

PROBLEMS IN TERMINOLOGY OF TAXONOMIC CHARACTERS OF SPECIES BELONGING TO *GYRODACTYLUS* NORDMANN, 1832 (MONOGENOIDEA: GYRODACTYLIDAE)

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Abstract. The unsatisfactory state of terminology of taxonomic characters of *Gyrodactylus* species is demonstrated on examples. The author suggests a standardization to be carried out by specialists. There are two possible ways of standardization: either to use Latin terms or select those terms of the present terminology which truthfully and unambiguously characterize the respective structure from the view of its function, morphology or topography.

The species determination of the members of *Gyrodactylus* is based particularly on morphological and metrical analysis of attaching structures distributed on the margin and in the centre of their opisthaptor. While assessing the total shape and measurements of these structures it is necessary to assess also their parts differing in their ontogenetic age and function. During the last 10-15 years a problem of ununiform terminology has appeared, which not only complicates the work of specialists, but also has a negative influence on the correctness of results obtained in the diagnostical laboratories.

This fact may be demonstrated on the example of English and German terms used in the descriptions of species. For better intelligibility and easy survey the individual attaching structures are marked by capital letters and their parts by figures (see scheme in Fig. 1).

In English language the following terms were used by Cooper (1915), Van Cleave (1921), Mueller and Van Cleave (1932), Price (1937), Yin and Sproston (1948), Hargis (1955), Turnbull (1956), Ikezaki and Hoffman (1957), Hoffmann and Putz (1964), Rogers and Wellborn (1965), Rogers (1967), Nowlin (1968) and other authors:

A = large hooks, central hooks, anchors; A-1 = point; A-2 = basal portion, shaft; A-3 = root-like portion, root, superficial root; A-4 = flattened heads of dorsal bar, swellings, terminal bullae, knob; A-5 = fold.

B = dorsal bar, deep bar.

C = transverse clamp, cross piece, clamp, ventral bar, ventral supporting bar, superficial bar; C-1 = lateral lobes, anteriorly projecting ends, anterior projections, antero-lateral projections, lateral anterior projections, anterior rami, processes of ventral bar; C-2 = plate, shield, ventral shield, haptor shield, ventral bar membrane, bar shield, superficial-bar shield.

D = peripheral hooks, marginal spines, small hooklets, hooks, marginal hooklets, marginal hooks, haptor hooks; D-1 = terminal hooklet of hook, sickle, tips, hook of marginal hook, hooklet, hook proper; D-2 = shaft, handle, shank; D-3 = point; D-4 = shaft; D-5 = toe, shelfless toe; D-6 = heel; D-7 = sickle membrane, secondary

filamentous hooklet loop (SFH loop); D-8 = accessory piece, sickle lamella, lamella, filamentous hooklet loop (FH loop), posterior projecting structure, sickle filament loop.

These examples show that in the English language as much as seven different terms are used for some of the attaching structures of the opisthaptor, or, on the contrary, a single term is applied for two different parts of this structure (D-2 and D-4).

A similar situation is encountered in case of papers published in German language. For example, Wagener (1860), Wegener (1910), Bychowsky (1933), Žitňan (1964), Ergens (1965), Braun (1966), Kollmann (1968) and others used the following terms:

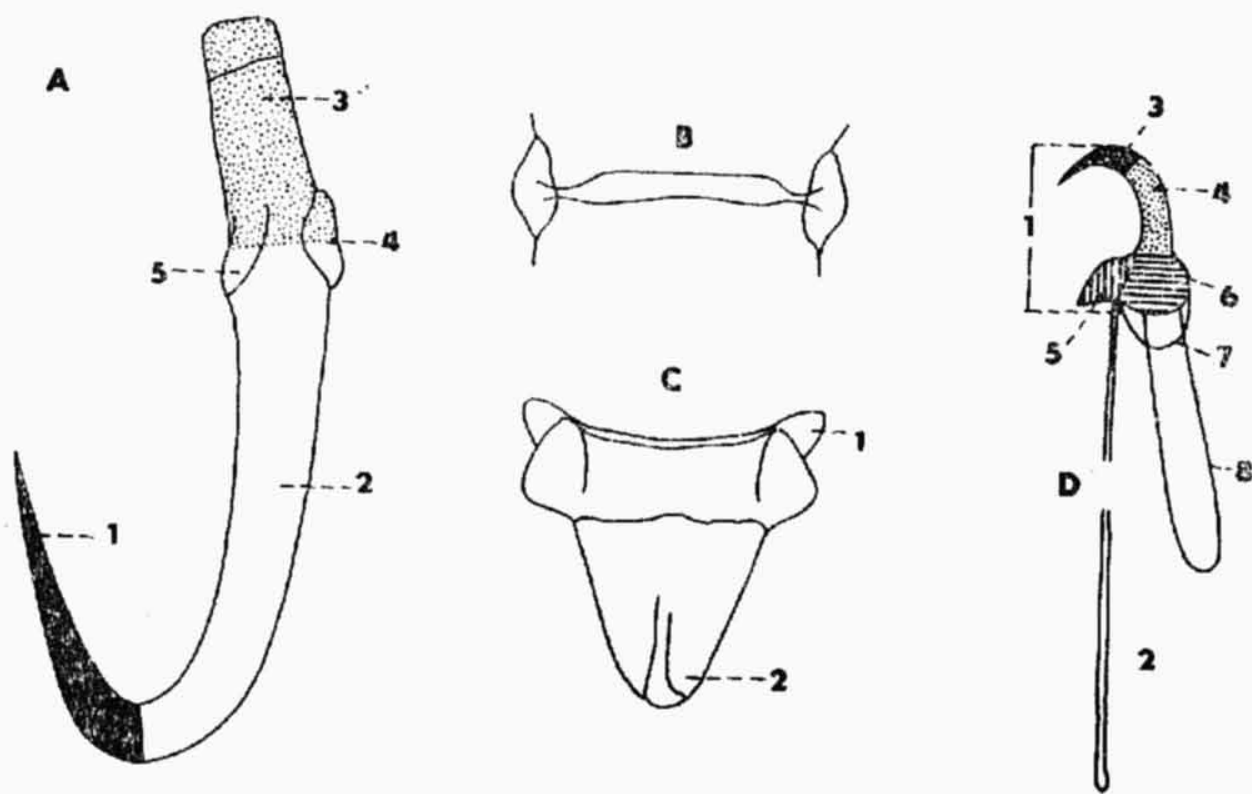


Fig. 1. Scheme of attaching structures of opisthaptor and their individual parts in species of the genus *Gyrodactylus* Nordmann, 1832.

A = Mittelhaken, grossen Haken, mittlerer Haken; A-1 = Spitze, Hakenspitze; A-2 = Basalteil der mittleren Haken, Hakenteil; A-3 = Wurzelfortsatz, inner Auswuchs, Dorsalvorsprung; A-4 = Ankerbeulen; A-5 = Ankernut.

B = obere Klammer, ventrale Klammer, dorsale Verbindungsplatte, dorsales Verbindungsstück, dorsales Brückenstück, Dorsalbrücke, Hilfsverbindungsplatte.

C = untere Klammer, ventrale Klammer, dorsales Verbindungsstück, ventrales Brückenstück, Ventralbrücke, Hauptverbindungsplatte; C-1 = Ankerfortsatz, Vorsprung Auswüchsen; C-2 = Membranvorsatz, membranartiger Fortsatz, Verlängerung, Membrananhang, Membrananhängsel.

D = Klammer, Randhaken; D-1 = Haken, Hakenspitze, Spitze, Krallen; D-2 = Stiel, Stift, Schaft; D-3 + D-4 = Krallenhaken; D-5 = Krallenwurzel-Ventralteil; D-6 = Krallenwurzel-Dorsalteil; D-7 = Öse, kurze Membran; D-8 = Zügel, Leitschlinge, lange Membrane, Schlaufe.

Both English and German belong to the so-called world languages, but it is not possible to use English or German terms in other languages. They are therefore translated and just in these cases the diversity in terminology is most conspicuous. In case that

the original paper in which the term was first used and explained is not available, the text, e.g., description of a new species, may sometimes be hardly understandable. I think that the following examples will clearly demonstrate this case.

If the German terms used for A-3 are translated into English, the number of English terms for A will increase by three (root extension, inner growth, dorsal projection) and, on the contrary, two additional German terms will arise by translating them from English: "Wurzelteil" and "oberflächlicher Wurzel".

If the English terms for A-4 are translated into German, then in addition to "Ankerbeulen" also "Plattkopf der Dorsalstange", "Terminalbeulen" and "Hügel" will be used for the same structure.

Instead of the two terms used in English for B (dorsal bar, deep bar), a total of nine terms would be used after translation from German (upper clamp, ventral clamp, dorsal connecting piece, dorsal connecting plate, dorsal bridge-like piece, dorsal bridge and auxiliary connecting plate), apart from confusing dorsal-ventral. It stands to reason that at reverse translation another two German terms will be formed—"Dorsalstange" and "Tiefstange".

In case of C, there are six different terms used both in English and German, so that after translation from English to German and vice versa there would be twelve terms in each language.

The same is true for other attaching structures and their parts. Further analysis of the terminology would reveal a similar situation as that shown on the above examples.

A large number of data have been published also in Russian language, but the terminology is rather stable compared to English and German ones. Only in case of B, there are three different terms "dorzhnaya soedinitelnaya plastinka", "dopolnitelnaya soedinitelnaya plastinka" and "soedinitelnaya plastinka razuzhnykh otrostkov" and in case of C "ventralnaya soedinitelnaya plastinka", "osnovnaya soedinitelnaya plastinka" and "soedinitelnaya plastinka vnutrennykh otrostkov".

All terms used for the attaching structures and their parts may be divided into three groups. The first one comprises the terms based on the function of the structure or of its parts. A typical example is "anchors" for A in English or "soedinitelnaya plastinka" for B and C in Russian. The second group includes the terms derived from the shape, as "loop", "knob", "shank", "shaft" in English, "Haken", "Stiel", "Zügel" in German or "kryuchya", "rukoyatka", "ukhovidnye vyresty" in Russian. In the third group, there are terms characterizing the topography of individual attaching structures or their parts, for example "Mittelhaken", "Randhaken" in German, "marginal hooks", "dorsal bar", "ventral bar" in English or "sredinye kryuchya", "ventralnaya plastinka", "dorzhnaya plastinka" in Russian.

Of course, some structure is better characterized by its function, and another one by its topography. But a principle should be always observed that no further terms should be created to replace already existing terms which may be quite suitable.

The authors give several reasons for the creation of new terms and sometimes they consider the previous ones to be unsuitable, clumsy or confusing. Mueller (1936) proposed to replace "central hooks" and "peripheral hooks" by "anchors" and "hooks" in order to avoid the adjectives. This proposal was more or less accepted by the authors writing in English, but in German and Russian the terms "Zentral—(Mittel-)haken", "Randhaken" and "sredinye kryuchya", "kraevye kryuchya" are still used. Moreover, quite inconsistent with Mueller's proposal to avoid the adjectives is the term "secondary filamentous hooklet loop" applied by Kritsky and Mizelle (1968) for D-7, which is a part of marginal hooks without any taxonomical significance.

According to Wood and Mizelle (1957), the terms used for B and C (transverse clamp, distal clamp, dorsal bar, ventral bar) should be replaced by "deep bar" and

"superficial bar" which is identical with the designation used for processes of anchors (deep and superficial). These were proposed by Mizelle (1938) instead of "outer" and "inner" established by Mueller (1936) for Gyrodactyloidea. The authors assume that the terms "dorsal" and "ventral" should be used only for bars connecting dorsal and ventral hooks of e.g. Tetraonchidae.

Gläser (1974) explains the formation of new terms for B and C in the following way: "Für die dorsale (vordere) und ventrale (hintere) Verbindungseinrichtung der Mittelhaken ist meines Erachtens die Bezeichnung Verbindungsbrücken besser als der von Ergens (1965) benutzte Terminus "Verbindungsplättchen" denn die dorsale Verbindungseinrichtung ist meist stabförmig, aber niemals plattenartig". It is true that B does not resemble a plate and the term "Verbindungsplatte" does not therefore express the real form of this structure, but only its function. I am afraid, however, that even the new term "Verbindungsbrücke" proposed by Gläser expresses primarily the function and not the shape, which is more distinct in case of C (Ventralbrücke).

Until recently, the authors publishing in German language distinguished in D only D-1 termed "Hakenspitze" (Wagener 1860), "Spitze" (Žitňan 1964, Ergens 1965), "Häkchen" (Braun 1966), or "Hakenteil" (Kollmann 1968), D-2 termed "Stiel" (Wagener 1960) or "Stift" (Braun 1966) and D-8 termed "Oese" (Wagener 1860), "Leitschlinge" (Braun 1966) and "Zügel" (Kollmann 1968). Gläser (1974) considers only "Stiel" (for D-2) and "Zügel" (for D-8) to be suitable. He proposes a new term for D-1 giving the following reason: "Wegen der Ähnlichkeiten in Form und Funktion des krallenartigen Hakens mit Greifvogel- oder Raubsäugerkrallen schlage ich dafür den Terminus Randhakenkralle oder kurz Kralle vor. Dieser Begriff ist meines Erachtens treffender als "Sichel" (Malmberg 1957, 1970); und die Termini "Spitze" (Ergens 1965, Žitňan 1964) oder "Hakenteil" (Kollmann 1968) sollten auf Teile der Kralle angewandt werden". I agree with the author that the terms "Sichel", "Spitze" or "Hakenteil" are rather unsuitable for D-1, but the term "Häkchen" (after Braun 1966) is quite acceptable and, moreover, it corresponds to English "hooklet" and Russian "kryuchek".

In 1967, Mizelle and Kritsky proposed the term "shank" for D-2 and "shaft" for D-4, though all previous authors applied "shaft" (exceptionally also "handle") for D-2. The reason was that "The shank is not considered homologous with the shaft of the ancyrocephalid haptor hook". I do not find this proposal acceptable, considering that in the English terminology a single term (shaft) could be then used for two different parts of the same attaching structure (D-2 and D-4). Moreover, these authors termed D-5 "toc" and D-6 "heel", though the term "heel" was used by Gussev for D-5 already in 1955.

In my opinion, all these facts, even if not quite exhaustive, justify sufficiently the standardization of terminology of all attaching structures and their individual parts. This standardization, however, must be coordinated and carried out simultaneously in all languages, particularly in English, German and Russian. If this standardization is made separately in one language only, the problems of general terminology remain usually unsolved. That was the case of recently submitted proposals of uniform terminology in German (Gläser 1974) and English (Gussev 1976). Even if these proposals might be supposed to be accepted by all authors writing in German and English, it should be considered that the German terms "Mittelhaken", "Ventralbrücke" or "Krallenhaken" are inadequate to English "anchors", "ventral bar" or "blade". In case that these independently uniformed German and English terms are translated into some of other languages, then again two or more terms may be created for the respective attaching structure.

One of the possible ways how to reach this standardization would be to set the Latin

terms. Unfortunately, it cannot be expected that they would be used everywhere and under any circumstances, especially in papers of local importance or those destined for common diagnosis. A compromising solution of this problem seems to be most suitable at present: to select those of the existing terms which even after translation unambiguously characterize the respective attaching structure in view of its function, morphology or topography. Of course, this way a priori excludes any subjective views or attempts to be original. I assume therefore that the participation of several authors, especially those applying English, German and Russian languages, would guarantee optimal results.

It should be noted that a standard terminology not only would enable the reader a rapid and reliable orientation in the text published in any language, but it might also serve for a unification in descriptions of the large number of hitherto recorded *Gyrodactylus* species. Thus the systematical evaluation of these parasites would be comparable and possible errors in determination would be almost excluded.

ПРОБЛЕМЫ В ТЕРМИНОЛОГИИ ТАКСОНОМИЧЕСКИХ ПРИЗНАКОВ ВИДОВ ОТНОСЯЩИХСЯ К РОДУ *GYRODACTYLUS* NORDMANN, 1832 (MONOGENOIDEA: GYRODACTYLIDAE)

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Резюме. Неудовлетворительное состояние терминологии таксономических признаков видов рода *Gyrodactylus* показано на примерах. Автор предлагает внести стандартизацию при участии специалистов. Стандартизацию можно осуществить двумя способами: или применять латинские термины, или выбрать такие термины существующей терминологии, которые правильно и недвусмысленно характеризуют соответствующее образование с точки зрения его функции, морфологии или топографии.

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