Notes on the immature stages of *Almeidella corrupta* (Schaus, 1913) (Lepidoptera, Saturniidae, Ceratocampinae)

Ryan A. St Laurent[1,2,4], Ana P. S. Carvalho[2] and Helena P. Romanowski[3]

1. Department of Entomology, Smithsonian Institution, National Museum of Natural History, Washington D.C., United States; 2. McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, Gainesville, FL, United States; http://orcid.org/0000-0003-3245-3648 (APSC); 3. Departamento de Zoologia / Instituto de Biociências, Universidade Federal do Rio Grande do Sul, Porto Alegre, RS, Brazil; http://orcid.org/0000-0001-8342-4607; 4. Corresponding author: st.laurentr@si.edu; http://orcid.org/0000-0001-6439-5249

Date of issue online: 29 October 2022
Electronic copies (ISSN 2575-9256) in PDF format at: https://journals.flvc.org/troplep; https://zenodo.org; archived by the Institutional Repository at the University of Florida (IR@UF), http://ufdc.ufl.edu/ufir; **DOI**: 10.5281/zenodo.7246167.

Abstract: The immature stages of the wild silk moth genus *Almeidella* Oiticica Filho (Saturniidae: Ceratocampinae) are illustrated, along with information pertaining to the life history, including host plants in captivity and in nature, for the first time. We reared *A. corrupta* (Schaus) from eggs obtained from a female collected in Paraíso do Sul, Rio Grande do Sul, Brazil. This location is the farthest west *Almeidella* has ever been reported in Rio Grande do Sul. An additional larva of *Almeidella*, preliminarily identified as *A. corrupta*, from Pedro Leopoldo, Minas Gerais, Brazil is figured along with its natural host plant, *Anadenanthera peregrina*. Both the captive host plants and the natural host plant belong to Fabaceae, a common host family for a wide range of Ceratocampinae species. General morphology is typical of Ceratocampinae, with silver, reflective scoli; we observed two color forms of the larvae: red and green.

Key words: *Anadenanthera peregrina*, Bombycoidea, Brazil, Fabaceae, Life history

INTRODUCTION

Wild silk moths, Saturniidae, include nearly 3,500 named species in 180 genera distributed globally (Lemaire & Minet, 1998; Kitching *et al.*, 2018). The Americas are home to six subfamilies of Saturniidae, five of which are endemic to this region (Lemaire & Minet, 1998). Most subfamilies of Saturniidae present in the Americas have been treated in the voluminous works of Lemaire (1978, 1980, 1988, 2002). One of the American endemic lineages, the Ceratocampinae, have had their life histories as the focus of an extensive literature (Packard, 1905; da Costa Lima, 1950; Dias, 1981; Lemaire, 1988; Furtado & Racheli, 1998; Lemaire & Minet, 1998; Furtado, 1999, 2000, 2001; Albertoni & Duarte, 2015; Zarco *et al.*, 2015). Despite this, many species, and even substantial numbers of genera, are completely lacking published life histories. As is the case for most Lepidoptera, all Saturniidae in the Americas are described from adult specimens, and thus there is a significant gap in our knowledge of life history traits such as larval morphology and host plant utilization.

The genus *Almeidella* Oiticica Filho, 1946 (type species: *A. almeidai* Oiticica Filho) was described to include three species of Ceratocampinae which, at the time, were only known to occur in southeastern Brazil: *A. almeidai*, *A. approximans* (Schaus, 1920), and *A. corrupta* (Schaus, 1913) (Oiticica Filho, 1946; Lemaire, 1988). These three species were most recently treated together by Lemaire (1988), who provided figures and descriptions of both sexes, their genitalia, as well as distribution maps of all three *Almeidella* species. Apart from the taxonomic and systematic treatments of authors such as Oiticica Filho (1946), Michener (1952), and Lemaire (1988), nothing has been published on the life history of *Almeidella*, with host plant associations and immature stages unknown.

Various efforts have been made to rear and publish images and larval descriptions for Ceratocampinae genera for which life history information was completely unknown, or for some genera where life histories were known for only very few species (Dias, 1981; Furtado & Racheli, 1998; Furtado, 1999, 2000, 2001; Albertoni & Duarte, 2015; Zarco *et al.*, 2015). The present article follows in the tradition of these studies and provides life history information for one of the three species of *Almeidella*, offering the first glimpse at the eggs and larvae of this genus. Such information is widely useful for those interested in locating this species in nature and presents an opportunity to understand the ecological requirements of *Almeidella* and may offer useful knowledge for the phylogeny of Ceratocampinae.

MATERIALS AND METHODS

The immature stages of the reared *Almeidella corrupta* figured in the present article were derived from eggs obtained from a single female (Fig. 1) collected in Paraíso do Sul, Rio Grande do Sul, Brazil on 8.X.2018 (29°37'6.168"S, 53° 8'38.3676"W). This location was a tobacco field on a slope surrounded by fragments of Mata Atlântica. This particular site was, therefore, highly disturbed by human interference. Numerous males of both *A. corrupta* and *A. approximans* were observed at this location on this night (Fig. 2), but only one female, the progenitor of the offspring reared here, was observed. An additional wild larva was observed by Wolfgang

Figure 1. Adult female *Almeidella corrupta* from Paraíso do Sul, Rio Grande do Sul, Brazil, progenitor of the offspring reared in the present article.

Figure 2. Adult males of sympatric *Almeidella* at Paraíso do Sul, Rio Grande do Sul, Brazil. Left: *A. corrupta*, right: *A. approximans*.

Walz in Pedro Leopoldo, Minas Gerais, Brazil (Fig. 3) that we identified as *A. corrupta* based on our rearing efforts in Rio Grande do Sul, but we appreciate the fact that this may represent another *Almeidella* species (such as *A. approximans*, which also occurs in Minas Gerais).

The female *A. corrupta* was placed in a screened cage and maintained indoors at room temperature for three days and nights, with eggs collected each afternoon. Upon hatching, first instar larvae were offered two woody, small leaflet Fabaceae species: one was a species of *Mimosa* L. (R. Valka pers. comm.) and a second tree belonging to an unidentified genus. Considering the time of year (spring) much of the useful species-level identification characters of the host plants (e.g. flowers or fruits) were not present and thus identifications of the plants are preliminary. Both plants were accepted, but only the *Mimosa* sp. was used due to early larval die off on the second plant. A third Fabaceae species, a taxon near *Heteroflorum* M. Sousa (R. Valka pers. comm.), was used during the last two weeks due to a move to a new location where the original *Mimosa* sp. was not available.

Larvae were reared indoors in sealed plastic boxes, kept at room temperature. First and second instar larvae were maintained in small (2 liter) containers; third instar larvae were transferred to a larger plastic tote (35 liters) and then later split into two groups evenly separated into two of the larger plastic totes for the final instar. The food plant (regardless of which plant was used) was cut and a wet paper towel was rolled around the cut end of the plant. Plants were changed every third day, or when completely eaten (this occurred in the final instar only). Frass was removed whenever host plants were changed, and the containers rinsed with water and dried completely with paper towel before reintroducing fresh plant material and the larvae. Prepupal larvae were transferred to separate boxes with torn paper towels inside as a pupation medium.

In larval descriptions, thoracic segments are abbreviated T1-T3, abdominal segments A1-10.

RESULTS

We provide images and brief descriptions of all immature stages of *A. corrupta* to help aid in the recognition of *Almeidella* larvae in nature, and for others interested in using morphological characters of these genera of Saturniidae for other systematics studies.

The female *A. corrupta* that gave rise to the larvae reared in the present study (Fig. 1) was collected around midnight after observing numerous males of both *A. corrupta* and *A. approximans*. The specimen was in good condition and did not show significant signs of wear and was evidently recently emerged and mated. Males were seen flying from around 22:00 h until around 24:00 h when the female was collected and was also when the light set up was shut down due to inclement weather. We consider it noteworthy that these two species of *Almeidella* are sympatric and synchronic at this location in Paraíso do Sul, especially considering that our reports of these two species from this location are the farthest west either has been recorded in Rio Grande do Sul (Prestes *et al.*, 2009).

We were able to observe and photograph eggs and all five larval instars. The larvae mostly failed to pupate or the pupae did not survive, thus no resulting adults from the rearing efforts were observed. Some measurements were made, when possible, for each stage and are provided below, but we caution the reader that these measurements were only based on one to three larvae, with measurements made at variable periods during the span of a given instar due to the nature of our rearing efforts which occurred during ongoing fieldwork. Due to this, chaetotaxy studies of first instar larvae were not possible, nor were the focus of this study. Limited availability of larvae was a significant constraint and photographing all larval instars was the paramount goal of this study.

To complement our study, we include a photo of a larva observed in nature on 9.XI.2021 in Pedro Leopoldo, Minas Gerais, Brazil (Fig. 3). Our identification of the larva is based on our rearing efforts and the known presence of *A. corrupta* in nearby regions of Minas Gerais (Carlos Mielke pers. comm.). The discoverer of the larva, Wolfgang Walz, also provided

Figure 3. Final instar *Almeidella* larva observed in nature on *Anadenanthera peregrina* (Fabaceae) in Pedro Leopoldo, Minas Gerais, Brazil by Wolfgang Walz. We preliminarily identify this larva as *A. corrupta* but this has not been confirmed through rearing. Photo by Wolfgang Walz, used with permission.

Figures 4, 5. Natural host plant of *Almeidella*, *Anadenanthera peregrina* (Fabaceae), in Pedro Leopoldo, Minas Gerais Brazil. 4. Leaves. 5. Bark. Photos by Wolfgang Walz, used with permission.

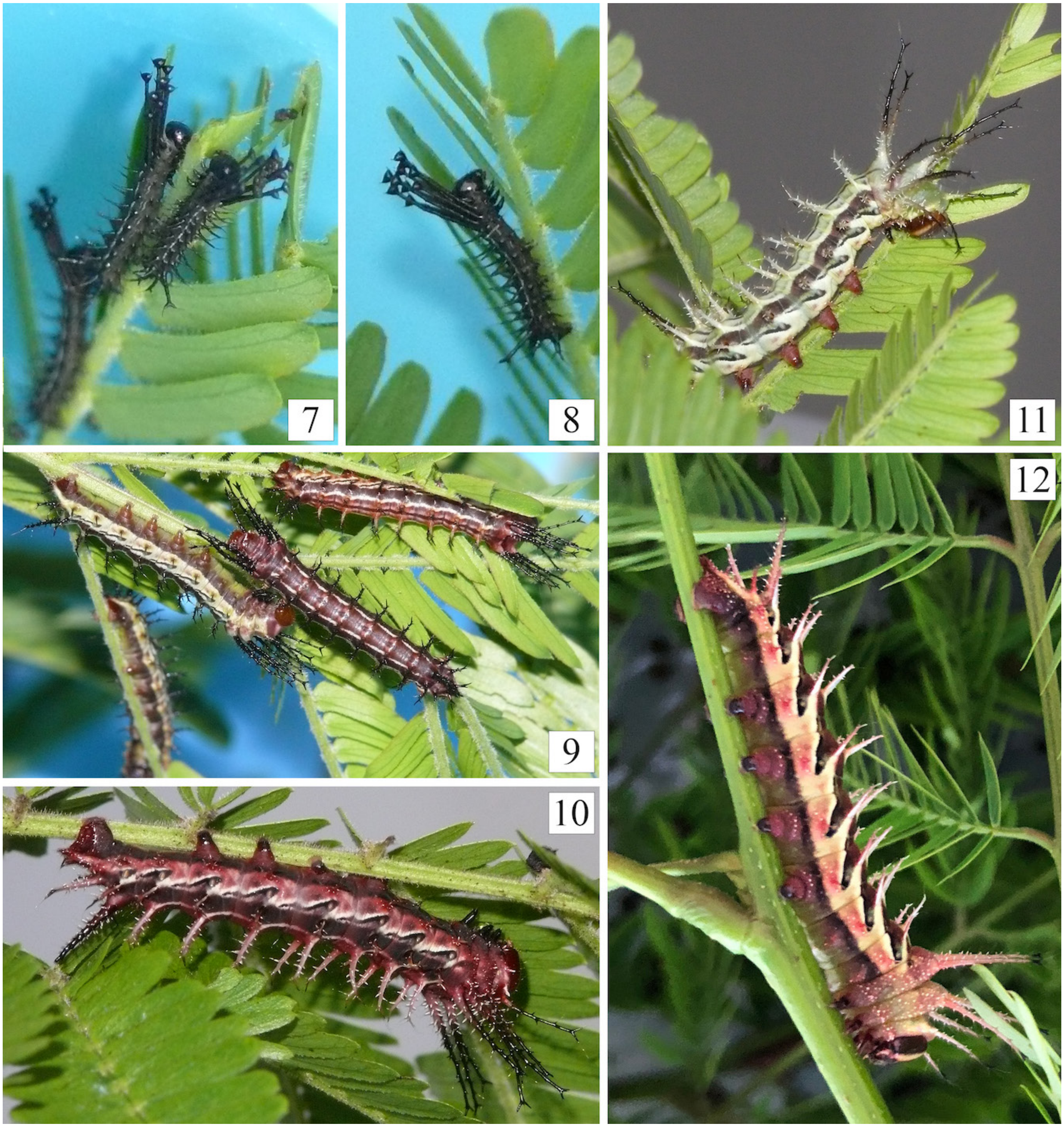
photographs of the host plant which are included in the present article (Figs 4, 5). The host plant was identified as the Fabaceae *Anadenanthera peregrina* L. (Speg.) (Geraldo Pereira pers. comm.) and is now known to be a natural host plant of *Almeidella* in Minas Gerais.

Egg (Fig. 6)

The first eggs (which were laid over the course of three consecutive nights) were noticed on 8.X.2018, with the bulk of eggs laid 9.X.2018. The first larval emergences occurred on 16.X.2018, with a majority of larvae hatching on 17.X.2018. Thus, egg development was eight to nine days at room temperature.

Eggs are ovoid in shape and slightly flattened. Two distinct color forms of the eggs were observed: dark brownish green and lighter green. The color differences were not a result of differential development since both colors were observed at the same times immediately after oviposition. The chorion is somewhat opaque such that larval development, while visible,

Figure 6. Eggs of *Almeidella corrupta* showing two distinct color forms, brown and green. Scale bars are each 1 mm.



Figures 7-12. Early instars of *Almeidella corrupta* reared in captivity on Fabaceae. 7. Group of First instar larvae. 8. Single first instar. 9. Several second instar larvae showing both red and green forms. 10. Third instar, red form. 11. Third instar, green form. 12. Fourth instar, red-green form.

was not as readily apparent as in other Ceratocampinae such as *Citheronia* Hübner, *Eacles* Hübner, *Syssphinx* Hübner which generally have much more transparent eggs (St Laurent pers. obs.). The diameter of the eggs at the widest distance: 2 mm (n = 7).

First instar (Fig. 7, 8)

The first instar larval integument is almost entirely black, with lighter gray dorso-lateral lines, coloration was consistent throughout the duration of the first instar. Legs, prolegs, head capsule, and scoli are all black. Scoli of T1-3 are more than one half length of the body of the unfed, recently eclosed larva. Thoracic scoli are each tipped by a globular structure which are apically spined at each distal angle. Arrangement of thoracic scoli are as follows: T1: one pair, T2 and T3: two pairs each. Primary scoli of A1-7 as three pairs on each segment, one pair subdorsally, one pair supraspiracularly, and a third pair subspiracularly. The abdominal scoli are sharp and somewhat anteriorly directed. A8 bears a prominent singular dorsal scolus that is distally bifurcated. Scoli of A9 and A10 are roughly twice the thickness and length of dorsal and lateral scoli of A1-7. Length: 5 mm.

Although we were unable to formally characterize and describe chaetotaxy for *A. corrupta*, we note very similar morphological arrangement of scoli as described and figured for first instar *Adeloneivaia fallax* (Boisduval) in Albertoni & Duarte (2015). It would be desirable for future rearers of *Almeidella* to preserve first instar larval specimens for more in-depth morphological description of this crucial stage of development.

Second instar (Fig. 9)

The second instar was the phase at which different larval color forms first became evident. There are two forms in the second instar: one primarily green and another primarily deep red. The two forms did not differ in morphological structure, with both showing a similar scoli arrangement to the first instar, but with the sizes of scoli smaller overall relative to body size than in the first instar. Thoracic scoli are not tipped with enlarged globular structures, but instead are bifurcated apically. Dorsal and lateral scoli are sharply spined, with apical tips pointed anteriorly. The coloration of scoli remain mostly black.

Coloration of the two forms were as follows: in the green form the subspiracular region and prolegs are deep red, with a sharply contrasting light green lateral band. The light green lateral band is interrupted by seven diagonal dark red-brown streaks. Dorsally to the lateral green band is a darker, greatly contrasting, deep red band. This dorso-lateral red band is darker than the ventral red band. Dorsally the ground color is light green with three deep red longitudinal bands, the central of which is the most well-defined. The patterning of the red form is identical to that of the green form, but with the light green bands replaced by light red bands, the darkest lateral red band is the same shade in both larval color forms. In the red form the dorsal and ventral margins of the darkest red lateral band are cream colored.

The head capsule is reddish brown in both larval color forms. Larval length: 14-15 mm.

Third instar (Figs 10, 11)

As in the second instar, the third instar larvae display two distinct color forms: a red form (Fig. 10) and a green form (Fig. 11). Scoli arrangement is as in the prior instars, but in the third instar the coloration of the scoli differs depending on their location on the body. Thoracic scoli are mostly dark-brown to nearly black except for basally where the ground color of the integument is present along the basal quarter of the scolus length. Dorsal scoli are the color of the ground color whereas dorsolateral and lateral scoli are reddish-brown. The elongate scolus of A8 is entirely dark brown.

Larval coloration is largely as described for the second instar, but with slightly more intricate patterning laterally such that the lateral diagonal streaks are outlined by black and cream giving them a more contrasting appearance. The colored scoli also give the larvae a more complex patterning than those which were entirely dark-brown in the previous two instars.

The head capsule remains dark red-brown, but with a pair of cream-colored dorso-ventral streaks. The true legs remain black in this instar. Larval length: ~22 mm.

Fourth instar (Fig. 12)

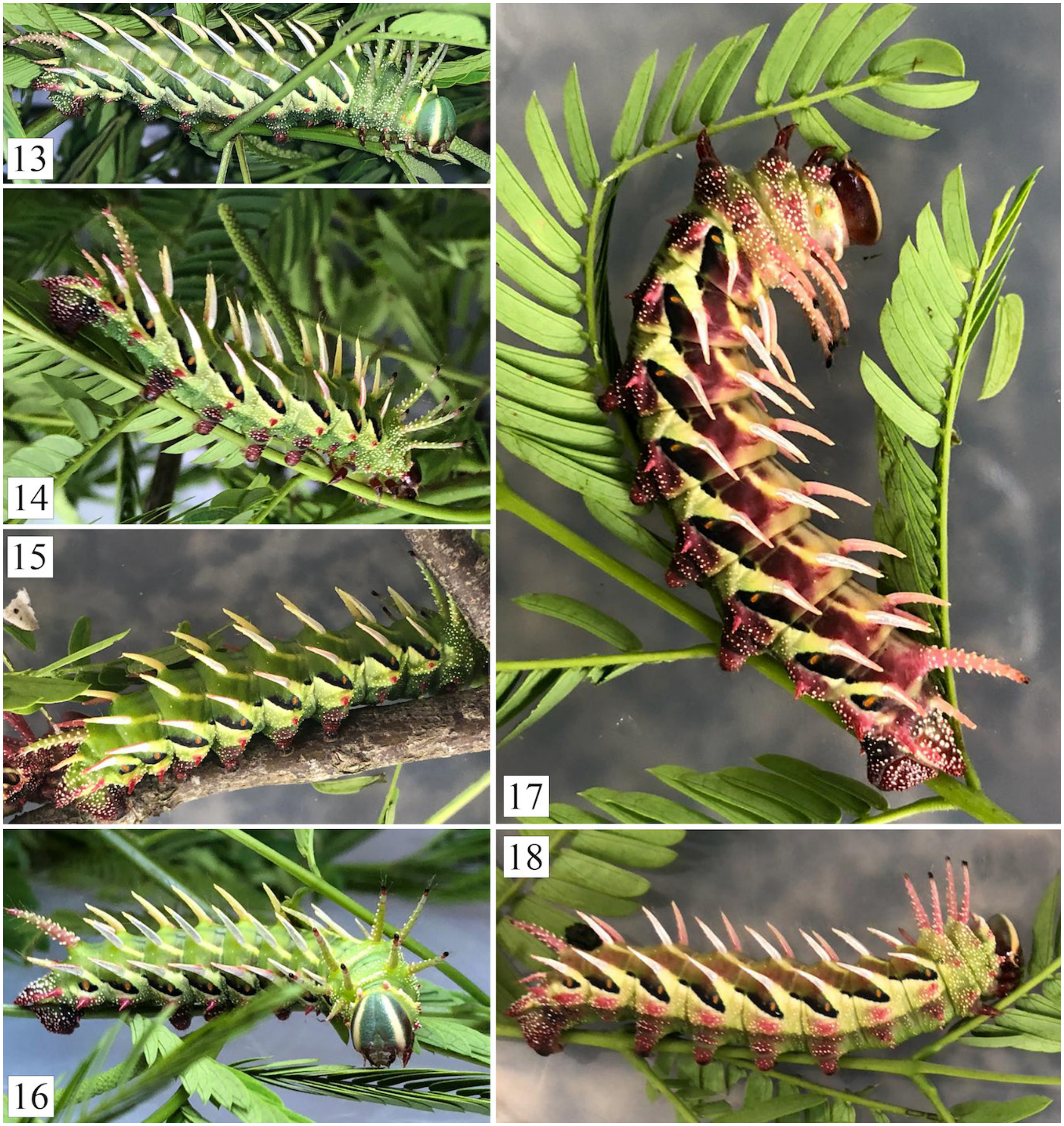
The fourth instar larvae displayed more complicated color forms that were not so easily binned into two distinct types. In general, there were still larvae that were greener and others that were redder, but a third category of coloration was intermediate between the two (Fig. 12). The scoli morphology in this form also underwent a more dramatic change upon the molt to the fourth instar. The thoracic and eighth abdominal scoli were noticeably thicker, and more distinctly colored to be more similar to the ground color of the integument. These scoli have more distinct white granules along their length, and distinct black tips. Very fine setae were noticeable apically on these scoli. The lateral and dorsolateral scoli undergo a more significant structural change between the third and fourth instar. Nearly the entire structure of these scoli become smooth, reflective triangular structures reminiscent of those observed in many Fabaceae feeding Ceratocampinae (e.g. as figured in Lemaire 1988, Janzen & Hallwachs 2022). These scoli have some smaller spines and auxiliary setae, particularly apically, but the bulk of the structure is a smooth, metallic, and somewhat widened structure.

All color forms retained the deep red ground color below the spiracles, such that the prolegs are deep red. Laterally the lighter coloration (lighter red, green, or green with an underlying reddish hue) is no longer a well-defined band narrowly interrupted by thin streaks but is instead fully interrupted along its dorsal margin at each invasion of a black diagonal streak. The light color of the lateral band runs uniformly along the contrasting interface with the ventral red region, and then constricts at the base of the dorsolateral scoli, giving the lateral band a jagged appearance. Dorsally the larvae are either light green or reddish.

In this instar the thoracic legs are more clearly reddish brown in color, the head capsule red-brown with a pair of well-defined dorso-ventral cream-colored streaks. Length: 30-35 mm.

Fifth (final) instar (Figs 3, 13-18)

In the final instar the coloration of the larvae is in general more green than red, with some larvae being almost entirely devoid of any red coloration (Figs 13-16). This became more apparent as the larvae fed such that fully fed red form larvae all had at least some degree of green coloration on the post-feeding expanded integument (Figs 17, 18). Those that retained more red coloration are more effectively described as light pink. However, the coloration of the pink forms was quite variable such that no two larvae were exactly alike in red:green color ratio. There are, however, fully green larvae that are devoid of red except for along small regions below the spiracles (including the now greatly reduced lateral scoli), parts of the scoli, the prolegs, the anal plate, and the anal prolegs. The dorso-lateral and dorsal scoli are thicker, glossier, and more metallic in appearance in the fifth instar. Thoracic scoli are also thickest in this instar, and range in color from green to pink, always



Figures 13-18. Fifth, final instar of *Almeidella corrupta* reared in captivity on Fabaceae. 13-16. Green form. 17, 18. Red-green form.

display white spinules and have distinct black tips. The large scolus of A8 is also greatly thickened, particularly basally, and covered in white spinules. The single wild-observed larva from Minas Gerais (Fig. 3) displays the same nearly all green color form that we observed in some larvae from the Rio Grande do Sul rearing efforts.

Head color ranges from green-blue to red, with a pair of dorso-ventral cream-colored streaks. Length: 42 mm (feeding) to 50 mm (nearly fully fed).

Prepupal larvae commenced wandering behavior roughly two weeks after the onset of molting to the fifth instar. Coloration of red form larvae was not noticeably different in the prepupal stage; however, green form larvae became decidedly pinkish-red when prepupal. Most larvae perished in the prepupal stage.

Pupa

The few larvae that pupated later died, therefore, it is possible that this species has specific requirements regarding pupation. It is also possible that the provided food plants or paper towel pupation medium were not appropriate for the larvae, resulting in poor success in pupation and pupal survival. The few pupae that were formed quickly died and were not photographed, but were otherwise typical of Ceratocampinae with a rough, thick cuticle and an extended, sharp cremaster. Others that discover *Almeidella* larvae should provide a wide range of different pupation media to encourage pupation.

DISCUSSION

Although the life history of *Almeidella* was previously unknown, we made an educated guess that they would be Fabaceae feeders considering the wide use of this family of plants by the Ceratocampinae (e.g. *Adeloneivaia* Travassos, *Adelowalkeria* Travassos, *Megaceresa* Michener, *Syssphinx*, among others) (Balcázar-Lara & Wolfe, 1997; Furtado & Racheli, 1998; Furtado, 1999, 2000, 2001; Albertoni & Duarte, 2015; Janzen & Hallwachs, 2022). Thus, the acceptance of various Fabaceae species by the larvae that we reared was expected.

We did not observe *Almeidella* larvae in nature, and thus cannot conclusively determine their natural host plants in Rio Grande do Sul. The observation by W. Walz in Pedro Leopoldo, Minas Gerais provides further confirmation that the natural host plant(s) belong to the Fabaceae. It is worth noting however, that according to Giehl (2021), there are no native *Anadenanthera* in Rio Grande do Sul, thus *A. corrupta* must utilize other Fabaceae host(s) in the state.

The larvae of *A. corrupta* have reflective scoli, which is often observed in Fabaceae-feeding Lepidoptera. It has been hypothesized that the reflective scoli of Ceratocampinae and certain other Lepidoptera that feed on Fabaceae have evolved these as a strategy of disruptive camouflage (Tuskes, 1985). We therefore encourage others to search Fabaceae in the natural range of *Almeidella* for larvae that are similar to the ones that we figure here, so that additional information on the natural host plant(s) can be gathered. Importantly, the other two species of *Almeidella* still have unknown life histories, and thus any discovery of larvae in nature that are similar to what we figure here should be reared.

Balcázar-Lara & Wolfe (1997) mentioned that *Almeidella* was a phylogenetically critical genus, whose inclusion in morphological phylogenetics was of interest. So far this genus has not been included in any published molecular phylogenies of Saturniidae and, in the morphological phylogeny of Balcázar-Lara & Wolfe (1997), its placement was unclear. Phylogenomic evidence suggests that *Almeidella* is sister to *Giacomellia* Bouvier (Kawahara pers. comm.; Rougerie *et al.* 2022), another Fabaceae feeder with somewhat similar larvae as per photos available at iNaturalist.org.

Though we were unable to fully document the life history of *A. corrupta* using more standardized techniques and more systematic documentation, we believe that by providing images and some observational data on a poorly understood species of saturniid, is significant. Of the 29 genera of Ceratocampinae (Kitching *et al.*, 2018) many of them have unknown, or at least, unpublished life histories, particularly species-poor genera endemic to Brazil and adjacent countries (St Laurent, pers. obs.), thus we present an important contribution in narrowing the uncertainties about the natural history of this subfamily. It is our hope that the provided images and an apparent host plant association with Fabaceae will enable others interested in locating *Almeidella* (of any of the three species) in nature, to do so, and to further study these moths.

In addition to the life history data reported here, we provide a new locality for both *A. corrupta* and *A. approximans* in Rio Grande do Sul. Prestes *et al.* (2009) treated all Ceratocampinae known from Rio Grande do Sul at the time, and included both *A. corrupta* and *A. approximans*, but had records for these species only from the northeastern quadrant of the state, near Porto Alegre. Lemaire (1988) reported *A. corrupta* from Santa Cruz do Sul, which is nearer to where we found these species, but still farther eastwards. We here report these species from the mountainous region in the center of Rio Grande do Sul. Despite the location being particularly disturbed by human activity, *Almeidella* were common at our lights. Both of the *Almeidella* species that we observed have since been discovered in Argentina, and *A. corrupta* from Paraguay and thus they are more widely distributed than previously known (Zapata *et al.*, 2012; Díaz & Smith, 2013; Núñez Bustos, 2015). Carlos Mielke informs us of the presence of *A. corrupta* from Minas Gerais, which has also not been previously reported.

ACKNOWLEDGMENTS

This study would not have been possible without the Carvalho family, who permitted us access to their land where the female *A. corrupta* was found. Carlos Mielke provided data for *A. corrupta* in Minas Gerais. Ruy Valka and Geraldo Periera aided in the identification of Fabaceae mentioned in this article. The female *A. corrupta* was collected with the SISBio permit number 11990-1. We thank two anonymous reviewers for their constructive feedback on the manuscript.

LITERATURE CITED

Albertoni, F. F., Duarte, M. 2015. Immature stages of *Adeloneivaia fallax* (Lepidoptera: Saturniidae). *Florida Entomologist* 98: 178-185.

Balcázar-Lara, M., Wolfe, K. L. 1997. Cladistics of the Ceratocampinae (Lepidoptera: Saturniidae). *Tropical Lepidoptera* 8: 1-53.

Costa Lima, A. M. da 1950. *Insetos do Brasil, 6: Lepidópteros (2a parte)*. Rio de Janeiro, Escola Nacional de Agronomia. 420 pp.

Dias, M. M. 1981. Estágios imaturos de *Citheronia (Citheronula) armata armata* Rothschild, 1907 (Lepidoptera, Attacidae). *Revista Brasileira de Entomologia* 25: 295-300.

Díaz, S. D. R., Smith, P. 2013. Cuatro nuevas especies de Saturniidae (Insecta: Lepidoptera) para el Paraguay. *Boletín del Museo Nacional de Historia Natural del Paraguay* 17: 86-90.

Furtado, E. 1999. *Megaceresa pulchra* (Bouvier) e seus estágios imaturos (Lepidoptera, Saturniidae, Ceratocampinae). *Lambillionea* 99: 521-525.

Furtado, E. 2000. *Psigida walkeri* (Grote) e seus estágios imaturos (Lepidoptera, Saturniidae, Ceratocampinae). *Revista Brasileira de Zoologia* 17: 603-607.

Furtado, E. 2001. *Adeloneivaia schubarti* Rêgo Barros & Mielke e seus estágios imaturos (Lepidoptera, Saturniidae, Ceratocampinae). *Revista Brasileira de Zoologia* 18: 1275-1280.

Furtado, E., Racheli, L. 1998. The preimaginal stages of *Othorene hodeva* (Druce, 1904) (Lepidoptera: Saturniidae, Ceratocampinae). *Neue Entomologische Nachrichten* 41: 173-176.

Giehl, E. L. H. 2022. *Flora digital do Rio Grande do Sul e de Santa Catarina*. http://floradigital.ufsc.br.

Janzen, D. H., Hallwachs, W. (2022). *Dynamic database for an inventory of the macrocaterpillar fauna, and its food plants and parasitoids, of Área de Conservación Guanacaste (ACG), northwestern Costa Rica*. http://janzen.sas.upenn.edu.

Kitching, I. J., Rougerie, R., Zwick, A., Hamilton, C. A., St Laurent, R. A., Naumann S., Ballesteros Mejia, L., Kawahara, A. Y. 2018. A global checklist of the Bombycoidea (Insecta: Lepidoptera). *Biodiversity Data Journal* 6: e22236.

Lemaire, C. 1978. *Les Attacidae Américains. The Attacidae of America (= Saturniidae): Attacinae*. Neuilly-sur-Seine, C. Lemaire. 238 pp., 49 pls.

Lemaire, C. 1980. *Les Attacidae Américains. The Attacidae of America (=Saturniidae): Arsenurinae.* Neuilly-sur-Seine, C. Lemaire. 199 pp., 76 pls.

Lemaire, C. 1988. *Les Saturniidae Américains; The Saturniidae of America; Los Saturniidae Americanos (=Attacidae): Ceratocampinae*. San José, Costa Rica, Museo Nacional de Costa Rica. 480 pp., 64 pls.

Lemaire, C. 2002. *The Saturniidae of America. Les Saturniidae américains (= Attaciae): Hemileucinae.* Keltern, Goecke & Evers. 1388 pp., 140 pls.

Lemaire, C., Minet, J. 1998. 18. *The Bombycoidea and their Relatives*, pp. 322-353. *In*: Kristensen, N. P. (Ed.), *Band 4: Arthropoda, 2 Hälfte: Insecta, Lepidoptera, Moths and Butterflies, Teilband/Part 35 Vol 1: Evolution, Systematics, and Biogeography*. Berlin, Walter de Gruyter.

Michener, C. D. 1952. The Saturniidae (Lepidoptera) of the western hemisphere, morphology, phylogeny, and classification. *Bulletin of the American Museum of Natural History* 98: 355-502.

Núñez Bustos, E. O. 2015. Catálogo preliminar de Saturniidae de Argentina, con veintún neuvos registros (Lepidoptera: Saturniidae). *Tropical Lepidoptera Research* 25: 22-33.

Oiticica Filho, J. 1946. *Almeidella almeidai* N.G. N.SP. (Lepidoptera; Adelocephalinae), pp. 263-278. *In*: *Livro de homenagem a Romualdo Ferreira d'Almeida*. Sociadade Brasileira Entomologia.

Packard, A. S. 1905. Monograph of the Bombycine Moths of North America, including their transformations and origin of the larval markings and armature. Part 2. *Memoirs of the National Academy of Sciences* 9: 1-151.

Prestes, A. S., Nunes, F. G., Corseuil, E., Moser, A. 2009. Arsenurinae and Ceratocampinae (Saturniidae) of Rio Grande do Sul State, Brazil. *Journal of the Lepidopterists' Society* 63: 214-232.

Rougerie, R., Cruaud, A., Arnal, P., Ballesteros-Mejia, L., Condamine, F. L., Decaëns, T., Elias, M., Gey, D., Hebert, P. D. N., Kitching, I. J., Lavergne, S., Lopez-Vaamonde, C., Murienne, J., Cuenot, Y., Nidelet, S., Rasplus, J.-Y. 2022. Phylogenomics illuminates the evolutionary history of wild silkmoths in space and time (Lepidoptera: Saturniidae). bioRxiv. https://doi.org/10.1101/2022.03.29.486224.

Tuskes, P. M. 1985. The biology and immature stages of *Sphingicampa albolineata* and *S. montana* in Arizona (Saturniidae). *Journal of the Lepidopterists' Society* 39: 85-94.

Zapata, A. I., Navarro, F. R., Beccacece, H. M., Villafañe, N. A., Zarco, A., Drewniak, M. E., De Coll, O. R. 2012. Nuevos registros para la fauna de Saturniidae (Lepidoptera) en Argentina. *Revista de la Sociedad Entomológica Argentina* 71: 315-319.

Zarco, A., Zapata, A. I., Beccacece, H. M. 2015. Ciclo de vida de *Psilopygida crispula* (Dognin, 1905) (Lepidoptera: Saturniidae, Ceratocampinae). *SHILAP Revista de Lepidopterologia* 43: 321-329.