

Supplementary material

Grim, T., Samaš, P., Moskát, C., Kleven, O., Honza, M., Moksnes, A., Røskaft, E. & Stokke, B.G. (2011) Constraints on host choice: why do parasitic birds rarely exploit some common potential hosts? *Journal of Animal Ecology*, **80**, 508–518 (doi: 10.1111/j.1365-2656.2010.01798.x)

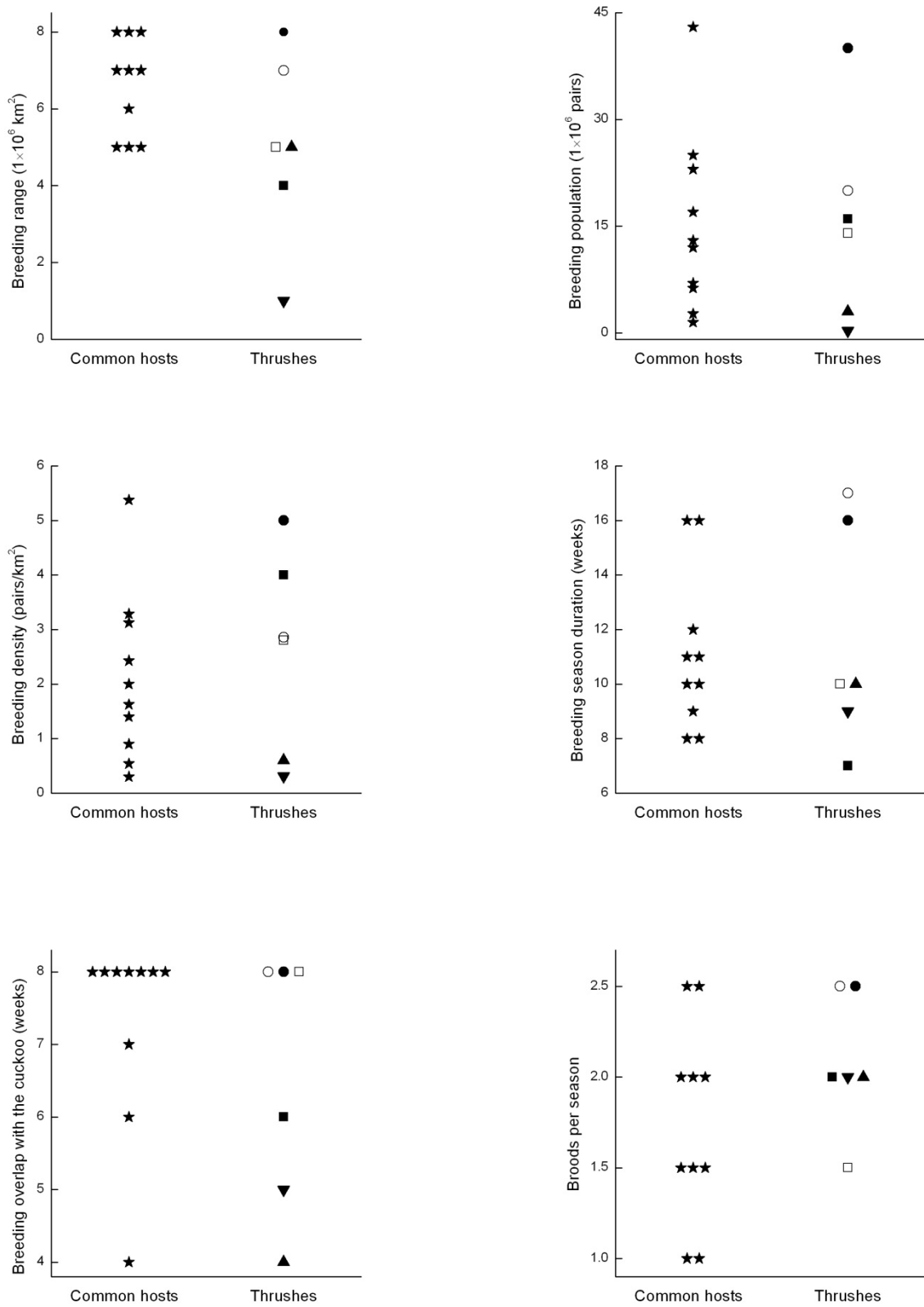
Appendix S1 Location of studied thrush populations living in sympatry or allopatry with cuckoos.

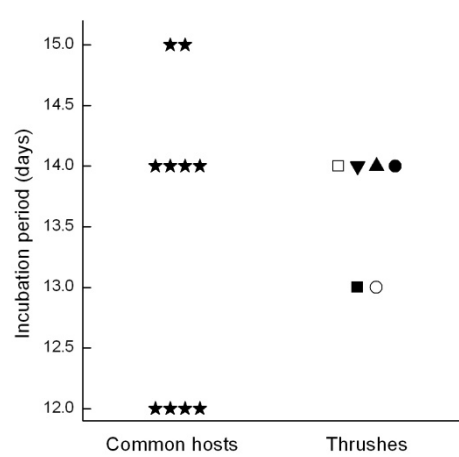
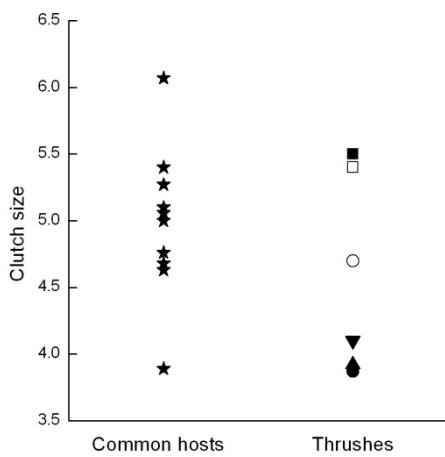
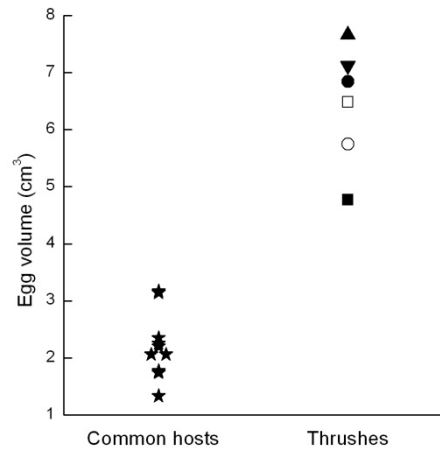
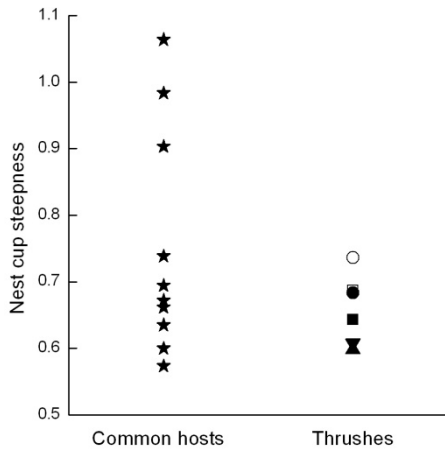
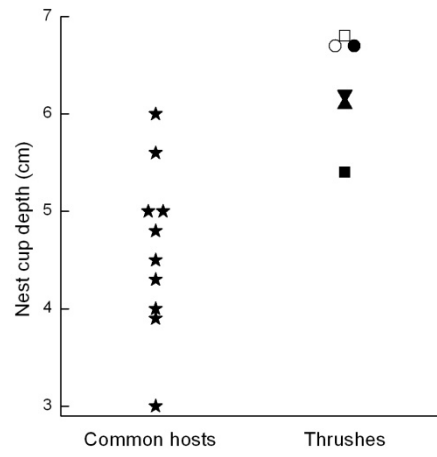
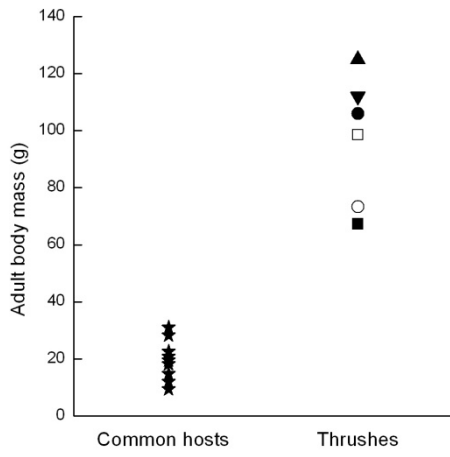
Study area	Country	Status	Latitude N	Longitude E
Buda hills	Hungary	sympatry	47° 01′	19° 00′
Budapest	Hungary	allopatry	47° 30′	19° 05′
Lužice	Czech Republic	sympatry	48° 51′	17° 04′
Brno	Czech Republic	allopatry	49° 12′	16° 38′
V. Knínice	Czech Republic	sympatry	49° 14′	16° 25′
Grygov	Czech Republic	sympatry	49° 32′	17° 19′
Olomouc	Czech Republic	allopatry	49° 35′	17° 15′
Rørkær	Denmark	sympatry	55° 25′	09° 14′
Lund	Sweden	allopatry	55° 42′	13° 10′
Oslo	Norway	allopatry	59° 55′	10° 45′
Tydal	Norway	sympatry	63° 04′	11° 34′
Stjørdal	Norway	allopatry	63° 27′	10° 57′

Figure S1. Variation in life-history traits between thrushes and common hosts: (a) general life-history traits, (b) specific parasitism-related traits (see Table S1 for explanation). Common hosts (★) include 10 most common hosts reported by Moksnes & Røskaft (1995). Thrushes include all 6 European members of genus *Turdus*: blackbird (●), song thrush (○), redwing (■), fieldfare (□), mistle thrush (▲), ring ouzel (▼). We extracted data from literature (Perrins 1998; Soler, Møller & Soler 1999; N. B. Davies, pers. comm.; M. Martín-Vivaldi, pers. comm.). In some cases information on the particular trait was not available (e.g., latency to egg rejection in the dunnoek *Prunella modularis* which is a pure acceptor of alien eggs).

Figure S2. Cuckoo chick growth in the nest of the fieldfare. The cuckoo hatched one day before the host chick but was quickly overgrown by the host nestling. The latter fledged at a typical age of 13 days post-hatch whereas the cuckoo suffered from poor growth and died at the age of 16 days at extremely low mass.

Figure S1a





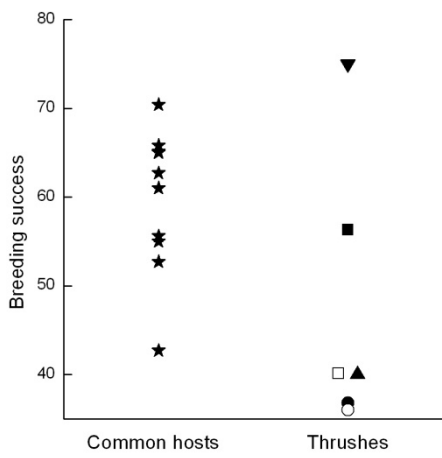
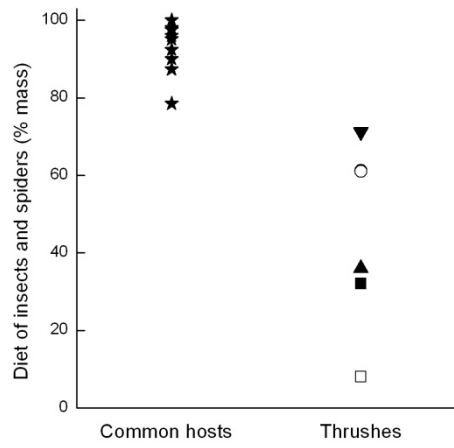
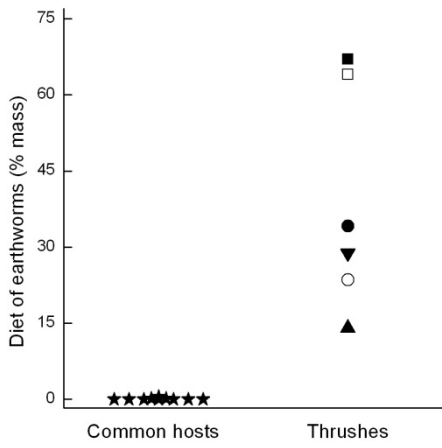
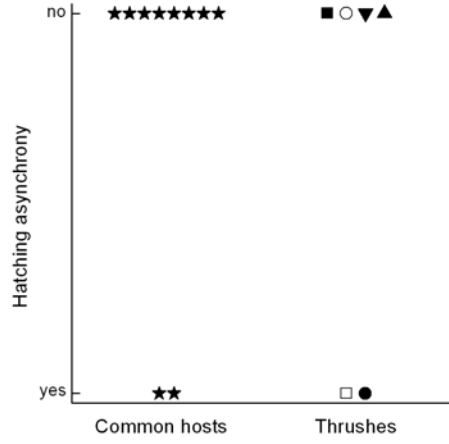
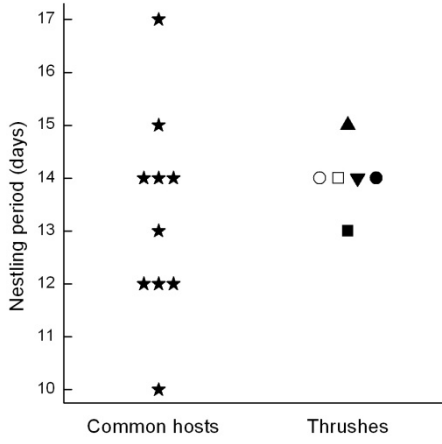
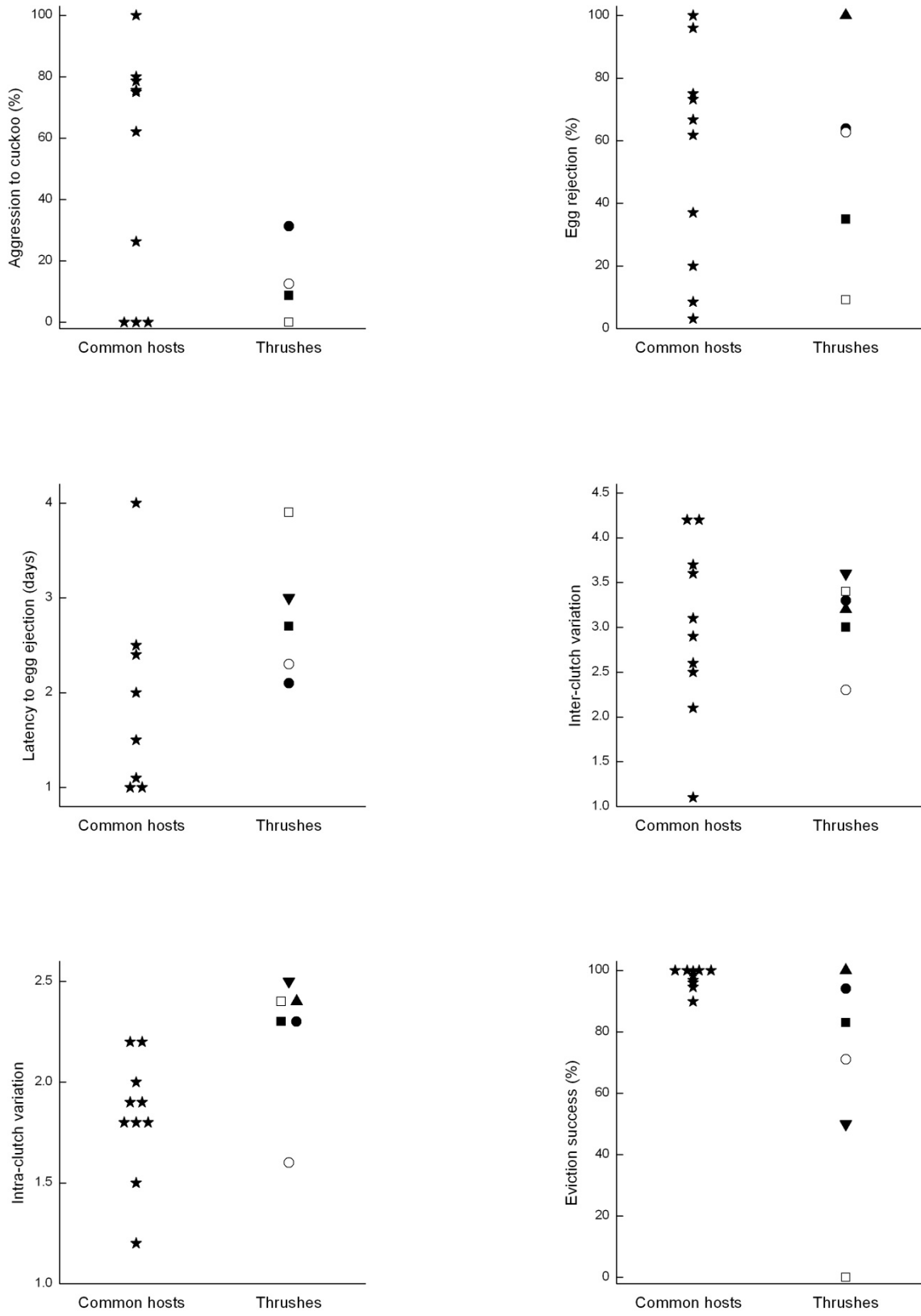


Figure S1b



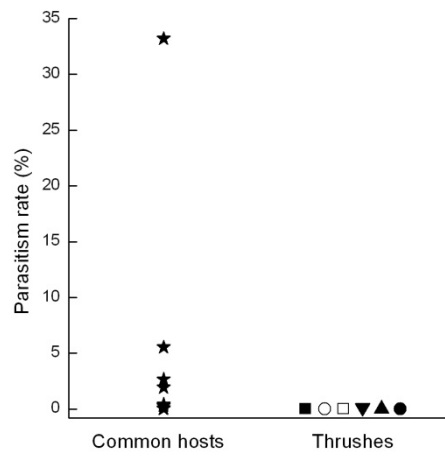


Figure S2

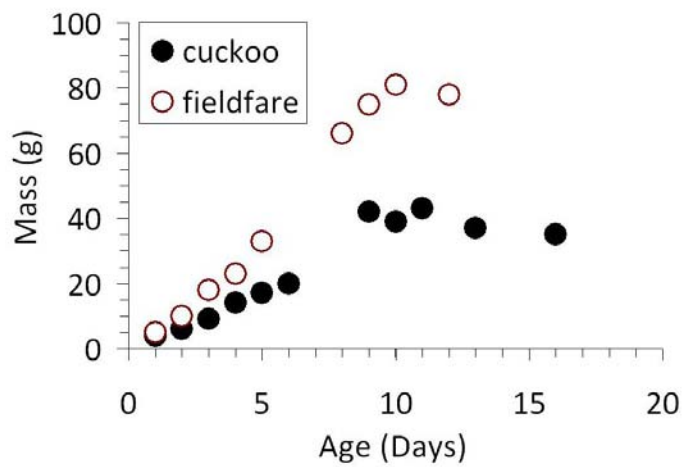


Table S1 Predictions for differences in candidate life-history characteristics between thrushes and regular cuckoo hosts. “Predicted differences” under the hypothesis that the particular factor explains the absence of cuckoo parasitism in thrushes. “–” = predicted lower value of the trait in thrushes than in common hosts, “+” = the opposite. “**General life-history traits**” may cause primary unsuitability of hosts for exploitation by parasites (such traits prevent host-parasite co-evolution). “**Specific parasitism-related traits**” may cause secondary unsuitability and represent host defences previously evolved due to brood parasitism (such traits do not enable parasites to colonize such hosts again). For rationales behind each hypothesis see sources in “References” column.

Trait	Predicted difference	References
General life-history traits		
Breeding range	–	Soler, Møller & Soler (1999)
Breeding population	–	Soler, Møller & Soler (1999)
Breeding density	–	Soler, Martín-Vivaldi & Møller (2009)
Duration of the breeding season	–	Soler, Møller & Soler (1999)
Overlap of breeding with the cuckoo	–	Honza, Kuiper & Cherry (2005)
Broods per season	–	Soler, Møller & Soler (1999)
Adult body mass	+	Soler, Møller & Soler (1999)
Nest cup depth	+	Grim <i>et al.</i> (2009a)
Nest cup steepness (depth/diameter ratio)	+	Grim <i>et al.</i> (2009a)
Egg volume	+	Moksnes <i>et al.</i> (1991)
Clutch size	+	Soler, Møller & Soler (1999)
Incubation period duration	–	Soler, Møller & Soler (1999)
Nestling period duration	–	Soler, Møller & Soler (1999)
Hatching asynchrony (presence)	+	Soler (2002)
Diet – insects + spiders	–	Grim & Honza (2001)
Diet – earthworms	+	Grim (2006)
Breeding success	–	Avilés <i>et al.</i> (2006)
Specific parasitism-related traits		
Aggression to cuckoo	+	Røskaft <i>et al.</i> (2002)
Egg rejection	+	Honza <i>et al.</i> (2004)
Latency to egg ejection	–	Honza <i>et al.</i> (2004)
Responses in sympatry vs. allopatry	S > A	Stokke <i>et al.</i> (2008)
Inter-clutch variation	+	Øien, Moksnes & Røskaft (1995)
Intra-clutch variation	–	Øien, Moksnes & Røskaft (1995)
Eviction success	–	Grim <i>et al.</i> (2009a,b)

Table S2 Responses by thrushes to simulated brood parasitism. Host responses include aggression to stuffed dummies of the common cuckoo and the hooded crow, rejection of parasitic model eggs (blue and spotted) and latencies to egg rejection in sympatry and allopatry with the cuckoo. For effect sizes see Table 1. For statistical and experimental procedure details see Methods. *d.d.f.* = denominator degrees of freedom. Nominator degrees of freedom = 1 in all cases except “nest stage” that had 4 *d.f.* in aggression analyses and 2 *d.f.* in egg rejection and latency analyses).

Predictor	Blackbird			Song thrush			Redwing			Fieldfare		
	<i>d.d.f.</i>	<i>F</i>	<i>P</i>	<i>d.d.f.</i>	<i>F</i>	<i>P</i>	<i>d.d.f.</i>	<i>F</i>	<i>P</i>	<i>d.d.f.</i>	<i>F</i>	<i>P</i>
Aggression												
Geography	160	0.22	0.64	114	1.04	0.31	120	2.09	0.15	138	0.00	1.00
Dummy	161	3.97	0.05	113	0.52	0.47	121	39.07	<0.0001	139	0.00	0.97
G*D	136	0.70	0.41	79	0.92	0.34	.	.	.	.	.	.
Clutch	137	0.11	0.74	94	2.09	0.15	105	2.47	0.12	118	0.12	0.73
Nest stage	156	1.43	0.23	90	2.20	0.08	102	0.79	0.50	115	0.05	0.98
Laying date	148	0.12	0.73	80	0.00	0.98	101	0.09	0.77	137	0.95	0.33
Egg rejection												
Geography	128	0.01	0.93	71	2.18	0.14	144	1.87	0.17	67	2.50	0.12
Egg model	129	2.47	0.12	72	6.00	0.02	143	0.93	0.34	66	0.08	0.77
G*E	121	3.15	0.08	67	0.00	0.95	.	.	.	.	.	.
Clutch	123	0.50	0.48	69	0.15	0.70	137	0.01	0.94	62	0.56	0.46
Nest stage	127	2.47	0.12	70	0.18	0.67	141	0.35	0.55	65	1.85	0.18
Laying date	122	0.27	0.61	68	0.04	0.85	.	.	.	64	0.56	0.46
Latency to egg rejection												
Geography	91	6.43	0.01	54	1.49	0.23	52	1.78	0.19	13	0.37	0.55
Egg model	90	1.41	0.24	53	1.41	0.24	51	0.46	0.50	14	4.64	0.049
G*E	84	0.72	0.40	49	1.36	0.25	.	.	.	.	.	.
Clutch	86	0.99	0.32	51	0.05	0.83	45	0.04	0.84	14	6.91	0.02
Nest stage	85	0.58	0.45	50	0.01	0.94	50	0.34	0.56	12	0.16	0.70
Laying date	89	0.18	0.68	52	1.97	0.17	49	0.19	0.67	14	11.84	0.004

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