

Diphascon langhovdense (Sudzuki, 1964) stat. nov., a new taxonomic status for the semi-terrestrial tardigrade (Tardigrada)

Diphascon langhovdense (Sudzuki, 1964) stat. nov., ein neuer taxonomischer Status für das semi-terrestrische Bärtierchen (Tardigrada)

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(Received: 20. February 2002)

SUMMARY: The upgrading of the tardigrade *Diphascon chilense langhovdense* (Sudzuki, 1964) to the species-level is proposed. The taxon has often been reported from the Antarctic and is known also from New Zealand. The confusing taxonomic status of *Diphascon chilense* Plate, 1888, the type species for *Diphascon*, is discussed.

Tardigrada, Diphascon langhovdense (Sudzuki, 1964) stat. nov., taxonomy, the Antarctic

ZUSAMMENFASSUNG: Es wird vorgeschlagen, die Tardigraden-Unterart *Diphascon chilense langhovdense* (Sudzuki, 1964), als Art einzustufen. Individuen dieser Art sind mehrmals aus der Antarktis gemeldet worden; die Art kommt auch in Neuseeland vor. Der verwirrende taxonomische Status der Art *Diphascon chilense* Plate, 1888, der Typusart für die Gattung *Diphascon*, wird diskutiert.

Tardigrada, Diphascon langhovdense (Sudzuki, 1964) stat. nov., Taxonomie, die Antarktis

1. Introduction

One of the taxonomically most confusing eutardigrades is *Diphascon chilense* Plate, 1888, the type species for the worldwide distributed and ubiquitous genus *Diphascon*. Extremely scanty original description, insufficient illustration (Fig. 1), non-existent type material and a widely defined type locality (Chile) leave a wide margin for speculative interpretation of the diagnostic key characters of the species. There is no doubt that under the name *D. chilense* several different species have been recorded worldwide within the last 100 years. Because of the scarce and confusing data, the species should be considered as *species inquirenda*.

SUDZUKI (1964) described a morphological variety of *D. chilense* from bryophytes from Langhovde in the vicinity of the Japanese Station Syowa (Continental Antarctic) and named it *Hypsibius (Diphascon) chilensis* var. *langhovdensis*, to differentiate these tardigrades from the enigmatic *D. chilense*. Although SUDZUKI's (l.c.) differential diagnosis had been based on MARCUS'

(1928, 1936) interpretation of *D. chilense*, MARCUS himself, after examination of the illustration by SUDZUKI, did not exclude the possibility that the specimens studied by the latter "...could be identical with *chilensis* of Plate" (SUDZUKI l.c., p. 14).

RAMAZZOTTI (1965) upgraded the variety to the subspecies level, however, without any comment. Subsequently, the taxon has most often been cited as the subspecies *langhovdense* (RAMAZZOTTI 1967, 1972; RAMAZZOTTI and MAUCCI 1983; DASTYCH 1984, 1989; MCINNES 1994; MILLER et al 1994; SOHLENIUS et al. 1995, 1996), although some authors (UTSUGI and OHYAMA 1989, 1991, 1993; MILLER et al. 1994, 1996) reported it also as *D. chilense*, enhancing the confusion surrounding the latter species. Recently a taxon belonging to the confusing *pingue-alpinum* group was reported as *D. chilense* from the Robinson-Crusoe Island by PILATO and BINDA (1998).

In this paper I provide the diagnosis of *D. chilense langhovdense*, propose the change of its taxonomic status and discuss the status of *D. chilense*.

2. Results and Discussion

The decision of SUDZUKI (1964) to describe a distinct member of the genus *Diphascon* from Langhovde in the East Antarctic as a (morphological) variety of the taxonomically obscure *D. chilense*, considerably enhanced the taxonomic confusion around the latter taxon. Additional confusion was caused by the upgrading of this variety to the subspecies rank by RAMAZZOTTI (1965). That subspecies fixation suggested the speciation event within *D. chilense* and simultaneously designated a nominotypical subspecies, i.e., *D. chilense chilense*. However, RAMAZZOTTI (l.c.) did not justify the upgrading and never discussed or proved speciation within *D. chilense*. The lack of his comment is understandable, as the obscure status and non-verifiable data on morphology in the nominal species provide no margin for speculation on the speciation phenomenon. The nominotypical subspecies, representing in fact a species inquirenda, has been present in the literature for almost 40 years.

The taxon described by SUDZUKI (l.c.) characterizes a distinct morphological separateness compared to other species of *Diphascon*, and one which can be relatively easily recognized. In the light of recent taxonomic criteria valid for the genus (PILATO 1974, 1975), *D. chilense langhovdense* should be recognized as a separate, valid (morpho)species. Thus, the elevation of its taxonomic status to that of species is proposed here. This should contribute to the nomenclatural stability through: (1) the invalidation of the nominotypical subspecies *D. chilense chilense*; (2) prevent the incorrect reporting of *D. chilense* as *D. chilense langhovdense* and vice versa in future, as well as (3) prevent the recording of the latter taxon within another confusing taxa-complex, i.e., *pingue-alpinum* group.

Diphascon langhovdense (SUDZUKI, 1964) (stat. nov.)

(Figs 2-9)

Hypsibius (Diphascon) chilensis (PLATE, 1888) var. *langhovdensis*, a new variety: SUDZUKI 1964 (p. 13-14, Figs 1-8)

Hypsibius (Diphascon) chilensis langhovdensis: RAMAZZOTTI 1965, 1967, 1972

Diphascon chilense langhovdense: RAMAZZOTTI and MAUCCI 1983; DASTYCH 1989*; MCINNES 1994; MILLER et al 1994*; SOHLENIUS et al. 1995*, 1996*

Diphascon chilense langhovdensis (sic): DASTYCH 1984*

Hypsibius (Diphascon) chilensis: JENNINGS 1976a*, 1976b*

Diphascon chilensis: UTSUGI and OHYAMA 1989*, 1991*, 1993

Diphascon chilense: ?RICHTERS 1908*; MILLER et al. 1996*

Diphascon alpinum: HORNING et al. 1978*

[Asterisk (*): report based on original material].

Type material: not available (lost: Dr. SUDZUKI, in litt. 1988).

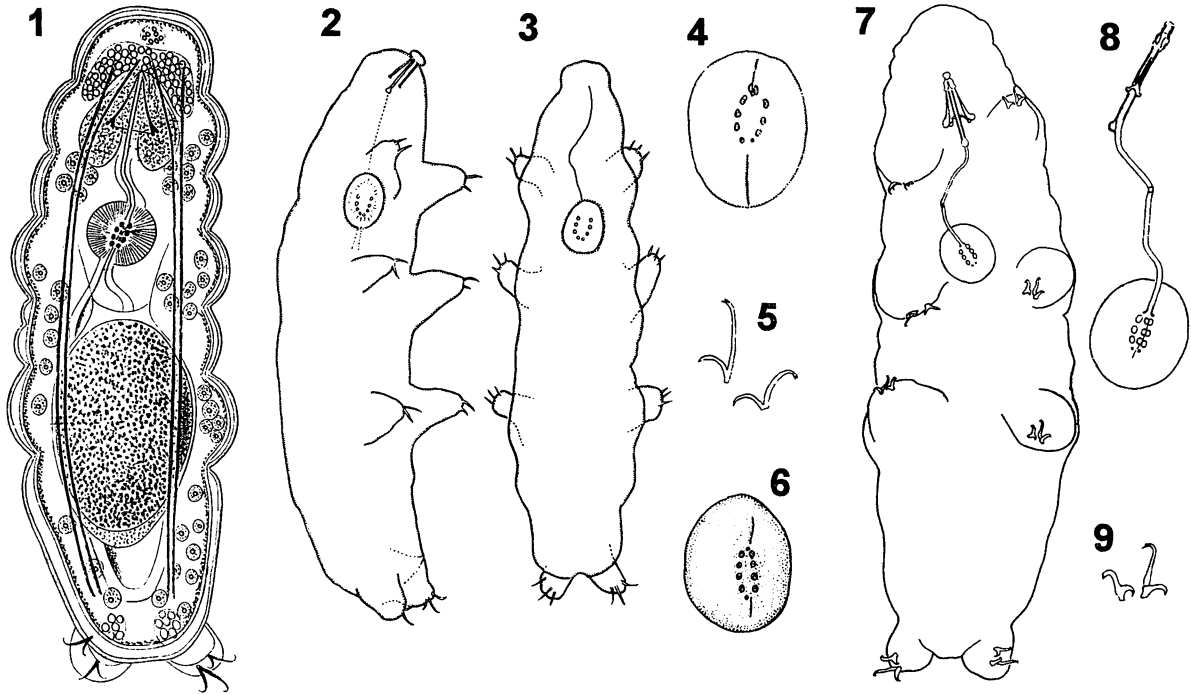
Diagnosis: Small *Diphascon* (range 84-256 μm , mostly 120-180 μm long), with cuticle smooth. Eye-dots absent. Mouth tube with a distinct dorsoposterior apodeme (= "drop-shaped thickening") (Figs 7-8). Pharyngeal tube long and very thin (external diameter about 0.9 μm in a specimen of 198 μm length), without terminal apophyses. Pharynx small, roundish (short-ovoid), with distinct pharyngeal apophyses, three small roundish, almost equally sized macroplacoids and distinct microplacoids (Figs 4, 6, 7, 8). Pharyngeal apophyses and microplacoids of similar size, smaller than macroplacoids (e.g., length of apophyses 1.0 μm , macroplacoids 1.2, microplacoids 0.9 μm in a specimen 198 μm long). No cuticular bars on legs I-III. Claws small, accessory spines small and inconspicuous; main branches of external claws without light-refracting section at their bases.

Habitat: Recorded from bryophytes, mainly mosses, on soil, rocks and from tufts of vascular plants (*Deschampia antarctica* E. Desv., 1854) in the Antarctic (auct.) and from various bryophytes on soil, rocks, vascular plants in New Zealand (HORNING et al. 1978).

Distribution: Reported from the Continental and Maritime Antarctic. The species has also been found in New Zealand (HORNING et al. 1978) but was, however, misidentified as *Diphascon alpinum* MURRAY, 1906 (see DASTYCH 1984). On the other hand, the species identified in the paper by HORNING et al. (l.c.) as *D. chilense* [exactly: *Hypsibius (Diphascon) c. chilensis*: (sic), p. 66, 270] represents in fact a taxon from the pingue-alpinum group: DASTYCH unpublished, 1984).

3. Notes on the status of *D. chilense*

PLATE (1888) provided very little data on *D. chilense*: (1) its size ("about 164,14 μm "); (2) number of examined specimens, i.e., four; (3) and (4) locus typicus of the species and substrate from which it was extracted ("Chilean moss"); (5) collector name ("Consul a.D. Dr. OCHENIUS"); (6) the species illustration. Diagnostic characters



Figs 1-9: *Diphascoen chilense* Plate. 1- habitus, dorsal view; *Diphascoen langhovdense* (Sudzuki); 2, 3- habitus, ventro-lateral and dorsal view, respectively; 4, 6- pharynx; 5- claw; 7- habitus, ventral view; 8- buccopharyngeal apparatus; 9- claws IV [After PLATE 1888 (Fig. 1), SUZUKI 1964 (Figs 2-6) and DASTYCH 1984 (Figs 7-9). All slightly changed].

Abb. 1-9: *Diphascoen chilense* Plate. 1- das Tier, dorsal; *Diphascoen langhovdense* (Sudzuki); 2, 3- das Tier, ventro-lateral und dorsal; 4, 6- Schlundkopf; 5- Krallen; 7- das Tier, ventral; 8- Buccalapparat; 9- Krallen des IV. Beines [Nach PLATE 1888 (Abb. 1), SUZUKI (Abb. 2-6) und DASTYCH 1984 (Abb. 7-9). Alle leicht verändert].

of the species can be inferred only from the single insufficiently detailed drawing (Fig. 1) which leaves a wide margin of crucial details to be guessed at. As a result, diverse interpretations of the morphology can be found, as in e.g. MURRAY (1906), RICHTERS (1908), MARCUS (1928, 1936), RAMAZZOTTI and MAUCCI (1983). The problem was partly discussed in DASTYCH (1984). One can therefore assume that some species of *Diphascion* (from the southern hemisphere) could well fit the vague morphological image of *D. chilense*. Therefore the problem of a “real” *D. chilense* (which is the type species for *Diphascion*) is still open and probably will never be answered without leaving doubts.

An attempt to clear the confusion around *D. chilense* was undertaken recently by PILATO and BINDA (1998). These authors (l.c.) named as *D. chilense* an unspecified number of specimens from Robinson-Crusoe Island (about 650 km off the Chilean coast), belonging to the perplexing *pingue-alpinum* taxa-complex. The authors reasoned briefly for such an identification in that “...The characteristics of these specimens corresponded well to the description of the species”, but did not provide information on whose interpretation of *D. chilense* from the past their statement (l.c.) is based. The taxonomic decision by PILATO and BINDA (l.c.) could be helpful in the clarification of existing confusion, but as the authors have not fixed the name-bearing type (see Article 75, ICZN), their proposal has no nomenclatural validity. Moreover, were the designation of such a type be based on material described in their paper (l.c.), it would be in conflict with Article 75.3.6 of the Code of Zoological Nomenclature, which requires that the neotype should come “as nearly as practicable from the original type locality”. This would not be possible, since the type locality for *D. chilense* was originally defined as “Chilean moss”, the area of which extends for about 4100 km in a N-S direction. Furthermore, since no island was mentioned in the PLATE’s paper, the most satisfactory solution would therefore be the fixation of the type based on material coming from continental Chile or any closely adjacent island. Until a formal type fixation has taken place as requested by the Code, it would be helpful as far as the taxonomic stability is concerned to use, if at all, the name *D. chilense* only for specimens which correspond exactly to those recently described and named as this species by PILATO and BINDA (1998).

Some confusion also surrounds the publication date of *D. chilense*. The paper by PLATE with the description of the species was published in 1888 in a third issue within the Volume No. 3 of Zoologische Jahrbücher (see the volume contents, “Heft III, ausgegeben am 30. November 1888”). The volume itself however, which includes also papers dated 1889, bears the year 1889 as its publication date. Thus, the correct citation of the publication date for *D. chilense* should be 1888 and not 1889.

Acknowledgements

I am grateful to Dr. D. L. Bürkel (Hamburg) for linguistic improvements to the English manuscript.

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A note added in proof:

Recently *D. langhovdence* has been reported from Australia (CLAXTON, S.K., 2001: *Antechiniscus* in Australia: description of *Antechiniscus moscali* sp. n. and redescription of *Antechiniscus parvisentus* (Horning & Schuster, 1983) (Heterotardigrada: Echiniscidae). - Zool. Anz. 240, 281-289.

Buchbesprechungen

GRAHSCHKE, Jan und BENS, Peter: ArcView Kochbuch Praktische GIS Anwendungen für Ökologie, Naturschutz und Landschaftsplanung. – Iutra Verlags- und Vertriebsgesellschaft b. R., Klitten 2002. 223 S, 1 CD-ROM, zahlreiche Zeichnungen, Tabellen und Kästen. 16,5 x 23,5 cm, Paperback. 55,- Euro. Studenten: 45,- Euro. ISBN 3-936412-99-5.

In der Landschaftsplanung ist das Programm „ArcView“ der Firma ESRI das am häufigsten genutzte Geoinformationssystem. Daher ist bei den Anwendern ein Wunsch nach einem umfassenden Lehrbuch vorhanden. Das vorliegende Buch ist jedoch kein solches Lehrbuch und ist auch nicht als solches konzipiert. Vielmehr will es die Einsatzmöglichkeiten des Programmes „ArcView“ einem breiten Kreis von Anwendern in verständlicher Form nahebringen. Am Anfang steht die überraschende, aber entscheidende Frage, ob überhaupt der Einsatz eines GIS notwendig ist. Der erste Abschnitt ist den „Grundlagen zur Arbeit mit ArcView“ gewidmet. Im zweiten Kapitel „... jetzt wird's richtig GIS“ wird eine konkrete Programmbeschreibung geliefert. Der dritte Teil beschreibt die „Visualisierung und Präsentation“. Das Programm „ArcView“ verfügt über eine eigene Programmiersprache, die im Teil 4 „Avenue-Programmierung“ vorgestellt wird. Das fünfte Kapitel beinhaltet konkrete „GIS-Arbeitsanleitungen“. Dieses Kapitel weckt hohe Erwartungen, die aber letztendlich nicht befriedigt werden. Auf 13 Seiten werden ausschließlich stichwortartig die in den vorhergehenden Kapitel des Buches behandelten Arbeitsweisen aufgelistet. Im Anhang wird die spezielle Fehlerbehandlung und der Inhalt der CD-ROM behandelt. Auf der CD-ROM sind Freeware-Programme und -Skripte enthalten. Im Buch ist ein ausführliches Inhaltsverzeichnis vorhanden; ein Register sucht man allerdings vergebens. Im Text fehlen gelegentlich wichtige Satzteile oder Wörter sind doppelt vorhanden. Hinweise, Tipps und Warnung vor problematischen Arbeitsschritten sind durch Symbole am Rand des Textes hervorgehoben. Das Buch kann eine Ergänzung für die Handbücher sein. Für den Personenkreis, der in der Landschaftsplanung mit dem Programm „ArcView“ arbeitet, ist dieses Buch ein „kann“.

M. Stevens, Düsseldorf

KAULE, Giselher: Umweltplanung. – Verlag Eugen Ulmer, Stuttgart 2002. 315 S., 1 CD-ROM, 90 Zeichnungen, 50 Tabellen. 21,5 × 15,0 cm, Paperback. 34,90 Euro. ISBN 3-8001-2770-9 (Verlag Eugen Ulmer). ISBN 3-8252-2282-9 (UTB).

Raum ist im dicht besiedelten Mitteleuropa eine sehr begrenzte und begehrte Ressource. Daher ist eine zukunftsorientierte Umweltplanung eine der größten Herausforderungen für das 21. Jahrhundert. Das vorliegende Buch, das aus einer Vorlesung an der Universität Stuttgart hervorgegangen ist, gibt einen Überblick über Ziele und Methoden der Umweltplanung. Die angeführten Beispiele beziehen sich daher auf die Stuttgarter Region. In einer kurzen Einleitung werden zunächst der Aufbau des Buches und die grundlegenden Planungsvoraussetzungen erläutert. Die unterschiedlichen Planungsebenen, Plan-