LIVING WORLD
Journal of the Trinidad and Tobago Field Naturalists' Club
admin@ttfnc.org

ISSN 1029-3299

TRINIDAD AND TOBAGO
FIELD NATURALISTS' CLUB

Pseudosphinx tetrio (L.) (Lepidoptera: Sphingidae) in Trinidad and Tobago

Matthew J.W. Cock

Cock, M.J.W. 2008. *Pseudosphinx tetrio* (L.) (Lepidoptera: Sphingidae) in Trinidad and Tobago. *Living World, Journal of The Trinidad and Tobago Field Naturalists' Club*, 2008, 49-52.

Pseudosphinx tetrio (L.) (Lepidoptera: Sphingidae) in Trinidad and Tobago

Matthew J. W. Cock
CABI Europe - Switzerland,
Rue des Grillons 1, CH-2800 Delémont, Switzerland.
E-mail: m.cock@cabi.org

ABSTRACT
A summary of observations on the hawkmoth *Pseudosphinx tetrio* (L.) in Trinidad and Tobago is given with notes on food plants of three families which generally produce a lactiferous sap.

Key words: *Pseudosphinx tetrio,* Apocynaceae, Asclepiadaceae, Euphorbiaceae, frangipani, Trinidad and Tobago.

Pseudosphinx tetrio (L.) is one of the largest hawkmoths (Sphingidae) found in Trinidad and Tobago, and its caterpillars are amongst the most conspicuous, so much so that one has been used to illustrate a brochure for eco-vacations to Trinidad and Tobago (TIDCTT undated, "sphingid caterpillar on frangipani"). The caterpillars are gregarious and well-known for their defoliation of ornamental frangipani trees (*Plumeria* spp.: Apocynaceae), when they are very conspicuous and noticed by naturalists and the general public. The purpose of this note is to summarise observations of this species in Trinidad and Tobago, and further comment on the food plants of the caterpillars.

Pseudosphinx tetrio was first described by Linnaeus in 1771 from "America" (Kitching and Cadiou 2000). Well before this, the caterpillar was amongst the first known from South America, as it was illustrated by Merian (1705, plate V) from Surinam. Its range is from southern USA through the Caribbean to Paraguay and Uruguay (Schreiber 1978), and it was recorded from Trinidad by Kaye (1901) and Kaye and Lamont (1927). It has not been recorded from Tobago, but the moths of Tobago have not been documented yet (Cock 2003). D. J. Stradling (pers. comm. 1995) ran a mercury vapour light (MVL) trap at Prospect, Arnos Vale, 8.viii.1977 and caught two males and a female *P. tetrio*. Ciesla (2008) shows pictures of a caterpillar photographed at Plymouth, Tobago. Additional observations are reported below, and so the regular presence of *P. tetrio* in Tobago is confirmed.

Adult moths are marked in shades of grey (Figs. 1-4), and their size (up to 15 cm wing span, with females larger than males), markings and lack of red, orange or yellow markings on the upper surface of the abdomen or hind wing should serve to identify them in Trinidad and Tobago. Adults moths are noticed much less often than the conspicuous caterpillars, and come only occasionally to light in Trinidad. Thus, Stradling *et al*. (1983) record just 12 males and six females from 3,767 MVL trap nights in the St. Augustine area, 1969-1977. A few years later, I recorded four specimens in 302 MVL trap nights at Curepe, 1978-1981 (MJWC unpublished). Its distribution within Trinidad is not well documented, but it can occur from the centre of Port of Spain (Fig. 3) to the heights of the Northern Range (Fig. 1), and could probably be found anywhere in the island.

Fig. 1. *Pseudosphinx tetrio* male upper side, collected Morne Bleu, Textel Installation, at light, 26.vii.1978, M.J.W. Cock (coll. MJWC). Approx. 0.9 x life size, forewing length 57 mm.

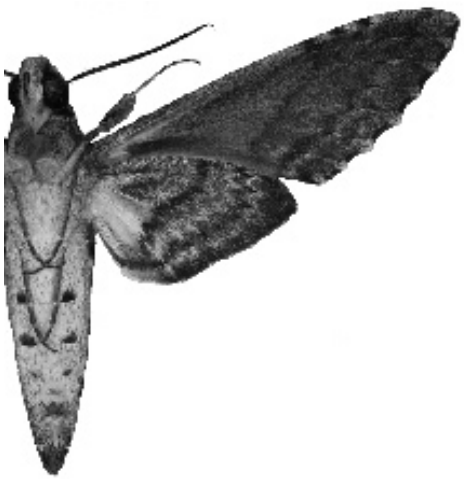

Fig. 2. *Pseudosphinx tetrio* male under side of specimen in Fig. 1.

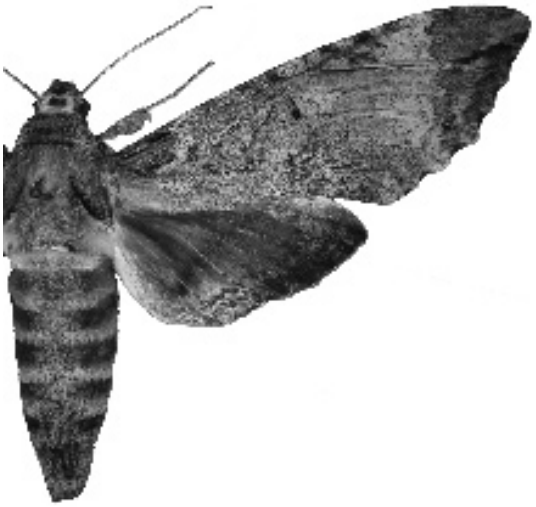

Fig. 3. *Pseudosphinx tetrio* female upper side, collected Port of Spain, 12.vii.1978, W. de Voogd (coll. MJWC). Approx. 0.8 x life size, forewing length 67 mm.

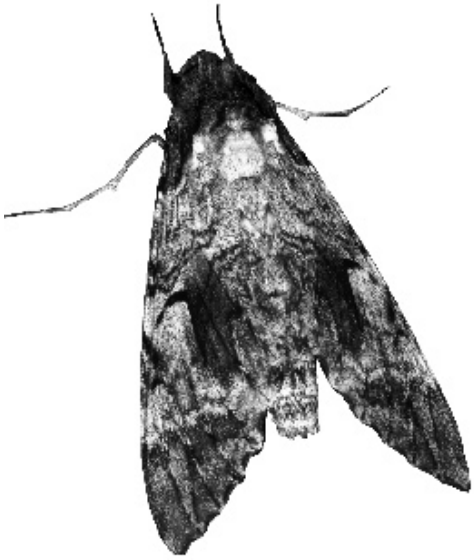

Fig. 4. *Pseudosphinx tetrio* female, in resting position, attracted to street lights, St. Benedict's, 12.x.1993. Approx. 0.75 x life size. The background (black tarmac) has been edited out for clarity.

The caterpillar is very distinctive, and well documented in publications (Merian 1705; Moss 1912; Janzen 1980, 1983; Santiago-Blay 1985; Tuttle 2007), and on the internet (Ciesla 2008; Janzen and Hallwachs 2008; Oehlke 2008, etc.). With its red-brown head and anal segment, yellow-banded black body and whiplash tail, it can be mistaken for no other species (Figs. 5, 7).

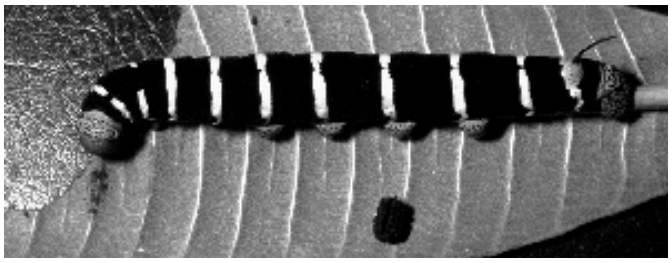

Fig. 5. *Pseudosphinx tetrio* fifth instar caterpillar, on *Plumeria* sp., Trinidad, 1987-81, no further data, approx. life size.

The pupa (Fig. 6) is formed at ground level between leaves pulled together with a few strands of silk (Moss 1920). It is rich mahogany brown with black markings most visible as lines on the wing cases.

Fig. 6. *Pseudosphinx tetrio* pupa, lateral view. Trinidad, 1987-81, no further data, approx. 1.2 x life size.

The mature caterpillars wander away from their food plants to pupate (Moss 1912) and may be found on other plants that are not used as food at this time, so observations on apparently new food plants should be critically assessed. For example, I have a photograph of a fifth instar caterpillar on a coarse grass (St. Benedict's, Pax Guest House, 15.x.1993), but this is not a food plant.

As Kitching and Cadiou (2000) point out, the caterpillar and pupa of *Pseudosphinx tetrio* illustrated by Merian (1705, plate V) are incorrectly associated with an adult of *Manduca rustica* (F.). The food plant association with cassava is also most likely incorrect for both species.

Moss (1912) notes that the food plant in the foothills east of the Andes in Peru is a wild rubber ("caucho de monte"). He subsequently found that at Pará (now Belem) in Brazil, frangipani is the normal food plant (Moss 1912, 1920), and this is the food plant normally associated with this species (Janzen and Hallwachs 2008; Kaye and Lamont 1927; Santiago-Blay 1985; Tuttle 2007, etc). Santiago-Blay (1985) records that *Plumeria rubra* L. is the main food plant recorded in Puerto Rico, but *P. alba* L. and *P. obtusa* L. are also used.

Santiago-Blay (1985) reported one record of caterpillars feeding naturally on *Allamanda cathartica* L. (Apocynaceae), but in captivity, he found that leaves of

A. cathartica were eaten only slowly. Laboratory trials with *A. blanchetii* A. DC. (= *violacea* Gardn. & Field.) and *Nerium oleander* L. (Apocynaceae) showed these plants were not accepted by *Pseudosphinx tetrio* caterpillars. In Trinidad, *A. cathartica* was probably introduced from South America (Cheesman 1947), and I have not found caterpillars of *P. tetrio* on it, although it is the normal food plant of another, closely related sphingid, *Isognathos scyron* (Cramer). It is therefore interesting and noteworthy, that two observers have told me of caterpillars of *P. tetrio* feeding on *A. cathartica* in Tobago (C. D. Adams, pers. comm. 1981 and Fig. 7; P. Rush, pers. comm. 1981). These reports provide confirmation that *A. cathartica* is used as a food plant at least occasionally.

Fig. 7. *Pseudosphinx tetrio* fifth instar caterpillar, on *Allamanda cathartica*, dorso-lateral view. Argyll Bay, Tobago, 28.ii.1981 (photo C. D. Adams), approx 0.75 x life size. The stem that the caterpillar holds with its anal claspers (arrow) has been defoliated (arrow), while the stem held with its legs and prolegs is untouched.

Ciesla (2008) gives the Old World *Calotropis gigantea* (L.) W. T. Aiton (Asclepiadaceae) as the food plant for his pictures of the caterpillar taken at Plymouth, Tobago. In addition to the 155 rearing records from *Plumeria rubra*, Janzen and Hallwachs (2008) list one record from *Sapium macrocarpum* Müll.Arg. (Euphorbiaceae). Jahnes *et al.* (2002) report studies on another food plant, *Himatanthus sucuuba* (Spruce ex Müll.Arg.) Woodson (Apocynaceae), in Peru.

Therefore, it seems that in addition to the ubiquitous *Plumeria* spp., *Pseudosphinx tetrio* can on occasion use a variety of plants in the families Apocynaceae, Asclepiadaceae and Euphorbiaceae – three families, the species of which generally produce a lactiferous sap.

An infestation of brightly coloured caterpillars on a defoliated frangipani is very conspicuous, and the caterpillars must be obvious to predators, yet they are not eaten. Observers have assumed that the black, yellow and red caterpillars show warning colouration reflecting that the larvae are distasteful due to sequestered noxious compounds from the milky sap of frangipani. If this is the case, are these sequestered chemicals also present in the adult moth? If they are present, why is the moth so cryptically coloured? There have been no experimental tests as to whether chemicals in frangipani sap, caterpillars or adult moths are distasteful to predators, and some interesting studies could be carried out with this system.

Plumeria spp. are not indigenous in Trinidad and Tobago, although they are indigenous in Central and South America (Cheesman 1947). This raises the interesting question as to whether *Pseudosphinx tetrio* is an indigenous species with other food plants amongst the native Apocynaceae, Asclepiadaceae or Euphorbiaceae or whether it extended its range to Trinidad and Tobago, only once *Plumeria* spp. were introduced and planted as ornamentals. Sphingidae are generally considered highly mobile, and records of vagrant specimens of *Pseudosphinx tetrio* well into the USA (Tuttle 2007) suggest it would be capable of colonising new areas where *Plumeria* spp. were planted. *Pseudosphinx tetrio* has only been present in Bermuda since the 1930s and Ferguson *et al.* (1991) include it amongst "migratory immigrants that apparently became established naturally following changes in the habitat caused by man", i.e. the planting of *Plumeria* spp. The situation in southern Florida is similar, and Tuttle (2007) suspects that *Pseudosphinx tetrio* only established breeding populations there once *Plumeria* spp. were introduced. Because *Pseudosphinx tetrio* lays its eggs in batches (Santiago-Blay 1985) and the larvae are voracious and wasteful feeders (Kaye and Lamont 1927; Moss 1912, 1920; Tuttle 2007), any indigenous plant routinely used as a food plant would need to be a large plant with plenty of leaves, probably a tree, or a bush growing in clumps. It seems likely that naturalists would have observed the conspicuous gregarious larvae on large plants other than *Plumeria* spp. if they were regularly used as food plants. Thus, although it would be premature to say there are no indigenous food plants in Trinidad and Tobago, it may well be that *Pseudosphinx tetrio* has only established breeding populations in historical times.

REFERENCES

Cheesman, E. E. 1947. Apocynaceae. *Flora of Trinidad and Tobago* 2(3): 144 - 162.

Ciesla, W. M. 2008. *Pseudosphinx tetrio* (Linnaeus 1771). http://www.forestryimages.org/browse/locimages.cfm?id=887 (Last accessed 4 February 2008).

Cock, M. J. W. 2003. On the number of moths (Lepidoptera)

that occur in Trinidad and Tobago. *Living World, Journal of The Trinidad and Tobago Field Naturalists' Club*, 2003: 49 - 58.

Ferguson, D. C., Hilburn, D. J. and **Wright, B.** 1991. The Lepidoptera of Bermuda: their food plants, biogeography, and means of dispersal. *Memoirs of the Entomological Society of Canada,* 158: 1 - 105.

Jahnes, B. C., Hyland, E. M., Needham, K., Brumwell, L. and **Rodriguez, E.** 2002. The chemical ecology of three species of Lepidoptera and their host plants on the Cornell Esbaran Preserve, Yarapa River, Peru. Emanations 4. 3 pp. http://labs.plantbio.cornell.edu/cubl/emanv4.html (Last accessed 4 February 2008).

Janzen, D. H. 1980. Two potential coral snake mimics in a tropical deciduous forest. *Biotropica*, 12: 77 - 78.

Janzen, D. H. 1983. *Pseudosphinx tetrio* (oruga falso-coral, frangipani sphinx). p. 764-765. *In* **Janzen, D. H.** ed. Costa Rican Natural History. Chicago, USA: University of Chicago Press.

Janzen, D. H. and **Hallwachs, W.** 2008. Dynamic database for an inventory of the macrocaterpillar fauna, and its food plants and parasitoids, of Area de Conservacion Guanacaste (ACG), northwestern Costa Rica. http://janzen.sas.upenn.edu. (Last accessed 4 February 2008).

Kaye, W. J. 1901. A preliminary catalogue of the Lepidoptera Heterocera of Trinidad. *Transactions of the Entomological Society of London*, 1901: 115 - 158, 2 plates.

Kaye, W. J. and **Lamont, N.** 1927. A catalogue of the Trinidad Lepidoptera Heterocera (moths). *Memoirs of the Department of Agriculture, Trinidad and Tobago*, 3. 144 p.

Kitching, I. J. and **Cadiou J. M.** 2000. *Hawkmoths of the World. An annotated and illustrated revisionary checklist (Lepidoptera: Sphingidae)*. London: The Natural History Museum, and Ithaca, USA: Cornell University Press. 226 p.

Merian, M. S. 1705. *Metamorphosis insectorum surinumensium*. Valk, Netherlands: Gerardum. 60 p.

Moss, A. M. 1912. On the Sphingidae of Peru. *Transactions of the Zoological Society of London*, 20, 73 - 135.

Moss, A. M. 1920. Sphingidae of Para, Brazil. *Novitates Zoologicae*, 27: 333 - 424, plates i-xi.

Oehlke, W. 2008. *Pseudosphinx tetrio*, the tetrio sphinx moth. http://www.silkmoths.bizland.com/ptetrio.htm (Last accessed 4 February 2008).

Santiago-Blay, J. A. 1985. Notes on *Pseudosphinx tetrio* (L.) (Lepidoptera: Sphingidae) in Puerto Rico. *Journal of the Lepidopterists' Society*, 39: 208 - 214.

Schreiber, H. 1978. *Dispersal centres of Sphingidae (Lepidoptera)*. Biogeographica, Volume 10. The Hague: Dr. W. Junk Publishers. 195 p.

Stradling, D. J., Legg, C. J. and **Bennett, F. D.** 1983. Observations on the Sphingidae (Lepidoptera) of Trinidad. *Bulletin of Entomological Research*, 73, 201 - 232.

TIDCTT (Tourism and Industrial Development Company of Trinidad and Tobago) Undated, ?2003. *Rich and rare. Eco vacations*. (A leaflet.) Tourism and Industrial Development Company of Trinidad and Tobago.

Tuttle, J. W. 2007. The Hawkmoths of North America. A Natural History Study of the Sphingidae of the United States and Canada. Washington, USA: The Wedge Entomological Research Foundation. 253 p.