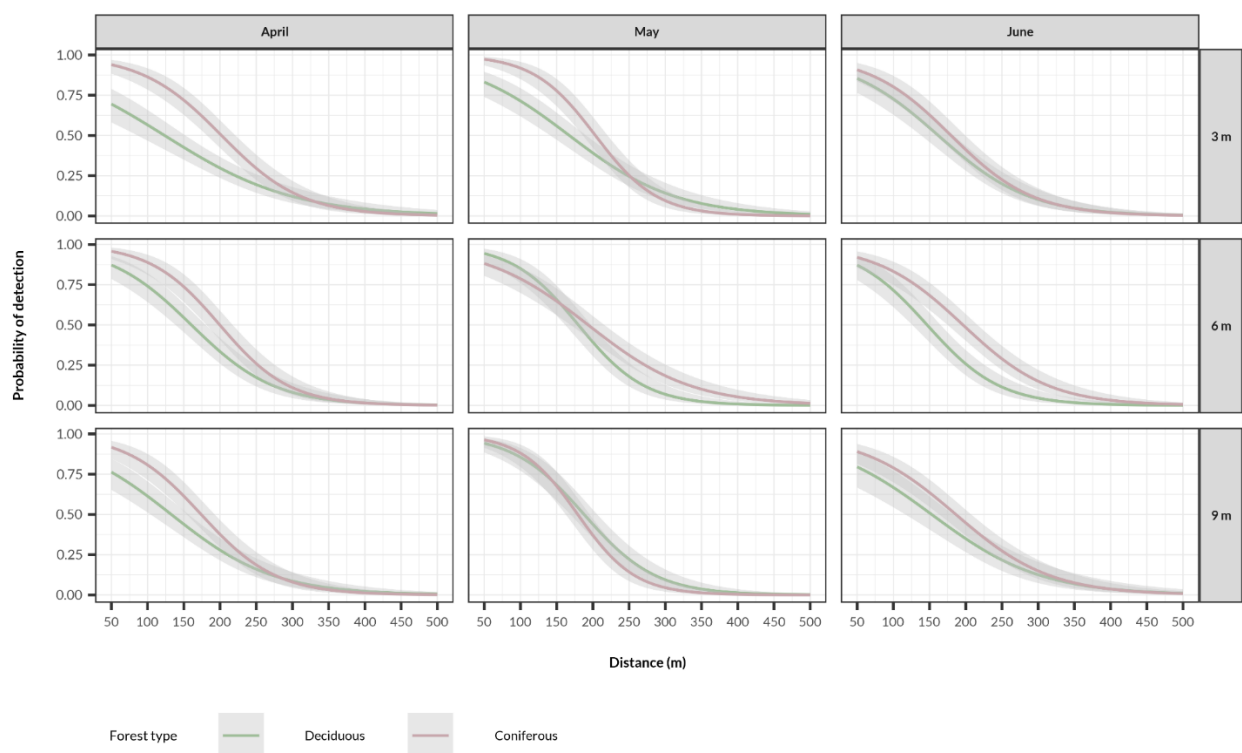


Detection ranges of forest bird vocalisations: guidelines for passive acoustic monitoring

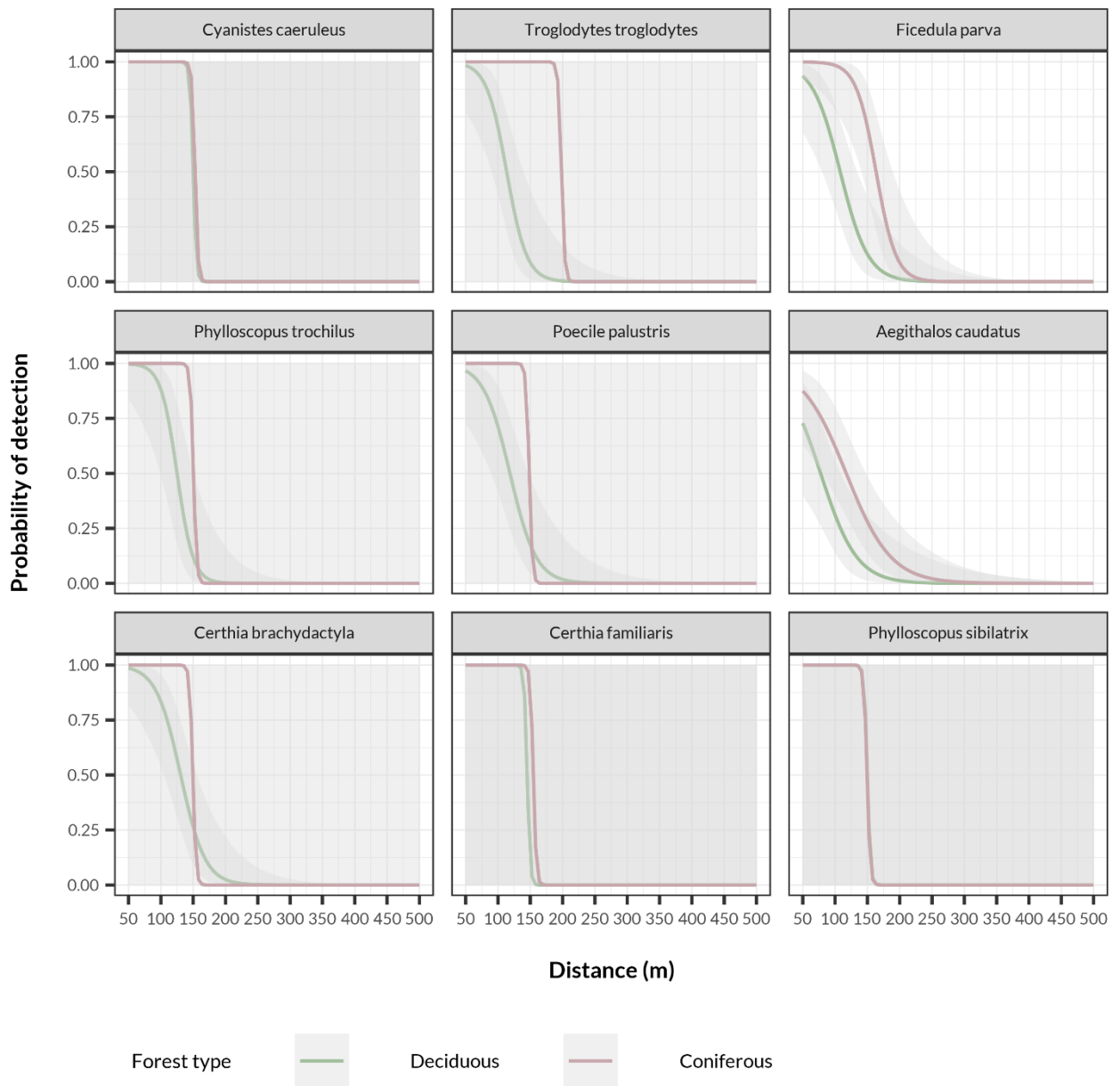
Authors Dominika Winiarska^{1*}, Paweł Szymański¹, Tomasz S. Osiejuk¹

¹ Department of Behavioural Ecology, Institute of Environmental Biology, Faculty of Biology, Adam Mickiewicz University, Poznań, Poland

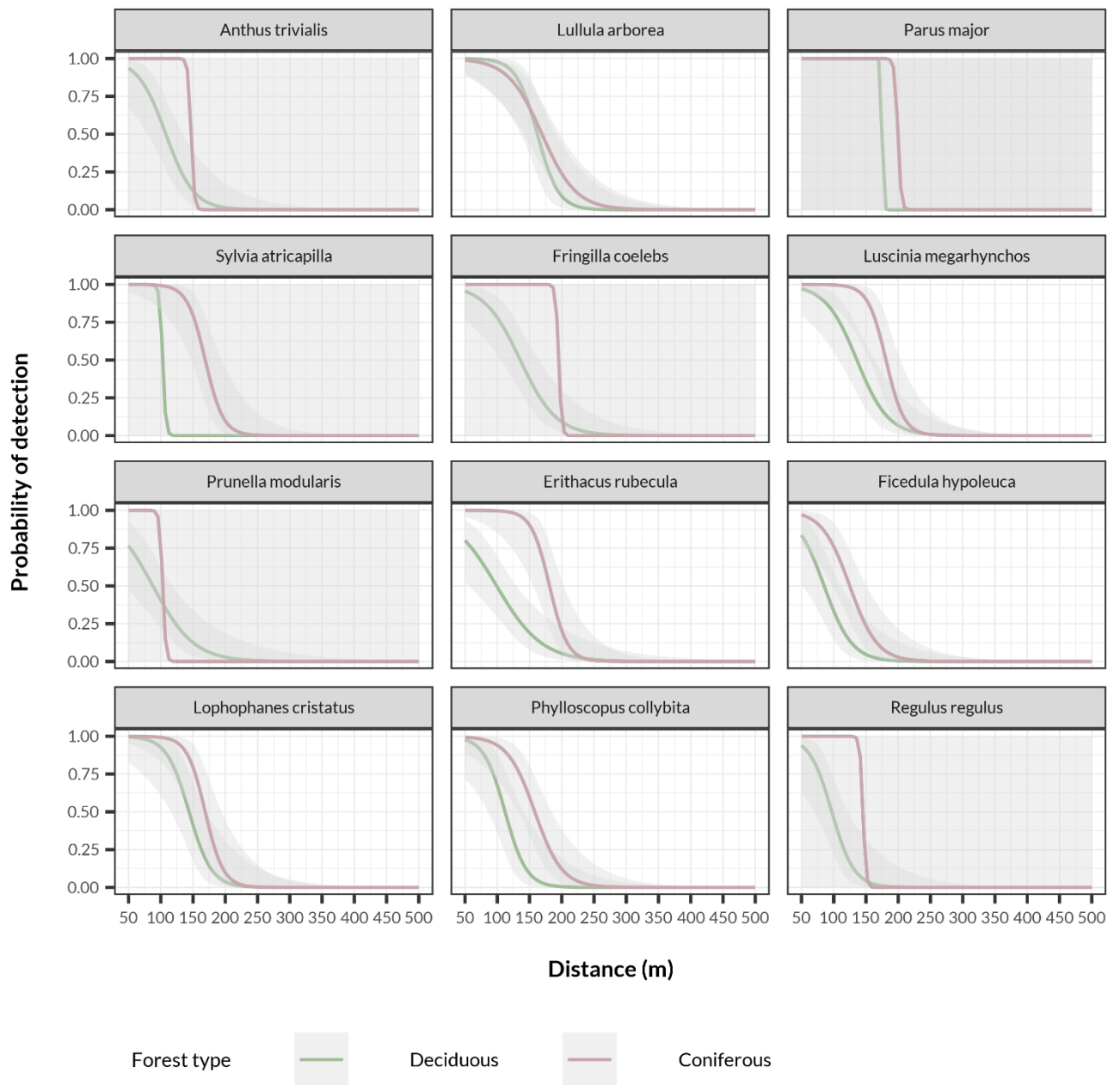
* dominika.winiarska@amu.edu.pl



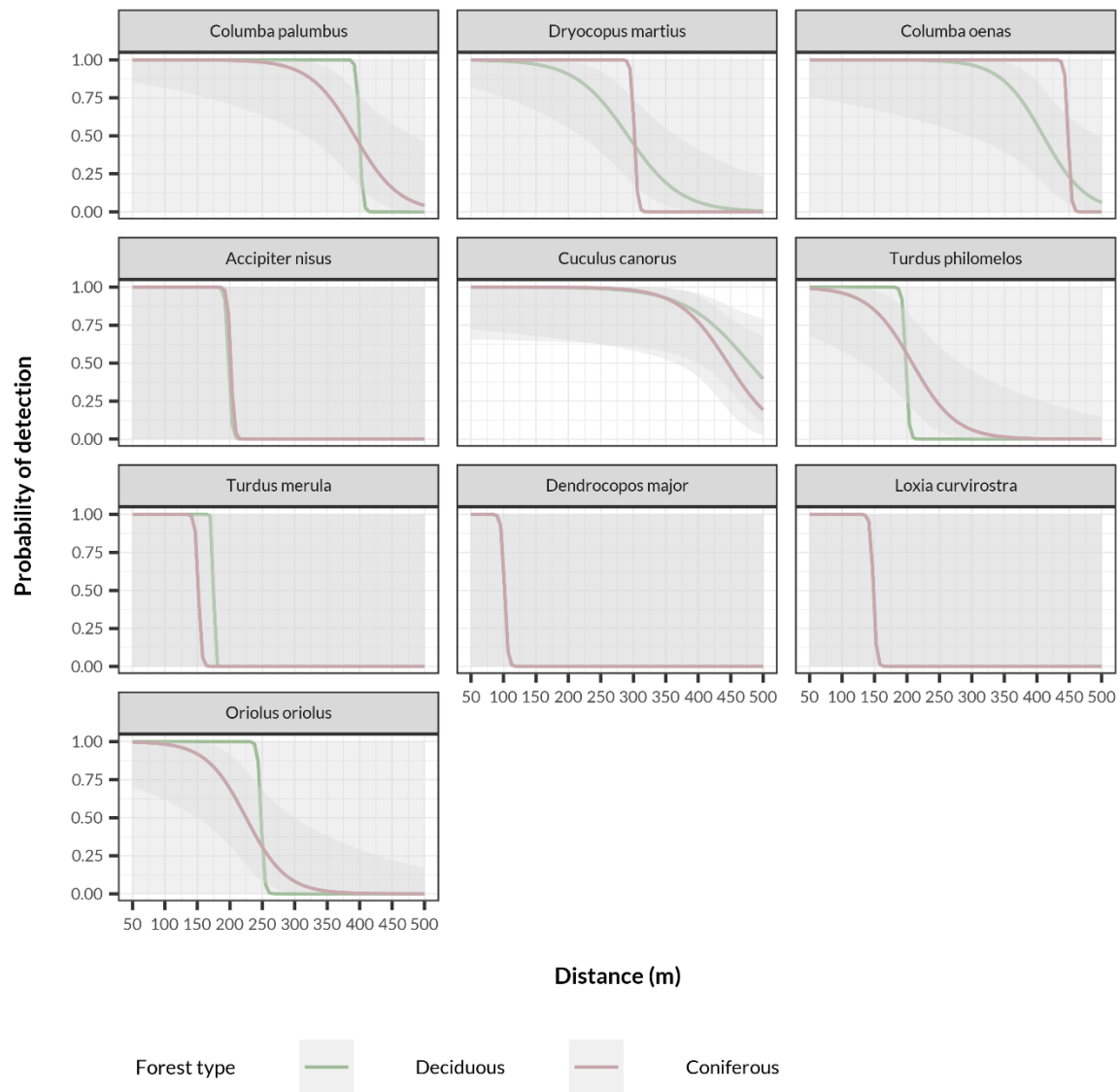
Supplementary Figure 1. Changes in detection probability for different broadcasting heights during the season.



Supplementary Figure 2a. Detection probability of each species.



Supplementary Figure 2b. Detection probability of each species.



Supplementary Figure 2c. Detection probability of each species.

Supplementary Table 1. Meteorological data on each experiment setup.

Transect	Date	Time (am)	Broadcast height	Wind (m/s)	Humidity (%)	Temperature (°C)
Coniferous	01.04.2021	07:05	3 m	0,00	75,8	7,2
		07:50	9 m	0,00	82,1	8,1
		08:30	6 m	0,00	80,2	10,3
Deciduous	02.04.2021	07:05	9 m	0,22	74,1	0,8
		07:50	3 m	0,22	79,5	2,0
		08:40	6 m	0,00	69,3	3,9
Coniferous	12.05.2021	06:05	6 m	0,00	74,3	14,1
		06:50	3 m	0,00	75,2	14,8
		07:32	9 m	0,36	67,5	17,1
Deciduous	14.05.2021	06:05	3 m	0,62	80,7	12,0
		06:53	6 m	0,52	83,7	12,0
		07:36	9 m	0,29	83,5	12,2
Coniferous	08.06.2021	05:50	9 m	0,00	79,2	11,3
		06:35	6 m	0,00	78,8	12,8
		07:20	3 m	0,00	76,5	14,9
Deciduous	09.06.2021	05:58	9 m	0,47	66,4	15,5
		07:23	3 m	0,59	62,6	16,6
		08:06	6 m	0,75	59,9	17,3

Supplementary Table 2. Best models of detection probability and maximum distance used for the analysis based on Akaike's information criterion (AIC).

Model

detected ~ distance + transect + height + month + temperature + humidity + wind + time + peak frequency + SPL + (1 species)				
df	Log-likelihood	AICc	Delta	Weight
13	-769	1564	0.00	0.092
	Estimate	Std Error	Z value	P value
Intercept	-39.675	49.690	-0.798	0.425
Distance	-2.447	0.094	-25.919	< 2e-16 ***
Transect	0.466	0.244	1.914	0.056 .
Height	-0.233	0.086	-2.720	0.007 **
Month June	-0.390	0.271	-1.436	0.151
Month May	0.134	0.271	0.495	0.620
Time	-0.636	0.447	-1.424	0.154
Temperature	1.775	0.481	3.688	0.000 ***
Humidity	5.736	2.079	2.760	0.006 **
Wind	-3.757	1.297	-2.896	0.004 **
Peak frequency	-12.355	1.500	-8.236	< 2e-16 ***
SPL	42.024	23.867	1.761	0.078.
detected ~ distance + transect + height + month + temperature + humidity + wind + peak frequency + SPL + (1 species)				
12	-770	1564	0.02	0.091
	Estimate	Std Error	Z value	P value
Intercept	-38.900	49.612	-0.784	0.433
Distance	-2.443	0.094	-25.934	< 2e-16 ***
Transect (pine)	0.536	0.239	2.245	0.025 *
Height	-0.237	0.085	-2.769	0.006 **
Month June	-0.435	0.269	-1.615	0.106
Month May	0.201	0.266	0.753	0.452
Humidity	4.727	1.951	2.423	0.015 *
Temperature	1.520	0.446	3.409	0.001 ***

Peak frequency	-12.340	1.498	-8.239	< 2e-16 ***
SPL	42.033	23.831	1.764	0.078 .
Wind	-4.036	1.282	-3.149	0.002 **
detected ~ distance + transect + height + month + temperature + humidity + wind + time + peak frequency + (1 species)				
12	-771	1565	0.96	0.057
	Estimate	Std Error	Z value	P value
Intercept	47.481	5.687	8.349	< 2e-16 ***
Distance	-2.447	0.094	-25.922	< 2e-16 ***
Transect (pine)	0.465	0.244	1.910	0.056 .
Height	-0.233	0.086	-2.718	0.007 **
Month June	-0.389	0.271	-1.435	0.151
Month May	0.134	0.271	0.494	0.621
Time	-0.638	0.447	-1.428	0.153
Humidity	5.737	2.078	2.760	0.006 **
Temperature	1.776	0.481	3.690	0.000 ***
Peak frequency	-14.048	1.227	-11.451	< 2e-16 ***
Wind	-3.758	1.297	-2.897	0.004 **
max distance ~ transect + height + time + temperature + humidity + peak frequency + SPL + (1 species)				
14	-2687	5402	0	0.345
	Estimate	Std Error	Z value	P value
Intercept	5.077	0.140	36.36	< 2e-16 ***
Transect pine	0.111	0.022	4.98	6.29e-07 ***
Height	-0.044	0.013	-3.55	0.000 ***
Time	-0.146	0.064	-2.28	0.022 *
Temperature	0.034	0.015	2.23	0.026 *
Humidity	0.043	0.009	4.82	1.40e-06 ***
Peak frequency high	0.093	0.088	1.06	0.291
Peak frequency medium	0.614	0.113	2.28	5.43e-08 ***
Peak frequency low	0.169	0.074	5.44	0.022 *
Peak frequency very low	0.995	0.112	8.89	< 2e-16 ***
SPL low	-0.313	0.092	-3.42	0.001 ***

SPL medium	-0.259	0.108	-2.39	0.017 *
max distance ~ transect + height + time + temperature + humidity + wind + peak frequency + SPL + (1 species)				
15	-2687	5404	1.7	0.150
	Estimate	Std Error	Z value	P value
Intercept	5.101	0.144	35.40	< 2e-16 ***
Transect pine	0.089	0.039	2.27	0.023 *
Height	-0.048	0.014	-3.53	0.000 ***
Time	-0.155	0.065	-2.38	0.017 *
Temperature	0.042	0.020	2.13	0.033 *
Humidity	0.046	0.010	4.65	3.38e-06 ***
Wind	-0.011	0.016	-0.67	0.504
Peak frequency high	0.093	0.089	1.05	0.292
Peak frequency medium	0.169	0.074	2.28	0.023 *
Peak frequency low	0.614	0.113	5.44	5.46e-08 ***
Peak frequency very low	0.995	0.112	8.89	< 2e-16 ***
SPL low	-0.313	0.092	-3.42	0.001 ***
SPL medium	-0.258	0.108	-2.39	0.017 *
max distance ~ transect + height + humidity + peak frequency + SPL + (1 species)				
12	-770	1564	0.02	0.091
	Estimate	Std Error	Z value	P value
Intercept	4.895	0.092	53.31	< 2e-16 ***
Transect pine	0.132	0.021	6.30	2.88e-10 ***
Height	-0.041	0.013	-3.27	0.001 **
Humidity	0.032	0.008	4.15	3.30e-05 ***
Peak frequency high	0.094	0.088	1.06	0.287
Peak frequency medium	0.170	0.074	2.31	0.021 *
Peak frequency low	0.613	0.112	5.47	4.60e-08 ***
Peak frequency very low	0.992	0.111	8.93	< 2e-16 ***
SPL low	-0.314	0.091	-3.45	0.001 ***
SPL medium	-0.260	0.107	-2.43	0.015 *