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**ASCALAPHIDAE (INSECTA: NEUROPTERA) DO
NORDESTE BRASILEIRO:
NOVOS REGISTROS E COMENTÁRIOS TAXONÔMICOS**

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**Ascalaphidae (Insecta: Neuroptera) do nordeste brasileiro:
novos registros e comentários taxonômicos**

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Resumo

Ascalaphidae é uma das 16 famílias da ordem Neuroptera e apresenta cerca de 450 espécies descritas em 100 gêneros e três subfamílias. São insetos geralmente grandes, que em seu habitus podem lembrar libélulas e/ou borboletas. Na América Latina, há registro de aproximadamente 15 gêneros e 90 espécies, das quais 37 possuem registro para o Brasil e apenas 13 para a região Nordeste. Desta forma, este estudo objetivou listar as espécies dos ascalafídeos no Nordeste brasileiro. O material examinado é oriundo do Programa de Pesquisa em Biodiversidade do Semiárido, sediado nas coleções da Universidade Federal da Bahia, Universidade Estadual de Feira de Santana e Universidade Federal do Piauí, e, especialmente, de material oriundo da Universidade Federal do Rio Grande do Norte. Os espécimes estão conservados em álcool a 80%, exceto cinco exemplares. Neste trabalho, 12 espécies (*Albardia furcata* Weele 1903, *Ameropterus breviantennis* Penny, 1981b, *Ascalobyas machadoi* Penny, 1981b, *Ascalorphne impavida* (Walker, 1853), *Fillus amazonicus* (Machado & Rafael, 2011), *Haploglenius flavicornis* (MacLachlan, 1871), *Ululodes bicolor* (Banks, 1895), *U. cajennensis* (Fabricius, 1787), *U. macleayanus* (Burmeister, 1839), *U. pilosus* Weele, 1909, *U. vetulus* (Rambur, 1842) e *Verticillecerus gerstaeckeri* Weele, 1909) de oito gêneros têm sua distribuição geográfica ampliada para o nordeste, elevando para 21 o número de espécies registradas para a região. Destas, cinco constituem novos registros para a Bahia (*Albardia furcata*, *Ameropterus breviantennis*, *Ululodes cajennensis*, *U. macleayanus* e *U. vetulus*), uma para o Piauí (*Albardia furcata*), 10 para o Rio Grande do Norte (*Albardia furcata*, *Ascalobyas machadoi*, *Ascalorphne impavida*, *Fillus amazonicus*, *Haploglenius flavicornis*, *Ululodes bicolor*, *U. cajennensis*, *U. macleayanus*, *U. pilosus* e *Verticillecerus gerstaeckeri*) e, por fim, duas são registradas para o Brasil pela primeira vez (*Haploglenius flavicornis* e *Ululodes bicolor*).

Abstract

Ascalaphidae is one of 16 families of the order Neuroptera, and consists of about 450 species described in 100 genera and 3 subfamilies. They are usually large and elegant insects, which in their form may resemble dragonflies and/or butterflies. In Latin America, there are approximately 15 genera and 90 species, of which 37 are registered for Brazil and only 13 in the Northeastern Region. Thus, this study aims to inventory unidentified specimens in several entomological collections in order to increase the distribution of owlflies in the Northeast of Brazil. The material examined was made available from PPBio of UFBA and UEFS, from donations made by the entomological collection of UFRN, and from some photographs of identified specimens from the UFPI. All specimens are preserved in 80% alcohol, except five pinned specimens. In this work, eight genera (*Albardia*, *Ameropterus*, *Ascalobyas*, *Ascalorphne*, *Fillus*, *Haploglenius*, *Ululodes* and *Verticillecerus*) and 12 species (*Albardia furcata* Weele 1903, *Ameropterus breviantennis* Penny, 1981b, *Ascalobyas machadoi* Penny, 1981b, *Ascalorphne impavida* (Walker, 1853), *Fillus amazonicus* (Machado & Rafael, 2011), *Haploglenius flavicornis* (MacLaclan, 1871), *Ululodes bicolor* (Banks, 1895), *U. cajennensis* (Fabricius, 1787), *U. macleayanus* (Burmeister, 1839), *U. pilosus* Weele, 1909, *U. vetulus* (Rambur, 1842) e *Verticillecerus gerstaeckeri* Weele, 1909) had its geographic distribution expanded to the northeastern Brazil, bringing to 21 the number of species registered for the region. Five of them are new records to Bahia state (*Albardia furcata*, *Ameropterus breviantennis*, *Ululodes cajennensis*, *U. macleayanus* and *U. vetulus*), one to Piauí state (*Albardia furcata*), 10 to Rio Grande do Norte state (*Albardia furcata*, *Ascalobyas machadoi*, *Ascalorphne impavida*, *Fillus amazonicus*, *Haploglenius flavicornis*, *Ululodes bicolor*, *U. cajennensis*, *U. macleayanus*, *U. pilosus* and *Verticillecerus gerstaeckeri*), and, two species are recorded to Brazil for the first time (*Haploglenius flavicornis* and *Ululodes bicolor*).

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Introdução geral

Neuroptera constitui uma ordem oligodiversa de insetos, que se destacam pelo seu papel ecológico como predadores, por sua grande diversidade em termos de morfologia larval (Badano *et al.*, 2016) e pela sua habilidade de explorar ambientes e nichos singulares, se estabelecendo tanto em ambientes aquáticos quanto em terrestres, sendo estes tropicais, temperados ou até mesmo áridos e semiáridos, o que reflete sua longa história evolutiva desde o Carbonífero (Winterton *et al.*, 2010).

A ordem possui aproximadamente 6000 espécies e é constituída de 16 famílias, divididas entre três subordens: Nevrorthiformia, Myrmeleontiformia e Hemerobiiformia (Oswald, 2016). Nevrorthiformia possui apenas uma família, Nevrorthidae, que é grupo-irmão das outras duas subordens, sendo representado por: Nevrorthidae + (Myrmeleontiformia + Hemerobiiformia). Myrmeleontiformia é constituída por cinco famílias, que apresentam dois grupos: (Psychopsidae + Nemopteridae) e (Nymphidae + (Ascalaphidae + Myrmeleontidae)) (Badano *et al.*, 2016). Já Hemerobiiformia possui as 10 famílias restantes (Ithonidae, Polystoechotidae, Chrysopidae, Hemerobiidae, Berothidae, Mantispidae, Dilaridae, Coniopterygidae, Osmylidae e Sisyridae) (Oswald, 2016), cujas relações são ainda pouco compreendidas. O grupo já foi muito questionado quanto a sua monofilia e existem hipóteses de que seja parafilético (Aspöck *et al.*, 2012).

Dentre os Myrmeleontiformia, os ascalafídeos impressionam por serem insetos grandes, e muitas vezes apresentarem coloração intensa, o que inclusive já os fez serem classificados juntamente com algumas borboletas no gênero *Papilio* Linnaeus, 1758 (Penny, 1981a). Em termos gerais, são também muito similares a Odonata, com suas grandes asas membranosas e enervadas, porém sendo facilmente diferenciados destes pela presença de longas antenas clavadas. Em sua forma larval, os Ascalaphidae são predadores “senta-e-espere”, e capturam suas presas (outros invertebrados) com suas longas mandíbulas ocas, que injetam um veneno paralisante para depois sugar seus fluidos internos (Henry, 1977). Os adultos costumam voar ao amanhecer e ao entardecer, possivelmente como uma estratégia de sobrevivência, uma vez que seus principais predadores aéreos, libélulas e morcegos, têm atividade diurna e noturna, respectivamente (Penny, 1981a).

Ascalaphidae Lefebvre, 1842, que inclui cerca de 450 espécies conhecidas (Badano *et al.*, 2016), é atualmente classificada em três subfamílias. Haplogleniinae Newman, 1853, apresenta

cerca de 100 espécies em 24 gêneros, e distribuição em América do Norte a América do Sul, África, Madagascar e Ásia ocidental. A segunda subfamília é a cosmopolita Ascalaphinae Rambur, 1842, que apresenta aproximadamente 350 espécies em 75 gêneros. Por fim, Albardiinae Weele, 1908, com uma única espécie, *Albardia furcata*, ocorrente no Brasil (Tjeder, 1992).

Para o Brasil, estão registradas 37 espécies de Ascalaphidae em nove gêneros e três subfamílias. Treze destas espécies possuem registro para a Região Nordeste (Bahia, Ceará, Maranhão e Pernambuco) e quatro com registros incertos (Penny, 1977, 1981a, 1981b; Machado & Rafael, 2011; Ábrahám, 2013).

Este trabalho apresenta uma lista das espécies das Ascalaphidae ocorrentes na Região Nordeste do Brasil, incluindo novos registros, assim como mapas de distribuição geográfica, além notas taxonômicas para algumas das espécies.

Capítulo 1

Este capítulo apresenta o manuscrito intitulado “Ascalaphidae from Brazilian Northeast region: new records and taxonomical remarks” a ser submetido ao periódico Checklist Journal of species lists and distribution (ISSN 1809-127X).

Lists of Species (LS)

Title:

Ascalaphidae from Brazilian Northeast region: new records and taxonomical remarks

Running title:

Ascalaphidae from Brazilian Northeast region

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Abstract

Three subfamilies, nine genera and 37 species of owlflies have been recorded in Brazil, 13 of which occurs in Northeast Region. The last study on owlfly biodiversity in Brazilian Northeast Region dated four decades ago. In this study we provided new records and distributional notes of Ascalaphidae over Northeastern Brazil, including 12 species. Additional taxonomical remarks were provided to complement some species descriptions. Ascalaphid fauna occurring in Brazilian Northeast was updated to 21 species. Five of them are new records to Bahia state (*Albardia furcata*, *Ameropterus breviantennis*, *Ululodes cajennensis*, *U. macleayanus* and *U. vetulus*), one to Piauí state (*Albardia furcata*), 10 to Rio Grande do Norte state (*Albardia furcata*, *Ascalobyas machadoi*, *Ascalorphne impavida*, *Fillus amazonicus*, *Haploglenius flavicornis*, *Ululodes bicolor*, *U. cajennensis*, *U. macleayanus*, *U. pilosus* and *Verticillecerus gerstaeckeri*), and, two species are recorded to Brazil for the first time (*Haploglenius flavicornis* and *Ululodes bicolor*).

Introduction

Ascalaphidae Lefebvre, 1842, includes about 450 known species, in 100 genera and three subfamilies (Albardiinae Weele, 1908, Ascalaphinae Rambur, 1842 and Haplogleniinae Newman, 1853) (Tjeder, 1992). About 15 genera and 90 species have records for Latin America, in which 37 species are registered for Brazil (Penny, 1977, 1981; Machado & Rafael, 2011; Ábrahám, 2013).

Ascalaphidae suffers from the lack of comprehensive revisionary taxonomic works, the last one being from Van der Weele, 1909, in which he treated 216 species. Penny (1981b, 2002), New (1984), and Tjeder (1992) performed reviews of different groups of owlflies, but all of them dealt with local specimens and none provided identification keys for all species from the genera they worked with (Jones, 2014).

Nevertheless, while one cannot deny that there has been some recent taxonomic progress involving Haplogleniinae species, very few advance has been made with Ascalaphinae, which reflects on the confusing taxonomic statuses of many species from *Ululodes*, *Ameropterus* and other Ululodini and non-Ululodini genera. Weele (1909) rised doubts in many of the species descriptions, and stated that many of them demanded revision. However, since his work in 1909 there has been almost none comprehensive researches on the taxonomic statuses of many of South American species of Ascalaphidae.

Penny (1981a, 1981b) delivered the first faunal and taxonomic study of owlflies in Brazil, focused on Amazonian species. Since then, no other research has been done about Brazilian Ascalaphidae, except the recent description of *Fillus amazonicus* by Machado & Rafael (2011). Therefore, apart from Amazonian species, Brazilian checklists are outdated by at least 40 years.

Hereupon, in this paper we provide a checklist of owlflies from Brazilian Northeast region, including new records, taxonomical remarks and distribution maps.

Material and methods

The material (302 specimens) was identified using taxonomical keys (e.g., Penny (1981a, 1981b, 2002); Abraham (2013), and comparison to original descriptions. Wing venation and morphology terminology follows Tjeder (1992). Specimens are preserved in alcohol 80%, except five pinned specimens. Specimens comes from Museu de Zoologia da Universidade Estadual de Feira de Santana (UEFS), Museu de Zoologia da Universidade Federal da Bahia (UFBA), and Coleção de História Natural da Universidade Federal do Piauí (CHNUFPI). New geographic distributional records are depicted in bold. Map of collect points (Figure 1) and geographic distribution maps (Figures 3 to 24) were made using QGIS 2.18 and Adobe Photoshop CS4.

Results

Twenty one species have been listed as having distributional records for Northeastern Brazilian region, in which 12 make up the examined material species. Of these, 10 count as new records for Rio Grande do Norte state, one new record for Piauí state, and five for Bahia state. Nine species are new records for the Northeastern Brazilian region, and two make up new records for Brazil. The other nine species were previously recorded for Northeastern Brazil and include in the checklist, while another four species have dubious distributional records.

The checklist is presented below, including geographical distribution data and diagnosis. For some species, taxonomic remarks and photographs are also provided. A table is presented with resumed species list (Table 1).

Codes for the Brazilian states are as follow: Amazonas (AM), Bahia (BA), Ceará (CE), Espírito Santo (ES), Mato Grosso (MT), Minas Gerais (MG), Pará (PA), Paraná (PR), Pernambuco

(PE), Piauí (PI), Rio de Janeiro (RJ), Rio Grande do Norte (RN), Rio Grande do Sul (RS), Rondônia (RO), Santa Catarina (SC), São Paulo (SP).

Checklist of Ascalaphidae from Northeastern Brazil

ALBARDIINAE

***Albardia furcata* Weele, 1903**

Diagnosis. Antennae short, clubbed; intense pilosity; reddish abdominal tergites and male terminalia with unusual hairy, black colored forceps (Penny, 1983) (Figure 2).

Previous distribution. Brazil (CE, ES, MG, MT, RJ, RS, PA, PE) (Weele, 1903; Penny, 1983, Willinner, 1991).

Examined material. Brazil: RN, Serra Negra do Norte, ESEC Seridó, 29.I.2000, Varela, A.A., 3 males (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 17.IV.1999, Equipe Trilhos, 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 23.III.1995, EquipeECO95.1, 1 female (UFBA); RN, Serra Negra do Norte, Seridó, Jucurutu, R.E. Stoessel de Brito, 17.II.1994, Freire A.A.V., 3 females (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 10.III.2005, Costa, 9 males, 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 10.III.2003, Costa, 5 males, 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, Varela, A.A., 28–29.I.2000, 2 males (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 1993, Freire, A.A.V., 2 males (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 12.III.1993, Varela, A.A., 1 male (UFBA); RN, Caicó, ESEC Seridó, 15.I.2014, Gomes, 1 male (UFBA); RN, Jucurutu, R. E. Stoessel de Brito, 12.III.1994, Varela, A.A., 3 females (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 28.III.1992, Varela, A.A., 1 female (UFBA);

RN, Ipueira, Centro, 20.V.2013, Medeiros, A.G.N., 4 females (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 10.III.2013, Corte, L.V.W., 6 males, 4 females (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 24.I.1991, Silva, 1 male (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 09–10.V.2003, Freire, A.A.V., 1 male (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 07–08.III.1997, Varela, A.A., 2 males, 4 females (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 10.III.2003, Corte, L.V.W., 7 males (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 21.II.2009, Varela, A.A., 3 males, 3 females (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 28–29.I.2000, Varela, A.A., 1 male (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 22.I.2014, Gomes, L.F.S., 1 male (UFBA); RN, Goianinha, Fz. Jardim, 05.V.2015, Grilo, M., 1 male (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 21.II.2009, Varela, A.A., 6 males (UFBA); RN, Caicó, Sitio Lagoa do Meio, 21.II.1987, Adalberto, Canindé, Moacir, and Severino, 4 males, 2 females (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 17.II.1999, Equipe TRILHAS, 2 males (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 14.II.1993, Varela A.A., 1 male (UFBA); RN, Serra Negra do Norte, ESEC Seridó, I.2006, Varela, A.A., 2 males, 2 females (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 10.III.2005, Costa, 7 males (UFBA); PI, Floriano, Carvalho, L., 1 female (CHNUFPI); BA, Lençóis, Balneário St. Antônio, Carvalho, L., 1 male (CHNUFPI).

Distribution. Brazil (BA, CE, ES, MG, MT, RJ, RN, RS, PA, PI, PE) (Figure 3).

Taxonomical remarks. *Albardia furcata* is one of the biggest South American neuropterans and is difficult to be mistaken for another species. It is the only species described for Albardiinae and it is known to be endemic to the Brazilian territory. Samples from Floriano and Lençóis are from photographs.

ASCALAPHINAE

Ameropterus breviantennis Penny, 1981

Diagnosis. Small size in comparison to other *Ameropterus*, and short antennae, which does not reach forewing pterostigma (Penny, 1981b) (Figure 4).

Previous distribution. Brazil (PA) (Penny, 1981).

Examined material. BA, Catu, Mata do Guigó, 04–05.II.2010, 1 female (UFBA).

Distribution. Brazil (BA, PA) (Figure 5).

Taxonomical remarks. Penny in 1981 described *Ameropterus breviantennis* based on a single male from state of Pará, in North Brazil. The examined specimen is larger in comparison to male description by Penny (1981b), but the difference can be result of the sexual dimorphism.

***Ameropterus versicolor* (Burmeister, 1839)**

Diagnosis. Antennae yellow, black ringed, with long black setae at the base. Clubbed tip yellow, with top third black. Female antennae slightly shorter than forewings, male antennae a bit longer than female's. Elongated legs, dorsally yellow and ventrally black (Weele, 1909).

Distribution. Brazil (BA, ES, RJ, RS, SC, SP), Paraguay, Peru (Weele, 1909, Navás, 1916) (Figure 5).

Taxonomic remarks. Weele (1909) mentioned some variation in wing slenderness between northern and southern samples. The latter had slender wings.

***Ameropterus muelleri* (Weele, 1909)**

Diagnosis. Hindwing much shorter than forewing, the latter having two rows of cells at apex area, while hindwing has only one row of cells. Wing tips lanceolate. Between hindwing M and Cu mid

third, there is an oblong, watery brown marking. Body dorsally black, ventrally yellow (Weele, 1909).

Distribution. Brazil (BA, ES) (Weele, 1909) (Figure 5).

***Ameropterus* sp. 1**

Diagnosis. Antennae short, not reaching forewing pterostigma, with dark brown-light brown striped coloration. Slender, brown spotted wings. The male exhibit long, forceps-like ectoproct (Figure 6), while the female show shorter ectoproct which length is about 1/3 that of the male (Figure 6).

Examined material. RN, Serra Negra do Norte, ESEC Seridó, 10–11.XI.2002, Varela, A.A., 1 male (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 01–02.V.2003, Varela, A.A., 1 male, 1 female (UFBA); RN, Caicó, Seridó, 20–21.II.2002, Varela, A.A., 1 male (UFBA).

Distribution. Brazil (RN) (Figure 5).

Taxonomical remarks. The specimens identified have antennae that does not reach forewing pterostigma, like *Ameropterus breviantennis*, but its slender, brown-spotted wings, striped antennae, and lighter body pigmentation differs from Penny description of *A. breviantennis*, which leads to believe that it could be a new species.

***Ascalorphne impavida* (Walker, 1853)**

Diagnosis. Shorter and few pronounced setae on antennae base, weak pronounced hourglass-shaped yellow notal marks (Penny, 1981b) (Figure 7).

Previous distribution. Brazil (MA, PA) (Penny, 1981b).

Examined material. RN, Serra Negra do Norte, ESEC Seridó, V.2005, 2 females, 2 males (UFBA); RN, Alto do Rodrigues, 17–18.VII.1996, Equipe 7, 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, IV.2005, Varela, A.A., 4 males (UFBA); RN, Serra de São Bento, 07.V.2006, Freire, A.A.V., 1 female (UFBA); RN, Martins, 04.V.2013, Ferreira, V.D.S., 1 male (UFBA).

Distribution. Brazil (PA, MA, **RN**) (Figure 8).

Taxonomical remarks. Another diagnosable feature is that *Ascalorphne impavida* is significantly smaller in relation to *Ascalorphne macrocerca*.

Ascalorphne macrocerca (Rambur, 1842)

Diagnosis. This species is very similar to *Ascalorphne impavida*, however it is significantly larger in size, and has more pronounced yellow notal markings (Weele, 1909).

Distribution. Brazil (BA, ES, RJ, SC) (Weele, 1909) (Figure 8).

Examined material. Brazil, RJ, Rio de Janeiro, Nova Campinas, 28.XI.2010, Lopes, T.R.P., 1 female (UFBA).

Cordulecerus alopecinus (Burmeister, 1839)

Diagnosis. Antennae reaching forewing pterostigma, clubbed tip red, with dark ventral longitudinal line. Thorax dorsally yellow, with medial brown patch. Head and thorax with dense red pilosity. Abdomen first segment with red setae. Terminalia red or brown colored, with small black setae. Male hindwing with semicircular lobes at wing base and at the end of CuP sinuous curve. Female hindwing has no such thing, however may or may not show a brown, triangular spot on anal margin (Weele, 1909).

Distribution. Brazil (BA, MG, SP) (Weele, 1909) (Figure 9).

***Cordulecerus unicus* (Walker, 1858)**

Diagnosis. Antennae yellow, reaching almost to pterostigma. Forewing triangular shaped, hyaline, with brown-spotted Sc vein. Hindwing triangular shaped, almost entirely black pigmented, with yellow veins (Weele, 1909).

Distribution. Brazil (BA, ES) (Weele, 1909) (Figure 9).

Taxonomic remarks. This species, together with *Cordulecerus maclachlani*, *Cordulecerus praecellens* and *Cordulecerus subiratus*, forms a group in that the gender difference is no longer expressed by the anal margin of hindwing. The semaphoront are instead distinguished by terminalia and wing coloration.

***Cordulecerus subiratus* (Walker, 1853)**

Diagnosis. Male antennae longer than forewing and female antennae reaching forewing pterostigma. Thorax dorsally grey, with broad black stripes and black setae on medial and lateral areas. Wings both the same width, in the male the hindwing being wider. Forewing with brown-spotted Sc vein, hyaline, only brown colored at forewing base, in males the brown pigmentation can extend over to one third of wing length. Male hindwing base with very intense black and yellow coloration. In the female, the coloration is sparser (Weele, 1909).

Distribution. Brazil (BA, RS), Guatemala, Honduras, Mexico (Weele, 1909) (Figure 9).

***Fillus amazonicus* Machado & Rafael, 2011**

Diagnosis. This species has clear wings, and eyes with a slight developed latitudinal depression. The male has a conical dorsal projection on the first abdominal tergite (Machado & Rafael, 2011) (Figure 10).

Previous distribution. Brazil (AM) (Machado & Rafael, 2011).

Examined material. Brazil: RN, Serra Negra do Norte, ESEC Seridó, 17.VII.2008, Varela, A.A., 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 23.V.2004, Varela, A.A., 1 female (UFBA).

Distribution. Brazil (AM, RN) (Figure 11).

Taxonomical remarks. This species is described based mostly on the unusual male terminalia and first abdominal tergite. Although this study only present female specimens, its morphology agrees with female description from Machado & Rafael (2011).

***Ululodes bicolor* (Banks, 1895)**

Diagnosis. Very similar to *Ululodes macleayanus*, but has white pterostigma on forewings and dark pterostigma on hindwings (Weele, 1909) (Figure 12).

Previous distribution. Costa Rica, Honduras, Mexico, Panama, US (Weele, 1909, Penny, 2002).

Examined material. RN, Serra Negra do Norte, ESEC Seridó, 23.VII.1991, Varela, A.A., 1 male (UFBA); RN, Serra Negra do Norte, Açude Campos I, 07–08.III.1997, Varela, A.A., 1 male (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 29.VII.1991, Silva-Melo, J.R., 1 male (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 19.VIII.1999, Varela, A.A., 1 male (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 10.VI.1997, Varela, A.A., 1 male (UFBA); RN, Serra Negra do

Norte, ESEC Seridó, 29–30.V.1998, Varela, A.A., 1 male (UFBA); RN, Serra Negra do Norte, ESEC Seridó, VII.2006, Varela, A.A., 1 male; RN, Serra Negra do Norte, ESEC Seridó, IV.2005, Varela, A.A., 1 female; RN, Serra Negra do Norte, ESEC Seridó, 10–11.IV.2003, Varela, A.A., 1 male (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 01–02.V.2005, Varela, A.A., 1 male (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 01.III.1996, Varela, A.A., 1 male (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 12.II.1993, Varela, A.A., 1 male (UFBA); RN, João Câmara, COHAB, 20.IV.2014, Nascimento, V.V., 2 males (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 22.VII.1991, Brito, F.E.S. & Varela, A.A., 1 male (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 25.IV.2009, Freire & Varela, A.A., 1 male (UFBA); RN, Carnaubais, ET 188, 25–26.VIII.1995, Team ASSB, 2 males (UFBA); RN, Nisia Floresta, Pium, 25.V.2010, Nascimento, 1 male (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 21.II.2009, Varela, A.A., 1 male (UFBA); RN, Alto do Rodrigues, 02.V.1995, 1 male (UFBA); RN, Serra Negra do Norte, Açude Campos I, 07–08.III.1997, Varela, A.A., 1 male (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 10.XII.1999, Lem, C.A.V., 2 males (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 20–21.VIII.1999, Varela, A.A., 1 male (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 11–12.V.1997, Varela, A.A., 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 14–16.III.2012, Santana, E., 1 female (UFBA); RN, Natal, 09.V.2012, Salvino, S.C.A, 1 male (UFBA).

Distribution. Brazil (RN), Costa Rica, Honduras, Mexico, Panama, USA (Figure 13).

Taxonomic remarks. *Ululodes bicolor* does not have any previous records to South America, which creates doubt in which the examined specimens are in fact *U. bicolor* or not. However, the examined specimen's features fit Weele description of *U. bicolor*, most of all the different colored pterostigma in forewing and hindwing. Another species, *Ululodes costanus* Navás, 1914, which has records for Brazil, also describes nicely the examined specimens. However, since Navás gives way less detail in his descriptions, *Ululodes bicolor* was regarded as a better choice.

***Ululodes cajennensis* (Fabricius, 1787)**

Diagnosis. Pale pterostigma in both wings. Penny (1981b) describes the male having a large infuscated area in apex of hindwing (Figure 14).

Previous distribution. Argentina, Brazil (AM, MA, MT, PA, RO), Costa Rica, Ecuador, French Guyana, Guatemala, Guyana, Mexico, Paraguay, Peru, St Lucia Island, Surinam, Venezuela, (Weele, 1909; Navás, 1932; Penny, 1981, 2002).

Examined material. BA, Abaíra, Catolés, 30.X.2013, Calor, A., Dias, E. and Campos, R., 1 male (UFBA); CE, Banabuiu, 24.IV.2014, Dias, E. and Duarte, T., 1 female (UFBA); RN, Extremoz, 03.IX.2011, 1 female (UFBA); RN, João Câmara, Bela Vista, 26.XI.2011, Dantas, 1 male (UFBA); RN, São Paulo do Potengi, 07.V.2007, Menezes, L.F., 1 female (UFBA); RN, Natal, 12.IX.2011, Amarante, R.A., 1 female (UFBA); RN, Ceará-mirim, 19.XI.2011, Sorral-Alves, R., 1 female (UFBA); RN, Natal, 01.VI.2012, Rocha. N.R., 1 female (UFBA); RN, Natal, 03.XII.2012, Erickson, M.F., 1 female (UFBA); RN, Dr. Severiano, 28.II.2014, Albuquerque, G.F., 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 22.I.2006, Varela, A.A., 2 females (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 10.XII.1999, Lem, C.A.V., 1 male, 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 12.XI.1991, Brito, 1 male (UFBA); RN, Macaíba, 11–12.II.2000, Chao, Chen and Varela, A.A., 1 male (UFBA); RN, Parnamirim, 03.III.2014, Emerenciano, Silva, 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 04.X.1991, Brito, 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 09.V.1996, Oliveira, 1 male (UFBA); RN, Natal, 6.V.2015, Silva, 1 male (UFBA); RN, Serra Negra do Norte, Açude Campos I, 07–08.III.1997, Varela, A.A., 3 males (UFBA); RN, Alto do Rodrigues, 02.V.1995, 1 male (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 01.III.1996, Oliveira and Varela, A.A., 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 28–30.VI.1999, Varela, A.A., 1 female (UFBA); RN,

Alto do Rodrigues, 17–18.VII.1996, Equipe 7, 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 15.III.2008, Varela, A.A., 1 male (UFBA); RN, Serra Negra do Norte, ESEC Seridó, VII.2006, Varela, A.A., 6 females (UFBA); RN, Serra Negra do Norte, ESEC Seridó, VI–VII.2007, Varela, A.A., 2 females, 1 male (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 16–17.IX.1993, Varela, A.A., 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 01–02.V.2003, Varela, A.A., 2 males (UFBA); RN, Serra Negra do Norte, Açude Campos I, 06–07.IV.1997, Varela, A.A., 1 male (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 25.IV.2009, Varela, A.A., 5 males, 2 females (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 01.VI.1997, Varela, A.A., 1 male; RN, Serra Negra do Norte, Açude Campos I, 12.XI.1994, Varela, A.A., 3 males (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 31.VIII.1991, Rocha, O.F. and Silva-Brito, 5 females (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 11.V.1997, Varela, A.A., 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 29.VIII.1991, Varela, A.A., 1 male, 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 07.VIII.1991, Rocha, O.I.F. and Silva-Neto, 1 female (UFBA); RN, Alto do Rodrigues, ARG 189, 03-04.II.1995, 2 females (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 31.VIII.1993, Varela, A.A., 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 23–24.VI.1997, Varela, A.A., 1 male (UFBA); RN, Caicó, 20–21.II.2002, Varela, A.A., 1 male (UFBA); RN, João Câmara, COHAB, 20.IV.2014, Nascimento, V.V., 1 male (UFBA); RN, João Câmara, 15.III.1986, Varela, A.A. and Team, 1 female (UFBA); RN, Carnaubais, Estreito 6, 05–06.II.1995, 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, IV.2005, 4 females (UFBA); RN, São Francisco do Oeste, 20.VII.2006, Barbosa, M.M.B., Kramer, M.A.F. and França, K.L.B., 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 21.II.2009, Varela, A.A., 2 females (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 09–10.V.1997, Varela, A.A., 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 09–10.IV.2000, Varela, A.A., 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 23.I.1996, Silva, 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 07.IV.1996, Varela, A.A., 1 male; RN, Carnaubais, Estreito 06, 01–

07.V.1995, Varela, A.A., 1 male (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 05–06.VII.2003, Varela, A.A., 1 male (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 11.III.1993, Varela, A.A., 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 16–17.IV.2003, Varela, A.A., 1 female (UFBA); RN, São Vicente, 05.III.2014, Ferré, I., 1 male (UFBA); RN, Mossoró, Canto do Amaro, 05–06.III.1995, 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 19.IX.1991, Brito, P.O.S., 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 31.IV.1997, Varela, A.A., 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 19.VIII.1999, Varela, A.A., 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 20.I.1996, Varela, A.A., 2 females (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 23.VII.1991, Varela, A.A., 1 male, 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 21.III.1993, Varela, A.A., 1 female (UFBA).

Distribution. Argentina, Brazil (AM, BA, MA, MT, PA, RN, RO), Costa Rica, Ecuador, French Guyana, Guatemala, Guyana Surinam, Mexico, Paraguay, Peru, Saint Lucia Island, Venezuela (Figure 13).

Taxonomic remarks. Penny and Weele (1981b; 1909) described *Ululodes cajennensis* male specimens as having a large infuscated area in apex of hindwing, but none of the *U. cajennensis* identified present this trait. In addition, Weele (1909), and Penny (2002) mentioned *U. cajennensis* long antennae, which reaches beyond forewing pterostigma. However, Penny (1981b) described *U. cajennensis* as having antennae that reach “almost to forewing pterostigma”. Among all specimens examined, there were both specimens whose antennae reach forewing pterostigma, and those whose antennae do not reach forewing pterostigma.

***Ululodes macleayanus* (Burmeister, 1839)**

Diagnosis. *Ululodes macleayanus* is diagnosed by the dark pterostigma in both wings, frequently exhibiting infuscations below hindwing pterostigma (Penny, 1981b) (Figure 15).

Previous distribution. Antilles, Argentina, Brazil (AM, ES, RJ, RS, SP), Colombia, Costa Rica, Haiti, St. Lucia Island, St. Vincent Island, US, Venezuela (Weele, 1908; Navás, 1912; Penny, 1981, 2002).

Examined material. Brazil, BA, Abaíra, Catolés, 01.XI.2013, Calor, A., Campos, R. & Dias, T., 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 22.I.2006, Varela, A.A., 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 01.VIII.1991, Rocha, O.I.F., Silva, 2 males (UFBA); RN, Natal, 15.X.2008, Santos, L.B., 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 03-07.VI.1999, Varela, A.A., 1 male, 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 09-10.V.1997, Varela, A.A., 1 male (UFBA); RN, Mossoró, Canto do Amaro, 18-19.VI.1996, 1 female (UFBA); RN, São Vicente, 05.III.2014, Ferré, I., 1 male (UFBA).

Distribution. Antilles, Argentina, Brazil (AM, **BA**, ES, RJ, **RN**, RS, SP), Colombia, Costa Rica, Cuba, Haiti, St Lucia Island, St. Vincent Island, US, Venezuela (Figure 13).

***Ululodes pilosus* Weele, 1908**

Diagnosis. Very similar to *Ululodes cajennensis*, but has narrower wings, somewhat widened towards the tip, and white setae along the body (Weele, 1909) (Figure 16).

Previous distribution. Brazil (BA, PE) (Weele, 1909).

Examined material. BA, Abaíra, Catolés, 30.X.2013, Calor, A., Dias, E. and Campos, R., 1 male (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 03-04.VIII.2002, Varela, A.A., 1 male (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 19.IV.1991, Brito, P.O.S., 1 female (UFBA); RN, Serra

Negra do Norte, ESEC Seridó, 26.XI. 2010, Varela, A.A., 1 female (UFBA); RN, Serra de São Bento, 12.IX.2015, Garcia, G.S., 1 male (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 31.VII.1993, Varela, A.A., 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, VI.VII.2007, Varela, A.A., 1 male (UFBA); RN, Serra Negra do Norte, ESEC Seridó, VI-VII.2007, Varela, A.A., 2 males (UFBA); RN, Carnaubais, ET 188, 26.VIII.1995, Team ASSB, 1 male (UFBA); RN, Serra Negra do Norte, ESEC Seridó, VII-VII.2007, Varela, A.A., 2 females (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 28-29.VI.2003, Varela, A.A., 2 females (UFBA); BA, Iaçú, Rio Paraguaçu, 24.III.2012, Calor, A., Duarte, T., Garcia, I. and Quinteiro, F., 1 female (UFBA).

Distribution. Brazil (BA, PE, RN) (Fig. 13).

Taxonomic remarks. *Ululodes pilosus* has a dark-light striped colored Sc vein, which is induced by a darkened C vein. This trait can easily distinguish *U. pilosus* from other *Ululodes* species.

***Ululodes vetulus* (Rambur, 1842)**

Diagnosis. Abundant yellow coloration (Penny, 1981b) (Figure 17).

Previous distribution. Argentina, Brazil (AM, PA), Paraguay (Weele, 1909, Penny, 1981).

Examined material. Brazil, BA, Abaíra, Catolés, 01.XI.2013, Calor, A., Campos, R., & Dias, E., 1 female (UFBA).

Distribution. Argentina; Brazil (AM, BA, PA), Paraguay (Figure 13).

Taxonomic remarks. *Ululodes vetulus* is an exquisite species, easy to identify due to its yellow pigmentation, mainly on body pilosity and in its abdomen lateral marks. It also has a yellow-freckled, Sc vein.

HAPLOGLENIINAE

Amoeba chlorops (Blanchard, 1847)

Diagnosis. Wing apex not narrowed, subcostal field distinctly yellow or brownish, costal field also more clearly brown.

Distribution. Bolivia, Brazil (BA, ES, RJ, SC), Paraguay (Weele, 1909) (Figure 18).

Taxonomic remarks. Weele, 1909, described this species as being very similar to *Amoeba immaculata*, and suggested that the two species might actually be the same.

Ascalobyas machadoi Penny, 1981b

Diagnosis. This species can be diagnosed by its reduced size in comparison to other *Ascalobyas*, and by presenting clear forewing costal margin (Penny, 1981b) (Figure 19).

Previous distribution. Brazil (AM, PA, RO) (Penny, 1981b).

Examined material. RN, Baía Formosa, Mata Estrela, 22.III.2014, Carvalho, R.M., 1 female (UFBA).

Distribution. Brazil (AM, PA, RN, RO) (Figure 20).

Haploglenius costatus (Burmeister, 1839)

Diagnosis. Area beyond pterostigma only slightly dark, hindwing with dark pigmentation on apex area, pigmentation of costal area not extending to radial crossveins (Penny, 1981).

Distribution. Argentina, Bolivia, Brazil (BA, ES, MG, RS, SC), Colombia, Honduras (Weele, 1909; Williner, 1945, Abraham, 2013) (Figure 21).

Taxonomic remarks. Abrahám (2013) listed this species only being registered to Bahia, while Weele (1909) mentioned specimens from states RS, ES, SP, MG and SC.

***Haploglenius flavicornis* (Maclachlan, 1871)**

Diagnosis. Eyes without transverse sulcus. Wings with brown colored venation (female), axillary angle of the fore wings long and veined, antennae brown and costal area brown in both pairs of wings. Male antennae reddish-brown, about $\frac{3}{4}$ the length of the forewings, which have an elongated, pear-shaped axillary angle. In females, the antennae are shorter, being about $\frac{1}{2}$ of the forewing length (Weele, 1909) (Figure 22).

Previous distribution. Costa Rica, Guatemala, Mexico, Panama (Gerstaecker, 1894; Weele, 1909)

Examined material. RN, Serra Negra do Norte, ESEC Seridó, 07–09.IV.2004, Varela, A.A., 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 10–11.IV.2003, Varela, A.A., 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 23–24.IV.2003, Varela, A.A., 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 29.IV.2010, Jorge, 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 23–24.V.1997, Varela, A.A., 2 males (UFBA); RN, Serra Negra do Norte, ESEC Seridó, I.2006, Varela, A.A., 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 13.VI.2004, Dias da Silva, 1 female (UFBA).

Distribution. Brazil (RN), Costa Rica, Guatemala, Mexico, Panama (Figure 21).

***Haploglenius handlirschi* Weele, 1909**

Diagnosis. Wing hyaline; Costal and subcostal area of forewing and hindwing (apart from a narrow line at costal margin) dark, pterostigma darker. Exhibit dark wing pigmentation beyond pterostigma. Body dark brown, antennae yellow (Weele, 1909)

Distribution. Brazil (ES; PE; BA), Honduras (Weele, 1909, Abrahám 2013) (Figure 21).

***Verticillecerus gerstaeckeri* Weele, 1909**

Diagnosis. Eyes whole, without transverse sulcus. Accentuated axillary angle on the forewing. Presence of whorls of setae on basal antennae flagelomeres (Abrahám, 2013) (Figure 23).

Previous distribution. Argentina, Brazil (MG, RO, RJ), Paraguay (Weele, 1909, Williner, 1945, Penny, 1982, Abraham, 2013).

Examined material. RN, ESEC Seridó, VI–VII.2007, Varela, A.A., 1 male (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 15–16.V.2005, Varela, A.A., 1 female (UFBA); RN, Serra Negra do Norte, ESEC Seridó, 23–24.IV.2003, Varela, A.A., 1 female (UFBA).

Distribution. Argentina, Brazil (MG, RJ, **RN**, RO), Paraguay (Fig. 24).

Taxonomic remarks. *Verticillecerus gerstaeckeri* is the only species of *Verticillecerus*, being easily identified through the whorls of setae on antennae base.

Discussion

Ascalaphid fauna occurring in Brazilian Northeast was updated to 21 species. Five of them are new records to Bahia state (*Albardia furcata*, *Ameropterus breviatennis*, *Ululodes cajennensis*, *U. macleayanus* and *U. vetulus*), one to Piauí state (*Albardia furcata*), 10 to Rio Grande do Norte state (*Albardia furcata*, *Ascalobyas machadoi*, *Ascalorphne impavida*, *Fillus amazonicus*, *Haploglenius flavicornis*, *Ululodes bicolor*, *U. cajennensis*, *U. macleayanus*, *U. pilosus* and *Verticillecerus gerstaeckeri*), and, two species are recorded to Brazil for the first time (*Haploglenius flavicornis* and *Ululodes bicolor*).

Among previously recorded species for Brazil, four species have inexact locations, therefore, it could not be concluded if those species actually occur on North Eastern Brazil. These species are *Ameropterus integer* (MacLachlan, 1871), *Ameropterus ululoides* Weele, 1909, *Amoea immaculata* Olivier, 1789, and *Ascalobyas microcerus* (Rambur, 1842). *A. integer*, *A. ululoides*, and *A. immaculata* had type locality written only as “Brazil”, while *A. microcerus* was registered to “Eastern Brazil”, which is an outdated geoeconomic division for Brazilian territory that contains states from both North Eastern and South Eastern Brazil.

Lack of distributional records for many regions are revealing in that Ascalaphidae remains an under-sampled family, a fact that places itself as both the cause and the consequence of the few amount of owlfly taxonomic studies.

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Figures and legends

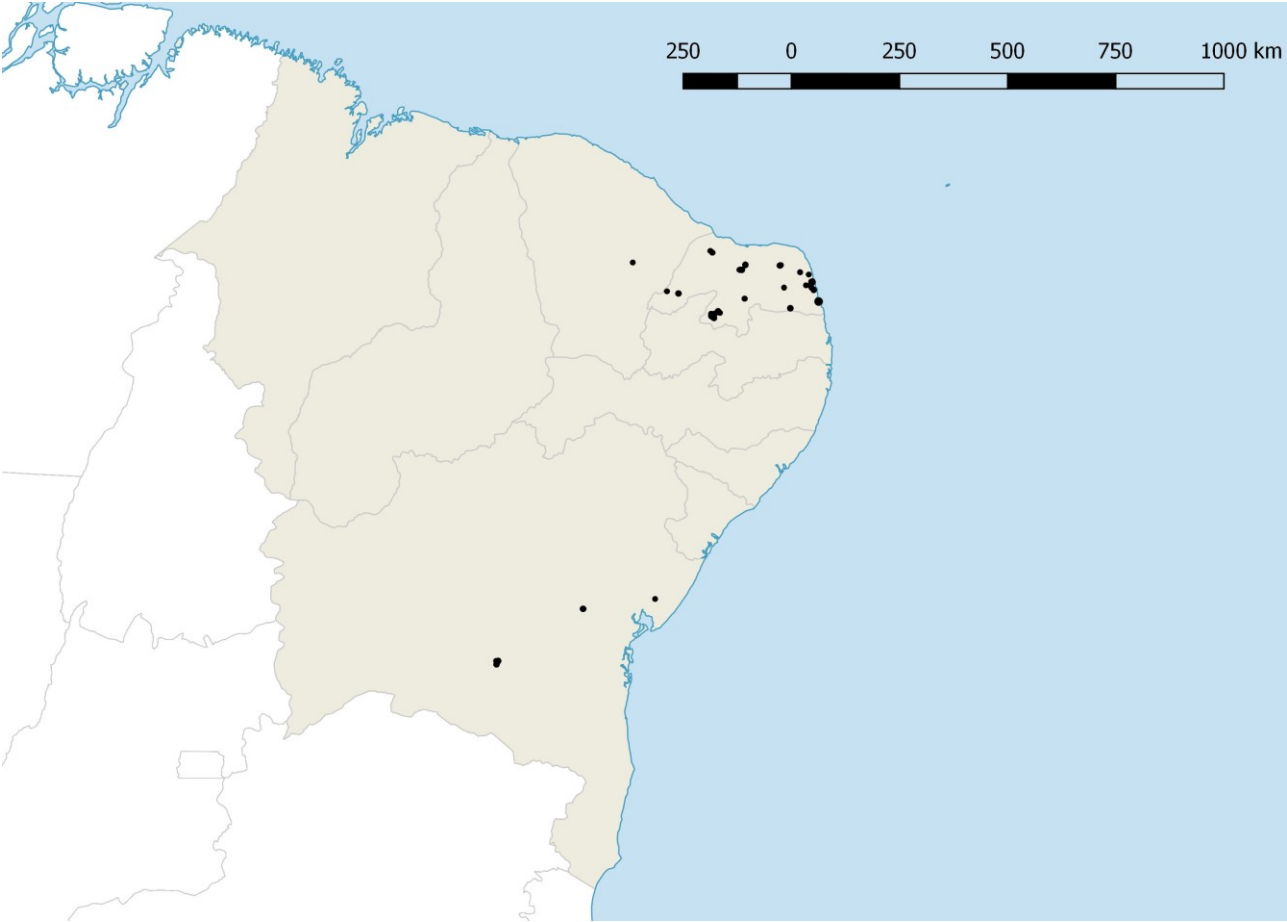


Figure 1. Map of Brazilian Northeast Region with all collection points from the examined specimens.

Família	Subfamília	Gênero	Espécie	Distribuição	
Ascalaphidae	Albardiinae	<i>Albardia</i>	<i>Albardia furcata</i>	BA, CE, ES, MG, MT, RJ, RN, RS, PA, PI, PE	
			<i>Ameropterus breviantennis</i>	BA, PA	
	Ascalaphinae	<i>Ameropterus</i>	<i>Ameropterus muelleri</i>	BA, ES	
			<i>Ameropterus versicolor</i>	BA, ES, RJ, RS, SC, SP	
			<i>Ameropterus sp. 1</i>	RN	
			<i>Ascalorphne impavida</i>	PA, MA, RN	
	Ascalaphinae	<i>Ascalorphne</i>	<i>Ascalorphne macrocerca</i>	BA, ES, RJ, SC	
			<i>Cordulecerus alopecinus</i>	BA, ES, RJ, SC	
		<i>Cordulecerus</i>	<i>Cordulecerus unicus</i>	BA, ES	
			<i>Cordulecerus subiratus</i>	BA, RS	
			<i>Fillus</i>	<i>Fillus amazonicus</i>	AM, RN
		Ascalaphinae	<i>Ululodes</i>	<i>Ululodes bicolor</i>	RN
				<i>Ululodes cajennensis</i>	AM, BA, MA, MT, PA, RN, RO
				<i>Ululodes macleayanus</i>	AM, BA, ES, RJ, RN, RS, SP
	<i>Ululodes pilosus</i>			BA, PE, RN	
	<i>Ululodes vetulus</i>			AM, BA, PA	
	<i>Amoea</i>			<i>Amoea chlorops</i>	BA, ES, RJ, SC
	Haplogleniinae	<i>Ascalobyas</i>	<i>Ascalobyas machadoi</i>	AM, PA, RN, RO	
		<i>Haploglenius</i>	<i>Haploglenius costatus</i>	BA, ES, MG, RS, SC	
			<i>Haploglenius flavicornis</i>	RN	
			<i>Haploglenius handilirshii</i>	BA, ES, PE	
		<i>Verticillecerus</i>	<i>Verticillecerus gerstaeckeri</i>	MG, RJ, RN, RO	

Table 1: Registered North Eastern Brazilian species of Ascalaphidae, with new records highlighted in bold letters.



Figure 2. Habitus of *Albardia furcata*, male, dorsal view.



Figure 3. Map of South America showing distributional records for *Albardia furcata*.



Figure 4. Habitus of *Ameropterus brevantennis*, female, dorsal view.



Figure 5. Map of neotropics showing distributional records for Brazilian Northeastern *Ameropterus*.



Figure 6. Habitus of of *Ameropterus* sp. 1. A. female, B. male.



Figure 7. Habitus of *Ascalorphne impavida*, male, dorsal view.



Figure 8. Map of Neotropics with distributional records of Brazilian Northeastern *Ascalorphne*.

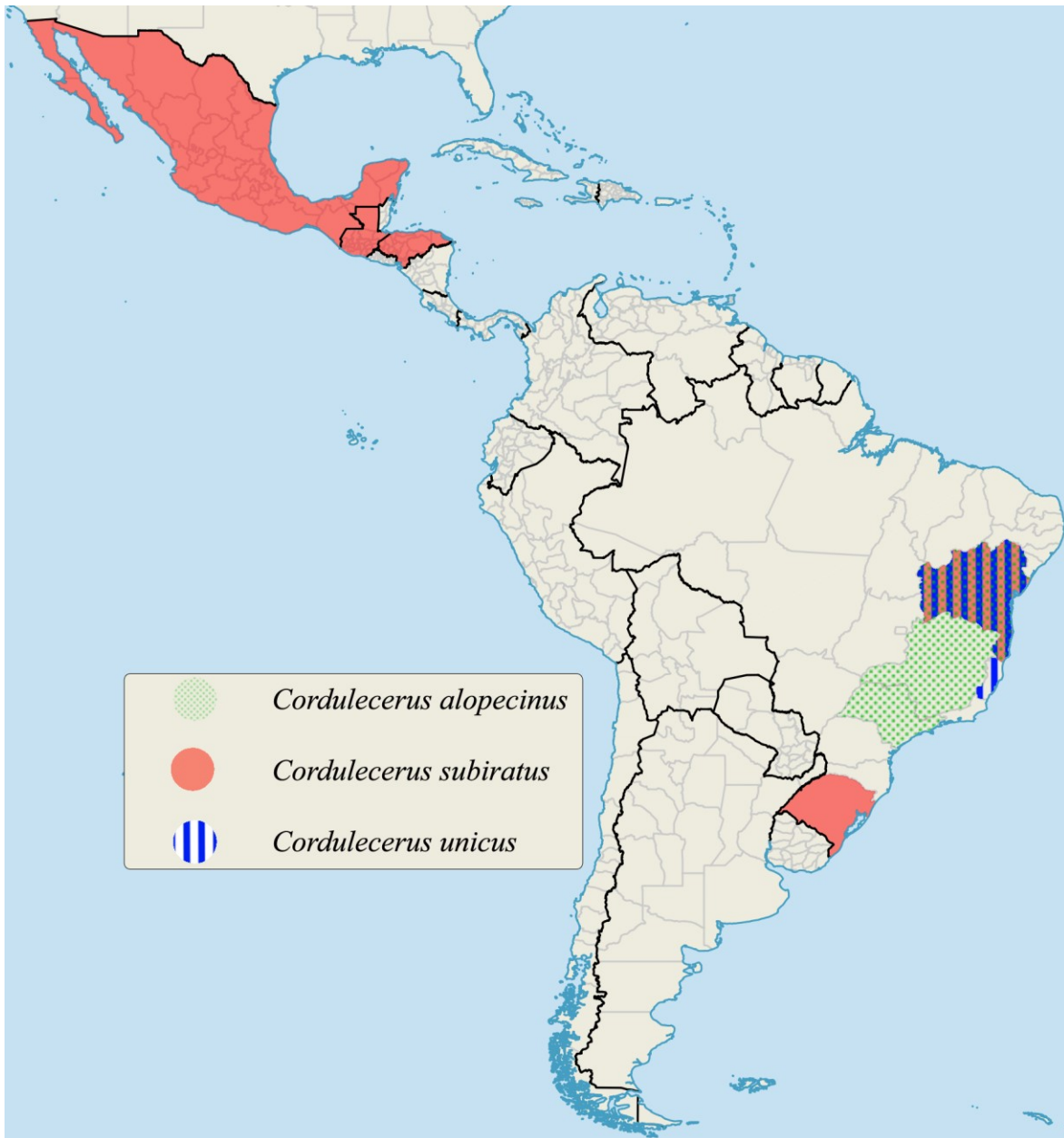


Figure 9. Map of Neotropics with distributional records for Brazilian Northeastern *Cordulecerus*.



Figure 10. Habitus of *Fillus amazonicus*, female, lateral view.



Figure 11. Map of South America showing distributional records of *Fillus amazonicus*.



Figure 12. Habitus of *Ululodes bicolor*, male, lateral view.



Figure 13. Map of Neotropics and southern North America showing distributional records for Brazilian Northeastern *Ululodes*.



Figure 14. Habitus of *Ululodes cajennensis*, female, dorsal view.



Figure 15. Habitus of *Ululodes macleayanus*, male, lateral view.



Figure 16. Habitus of *Ululodes pilosus*, male, lateral view.



Figure 17. Habitus of *Ululodes vetulus*, female, lateral view.



Figure 18. Map of Neotropics showing distributional records for Brazilian Northeastern *Ammoea*.



Figure 19. Habitus of *Ascalobyas machadoi*, female, dorsal view.



Figure 20. Map of South America showing distributional records of Brazilian Northeastern *Ascalobyas*.

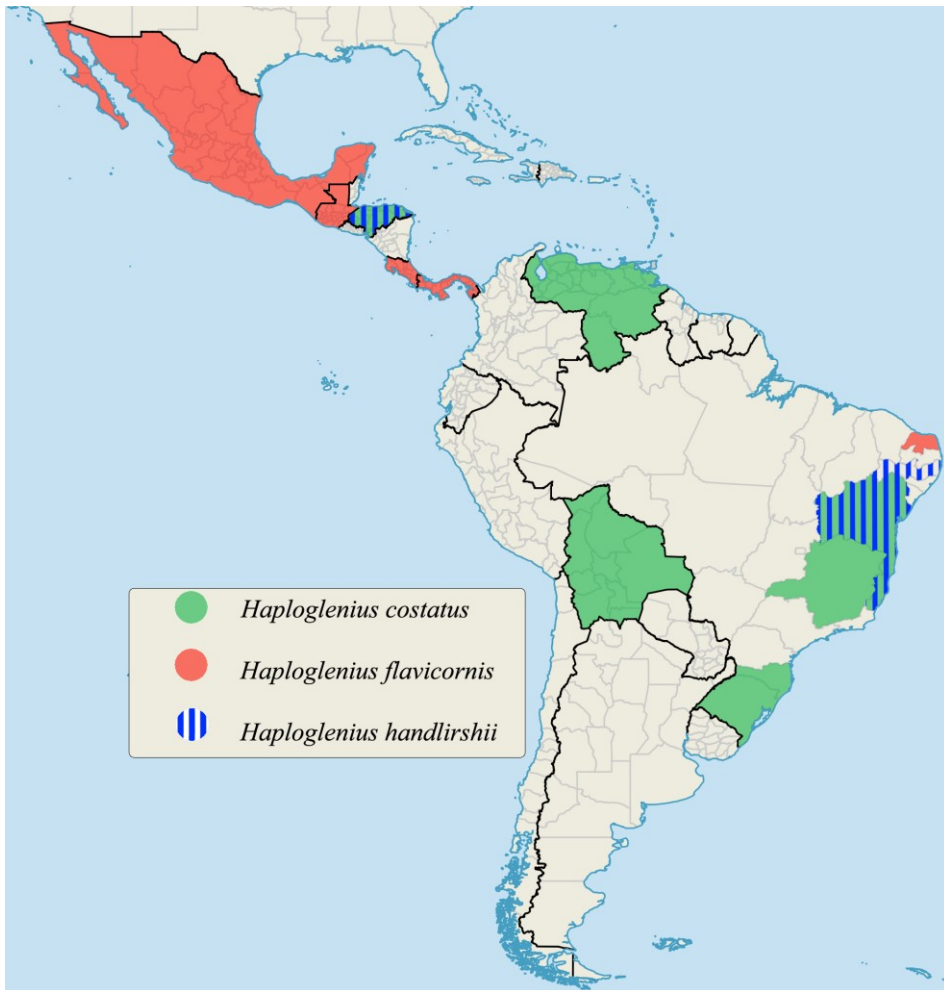


Figure 21. Map of Neotropics showing the distributional records of Brazilian Northeastern *Haploglenius*.



Figure 22. Habitus of *Haploglenius flavicornis*, female, lateral view.



Figure 23. Habitus of *Verticillecerus gerstaeckeri*, female, lateral view.



Figure 24. Map of Neotropics showing distributional records of *Verticillecerus gerstaeckeri*.

Considerações finais

Diante dos resultados obtidos, torna-se clara a lacuna existente no que se refere ao conhecimento faunístico e taxonômico acerca de Neuroptera, em especial de Ascalaphidae no Brasil. O estudo faunístico brasileiro mais recente sobre os ascalafídeos foi produzido por Penny em 1981, onde ele tratou apenas das espécies da bacia amazônica. Antes dele, Navás produziu algumas chaves taxonômicas e trabalhos revisionais para espécies brasileiras, porém esse autor é infame por produzir estudos taxonômicos carentes de detalhes.

Diversas revisões vêm sendo feitas ao redor do mundo (New, 1984, Tjeder, 1992), e algumas tratam inclusive de espécies brasileiras (Ábrahám, 2013), mas nenhum estudo se dá com inventário, coleta, revisão de gênero, ou produção de checklists voltadas especificamente para o país, o que se reflete numa desatualização de dados e registros distributivos, fato que muitas vezes se torna obstáculo para o desenvolvimento de mais trabalhos científicos no âmbito taxonômico.

A falta de pesquisadores e especialistas nessa família acaba também por resultar em um baixo número de amostragem nas coleções, e/ou em um grande volume de amostras não catalogadas, o que foi exemplificado com o atual estudo, uma vez que somente com a produção desta checklist, dobrou-se o número de espécies com registro para a região Nordeste.

Sendo assim, esperamos que este trabalho possa também influenciar futuros pesquisadores a se debruçar no ramo da taxonomia de Ascalaphidae, não somente na região Nordeste como no Brasil em geral, uma vez que todo o país sofre de uma lacuna de neuropterólogos, e novos especialistas poderão ampliar o que se conhece acerca da família com novos registros e possíveis novas espécies.

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Anexo 1

Regras para autores / Check List Journal of species lists and distribution

CATEGORIES OF PAPERS

Two types of papers are considered for publication: Lists of Species and Notes on Geographic Distribution.

Lists of Species (LS): Articles concerning a species inventory from a given locality.

Notes on Geographic Distribution (NGD): Articles concerning new distribution records of one or several species. A brief diagnosis of the treated species is required and high-resolution photographs of specimens highlighting diagnostic features can be requested by editors or reviewers. It is strongly recommended to have specimen verification done by an expert in the taxon. Authors must include a clear statement that justifies the importance of their findings in the context of the species' biogeography and/or conservation.

LANGUAGE

Manuscripts must be written in American or British English; be consistent in whatever form is used. If the author is not a native speaker, it is strongly recommend having the manuscript edited by a native English speaker or a professional translator before submission. Please, keep in mind that well written manuscripts usually go through review process faster. Submissions containing poor grammar may experience long delays before publication.

MANUSCRIPT INSTRUCTIONS

FORMATTING

The manuscript must be submitted electronically as a Word document (.doc) or Rich Text Format (.rtf), double-spaced throughout (including tables and references). Use A4 (21.0 x 29.7 cm) or US Letter (21.59 x 27.94) for the document size, leaving 2.0 cm margins on all sides. Please use Times New Roman 12 point and do not format table lines. All pages should be numbered consecutively. Footnotes are allowed only in tables. Please indicate the category (NGD or LS) in the first line of the document.

MANUSCRIPT TEXT

Title, running title, authors and affiliations, and Abstract must be in the Cover Page. Body text, Acknowledgments, Literature Cited, Tables and Figure captions must be in subsequent pages.

Title

Left to the author(s) discretion, but basic taxonomic information of studied taxa and area are necessary.

Examples: First Report on the Herpetofauna of Ataúro Island, Timor-Leste

First record of *Euborlasia nigrocincta* Coe, 1940 (Nemertea: Heteronemertea) from the western Pacific

Running Title

An abbreviated version of the Title.

Examples: Herpetofauna of Ataúro Island, Timor-Leste; First record of *Euborlasia nigrocincta* in western Pacific

Author(s)

Name(s) with respective institutions, with institutions listed in the order provided in the example, and corresponding author (provide e-mail):

First Name and Surnames^{1*}, First Name and Surnames² and First Name and Surnames³

¹ Universidade [...], Instituto de [...], Departamento de [...], Rua das Acácias, CEP 12345-000, São Paulo, SP, Brazil.

² University of [...], Department of [...], 1900 University Drive, San Diego, CA, USA 98777.

³ Museum of Natural History. 1300 Main Street, Victoria, BC, Canada V8W 1X1.

* Corresponding author. E-mail: author@company-or-university

Important Note: Starting in July 2014, NGDs will be limited to **up to five (5)** authors.

Abstract

Up to 150 words for Lists of Species.

Up to 90 words for Notes on Geographic Distribution.

Keywords

Up to five (5) keywords to index the manuscript should be included in the text following the abstract. Optionally, authors could also include geographical coverage of the study when submitting their manuscript through the submission system. These data will be used to index the manuscript after acceptance in our databases and ease its finding in search engines like Google.

Body Text

Lists of Species (LS) must be prepared separating the text into the following sections:

Introduction (brief).

Materials and Methods (including *Study site*, *Data Collection* and (if applicable) *Data Analysis*).

Results (information regarding the findings of the study, complemented by tables and figures if necessary).

Discussion (interpretation of the acquired results and their relationship with existing literature data must be present at this section).

Acknowledgments (optional; any sort of permits/authorizations should be mentioned in Materials and Methods, not in Acknowledgments).

Literature Cited (see below how to correctly format this section).

Author's contribution statement (The contribution of each author should be explicitly stated. For example, "JS collected the data, JS, ED and JB wrote the text, and MD made the analysis").

Notes on Geographic Distribution (NGD) must be written with no subheadings, except by Acknowledgments (optional), Literature cited (see below how to correctly format this section), and Author's contribution statement.

Nomenclature

Authors are entirely responsible for correct species identifications and checking their authority. But should also provide enough information to ascertain its identification by a potential reader, in the case of Notes on Geographic Distribution. However, it is strongly recommended to have specimen verification done by an expert in the taxon. When first mentioning a species, provide its complete binomial name including the authority and - for animals or "protozoans" - date.

Important Note: Starting in 2014, taxon authorities must be cited in *Check List* using an ampersand (&) instead of "and".

Examples:

Teratohyla midas (Lynch & Duellman, 1973)

Tapecomys primus Anderson & Yates, 2000

Thamnophilus divisorius Whitney, Oren & Brumfield, 2004

Adiantum tetraphyllum Humb. & Bonpl. ex Willd.

Mansoa difficilis (Cham.) Bureau & K.Schum.

Example of (hypothetical) taxon authorship and in-text citations in the same sentence:

Fladang nurosa (Reuel, Bratt & Morgan, 1889) and *F. kilonet* Niggle & Giles, 1937 are endemic to coastal regions of the country (Baggins and Gamgi 1954; Baggins *et al.* 1955).

Formatting Literature Cited

Journal titles should be cited in full, not abbreviated. Volume should be followed by issue number in parenthesis. Cited publications should be included in alphabetical order in the following

formats. **Note: starting in July 2014**, the Digital Object Identifier (DOI) in its short format (**without** this prefix <http://dx.doi.org>) or URL of online articles must be informed. Pay attention to the usage of upper and lowercases, commas, semi-colon, brackets, spaces (or lack of spaces), italics and foreign words:

Journal articles with usual volume and issue number:

Barroso, C.X., S.G. Rabay, F.D. Passos and H. Matthews-Cascon. 2013. An extended geographical distribution of *Donax gemmula* Morrison, 1971 (Bivalvia: Donacidae): New record from the Brazilian Northeastern coast. *Check List* 9(5): 1087–1090 (<http://www.checklist.org.br/getpdf?NGD116-13>).

Cardoso, P, T.L. Erwin, P.A.V. Borges and T.R. New. 2011. The seven impediments in invertebrate conservation and how to overcome them. *Biological Conservation* 144(11): 2647–2655 (doi: [10.1016/j.biocon.2011.07.024](https://doi.org/10.1016/j.biocon.2011.07.024)).

Chapter in an edited volume:

Tyrberg, T. 2009. Holocene avian extinctions; pp. 63–106, in: S.T. Turvey (ed.). *Holocene Extinctions*. New York: Oxford University Press.

Books:

Nelson, J.S. 2006. *Fishes of the World*. Hoboken: John Wiley & Sons. 601 pp.

Electronic publications:

IUCN. 2013. *IUCN Red List of Threatened Species*. Version 2013.2. Accessible at <http://www.iucnredlist.org/>. Captured on 22 December 2013.

TABLES

Tables must be numbered consecutively in Arabic numerals and formatted using the "Insert/Create Table" function of MS Word or relative. **Do not** format tables text paragraphs using spaces or Tab-key. Place all tables, with their corresponding headings, after Literature Cited. In the text, tables must be referred as Table 1, Tables 2 and 3, Tables 2-5.

APPENDICES

If authors wish to include one or more appendices, they must be placed after the last Table (if any).

FIGURES

File formats used for publication are JPEG (.jpg) and Tagged Image File Format (.tif). Figure files should be submitted as Supplementary Material. For review purposes, submissions must contain figures in low-resolution .jpg or .tif format (please try not to exceed 1 Mb per file). Do not submit figures embedded in the text file. After acceptance, high-resolution figures (150 or 300dpi) and vector-based maps (formats such as .eps and .ai) can be sent to the Subject Editor. For manuscripts

with numerous illustrations, it is recommended that figures be converted to one PDF file (no more than 10 Mb in size). This makes it easier for editors to forward images to reviewers. Figures must be numbered consecutively in Arabic numerals. In the text, figures must be referred as Figure 1, Figures 2 and 3, Figures 2-5, Figure 4a and 4b (**not** Fig. 1, figure 1, fig. 1, figs. 1-3). Figure captions must be at the end of the manuscript file, after Literature Cited, Tables (if any) and Appendices (if any).

ABBREVIATIONS

Remember to italicize the abbreviations *e.g.*, *i.e.*, and *et al.*

Use SI units (quick downloads: International System of Units(SI), SI guide, SI rules and style).

Examples:

Time:

02:22 h; 14:55 h.

Distances and areas:

4.0-5.5 mm; 15.5 km²; 60 m; 20,760 ha (leave space between numbers and units)

Geographic coordinates:

15°45'00" S, 44°25'30" W (degrees, minutes and seconds) or 15.75° S, 44.425° W (decimal degrees). Use degree symbol, **not** superscript 0 (zero), O (letter o) or anything else. For minutes and seconds use "prime" (') and "double prime" (") symbols, **not** apostrophe ('), quotation marks (") or anything else.

Temperatures:

20°C (without spacing)

Percentages:

15% (without spacing)

Spell out "number" or use #; do not use N° or No.