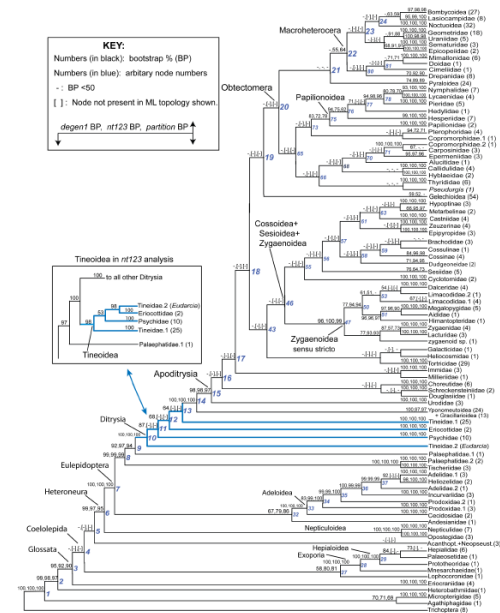
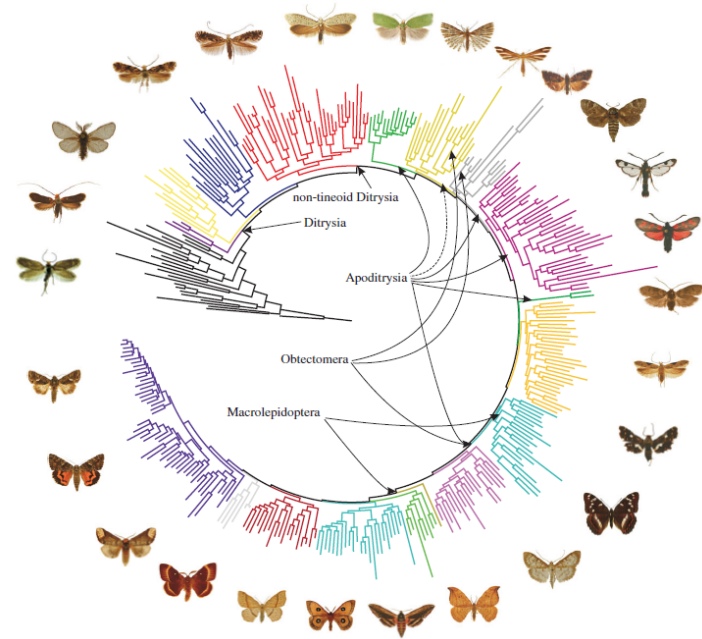


- Over 150 000 described species
- Probably between 300 000 and 500 000 species
- 2<sup>nd</sup> most diverse insect order (probably 4<sup>th</sup>)
- Best known insect group
- Phylogeny between different superfamilies recently studied
- Phylogeny within major part of families and superfamilies still not clear
- Diversification processes still not clear

# Phylogeny!

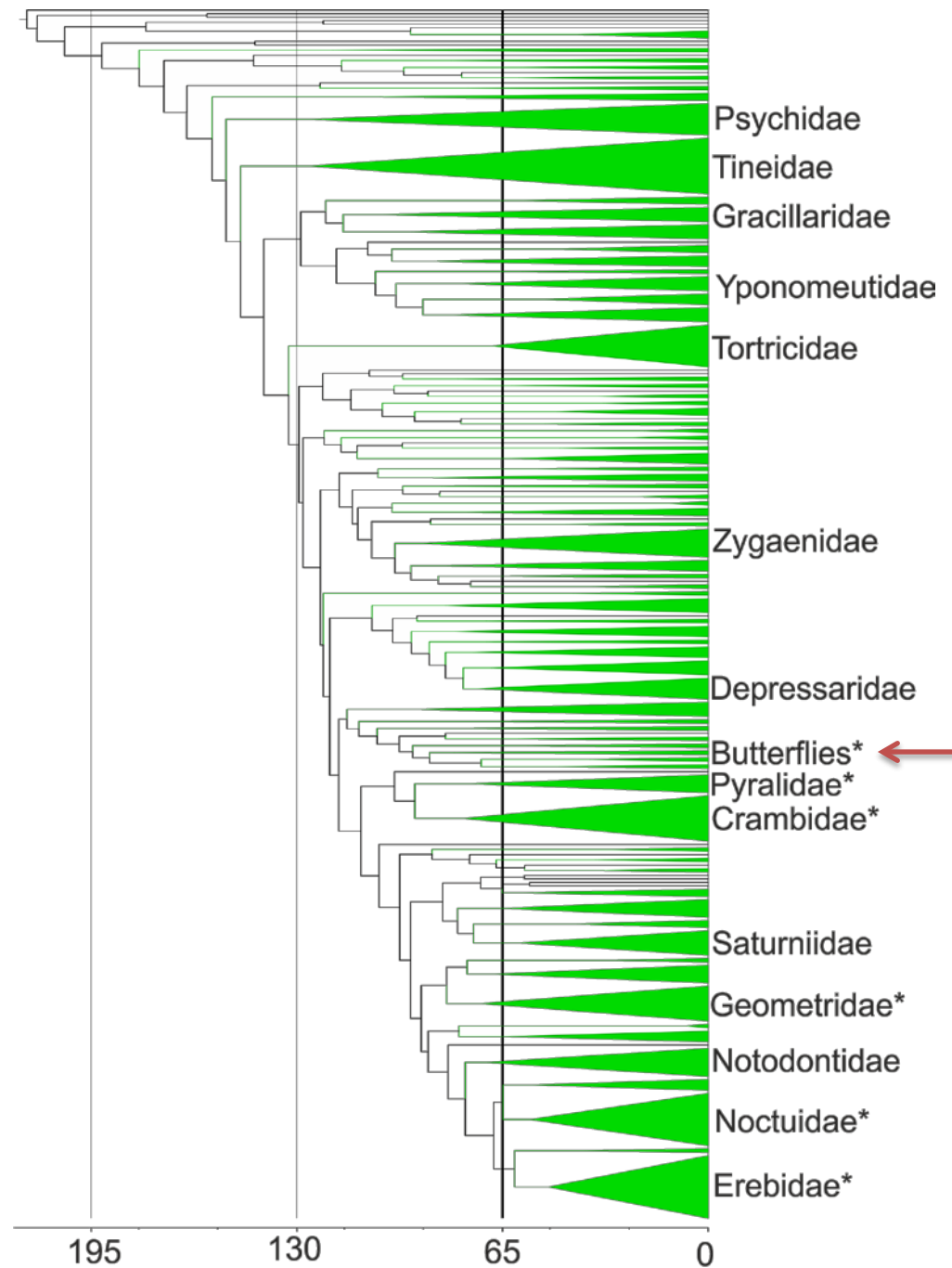
- Mutanen et al. 2012  
 (8 genes)
- Regier et al. 2013  
 (19 genes)



## Diversification through time!

Diversification times of  
 Lepidoptera's major lineages  
 (Wahlberg et al. 2013).

- Green triangles capture the earliest divergence within families.
- Width of triangles is proportional to number of taxa.





# My thesis....



## My thesis....

My thesis....

# Diversification dynamics of Lepidoptera over the past 200 million years

Project 1: Diversification  
dynamics of Geometridae  
moths

Project 2: Diversification  
dynamics of Erebidae  
moths: comparison to  
geometrids

Project 3: Diversification  
dynamics of .....???

Project 4: .....???



Project 1: Diversification  
dynamics of Geometridae  
moths

Project 1: Diversification dynamics of Geometridae moths

# Geometridae

## Project 1: Diversification dynamics of Geometridae moths

### Geometridae

- More than 23000 described species
- Earth measuring caterpillars!
- About 3 cm (10-50mm most of them)
- (Many pests)



## Project 1: Diversification dynamics of Geometridae moths

- To infer a comprehensive phylogeny of Geometridae
- To for the first time, get a good timescale for the family
- Infer diversification dynamics based on this and see if they relate to changes in the environment of millions of years
- Compare to patterns found in butterflies

## Project 1: Diversification dynamics of Geometridae moths

- So far 13 genes:

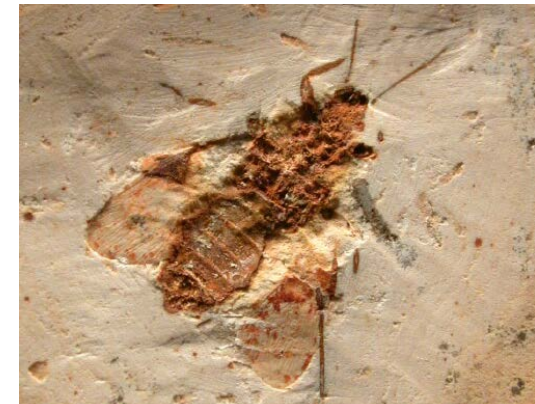
	ARGK	CA-ATPASE	CA2	CAD	COI-BEGIN	COI-END	CYCY	EF1A-BEGIN	EF1A-CENTER	EF1A-END	GAPDH	IDH	MDH	NEX9	RPS5	WINGLESS			
520 samples																			
	92	26	47	221	500	431	46	373	243	358	249	182	332	111	344	269	3824	4496	
%complete	18	5	9	43	96	83	9	72	47	69	48	35	64	21	66	52	46		
%left	82	95	91	58	4	17	91	28	53	31	52	65	36	79	34	48		54	

- Another 20 genes possible if necessary



## Project 1: Diversification dynamics of Geometridae moths

- Fossils (none of these are geometrids!)



Project 1: Diversification  
dynamics of Geometridae  
moths

Project 2: Diversification  
dynamics of Erebidae  
moths: comparison to  
geometrids

Project 3: Diversification  
dynamics of .....???

Project 4: .....???

Project 2: Diversification  
dynamics of Erebidae  
moths: comparison to  
geometrids



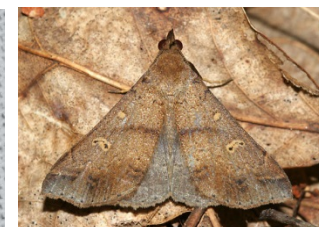
## Project 1: Diversification dynamics of Geometridae moths

# Erebidae

## Project 1: Diversification dynamics of Geometridae moths

### Erebidae

- More than 20000 described species
- Their phylogeny is a mess!
- One of the relatively biggest moths



## Project 2: Diversification dynamics of Erebidae moths: comparison to geometrids

Similar methods as in the first project, differences:

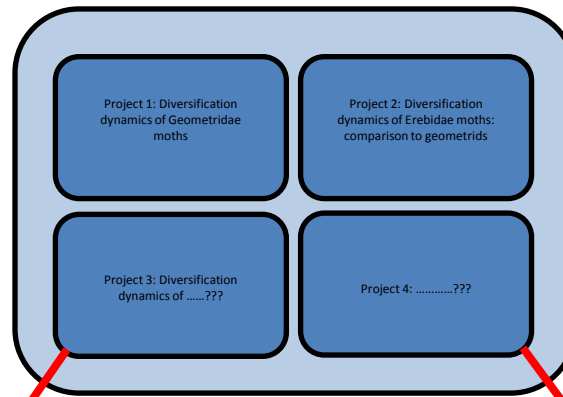
- Less gene sequences available
- More time
- A new postdoc will be helping to work on a potential NGS approach, if it doesn't work, more genes can be sequenced using PCR

Project 1: Diversification  
dynamics of Geometridae  
moths

Project 2: Diversification  
dynamics of Erebidae  
moths: comparison to  
geometrids

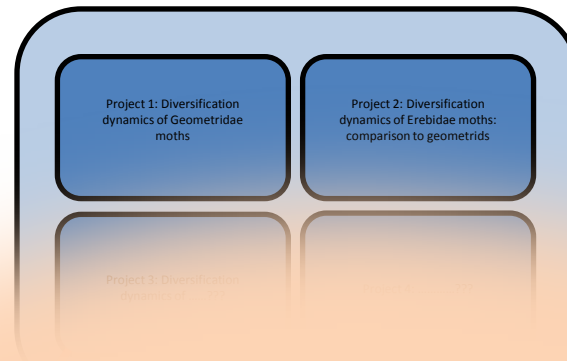
Project 3: Diversification  
dynamics of .....???

Project 4: .....???



Diversification dynamics of some more basal families maybe.....

Comparing the diversification dynamics of all groups obtained within Lepidoptera or maybe even study the entire group together



But it really depends on the  
 results of the two first  
 projects!

Diversification dynamics of  
 more basal families may

ersification  
 of all groups obtained  
 within Lepidoptera or maybe  
 even study the entire group  
 together

## Next steps

- January 2017 finishing lab work of project 1
- June 2017 finishing analyses of the data
- August 2017 Submit the first manuscript
- November 2017 finishing lab work of project 2
- April 2018 finishing analyses of the data
- June 2018 Submit the second manuscript
- .....

# Thank you for you attention