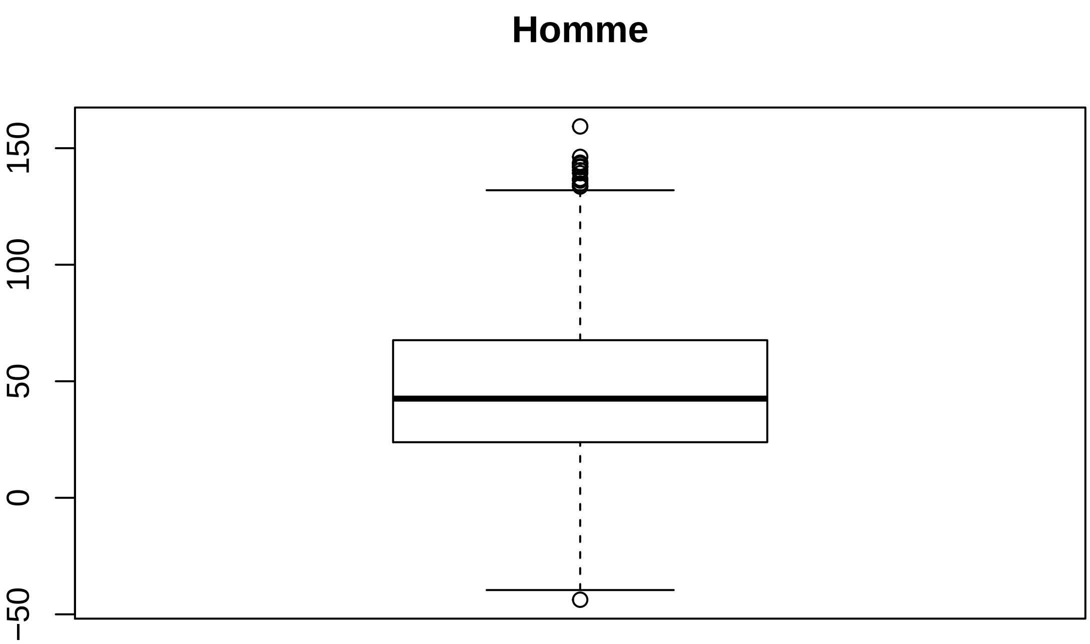
projet

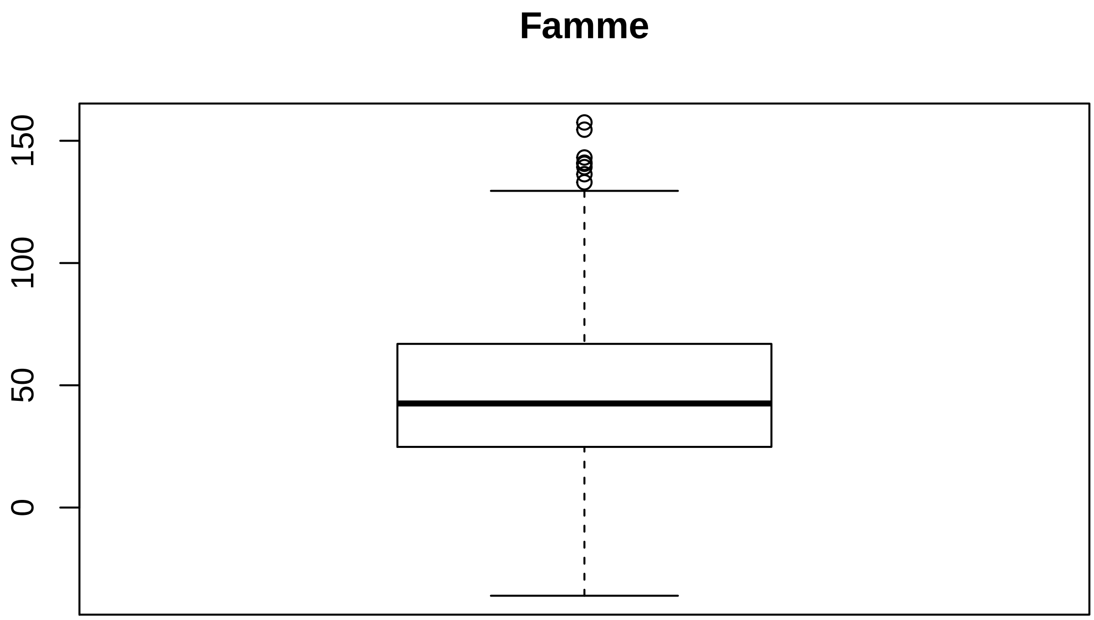
1 Statistique Descriptives

(a) Tracer les boîte des femmes et les hommes

```
rm(list = ls())


  data=read.csv("DB_binome_56.csv",header = TRUE)

  hommes <-subset(data,data['Sexe']==0)
  femmes<-subset(data,data['Sexe']==1)
  boxplot(hommes['Peche'],TRUE,main = "Homme")
```




```
  boxplot(femmes['Peche'],TRUE,main = "Famme")
```

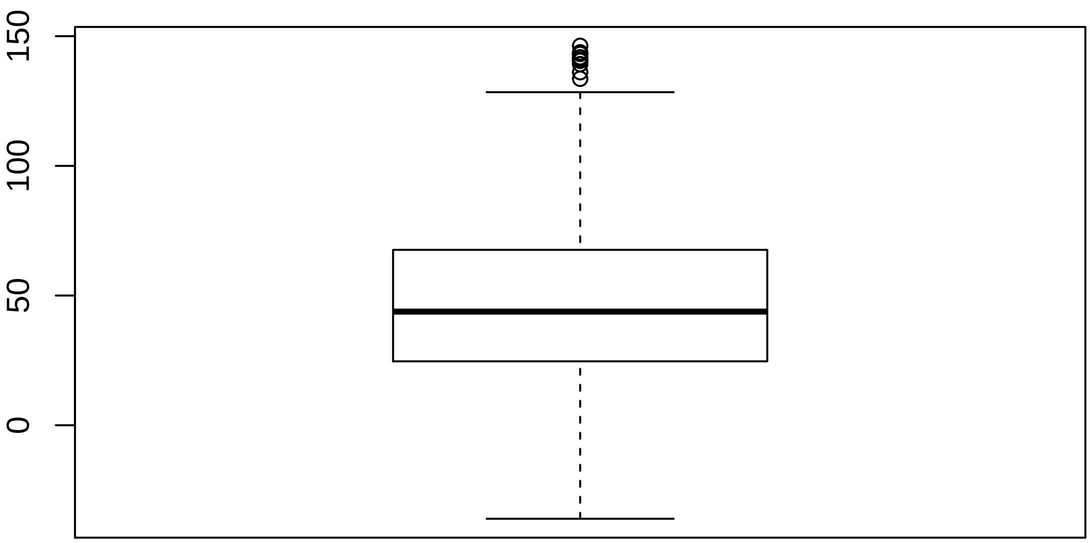


On remarque que il n'y a pasune grande defference entre les hommes et les femmes.

(b)Tracer la quantité de péche en fonction de la tranche d'age

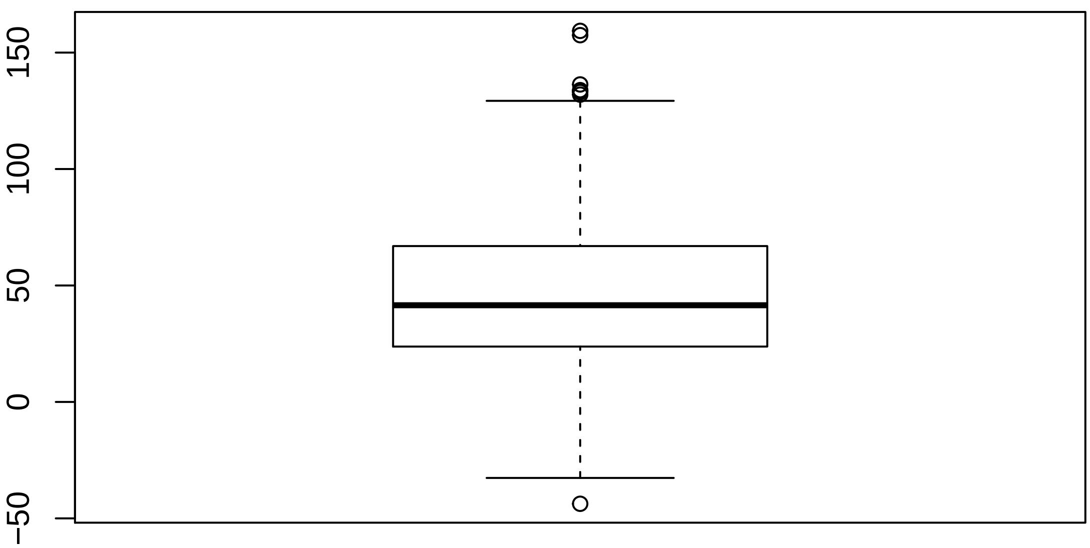
```
rm(list = ls())


  data=read.csv("DB_binome_56.csv",header = TRUE)


  children<-subset(data,data['Age']==0)
  adults<-subset(data,data['Age']==1)
  oldmen<-subset(data,data['Age']==2)
  boxplot(children['Peche'],TRUE,main = "Children")
```

Children

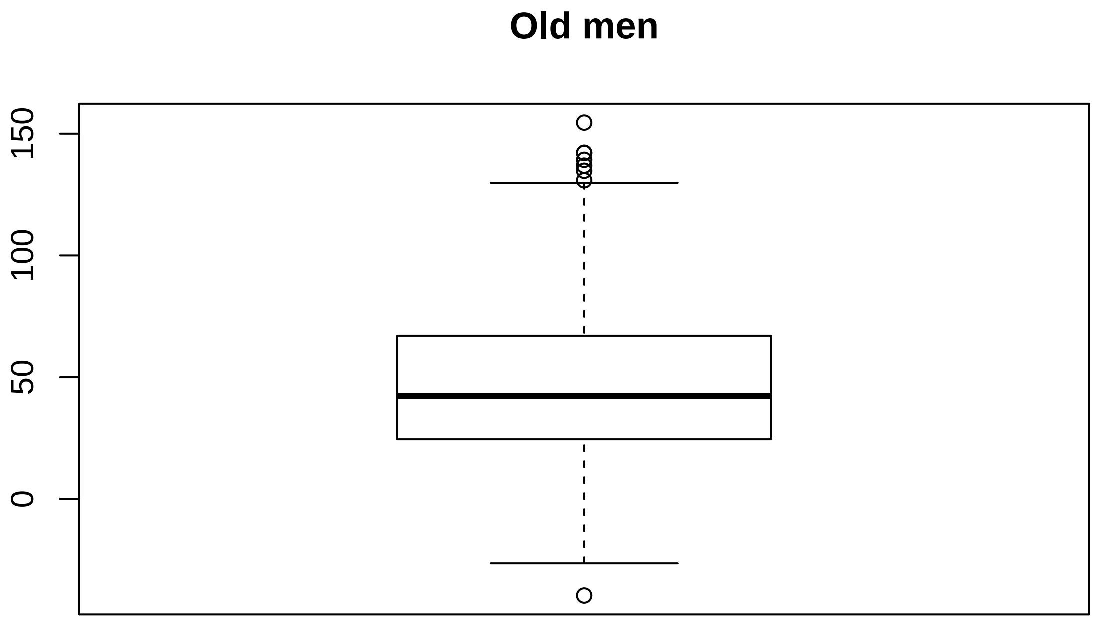



```r
boxplot(adults['Peche'],TRUE,main = "Adults")
```

Adults



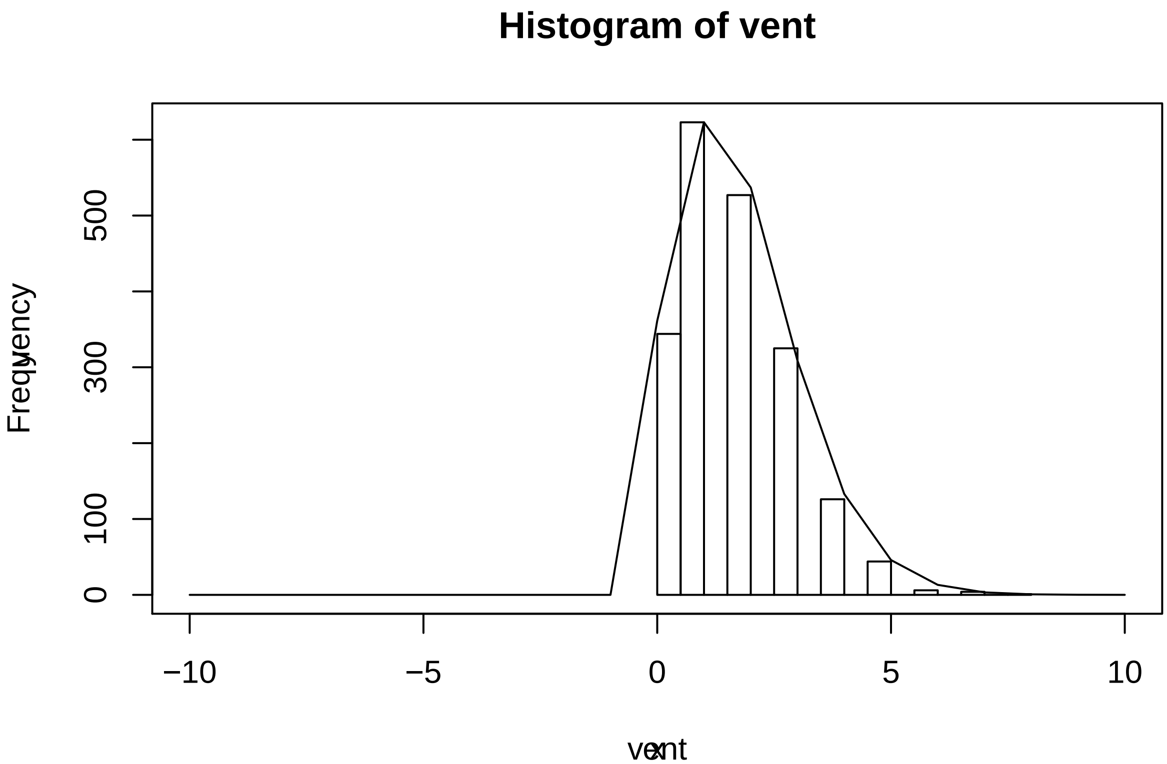

```r
boxplot(oldmen['Peche'],TRUE,main = "Old men")
```



On remarque que il n'y a pasune grande defference entre les gens qui ont les age defferents.

(c)Tracer l'histogramme l'intensité de vent

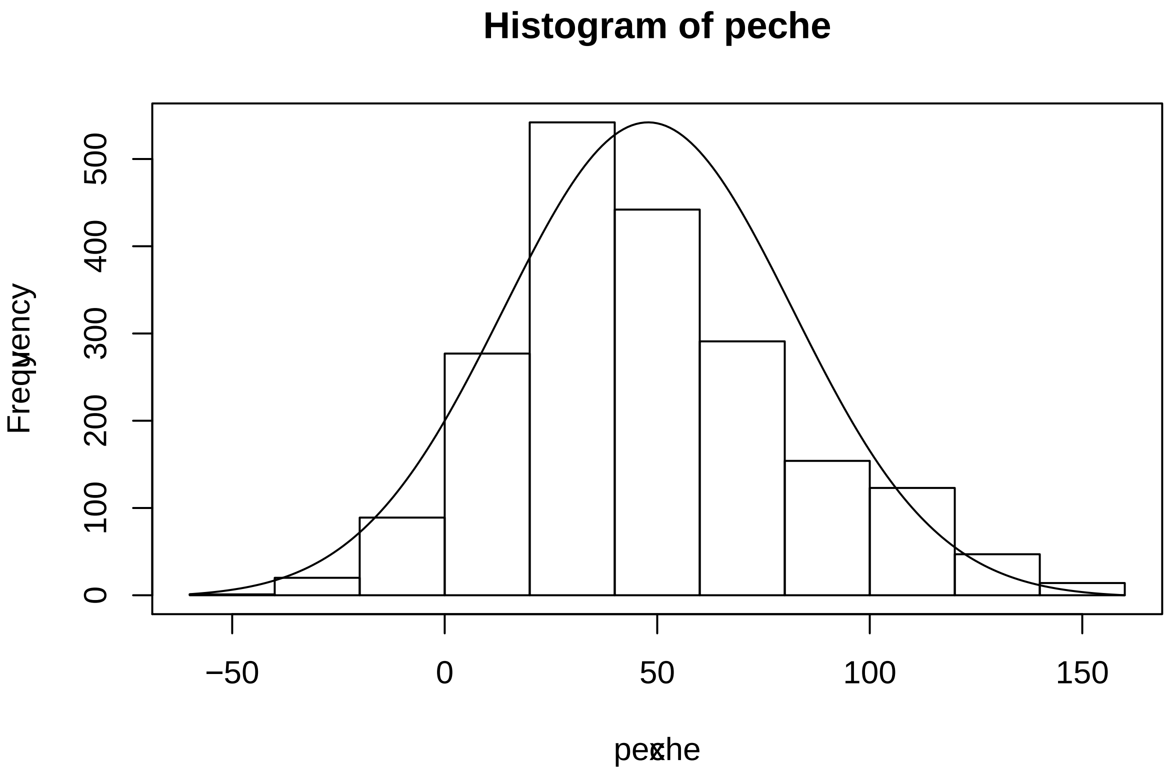
```
  vent<-data[,'Noeuds']
hist(vent,freq=TRUE,xlim=c(-10,10))
lambda=mean(vent)

x=seq(-10,10)
y<-dpois(x,lambda)
par(new=TRUE)
plot(x,y,type="l",xaxt="n",yaxt="n")
```



Elle suive la loi de Poisson . On le justifie par la courbe de "dpoi"

(d)Tracer l'histogramme la quantité de péche

```
  peche<-data[,'Peche']
hist(peche,freq=TRUE,xlim=c(-60,160))

mu=mean(peche)
delta=sqrt(var(peche))
x=seq(-60,160)
y<-dnorm(x,mu,delta)
par(new=TRUE)
plot(x,y,type="l",xaxt="n",yaxt="n")
```



Elle suive la loi de Normale . On le justifie par la courbe de "dnorm"

2

(a)Verifier les observation

```
nb = length(vent)
lambda = mean(vent)
echant =  rpois(nb , lambda)
ks.test(vent, echant)
```

```
## Warning in ks.test(vent, echant): p-value will be approximate in the
## presence of ties
```

```
##
##  Two-sample Kolmogorov-Smirnov test
##
## data:  vent and echant
## D = 0.0145, p-value = 0.9845
## alternative hypothesis: two-sided
```

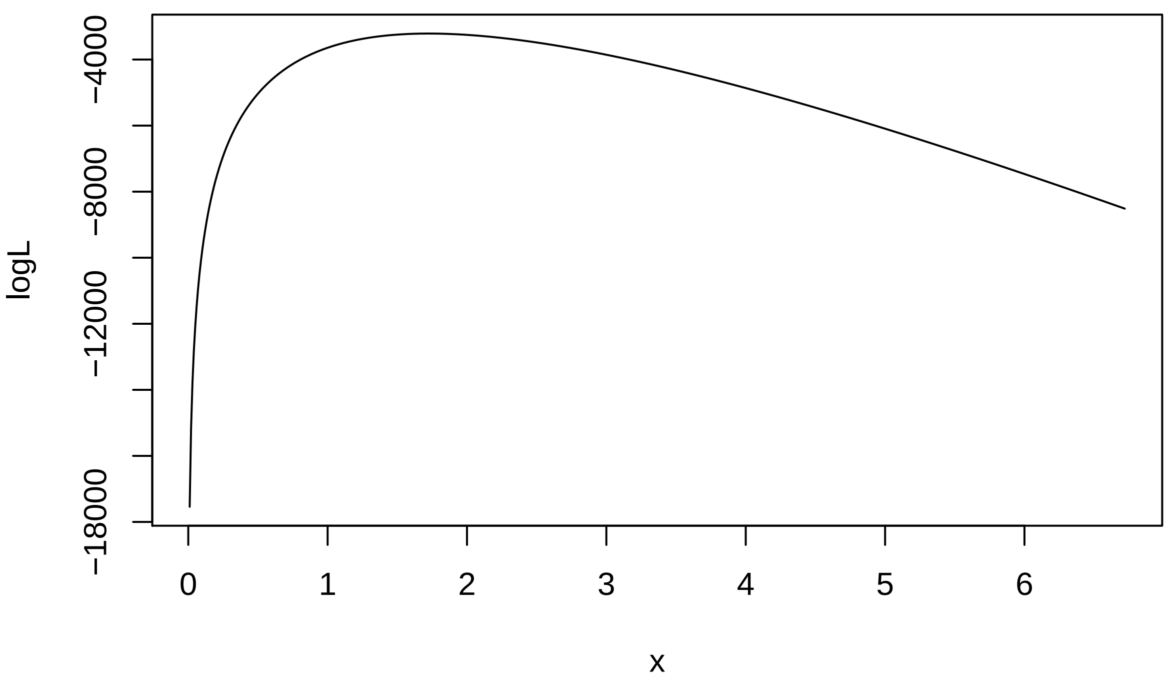
Donc on remarque la p-value est presque $1 > 0.05$, donc il suivre la loi poisson

(b)La vraisemblance

$L = e^{-n\lambda} \prod_{i=0}^{n} \frac{\lambda^{x_i}}{x_i!}$ $logL = -\lambda n + \sum_{i=0}^{n}(x_i log\lambda - logx_i!)$ $logL' = -n + \frac{1}{\lambda}\sum_{i=0}^{n}(x_i) = 0$ $\widehat{\lambda} = \frac{1}{n}\sum_{i=0}^{n} x_i = \bar{x}$

(c) Tracer La log-vraisemblance et déterminer le maximun de vraisemblance

```
lambda=mean(vent)

x<-seq(0.01,lambda+5,0.01)
logL=vector(length=length(x))
n<-length(vent)

max=-100000
maxX=0

for( i in seq(1,length(x))){
  sum=0
  for(j in seq(1,length(vent))){
  sum = sum + vent[j]*log(x[i]) - log(factorial(vent[j]))
  }

  logL[i]=-n*x[i] +sum
  if(logL[i]>max){
    max=logL[i]
    maxX=x[i]
  }
}

#print(logL)
plot(x,logL,type="l",xaxt="lambda",yaxt="logL")
```

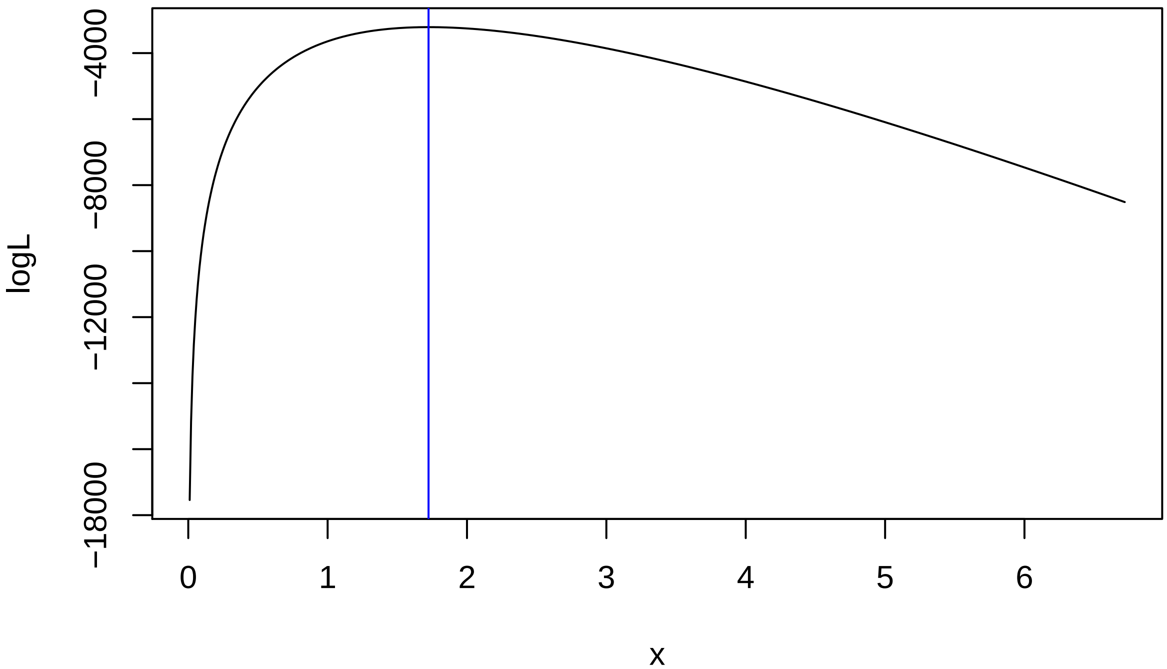


#(d)

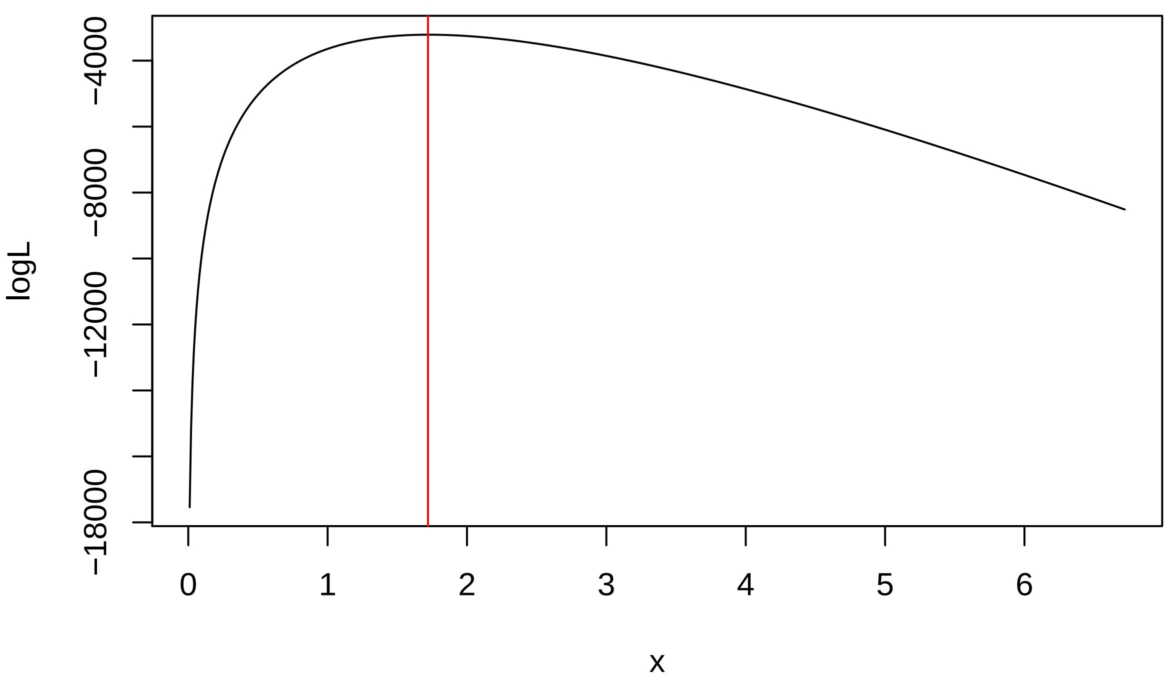
donner une estimation du parametre λ ,et faire apparaitre sur le graphique

je utilise deux facos pour estimer le parametre

```r
plot(x,logL,type="l",xaxt="lambda",yaxt="logL")
par(new=TRUE)

abline(v=lambda,col = "blue")
```




```r
plot(x,logL,type="l",xaxt="lambda",yaxt="logL")
par(new=TRUE)

abline(v=maxX,col = "red")
```



```
print("1er")
```

```
## [1] "1er"
```

```
print(lambda)
```

```
## [1] 1.724
```

```
print("2eme")
```

```
## [1] "2eme"
```

```
print(maxX)
```

```
## [1] 1.72
```

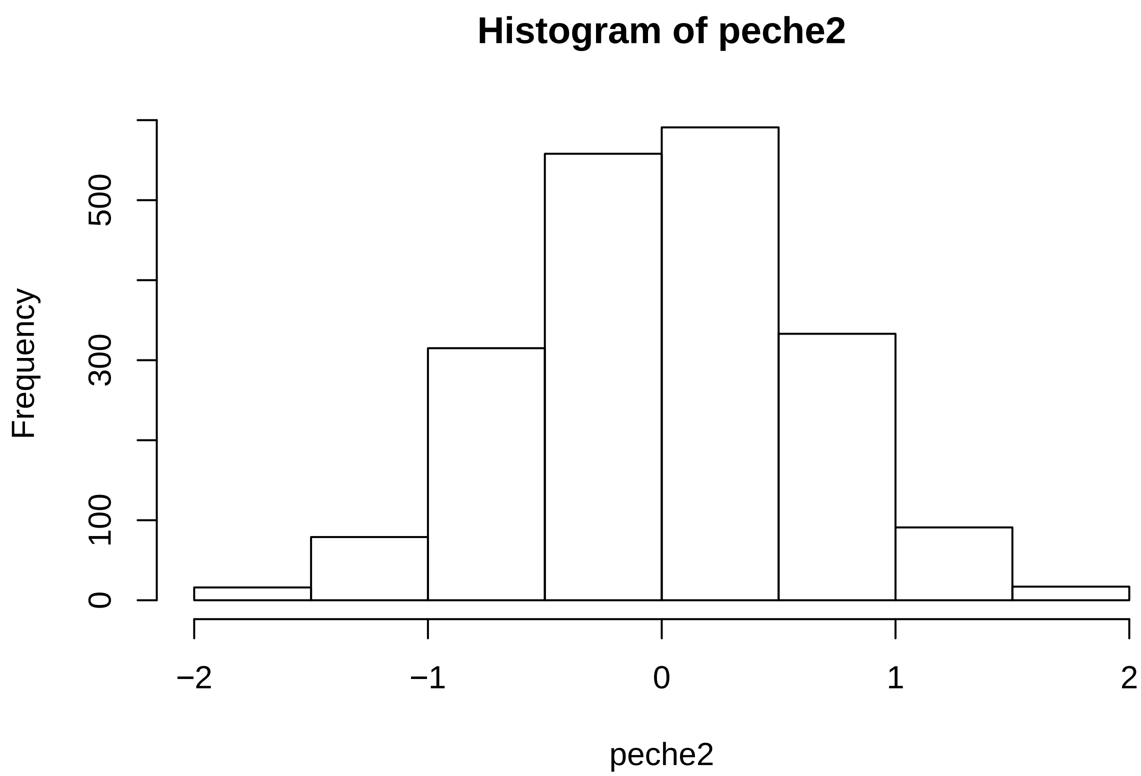
(e)écrire la vraisemblance théorique du modèle de la quantité de péche

$$L = (\frac{1}{\sqrt{2\pi}\delta})^n \exp(\sum_{i=0}^{n} \frac{-(x_i - \frac{100}{1+\lambda_i})^2}{2\delta^2})$$

$$logL = -n * log(\sqrt{2\pi}\delta) + \sum_{i=0}^{n} \frac{-(x_i - \frac{100}{1+\lambda_i})^2}{2\delta^2}$$

(f)TCL

```
peche2=vector(length=length(peche))
for(i in seq(length(peche))){
  peche2[i]=(peche[i]-100/(1+vent[i]))/delta
}
hist(peche2,freq=TRUE)
```



(g)Déterminer le maximum de vraissemblance du parametre

δ, tracer la log-vraissemblance de l'échantillon en fonction de la valeur du δ avec chaqu'une des méthodes

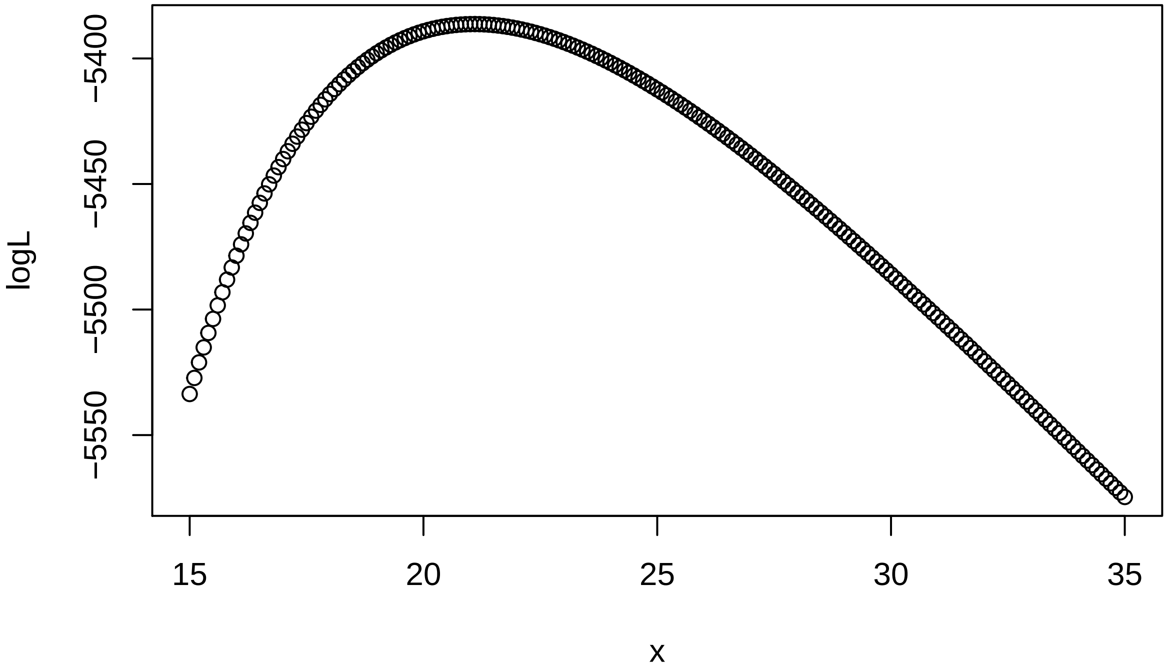
$$logL = -n * log(\sqrt{2\pi}\delta) + \sum_{i=0}^{n} \frac{-(x_i - \frac{100}{1+\lambda_i})^2}{2\delta^2}$$

$$L' = \frac{-n}{\delta} + \sum_{i=0}^{n} \frac{(x_i - \frac{100}{1+\lambda_i})^2}{\delta^3} = 0$$

$$\widehat{\delta}^2 = \frac{\sum_{i=0}^{n}(x_i - \frac{100}{1+\lambda_i})^2}{n}$$

```
sum<-0
x<-seq(15,35,0.1)
logL=vector(length=length(x))

for(j in seq(1,length(x))){
  sum<-0
  for(i in seq(1,length(peche))){
      if(vent[i]<qpois(0.999999,lambda=1.724)){
        sum=sum-((peche[i]-100/(1+vent[i]))/2/x[j])^2
      }


  }
  logL[j]=-n*log(sqrt(2*pi*x[j]))+sum
```

```
}
plot(x,logL)
```

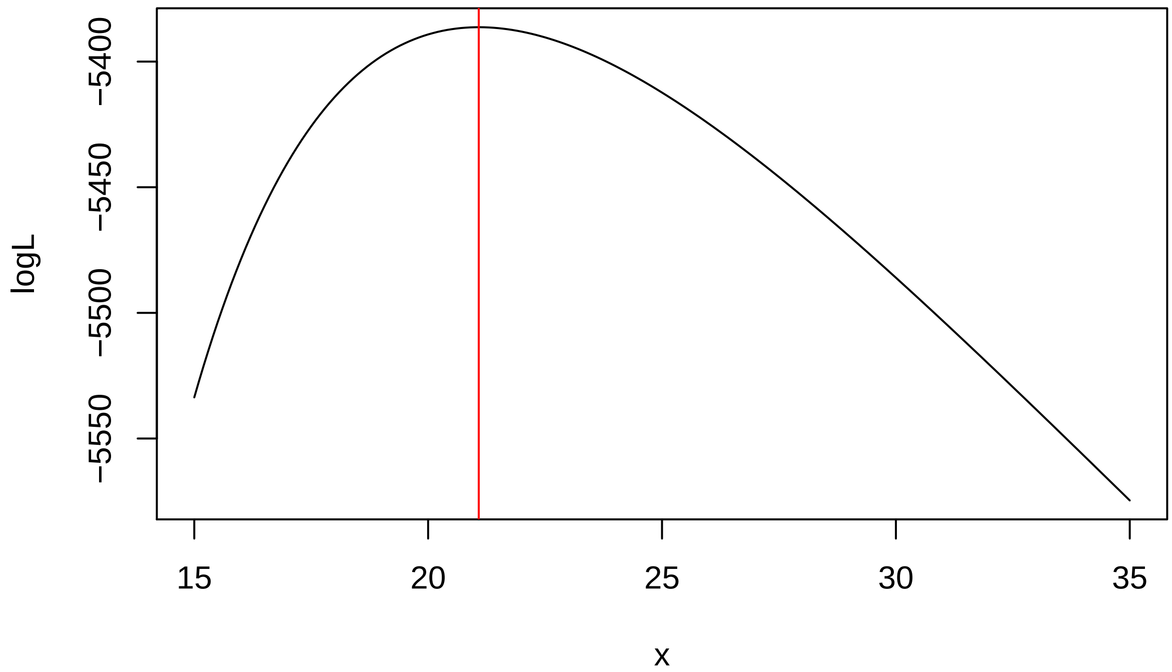


#(h)Donner une estimation du parametre δ avec les deux approches et la faire apparaitre sur les graphiques

```
sum=0
for(i in seq(1,length(peche))){
  if(vent[i]<qpois(0.999999,lambda=1.724)){
  sum=sum+((peche[i]-100/(1+vent[i])))^2
  }

}
delta_esti=sqrt(sum/length(peche))
print(delta_esti)
```

```
## [1] 21.0824
```

```
plot(x,logL,type="l",xaxt="lambda",yaxt="logL")
par(new=TRUE)

abline(v=delta_esti,col = "red")
```


logL
−5400
−5450
−5500
−5550
15
20
25
30
35
x