## A Compendium of Photopigment Peak Sensitivities and Spectral Response Curves of Terrestrial Wildlife to Guide Design of Outdoor Nighttime Lighting

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## Appendix A. Supplementary Data

Table 1. Index of Species in Peak Photopigment Sensitivity Database

Phylum	Class	Order	Family	Species	References
Arthropoda	Arachnida	Aranae	Araneidae	Argiope amoena	(Yamashita & Tateda, 1976)
Arthropoda	Arachnida	Aranae	Araneidae	Argiope bruennichi	(Yamashita & Tateda, 1976)
Arthropoda	Arachnida	Aranae	Ctenidae	Cupiennius salei	(Walla et al., 1996)
Arthropoda	Arachnida	Aranae	Salticidae	Menemerus confusus	(Yamashita & Tateda, 1976)
Arthropoda	Arachnida	Aranae	Salticidae	Phidippus regius	(DeVoe, 1972)
Arthropoda	Arachnida	Aranae	Salticidae	Plexippus validus	(Blest et al., 1981)
Arthropoda	Branchiopoda	Anomopoda	Daphniidae	Daphnia magna	(Smith & Macagno, 1990)
Arthropoda	Insecta	Blattodea	Blattidae	Periplaneta americana	(Mote & Goldsmith, 1970; Paul et al., 1986)
Arthropoda	Insecta	Coleoptera	Carabidae	Carabus auratus	(Hasselmann, 1962)
Arthropoda	Insecta	Coleoptera	Carabidae	Carabus nemoralis	(Hasselmann, 1962)
Arthropoda	Insecta	Coleoptera	Coccinellidae	Coccinella septempunctata	(Lin & Wu, 1992)
Arthropoda	Insecta	Coleoptera	Lampyridae	Bicellonycha wickershamorum	(Lall et al., 1988)
Arthropoda	Insecta	Coleoptera	Lampyridae	Photinus collustrans	(Lall et al., 1988)
Arthropoda	Insecta	Coleoptera	Lampyridae	Photinus macdermotti	(Lall et al., 1988)
Arthropoda	Insecta	Coleoptera	Lampyridae	Photinus marginellus	(Lall et al., 1988)
Arthropoda	Insecta	Coleoptera	Lampyridae	Photinus pyralis	(Lall et al., 1988)
Arthropoda	Insecta	Coleoptera	Lampyridae	Photinus scintillans	(Lall et al., 1988)
Arthropoda	Insecta	Coleoptera	Lampyridae	Photuris frontalis	(Lall et al., 1988)
Arthropoda	Insecta	Coleoptera	Lampyridae	Photuris lucicrescens	(Lall et al., 1988)
Arthropoda	Insecta	Coleoptera	Lampyridae	Photuris potomaca	(Lall et al., 1988)
Arthropoda	Insecta	Diptera	Drosophilidae	Drosophila melanogaster	(Bernard & Stavenga, 1979)
Arthropoda	Insecta	Diptera	Muscidae	Musca domestica	(Hardie, 1985)
Arthropoda	Insecta	Diptera	Syrphidae	Eristalis tenax	(Horridge et al., 1975)
Arthropoda	Insecta	Hemiptera	Notonectidae	Notonecta glauca	(Bennett & Ruck, 1970; Bruckmoser, 1968)
Arthropoda	Insecta	Hemiptera	Notonectidae	Notonecta insulata	(Bennett & Ruck, 1970)
Arthropoda	Insecta	Hemiptera	Notonectidae	Notonecta irrorata	(Bennett & Ruck, 1970)
Arthropoda	Insecta	Hemiptera	Notonectidae	Notonecta undulata	(Bennett & Ruck, 1970)
Arthropoda	Insecta	Hymenoptera	Adrenidae	Andrena florea	(Peitsch et al., 1992)

Arthropoda	Insecta	Hymenoptera	Adrenidae	Anthophora	(Peitsch et al., 1992)
Arthropoda	Insecta	Hymenoptera	Adrenidae	acervorum Callonychium	(Peitsch et al., 1992)
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Arthropoda	Insecta Insecta	Hymenoptera Hymenoptera	Adrenidae	Oxea flavescens Apis mellifera	(Peitsch et al., 1992) (Peitsch et al., 1992)
Arthropoda	Insecta		Apidae	Apis menijera Bombus	
Arthropoda	msecia	Hymenoptera	Apidae		(Vishnevskaya & Mazokhin-
A 41 1	Τ ,	TT	A '1	distinguendis	Porshnyakov, 1972)
Arthropoda	Insecta	Hymenoptera	Apidae	Bombus fervidus	(Bernard & Stavenga, 1978)
Arthropoda	Insecta	Hymenoptera	Apidae	Bombus hortorum	(Meyer-Rochow, 1980)
Arthropoda	Insecta	Hymenoptera Hymenoptera	Apidae	Bombus hypnorum	(Peitsch et al., 1992)
Arthropoda	Insecta	• •	Apidae	Bombus impatiens	(Bernard & Stavenga, 1978)
Arthropoda	Insecta	Hymenoptera	Apidae	Bombus jonellus	(Peitsch et al., 1992)
Arthropoda	Insecta	Hymenoptera	Apidae	Bombus lapidarius	(Peitsch et al., 1992)
Arthropoda	Insecta	Hymenoptera	Apidae	Bombus monticola	(Peitsch et al., 1992)
Arthropoda	Insecta	Hymenoptera	Apidae	Bombus morio	(Peitsch et al., 1992)
Arthropoda	Insecta	Hymenoptera	Apidae	Bombus terrestris	(Peitsch et al., 1992)
Arthropoda	Insecta	Hymenoptera	Apidae	Collectes fulgidus	(Peitsch et al., 1992)
Arthropoda	Insecta	Hymenoptera	Apidae	Lestrimelitta limao	(Peitsch et al., 1992)
Arthropoda	Insecta	Hymenoptera	Apidae	Melecta punctata	(Peitsch et al., 1992)
Arthropoda	Insecta	Hymenoptera	Apidae	Melipona marginata	(Peitsch et al., 1992)
Arthropoda	Insecta	Hymenoptera	Apidae	Melipona	(Peitsch et al., 1992)
	_			quadrifasciata	
Arthropoda	Insecta	Hymenoptera	Apidae	Nomada	(Peitsch et al., 1992)
				alboguttata	
Arthropoda	Insecta	Hymenoptera	Apidae	Partamona helleri	(Chittka et al., 1997)
Arthropoda	Insecta	Hymenoptera	Apidae	Schwarziana sp	(Peitsch et al., 1992)
Arthropoda	Insecta	Hymenoptera	Apidae	Trigona spinipes	(Peitsch et al., 1992)
Arthropoda	Insecta	Hymenoptera	Apidae	Xylocopa brasilianorum	(Peitsch et al., 1992)
Arthropoda	Insecta	Hymenoptera	Colletidae	Formica polyctena	(Menzel & Knaut, 1973)
Arthropoda	Insecta	Hymenoptera	Crabronidae	Cataglyphis bicolor	(Paul et al., 1986)
Arthropoda	Insecta	Hymenoptera	Crabronidae	Philanthus triangulum	(Peitsch et al., 1992)
Arthropoda	Insecta	Hymenoptera	Formicidae	Anthidium manicatum	(Peitsch et al., 1992)
Arthropoda	Insecta	Hymenoptera	Formicidae	Myrmecia gulosa	(Lieke, 1981)
Arthropoda	Insecta	Hymenoptera	Halictidae	Lasioglossum albipes	(Peitsch et al., 1992)
Arthropoda	Insecta	Hymenoptera	Halictidae	Lasioglossum malachurum	(Peitsch et al., 1992)
Arthropoda	Insecta	Hymenoptera	Ichneumoidae	Ichneumon spp.	(Peitsch et al., 1992)
Arthropoda	Insecta	Hymenoptera	Ichneumoidae	Ichneumon	(Peitsch et al., 1992)
	Inscoto			stramentarius	
Arthropoda	Insecta	Hymenoptera	Megachilidae	Chelostoma florisomne	(Peitsch et al., 1992)
Arthropoda	Insecta	Hymenoptera	Megachilidae	Osmia rufa	(Peitsch et al., 1992)
Arthropoda	Insecta	Hymenoptera	Siricidae	Urocerus gigas	(Peitsch et al., 1992)
Arthropoda	Insecta	Hymenoptera	Sphecidae	Cerceris rybyensis (female)	(Peitsch et al., 1992)
Arthropoda	Insecta	Hymenoptera	Sphecidae	Cerceris rybyensis (male)	(Peitsch et al., 1992)

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Arthropoda Insecta Hymenoptera Vespidae   Fespo crabro (female)   Arthropoda Insecta Hymenoptera Vespidae   Fespo crabro (female)   Arthropoda Insecta Hymenoptera Vespidae   Fespo crabro (male)   Arthropoda Insecta Hymenoptera Vespidae   Fespo gramatica (Peitsch et al., 1992)   Arthropoda Insecta Hymenoptera Vespidae   Fespo gramatica (Peitsch et al., 1992)   Arthropoda Insecta Hymenoptera   Vespidae   Fespo gramatica (Peitsch et al., 1992)   Arthropoda Insecta Hymenoptera   Fespo gramatica   Peitsch et al., 1992)   Arthropoda Insecta Lepidoptera   Fespo gramatica   Fespo gramatica	Arthropoda	Insecta	Hymenoptera	Vespidae	Ü	(Peitsch et al., 1992)
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Arthropoda Insecta Lepidoptera Nymphalidae Nymphalis (Eguchi et al., 1982)  Arthropoda Insecta Lepidoptera Nymphalidae Parage aegeria (Paul et al., 1986)  Arthropoda Insecta Lepidoptera Nymphalidae Polygonia c-album (Eguchi et al., 1982)  Arthropoda Insecta Lepidoptera Nymphalidae Vanessa cardui (Bernard, 1979; Briscoe et al., 2003)  Arthropoda Insecta Lepidoptera Papilionidae Atrophaneura (Eguchi et al., 1982)	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Minois dryas	(Eguchi et al., 1982)
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al., 2003) Arthropoda Insecta Lepidoptera Papilionidae Atrophaneura (Eguchi et al., 1982)	Arthropoda	Insecta				(Eguchi et al., 1982)
Arthropoda Insecta Lepidoptera Papilionidae Atrophaneura (Eguchi et al., 1982)	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Vanessa cardui	
	Arthropoda	Insecta	Lepidoptera	Papilionidae	_	(Eguchi et al., 1982)

Arthropoda	Insecta	Lepidoptera	Papilionidae	Graphium sarpedon	(Eguchi et al., 1982)
Arthropoda	Insecta	Lepidoptera	Papilionidae	Papilio achaon	(Eguchi et al., 1982)
Arthropoda	Insecta	Lepidoptera	Papilionidae	Papilio aegeus	(Matic, 1983)
Arthropoda	Insecta	Lepidoptera	Papilionidae	Papilio maackii	(Eguchi et al., 1982)
Arthropoda	Insecta	Lepidoptera	Papilionidae	Papilio protenor	(Eguchi et al., 1982)
Arthropoda	Insecta	Lepidoptera	Papilionidae	Papilio xuthus	(Arikawa et al., 1987;
•		• •	•	•	Eguchi et al., 1982)
Arthropoda	Insecta	Lepidoptera	Papilionidae	Papilo bianor	(Eguchi et al., 1982)
Arthropoda	Insecta	Lepidoptera	Pieridae	Colias erate	(Eguchi et al., 1982)
Arthropoda	Insecta	Lepidoptera	Pieridae	Gonepteryx aspasia	(Eguchi et al., 1982)
Arthropoda	Insecta	Lepidoptera	Pieridae	Pieris brassicae	(Paul et al., 1986; Steiner et al., 1987)
Arthropoda	Insecta	Lepidoptera	Pieridae	Pieris melete	(Eguchi et al., 1982)
Arthropoda	Insecta	Lepidoptera	Pieridae	Pieris rapae	(Wakakuwa et al., 2010)
Arthropoda	Insecta	Lepidoptera	Pyralidae	Amyelois	(Bernard et al., 1984; Eguchi
•		• •	•	transitella	et al., 1982)
Arthropoda	Insecta	Lepidoptera	Pyralidae	Galleria mellonella	(Goldman et al., 1975)
Arthropoda	Insecta	Lepidoptera	Saturniidae	Actias artemis aliena	(Eguchi et al., 1982)
Arthropoda	Insecta	Lepidoptera	Saturniidae	Antheraea polyphemus	(Langer et al., 1986)
Arthropoda	Insecta	Lepidoptera	Saturniidae	Samia cynthia ricini	(Eguchi et al., 1982)
Arthropoda	Insecta	Lepidoptera	Sphingidae	Ampelophaga rubiginosa	(Eguchi et al., 1982)
Arthropoda	Insecta	Lepidoptera	Sphingidae	Callambulyx tatarinovii	(Eguchi et al., 1982)
Arthropoda	Insecta	Lepidoptera	Sphingidae	Deilephila elpenor	(Hamdorf et al., 1971; Höglund et al., 1973;
					Schwemer & Paulsen, 1973)
Arthropoda	Insecta	Lepidoptera	Sphingidae	Macroglossum stellatarum	(Hasselmann, 1962)
Arthropoda	Insecta	Lepidoptera	Sphingidae	Manduca sexta	(White et al., 1983)
Arthropoda	Insecta	Lepidoptera	Sphingidae	Marumba sperchius	(Eguchi et al., 1982)
Arthropoda	Insecta	Neuroptera	Ascalaphidae	Libelloides macaronius	(Gogala, 1967; Paul et al., 1986)
Arthropoda	Insecta	Odonata	Aeshnidae	Aeschna cyanea	(Autrum & Kolb, 1968)
Arthropoda	Insecta	Odonata	Aeshnidae	Aeshna tuberculifera	(Chappell & DeVoe, 1975)
Arthropoda	Insecta	Odonata	Aeshnidae	Anax junius	(Chappell & DeVoe, 1975)
Arthropoda	Insecta	Odonata	Aeshnidae	Libellula pulchella	(Chappell & DeVoe, 1975)
Arthropoda	Insecta	Odonata	Corduliidae	Hemicordulia tau	(Yang & Osorio, 1991)
Arthropoda	Insecta	Odonata	Libellulidae	Sympetrum rubicundulum	(Meinertzhagen et al., 1983)
Arthropoda	Insecta	Orthoptera	Acrididae	Locusta migratoria	(Vishnevskaya & Shura- Bura, 1990)
Arthropoda	Insecta	Orthoptera	Blattidae	Gryllus bimaculatus adult	(Zufall et al., 1989)
Arthropoda	Insecta	Orthoptera	Blattidae	Gryllus campestris	(Zufall et al., 1989)
Arthropoda	Insecta	Orthoptera	Romaleidae	Romalea microptera	(Bruckler & Williams, 1981)
Arthropoda	Malacostraca	Isopoda	Ligiidae	Ligia exotica	(Hariyama et al., 1993)

Chordata	Amphibia	Anura	Bufonidae	Bufo bufo	(Ala-Laurila et al., 2002;
Chordata	Amphibia	Anura	Bufonidae	Rhinella [=Bufo] marinus	Fyhrquist et al., 1998) (Ala-Laurila et al., 2002; Hárosi, 1975; Matthews, 1983; Sillman, 1987)
Chordata	Amphibia	Anura	Pipidae	Xenopus laevis	(Darden et al., 2003; Witkovsky et al., 1981)
Chordata	Amphibia	Anura	Ranidae	Rana catesbeiana	(Crescitelli, 1958; Donner et al., 1990; Gordon & Hood, 1976; Makino-Tasaka & Suzuki, 1984)
Chordata	Amphibia	Anura	Ranidae	Rana catesbeiana larvae	(Crescitelli, 1958; Donner et al., 1990)
Chordata	Amphibia	Anura	Ranidae	Rana cracrivora	(Dartnall, 1967; Donner & Reuter, 1962)
Chordata	Amphibia	Anura	Ranidae	Rana pipiens	(Crescitelli, 1958; Liebman & Entine, 1968)
Chordata	Amphibia	Anura	Ranidae	Rana temporaria	(Koskelainen et al., 1994)
Chordata	Amphibia	Gymnophiona	Dermophiidae	Geotrypetes seraphini	(Mohun et al., 2010)
Chordata	Amphibia	Gymnophiona	Ichthyophiidae	Ichthyophis cf. kohtaoensis	(Mohun et al., 2010)
Chordata	Amphibia	Gymnophiona	Rhinatrematidae	Rhinatrema bivittatum	(Mohun et al., 2010)
Chordata	Amphibia	Gymnophiona	Typhlonectidae	Typhlonectes natans	(Mohun et al., 2010)
Chordata	Amphibia	Urodela	Ambystomatidae	Ambystoma tigrinum larvae	(Isayama et al., 2014; Ma et al., 2001; Perry & McNaughton, 1991)
Chordata	Amphibia	Urodela	Ambystomatidae	Ambystoma tigrinum aquatic	(Hárosi, 1975; Isayama et al., 2014)
Chordata	Amphibia	Urodela	Ambystomatidae	Ambystoma tigrinum land	(Hárosi, 1975; Isayama et al., 2014)
Chordata	Amphibia	Urodela	Proteidae	Necturus maculosus	(Crescitelli, 1958; Hárosi, 1975; Liebman, 1972)
Chordata	Amphibia	Urodela	Salamandridae	Cynops orientalis	(Korenyak & Govardovskii, 2013)
Chordata	Amphibia	Urodela	Salamandridae	Cynops pyrrhogaster	(Takahashi & Ebrey, 2003)
Chordata	Amphibia	Urodela	Salamandridae	Lissotriton vulgaris	(Korenyak & Govardovskii, 2013)
Chordata	Amphibia	Urodela	Salamandridae	Pleurodeles waltl	(Korenyak & Govardovskii, 2013)
Chordata	Aves	Accipitriformes	Accipitridae	Buteo jamaicensis	(Sillman et al., 1981)
Chordata	Aves	Anseriformes	Anatidae	Anas platyrhynchos	(Hart & Vorobyev, 2005;
Cilordata	Aves	Alisemonics	Allatidac	Anus piutyrnynchos	Jane & Bowmaker, 1988)
Chordata	Aves	Caprimulgiforme s	Caprimulgidae	Caprimulgus europaeus	(Ödeen & Håstad, 2003)
Chordata	Aves	Casuariiformes	Casuariidae	Dromiceius novae- hollandiae	(Sillman et al., 1981)
Chordata	Aves	Charadriiformes	Laridae	Larus atricilla	(Liebman, 1972)
Chordata	Aves	Columbiformes	Columbidae	Columba livia	(Bowmaker et al., 1997)
Chordata	Aves	Galliformes	Phasianidae	Coturnix coturnix	(Bowmaker et al., 1993; Hart
					& Vorobyev, 2005)

Chordata Aves   Galliformes   Phasianidae   Meleagris   Gerecitelli et al., 1964   galloparo	Chordata	Aves	Galliformes	Phasianidae	Gallus gallus	(Bowmaker et al., 1993; Hart
Chordata	Chordata	Aves	Galliformes	Phasianidae	-	
Chordata   Aves   Passeriformes   Estrilidae   Corvias frugilegus   Geomaker, 1979	Chordata	Aves	Galliformes	Phasianidae		•
Chordata   Aves   Passeriformes   Estrildidae   Tueniopygia   (Bowmaker et al., 1997)	Chordata	Aves	Passeriformes	Corvidae	Corvus frugilegus	
Chordata   Aves   Passeriformes   Estrildidae   Taeniopygia guttata						
Chordata Aves Passeriformes Fringillidae Serinus canaria (Das et al., 1999; Hart & Vorobyev, 2005) Chordata Aves Passeriformes Paridae Parus caeruleus (Hart et al., 2000; Hart & Vorobyev, 2005) Chordata Aves Passeriformes Passeridae Parus caeruleus (Hart et al., 2000; Hart & Vorobyev, 2005) Chordata Aves Passeriformes Passeridae Passer domesticus (Hart et al., 2000; Hart & Vorobyev, 2005) Chordata Aves Passeriformes Passeroidea Chloebia gouldiae (Hart et al., 2000; Hart & Vorobyev, 2005) Chordata Aves Passeriformes Passeroidea Chloebia gouldiae (Hart et al., 2000; Hart & Vorobyev, 2005) Chordata Aves Passeriformes Passeroidea Neochmia modesta (Hart et al., 2000; Hart & Vorobyev, 2005) Chordata Aves Passeriformes Sturnidae Sturnus vulgaris (Hart et al., 2000; Hart & Vorobyev, 2005) Chordata Aves Passeriformes Turdidae Sturnus vulgaris (Hart et al., 2000; Hart & Vorobyev, 2005) Chordata Aves Procellariiformes Procellariidae Puffinus pacificus (Hart et al., 2000; Hart & Vorobyev, 2005) Chordata Aves Procellariiformes Procellariidae Puffinus pacificus (Hart et al., 2000; Hart & Vorobyev, 2005) Chordata Aves Procellariiformes Procellariidae Puffinus pacificus (Bowmaker et al., 1997) Chordata Aves Rheiformes Pricaliaridae Melopstitacus (Bowmaker et al., 1997) Chordata Aves Strigiformes Strigidae Strigidae (Bowmaker et al., 1997) Chordata Aves Strigiformes Strigidae Strigidae (Bowmaker & Martin, 1985) Chordata Aves Strigiformes Struthionidae Struthio andiae (Wright & Bowmaker, 2001) Chordata Aves Tinamiformes Tinamidae Nothoprocta (Sillman et al., 1981) Chordata Aves Tinamiformes Tinamidae Nothoprocta (Sillman et al., 1998) Chordata Mammalia Artiodactyla Bovidae Capra hircus (Jacobs et al., 1998) Chordata Mammalia Artiodactyla Bovidae Capra hircus (Jacobs et al., 1998) Chordata Mammalia Artiodactyla Cervidae Dama dama (Jacobs et al., 1998) Chordata Mammalia Artiodactyla Cervidae Dama dama (Jacobs et al., 1998) Chordata Mammalia Artiodactyla Cervidae Dama dama (Jacobs et al., 1994) Virginiamus (Neitz & Jacobs, Deegan,					•	
Chordata         Aves         Passeriformes         Fringillidae         Serinus canaria         (Das et al., 1999; Hart & Vorobyev, 2005)           Chordata         Aves         Passeriformes         Leiothrichidae         Leiothrix lutea         (Maire & Bowmaker, 1993)           Chordata         Aves         Passeriformes         Passeridae         Passer domesticus         (Hart et al., 2000; Hart & Vorobyev, 2005)           Chordata         Aves         Passeriformes         Passeroidea         Choebia gouldiae         (Iflart et al., 2000; Hart & Vorobyev, 2005)           Chordata         Aves         Passeriformes         Passeroidea         Lonchura maja         (Hart et al., 2000; Hart & Vorobyev, 2005)           Chordata         Aves         Passeriformes         Passeroidea         Neochmia modesta         (Hart et al., 2000; Hart & Vorobyev, 2005)           Chordata         Aves         Passeriformes         Sturnidae         Sturnus vulgaris         (Hart et al., 2000; Hart & Vorobyev, 2005)           Chordata         Aves         Passeriformes         Turdidae         Turdus merula         (Hart et al., 2000; Hart & Vorobyev, 2005)           Chordata         Aves         Procellariiformes         Procellariidae         Puffinus puffinus         (Bowmaker et al., 1997)           Chordata         Aves         Rheiformes	Chordata	Aves	1 assermonnes	Estilididae		(Bowinaker et al., 1997)
Chordata         Aves         Passeriformes         Leiothrichidae         Leiothrichidae         Leiothrichidae         (Maier & Bowmaker, 1993)           Chordata         Aves         Passeriformes         Passeridae         Passer domesticus         (Hart et al., 2000; Hart & Vorobyev, 2005)           Chordata         Aves         Passeriformes         Passeridae         Chloebia gouldiae         (Hart et al., 2000; Hart & Vorobyev, 2005)           Chordata         Aves         Passeriformes         Passeroidea         Lonchura maja         (Hart et al., 2000; Hart & Vorobyev, 2005)           Chordata         Aves         Passeriformes         Passeroidea         Neochmia modesta         (Hart et al., 2000; Hart & Vorobyev, 2005)           Chordata         Aves         Passeriformes         Sturnidae         Sturnus vulgaris         (Hart et al., 2000; Hart & Vorobyev, 2005)           Chordata         Aves         Passeriformes         Turdidae         Turdidae merula         (Hart et al., 2000; Hart & Vorobyev, 2005)           Chordata         Aves         Procellariiformes         Procellariidae         Puffinus pacificus         (Hart et al., 2000; Hart & Vorobyev, 2005)           Chordata         Aves         Procellariiformes         Procellariidae         Puffinus pacificus         (Hart et al., 2000; Hart & Vorobyev, 2005)           Chordata </td <td>Chordata</td> <td>Aves</td> <td>Passeriformes</td> <td>Fringillidae</td> <td>O</td> <td>•</td>	Chordata	Aves	Passeriformes	Fringillidae	O	•
Chordata         Aves         Passeriformes         Paridae         Parus caeruleus         (Hart et al., 2000; Hart & Vorobyev, 2005)           Chordata         Aves         Passeriformes         Passeridae         Passer domesticus         (Hart, 2011)           Chordata         Aves         Passeriformes         Passeroidea         Chloebia gouldiae         (Hart et al., 2000; Hart & Vorobyev, 2005)           Chordata         Aves         Passeriformes         Passeroidea         Neochmia modesta         Vorobyev, 2005)           Chordata         Aves         Passeriformes         Sturnidae         Sturnus vulgaris         (Hart et al., 2000; Hart & Vorobyev, 2005)           Chordata         Aves         Passeriformes         Turdidae         Turdus merula         (Hart et al., 2000; Hart & Vorobyev, 2005)           Chordata         Aves         Passeriformes         Turdidae         Turdus merula         (Hart et al., 2000; Hart & Vorobyev, 2005)           Chordata         Aves         Procellariiformes         Procellariidae         Puffinus pacificus         (Hart et al., 2000; Hart & Vorobyev, 2005)           Chordata         Aves         Procellariiformes         Procellariidae         Puffinus puffinus         (Bowmaker et al., 1997)           Chordata         Aves         Rheiformes         Rheidae         Rhea ameri	Chordata	Aves	Passeriformes	Leiothrichidae	Leiothrix lutea	· · · · · · · · · · · · · · · · · · ·
Chordata         Aves         Passeriformes         Passeriodea         Passeridous (Choebia gouldiae Vorbeyv, 2005)         (Hart, 2001) (Hart & al., 2000; Hart & Vorbeyv, 2005)           Chordata         Aves         Passeriformes         Passeroidea         Lonchura maja (Hart et al., 2000; Hart & Vorobyev, 2005)           Chordata         Aves         Passeriformes         Passeroidea         Neochmia modesta (Hart et al., 2000; Hart & Vorobyev, 2005)           Chordata         Aves         Passeriformes         Sturnidae         Sturnus vulgaris (Hart et al., 2000; Hart & Vorobyev, 2005)           Chordata         Aves         Passeriformes         Turdidae         Turdus merula (Hart et al., 2000; Hart & Vorobyev, 2005)           Chordata         Aves         Passeriformes         Procellariidae         Puffinus pacificus (Hart et al., 2000; Hart & Vorobyev, 2005)           Chordata         Aves         Procellariiformes         Procellariidae         Puffinus pacificus (Hart et al., 2000; Hart & Vorobyev, 2005)           Chordata         Aves         Procellariiformes         Procellariidae         Puffinus pacificus         (Bowmaker et al., 1997)           Chordata         Aves         Pheiformes         Procellariidae         Puffinus puffinus         (Bowmaker et al., 1997)           Chordata         Aves         Strigiformes         Strigidae         Spheniscidae	Chordata	Aves		Paridae	Parus caeruleus	(Hart et al., 2000; Hart &
Chordata Aves Passeriformes Passeroidea Lonchura maja (Hart et al., 2000; Hart & Vorobyev, 2005)  Chordata Aves Passeriformes Passeroidea Neochmia modesta (Hart et al., 2000; Hart & Vorobyev, 2005)  Chordata Aves Passeriformes Sturnidae Sturnus vulgaris (Hart et al., 2000; Hart & Vorobyev, 2005)  Chordata Aves Passeriformes Turdidae Turdus merula (Hart et al., 2000; Hart & Vorobyev, 2005)  Chordata Aves Procellariiformes Procellariidae Puffinus pacificus (Hart, 2004; Hart & Vorobyev, 2005)  Chordata Aves Procellariiformes Procellariidae Puffinus puffinus (Bowmaker et al., 1997)  Chordata Aves Prittaciformes Prittacidae Melopsittacus (Bowmaker et al., 1997)  Chordata Aves Rheiformes Rheidae Rhea americana (Wright & Bowmaker, 2001)  Chordata Aves Sphenisciformes Spheniscidae Spheniscus (Bowmaker & Martin, 1985)  humbolditi  Chordata Aves Strigiformes Strigidae Strix aluco (Bowmaker & Martin, 1978)  Chordata Aves Strigiformes Struthionidae Struthio camelus (Wright & Bowmaker, 2001)  Chordata Aves Tinamiformes Tinamidae Nothoprocta (Sillman et al., 1981)  Chordata Aves Tinamiformes Tinamidae Nothoprocta (Sillman et al., 1981)  Chordata Aves Tinamiformes Tinamidae Ovis aries (Jacobs et al., 1998)  Chordata Mammalia Artiodactyla Bovidae Bos taurus (Jacobs et al., 1998)  Chordata Mammalia Artiodactyla Bovidae Ovis aries (Jacobs et al., 1998)  Chordata Mammalia Artiodactyla Bovidae Ovis aries (Jacobs et al., 1998)  Chordata Mammalia Artiodactyla Cervidae Dama dama (Jacobs et al., 1998)  Chordata Mammalia Artiodactyla Sovidae Ovis aries (Jacobs et al., 1998)  Chordata Mammalia Artiodactyla Sovidae Ovis aries (Jacobs et al., 1998)  Chordata Mammalia Artiodactyla Cervidae Dama dama (Jacobs et al., 1998)  Chordata Mammalia Artiodactyla Suidae Sus scrofa (Neitz & Jacobs, 1989)  Chordata Mammalia Artiodactyla Suidae Urocyon littoralis (Jacobs, Deegan, et al., Igalilaris Jagobs, Deegan, e	Chordata	Aves	Passeriformes	Passeridae	Passer domesticus	(Hart, 2001)
Chordata Chordata         Aves         Passeriformes Passeroidea         Lonchura maja Vorobyev, 2005)         (Hart et al., 2000; Hart & Vorobyev, 2005)           Chordata         Aves         Passeriformes         Sturnidae         Neochmia modesta Vorobyev, 2005)           Chordata         Aves         Passeriformes         Sturnidae         Sturnus vulgaris         (Hart et al., 2000; Hart & Vorobyev, 2005)           Chordata         Aves         Passeriformes         Turdidae         Turdus merula         (Hart et al., 2000; Hart & Vorobyev, 2005)           Chordata         Aves         Passeriformes         Procellariidae         Puffinus pacificus         (Hart, 2004; Hart & Vorobyev, 2005)           Chordata         Aves         Procellariiformes         Procellariidae         Puffinus pacificus         (Bowmaker et al., 1997)           Chordata         Aves         Psittaciformes         Psittacidae         Puffinus puffinus         (Bowmaker et al., 1997)           Chordata         Aves         Psittaciformes         Psittacidae         Rhea americana         (Wright & Bowmaker, 2001)           Chordata         Aves         Strigiformes         Strigidae         Strix aluco         (Bowmaker & Martin, 1978)           Chordata         Aves         Strigiformes         Strigidae         Strixa luco         (Bowmaker & Martin, 1	Chordata	Aves	Passeriformes	Passeroidea	Chloebia gouldiae	•
Chordata Aves Passeriformes Turdidae Turdus merula (Hart et al., 2000; Hart & Vorobyev, 2005)  Chordata Aves Passeriformes Procellariidae Turdus merula (Hart et al., 2000; Hart & Vorobyev, 2005)  Chordata Aves Procellariiformes Procellariidae Puffinus pacificus (Hart, 2004; Hart & Vorobyev, 2005)  Chordata Aves Procellariiformes Procellariidae Puffinus puffinus (Bowmaker et al., 1997)  Chordata Aves Psittaciformes Psittacidae Melopsituacus (Bowmaker et al., 1997)  Chordata Aves Rheiformes Rheidae Rhea americana (Wright & Bowmaker, 2001)  Chordata Aves Strigiformes Strigidae Spheniscus (Bowmaker & Martin, 1985)  Chordata Aves Strigiformes Strigidae Strix aluco (Bowmaker & Martin, 1978)  Chordata Aves Struthioniformes Struthionidae Struthio camelus (Wright & Bowmaker, 2001)  Chordata Aves Struthioniformes Tinamidae Nothoprocta (Sillman et al., 1981)  Chordata Aves Tinamiformes Tinamidae Nothoprocta (Sillman et al., 1981)  Chordata Aves Tinamiformes Tinamidae Dovidae Oris aries (Jacobs et al., 1998)  Chordata Mammalia Artiodactyla Bovidae Oris aries (Jacobs et al., 1998)  Chordata Mammalia Artiodactyla Bovidae Oris aries (Jacobs et al., 1998)  Chordata Mammalia Artiodactyla Cervidae Dama dama (Jacobs et al., 1998)  Chordata Mammalia Artiodactyla Cervidae Dama dama (Jacobs et al., 1994)  Chordata Mammalia Artiodactyla Suidae Sus scrofa (Neitz & Jacobs, 1994)  Chordata Mammalia Artiodactyla Suidae Sus scrofa (Neitz & Jacobs, 1994)  Chordata Mammalia Artiodactyla Suidae Sus scrofa (Neitz & Jacobs, 1994)  Chordata Mammalia Artiodactyla Cervidae Dama dama (Jacobs et al., 1994)  Chordata Mammalia Artiodactyla Suidae Sus scrofa (Neitz & Jacobs, 1994)  Chordata Mammalia Artiodactyla Cervidae Dama dama (Jacobs et al., 1994)  Chordata Mammalia Artiodactyla Cervidae Dama dama (Jacobs et al., 1994)  Chordata Mammalia Artiodactyla Cervidae Dama dama (Jacobs et al., 1994)  Chordata Mammalia Artiodactyla Cervidae Dama dama (Jacobs et al., 1994)	Chordata	Aves	Passeriformes	Passeroidea	Lonchura maja	(Hart et al., 2000; Hart &
Chordata   Aves   Passeriformes   Sturnidae   Sturnus vulgaris   (Hart et al., 2000; Hart & Vorobyev, 2005)	Chordata	Aves	Passeriformes	Passeroidea	Neochmia modesta	(Hart et al., 2000; Hart &
Chordata Aves Procellariiformes Procellariidae Puffinus pacificus (Hart et al., 2000; Hart & Vorobyev, 2005)  Chordata Aves Procellariiformes Procellariidae Puffinus pacificus (Hart, 2004; Hart & Vorobyev, 2005)  Chordata Aves Procellariiformes Procellariidae Puffinus puffinus (Bowmaker et al., 1997)  Chordata Aves Psittaciformes Psittacidae Melopsittacus (Bowmaker et al., 1997)  Chordata Aves Rheiformes Rheidae Rhea americana (Wright & Bowmaker, 2001)  Chordata Aves Sphenisciformes Spheniscidae Spheniscus (Bowmaker & Martin, 1985)  Chordata Aves Strigiformes Strigidae Bubo virginianus (Jacobs, Crognale, et al., 1987)  Chordata Aves Strigiformes Struthionidae Struthio camelus (Wright & Bowmaker, 2001)  Chordata Aves Struthioniformes Struthionidae Struthio camelus (Wright & Bowmaker, 2001)  Chordata Aves Tinamiformes Tinamidae Nothoprocta (Sillman et al., 1981)  Chordata Aves Tinamiformes Tinamidae Nothoprocta (Sillman et al., 1981)  Chordata Aves Tinamiformes Tinamidae Bovidae Bos taurus (Jacobs et al., 1998)  Chordata Mammalia Artiodactyla Bovidae Capra hircus (Jacobs et al., 1998)  Chordata Mammalia Artiodactyla Bovidae Ovis aries (Jacobs et al., 1998)  Chordata Mammalia Artiodactyla Cervidae Dama dama (Jacobs et al., 1994)  Chordata Mammalia Artiodactyla Suidae Sus scrofa (Neitz & Jacobs, Deegan, et al., familiaris 1993)  Chordata Mammalia Carnivora Canidae Urocyon littoralis (Jacobs, Deegan, et al.,	Chordata	Aves	Passeriformes	Sturnidae	Sturnus vulgaris	(Hart et al., 2000; Hart &
Chordata Aves Procellariiformes Procellariidae Puffinus pacificus (Hart, 2004; Hart & Vorobyev, 2005)  Chordata Aves Procellariiformes Procellariidae Puffinus puffinus (Bowmaker et al., 1997)  Chordata Aves Psittaciformes Psittacidae Melopsittacus (Bowmaker et al., 1997)  Chordata Aves Rheiformes Rheidae Rhea americana (Wright & Bowmaker, 2001)  Chordata Aves Sphenisciformes Spheniscidae Spheniscus (Bowmaker & Martin, 1985)  Chordata Aves Strigiformes Strigidae Strix aluco (Bowmaker & Martin, 1978)  Chordata Aves Strigiformes Struthionidae Struthio camelus (Wright & Bowmaker, 2001)  Chordata Aves Struthioniformes Struthionidae Struthio camelus (Wright & Bowmaker, 2001)  Chordata Aves Tinamiformes Tinamidae Nothoprocta (Sillman et al., 1981)  Chordata Aves Tinamiformes Tinamidae Nothoprocta (Sillman et al., 1981)  Chordata Mammalia Artiodactyla Bovidae Bos taurus (Jacobs et al., 1998)  Chordata Mammalia Artiodactyla Bovidae Capra hircus (Jacobs et al., 1998)  Chordata Mammalia Artiodactyla Cervidae Dama dama (Jacobs et al., 1994)  Chordata Mammalia Artiodactyla Cervidae Dama dama (Jacobs et al., 1994)  Chordata Mammalia Artiodactyla Cervidae Dama dama (Jacobs et al., 1994)  Chordata Mammalia Artiodactyla Cervidae Dama dama (Jacobs et al., 1994)  Chordata Mammalia Artiodactyla Cervidae Dama dama (Jacobs et al., 1994)  Chordata Mammalia Artiodactyla Cervidae Dama dama (Jacobs et al., 1994)  Chordata Mammalia Artiodactyla Cervidae Dama dama (Jacobs et al., 1994)  Chordata Mammalia Artiodactyla Cervidae Dama dama (Jacobs et al., 1994)  Chordata Mammalia Artiodactyla Cervidae Dama dama (Jacobs et al., 1994)  Chordata Mammalia Artiodactyla Cervidae Dama dama (Jacobs et al., 1994)  Chordata Mammalia Artiodactyla Cervidae Dama dama (Jacobs et al., 1994)  Chordata Mammalia Artiodactyla Cervidae Dama (Jacobs et al., 1994)	Chordata	Aves	Passeriformes	Turdidae	Turdus merula	(Hart et al., 2000; Hart &
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Chordata Aves Tinamiformes Tinamidae Nothoprocta cinerascens  Chordata Aves Tinamiformes Tinamidae Nothoprocta (Sillman et al., 1981)  Chordata Mammalia Artiodactyla Bovidae Bos taurus (Jacobs et al., 1998)  Chordata Mammalia Artiodactyla Bovidae Capra hircus (Jacobs et al., 1998)  Chordata Mammalia Artiodactyla Bovidae Ovis aries (Jacobs et al., 1998)  Chordata Mammalia Artiodactyla Cervidae Dama dama (Jacobs et al., 1994)  Chordata Mammalia Artiodactyla Cervidae Dama dama (Jacobs et al., 1994)  Chordata Mammalia Artiodactyla Cervidae Odocoileus (Jacobs et al., 1994)  Chordata Mammalia Artiodactyla Suidae Sus scrofa (Neitz & Jacobs, 1989)  Chordata Mammalia Carnivora Canidae Canis lupus (Jacobs, Deegan, et al., familiaris 1993)  Chordata Mammalia Carnivora Canidae Urocyon littoralis (Jacobs, Deegan, et al.,	Chordata	Aves	Strigiformes	Strigidae	Strix aluco	(Bowmaker & Martin, 1978)
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Chordata Mammalia Artiodactyla Cervidae Dama dama (Jacobs et al., 1994) Chordata Mammalia Artiodactyla Cervidae Odocoileus (Jacobs et al., 1994)  Chordata Mammalia Artiodactyla Suidae Sus scrofa (Neitz & Jacobs, 1989) Chordata Mammalia Carnivora Canidae Canis lupus (Jacobs, Deegan, et al., familiaris 1993) Chordata Mammalia Carnivora Canidae Urocyon littoralis (Jacobs, Deegan, et al.,	Chordata	Mammalia	Artiodactyla	Bovidae	Capra hircus	(Jacobs et al., 1998)
Chordata Mammalia Artiodactyla Cervidae Odocoileus virginianus  Chordata Mammalia Artiodactyla Suidae Sus scrofa (Neitz & Jacobs, 1989)  Chordata Mammalia Carnivora Canidae Canis lupus (Jacobs, Deegan, et al., familiaris 1993)  Chordata Mammalia Carnivora Canidae Urocyon littoralis (Jacobs, Deegan, et al.,	Chordata	Mammalia	Artiodactyla	Bovidae	Ovis aries	(Jacobs et al., 1998)
Chordata Mammalia Artiodactyla Suidae Sus scrofa (Neitz & Jacobs, 1989)  Chordata Mammalia Carnivora Canidae Canis lupus (Jacobs, Deegan, et al., familiaris 1993)  Chordata Mammalia Carnivora Canidae Urocyon littoralis (Jacobs, Deegan, et al.,	Chordata	Mammalia	Artiodactyla	Cervidae	Dama dama	(Jacobs et al., 1994)
ChordataMammaliaArtiodactylaSuidaeSus scrofa(Neitz & Jacobs, 1989)ChordataMammaliaCarnivoraCanidaeCanis lupus familiaris(Jacobs, Deegan, et al., 1993)ChordataMammaliaCarnivoraCanidaeUrocyon littoralis(Jacobs, Deegan, et al.,	Chordata	Mammalia	Artiodactyla	Cervidae		
Chordata Mammalia Carnivora Canidae Indiaris (Jacobs, Deegan, et al.,	Chordata	Mammalia	Artiodactyla	Suidae	Sus scrofa	(Neitz & Jacobs, 1989)
	Chordata	Mammalia	Carnivora	Canidae	_	· -
	Chordata	Mammalia	Carnivora	Canidae	Urocyon littoralis	· -

Chordata	Mammalia	Carnivora	Canidae	Vulpes vulpes	(Jacobs, Deegan, et al.,
Chordata	Mammalia	Carnivora	Felidae	Felis catus	1993) (Crocker et al., 1980; Jacobs & Neitz, 1986; Nelson, 1977; Ringo et al., 1977)
Chordata	Mammalia	Carnivora	Mustelidae	Mustela putorius furo	(Calderone & Jacobs, 2003)
Chordata	Mammalia	Carnivora	Procyonidae	Nasua nasua	(Jacobs & Deegan, 1992)
Chordata	Mammalia	Carnivora	Procyonidae	Potos flavus	(Jacobs & Deegan, 1992)
Chordata	Mammalia	Carnivora	Procyonidae	Procyon lotor	(Jacobs & Deegan, 1992)
Chordata	Mammalia	Chiroptera	Hipposideridae	Hipposideros speoris	(Joshi & Chandrashekaran, 1985)
Chordata	Mammalia	Chiroptera	Phyllostomidae	Carollia perspicillata	(Müller et al., 2009)
Chordata	Mammalia	Chiroptera	Phyllostomidae	Glossophaga soricina	(Müller et al., 2009)
Chordata	Mammalia	Chiroptera	Pteropodidae	Haplonycteris fischeri	(Wang et al., 2004)
Chordata	Mammalia	Chiroptera	Pteropodidae	Pteropus dasymallus	(Wang et al., 2004)
Chordata	Mammalia	Chiroptera	Pteropodidae	Pteropus samoensis	(Melin et al., 2014)
Chordata	Mammalia	Chiroptera	Vespertilionidae	Myotis velifer	(Wang et al., 2004)
Chordata	Mammalia	Chiroptera	Vespertilionidae	Myotis lucifugus	(Feller et al., 2009)
Chordata	Mammalia	Lagomorpha	Leporidae	Oryctolagus cuniculus	(Nuboer et al., 1983)
Chordata	Mammalia	Marsupialia	Didelphidae	Didelphis aurita	(Hunt et al., 2009)
Chordata	Mammalia	Marsupialia	Didelphidae	Didelphis virginiana	(Jacobs & Williams, 2010)
Chordata	Mammalia	Marsupialia	Didelphidae	Monodelphis domestica	(Hunt et al., 2009)
Chordata	Mammalia	Marsupialia	Didelphidae	Thylamys elegans	(Palacios et al., 2010)
Chordata	Mammalia	Marsupialia	Macropodidae	Setonix brachyurus	(Arrese et al., 2005)
Chordata	Mammalia	Perissodactyla	Equidae	Equus caballus	(Carroll et al., 2001)
Chordata	Mammalia	Primates	Aotidae	Aotus trivirgatus	(Jacobs, Deegan II, et al., 1993; Tan & Li, 1999; Tan et al., 2005)
Chordata	Mammalia	Primates	Cebidae	Callithrix jacchus jacchus	(Tovée et al., 1992; Travis et al., 1988)
Chordata	Mammalia	Primates	Cebidae	Cebus spp.	(Jacobs & Deegan II, 2003)
Chordata	Mammalia	Primates	Cebidae	Leontopithecus rosalia rosalia	(Jacobs & Deegan II, 2003)
Chordata	Mammalia	Primates	Cebidae	Sagiunus midas	(Jacobs & Deegan II, 2003)
Chordata	Mammalia	Primates	Cebidae	Saguinus fuscicollis	(Jacobs & Deegan II, 2003)
Chordata	Mammalia	Primates	Cebidae	Saguinus oedipus	(Jacobs & Deegan II, 2003)
Chordata	Mammalia	Primates	Cebidae	Saimiri sciureus	(Jacobs, Neitz, et al., 1987)
Chordata	Mammalia	Primates	Cercopithecidae	Cercopithecus cephus	(Bowmaker et al., 1991)
Chordata	Mammalia	Primates	Cercopithecidae	Cercopithecus diana	(Bowmaker et al., 1991)
Chordata	Mammalia	Primates	Cercopithecidae	Cercopithecus petaurista	(Bowmaker et al., 1991)
Chordata	Mammalia	Primates	Cercopithecidae	Chlorocebus aethiops	(Bowmaker et al., 1991)
Chordata	Mammalia	Primates	Cercopithecidae	Erythrocebus patas	(Bowmaker et al., 1991)

Chordata	Mammalia	Primates	Cercopithecidae	Macaca fascicularis	(Baylor et al., 1984; Baylor et al., 1987; Nunn et al., 1984)
Chordata	Mammalia	Primates	Cercopithecidae	Macaca mulatta	(Bowmaker et al., 1991)
Chordata	Mammalia	Primates	Cercopithecidae	Miopithecus talapoin	(Bowmaker et al., 1991)
Chordata	Mammalia	Primates	Cercopithecidae	Papio papio	(Bowmaker et al., 1991)
Chordata	Mammalia	Primates	Cheirogaleidae	Cheirogaleus major	(Tan & Li, 1999)
Chordata	Mammalia	Primates	Cheirogaleidae	Cheirogaleus medius	(Tan & Li, 1999)
Chordata	Mammalia	Primates	Cheirogaleidae	Microcebus murinus	(Tan & Li, 1999)
Chordata	Mammalia	Primates	Cheirogaleidae	Mirza coquereli	(Carvalho et al., 2012; Tan & Li, 1999)
Chordata	Mammalia	Primates	Daubentoniidae	Daubentonia madagascariensis	(Carvalho et al., 2012; Hunt et al., 2009; Tan & Li, 1999)
Chordata	Mammalia	Primates	Galagidae	Galago senegalensis	(Tan & Li, 1999; Zhou et al., 1997)
Chordata	Mammalia	Primates	Galagidae	Otolemur crassicaudatus	(Deegan & Jacobs, 1996; Tan & Li, 1999)
Chordata	Mammalia	Primates	Galagidae	Otolemur garnettii	(Tan & Li, 1999; Zhou et al., 1997)
Chordata	Mammalia	Primates	Hominidae	Homo sapiens	(Dartnall et al., 1983)
Chordata	Mammalia	Primates	Indriidae	Avahi laniger	(Tan et al., 2005)
Chordata	Mammalia	Primates	Lemuridae	Eulemur fulvus fulvus	(Jacobs & Deegan, 1993)
Chordata	Mammalia	Primates	Lemuridae	Lemur catta	(Jacobs & Deegan, 1993)
Chordata	Mammalia	Primates	Lepilemuridae	Lepilemur ruficaudatus	(Tan & Li, 1999; Tan et al., 2005)
Chordata	Mammalia	Primates	Lorisidae	Loris tardigradus	(Kawamura & Kubotera, 2004; Tan & Li, 1999)
Chordata	Mammalia	Primates	Pitheciidae	Pithecia pithecia	(Jacobs & Deegan II, 2003)
Chordata	Mammalia	Primates	Tarsiidae	Carlito syrichta	(Tan & Li, 1999; Tan et al., 2005)
Chordata	Mammalia	Primates	Tarsiidae	Cephalopachus bancanus	(Tan & Li, 1999; Tan et al., 2005)
Chordata	Mammalia	Proboscidea	Elephantidae	Elephas maximus	(Yokoyama et al., 2005)
Chordata	Mammalia	Proboscidea	Elephantidae	Loxodonta africana	(Yokoyama et al., 2005)
Chordata	Mammalia	Rodentia	Caviidae	Cavia porcellus	(Parry & Bowmaker, 2002)
Chordata	Mammalia	Rodentia	Cricetidae	Mesocricetus auratus	(Calderone & Jacobs, 1999; Williams & Jacobs, 2008)
Chordata	Mammalia	Rodentia	Cricetidae	Mesocricetus brandti	(Williams & Jacobs, 2008)
Chordata	Mammalia	Rodentia	Cricetidae	Phodopus sungorus	(Calderone & Jacobs, 1999)
Chordata	Mammalia	Rodentia	Geomyidae	Geomys bursarius	(Williams et al., 2003)
Chordata	Mammalia	Rodentia	Geomyidae	Thomomys bottae	(Williams et al., 2005)
Chordata	Mammalia	Rodentia	Muridae	Meriones	(Jacobs & Deegan II, 1994a;
				unguiculatus	Jacobs & Neitz, 1989)
Chordata	Mammalia	Rodentia	Muridae	Mus musculus	(Jacobs, 1993; Jacobs et al., 1991)
Chordata	Mammalia	Rodentia	Muridae	Rattus rattus	(Jacobs, 1993; Jacobs et al., 1991)
Chordata	Mammalia	Rodentia	Octodontidae	Octodon degus	(Chávez et al., 2003)

Chordata	Mammalia	Rodentia	Octodontidae	Spalacopus cyanus	(Peichl et al., 2005)
Chordata	Mammalia	Rodentia	Sciuridae	Glaucomys	(Carvalho et al., 2006;
				sabrinus	Jacobs, 1993)
Chordata	Mammalia	Rodentia	Sciuridae	Sciurus carolinensis	(Blakeslee et al., 1988)
Chordata	Mammalia	Rodentia	Sciuridae	Otospermophilus beecheyi	(Jacobs et al., 1985)
Chordata	Mammalia	Rodentia	Sciuridae	Callospermophilus lateralis	(Kraft, 1988)
Chordata	Mammalia	Rodentia	Sciuridae	Ictidomys [=Spermophilus] tridecemlineatus	(Jacobs et al., 1985)
Chordata	Mammalia	Scandentia	Tupaiidae	Tupaia glis	(Bowmaker et al., 1991)
Chordata	Reptilia	Crocodilia	Alligatoridae	Alligator mississippiensis	(Sillman et al., 1991)
Chordata	Reptilia	Squamata	Agamidae	Ctenophorus ornatus	(Barbour et al., 2002)
Chordata	Reptilia	Squamata	Chamaeleonidae	Chamaeleo dilepis	(Bowmaker et al., 2005)
Chordata	Reptilia	Squamata	Chamaeleonidae	Furcifer pardalis	(Bowmaker et al., 2005)
Chordata	Reptilia	Squamata	Colubridae	Boa constrictor	(Sillman et al., 2001)
Chordata	Reptilia	Squamata	Colubridae	Masticophis flagellum	(Macedonia et al., 2009)
Chordata	Reptilia	Squamata	Colubridae	Python regius	(Davies et al., 2009; Sillman et al., 1999)
Chordata	Reptilia	Squamata	Colubridae	Thamnophis sirtalis sirtalis	(Sillman et al., 1997)
Chordata	Reptilia	Squamata	Colubridae	Xenopeltis unicolor	(Davies et al., 2009)
Chordata	Reptilia	Squamata	Colubridae	Lampropeltis getula	(Simoes et al., 2016)
Chordata	Reptilia	Squamata	Colubridae	Arizona elegans	(Simoes et al., 2016)
Chordata	Reptilia	Squamata	Colubridae	Rhinocheilus lecontei	(Simoes et al., 2016)
Chordata	Reptilia	Squamata	Colubridae	Hypsiglena torquata	(Simoes et al., 2016)
Chordata	Reptilia	Squamata	Gekkonidae	Cyrtopodion caspium	(Govardovskii et al., 1984)
Chordata	Reptilia	Squamata	Gekkonidae	Cyrtopodion fedtschenkoi	(Govardovskii et al., 1984)
Chordata	Reptilia	Squamata	Gekkonidae	Cyrtopodion kotschyi	(Govardovskii et al., 1984)
Chordata	Reptilia	Squamata	Gekkonidae	Gekko gekko	(Loew, 1994)
Chordata	Reptilia	Squamata	Gekkonidae	Hemidactylus frenatus	(Loew et al., 1996)
Chordata	Reptilia	Squamata	Gekkonidae	Hemidactylus garnotii	(Loew et al., 1996)
Chordata	Reptilia	Squamata	Gekkonidae	Hemidactylus platyurus	(Crescitelli et al., 1977)
Chordata	Reptilia	Squamata	Gekkonidae	Hemidactylus turcicus	(Loew et al., 1996)
Chordata	Reptilia	Squamata	Gekkonidae	Ptychozoon lionotum	(Crescitelli et al., 1977)
Chordata	Reptilia	Squamata	Iguanidae	Anolis bahorucoensis	(Loew et al., 2002)

Chordata	Reptilia	Squamata	Iguanidae	Anolis carolinensis	(Kawamura & Yokoyama, 1998)
Chordata	Reptilia	Squamata	Iguanidae	Anolis conspersus	(Loew et al., 2002)
Chordata	Reptilia	Squamata	Iguanidae	Anolis cristatellus	(Loew et al., 2002)
Chordata	Reptilia	Squamata	Iguanidae	Anolis evermanni	(Loew et al., 2002)
Chordata	Reptilia	Squamata	Iguanidae	Anolis extremus	(Loew et al., 2002)
Chordata	Reptilia	Squamata	Iguanidae	Anolis grahami	(Loew et al., 2002)
Chordata	Reptilia	Squamata	Iguanidae	Anolis gundlachi	(Loew et al., 2002)
Chordata	Reptilia	Squamata	Iguanidae	Anolis krugi	(Loew et al., 2002)
Chordata	Reptilia	Squamata	Iguanidae	Anolis lineatopus	(Loew et al., 2002)
Chordata	Reptilia	Squamata	Iguanidae	Anolis pulchellus	(Loew et al., 2002)
Chordata	Reptilia	Squamata	Iguanidae	Anolis sagrei	(Loew et al., 2002)
Chordata	Reptilia	Squamata	Iguanidae	Anolis stratulus	(Loew et al., 2002)
Chordata	Reptilia	Squamata	Iguanidae	Crotaphytus	(Macedonia et al., 2009)
				dickersonae	
Chordata	Reptilia	Squamata	Iguanidae	Platysaurus	(Fleishman et al., 2011)
				broadleyi	
Chordata	Reptilia	Squamata	Phyllodactylidae	Tarentola	(Roth & Kelber, 2004)
				chazaliae	
Chordata	Reptilia	Squamata	Sphaerodactylidae	Teratoscincus	(Loew et al., 1996)
				scincus	
Chordata	Reptilia	Testudines	Chelonidae	Chelonia mydas	(Liebman & Granda, 1971)
Chordata	Reptilia	Testudines	Cheloniidae	Caretta caretta	(Gocke, 2003)
Chordata	Reptilia	Testudines	Emydidae	Trachemys scripta	(Baylor & Hodgkin, 1973)
Chordata	Reptilia	Testudines	Geoemydidae	Mauremys reevesii	(Ohtsuka, 1985)

Table 2. Index of Species in Spectral Response Curve Database

Class	Species	Type	Condition	Notes	Reference
Amphibia	Agalychnis callidryas	ERG	Dark		(Liebau et al., 2015)
Amphibia	Agalychnis callidryas	ERG	Light		(Liebau et al., 2015)
Amphibia	Ambystoma mexicanum	ERG			(Deutschlander & Phillips, 1995)
Amphibia	Ambystoma tirgrinum	Optical Density	Dark		(Cornwall et al., 1984)
Amphibia	Dryophytes cinereus [=Hyla cinerea]	Behavior	Dark	Measured optomotor response	(King et al., 1993)
Amphibia	Pseudocris [Hyla] regilla	ERG	Light		(Wente & Phillips, 2005)
Amphibia	Lithobates pipiens	ERG	Dark		(Kennedy, 1957)
Amphibia	Lithobates pipiens	ERG	Light		(Kennedy, 1957)
Amphibia	Rana temporaria	ERG	Dark		(Govardovskii & Zueva, 1974)
Amphibia	Salamandra salamandra	Behavior	Light	Measured negative phototaxis	(Przyrembel et al., 1995)
Arachnida	Lycosa baltimoriana anterior median eye	ERG	Dark		(DeVoe, 1972)
Arachnida	Menemerus confusus	ERG	Dark		(Yamashita & Tateda, 1976)
Arachnida	Plexippus validus	ERG	Light		(Blest et al., 1981)
Arachnida	Vejovis spinigerus Centruoides sculpturatus Opisthacanthus validus	ERG	Light		(Machan, 1968)
Aves	Anous minutus	ERG	Dark		(Reed, 1986)
Aves	Anous stolidus	ERG	Dark		(Reed, 1986)
Aves	Columba livia	ERG	Dark		(Blough, 1957) See also (Remy & Emmerton, 1989)
Aves	Columba livia	Behavior	Light	Pigeons trained to move mandible in response to light stimulus	(Remy & Emmerton, 1989)
Aves	Coturnix japonica	ERG	Dark		(Kawamuro et al., 1997)
Aves	Gallus domesticus	ERG	Dark		(Armington & Thiede, 1956)
Aves	Gygis alba	ERG	Dark		(Reed, 1986)
Aves	Larus argentatus/fuscus	ERG	Light	Confirmed with pupil response	(Thompson, 1971)
Aves	Larus argentatus/fuscus juv.	ERG	Light	Confirmed with pupil response	(Thompson, 1971)

Aves	Leiothrix lutea	Behavior	Low light	Trained to jump on perch in front of dark screen instead of lighted screen	(Maier, 1992)
Aves	Phoebastria immutabilis	ERG	Dark		(Reed, 1986)
Aves	Phoebastria nigripes	ERG	Dark		(Reed, 1986)
Aves	Pterodroma hypoleuca	ERG	Dark		(Reed, 1986)
Aves	Pterodroma phaeopygia	ERG	Dark		(Reed, 1986)
Aves	Puffinus newelli	ERG	Dark		(Reed, 1986)
Aves	Strix aluco	Behavior	Dark	Trained with rewards to respond to visible light	(Martin, 1977)
Aves	Sturnus vulgaris	Behavior	Dark	Trained to peck in response to light	(Hart, 2001)
Aves	Sula nebouxii	ERG	Dark		(Reed, 1986)
Aves	Sula sula	ERG	Dark		(Reed, 1986)
Aves	Sula variegata	ERG	Dark		(Reed, 1986)
Aves	Buteo jamaicensis	ERG	Light		(Krempels, 1989)
Aves	Buteo jamaicensis	ERG	Dark		(Krempels, 1989)
Aves	Buteo lineatus	ERG	Light		(Krempels, 1989)
Aves	Buteo regalis	ERG	Light		(Krempels, 1989)
Aves	Buteo regalis	ERG	Dark		(Krempels, 1989)
Aves	Buteo platypterus	ERG	Light		(Krempels, 1989)
Aves	Buteo platypterus	ERG	Dark		(Krempels, 1989)
Crustacea	Talorchestia longicornis	Behavior	Night	Measured positive and negative phototaxis within tank.	(Cohen et al., 2010)
Insecta	Aedes aegypti	ERG	Dark		Combined (Goldman, 1972; Muir et al., 1992)
Insecta	Aeshna tuberculifera	ERG	Dark		(Chappell & DeVoe, 1975)
Insecta	Aglais io	ERG	Dark		(Eguchi et al., 1982)
Insecta	Aleochara bilineata	ERG	Unk		https://cronodon.com/BioTech/Insect_Vision.html
Insecta	Amyelois transitella	Optical	Dark		(Bernard et al., 1984)
Insecta	Anax junius	ERG	Dark		(Chappell & DeVoe, 1975)
Insecta	Argyronome ruslana	ERG	Dark		(Eguchi et al., 1982)
Insecta	Arichanna gaschkevitchii	ERG	Dark		(Eguchi et al., 1982)
Insecta	Ascalaphus macaronius	ERG	Unk		(Gogala, 1967; Paul et al., 1986)
Insecta	Atrophaneura alcinous	ERG	Dark		(Eguchi et al., 1982)
Insecta	Bibio marci (main and ventral)	ERG	Light		(Burkhardt & de la Motte, 1972)

Insecta	Bicellonycha wickershamorum	ERG	Dark		(Lall et al., 1988)
Insecta	Bombus hortorum	ERG	Light		(Meyer-Rochow, 1980)
Insecta	Caliothrips phaseoli	Behavior	Dark	Measured positive phototaxis.	(Mazza et al., 2010)
Insecta	Calliphora vicinia	Optical	Dark	- Francisco Para Caracteristics	(Bernard & Stavenga, 1979; McCann & Arnett, 1972)
Insecta	Cataglyphis bicolor	ERG	Unk		(Paul et al., 1986)
Insecta	Cephonodes hylas	ERG	Dark		(Eguchi et al., 1982)
Insecta	Cerapteryx graminis	ERG	Dark		(Mikkola, 1972)
Insecta	Chlorops sp.	Optical	Dark		(Bernard & Stavenga, 1979)
Insecta	Colias erate	ERG	Dark		(Eguchi et al., 1982)
Insecta	Conistra vaccinii	ERG	Dark/Day		(Mikkola, 1972)
Insecta	Conistra vaccinii	ERG	Dark/Night		(Mikkola, 1972)
Insecta	Culex pipiens	ERG	Dark		(Peach et al., 2019)
Insecta	Delia antiqua	ERG	Unk		https://cronodon.com/BioTech/Insect Vision.html
Insecta	Dielepila elpenor	ERG	Dark		(Höglund et al., 1973)
Insecta	Dimecoenia spinosa	Optical	Dark		(Bernard & Stavenga, 1979)
Insecta	Drosophila	Optical	Dark		(Bernard & Stavenga, 1979)
	melanogaster	1			
Insecta	Ephoron virgo	Behavior	Dark	Measured positive phototaxis.	(Mészáros et al., 2021)
Insecta	Eristalis sp.	ERG	Dark	• •	(Burkhardt & de la Motte, 1972)
Insecta	Fulgeochlizus bruchii	ERG	Dark		(Lall et al., 2010)
Insecta	Glossina morsitans	ERG	Light		(Hardie et al., 1989) R1-6
Insecta	Gonepteryx aspasia	ERG	Dark		(Eguchi et al., 1982)
Insecta	Haematobia irritans	ERG	Light		(Agee & Patterson, 1983)
Insecta	Heliconius erato	ERG	Light		(Struwe, 1972b)
Insecta	Heliconius sara	ERG	Light		(Struwe, 1972b)
Insecta	Hepialus ganna	ERG	Dark		(Mikkola, 1972)
Insecta	Hydraecia fucosa	ERG	Dark/Day		(Mikkola, 1972)
Insecta	Hydraecia fuscos	ERG	Dark/Night		(Mikkola, 1972)
Insecta	Hydroecia micacea	ERG	Dark		(Mikkola, 1972)
Insecta	Laothoe populi	ERG	Dark		(Mikkola, 1972)
Insecta	Lutzomyia longipalpis	ERG	Dark		(Mellor et al., 1996)
Insecta	Lycaena phlaeas	ERG	Dark		(Eguchi et al., 1982)
Insecta	Minois dryas	ERG	Dark		(Eguchi et al., 1982)
Insecta	Musca autumnalis	ERG	Light		(Agee & Patterson, 1983)
Insecta	Musca domesticus	Optical	Dark		(Bernard & Stavenga, 1979)
Insecta	Neope goschkevitschii	ERG	Dark		(Eguchi et al., 1982)

Insecta	Notonecta	ERG	Dark	Average of curves from dorsal and anterior regions of the eye used	(Bennett & Ruck, 1970)
·	irrorata/undulata	EDG	D 1	anterior regions of the eye used	(T. 11 + 1 1000)
Insecta	Ochlodes venata	ERG	Dark		(Eguchi et al., 1982)
Insecta	Panorpa cognata	ERG	Light		(Burkhardt & de la Motte, 1972)
Insecta	Papilio maackii	ERG	Dark		(Eguchi et al., 1982)
Insecta	Papilio machaon	ERG	Dark		(Eguchi et al., 1982)
Insecta	Papilio xuthus	ERG	Light		Ave of eye parts (Arikawa et al., 1987)
Insecta	Papilio xuthus	ERG	Dark		(Eguchi et al., 1982)
Insecta	Parantica sita	ERG	Dark		(Eguchi et al., 1982)
Insecta	Parnara guttata	ERG	Dark		(Eguchi et al., 1982)
Insecta	Periplaneta americana	ERG	Unk		(Paul et al., 1986)
Insecta	Pharmacis	ERG	Dark		(Mikkola, 1972)
	fusconebulosus				
Insecta	Photinus collustrans	ERG	Dark		(Lall et al., 1988)
Insecta	Photinus macdermotti	ERG	Dark		(Lall et al., 1988)
Insecta	Photinus marginellus	ERG	Dark		(Lall et al., 1988)
Insecta	Photinus pyralis	ERG	Dark		(Lall et al., 1988)
Insecta	Photinus scintillans	ERG	Dark		(Lall et al., 1988)
Insecta	Photuris lucicrescens	ERG	Dark		(Lall et al., 1982)
Insecta	Phryganea grandis	ERG	Dark		(Mikkola, 1972)
Insecta	Pieris brassicae	ERG	Light		(Steiner et al., 1987)
Insecta	Pieris melete	ERG	Dark		(Eguchi et al., 1982)
Insecta	Plusia chrysitis	ERG	Dark		(Mikkola, 1972)
Insecta	Poecilocampa populi	ERG	Dark		(Mikkola, 1972)
Insecta	Pseudozizeeria maha	ERG	Dark		(Eguchi et al., 1982)
Insecta	Pyrearinus termitilluminans	ERG	Dark		(Lall et al., 2010)
Insecta	Pyrophorus divergens	ERG	Dark		(Lall et al., 2010)
Insecta	Pyrophorus punctatissimus	ERG	Dark		(Lall et al., 2010)
Insecta	Romalea microptera	ERG	Dark		(Bruckler & Williams, 1981)
Insecta	Simuliid	ERG	Light		(Kirschfeld & Vogt, 1986)
Insecta	Stomoxys calcitrans	ERG	Light		(Agee & Patterson, 1983)
Insecta	Tabanus nigrovittatus	ERG	Light		(Allan et al., 1991)
Mammalia	Aotus trivirgatus	ERG	Dark		(Jacobs, Deegan II, et al., 1993)
Mammalia	Carollia perspicillata	ERG	Mesopic		(Müller et al., 2009)
Mammalia	Carollia perspicillata	ERG	Mesopic		(Müller et al., 2009)
Mammalia	Cavia porcellus	ERG	Dark		(Jacobs & Deegan II, 1994b)

Mammalia	Ctenomys magellanicus	ERG	Light		(Schleich et al., 2010)
Mammalia	Ctenomys talarum	ERG	Light		(Schleich et al., 2010)
Mammalia	Cynomys ludovicianus	ERG	Dark		(Jacobs, 1978)
Mammalia	Dama dama	ERG	Dark		(Jacobs et al., 1994)
Mammalia	Equus caballus	ERG	Light		(Carroll et al., 2001)
Mammalia	Felis catus	ERG	Light		(Jacobs & Neitz, 1986)
Mammalia	Glossophaga soricina	ERG	Mesopic		(Müller et al., 2009)
Mammalia	Glossophaga soricine	ERG	Mesopic		(Müller et al., 2009)
Mammalia	Lemur catta	ERG	Dark		(Jacobs & Deegan, 1993)
Mammalia	Meriones unguiculatus	ERG	Light		(Jacobs et al., 1991)
Mammalia	Mesocricetus auratus	ERG	Light		(Williams & Jacobs, 2008)
Mammalia	Mesocricetus brandtii	ERG	Light		(Williams & Jacobs, 2008)
Mammalia	Mus musculus	ERG	Light		(Jacobs & Williams, 2007; Rocha et al., 2016)
Mammalia	Mustela putorious furo	ERG	Dark		(Calderone & Jacobs, 2003)
Mammalia	Nasua nasua	ERG	Light		(Jacobs & Deegan, 1992)
Mammalia	Octodon bridgesi	ERG	Dark		(Chávez et al., 2003)
Mammalia	Octodon degus	ERG	Dark		(Chávez et al., 2003)
Mammalia	Octodon lunatus	ERG	Dark		(Chávez et al., 2003)
Mammalia	Odocoileus virginianus	ERG	Dark		(Jacobs et al., 1994)
Mammalia	Oryctolagus cuniculus	Behavior	Light	Animal rewarded for picking location with light.	(Nuboer & Moed, 1983)
Mammalia	Otospermophilus beecheyi	ERG	Dark	V	(Jacobs, 1978; Jacobs et al., 1985)
Mammalia	Phoca vitulina	ERG	Light		(Crognale et al., 1998)
Mammalia	Phodopus sungorus	ERG	Dark		(Calderone & Jacobs, 1999)
Mammalia	Procyon lotor	ERG	Dark		(Jacobs & Deegan, 1992)
Mammalia	Rattus norvegicus	ERG	Light		(Jacobs et al., 1991)
Mammalia	Leontocebus fuscucs[=Saguinus fuscicollis]	ERG	Light		(Jacobs, Neitz, et al., 1987)
Mammalia	Sciurus carolinensis	ERG	Dark		(Blakeslee et al., 1988)
Mammalia	Sciurus carolinensis	Behavior	Dark	Animals trained to come to platform where light was one	(Arden & Silver, 1962)
Mammalia	Sciurus niger	Behavior	Dark	Animal trained to depress lever associated with light	(Jacobs, 1974)
Mammalia	Ammospermophilus luecurus	ERG	Dark, Light		(Fisher et al., 1976)

Mammalia	Callospermophilus	ERG	Dark	(Jacobs, 1978)
	lateralis			
Mammalia	Ictidomys	ERG	Dark	(Jacobs, 1978)
	[=Spermophilus]			
	mexicanus			
Mammalia	Ictidomys	ERG	Dark	(Jacobs, 1978)
	[=Spermophilus]			
	tridecemlineatus			
Mammalia	Thomomys bottae	ERG	Light	(Jacobs et al., 1991; Williams et al., 2005)
Reptilia	Anolis sagrei	ERG	Dark	(Fleishman et al., 2011)
Reptilia	Caretta caretta	ERG	Light	(Levenson et al., 2004)
Reptilia	Carretta carretta			(Horch et al., 2008)
	hatchling			
Reptilia	Chelonia mydas	ERG	Light	(Levenson et al., 2004) (Granda & O'Shea, 1972)
Reptilia	Dermochelys coriacea	ERG	Dark	(Gocke, 2003)
Reptilia	Dermochelys coriacea	ERG	Dark	(Horch et al., 2008)
	hatchling			
Reptilia	Platysaurus broadleyi	ERG	Dark	(Fleishman et al., 2011)
Reptilia	Tiliqua rugosa	ERG	Light	(Nagloo, 2016)
Mammalia	Canis familiaris	ERG	Dark, Light	(Jacobs, Deegan, et al., 1993)
Mammalia	Urocyon littoralis	ERG	Light	(Jacobs, Deegan, et al., 1993)
Mammalia	Vulpes vulpes	ERG	Light	(Jacobs, Deegan, et al., 1993)
Mammalia	Alopex lagopus	ERG	Light	(Jacobs, Deegan, et al., 1993)
Reptilia	Pseudemys scripta	ERG	Dark	(Baylor & Hodgkin, 1973)
Reptilia	Pseudemys scripta	ERG	Dark	(Granda & Stirling, 1966)

## References

- Agee, H. R., & Patterson, R. S. (1983). Spectral sensitivity of stable, face, and horn flies and behavioral responses of stable flies to visual traps (Diptera: Muscidae). *Environmental Entomology*, 12(6), 1823–1828.
- Ala-Laurila, P., Saarinen, P., Albert, R., Koskelainen, A., & Donner, K. (2002). Temperature effects on spectral properties of red and green rods in toad retina. *Visual Neuroscience*, 19(6), 781–792.
- Allan, S. A., Stoffolano Jr, J. G., & Bennett, R. R. (1991). Spectral sensitivity of the horse fly *Tabanus nigrovittatus* (Diptera: Tabanidae). *Canadian Journal of Zoology*, 69(2), 369–374.

- Arden, G. B., & Silver, P. H. (1962). Visual thresholds and spectral sensitivities of the grey squirrel (*Sciurus carolinensis leucotis*). *The Journal of Physiology*, 163(3), 540–557.
- Arikawa, K., Inokuma, K., & Eguchi, E. (1987). Pentachromatic visual system in a butterfly. *Naturwissenschaften*, 74(6), 297–298.
- Armington, J. C., & Thiede, F. C. (1956). Electroretinal demonstration of a Purkinje shift in the chicken eye. *American Journal of Physiology*, 186(2), 258–262.
- Arrese, C. A., Oddy, A. Y., Runham, P. B., Hart, N. S., Shand, J., Hunt, D. M., & Beazley, L. D. (2005). Cone topography and spectral sensitivity in two potentially trichromatic marsupials, the quokka (*Setonix brachyurus*) and quenda (*Isoodon obesulus*). *Proceedings of the Royal Society B: Biological Sciences*, 272(1565), 791-796.
- Autrum, H., & Kolb, G. (1968). Spektrale Empfindlichkeit einzelner Sehzellen der Aeschniden. Zeitschrift für vergleichende Physiologie, 60(4), 450–477.
- Barbour, H. R., Archer, M. A., Hart, N. S., Thomas, N., Dunlop, S. A., Beazley, L. D., & Shand, J. (2002). Retinal characteristics of the ornate dragon lizard, *Ctenophorus ornatus*. *Journal of Comparative Neurology*, 450(4), 334–344.
- Baylor, D. A., & Hodgkin, A. L. (1973). Detection and resolution of visual stimuli by turtle photoreceptors. *The Journal of Physiology*, 234(1), 163–198.
- Baylor, D. A., Nunn, B. J., & Schnapf, J. L. (1984). The photocurrent, noise and spectral sensitivity of rods of the monkey *Macaca fascicularis*. *The Journal of Physiology*, *357*(1), 575–607.
- Baylor, D. A., Nunn, B. J., & Schnapf, J. L. (1987). Spectral sensitivity of cones of the monkey *Macaca fascicularis*. The Journal of *Physiology*, 390(1), 145–160.
- Bennett, R. R., & Ruck, P. (1970). Spectral sensitivities of dark-and light-adapted *Notonecta* compound eyes. *Journal of Insect Physiology*, 16(1), 83–88.
- Bernard, G. D. (1979). Red-absorbing visual pigment of butterflies. Science, 203(4385), 1125-1127.
- Bernard, G. D., Owens, E. D., & Hurley, A. V. (1984). Intracellular optical physiology of the eye of the pyralid moth *Amyelois*. *Journal of Experimental Zoology*, 229(2), 173-187.
- Bernard, G. D., & Remington, C. L. (1991). Color vision in *Lycaena* butterflies: spectral tuning of receptor arrays in relation to behavioral ecology. *Proceedings of the National Academy of Sciences*, 88(7), 2783–2787.
- Bernard, G. D., & Stavenga, D. G. (1978). Spectral sensitivities of retinular cells measured in intact, living bumblebees by an optical method. *Naturwissenschaften*, 65(8), 442–443.
- Bernard, G. D., & Stavenga, D. G. (1979). Spectral sensitivities of retinular cells measured in intact, living flies by an optical method. *Journal of Comparative Physiology*, 134(2), 95–107.
- Blakeslee, B., Jacobs, G. H., & Neitz, J. (1988). Spectral mechanisms in the tree squirrel retina. *Journal of Comparative Physiology A*, 162(6), 773–780.

- Blest, A. D., Hardie, R. C., McIntyre, P., & Williams, D. S. (1981). The spectral sensitivities of identified receptors and the function of retinal tiering in the principal eyes of a jumping spider. *Journal of Comparative Physiology*, 145(2), 227-239.
- Blough, D. S. (1957). Spectral sensitivity in the pigeon. JOSA, 47(9), 827-833.
- Bowmaker, J. (1979). Visual pigments and oil droplets in the pigeon retina, as measured by microspectrophotometry, and their relation to spectral sensitivity. In A. M. Granda & J. H. Maxwell (Eds.), *Neural Mechanisms of Behaviour in the Pigeon* (pp. 287–305).
- Bowmaker, J. K., Astell, S., Hunt, D. M., & Mollon, J. D. (1991). Photosensitive and photostable pigments in the retinae of Old World monkeys. *Journal of Experimental Biology*, 156(1), 1–19.
- Bowmaker, J. K., Heath, L. A., Wilkie, S. E., & Hunt, D. M. (1997). Visual pigments and oil droplets from six classes of photoreceptor in the retinas of birds. *Vision Research*, *37*(16), 2183–2194.
- Bowmaker, J. K., Kovach, J. K., Whitmore, A. V., & Loew, E. R. (1993). Visual pigments and oil droplets in genetically manipulated and carotenoid deprived quail: a microspectrophotometric study. *Vision Research*, 33(5-6), 571–578.
- Bowmaker, J. K., Loew, E. R., & Ott, M. (2005). The cone photoreceptors and visual pigments of chameleons. *Journal of Comparative Physiology A*, 191(10), 925–932.
- Bowmaker, J. K., & Martin, G. R. (1978). Visual pigments and colour vision in a nocturnal bird, *Strix aluco* (tawny owl). *Vision Research*, 18(9), 1125–1130.
- Bowmaker, J. K., & Martin, G. R. (1985). Visual pigments and oil droplets in the penguin, *Spheniscus humboldti. Journal of Comparative Physiology A*, 156(1), 71–77.
- Briscoe, A. D., Bernard, G. D., Szeto, A. S., Nagy, L. M., & White, R. H. (2003). Not all butterfly eyes are created equal: Rhodopsin absorption spectra, molecular identification, and localization of ultraviolet-, blue-, and green-sensitive rhodopsin-encoding mRNAs in the retina of *Vanessa cardui*. *Journal of Comparative Neurology*, 458, 334-349.
- Bruckler, R. M., & Williams, T. P. (1981). Adaptation properties of the ERG in the grasshopper, *Romalea microptera*. *Biophysics of structure and mechanism*, 7(3), 205-208.
- Bruckmoser, P. (1968). Die spektrale empfindlichkeit einzelner sehzellen des rückenschwimmers *Notonecta glauca* L.(Heteroptera). *Zeitschrift für vergleichende Physiologie*, 59(2), 187–204.
- Burkhardt, D., & de la Motte, I. (1972). Electrophysiological studies on the eyes of Diptera, Mecoptera and Hymenoptera. In R. Wehner (Ed.), *Information Processing in the Visual Systems of Anthropods* (pp. 147–153). Springer.
- Calderone, J. B., & Jacobs, G. H. (1999). Cone receptor variations and their functional consequences in two species of hamster. *Visual Neuroscience*, 16(1), 53–63.
- Calderone, J. B., & Jacobs, G. H. (2003). Spectral properties and retinal distribution of ferret cones. Visual Neuroscience, 20(1), 11–17.
- Carroll, J., Murphy, C. J., Neitz, M., Ver Hoeve, J. N., & Neitz, J. (2001). Photopigment basis for dichromatic color vision in the horse. *Journal of Vision*, 1(2), 80–87.

- Carvalho, L. d. S., Cowing, J. A., Wilkie, S. E., Bowmaker, J. K., & Hunt, D. M. (2006). Shortwave visual sensitivity in tree and flying squirrels reflects changes in lifestyle. *Current Biology*, 16(3), R81–R83.
- Carvalho, L. S., Davies, W. L., Robinson, P. R., & Hunt, D. M. (2012). Spectral tuning and evolution of primate short-wavelength-sensitive visual pigments. *Proceedings of the Royal Society B: Biological Sciences*, 279(1727), 387–393.
- Chappell, R. L., & DeVoe, R. D. (1975). Action spectra and chromatic mechanisms of cells in the median ocelli of dragonflies. *The Journal of general physiology*, 65(4), 399–419.
- Chávez, A. E., Bozinovic, F., Peichl, L., & Palacios, A. G. (2003). Retinal spectral sensitivity, fur coloration, and urine reflectance in the genus *Octodon* (Rodentia): implications for visual ecology. *Investigative Ophthalmology & Visual Science*, 44(5), 2290–2296.
- Chittka, L., Schorn, J., de Souza, J. M., Ventura, D. F., & Camargo, J. M. F. (1997). The nest entrance signal of the Amazonian bees Partamona pearsoni—a case where insects design their own flight targets. In V. E. Kipyatkov (Ed.), Proceedings of the International Colloquia on Social Insects (Vol. 3-4, pp. 107–116). Russian Language Section of the IUSSI, Socium.
- Cohen, J. H., Cronin, T. W., Lessios, N., & Forward Jr, R. B. (2010). Visual physiology underlying orientation and diel behavior in the sand beach amphipod *Talorchestia longicornis*. *Journal of Experimental Biology*, 213(22), 3843–3851.
- Cornwall, M. C., MacNichol Jr, E. F., & Fein, A. (1984). Absorptance and spectral sensitivity measurements of rod photoreceptors of the tiger salamander, Ambystoma tigrinum. *Vision Research*, 24(11), 1651–1659.
- Crescitelli, F. (1958). The natural history of visual pigments. Annals of the New York Academy of Sciences, 74(2), 230–255.
- Crescitelli, F., Dartnall, H. J. A., & Loew, E. R. (1977). The gecko visual pigments: A microspectrophotometric study. *The Journal of Physiology*, 268(2), 559–573.
- Crescitelli, F., Wilson, B. W., & Lilyblade, A. L. (1964). The visual pigments of birds: I. The turkey. *Vision Research*, 4(5-6), 275–280.
- Crocker, R. A., Ringo, J., Wolbarsht, M. L., & Wagner, H. G. (1980). Cone contributions to cat retinal ganglion cell receptive fields. The Journal of general physiology, 76(6), 763–785.
- Crognale, M. A., Levenson, D. H., Ponganis, P. J., Deegan II, J. F., & Jacobs, G. H. (1998). Cone spectral sensitivity in the harbor seal (*Phoca vitulina*) and implications for color vision. *Canadian Journal of Zoology*, 76(11), 2114–2118.
- Darden, A. G., Wu, B. X., Znoiko, S. L., Hazard, E., Kono, M., Crouch, R. K., & Ma, J.-X. (2003). A novel *Xenopus* SWS2, P434 visual pigment: structure, cellular location, and spectral analyses. *Molecular Vision*, 9, 191–199.
- Dartnall, H. J., Bowmaker, J. K., & Mollon, J. D. (1983). Human visual pigments: microspectrophotometric results from the eyes of seven persons. *Proceedings of the Royal society of London. Series B. Biological sciences*, 220(1218), 115–130.
- Dartnall, H. J. A. (1967). The visual pigment of the green rods. Vision Research, 7(1-2), 1-16.
- Das, D., Wilkie, S. E., Hunt, D. M., & Bowmaker, J. K. (1999). Visual pigments and oil droplets in the retina of a passerine bird, the canary *Serinus canaria*: microspectrophotometry and opsin sequences. *Vision Research*, 39(17), 2801–2815.

- Davies, W. L., Cowing, J. A., Bowmaker, J. K., Carvalho, L. S., Gower, D. J., & Hunt, D. M. (2009). Shedding light on serpent sight: the visual pigments of henophidian snakes. *Journal of Neuroscience*, 29(23), 7519–7525.
- Deegan, J. F., & Jacobs, G. H. (1996). Spectral sensitivity and photopigments of a nocturnal prosimian, the bushbaby (*Otolemur crassicaudatus*). *American Journal of Primatology*, 40(1), 55–66.
- Deutschlander, M. E., & Phillips, J. B. (1995). Characterization of an ultraviolet photoreception mechanism in the retina of an amphibian, the axolotl (*Ambystoma mexicanum*). Neuroscience Letters, 197(2), 93–96.
- DeVoe, R. D. (1972). Dual sensitivities of cells in wolf spider eyes at ultraviolet and visible wavelengths of light. *The Journal of general physiology*, 59(3), 247–269.
- Donner, K., Firsov, M. L., & Govardovskii, V. I. (1990). The frequency of isomerization-like 'dark' events in rhodopsin and porphyropsin rods of the bull-frog retina. *The Journal of Physiology*, 428(1), 673–692.
- Donner, K. O., & Reuter, T. (1962). The spectral sensitivity and photopigment of the green rods in the frog's retina. *Vision Research*, 2(11), 357–372.
- Eguchi, E., Watanabe, K., Hariyama, T., & Yamamoto, K. (1982). A comparison of electrophysiologically determined spectral responses in 35 species of Lepidoptera. *Journal of Insect Physiology*, 28(8), 675–682.
- Feller, K. D., Lagerholm, S., Clubwala, R., Silver, M. T., Haughey, D., Ryan, J. M., Loew, E. R., Deutschlander, M. E., & Kenyon, K. L. (2009). Characterization of photoreceptor cell types in the little brown bat *Myotis lucifugus* (Vespertilionidae). *Comparative Biochemistry and Physiology Part B: Biochemistry and Molecular Biology*, 154(4), 412–418.
- Fisher, S. K., Jacobs, G. H., Anderson, D. H., & Silverman, M. S. (1976). Rods in the antelope ground squirrel. *Vision Research*, 16(8), 875–877.
- Fleishman, L. J., Loew, E. R., & Whiting, M. J. (2011). High sensitivity to short wavelengths in a lizard and implications for understanding the evolution of visual systems in lizards. *Proceedings of the Royal Society B: Biological Sciences*, 278(1720), 2891–2899.
- Fyhrquist, N., Govardovskii, V., Leibrock, C., & Reuter, T. (1998). Rod pigment and rod noise in the European toad *Bufo bufo. Vision Research*, *38*(4), 483–486.
- Gocke, J. P. (2003). Visual spectral sensitivity of loggerhead (Caretta caretta L.) and leatherback (Dermochelys coriacea L.) hatchlings: A comparative study. Florida Atlantic University.
- Gogala, M. (1967). Die spektrale empfindlichkeit der doppelaugen von *Ascalaphus macaronius* Scop. (Neuroptera, Ascalaphidae). *Zeitschrift für vergleichende Physiologie*, 57(3), 232–243.
- Goldman, L. J. (1972). The electroretinogram and spectral sensitivity of the compound eye of Aedes aegypti University of Florida].
- Goldman, L. J., Barnes, S. N., & Goldsmith, T. H. (1975). Microspectrophotometry of rhodopsin and metarhodopsin in the moth Galleria. *The Journal of general physiology*, 66(3), 383–404.

- Gordon, J., & Hood, D. C. (1976). Anatomy and physiology of the frog retina. In K. V. Fite (Ed.), *The Amphibian Visual System* (pp. 29–86). Elsevier.
- Govardovskii, V. I., & Zueva, L. V. (1974). Spectral sensitivity of the frog eye in the ultraviolet and visible region. *Vision Research*, 14(12), 1317–1321.
- Govardovskii, V. I., Zueva, L. V., & Lychakov, D. V. (1984). Microspectrophotometric study of visual pigments in five species of geckos. *Vision Research*, 24(10), 1421–1423.
- Granda, A. M., & O'Shea, P. J. (1972). Spectral sensitivity of the green turtle (*Chelonia mydas mydas*) determined by electrical responses to heterochromatic light. *Brain, Behavior and Evolution*, 5(2-3), 143–154.
- Granda, A. M., & Stirling, C. E. (1966). The spectral sensitivity of the turtle's eye to very dim lights. *Vision Research*, 6(3-4), 143–152.
- Hamdorf, K., Höglund, G., & Langer, H. (1971). Mikrophotometrische Untersuchungen an der Retinula des Nachtschmetterlings Deilephila elpenor. Verhandlungen der Deutschen Zoologischen Gesellschaft, 65, 276–280.
- Hardie, R., Vogt, K., & Rudolph, A. (1989). The compound eye of the tsetse fly (*Glossina morsitans morsitans and Glossina palpalis* palpalis). Journal of Insect Physiology, 35(5), 423-431.
- Hardie, R. C. (1985). Functional organization of the fly retina. In H. Autrum, D. Ottoson, E. R. Perl, R. F. Schmidt, H. Shimazu, & W. D. Willis (Eds.), *Progress in Sensory Physiology* (Vol. 5, pp. 1-79). Springer.
- Hariyama, T., Tsukahara, Y., & Meyer-Rochow, V. B. (1993). Spectral responses, including a UV-sensitive cell type, in the eye of the isopod *Ligia exotica*. *Naturwissenschaften*, 80(5), 233–235.
- Hárosi, F. I. (1975). Absorption spectra and linear dichroism of some amphibian photoreceptors. *The Journal of general physiology*, 66(3), 357–382.
- Hart, N. S. (2001). The visual ecology of avian photoreceptors. *Progress in retinal and eye research*, 20(5), 675–703.
- Hart, N. S. (2004). Microspectrophotometry of visual pigments and oil droplets in a marine bird, the wedge-tailed shearwater *Puffinus pacificus*: topographic variations in photoreceptor spectral characteristics. *Journal of Experimental Biology*, 207(7), 1229–1240.
- Hart, N. S., Partridge, J. C., Bennett, A. T. D., & Cuthill, I. C. (2000). Visual pigments, cone oil droplets and ocular media in four species of estrildid finch. *Journal of Comparative Physiology A*, 186(7), 681–694.
- Hart, N. S., & Vorobyev, M. (2005). Modelling oil droplet absorption spectra and spectral sensitivities of bird cone photoreceptors. *Journal of Comparative Physiology A*, 191(4), 381–392.
- Hasselmann, E.-M. (1962). Über die relative spektrale Empfindlichkeit von Käfer-und Schmetterlingsaugen bei verschiedenen Helligkeiten. *Zoologische Jahrbucher*, 69, 573–576.
- Höglund, G., Hamdorf, K., Langer, H., Paulsen, R., & Schwemer, J. (1973). The photopigments in an insect retina. In *Biochemistry* and physiology of visual pigments (pp. 167-174). Springer.

- Horch, K. W., Gocke, J. P., Salmon, M., & Forward, R. B. (2008). Visual spectral sensitivity of hatchling loggerhead (*Caretta caretta* L.) and leatherback (*Dermochelys coriacea* L.) sea turtles, as determined by single-flash electroretinography. *Marine and Freshwater Behaviour and Physiology*, 41(2), 107–119.
- Horridge, G. A., Mimura, K., & Tsukahara, Y. (1975). Fly photoreceptors-II. Spectral and polarized light sensitivity in the drone fly Eristalis. *Proceedings of the Royal Society of London. Series B. Biological Sciences*, 190(1099), 225–237.
- Hunt, D. M., Chan, J., Carvalho, L. S., Hokoc, J. N., Ferguson, M. C., Arrese, C. A., & Beazley, L. D. (2009). Cone visual pigments in two species of South American marsupials. *Gene*, 433(1-2), 50–55.
- Ichikawa, T., & Tateda, H. (1982). Distribution of color receptors in the larval eyes of four species of Lepidoptera. *Journal of Comparative Physiology*, 149(3), 317–324.
- Isayama, T., Chen, Y., Kono, M., Fabre, E., Slavsky, M., DeGrip, W. J., Ma, J. X., Crouch, R. K., & Makino, C. L. (2014). Coexpression of three opsins in cone photoreceptors of the salamander Ambystoma tigrinum. *Journal of Comparative Neurology*, 522(10), 2249–2265.
- Jacobs, G. H. (1974). Scotopic and photopic visual capacities of an arboreal squirrel (*Sciurus niger*). *Brain, Behavior and Evolution*, 10(4-5), 307–321.
- Jacobs, G. H. (1978). Spectral sensitivity and colour vision in the ground-dwelling sciurids: results from golden mantled ground squirrels and comparisons for five species. *Animal Behaviour*, 26, 409–421.
- Jacobs, G. H. (1993). The distribution and nature of colour vision among the mammals. *Biological Reviews of the Cambridge Philosophical Society*, 68(3), 413–471.
- Jacobs, G. H., Crognale, M., & Fenwick, J. (1987). Cone pigment of the great horned owl. Condor, 89, 434-436.
- Jacobs, G. H., & Deegan II, J. F. (1994a). Sensitivity to ultraviolet light in the gerbil (*Meriones unguiculatus*): characteristics and mechanisms. *Vision Research*, 34(11), 1433–1441.
- Jacobs, G. H., & Deegan II, J. F. (1994b). Spectral sensitivity, photopigments, and color vision in the guinea pig (*Cavia porcellus*). *Behavioral Neuroscience*, 108(5), 993.
- Jacobs, G. H., & Deegan II, J. F. (2003). Cone pigment variations in four genera of New World monkeys. *Vision Research*, 43(3), 227–236.
- Jacobs, G. H., Deegan II, J. F., Neitz, J., Crognale, M. A., & Neitz, M. (1993). Photopigments and color vision in the nocturnal monkey, *Aotus. Vision Research*, 33(13), 1773–1783.
- Jacobs, G. H., Deegan II, J. F., Neitz, J., Murphy, B. P., Miller, K. V., & Marchinton, R. L. (1994). Electrophysiological measurements of spectral mechanisms in the retinas of two cervids: white-tailed deer (*Odocoileus virginianus*) and fallow deer (*Dama dama*). Journal of Comparative Physiology A, 174(5), 551–557.
- Jacobs, G. H., & Deegan, J. F. (1992). Cone photopigments in nocturnal and diurnal procyonids. *Journal of Comparative Physiology A*, 171(3), 351–358.

- Jacobs, G. H., & Deegan, J. F. (1993). Photopigments underlying color vision in ringtail lemurs (*Lemur catta*) and brown lemurs (*Eulemur fulvus*). *American Journal of Primatology*, 30(3), 243–256.
- Jacobs, G. H., Deegan, J. F., Crognale, M. A., & Fenwick, J. A. (1993). Photopigments of dogs and foxes and their implications for canid vision. *Visual Neuroscience*, 10(1), 173–180.
- Jacobs, G. H., Deegan, J. F., & Neitz, J. (1998). Photopigment basis for dichromatic color vision in cows, goats, and sheep. *Visual Neuroscience*, 15(3), 581–584.
- Jacobs, G. H., & Neitz, J. (1986). Spectral sensitivity of cat cones to rapid flicker. Experimental Brain Research, 62(2), 446–448.
- Jacobs, G. H., & Neitz, J. (1989). Cone monochromacy and a reversed Purkinje shift in the gerbil. Experientia, 45(4), 317–319.
- Jacobs, G. H., Neitz, J., & Crognale, M. (1985). Spectral sensitivity of ground squirrel cones measured with ERG flicker photometry. *Journal of Comparative Physiology A*, 156(4), 503–509.
- Jacobs, G. H., Neitz, J., & Crognale, M. (1987). Color vision polymorphism and its photopigment basis in a callitrichid monkey (*Saguinus fuscicollis*). Vision Research, 27(12), 2089–2100.
- Jacobs, G. H., Neitz, J., & Deegan, J. F. (1991). Retinal receptors in rodents maximally sensitive to ultraviolet light. *Nature*, 353(6345), 655–656.
- Jacobs, G. H., & Williams, G. A. (2007). Contributions of the mouse UV photopigment to the ERG and to vision. *Documenta ophthalmologica*, 115(3), 137-144.
- Jacobs, G. H., & Williams, G. A. (2010). Cone pigments in a North American marsupial, the opossum (*Didelphis virginiana*). *Journal of Comparative Physiology A*, 196(5), 379–384.
- Jane, S., & Bowmaker, J. (1988). Tetrachromatic colour vision in the duck (*Anas platyrhynchos* L.): microspectrophotometry of visual pigments and oil droplets. *Journal of Comparative Physiology A*, 162(2), 225–235.
- Joshi, D., & Chandrashekaran, M. K. (1985). Spectral sensitivity of the photoreceptors responsible for phase shifting the circadian rhythm of activity in the bat, Hipposideros speoris. *Journal of Comparative Physiology A*, 156(2), 189–198.
- Kawamura, S., & Kubotera, N. (2004). Ancestral loss of short wave-sensitive cone visual pigment in lorisiform prosimians, contrasting with its strict conservation in other prosimians. *Journal of Molecular Evolution*, 58(3), 314–321.
- Kawamura, S., & Yokoyama, S. (1998). Functional characterization of visual and nonvisual pigments of American chameleon (*Anolis carolinensis*). *Vision Research*, 38(1), 37–44.
- Kawamuro, K., Irie, T., & Nakamura, T. (1997). Filtering effect of cone oil droplets detected in the P-111 response spectra of japanese quail. *Vision Research*, *37*(20), 2829–2834.
- Kennedy, D. (1957). A comparative study of spectral sensitivity in tadpoles and adult frogs. *Journal of Cellular and Comparative Physiology*, 50(1), 155-165.
- King, R. B., Douglass, J. K., Phillips, J. B., & Baube, C. L. (1993). Scotopic spectral sensitivity of the optomotor response in the green treefrog *Hyla cinerea*. *Journal of Experimental Zoology*, 267(1), 40-46.

- Kirschfeld, K., & Vogt, K. (1986). Does retinol serve a sensitizing function in insect photoreceptors? *Vision Research*, 26(11), 1771–1777.
- Korenyak, D. A., & Govardovskii, V. I. (2013). Photoreceptors and visual pigments in three species of newts. *Journal of Evolutionary Biochemistry and Physiology*, 49(4), 399–407.
- Koskelainen, A., Hemilä, S., & Donner, K. (1994). Spectral sensitivities of short-and long-wavelength sensitive cone mechanisms in the frog retina. *Acta Physiologica Scandinavica*, 152(1), 115–124.
- Kraft, T. W. (1988). Photocurrents of cone photoreceptors of the golden-mantled ground squirrel. *The Journal of Physiology*, 404(1), 199–213.
- Krempels, D. M. (1989). "Visible light" and near-infrared reflectance of amphibians and reptiles and the visual system of avian predators (Accipitridae: Buteo spp.) University of Miami]. Coral Gables, Florida.
- Lall, A. B., Cronin, T. W., Carvalho, A. A., de Souza, J. M., Barros, M. P., Stevani, C. V., Bechara, E. J. H., Ventura, D. F., Viviani, V. R., & Hill, A. A. (2010). Vision in click beetles (Coleoptera: Elateridae): pigments and spectral correspondence between visual sensitivity and species bioluminescence emission. *Journal of Comparative Physiology A*, 196(9), 629–638.
- Lall, A. B., Lord, E. T., & Trouth, C. (1982). Vision in the firefly *Photuris lucicrescens* (Coleoptera: Lampyridae): Spectral sensitivity and selective adaptation in the compound eye. *Journal of Comparative Physiology*, 147(2), 195-200.
- Lall, A. B., Strother, G. K., Cronin, T. W., & Seliger, H. H. (1988). Modification of spectral sensitivities by screening pigments in the compound eyes of twilight-active fireflies (Coleoptera: Lampyridae). *Journal of Comparative Physiology A*, 162(1), 23–33.
- Langer, H., Hamann, B., & Meinecke, C. C. (1979). Tetrachromatic visual system in the moth *Spodoptera exempta* (Insecta: Noctuidae). *Journal of Comparative Physiology A*, 129(3), 235–239.
- Langer, H., Schmeinck, G., & Anton-Erxleben, F. (1986). Identification and localization of visual pigments in the retina of the moth, *Antheraea polyphemus* (Insecta, Saturniidae). *Cell and Tissue Research*, 245(1), 81–89.
- Levenson, D. H., Eckert, S. A., Cognale, M. A., Deegan II, J. F., & Jacobs, G. H. (2004). Photopic spectral sensitivity of green and loggerhead sea turtles. *Copeia*, 2004, 908–914.
- Liebau, A., Eisenberg, T., & Esser, K.-H. (2015). The scotopic and photopic visual sensitivity in the nocturnal tree frog Agalychnis callidryas. *Journal of Comparative Physiology A*, 201(10), 1035-1041.
- Liebman, P. (1972). Microspectrophotometry of photoreceptors. In H. J. A. Dartnall (Ed.), *Photochemistry of Vision* (Vol. 7, pp. 481–528). Springer.
- Liebman, P. A., & Entine, G. (1968). Visual pigments of frog and tadpole (*Rana pipiens*). Vision Research, 8(7), 761-775, IN761–IN767.
- Liebman, P. A., & Granda, A. M. (1971). Microspectrophotometric measurements of visual pigments in two species of turtle, *Pseudemys scripta* and *Chelonia mydas. Vision Research*, 11(2), 105–114.

- Lieke, E. (1981). Graded and discrete receptor potentials in the compound eye of the Australian bulldog-ant (*Myrmecia gulosa*). *Biological Cybernetics*, 40(2), 151–156.
- Lin, J.-T., & Wu, C. Y. (1992). A comparative study on the color vision of four coleopteran insects. *Bulletin of the Institute of Zoology, Academia Sinica*, 31, 81–88.
- Loew, E. R. (1994). A third, ultraviolet-sensitive, visual pigment in the Tokay gecko (*Gekko gekko*). Vision Research, 34(11), 1427–1431.
- Loew, E. R., Fleishman, L. J., Foster, R. G., & Provencio, I. (2002). Visual pigments and oil droplets in diurnal lizards: a comparative study of Caribbean anoles. *Journal of Experimental Biology*, 205(7), 927–938.
- Loew, E. R., Govardovskii, V. I., Röhlich, P., & Szel, A. (1996). Microspectrophotometric and immunocytochemical identification of ultraviolet photoreceptors in geckos. *Visual Neuroscience*, 13(2), 247–256.
- Ma, J.-X., Znoiko, S., Othersen, K. L., Ryan, J. C., Das, J., Isayama, T., Kono, M., Oprian, D. D., Corson, D. W., & Cornwall, M. C. (2001). A visual pigment expressed in both rod and cone photoreceptors. *Neuron*, 32(3), 451–461.
- Macedonia, J. M., Lappin, A. K., Loew, E. R., Mcguire, J. A., Hamilton, P. S., Plasman, M., Brandt, Y., Lemos-Espinal, J. A., & Kemp, D. J. (2009). Conspicuousness of Dickerson's collared lizard (*Crotaphytus dickersonae*) through the eyes of conspecifics and predators. *Biological Journal of the Linnean Society*, 97(4), 749–765.
- Machan, L. (1968). Spectral sensitivity of scorpion eyes and the possible role of shielding pigment effect. *Journal of Experimental Biology*, 49(1), 95-105.
- Maier, E., & Bowmaker, J. (1993). Colour vision in the passeriform bird, *Leiothrix lutea*: correlation of visual pigment absorbance and oil droplet transmission with spectral sensitivity. *Journal of Comparative Physiology A*, 172(3), 295-301.
- Maier, E. J. (1992). Spectral sensitivities including the ultraviolet of the passeriform bird *Leiothrix lutea*. *Journal of Comparative Physiology A*, 170(6), 709–714.
- Makino-Tasaka, M., & Suzuki, T. (1984). The green rod pigment of the bullfrog. Rana catesbeiana. Vision Research, 24(4), 309–322.
- Martin, G. R. (1977). Absolute visual threshold and scotopic spectral sensitivity in the tawny owl *Strix aluco*. *Nature*, *268*(5621), 636–638.
- Matic, T. (1983). Electrical inhibition in the retina of the butterfly Papilio. I: Four spectral types of photoreceptors. *Journal of Comparative Physiology*, 152(2), 169–182.
- Matthews, G. (1983). Physiological characteristics of single green rod photoreceptors from toad retina. *The Journal of Physiology*, 342(1), 347–359.
- Mazza, C. A., Izaguirre, M. M., Curiale, J., & Ballaré, C. L. (2010). A look into the invisible: ultraviolet-B sensitivity in an insect (*Caliothrips phaseoli*) revealed through a behavioural action spectrum. *Proceedings of the Royal Society B: Biological Sciences*, 277(1680), 367–373.

- McCann, G. D., & Arnett, D. W. (1972). Spectral and polarization sensitivity of the dipteran visual system. *The Journal of general physiology*, *59*(5), 534–558.
- Meinertzhagen, I. A., Menzel, R., & Kahle, G. (1983). The identification of spectral receptor types in the retina and lamina of the dragonfly *Sympetrum rubicundulum*. *Journal of Comparative Physiology*, 151(3), 295–310.
- Melin, A. D., Danosi, C. F., McCracken, G. F., & Dominy, N. J. (2014). Dichromatic vision in a fruit bat with diurnal proclivities: the Samoan flying fox (*Pteropus samoensis*). *Journal of Comparative Physiology A*, 200(12), 1015–1022.
- Mellor, H. E., Hamilton, J. G. C., & Anderson, M. (1996). Spectral sensitivity in the eyes of male and female *Lutzomyia longipalpis* sand flies. *Medical and Veterinary Entomology*, 10(4), 371–374.
- Menzel, R., & Knaut, R. (1973). Pigment movement during light and chromatic adaptation in the retinula cells of *Formica polyctena* (Hymenoptera, Formicidae). *Journal of Comparative Physiology*, 86(2), 125–138.
- Mészáros, Á., Kriska, G., & Egri, Á. (2021). Spectral optimization of beacon lights for the protection of night-swarming mayflies. Insect Conservation and Diversity, 14(2), 225–234.
- Meyer-Rochow, V. B. (1980). Electrophysiologically determined spectral efficiences of the compound eye and median ocellus in the bumblebee *Bombus hortorum tarhakimalainen* (Hymenoptera, Insecta). *Journal of Comparative Physiology, A, 139*(4), 261–266.
- Mikkola, K. (1972). Behavioural and electrophysiological responses of night-flying insects, especially Lepidoptera, to near-ultraviolet and visible light. *Annales Zoologici Fennici*, *9*, 225–254.
- Mohun, S. M., Davies, W. L., Bowmaker, J. K., Pisani, D., Himstedt, W., Gower, D. J., Hunt, D. M., & Wilkinson, M. (2010). Identification and characterization of visual pigments in caecilians (Amphibia: Gymnophiona), an order of limbless vertebrates with rudimentary eyes. *Journal of Experimental Biology*, 213(20), 3586–3592.
- Mote, M. I., & Goldsmith, T. H. (1970). Spectral sensitivities of color receptors in the compound eye of the cockroach *Periplaneta*. *Journal of Experimental Zoology*, 173(2), 137–145.
- Muir, L. E., Thorne, M. J., & Kay, B. H. (1992). Aedes aegypti (Diptera: Culicidae) vision: spectral sensitivity and other perceptual parameters of the female eye. *Journal of Medical Entomology*, 29(2), 278-281.
- Müller, B., Glösmann, M., Peichl, L., Knop, G. C., Hagemann, C., & Ammermüller, J. (2009). Bat eyes have ultraviolet-sensitive cone photoreceptors. *PLoS ONE*, 4(7), e6390.
- Nagloo, N. (2016). Visual ecology of Australian reptiles: retinal organisation and colour vision University of Western Australia].
- Neitz, J., & Jacobs, G. H. (1989). Spectral sensitivity of cones in an ungulate. Visual Neuroscience, 2(2), 97-100.
- Nelson, R. (1977). Cat cones have rod input: a comparison of the response properties of cones and horizontal cell bodies in the retina of the cat. *Journal of Comparative Neurology*, 172(1), 109–135.
- Nuboer, J. F. W., & Moed, P. J. (1983). Increment-threshold spectral sensitivity in the rabbit. *Journal of Comparative Physiology*, 151(3), 353–358.

- Nuboer, J. F. W., Van Nuys, W. M., & Wortel, J. F. (1983). Cone systems in the rabbit retina revealed by ERG-null-detection. *Journal of Comparative Physiology*, 151(3), 347–352.
- Nunn, B. J., Schnapf, J. L., & Baylor, D. A. (1984). Spectral sensitivity of single cones in the retina of *Macaca fascicularis*. *Nature*, 309(5965), 264–266.
- Ödeen, A., & Håstad, O. (2003). Complex distribution of avian color vision systems revealed by sequencing the SWS1 opsin from total DNA. *Molecular Biology and Evolution*, 20(6), 855–861. <a href="https://doi.org/10.1093/molbev/msg108">https://doi.org/10.1093/molbev/msg108</a>
- Ohtsuka, T. (1985). Spectral sensitivities of seven morphological types of photoreceptors in the retina of the turtle, *Geoclemys reevesii*. Journal of Comparative Neurology, 237(2), 145–154.
- Palacios, A. G., Bozinovic, F., Vielma, A., Arrese, C. A., Hunt, D. M., & Peichl, L. (2010). Retinal photoreceptor arrangement, SWS1 and LWS opsin sequence, and electroretinography in the South American marsupial *Thylamys elegans* (Waterhouse, 1839). *Journal of Comparative Neurology*, 518(9), 1589–1602.
- Parry, J. W. L., & Bowmaker, J. K. (2002). Visual pigment coexpression in guinea pig cones: a microspectrophotometric study. *Investigative Ophthalmology & Visual Science*, 43(5), 1662–1665.
- Paul, R., Steiner, A., & Gemperlein, R. (1986). Spectral sensitivity of *Calliphora erythrocephala* and other insect species studied with Fourier Interferometric Stimulation (FIS). *Journal of Comparative Physiology A*, 158(5), 669–680.
- Peach, D. A. H., Ko, E., Blake, A. J., & Gries, G. (2019). Ultraviolet inflorescence cues enhance attractiveness of inflorescence odour to *Culex pipiens* mosquitoes. *PLoS ONE*, *14*(6), e0217484.
- Peichl, L., Chavez, A. E., Ocampo, A., Mena, W., Bozinovic, F., & Palacios, A. G. (2005). Eye and vision in the subterranean rodent cururo (*Spalacopus cyanus*, Octodontidae). *Journal of Comparative Neurology*, 486(3), 197–208.
- Peitsch, D., Fietz, A., Hertel, H., de Souza, J., Ventura, D. F., & Menzel, R. (1992). The spectral input systems of hymenopteran insects and their receptor-based colour vision. *Journal of Comparative Physiology A*, 170(1), 23–40.
- Perry, R. J., & McNaughton, P. A. (1991). Response properties of cones from the retina of the tiger salamander. *The Journal of Physiology*, 433(1), 561–587.
- Przyrembel, C., Keller, B., & Neumeyer, C. (1995). Trichromatic color vision in the salamander (*Salamandra salamandra*). *Journal of Comparative Physiology A*, 176(4), 575–586.
- Reed, J. R. (1986). Seabird vision: spectral sensitivity and light-attraction behavior [Dissertation, University of Wisconsin]. Madison, Wisconsin.
- Remy, M., & Emmerton, J. (1989). Behavioral spectral sensitivities of different retinal areas in pigeons. *Behavioral Neuroscience*, 103(1), 170–177.
- Ringo, J., Wolbarsht, M. L., Wagner, H. G., Crocker, R., & Amthor, F. (1977). Trichromatic vision in the cat. *Science*, 198(4318), 753–755.

- Rocha, F. A. d. F., Gomes, B. D., Silveira, L. C. d. L., Martins, S. L., Aguiar, R. G., de Souza, J. M., & Ventura, D. F. (2016). Spectral sensitivity measured with electroretinogram using a constant response method. *PLoS ONE*, *11*(1), e0147318.
- Roth, L. S. V., & Kelber, A. (2004). Nocturnal colour vision in geckos. *Proceedings of the Royal Society of London. Series B: Biological Sciences*, 271(suppl\_6), S485–S487.
- Schleich, C. E., Vielma, A., Glösmann, M., Palacios, A. G., & Peichl, L. (2010). Retinal photoreceptors of two subterranean tucotuco species (Rodentia, Ctenomys): Morphology, topography, and spectral sensitivity. *Journal of Comparative Neurology*, 518(19), 4001–4015.
- Schwemer, J., & Paulsen, R. (1973). Three visual pigments in *Deilephila elpenor* (Lepidoptera, Sphingidae). *Journal of Comparative Physiology*, 86(3), 215–229.
- Sillman, A. J. (1987). Extraction and characterization of the blue-sensitive visual pigment of the toad *Bufo marinus*. *Canadian Journal of Zoology*, 65(4), 884–887.
- Sillman, A. J., Bolnick, D. A., Haynes, L. W., Walter, A. E., & Loew, E. R. (1981). Microspectrophotometry of the photoreceptors of palaeognathous birds—the emu and the tinamou. *Journal of Comparative Physiology*, 144(3), 271–276.
- Sillman, A. J., Carver, J. K., & Loew, E. R. (1999). The photoreceptors and visual pigments in the retina of a boid snake, the ball python (*Python regius*). *Journal of Experimental Biology*, 202(14), 1931–1938.
- Sillman, A. J., Govardovskii, V. I., Röhlich, P., Southard, J. A., & Loew, E. R. (1997). The photoreceptors and visual pigments of the garter snake (*Thamnophis sirtalis*): a microspectrophotometric, scanning electron microscopic and immunocytochemical study. *Journal of Comparative Physiology A*, 181(2), 89–101.
- Sillman, A. J., Johnson, J. L., & Loew, E. R. (2001). Retinal photoreceptors and visual pigments in *Boa constrictor* imperator. *Journal of Experimental Zoology*, 290(4), 359–365.
- Sillman, A. J., Ronan, S. J., & Loew, E. R. (1991). Histology and microspectrophotometry of the photoreceptors of a crocodilian, *Alligator mississippiensis. Proceedings of the Royal Society of London. Series B: Biological Sciences*, 243(1306), 93–98.
- Simoes, B. F., Sampaio, F. L., Loew, E. R., Sanders, K. L., Fisher, R. N., Hart, N. S., Hunt, D. M., Partridge, J. C., & Gower, D. J. (2016). Multiple rod-cone and cone-rod photoreceptor transmutations in snakes: evidence from visual opsin gene expression. *Proceedings of the Royal Society B: Biological Sciences*, 283(1823), 20152624.
- Smith, K. C., & Macagno, E. R. (1990). UV photoreceptors in the compound eye of *Daphnia magna* (Crustacea, Branchiopoda). a fourth spectral class in single ommatidia. *Journal of Comparative Physiology A*, 166(5), 597–606.
- Steiner, A., Paul, R., & Gemperlein, R. (1987). Retinal receptor types in *Aglais urticae* and *Pieris brassicae* (Lepidoptera), revealed by analysis of the electroretinogram obtained with Fourier interferometric stimulation (FIS). *Journal of Comparative Physiology A*, 160(2), 247–258.
- Struwe, G. (1972a). Spectral sensitivity of single photoreceptors in the compound eye of a tropical butterfly (*Heliconius numata*). *Journal of Comparative Physiology*, 79(2), 197–201.

- Struwe, G. (1972b). Spectral sensitivity of the compound eye in butterflies (*Heliconius*). *Journal of Comparative Physiology*, 79(2), 191–196.
- Takahashi, Y., & Ebrey, T. G. (2003). Molecular basis of spectral tuning in the newt short wavelength sensitive visual pigment. *Biochemistry*, 42(20), 6025–6034.
- Tan, Y., & Li, W.-H. (1999). Trichromatic vision in prosimians. *Nature*, 402(6757), 36.
- Tan, Y., Yoder, A. D., Yamashita, N., & Li, W.-H. (2005). Evidence from opsin genes rejects nocturnality in ancestral primates. *Proceedings of the National Academy of Sciences*, 102(41), 14712–14716.
- Thompson, G. (1971). The photopic spectral sensitivity of gulls measured by electroretinographic and pupillometric methods. *Vision Research*, 11(7), 719–731.
- Tovée, M. J., Bowmaker, J. K., & Mollon, J. D. (1992). The relationship between cone pigments and behavioural sensitivity in a New World monkey (*Callithrix jacchus*). *Vision Research*, 32(5), 867–878.
- Travis, D. S., Bowmaker, J. K., & Mollon, J. D. (1988). Polymorphism of visual pigments in a callitrichid monkey. *Vision Research*, 28(4), 481–490.
- Vishnevskaya, T. M., & Mazokhin-Porshnyakov, G. A. (1972). Spectral sensitivity of single visual cells of the grasshopper *Tettigonia* cantans and the bumblebee *Bombus distinguendus*. *Biophysics*, 17(4), 663–670.
- Vishnevskaya, T. M., & Shura-Bura, T. M. (1990). Spectral sensitivity of photoreceptors and spectral inputs to the neurons of the first optic ganglion in the locust (*Locusta migratoria*). In F. G. Gribakin, K. Wiese, & A. V. Popov (Eds.), *Sensory Systems and Communication in Arthropods. Advances in Life Sciences* (pp. 106–111). Birkhäuser.
- Wakakuwa, M., Terakita, A., Koyanagi, M., Stavenga, D. G., Shichida, Y., & Arikawa, K. (2010). Evolution and mechanism of spectral tuning of blue-absorbing visual pigments in butterflies. *PLoS ONE*, *5*(11), e15015.
- Walla, P., Barth, F. G., & Eguchi, E. (1996). Spectral sensitivity of single photoreceptor cells in the eyes of the ctenid spicier *Cupiennius salei* Keys. *Zoological Science*, 13(1), 199–202.
- Wang, D., Oakley, T., Mower, J., Shimmin, L. C., Yim, S., Honeycutt, R. L., Tsao, H., & Li, W.-H. (2004). Molecular evolution of bat color vision genes. *Molecular Biology and Evolution*, 21(2), 295–302.
- Weller, S. J., & Pashley, D. P. (1995). In search of butterfly origins. *Molecular Phylogenetics and Evolution*, 4(3), 235–246.
- Wente, W. H., & Phillips, J. B. (2005). Microhabitat selection by the Pacific treefrog, Hyla regilla. Animal Behaviour, 70(2), 279-287.
- White, R. H., Banister, M. J., & Bennett, R. R. (1983). Spectral sensitivity of screening pigment migration in the compound eye of *Manduca sexta. Journal of Comparative Physiology*, 153(1), 59–66.
- Williams, G. A., Calderone, J. B., & Jacobs, G. H. (2003). Photoreceptors and photopigments in a fossorial rodent, the pocket gopher (*Geomys bursarius*). *Investigative Ophthalmology & Visual Science*, 44(13), 4163–4163.
- Williams, G. A., Calderone, J. B., & Jacobs, G. H. (2005). Photoreceptors and photopigments in a subterranean rodent, the pocket gopher (*Thomomys bottae*). *Journal of Comparative Physiology A*, 191(2), 125-134.

- Williams, G. A., & Jacobs, G. H. (2008). Absence of functional short-wavelength sensitive cone pigments in hamsters (*Mesocricetus*). *Journal of Comparative Physiology A*, 194(5), 429–439.
- Witkovsky, P., Levine, J. S., Engbretson, G. A., Hassin, G., & MacNichol Jr, E. F. (1981). A microspectrophotometric study of normal and artificial visual pigments in the photoreceptors of *Xenopus laevis*. *Vision Research*, *21*(6), 867–873.
- Wright, M. W., & Bowmaker, J. K. (2001). Retinal photoreceptors of paleognathous birds: the ostrich (*Struthio camelus*) and rhea (*Rhea americana*). Vision Research, 41(1), 1–12.
- Yamashita, S., & Tateda, H. (1976). Spectral sensitivities of jumping spider eyes. Journal of Comparative Physiology, 105(1), 29-41.
- Yang, E.-C., & Osorio, D. (1991). Spectral sensitivities of photoreceptors and lamina monopolar cells in the dragonfly, *Hemicordulia* tau. Journal of Comparative Physiology A, 169(6), 663–669.
- Yokoyama, S., Takenaka, N., Agnew, D. W., & Shoshani, J. (2005). Elephants and human color-blind deuteranopes have identical sets of visual pigments. *Genetics*, 170(1), 335–344.
- Zhou, Y.-H., Hewett-Emmett, D., Ward, J. P., & Li, W.-H. (1997). Unexpected conservation of the X-linked color vision gene in nocturnal prosimians: evidence from two bush babies. *Journal of Molecular Evolution*, 45(6), 610–618.
- Zufall, F., Schmitt, M., & Menzel, R. (1989). Spectral and polarized light sensitivity of photoreceptors in the compound eye of the cricket (*Gryllus bimaculatus*). *Journal of Comparative Physiology A*, 164(5), 597–608.