

SCIENTIFIC NOTE

Occurrence of Lepidopterism Caused by the Moth *Hylesia nigricans* (Berg) (Lepidoptera: Saturniidae) in Rio Grande do Sul State, Brazil¹

CRISTIANO A. ISERHARD^{2,3}, LUCAS A. KAMINSKI², MARIA O. MARCHIORI², EDUARDO C. TEIXEIRA² AND HELENA P. ROMANOWSKI^{2,3}

¹Contribution number 505 of the Depto. Zoologia, Instituto de Biociências, UFRGS, Porto Alegre, RS

²Lab. Ecologia de Insetos, Depto. Zoologia, Instituto de Biociências, Univ. Federal do Rio Grande do Sul, Av. Bento Gonçalves, 9500, Prédio 43435, Sala 218, 91501-970, Porto Alegre, RS

³Programa de Pós-Graduação em Biologia Animal, Depto. Zoologia, Instituto de Biociências, Universidade Federal do Rio Grande do Sul, Av. Bento Gonçalves, 9500; 91501-970, Porto Alegre, RS
agriola@portoweb.com.br, hpromano@ufrgs.br

Neotropical Entomology 36(4):612-615 (2007)

Ocorrência de Lepidopterismo Provocado pela Mariposa *Hylesia nigricans* (Berg) (Lepidoptera: Saturniidae) no Rio Grande do Sul

RESUMO - É registrado pela primeira vez o lepidopterismo provocado pela mariposa *Hylesia nigricans* (Berg) para o sul do Brasil. São apresentados alguns aspectos da biologia da espécie e relatadas medidas como estratégia preventiva de controle.

PALAVRAS-CHAVE: Dermatite, mariposa urticante, planta hospedeira, Sul do Brasil

ABSTRACT - Lepidopterism by *Hylesia nigricans* (Berg) moth is recorded for the first time in southern Brazil. Preventive strategies of control are proposed based on information on the biology and ecology of this moth.

KEY WORDS: Dermatitis, host-plant, southern Brazil, urticating moth

The genus *Hylesia* Hübner is exclusively Neotropical and comprises approximately 100 species of moths (Lamy *et al.* 1984). At population peaks some species of *Hylesia* pose a public health problem, causing epidemic outbreaks of dermatitis in human beings (Carrera 1991, Scoble 1992). Such dermatitis can be caused by caterpillars (erucism) as well as by adults (lepidopterism), the latter case occurring when urticating bristles are released from the abdomen of females (Lamy & Lemaire 1983, Rodriguez *et al.* 2004). Cases of lepidopterism caused by *Hylesia* spp. have been registered since the beginning of the last century in several countries of Central e South America, including Mexico, Costa Rica, French Guiana, Surinam, Venezuela, Peru, Argentina and Uruguay (Leger & Mouzels 1918; Fornés & Hernández 2000, 2001; Willat *et al.* 2003). In Brazil, there are records for the Amapá, Minas Gerais and São Paulo States (Gusmão *et al.* 1961, Mascarenhas *et al.* 1980, Glasser *et al.* 1993).

Hylesia nigricans (Berg) is present from Southeastern Brazil down to Uruguay and Argentina (Silva *et al.* 1968, Lemaire 2002). Adults have sexual dimorphism and intraspecific variation (Specht *et al.* 2006). The females are larger, more robust and darker than the males, which can have color variations in their wings and dark or yellow abdomen (Mabilde 1896, Köhler 1931, Specht *et al.* 2006).

The egg masses are brownish-orange, formed by layers of eggs covered by urticating bristles, which are released from the abdomen tip of females at oviposition.

Caterpillars of *H. nigricans* have gregarious habits, and have been observed in various families of host plants (Mabilde 1896, Bourquin 1945, Specht *et al.* 2006), being considered a pest of several cultivated plants, such as *Ilex paraguariensis* St. Hil. (Bourquin 1945, Quintanilha 1946, Silva *et al.* 1968, Penteado 1995). Cases of lepidopterism caused by *H. nigricans* are cited for Argentina and Uruguay (Pesce & Delgado 1971, Arias 1981, Willat *et al.* 2003). Recently, aspects of the biology of the *H. nigricans* have been described in detail by Specht *et al.* (2006).

During the months of December and January of 2000 many cases of dermatitis caused by *H. nigricans* were reported at the Valley of the Paranhana River in Rio Grande do Sul, South Brazil. The official records of occurrence were higher in the municipalities of Igrejinha and Três Coroas (L.M.G. Diefenbach, pers.com.). In Igrejinha, the Secretaria de Saúde do Estado do Rio Grande do Sul recorded 168 cases of dermatitis, but probably many others were not duly recorded.

There is a lack on the knowledge about this moth, mainly concerning its population biology. The aims of the present

work are (i) to document the population outbreak of *H. nigricans* at Igrejinha and Três Coroas and (ii) to propose control strategies to prevent future occurrences.

The Vale do Rio Paranhana (29°34'S, 50°48'W) is located at the lower part of the Northeastern Slope, at the South boundaries of the Serra Geral (a major mountain range in Southern Brazil) at Rio Grande do Sul State, with altitudes varying from 20 m to 773 m. According to the Köppen classification, its climate is Cfa (subtropical humid) (Mota 1951) with temperatures varying from 0°C in the winter to 40°C in the summer. The region embraces areas of Dense Rain Forests and Mixed Rain Forests, and is included within the "Atlantic Forest Biosphere Reserve" already recognized by the Man and Biosphere Program Council of UNESCO.

Igrejinha has approximately 25,000 inhabitants, its territorial extension is 162 km², and it is about 85 km away from Porto Alegre, the capital of the State. Três Coroas is 92 km away from Porto Alegre and 7 km away from Igrejinha, has a total area of 166 km², and it is located along the RS-115 State Highway, being at the foot of the previously mentioned Serra Geral. Both towns are surrounded by areas of native vegetation, which makes the contact between their urban areas and the Floresta Atlantica very close.

Field expeditions were carried out in December 2000 and January and December 2001 in Igrejinha and Três Coroas. The vegetation at and around the points where infestations had been reported was visually inspected for host plants, adults, eggs and larvae of *H. nigricans* in the central and peripheral regions of the towns. The egg masses collected were reared and monitored on host plants inside breeding cages, in laboratory, until the individuals became adult. For the sampling of adults "Luiz de Queiroz" light traps were used (Silveira Neto & Silveira 1969). Two traps were placed in each town, close to the edge of the forest, at two different collecting spots per year. The traps lights were kept on from 06:00 PM to 06:00 AM and checked at 00:00 AM on each sampling occasion, totalizing 96 hours of sampling effort. Data on host plants and the biology of *H. nigricans* were recorded in the field and supplemented by literature review (Mabilde 1896, Köhler 1931, Bourquin 1945, Quintanilha 1946, Silva *et al.* 1968, Lamy & Lemaire 1983, Pentead 1995, Specht *et al.* 2006).

The insects collected in the light traps were identified at order level and placed in 70% alcohol. The Macrolepidoptera (*sensu* Kristensen 1998) were separated by morphotypes and *H. nigricans* were identified according to Lemaire (2002) and Specht *et al.* (2006). The individuals collected manually were mounted and added to the Lepidoptera Reference Collection of the Zoology Department, Federal University of Rio Grande do Sul (UFRGS).

The plants in which egg masses were found were new records for families and species of host plants for the immature stages of *H. nigricans*: *Lithraea brasiliensis* March. (Anacardiaceae), *Schinus terebinthifolius* Raddi (Anacardiaceae), *Luehea divaricata* Mart (Tiliaceae) and *Allophylus edulis* (St. Hill.) Radlk. (Sapindaceae). Eggs collected in January, only hatched the following October and November. Although no quantitative study was carried out concerning the developmental time of the egg masses of

H. nigricans, infestations of larvae also occurred in the field during these same months in Igrejinha and Três Coroas. This pattern is similar to the one described by Mabilde (1896) and Bourquin (1945), indicating that *H. nigricans* has univoltine cycles. Adults emerged in the laboratory ca. two to three weeks after pupating.

In the first year of sampling, from the total of 1,222 Macrolepidoptera, 484 were *H. nigricans* (Fig. 1). Of these, 364 were males and 120 females, a sexual ratio of 3:1. From 6 p.m. to 0 a.m., only 45 *H. nigricans* were collected, all the other 90.7% were recorded between 0 a.m. to 6 a.m. A peak of activity in the latter half of the night was also observed for other *Hylesia* species, corresponding with their reproductive characteristics (Janzen 1984, Fornés & Hernández 2000).

This population boom close to human populations may have occurred due to the increasing expansion of the urban areas, with buildings being constructed very close to the forested areas. This way, an ever-growing contact zone between forests and urban environments is yielded and the presence of wild life in urbanized spaces is inevitable. In the case of this study, in particular, there is the added condition that public squares have many plants that may host *H. nigricans* and strong artificial night lighting. These elements are very attractive to this species and coincide with its nocturnal activity period (Fornés & Hernández 2000). In a study by Glasser *et al.* (1993), these aspects are corroborated: in epidemic outbreaks in the Vale da Ribeira and in the Baixada Santista, in São Paulo State, the vegetation of affected urban areas was important for these moths, and a high density of these insects was recorded close to buildings with permanent lighting and light-colored walls.

Based on sampling field observations and biological data for other species of *Hylesia* (see Fornés & Hernández 2000), in December 2000 we suggested that the City Councils of Igrejinha and Três Coroas monitor the situation. Measures suggested included the recording of dermatitis cases and basic control measures, such as the manual destruction of

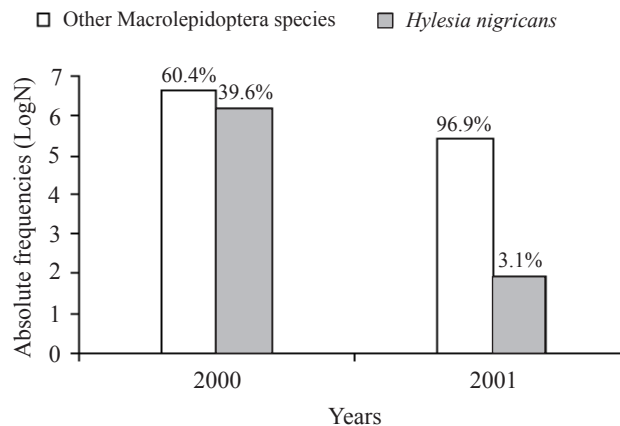


Fig. 1. Absolute frequencies (LogN) of individuals of *H. nigricans* and other Macrolepidoptera species collected in light traps in December 2000 and December 2001. Igrejinha and Três Coroas, RS. Numbers on the top of the bars indicate relative abundance.

egg masses, washing of walls, reduction of public lighting and avoidance of light colors on external walls. The control measures taken, however, were not documented by the city Administrations.

In 2001, the *H. nigricans* adult population in the Vale do Paranhana was much lower than in the previous year. From a total of 229 individuals of Lepidoptera collected, only seven were *H. nigricans* (Fig. 1). The lower density of the moth may have been due to (i) the particular dry weather conditions in spring and summer 2001; (ii) early measures of control taken by local inhabitants and technicians of the Health Secretary targeting the immature stages during the first period of its massive appearance, and may also be due to (iii) special aspects of the population dynamics and the biology of the *Hylesia* genus.

Climatic factors may affect the population dynamics of Lepidoptera (Dennis & Shreeve 1991, Parmesan 1996, Konvicka et al. 2003). A study carried out in protected areas of Rio Grande do Sul in 1998 and 1999 (A. Schantz, UFRGS, unpublished data) corresponding to dry spells caused by the phenomenon "El Niño" reported markedly low richness and abundance of butterfly assemblages. As a matter of fact, the 2001 draught may have negatively affected not only *H. nigricans* populations, but also other species of Macrolepidoptera (Fig. 1).

The control measures taken on the immature stages may have caused some decrease in the number of moths in 2001, but this may not have been the predominant factor, due to the enormous quantity of caterpillars and adults of *H. nigricans* present in both cities at the outbreak period. In any case, continuous caution is recommended. Control measures, if not properly carried out, may cause great damage to the native flora and fauna of the region; in particular, the indiscriminate use of chemical biocides can irreversibly damage the population not only of *H. nigricans*, but also other Lepidoptera and living organisms. In the same way, the elimination of potential host plants must not be stimulated as a control measure, since, besides posing a threat to plant species, can enlarge the contact zone between urban environments and forests.

With respect to characteristics of the genus *Hylesia* population dynamics, a similar situation was registered for the Distrito de Bertioga, the Baixada Santista and the Vale do Ribeira, in which a first year of a strong outbreak affecting nine municipalities was followed by a much less intense infestation on the second year (Glasser et al. 1993).

It seems that all three aspects may have played a role on the low population levels of 2001. It is suggested, nevertheless, that the special aspects of the population dynamics and the biology of *H. nigricans* were the preponderant factors. Efficient environmentally friendly measures can only be devised based on the biology of this insect. We advise that, independent of the densities of *H. nigricans*, annual monitoring should be carried out by properly trained personnel from October to December, period of occurrence of the immature stages. If abundance is high, eggs, caterpillars and pupae of *H. nigricans* would be selectively eliminated by authorized personal. Thus, action should precede problem and the need for urgent - and not

always effective - measures, would be avoided; and so would the risk for non-target species and the high economic costs. Bearing this prophylactic attitude in mind, we believe that any future problem can be duly controlled without causing damage to the local inhabitants of the region and the native fauna and flora.

Acknowledgments

The authors thank Lucia Diefenbach (CIT - Secretaria Estadual de Saúde do Rio Grande do Sul) for the opportunity of carrying out this study, Alexandre Specht (UCS) and Elise Cordeiro (PUC-RS) for the exchange of information on the biology and taxonomy of *H. nigricans*, Rosina Segui (Facultad de Ciencias UDELAR, Montevideo) for the information on cases of lepidopterism in Uruguay and the City Councils of Igrejinha and Três Coroas for their logistical support during the field expeditions.

References

- Arias, H. 1981. Dermatititis por *Hylesia nigricans*. Arch. Argent. Dermatol. 31:171-180.
- Bourquin, F. 1945. Mariposas argentinas: Vida, desarrollo, costumbres y hechos curiosos de algunos lepidópteros argentinos. Bueno Aires, Autor, 209p.
- Carrera, M. 1991. Insetos de interesse médico e veterinário. Curitiba, UFPR, 228p.
- Dennis, R.L.H. & T.G. Shreeve. 1991. Climatic change and the British butterfly fauna: Opportunities and constraints. Biol. Conserv. 55: 1-16.
- Fornés, L. & J.V. Hernández. 2000. Algunos aspectos de la biología de *Hylesia metabus* (Cramer 1775) (Lepidoptera: Saturniidae). Bol. Entomol. Venez. 15: 127-145.
- Fornés, L. & J.V. Hernández. 2001. Reseña histórica e incidencia en la salud pública de *Hylesia metabus* (Cramer) (Lepidoptera: Saturniidae) en Venezuela. Entomotropica 16: 137-141.
- Glasser, C.M., J.L. Cardoso, G.C. Carréri-Bruno, M.F. Domingos, R.H.P. Moraes & R.M.C. Ciaravolo. 1993. Surtos epidêmicos de dermatite causados por mariposas do gênero *Hylesia* (Lepidoptera: Hemileucidae) no estado de São Paulo, Brasil. Rev. Saúde Pública 27: 217-220.
- Gusmão, H., O.P. Forattini & A. Roetberg. 1961. Dermatite provocada por lepidópteros do gênero *Hylesia*. Rev. Inst. Méd. Trop. 3: 114-120.
- Janzen, D.H. 1984. Natural history of *Hylesia lineata* (Saturniidae: Hemileucinae) in Santa Rosa National Park, Costa Rica. J. Kans. Entomol. Soc. 57: 490-514.
- Köhler, P. 1931. El género *Hylesia* en la Argentina. Rev. Soc. Argentina Entomol. 6: 305-308.
- Konvicka, M., M. Maradova, J. Benes, Z. Fric & P. Kepka. 2003. Uphill shifts in distribution of butterflies in the Czech Republic:

- Effects of changing climate detected on a regional scale. *Glob. Ecol. Biogeogr.* 12: 403-410.
- Kristensen, N.P. 1998. Lepidoptera: Moths and butterflies. 1. Systematics, evolution and biogeography. *Handbook of Zoology*, IV, 35. Berlin, Walter de Gruyter & Co., 491p.
- Lamy, M. & C. Lemaire. 1983. Contribution à la systématique des *Hylesia*: Étude au microscope électronique à balayage des "fléchettes" urticantes. *Bull. Soc. Zool. Fr.* 88: 176-192.
- Lamy, M., M.H. Pastureau, F. Novak & G. Ducombs. 1984. Papillons urticants d'Afrique et d'Amérique du Sud (g. *Anaphea* et g. *Hylesia*): Contribution du microscope électronique à balayage à l'étude de leur appareil urticant et à leur mode d'action. *Bull. Soc. Zool. Fr.* 109: 163-177.
- Leger, M. & P. Mouzels. 1918. Dermatose prurigineuse déterminée par des papillons saturnidés du genre *Hylesia*. *Bull. Soc. Path. Exot.* 11:104-107.
- Lemaire, C. 2002. The Saturniidae of America. Les Saturniidae Américains. Hemileucinae (= Attacinae). Vol. 1-3. Keltern, Goecke & Evers, 1388p.
- Mabilde, A.P. 1896. Guia practica para os principiantes collecionadores de insectos, contendo a descrição fiel de perto de 1000 borboletas com figuras lithographadas em tamanho, formas e desenhos conforme o natural. Estudo sobre a caça, classificação e conservação de uma coleção mais ou menos regular. Porto Alegre, Gundlach & Schuldt, 238p.
- Mascarenhas, C.S., M.A. Vulcano & F.S. Pereira. 1980. Nova constatação de dermatite provocada por lepidópteros do gênero *Hylesia* Hübner. *Lundiana* 1: 143-148.
- Mota, F.S. 1951. Estudos do clima do estado do Rio Grande do Sul, segundo o sistema de W. Köppen. *Rev. Bras. Geogr.* 13: 275-284.
- Parmesan, C. 1996. Climate and species' range. *Nature* 382: 765-766.
- Penteado, S.R.C. 1995. Principais pragas da erva-mate e medidas alternativas para o seu controle, p. 109-120. In H. Winge, A.G. Ferreira, J.E.A. Mariath & L.C. Tarasconi (eds.), *Erva-mate: Biologia e cultura no Cone Sul*. Porto Alegre, Editora da Universidade, 356p.
- Pesce, H. & A. Delgado. 1971. Poisoning from adult moths and caterpillars, p.119-156. In W. Burchel & E.E. Buckley (eds.), *Venomous animals and their venoms*, Vol III, *Venomous invertebrates*. New York, Academic Press, 537p.
- Quintanilla, R.H. 1946. *Zoologia agricola: Apuntes de clase, colaboraciones y recopilaciones*. 2. ed. Buenos Aires, El Ateneo, 774p.
- Rodriguez, J., J.V. Hernández, L. Fornés, U. Lundberg, C.L.A. Piñango & F. Osborn. 2004. External morphology of abdominal setae from male and female *Hylesia metabus* adults (Lepidoptera: Saturniidae) and their function. *Fl. Entomol.* 87: 30-36.
- Scoble, M.J. 1992. *The Lepidoptera: Form, function and diversity*. Oxford, Oxford University Press, 404p.
- Silva, A.G.A., C.R. Gonçalves, D.M. Galvão, A.J.L. Gonçalves, J. Gomes, N.M. Silva & L. Simoni. 1968. Quarto catálogo dos insetos que vivem nas plantas do Brasil, seus parasitos e predadores. Tomo 1. Parte 2. Rio de Janeiro, Ministério da Agricultura, 622p.
- Silveira Neto, S. & A.C. Silveira. 1969. Armadilha luminosa, modelo "Luiz de Queiroz". *O Solo* 61: 19-21.
- Specht, A., A.C. Formentini & E. Corseuil. 2006. Biologia de *Hylesia nigricans* (Berg) (Lepidoptera, Saturniidae, Hemileucinae). *Rev. Bras. Zool.* 23: 248-255.
- Willat, G., A. Capdevila, M. Martinez, C. Benavides & R. Carballo. 2003. Brotes de dermatitis urticante por mariposas del género *Hylesia* em Uruguay. *Rev. Salud Pública* 2: 4-6.

Received 21/IV/06. Accepted 06/VI/06.
