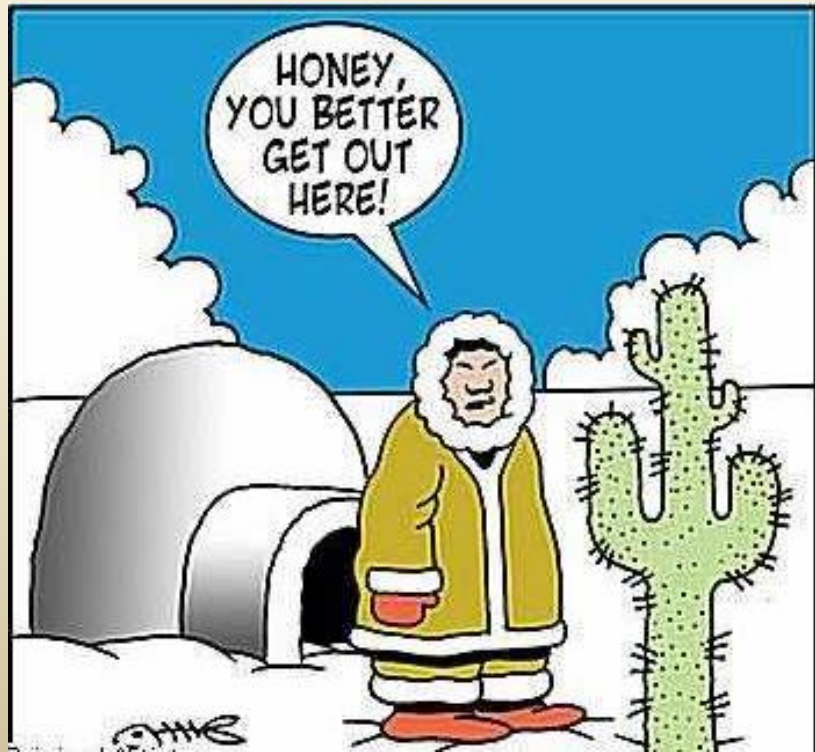
Climate Change: Species distribution and geographical change

Reuven Yosef, Prof.

Dept. of Life Sciences, Ben Gurion University of the Negev, Israel

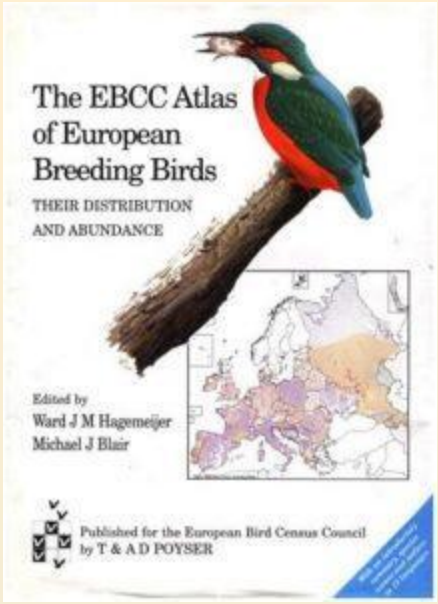


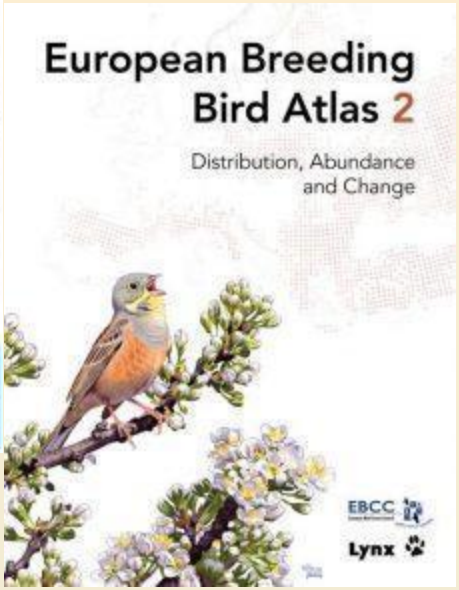
Definitions

Global warming:
the increase in Earth's average surface temperature due to rising levels of greenhouse gases.

Climate change:
a long-term change (min. 30 yrs) in the Earth's climate (or of a region).

BiRd NUMBERS 2007





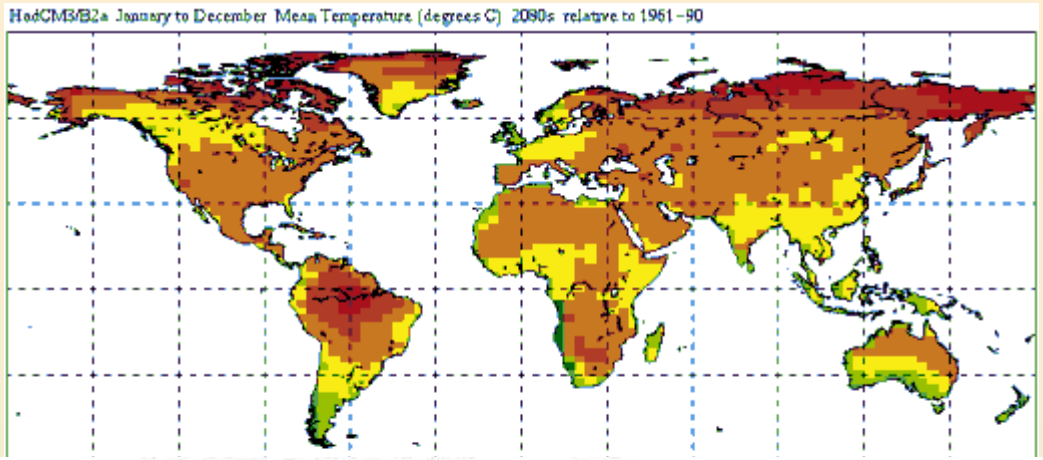
Bird Numbers 2007
"Monitoring for Conservation and Management"

17th International Conference of the European Bird Census Council

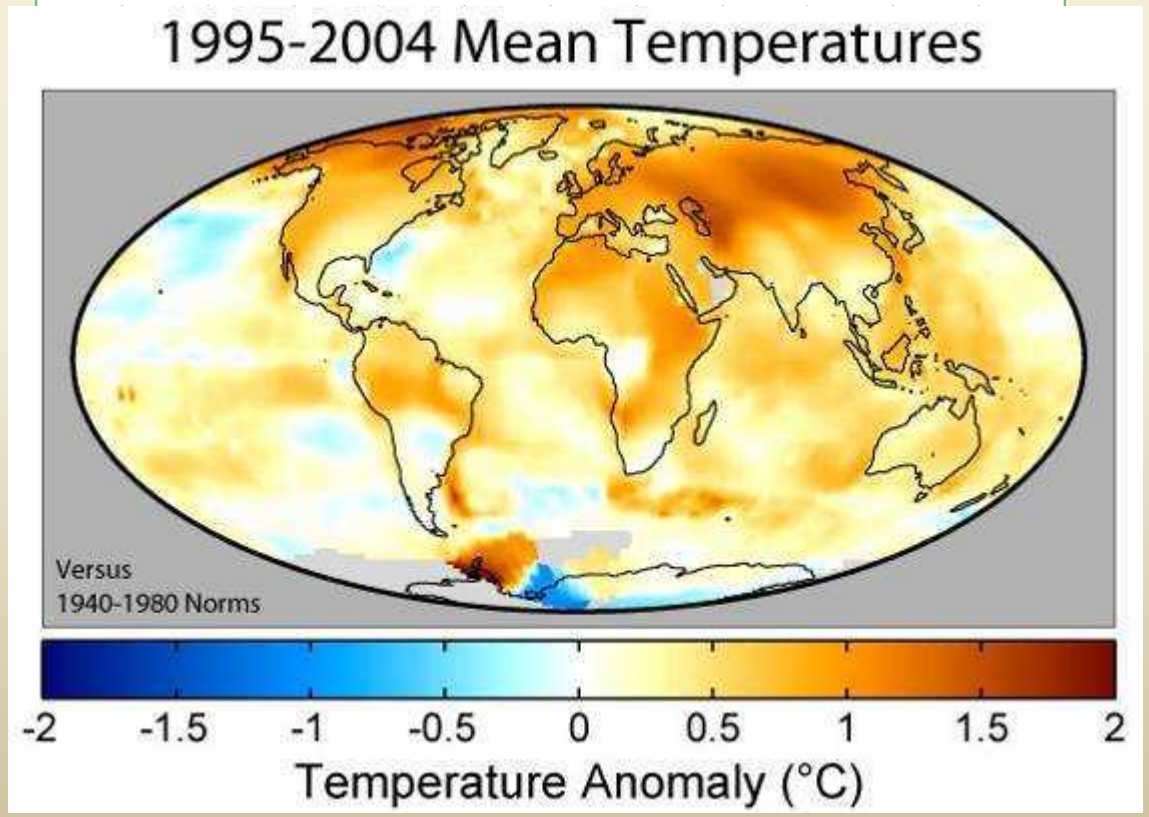
17-22 April 2007, Chiavenna (Italy)

➢ Forecast climate change across Europe

- **Projected change in annual mean temperature (2080s under HadCM3/B2)**



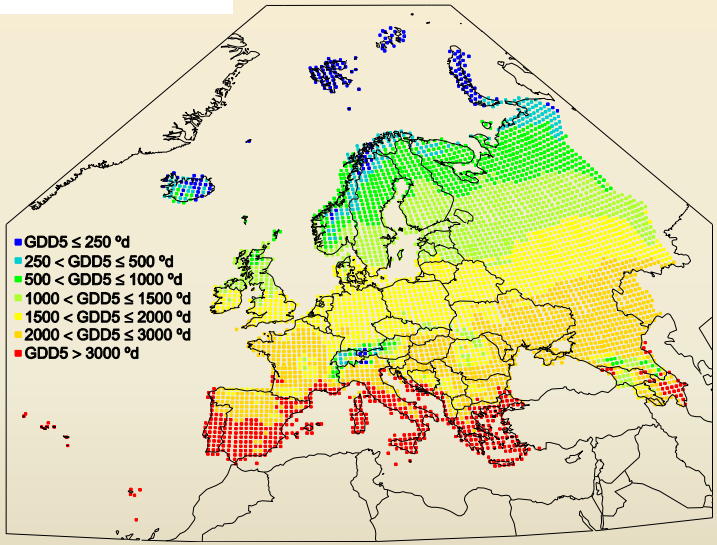
- **Projected change in annual precipitation (2080s under HadCM3/B2)**



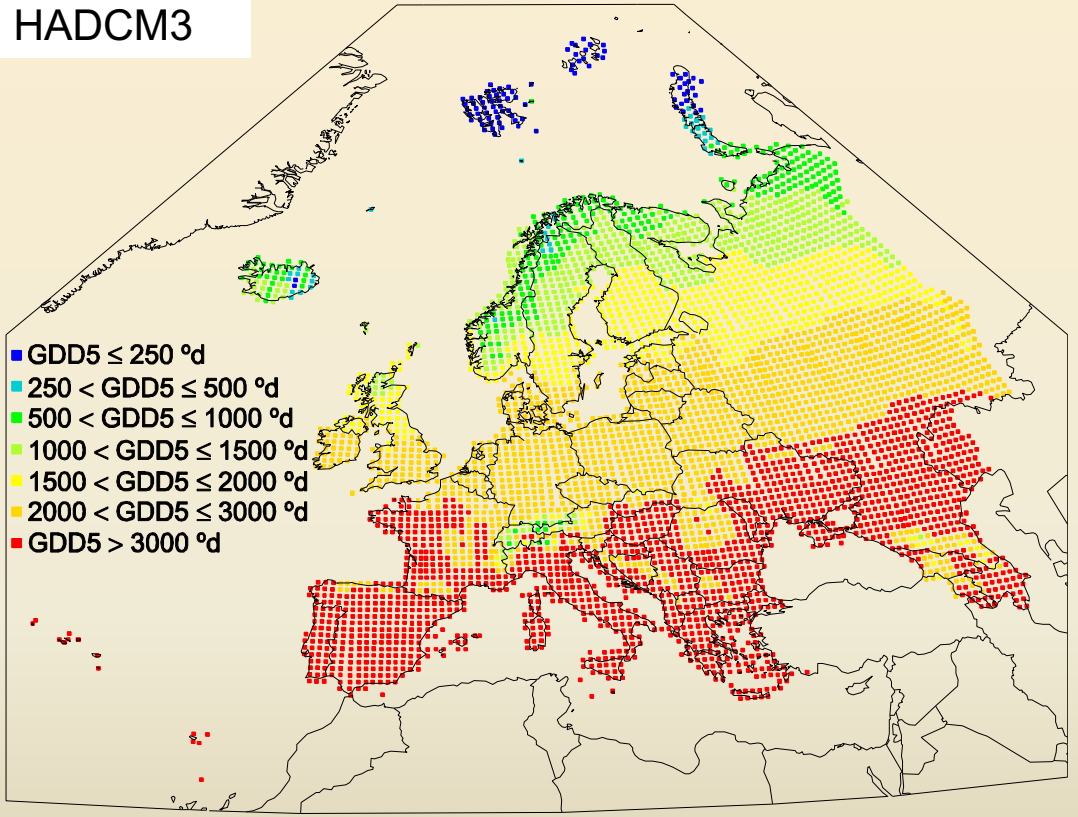
➢Future climate across Europe (2070-2099)

Growing Season Warmth

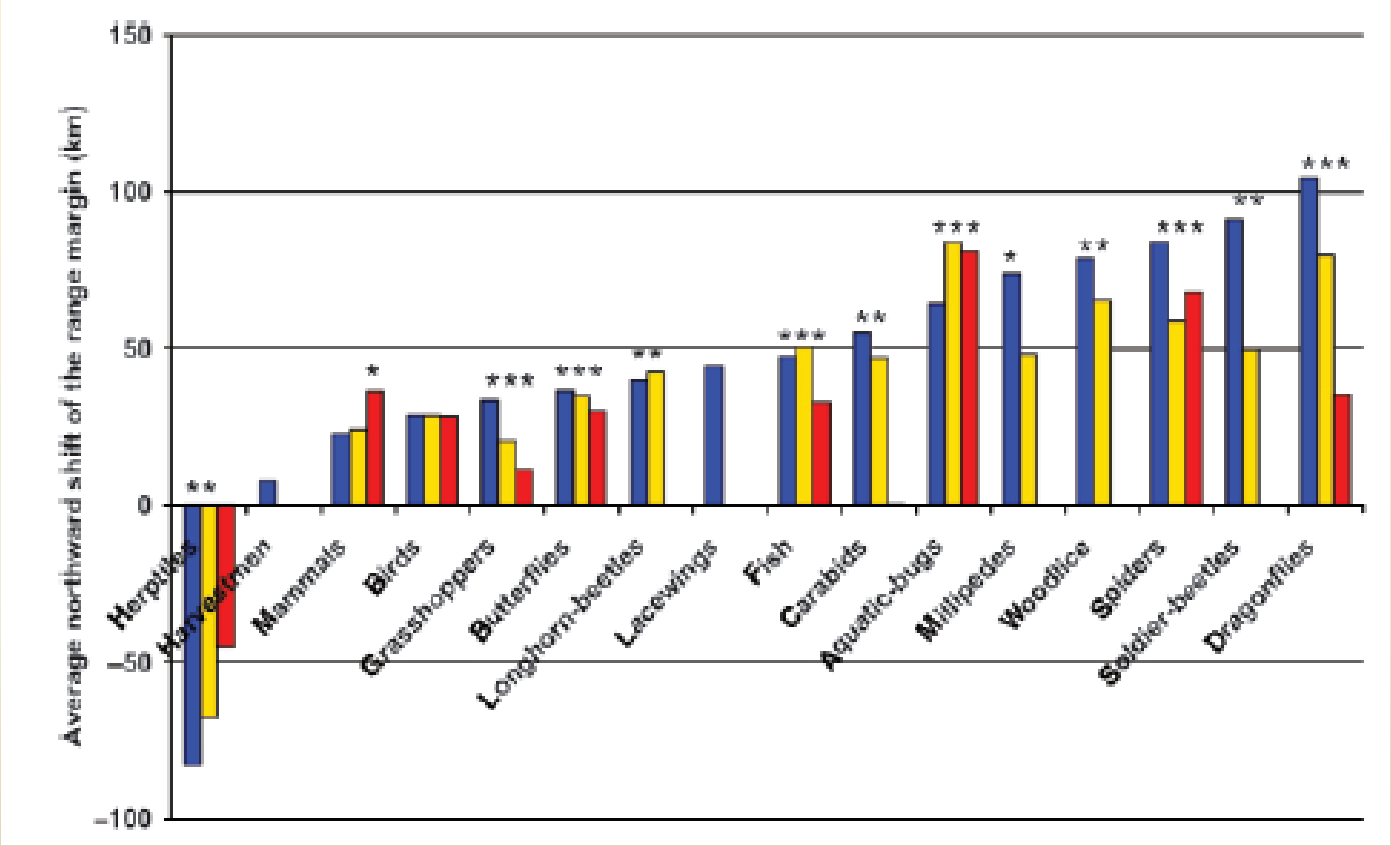
1961-90



HADCM3



➢Species moving northward and uphill in UK



Hickling *et al.* 2006

Journal of Biogeography (J. Biogeogr.) (2015) 42, 976–988

ORIGINAL ARTICLE

Stacked species distribution models and macroecological models provide congruent projections of avian species richness under climate change

Trisha Distler[1,*], Justin G. Schuetz[1], Jorge Velásquez-Tibatá[1] and Gary M. Langham[2]

Diversity and Distributions, (Diversity Distrib.) (2014) 20, 1285–1295

BIODIVERSITY RESEARCH

A 40-year, continent-wide, multispecies assessment of relevant climate predictors for species distribution modelling

Morgane Barbet-Massin[1,2*] and Walter Jetz[1]

Breeding Distributions of North American Bird Species Moving North as a Result of Climate Change

ALAN T. HITCH* AND PAUL L. LEBERG
Department of Biology, University of Louisiana at Lafayette, Lafayette, LA 70504-2451, U.S.A.

Conservation Biology Volume 21, No. 2, 534–539

DOI: 10.1111/j.1523-1739.2006.00609.x

nature climate change
LETTERS
PUBLISHED ONLINE: 16 SEPTEMBER 2012 | DOI: 10.1038/NCLIMATE1688

Focus on poleward shifts in species' distribution underestimates the fingerprint of climate change

Jeremy VanDerWal[1]*, Helen T. Murphy[2], Alex S. Kutt[3], Genevieve C. Perkins[3], Brooke L. Bateman[1†], Justin J. Perry[3] and April E. Reside[1,3]

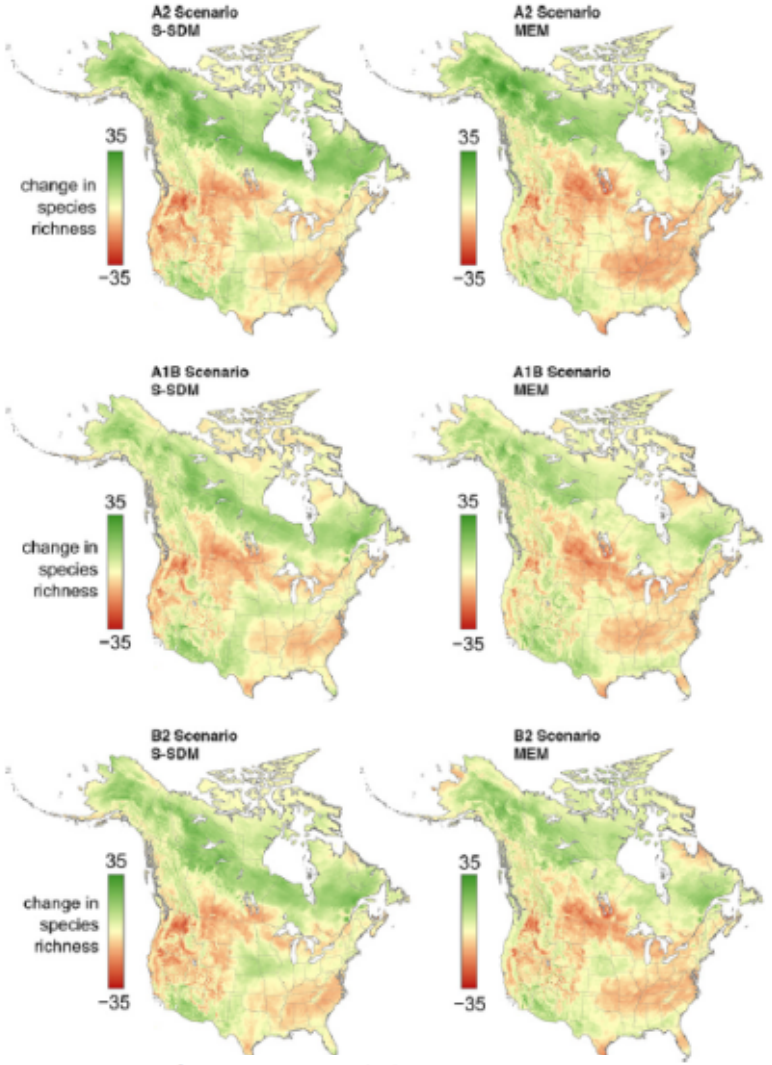


Figure 4 Projected changes in summer species richness of North American birds from the 2000s to 2080s derived from stacked species distribution models (S-SDM) and macroecological models (MEM). Projections are made for three future emissions scenarios: low emissions (B2), moderate emissions (A1B) and high emissions (A2).

➢ Average potential range centroid displacements

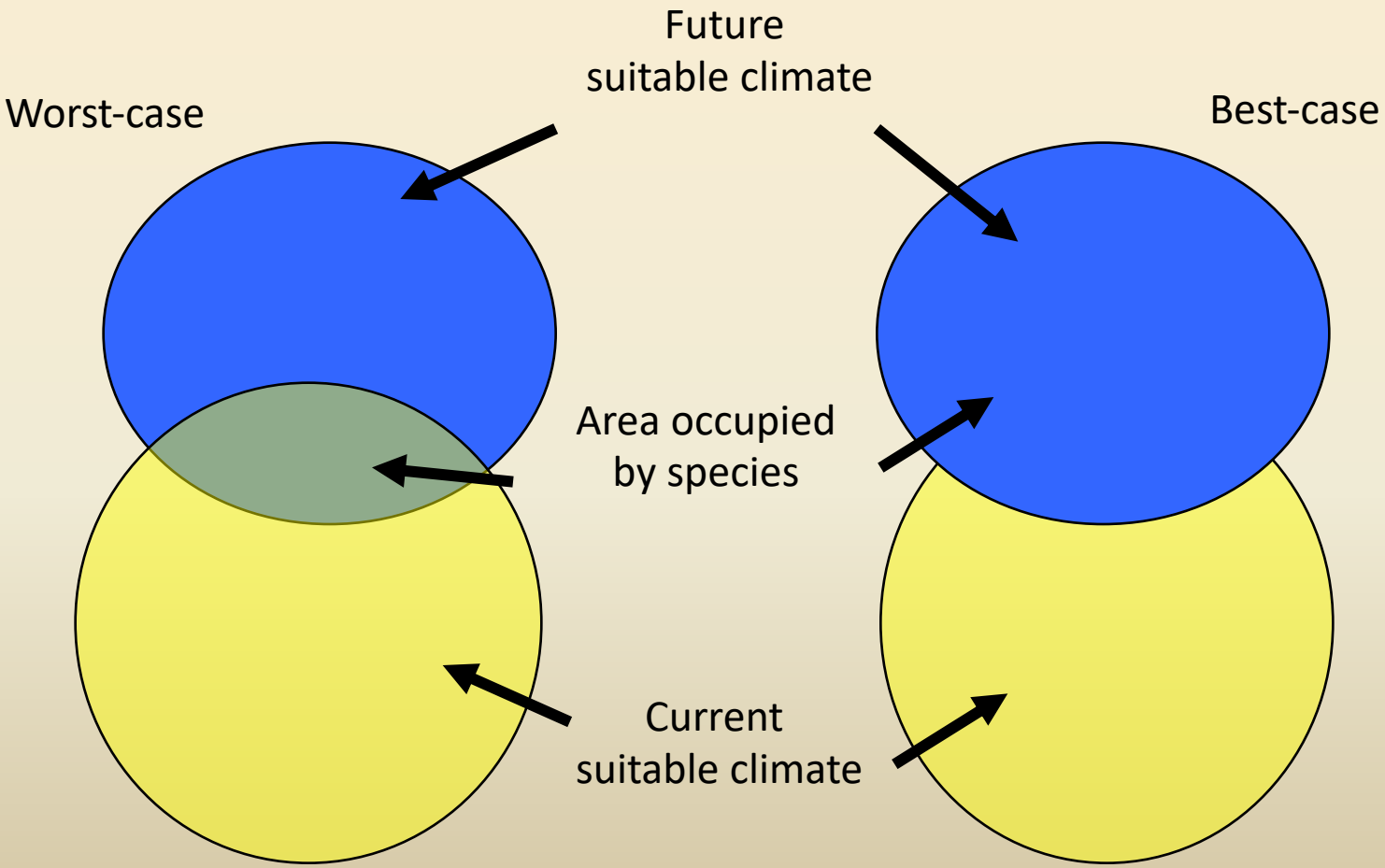
Median bearings for these groups vary only between north and north-east

Mean displacement is approximately 500km!

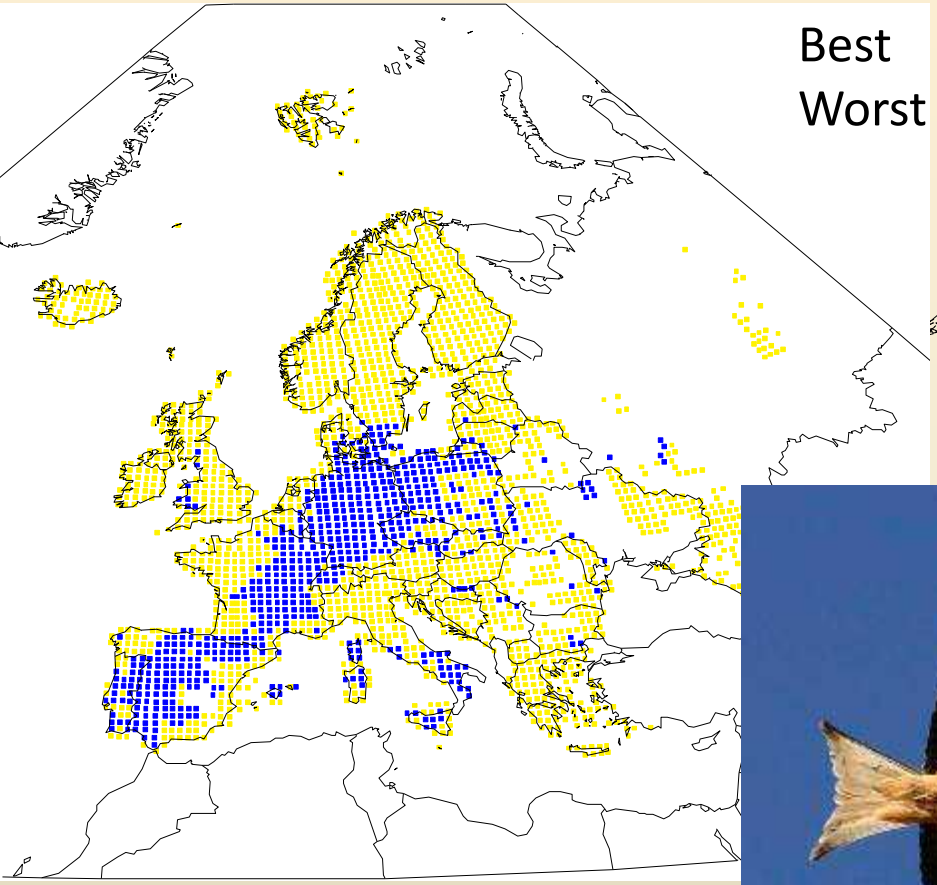
Biogeographic Element	Median initial azimuth (bearing in degrees)	Mean displacement (km)	Median displacement (km)
Maritime-Insular	0	448	443
Southern	24	632	577
Southern Nemoral	3	617	599
Sub-Continental Nemoral	357	500	458
Nemoral	357	392	377
European	352	282	264
Boreo-Nemoral	3	566	544
Continental Nemoral	6	574	565
Sub-Continental Boreo-Nemoral	9	782	789
Continental Boreo-Nemoral	20	573	563
Boreal	28	545	565
Northern Nemoral	4	483	384
Oceanic Boreal	12	555	442
Arctic–Boreal	15	579	567
Arctic	26	446	427
Northern	10	663	656
North European	347	336	298
Northern Maritime	4	573	438
Arctic–Maritime	43	588	557

Best-case and worst-case scenarios

We calculate a best case (all new area occupied) and a worst case (overlap only occupied) scenario of range shift for each species

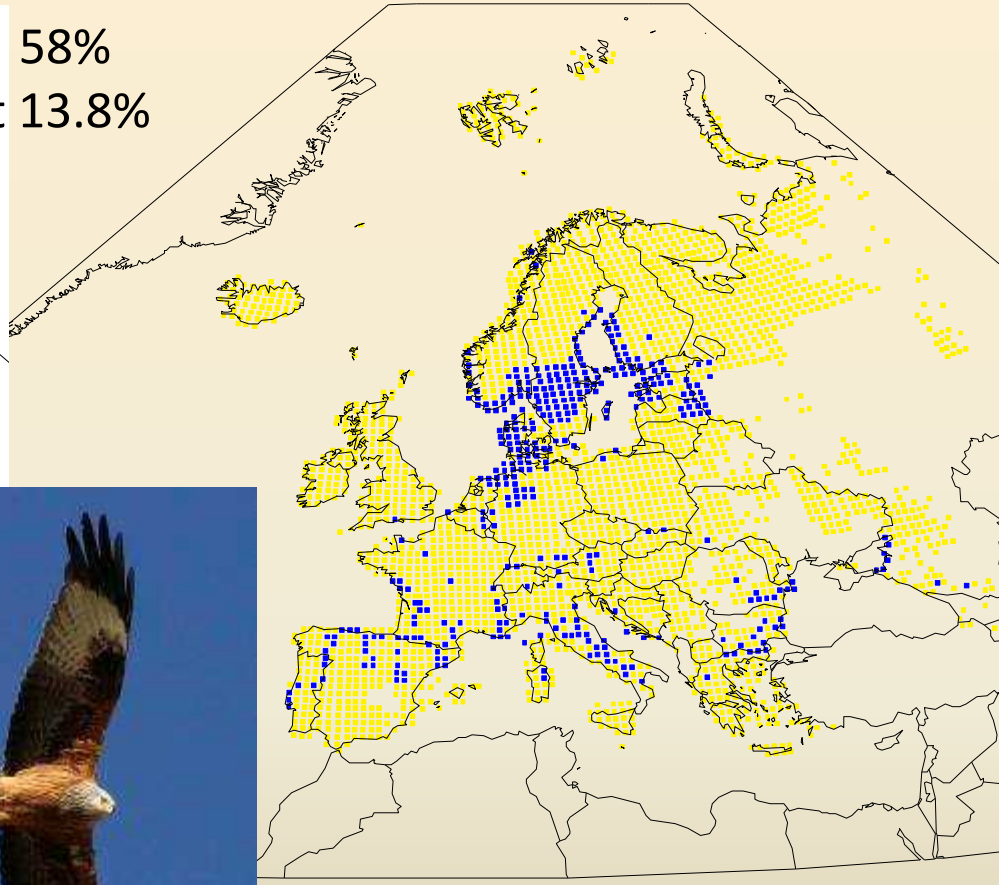


European birds and future climate



Observed current distribution

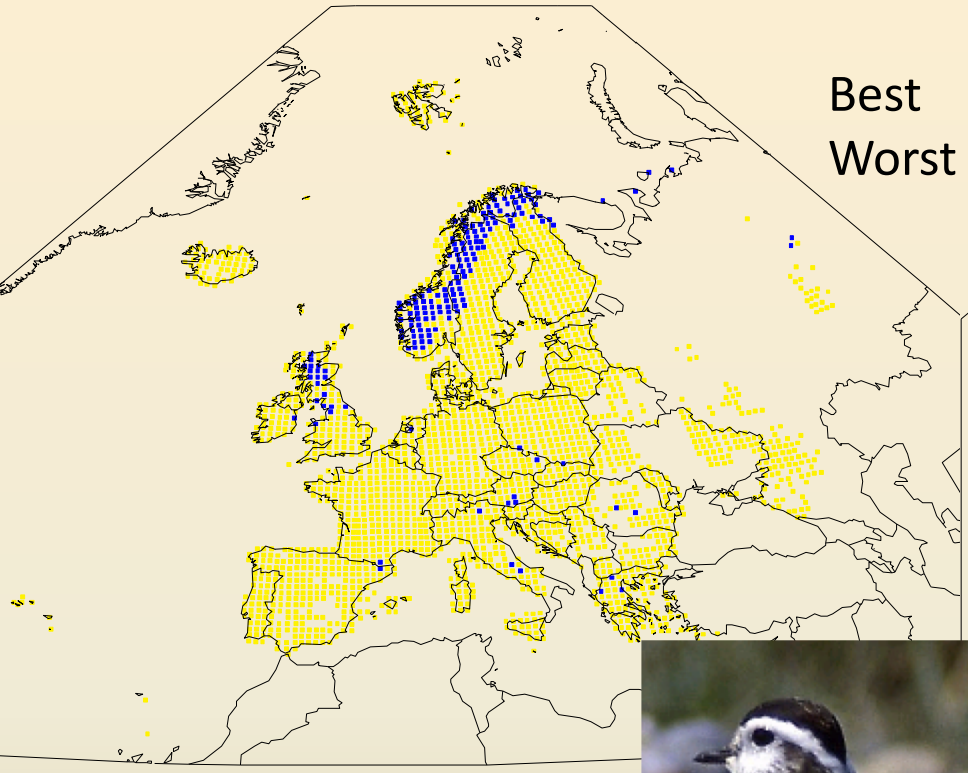
Best 58%
Worst 13.8%



Simulated late 21st century distribution

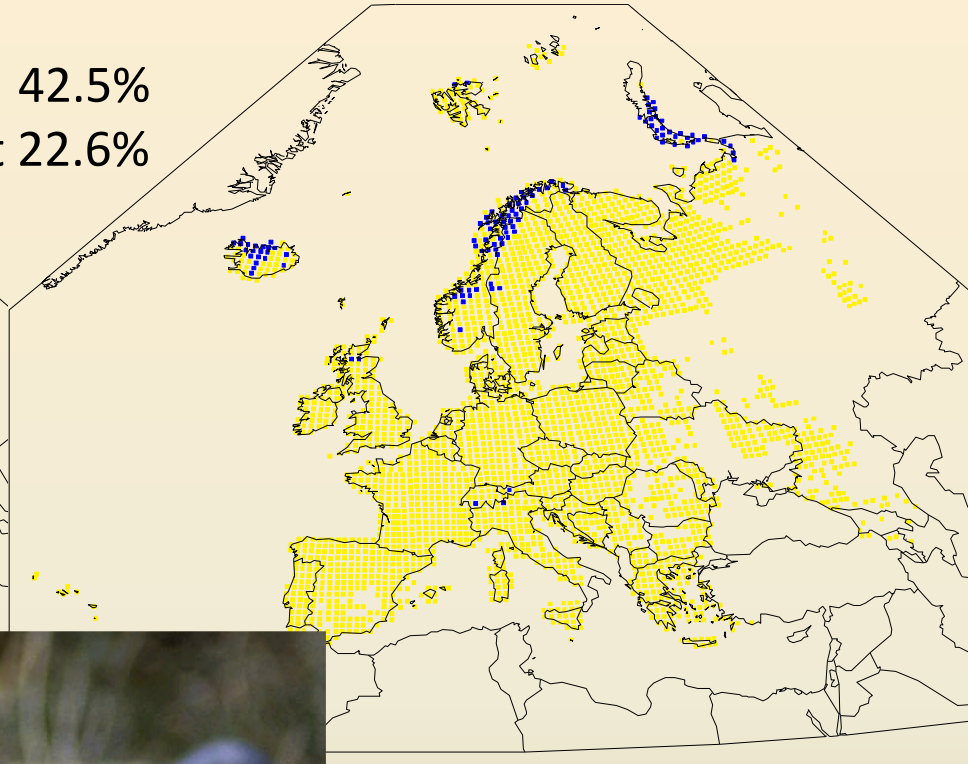
Red Kite: Central European

European birds and future climate



Observed current distribution

Best 42.5%
Worst 22.6%

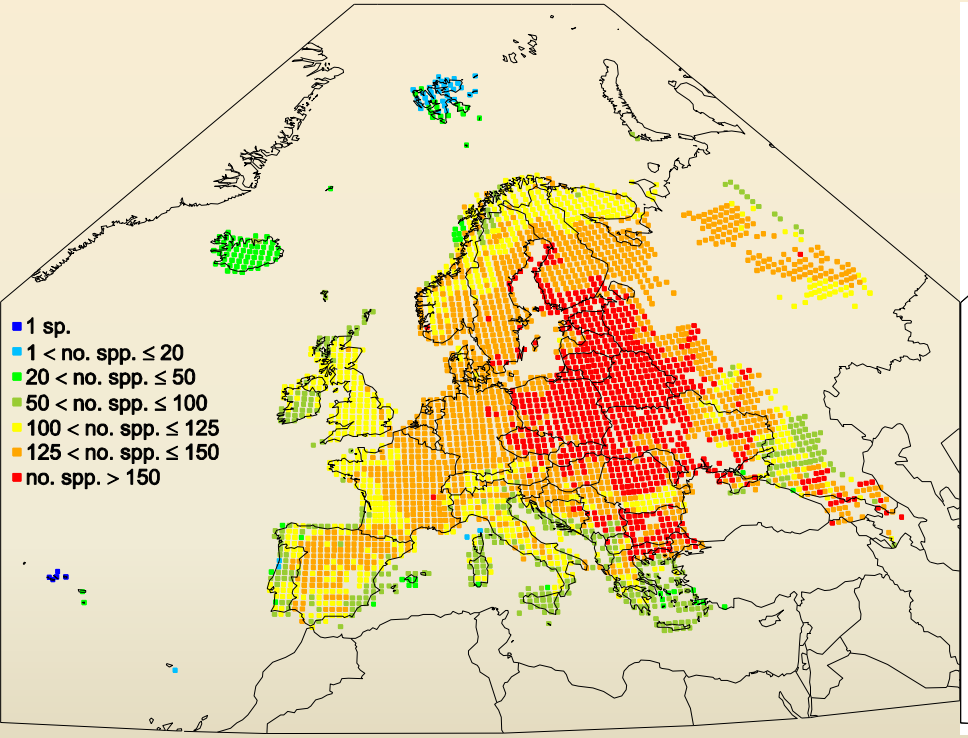


Simulated late 21st century distribution

Dotterel: Northern European

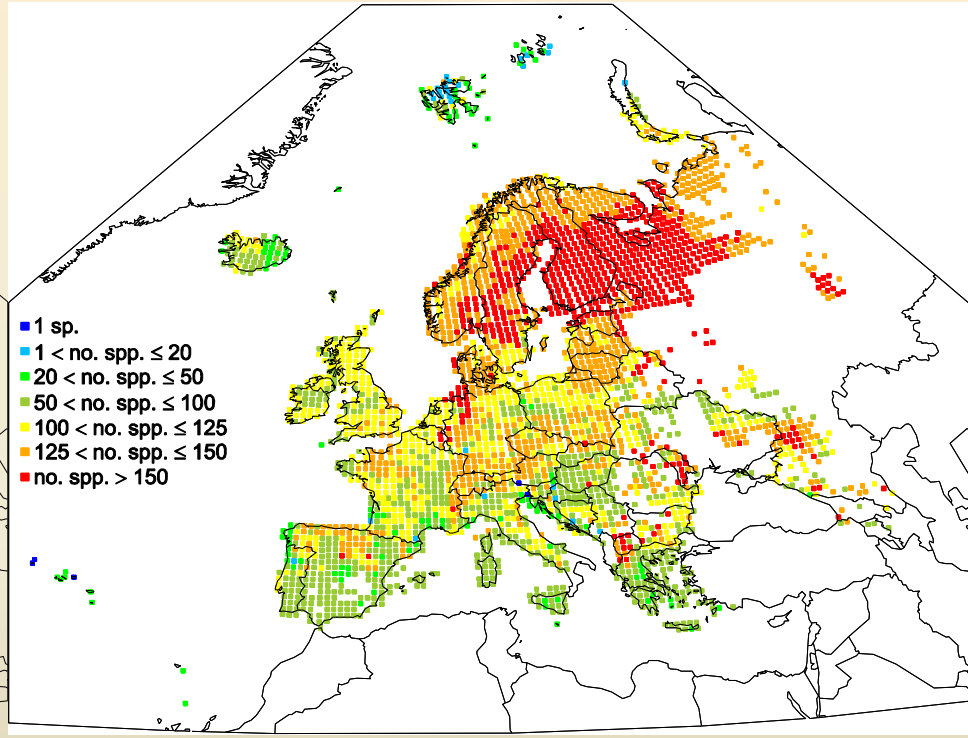
Potential impacts on species richness

Assuming perfect dispersal



Observed current distribution

(Mean obs = 120 spp.; mean sim = 123 spp.)



Simulated late 21st century distribution

(Best case, mean = 115 spp.; *worst* = *76 spp.*)

➢Other applications (1)To help explain trends

Jackdaw

Current range

Predicted 2070 range

The European Zoological Journal, 2020, 591–596
Vol. 87, No. 1, https://doi.org/10.1080/24750263.2020.1821801

Taylor & Francis

Check for updates

Kites (*Milvus* spp.) wintering on Crete

C. T. PANTER[1,2], S. XIROUCHAKIS[3], Š. DANKO[4], H. MATUŠÍK[1], P. PODZEMNÝ[1], S. OVČARIKOVÁ[1], & I. LITERÁK[1]*

[1]*Department of Biology and Wildlife Diseases, Faculty of Veterinary Hygiene and Ecology, University of Veterinary and Pharmaceutical Sciences Brno, Brno, Czech Republic,* [2]*Ecology, Conservation &*
School of Pharmacy and Biomolecular Sciences, University of Brighton, Brighto
Sciences & Engineering, University of Crete, University Campus (Knosos),
Society/BirdLife Slovakia, Michalovce, Slovakia

Slovak Raptor Journal 2017, 11: 0–0. DOI: 10.1515/srj-2017-0001.

DE GRUYTER OPEN

Common wintering of black kites (*Milvus migrans migrans*) in Greece, and new data on their wintering elsewhere in Europe

Bežné zimovanie hají tmavých (*Milvus migrans migrans*) v Grécku a nové údaje o ich zimovaní inde v Európe

Ivan LITERÁK, David HORAL, Haralambos ALIVIZATOS & Hynek MATUŠÍK

Martin Garner

J. Raptor Res. 29(2):127–134

SPRING 1994 RAPTOR MIGRATION AT EILAT, ISRAEL

REUVEN YOSEF
International Birding Center, P.O. Box 774, Eilat 88000, Israel

Black kites were the only species counted in considerably lower numbers in the 1994 survey compared to previous studies. The 15 659 kites seen is well below the minimum of 24 728 seen in 1986. In the 1994 survey, they comprised only 1.5% of total raptors observed in comparison to 2–4.6% in previous years. Peak migration, when 1000–2000 kites per day were seen, was spread over 2 wk—22 March to 2 April. Although seen throughout late April and May, appearance was irregular with many days having no kites at all.

ZooKeys 31: 193–210 (2009)
doi: 10.3897/zookeys.31.107
www.pensoftonline.net/zookeys

RESEARCH ARTICLE

A peer-reviewed open-access journal
ZooKeys
Launched to accelerate biodiversity research

Spring bird migration phenology in Eilat, Israel

Reuven Yosef[1], Mikhail Markovets[1,2]

1 *International Birding and Research Centre in Eilat, Eilat, Israel* **2** *Zoological Institute RAS, St. Petersburg 199034, Russia*

Corresponding author: *Reuven Yosef* (ryosef@eilatcity.co.il)

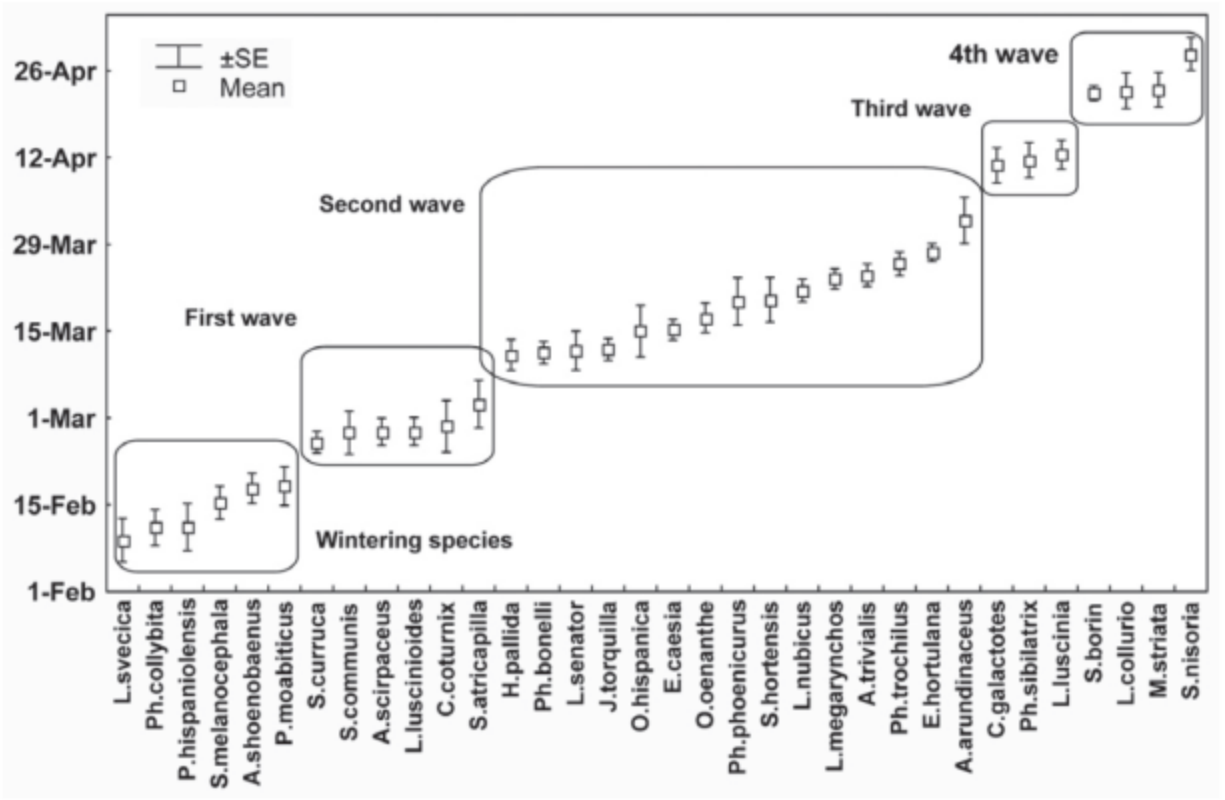


Figure 1. Data of first capture of 34 species of birds in Eilat in 1984–2003.

White-winged Black Terns, Eilat