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A salticid archetype for salticid spiders [1]

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[1] Detailed attribution for images in Figures 1-29 is given in Appendix 1. All images have been edited or modified by the author.

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Abstract: The concept of a salticid *archetype*, as an innate image of salticid spiders that supports their recognition of other salticid spiders, is discussed. Supporting evidence is derived from review of the characteristics of a variety of Lepidoptera that appear to carry the images of salticids on their wings.

Keywords: Acentropinae, Araneae, *Brenthia*, *Cataclysta*, *Chalcoela*, *Chrysendeton*, Crambidae, *Cyllopsis*, *Dichrorampha*, diurnal moth, *Eoophyla*, *Epinotia*, *Euchromius*, evolution, *Fabiola*, face, *Glyphipterix*, *Grapholita*, innate, jumping spider, Carl Gustav Jung, Lepidoptera, *Margarosticha*, microlepidoptera, mimicry, *Neonympha*, Nymphalidae, *Nymphicula*, Oecophoridae, *Olethreutes*, Olethreutinae, *Ofatulena*, *Pelocrista*, *Petrophila*, *Phiaris*, *Phidippus*, recognition, Salticidae, Satyrinae, scale pattern, selection, supernormal, *Syricoris*, *Talponia*

Among small terrestrial arthropods, jumping spiders (Araneae: Salticidae) are remarkable for both their *faces*, and the quick turns (*facing turns*) that they make to face objects in their field of vision (Land 1971; Duelli 1978; Jackson & Harland 2009; Hill 2022). Several recent papers (Rota & Wagner 2006; Wang et al. 2017; Hill, Abhijith & Burini 2019) have advanced the hypothesis that a number of insects, notably lepidopterans, mimic jumping spiders to distract them from predation (*predator distraction*). This mimicry may include either display of an image of a salticid, or movement suggestive of an active salticid. In effect, through selection in favor of their mimics (or predation on less-effective mimics), salticid predators may produce their own image of salticids on these mimics. In some cases, the detail present in these salticid images is surprising.

In a more general sense, visual recognition of conspecifics by courting or mating salticids has been widely studied. A nearby salticid may also present a threat that requires immediate and special attention by another salticid, as this represents a predator that, unlike almost all other arthropods, shares the advantage of acute vision. Thus one might expect that a salticid would be able to recognize another salticid spider as such, regardless of its conspecificity, and to respond accordingly.

Assuming *predator distraction* as a working hypothesis for the mimicry of salticids by insects, one can use the characteristics of these mimics to derive a hypothesis for the archetypal image (*archetype*) of a salticid, or innate basis of recognition of a salticid, that is held by a salticid spider. This definition agrees with the designation of innate human archetypes by Jung (Jung 1969), but with more of a focus on ethology and evolution (e.g., Major 2021) than on the more expansive treatment of the archetype as a concept by psychologists or by the humanities (e.g., Bradshaw & Storm 2013; Caputo 2014; Westley & Folke 2018; Ottosson & Grahn 2021). Based on examination of features shared by a variety of lepidopteran mimics, it is possible to identify a hypothetical salticid archetype (Figure 1).

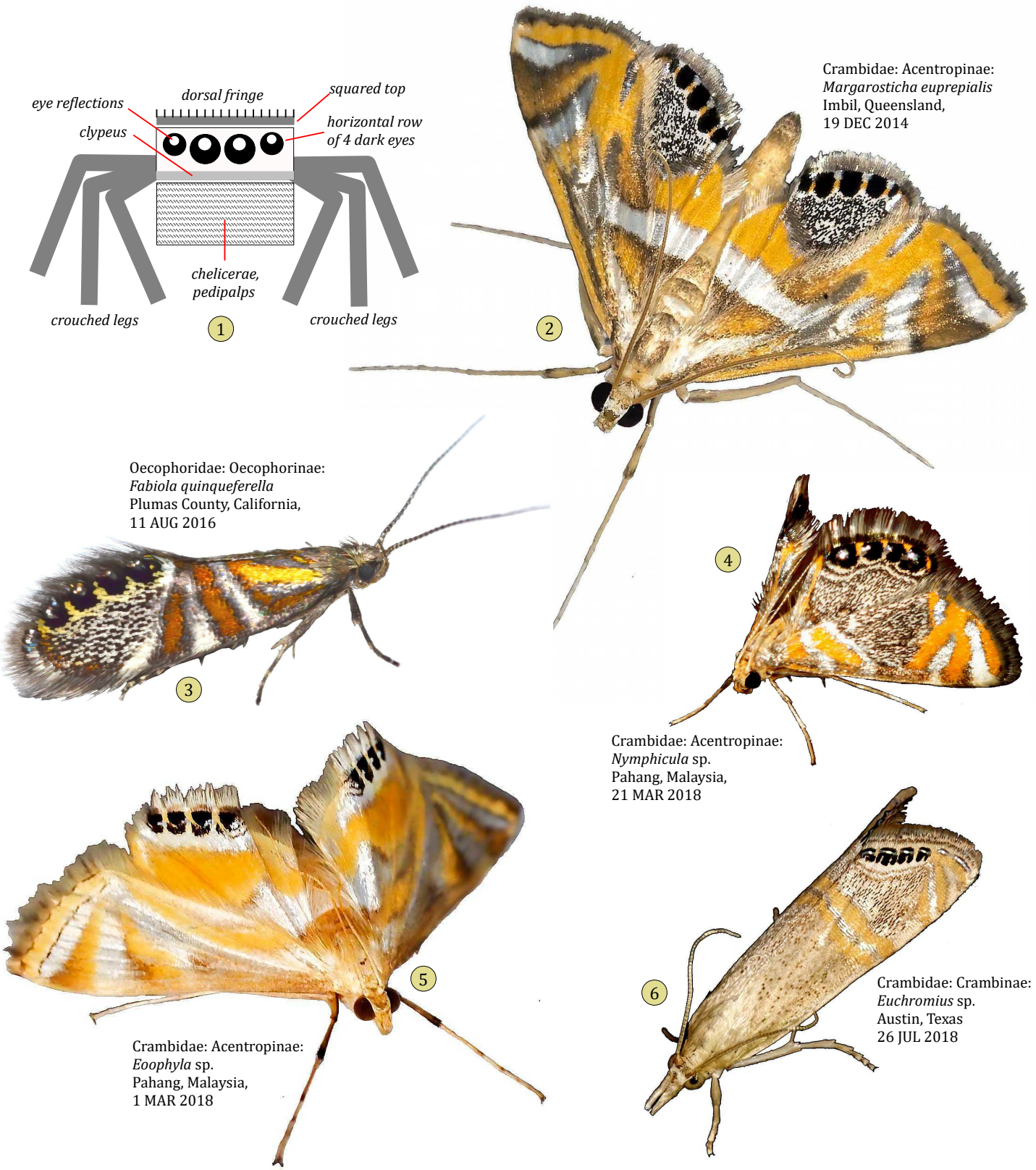

Figure 1. Hypothetical salticid archetype for a salticid spider (1) and representatives of five lepidopteran genera that share these archetypal features (2-6), apparently the result of convergent evolution. Attribution and ©: 1, David E. Hill; 2, Ian McMillan; 3, Christian Schwartz; 4, Arnold Wijker; 5, CheongWeei Gan; 6, Eric Carpenter.

Jumping spiders (Salticidae) are a large and diverse group, with many differences in facial appearance, including many features that can be associated with courtship or intraspecific communication (Figures 2-3). Nonetheless the more general features of this hypothetical archetype (Figure 1.1), notably the front eye row, can be found in many if not most of them.

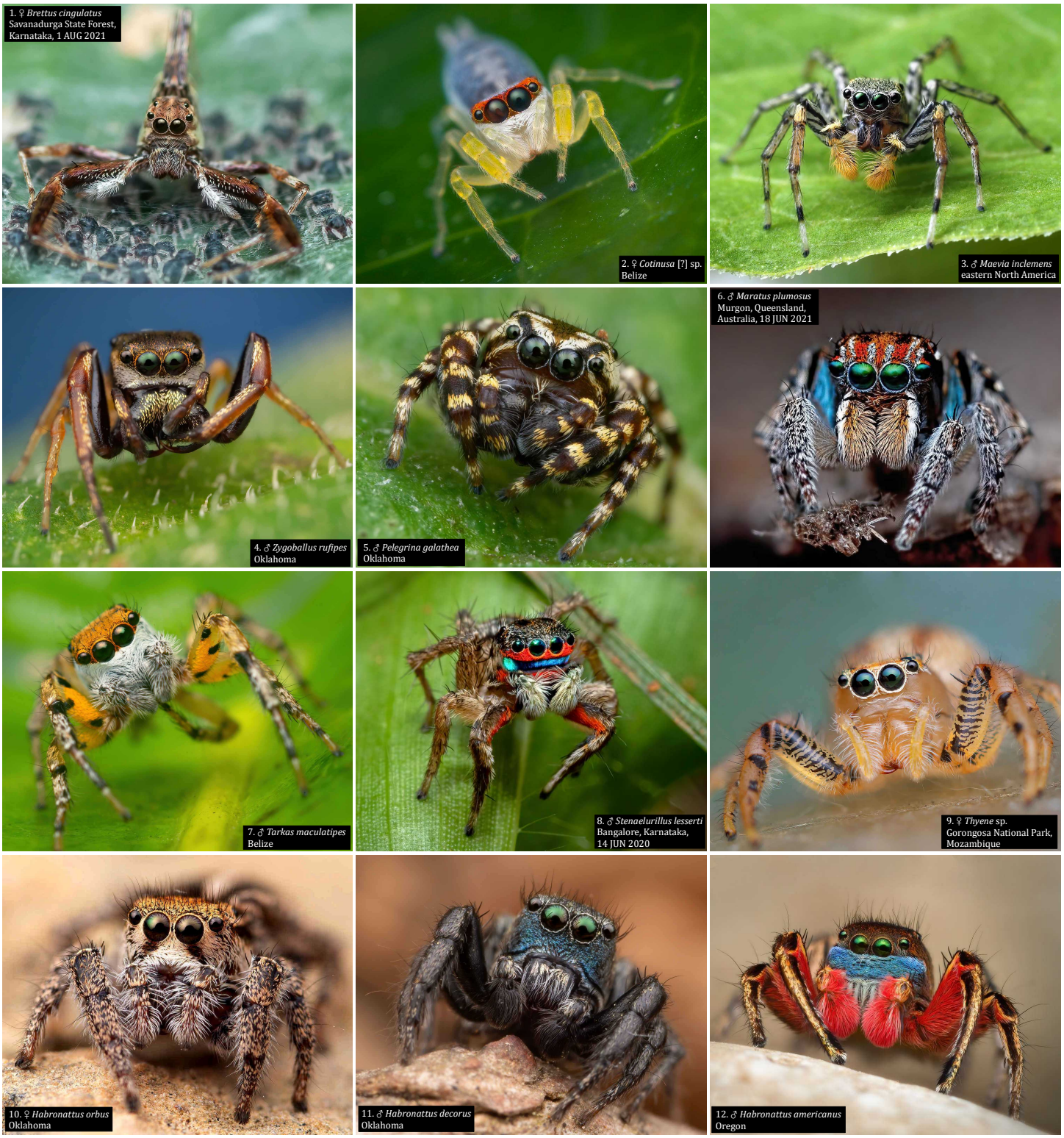

Figure 2. Some of the many, diverse faces of jumping spiders (Salticidae). Attribution and ©: 1, Naveen Iyer; 2, 4-5, 7, 9-12, Thomas Shahan; 6, Jacky Lien; 8, acharya_mr. Names follow the WSC (2022).

Figure 3. Representatives of genus *Phidippus*, a group of large North American dendryphantines. In this genus males usually have darker faces, but the front eyes of mature females are often highlighted by the contrasting white setae that surround them. Names follow the WSC (2022) and Edwards (2004, 2020). Attribution and ©: 1-12, David E. Hill.

The larger salticids, in particular, represent a significant threat to many diurnal Lepidoptera which, if detected, are relatively defenseless (Figure 4). Presently we know nothing about the effectiveness of lepidopteran chemical defenses with respect to salticids.

Figure 3. Some salticids with their lepidopteran prey. The larger salticids like *Phidippus* may take even large butterflies as prey. Attribution and ©: 1, Luis Fernanda Valdez Ojeda; 2, donnamareetomkinson; 3, Liana (lianaj); 4, Alberto González; 5, Rhonda S. Fair; 6, Aniruddha Singhamahapatra; 7, Samyak S; 8, Huang, Yu-Xiang; 9, Hong; 10, Will George; 11, loes; 12, Andrés Pautasso.

Although many Lepidoptera, representing divergent clades, carry the hypothetical *salticid archetype of a salticid* (hereafter referred to as *the archetype*), it is important to realize that the great majority of species in these clades do not bear this image. In searching for its presence, I have reviewed many thousands of lepidopteran species, and have found a significant but also *relatively small* number of species that appear to carry an image that might be identified as a salticid. Key correlates for the appearance of this image include the following: diurnal activity of the adult butterfly or moth, relatively small size (at a scale that corresponds to the size of salticid spiders, and a habit that includes display of either the dorsal (in most cases) or ventral side of the wings when resting. Just why this image appears in only some species that meet these criteria, but not in most, is not known. One can only surmise that in many places the salticid presence represents a major factor in the selection of detailed scale patterns or the ornamentation of lepidopteran wings, at a smaller scale that is much less relevant to avian predators. Salticids are one of the few groups known to observe their prey, or conspecifics, at this level of detail.

There are alternatives to the working hypothesis of *predator distraction* (where the salticid is the predator) that bear mention. The first of these is the idea that the image of a salticid is threatening to the more important predators of Lepidoptera. Presently we have no evidence to support this idea, and salticids themselves are clearly vulnerable to the birds, lizards or wasps that might be able to see these signals. Then we have the *null hypothesis*, essentially that these patterns are simply random. Given the convergent evolution of this pattern in many different clades, as well as the tendency to hold the wings in a position that prominently displays a salticid image, this seems unlikely. A third hypothesis, that this display plays a role in *intraspecific communication*, should also be considered. However, this does not explain either the origin, or the maintenance, of this pattern in a widely-distributed lepidopteran population.

A more comprehensive review of many examples from wild populations of 15 different lepidopteran genera suggests that, although individual variations exist, there is remarkable consistency in the appearance of the archetypal pattern across populations (Table 1; Figures 5-26, 29). Consideration of the known biology for each of these genera should contribute to our understanding of the importance of this apparent mimicry.

Table 1. Hypothetical phylogeny of some lepidopteran genera with species that appear to mimic salticid spiders (Solis & Maes 2002; Solis 2007; Marín et al. 2011; Regier et al. 2012; Mitter, Davis & Cummings 2017; Kawahara et. al 2019; ITIS 2022). Most of these are *micro moths (microlepidoptera)*. The subfamily Acentropinae is part of a large *wet habitat clade* of pyraloid moths, with aquatic larvae. Many species in these genera have not been described.

		Superfamily	**Family**	**Subfamily**	**Tribe**	**Genus**	**Figures**
Apoditrysia	Choreutoidea		Choreutidae	Brenthiinae		*Brenthia* Clemens 1860	5
	Obtectomera	Gelechioidea	Oecophoridae	Oecophorinae	Oecophorini	*Fabiola* Busck 1908	1.3
		Papilionoidea	Nymphalidae	Satyrinae	Satyrini	*Cyllopsis* Felder 1869	6-8
						Neonympha Hübner 1818	9
		Pyraloidea	Crambidae	Acentropinae	Argyractini	*Petrophila* Guilding 1830	10-12
					Nymphulini	*Cataclysta* Hübner 1825	13
						Chrysendeton Grote 1881	14
						Eoophyla Swinhoe 1900	1.5, 15-16
						Margarosticha Lederer 1863	1.2, 17-18
						Nymphicula Snellen [1880]	1.4, 19
				Crambinae	Euchromiini	*Euchromius* Guenée 1845	1.6, 20-21
				Glaphriinae		*Chalcoela* Zeller 1872	22
	Tortricoidea		Tortricidae	Olethreutinae	Eucosmini	*Pelocrista* Lederer 1859	23
					Olethreutini	*Olethreutes* Hübner 1822	24, 29
Yponomeutoidea			Glyphipterigidae	Glyphipteriginae		*Glyphipterix* Hübner 1825	25-26

Figure 5. Some moths of the genus *Brenthia* that are thought to mimic salticids. Field observations and laboratory experiments have shown that salticids are distracted by these displays, which include active movement across the surface of a leaf (Robinson et al. 1994; Aiello & Becker 2004; Rota & Wagner 2006; Rota 2008; Wang et al. 2017). Although the *crouched legs* images are fairly consistent in these species, the accuracy of the *horizontal eye row* image varies, and the elevated forewings appear in some cases to represent two salticids, side by side. These images may have a *supernormal* (see Tanaka et al. 2011; Goodwin, Browne and Rockloff 2015; Kral 2016; Vidya 2018; Outomuro et al. 2020) effect on a salticid predator. *Brenthia* larvae feed on the surfaces of leaves (Rota 2008). Attribution and ©: 1, Thomas Shahan; 2, chipperatl; 3, Shanelle Wikramanayake; 4, Felix Fleck; 5, Hervé Galliffet; 6, Frank Thomas Sautter; 7, Soh Kam Yung; 8-9, Roman Prokorov; 10, Ketan Anklesaria; 11, Native HK; 12, Yuwaraj Gurjar.

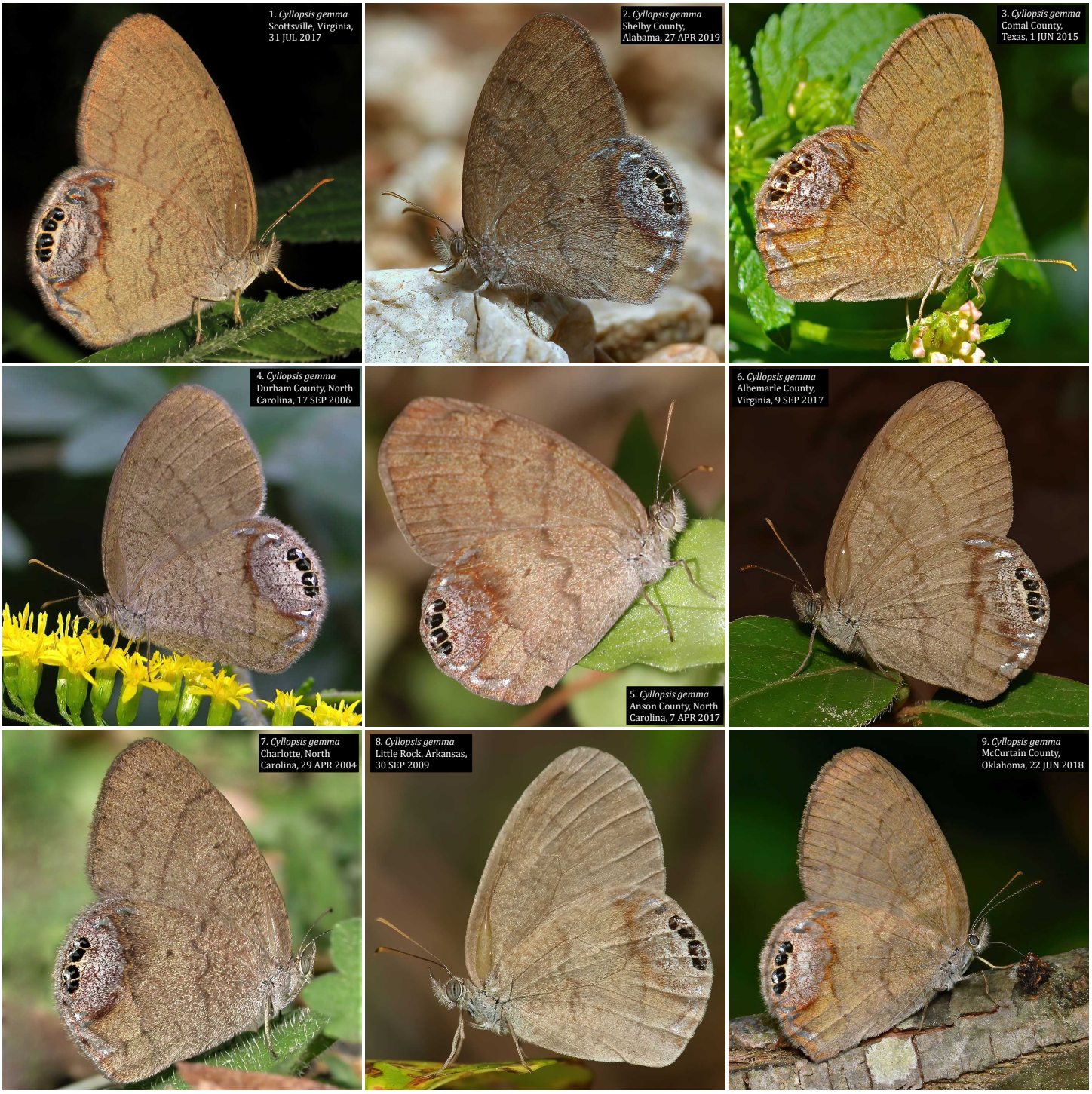

Figure 6. *Cyllopsis gemma*. These small satyrs live on plants in the understory of the great deciduous forest in southeastern North America, almost always resting with their wings closed as shown here. Larger and perhaps relevant salticid predators that frequent this habitat include *Colonus sylvanus*, several species of *Phidippus*, and *Platycryptus undatus*. Colors vary but the image of an archetypal salticid on the ventral margin of each hindwing is fairly consistent and sometimes (1) remarkably detailed. The most recent revision of the genus *Cyllopsis* (Miller 1974) referred to the characteristic presence of *submarginal ocelli* or *hindwing maculation* in a *grey patch*, but no mention of the relationship of these patterns to salticid spiders. However, Warren et. al (2018) reported that these markings, also found in a new species from Chiapas (*C. tomemmeli*) *strongly suggest* mimicry of jumping spiders. Their larvae feed on grasses in the woodland, and there are multiple broods each year (Edwards 1868-1897; Miller 1974; Warren et al. 2018). Attribution and ©: 1, Judy Gallagher; 2, Vitaly Charny; 3, John Davis; 4, Roger Rittmaster; 5, Will Stuart; 6, Kerry Givens; 7, Robb Van Epps; 8, John Rosford; 9, Robby Deans.

Figure 7. Southeastern *Cyllopsis gemma* and its southwestern relative, *C. pyracmon*. Attribution and ©: 1, nitinr; 2, Sean Werle; 3, funnystuff2495; 4, John Rosford; 5, Joe (jhousephotos); 6, Brian Ahern; 7, ronthill; 8, Ethan (ethan-k); 9, Gregory Greene.

Figure 8. Southwestern *Cyllopsis pyracmon* and three other *Cyllopsis* species. *C. pyracmon* has two forms, a darker spring form (1-2) and a lighter fall form (3-6), although some individuals may be intermediate. The tropical species shown here (7, 9) have a less pronounced salticid image on each hindwing, but retain the large eyes. Along with *Neonympha* (Figure 9), these are members of a very large, mostly Neotropical, clade of butterflies with ocelli on the margins of the wings (Euptychiina; Marín et al. 2019). Attribution and ©: 1, Pierre Deviche; 2, tomoclark; 3, Dianna-Terry Hibbitts; 4, Greg Lasley; 5, 7 Roger Rittmaster; 6, James A. Giroux; 8, Mark and Holly Salvato; 9, Bodo Nuñez Oberg.

Figure 9. Two species of *Neonympha* from the southeastern United States. Only three species of the genus *Neonympha* are known (Marín et al. 2019). Like many related species these carry rows of ocelli on the underside of the wings, but the image of a salticid archetype is much less obvious than in the *Cyllopsis* species. For salticids, these could provide distraction as a supernormal stimulus, but might be more effective at the misdirection of other predators. For the unrelated hairstreak butterfly *Calycopis cecrops*, less convincing eye spots and tails along the margin of the hindwing are thought to lead salticids like *Phidippus* to make a misdirected attack (Sourakov 2013; Hill 2018, p. 54). Attribution and ©: 1, 3, 6, Edward Perry IV; 2, 8, John and Nancy Crosby; 4, Adriana de Sousa; 5, 7, 9, Vitaly Charny.

Figure 10. Three *Petrophila* species. *Petrophila* is only one of many crambid genera with species that display the features of the salticid archetype on their wings. All tend to hold their wings in a partly elevated position, at an angle that displays the image of a salticid spider in two directions. Like other members of the subfamily Acentropinae, *Petrophila* larvae are aquatic, and the adults can be abundant on plants near running water when they emerge (Dray, Center & Habeck 1989; Tuskes & McGowan-Tuskes 2019; Sexton 2021). At least 39 species from North and South America have been assigned to this genus, many if not most of which display the salticid archetype. Attribution and ©: 1-2, Glen Berry; 3, Sydney Penner; 4, Chelsea Gottfried; 5, David G. Barker; 6, Kristi Dubois; 7-8, Brad Smith.

Figure 11. Two *Petrophila* species. Attribution and ©: 1, Jim Brighton; 2, Rick Barricklow; 3, Kat Halsey; 4, John Garrett; 5, David G. Barker; 6, Annika Lindqvist; 7, Sam Kieschnick; 8, Dusty.

Figure 12. Three *Petrophila* species. Attribution and ©: 1, Andrew Meeds; 2, Andrew Hebert; 3-4, dlbowls; 5, Greg Lasley; 6, sehnature; 7, Juan Loredo; 8, David G. Barker; 9, Eric Carpenter.

Figure 13. Three *Cataclysta* species. *Cataclysta* is another crambid moth with aquatic larvae, widely distributed from tropical Australia to Eurasia (Pabis 2014; Farahpour-Haghani et al. 2018; Marani et al. 2021). **11-12,** *C. angulata*, with a more regular pattern, nonethless displays crouched legs on the forewings and a row of ocelli on the rear margin of the hindwings. Attribution and ©: 1-2, Donald Hobern; 3, dhfischer; 4, sunos; 5, Yuri Bengus; 6, Viktor Parkomenko; 7-8, philippe_geniez; 9, Paolo Mazzei; 10, sabine-g; 11, sk2; 12, max822 (羅忠良).

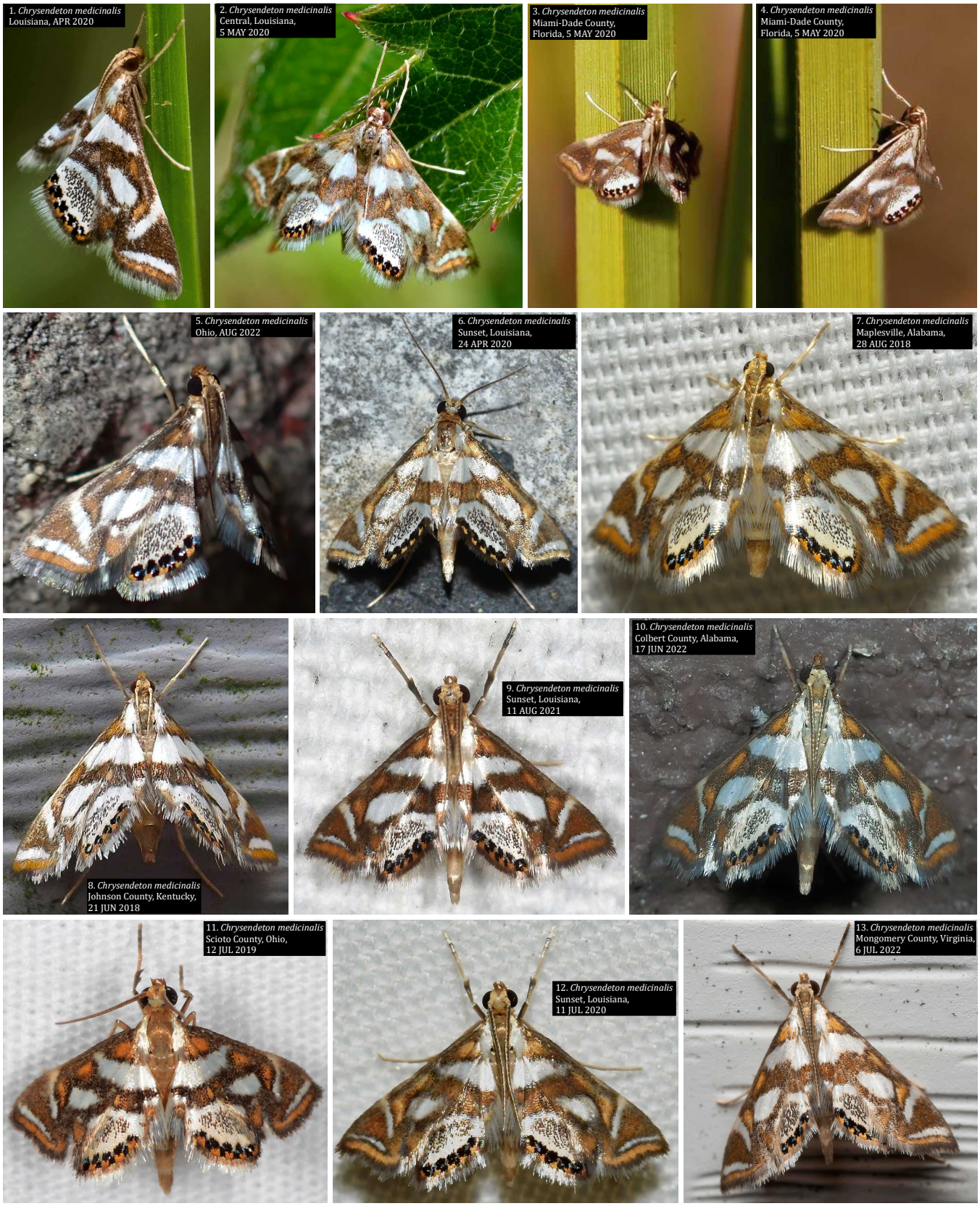

Figure 14. *Chrysendeton medicinalis*. Some 20 species in this genus of aquatic crambids have been described from the Americas (Heppner 1991). Attribution and ©: 1, Joan Costanza; 2, Amber king; 3-4, lisnel; 5, Jessee J. smith; 6, 9, 12, Erik Johnson; 7, John Morgan; 8, Alex Bowen; 10, Vitaly Charny; 11, Marcia Morris; 13, Don Marseille.

Figure 15. *Eoophyla conjunctalis*. *Eoophyla* is a large crambid genus in Afrotropical, Oriental, and Australasian regions, with some 50 described species in the Orient (Speidel, Mey & Schultze 2002), with aquatic larvae that build nests in rapidly flowing streams (Burnhill 2006). Attribution and ©: 1, John Ibis; 2, Gc Chan; 3, Young Chan; 4, 6, 11, max822 (羅忠良); 5, 7, stevenson1002 (利承拔); 8, blackdogto; 9, sk2; 10, 12, Takaaki Hattori.

Figure 16. *Eoophyla* species from Africa and Asia. Species with a less distinct image of the hypothetical salticid archetype (7, 10-12) nonetheless have a row of 4 ocelli along the rear margin of each hindwing. These moths deposit egg clusters on the surface of submerged rocks in streams (Yen 2004). Attribution and ©: 1, stevenson1002 (利承拔); 2, sk2; 3, dhfischer; 4-6, Ben Wursten; 7, max822 (羅忠良); 8, jiangzhu (朱江); 9, Vinod Borse; 10, rhabdornis; 11, Leif Gabrielson; 12, Bali Wildlife.

Figure 17. *Margarosticha euprepialis*. Like the other Acentropinae, these crambids have aquatic larvae. They can be found in wet habitats at lower elevations in tropical to subtropical Australia (Habeck & Balciunas 2005; Kitching et al. 2020). Attribution and ©: 1, Steve and Alison Pearson, Airlie Beach; 2-5, Ian McMillan; 6-8, Victor W. Fazio III; 9, David Mules.

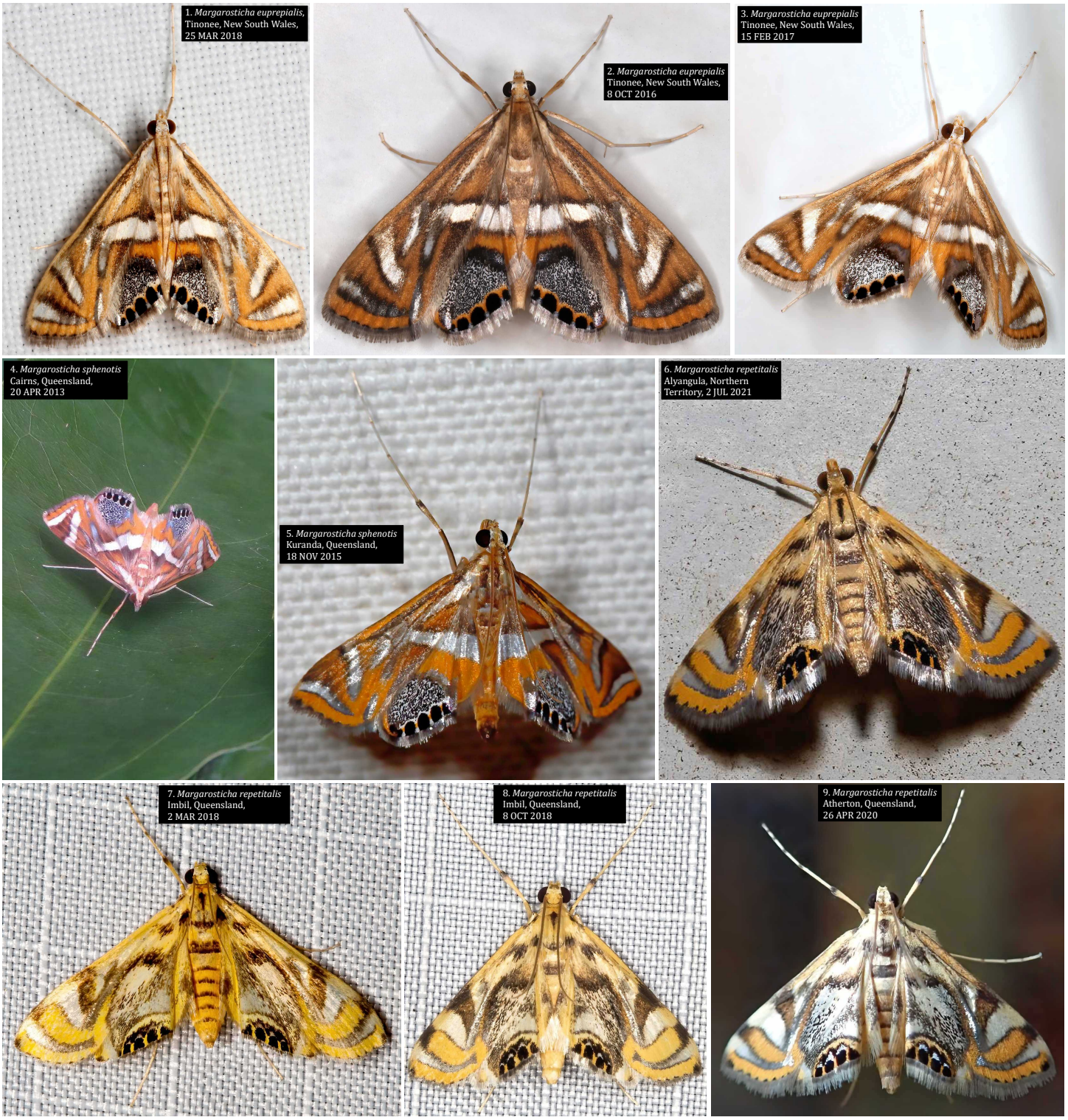

Figure 18. Three Australian *Margarosticha*. Attribution and ©: 1-3, Victor W. Fazio III; 4, kerrycoleman; 5, John Lenagan; 6, dddwebbb; 7-8, Ian McMillan; 9, Patrick De Geest.

Figure 19. *Nymphicula* species. Most Acentropinae have aquatic larvae, but the larvae of *Nymphicula* are terrestrial; this is a large genus with many species recently described, most bearing the hypothetical salticid archetype on their wings (Agassiz 2014; Pabis 2018). Attribution and ©: 1-3, budak; 4, klearad; 5, domf; 6, dhfischer; 7, Licheng Shih; 8-10, Dr. Vijay Anand Ismavel MS MCh; 11, Anisha Sapkota; 12, P. A. Vinayan; 13, N. Mahathi; 14, Bart Wursten; 15, sreenivasan.

Figure 20. *Euchromius* species. Differences between the species of this widely-distributed genus can be subtle, and many carry the hypothetical salticid archetype including *terminal dots* along the rear margin of the forewing (Schouten 1988, 1992). Larvae feed on dry leaves and flowers; adults may be migratory (Fazekas 2011; Wąsala & Górnicki 2012). Attribution and ©: 1-2, 10, Tiziano Dinoflo; 3-7, Luigi Andena; 8, Kakalotli; 9, Arthur Macmillan; 11, 14-15, cossus; 12, Wanda Smith; 13, cjackson.

Figure 21. *Euchromius ocellea*. This cosmopolitan species is apparently migratory, with little variation in appearance between populations (Schouten 1992). Attribution and ©: 1, 4, 20, Chuck Sexton; 2, Ken-ichi Ueda; 3, 21, Monica Krancevic; 5, Diana-Terry Hibbitts; 6-7, Sam Kieschnick; 8, Cosimo Costanzia di Costgliole; 9, 16-17, Jack Cochran; 10, 12, Jon McIntyre; 11, C. McClarren and A. Reago; 13, Justin Williams; 14, Dusty; 15, Gary Nunn; 18, Ellen Hildebrandt; 19, A Rector.

Figure 22. *Chalcoela iphitalis* and *C. pegasalis*. Members of this genus parasitize the broods of social wasps, laying their eggs at night (Whiteman & Landwer 2000; Nacko & Henderson 2017; Sourakov 2022). These are the only two species of the genus known from North America (Scholtens & Solis 2015). In a resting position they display a horizontal eye row along the rear margin of each hindwings, and a white "clypeus" line below this eye row in *C. pegasalis*. Otherwise the relationship of their appearance to the hypothetical salticid archetype is less convincing to the human observer. Attribution and ©: 1-2, Susan Elliot; 3, edporopat; 4, joannerusso; 5, Kristi DuBois; 6, Monica Krancevic; 7, John Morgan; 8, Blue Wing; 9, Christian Schwartz; 10, Vitaly Charny; 11-12, Rose A. Payne.

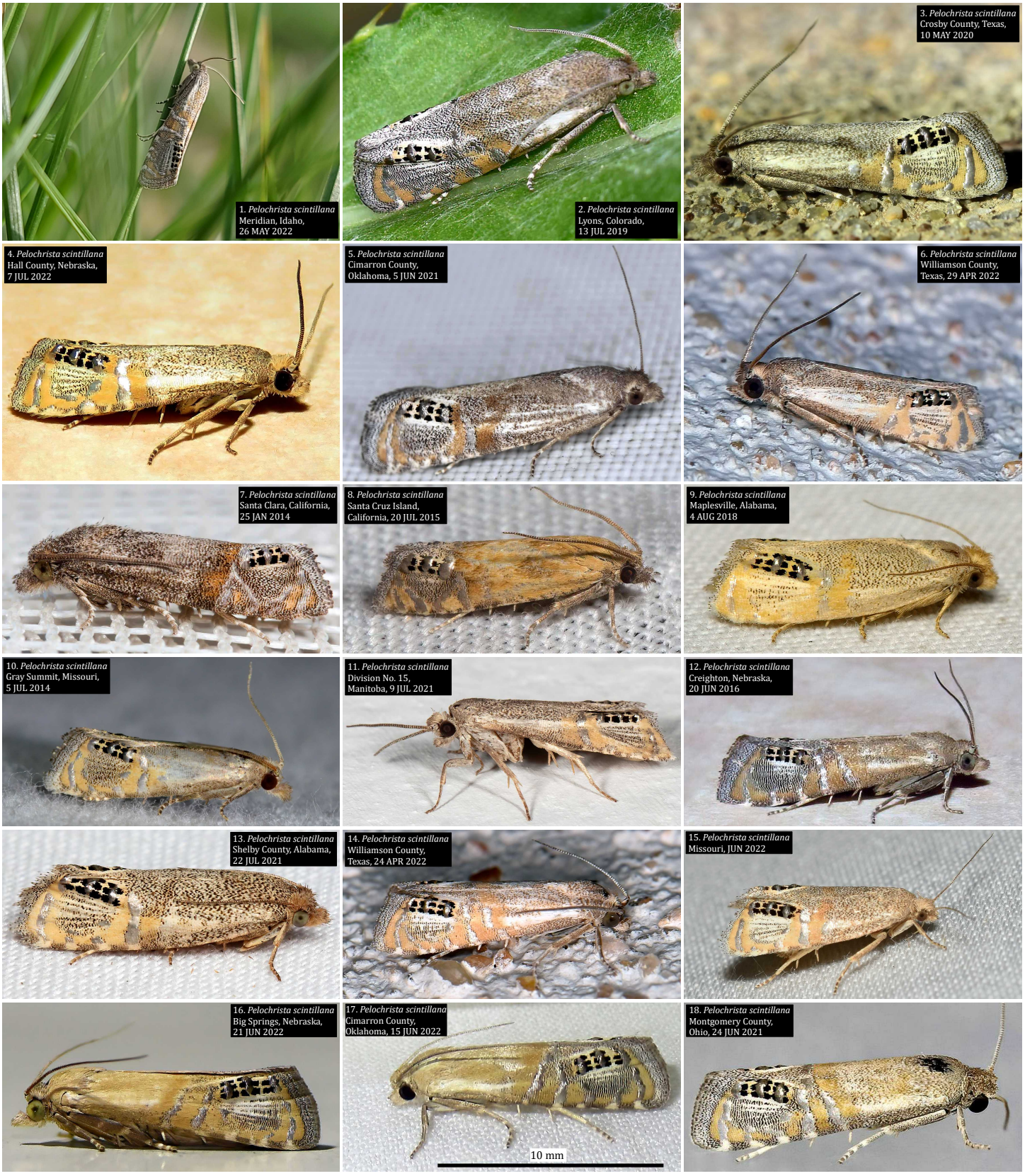

Figure 23. *Pelochrista scintillana*. *Pelocrista* is a large Holarctic genus of tortricid moths with at least 226 described species, most in the United States, but only a few display the hypothetical salticid archetype on their forewings (Gilligan & Wright 2013; Wright & Gilligan 2017). *P. scintillana* was found in a survey of prairie habitat in Iowa, but it appears that little is known of their biology (Schmitt & Larsen 2021). Attribution and ©: 1, phytographer; 2, 16, Steven Mlodinow; 3, Lena Zappia; 4, cranetrust; 23.5, Zach Dufran; 6, 14, Jack Cochran; 7-8, Ken-ichi Ueda; 9, 13, John Morgan; 10, 15, Chrissy McClarren and Andy Reago; 11, Karl Kroeker; 12, Mark A. Brogie; 17, Chuck Sexton; 18, Ken Lebo.

Figure 24. *Olethreutes arcuella*. *Olethreutes* is part of a very large tortricid subfamily (Olethreutinae) with many small, hightly, ornamented species, very few of which come close to displaying *any* features of the hypothetical salticid archetype (Figure 29). Extra "eyes" of *O. arcuella* may induce a supernormal response by salticids. Attribution and ©: 1, Kostas Zontanos; 2, Felix Riegel; 3, sabine-g; 4, Mirko Tomasi; 5, Marie Lou Legrand; 6, oe5hm; 7, Andrei; 9, 15, Paolo Mazzei; 8, Franziska Bauer; 10, Joey Bom; 11, Xavier Mas; 12, Vojtek Pavel; 13-14, Ryszard.

Figure 25. *Glyphipteryx loricatella*. Known from only a few localities in Europe, *G. loricatella* is a rare species (Kun & Szabóky 1999), remarkably similar to the unrelated *Olethreutes arcuella* (Figure 24) in its "supernormal" coloration and appearance. Until recently little was known of this species, but it is now known that larvae burrow in the leaves and rhizomes of *Iris gemanica*, then emerge to pupate in the soil; females rest on the leaves of *I. germanica*, and release pheromones in the early morning (Takacs & Szabóky 2018). Attribution and ©: 1-12, Sándor Nagy.

Figure 26. *Glyphipteryx* species. *Glyphipteryx* is a large, cosmopolitan genus of sedge moths with at least 283 named species, many with metallic scale patterns (Takács & Szabóky 2018). Although many have some of the features of the hypothetical salticid archetype (e.g, 7-12), a complete and quite impressive set of these features can be found in only a few species (e.g, 1-6). Attribution and ©: 1-2, Eric Carpenter; 3, Justin Williams; 4, Ben Hutchins; 5, Ken-ichi Ueda; 6, Kerry-Lee Harris; 7, Arnold Wijker; 8, Marie Lou Legrand; 9, Arno Beidts; 10, Roman Providukhin; 11, Woolcarderbee; 12, ronigreer.

Recognition of jumping spiders by jumping spiders. Many studies support the general idea that salticids visually recognize other salticids either as prey (Nelson & Jackson 2007; Dolev & Nelson 2014; Rößler et al. 2021), as a rival (Faber & Baylis 1993; Lim & Li 2004), or as a conspecific (Clark & Uetz 1990; Nelson 2010; Girard, Kasumovic & Elias 2011). The relative position of the legs of an sighted object appears to be a relevant feature (Dolev & Nelson 2014). Salticids also frequently turn to examine *the face* of a human observer, who with a bold eye pattern and large size may present a *very supernormal* stimulus for these small spiders (Hill 2022, Figure 26). Or, salticid facing turns may simply be a response to our movement, or a response to reflection off of eye glasses or a camera lens.

Figure 27. Faces. We readily recognize salticids by the presence of a row of large anterior eyes (1-2), but also respond to the faces of our primate relatives (3-6). Facial expressions of primates are versatile, but salticids may also communicate through positions and movement of pedipalps and chelicerae, sometimes concealing the latter with the former. Attribution and ©: 1, mika mamy; 2, Ronny Overhate; 3, Pete Linforth; 4-6, David E. Hill.

In one laboratory study (Harland & Jackson 2000), the spartaeine salticid *Portia fimbriata* adopted a special form of *cryptic stalking* (including a *retracted palps posture* and freezing in place when the salticid turned to face the *Portia*), but only when it faced the anterior medial eyes (AME) of a salticid spider that it was pursuing. When the AME were not visible *P. fimbriata* relied on the same kind of *ordinary stalking* used during pursuit of other spiders and insects. Experiments involving the removal of appendages from a salticid target indicated that the large AME of salticids as prey played a key role in their recognition by *Portia*. However, *leg-based cues* were also required to initiate stalking by a *Portia*. These observations support the idea that both the facial eyes and the legs are important features of a salticid archetype.

As noted previously (Figure 3), the front eyes of female *Phidippus* species tend to be highlighted by contrasting, white facial setae. In *P. princeps* immature females (and males) have a band of darker setae across the anterior eye row, but adult females have bright white setae around the eyes (Figure 27). This may improve visual recognition (or, for males, attractiveness) of an adult female at a distance.

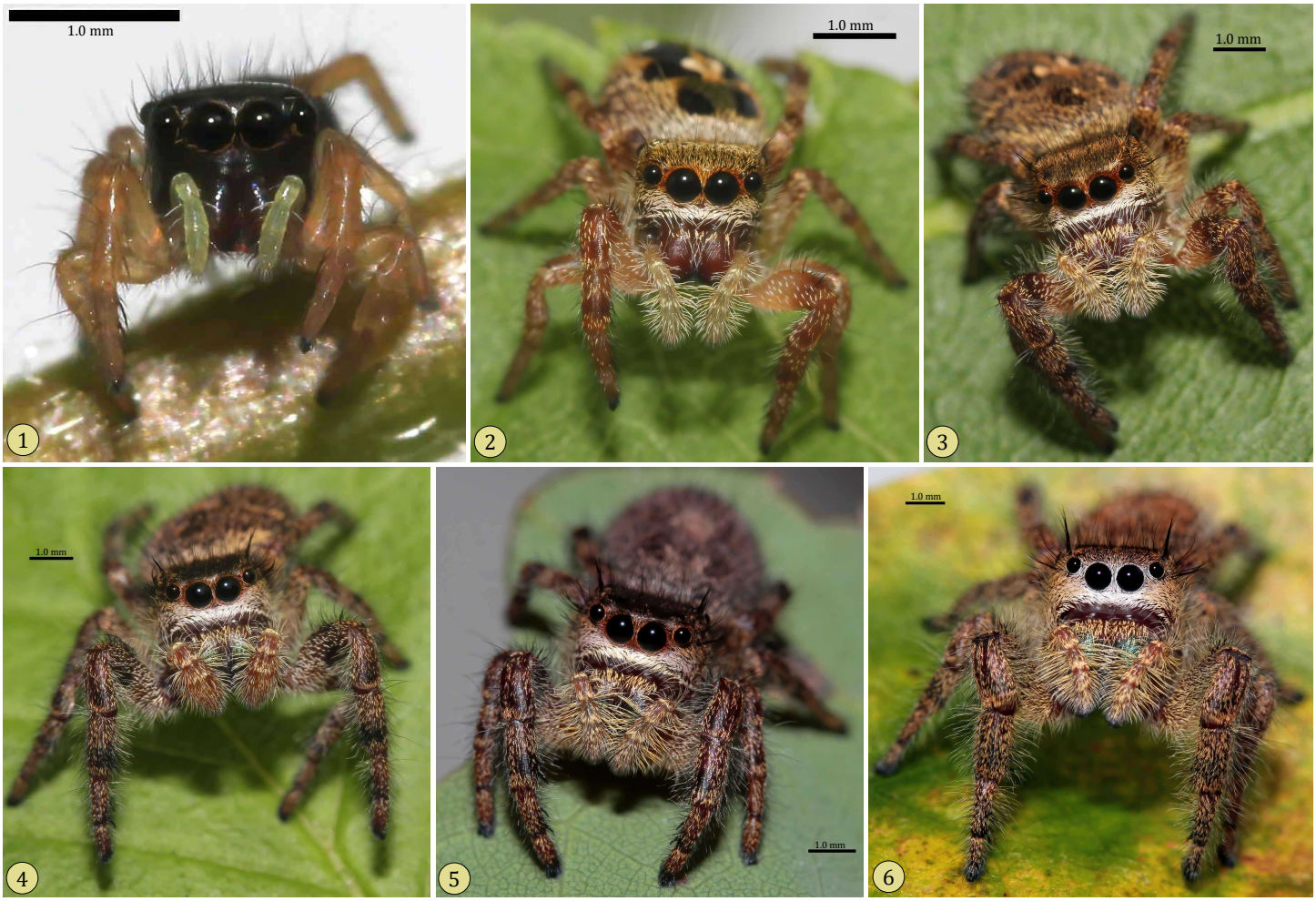

Figure 28. Developmental stages of *Phidippus princeps* from Greenville County, South Carolina. **1,** The first emergent or free-living stage (instar II) is black, with pedipalps and legs that fluoresce (emit bright yellow-green) in near-UV light. **2,** The pedipalps and proximal segments of the legs of early instars like this one also fluoresce, but the face now has a cover of setae, including a darker band through the anterior eye row, typical of later instars through the penultimate stage. **3,** At the pre-penultimate stage males and females are similar. **4,** Penultimate male, with distinct enlargement of the pedipalps but otherwise coloration like that of the female. **5,** Penultimate female. **6,** Adult female, with bright white setae covering the face, highlighting the anterior eyes. Attribution and ©: 1-6, David E. Hill.

Evolution of moths that carry the hypothetical salticid archetype for a salticid spider, or lack thereof. When one examines the scale patterns of a series of Lepidoptera species, the variety can be kaleidoscopic. There are many kinds of leafroller moths (Tortricidae: Olethreutinae; Figure 29), a large group with a worldwide distribution, but only a few, like *Olethreutes arcuella* (Figure 24) and *Pelochrista scintillana* (Figure 23), display the hypothetical salticid archetype. In several genera (e.g., *Grapholita* and *Ofatulena*), scale patterns are suggestive, but instead of rows of round "eye" spots these have a series of parallel black lines near the posterior margin of the forewings. Otherwise the patterns of these moths may provide camouflage, or they may disrupt the outline of the moth, or they may be confusing to a visual predator, thus providing some protection against both salticids and a host of other predators (e.g., Moss, Jackson & Pollard 2006).

Figure 29. Some olethreutine leafroller moths (Tortricidae: Olethreutinae). Attribution and ©: 1, cjackson; 2, Robby Deans; 3, Judy Gallagher; 4, C. Mallory; 5, Russell Pfau; 6, assmann; 7, Lyn Craggs; 8, 10, Andrey Ponomarev; 9, Brenda Bull; 11, molanic; 12, Vitaly Charny; 13, David Okines; 14, 19, Katja Schultz; 15, Christina Butler; 16, edporopat; 17, Andy Reago and Chrissy McClarren; 18, Nancy (nancymullin); 20, Kostas Zontanos; 21, sabine-g.

So how do these patterns evolve to the level of detail associated with the hypothetical salticid archetype? Prerequisites should include both 1) a prexisting pattern that can be modified and 2) a versatile toolkit of regulatory genes capable of modifying that pattern in response to selection by a salticid predator. Lepidoptera are known for their versatile regulation of *pattern elements*, as well as their conservation of inherited pattern elements, a subject of considerable interest in recent years (e.g, Martin & Reed 2010, 2014; Martin et al. 2012; Gallant et al. 2014; Livragi et al. 2021). As noted previously, salticids can observe detailed visual patterns in the appearance of small arthropods far beyond the abilities of other potential predators, so it should not be surprising that, at least in some cases, salticids can select for these patterns. Perhaps the more difficult question to address is this: How are accurate salticid archetype patterns maintained when less realistic, but supernormal, patterns would have a greater effect? Perhaps salticids also *coevolve* the ability to discriminate between supernormal stimuli and the real thing. Don't be fooled.

Acknowledgements

This paper is dedicated to the memory of Thomas C. Emmel (1941-2018), a distinguished naturalist and student of the Lepidoptera at the University of Florida. Many were fortunate to have had his acquaintance. It is fitting that the satyrid and salticid-mimic *Cyllopsis tomemmeli* Warren & Nakara 2018 bears his name. I am very grateful to the host of photographers and students of nature who post their findings on iNaturalist and FLICKR, and also allow others to use their photographs in new and original work. Without their contributions a project of this kind would not be possible. We live in an era characterized by the newfound ability of a large group of observers to share their work, and the availability of digital macrophotography. As a result, our knowledge and awareness of small creatures, to include jumping spiders and macrolepidoptera, is increasing rapidly. I have chosen to include species identifications posted with photographs here, with the knowledge that some of these are only tentative. Detailed attribution information for all contributions is given in Appendix 1.

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4.4	♀ *Phidippus bidentatus*	Coatepec, Veracruz, México	27 SEP 2016	Alberto González	https://www.inaturalist.org/observations/4270511	CC BY 4.0
4.5	♀ *Phidippus audax*	Oklahoma	AUG 2021	Rhonda S. Fair	https://www.inaturalist.org/observations/91799534	CC BY 4.0
4.6	♂ *Telamonia dimidiata*	Kadma, West Bengal	25 MAY 2020	Aniruddha Singhamahapatra	https://www.inaturalist.org/observations/47433857	CC BY 4.0
4.7	♀ *Telamonia dimidiata*	Bangalore, Karnataka	8 FEB 2022	Samyak S	https://www.inaturalist.org/observations/106969928	CC BY 4.0
4.8	♀ *Telamonia festiva*	New Taipei, Taiwan	10 APR 2022	Huang, Yu-Xiang	https://www.inaturalist.org/observations/110931196	CC BY 4.0
4.9	♀ *Telamonia festiva*	Taitung, Taiwan	10 JUL 2018	Hong	https://www.inaturalist.org/observations/35632116	CC BY 4.0
4.10	♀ *Salticus scenicus*	Sutton, England, United Kingdom	16 JUL 2009	Will George	https://www.flickr.com/photos/runnerwill/3727503790	CC BY 4.0
4.11	♀ *Phiale guttata*	Mariato District, Panama	23 AUG 2020	loes	https://www.inaturalist.org/observations/58382082	CC BY 4.0
4.12	♀ *Phiale roburifoliata*	Dep. Las Colonias, Santa Fe, Argentina	3 JAN 2021	Andrés Pautasso	https://www.inaturalist.org/observations/68005856	CC BY 4.0
5.1	*Brenthia pavonacella*	Oklahoma	24 AUG 2021	Thomas Shahan	https://www.flickr.com/photos/49580580@N02/51400802453	CC BY 2.0
5.2	*Brenthia pavonacella*	Emmett Calhoun County, Michigan	29 JUL 2022	chipperatl	https://www.inaturalist.org/observations/128563339	CC BY-NC 4.0
5.3	*Brenthia* sp.	Costa Rica	26 JUL 2022	Shanelle Wikramanayake	https://www.inaturalist.org/observations/128566195	CC BY-NC 4.0
5.4	*Brenthia* sp.	Costa Rica	24 JAN 2015	Felix Fleck	https://www.inaturalist.org/observations/8805146	CC BY-NC 4.0
5.5	*Brenthia* sp.	Kourou, Guyane française	18 JUN 2022	Hervé Galliffet	https://www.inaturalist.org/observations/122490725	CC BY-NC 4.0
5.6	*Brenthia stimulans*	Itaara, Rio Grande do Sul, Brasil	7 MAY 2020	Frank Thomas Sautter	https://www.inaturalist.org/observations/99072217	CC BY-NC 4.0
5.7	*Brenthia* sp.	Singapore	15 MAY 2022	Soh Kam Yung	https://www.inaturalist.org/observations/117112079	CC BY-NC 4.0
5.8	*Brenthia* sp.	Columbo, Sri Lanka	1 FEB 2022	Roman Prokhorov	https://www.inaturalist.org/observations/106030813	CC BY-NC 4.0
5.9	*Brenthia* sp.	Columbo, Sri Lanka	1 FEB 2022	Roman Prokhorov	https://www.inaturalist.org/observations/37985179	CC BY-NC 4.0
5.10	*Brenthia* sp.	Mumbai	12 SEP 2020	Ketan Anklesaria	https://www.inaturalist.org/observations/59417819	CC BY-NC 4.0
5.11	*Brenthia* sp.	Sai Kung, Hong Kong	10 SEP 2016	Native HK	https://www.inaturalist.org/observations/4085034	CC BY-NC 4.0
5.12	*Brenthia* sp.	Mariani, Jorhat, Assam	15 MAR 2015	Yuwaraj Gurjar	https://www.inaturalist.org/observations/53737761	CC BY-NC 4.0
6.1	*Cyllopsis gemma*	Scottsville, Virginia	31 JUL 2017	Judy Gallagher	https://www.flickr.com/photos/52450054@N04/28217473289	CC BY 2.0
6.2	*Cyllopsis gemma*	Shelby County, Alabama	27 APR 2019	Vitaly Charny	https://www.inaturalist.org/observations/23677966	CC BY-NC 4.0
6.3	*Cyllopsis gemma*	New Braunfels, Comal County, Texas	1 JUN 2015	John Davis	https://www.inaturalist.org/observations/3026732	CC BY-NC 4.0
6.4	*Cyllopsis gemma*	Durham County, North Carolina	17 SEP 2006	Roger Rittmaster	https://www.inaturalist.org/observations/17940927	CC BY-NC 4.0
6.5	*Cyllopsis gemma*	Anson County, North Carolina	7 APR 2017	Will Stuart	https://www.inaturalist.org/observations/9383476	CC BY-NC 4.0
6.6	*Cyllopsis gemma*	Albemarle County, Virginia	9 SEP 2017	Kerry Givens	https://www.inaturalist.org/observations/7993541	CC BY-NC 4.0
6.7	*Cyllopsis gemma*	Dilworth, Charlotte, North Carolina	29 APR 2004	Robb Van Epps	https://www.inaturalist.org/observations/4928803	CC BY-NC 4.0
6.8	*Cyllopsis gemma*	Little Rock, Arkansas	30 SEP 2009	John Rosford	https://www.inaturalist.org/observations/111484074	CC BY-NC 4.0
6.9	*Cyllopsis gemma*	McCurtain County, Oklahoma	22 JUN 2018	Robby Deans	https://www.inaturalist.org/observations/13800103	CC BY-NC 4.0
7.1	*Cyllopsis gemma*	Richland County, South Carolina	14 SEP 2019	nitinr	https://www.inaturalist.org/observations/41226506	CC BY-NC 4.0
7.2	*Cyllopsis gemma*	Oak Ridge, Tennessee	28 SEP 2012	Sean Werle	https://www.inaturalist.org/observations/87238313	CC BY-NC 4.0
7.3	*Cyllopsis gemma*	Cabarrus County, North Carolina	10 OCT 2021	funnystuff2495	https://www.inaturalist.org/observations/97847780	CC BY-NC 4.0
7.4	*Cyllopsis gemma*	Pontotoc County, Mississippi	12 SEP 2009	John Rosford	https://www.inaturalist.org/observations/111272198	CC BY-NC 4.0
7.5	*Cyllopsis gemma*	Van Buren County, Arkansas	9 SEP 2017	Joe (jhousephotos)	https://www.inaturalist.org/observations/33675013	CC BY-NC 4.0
7.6	*Cyllopsis gemma*	Dixie County, Florida	27 OCT 2007	Brian Ahern	https://www.inaturalist.org/observations/125242519	CC BY-NC 4.0
7.7	*Cyllopsis pyracmon*	Sierra Vista, Arizona	1 SEP 2019	ronthill	https://www.inaturalist.org/observations/101566950	CC BY-NC 4.0
7.8	*Cyllopsis pyracmon*	Pima County, Arizona	11 AUG 2019	Ethan (ethan-k)	https://www.inaturalist.org/observations/30663550	CC BY-NC 4.0
7.9	*Cyllopsis pyracmon*	Madera Canyon, Arizona	1 SEP 2018	Gregory Greene	https://www.inaturalist.org/observations/16138055	CC BY-NC 4.0
8.1	*Cyllopsis pyracmon*	Santa Rita Mountains, Arizona	19 MAY 2018	Pierre Deviche	https://www.flickr.com/photos/154519935@N05/42191995602	with permission
8.2	*Cyllopsis pyracmon*	Pinal County, Arizona	29 APR 2017	tomoclark	https://www.inaturalist.org/observations/6357202	CC BY-NC 4.0
8.3	*Cyllopsis pyracmon*	Cochise County, Arizona	31 AUG 2015	Diana-Terry Hibbitts	https://www.inaturalist.org/observations/1959872	CC BY-NC 4.0
8.4	*Cyllopsis pyracmon*	Cochise County, Arizona	26 AUG 2013	Greg Lasley	https://www.inaturalist.org/observations/379345	CC BY-NC 4.0
8.5	*Cyllopsis pyracmon*	Cochise County, Arizona	24 AUG 2004	Roger Rittmaster	https://www.inaturalist.org/observations/17740209	CC BY-NC 4.0

8.6	*Cyllopsis pyracmon*	Cochise County, Arizona	24 SEP 2017	James A. Giroux	https://www.inaturalist.org/observations/8380142	CC BY-NC 4.0
8.7	*Cyllopsis argentella*	San Gerardo de Dota, Costa Rica	16 NOV 2016	Roger Rittmaster	https://www.inaturalist.org/observations/17291694	CC BY-NC 4.0
8.8	*Cyllopsis perpeptida*	Apaches County, Arizona	21 JUN 2016	Mark and Holly Salvato	https://www.inaturalist.org/observations/104729661	CC BY-NC 4.0
8.9	*Cyllopsis suivalens*	Huautla de Jiménez, Oaxaca, México	8 AUG 2018	Bodo Nuñez Oberg	https://www.inaturalist.org/observations/15694667	CC BY-NC 4.0
9.1	*Neonympha areolatus*	Okeechobee County, Florida	11 JUL 2020	Edward Perry IV	https://www.inaturalist.org/observations/52787831	CC BY-NC 4.0
9.2	*Neonympha areolatus*	McIntosh County, Georgia	17 MAY 2020	John and Nancy Crosby	https://www.inaturalist.org/observations/46895551	CC BY-NC 4.0
9.3	*Neonympha areolatus*	St. Cloud, Florida	14 JUL 2018	Edward Perry IV	https://www.inaturalist.org/observations/28434331	CC BY-NC 4.0
9.4	*Neonympha areolatus*	Bristol, Florida	5 JUN 2021	Adriana de Sousa	https://www.inaturalist.org/observations/81785940	CC BY-NC 4.0
9.5	*Neonympha areolatus*	Bay Minette, Alabama	13 OCT 2017	Vitaly Charny	https://www.inaturalist.org/observations/64293367	CC BY-NC 4.0
9.6	*Neonympha areolatus*	St. Cloud, Florida	8 SEP 2021	Edward Perry IV	https://www.inaturalist.org/observations/94217715	CC BY-NC 4.0
9.7	*Neonympha mitchelli*	Alabama	JUN 2017	Vitaly Charny	https://www.inaturalist.org/observations/64293512	CC BY-NC 4.0
9.8	*Neonympha mitchelli*	Alabama	JUN 2019	John and Nancy Crosby	https://www.inaturalist.org/observations/46896122	CC BY-NC 4.0
9.9	*Neonympha mitchelli*	Alabama	JUN 2013	Vitaly Charny	https://www.inaturalist.org/observations/27118857	CC BY-NC 4.0
10.1	*Petrophila canadensis*	London, Ontario, Canada	29 AUG 2021	Glen Berry	https://www.inaturalist.org/observations/92950116	CC0
10.2	*Petrophila canadensis*	London, Ontario, Canada	29 AUG 2021	Glen Berry	https://www.inaturalist.org/observations/92950116	CC0
10.3	*Petrophila canadensis*	Jessamine County, Kentucky	17 MAY 2022	Sydney Penner	https://www.inaturalist.org/observations/117487226	CC BY-NC 4.0
10.4	*Petrophila canadensis*	Seneca County, Ohio	22 AUG 2021	Chelsea Gottfried	https://www.inaturalist.org/observations/92169574	CC BY-NC 4.0
10.5	*Petrophila heppneri*	Val Verde County, Texas	5 FEB 2019	David G. Barker	https://www.inaturalist.org/observations/20352167	CC BY-NC 4.0
10.6	*Petrophila confusalis*	Missoula County, Montana	31 JUL 2021	Kristi Dubois	https://www.inaturalist.org/observations/104160412	CC BY-NC 4.0
10.7	*Petrophila confusalis*	Lassen County, California	3 JUL 2018	Brad Smith	https://www.inaturalist.org/observations/25527461	CC BY-NC 4.0
10.8	*Petrophila confusalis*	Lassen County, California	3 JUL 2018	Brad Smith	https://www.inaturalist.org/observations/25527461	CC BY-NC 4.0
11.1	*Petrophila fulicalis*	Hartford County, Maryland	27 SEP 2020	Jim Brighton	https://www.inaturalist.org/observations/61559441	CC BY-NC 4.0
11.2	*Petrophila fulicalis*	Waterville, Ohio	8 JUL 2022	Rick Barricklow	https://www.inaturalist.org/observations/125391790	CC BY-NC 4.0
11.3	*Petrophila jaliscalis*	Los Angeles County, California	3 JUL 2016	Kat Halsey	https://www.inaturalist.org/observations/3630756	CC BY-NC 4.0
11.4	*Petrophila jaliscalis*	Austin, Texas	30 MAY 2021	John Garrett	https://www.inaturalist.org/observations/81050607	CC BY-NC 4.0
11.5	*Petrophila jaliscalis*	Val Verde County, Texas	14 AUG 2018	David G. Barker	https://www.inaturalist.org/observations/15737366	CC BY-NC 4.0
11.6	*Petrophila jaliscalis*	Dallas, Texas	6 JUL 2021	Annika Lindqvist	https://www.inaturalist.org/observations/86608964	CC BY-NC 4.0
11.7	*Petrophila jaliscalis*	Duncanville, Texas	16 MAY 2022	Sam Kieschnick	https://www.inaturalist.org/observations/117404322	CC BY-NC 4.0
11.8	*Petrophila jaliscalis*	Bell, Texas	26 JUN 2022	Dusty	https://www.inaturalist.org/observations/123647022	CC BY-NC 4.0
12.1	*Petrophila jaliscalis*	Estrella Village, Arizona	30 APR 2022	Andrew Meeds	https://www.inaturalist.org/observations/114127066	CC BY 4.0
12.2	*Petrophila jaliscalis*	Henderson, Nevada	6 JUN 2020	Andrew Hebert	https://www.inaturalist.org/observations/54824367	CC BY-NC 4.0
12.3	*Petrophila jaliscalis*	Los Angeles County, California	JUN 2022	dlbowls	https://www.inaturalist.org/observations/121106111	CC BY-NC 4.0
12.4	*Petrophila jaliscalis*	Los Angeles County, California	JUL 2018	dlbowls	https://www.inaturalist.org/observations/14456695	CC BY-NC 4.0
12.5	*Petrophila jaliscalis*	Hays County, Texas	2 JUL 2016	Greg Lasley	https://www.inaturalist.org/observations/3593865	CC BY-NC 4.0
12.6	*Petrophila jaliscalis*	Dallas, Texas	29 DEC 2021	sehnature	https://www.inaturalist.org/observations/97197797	CC BY-NC 4.0
12.7	*Petrophila jaliscalis*	Rosales, Chihuahua, México	26 JUL 2022	Juan Loredo	https://www.inaturalist.org/observations/128082847	CC BY-NC 4.0
12.8	*Petrophila daemonalis*	Val Verde County, Texas	8 AUG 2017	David G. Barker	https://www.inaturalist.org/observations/55545331	CC BY-NC 4.0
12.9	*Petrophila cappsi*	Hays County, Texas	12 JUL 2019	Eric Carpenter	https://www.inaturalist.org/observations/28755628	CC BY-NC 4.0
13.1	*Cataclysta lampetialis*	Clump Point, Queensland	22 DEC 2011	Donald Hobern	https://www.inaturalist.org/observations/1141154	CC BY 4.0
13.2	*Cataclysta lampetialis*	Clump Point, Queensland	23 NOV 2014	Donald Hobern	https://www.inaturalist.org/observations/1141152	CC BY 4.0
13.3	*Cataclysta lampetialis*	Mission Beach, Queensland	1 JAN 2000	dhfischer	https://www.inaturalist.org/observations/47956031	CC BY-NC 4.0
13.4	*Cataclysta lemnata*	N. Egglestad Sweden	27 JUL 2021	sunos	https://www.inaturalist.org/observations/105981993	CC BY-NC 4.0
13.5	*Cataclysta lemnata*	Kharkiv Region, Ukraine	9 JUL 2019	Yuri Bengus	https://www.inaturalist.org/observations/102890464	CC BY-NC 4.0
13.6	*Cataclysta lemnata*	Kiev Region, Ukraine	24 JUL 2018	Viktor Parkomenko	https://www.inaturalist.org/observations/106872083	CC BY-NC 4.0
13.7	*Cataclysta lemnata*	Camargue, Arles, France	30 AUG 2014	philippe_geniez	https://www.inaturalist.org/observations/107712258	CC BY-NC 4.0
13.8	*Cataclysta lemnata*	Camargue, Arles, France	30 AUG 2014	philippe_geniez	https://www.inaturalist.org/observations/107712258	CC BY-NC 4.0
13.9	*Cataclysta lemnata*	Rome, Italy	19 SEP 2018	Paolo Mazzei	https://www.inaturalist.org/observations/19705467	CC BY-NC 4.0
13.10	*Cataclysta lemnata*	Allerheiligen bei Wildon, Österreich	5 AUG 2022	sabine-g	https://www.inaturalist.org/observations/129582214	CC BY-NC 4.0
13.11	*Cataclysta angulata*	Hong Kong Island	27 APR 2018	sk2	https://www.inaturalist.org/observations/11736768	CC BY-NC 4.0
13.12	*Cataclysta angulata*	Taichung, Taiwan	9 APR 2020	max822 羅忠良	https://www.inaturalist.org/observations/42649418	CC BY-NC 4.0
14.1	*Chrisendeton medicinalis*	Louisiana	APR 2020	Joan Costanza	https://www.inaturalist.org/observations/41869110	CC BY-NC 4.0
14.2	*Chrisendeton medicinalis*	Central, Louisiana	5 MAY 2020	Amber King	https://www.inaturalist.org/observations/45027592	CC BY 4.0
14.3	*Chrisendeton medicinalis*	Miami-Dade County, Florida	13 JAN 2019	lisnel	https://www.inaturalist.org/observations/19626629	CC BY-NC 4.0
14.4	*Chrisendeton medicinalis*	Miami-Dade County, Florida	13 JAN 2019	lisnel	https://www.inaturalist.org/observations/19626629	CC BY-NC 4.0
14.5	*Chrisendeton medicinalis*	Ohio	AUG 2020	Jessee J. Smith	https://www.inaturalist.org/observations/61610781	CC BY-NC 4.0
14.6	*Chrisendeton medicinalis*	Sunset, Louisiana	24 APR 2020	Erik Johnson	https://www.inaturalist.org/observations/43818738	CC BY-NC 4.0
14.7	*Chrisendeton medicinalis*	Maplesville, Alabama	28 AUG 2018	John Morgan	https://www.inaturalist.org/observations/16001767	CC BY-NC 4.0
14.8	*Chrisendeton medicinalis*	Johnson County, Kentucky	21 JUN 2018	Alex Bowen	https://www.inaturalist.org/observations/13841595	CC BY-NC 4.0
14.9	*Chrisendeton medicinalis*	Sunset, Louisiana	24 APR 2020	Erik Johnson	https://www.inaturalist.org/observations/92311979	CC BY-NC 4.0
14.10	*Chrisendeton medicinalis*	Colbert County, Alabama	17 JUN 2022	Vitaly Charny	https://www.inaturalist.org/observations/123450506	CC BY-NC 4.0
14.11	*Chrisendeton medicinalis*	Scioto County, Ohio	12 JUN 2019	Marcia Morris	https://www.inaturalist.org/observations/28971397	CC BY-NC 4.0
14.12	*Chrisendeton medicinalis*	Sunset, Louisiana	11 JUL 2020	Erik Johnson	https://www.inaturalist.org/observations/53215732	CC BY-NC 4.0
14.13	*Chrisendeton medicinalis*	Montgomery County, Virginia	6 JUL 2022	Don Marseille	https://www.inaturalist.org/observations/125515143	CC BY-NC 4.0
15.1	*Eoophyla* cf. *conjunctalis*	Chiang Dao, Thailand	31 OCT 2021	John Ibis	https://www.inaturalist.org/observations/103034625	CC BY-NC 4.0
15.2	*Eoophyla* cf. *conjunctalis*	Penang, Malaysia	15 APR 2017	Gc Chan	https://www.inaturalist.org/observations/21660928	CC BY-NC 4.0
15.3	*Eoophyla* cf. *conjunctalis*	Hong Kong	24 AUG 2018	Young Chan	https://www.inaturalist.org/observations/15862509	CC BY-NC 4.0
15.4	*Eoophyla conjunctalis*	Nantou County, Taiwan	22 MAR 2020	max822 羅忠良	https://www.inaturalist.org/observations/40670871	CC BY-NC 4.0
15.5	*Eoophyla conjunctalis*	Nantou County, Taiwan	22 MAR 2020	stevenson1002 利承拔	https://www.inaturalist.org/observations/45854248	CC BY-NC 4.0
15.6	*Eoophyla conjunctalis*	Miaoli, Taiwan	25 APR 2020	max822 羅忠良	https://www.inaturalist.org/observations/44221136	CC BY-NC 4.0
15.7	*Eoophyla conjunctalis*	Nantou County, Taiwan	22 MAR 2020	stevenson1002 利承拔	https://www.inaturalist.org/observations/45854248	CC BY-NC 4.0
15.8	*Eoophyla cf. conjunctalis*	Lam Suen, Hong Kong	17 OCT 2018	blackdogto	https://www.inaturalist.org/observations/17675811	CC BY-NC 4.0
15.9	*Eoophyla cf. conjunctalis*	Hong Kong	29 MAR 2017	sk2	https://www.inaturalist.org/observations/5498924	CC BY-NC 4.0
15.10	*Eoophyla conjunctalis*	Okinawa	6 MAY 2019	Takaaki Hattori	https://www.inaturalist.org/observations/34150844	CC BY-NC 4.0
15.11	*Eoophyla conjunctalis*	Taichung, Taiwan	23 FEB 2013	max822 羅忠良	https://www.inaturalist.org/observations/21622643	CC BY-NC 4.0
15.12	*Eoophyla conjunctalis*	Okinawa	13 APR 2019	Takaaki Hattori	https://www.inaturalist.org/observations/35268460	CC BY-NC 4.0
16.1	*Eoophyla cf. conjunctalis*	Hsinchu County, Taiwan	23 NOV 2019	stevenson1002 利承拔	https://www.inaturalist.org/observations/36186722	CC BY-NC 4.0
16.2	*Eoophyla cf. conjunctalis*	Hong Kong	9 OCT 2019	sk2	https://www.inaturalist.org/observations/34146801	CC BY-NC 4.0
16.3	*Eoophyla cf. conjunctalis*	Dhofar Governate, Oman	31 JAN 2015	dhfischer	https://www.inaturalist.org/observations/58403183	CC BY-NC 4.0
16.4	*Eoophyla capensis*	Gorongosa NP, Mozambique	27 APR 2015	Ben Wursten	https://www.inaturalist.org/observations/42956543	CC BY-NC 4.0
16.5	*Eoophyla capensis*	Gorongosa NP, Mozambique	27 APR 2015	Ben Wursten	https://www.inaturalist.org/observations/42956543	CC BY-NC 4.0
16.6	*Eoophyla capensis*	Gorongosa NP, Mozambique	27 APR 2015	Ben Wursten	https://www.inaturalist.org/observations/42956543	CC BY-NC 4.0
16.7	*Eoophyla gibbosalis*	Taichung, Taiwan	9 OCT 2019	max822 羅忠良	https://www.inaturalist.org/observations/35347835	CC BY-NC 4.0
16.8	*Eoophyla halialis*	New Guangzhou, China	20 MAR 2022	jiangzhu 朱江	https://www.inaturalist.org/observations/128596634	CC BY-NC 4.0
16.9	*Eoophyla sejunctalis*	Jawar, Maharashtra, India	17 JUL 2021	Vinod Borse	https://www.inaturalist.org/observations/87550458	CC BY-NC 4.0
16.10	*Eoophyla snelleni*	Santa Fe, Nueva Vizcaya, Philippines	28 NOV 2016	rhabdornis	https://www.inaturalist.org/observations/4862919	CC BY-NC 4.0
16.11	*Eoophyla snelleni*	Dalwangon, Bukidnon, Philippines	29 MAR 2019	Leif Gabrielson	https://www.inaturalist.org/observations/24750909	CC BY-NC 4.0
16.12	*Eoophyla* sp.	Gianar Regency, Bali	4 APR 2022	Bali Wildlife	https://www.inaturalist.org/observations/110382813	CC BY-NC 4.0
17.1	*Margarosticha euprepialis*	Airlie Beach, Queensland	5 APR 2013	Steve and Alison Pearson , Airlie Beach	https://www.flickr.com/photos/72842252@N04/8650205884	with permission
17.2	*Margarosticha euprepialis*	Imbil, Queensland	9 DEC 2018	Ian McMillan	https://www.inaturalist.org/observations/18935125	CC BY-NC 4.0
17.3	*Margarosticha euprepialis*	Imbil, Queensland	19 DEC 2014	Ian McMillan	https://www.inaturalist.org/observations/7370268	CC BY-NC 4.0
17.4	*Margarosticha euprepialis*	Imbil, Queensland	23 APR 2018	Ian McMillan	https://www.inaturalist.org/observations/11383520	CC BY-NC 4.0
17.5	*Margarosticha euprepialis*	Imbil, Queensland	31 OCT 2014	Ian McMillan	https://www.inaturalist.org/observations/7370304	CC BY-NC 4.0
17.6	*Margarosticha euprepialis*	Tinonee, New South Wales	1 MAR 2019	Victor W. Fazio III	https://www.inaturalist.org/observations/20831070	CC BY-NC 4.0
17.7	*Margarosticha euprepialis*	Tinonee, New South Wales	26 OCT 2016	Victor W. Fazio III	https://www.inaturalist.org/observations/4448240	CC BY-NC 4.0
17.8	*Margarosticha euprepialis*	Tinonee, New South Wales	26 MAR 2019	Victor W. Fazio III	https://www.inaturalist.org/observations/21617112	CC BY-NC 4.0
17.9	*Margarosticha* sp.	The Leap, near Mackay, Queensland	26 AUG 2011	David Mules	https://www.inaturalist.org/observations/50233783	CC BY-NC 4.0
18.1	*Margarosticha euprepialis*	Tinonee, New South Wales	25 MAR 2018	Victor W. Fazio III	https://www.inaturalist.org/observations/10406797	CC BY-NC 4.0

18.2	*Margarosticha euprepialis*	Tinonee, New South Wales	8 OCT 2016	Victor W. Fazio III	https://www.inaturalist.org/observations/4308920	CC BY-NC 4.0
18.3	*Margarosticha euprepialis*	Tinonee, New South Wales	15 FEB 2017	Victor W. Fazio III	https://www.inaturalist.org/observations/5112412	CC BY-NC 4.0
18.4	*Margarosticha sphenotis*	Cairns, Queensland	20 APR 2013	kerrycoleman	https://www.inaturalist.org/observations/41354918	CC BY-NC 4.0
18.5	*Margarosticha sphenotis*	Kuranda, Queensland	18 NOV 2015	John Lenagan	https://www.inaturalist.org/observations/41335100	CC BY-NC 4.0
18.6	*Margarosticha repetitalis*	Alyangula, Northern Territory	2 JUL 2021	dddwebbb	https://www.inaturalist.org/observations/81276192	CC BY-NC 4.0
18.7	*Margarosticha repetitalis*	Imbil, Queensland	2 MAR 2018	Ian McMillan	https://www.inaturalist.org/observations/10061314	CC BY-NC 4.0
18.8	*Margarosticha repetitalis*	Imbil, Queensland	8 OCT 2018	Ian McMillan	https://www.inaturalist.org/observations/17334468	CC BY-NC 4.0
18.9	*Margarosticha repetitalis*	Atherton, Queensland	26 APR 2020	Patrick De Geest	https://www.inaturalist.org/observations/43720483	CC BY-NC 4.0
19.1	*Nymphicula blandialis*	Yishun, Singapore	16 DEC 2019	budak	https://www.inaturalist.org/observations/36700463	CC BY-NC 4.0
19.2	*Nymphicula blandialis*	Yishun, Singapore	16 DEC 2019	budak	https://www.inaturalist.org/observations/36700463	CC BY-NC 4.0
19.3	*Nymphicula blandialis*	Yishun, Singapore	16 DEC 2019	budak	https://www.inaturalist.org/observations/36700463	CC BY-NC 4.0
19.4	*Nymphicula blandialis*	Singapore	8 SEP 2021	klearad	https://www.inaturalist.org/observations/94915826	CC BY-NC 4.0
19.5	*Nymphicula queenslandica*	Lockhart, Queensland	29 MAY 2022	domf	https://www.inaturalist.org/observations/121553201	CC BY-NC 4.0
19.6	*Nymphicula torresalis*	Malanda, Queensland	1 FEB 2015	dhfischer	https://www.inaturalist.org/observations/46906343	CC BY-NC 4.0
19.7	*Nymphicula yoshiyasui*	Hualien, Taiwan	27 MAY 2020	Licheng Shih	https://www.inaturalist.org/observations/48305053	CC BY-NC 4.0
19.8	*Nymphicula drusiusalis*	Karimanj District, Assam	16 OCT 2020	Dr. Vijay Anand Ismavel MS MCh	https://www.inaturalist.org/observations/63760653	CC BY-NC 4.0
19.9	*Nymphicula drusiusalis*	Karimanj District, Assam	16 OCT 2020	Dr. Vijay Anand Ismavel MS MCh	https://www.inaturalist.org/observations/63760653	CC BY-NC 4.0
19.10	*Nymphicula* sp.	Karimanj District, Assam	17 JUN 2020	Dr. Vijay Anand Ismavel MS MCh	https://www.inaturalist.org/observations/50045918	CC BY-NC 4.0
19.11	*Nymphicula* sp.	Bharatpur, Nepal	18 JUL 2020	Anisha Sapkota	https://www.inaturalist.org/observations/55388950	CC BY-NC 4.0
19.12	*Nymphicula* sp.	Wayanad, Kerala, Inda	3 JUN 2018	P A Vinayan	https://www.inaturalist.org/observations/46653482	CC BY-NC 4.0
19.13	*Nymphicula* cf. *perirrorata*	Chennai, Tamil Nadu	25 OCT 2020	N. Mahathi	https://www.inaturalist.org/observations/63556441	CC BY-NC 4.0
19.14	*Nymphicula perirrorata*	Gorongosa NP, Mozambique	2 APR 2016	Bart Wursten	https://www.inaturalist.org/observations/51565855	CC BY-NC 4.0
19.15	*Nymphicula trimacula*	Thrissur District, Kerala	1 FEB 2015	sreenivasan	https://www.inaturalist.org/observations/86859250	CC BY-NC 4.0
20.1	*Euchromius superbellus*	Siculiana, Italy	2 AUG 2021	Tiziano Dinoflo	https://www.inaturalist.org/observations/89769080	CC BY-NC 4.0
20.2	*Euchromius superbellus*	Siculiana, Italy	2 AUG 2021	Tiziano Dinoflo	https://www.inaturalist.org/observations/89769080	CC BY-NC 4.0
20.3	*Euchromius bella*	Provincia di Pavia, Italy	30 AUG 2020	Luigi Andena	https://www.inaturalist.org/observations/55275873	CC BY-NC 4.0
20.4	*Euchromius bella*	Provincia di Pavia, Italy	30 AUG 2020	Luigi Andena	https://www.inaturalist.org/observations/55275873	CC BY-NC 4.0
20.5	*Euchromius bella*	Provincia di Pavia, Italy	29 JUL 2020	Luigi Andena	https://www.inaturalist.org/observations/51549906	CC BY-NC 4.0
20.6	*Euchromius bella*	Provincia di Pavia, Italy	24 JUL 2020	Luigi Andena	https://www.inaturalist.org/observations/89889981	CC BY-NC 4.0
20.7	*Euchromius bella*	Provincia di Pavia, Italy	2 AUG 2020	Luigi Andena	https://www.inaturalist.org/observations/61343200	CC BY-NC 4.0
20.8	*Euchromius californicalis*	Cabo San Lucas, México	8 NOV 2016	Kakalotli	https://www.inaturalist.org/observations/4531019	CC BY-NC 4.0
20.9	*Euchromius ocellea*	Santa Cruz County, California	26 JUL 2012	Arthur Macmillan	https://www.inaturalist.org/observations/60448922	CC BY-NC 4.0
20.10	*Euchromius ocellea*	Siculiana, Italy	8 AUG 2019	Tiziano Dinoflo	https://www.inaturalist.org/observations/52562865	CC BY-NC 4.0
20.11	*Euchromius ocellea*	Moscow Oblast, Russia	22 SEP 2015	cossus	https://www.inaturalist.org/observations/130130707	CC BY-NC 4.0
20.12	*Euchromius ocellea*	San Jacinto County, Texas	25 MAR 2017	Wanda Smith	https://www.inaturalist.org/observations/8698183	CC BY-NC 4.0
20.13	*Euchromius ocellea*	San Diego, California	29 JUN 2022	cjackson	https://www.inaturalist.org/observations/125485143	CC BY-NC 4.0
20.14	*Euchromius ocellea*	Moscow Oblast, Russia	1 SEP 2020	cossus	https://www.inaturalist.org/observations/130130711	CC BY-NC 4.0
20.15	*Euchromius ocellea*	Moscow Oblast, Russia	1 SEP 2020	cossus	https://www.inaturalist.org/observations/130130711	CC BY-NC 4.0
21.1	*Euchromius ocellea*	Clarendon, Donley County, Texas	30 AUG 2018	Chuck Sexton	https://www.inaturalist.org/observations/17754037	CC BY-NC 4.0
21.2	*Euchromius ocellea*	Bolinas, Marin County, California	6 JUN 2015	Ken-ichi Ueda	https://www.inaturalist.org/observations/1601090	CC BY 4.0
21.3	*Euchromius ocellea*	Lake Jackson, Texas	1 FEB 2017	Monica Krancevic	https://www.inaturalist.org/observations/5042170	CC BY-NC 4.0
21.4	*Euchromius ocellea*	Granger L., Williamson County, Texas	2 NOV 2014	Chuck Sexton	https://www.inaturalist.org/observations/1052678	CC BY-NC 4.0
21.5	*Euchromius ocellea*	Edwards County, Texas	24 OCT 2017	Diana-Terry Hibbitts	https://www.inaturalist.org/observations/8821992	CC BY-NC 4.0
20.6	*Euchromius ocellea*	Ft. Worth, Texas	8 AUG 2018	Sam Kieschnick	https://www.inaturalist.org/observations/15260401	CC BY-NC 4.0
21.7	*Euchromius ocellea*	Ft. Worth, Texas	8 AUG 2018	Sam Kieschnick	https://www.inaturalist.org/observations/15260401	CC BY-NC 4.0
21.8	*Euchromius ocellea*	Kassandra, Central Macedonia, Greece	9AUG 2022	Cosimo Costanzia di Costgliole	https://www.inaturalist.org/observations/130422364	CC BY 4.0
21.9	*Euchromius ocellea*	Williamson County, Texas	4 OCT 2021	Jack Cochran	https://www.inaturalist.org/observations/97418640	CC BY-NC 4.0
21.10	*Euchromius ocellea*	Chapman Ranch, Texas	19 MAR 2021	Jon McIntyre	https://www.inaturalist.org/observations/71595262	CC BY-NC 4.0
21.11	*Euchromius ocellea*	St. Louis, Missouri	27 SEP 2021	C. McClarren and A. Reago	https://www.inaturalist.org/observations/98212895	CC0
21.12	*Euchromius ocellea*	Williamson County, Texas	26 SEP 2021	Jack Cochran	https://www.inaturalist.org/observations/96326528	CC BY-NC 4.0
21.13	*Euchromius ocellea*	Austin, Texas	25 OCT 2021	Justin Williams	https://www.inaturalist.org/observations/99424887	CC BY-NC 4.0
21.14	*Euchromius ocellea*	Bell County, Texas	6 OCT 2019	Dusty	https://www.inaturalist.org/observations/33994609	CC BY-NC 4.0
21.15	*Euchromius ocellea*	San Diego County, California	19 SEP 2018	Gary Nunn	https://www.inaturalist.org/observations/16818929	CC BY-NC 4.0
21.16	*Euchromius ocellea*	Williamson County, Texas	31 JUL 2021	Jack Cochran	https://www.inaturalist.org/observations/129027893	CC BY-NC 4.0
21.17	*Euchromius ocellea*	Williamson County, Texas	31 JUL 2022	Jack Cochran	https://www.inaturalist.org/observations/129027876	CC BY-NC 4.0
21.18	*Euchromius ocellea*	New Mexico	JUL 2022	Ellen Hildebrandt	https://www.inaturalist.org/observations/129305190	CC BY-NC 4.0
21.19	*Euchromius ocellea*	Texas	APR 2022	A Rector	https://www.inaturalist.org/observations/112354021	CC BY-NC 4.0
21.20	*Euchromius ocellea*	Austin, Texas	12 AUG 2019	Chuck Sexton	https://www.inaturalist.org/observations/30745322	CC BY-NC 4.0
21.21	*Euchromius ocellea*	Lake Jackson, Texas	25 AUG 2019	Monica Krancevic	https://www.inaturalist.org/observations/31547194	CC BY-NC 4.0
22.1	*Chalcoela iphitalis*	Rutland, Vermont	12 JUL 2018	Susan Elliot	https://www.inaturalist.org/observations/14285614	CC BY-NC 4.0
22.2	*Chalcoela iphitalis*	Rutland, Vermont	20 JUL 2018	Susan Elliot	https://www.inaturalist.org/observations/14560822	CC BY-NC 4.0
22.3	*Chalcoela iphitalis*	Haliburton, Ontario, Canada	11 JUN 2011	edporopat	https://www.inaturalist.org/observations/82750751	CC BY-NC 4.0
22.4	*Chalcoela iphitalis*	Rockingham, Vermont	4 JUN 2021	joannerusso	https://www.inaturalist.org/observations/81689883	CC BY-NC 4.0
22.5	*Chalcoela iphitalis*	Missoula County, Montana	4 JUN 2021	Kristi DuBois	https://www.inaturalist.org/observations/82306844	CC BY-NC 4.0
22.6	*Chalcoela iphitalis*	Lake Jackson, Texas	28 JUL 2018	Monica Krancevic	https://www.inaturalist.org/observations/14919232	CC BY-NC 4.0
22.7	*Chalcoela pegasalis*	Maplesville, Alabama	22 MAY 2018	John Morgan	https://www.inaturalist.org/observations/12973119	CC BY-NC 4.0
22.8	*Chalcoela pegasalis*	Mars Hill, North Carolina	19 JUN 2020	Blue Wing	https://www.inaturalist.org/observations/50249613	CC BY-NC 4.0
22.9	*Chalcoela pegasalis*	Athens, Georgia	15 JUL 2017	Christian Schwartz	https://www.inaturalist.org/observations/7170641	CC BY-NC 4.0
22.10	*Chalcoela pegasalis*	Cane Creek Canyon, Alabama	17 JUN 2022	Vitaly Charny	https://www.inaturalist.org/observations/123423810	CC BY-NC 4.0
22.11	*Chalcoela pegasalis*	Bibb County, Georgia	28 APR 2019	Rose A. Payne	https://www.inaturalist.org/observations/24079853	CC BY-NC 4.0
22.12	*Chalcoela pegasalis*	Bibb County, Georgia	28 APR 2019	Rose A. Payne	https://www.inaturalist.org/observations/24079853	CC BY-NC 4.0
23.1	*Pelochrista scintillana*	Meridian, Idaho	26 MAY 2022	phytographer (Daniel)	https://www.inaturalist.org/observations/118874459	CC BY 4.0
23.2	*Pelochrista scintillana*	Lyons, Colorado	13 JUL 2019	Steven Mlodinow	https://www.inaturalist.org/observations/28974249	CC BY-NC 4.0
23.3	*Pelochrista scintillana*	Crosby County, Texas	10 MAY 2020	Lena Zappia	https://www.inaturalist.org/observations/46325467	CC BY-NC 4.0
23.4	*Pelochrista scintillana*	Hall County, Nebraska	7 JUL 2022	cranetrust	https://www.inaturalist.org/observations/126871580	CC BY-NC 4.0
23.5	*Pelochrista scintillana*	Cimarron County, Oklahoma	5 JUN 2021	Zach Dufran (zdufran)	https://www.inaturalist.org/observations/82054697	CC BY-NC 4.0
23.6	*Pelochrista scintillana*	Williamson County, Texas	29 APR 2022	Jack Cochran	https://www.inaturalist.org/observations/113702366	CC BY-NC 4.0
23.7	*Pelochrista scintillana*	Santa Clara, California	25 JAN 2014	Ken-ichi Ueda	https://www.inaturalist.org/observations/511374	CC BY 4.0
23.8	*Pelochrista scintillana*	Santa Cruz Island, California	20 JUL 2015	Ken-ichi Ueda	https://www.inaturalist.org/observations/1790011	CC BY 4.0
23.9	*Pelochrista scintillana*	Maplesville, Alabama	4 AUG 2018	John Morgan	https://www.inaturalist.org/observations/15179180	CC BY-NC 4.0
23.10	*Pelochrista scintillana*	Gray Summit, Missouri	5 JUL 2014	Chrissy McClarren and Andy Reago	https://www.inaturalist.org/observations/58193594	CC0
23.11	*Pelochrista scintillana*	Division No. 15, Manitoba	9 JUL 2021	Karl Kroeker	https://www.inaturalist.org/observations/82385908	CC BY-NC 4.0
23.12	*Pelochrista scintillana*	Creighton, Nebraska	20 JUN 2016	Mark A. Brogie	https://www.inaturalist.org/observations/88336919	CC BY-NC 4.0
23.13	*Pelochrista scintillana*	Shelby County, Alabama	22 JUL 2021	John Morgan	https://www.inaturalist.org/observations/88603789	CC BY-NC 4.0
23.14	*Pelochrista scintillana*	Williamson County, Texas	24 APR 2022	Jack Cochran	https://www.inaturalist.org/observations/112687961	CC BY-NC 4.0
23.15	*Pelochrista scintillana*	Missouri	JUN 2022	Chrissy McClarren and Andy Reago	https://www.inaturalist.org/observations/123108823	CC0
23.16	*Pelochrista scintillana*	Big Springs, Nebraska	21 JUN 2022	Steven Mlodinow	https://www.inaturalist.org/observations/123307541	CC BY-NC 4.0
23.17	*Pelochrista scintillana*	Cimarron County, Oklahoma	15 JUN 2022	Chuck Sexton	https://www.inaturalist.org/observations/124903107	CC BY-NC 4.0
23.18	*Pelochrista scintillana*	Montgomery County, Ohio	24 JUN 2021	Ken Lebo	https://www.inaturalist.org/observations/125338672	CC BY-NC 4.0
24.1	*Olethreutes arcuella*	Macedonia, Greece	20 MAY 2018	Kostas Zontanos	https://www.inaturalist.org/observations/12720754	CC BY-NC 4.0
24.2	*Olethreutes arcuella*	Bayern, Germany	3 JUN 2019	Felix Riegel	https://www.inaturalist.org/observations/27280895	CC BY-NC 4.0
24.3	*Olethreutes arcuella*	Graz-Umgebung, Austria	24 MAY 2021	sabine-g	https://www.inaturalist.org/observations/106930175	CC BY-NC 4.0
24.4	*Olethreutes arcuella*	Provincia di Cuneo, Italia	23 MAY 2015	Mirko Tomasi	https://www.inaturalist.org/observations/36530957	CC BY-NC 4.0
24.5	*Olethreutes arcuella*	Clairmarais, France	3 JUN 2018	Marie Lou Legrand	https://www.inaturalist.org/observations/61299192	CC BY-NC 4.0
24.6	*Olethreutes arcuella*	Freistadt, Austria	19 JUN 2021	oe5hm	https://www.inaturalist.org/observations/84151856	CC BY-NC 4.0
24.7	*Olethreutes arcuella*	Karelia, Russia	5 JUN 2013	Andrei	https://www.inaturalist.org/observations/18967091	CC BY-NC 4.0
24.8	*Olethreutes arcuella*	Dresden, Germany	25 MAY 2015	Franziska Bauer	https://www.inaturalist.org/observations/1556791	CC BY-NC 4.0

24.9	*Olethreutes arcuella*	Rome, Italy	12 JUN 2019	Paolo Mazzei	https://www.inaturalist.org/observations/69680459	CC BY-NC 4.0
24.10	*Olethreutes arcuella*	Bergen, Nederland	10 JUN 2021	Joey Bom	https://www.inaturalist.org/observations/102038748	CC BY-NC 4.0
24.11	*Olethreutes arcuella*	Girona, Spain	4 MAY 2017	Xavier Mas	https://www.inaturalist.org/observations/116674209	CC BY-NC 4.0
24.12	*Olethreutes arcuella*	Kalinkovo, Slovensko	12 MAY 2013	Vojtek Pavel	https://www.inaturalist.org/observations/39811421	CC BY-NC 4.0
24.13	*Olethreutes arcuella*	Łuków, Lubelskie, Polska		Ryszard	https://www.flickr.com/photos/ricosz/15930019523	CC BY-NC 2.0
24.14	*Olethreutes arcuella*	Łuków, Lubelskie, Polska		Ryszard	https://www.flickr.com/photos/ricosz/16364286957	CC BY-NC 2.0
24.15	*Olethreutes arcuella*	Rome, Italy	12 JUN 2018	Paolo Mazzei	https://www.inaturalist.org/observations/19590173	CC BY-NC 4.0
25.1	*Glyphipteryx loricatella*	Törökbálint, Hungary	2 JUN 2015	Sándor Nagy	https://www.flickr.com/photos/nagysandor/18228846618	with permission
25.2	*Glyphipteryx loricatella*	Törökbálint, Hungary	3 JUN 2015	Sándor Nagy	https://www.flickr.com/photos/nagysandor/18227015920	with permission
25.3	*Glyphipteryx loricatella*	Törökbálint, Hungary	3 JUN 2015	Sándor Nagy	https://www.flickr.com/photos/nagysandor/18415048105	with permission
25.4	*Glyphipteryx loricatella*	Törökbálint, Hungary	4 JUN 2015	Sándor Nagy	https://www.flickr.com/photos/nagysandor/18259506330	with permission
25.5	*Glyphipteryx loricatella*	Törökbálint, Hungary	5 JUN 2015	Sándor Nagy	https://www.flickr.com/photos/nagysandor/18564142096	with permission
25.6	*Glyphipteryx loricatella*	Törökbálint, Hungary	7 JUN 2015	Sándor Nagy	https://www.flickr.com/photos/nagysandor/18404845449	with permission
25.7	*Glyphipteryx loricatella*	Törökbálint, Hungary	19 MAY 2018	Sándor Nagy	https://www.flickr.com/photos/nagysandor/42161804282	with permission
25.8	*Glyphipteryx loricatella*	Törökbálint, Hungary	23 MAY 2018	Sándor Nagy	https://www.flickr.com/photos/nagysandor/41437959645	with permission
25.9	*Glyphipteryx loricatella*	Törökbálint, Hungary	23 MAY 2018	Sándor Nagy	https://www.flickr.com/photos/nagysandor/41617439574	with permission
25.10	*Glyphipteryx loricatella*	Törökbálint, Hungary	23 MAY 2018	Sándor Nagy	https://www.flickr.com/photos/nagysandor/41437958625	with permission
25.11	*Glyphipteryx loricatella*	Törökbálint, Hungary	23 MAY 2018	Sándor Nagy	https://www.flickr.com/photos/nagysandor/41617438224	with permission
25.12	*Glyphipteryx loricatella*	Törökbálint, Hungary	25 MAY 2018	Sándor Nagy	https://www.flickr.com/photos/nagysandor/40532351790	with permission
26.1	*Glyphipterix circumscriptella*	Travis County, Texas	12 OCT 2018	Eric Carpenter	https://www.inaturalist.org/observations/17778645	CC BY-NC 4.0
26.2	*Glyphipterix circumscriptella*	Hays County, Texas	13 APR 2021	Eric Carpenter	https://www.inaturalist.org/observations/73907433	CC BY-NC 4.0
26.3	*Glyphipterix circumscriptella*	Austin, Texas	29 APR 2020	Justin Williams	https://www.inaturalist.org/observations/44337763	CC BY-NC 4.0
26.4	*Glyphipterix circumscriptella*	San Marcos, Texas	24 SEP 2017	Ben Hutchins	https://www.inaturalist.org/observations/8099111	CC BY-NC 4.0
26.5	*Glyphipterix bifasciata*	Pumas County, California	27 JUN 2020	Ken-ichi Ueda	https://www.inaturalist.org/observations/51759691	CC BY-NC 4.0
26.6	*Glyphipterix cometophora*	Wonboyn, New South Wales	28 SEP 2021	Kerry-Lee Harris	https://www.inaturalist.org/observations/96451362	CC BY-NC 4.0
26.7	*Glyphipterix* sp.	Tambopata, Madre de Dios, Peru	1 NOV 2014	Arnold Wijker	https://www.inaturalist.org/observations/9239505	CC BY-NC 4.0
26.8	*Glyphipterix thrasonella*	Ypres, Belgium	28 MAY 2018	Marie Lou Legrand	https://www.inaturalist.org/observations/60864284	CC BY-NC 4.0
26.9	*Glyphipterix thrasonella*	Belluno, Veneto, Italy	13 JUL 2021	Arno Beidts	https://www.inaturalist.org/observations/88703858	CC BY-NC 4.0
26.10	*Glyphipterix forsterella*	Moscow Oblast, Russia	11 JUN 2017	Roman Providukhin	https://www.inaturalist.org/observations/22145696	CC BY-NC 4.0
26.11	*Glyph. quadragintapunctata*	Cross Plains, Wisconsin	21 JUN 2022	Woolcarderbee	https://www.inaturalist.org/observations/123031529	CC BY-NC 4.0
26.12	*Glyphipterix chrysoplanetis*	Briagolong, Victoria, Australia	8 NOV 2020	ronigreer	https://www.inaturalist.org/observations/64480618	CC BY-NC 4.0
27.1	♂ salticid, sp. indet.			mika mamy		Pixabay License
27.2	♀ *Hyllus* sp.			Ronny Overhate		Pixabay License
27.3	young macaques			Pete Linforth		Pixabay License
27.4	♀ *Homo sapiens*			David E. Hill		CC0
27.5	♀ *Homo sapiens*			David E. Hill		CC0
27.6	♀ *Homo sapiens*			David E. Hill		CC0
28.1	*Phidippus princeps*, instar II	Greenville County, South Carolina		David E. Hill		CC BY 4.0
28.2	*Phidippus princeps*, imm.	Greenville County, South Carolina		David E. Hill		CC BY 4.0
28.3	*Phidippus princeps*, imm.	Greenville County, South Carolina		David E. Hill		CC BY 4.0
28.4	*Phidippus princeps*, pen. ♂	Greenville County, South Carolina		David E. Hill		CC BY 4.0
28.5	*Phidippus princeps*, pen. ♀	Greenville County, South Carolina		David E. Hill		CC BY 4.0
28.6	*Phidippus princeps*, ♀	Greenville County, South Carolina		David E. Hill		CC BY 4.0
29.1	*Epinotia subviridis*	Carmel Valley, San Diego, California	26 AUG 2020	cjackson	https://www.inaturalist.org/observations/57802437	CC BY-NC 4.0
29.2	*Dichrorampha flinti*	Cochise County, Arizona	11 AUG 2019	Robby Deans	https://www.inaturalist.org/observations/30905598	CC BY-NC 4.0
29.3	*Talponia plummeriana*	Triangle, Virginia	6 JUN 2019	Judy Gallagher	https://www.inaturalist.org/observations/26533481	CC BY 4.0
29.4	*Ofatulena duodecemstriata*	Pima County, Arizona	27 APR 2018	C. Mallory	https://www.inaturalist.org/observations/11574418	CC BY-NC 4.0
29.5	*Ofatulena duodecemstriata*	Somervell County, Texas	20 AUG 2022	Russell Pfau	https://www.inaturalist.org/observations/131824104	CC BY-NC 4.0
29.6	*Grapholita packardi*	Plano, Texas	4 JUN 2020	assmann	https://www.inaturalist.org/observations/48782756	CC BY-NC 4.0
29.7	*Grapholita zapyrana*	Tamworth, New South Wales	30 JAN 2022	Lyn Craggs	https://www.inaturalist.org/observations/105829574	CC BY-NC 4.0
29.8	*Grapholita lobarzewskii*	Moscow Oblast, Russia	4 JUN 2018	Andrey Ponomarev	https://www.inaturalist.org/observations/98621739	CC BY-NC 4.0
29.9	*Grapholita eclipsana*	Wading River, New York	2 MAY 2021	Brenda Bull	https://www.inaturalist.org/observations/77368340	CC BY-NC 4.0
29.10	*Grapholita orobana*	Moscow Oblast, Russia	25 JUN 2015	Andrey Ponomarev	https://www.inaturalist.org/observations/98621849	CC BY-NC 4.0
29.11	*Grapholita tristrigana*	Illinois	JUN 2021	molanic	https://www.inaturalist.org/observations/83852890	CC BY-NC 4.0
29.12	*Cydia latiferreana*	Colbert County, Alabama	12 AUG 2022	Vitaly Charny	https://www.inaturalist.org/observations/131339145	CC BY-NC 4.0
29.13	*Cydia latiferreana*	Norfolk County, Ontario	14 AUG 2022	David Okines	https://www.inaturalist.org/observations/130794623	CC BY-NC 4.0
29.14	*Olethreutes* sp.	Washington D. C.	7 JUN 2014	Katja Schultz	https://www.flickr.com/photos/treegrow/14494166370	CC BY 2.0
29.15	*Olethreutes* sp.	Canton, Georgia		Christina Butler	https://www.flickr.com/photos/144198875@N02/48026772243	CC BY 2.0
29.16	*Olethreutes nitidana*	Haliburton, Ontario, Canada	13 JUL 2021	edporopat	https://www.inaturalist.org/observations/86916106	CC BY-NC 4.0
29.17	*Olethreutes nigranum*	Wildwood, Missouri	7 JUL 2019	Andy Reago & Chrissy McClarren	https://www.flickr.com/photos/wildreturn/48244845686	CC BY 2.0
29.18	*Olethreutes permundana*	Quarryville, New Brunswick	22 JUN 2021	Nancy (nancymullin)	https://www.inaturalist.org/observations/84248333	CC0
29.19	*Olethreutes* cf. *astrologana*	Washington D. C.	7 JUN 2014	Katja Schultz	https://www.flickr.com/photos/treegrow/15503895731	CC BY 2.0
29.20	*Phiaris stibiana*	Epirus and W. Macedonia, Greece	8 JUN 2020	Kostas Zontanos	https://www.inaturalist.org/observations/58867779	CC BY-NC 4.0
29.21	*Syricoris lacunana*	Graz-Umgebung, Austria	31 MAY 2022	sabine-g	https://www.inaturalist.org/observations/119637583	CC BY-NC 4.0