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**The male of *Macroxiphus siamensis* (HELFFERT & SÄNGER 1995)
(Orthoptera: Tettigoniidae: Agracini)**

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Abstract

The male of *M. siamensis* is described for the first time. The song pattern and some observations on the biology of this species are provided.

Key words: *Macroxiphus siamensis*, Tettigoniidae, evergreen moist lowland rainforest, Thailand.

1. Introduction

The species *M. siamensis* was based on females only: the specimens were collected as first instar larvae in primary lowland rainforests of southern Thailand and reared until adulthood in the laboratory (HELFFERT & SÄNGER 1995 a). During maintenance of the larvae the morphological changes and behaviour were investigated, especially with regard to the species-specific ant-mimicking (HELFFERT & SÄNGER 1995 b). In contrast to other rainforest tettigoniids, a distinct seasonality of *M. siamensis* was assumed because first instar larvae occurred in great abundance during the rainy season only. A dependence of the phenology on seasonal changes in climate and vegetation appears likely, especially in the comparatively open moist evergreen rainforests (Thai-type sensu WHITMORE 1984) of the investigated area. The annual variability in precipitation causes a luxuriant herbaceous stratum only during the rainy season, where the young detritivorous larvae of *M. siamensis* dwell.

Based on the occurrence of larvae during September (the time of maximal rainfall) and the duration of larval development in the laboratory, we expected the adults approximately at the onset of the dry season.

In order to confirm our assumption about the life style and life cycle of *M. siamensis*, the type locality was re-investigated with special regard to the appearance of this species during February 1995.

2. Material and Methods

The type locality, situated in a moist lowland rainforest (Sri Phang Nga National Park, Province Ranong), was investigated for six days and nights (6. 2. - 11. 2. 1995) from dawn to 2 a. m. We searched for *M. siamensis* in the lower vegetation and on randomly chosen tree stems by continuously shining them with strong halogen lights.

The song of the male was recorded during five nights in a sound-proof chamber at 26°C with a SONY TCS-D7 Dat-recorder and a SENNHEISER ME 46 microphone, positioned 20 cm vertically above the stridulatory apparatus. The sound analysis was carried out with S-Tools, Integrated Work Station for Acoustics, Speech and Signal Processing, Austrian Academy of Natural Sciences, Research Laboratory of Acoustics.

The microphoto was taken with a WILD M 400 photo-binocular.

The material is deposited in the Museum of Natural History, Vienna.

3. Results and Discussion

The investigations confirmed our previous results and the assumptions about the phenology and the life style of *M. siamensis*: in February, during the dry season, no larvae could be detected, but we found adults as expected. The imagines are exclusively active during the night and arboricolous, which is in contrast to larval *M. siamensis*. Two specimens (1 ♀, 1 ♂) were apparently attracted by the light and moved slowly down on the stems from 10-15m height. They



Fig. 1. Tubes at the articulation of the alae in male *M. siamensis* (scale bar = 2 mm).

turned at a height of approximately 3 m, perhaps as a consequence of too-high light intensity, and were collected immediately afterwards. A comparison of larval and adult abundance is not yet possible, because a quantitative analysis of the imagines in the canopy would require a much greater technical effort (e. g. PERRY 1978, STORK 1991) than merely the use of halogen lights.

Like the females, male *M. siamensis* are sluggish and unwilling to fly: if severely disturbed, the animals mainly react by moving faster, jumps or short flights are very rare. The older larvae as well as the imagines are distinctly positive thigmotactic.

Description of the male (only features differing from those of the type material):

Material: 1♂

Locality: Bang Wan (Sri Phang Nga), Province Ranong, Peninsular Thailand; 7. 2. 1995. Moist lowland rainforest.

Measures (in mm):

Body length: 41,0; head length (vertex to clypeal suture): 6,1; median pronotum length: 8,9; metafemur length: 18,0; metatibia length: 19,2; elytra length: 32,3.

Stridulatory apparatus comparatively small (length: 4,5 mm), not covered by the posterior margin of the pronotum. Paired, membranous, apically pointed tubes at the articulation of the alae distinctly longer than in females (Fig. 1). First abdominal tergite with a prominent median carina that increases considerably in height posteriad and ends abruptly and vertically at the posterior margin of the tergite.

Genital segments (Fig. 2):

Last tergite surrounds the cercal bases, epiproct directed slightly downwards, subapical portion concave. Paraproct with horizontal processus on the ventral margin; the processus is clearly visible in dorsal view (Fig. 2 a). Cerci with 2 distal teeth and a smooth, roundish process on the dorsal side of the bases. Dorsal tooth towards the apex shovel-like, triangular, ventral tooth narrow with rounded apex. Cerci smooth at the bases, distally with coarse, wart-like structures and long setae; insertion of setae in distinct crypts. Surface structure against the apex of the teeth minute, with short hairs (Fig. 2 c, d). Subgenital plate subtriangular, terminating distally in 2 processes. Subgenital plate with indistinct, median carina and 2 convergent, lateral carinae in the distal half. Styli moderately long, bent outwards, with short hairs (Fig. 2 b). Titillator simple, minutely tuberculate (Fig. 2 e).

Sound production:

The stridulation of *M. siamensis* is restricted to scotophase. The song consists of irregularly repeated chirps. During the time of maximal stridulatory activity (7-9 p. m.) inter-verse intervals

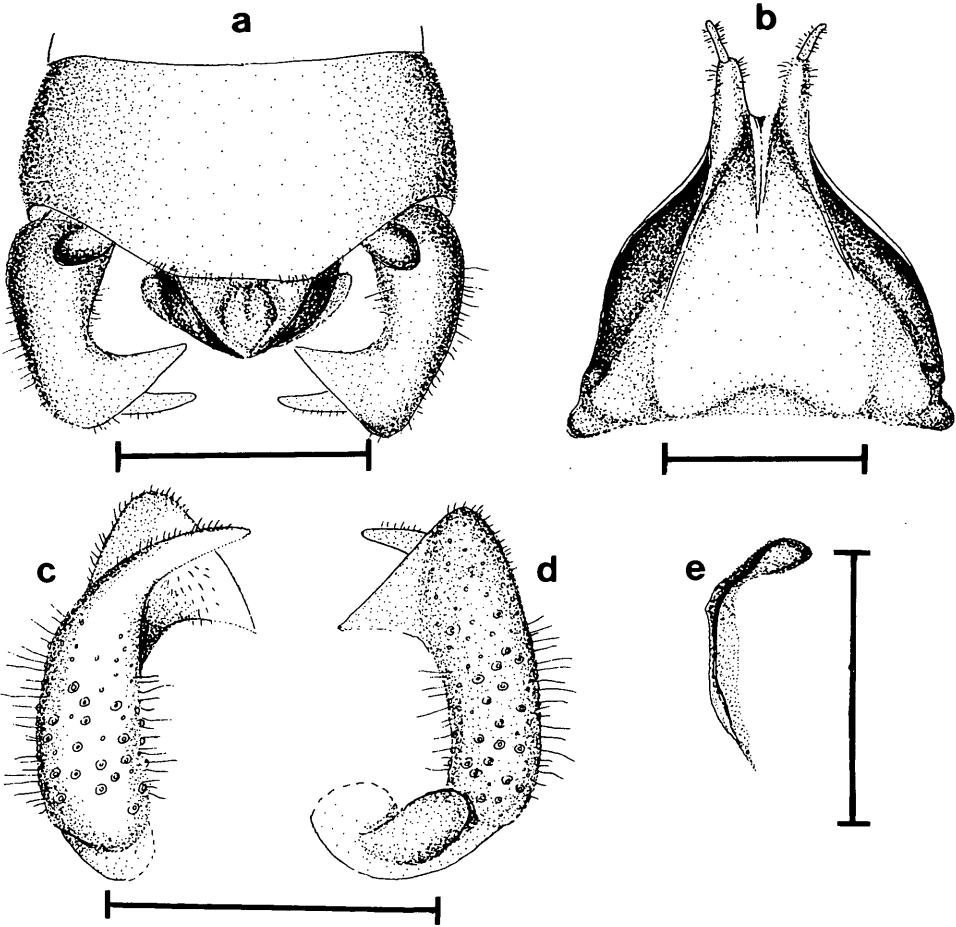


Fig. 2. Genital segments of male *M. siamensis*: a) terminal segments in dorsal view (scale bar = 2 mm); b) subgenital plate in ventral view (scale bar = 2 mm); c) left cercus in ventral view (scale bar = 2 mm); d) left cercus in dorsal view (scale bar = 2 mm); e) left titillator in dorsal view (scale bar = 1 mm).

vary between 3 seconds and about 5 minutes. One verse lasts on the average 160 msec. (117-213 msec.) and consists mainly of 5 syllables; occasionally, six syllables are produced. The mean durations of the syllables are: 14 msec. (first), 15 msec. (second), 15 msec. (third), 15 msec. (fourth), 17 msec. (fifth) (Fig. 3).



Fig. 3. Oscillogram of the calling song of *M. siamensis* (scale bar = 20 msec.).

An analysis of the total frequency range reveals two separate frequency bands: a narrow, conspicuous low-frequency band (up to 1 kHz) and a wider, higher frequency band (12-18 kHz, with dominant frequencies at 14-16 kHz). The low-frequency part of the song suggests that another resonant system is operating in addition to the elytro-elytral complex.

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Zusammenfassung

Das Männchen von *M. siamensis* wird erstmals beschrieben. Die Arbeit enthält weiters Angaben zur Stridulation und zur Biologie der Art.

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