

FERNANDO PEDERZANI (*)

DYTISCIDAE COLLECTED IN ZAMBIA AND
DESCRIPTION OF *HYPHYDRUS FLUVIATILIS* N. SP.
AND *HYPHYDRUS ZAMBIENSIS* N. SP.
(*Coleoptera Dytiscidae*)

1. INTRODUCTION

In August 1986 I had the opportunity to make a collection of *Dytiscidae* in southern Zambia. Due to little stay in that country, I could investigate only five collecting areas, however the field researches produced interesting results because I found different types of aquatic environment in the five sites, and it is well known to collectors that the higher is the variety of the habitats, the higher is the number of species collected on the whole. The five locations are listed here below, in the order of date of the visit, with a brief description of the aquatic environment of each site.

2. LIST OF THE SITES

Loc. No. 1 - Watergreen farm, Chongwe valley, approxim. 60 Km East of Lusaka. (4 August 1986). Environment: Water reservoirs for irrigation; wide ponds with the shores mostly covered by grass and aquatic vegetation, partly shadowed by trees and shrubs; bottom soil consisting in clay, sand and vegetal debris.

Loc. No. 2 - Mountain stream crossing the road Kafue-Chirundu. The site is about midway between Kafue and Chirundu, but in the following pages it will be named simply «stream of Chirundu». (9 August 1986). Environment: Steeply bed of the stream on rock *in situ*, with rockpit holes or potholes made by erosion; less steeply places with shallow

(*) Lavoro presentato dal socio dott. Antonio Galvagni.

residual water pools on gravel and sand; no water flow on the surface, due to the seasonal drought, but there is some evidence of a minor subterranean water flow appearing and disappearing per places; stream bed fully exposed to sun, except some lateral pools shadowed by the trees from the banks; no aquatic vegetation except a few algae.

Loc. No. 3 - Kafue riverside, near the Kafue River Motel. (10 August 1986). Environment: Riverside marshes with herbaceous vegetation and reeds, at the sides of the broad and slow running Kafue river; bottom soil made of clay, sand and vegetal debris.

Loc. No. 4 - Chipangwe, 30 Km South of Lusaka, Mungu stream (12 August 1986). Environment: Small stream deeply excavated in the flatland, with a winding course, sometimes broadened to form wide pools. The stream was nearly dry in August 1986 and most beetles were collected at the sides of the residual pools, left as stagnant ponds; bottom of the ponds made of rocks, sand and clay with vegetal debris; sides partially covered by herbaceous vegetation and shadowed by trees and shrubs.

Loc. No. 5 - Livingstone, Musi O'Tunya, Zambesi riverside upstream the Victoria falls. (16 August 1986). Environment: Standing water in quiet pools and coves, on rock and gravel at the edgings of the rapid stream of the river; vegetation present only in a few places, principally at the sides of the isolate pools.

3. FAUNAL SIMILARITY OF THE SITES

In the five collecting areas I found 66 species of *Dytiscidae* s.l., including both forms of *Copelatus variegatus* dealt with later. The species are listed in Table 1. The indices of similarity after Sørensen (1948) and Mountford (1962) have been calculated from the data of Table 1, obtaining the faunal similarity between sites and groups of sites. The result is shown in the dendrogram Fig. 1. The similarity between the sites is rather low, not exceeding 40%. The sites Loc. No. 1 and Loc. No. 4 (pond habitats of the Watergreen farm and Chipangwe) form a cluster, as well as the sites Loc. No. 2 and Loc. No. 5 (mountain stream of Chirundu and Zambesi riverside near the Victoria falls). The site Loc. No. 3 (riverside marshes of the Kafue river) is nearly intermediate between groups 1-4 and 2-5: that is a predictable result because the Kafue riverside is actually an intermediate aquatic environment between the running water and the pond habitats.

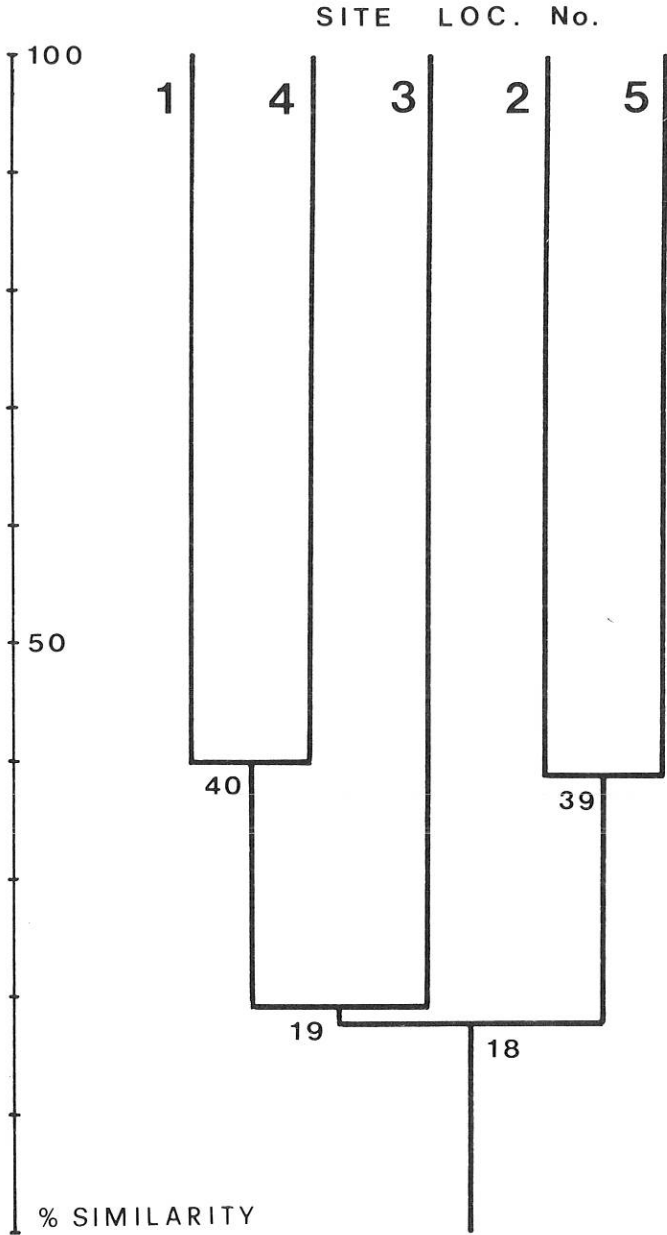


Fig. 1 - Faunal similarity between sites and groups of sites.

Table 1 - LIST OF SPECIES AND NUMBER OF SPECIMENS COLLECTED IN ZAMBIA

Species name	Loc. 1	Loc. 2	Loc. 3	Loc. 4	Loc. 5	Loc. 2/A	Loc. 2/B	Loc. 2/C
	Water-green farm	Mountain stream Chirundu	Kafue River Side	Chipangwe	Victoria Falls Zambesi	Rocky Holes	Gravel Pools	Sand Pools
1 Derovatellus erratus BISTRÖM	2							
2 Hyphydrus cycloides REGIMBART	12							x
3 Hyphydrus fluviatilis n. sp.		2			1			
4 Hyphydrus ? caffer BOHEMAN (females)	1		1		2			
5 Hyphydrus impressus KLUG	7	3		32	5		x	
6 Hyphydrus signatus SHARP		15					x	
7 Hyphydrus zambiensis n. sp.	1		1		1			x
8 Hydrovatus absonus GUIGNOT			6					
9 Hydrovatus difformis REGIMBART	1							
10 Hydrovatus reticuliceps REGIMBART	2				1			
11 Hydrovatus senegalensis REGIMBART			2					
12 Hydrovatus simoni REGIMBART			11					
13 Hydrovatus sporas GUIGNOT	1							
14 Hydrovatus n. sp. near procus GUIGNOT					5			
15 Yola bicostata ZIMMERMANN sensu BISTRÖM		54					x	x
16 Yola dohrni SHARP					2			
17 Yola natalensis REGIMBART	1							x
18 Yolina elegantula (BOHEMAN)	16				7	x	x	x
19 Clypeodytes evanescens (BOHEMAN)	7							
20 Clypeodytes hieroglyphicus REGIMBART			5					
21 Clypeodytes voiensis GUIGNOT		1	1		4		x	
22 Bidessus sharpi f. OMER COOPER					1			
23 Guignotus flumineus OMER COOPER			1					

(continued)

Table 1 - LIST OF SPECIES AND NUMBER OF SPECIMENS COLLECTED IN ZAMBIA

Species name	Loc. 1	Loc. 2	Loc. 3	Loc. 4	Loc. 5	Loc. 2/A	Loc. 2/B	Loc. 2/C
	Water-green farm	Mountain stream Chirundu	Kafue River Side	Chipangwe	Victoria Falls Zambesi	Rocky Holes	Gravel Pools	Pools Sand
24 Guignotus geminodes (REGIMBART)	5	6	2		11		x	x
25 Guignotus infirmus (BOHEMAN)					2			
26 Guignotus zanzibarensis (REGIMBART)	4	1	11		9			x
27 Uvarus baoulicus GUIGNOT			5		2			
28 Uvarus gschwendineri GUIGNOT	5		5					
29 Uvarus infimus GUIGNOT		4	1		2			x
30 Uvarus peringueyi (REGIMBART)		9						x
31 Uvarus vitticollis (BOHEMAN)	4	3		1	2			x
32 Laccophilus adpersus BOHEMAN	1	2		1				x
33 Laccophilus congener OMER COOPER	4	1	3		1			x
34 Laccophilus contiro GUIGNOT	9			3				
35 Laccophilus evanescens REGIMBART					5			x
36 Laccophilus flaveolus REGIMBART		3						x
37 Laccophilus lineatus AUBÉ		5			1			x
38 Laccophilus pallescens REGIMBART		13			2		x	x
39 Laccophilus pellucidus SHARP		30					x	
40 Laccophilus propinquus OMER COOPER	4							
41 Laccophilus sp. (unidentified)			1					
42 Hydrocanthus constrictus REGIMBART	3							
43 Hydrocanthus micans WEHNCKE	2				3			
44 Hydrocoptus koppi WEHNCKE					1			
45 Herophydrus gigas REGIMBART	5			1	2			2
46 Herophydrus mutatus (GEMM. & HAR.)					2			

(continued)

Table 1 - LIST OF SPECIES AND NUMBER OF SPECIMENS COLLECTED IN ZAMBIA

Species name	Loc. 1	Loc. 2	Loc. 3	Loc. 4	Loc. 5	Loc. 2/A	Loc. 2/B	Loc. 2/C
	Water-green farm	Mountain stream Chirundu	Kafue River Side	Chipangwe	Victoria Falls Zambesi	Rocky Holes	Gravel Pools	Sand Pools
47 Herophydrus oscillator SHARP	8			1				
48 Peschettius carinipennis (REGIMBART)		48		6			x	
49 Copelatus erichsoni GUERIN	1	4		2	2			x
50 Copelatus johannis BALFOUR BROWNE	6		37	3				
51 Copelatus ornatipennis ZIMMERMANN		1				x		
52 Copelatus thrasys GUIGNOT (uncertain)	3		3					
53 Copelatus variegatus s.l. broad form (1)		47				x	x	
(var. subconcolor broad form)		15				(x)	(x)	
54 Copelatus variegatus s.l. narrow form (2)		11				x	x	
(var. subconcolor narrow form)		3				(x)	(x)	
55 Hydaticus caffer BOHEMAN		2		2				x
56 Hydaticus dorsiger AUBÈ	9	3						x
57 Hydaticus dregei AUBÈ		17				x	x	
58 Hydaticus exclamatorius GSCHWENDNER	5							
59 Hydaticus flavolineatus BOHEMAN				1				
60 Hydaticus matruelis CLARK		2						x
61 Hydaticus servillianus AUBÈ	22		6					
62 Rhantaticus congestus (KLUG)	4							
63 Eretes sticticus (LINNE)		2						
64 Cybister tripunctatus africanus CAST.					1			
65 Cybister marginicollis REGIMBART	1							
66 Cybister senegalensis AUBÈ	2	1					x	

During the field researches it became evident that the less omogeneous collecting area was the mountain stream Loc. No. 2 because a variety of different habitats can be recognized in that site. Therefore I kept in separate vials the material collected in the different habitats of that area. The site Loc. No. 2 is also the richest site in number of species and individuals. The wealth of *Dytiscidae* is a consequence of two causes: the first one is that in August 1986 the stream was nearly dry and the aquatic life was concentrated into small residual pools; the second cause is that the residual pools are different minor habitats depending on type of bottom, vegetation and water temperature, plus other factors which cannot be easily understood without a biotic and physicochemical investigation. The minor habitats of Loc. No. 2 can be roughly classified as follows:

2/A: Erosion potholes made by the water stream in the rock *in situ*, in the steeply parts of the bed. Standing water in the potholes is clear and warmer than in other situations; visible vegetation is absent or reduced to traces of microalgae.

2/B: Shallow pools left on the gravelly and sandy bed of the stream. This habitat occurs in less steeply situations of the bed. Water is clear, vegetation is scarce and consists in green filamentous algae.

2/C: Deeper and wider pools at the sides of the stream bed, originated by erosion of the banks. The water pools are partly shadowed by the trees of the banks; water is colder than in other situations; the sandy bottom is partly covered by vegetal debris from the overhanging trees.

Although very close, the above water situations are different minor habitats, which support fairly different communities of water beetles. Type of food and pressure from predators as well as other biotic and physicochemical conditions, are factors which confine some species to one or another minor habitat of the area. The result is a different faunal composition, with the consequent increase in the number of species collected on the whole, as shown in the right columns of Table 1.

The minor habitats 2/A, 2/B and 2/C, being different aquatic environments, can be regarded as separate sites and compared with the others. The dendrogram Fig. 2 shows the similarity of the sites Loc. No. 1, 3, 4, 5 and 2/A 2/B, 2/C, calculated by means of the indices of Sørensen and Mountford. Three principal clusters are recognized: The collecting areas with pond conditions, Loc. No. 1 and No. 4, are relatively similar and form the first cluster. The rocky potholes 2/A and the gravelly and sandy shallow pools 2/B form a second cluster.

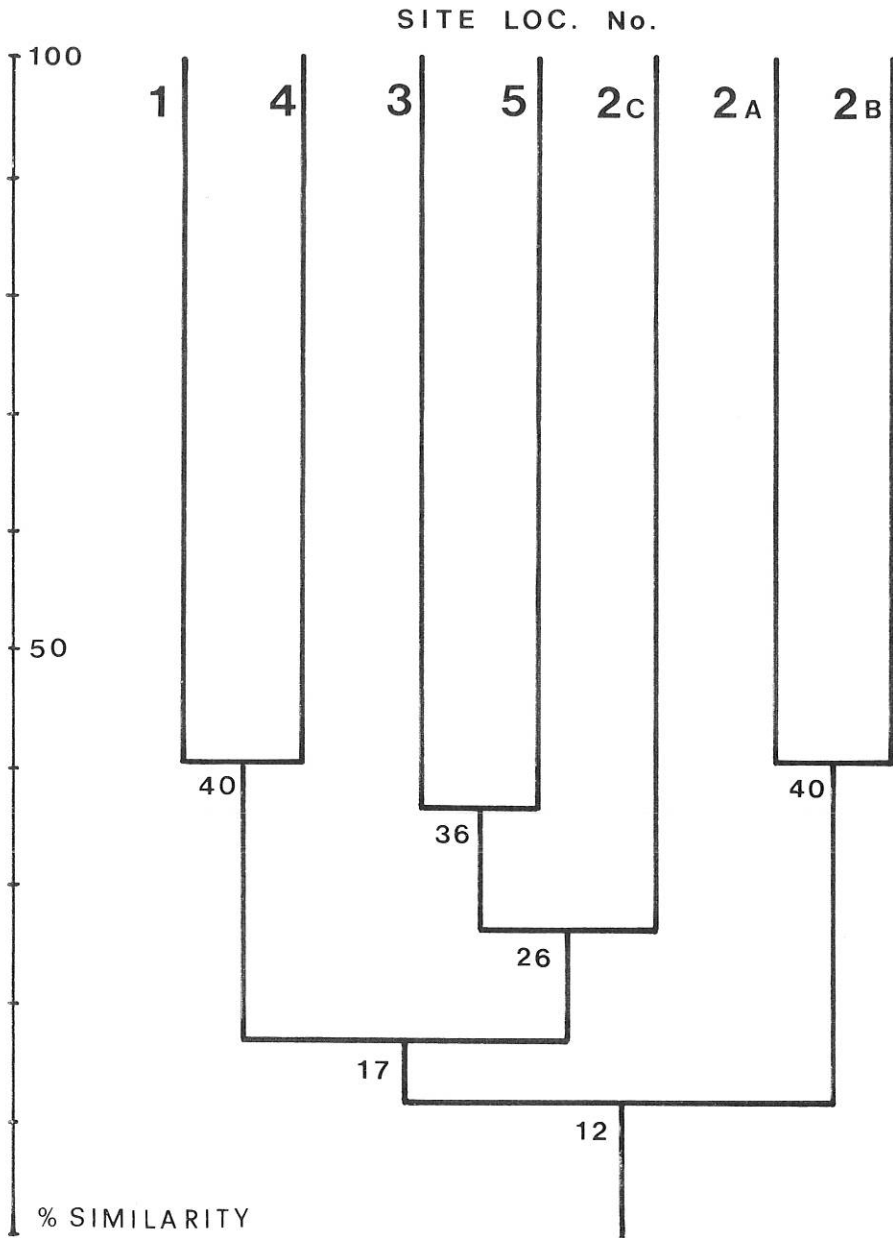


Fig. 2 - Faunal similarity between sites and groups of sites, with Loc. No. 2 splitted into three groups of habitats. The groups 2/A, 2/B and 2/C are treated as different sites and compared with the others.

Another cluster is formed by the Kafue and Zambesi riversides, Loc. No. 3 and No. 5; the sandy pools 2/C can be attached here although with lower similarity. The latter cluster is actually a group of intermediate aquatic environments between the pond and running water habitats. It should be pointed out that in spite of the inadequate duration of the field researches and the low number of sites investigated, the cluster analysis provides a fairly good description of the results in terms of numeric values.

4. NOTES ON REMARKABLE SPECIES AND DESCRIPTION OF NEW TAXA

The following notes are arranged in the same order as the species in the list of Table 1, with the reference number from the first column of the table.

Sp. N. 1 - *Derovatellus erratus* Biström.

Species identified by means of the description and the figures given by Biström (1979), however the specimens have not been compared with type material.

Sp. No. 2 - *Hyphydrus fluvialtilis* n. sp.

Widely oval, convex, outline discontinuous. Olotype male: Length mm 5.3, breadth mm 3.5.

Head. Ferruginous with vague brownish marking behind; clypeal border rather fine, brownish, subtruncate; punctuation dense, double behind with large punctures not much larger than the fine; slightly reticulate; a shallow transverse depression, impunctate, reticulate. Antennae testaceous, palpi piceous.

Pronotum. Black with the margins widely rufo-testaceous; shining not reticulate; lateral borders almost straight except near the base; doubly punctured, the large punctures much larger than the fine, densely placed behind the anterior margin, less densely at the sides, very coarse and strong behind, almost confluent in the middle of the base; fine punctures regularly placed.

Elytra. Black with yellow pattern as in Fig. 3; shining not reticulate; double punctures very different in size; discal row of large and

confluent punctures, forming a short stria very deeply impressed; large punctures irregularly placed, a little sparser at the base between the discal striae; fine punctures almost regular. Epipleurae rufo-testaceous.

Legs. Ferruginous with tarsi blackish brown. Anterior tarsi widened and flattened; third joint very broad, as in Fig. 4. Intermediate tarsi slightly and regularly widened. Underside of the anterior and meso-tarsi provided with dense felty hairs much paler than the tarsal joints, whitish. Posterior tibial spines almost straight.

Underside. Brown, convex, shining, strongly punctured. Aedeagus: Paramers and penis in dorsal view (Fig. 5b) like in other species of the group *perforatus*; penis in side view rather distinctive, slightly curved before the tip, truncate, laterally pointed at the apex, as in Fig. 5a.

Allotype female. Length mm 4.9, breadth mm 3.2. Similar to the male, but smaller. Head darker, distinctly reticulate; clypeal margin of the head and side margins of the pronotum more distinctly rounded than in the male. Elytra with the yellow pattern almost obsolete; shining not reticulate. Anterior and meso-tarsi less darkened, narrower than in the male and with the joints laterally compressed; femurs and tibiae dark brown, not ferruginous as in the male.

Clotype and Allotype labelled «Zambia, mountain stream crossing the road Kafue-Chirundu, 9 Aug. 1986, Pederzani» Both types are placed in the author's collection.

The new species was collected in a sandy pool, at the side of the stream bed (Loc. No. 2/C) with the bottom covered by vegetal debris. It belongs to the group of species near *H. perforatus*; it is the largest species of the group.

The male can be easily identified by its length, the shape of the penis in side view and the head provided with a single transverse depression, reticulate and almost impunctate. The female has no particular characters; although larger than the other females of the group *perforatus*, it can be identified with certainty only if found in association with the male.

Sp. No. 4 - *Hyphydrus caffer* Boheman.

Two females identified as *H. caffer* Boheman are actually indistinguishable from the females of *H. grandis* Castelnau. The identification is based on the ascertainment by Omer-Cooper (1971) and Biström (1982) that *H. grandis* does not occur as south as Zambia. Unfortunately the available keys to the identification of the females do not provide valid characters for the separation of the two species.

Sp. No. 7 - *Hyphydrus zambiensis* n. sp.

Widely oval, not attenuated behind, outline slightly discontinuous.

Head. Rufo-testaceous, in some individuals with vague brownish markings at the sides of the frons; clypeal margin almost rounded, with a rather fine border, little raised. Head densely punctured with nearly simple punctuation, shining, with traces of reticulation on the clypeus; two shallow depressions, as in other species of the group *cycloides*. Antennae testaceous, the intermediate joints little serrulate on the anterior border; palpi testaceous.

Pronotum. Black with the margins slightly rounded, yellow; the yellow pattern is narrow behind, broader in the anterior third; lateral border raised and broad; punctuation double; large punctures rather variable in size, dense and strong in the middle of the base, finer and sparser at the sides and behind the anterior margin, nearly missing on the disc; fine punctures regularly placed, not very dense; shining not reticulate.

Elytra. Black with yellow pattern basically resembling that of other species of the group *cycloides*, a little variable from individual to individual; yellow transverse band at the base of the elytra not interrupted, often expanded in a juxta-sutural line extending for about one third of the elytral length; shining not reticulate. Punctuation double, large punctures very strong, fine punctures small and poorly impressed. Epipleurae testaceous.

Legs. Rufo-testaceous, regularly featured.

Underside. Brownish black, shining, with large and dense punctures.

Male. Anterior and meso-tarsi slightly widened; only the second joint of the meso-tarsi distinctly broader than in the female. Longer spine of the posterior tibiae curved at the tip. Apical abdominal sternite transversely impressed, the impression followed by a distinct tubercle. Median lobe of the aedeagus sub-parallel in dorsal view, with an apical tooth and a preapical tuft of setae on each side, as in Figs. 6a, 6b.

Female. Head clearly reticulate in front, obscurely behind, with punctures finer and sparser than in the male; spines of the posterior tibiae straight.

Otype male: Length mm 3.74, breadth mm 2.40. Allotype female: Length mm 3.65, breadth mm 2.39. Paratypes: 5 ♂♂ and 8 ♀♀. Length range mm 3.53 to mm 3.80, average length mm 3.70.

The type material is placed in my collection; some paratypes also in collection Rocchi. All types are labelled «Zambia, mountain stream crossing the road Kafue-Chirundu, 9 Aug. 1986, Pederzani». The specimens

have been collected in the gravelly shallow pools, left in the bed of the stream (2/B) and a few individuals also in the wider sandy lateral pools (2/C).

The new species clearly belongs to the group *cycloides*. The diagnostic characters are the length, the shape of the aedeagus and the rounded anterior margin of the clypeus. The penis of the new sp. is like that of *H. inopinatus* and *H. malawiensis*, but both species are smaller: *inopinatus* ranges mm 3.0 to mm 3.5 and *malawiensis* mm 3.2 to mm 3.5. Both *inopinatus* and *malawiensis* have the fore margin of the clypeus subtruncate, whereas it is nearly rounded in *zambiensis* n. sp. Also *H. pelates* Guignot, a species unknown to me, is close to the new species in the length of the body and the feature of the last abdominal sternite, but it differs in the shape of the aedeagus and, as a rule, in the elytral pattern.

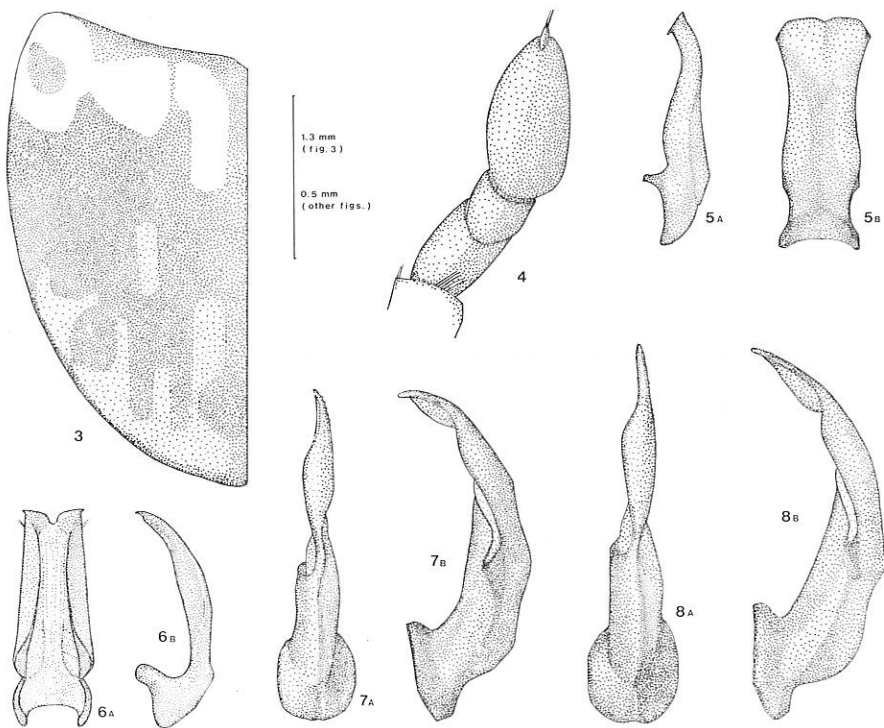


Fig. 3 to 8 - *Hyphydrus fluviatilis* n. sp., oltotype: 3. elytral pattern, 4. last joints of the right protarsi, 5. median lobe of the aedeagus - *Hyphydrus zambiensis* n. sp., oltotype: 6. median lobe of the aedeagus - *Copelatus variegatus* s.l., narrow form (Chirundu 2): 7. median lobe of the aedeagus - *Copelatus variegatus* s.l., broad form (Chirundu 1): 8. median lobe of the aedeagus.

The living individuals of the new species have a bright yellow and black upper colouring. The habitat and the behaviour of *H. zambiensis* n. sp. resemble at first sight that of some mediterranean *Stictonectes*.

Sp. No. 14 - *Hydrovatus* sp.

A little series of *Hydrovatus* was collected from the edgings of Zambesi, site Loc. No. 5. The species has not been identified since it is slightly different from the known species around it. Although recognized as a new species, it is not named hereby to prevent further complication in the systematics of *Hydrovatus*, a genus which actually needs a revision. The species belongs to the group near *H. procus* Guignot, with a bottle-shaped penis, provided with a long downwards point at the end.

Sp. No. 29 and 30 - *Uvarus infimus* Guignot and *U. peringueyi* (Regimbart).

The shape of the penis is the only reliable character to divide the two species. When they are found together, the identification of the females is rather difficult, because it is based only on the different sculpture of the pronotum.

Sp. No. 52 - *Copelatus thrasys* Guignot

The identification of this species is uncertain, because the individuals from Zambia are slightly different from other specimens seen for comparison.

Sp. No. 53 and 54 - *Copelatus variegatus* s. l.

The population of *C. variegatus* found in the stream of Chirundu (Loc. No. 2) is discussed here below. The species was collected in great number of individuals in the potholes, habitat 2/A; it also occurs in the gravelly pools left in the bed of the stream, habitat 2/B. Two different forms are recognized in the population of *C. variegatus*; the two forms have the same elytral pattern but they can be divided on the basis of the shape, the length of the body and little differences of the aedeagus. Almost 90% of the specimens of the two forms, both males and females, can be distinguished at first sight.

To provide a term of comparison for the population from the stream of Chirundu, a third form of *C. variegatus* s. l. from Marangu (Mt. Kilimanjaro, Tanzania) has been studied. The length and the breadth of the males of the three forms are given in Table 2. According to the data published so far, the length of *C. variegatus* should be in the range bet-

ween mm 6.2 and mm 7.0. The narrow form of *C. variegatus* Chirundu 2 is smaller and evidently out of that range, but the ratio length to breadth, which better describes the shape of the body, is almost intermediate, in the narrow form Chirundu 2, between the form Marangu and the broad form Chirundu 1. The latter in its turn is broader and more regularly oval than each. The aedeagus is slightly different in the two forms Chirundu and its shape is nearly constant in each form. The penis of the narrow form is shown in Fig. 7a and 7b, and that of the broad form is shown in Fig. 8a and 8b. The males of the form Marangu (see BILARDO & PEDERZANI, 1972, Fig. 4) have the penis intermediate between the two forms Chirundu; in dorsal view it is closer to one form, in side view it is closer to the other. The colouring of the head and the pronotum is reddish in the specimens from Marangu (Tanzania) whereas it is dark ferrugineous to brown in the specimens from Chirundu. Other diagnostic characters cannot be taken into consideration because they present a wide range of variation within each form. The number of striae on the pronotum and the metacoxae, for instance, is variable, as well as the length of the submarginal stria of the elytra, which is usually short and in a few specimens is dissolved into a row of punctures. Also the elytral striae present individual variations, being more or less impressed or even shortly interrupted.

Table 2 - MALES OF COPELATUS VARIEGATUS

Copeletus variegatus forms	Number of males measured	Length range (mm)		Average length (mm)	Aver. ratio length to breadth
		Min	Max		
Marangu	4	6.24	6.65	6.41	2.19
Chirundu 1	10	6.10	6.97	6.37	1.94
Chirundu 2	9	5.70	6.30	5.96	2.08

A common character of the three forms is the colour variation of the elytral pattern. In most individuals the yellow and black colouring of the elytra gives a fine pattern which is persistent also in dried specimens. In some individuals the black colouring is reduced to a preapical dark spot and the yellow colouring becomes fuscous, particularly so in dried specimens: colour variation var. *subconcolor* Guignot.

Individuals with reduced black colouring occur with the same frequency in the three forms, namely 25% in the form Marangu, 24% in the broad form Chirundu 1 and 20% in the narrow form Chirundu 2.

If the three forms were collected in different areas, the best conclusion should be that they are subspecies or races of *C. variegatus* Regimbart. The occurrence of two forms in the same site put a question which requires a different answer. First it should be ascertained whether the two forms can interbreed, that is whether they are a case of polymorphism or two closely related species. I have no arguments to answer this question. A little percentage of the specimens from Chirundu, less than 10%, are hardly assigned to either of the two forms. That individuals may be either sterile hybrids or interbreeding intermediate of the two forms and their occurrence does not facilitate the answer.

If the two forms Chirundu are different species, which one can be identified as a race of *C. variegatus*? To satisfy symmetry, all forms, also including var. *incisus* Guignot from Zaire, should be recognized as valid species. That would cause the splitting of *C. variegatus* into a complex of at least four closely related species. I share the opinion that excessive splitting in nomenclature can be disadvantageous for systematic and does not help finding the solution to biological problems. In consequence, the two forms Chirundu 1 and 2 are separately listed in Table 1 as «broad form» and «narrow form» of *C. variegatus* s. l. and no proposition is made to name and raise them to specific rank.

One more remark on the present species: The habitat and the behaviour of *C. variegatus* and that of some mediterranean *Potamonectes* are surprisingly alike, as well as the size and the bright elytral pattern. In some individuals of *Potamonectes martini* and *P. bucheti*, the black colouring of the elytra is reduced and the yellow colouring becomes fuscous, as in *C. variegatus* var. *subconcolor*. However on dry land the behaviour of *Copelatus* and *Potamonectes* is quite different, because *Copelatus* promptly fly away, as a rule, whereas *Potamonectes* walk and hide.

5. ACKNOWLEDGEMENTS

I wish to express my thanks to the farmers Mr. Narder and Mr. Amorati who kindly co-operated and made possible my researches in the Watergreen farm and Chipangwe. I am also indebted to Mr. Rocchi (Florence) for the help given in the identification of the species from Chirundu.

6. REFERENCES

- BILARDO A. & PEDERZANI F., 1972 - *Contributo alla conoscenza dei Copelatus Er. africani con descrizione di quattro nuove specie.* - Mem. Soc. Entom. Ital., 51: 71-87 (Genova).
- BISTRÖM O., 1979 - *A revision of the genus Derovatellus Sharp in Africa.* - Acta Entomol. Fennica, 35: 1-28 (Helsinki).
- BISTRÖM O., 1982 - *A revision of the genus Hyphydrus Illiger.* - Acta Zool. Fennica, 165: 1-121 (Helsinki).
- MOUNTFORD M. D., 1962 - *An index of similarity and its application to classificatory problems.* - In: Progress in Soil Zoology. P. W. Murphy Edit., pp. 43-50 (London).
- OMER-COOPER J., 1971 - *Taxonomic studies on some african Hyphydrus.* - J. Ent. Soc. Sth. Afr., 34 (2): 277-288.
- SØRENSEN T., 1948 - *A method of establishing groups of equal amplitude in plant sociology based on similarity of species content and its application to analyses of the vegetation of Danish commons.* - Biol. Skr., 5: 34 (Copenhagen).

RIASSUNTO – Dytiscidae raccolti in Zambia e descrizione di *Hyphydrus fluviatilis* n. sp. ed *Hyphydrus zambiensis* n. sp. Nota sui Dytiscidae raccolti in Zambia dall'autore durante un breve soggiorno nell'agosto 1986. Le località di raccolta sono cinque e le specie rinvenute sono 66, comprendendo anche due nuove specie: *Hyphydrus fluviatilis* n. sp. del gruppo perforatus ed *Hyphydrus zambiensis* n. sp. del gruppo cycloides. Sono discusse due forme conviventi di *Copelatus variegatus* s. l., ma rimane senza risposta il quesito se si tratta di due specie distinte o di un caso di polimorfismo. La composizione faunistica dei luoghi visitati è confrontata mediante gli indici di similarità di Sorenson e Mountford. Poiché in una stessa località sono stati individuati tre diversi tipi di habitat, la ricerca della similarità è ripetuta anche considerando i tre gruppi di habitat come località distinte; i risultati sono rappresentati mediante dendrogrammi.

SUMMARY – A report on the Dytiscidae collected in five sites of southern Zambia. The collection of 66 species includes *Hyphydrus fluviatilis* n. sp. of the group perforatus, and *Hyphydrus zambiensis* n. sp. of the group cycloides. Two cobabiting forms of *Copelatus variegatus* are discussed: whether they are two closely related species or a case of polymorphism, it is an open question.

The collecting areas are classified in terms of their faunal similarity.