



Chemosensory transcriptomes of bloodsucking bugs, Chagas disease vectors

A. Marchant^{1,2}, F. Mougel^{1,2}, C. Almeida³, E. Jacquin-Joly⁴, J. Costa⁵, M. Harry^{1,2}

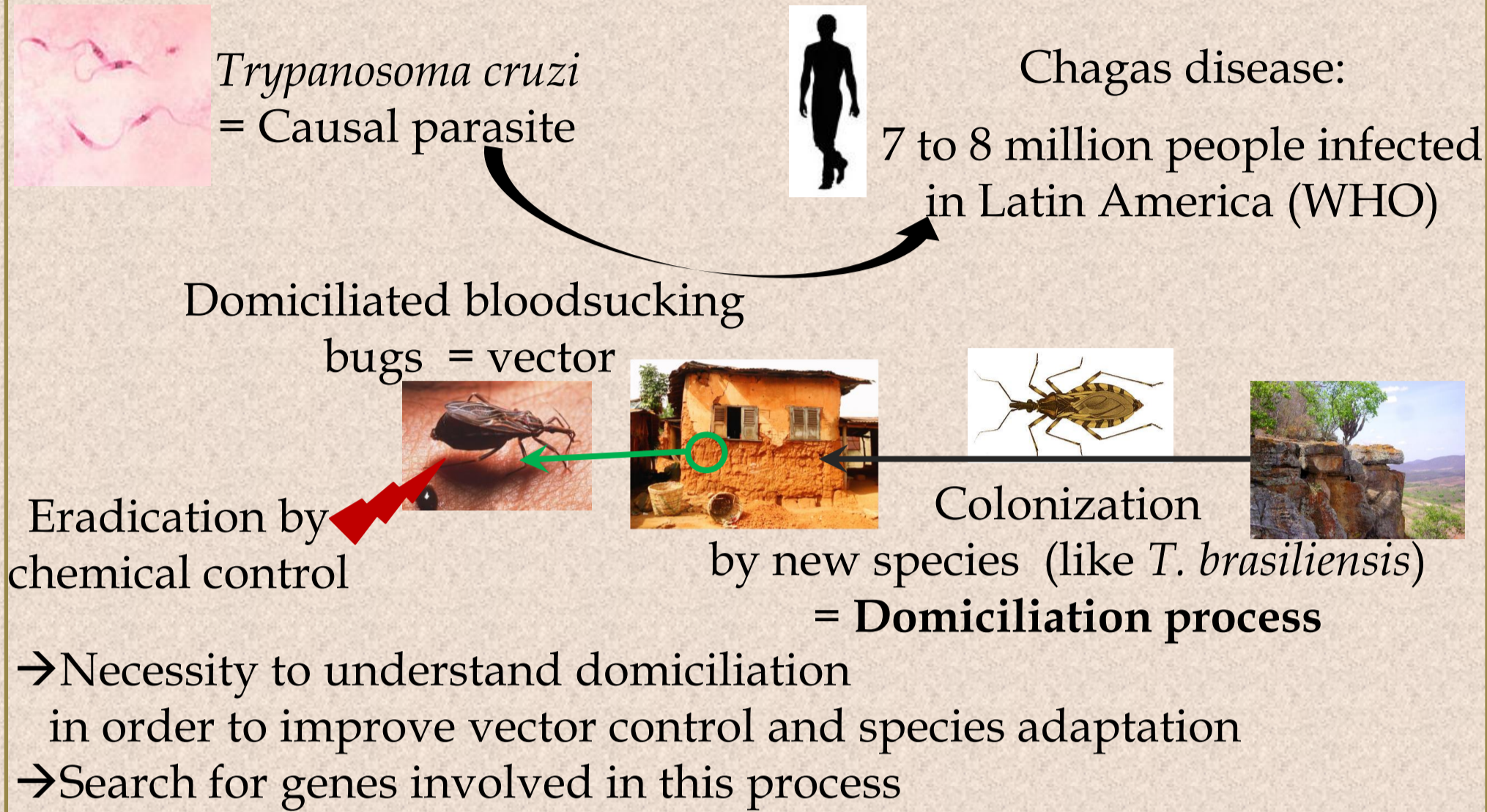
1: LEGS - CNRS : UPR9034 - IRD: UR072, Gif sur Yvette FRANCE - 2: UP Sud, Orsay FRANCE

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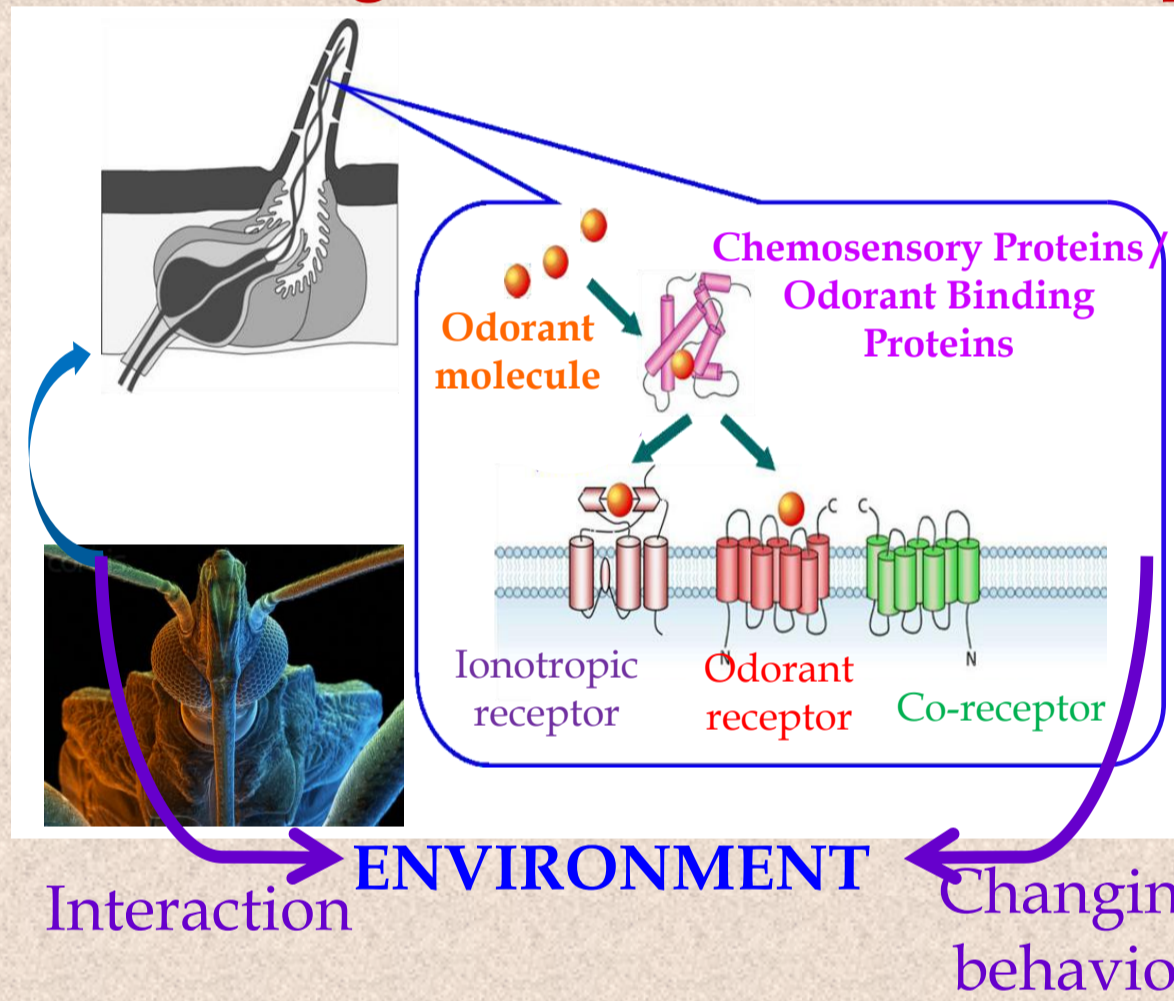
AIM → Search for genes implicated in the domiciliation process of *Triatoma brasiliensis* using differential gene expression analysis

Introduction:

Chagas disease vectors and domiciliation process



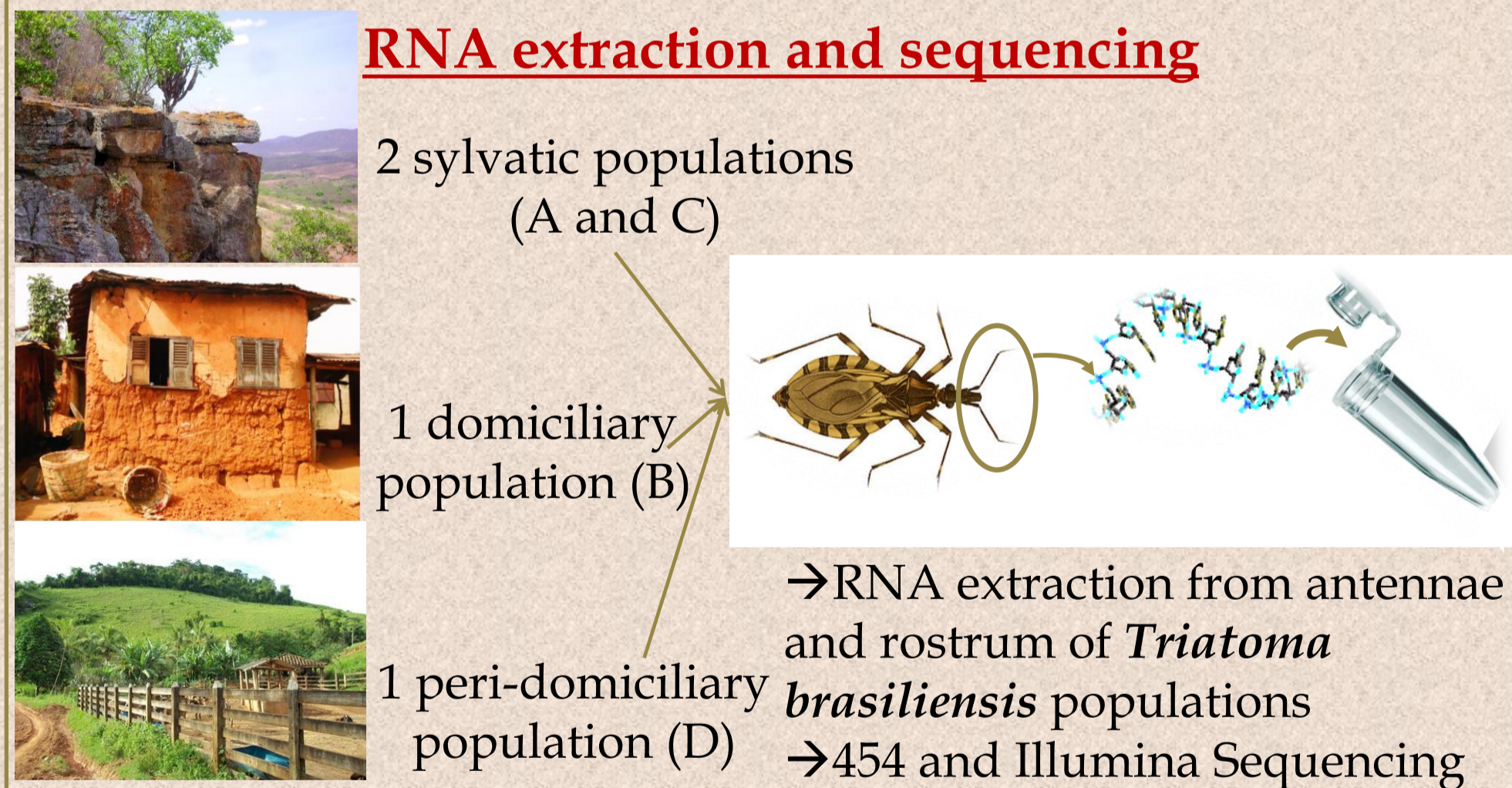
Chemosensory system = candidate genes for domiciliation process



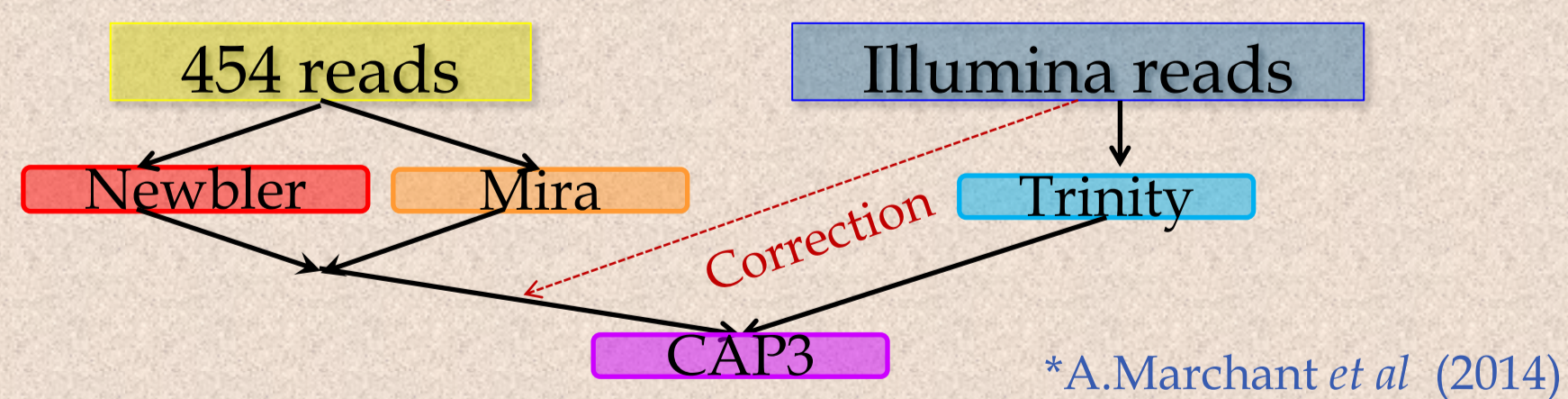
Bugs interact with their environment and behave thanks to their chemosensory system. It could play an important role in anthropogenic adaptation. Understanding the chemosensory system of Triatominae could shed light on the domiciliation process

Materials & Methods

RNA extraction and sequencing



De novo assembly of the *T. brasiliensis* reference transcriptome pooling all data



Differential expression analysis

- Mapping each sample on *T. brasiliensis* reference transcriptome with BWA
- Differential expression analysis with DESeq2 → comparison of environmental conditions
- Annotation of differentially expressed transcripts with blastx against swissprot database

Results

Reference transcriptome results

Contig number	N50	Length distribution		Completeness
		mean	total length	
42,293	1146 bp	1110 bp	46,952,869 bp	88,71 %

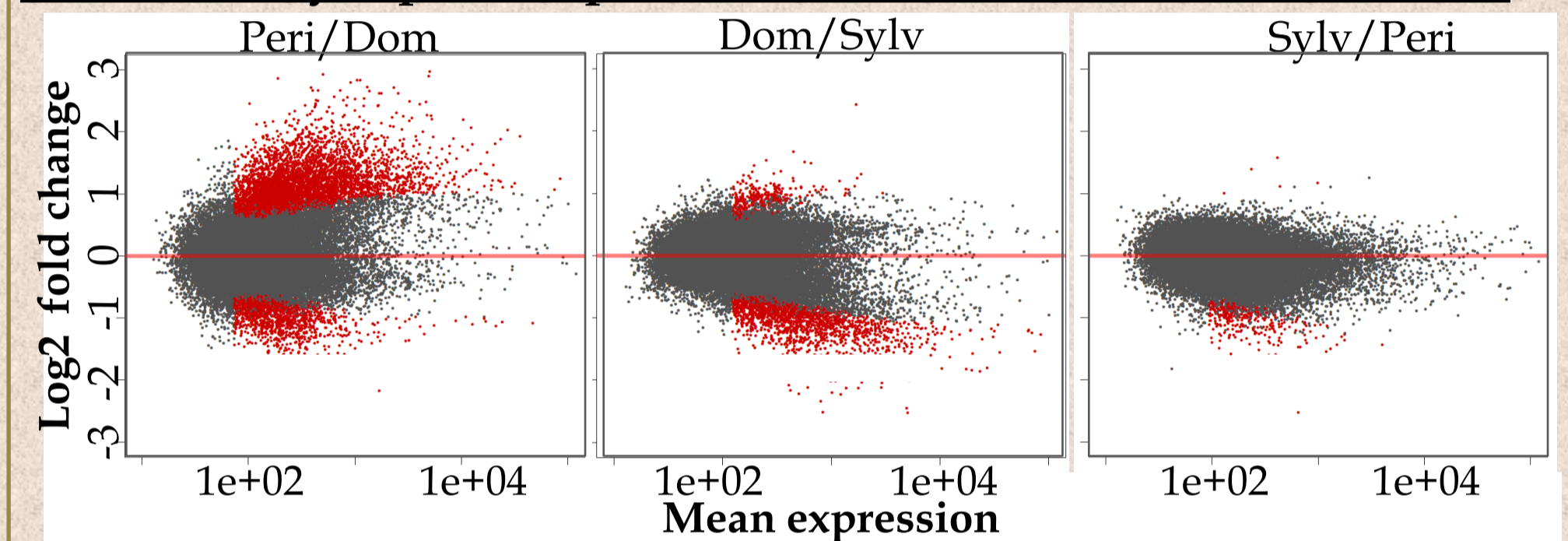
*A.Marchant et al (2014)

Differential expression analysis results

Number of differentially expressed genes between 3 environments (Padj < 0.05):

Dom/Sylv	Peri/Dom	Sylv/Peri
1219	4555	207

Differentially expressed profiles between different environments

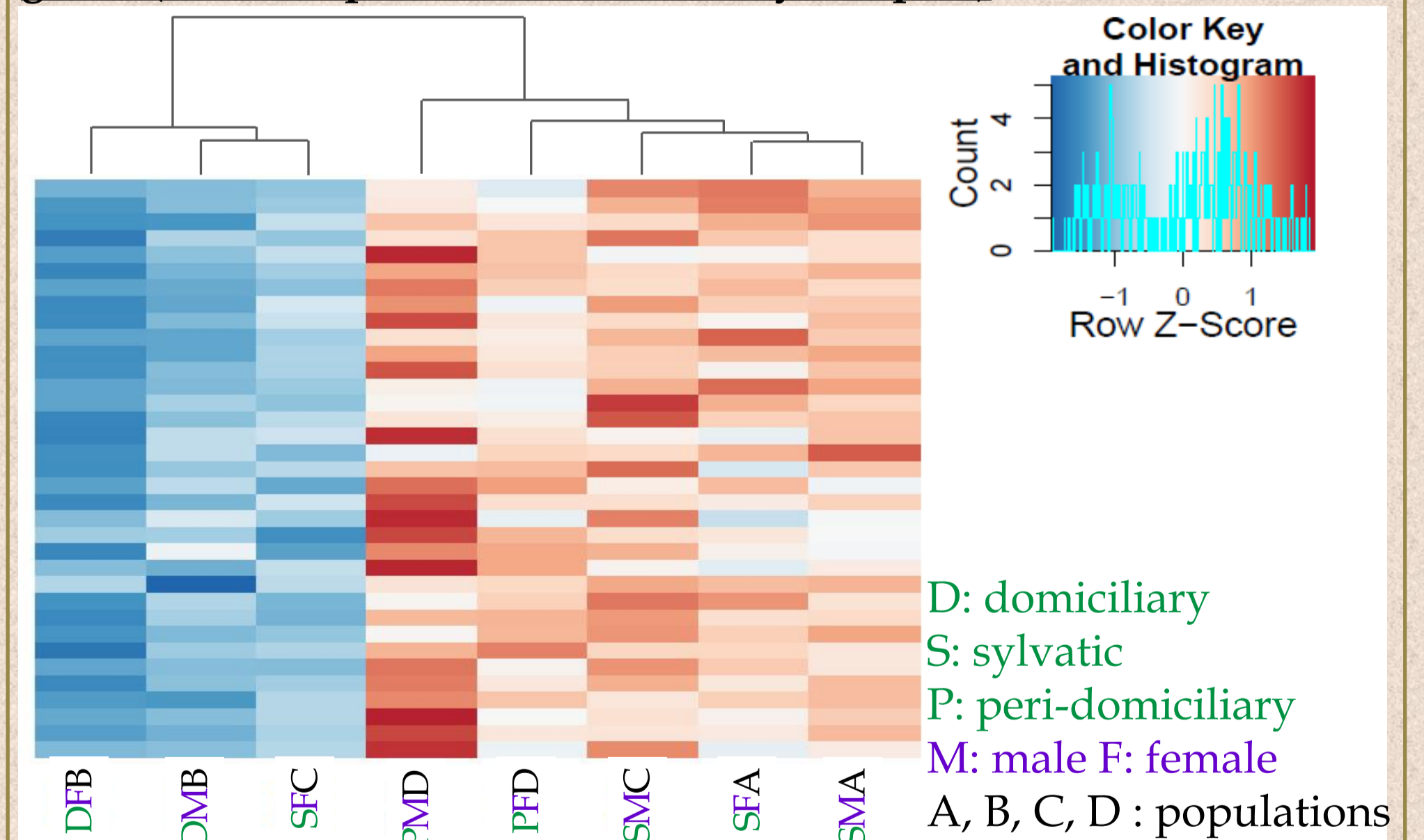


Log2 fold change: Attributable to a variable over the mean of normalized counts. Red points: genes differentially expressed (Padj < 0.05)

Among top 50 differentially expressed genes of environment comparisons, a majority of chemosensory genes:

- **Odorant-binding proteins:** transport odorant molecules to olfactory receptors in sensilla
- **Pheromone-binding proteins:** transport pheromones to olfactory receptors
- **Cytochrome P450:** have been proposed to act as odorant-degrading enzymes in several insect species
- **RNA-binding proteins:** participate in forming ribonucleoprotein complexes

Genes clustering based on differentially expressed OBP or P450 genes (under-expressed in domiciliary samples)



Conclusion

As expected, differences of expression are found in the chemosensory system between different environments. These results remain to be confirmed by qPCR.

Domiciliary samples present gene expression profiles which significantly differ from sylvatic and peridomiciliary populations, while sylvatic and peridomiciliary samples show few differences in expression profiles.

*A.Marchant et al. De novo transcriptome assembly for a non model species, the blood-sucking bug *Triatoma brasiliensis*, a vector of Chagas disease. Genetica, submitted