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Digital supplementary material

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Insights into social organization and population genetics of introduced *Odontomachus troglodytes* (Hymenoptera: Formicidae) in Taiwan

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Appendix, as digital supplementary material to this article, at the journal's web pages:

Fig. S1: Rapid antennation (RA) duration box chart for each encounter (encounters over 10 are grouped together), plotted using R to illustrate the overtime bout duration pattern among the five groups.
Fig. S2: Combined rapid antennation (RA) duration across both populations.
Tab. S1: Colony IDs, collected counties, and the latitudes and longitudes of collected nests. Latitude and longitude data are represented in WGS84 (World Geodetic System 1984).
Tab. S2: Characteristics of the developed microsatellite markers.
Tab. S3: Model selection for rapid antennation duration analysis using quasi-information criterion (QIC).
Tab. S4: Pairwise relatedness values among *O. troglodytes* individuals in Chiayi and Kaohsiung populations.

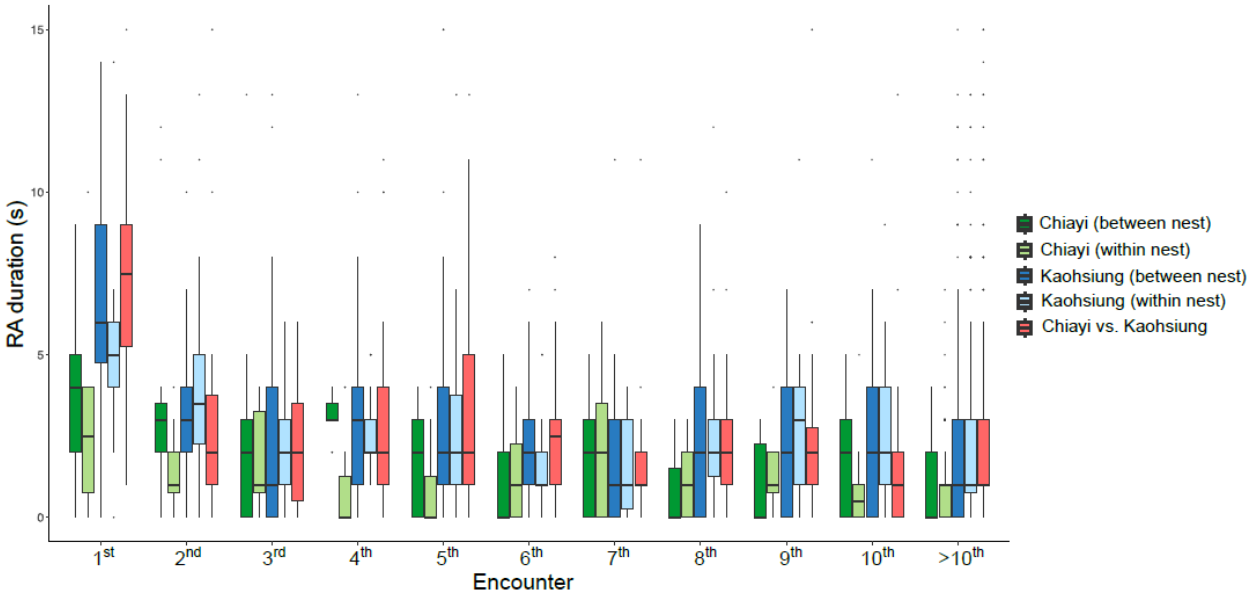

Fig. S1: Rapid antennation (RA) duration box chart for each encounter (encounters over 10 are grouped together), plotted using R to illustrate the overtime bout duration pattern among the five groups. Dark green: Duration of nests-to-nest in Chiayi; Light green: Duration of within nests in Chiayi; Dark blue: Duration of nests-to-nest in Kaohsiung; Light blue: Duration of within nests in Kaohsiung; Red: Chiayi vs. Kaohsiung.

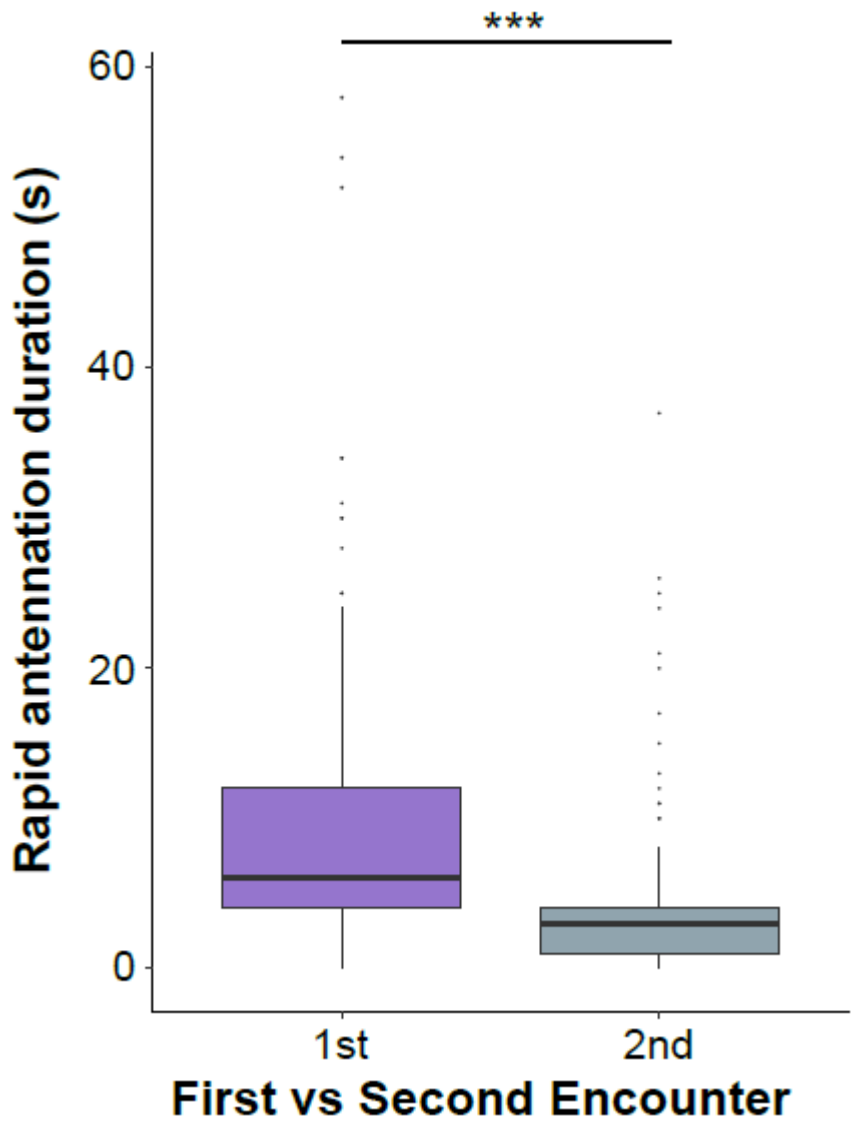

Fig. S2: Combined rapid antennation (RA) duration across both populations. RA duration during the first and second encounters is shown for all assays pooled from Chiayi and Kaohsiung. This summary figure illustrates the overall pattern of decreased RA duration during second encounters. Statistical differences were tested using Generalized Estimating Equations (***$p < 0.001$). Note: This figure presents pooled data and does not reflect population-level differences, which are presented in Figure 3.

Tab. S1: Colony IDs, collected counties, and the latitudes and longitudes of collected nests. Latitude and longitude data are represented in WGS84 (World Geodetic System 1984).

Nest	County	Latitude	Longitude
CY01	Chiayi	23.49076	120.47226
CY02	Chiayi	23.49076	120.4723
CY03	Chiayi	23.49069	120.47228
CY04	Chiayi	23.49069	120.47276
CY05	Chiayi	23.49076	120.47264
KH01	Kaohsiung	22.61907	120.37898
KH02	Kaohsiung	22.61907	120.37921
KH03	Kaohsiung	22.61898	120.37931
KH04	Kaohsiung	22.59272	120.37104
KH05	Kaohsiung	22.59255	120.37126
KH06	Kaohsiung	22.55818	120.38945
KH07	Kaohsiung	22.55820	120.38947

Tab. S2: Characteristics of the developed microsatellite markers.

Marker	Repeat motif	Primer sequence (5′-3′)	Ta (°C)	*Na*	*He*	*Ho*	Size range (bp)
OT1	(CT)^16	F: AACAGGGTGCGTTCTCTCTC	58	2	0.241	0.179	112-114
		R: TAATTTTCGTGGCACGGCAC					
OT2	(GTC)^12	F: CGTAATTAACGCCTCGACGC	58	2	0.373	0.27	112-115
		R: AATCCGTCCGCTTATGGTGC					
OT3	(AG)^13	F: CTTTGTAACCCCGACGAAGC	58	—	—	—	
		R: TCTCCCTCTCTCCCTCTCAC					
OT4	(GA)^11	F: ACGAGTCGGTATGTGCCTTC	58	2	0.214	0.047	113-115
		R: AACGACACGAAAACAAGCGG					
OT5	(CA)^11	F: ACCGTCACACTGTCGTTACG	58	3	0.603	0.365	109-134
		R: GATTCAACGAACCGTCTCGC					
OT6	(AG)^14	F: GAGAGAAACGGGAAAGGGGG	58	—	—	—	
		R: TACCGACTGCTACGTTGCTC					
OT7	(CT)^14	F: AACCTGCAGGGAGACGTTAC	58	—	—	—	
		R: GAGAGAGAGCGAGAGAGAGAAG					
OT8	(CT)^11	F: AGAAAACGCGCCTCTCTCTC	58	3	0.616	0.382	112-116
		R: GAGTCGCCGCATTCGAAATG					
OT9	(AG)^12	F: AACGAGACAAAGTAGGGAGTGG	58	—	—	—	
		R: TCTCTCTCTTTCTCCCTCCCC					
OT10	(AGTG)^11	F: ACGTGAGTGAGTGAGTGAGTG	58	—	—	—	
		R: ACACACACACACACACACAC					
OT11	(CT)^11	F: TCTGCGTGTCAGACAGGTTC	58	1	0	0	120
		R: GATGAATCAACGCGGCAGAC					
OT12	(CA)^14	F: TTTCCCGTTGGAGTATGGCC	58	3	0.549	0.418	207-211
		R: AAGGCCGGAGACTTTTGGAG					
OT13	(AT)^12	F: GTGAAACTGCCGTCGTTCTG	58	—	—	—	
		R: GTGAAACTGCCGTCGTTCTG					
OT14	(TC)^13	F: TACGTCACACCAGCTGGAAC	58	—	—	—	
		R: GAATCGATTCGACCTCCGGG					
OT15	(TG)^11	F: AGCAGCGTCCCTTAAGTACG	58	2	0.108	0.085	215-221
		R: TCCAAGCGCGGTACTAACAG					
OT16	(CA)^12	F: ACACGCACACACACTCTCTC	58	2	0.237	0.142	212-214
		R: ATTACGAGCGACGAGAGCTG					
OT17	(CT)^12	F: TTTCGGGCAATGCGTTTCTG	58	2	0.211	0.151	216-219
		R: GCTAATACCGACAGGGGAGC					
OT18	(CT)^13	F: CCACGCTCGCTTTCGATAAC	58	3	0.502	0.437	218-226
		R: TACAACGACCGCGCTAATGG					
OT19	(TA)^12	F: AATTTCCTCCCGGATTTCTCTG	58	—	—	—	
		R: TGACTGACAGCTCGTACGAC					
OT20	(AG)^15	F: GGCTGGAGAGGACATGATGG	58	2	0.204	0.183	212-214

	R: GGTCTCACCTCCTCTTTCGC

Empty entries in columns indicate NA values for markers that could not be amplified and were excluded from subsequent analyses.
He: Expected heterozygosity; Ho: Observed heterozygosity; Na: Number of alleles in workers; Ta: Annealing temperature; Size range: Product size of amplified alleles.

Tab. S3: Model selection for rapid antennation duration analysis using quasi-information criterion (QIC).

Model	QIC	Parameters
Encounter Sequence × Group	69934.51	10
Encounter Sequence + Group	70873.92	6
Encounter Sequence × Category	70669.42	6
Encounter Sequence + Category	71244.84	4
Encounter Sequence only	71750.12	2

Group levels: Chiayi (between-nests), Chiayi (within-nest), Kaohsiung (between-nests), Kaohsiung (within-nest), and cross-regional Chiayi–Kaohsiung pairings. Category levels: within-nest (workers from the same nest), between-nest (workers from different nests within the region), and between-region (workers from Chiayi versus Kaohsiung).

Tab. S4: Pairwise relatedness values among *O. troglodytes* individuals in Chiayi and Kaohsiung populations. Relatedness was estimated using the Queller & Goodnight (1989) estimator and grouped by pair type (Worker–Worker or Queen–Worker) and nest category (within-nest or between-nest).

Region	Pair Type	N	Mean	SD
Kaohsiung	Worker-Worker (within)	30	0.188	0.514
Kaohsiung	Worker-Worker (between)	160	-0.081*	0.431
Kaohsiung	Queen-Worker (within)	48	0.074	0.452
Kaohsiung	Queen-Worker (between)	192	-0.051	0.453
Chiayi	Worker-Worker (within)	24	-0.013	0.426
Chiayi	Worker-Worker (between)	96	-0.013	0.439
Chiayi	Queen-Worker (within)	24	0.221*	0.410
Chiayi	Queen-Worker (between)	72	-0.159 **	0.450

N = number of pairwise comparisons. Values shown are mean relatedness ± standard deviation (SD). Values that significantly deviate from zero (based on Wilcoxon signed-rank tests) are indicated with asterisks: * $p < 0.05$, ** $p < 0.01$.