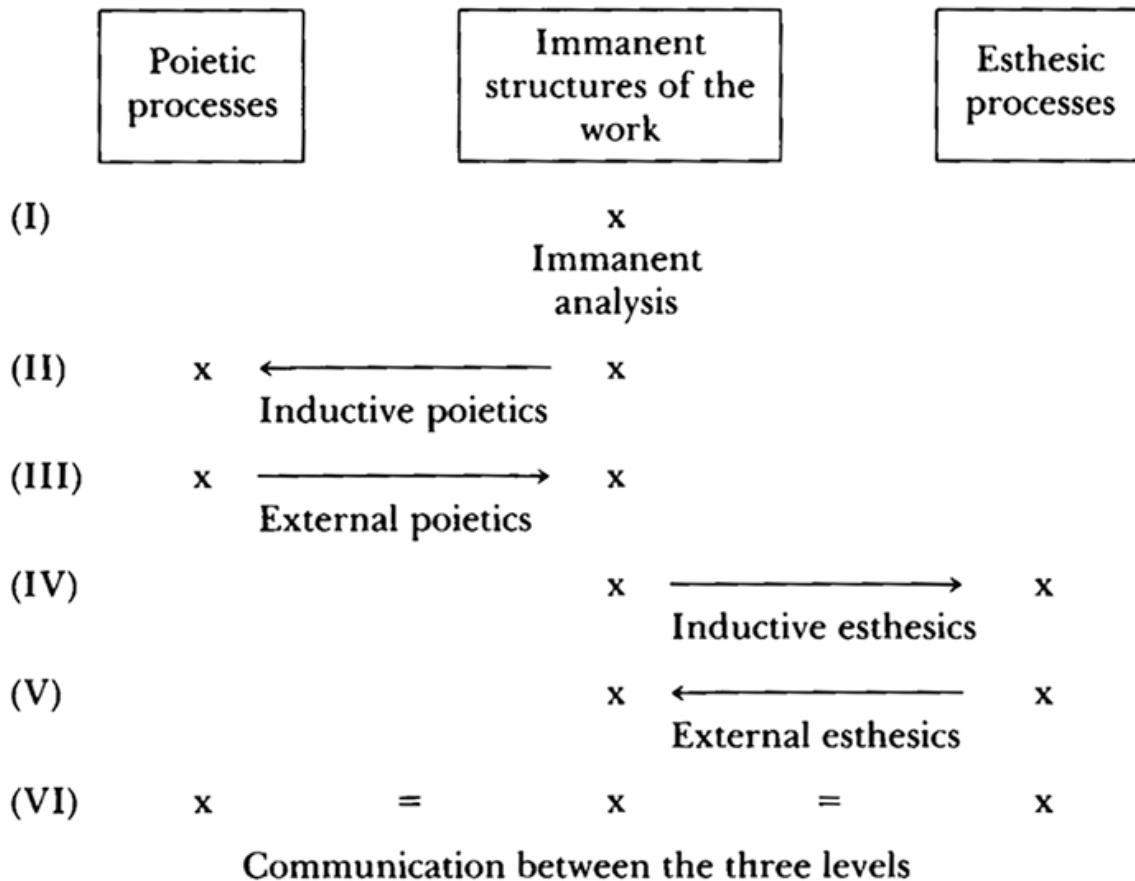


MTO 30.1 Examples: Miller and Cox, Music from Plant Biosignals

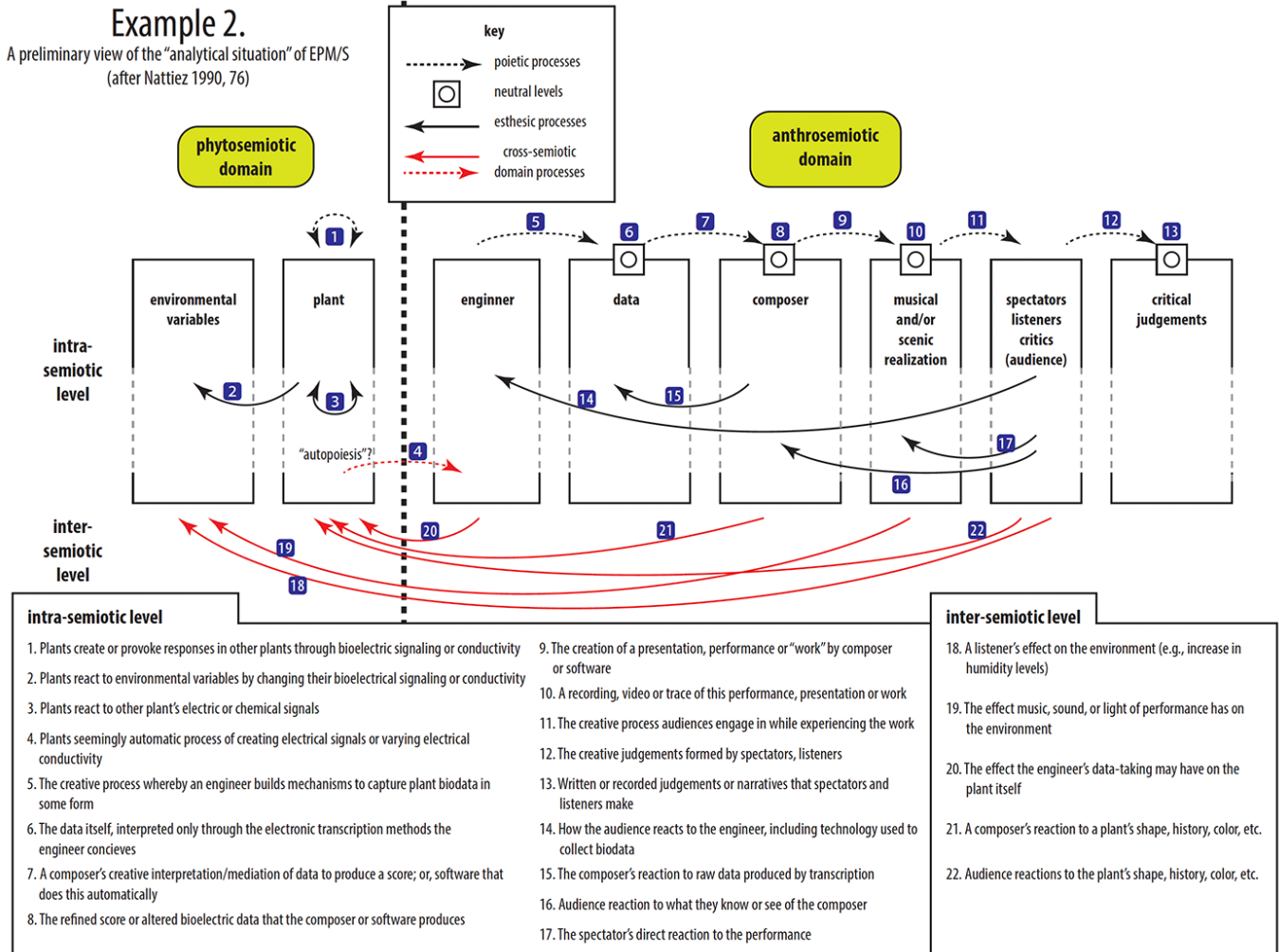
(Note: audio, video, and other interactive examples are only available online)

<https://mtosmt.org/issues/mto.24.30.1/mto.24.30.1.millercox.html>

Example 1. Nattiez: Six Analytical Situations from *Music and Discourse: Towards a Semiology of Music* (1990), 140)



Example 2. Preliminary View of the "Analytical Situation" of EPM/S (after Nattiez 1990, 76)

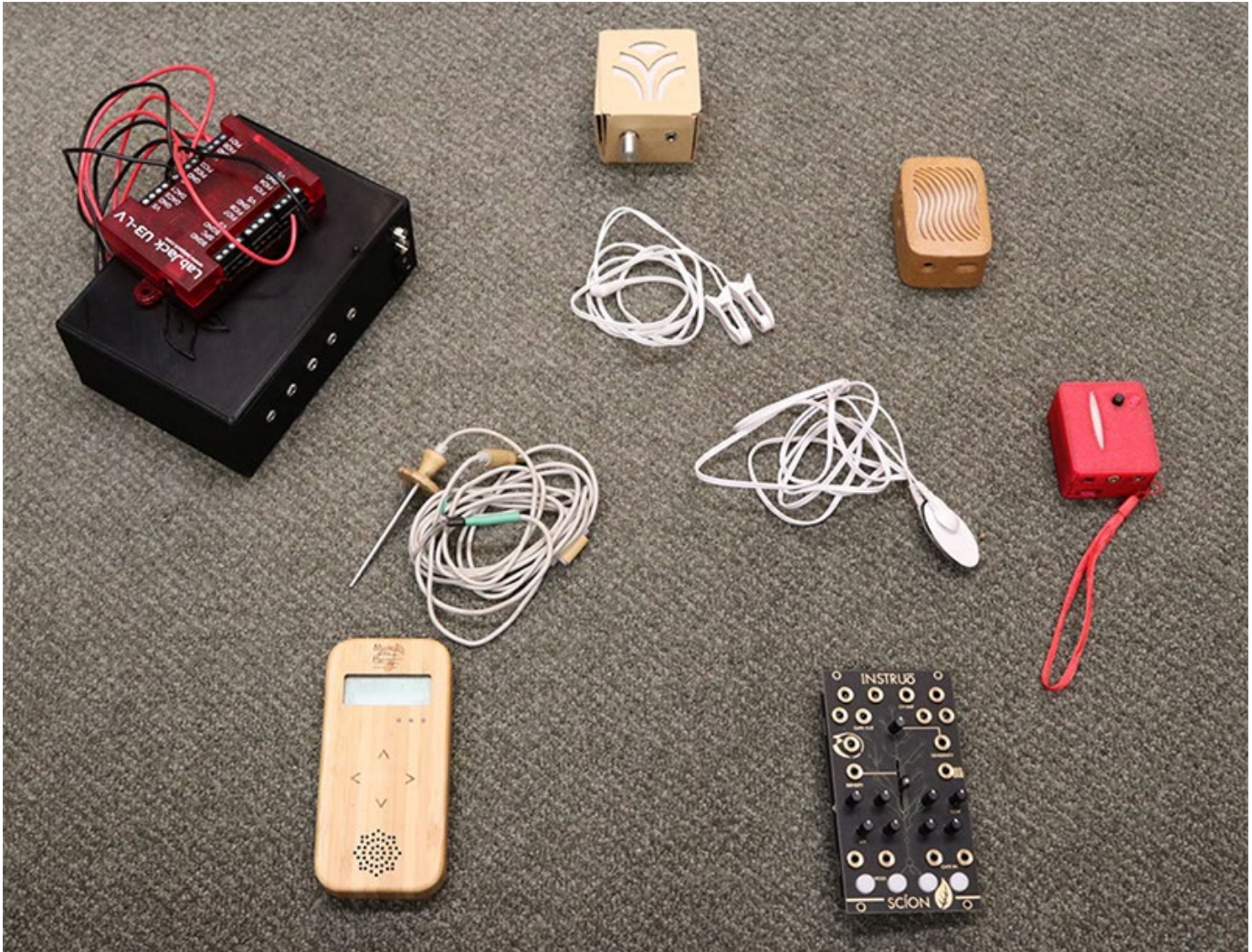


Example 3. Typical EPM/S setup showing TENS cables positioned approximately 4cm apart on the leaf of a croton houseplant (this was the methodology used throughout this study)

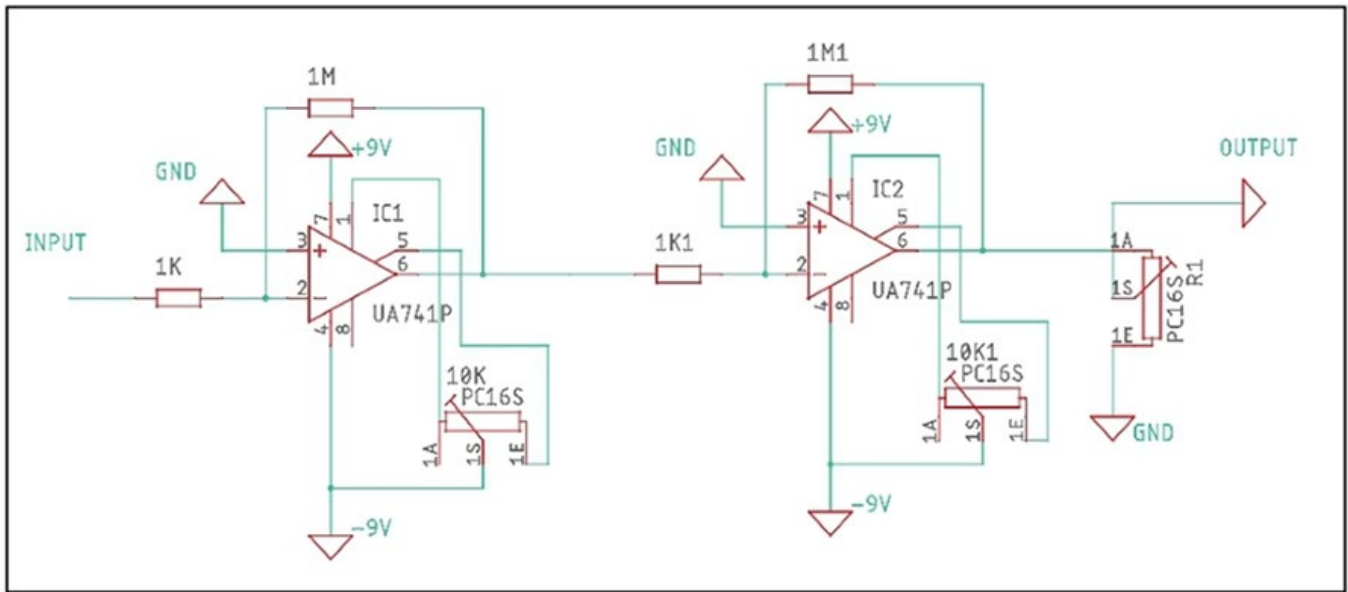


Example 4. Six EPM/S devices/instruments

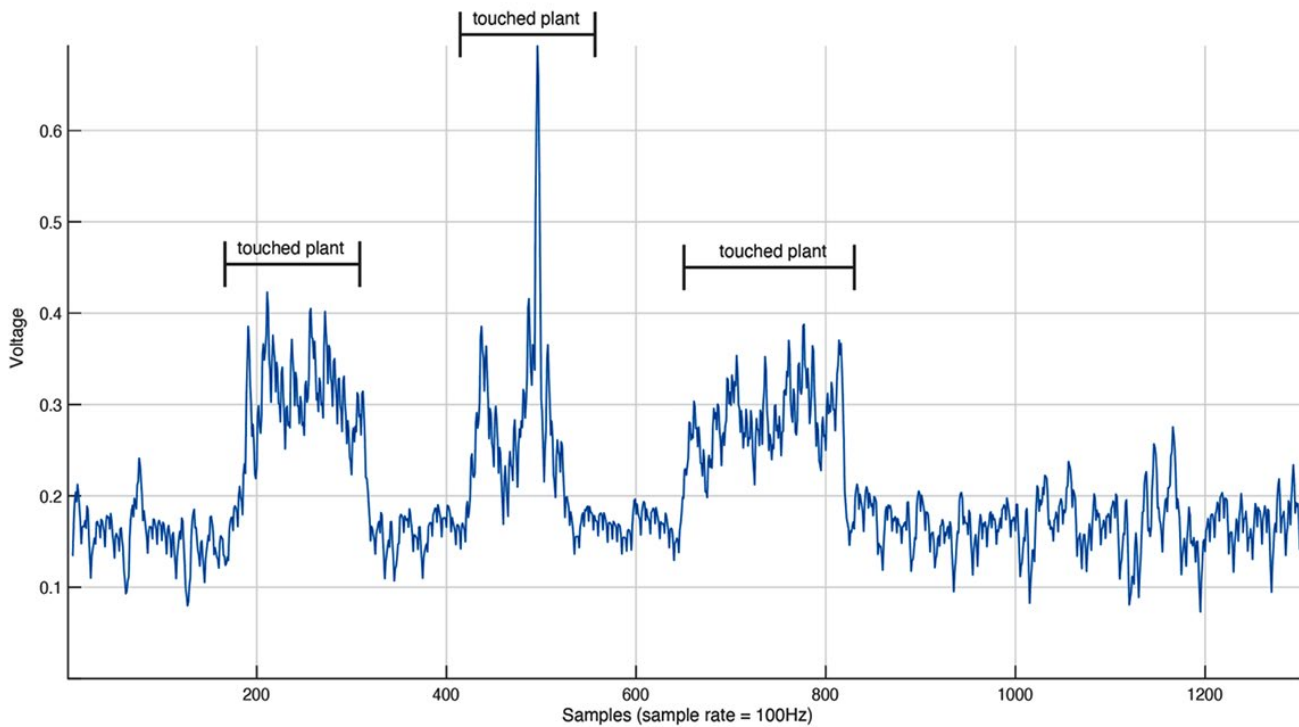
Outer circle, clockwise, from top: MIDISprout, PlantWave, DIY MIDISprout, Instruo's Scion Eurorack module,
Damanhour "Music of the Plants," custom passive amplifier with LabJack data acquisition device attached
Inner circle, from top: clamp electrodes, adhesive TENS cables, Damanhour electrodes with root probe and leaf clip



Example 5. A custom passive amplifier design for plant bioelectric signals

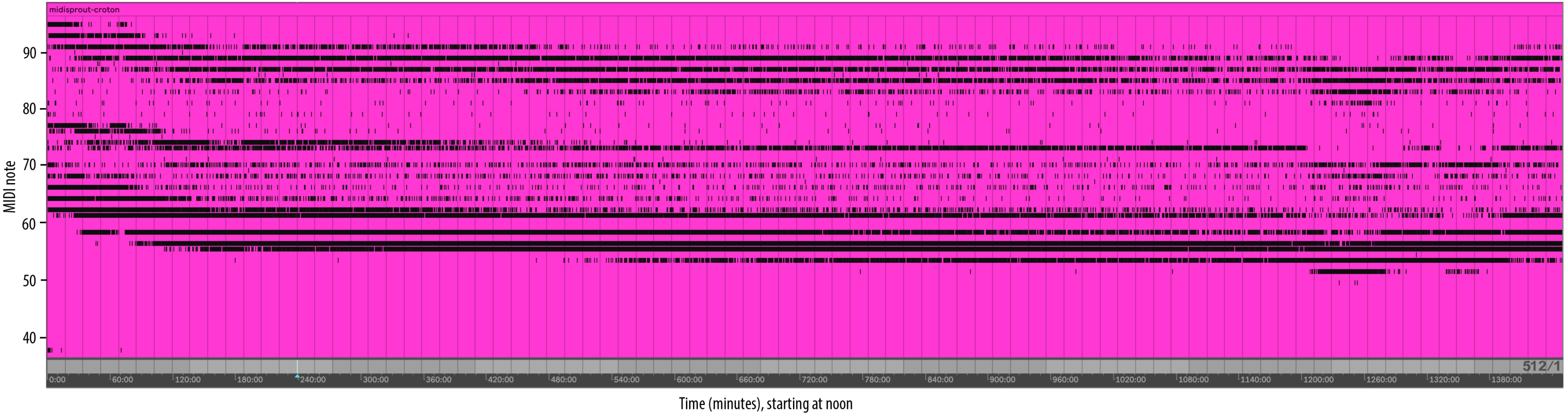
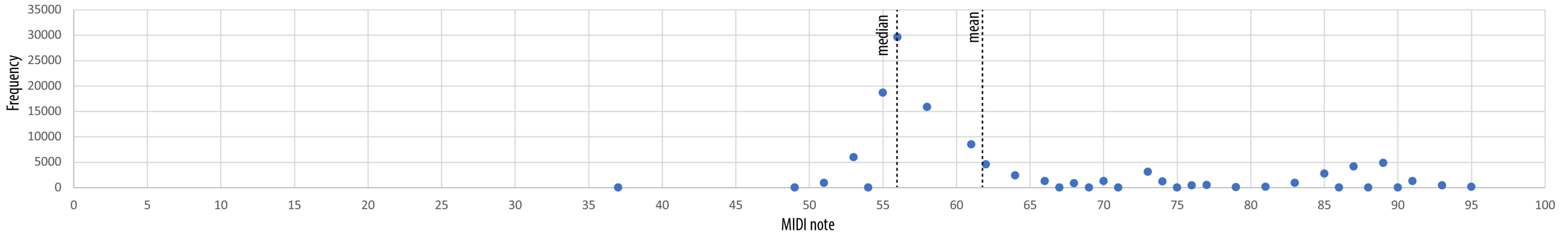


Example 12. Effects of touching a snake plant on biodata transcription (data recorded using custom passive amplifier)



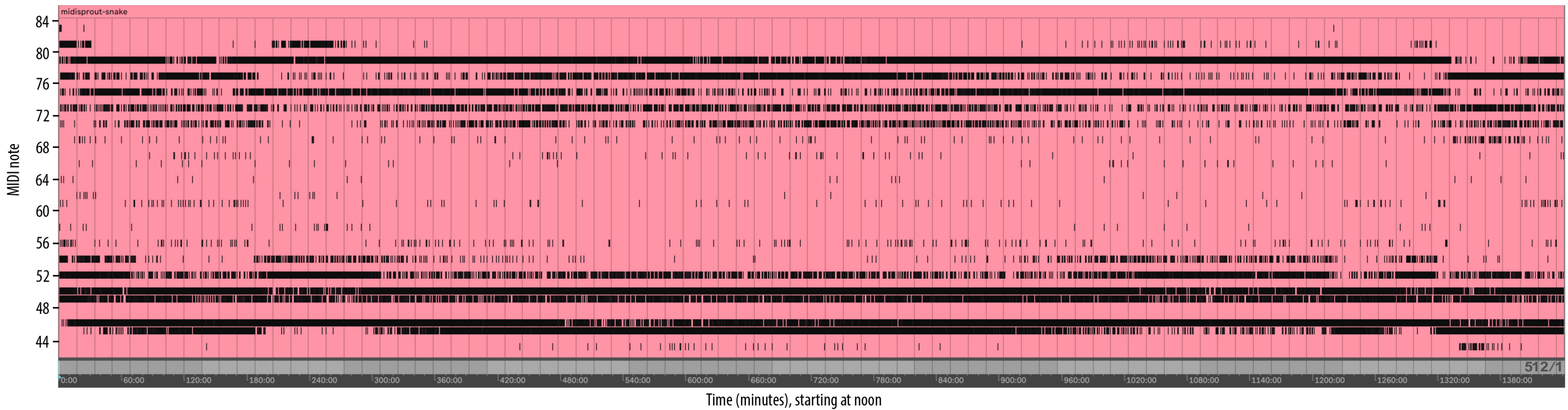
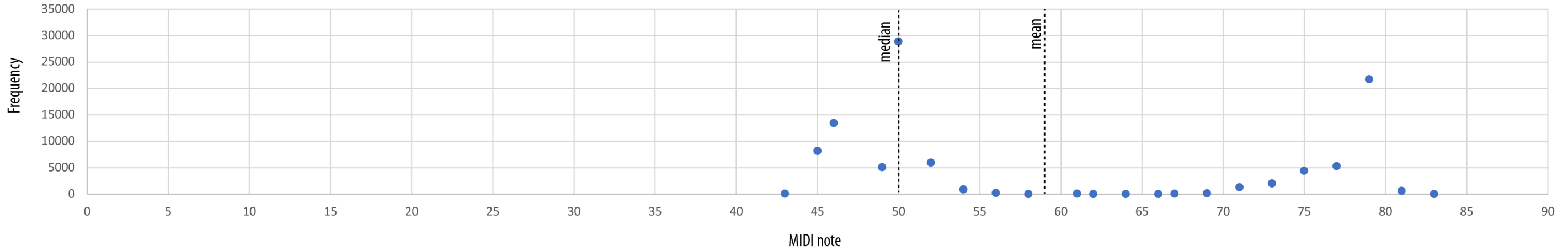
Interface Device	Plant	Length of Time Sampled	Number of MIDI notes in data set	High MIDI note	Low MIDI note	Mean	Median	Standard Deviation
MidiSprout	Croton	24 hours, 9 minutes, 20 seconds	110,251	95	37	62.22	56	11.10

Histogram -- MidiSprout -- Croton Plant



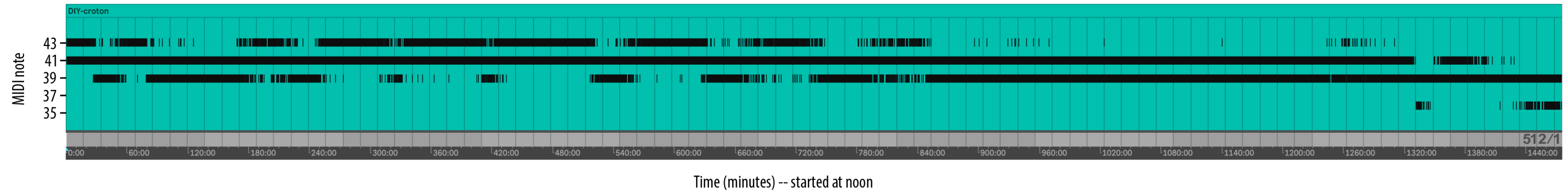
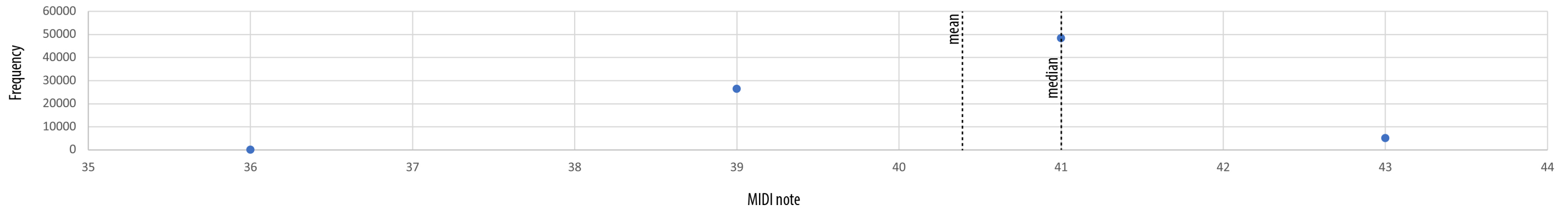
Interface Device	Plant	Length of Time Sampled	Number of MIDI notes in data set	High MIDI note	Low MIDI note	Mean	Median	Standard Deviation
MidiSprout	Snake plant	24 hours, 50 seconds	98,687	83	43	59.14	50	14.07

Histogram – MidiSprout – Snake Plant



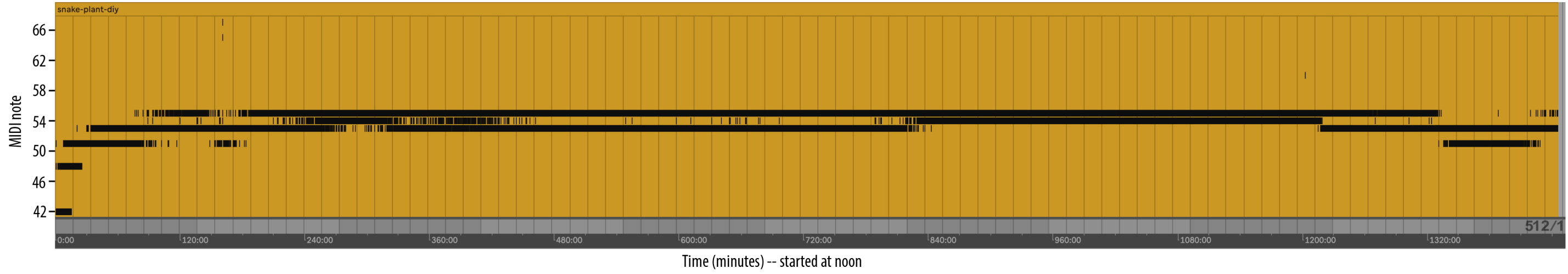
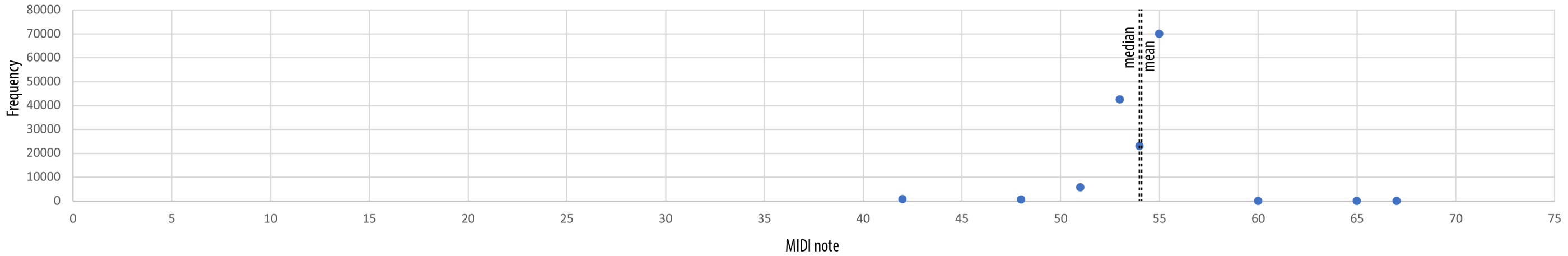
Interface Device	Plant	Length of Time Sampled	Number of MIDI notes in data set	High MIDI note	Low MIDI note	Mean	Median	Standard Deviation
MidiSprout -- DIY	Croton	24 hours, 35 minutes, 30 seconds	80,663	43	36	40.46	41	1.17

Histogram -- MidiSprout DIY -- Croton Plant



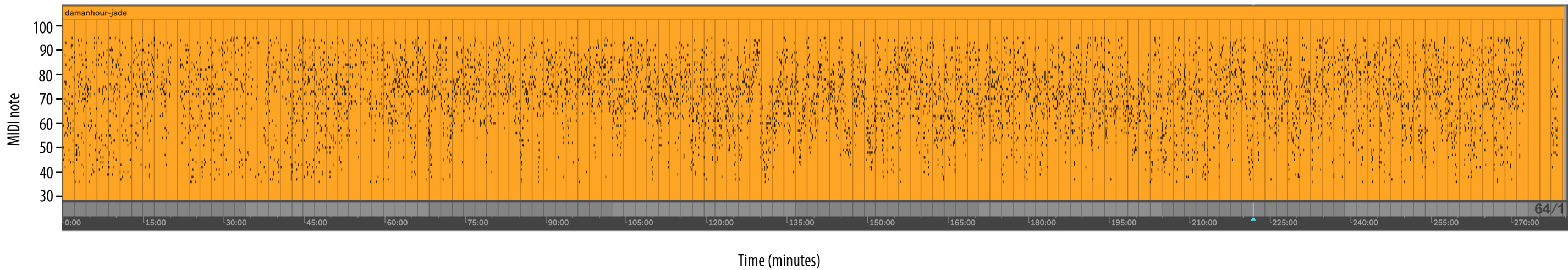
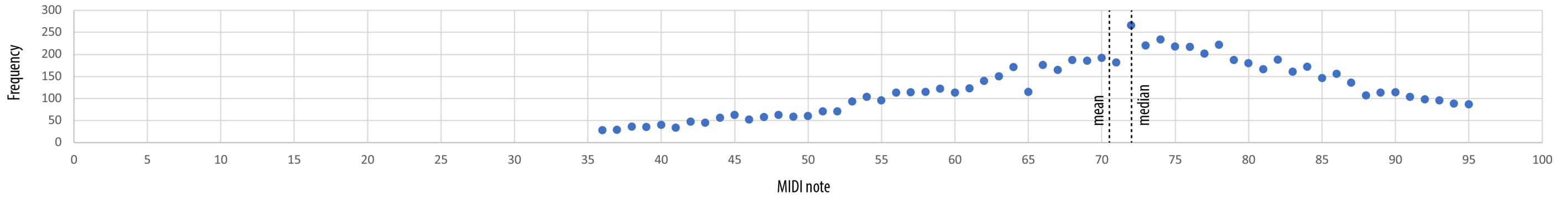
Interface Device	Plant	Length of Time Sampled	Number of MIDI notes in data set	High MIDI note	Low MIDI note	Mean	Median	Standard Deviation
MidiSprout -- DIY	Snake plant	24 hours, 6 minutes, 2 seconds	143,024	67	42	54.08	54	1.49

Histogram -- MidiSprout DIY -- Snake plant

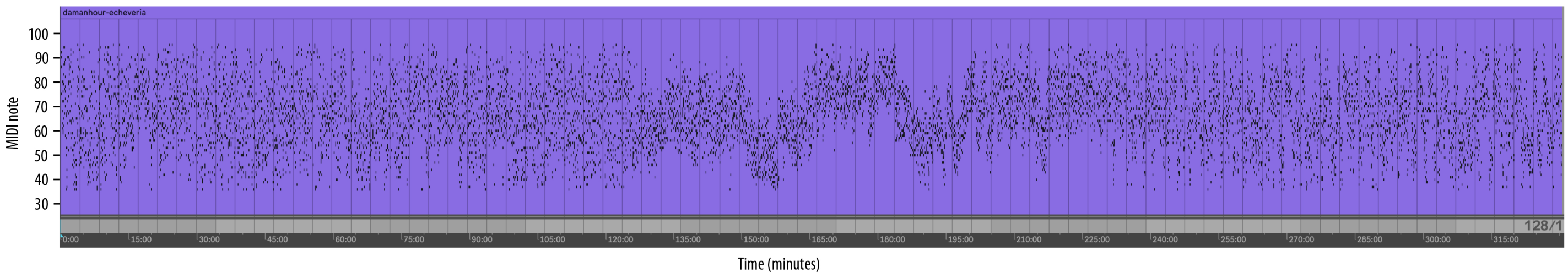
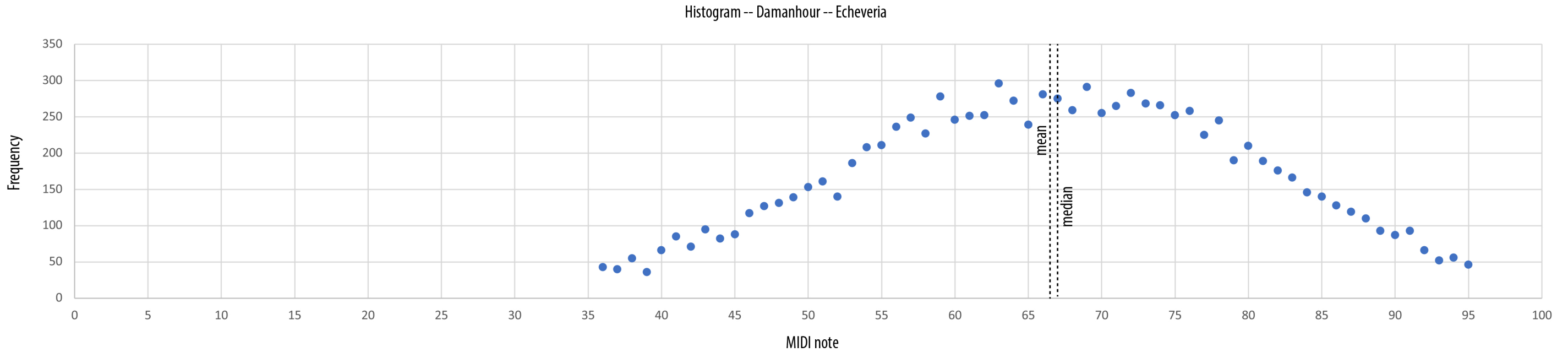


Interface Device	Plant	Length of Time Sampled	Number of MIDI notes in data set	High MIDI note	Low MIDI note	Mean	Median	Standard Deviation
Damanhour	Jade plant	4 hours, 35 minutes, 54 seconds	7380	95	36	70.68	72	13.77

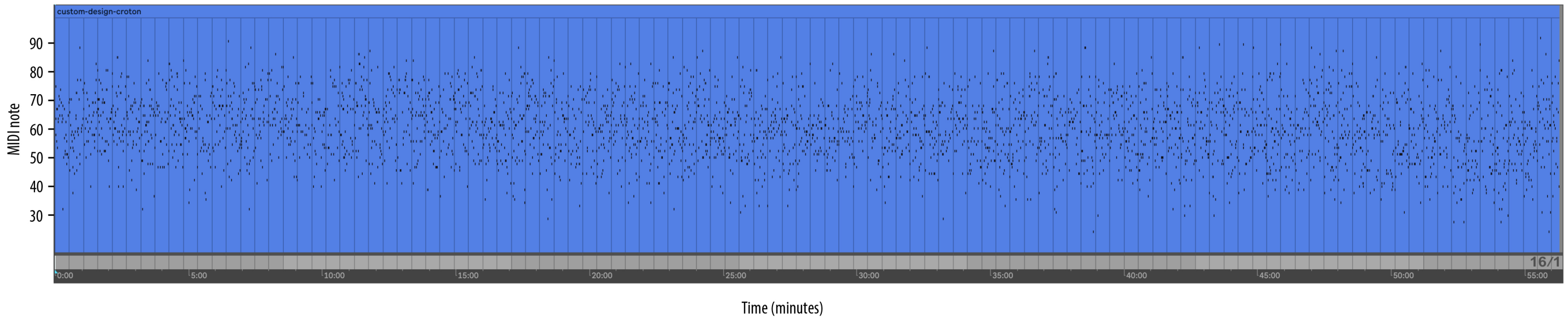
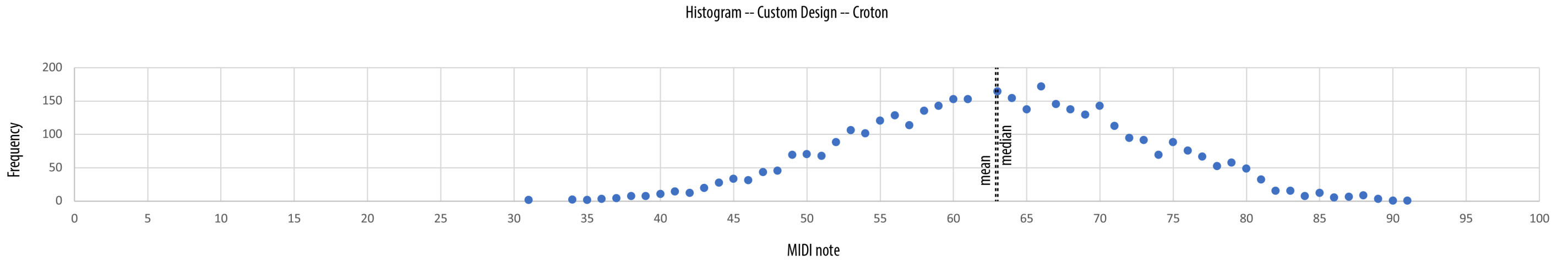
Histogram -- Damanhour -- Jade plant



Interface Device	Plant	Length of Time Sampled	Number of MIDI notes in data set	High MIDI note	Low MIDI note	Mean	Median	Standard Deviation
Damanhour	Echeveria	5 hours, 50 minutes, 48 seconds	10,270	95	36	66.54	67	13.30

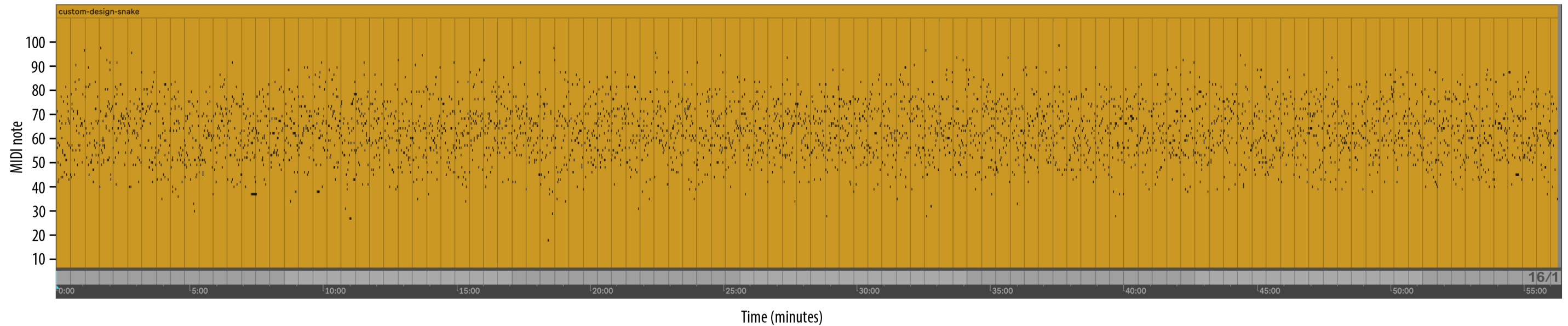
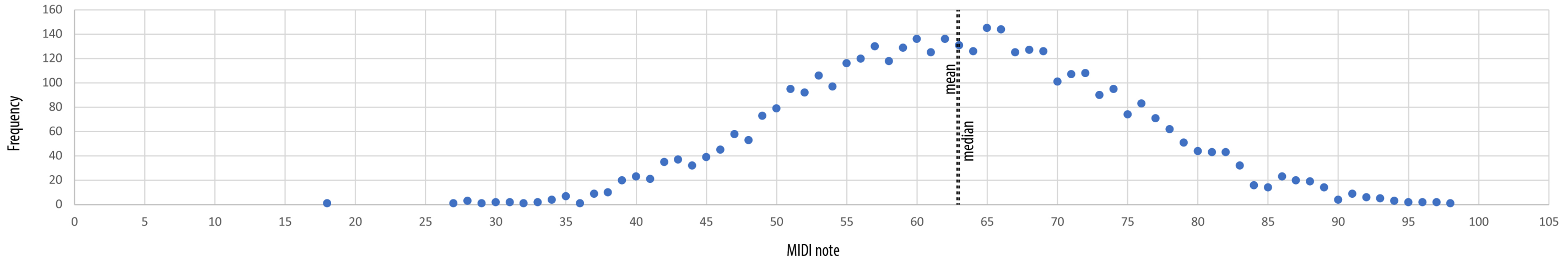


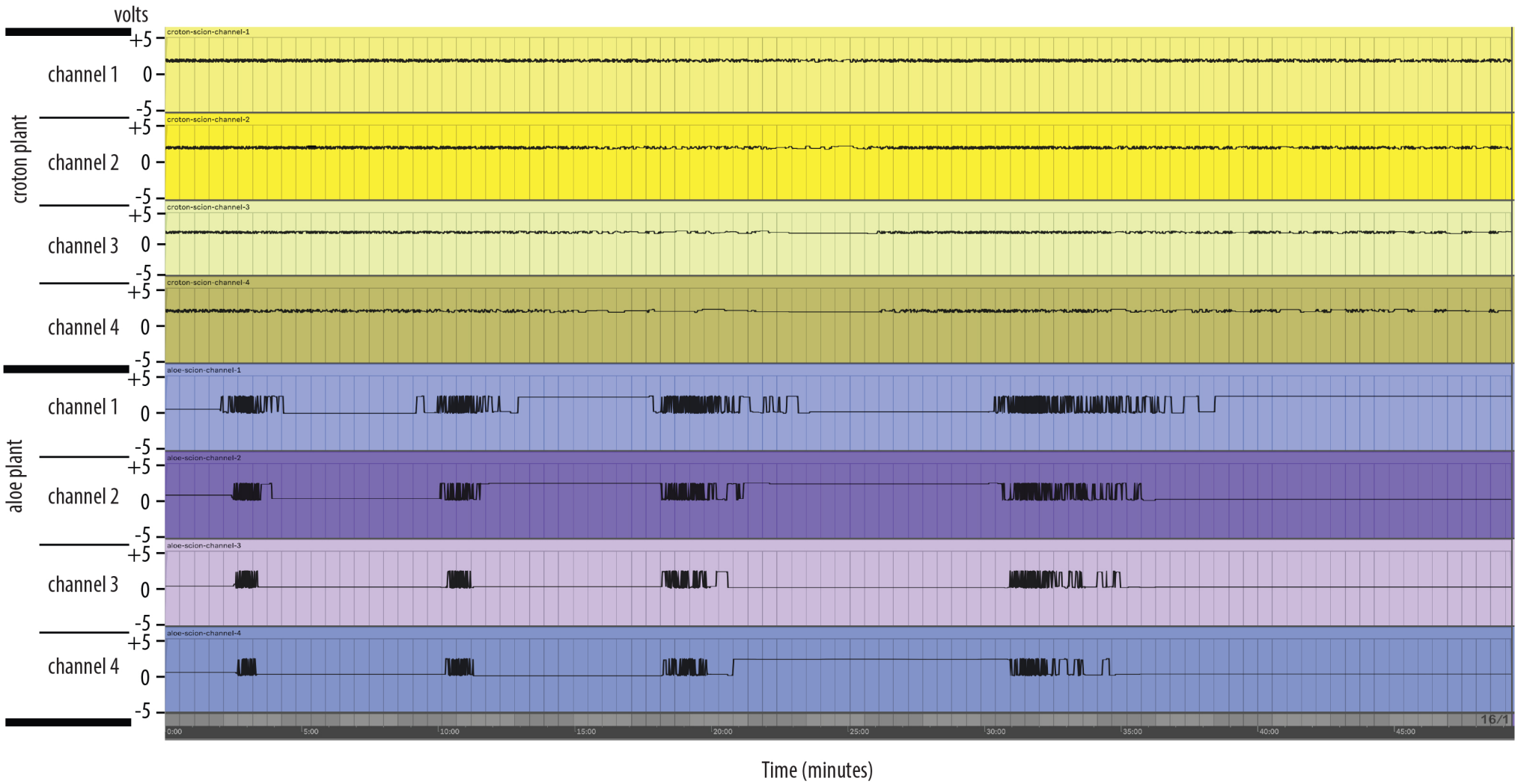
Interface Device	Plant	Length of Time Sampled	Number of MIDI notes in data set	High MIDI note	Low MIDI note	Mean	Median	Standard Deviation
Custom design	Croton	56 minutes, 18 seconds	3954	91	31	62.94	63	9.73

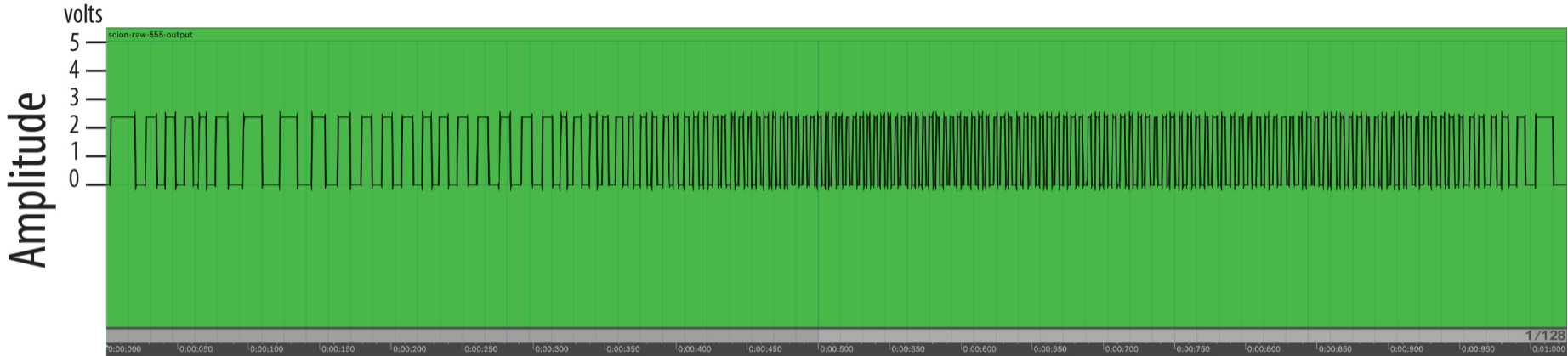


Interface Device	Plant	Length of Time Sampled	Number of MIDI notes in data set	High MIDI note	Low MIDI note	Mean	Median	Standard Deviation
Custom design	Snake plant	54 minutes, 16 seconds	4026	98	18	62.96	63	11.40

Histogram -- Custom design -- snake plant

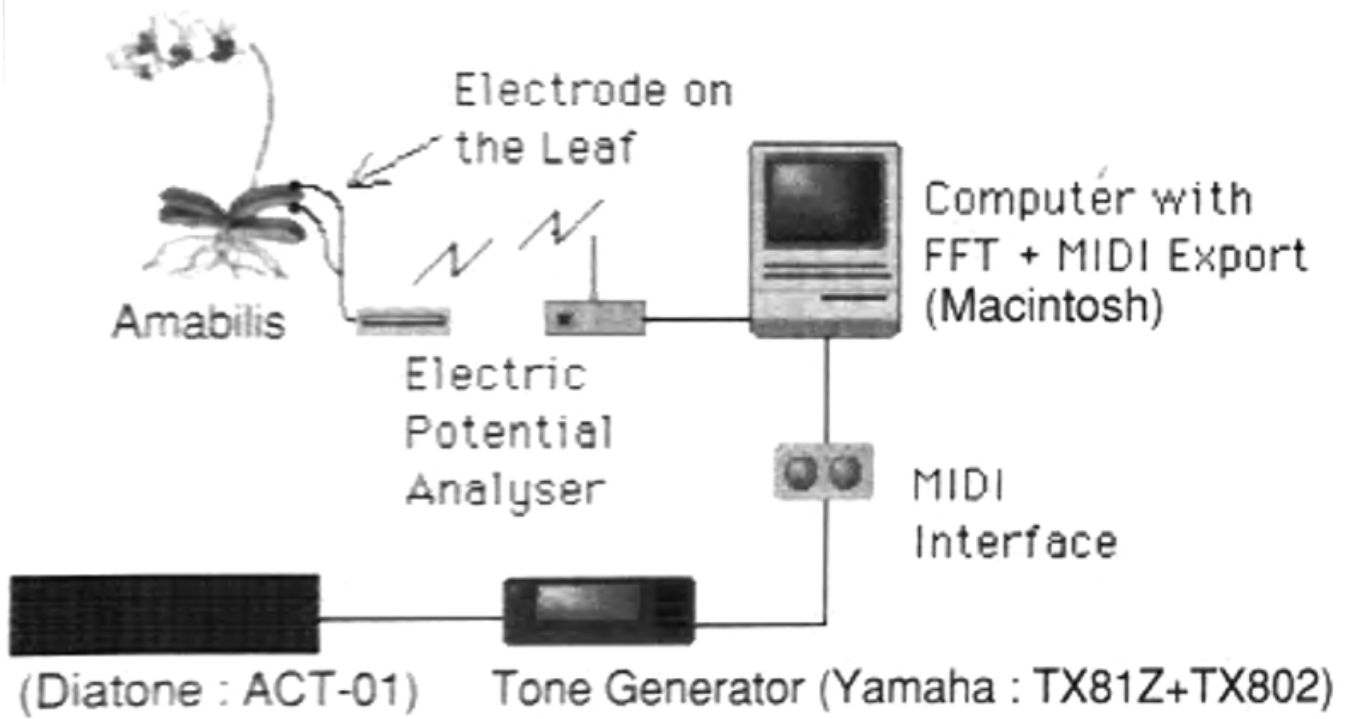






Time (in seconds)

Example 13. Fujieda/Dogane, "Ecological Plantron," liner notes



Example 14. Paradigmatic Analysis of Fujieda's *Pattern A* from *Patterns of Plants XI*, piano version, top part only

1
3
8
13
18
22
27
31
34
35
39
41
43
44
45
46
48
52
53
57

Example 15. Fujieda: *Pattern A* from *Patterns of Plants XI*: contour analysis (different colors highlight repeating, or nearly repeating, patterns of contour)

Segment	Bar	Contour (160 contour changes altogether)															
1	1	-	+	-	-												
2	3	-	+	-	-	+	-	-	+	+	+	+	-	+	-	-	
3	8	-	+	-	-	+	-	-	+	+	+	+	+	-	-	-	
4	13	-	+	-	-	+	-	-	+	+	+	-	+	+	-	-	
5	18	-	+	-	-	+	-	-	+	+	+	-	+	-	-		
6	22	-	+	-	-	+	-	-	+	+	+	-	+	-	+	-	-
7	27	-	+	-	-	+	-	-	+	+	+						
8	31	+	+	-	-	-	-	-	-								
9	34	+	+	-	-	+											
10	35	+	+	-	-	-	-	-	-								
11	39	+	-	-	+	+											
12	41	-	-	+													
13	43	-															
14	44	-	-	+													
15	45	-	-	+													
16	46	-	+	-	-												
17	48	-	+	-	-	+	-	-	+	+	+						
18	52	-	+	-	-												
19	53	-	+	-	-	+	-	-	+	+	+						
20	57	-	+	+	-	+	-	-	+								

Example 16. Fujieda: *Pattern A* from *Patterns of Plants XI*: pitch analysis (different colors highlight repeating, or nearly repeating, patterns of pitches)

Segment	Bar	Diatonic Pitch Classes. Integers in parenthesis indicate the next note is elided into the next segment. (F#4 = 1, G#4 = 2, A = 3, B = 4, C# = 5, D = 6, E = 7 (180 notes altogether))																
1	1	5	4	5	4	3												
2	3	4	3	4	3	2	3	2	1	2	3	4	5	4	5	4	3	
3	8	4	3	4	3	2	3	2	1	2	3	4	5	6	5	4	(5)	
4	13	5	4	5	4	3	4	3	2	3	4	5	4	5	6	5	4	
5	18	5	4	5	4	3	4	3	2	3	4	5	4	5	4	3		
6	22	4	3	4	3	2	3	2	1	2	3	4	3	5	4	5	4	3
7	27	4	3	4	3	2	3	2	1	2	3	4						
8	31	5	6	7	6	5	4	3	2	1								
9	34	1	2	3	2	1	2											
10	35	5	6	7	6	5	4	3	2	1								
11	39	2	3	2	1	2	3	(4)										
12	41	4	3	2	3													
13	43	4	3															
14	44	4	3	2	3													
15	45	4	3	2	3													
16	46	5	4	5	4	3												
17	48	4	3	4	3	2	3	2	1	2	3	4						
18	52	5	4	5	4	3												
19	53	4	3	4	3	2	3	2	1	2	3	4						
20	57	5	4	5	6	5	6	5	4	5								

Example 17. Fujieda: *Pattern A* from *Patterns of Plants XI*. rhythmic analysis (segments that conclude with their longest values are highlighted in orange)

Segment	Bar	Each note's duration is indicated by its length in eighth notes. Numbers in parenthesis indicate triplets.																
1	1	3	2	2	2	8												
2	3	2	2	3	1	2	2	1	3	3	3	2	2	1	1	3	8	
3	8	1	2	3	1	2	2	2	2	3	3	3	3	1	3	8		
4	13	1	2	3	2	1	2	1	3	3	4	2	1	2	2	3	8	
5	18	1	2	3	1	1	3	1	3	3	2	1	1	1	3	8		
6	22	2	2	2	2	1	3	1	3	2	4	2	1	2	1	1	3	8
7	27	1	2	3	2	1	2	1	3	4	4	3						
8	31	1	1	1	1	2	5	4	5	4								
9	34	1	1	1	2	2	6											
10	35	4	2	1	1	2	6	4	4	5								
11	39	1	2	2	2	2	7											
12	41	1	2	1	10													
13	43	5	4															
14	44	2	1	1	8													
15	45	2	1	1	6													
16	46	2	1	1	3	8												
17	48	1	2	3	2	1	2	2	2	4	3	5						
18	52	1	1	1	3	8												
19	53	2	2	2	2	1	2	1	4	2	4	4						
20	57	1	1	1	5	4	(2)*	(1)	(1)	8								

Example 18. Hypothetical scatter chart suggesting a correlation between the amount of intervention artists typically make interpreting biodata and the musical style that results

