Diversity

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## Richness analysis

Analysis on max land cover and on >=60% cover. Initially, analysis were performed on the land cover that was most dominant on the route the samples was collected (hence, with varying proportions). This is the first analysis. I then build on what Lauren Nichols has done, by carrying out analysis on the >=60% land cover (also only forest, urban and farmland and a mix hereof). Note that I carry out the analysis on the 1000 m buffer, where Lauren carried out the analysis on the 250 m buffer.

## Maximum land cover of urban, farmland and forest

Load data

allInsects\_totasvs <- read.csv("H:/Documents/Insektmobilen/Analysis/InsectMobile\_Diversity/cleaned-data/allInsects\_totasvs.txt", row.names=1, sep="")  
  
allInsects\_totsample <- read.csv("H:/Documents/Insektmobilen/Analysis/InsectMobile\_Diversity/cleaned-data/allInsects\_totsample.txt", sep="")  
  
taxonomy\_Insecta <- read.delim("H:/Documents/Insektmobilen/Analysis/InsectMobile\_Diversity/cleaned-data/DK\_taxonomy\_Insecta.txt")  
  
allInsects <- allInsects\_totsample  
asvs <- allInsects\_totasvs

## Prepare data max land cover

How many species are there in the samples?

envvar <- c("Forest\_1000", "Agriculture\_1000", "Urban\_1000")  
site\_type <- allInsects %>% filter(maxLand\_use %in% envvar) %>% select(SampleID, maxLand\_use)  
keep <- site\_type$SampleID  
otus <- subset(asvs, select=keep)  
  
pa <- decostand(otus, method = "pa")  
tpa <- t(pa)  
sppr <- specnumber(tpa)

Analysis of variance

sppr\_aov <- aov(sppr ~ maxLand\_use, data = site\_type)  
summary(sppr\_aov)

## Df Sum Sq Mean Sq F value Pr(>F)   
## maxLand\_use 2 146538 73269 16.48 1.42e-07 \*\*\*  
## Residuals 357 1586752 4445   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

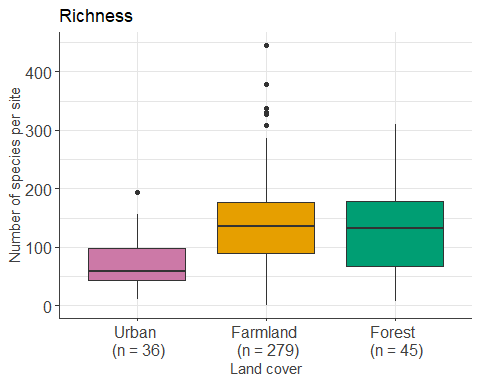
sppr\_df <- sppr %>%   
 enframe() %>%   
 full\_join(site\_type, by = c("name" = "SampleID"))  
  
sppr\_df <- sppr\_df %>% mutate(  
 maxLand\_use = fct\_relevel(  
 maxLand\_use,  
 "Urban\_1000",  
 "Agriculture\_1000",  
 "Forest\_1000"))   
  
table(sppr\_df$maxLand\_use)

##   
## Urban\_1000 Agriculture\_1000 Forest\_1000   
## 36 279 45

## Including Plots

Box-plots of richness

landuseCols <- c("#CC79A7", "#E69F00", "#D55E00", "#56B4E9", "#009E73", "darkgrey")   
  
plot\_sppr <- ggplot(sppr\_df, aes(x = maxLand\_use, y = value, fill = maxLand\_use)) +  
 geom\_boxplot() +  
 scale\_fill\_manual(values = landuseCols[c(1,2,5)]) +  
 scale\_x\_discrete(labels = c("Urban \n (n = 36)", "Farmland \n (n = 279)", "Forest \n (n = 45)")) +  
 theme(legend.position = "none",  
 plot.background = element\_rect("white"),  
 panel.background = element\_rect("white"),  
 panel.grid = element\_line("grey90"),  
 axis.line = element\_line("gray25"),  
 axis.text = element\_text(size = 12, color = "gray25"),  
 axis.title = element\_text(color = "gray25"),  
 legend.text = element\_text(size = 12)) +   
 labs(x = "Land cover",  
 y = "Number of species per site",  
 title = "Richness")  
plot\_sppr



## Land cover >=60% at the 1000 m buffer

Based on Lauren’s script

met <- allInsects  
met$hab60 = 'Mix'  
met$hab60[met$Agriculture\_1000>=.6]<-'Agriculture60'  
met$hab60[met$Forest\_1000>=.6]<-'Forest60'  
met$hab60[met$Urban\_1000>=.6]<-'Urban60'  
  
pa <- decostand(asvs, method = "pa")  
tpa <- t(pa)  
sppr <- specnumber(tpa)  
  
site\_type <- met %>% select(SampleID, hab60)  
  
sppr\_aov <- aov(sppr ~ hab60, data = site\_type)  
summary(sppr\_aov)

## Df Sum Sq Mean Sq F value Pr(>F)   
## hab60 3 111197 37066 8.137 2.95e-05 \*\*\*  
## Residuals 360 1639862 4555   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

sppr\_df <- sppr %>%   
 enframe() %>%   
 full\_join(site\_type, by = c("name" = "SampleID"))  
  
sppr\_df <- sppr\_df %>% mutate(  
 hab60 = fct\_relevel(  
 hab60,  
 "Urban60",  
 "Agriculture60",  
 "Forest60",  
 "Mix"))   
  
table(sppr\_df$hab60)

##   
## Urban60 Agriculture60 Forest60 Mix   
## 10 182 6 166

## Including Plots

Box-plots of richness

plot\_sppr\_lauren <- ggplot(sppr\_df, aes(x = hab60, y = value, fill = hab60)) +  
 geom\_boxplot() +  
 scale\_fill\_manual(values = landuseCols[c(1,2,5,6)]) +  
 scale\_x\_discrete(labels = c("Urban \n (n = 10)", "Farmland \n (n = 182)", "Forest \n (n = 6)", "Mix \n (n = 166)")) +  
 theme(legend.position = "none",  
 plot.background = element\_rect("white"),  
 panel.background = element\_rect("white"),  
 panel.grid = element\_line("grey90"),  
 axis.line = element\_line("gray25"),  
 axis.text = element\_text(size = 12, color = "gray25"),  
 axis.title = element\_text(color = "gray25"),  
 legend.text = element\_text(size = 12)) +   
 labs(x = "Land cover",  
 y = "Number of species per site",  
 title = "Richness")  
plot\_sppr\_lauren

