

African Trapdoor Spider (*Gorgyrella inermis*), Field Wolf Spider (*Hogna lenta*), and Mexican Blond Tarantula (*Aphonopelma chalcodes*) Burrow Casts

Principle Investigator: Michael Hils

Project Duration: 2012 – 2014

African Trapdoor Spider (*G. inermis*)

Total Burrows: 27

Vertical Shafts (14)

G1, G7, G8, G9, G11, G13, G14, G15, G18, G19, G21, G22, G25, G28

Vertical Shafts with Terminal Chamber (5)

G2, G4, G16, G17, G26

Subvertical Shafts (5)

G5, G10, G12, G20, G24

Subvertical Shaft with Terminal Chamber (1)

G27

J-Shaped Burrow (1)

G23

Isolated Chamber (1)

G6



Field Wolf Spider (*H. lenta*)

Total Burrows: 19

Vertical Shafts (10)

H1, H5, H7, H9, H10, H15, H17, H18, H19, H21

Vertical Shaft with Terminal Chamber (1)

H6

Subvertical Shafts (7)

H2, H11, H12, H13, H14, H16, H20

Y-Shaped Burrow (1)

H4



Mexican Blond Tarantula (*A. chalcodes*)

Total Burrows: 2

Subvertical Ramps (2)

A1, A2



Other Burrow Casts

Florida Trapdoor Spider (*Myrmekiaphila coreyi*): R1

G. inermis: S1, S2, S3

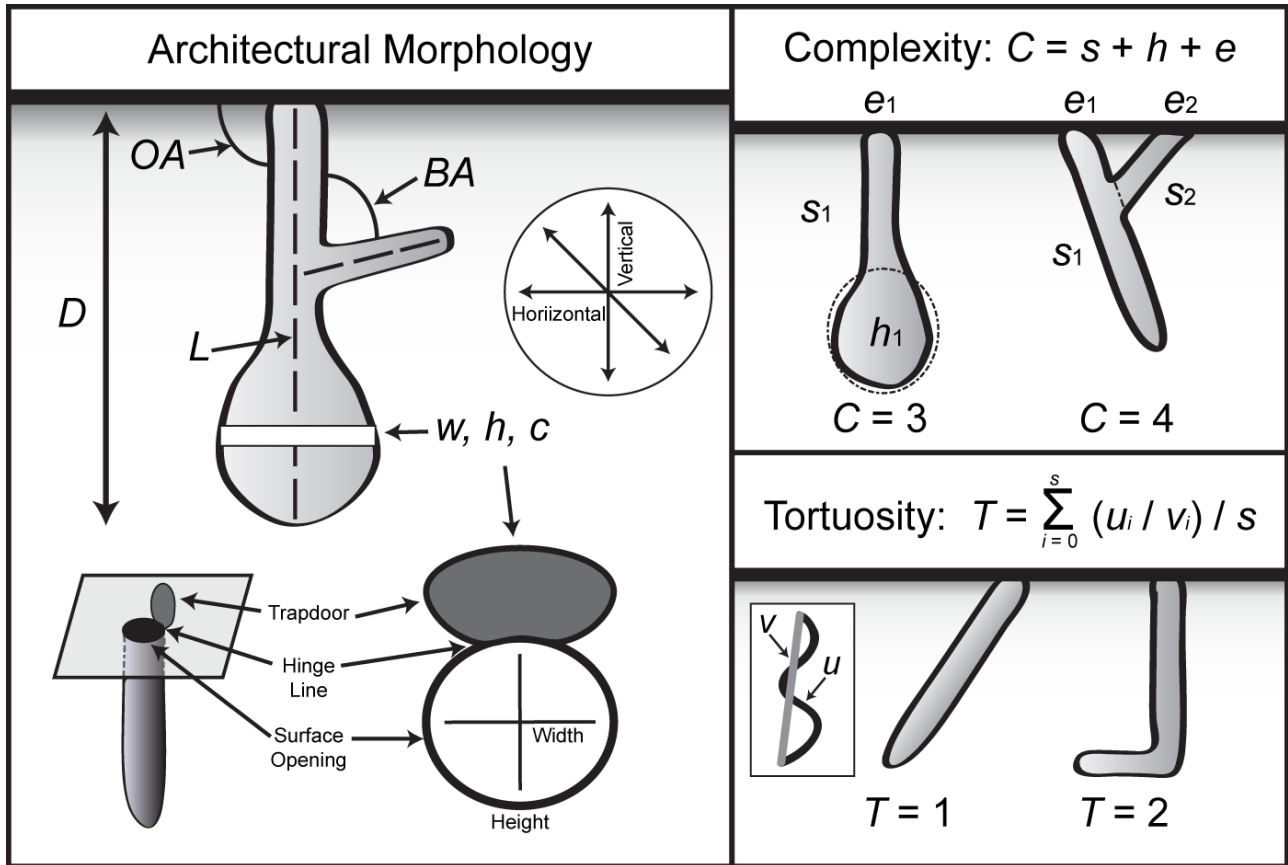
H. lenta: F1, F2, F3, F4, F5, F6, F7, F8

A. chalcodes: T1

Bags of Burrow Casts

Bag #	Casts Contained	Architecture
1	G1, G7, G8, G9, G11, G13, G14, G15	VS
2	G18, G19, G21, G22, G25, G28	VS
3	G5, 10, G12, G20, G24	SS
4	G2, G4, G16, G17	VC
5	G6, G23, G26, G27	IC, JS, VC, SC
6	H1, H5, H7, H9, H10	VS
7	H15, H17, H18, H19, H21	VS
8	H2, H11, H12, H13, H14, H16, H20	SS
9	H4, H6	YS, VC
10	A1, A2	SR
11	F1, F2, F3, F4, F5, F6, F7, F8	Others
12	Ta, S1, S2, S3, R1	Others

Burrow Measurements



Experimental Setup

A. Experiment 1: Basic Morphology

Species	Individuals	Terrarium		Sediment Composition	Sediment Depth (cm)	Sediment Density	Sediment Moisture	Duration (day)	Resulting Burrow Architecture
		Size (gal)							
<i>G. inermis</i>	5	20		30-50-20% organic-sand-clay/silt	35	0.35	55%	14	VS (3), SS (1), IC (1)
<i>G. inermis</i>	5	20		30-50-20% organic-sand-clay/silt	35	0.35	55%	30	VS (2), VC (2)
<i>G. inermis</i>	3	30		30-50-20% organic-sand-clay/silt	25	0.35	55%	14	VS (1), VC (1), SC (1)
<i>G. inermis</i>	3	30		30-50-20% organic-sand-clay/silt	25	0.35	55%	30	VS (1), SS (1)
<i>H. lenta</i>	5	10		50-50% organic-clay/silt	25	0.35	35%	14	VS (3), YS (1)
<i>H. lenta</i>	4	10		50-50% organic-clay/silt	25	0.35	35%	30	VS (2), VC (1)
<i>H. lenta</i>	4	20		50-50% organic-clay/silt	26	0.35	35%	14	VS (1)

B. Experiment 2: Sediment Composition

Species	Individuals	Terrarium		Sediment Composition	Sediment Depth (cm)	Sediment Density	Sediment Moisture	Duration (day)	Resulting Burrow Architecture
		Size (gal)							
<i>G. inermis</i>	5	20		30-35-35% organic-sand-clay/silt	35	0.35	55%	30	VS (4)
<i>G. inermis</i>	5	20		30-20-50% organic-sand-clay/silt	35	0.70	55%	30	VS (2), VC (2)
<i>H. lenta</i>	3	20		25-75% organic-clay/silt	26	0.35	35%	30	VS (2), SS (1)
<i>H. lenta</i>	4	20		100% clay/silt	26	0.70	35%	30	VS (1), SS (3)

C. Experiment 3: Sediment Moisture

Species	Individuals	Terrarium		Sediment Composition	Sediment Depth (cm)	Sediment Density	Sediment Moisture	Duration (day)	Resulting Burrow Architecture
		Size (gal)							
<i>G. inermis</i>	4	20		30-50-20% organic-sand-clay/silt	35	0.35	35%	30	VS (2), SS (1), JS (1)
<i>G. inermis</i>	4	20		30-50-20% organic-sand-clay/silt	35	0.70	75%	30	VS (1)
<i>H. lenta</i>	4	20		50-50% organic-clay/silt	26	0.35	15%	30	VS (2)
<i>H. lenta</i>	4	20		50-50% organic-clay/silt	26	0.35-0.70	55%	30	VS (1), SS (1)

	G1	G7	G8	G9	G13	G14	G15	G18	G19	G21	G22	G25	G28
PAST Identifier	GI1_VS	GI2_VS	GI3_VS	GI4_VS	GI5_VS	GI6_VS	GI7_VS	GI8_VS	GI9_VS	GI10_VS	GI11_VS	GI12_VS	GI13_VS
Architecture	VS	VS	VS	VS	VS	VS	VS	VS	VS	VS	VS	VS	VS
Surface Openings	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum depth	9.8	6	7.2	13.4	14.2	7.2	3.6	4.5	16.6	6.7	9.4	12.6	3.4
Total Length	10	6.1	7.8	13.6	14.6	7.9	3.6	4.7	17.4	6.7	9.6	12.6	3.4
Maximum width	2.5	1.9	2.1	3.2	2.3	2.4	5.1	1.9	3.9	3.3	3	3.2	2.8
Minumum width	1.8	1.7	1.6	1.9	1.8	1.8	1.2	1.7	2.2	1.4	2.6	2.3	2.3
Average width	2.2	1.8	1.9	2.9	2.1	2.1	3.4	1.8	2.9	2.6	2.9	2.9	2.6
Maximum height	2.5	2.1	1.9	2.9	1.7	2.4	4.6	2.1	3.5	3.3	2.8	3.4	3
Minimum height	1.7	1.6	1.5	2.2	2.4	1.7	1.4	1.5	1.8	1.3	2.2	2.3	1.6
Average height	2.1	1.9	1.7	2.7	2.1	2.1	3.2	1.9	2.7	2.3	2.5	3	2.4
Average W/H ratio	1	1	1.1	1.1	1	1	1	1	1.1	1.1	1.2	1	1.1
Max circumference	7.8	6.6	6.3	9.8	7.5	7.6	15.6	6.6	10.1	10.5	9.3	10.1	9.8
Min circumference	5.1	5.3	5.7	6.1	5.7	5.8	3.1	4.2	6.5	3.7	7.4	7.6	5.6
Avg circumference	6.7	6.1	6	9	7.1	7	10.7	5.6	8.6	7.9	8.6	8.9	7.9
Maximum slope	85°	80°	85°	85°	90°	85°	90°	80°	90°	90°	88°	90°	90°
Minimum slope	85°	80°	85°	85°	85°	85°	90°	80°	60°	90°	88°	70°	90°
Average slope	85°	80°	85°	85°	87.5°	85°	90°	80°	75°	90°	88°	80°	90°
Branching angles	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Complexity	2	2	2	2	2	2	2	2	2	2	2	2	2
Tortuosity	1	1	1.1	1	1.1	1.1	1	1.1	0.5	1	1	1	1

	G29	G2	G4	G16	G17	G26	G5	G10	G12	G20	G24	G27	G6	G23
PAST Identifier	GI14_VS	GI15_VC	GI16_VC	GI17_VC	GI18_VC	GI19_VC	GI20_SS	GI21_SS	GI22_SS	GI23_SS	GI24_SS	GI25_SC	GI26_IC	GI27_JS
Architecture	VS	VC	VC	VC	VC	VC	SS	SS	SS	SS	SS	SC	IC	JS
Surface Openings	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum depth	2.5	16.3	7.08	13	12.5	5.7	11.2	13.9	6.6	4.4	8.3	9.3	2.1	8.6
Total Length	2.5	18.4	7.7	13.2	12.5	5.7	13.2	14.4	7.8	4.6	8.4	9.5	3.7	8.9
Maximum width	1.7	2.4	2.2	6	4.4	5.7	3.1	2.4	3.3	2.9	3.4	5.8	2.7	2
Minumum width	1.7	1.9	1.7	1.8	2.3	2.9	2.3	1.5	2.1	1.8	1.6	2.4	2.1	1.7
Average width	1.7	2.1	1.9	3.6	3	4.3	2.6	2	2.9	2.3	2.6	3.5	2.5	1.9
Maximum height	1.6	2.7	1.7	3.7	2.7	3.4	3	2.4	3	3	2.7	3.9	2.3	2
Minimum height	1.6	1.7	1.4	2.2	1.8	2.1	2.1	1.8	1.9	1.5	1.8	2.3	1.6	1.2
Average height	1.6	2.1	1.6	2.7	2.2	2.9	2.3	2.1	2.5	2.4	2.4	3.1	1.9	1.7
Average W/H ratio	1	1	1.2	1.3	1.3	1.5	1.1	1	1.1	1	1.1	1.1	1.3	1.1
Max circumference	5.3	7.9	6.3	15.6	12.2	23.6	8.9	7.6	9.5	8.4	9.4	15.3	7.9	6.4
Min circumference	5.2	5.4	5.2	3.1	6.9	17	7.4	5.7	4.5	5.6	5.4	7.2	7	5.1
Avg circumference	5.3	6.6	5.6	10.7	8.4	20.8	7.9	6.7	8.4	7.3	7.8	10.8	7.4	5.7
Maximum slope	90°	90°	90°	90°	90°	90°	75°	75°	70°	70°	70°	75°	45°	90°
Minimum slope	90°	78°	76°	90°	90°	90°	75°	75°	70°	70°	70°	75°	45°	39°
Average slope	90°	84°	83°	90°	90°	90°	75°	75°	70°	70°	70°	75°	45°	64.5°
Branching angles	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Complexity	2	3	3	3	3	3	2	2	2	2	2	3	2	2
Tortuosity	1	1.4	1.2	1	1	1	1.1	1	1.1	1	1	1	1.1	0.6

	H1	H5	H17	H18	H19	H7	H9	H10	H15	H21	H6	H2	H11	H12	H13	H14	H16	H20	H4
PAST Identifier	HL1_VS	HL2_VS	HL3_VS	HL4_VS	HL5_VS	HL6_VS	HL7_VS	HL8_VS	HL9_VS	HL10_VS	HL11_VC	HL12_SS	HL13_SS	HL14_SS	HL15_SS	HL16_SS	HL17_SS	HL18_SS	HL19_VS
Architecture	VS	VS	VS	VS	VS	VS	VS	VS	VS	VS	VC	SS	SS	SS	SS	SS	SS	SS	YS
Surface openings	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
Maximum depth	8	8.7	6.6	3.8	6.5	5.1	6.8	5.6	3.9	7.4	3.2	5.5	5.5	6.1	4.4	5.7	6.3	6.6	4.1
Total length	8	8.7	6.6	3.8	6.5	5.3	6.8	5.6	3.9	7.4	3.2	5.7	5.6	6.2	5.2	5.8	6.9	7.4	6.7
Maximum width	2.7	2.9	2.5	3.2	2.7	2.5	2.6	3	2.7	3.2	2.6	2.8	2.9	2.7	2.5	3.1	2.6	3.1	2.1
Minimum width	1.3	2.1	1.5	2.3	2.1	1.4	2	2.3	1.8	2.5	2.4	2.1	1.8	1.6	1.2	2.3	1.7	1.7	1.7
Average width	2.3	2.3	2.1	2.8	2.3	2.1	2.3	2.6	2.3	2.8	2.5	2.3	2.4	2.3	2.2	2.7	2.3	2.5	1.9
Maximum height	2.5	2.4	2.6	2.8	2.6	2.2	2.7	3.1	2.9	3.1	2.8	2.8	2.6	2.8	2.5	2.7	2.6	3.6	1.9
Minimum height	1.9	2.1	1.4	2.6	2	1.6	2	2.4	2.6	2	2.8	1.9	1.6	1.6	1.4	2.3	1.2	1.9	1.4
Average height	2.3	2.2	2	2.7	2.3	2	2.4	2.9	2.8	2.4	2.8	2.2	2.2	2.4	2.2	2.5	2.3	2.8	1.8
Average W/H ratio	1	1	0.9	1	1	1	1.1	1.1	1.2	0.9	1.1	1	0.9	1	1	0.9	1	1.1	1
Maximum circumference	8.4	7.6	8	9.1	8.1	7.8	8.5	10.2	10.2	8.9	7.8	8.9	9	8.8	7.9	9.1	8.3	11.1	6.8
Minimum circumference	5.6	6.6	3.7	7.9	6.5	5.1	6.3	5.6	7.4	6.7	5.1	6.1	4.5	5.1	3	7.1	4.8	6	4.9
Average circumference	7.5	7.1	6.4	8.5	7.3	6.8	7.4	8.5	8.9	7.5	6.8	7.3	7.5	7.4	6.5	8.3	7.2	8.7	6.0
Maximum slope	85°	87°	90°	90°	85°	85°	90°	85°	90°	90°	85°	75°	60°	65°	70°	60°	60°	76°	75°
Minimum slope	85°	87°	90°	90°	85°	85°	90°	85°	90°	90°	85°	75°	60°	65°	70°	60°	60°	65°	35°
Average slope	85°	87°	90°	90°	85°	85°	90°	85°	90°	90°	85°	75°	60°	65°	70°	60°	60°	70.5°	55°
Branching angles	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	90°
Complexity	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2	2	2	2	4
Tortuosity	1	1	1	1	1	1	1	1	1	1	1	1	1.1	1.1	1.1	1	1	1.1	1

	A1	A2
PAST Identifier	AC1_SR	AC2_SR
Architecture	SR	SR
Surface openings	1	1
Maximum depth	9.5	3.1
Total length	17.9	6.1
Maximum width	7.6	3.7
Minimum width	3.6	2.9
Average width	6.6	3.4
Maximum height	6.7	2.4
Minimum height	2.5	1.2
Average height	5.1	1.9
Average W/H ratio	0.77	0.55
Maximum circumference	22.2	10.9
Minimum circumference	11.1	7.1
Average circumference	19.14	9.46
Maximum slope	55°	25°
Minimum slope	0°	25°
Average slope	27.5°	25°
Branching angles	NA	NA
Complexity	2	2
Tortuosity	1.04	0.98