

```
shannondiv=function(x)
{
  ifelse((length(x)>0),

  {df=data.frame(table(x))
  ab.sum=sum(df$Freq,na.rm=T)
  p.i=df$Freq/ab.sum
  lnpi=log(p.i)
  c(-sum(p.i*lnpi,na.rm=T))
  }
  ,c(0))
}
```