characterized by a negative coordinate on the axis) is sharing :

- high values for the variables *ShootRoot\_ratio*, *gs\_r\_90*, *Plant\_height\_*, *gs\_r\_50*, *gs\_r\_max* and *gsmax* (variables are sorted from the strongest).
- low values for variables like *NPQ\_r\_50*, *NPQ\_r\_90*, *NPQ\_r\_slope\_*, *Root\_biomass\_*, *gs\_r\_min*, *gs\_r\_slope*, *WUE\_*, *NPQ\_*, *Shoot\_area\_* and *AbaxialSD* (variables are sorted from the weakest).

## 6. Description of the plane 7:8



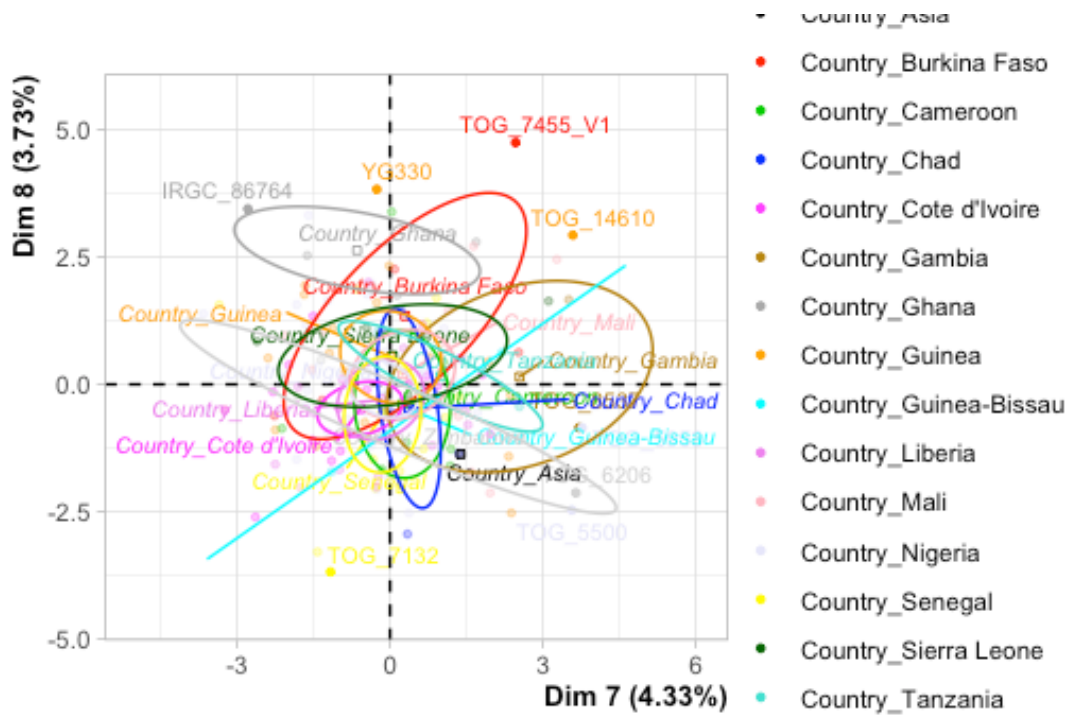
**Figure 6.1 - Individuals factor map (PCA)** *The labeled individuals are those with the higher contribution to the plane construction.*

The Wilks test p-value indicates which variable factors are the best separated on the plane (i.e. which one explain the best the distance between individuals).

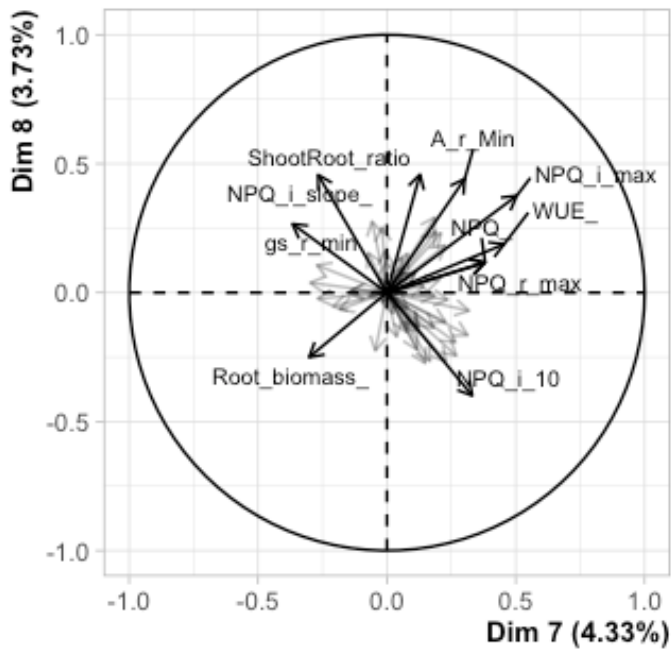
##	Country	Broad_Ecology	Ecology	African_Region
##	0.05619913	0.27644475	0.56378650	0.69877927

The best qualitative variable to illustrate the distance between individuals on this plane is : *Country*.

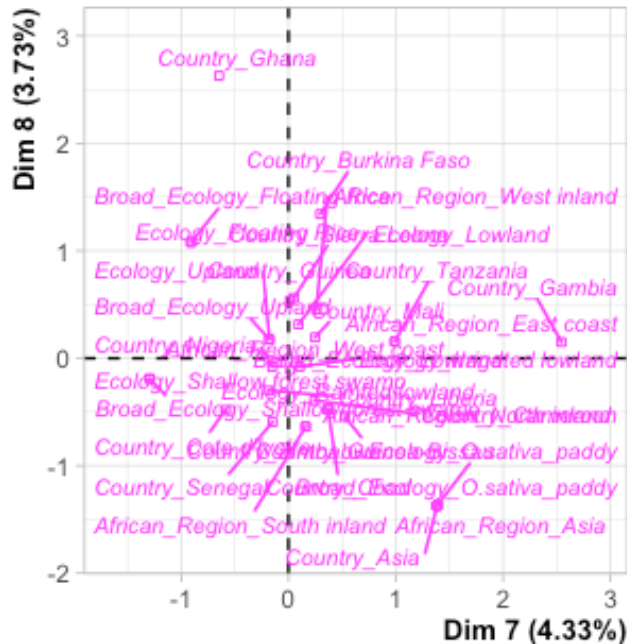




**Figure 6.2 - Individuals factor map (PCA)** *The labeled individuals are those with the higher contribution to the plane construction. The individuals are coloured after their category for the variable Country.*



**Figure 6.3 - Variables factor map (PCA)** The labeled variables are those the best shown on the plane.



**Figure 6.4 - Qualitative factor map (PCA)** The labeled factors are those the best shown on the plane.

The **dimension 7** opposes individuals such as *TOG\_14610*, *TOG\_7455\_V1*, *TOG\_8537*, *TOG\_6206*, *TOG\_5500* and *TOG\_5953* (to the right of the graph, characterized by a strongly positive coordinate on the axis) to individuals such as *TOG\_7132*, *YG330* and *IRGC\_86764* (to the left of the graph, characterized by a strongly negative coordinate on the axis).

The group in which the individuals *TOG\_8537*, *TOG\_6206*, *TOG\_5500* and *TOG\_5953* stand (characterized by a positive coordinate on the axis) is sharing :

- high values for variables like *gs\_r\_50*, *gs\_r\_90*, *gs\_r\_10*, *NPQ\_i\_10*, *NPQ\_r\_min*, *gs\_i\_50*, *gs\_i\_90*, *A\_r\_Slope*, *NPQ\_i\_rate* and *NPQ\_i\_50* (variables are sorted from the strongest).
- low values for the variables *gs\_r\_min*, *NPQ\_i\_slope\_*, *Plant\_height\_* and *gs\_r\_slope* (variables are sorted from the weakest).

The group in which the individuals *TOG\_14610* and *TOG\_7455\_V1* stand (characterized by a positive coordinate on the axis) is sharing :

- high values for the variables *NPQ\_i\_max*, *ShootRoot\_ratio*, *A\_i\_min*, *A\_r\_Min*, *WUE\_*, *NPQ\_*, *NPQ\_i\_50*, *NPQ\_r\_max* and *A\_r\_Max* (variables are sorted from the strongest).
- low values for the variable *Root\_biomass\_*.

The group in which the individual *TOG\_7132* stands (characterized by a negative coordinate on the axis) is sharing :

- high values for the variable *Root\_biomass\_*.
- low values for the variables *NPQ\_i\_max*, *NPQ\_r\_max*, *A\_r\_Min*, *NPQ\_*, *Vpdl\_*, *ShootRoot\_ratio* and *WUE\_* (variables are sorted from the weakest).

The group in which the individuals *YG330* and *IRGC\_86764* stand (characterized by a negative coordinate on the axis) is sharing :

- high values for the variables *gs\_r\_min*, *NPQ\_i\_slope\_*, *gs\_r\_slope*, *Plant\_height\_*, *A\_i\_90* and *ShootRoot\_ratio* (variables are sorted from the strongest).
- low values for the variables *gs\_r\_90*, *NPQ\_i\_10*, *NPQ\_i\_50*, *AbaxialSD*, *gs\_i\_50*, *gs\_r\_50*, *A\_r\_Slope*, *A\_r\_ED90* and *gs\_i\_90* (variables are sorted from the weakest).

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The **dimension 8** opposes individuals such as *TOG\_14610*, *TOG\_7455\_V1*, *YG330* and *IRGC\_86764* (to the top of the graph, characterized by a strongly positive coordinate on the axis) to individuals such as *TOG\_7132*, *TOG\_8537*, *TOG\_6206*, *TOG\_5500* and *TOG\_5953* (to the bottom of the graph, characterized by a strongly negative coordinate on the axis).

The group in which the individuals *YG330* and *IRGC\_86764* stand (characterized by a positive coordinate on the axis) is sharing :

- high values for the variables *gs\_r\_min*, *NPQ\_i\_slope\_*, *gs\_r\_slope*, *Plant\_height\_*, *A\_i\_90* and *ShootRoot\_ratio* (variables are sorted from the strongest).
- low values for the variables *gs\_r\_90*, *NPQ\_i\_10*, *NPQ\_i\_50*, *AbaxialSD*, *gs\_i\_50*, *gs\_r\_50*, *A\_r\_Slope*, *A\_r\_ED90* and *gs\_i\_90* (variables are sorted from the weakest).

The group in which the individuals *TOG\_14610* and *TOG\_7455\_VI* stand (characterized by a positive coordinate on the axis) is sharing :

- high values for the variables *NPQ\_i\_max*, *ShootRoot\_ratio*, *A\_i\_min*, *A\_r\_Min*, *WUE\_*, *NPQ\_*, *NPQ\_i\_50*, *NPQ\_r\_max* and *A\_r\_Max* (variables are sorted from the strongest).
- low values for the variable *Root\_biomass\_*.

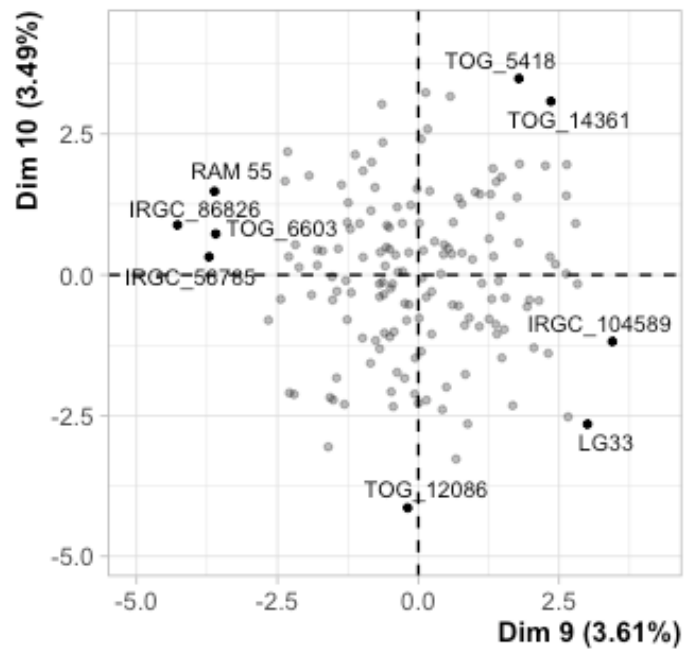
The group in which the individual *TOG\_7132* stands (characterized by a negative coordinate on the axis) is sharing :

- high values for the variable *Root\_biomass\_*.
- low values for the variables *NPQ\_i\_max*, *NPQ\_r\_max*, *A\_r\_Min*, *NPQ\_*, *Vpdl\_*, *ShootRoot\_ratio* and *WUE\_* (variables are sorted from the weakest).

The group in which the individuals *TOG\_8537*, *TOG\_6206*, *TOG\_5500* and *TOG\_5953* stand (characterized by a negative coordinate on the axis) is sharing :

- high values for variables like *gs\_r\_50*, *gs\_r\_90*, *gs\_r\_10*, *NPQ\_i\_10*, *NPQ\_r\_min*, *gs\_i\_50*, *gs\_i\_90*, *A\_r\_Slope*, *NPQ\_i\_rate* and *NPQ\_i\_50* (variables are sorted from the strongest).
  - low values for the variables *gs\_r\_min*, *NPQ\_i\_slope\_*, *Plant\_height\_* and *gs\_r\_slope* (variables are sorted from the weakest).
-

## 7. Description of the plane 9:10

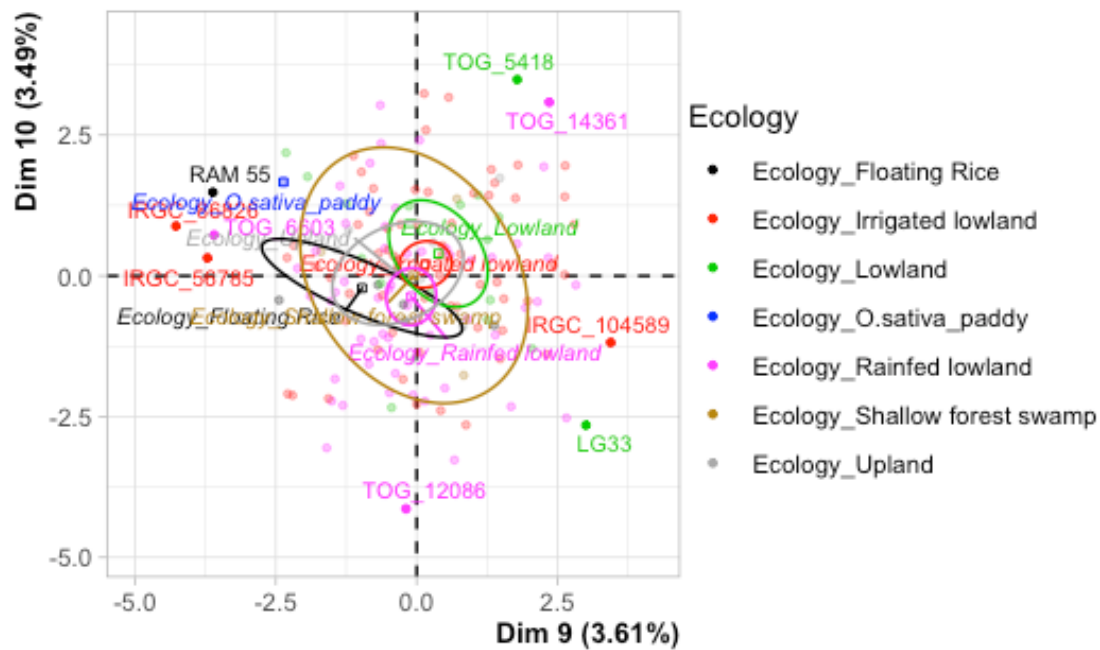


**Figure 7.1 - Individuals factor map (PCA)** *The labeled individuals are those with the higher contribution to the plane construction.*

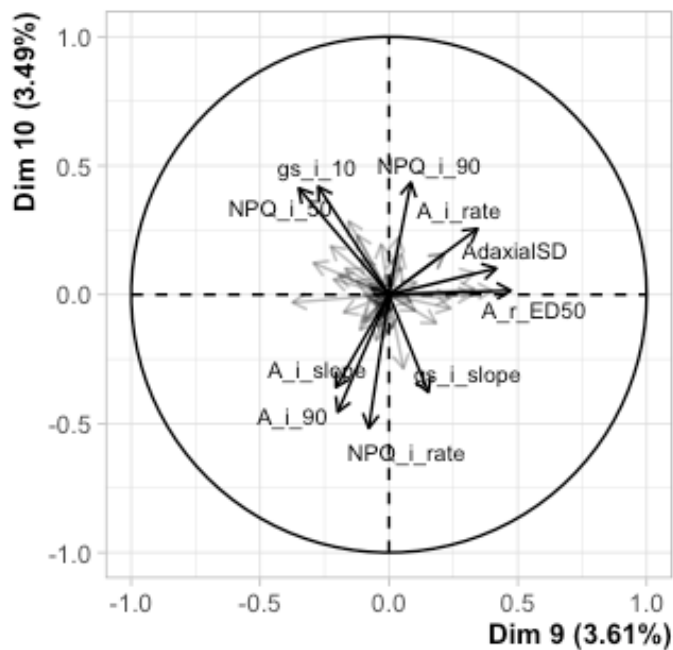
The Wilks test p-value indicates which variable factors are the best separated on the plane (i.e. which one explain the best the distance between individuals).

##	Ecology	Country	Broad_Ecology	African_Region
##	0.3316501	0.4725286	0.7411215	0.8521221

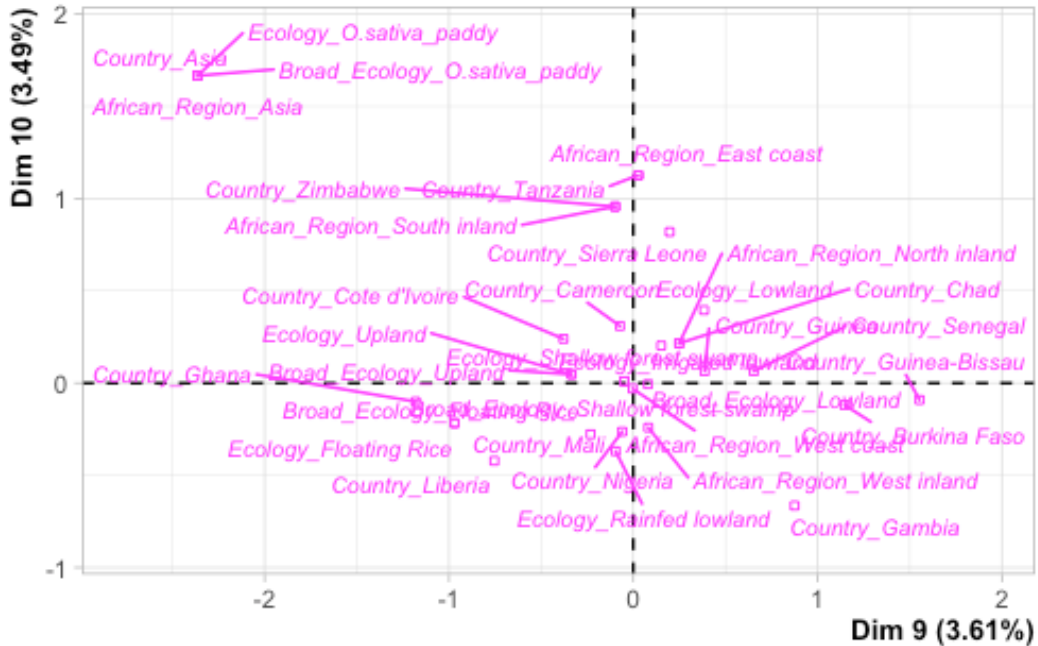
The best qualitative variable to illustrate the distance between individuals on this plane is : *Ecology*.



**Figure 7.2 - Individuals factor map (PCA)** *The labeled individuals are those with the higher contribution to the plane construction. The individuals are coloured after their category for the variable Ecology.*



**Figure 7.3 - Variables factor map (PCA)** The labeled variables are those the best shown on the plane.



**Figure 7.4 - Qualitative factor map (PCA)** The labeled factors are those the best shown on the plane.

The **dimension 9** opposes individuals such as *IRGC\_104589*, *TOG\_5418* and *TOG\_14361* (to the right of the graph, characterized by a strongly positive coordinate on the axis) to individuals such as *IRGC\_56785*, *RAM 55*, *IRGC\_86826* and *TOG\_6603* (to the left of the graph, characterized by a strongly negative coordinate on the axis).

The group in which the individuals *IRGC\_104589*, *TOG\_5418* and *TOG\_14361* stand (characterized by a positive coordinate on the axis) is sharing :

- high values for the variables *A\_r\_ED50*, *A\_r\_ED90*, *A\_i\_rate*, *AdaxialSD*, *NPQ\_i\_90*, *A\_r\_Slope*, *gs\_percentage\_rise*, *gs\_i\_max* and *AbaxialSD* (variables are sorted from the strongest).

- low values for the variables  $A\_i\_90$ ,  $NPQ\_i\_rate$ ,  $A\_i\_slope$ ,  $NPQ\_r\_min$  and  $NPQ\_i\_10$  (variables are sorted from the weakest).

The group in which the individuals  $IRGC\_56785$ ,  $RAM\ 55$ ,  $IRGC\_86826$  and  $TOG\_6603$  stand (characterized by a negative coordinate on the axis) is sharing :

- high values for the variables  $NPQ\_i\_50$ ,  $gs\_i\_10$  and  $A\_i\_50$  (variables are sorted from the strongest).
- low values for the variables  $A\_r\_ED90$ ,  $AdaxialSD$ ,  $A\_r\_Slope$ ,  $A\_r\_ED50$ ,  $AbaxialSD$  and  $gs\_percentage\_rise$  (variables are sorted from the weakest).

The **dimension 10** opposes individuals such as  $IRGC\_104589$ ,  $IRGC\_56785$ ,  $TOG\_5418$ ,  $TOG\_14361$ ,  $RAM\ 55$ ,  $IRGC\_86826$  and  $TOG\_6603$  (to the top of the graph, characterized by a strongly positive coordinate on the axis) to individuals such as  $TOG\_12086$  and  $LG33$  (to the bottom of the graph, characterized by a strongly negative coordinate on the axis).

The group in which the individuals  $IRGC\_56785$ ,  $RAM\ 55$ ,  $IRGC\_86826$  and  $TOG\_6603$  stand (characterized by a positive coordinate on the axis) is sharing :

- high values for the variables  $NPQ\_i\_50$ ,  $gs\_i\_10$  and  $A\_i\_50$  (variables are sorted from the strongest).
- low values for the variables  $A\_r\_ED90$ ,  $AdaxialSD$ ,  $A\_r\_Slope$ ,  $A\_r\_ED50$ ,  $AbaxialSD$  and  $gs\_percentage\_rise$  (variables are sorted from the weakest).

The group in which the individuals  $IRGC\_104589$ ,  $TOG\_5418$  and  $TOG\_14361$  stand (characterized by a positive coordinate on the axis) is sharing :

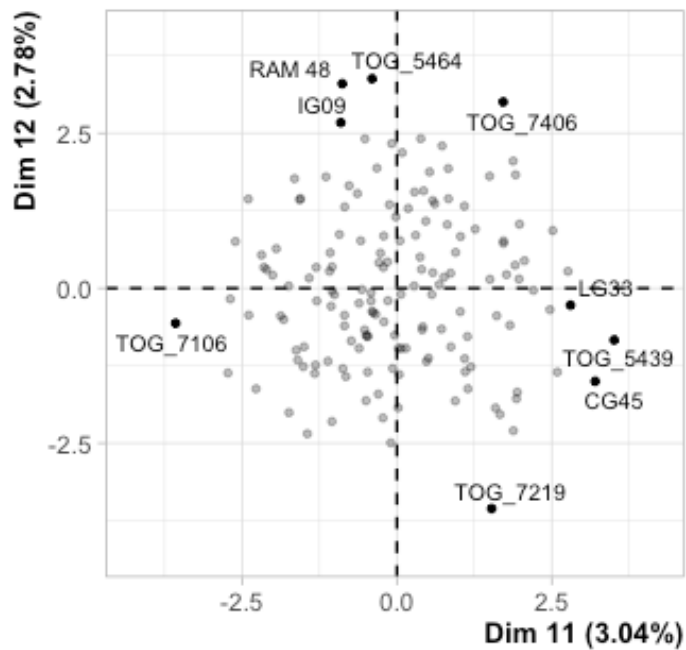
- high values for the variables  $A\_r\_ED50$ ,  $A\_r\_ED90$ ,  $A\_i\_rate$ ,  $AdaxialSD$ ,  $NPQ\_i\_90$ ,  $A\_r\_Slope$ ,  $gs\_percentage\_rise$ ,  $gs\_i\_max$  and  $AbaxialSD$  (variables are sorted from the strongest).
- low values for the variables  $A\_i\_90$ ,  $NPQ\_i\_rate$ ,  $A\_i\_slope$ ,  $NPQ\_r\_min$  and  $NPQ\_i\_10$  (variables are sorted from the weakest).



The group in which the individuals *TOG\_12086* and *LG33* stand (characterized by a negative coordinate on the axis) is sharing :

- high values for the variables *NPQ\_i\_rate*, *A\_i\_90*, *A\_i\_slope*, *gs\_i\_slope* and *Plant\_height* (variables are sorted from the strongest).
- low values for the variables *NPQ\_i\_90*, *NPQ\_i\_50*, *gs\_i\_10*, *A\_i\_10* and *gsmax* (variables are sorted from the weakest).

### 8. Description of the plane 11:12

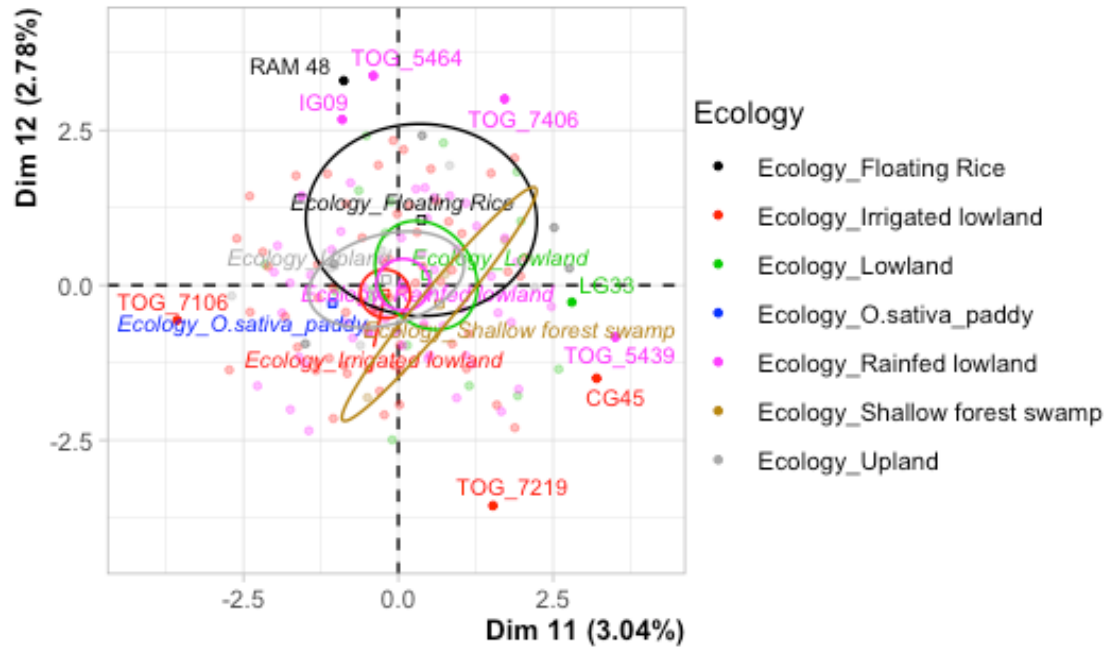


**Figure 8.1 - Individuals factor map (PCA)** *The labeled individuals are those with the higher contribution to the plane construction.*

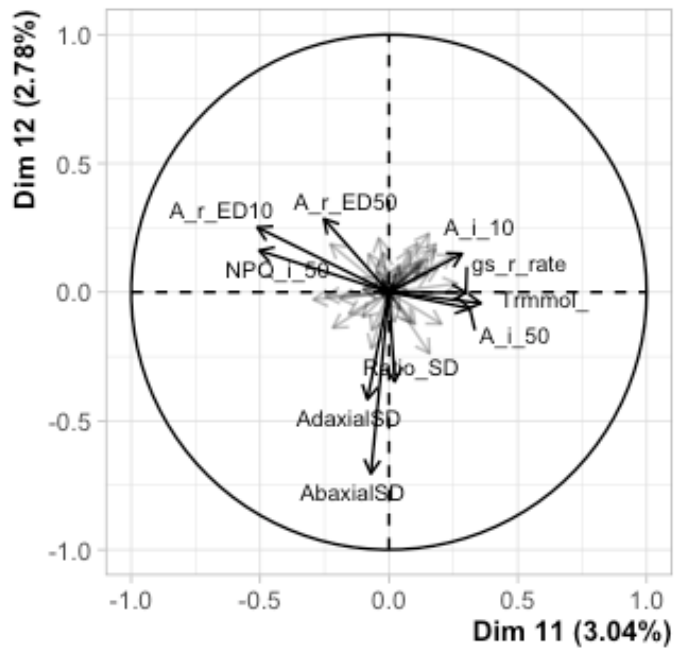
The Wilks test p-value indicates which variable factors are the best separated on the plane (i.e. which one explain the best the distance between individuals).

##	Ecology	Broad_Ecology	African_Region	Country
##	0.4336165	0.4708979	0.5856632	0.9297229

The best qualitative variable to illustrate the distance between individuals on this plane is :  
*Ecology.*



**Figure 8.2 - Individuals factor map (PCA)** *The labeled individuals are those with the higher contribution to the plane construction. The individuals are coloured after their category for the variable Ecology.*



**Figure 8.3 - Variables factor map (PCA)** *The labeled variables are those the best shown on the plane.*



**Figure 8.4 - Qualitative factor map (PCA)** *The labeled factors are those the best shown on the plane.*

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The **dimension 11** opposes individuals such as *TOG\_7219*, *TOG\_5439*, *CG45* and *LG33* (to the right of the graph, characterized by a strongly positive coordinate on the axis) to individuals such as *\*\** and *TOG\_7106* (to the left of the graph, characterized by a strongly negative coordinate on the axis).

The group in which the individuals *TOG\_7219*, *TOG\_5439*, *CG45* and *LG33* stand (characterized by a positive coordinate on the axis) is sharing :

- high values for the variables *Trmmol\_*, *NPQ\_i\_rate*, *A\_i\_50*, *gs\_i\_rate*, *A\_i\_max*, *gs\_r\_rate* and *ShootRoot\_ratio* (variables are sorted from the strongest).
- low values for the variables *A\_r\_ED10*, *NPQ\_i\_50*, *NPQ\_i\_90*, *A\_r\_ED50*, *gs\_r\_slope*, *NPQ\_r\_min* and *NPQ\_i\_10* (variables are sorted from the weakest).

The group in which the individual *TOG\_7106* stands (characterized by a negative coordinate on the axis) is sharing :

- high values for the variables *NPQ\_i\_90*, *NPQ\_i\_50*, *A\_r\_ED10*, *AbaxialSD*, *AdaxialSD*, *WUE\_*, *A\_r\_Min* and *A\_i\_slope* (variables are sorted from the strongest).
- low values for the variables *NPQ\_i\_rate*, *Trmmol\_*, *A\_i\_50*, *gsmax*, *A\_i\_10*, *A\_i\_min*, *gs\_i\_max* and *A\_r\_Slope* (variables are sorted from the weakest).

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The **dimension 12** opposes individuals such as *TOG\_7406*, *TOG\_5464*, *IG09* and *RAM 48* (to the top of the graph, characterized by a strongly positive coordinate on the axis) to individuals such as *TOG\_7219*, *TOG\_5439*, *CG45*, *TOG\_7106* and *LG33* (to the bottom of the graph, characterized by a strongly negative coordinate on the axis).

The group in which the individuals *TOG\_7406*, *TOG\_5464*, *IG09* and *RAM 48* stand (characterized by a positive coordinate on the axis) is sharing :

- high values for the variables *A\_r\_ED50*, *NPQ\_r\_slope\_*, *NPQ\_r\_90*, *gs\_r\_min*, *NPQ\_r\_50*, *gs\_i\_min*, *A\_r\_ED10*, *gs\_i\_90* and *Plant\_height\_* (variables are sorted from the strongest).
- low values for the variables *AbaxialSD*, *AdaxialSD* and *A\_r\_Min* (variables are sorted from the weakest).

The group in which the individual *TOG\_7106* stands (characterized by a negative coordinate on the axis) is sharing :

- high values for the variables *NPQ\_i\_90*, *NPQ\_i\_50*, *A\_r\_ED10*, *AbaxialSD*, *AdaxialSD*, *WUE\_*, *A\_r\_Min* and *A\_i\_slope* (variables are sorted from the strongest).
- low values for the variables *NPQ\_i\_rate*, *Trmmol\_*, *A\_i\_50*, *gsmax*, *A\_i\_10*, *A\_i\_min*, *gs\_i\_max* and *A\_r\_Slope* (variables are sorted from the weakest).

The group in which the individuals *TOG\_7219*, *TOG\_5439*, *CG45* and *LG33* stand (characterized by a negative coordinate on the axis) is sharing :

- high values for the variables *Trmmol\_*, *NPQ\_i\_rate*, *A\_i\_50*, *gs\_i\_rate*, *A\_i\_max*, *gs\_r\_rate* and *ShootRoot\_ratio* (variables are sorted from the strongest).
- low values for the variables *A\_r\_ED10*, *NPQ\_i\_50*, *NPQ\_i\_90*, *A\_r\_ED50*, *gs\_r\_slope*, *NPQ\_r\_min* and *NPQ\_i\_10* (variables are sorted from the weakest).

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## Annexes