Notes on genital stridulation in male hawkmoths in South East Asia (Lep., Sphingidae)

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Introduction

During two trips to South East Asia (Indonesia: North and West Sumatra; peninsular Malaysia; and North Thailand) in 1984 and 1986, the senior author while collecting at light repeatedly noticed sound production in sphingid moths. The males of some species produced clearly audible stridulation after being injected with a killing liquid (solution of ammonia and nicotine in water) in the thorax, a behavior previously described by DOESBURG (1966). Similar stridulation was often also audible during flight after irritation of the moths. These sounds were produced with the caudal end of the abdomen. The moths moved their genitalia (valves) mainly laterally, and each movement produced a sound.

This method of sound production has been observed repeatedly by lepidopterists (for a literature review see DOESBURG 1966). Only male moths are capable of genital stridulation. Hawkmoths of the genus Acherontia [LASPEYRES], in contrast, apparently produce sound in their pharyngeal tract. In this genus, both sexes are capable of sound production. Recently ROESLER & KÜPPERS (1977) reported sound emission by sphingids in Sumatra but did not differentiate between the “squeaking” sound of Acherontia and the stridulation of Psilogramma menephron (CRAMER).

DOESBURG (1966) and ROBINSON & ROBINSON (1972) made detailed studies on the morphology of the sound producing apparatus. Stridulation is caused by rubbing specialized scales on the dorsal edge of the valves against spines on the posterior edge of the 8th tergite of the abdomen. Genital stridulation seems to be fairly widespread in male sphingids; possibly, however, it is not loud enough (or consists of ultrasonic sound?) in most species to be heard by man. ROBINSON & ROBINSON interpreted the sound production to have a double function: basically it seems to be part of the courtship behavior, but in some species, in addition, it serves a defensive function. LLOYD (1974) added some other aspects in the discussion of the stridulation.
Results
Loud genital (or valvular) stridulation has been observed by the senior author in the following species (the moths are now in the collection of the junior author, unless stated otherwise).

1. *Psilogramma menephron* (CRAMER)
Stridulation in this species has long been known; it might be a character of the whole genus (compare ROBINSON & ROBINSON 1972). *P. menephron* is a fairly common species at least on Sumatra, and it is therefore the usual exemplar of sound production apart from *Acherontia* (ROESLER & KÜPPERS 1977).

2. *Meganoton analis sumatranus* CLARK
To our knowledge this is the first report of sound production in this species; the senior author collected it repeatedly in Sumatra in 1984. There was no noticeable difference in stridulation between this species and *P. menephron*. It should be checked in future whether other members of the genus *Meganoton* also use stridulatory sound as a defensive reaction.

3. *Amphypterus* sp. near *panopus* (CRAMER)
(sensu DIEHL 1980 [as *Compsogene panopus*], det. H. BANZIGER; compare opinion 275 of ICZN for the use of the generic name *Amphypterus* HUBNER, [1819] instead of *Compsogene* ROTHSCHILD & JORDAN, 1903)
During a collecting evening with H. BANZIGER on 12 March 1986 in North Thailand, Chiang Mai province, Doi Saket distr., below Doi San Yao, ca. 1250 m, we found a male sphingid closely related to or identical with the species figured by DIEHL (1980) as *Amphypterus panopus*; the specimen is now in the collection of H. BANZIGER. Sound production in this specimen was not as loud as in the other two species, but quite similar and well perceptible.

In addition to these three species, where the stridulation was loud enough to draw the collector’s attention at light, a few other individuals with very weak sounds were noticed. Regrettably none of these could be marked or identified.

Conclusive remarks
Generally sound production seems to be more widespread in tropical lepidoptera than usually expected. Another example is the family Noctuidae. During good collecting nights it is not unusual to notice some sound production in noctuid moths. This phenomenon deserves more attention. Animals producing sound should be collected, and a note on their sound production should be included with the collecting data. It should as far as possible be reported how and under what circumstances they produce which kind of sound. Later, hopefully, some causal explanations why these animals produce sound may be arrived at.

Generally nocturnal lepidoptera more often tend to produce ultrasonic sound than a “normal” sound perceptible to man; this is usually connected with bat-specific defensive strategies or derived from such. For more recent publications on this subject, refer to, e.g., SURLYKKE & GOGALA (1986) and the references therein.

We hope that our remarks here will motivate more people collecting at light in tropical areas to pay attention to sound production in lepidoptera.
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References:

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