Historical tick data for Europe

Merlin Aurélie
Laurence Vial
CIRAD, UMR CMAEE

Species selection

- *Dermacentor marginatus*
- *Dermacentor reticulatus*
- *Hyalomma marginatum marginatum*
- *Rhipicephalus sanguineus*

→ **Human diseases vectors** : rickettsial diseases, tularemia and Crimean-Congo haemorrhagic fever

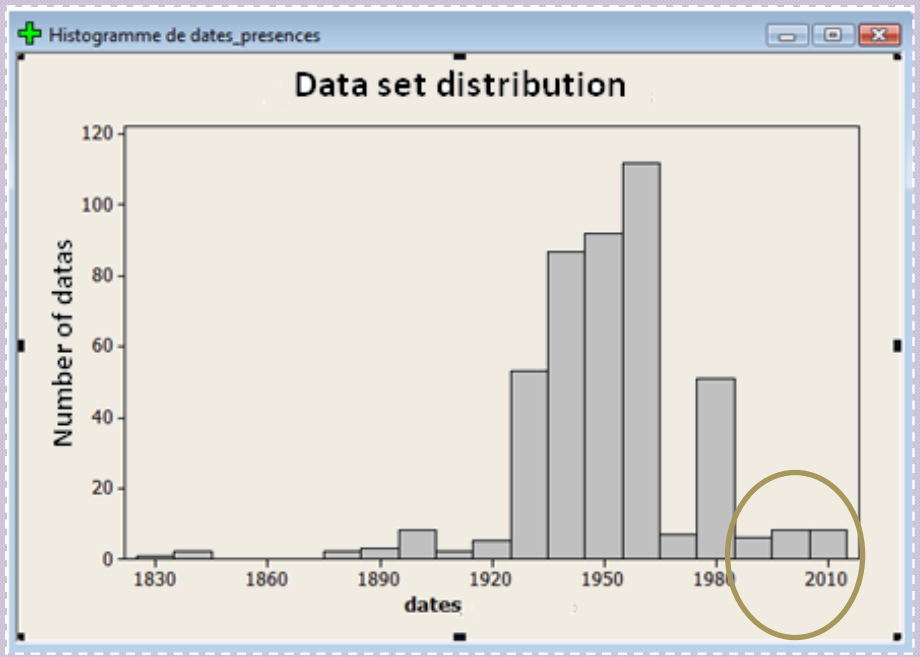
Data collection

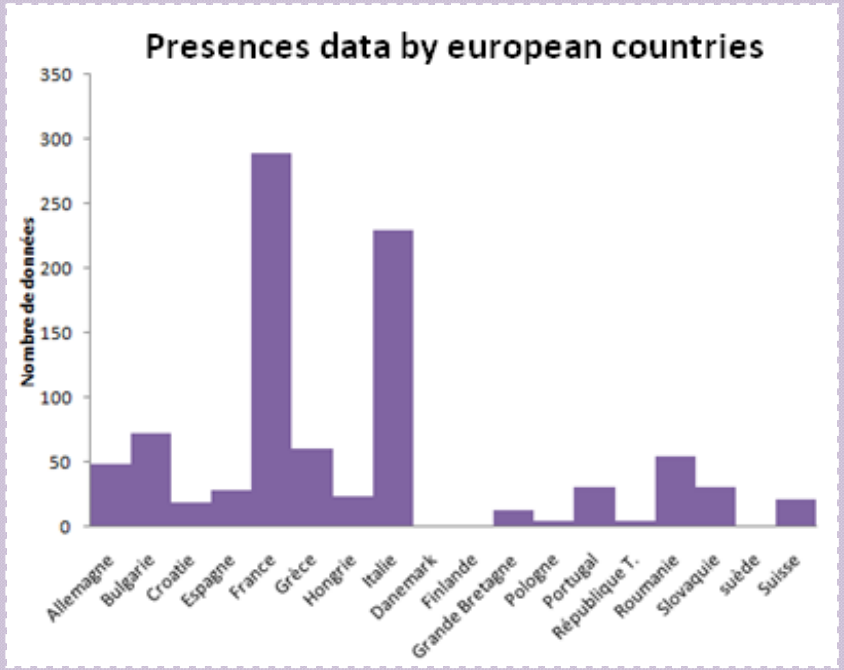
Sources :

- P.C. Morel acarologist book
- Articles and scientific publications
- Database creation: species, location, GPS coordinates, host, source ...

Data description

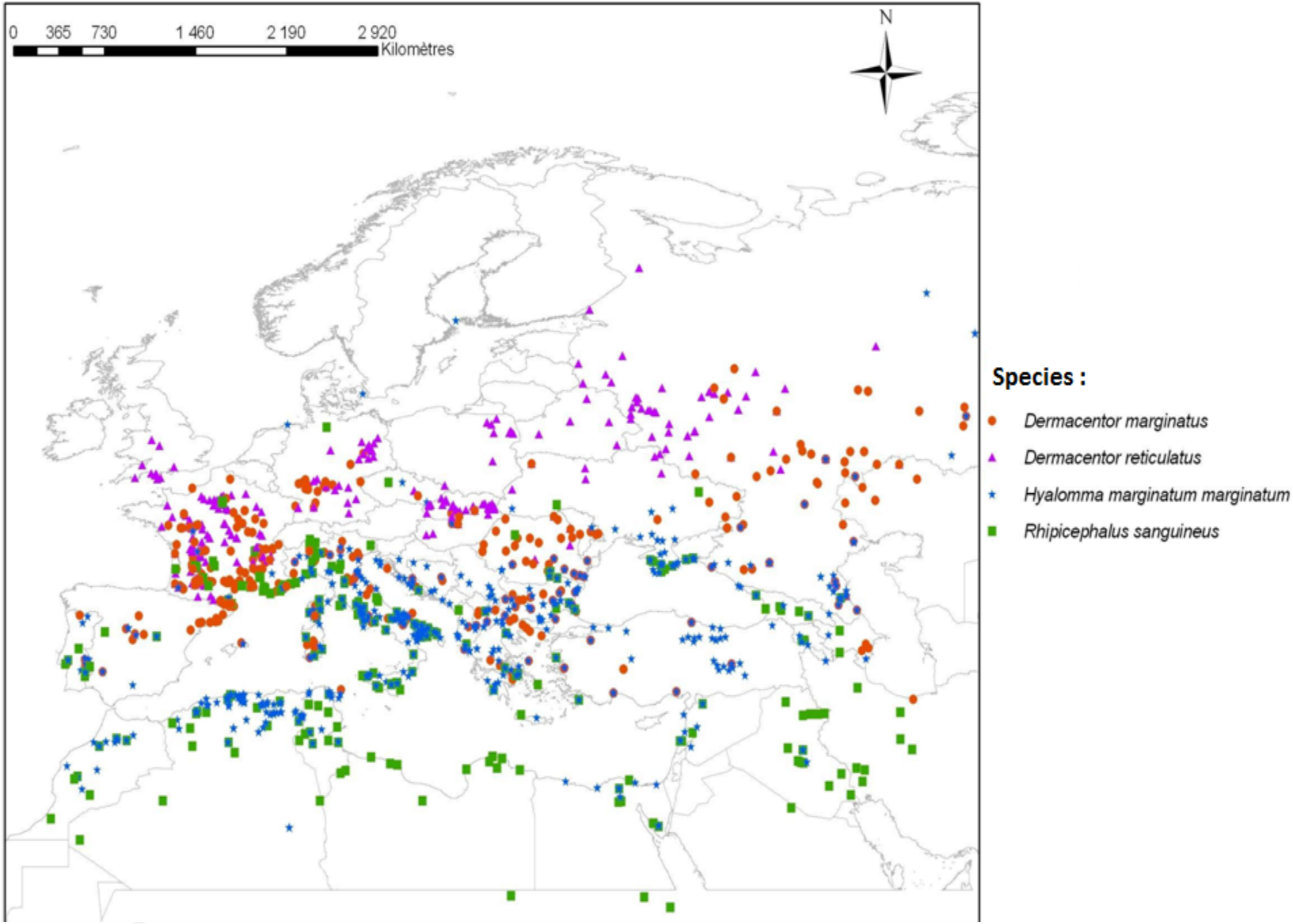
1426 data





→ Lack of recent data

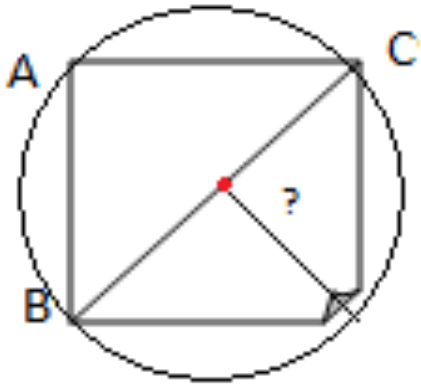
Geographical repartition of 4 ticks species into 1826 and 2010



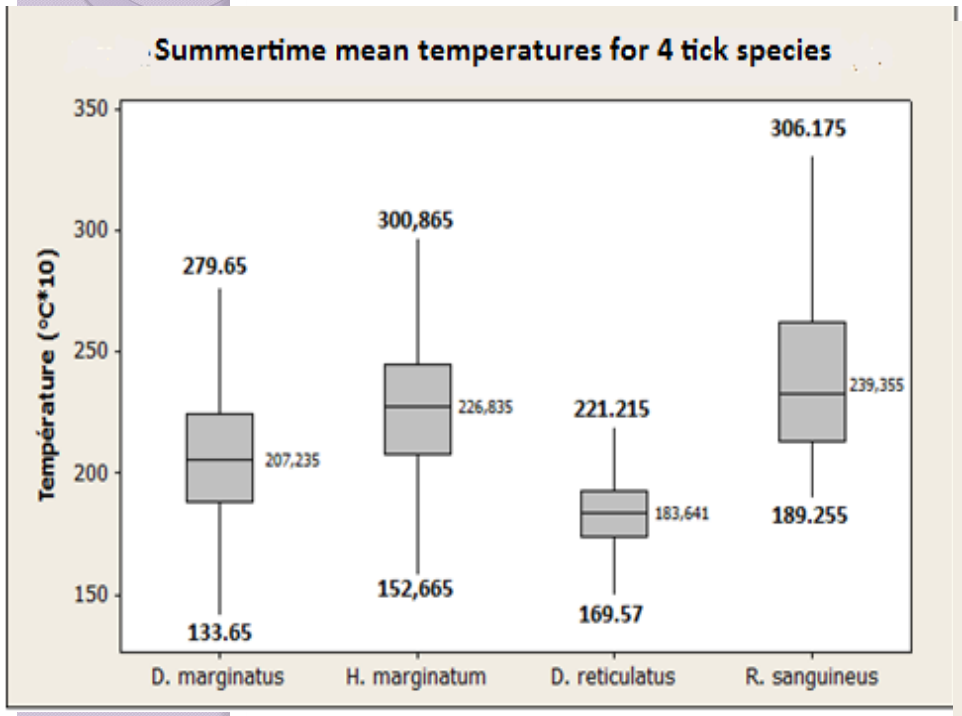
Correlation presence data with environmental data

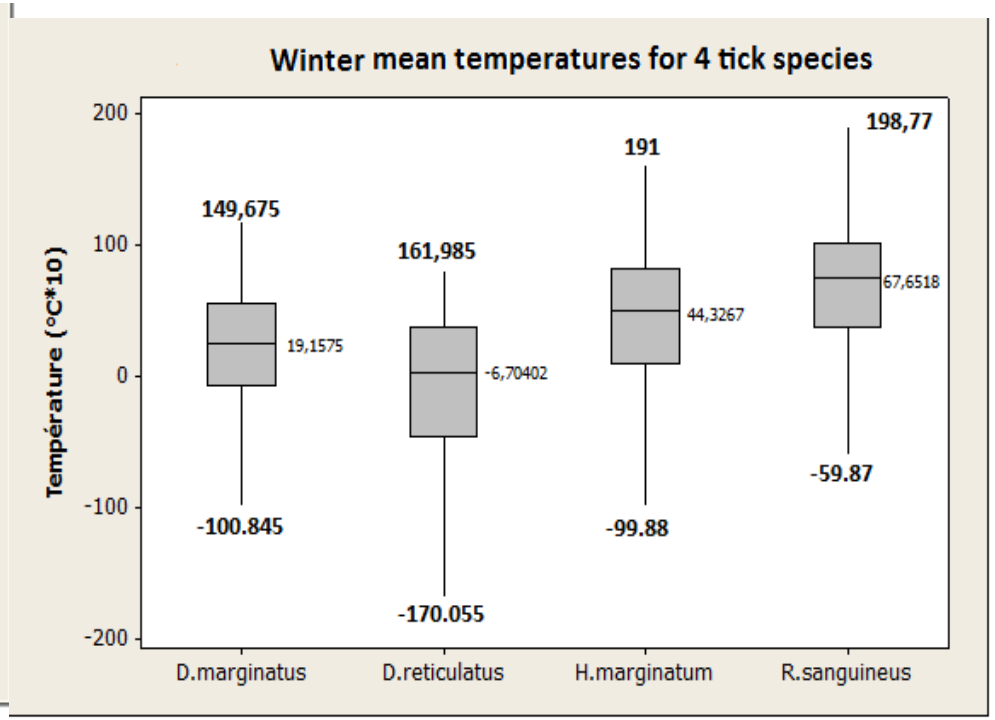
- Around each localities a **buffer area** was created to reduce the risk errors due to sampling's lake of precisions

- Radius of the circle : 35 km



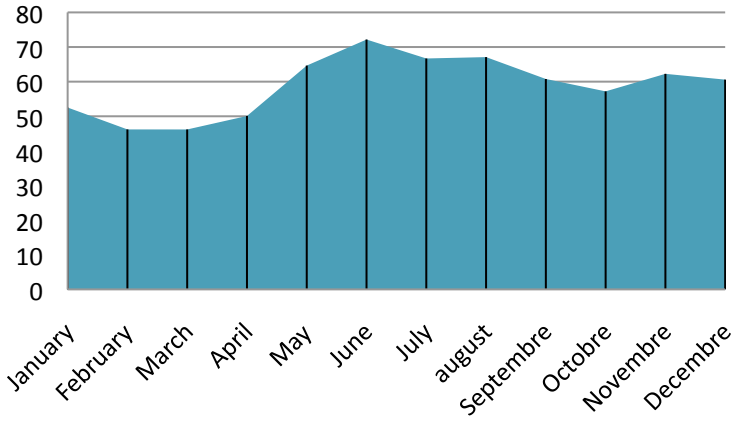
1) Temperature



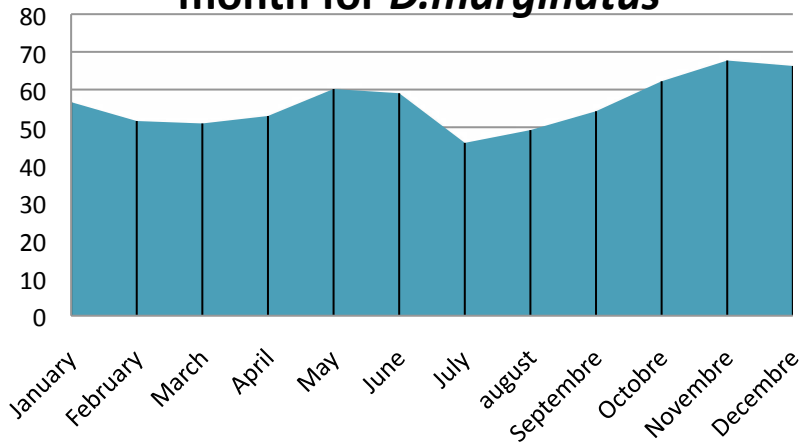


2) Precipitation

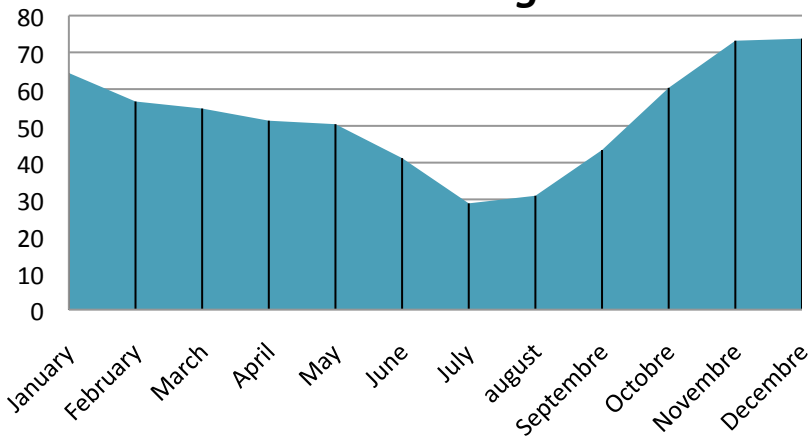
Means precipitation (mm) per month for *D.reticulatus*



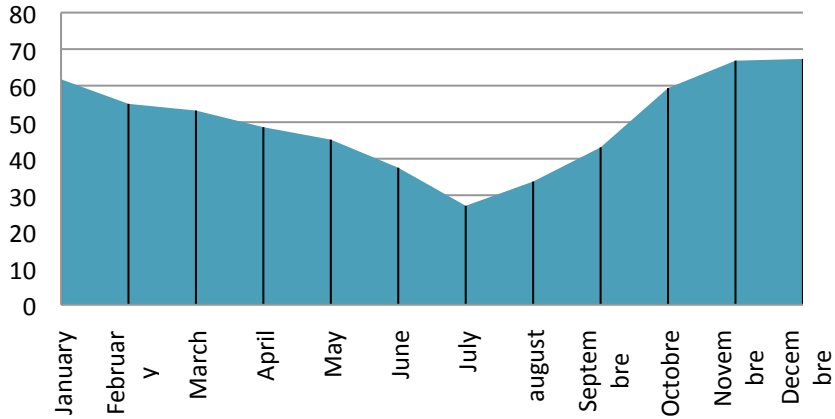
Means precipitation (mm) per month for *D.marginatus*



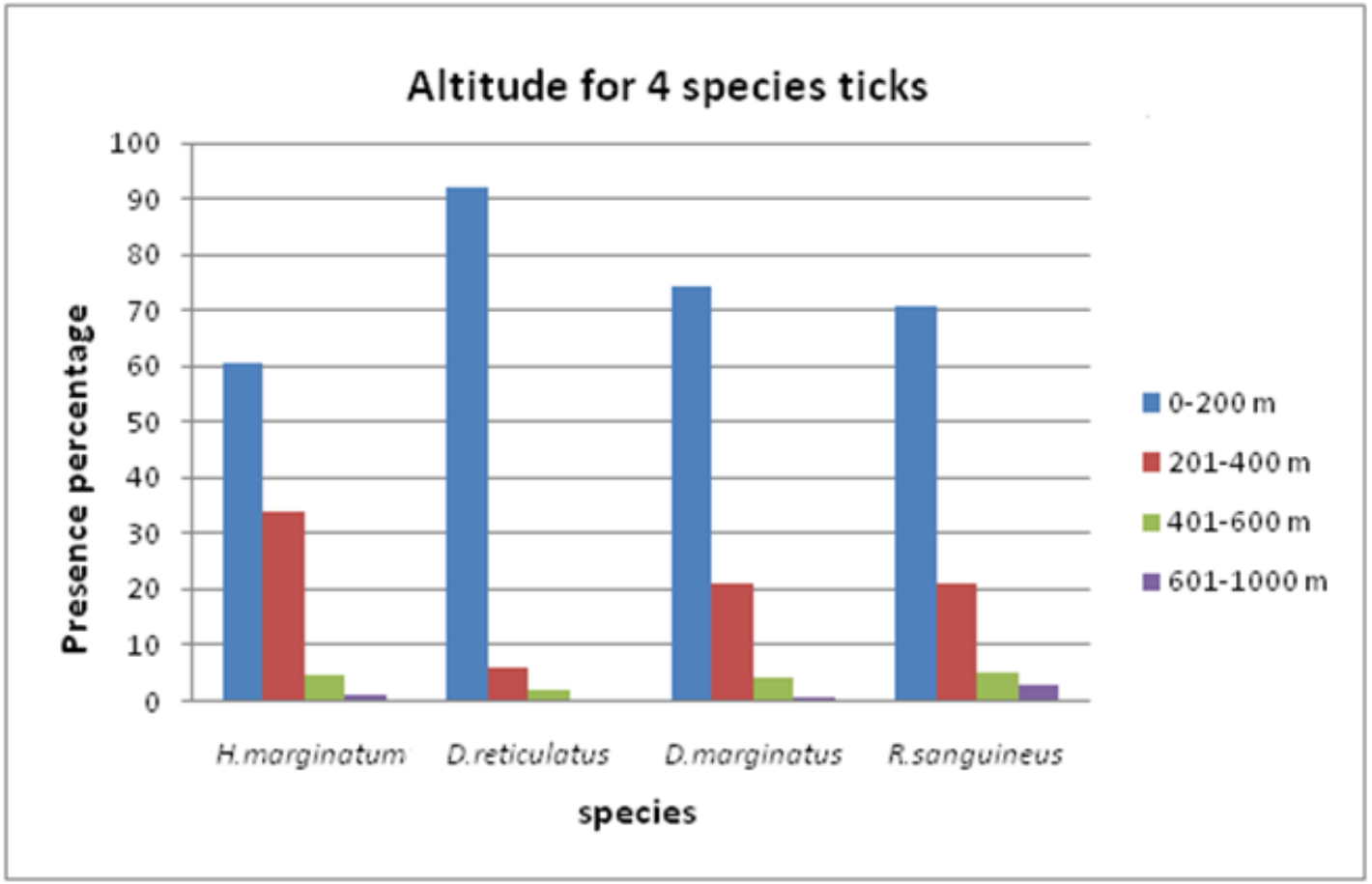
Means precipitation (mm) per month for *H.m.marginatum*



Means precipitation (mm) per month for *R.sanguineus*

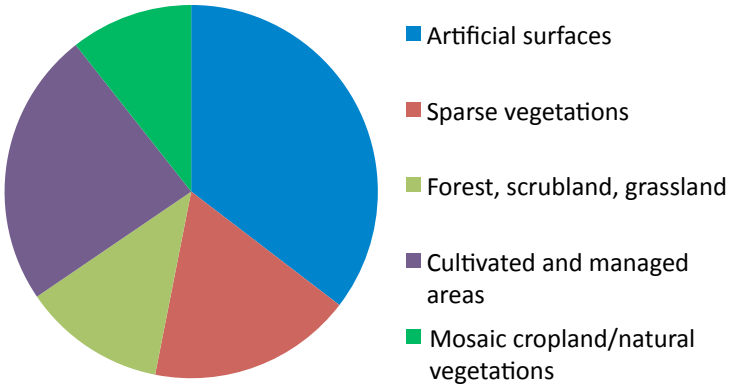


3) Altitude

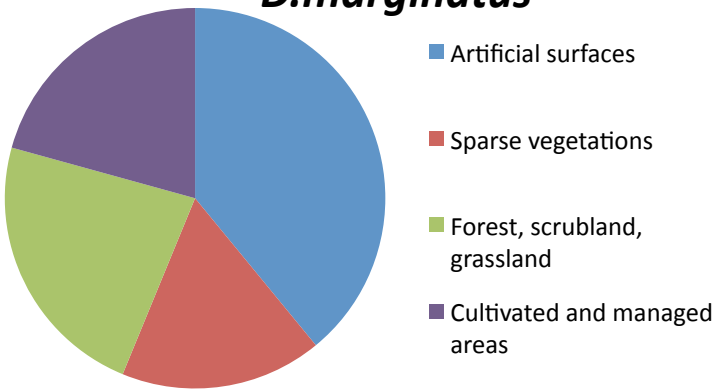

Altitude for 4 species ticks
Presence percentage
100
90
80
70
60
50
40
30
20
10
0
H.marginatum
D.reticulatus
D.marginatus
R.sanguineus
species
0-200 m
201-400 m
401-600 m
601-1000 m

4) Vegetation

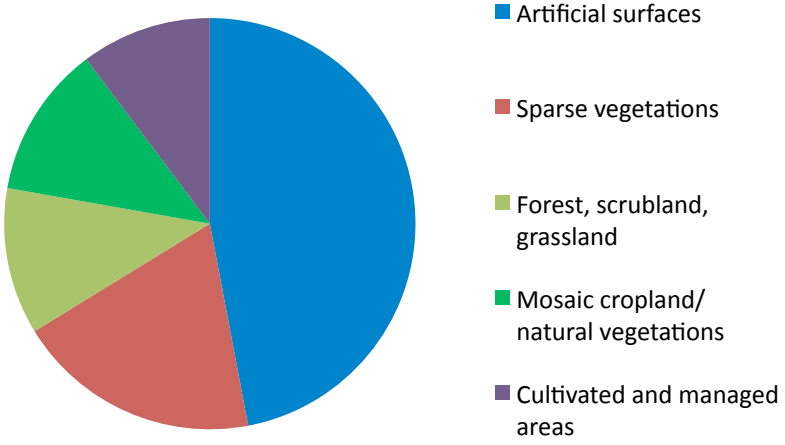
The main kind of vegetation for *D.reticulatus*



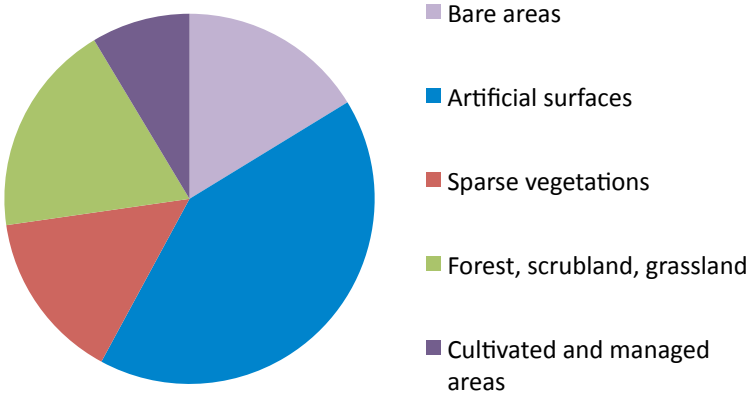
The main kind of vegetations for *D.marginatus*



The main kind of vegetations for *H.m.marginatum*



The main kind of vegetations for *R.sanguineus*



Interpretation

	D. marginatus	*D. reticulatus*	*H. m. marginatum*	*R. sanguineus*
Mean temperature (°C)		Sweet summers and cold winters	Hot and dry summers, sweet winters	Hot and dry summers, sweet winters
Warmer months	13 à 28	17 à 22	15 à 31	19 à 31
Coldest months	-11 à 15	-17 à 16	-10 à 19	-6 à 20
Mean precipitation (mm)	Irregularity , max. november, min summer	Irregularity, max. in june-july	Seasonality, Max.winter and min summer	Seasonality, max. winter and min. summer
Altitude (m)	Medium altitude	Low altitude	High altitude	Medium altitude
Vegetation	Cultivated areas, natural areas and artificial areas	Cultivated areas, natural areas and artificial areas	Cultivated areas, natural areas and artificial areas	Dry vegetation, cultivated areas, natural areas and artificial areas
Climate type	**Continental**	**Oceanic**	**Mediterranean**	**Mediterranean**

Perspectives

In order to deal with data gaps (non sampled areas and a few data for recent periods) :

- Complete the dataset of presence record, with targeted sampling if necessary

- Construction of a **statistical model** based on presence data to detect suitable habitats for each tick species