Vitessa segereri sp. n. (Lepidoptera, Pyralidae) from the Tanimbar Islands (Indonesia)

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Abstract

A new Pyralidae species, *Vitessa segereri* **sp. n.**, is described from the Tanimbar Islands (Indonesia). The species differs from the similar species *V. ternatica* LEDERER, 1863, *V.* and *V. hollandi* MUNROE & SHAFFER, 1980 morphologically and in the DNA-barcode.

Keywords: Lepidoptera, Pyralidae, *Vitessa segereri* **sp. n.**, Tanimbar Islands, Indonesia, DNA, distribution

Zusammenfassung

Eine neue Pyralidenart, *Vitessa segereri* **sp. n.**, wird von den Tanimbar Inseln (Indonesien) beschrieben. Die Art unterscheidet sich von den ähnlichen Arten *V. ternatica* LEDERER, 1863 und *V. hollandi* MUNROE & SHAFFER, 1980 sowohl morphologisch wie auch durch die DNA.

Introduction

The genus *Vitessa* MOORE, [1860] is restricted to Southeast Asia and Australia. It ranges from Southeast China, Indo-China (Thailand, Burma, Laos, Vietnam and Cambodia) via Malaysia, Indonesian Islands, New Guinea to Australia and the Solomons with 29 species presently known (MUNROE & SHAFFER 1980, BUCHSBAUM 2000, 2002).

The Mollucan Islands and New Guinea are the region with the highest number of species (MUNROE & SHAFFER 1980, BUCHSBAUM 2000, 2002, 2012,). All together 17 species are recorded from there.

The species here described was discovered in the Tanimbar Islands, where so far no species of the genus was known. It seems to be the only *Vitessa*-species occuring in these islands because only this species was found there in spite of extensive collections. The Tanimbar Island group is situated east of the Moluccan Islands and southwest from Papua. This Mololuccan region and Sulawesi is also called Wallacea (e. g. SEDLAG 1984, 1995, ILLIES 1971, REICHHOLF 2003) and is one of the biodiversity hotspots (MYERS et

al. 2000). HOLLOWAY & HALL (1998) and BECK et al. (2006) show the high diversity in butterflies and moths. Recently, another quite spectacular large species (*Vitessa ingeae* BUCHSBAUM & CHEN, 2013) has been described from there (BUCHSBAUM & CHEN 2013), and now another species can be added from this region, bringing the total of Wallacean species to 12.

Most of the *Vitessa*-species are known only in a low number of specimens. The species fly in the night and can be observed at light. The Sundaland region is only moderately rich in species numbers (KALTENBACH & ROESLER 1989), but mass occurences of *Vitessa* species at light in Sumatra (Indonesia) were recorded (BUCHSBAUM 2002).

Description

***Vitessa segereri* sp. n.** (Fig. 1)

Material: Holotype ♂: S. Moluccas, Tanimbar Islands, S. Yamdena isl., 150 m, 20 km NE Saumlaki, Lovulun vill., 5 km NW, 5. ii.-30 iii. 2007, Jakl leg., ex coll. W. Speidel in coll. Zoologische Staatssammlung (ZSM), Munich. **Paratypes**: 6 ♂, 21 ♀ with the same data as holotype in coll. W. Speidel (Olching), 2 ♀, Indonesia, Tanimbar Islands, 10. i. - 05. ii. 2007, leg. Jakl, ex Museum Witt now in ZSM, DNA-No.: BC ZSM Lep 45986 and Gen.-prep-No.: M3453, DNA-No.: BC ZSM Lep 45985, Gen.-prep-No.: M3452; 2 ♀ Tanimbar Isls.; Indonesia, Yamdena Isl., 20 km NE of Saumlaki; 7°47'S ● 131°19'E; 150 m, 6.ii.-30. iii. 2007; leg. Jakl, Coll. Schintlmeister, ex Museum Witt, now in ZSM); 1 ♂, 9 ♀, S. Moluccas, Tanimbar Islands, S. Yamdena isl., 150 m, 20 km NE Saumlaki, Lovulun vill., 5 km NW, 5. ii.-30 iii. 2007, Jakl leg., with gen. prep.-No. ♂ M3454 viz. gen. prep.-No. ♀ 3455 respectively.

Description and differential diagnosis: Wingspan: 38 - 40 mm, Ø 39 mm Forwing length: 17 – 19 mm, Ø 18 mm

Body and wings black with white and yellow coloration. Thorax with rich yellow markings, abdomen with scattered yellow scales at base and espacially at the end, underside with white stripes. Head black with yellowish orange frons and anterior tibiae. Forewing glossy blue-black; orange subbasal area small, in most cases triangular, vein CuP forming the underside of the triangle and the upper angle of triangle reaching costa, in some specimens especially females, this yellow region enlarged beyond vein CuP and being broader at costal margin; antemedial fascia reduced to a triangular indistinct whitish spot, infuscated with blackish scales. Postmedial fascia also reduced to two indistinct whitish spots, infuscated with blackish scales, the upper one larger and round, the lower one elongate. Terminal area with white vein-lines on most veins, not restricted to the area above vein Cu2 like in *Vitessa ternatica* LEDERER, 1863. Hindwing above mostly blue-black, with violaceous reflections, white, blackish infuscated medial area small, comparable in size to that of *V. ternatica*, whereas the white area is larger and brighter in *V. hollandi* MUNROE & SHAFFER, 1980. The white colour of the wing-markings are characteristically infuscated, not bright white like in the related species. No distinct sexual dimorphism.

Male genitalia (fig. 2): Uncus differentiated in a relatively wide basal portion, shorter than the relatively slender, rod-like distal portion. Gnathos large, sickle-shaped. Valva with posterior margin concave at centre; clasper larger and more prominent than in all other *Vitessa* species, protruding over the posterior margin of the valvae. 3 elongate clusters of cornuti in the vesica.

Female genitalia (fig. 3): Posterior apophyses shorter, slender than anterior apophyses which are stronger, curved and strongly developed, sclerotized, with lateral prolongations. Bursa with slender ductus and week, membraneous ovoid corpus without signum.

Biological data are largely unknown. The specimens were found in February and March according to the labels of the present specimens, but possibly can be found all over the year.

Distribution: The new species is only known from the Tanimbar Islands (Indonesia).

Etymology: The species is dedicated to our colleague Dr Andreas Segerer (ZSM, Munich).

Molecular genetic results: In addition to the morphological differences, the DNA-cytochrome oxidase subunit I (barcode) shows a considerable difference to the known species of the Wallacean region. However only a limited number of *Vitessa*-barcodes is known so far, which all, however, significantly differ from the present species. The barcode of the sister-species, *Vitessa ternatica*, is unknown.

The barcode of the present new species was determined as follows (ID: GWOSH809-10, Sample ID: BC ZSM Lep 45985, GenBank Accession: JF851689):

TACATTATATTTTATTTTTGGAATTTGATCAGGGATAGTTGGAACTTCTTTAAGATTATTAATT
CGAGCAGAATTAGGAACCCCCGAATCTTTAATTGGAGATGACCAAATTTATAACACTATTGT
TACTGGTCATGCCTTTATTATAATCTTTTTTATAGTTATACCAATCATAATTGGAGGATTTGGA
AATTGATTAGTACCTTTAATATTAGGAGCTCCTGATATAGCTTTCCCCCGAATAAATAATATA
AGATTTTGACTATTACCCCCATCTATTACTCTTTTAATTTCAAGAAGAATTGTTGAAAACGGT
GCTGGAACAGGTTGAACAGTTTACCCCCCTTTATCCTCTAATATTGCCCATAGAGGAAGCTC
TGTAGATTTAGCAATTTTTTCGTTGCATTTAGCTGGTATTTCATCTATTTTAGGGGCAATTAA
CTTTATTACTACTATTATTAATATAAAATTAAATGGTCTACATTTTGATCAAATACCTTTATTTA
TTTGAGCTGTAGGTATCACAGCTCTTTTATTACTTTTATCTTTACCTGTTTTAGCTGGAGCTA
TTACGATACTTTTAACAGATCGAAATTTAAATACTTCTTTCTTTGACCCTGCTGGGGGTGGG
GACCCTATTCTTTATCAACACTTATTC

The barcode of *Vitessa hieratica* SWINHOE, 1900 (ID: GWORM520-09, Sample ID: BC ZSM Lep 20770, GenBank Accession: HM393695) is as follows:

TACATTATACTTCATTTTTGGAATTTGATCTGGAATAGTAGGAACCTCCTTAAGATTATTAATT
CGAGCAGAATTAGGAACCCCTGAATCTTTAATTGGAGATGATCAAATTTATAATACCATTGT
TACTGGTCATGCTTTTATTATAATTTTTTTTATAGTTATACCAATTATAATTGGAGGATTTGGA
AATTGATTAGTACCTTTAATATTAGGAGCCCCTGATATAGCTTTCCCCCGAATAAATAATATA
AGATTTTGATTGTTACCCCCCTCTCTTACTCTTTTAATTTCAAGAAGAATTGTTGAAAATGGT
GCTGGAACAGGTTGAACAGTTTACCCCCCTTTATCCTCTAATATTGCTCATAGAGGAAGATC
TGTAGATTTAGCAATTTTTTCATTACATTTAGCAGGTATTTCATCTATTTTAGGTGCAATTAAT
TTTATTACTACTATTATTAATATAAAATTAAATGGTTTACATTTTGATCAAATACCATTATTTGT
TTGAGCTGTAGGAATTACAGCCCTTTTACTACTTTTATCTTTACCTGTTTTAGCTGGAGCTAT
TACTATACTTCTTACAGATCGAAATTTAAACACTTCTTTTTTTGATCCTGCCGGAGGGGGAG
ATCCCATTCTTTATCAACATTTATTT

At last that of *Vitessa hollandi hollandi* (ID: GWORM526-09, Sample ID: BC ZSM Lep 20776, GenBank Accession: -) was partially determined:

ACATTATATTTTATTTTTGGAATTTGATCAGGAATAGTTGGAACCTCCTTAAGATTATTAATTC
GAGCAGAATTAGGAACCCCTGAATCTTTAATTGGAGATGATCAAATTTATAACACTATTGTTA
CCGGTCATGCTTTTATTATAATTTTTTTTATAGTTATACCAATCATAATTGGAGGTTTTGGAAA
TTGATTAGTACCTTTAATGTTAGGAGCTCCTGATATAGCTTTCCCCCGAATAAATAATATAAG
ATTTTGATTATTACCCCCATCTATTACTCTCTTAATTTCAAGAAGAATTGTT

The similarities in the known barcodes of *Vitessa* species are graphically shown in a dendrogram (Fig. 1)

Discussion

The new species is rather similar to *Vitessa ternatica* and also to *V. hollandi*. The shape of the valvae which is less regular in outline than in the *V. stettina*-group (MUNROE & SHAFFER 1980), with posterior margin concave at centre, indicates that the new species belongs to the *V. hemiallactis* MEYRICK, 1887-group of species in the sense of MUNROE & SHAFFER 1980 rather than to the *V. stettina*-group of species. This position is corroborated by the fact that the clasper of *Vitessa segereri* **sp. n.** is larger and more prominent than in the *V. stettina*-group, protruding over the posterior margin of the valvae. So probably the closest allied species is *V. ternatica*, as *V. hollandi* belongs to the *V. stettina*-group of species.

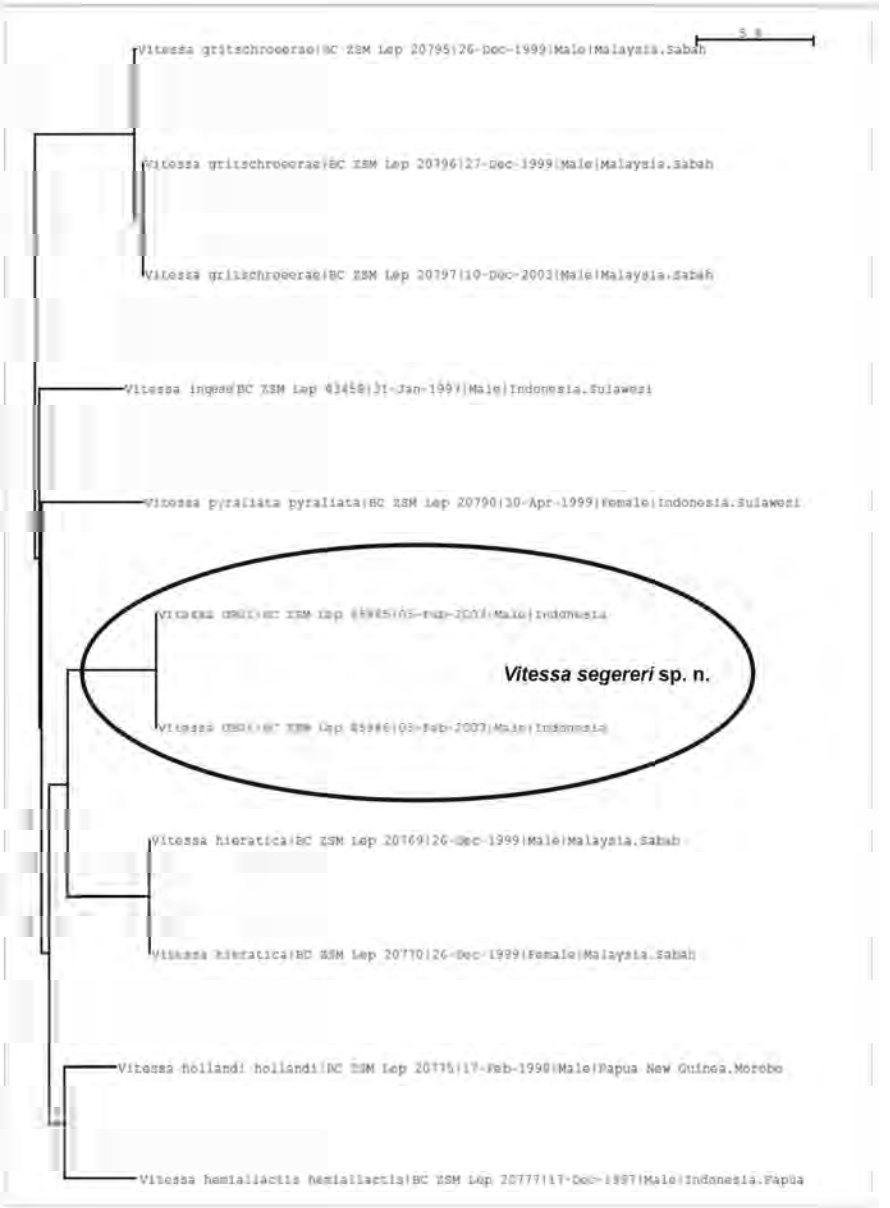

Fig. 1. BOLD-dendrogram giving the similarities in CO1 gene structure with the neighbour-joining method. This shows that the few known barcodes within the genus differentiate the species quite clearly. However, nothing can be derived from this dendrogram concerning the phylogenetic relationship of the species within the genus.

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Prof. Paul Hebert and his team (University of Guelph) kindly furnished the data of the CO1 gene and the dendrogram (BOLD system).

Legend to plate 1

2. *Vitessa segereri* **sp. n.** ♂ holotype "S. Moluccas, Tanimbar Islands, S. Yamdena isl., 150 m, 20 km NE Saumlaki, Lovulun vill., 5 km NW, 5. ii.-30 iii. 2007, Jakl leg." Forewing length 16 mm.

3. *Vitessa segereri* **sp. n.** ♀ paratype "Indonesia, Tanimbar Islands, 10. i.-5. ii. 2007, leg. Jakl, Museum Witt. Forewing length 18,5 mm.

4. Map indicating situation of type locality and known distribution

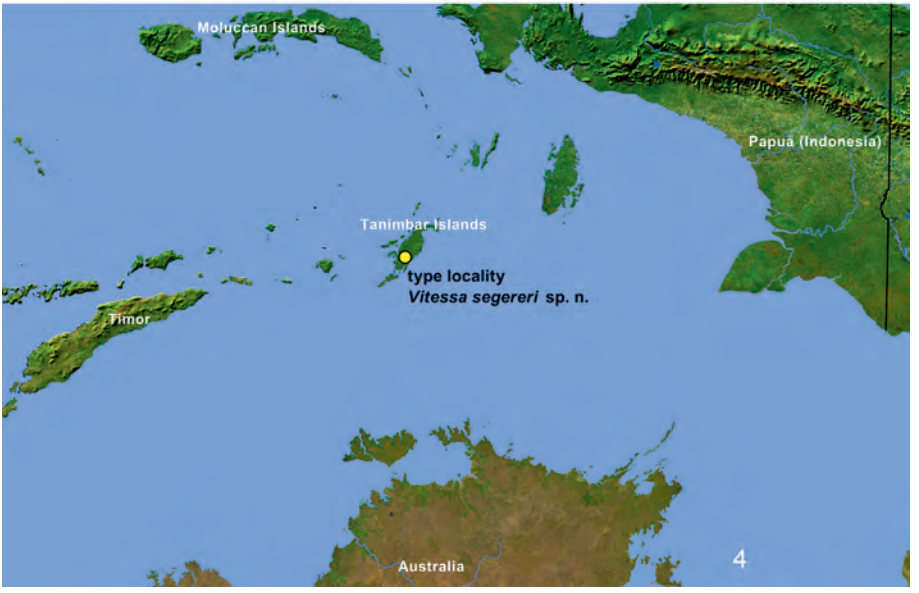

Fig. 5. Male genitalia (slide No. M3454)

Fig. 6. Female genitalia (slide No. M3455)

References

BECK, J., KITCHING, I. J. & K. E. LINSENMAIR (2006): Wallace's line reviseted; has vicariance or dispersal shaped the distribution of Malesian hawkmoths (Lepidoptera: Sphingidae) ? – Biological Journal of the Linnean Society **89**: 455-468.

BUCHSBAUM, U. (2000): Eine neue Pyralide der Gattung *Vitessa* MOORE, [1860], aus Sabah, Nord-Borneo, Malaysia (Lepidoptera: Pyralidae). – Entomologische Zeitschrift, Stuttgart **110** (11): 337-339.

BUCHSBAUM, U. (2002): Unusual mass occurences at lights of species in the genus *Vitessa* Moore, [1860] in Sumatra, Indonesia (Lepidoptera, Pyralidae). – Heterocera Sumatrana **12** (3): 171-175.

BUCHSBAUM, U. (2012): *Vitessa ingeae* sp. n. (Lepidoptera, Pyralidae) from Sulawesi (Indonesia). – Entomofauna **34**: 333-340.

HOLLOWAY, J. D. & R. HALL (1998): SE Asian geology and biogeography: an introduction. *In*: Hall, R. & J. D. Holloway (eds.): Biogeography and geological evolution of SE Asia. – Leiden: Backhuys Publishers, 1-23.

ILLIES, J. (1971): Einführung in die Tiergeographie. – Gustav Fischer Verlag Stuttgart, 91 pp.

KALTENBACH, T. & R. U. ROESLER (1989): Die Arten der Pyraliden-Gattungen *Vitessa* MOORE, 1869 (Pyralinae) und *Heortia* LEDERER, 1863 (Odontiniiae) von Sumatra (Lepidoptera, Pyraloidea). – Atalanta **19** (1/4): 219-233.

MUNROE, E. G. & M. SHAFFER (1980): A revision of *Vitessidia* ROTHSCHILD & JORDAN and *Vitessa* MOORE (Lepidoptera: Pyralidae). – Bulletin Britsh Museum Nat. Hist. (Ent.) **39**: 241-360, 318 figs.

MYERS, N., MITTERMEIER, R. A., MITTERMEIER, C. G., DA FONSECA, G. A. B. & J. KENT (2000): Biodiversity hotspots for conservation priorities. – Nature **403**: 853-858.

REICHHOLF, J. H. (2003): Malesian Island Biogeography. From Alfred R. Wallace to Robert H. MacArther and beyond: What makes "Wallacea" so unique? – Journal of the Zoological Society Wallacea **1**: 4-11.

SEDLAG, U. (1984): Wörterbücher der Biologie. Biogeographie, Artbildung, Evolution. – Gustav Fischer Verlag, Jena, 333 pp.

SEDLAG, U. (1995): Tiergeographie. Urania Tierreich. – Urania Verlag Leipzig, Jena, Berlin, 447 pp.

WHITEMORE, T. C (Ed.) (1987): Biogeographical Evolution of the Malay Archipelago. – Clarendon Press, Oxford, 147 pp.

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