



# Co-occurrence of three *Aristolochia*-feeding papilionids (*Archon apollinus*, *Zerynthia polyxena* a *Zeryntiha cerisy*) in Thrace, Greece

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# Introduction

*Zerynthia polyxena*



*Zerynthia rumina*



*Zerynthia cerisy*



*Zerynthia cretica*



*Archon apollinus*



- Host plants – *Aristolochia* spp.

# What allows the coexistence?

difference in:

host plants?

habitat use?

phenology?

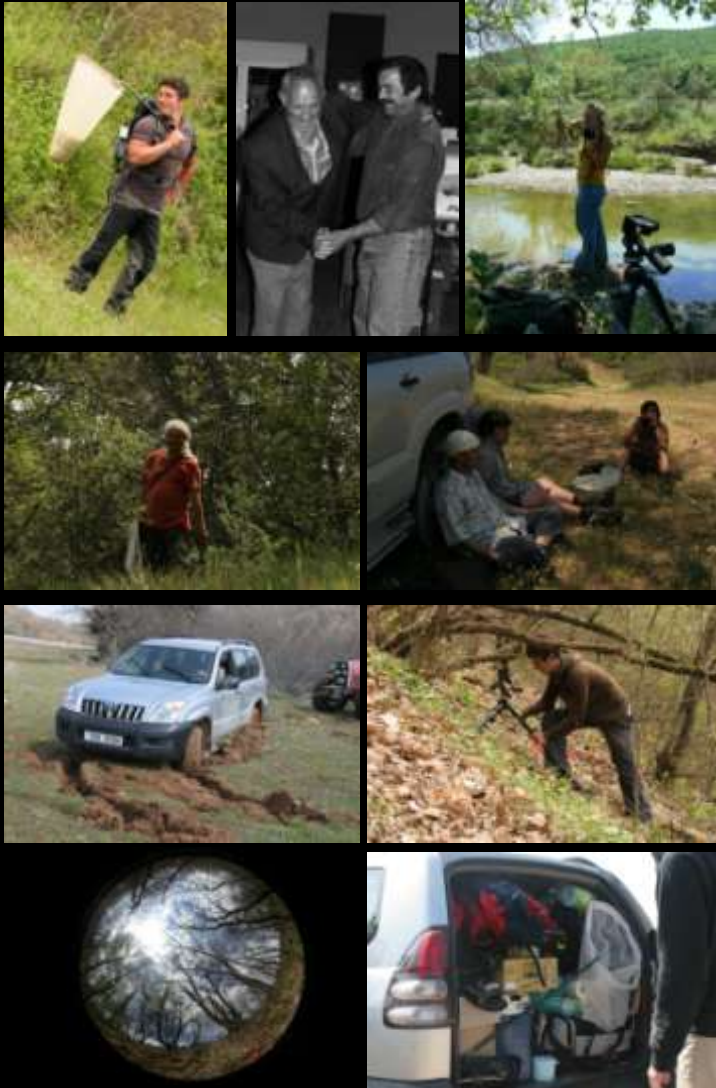
	February		March		April		May		June	
<i>A. apollinus</i>										
<i>Z. polyxena</i>										
<i>Z. cerisy</i>										





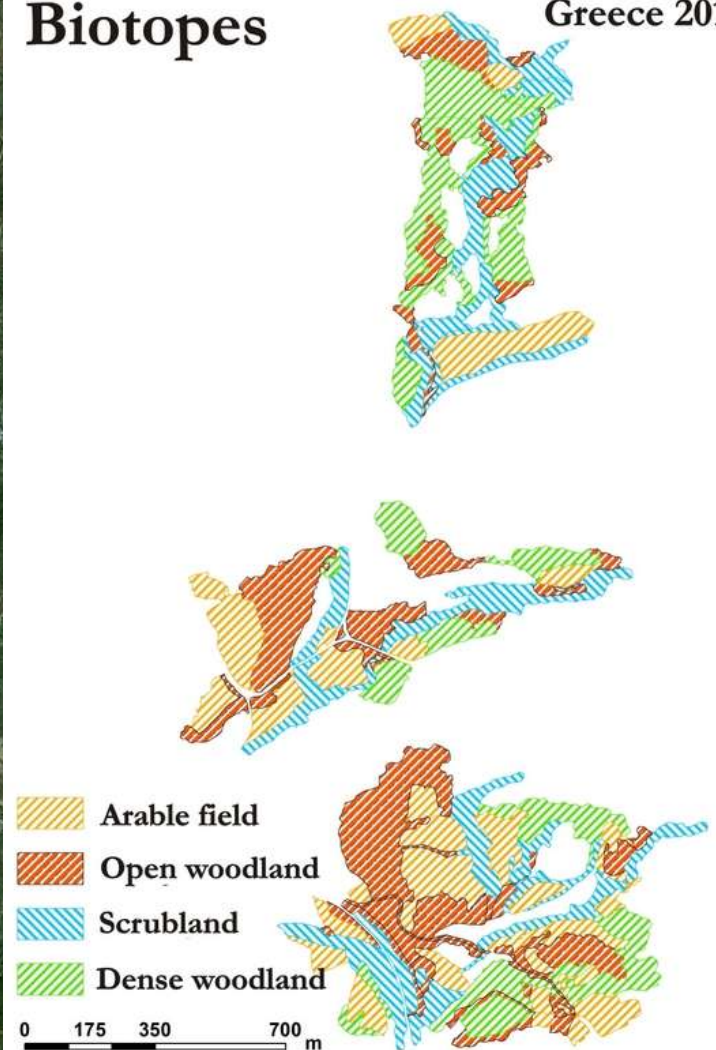
# Methods

- Eggs distribution (4. 4. – 4. 5. 2010)
- Mark-release-recapture (2. 4. 12. 5. 2011)



## Biomes

Greece 2011



# Larvae

1<sup>st</sup> instar

2<sup>nd</sup> instar

3<sup>rd</sup> instar

4<sup>th</sup> instar





# Extras



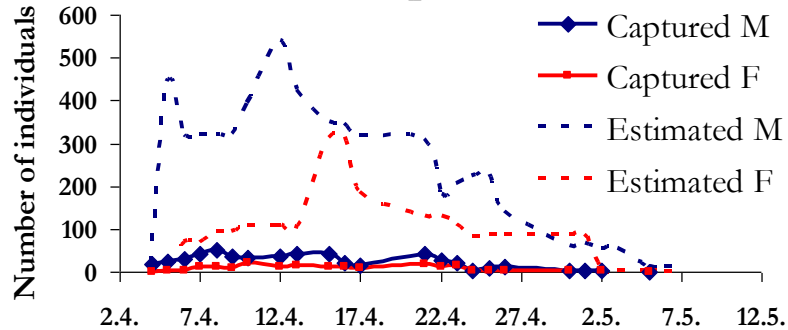
- Early larval stages inside the flower buds
- Specific feeding marks and tents
- Larvae of *A. apollinus* presented on *A. clematitis*
- Presence of two species on one host plant
- Toxicity to predators



# Mark-release-recapture



### *Archon apollinus*



#### Population size

Males  $992 \pm 48,38$

Females  $707 \pm 96,44$

**Total 1699**

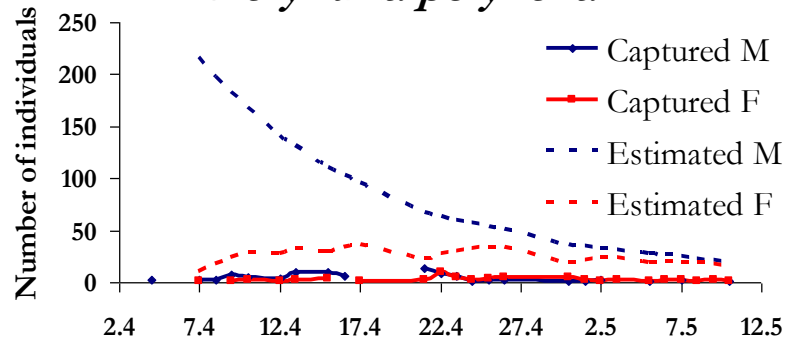
#### Average Life Span

Males 14,6

Females 5,7

**1277 captured (522 M/184 F; 517 M/54 F recap.)**

### *Zerynthia polyxena*



#### Population size

Males  $337 \pm 78,55$

Females  $252 \pm 64,37$

**Celkem 589**

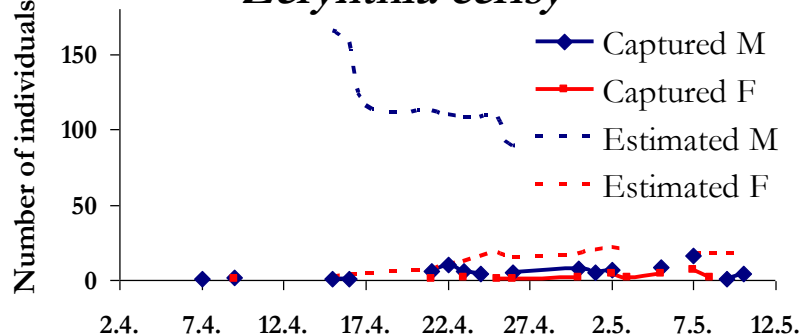
#### Average Life Span

Males 10,3

Females 3,6

**243 captured (93 M/65 F; 71 M/514 F recap.)**

### *Zerynthia cerisy*



#### Population size

Males  $373 \pm 158,5$

Females  $75 \pm 22,5$

**Celkem 448**

#### Average Life Span

Males 8,2

Females 4,5

**174 captured (85 M/28 F; 48 M/13 F recap.)**



# Egg distribution

Total numbers  
of records

<i>A. apollinus</i>	195
<i>Z. polyxena</i>	116
<i>Z. cerisy</i>	61



# Plant phenology priority

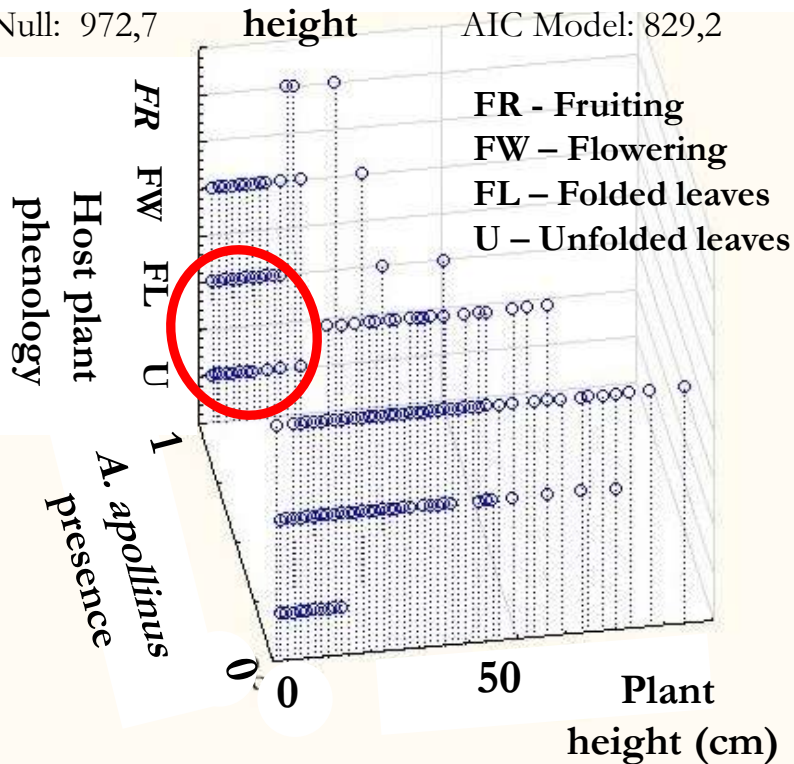
## Host plant phenology

(Chi-square = 115.8, df = 6,  $p < 0.00001$ )

*A. apollinus* ~ host plant phenology \* plant

AIC Null: 972,7

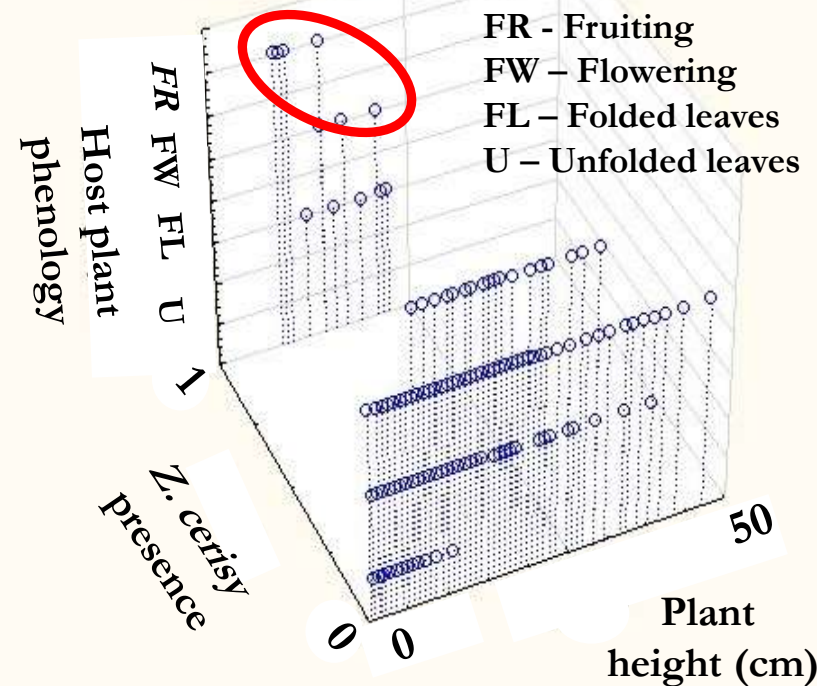
AIC Model: 829,2



*Z. cerisy* ~ host plant phenology \* plant height

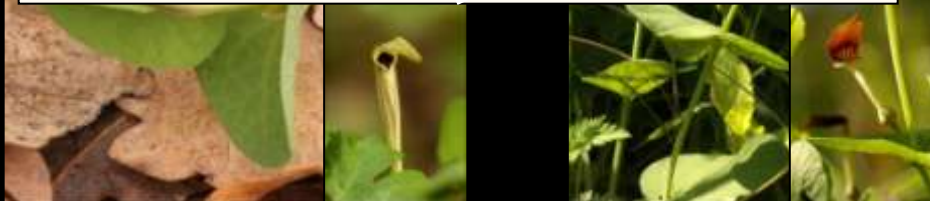
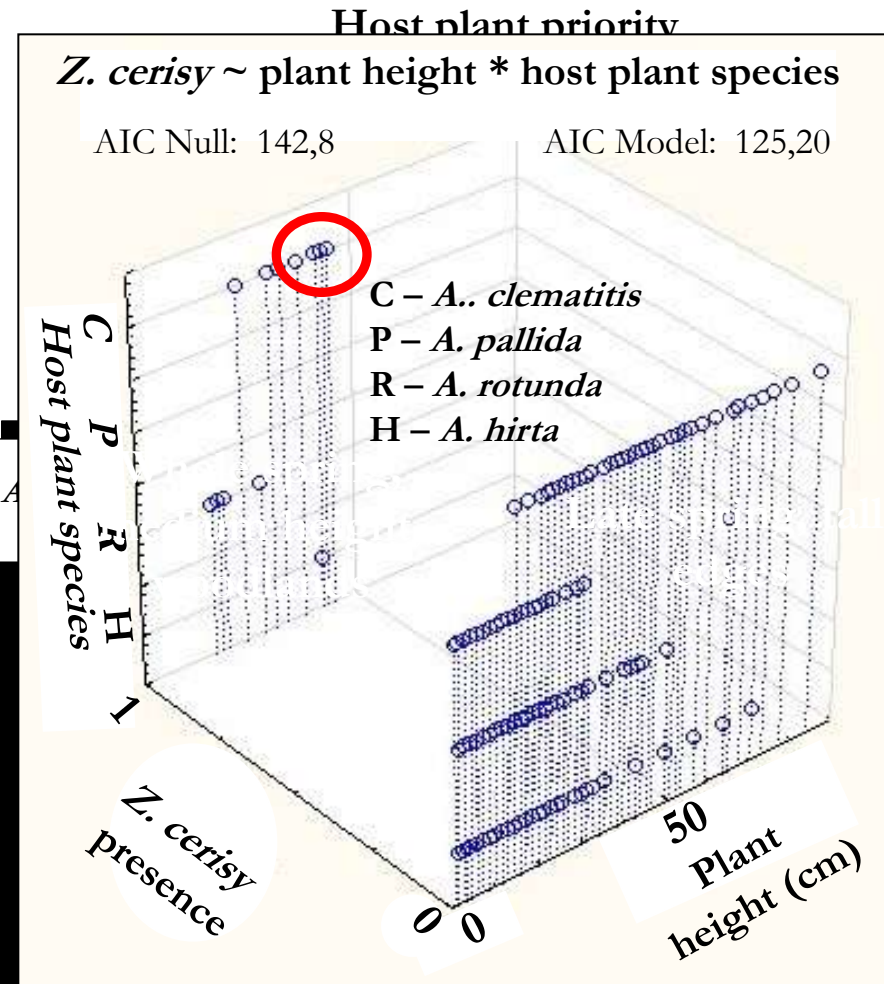
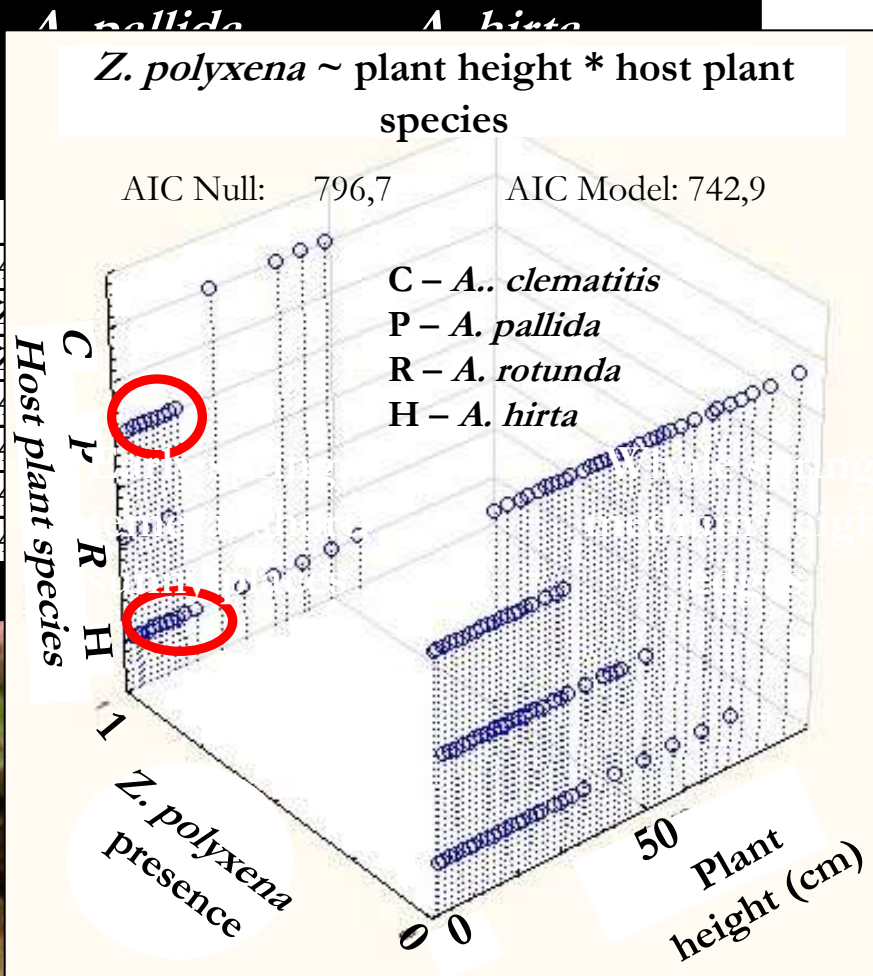
AIC Null: 142,8

AIC Model: 127,70



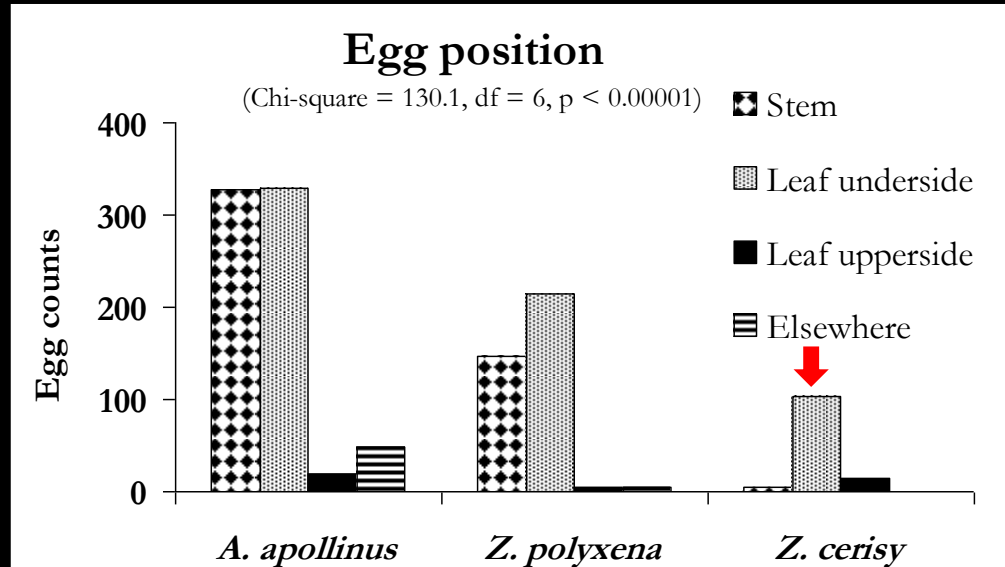


# Host plant priority

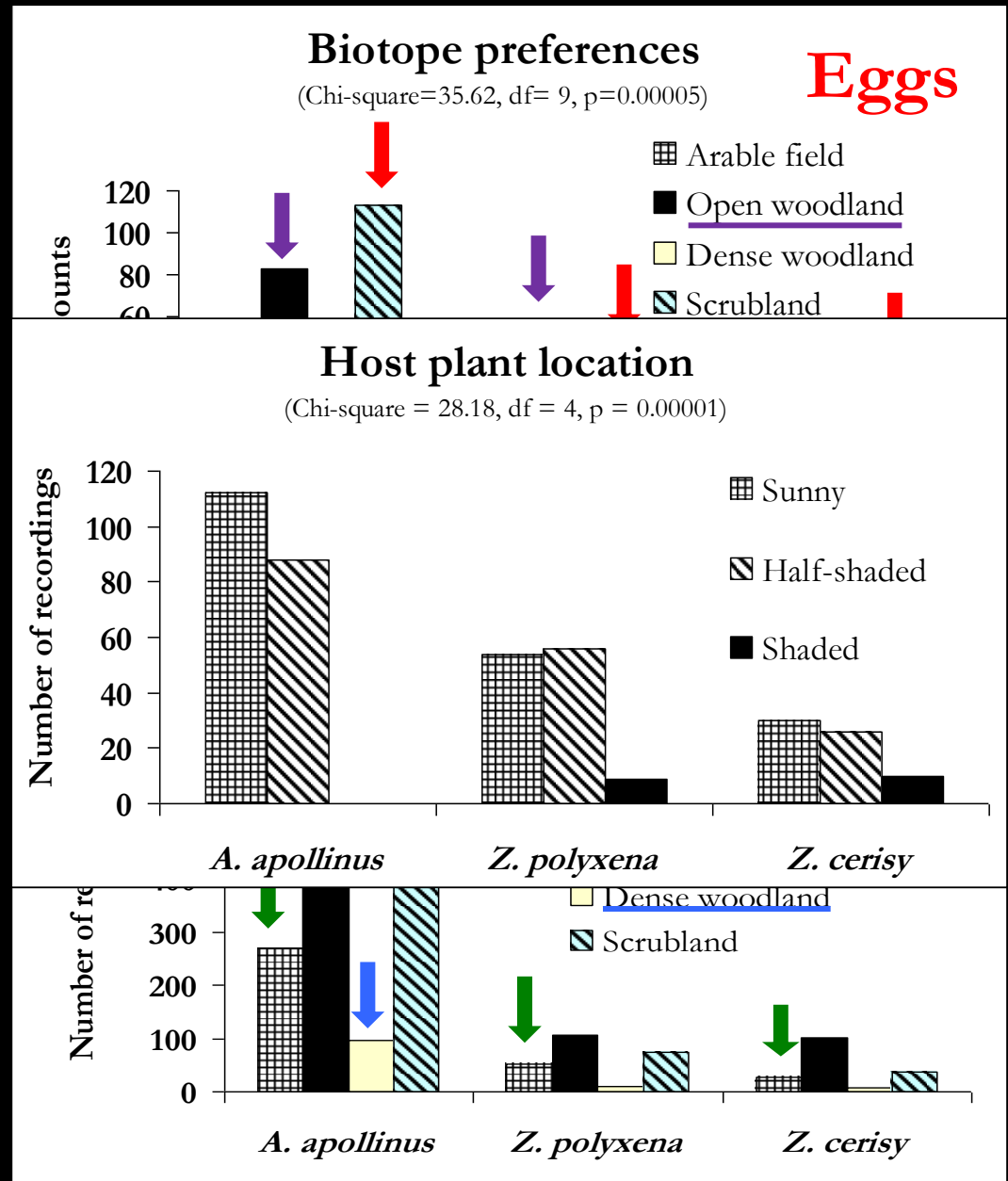




# Egg position



# Heterogeneity requirements



# Conclusion

- Diverse system of *Aristolochia*-feeders and their host plants, matching those described from other continents
- All three butterflies use all four host plants, differences reflect their phenology
- The early flight of *A. apollinus* allows it to use plants in dense woodland
- Shaded host plants (near shrubs) are generally avoided
- Crucial role of landscape heterogeneity



# System under threat?



Mediterranean landscape

- grazing
- burning
- „megaherbivores“



## Greece

- Currently forested: 29 % (3 752 000 ha)
- 14% increment of new forest between 1990 and 2005
- Most of it are plantations or overgrowing macchia
- Probably never continuously forested for entire Holocene (Blondel et al. 2010, Grove & Rackham, 2001)
- High biodiversity in forest-grassland mosaics

**Much more work in eastern Mediterranean needed**

# Thank you for Acknowledgements

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