Analyse

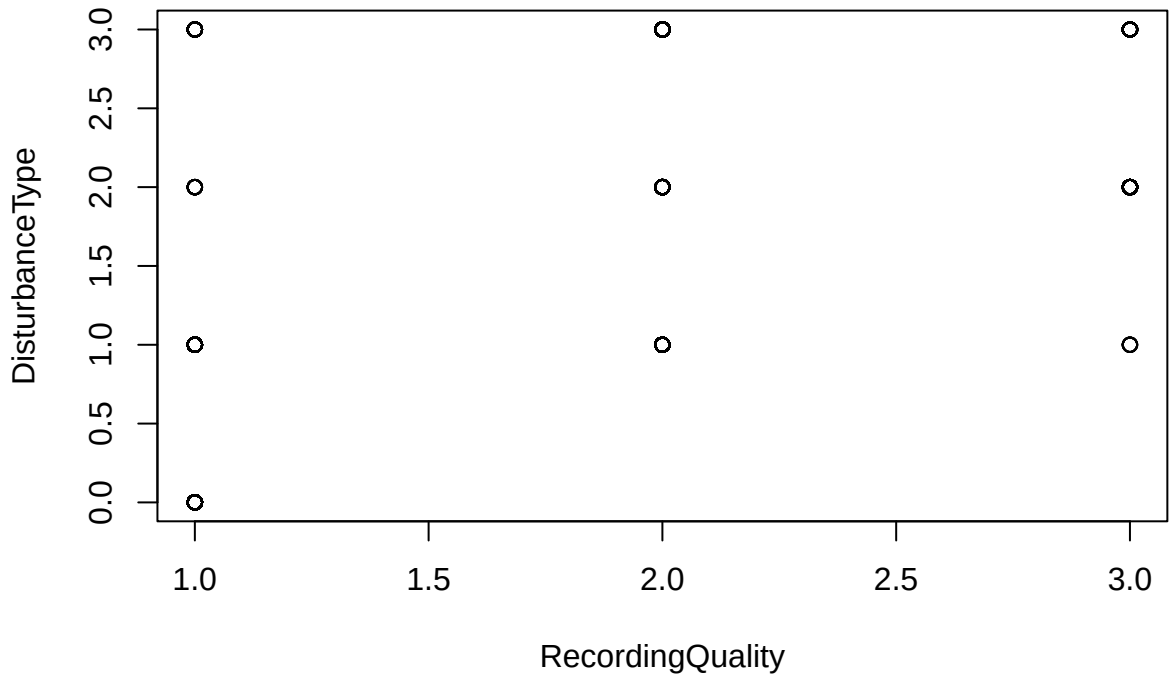
Corrélation des variables

Variable de détection

```
cor(anoure$RecordingQuality, anoure$DisturbanceType)
```

```
## [1] 0.5707699
```

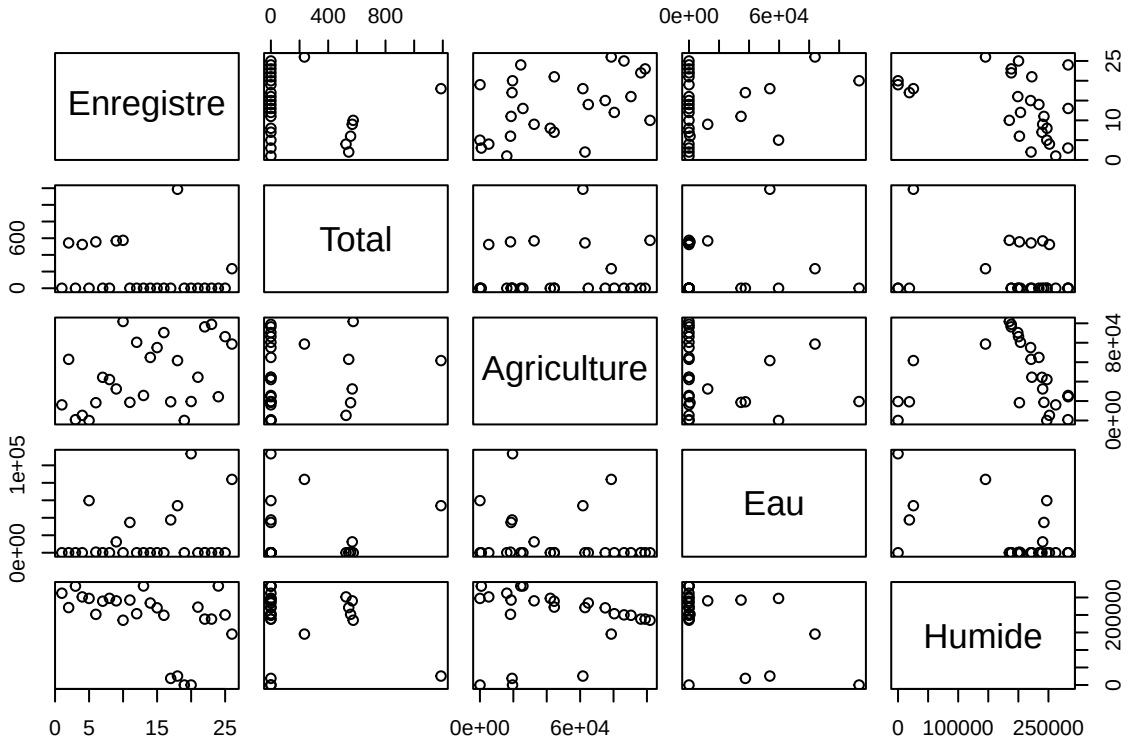
```
detection_anoure <- subset(anoure, select = c(RecordingQuality, DisturbanceType))
plot(detection_anoure)
```



Variable d'occupation

```
occupation_anoure <- merge(MH, route, by ="Enregistre")
occ_anoure <- merge(occupation_anoure, territoire, by = "Enregistre")
occ_anoure$Eau <- occ_anoure$Eau.peu.profonde + occ_anoure$Marais + occ_anoure$Riviere
occ_anoure$Humide <- occ_anoure$Marecage + occ_anoure$Milieu.humide + occ_anoure$Tourbiere
occ_anoure <- subset(occ_anoure, select = c(Enregistre, Total, Agriculture, Eau, Humide))

plot(occ_anoure)
```



Analyse

LISYL 2022 1h

```
lisyl_22_21h <- subset(lisyl_22_21h, select = -c(Site))
disturb_2022_21h <- subset(disturb_2022_21h, select = -c(Site))
qualite_2022_21h <- subset(qualite_2022_21h, select = -c(Site))
```

Création données unmarked

```
lisyl_22_21h.data <- unmarkedFrameOccu(y = lisyl_22_21h, siteCovs = occ_anoure, obsCovs = list(disturba
```

```
## Warning: siteCovs contains characters. Converting them to factors.
```

```
summary(lisyl_22_21h.data)
```

```
## unmarkedFrame Object
##
## 26 sites
## Maximum number of observations per site: 16
## Mean number of observations per site: 15.15
```

```
## Sites with at least one detection: 11
##
## Tabulation of y observations:
##    0    1 <NA>
##  379   15   22
##
## Site-level covariates:
##      Enregistre     Total          Agriculture             Eau
##  C-foret  : 1   Min.   :   0.0   Min.   :     5.14   Min.   :     0
##  C-lisiere: 1   1st Qu.:   0.0   1st Qu.: 18795.08   1st Qu.:     0
##  E-foret  : 1   Median :   0.0   Median : 43289.47   Median :     0
##  E-lisiere: 1   Mean   : 161.1   Mean   : 46506.54   Mean   : 15236
##  F-foret  : 1   3rd Qu.: 175.6   3rd Qu.: 77739.69   3rd Qu.:  9517
##  F-lisiere: 1   Max.   :1187.3   Max.   :101863.09   Max.   :113276
##  (Other)  :20
##      Humide
##  Min.   :     0
##  1st Qu.:188215
##  Median :220775
##  Mean   :193579
##  3rd Qu.:246110
##  Max.   :282781
##
##
## Observation-level covariates:
##   disturbance       qualite
##  Min.   :0.000   Min.   :1.000
##  1st Qu.:1.000   1st Qu.:1.000
##  Median :1.000   Median :2.000
##  Mean   :1.475   Mean   :1.883
##  3rd Qu.:2.000   3rd Qu.:2.000
##  Max.   :3.000   Max.   :3.000
##  NA's   :22      NA's   :22
```

Modèles

```
#Détectabilité et occupation constante
m00 <- occu(~ 1 ~ 1, data = lisyl_22_21h.data)

##Détectabilité varie, mais occupation est constante
mDetection2 <- occu(~ disturbance + qualite ~ 1, data = lisyl_22_21h.data)
mDetection2
```

```
##
## Call:
## occu(formula = ~disturbance + qualite ~ 1, data = lisyl_22_21h.data)
##
## Occupancy:
##  Estimate   SE     z P(>|z|)
##      2.23 3.62 0.616   0.538
##
## Detection:
##             Estimate    SE      z P(>|z|)
## (Intercept)    0.496 1.023  0.485  0.6276
```

```
## disturbance   -0.446 0.464 -0.961  0.3366
## qualite       -2.204 0.875 -2.520  0.0117
##
## AIC: 110.3699
```

```
##Détectabilité varie et l'occupation varie
mHumide2 <- occu(~ disturbance + qualite ~ Humide, data = lisyl_22_21h.data)
##Détectabilité constante et l'occupation varie
mHumide3 <- occu(~ 1 ~ Humide, data = lisyl_22_21h.data)

##Détectabilité varie et l'occupation varie
mEaulibre2 <- occu(~ disturbance + qualite ~ Eau, data = lisyl_22_21h.data)
##Détectabilité constante et l'occupation varie
mEaulibre3 <- occu(~ 1 ~ Eau, data = lisyl_22_21h.data)

##Détectabilité varie et l'occupation varie
mAgriculture2 <- occu(~ disturbance + qualite ~ Agriculture, data = lisyl_22_21h.data)
##Détectabilité constante et l'occupation varie
mAgriculture3 <- occu(~ 1 ~ Agriculture, data = lisyl_22_21h.data)

##Détectabilité varie et l'occupation varie !!!
mRoute2 <- occu(~ disturbance + qualite ~ Total, data = lisyl_22_21h.data)
mRoute2
```

```
##
## Call:
## occu(formula = ~disturbance + qualite ~ Total, data = lisyl_22_21h.data)
##
## Occupancy:
##             Estimate      SE     z P(>|z|)
## (Intercept)  2.51782 2.41144  1.04   0.296
## Total       -0.00591 0.00468 -1.26   0.207
##
## Detection:
##             Estimate    SE      z P(>|z|)
## (Intercept)    0.670 0.981  0.683  0.4945
## disturbance   -0.452 0.465 -0.973  0.3304
## qualite       -2.201 0.881 -2.498  0.0125
##
## AIC: 109.7199
```

```
##Détectabilité constante et l'occupation varie
mRoute3 <- occu(~ 1 ~ Total, data = lisyl_22_21h.data)

##Détectabilité varie et l'occupation varie
mAgri_Route2 <- occu(~ disturbance + qualite ~ Agriculture + Total, data = lisyl_22_21h.data)
##Détectabilité constante et l'occupation varie
mAgri_Route3 <- occu(~ 1 ~ Agriculture + Total, data = lisyl_22_21h.data)
```

```
Cands <- list(m00, mDetection2, mHumide2, mEaulibre2, mRoute2, mAgriculture2)
##assign meaningful names to each model
Model.names <- c("nulle", "psi(.)p(Qualité + Perturbation)","psi(Milieux humides)p(Qualité + Perturbati
##do model selection based on AICc
aictab(cand.set = Cands,  modnames = Model.names)
```

```
##
## Model selection based on AICc:
##
##                                                K   AICc Delta_AICc AICcWt Cum.Wt
## psi(.)p(Qualité + Perturbation)                4 112.27       0.00   0.56   0.56
## psi(Route)p(Qualité + Perturbation)            5 112.72       0.45   0.44   1.00
## nulle                                          2 131.81      19.53   0.00   1.00
## psi(Agriculture)p(Qualité + Perturbation)      5 280.55     168.28   0.00   1.00
## psi(Milieux humides)p(Qualité + Perturbation) 5 280.55     168.28   0.00   1.00
## psi(Eau libre)p(Qualité + Perturbation)        5 280.55     168.28   0.00   1.00
##                                                    LL
## psi(.)p(Qualité + Perturbation)                 -51.18
## psi(Route)p(Qualité + Perturbation)             -49.86
## nulle                                           -63.64
## psi(Agriculture)p(Qualité + Perturbation)      -133.78
## psi(Milieux humides)p(Qualité + Perturbation) -133.78
## psi(Eau libre)p(Qualité + Perturbation)        -133.78
```

LICAT 2021 1h

```
licat_21_1h <- subset(licat_21_1h, select = -c(Site))
disturb_2021_1h <- subset(disturb_2021_1h, select = -c(Site))
qualite_2021_1h <- subset(qualite_2021_1h, select = -c(Site))
```

Création données unmarked

```
licat_21_1h.data <- unmarkedFrameOccu(y = licat_21_1h, siteCovs = occ_anoure, obsCovs = list(disturbanc
```

```
## Warning: siteCovs contains characters. Converting them to factors.
```

```
summary(licat_21_1h.data)
```

```
## unmarkedFrame Object
##
## 26 sites
## Maximum number of observations per site: 8
## Mean number of observations per site: 7.77
## Sites with at least one detection: 14
##
## Tabulation of y observations:
##    0    1    2    3 <NA>
##  159   30   12    1    6
##
## Site-level covariates:
##      Enregistre     Total          Agriculture             Eau
##  C-foret  : 1   Min.   :   0.0   Min.   :     5.14   Min.   :     0
##  C-lisiere: 1   1st Qu.:   0.0   1st Qu.: 18795.08   1st Qu.:     0
##  E-foret  : 1   Median :   0.0   Median : 43289.47   Median :     0
##  E-lisiere: 1   Mean   : 161.1   Mean   : 46506.54   Mean   : 15236
##  F-foret  : 1   3rd Qu.: 175.6   3rd Qu.: 77739.69   3rd Qu.:  9517
```

```
##  F-lisiere: 1   Max.   :1187.3   Max.   :101863.09   Max.   :113276
##  (Other)  :20
##      Humide
##  Min.   :     0
##  1st Qu.:188215
##  Median :220775
##  Mean   :193579
##  3rd Qu.:246110
##  Max.   :282781
##
##
## Observation-level covariates:
##   disturbance       qualite
##  Min.   :0.000   Min.   :1.000
##  1st Qu.:1.000   1st Qu.:1.000
##  Median :2.000   Median :2.000
##  Mean   :1.733   Mean   :1.772
##  3rd Qu.:3.000   3rd Qu.:2.000
##  Max.   :3.000   Max.   :3.000
##  NA's   :6       NA's   :6
```

Modèles

```
mDetection
```

```
##
## Call:
## occu(formula = ~disturbance + qualite ~ 1, data = licat_21_1h.data)
##
## Occupancy:
##  Estimate    SE     z P(>|z|)
##     0.224 0.411 0.545   0.586
##
## Detection:
##             Estimate    SE     z P(>|z|)
## (Intercept)    1.867 0.696  2.68 0.00729
## disturbance    0.243 0.234  1.04 0.29908
## qualite       -1.638 0.561 -2.92 0.00352
##
## AIC: 172.3197
```

```
mRoute
```

```
##
## Call:
## occu(formula = ~disturbance + qualite ~ Total, data = licat_21_1h.data)
##
## Occupancy:
##             Estimate      SE     z P(>|z|)
## (Intercept)  0.49349 0.48148  1.02   0.305
## Total       -0.00174 0.00158 -1.10   0.270
##
## Detection:
```

```
##             Estimate    SE     z P(>|z|)
## (Intercept)    1.861 0.696  2.68 0.00746
## disturbance    0.238 0.233  1.02 0.30764
## qualite       -1.627 0.559 -2.91 0.00358
##
## AIC: 172.994
```

```
Cands <- list(m0, mDetection, mHumide, mEaulibre, mRoute, mAgriculture)
##assign meaningful names to each model
Model.names <- c("nulle", "psi(.)p(Qualité + Perturbation)","psi(Milieux humides)p(Qualité + Perturbati
##do model selection based on AICc
aictab(cand.set = Cands,  modnames = Model.names)
```

```
##
## Model selection based on AICc:
##
##                                              K   AICc Delta_AICc AICcWt Cum.Wt
## psi(.)p(Qualité + Perturbation)              4 174.22       0.00   0.70   0.70
## psi(Route)p(Qualité + Perturbation)          5 175.99       1.77   0.29   0.99
## nulle                                        2 183.10       8.88   0.01   1.00
## psi(Agriculture)p(Qualité + Perturbation)    5 191.76      17.54   0.00   1.00
## psi(Milieux humides)p(Qualité + Perturbation) 5 194.85      20.63   0.00   1.00
## psi(Eau libre)p(Qualité + Perturbation)      5 195.90      21.67   0.00   1.00
##                                                 LL
## psi(.)p(Qualité + Perturbation)              -82.16
## psi(Route)p(Qualité + Perturbation)          -81.50
## nulle                                        -89.29
## psi(Agriculture)p(Qualité + Perturbation)    -89.38
## psi(Milieux humides)p(Qualité + Perturbation) -90.93
## psi(Eau libre)p(Qualité + Perturbation)      -91.45
```