MST marker bubble plots

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Prevalence of MST markers in Ecuadorian household samples

Load libraries

```
library(vegan)
library(reshape2)
library(ggpubr)
library(ggthemes)
library(ggplot2)
library(magrittr)
library(reshape2)
library(tidyr)
library(dplyr)
library(tibble)
library(janitor)
library(kableExtra)
```

Clear environment

```
rm(list = ls())
```

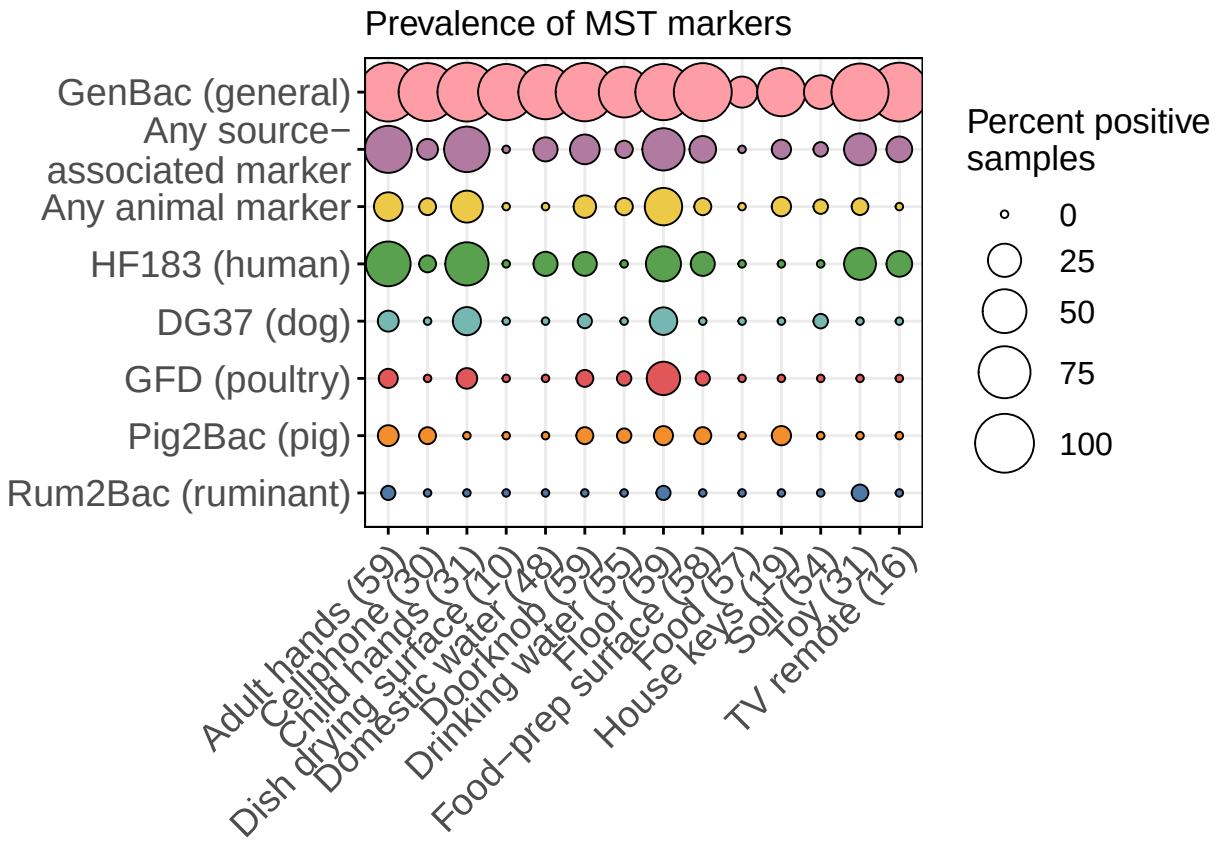
Import data

```
prev<-read.csv("prevalence_final_dataset.csv")
data<-read.csv("Phase II 09022022.csv")
```

Bubble plot

```
#format data
counts<-prev %>%
  select(-matches("Number"))%>%
  select(-c("Site", "Household", "Sample_Code"))%>%
  melt(id.vars= c("Sample_Type"))%>%
  group_by(Sample_Type, variable)%>%
  summarize(cnt=n())

sums<- prev %>%
  select(-matches("Number"))%>%
  select(-c("Site", "Sample_Code", "Household"))%>%
  melt(id.vars= c("Sample_Type"))%>%
  group_by(Sample_Type, variable)%>%
```

```
  summarise(across(value, sum))

prev_sampletype<-data.frame(Sample_Type=counts$Sample_Type,
                            Assay=counts$variable,
                            Total_Samples=counts$cnt,
                            Total_Pos=sums$value,
                            Percent_Pos=sums$value/counts$cnt*100)

prev_sampletype_balloon<-prev_sampletype %>%
  subset(Assay != "Human_positive" & Assay != "Any_positive")

#plot
prev_sampletype_balloon$Assay <- factor(prev_sampletype_balloon$Assay, levels = c("Rum2Bac", "Pig2Bac",

labels<-c("Rum2Bac (ruminant)", "Pig2Bac (pig)", "GFD (poultry)", "DG37 (dog)", "HF183 (human)", "Any a

a<-ggballoonplot(prev_sampletype_balloon,
             x="Sample_Type",
             y="Assay",
             fill="Assay",
             size="Percent_Pos",
             ggtheme=theme_minimal())+
  scale_fill_tableau()+
  scale_y_discrete(labels=labels)+
  ggtitle("Prevalence of MST markers")+
  guides(fill = "none",
         size=guide_legend(title="Percent positive\nsamples"))+
  theme(axis.text.y=element_text(size=14),
        axis.text.x=element_text(size=14),
        legend.background=element_rect(color=NA),
        legend.text=element_text(size=12),
        legend.title=element_text(size=13),
        panel.border=element_rect(color="black", fill=NA))


  a
```

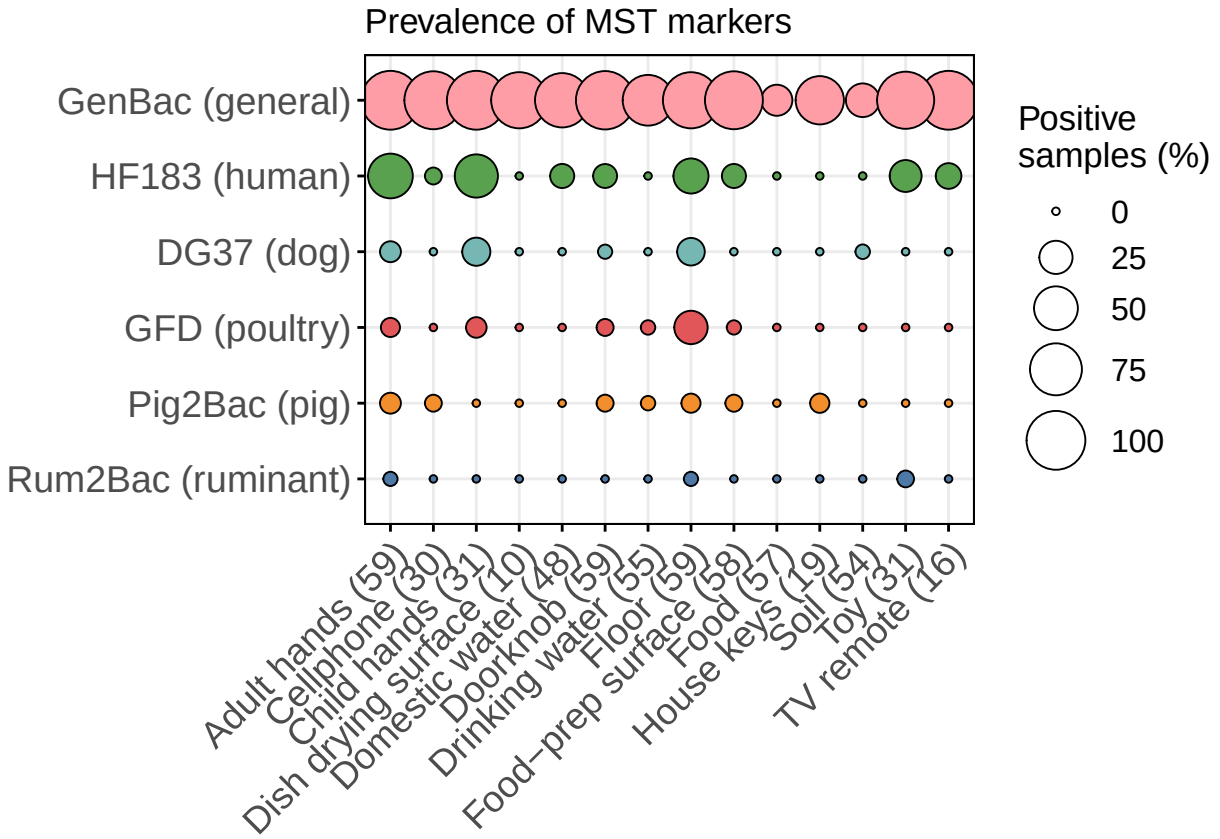


Bubble plot without any source and any animal

```
#format data
counts<-prev %>%
  select(-matches("Number"))%>%
  select(-c("Site", "Household", "Sample_Code"))%>%
  melt(id.vars= c("Sample_Type"))%>%
  group_by(Sample_Type, variable)%>%
  summarize(cnt=n())

sums<- prev %>%
  select(-matches("Number"))%>%
  select(-c("Site", "Sample_Code", "Household"))%>%
  melt(id.vars= c("Sample_Type"))%>%
  group_by(Sample_Type, variable)%>%
  summarise(across(value, sum))

prev_sampletype<-data.frame(Sample_Type=counts$Sample_Type,
                            Assay=counts$variable,
                            Total_Samples=counts$cnt,
                            Total_Pos=sums$value,
                            Percent_Pos=sums$value/counts$cnt*100)

prev_sampletype_balloon<-prev_sampletype %>%
  subset(Assay != "Human_positive" & Assay != "Any_positive" & Assay != "Any_animal_pos" & Assay != "Any
```

```r
#kbl(prev_sampletype_balloon)%>%
  #kable_styling(latex_options="scale_down", font_size=10)%>%
  #kable_minimal()

#plot
prev_sampletype_balloon$Assay <- factor(prev_sampletype_balloon$Assay, levels = c("Rum2Bac", "Pig2Bac",

labels<-c("Rum2Bac (ruminant)", "Pig2Bac (pig)", "GFD (poultry)", "DG37 (dog)", "HF183 (human)", "GenBa


cols <- c("GenBac"="#FF9DA7", "HF183"="#59A14F", "DG37"="#76B7B4", "GFD"="#E15759", "Pig2Bac"="#F28E2B"

b<-ggballoonplot(prev_sampletype_balloon,
             x="Sample_Type",
             y="Assay",
             fill="Assay",
             size="Percent_Pos",
             ggtheme=theme_minimal())+
  scale_fill_manual(values=cols, labels=scales::percent)+
  scale_y_discrete(labels=labels)+
  #scale_x_discrete(labels=labels2)+
  ggtitle("Prevalence of MST markers")+
  guides(fill = "none",
         size=guide_legend(title="Positive\nsamples (%)"))+
  theme(axis.text.y=element_text(size=14),
        axis.text.x=element_text(size=14),
        legend.background=element_rect(color=NA),
        legend.text=element_text(size=12),
        legend.title=element_text(size=13),
        panel.border=element_rect(color="black", fill=NA))


  b
```

GenBac	HF183	DG37	GFD	Pig2Bac	Rum2Bac
77.98635	15.35836	3.412969	4.095563	2.389079	0.5119454



Overall prevalence by assay

```
perc_all<-data.frame(GenBac=(sum(prev$GenBac))/586*100,
                     HF183=(sum(prev$HF183))/586*100,
                     DG37=(sum(prev$DG37))/586*100,
                     GFD=(sum(prev$GFD))/586*100,
                     Pig2Bac=(sum(prev$Pig2Bac))/586*100,
                     Rum2Bac=(sum(prev$Rum2Bac))/586*100)

kbl(perc_all)%>%
  kable_styling(latex_options="scale_down", font_size=12)%>%
  kable_minimal()
```

Number of detections by sample type and marker

```
prev_melt<-prev %>%
  melt(id.vars=c("Sample_Code", "Sample_Type", "Site", "Household"), variable.name=("measurement"), valu

detections<-prev%>%
  select(-c(11:17))%>%
  melt(id.vars=c("Sample_Code", "Sample_Type", "Site", "Household"), variable.name=("measurement"), valu
```

```
  group_by(Sample_Type, measurement)%>%
  summarize(count=sum(value, na.rm=TRUE))

detections_host<-prev%>%
  select(-c(GenBac, 11:17))%>%
  melt(id.vars=c("Sample_Code", "Sample_Type", "Site", "Household"), variable.name=("measurement"), valu
  group_by(Sample_Type, measurement)%>%
  summarize(count=sum(value, na.rm=TRUE))

kbl(detections_host)%>%
  kable_styling(latex_options="scale_down")%>%
  kable_minimal()
```

Sample_Type	measurement	count
Adult hands (59)	HF183	31
Adult hands (59)	Rum2Bac	1
Adult hands (59)	Pig2Bac	4
Adult hands (59)	DG37	4
Adult hands (59)	GFD	3
Cellphone (30)	HF183	1
Cellphone (30)	Rum2Bac	0
Cellphone (30)	Pig2Bac	1
Cellphone (30)	DG37	0
Cellphone (30)	GFD	0
Child hands (31)	HF183	15
Child hands (31)	Rum2Bac	0
Child hands (31)	Pig2Bac	0
Child hands (31)	DG37	5
Child hands (31)	GFD	2
Dish drying surface (10)	HF183	0
Dish drying surface (10)	Rum2Bac	0
Dish drying surface (10)	Pig2Bac	0
Dish drying surface (10)	DG37	0
Dish drying surface (10)	GFD	0
Domestic water (48)	HF183	5
Domestic water (48)	Rum2Bac	0
Domestic water (48)	Pig2Bac	0
Domestic water (48)	DG37	0
Domestic water (48)	GFD	0
Doorknob (59)	HF183	6
Doorknob (59)	Rum2Bac	0