

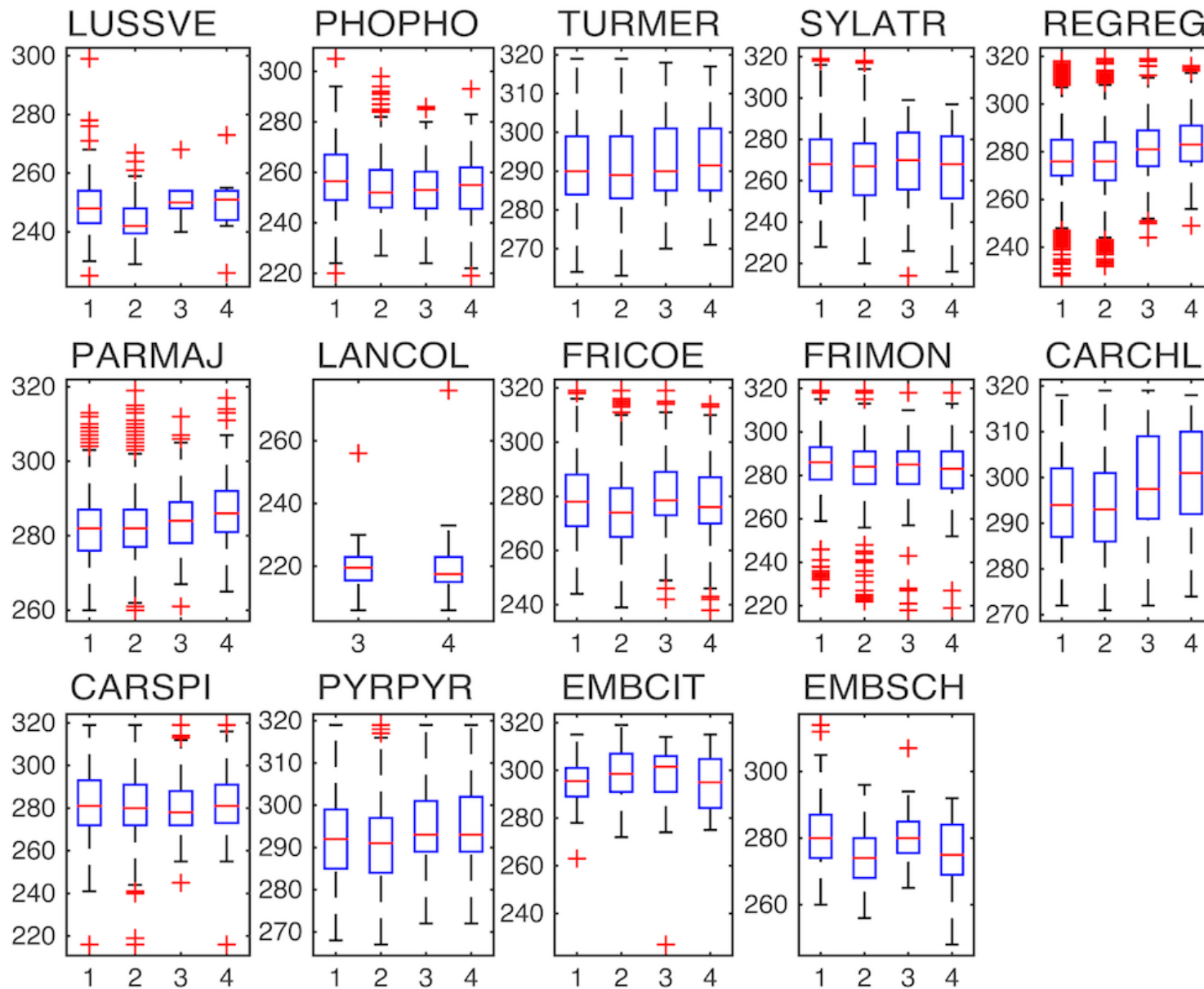
## Supplementary material

Aleksi Lehikoinen\*, Jarkko Santaharju & Anders Pape Møller: Sex-specific timing of autumn migration in birds: the role of sexual size dimorphism, migration distance and differences in breeding investment.  
— *Ornis Fennica* 94: 53–65.

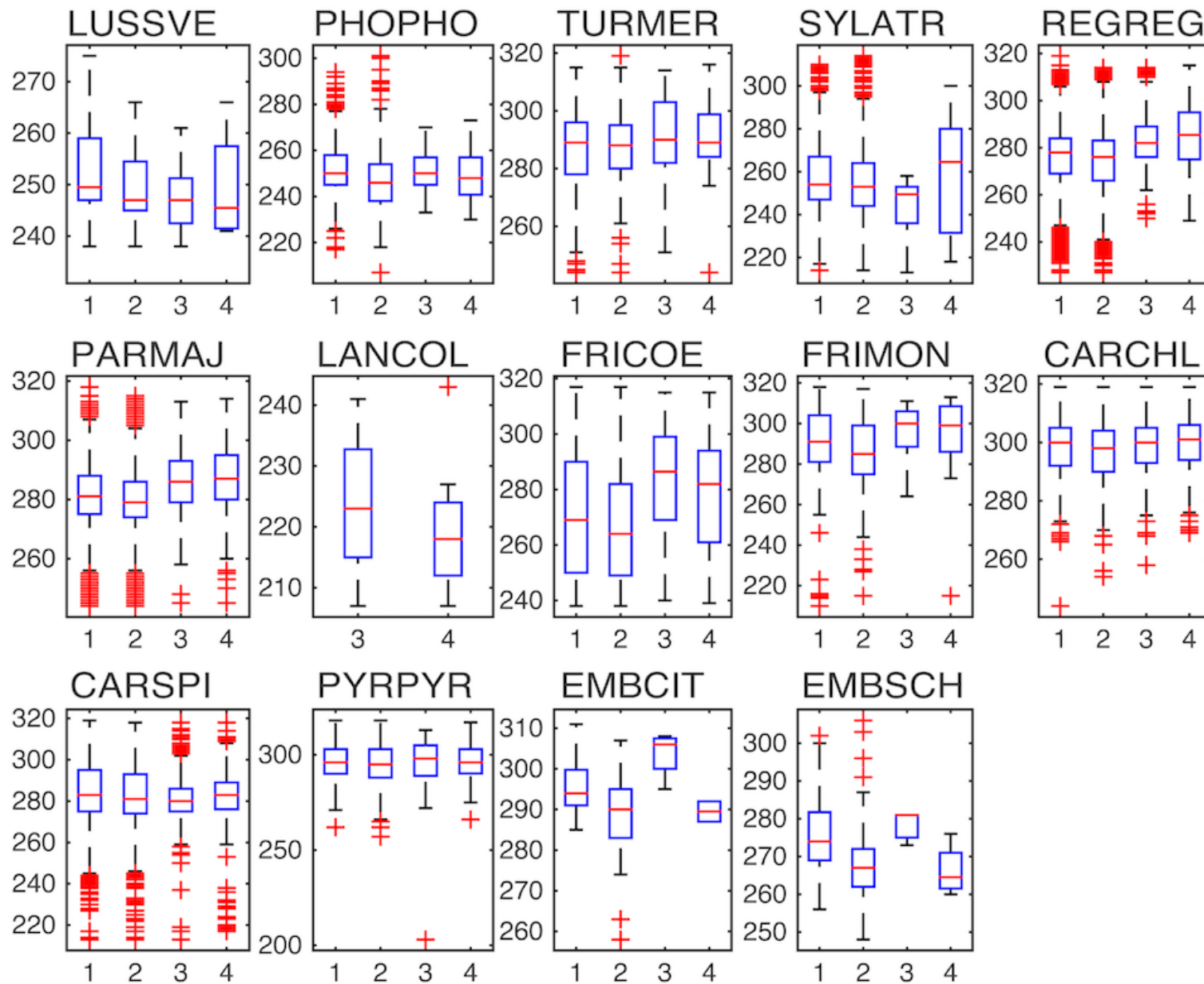
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Supplementary Figure 1. Species-specific migration dates given as day of the year (1 = 1 January) for different sex and age classes (1 = young male, 2 = young female, 3 = adult male, 4 = adult female) at the Hanko Bird Observatory. The name of the species is mentioned above each subfigure as acronym of the scientific name (e.g. LUSSVE = *Luscinia svecica*, Bluethroat). The boxes represent 50% of the annual observations (median red line in the middle) and bars the rest of the observations. Dots and asterisks are outliers.



Supplementary Figure 2. Species-specific migration dates given as day of the year (1 = 1 January) for different sex and age classes (1 = young male, 2 = young female, 3 = adult male, 4 = adult female) at the Lågskär Bird Observatory. The name of the species is mentioned above each subfigure as acronym of the scientific name (e.g. LUSSVE = *Luscinia svecica*, Bluethroat). The boxes represent 50% of the annual observations (median red line in the middle) and bars the rest of the observations. Dots and asterisks are outliers.

Supplementary Table 2. Parameter estimates and test values of mixed-effect models where autumn migration dates at Hanko are explained by the fixed factors of age, sex and migration strategy (SDM and LDM, short- and long-distance migrants, respectively) their interaction and site.

Parameter	b ± SE	df	t	P
Intercept	238.6 ± 6.4	12	37.08	< 0.001
Sex (males compared to females)	4.28 ± 1.13	9	3.80	0.004
Age (adults compared to young)	1.14 ± 2.84	27	1.78	0.088
Mig (adult males)	40.61 ± 7.56	12	5.37	< 0.001
Sex x Age (adult males compared to others)	-4.79 ± 2.30	44	-2.09	0.042
Sex x Mig (male SDMs compared to others)	-1.81 ± 1.27	9	-1.42	0.190
Age x Mig (adult SDM compared to others)	4.09 ± 3.13	22	1.31	0.205
Sex x Age x Mig (adult male SDMs compared to others)	3.50 ± 2.41	27	1.45	0.158

Supplementary Table 2. Comparison of the full models (Pro ~ SSD\*Age\*Mig + Site + 1 | Species; see methods) with different phylogenetic structures explaining protandry/protogyny in species. Phylogenetic structures were obtained from [www.birdtree.org](http://www.birdtree.org) (Jetz et al. 2012, see footnotes).

Phylogeny	DIC	ΔDIC
Tree7	191.072	0
Tree1	191.249	0.177
Tree3	191.274	0.202
Tree4	191.294	0.222
Tree5	191.302	0.230
Tree9	191.356	0.284
Tree8	191.361	0.289
Tree2	191.364	0.292
Tree6	191.382	0.310
Tree10	191.528	0.456

TREE1="(Lanius\_collurio:50.383099,((Parus\_major:43.406723,Sylvia\_atricapilla:43.406719):1.475883,(((Turdus\_merula:28.286951,(Luscinia\_svecica:19.206594,Phoenicurus\_phoenicurus:19.206594):9.080358):14.317297,Regulus\_regulus:42.604248):0.035341,(((Pyrrhula\_pyrrhula:16.076178,(Carduelis\_spinus:9.693218,Carduelis\_chloris:9.693218):6.382960):7.591964,(Fringilla\_coelebs:7.087906,Fringilla\_montifringilla:7.087906):16.580236):1.092516,(Emberiza\_schoeniclus:9.695303,Emberiza\_citrinella:9.695304):15.065355):17.878931):2.243015):5.500493):63.961510;"

TREE2="(Lanius\_collurio:45.213902,((Parus\_major:39.191963,Sylvia\_atricapilla:39.191959):1.577228,((Regulus\_regulus:39.196140,(Turdus\_merula:24.090317,(Luscinia\_svecica:16.402557,Phoenicurus\_phoenicurus:16.402557):7.687761):15.105825):0.578862,(((Pyrrhula\_pyrrhula:18.397964,(Carduelis\_chloris:11.610979,Carduelis\_spinus:11.610979):6.786987):7.508184,

(Fringilla\_coelebs:8.723475,Fringilla\_montifringilla:8.723475):17.182676):0.319137,  
(Emberiza\_schoeniclus:10.600456,Emberiza\_citrinella:10.600456):15.624830):13.549720):0.994182):4.444714):56.970169;"

TREE3="(Lanius\_collurio:53.613461,((Parus\_major:46.577984,Sylvia\_atricapilla:46.577988):1.489825,(((Turdus\_merula:36.437103,  
(Phoenicurus\_phoenicurus:22.646183,Luscinia\_svecica:22.646181):13.790926):9.968757,Regulus\_regulus:46.405861):0.376947,  
(((Pyrrhula\_pyrrhula:20.918615,(Carduelis\_chloris:13.340302,Carduelis\_spinus:13.340302):7.578315):10.481265,  
(Fringilla\_coelebs:8.188070,Fringilla\_montifringilla:8.188070):23.211811):0.649533,  
(Emberiza\_citrinella:11.953676,Emberiza\_schoeniclus:11.953676):20.095737):14.733396):1.285001):5.545652):49.677193;"

TREE4="(Lanius\_collurio:51.768074,((Parus\_major:41.837322,Sylvia\_atricapilla:41.837326):2.946698,((Regulus\_regulus:42.720211,  
(Turdus\_merula:25.636982,(Luscinia\_svecica:15.589845,Phoenicurus\_phoenicurus:15.589845):10.047138):17.083229):0.002987,  
(((Carduelis\_spinus:11.283958,Carduelis\_chloris:11.283958):3.856041,Pyrrhula\_pyrrhula:15.139999):7.039786,  
(Fringilla\_coelebs:7.460047,Fringilla\_montifringilla:7.460047):14.719739):0.473881,  
(Emberiza\_schoeniclus:7.272464,Emberiza\_citrinella:7.272465):15.381203):20.069530):2.060826):6.984051):43.039116;"

TREE5="(Lanius\_collurio:50.137672,((Parus\_major:41.313797,Sylvia\_atricapilla:41.313797):2.013063,((Regulus\_regulus:41.971741,  
(Turdus\_merula:26.461987,(Luscinia\_svecica:18.032173,Phoenicurus\_phoenicurus:18.032171):8.429812):15.509756):0.104273,  
(((Pyrrhula\_pyrrhula:13.926555,(Carduelis\_spinus:8.907168,Carduelis\_chloris:8.907168):5.019386):7.392084,  
(Fringilla\_coelebs:5.963190,Fringilla\_montifringilla:5.963190):15.355449):0.908863,  
(Emberiza\_schoeniclus:8.771775,Emberiza\_citrinella:8.771775):13.455727):19.848515):1.250844):6.810812):72.462234;"

TREE6="(Lanius\_collurio:56.401207,((Parus\_major:51.519814,Sylvia\_atricapilla:51.519817):1.252953,(((Turdus\_merula:33.903374,  
(Phoenicurus\_phoenicurus:20.138700,Luscinia\_svecica:20.138699):13.764673):18.198269,Regulus\_regulus:52.101643):0.096242,  
(((Pyrrhula\_pyrrhula:22.532259,(Carduelis\_chloris:13.292132,Carduelis\_spinus:13.292132):9.240128):6.441761,  
(Fringilla\_coelebs:9.463299,Fringilla\_montifringilla:9.463299):19.510721):3.285466,  
(Emberiza\_schoeniclus:12.086257,Emberiza\_citrinella:12.086257):20.173229):19.938398):0.574886):3.628437):55.616966;"

TREE7="(Lanius\_collurio:54.568249,((Parus\_major:45.866352,Sylvia\_atricapilla:45.866352):1.620013,(((Turdus\_merula:28.578970,  
(Luscinia\_svecica:18.514009,Phoenicurus\_phoenicurus:18.514009):10.064960):17.281273,Regulus\_regulus:45.860245):0.490390,  
(((Pyrrhula\_pyrrhula:18.049997,(Carduelis\_chloris:12.232369,Carduelis\_spinus:12.232370):5.817627):6.688509,  
(Fringilla\_coelebs:7.623513,Fringilla\_montifringilla:7.623514):17.114992):1.502818,  
(Emberiza\_schoeniclus:13.872449,Emberiza\_citrinella:13.872449):12.368875):20.109310):1.135733):7.081882):59.838425;"

TREE8="(Lanius\_collurio:50.714245,((Parus\_major:40.654369,Sylvia\_atricapilla:40.654373):4.293519,(((Turdus\_merula:20.003742,  
(Luscinia\_svecica:12.849714,Phoenicurus\_phoenicurus:12.849713):7.154028):22.498411,Regulus\_regulus:42.502151):1.377617,  
(((Carduelis\_chloris:12.016890,Carduelis\_spinus:12.016890):6.114943,Pyrrhula\_pyrrhula:18.131830):8.221398,  
(Fringilla\_coelebs:9.603033,Fringilla\_montifringilla:9.603033):16.750196):2.841004,  
(Emberiza\_citrinella:11.461585,Emberiza\_schoeniclus:11.461585):17.732651):14.685536):1.068121):5.766352):67.452576;"

TREE9="(Lanius\_collurio:54.151066,((Parus\_major:45.387062,Sylvia\_atricapilla:45.387058):2.268208,((Regulus\_regulus:46.813236,  
(Turdus\_merula:27.663956,(Phoenicurus\_phoenicurus:18.485250,Luscinia\_svecica:18.485249):9.178705):19.149284):0.218327,  
(((Carduelis\_spinus:13.086466,Carduelis\_chloris:13.086466):6.592345,Pyrrhula\_pyrrhula:19.678812):8.968523,

(Fringilla\_coelebs:9.807929,Fringilla\_montifringilla:9.807929):18.839405):0.497130,  
(Emberiza\_schoeniclus:16.031437,Emberiza\_citrinella:16.031437):13.113026):17.887102):0.623703):6.495799):49.091492;"

TREE10="(Lanius\_collurio:55.694695,((Parus\_major:44.916023,Sylvia\_atricapilla:44.916023):1.970020,(((Turdus\_merula:30.122612,  
(Luscinia\_svecica:18.819389,Phoenicurus\_phoenicurus:18.819391):11.303223):14.540756,Regulus\_regulus:44.663368):1.819273,  
(((Pyrrhula\_pyrrhula:18.959946,(Carduelis\_chloris:12.564382,Carduelis\_spinus:12.564382):6.395566):8.994919,  
(Fringilla\_coelebs:8.635311,Fringilla\_montifringilla:8.635311):19.319553):1.203144,  
(Emberiza\_citrinella:11.102395,Emberiza\_schoeniclus:11.102395):18.055613):17.324633):0.403401):8.808649):59.259014;"