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**A new species of *Trachyaretaon* REHN & REHN, 1939
from the Babuyan Islands, Philippines
(Phasmatodea: Heteropterygidae, Obriminae, Obrimini)**

Frank H. HENNEMANN & Oskar V. CONLE

Abstract

Trachyaretaon brueckneri **sp. nov.** from the Babuyan Islands (Northern Philippines), a new species of the genus *Trachyaretaon* REHN & REHN, 1939 is described and illustrated from both sexes and the eggs: For comparison, illustrations of the type-species *T. echinatus* (STÅL, 1877) are provided. Keys are provided to distinguish the taxa of *Trachyaretaon* REHN & REHN, 1939. The holotype is preserved in the State Zoological Collections Munich (ZSMC), paratypes are deposited in various public and private collections.

Key words: Phasmatodea, Heteropterygidae, *Obrimini*, Philippines, *Trachyaretaon*, new species, eggs.

Zusammenfassung

Trachyaretaon brueckneri **sp. nov.** von den Babuyan-Inseln (Nord Philippinen), eine neue Art der Gattung *Trachyaretaon* REHN & REHN, 1939 wird anhand beider Geschlechter und der Eier beschrieben und abgebildet: Zum Vergleich werden Abbildungen der Typus-Art *T. echinatus* (STÅL, 1877) angefügt. Zusätzlich werden Bestimmungsschlüssel für die Arten von *Trachyaretaon* REHN & REHN, 1939 präsentiert. Der Holotypus wird in der Zoologischen Staatssammlung München (ZSMC) hinterlegt, Parotypen in verschiedenen öffentlichen und privaten Sammlungen.

Introduction

The Phasmatodea of the Philippine Islands are poorly studied, but an extensive study on the islands members of the *Obrimini*, a tribe of Heteropterygidae: Obriminae, was published by REHN & REHN in 1939. The Obrimini are most typical faunal elements of this area, with the majority of taxa being endemic to the Philippines. The tribal revision of REHN & REHN (1939) included descriptions of several new genera and a great number of new species. The most recent descriptions of Philippine Obriminae are those of ZOMPRO (1996a, 1996b, 2004), ZOMPRO & EUSEBIO (2001) and HENNEMANN & CONLE (2003) in all describing four new species and a new genus. In his generic revision of the “Areolatae”, which includes the family Heteropterygidae, ZOMPRO (2004) provided keys to all subfamilies, tribes and genera of Obriminae and described a new species of *Trachyaretaon* REHN & REHN, 1939 from Palawan.

Amongst a considerable number of Philippine Obriminae, the collections of the authors include a new, strikingly large species of the tribe *Obrimini*, which is described and illustrated below. Further research proved it to belong to *Trachyaretaon* REHN & REHN, 1939. The description is based on several wild-caught and captive reared adults and eggs.

The terminology used for the description of head and thoracic armature is the acanthotaxy proposed by REHN & REHN (1939: 395). The description of the colouration was based on live specimens. Egg structures are described, following the terminology established by CLARK-SELICK (1997).

Abbreviations for Depositories

BMNH = British Museum of Natural History, London / England.

NHMW = Naturhistorisches Museum Vienna / Austria.

UPLBMNHC = University of the Philippines Los Baños, Museum of Natural History, Los Baños / Philippines.

ZMHB = Zoologisches Museum der Humboldt-Universität, Berlin / Germany.

ZSMC = Zoologische Staatssammlung, Munich / Germany.

FH = Private collection FRANK H. HENNEMANN, Kaiserslautern / Germany.

OC = Private collection OSKAR V. CONLE, Fischen / Germany.

Trachyaretaon REHN & REHN, 1939

Type-species: *Obrimus echinatus* STÅL, 1877: 68, by original designation.

Aretaon (*Trachyaretaon*) REHN & REHN, 1939: 420, 422 [as subgenus of *Aretaon* REHN & REHN, 1939].

Obrimus STÅL, 1877: 68 [in part], KIRBY 1904: 398 [in part], REDTENBACHER 1906: 38 [in part].

Trachyaretaon ZOMPRO, 2004: 123 [as a valid genus].

Differentiation: Differing from *Aretaon* REHN & REHN, 1939 by the absence of definite anterior mesonotals, the post-median mesonotals being small or very indistinct and presence of anterior mesal metanotals.

Distribution: Philippine Islands & Palawan.

Comments: REHN & REHN (1939: 419) established the genus *Aretaon* for three species which were originally described in *Obrimus* STÅL, 1875. They placed *Aretaon* in close relation to *Obrimus* STÅL, *Brasidas* REHN & REHN, 1939 and *Euobrimus* REHN & REHN, 1939 and distinguished it from these genera by lacking metasternal pseudo-foramina or a

marginal fold. REHN & REHN subdivided *Aretaon* into two subgenera, *Aretaon* (*Aretaon*) and *Aretaon* (*Trachyaretaon*), which they distinguished by the presence or absence of inter-posterior pronotal spines and anterior mesal metanotal spines. ZOMPRO (2004) raised both subgenera to generic rank. *Aretaon* has so far only been recorded from Borneo. *Trachyaretaon* is restricted to the Philippine Islands and Palawan.

Species included:

1. *Trachyaretaon brueckneri* **sp. nov.** [Babuyan Islands: Calayan Id.].
2. *Obrimus echinatus* Stål, 1877: 68* [Luzon, Panay, Mindoro, Masbate & Sibuyan].
3. *Trachyaretaon gatla* ZOMPRO, 2004: 124, fig. 124b [Palawan: Palawan Prince, Port Barton].

* The collections of the authors contain large series of *Trachyaretaon echinatus* (STÅL, 1877) from Panay Island (Mount Nangtud) and Mindoro Island (Mt. Halcon). These exhibit a nice range of intraspecific variation and show the specimens from Panay to be comparably larger than those from Mindoro. Measurements of *T. echinatus* (STÅL) in coll. FH from the mentioned localities are included in table 1.

Keys to the species of *Trachyaretaon* REHN & REHN, 1939

♀♀:

- 1 Large insects (> 8 cm); apex of supraanal plate rounded or truncate; tergites VI-IX smooth or indistinctly keeled; Philippines 2
- Small insects (< 7.5 cm); apex of supraanal plate distinctly notched; tergites VI-IX with a prominently raised, crest-like lobe; Palawan *gatla*
- 2 Body armature strongly reduced; tergites II-VII indistinctly transverse; ventral carinae of meso- and metafemora with several minute spines between the larger teeth *brueckneri* sp. nov.
- Body armature distinct; tergites II-VII almost 2x wider than long; ventral carinae of meso- and metafemora lacking minute spines between the large teeth *echinatus*

♂♂:

- 1 Body armature strongly reduced; ventral carinae of meso- and metafemora with several minute spines between the larger teeth *brueckneri* sp. nov.
- Body armature distinct; ventral carinae of meso- and metafemora lacking minute spines between the large teeth *echinatus*

[♂♂ of *Trachyaretaon gatla* ZOMPRO, 2004 are not known]

Trachyaretaon brueckneri **sp. nov.** (Figs 3, 4, 7-9)

Holotype, ♂: Northern Philippines, Babuyan Islands, Calayan Id., VI.2003, via. I.O. LUMAWIG (ZSMC).

Paratypes (53 ♂♂, 43 ♀♀, eggs): 1 ♀, 2 eggs ex Zucht O. CONLE: N-Philippines, Babuyan Islands, Calayan Id., F1-Generation, 2004 (ZSMC); 1 ♂, 1 ♀, 2 eggs ex Zucht F. HENNEMANN: N-Philippines, Babuyan Islands, Calayan Id., F1-Generation, 2004 (UPLBMNHC); 1 ♂, 1 ♀, 2 eggs ex Zucht F. HENNEMANN: N-Philippines, Babuyan Islands, Calayan Id., F1-Generation, 2004 (BMNH); 1 ♂, 1 ♀, 2 eggs ex Zucht F. HENNEMANN: N-Philippines, Babuyan Islands, Calayan Id., F1-Generation, 2004 (NHMW); 2 ♂♂, 2 ♀♀, 2 eggs ex Zucht O. CONLE: N-Philippines, Babuyan Islands,

Calayan Id., F1-Generation, 2004 (ZMHB); 2 ♂♂, 2 ♀♀, eggs: Northern Philippines, Babuyan Islands, Calayan Id., VI.2003, via I.O. LUMAWIG (Coll FH, No. 0498-1 to 4 & E); 20 ♂♂, 10 ♀♀, eggs: ex Zucht F. HENNEMANN: Northern Philippines, Babuyan Islands, Calayan Id., F2-Generation, 2004 (Coll. FH, No. 0498-5 to 34 & ED); 4 ♂♂, 3 ♀♀: Northern Philippines, Babuyan Islands, Calayan Id., VI.2003, via I.O. LUMAWIG (Coll. OC); 22 ♂♂, 22 ♀♀, eggs ex Zucht O. CONLE: N-Philippines, Babuyan Islands, Calayan Id., F1-Generation, 2004 (Coll. OC).

Differentiation: This is the largest so far known representative of the subfamily Obriminae and is distinguished from the two other members of *Trachyaretaon* REHN & REHN, 1939 by the larger size, more slender body and relatively longer body segments, reduced body armature and presence of several distinctly smaller teeth between the larger teeth of the ventral carinae of the meso- and metafemora of both sexes. From *T. echinatus* (STÅL, 1877) it additionally differs by the mesothorax of ♀♀ being more prominently constricted towards the anterior and the eggs having a much smaller micropylar plate, which has the posterolateral sections not conspicuously dilated along the lateral surfaces of the capsule.

Description (measurements in table 1)

♂: Large (body length 66.0-85.0 mm) and general form rather slender and elongate for the genus, body width 7.0-8.0 mm if measured in medial section of metathorax (width of tergite IV 3.7-3.9 mm), body surface, except for elements of armature, which are comparably smooth to slightly granulose. Abdomen completely destitute of distinct spines. General colouration of body and legs dark olive green, abdomen slightly paler green, sternites dark yellowish to straw; colours darkening with age. Occasionally complete dorsal surface of body with irregular and indistinct yellowish or pale brown markings. All membranaceous joints of the body as well as those of the coxae and trochanter reddish or yellowish brown with small black spots. Eyes reddish brown with numerous irregular yellow spots. Antennae greenish brown in basal quarter, otherwise pale reddish brown; all antennomeres with an indistinct, more or less broad, straw basal transverse band.

Head: Slightly longer than wide, narrowing towards the posterior, vertex strongly convex and conically elevated. Eyes very prominent, strongly convex, circular and projecting hemispherically from head capsule; reddish brown. Supra-antennals very indistinct and represented by a pair of minute tubercles. Anterior occipital medials very indistinct, the medial ones distinctly larger than the posterior pair. Median and lateral coronals prominent and of equal size. Only two indistinct gulars present. Supra-orbital prominent, supra-orbital series only consisting of one further distinct spine and a few minute granules. Antennae slightly projecting over posterior margin of tergite IV and consisting of 26 segments; all densely covered with short setae. Scapus slightly dorso-ventrally compressed and 1.2x longer than wide, pedicellus cylindrical, roughly half the length of scapus. Third antennomere longer than pedicellus and as long as IV and V combined. Following antennomeres increasing then decreasing in length towards apices of antennae.

Thorax: Pronotum of similar dimension to the head, rectangular, about 1.5x longer than wide and very slightly medially constricted. Transverse median depression indistinct, oval. Anterior margin slightly raised and with an oval lateral excavation. Posterior pronotals and anterior-posterior pronotals present but indistinct. Anterior mesal pronotals represented by distinct blunt tubercles, posterior- mesal pronotals indistinct. Sensory areas of pronotum

very prominent and strongly convex; black. Mesothorax strongly broadened towards posterior margin which is almost 2x broader than anterior margin. Mesonotum with a distinct, fine median carina which becomes quite indistinct towards the posterior margin; complete surface densely covered with minute, rounded granules. Anterior 2/3 of mesonotum parallel-sided, posterior third widened. Lateral mesonotals only produced as minute granules. Pre-, median- and post-median mesonotals absent. Posterior mesonotals prominent, slightly conical, pointed and slightly composite. Interior posterior mesonotals lacking. Metanotum structured like mesonotum, with a fine median carina and prominent, conical, slightly composite posterior metanotals. Otherwise destitute of distinct spines. Meso- and metapleurae densely granulate, and destitute of distinct spines except for a prominent, blunt supra-coxal, laterals by 5-7 minute, pointed spines and a variable number of much more minute spines in between them. Meso- and metasternum with a fine median carina, densely and very minutely granulate. Mesosternum with two rows of each 5-6 very low mesosternals; posterior sternal indistinct. Metasternum with three very minute metasternals on each side of the median line and two trapezoidal, distinctly impressed areas just before the posterior margin. Any other specializations of the metasternum, like metasternal-foramina or a marginal fold lacking.

Abdomen: Median segment slightly less than 2/3 the length metanotum, narrower than this segment, trapezoidal, anterior margin rounded and with a fine median carina. Surface covered with some minute granules, otherwise smooth. Segment II slightly longer than median segment and constricted towards posterior margin; tergite trapezoidal in dorsal aspect. Segments III-V slightly longer than II, of equal length, about 1.3x longer than wide, cylindrical and parallel-sided. VI slightly shorter and narrower than previous. VII as long as VI but slightly widening towards posterior margin. VIII broadest, transverse and about 1.5x wider than III-VI. IX slightly longer than VIII and very slightly transverse. Anal segment strongly tapered and with a bold triangular posteromedial notch, posterolateral angles rounded. Supraanal plate truncate, posterior margin excavated, with a fine median carina and slightly projecting over the anal segment. Vomer broad, semi-circular and seen ventrally with a prominent, black triangular tooth pointing towards the right. Cerci small and laterally compressed. Poculum very bulgy, strongly convex, cup-like and prominently keeled. Tergites VII-IX each with a very minute posterior mesal tubercle which is elongated and carina-like on VI-IX (most prominent on VIII). Sternites simple and slightly tectiform.

Legs: All comparably long, with femora conspicuously thickened; mesofemora longer than mesonotum, metafemora almost reaching posterior margin of tergite V. Femora quadrate, tibiae trapezoidal in cross-section. Anterodorsal carina of profemora with 4-8 minute, saw-like teeth, posterodorsal carina with 2-4 minute, saw-like teeth in apical half of femora. Ventral carinae each with 2-3 distinct teeth in apical half of femora. Protibiae simple. Meso- and metafemora with 4-6 saw-like teeth on dorsal carinae and several, much smaller, spine-like teeth in basal half of femora. Ventral carinae with 5-7 more distinct, spine-like teeth (the apical one being largest) and with several much smaller teeth in the spaces between the larger spines; spination of ventral carinae generally increasing in size towards apex of femora. Ventral surfaces smooth, medioventral carina indistinct. Medioventral and posteroventral carinae of mesotibiae each with 3-6 very minute teeth, otherwise smooth and densely bristled; in the metatibiae these carinae are covered with more numerous very minute spines. Basitarsus longer than following three tarsomeres combined.

♀: Very large (body length including subgenital plate 108.0-130.0 mm) and rather slender and elongate for the genus, body width 13.5-14.5 mm if measured in medial section of metathorax (width of tergite IV 9.5-10.5 mm); body surface, except for elements of armament and numerous minute tubercles on the thorax, relatively smooth to slightly granulose. Armature of the body and legs rather poorly developed when compared with the other members of the genus. Abdomen completely destitute of distinct spines. General colouration of body and legs ranging from pale to dark yellowish, greenish or reddish brown to almost black usually with complex combinations of white, yellow, green, orange, brown or black speckles and markings. The colours darken with age. Specimens are either of a more or less plain general colour with only indistinct differently coloured speckles or markings but in particular darker brown specimens often exhibit prominent white markings on abdominal tergites V and VI and two conspicuous elongate, triangular white markings at the anterior margin of the mesonotum. Ventral surface of body more or less plain yellowish or reddish brown. Membranaceous joints of the body as well as coxae, trochanter and eyes as in ♂♂. Antennae as in ♂♂ but pale brown to straw, transverse bands more prominent.

Head: Shape and spination generally as in ♂♂ but spines comparably larger and more prominent. Supra-antennal more prominent. Occipital medials standing in a circle usually with several minute tubercles in their centre. Median and lateral coronals prominent, right median coronal always larger than left one. Antennae with 28 segments and reaching posterior margin of tergite III, otherwise as in ♂♂.

Thorax: Armature of pronotum generally as in ♂♂ but spines more prominent especially the posterior and inter-posterior pronotals slightly larger than in ♂♂. Usually with 4-6 minute medial pronotals. Mesothorax trapezoidal and strongly narrowed towards anterior margin, posterior margin almost 2x broader than anterior margin. Mesonotum with a fine but obvious median carina; this of a slightly lighter colouring than rest of body. Structure and armature generally as in ♂♂ except for: pre-median mesonotals present but indistinct; presence of 4-6 minute median mesonotals; distinct inter-posterior mesonotals and lateral mesonotals being produced as a row of 5-6 small but pointed tubercles. Metanotum as in ♂♂, with a distinct median carina. Laterals and supra-coxals of meso- and metapleurae represented by a row of 5-6 small but pointed spines, with a variable number of very minute teeth inbetween them and a prominent, conical supracoxal. Sensory-areas of prosternum prominent, distinctly convex; black. Meso- and metasternum generally as in ♂♂ but: mesosternum with distinct antero-lateral mesosternals and two longitudinal rows of mesosternals distinct. Any other specializations of the metasternum, like metasternal-foramina or a marginal fold lacking.

Abdomen: Median segment trapezoidal and transverse, anterior margin rounded, destitute of distinct tubercles or spines except for a very indistinct pair of medials. Surface otherwise granulose, with distinct but short transverse carina slightly after mid of segment and with a distinct, fine median carina. Segments II-V of equal length and width, all slightly transverse. VI and VII equal in length and slightly shorter than preceeding, about 1.3x wider than long; lateral margins slightly convex. VIII as long as VII, strongly convex and narrowed towards posterior margin, IX distinctly narrower than VII, strongly convex and tapered towards the posterior. Anal segment slightly longer than IX, distinctly keeled and narrowed towards the apex, posterior margin notched. Supraanal plate very elongate and slender, almost as long as tergites IX and X combined, straight, tectiform and very slightly tapered towards the apex which is truncate and does not reach the tip of the

operculum. Cerci very small, laterally compressed and bristled. Subgenital plate strongly keeled, slightly upcurving in apical portion, apex pointed and slightly projecting over the supraanal plate; tip itself very slightly downcurving. The supraanal plate and subgenital plate form a bird-beak like ovipositor. All tergites with a very fine median carina which becomes more distinct and forms a low, longitudinal crest on VII-IX (most prominent on VII). II-VIII smooth, except for a few minor granules on II and III. Sternite II with indistinct latero-anteriors and very indistinct first paired posteriors; III-VI smooth. VII with a slight median keel, posterior margin raised and medially notched, forming two blunt humps.

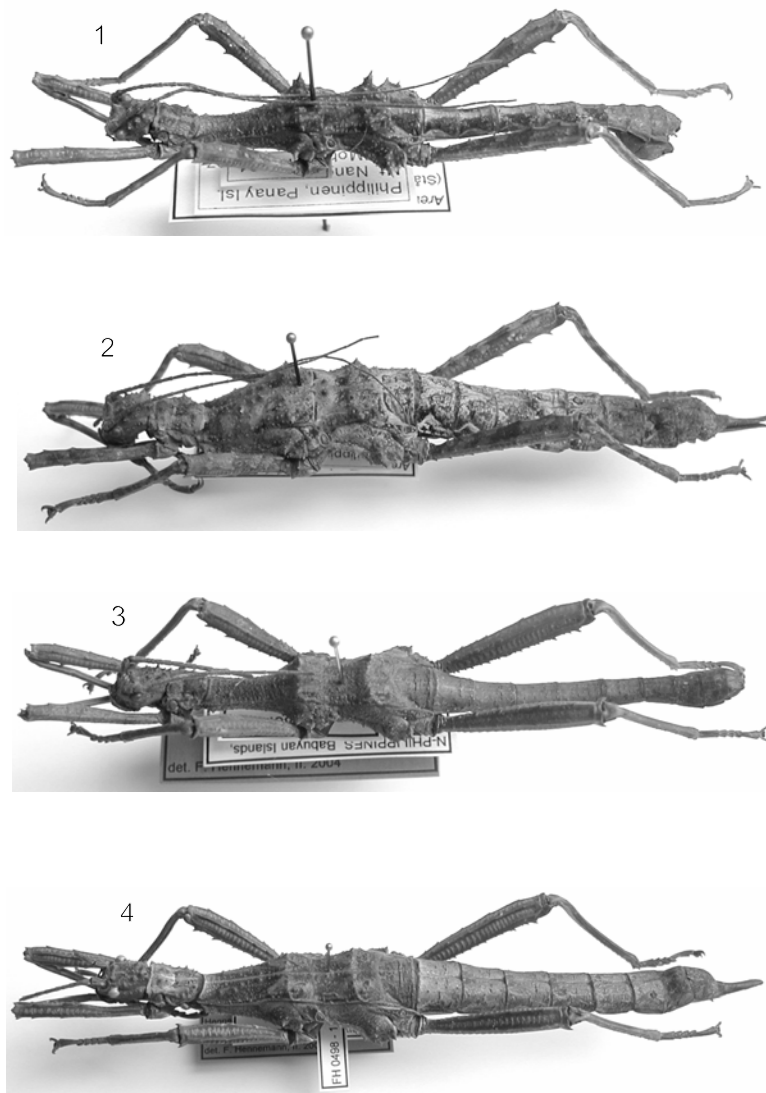
Legs: As in ♂♂ but saw-like teeth of the femora somewhat more prominent.

Nymphs: Nymphs in the later instars have more spinose legs than the adults and a more strongly developed body armature. The size of the spines is considerably reduced with the final ecdysis. Nymphs of all instars tend to be much more colourful than adults, which particularly concerns to ♂♂, having various shades of brown, yellow and bright green. The thorax often exhibits conspicuous blackish lateral markings and occasionally a more or less distinct and bold longitudinal, yellowish median line. The four basal tergites often possess a slightly C-shaped blackish lateral margin. The final colouration of the adults does not appear before the final ecdysis.

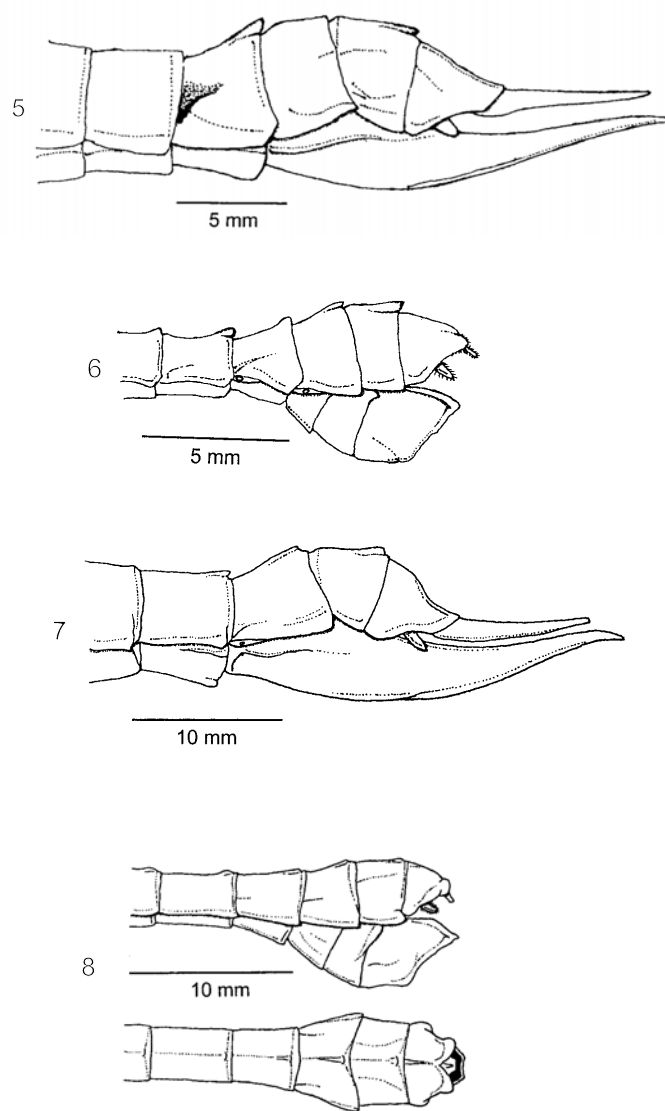
Description of the eggs: All eggs used for the following descriptions were already laid and fully developed. Large, capsule elongate, 2x longer than wide, cylindrical in cross-section, polar-area hemispherical. General colouration of capsule, micropylar plate and operculum uniformly mid grey. Capsule surface minutely but densely punctured. Micropylar plate elongate and shaped like a bold, inverted "Y". posterolateral arms projecting considerably over the micropylar cup and circle the polar and by roughly half the way. Micropylar cup placed in posteromedial notch of plate, black. Median line distinct and reaching as far as to the polar end of capsule. Operculum circular, very slightly convex and with a minute central hump. Measurements (in mm): Length 4.7-5.0, width 2.6-2.7, height 2.8-3.1, length of micropylar plate 3.7-3.8.

Etymology: This new striking species, which is the so far largest known member of the subfamily Obriminae, is dedicated to Mr. Martin BRÜCKNER (Munich) for many years of friendship, assistance and providing useful comments on this and other manuscripts of the authors.

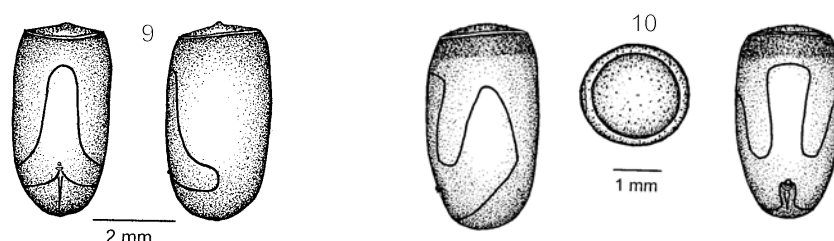
Comments: In June 2003 several specimens of this striking new species were taken by a native collector on Calayan Island one of the Babuyan Islands, which are situated in the very northern Philippines. The insects were found on various low-growing plants and ♀♀ were kept alive in order to produce eggs. In captivity they readily accepted guava (*Psidium guajava*, Myrtaceae) as an alternative foodplant and culturing of the species in the Philippines has proven quite easy (pers. comm. I.O. LUMAWIG). In autumn 2003 numerous eggs, laid by the wild-caught ♀♀ have been forwarded to the authors and other European breeders by I. O. LUMAWIG (Philippines). Also in Europe this species has proven pretty easy to rear in humid but well ventilated conditions and temperatures between 22-26°C. Bramble (*Rubus* spp., Rosaceae), rose (*Rosa* spp., Rosaceae), ivy (*Hedera helix*, Araliaceae) and firethorn (*Pyracantha* spp., Rosaceae) have so far been observed to be readily accepted as alternative foodplants. The eggs hatch after an incubation of 4-6 months with remarkably high ratios, being close to 100%. Newly hatched nymphs are very sturdy and reach maturity after 3-6 months, depending on temperature and quality of the offered foodplants. As typical in Obriminae and the other species of *Trachyaretaon* REHN & REHN,



Figs 1-4 *Trachyaretaon* spp.: 1 *T. echinatus* (STÅL, 1877) ♂ (Philippines, Panay Id., Coll. FH, No. 0119-31); 2 *T. echinatus* (STÅL, 1877) ♀ (Philippines, Panay Id., Coll. FH, No. 0119-23); 3 *T. brueckneri* sp. nov. ♂ Paratype (Coll. FH, No. 0498-3); 4 *T. brueckneri* sp. nov. ♀ Paratype (Coll. FH, No. 0498-1).



Figs 5-8 *Trachyaretaon* spp., terminal abdominal segments of: 5 *T. echinatus* (STÅL, 1877) ♀ (lateral view); 6 *T. echinatus* (STÅL, 1877) ♂ (lateral view); 7 *T. brueckneri* sp. nov. ♀ (lateral view); 8 *T. brueckneri* sp. nov. ♂ (lateral & dorsal view).



Figs 9-10 *Trachyaretaon* spp., eggs of: 9 *T. brueckneri* sp. nov. (dorsal, lateral view); 10 *T. echinatus* (STÅL, 1877) (dorsal, lateral view & operculum).

1939, ♀♀ bury their eggs singularly in the soil by using their bird-beak like ovipositor. Up to three eggs are laid per day and ♀. When disturbed, nymphs and adults will drop to the floor and move very rapidly which makes handling somewhat difficult. Numerous photos of alive *Trachyaretaon brueckneri* **sp. nov.** can be viewed on the author's website: www.phasmatodea.com.

Acknowledgements

The authors would like to thank I.O. LUMAWIG (Philippines) for kindly providing dried and live material as well as precise collecting data and information on captivity of *T. brueckneri* sp. nov. in the Philippines.

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Literaturbesprechung

CHANNING, A. & HOWELL, K.M. 2006: Amphibians of East Africa. - Edition Chimaira, Frankfurt am Main. 418 S.

Nach dem 2001 erschienen "Amphibians of Central and Southern Africa" liegt nun vom gleichen Autor (in Zusammenarbeit mit Kim HOWELL) ein Band über die Amphibien Ostafrikas vor. Von den weltweit in etwa 5500 Arten vorkommenden Amphibien leben etwas mehr als 200 Arten in den Ländern Ostafrikas (Uganda, Kenya, Tanzania). Zusammenfassende Fachliteratur über das östliche Afrika existiert kaum und somit ist diese Monographie als Standardwerk zu sehen, auf dem alle zukünftigen Beschreibungen und Forschungen aufbauen werden. Behandelt werden die beiden Ordnungen Anura (Froschlurche) und Gymnophiona (Blindwühlen). Eine kurze Einführung (Sammeln, Historie, Geographie und Umwelt sowie Naturschutz) bereitet den Leser auf den Artenteil vor; bemerkenswert ist hierbei der ebenso einfache wie geniale Bestimmungsschlüssel der Familien (adulter Frösche). Der Artenteil beginnt innerhalb jeder Familie jeweils mit einem Gattungsschlüssel, einer kurzen Charakterisierung der Gattung und dem Artenschlüssel. Jede Art wird entsprechend dem Wissensstand ausführlich beschrieben, des weiteren gibt es Anmerkungen zu Verbreitung und Habitat (inkl. einer Verbreitungskarte), Werberuf, Eiablage, Bemerkungen und die wichtigste Referenzliteratur. Erwähnenswert ist das abschließende Kapitel über Kaulquappen (sofern bekannt), welches wiederum Bestimmungsschlüssel zu Familie und Gattung beinhaltet, sowie durch einige fantastische Habituszeichnungen besticht. In der Mitte des Buches befinden sich 24 Farbtafeln mit meist acht (zu kleinen) Fotos, die einen Großteil der beschriebenen Arten zeigen.

Eine fantastische Darstellung zu Systematik und Lebensweise ostafrikanischer Frösche.

R. GERSTMEIER

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