

Supplementary material

Henning Heldbjerg*, Kevin Kuhlmann Clausen, Lei Cao & Anthony David Fox 2024:
GPS-tracking reveals winter short-stopping and large differences in individual
migratory distance among Greylag Geese (*Anser anser*) breeding in Denmark. —
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Table S1. Overview of all included individual Greylag Geese (*Anser anser*). Status of the bird/tag is per the end the included period (1 June 2023).

Status: A – alive, D – Bird probably dead, L – Logger stopped and O – omitted from this study. ID #17581 was omitted from the calculations of mean distance from the breeding site (see text). Date in bracket for last position indicate ongoing activity.

Ringling Year	ID	Area	Site	Sex	Age	Max distance from ringing site (km)	Max distance site	Date of last position	Status
2021	17581	Djursland	Clausholm	M	Ad	157	Wadden Sea	30-12-2021	D/O
2021	17593	Djursland	Clausholm	F	Juv	108	Thy	18-12-2022	D
2021	17597	Djursland	Clausholm	F	Ad	156	Wadden Sea	27-12-2021	L
2021	17592	Djursland	Kastrup Mose	F	Ad	2502	Spain	(1-6-2023)	A
2021	17594	Djursland	Kastrup Mose	F	Ad	2500	Spain	(1-6-2023)	A
2021	17596	Djursland	Kastrup Mose	F	Ad	2500	Spain	27-05-2022	D
2021	17599	Djursland	Kastrup Mose	F	Ad	2500	Spain	18-05-2022	D
2022	11575	Zealand	Agersø, Lillemaden	F	Ad	31	Lolland	(01-06-2023)	A
2022	11579	Zealand	Agersø, Lillemaden	F	Ad	53	Zealand	(01-06-2023)	A
2022	11610	Zealand	Agersø, Lillemaden	F	Ad	73	Møn	(01-06-2023)	A
2022	11612	Zealand	Agersø, Krebsgaarden	F	Ad	185	German Wadden Sea	(01-06-2023)	A
2022	11617	Zealand	Agersø, Lillemaden	F	Ad	77	Lolland	(01-06-2023)	A
2022	11640	Zealand	Agersø, Krebsgaarden	F	Ad	623	The Netherlands	(01-06-2023)	A
2022	11570	Zealand	Agersø, Krebsgaarden	F	Ad	53	Zealand	21-11-2022	L
2022	11703	Zealand	Agersø, Krebsgaarden	F	Ad	19	Local	10-05-2023	L
2022	11603	Zealand	Agersø Krebsgaarden	F	Ad	NA	Local	17-08-2022	L/O
2022	11692	Zealand	Agersø, Lillemaden	F	Ad	NA	Local	26-06-2022	L/O
2022	11624	Zealand	Skjoldnæsholm Engsø	F	Ad	92	Lolland	(01-06-2023)	A

Table S2. Timing of migration and staging periods for four Danish breeding Greylag Geese (*Anser anser*) during their migrations to and from Coto Doñana, Spain during the winter 2021/2022. The number of days mentioned includes first and last day.

Season	Activity	17592	17594	17596	17599
Autumn	Start of migration	21 Nov	5 Nov	21 Nov	22 Oct
	Staging sites				
	Germany		5–14 Nov		23 Oct
	Netherlands		14–21 Nov		23 Oct–5 Nov
	France	22 Nov	21–22 Nov		6 Nov
	Spain	22–23 Nov	22–23 Nov	22–27 Nov	
	Arrival Coto Doñana	23 Nov	23 Nov	27 Nov	6 Nov
	Migration duration (days)	3	19	7	16
Spring	Departure Coto Doñana	2 Feb	7 Feb	10 Dec	8 Feb
	Staging sites				
	Spain		8 Feb	10 Dec–16 Feb	
	France	3–4 Feb	9 Feb	16–18 Feb	
	Netherlands	4–5 Feb	9–19 Feb	18–27 Feb	9–17 Feb
	Germany		22–23 Feb		17 Feb
	End of migration	5 Feb	23 Feb	28 Feb	18 Feb
	Migration duration (days) ¹	4	17	81 (14)	10
Total	Coto Doñana (days) ¹	72	77	14 (81)	95
	Days away from Denmark	77	111	100	119

¹ Goose #17596 stayed near Cordoba. ca. 220 km north of Doñana until 15 February. Figures in brackets include this period at Coto Doñana.



Fig. S1. Map of the included sites in Denmark for ringing and tagging Greylag Goose (*Anser anser*) in 2021 and 2022. See also Table S1.

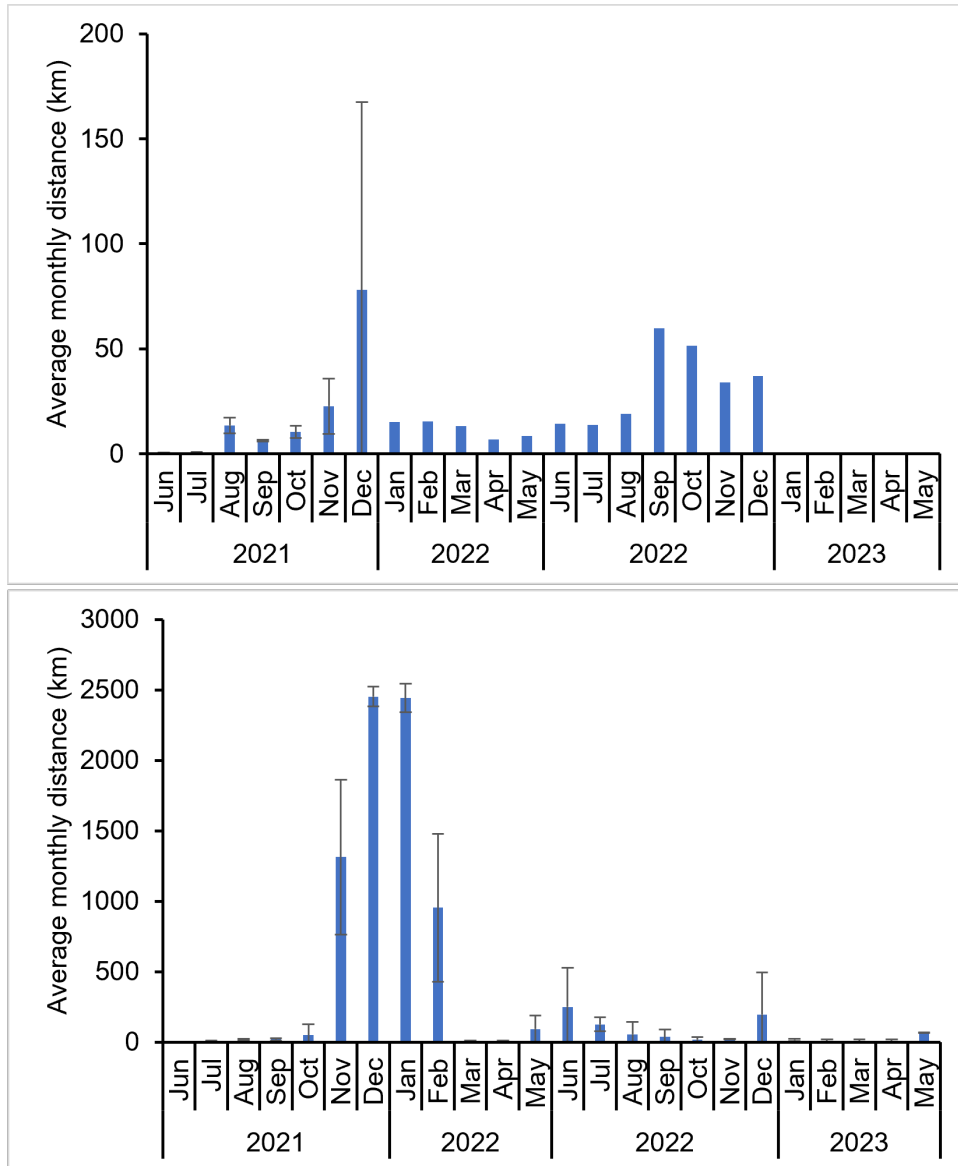


Fig. S2. Mean (\pm 95% CI) monthly distance to the ringing site for seven Greylag Geese (*Anser anser*) ringed at Djursland in June 2021. Upper: Three sedentary birds (only one from January 2022). The male goose #17581 mated one of the included females and was therefore excluded from this calculation to avoid pseudo-replication. Lower: Four migrating birds (only two from June 2022). Note the different scales of the y-axes.

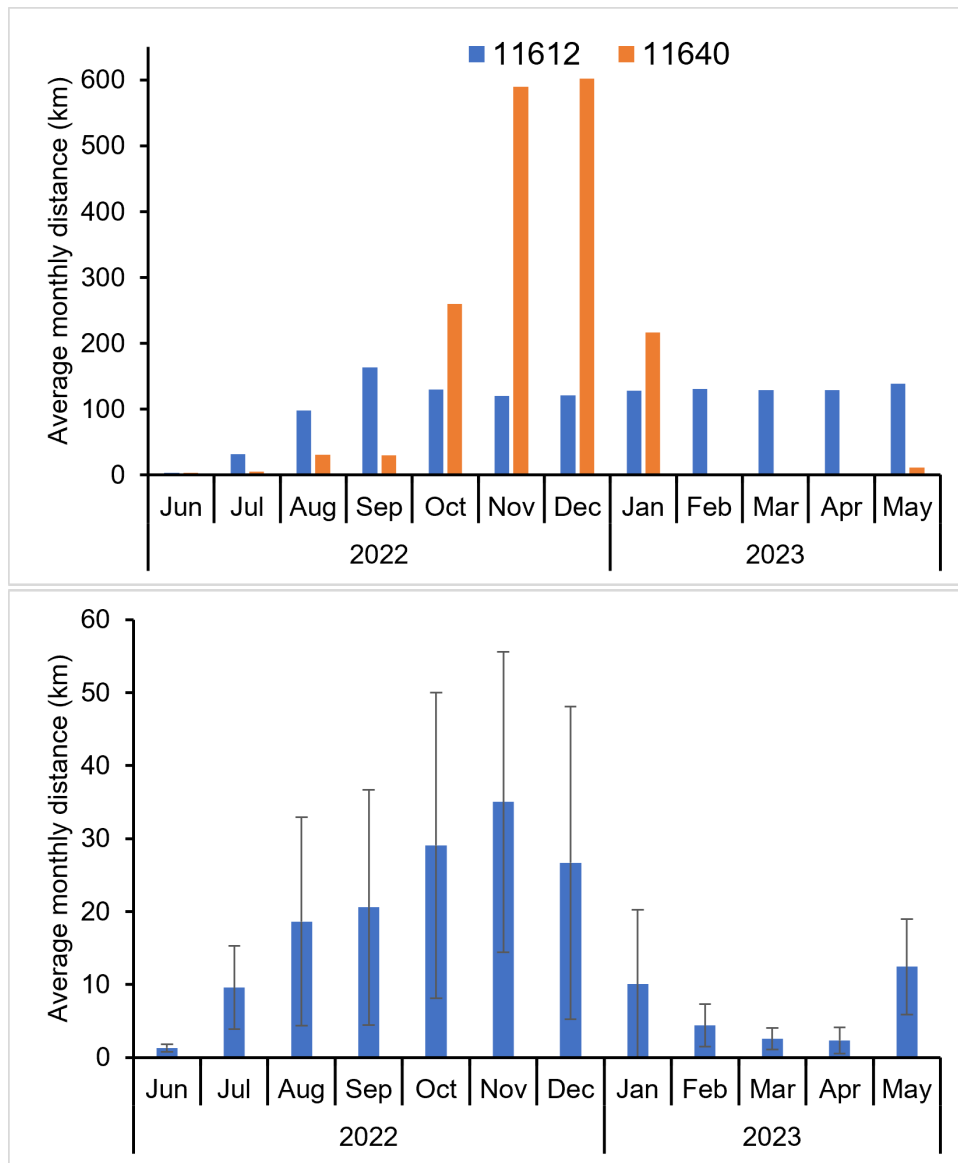


Fig. S3. Mean (\pm 95% CI) monthly distance to the ringing site for nine Greylag Geese (*Anser anser*) ringed at Zealand in June 2022. Upper: Two birds are presented in a separate graph: One bird (#11612) went to Germany and never returned to the ringing site. Another bird (#11640) migrated to the Netherlands during winter. Lower: The remaining seven geese stayed closer to the ringing site all year round. Note the different scales of the y-axes.

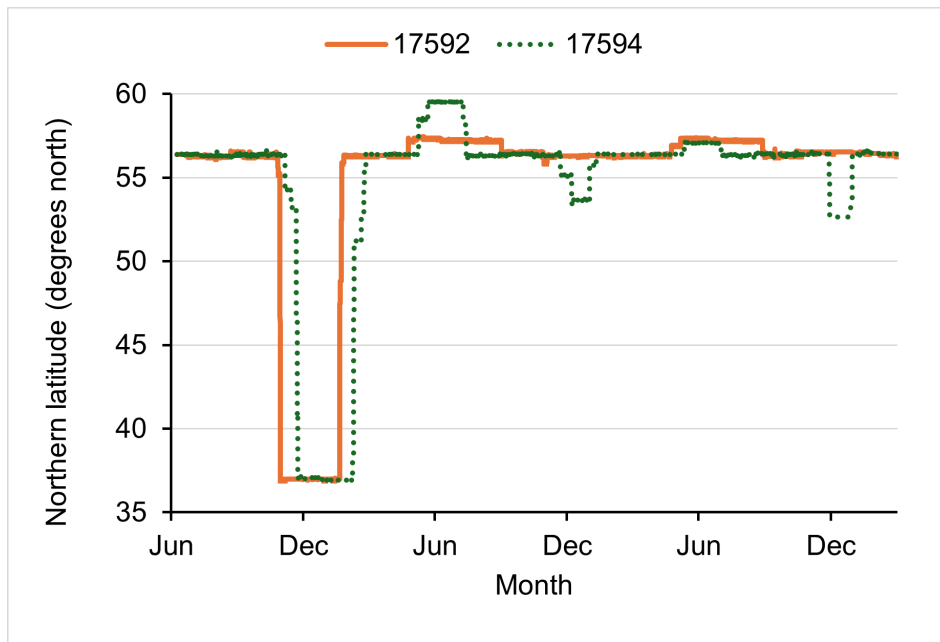


Fig. S4. Seasonal changes in latitude of two individual Greylag Geese (*Anser anser*) during the period 9 June 2021 (when they were ringed at Kastrup Mose in Denmark) to 1 March 2024. Both geese migrated to Coto Doñana in Spain in the winter of 2021/2022 and returned to the breeding area in early spring. The bird with logger #17592 stayed in Denmark in the following two winters while #17594 went to Wadden Sea in Germany in 2022/2023 and to Ijsselmeer in the Netherlands in 2023/2024. Notice also that both birds migrated to moulting sites north of the breeding area in both years.