

**OPTIMIZING FROG SURVEYS THROUGH OCCUPANCY MODELING: AN
OVERVIEW OF ENVIRONMENTAL AND METHODOLOGICAL
DETERMINANTS OF ANURAN DETECTABILITY**

Juliane Pereira-Ribeiro^{1} , Átilla Colombo Ferreguetti¹ , Helena Godoy Bergallo¹  & Carlos
Frederico Duarte Rocha¹ *

¹ Rio de Janeiro State University, Department of Ecology, Rua São Francisco Xavier, nº 524, Pavilhão Haroldo Lisboa da Cunha, 2º andar, sala 224. Bairro Maracanã, CEP: 20550-013. Rio de Janeiro, RJ, Brazil.

E-mails: julianeribeiro25@gmail.com (corresponding author); atilla.ferreguetti@gmail.com; nena.bergallo@gmail.com; cfdrocha@gmail.com

SUPPLEMENTARY MATERIAL

Table S1. Types of information extracted from each study included in this review.

Information type	Description
Geographic location	Country, state, specific study location and geographic coordinates (when available)
Year	Year of publication
Species	Frog species
Variables evaluated	Variables tested for the detectability of anurans
Variable type	Description of how the variables were measured and included in the models
Results of the variables	Whether or not the tested variables influenced the detectability of the species evaluated

Table S2. Complete list of environmental and habitat factors that influence the detectability of frogs and studies that tested the respective factors.

Variable	Studies in which the factor influenced the detectability of frogs	Studies that tested, but the factor did not influence the detectability of frogs
Air temperature	MacKenzie et al. 2002; Weir et al. 2005; Schmidt & Pellet 2005; Pellet & Schmidt 2005; Mazerolle et al. 2005; Sung et al. 2006; Gooch et al. 2006; Brander et al. 2007; Sewell & Griffiths 2010; Cook et al. 2011; Roloff et al. 2011; Dostine et al. 2013; Lehtinen & Witter 2014; Harings & Boeing 2014; Smith et al 2014; Murray et al. 2015; Barrett et al. 2016; Friedman et al. 2016; Johnson et al. 2016; Gustafon & Newman 2016; Strain et al. 2016; Rivera & Folt 2018; Alvarez et al. 2019; Cassel et al. 2019; Swanson et al. 2019; Asad et al. 2020; Ngo et al. 2020; Pereira-Ribeiro et al. 2020; Flynn et al. 2023; Williams et al. 2012	Kroll et al. 2008; Popescu & Gibbs 2009; Tanadini & Schmidt 2011; Olson et al. 2011; Lehtinen et al. 2016; Monroe et al. 2017; Pereira-Ribeiro et al. 2019; Green et al. 2020; Cashins et al. 2015; Barrantes-Madrigal et al. 2022
Precipitation	Weir et al. 2005; Roloff et al. 2011; Murray et al. 2015; Friedman et al. 2016; Johnson et al. 2016; Ribeiro et al. 2018; Rivera & Folt 2018; Asad et al. 2020; Ngo et al. 2020, Williams et al 2012	Schmidt & Pellet 2005; Pellet & Schmidt 2005; Kroll et al. 2008; Smith et al 2014; Barrett et al. 2016; Alvarez et al. 2019; Cassel et al. 2019; Pereira-Ribeiro et al. 2019; Green et al. 2020; Cashins et al. 2015
Water temperature	Gooch et al. 2006; Curtis & Paton 2010; Sewell et al. 2010; Cook et al. 2011; Dostine et al. 2013; Smith et al. 2014; Petitot et al. 2014; Moreira et al. 2015, 2016; Strain et al. 2016, Pereira-Ribeiro et al. 2020, Pereira-Ribeiro et al. 2023	Kroll et al. 2008; Green et al. 2020; Silveira & Guimarães 2020.
Relative humidity	Sung et al. 2006; Olson et al. 2011; Lehtinen et al. 2016; Strain et al. 2016, Monroe et al. 2017; Pereira-Ribeiro et al. 2019, Asad et al. 2020; Green et al. 2020; Ngo et al. 2020; Pereira-Ribeiro et al. 2020	Gooch et al. 2006; Smith et al 2014; Pereira-Ribeiro et al. 2023; Flynn et al. 2023; Cashins et al. 2015; Barrantes-Madrigal et al. 2022
Wind speed	Weir et al. 2005; Popescu & Gibbs 2008; Curtis & Paton 2010; Olson et al. 2011; Tanadini & Smith 2011; Smith et al 2014; Gustafon & Newman 2016; Strain et al. 2016; Cashins et al. 2015	Gooch et al. 2006; Murray et al. 2015; Cassel et al. 2019; Green et al. 2020.
Cloudiness	Weir et al. 2005; Curtis & Paton 2010; Olson et al. 2011; Strain et al. 2016	Gooch et al. 2006; Kroll et al. 2008; Popescu & Gibbs 2009; Harings & Boeing 2014; Murray et al. 2015; Cashins et al. 2015
Moon phase/illumination	Weir et al. 2005; Asad et al. 2020	Popescu & Gibbs 2009; Lehtinen & Witter 2014; Murray et al. 2015; Green et al. 2020; Barrantes-Madrigal et al. 2022
Conductivity	Klaver et al. 2013; Moreira et al. 2016	Pereira-Ribeiro et al. 2020

Water depth	Curtis & Paton 2010; Moreira et al. 2016	-
pH	Pereira-Ribeiro 2023	Pereira-Ribeiro et a. 2020
Soil temperature	Tanadini & Schmidt 2011	
Soil water storage	Friedman et al. 2016	
Wind Chill	Smith et al. 2014	
Elevation	Campos-Cerqueira & Aide 2017.	
Litter coverage	Flynn et al 2023	
Wetland type	Hansen et al 2012;	
Vegetation cover	Curtis & Paton 2010; Moreira et al. 2015; Moreira et al. 2016	
