SUPPLEMENTARY MATERIAL FOR

Breeding Phenology of Red-shouldered Hawks (*Buteo lineatus)* is Related to Snow Cover and Air Temperature During the Pre-laying Period

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Table S1. Hatching date analyses for some diurnal and nocturnal raptors. Phenology change is shown as described by the authors. Diet is shown if reported by the authors or by another researcher in the same study area (one case; see footnotes). Hatching date was typically calculated from the age of the nestlings at banding/ringing; in most cases laying date was back-calculated from hatching date.

Species	Location	Habitat	Years	Response Variable	Phenology Change	Diet (as reported by authors)	Source	Comments
Black Kite (*Milvus migrans*)	Northern Italy	Lake district of the Italian pre-Alps	1992-2002	Laying date[a]	Advanced 10-11 d	Fish	Sergio, 2003	Mean spring temperature also increased.
American Kestrel (*Falco sparverius*)	Southwestern Idaho, USA	Agriculture and sagebrush	1992 to 2015	Nest discovery date	Advanced 15 d	Small mammals (29% by number; 80% by biomass) and insects (64%, 13%)	Smith et al., 2017	Warmer winters, but not springs, caused farmers to plant earlier, which influenced kestrel nest-initiation dates.
American Kestrel[b]	Southwestern Idaho, USA	Agriculture, rangeland, and exurban	1986-2006; 1987-2009	Hatching date and nest initiation date; nest discovery date	Hatching date advanced 21 d. Nest initiation date advanced 23 d; Advanced significantly	Voles ("main vertebrate prey")	Steenhof and Peterson, 2009; Heath et al., 2012	Winter air temperature also increased; kestrels tended to nest earlier after warm winters.
Gyrfalcon (*Falco rusticolus*)	Greenland	High Arctic, coastal	1994-2010	Hatching date	Advanced 6 d	Birds	Burnham and Burnham, 2011	
Peregrine Falcon (*Falco peregrinus*)	Mackenzie River, Canada	Arctic	1985-2010	Hatching date	Advanced 1.5-3.6 d/decade	Birds[c]	Carrière and Matthews, 2013	

Peregrine Falcon	South Greenland	Arctic	1981-2017	Hatching date	Advanced 0.9 d/ decade	---[d]	Falk and Møller, pers. comm. reported in Franke et al., 2020	
Peregrine Falcon	Northern Spain	Temperate forest, urban, industry, and agriculture	1998-2017	Incubation onset	Delayed slightly in last decade	---[d]	Zuberogoitia et al., 2018	Rainy February weather also associated with delayed incubation onset.
Cooper's Hawk (*Accipiter cooperii*)	Wisconsin, USA	Forest	1980-2015	Hatching date	Advanced 4-5 d	Primarily birds	Rosenfield et al., 2017	
Eurasian Sparrowhawk (*Accipiter nisus*)	Finland		1973-2007	Hatching date	Advanced 0.18 ± 0.05 d/yr	Passerines[e]	Lehikoinen et al., 2010	Temperature during April (laying period) also inversely related to hatching date.
Eurasian sparrowhawk	Denmark	Farmland with scattered forest	1977-1997	Laying date[a]	No trend	Birds	Nielsen and Møller, 2006	
Eurasian Sparrowhawk	Hoge Veluwe, The Netherlands	Mixed forest	1985-2004	Hatching date	No trend	Mostly birds	Both et al., 2009	
Montagu's Harrier (*Circus pygargus*)	Southeastern Spain	Cereal crops	2003-2014	Laying date	Advanced	---[f]	Moreno-Rueda et al., 2019	
Common Buzzard (*Buteo buteo*)	Finland		1979-2004	Hatching date	Advanced 11.4 d	Mainly voles	Lehikoinen et al., 2009	Earlier breeding in warmer springs. Air temperature increased in spring, but not summer.
Rough-legged Hawk (*Buteo lagopus*)	Finland and Norway	Mountainous birch forest and lowland willow/birch scrub	1985-2005	Laying date[a]	Advanced 0.1d/yr	Mainly voles	Terraube et al., 2015	Laying date related to snow cover, but not air temperature.
Red-shouldered Hawk (*Buteo lineatus*)	Southern Ohio, USA	Deciduous forest; suburban	1997-2020	Hatching date	No trend	Small mammals, amphibians, reptiles, invertebrates[g]	This study	Hatching date related to snow cover and air temperature in the pre-laying period.

Northern Saw-whet Owl (*Aegolius acadicus*)	British Columbia, Canada, interior	Mixed conifer forests	1995-2011	Laying date	No trend	---	Drake and Martin, 2018	Laying date also unrelated to temperature.
Tawny Owl (*Strix aluco*)	Southern Finland	Agriculture, silviculture, suburban and urban parks	1986-2011	Hatching date	No trend	Typically voles	Solenen, 2014	Hatching date related to snow depth and temperature.
Tawny Owl	Latvia	Temperate deciduous forest	1991-2008	Laying date	No trend	Mainly voles	Grandāns et al., 2009	Laying date related to snow depth and air temperature in February-March.
Tawny Ow1	Finland	Northern boreal forest	1973-2004	Hatching date	No trend	Rodents, esp. voles	Lehikoinen et al., 2011	Hatching date related to vole numbers in previous year and March air temperature.
Ural Owl (*Strix uralensis*)	Finland	Northern boreal forest	1973-2004	Hatching date	No trend	Rodents, esp. voles	Lehikoinen et al., 2011	Hatching date related to vole numbers in previous year and February air temperature and snow depth.
Pygmy Owl (*Glaucidium passerinum*)	Finland	Northern boreal forest	1988-2004	Hatching date	No trend	Rodents, esp. voles	Lehikoinen et al., 2011	Hatching date unrelated to any tested variable.
Tengmalm's (Boreal) Owl (*Aegolius funereus*)	Finland	Northern boreal forest	1973-2004	Hatching date	No trend	Rodents, esp. voles	Lehikoinen et al., 2011	Hatching date related to vole numbers in previous year.
Tengmalm's (Boreal) Owl	Western Finland	Boreal forest	1973-2018	Laying date[a]	Slightly delayed	Small mammals, esp. voles	Kouba et al., 2020	Laying date related to vole numbers and January-March snow depth.
Burrowing Owl (*Athene cunicularia*)	Albuquerque, New Mexico, USA	Urban and grassland	2005-2013	Hatching date	Delayed 9.4 d	Primarily small mammals and insects	Cruz-McDonnell and Wolf, 2016	Hatching date linked to drought.

a. Laying date back-calculated from hatching date, which was typically determined from the age of the nestlings.

b. Two studies used the same dataset (extended to 2009 in Heath et al. 2012); results from the later study shown after the semi-colon in each cell.
c. Diet information for Mackenzie River territories (2000–2013) from Hodson (2019).
d. Though Peregrine Falcon studies did not provide diet information, data from other studies in similar habitat suggest that diet likely included some birds or mostly birds (West Greenland, Rosenfield et al., 1995; Spain, López-López et al., 2009, Zabala and Zuberogoitia, 2014).
e. Authors describe Eurasian Sarrowhawks as "highly specialized predators of passerines" (Lehikoinen et al., 2010).
f. Though Montagu's Harrier study did not provide diet information, data from other studies in the region suggest that the species is a generalist with a diet containing birds, mammals, and insects (eastern Spain, Liminana et al., 2012; northeastern Spain, Terraube et al., 2014).
g. From Dykstra et al. (2003).

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