

Maternal and nourishment factors interact to influence offspring developmental trajectories in social wasps

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Electronic Supplementary Material-1: Nest Collection, Field Site Set-up, and Colony Samples.

Fifty wooden boxes (14 cm x 14 cm x 14 cm, open at the bottom but covered with a coarse wire screen 1x1cm mesh) were set up at the Iowa State University (ISU) Horticulture Farm to attract nesting wasps. We also set up 75 boxes each at two additional field sites in central Iowa: Iowa 4-H Center (Madrid, Iowa), and Chichaqua Bottoms Greenbelt (Maxwell, Iowa). Foundress-reared (FR) nests (with 1st instar or older larvae in the nest; Figure 1a) from these two sites were subsequently transplanted to the ISU Horticulture Farm. Nest transplantation facilitates nest monitoring, ensures all nests experience the same local site conditions, and does not alter colony development (27). Colonies were collected in June (after 1st instar larvae appeared in each colony), between 05 00 and 07 00 to ensure that all colony members were present on the nest. Transplanted colonies were sealed with duct tape for transport, then opened 1-2 hours after boxes were set up in the field. Nineteen colonies originated at the Horticulture Farm (6 in 2013, 13 in 2014), 53 were transplanted there from Madrid, IA (32 in 2013, 21 in 2014), and 18 were transplanted from Maxwell, IA (4 in 2013, 14 in 2014).

Colonies and samples collected for analyses. Data are separated by year and organized by treatment group (colonies that produced only FR pre-pupae, followed by those that produced WR pre-pupae or both). No. Found = the number of foundresses observed on the nest before workers emerged. Dates = range of dates when samples were collected from the nest. When No. FR pre-pupae and No. WR pre-pupae used in lipid (L) and gene expression (G) analyses was not equal, we denoted the number used for each. Worker:brood = workers: all female adults seen on nest (foundress + offspring); brood: all 1st-5th instar larvae (does not include eggs or pupae). Numbers in parentheses are calculated 1:x ratios.

2013 Data:

Colony	No. Found	Drum	Foraging	No. FR pre-pupae	Dates FR pre-pupae	No. WR pre-pupae	Dates WR pre-pupae	Worker:brood
A1	1			1	7/8/13			
D4	1			1	6/21/13			
G7	1			1L, 0G	7/2/13			
N14	1			1L, 0G	7/8/13			
R18	1			1L, 0G	7/8/13			
U21	1			1L, 0G	7/2/13			
U46	1			1	7/8/13			
X24	1	On		1	6/21/13	2L, 1G	8/22/13-9/11/13	3:14 (1:4.7)
M38	3	On		3L, 1G	6/21/13-7/2/13	8L, 2G	8/11/13-9/6/13	7:34 (1:4.9)
Y42	2	On				6L, 2G	8/7/13-8/21/13	7:21 (1:3)
U49	1	On				3L, 1G	8/7/13-8/17/13	5:29 (1:5.8)
Z9	1	Off				2L, 1G	8/22/13	2:17 (1:8.5)
P31	1	Off				1	8/24/13	1:6
H33	1	Off				7L, 2G	8/7/13-8/25/13	5:15 (1:3)
V47	1	Off				42L, 2G	8/7/13-9/12/13	7:16 (1:2.3)
Y50	1	Off				5L, 2G	8/21/13-9/4/13	8:26 (1:3.3)

2014 Data:

Colony	No. Found	Drum	Foraging	No. FR pre-pupae	Dates FR pre-pupae	No. WR pre-pupae	Dates WR pre-pupae	Worker:brood
E5	1			1	6/28/14			
G7	1			1	6/28/14			
I9	1			1	6/28/14			
Q17	1			1	6/28/14			
S19	1			1	6/28/14			
C28	1			1	6/28/14			
E30	1			1	6/28/14			
P41	1			1	6/28/14			
W23	1	On	Unrestricted	1	6/28/14	2	8/8/14-8/29/14	5:23 (1:4.6)
J10	1	On	Unrestricted			2	8/22/14-8/29/14	6:26 (1:4.3)
K36	1	On	Unrestricted			2	8/22/14-8/29/14	1:3
M13	1	On	Restricted	1	6/28/14	2L, 1G	8/29/14-9/5/14	10:20 (1:2)
U31	1	On	Restricted	1	6/28/14	1	8/22/14	2:18 (1:9)
Q37	1	On	Restricted	1	6/28/14	3L, 2G	8/15/14-8/29/14	6:14 (1:2.3)
N14	1	On	Restricted			1L, 0G	8/22/14	1:10
O40	1	Off	Unrestricted	1	7/6/14	3L, 2G	8/8/14-8/22/14	5:19 (1:3.8)
A1	1	Off	Unrestricted	1	6/28/14	1	8/22/14	2:5 (1:2.5)
Y25	1	Off	Unrestricted	1	7/6/14	1	9/5/14	4:2 (1:0.5)
U21	1	Off	Unrestricted			2L, 0G	8/22/14-9/5/14	6:7 (1:1.2)
D29	1	Off	Unrestricted			3L, 1G	8/15/14-9/5/14	5:22 (1:4.4)
R43	1	Off	Restricted	1	6/28/14	3L, 2G	8/8/14-8/22/14	7:8 (1:1.1)
C3	1	Off	Restricted			2	8/15/14-8/22/14	2:21 (1:10.5)
K11	1	Off	Restricted			2	8/22/14-9/13/14	7:35 (1:5)
X24	1	Off	Restricted			3L, 1G	8/8/14-8/22/14	4:5 (1:1.3)
T39	1	Off	Restricted			1	8/22/14	5:26 (1:5.2)
W44	1	Off	Restricted			1	8/29/14	6:24 (1:4)
Y50	1	Off	Restricted			1	8/15/14	2:12 (1:6)