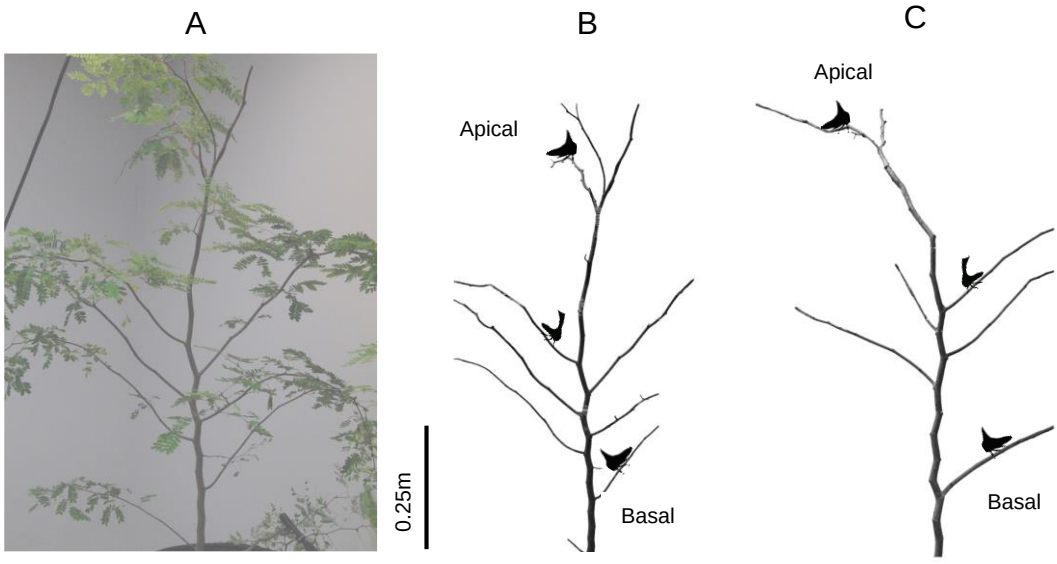

Figure S1. Host plants used in the experiment. (A) one of the plants, with leaves as used in the experiment; (B,C) Branching structure of the two plants, with the two possible female locations ( ) and the starting male location ( );

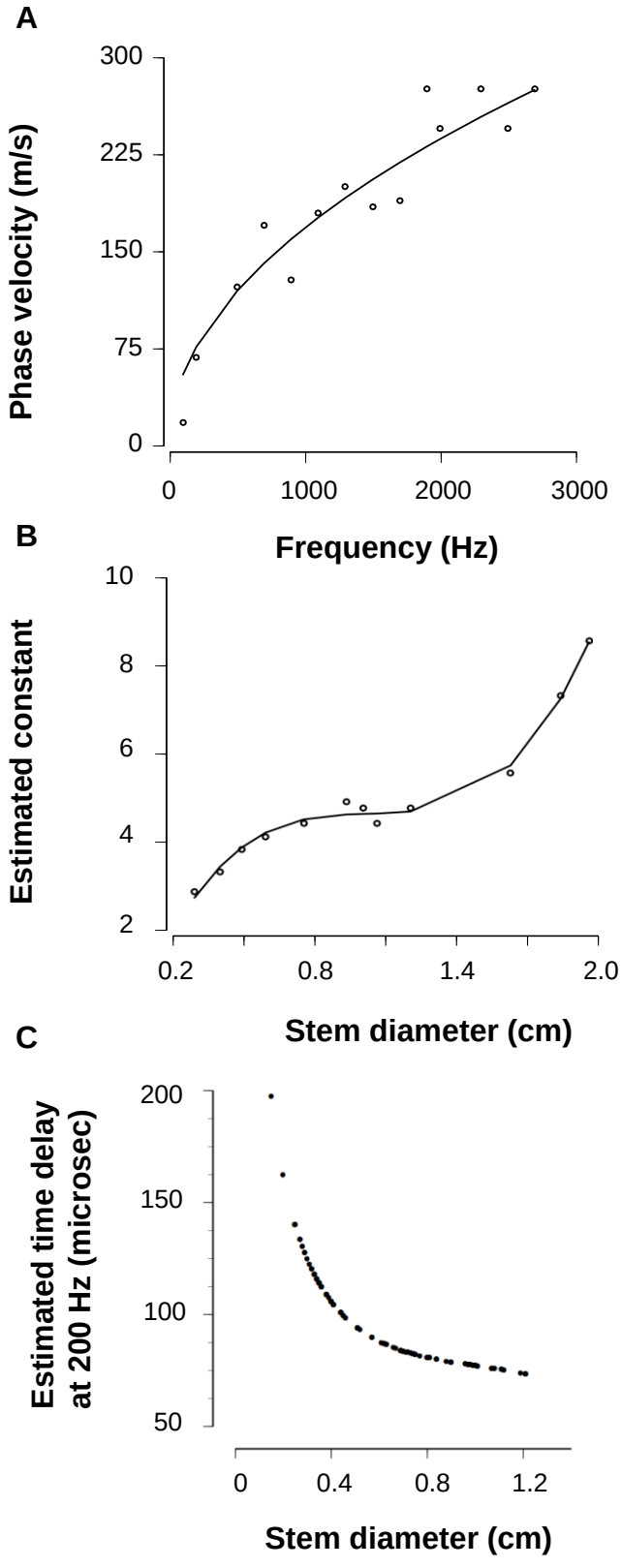

Figure S2. Wave propagation velocity as a function of stem diameter. A. Example of phase propagation measurement at one location with a diameter of 1.63 cm, with curve = constant (5.3) * square root of frequency. Note that measured points will deviate from predicted velocity when there has been a change in the major axis of stem movement. B. Stem diameter vs. estimated constants, with fitted curve used to estimate phase velocity at plant locations sampled by males. C. Estimated time-of-arrival delay at 200 Hz between front and back legs of a male thornbug (distance ~5 mm).

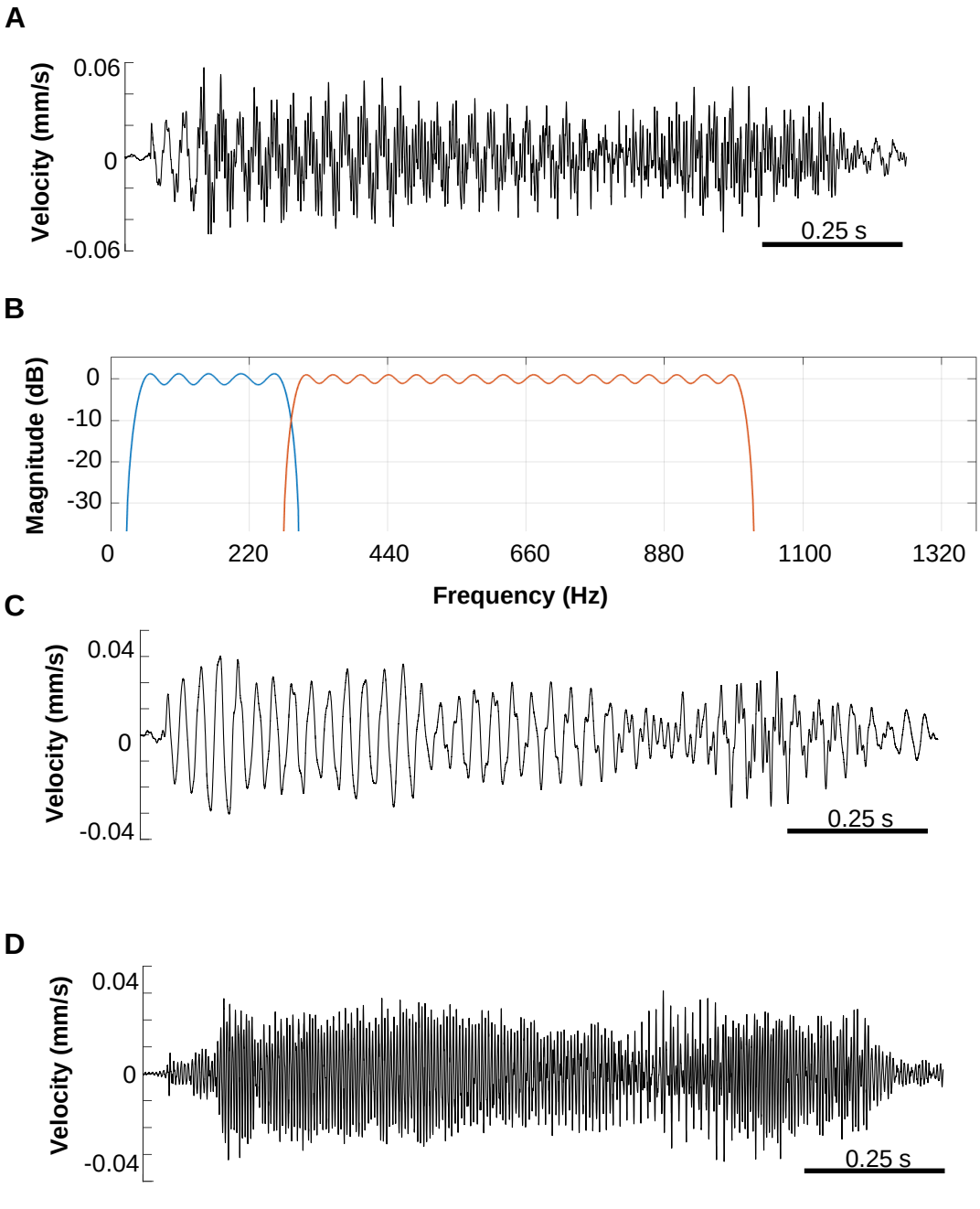

Figure S3. Example measurement of the relative amplitude of higher and lower frequencies in a female response signal, recorded at a location sampled by a searching male. A. Waveform of the female signal; B. Bandpass filters used to generate waveforms of lower and higher frequency bands in the signal shown in (A). C. Waveform of lower frequency band; D. Waveform of higher frequency band. In this example, the RMS amplitude of C is 0.0124 mm/s, the RMS amplitude of D is 0.0121 mm/s, and the relative amplitude of higher and lower frequency bands is 20*log10(.0121/.0124) = -0.2 dB.

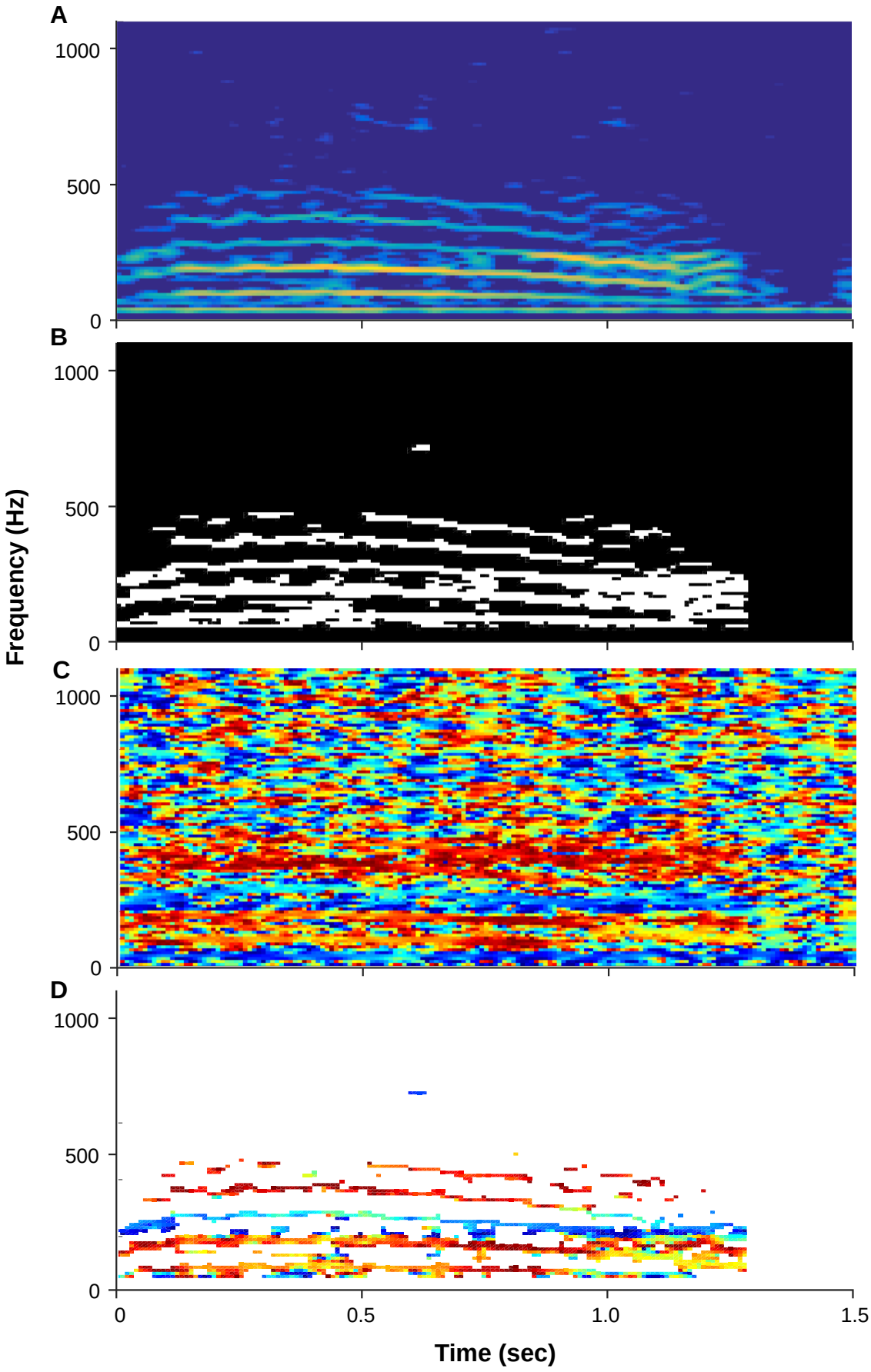

Figure S4. Generation of a spectrogram for angle of rotation. A. Amplitude spectrum; B. Mask generated from amplitude spectrum, excluding values not within 24 dB of peak; C. Spectrogram of angle of rotation; D. Masked spectrogram of angle of rotation, where only the time-frequency bins with signal energy w/in 24 dB of peak are included.

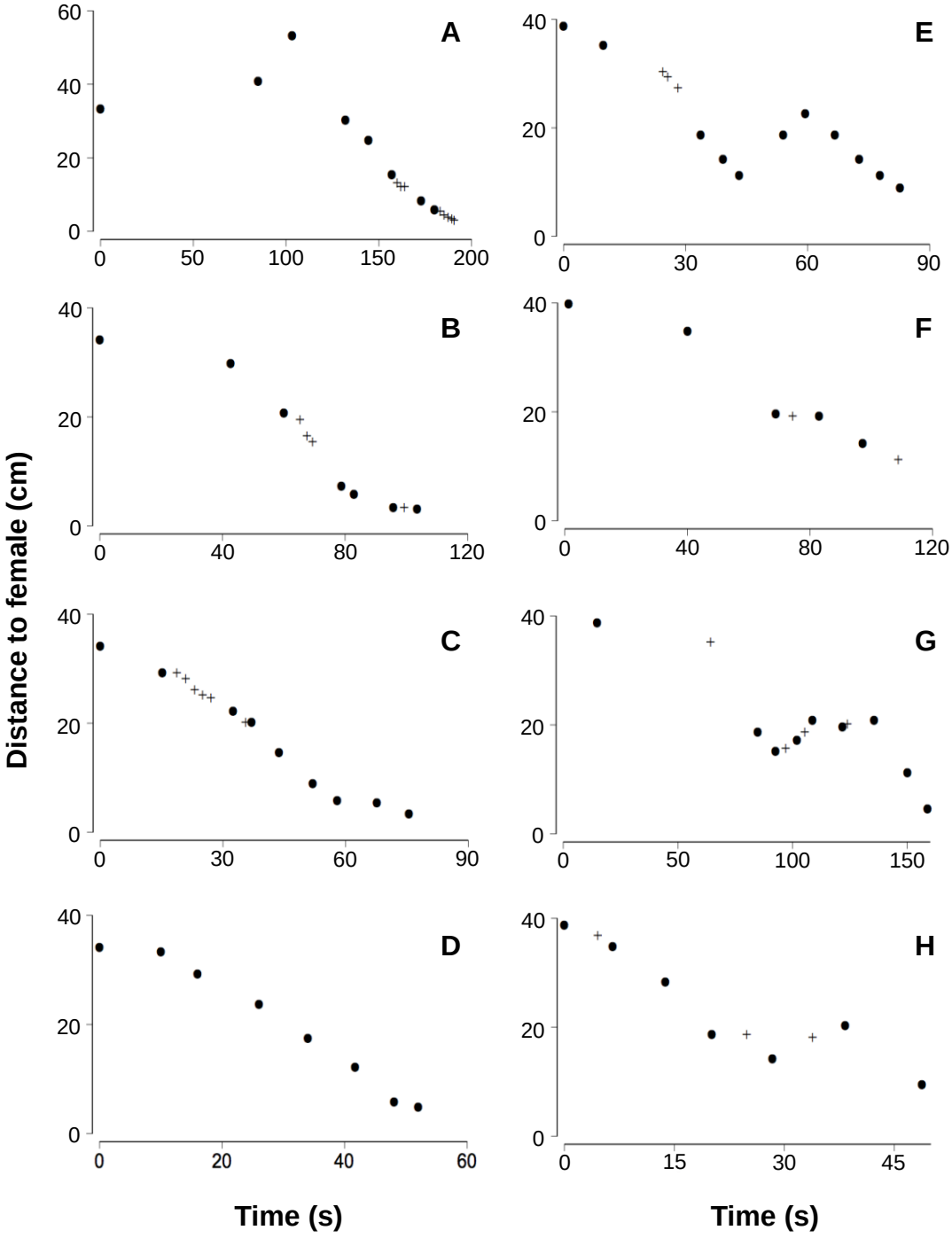

Figure S5. Search paths of male *U. crassicornis*, when the female was in the apical location in the plant. Searches on one plant (A-D); searches on other plant (E-H). ● = stationary samples, during which male signaled and elicited a female response; + = microsamples, during which male signaled while walking, and paused briefly during the female response.

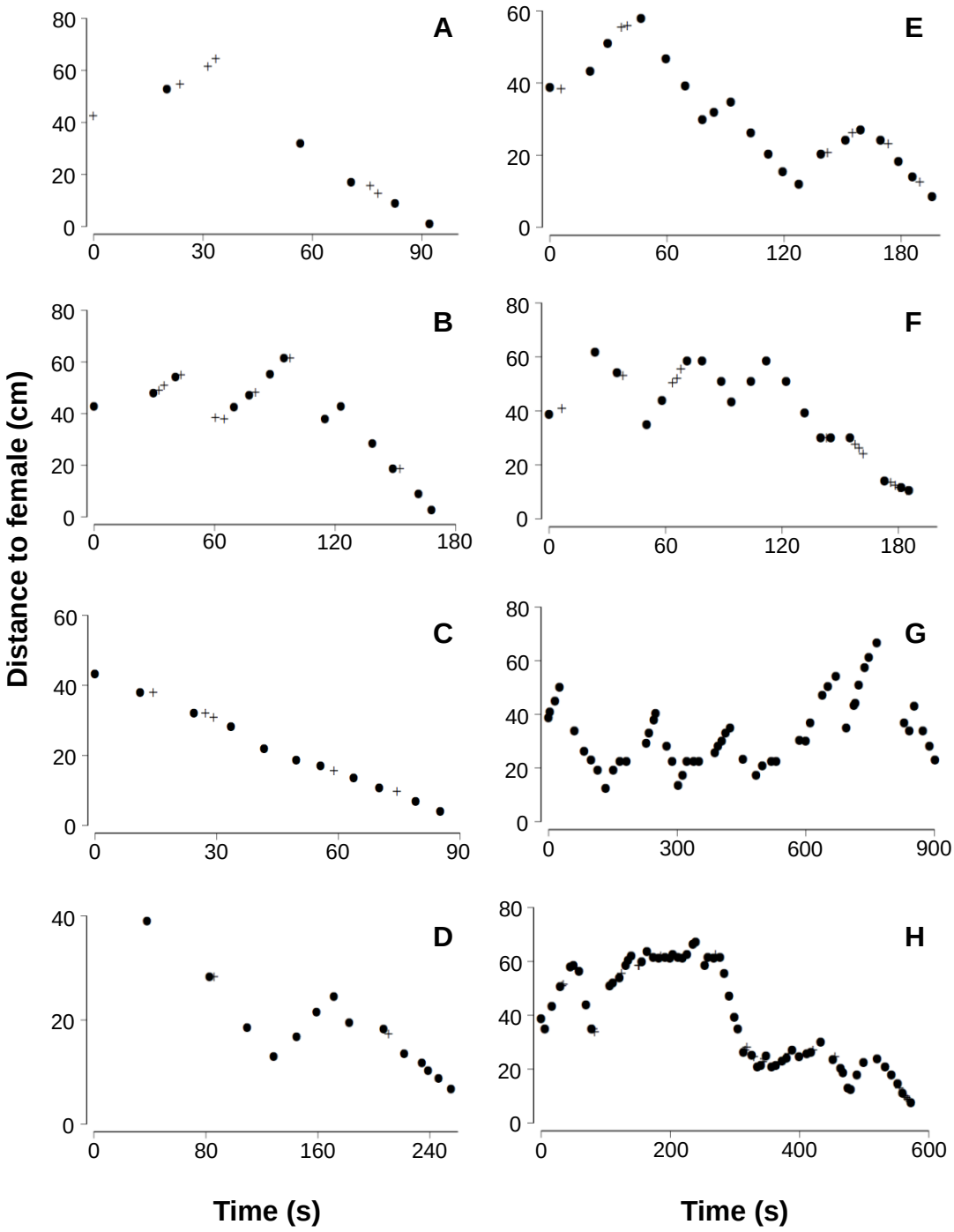

Figure S6. Search paths of male *U. crassicornis*, when the female was in the basal location in the plant. Searches on one plant (A-D); searches on other plant (E-H). ●= stationary samples, during which male signaled and elicited a female response; + = microsamples, during which male signaled while walking, and paused briefly during the female response.

Table S1: The relationship between mean eccentricity, distance to the signal source, stem diameter, and female position.

Mean eccentricity **Effects**	**Num DF / Den DF**	**F-Value**	**P-Value**
Distance to female	1/226	7.02	**0.0086**
Stem diameter	1/226	1.99	0.1602
Female position	1/226	22.48	**<0.0001**
Distance to female * diameter	1/226	3.00	0.0848
Distance to female * female position	1/226	16.80	**<0.0001**
Diameter * female position	1/226	6.45	**0.0117**
Distance to female * diameter * female position	1/226	4.83	**0.0290**