



# Twenty years of reintroduction of Egyptian vultures in Israel – a success story



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Photo by David Razek



# Reintroduction of Egyptian vultures in Mt. Carmel, Israel

- The program started in 1989 with a feasibility analysis for reintroduction of Griffon and Egyptian vultures that is based on captive breeding in Israel.
- From 1991 on it continued with building capacity mainly in Tel-Aviv university research zoo. Later it was moved to a facility specially designated for this purpose in Hai-bar Carmel nature reserve.



Photo by Adi Ashkenazi





# Mt Carmel cliffs





# Reintroduction of Egyptian vultures in Mt. Carmel, Israel

- All reintroduced vultures are captive-bred
- Starting in 2005 vultures were released:
  - During their first or second year of life
  - In winter or spring

acclimatization cage



feeding site



## Egyptian vultures reintroduction effort

origin	release started	released	mortality
Captive breeding	2005	96	25



Photo by Moti Dolev. A nesting ad in Mt. Arbel for the 1<sup>st</sup> time after more than 60 years.



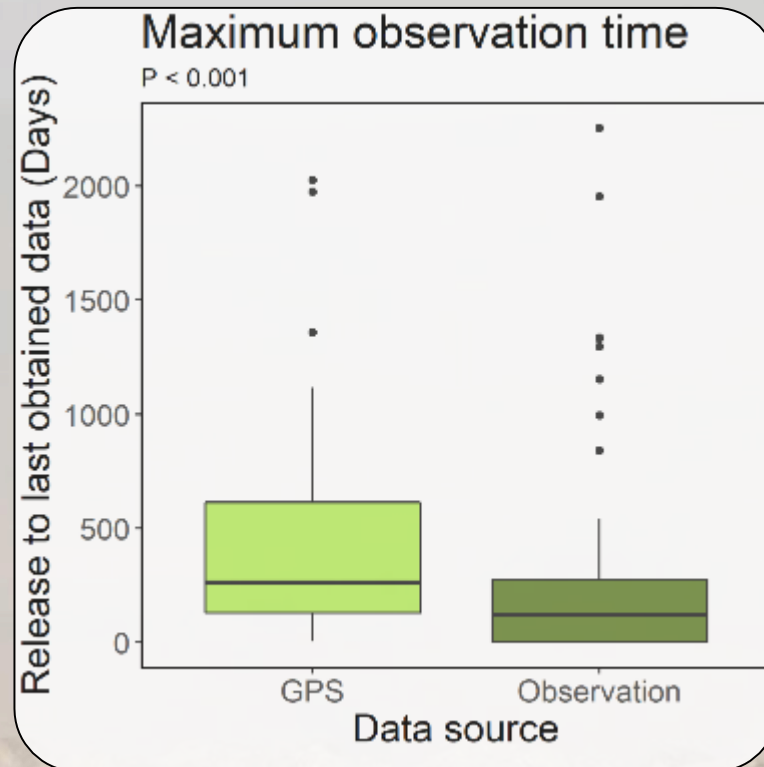
# Monitoring methods

- Direct observations – all with uniquely identifiable color rings
- GPS data – some fitted with GPS transmitters (all since 2016)



# Results

- 2005-2020: 82 captive-bred Egyptian vultures released
- 2013-2020: 47 fitted with GPS tags



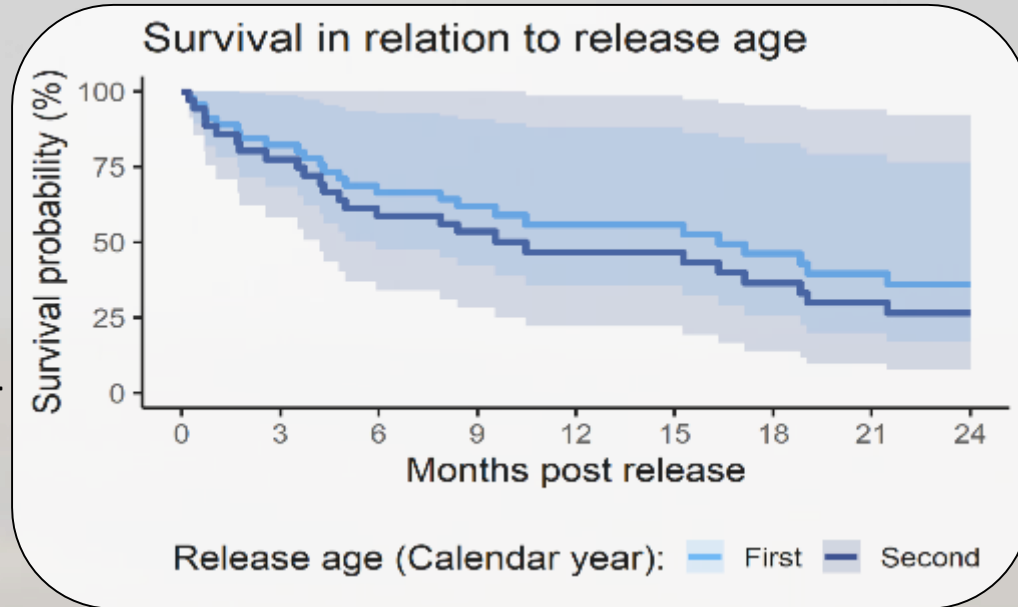
paired-sample Wilcoxon Signed Rank test,  $p < 0.001$



# Survival – release protocols: age

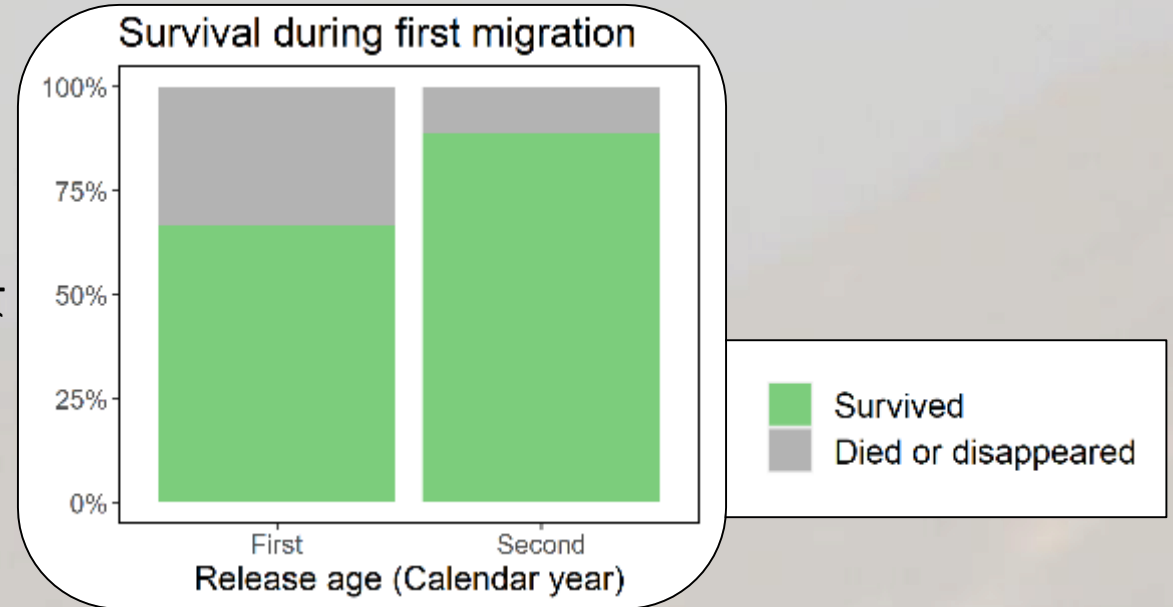
Cox Proportional-Hazard Model

$p = 0.53$



25 released during their 1<sup>st</sup> calendar year  
17 during their 2<sup>nd</sup> calendar year

GLM,  $p = 0.2$



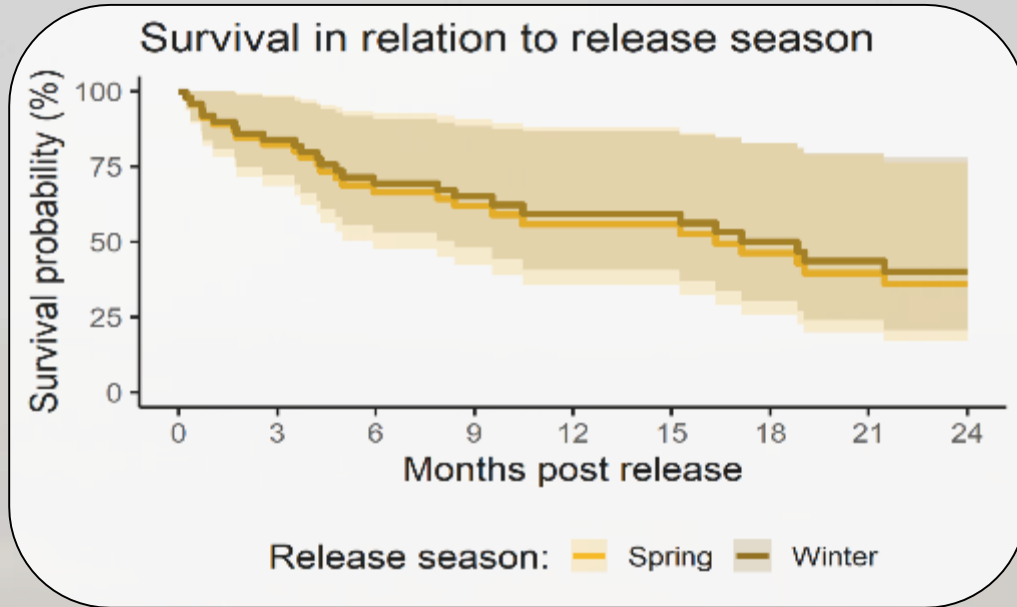
12 1<sup>st</sup> calendar year  
9 2<sup>nd</sup> calendar year



# Survival – release protocols: season

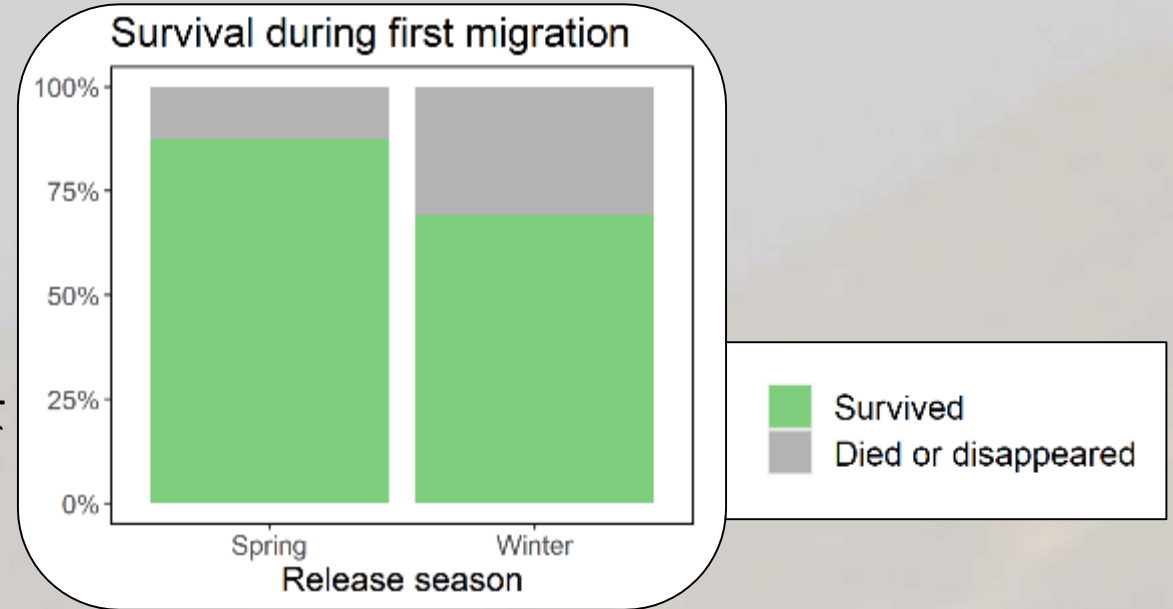
Cox Proportional-Hazard Model

$p = 0.81$



13 released in spring  
30 released in winter

GLM,  $p = 0.15$



8 released in spring  
13 released in winter

# Survival – captive vs. wild

- Using data collected from Egyptian vultures tagged in their nests in Israel, we were able to check if reintroduction affects survival

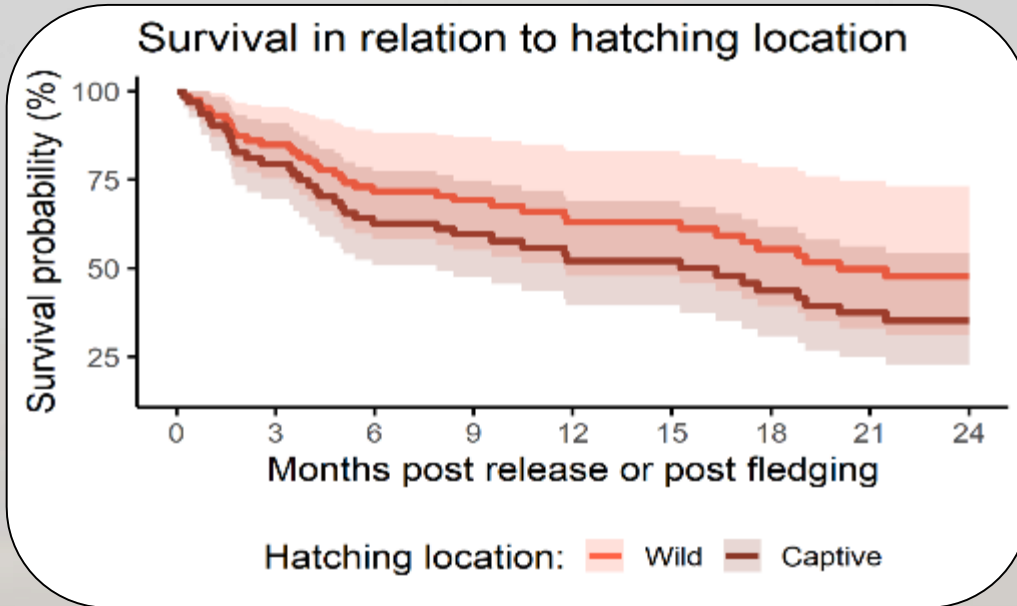




# Survival – captive vs. wild

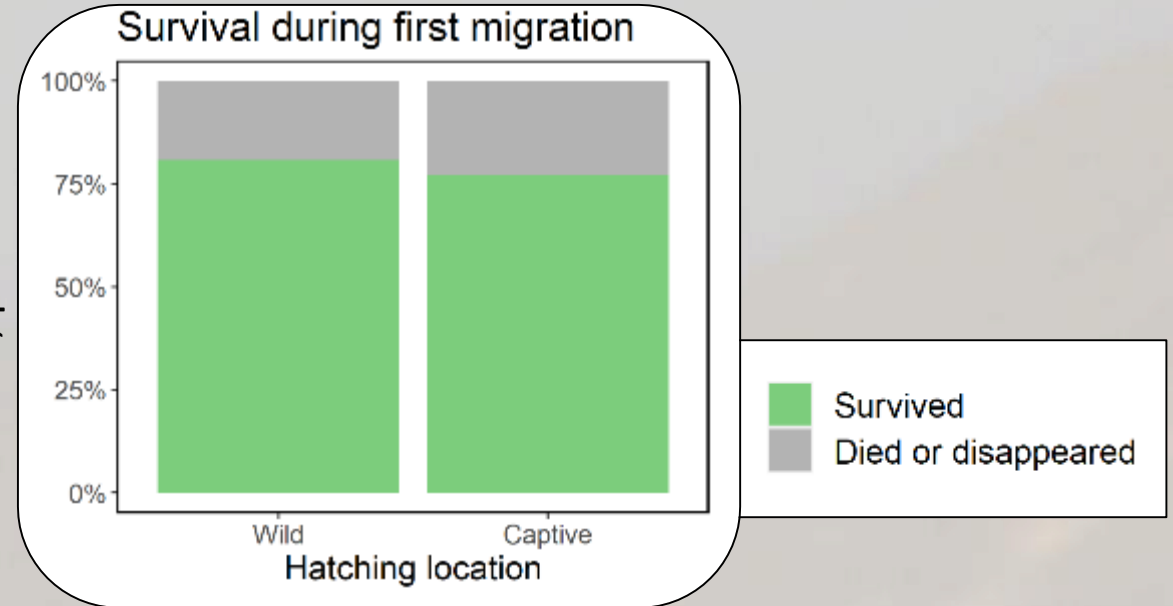
Cox Proportional-Hazard Model

$p = 0.33$



44 captive  
origin  
23 wild origin

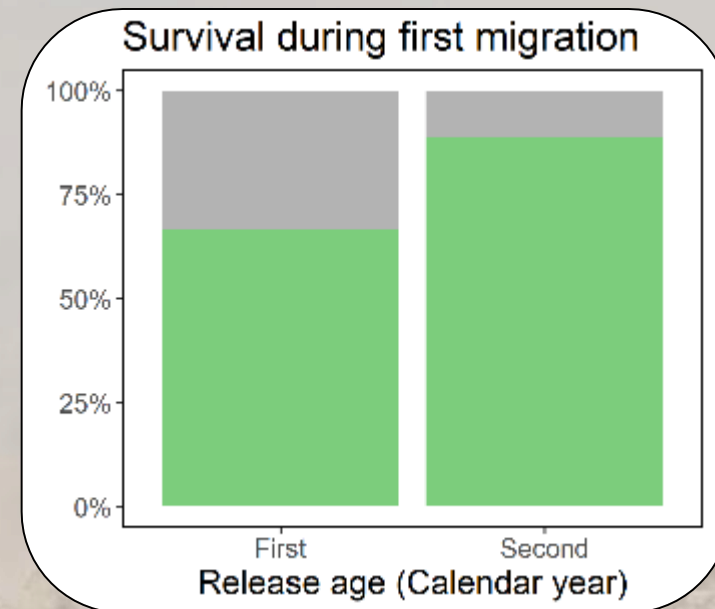
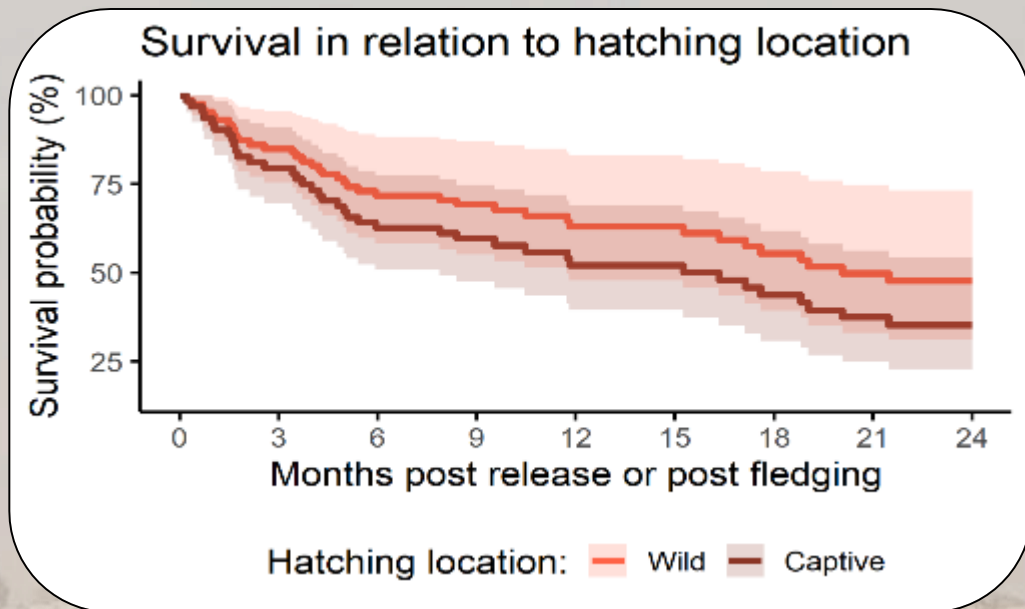
GLM,  $p = 0.77$



22 captive  
origin  
26 wild origin

# Summary

- Release protocol and captive-breeding in general were not found to affect the survival of Egyptian vultures.
- Although some results showed a trend fitting the predictions.
- Even if future studies will find differences, they are likely to be small.





# After ~20 years of release

- In 2023 at least 5 pairs of EV nested in northern Israel were with at least one partner that was born in captive.
- Since 2020 captive born EV are nesting in the wild. Yet, only in 2021 it was successful.
- The species is made a comeback to Mt. Carmel after ~60 years but not only.
- The wild breeding population in Israel is stable or slightly increasing.



Photo by Motti Dolev

# Conclusions

- Considering only survival, the project is a success!
- Considering the original goal – the reintroduction is succeeding, but requires vision, patience, persistence among professionalism and funding.





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**Questions?**



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