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The *Crenitis* of the Old World *(Coleoptera, Hydrophilidae)*

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With 32 figures

ABSTRACT

A synopsis of all known species of the genus *Crenitis* BEDEL is given with a key to the Old World species. Some phylogenetic aspects of that genus and the *Anacaena*-group are discussed and 12 species new to science are described: *Crenitis cordula* sp. n., *C. nepalensis* sp. n., *C. rufula* sp. n. (Nepal). *C. formosana* sp. n., *C. nakanei* sp. n., *C. primorica* sp. n., *C. satoi* sp. n. (East Asia and Japan). *C. calva* sp. n., *C. cinnamomea* sp. n., *C. danielssoni* sp. n., *C. excusa* sp. n., *C. glabricollis* sp.n. (Africa). *Aparacymus* is a new synonym of *Crenitis*. The aedeagi of 21 species are illustrated.

1. Introduction

The genus *Crenitis* was erected by BEDEL (1881) based on the only known species at that time *Hydrobius punctatostriatus* LETZNER, 1840, fixed by monotypy. REITTER, (1896) decribed a second species of the Old World as *Paracymus apicalis* from Transbaikalia. For the first African species, *C. zimmermanni* KNISCH, 1924, D'ORCHYMONT (1925) created a new genus *Noxonus*, but synomymized it with *Crenitis* in 1942. A second African species *C. capensis* D' ORCHYMONT, 1942 followed later. In this paper 5 new South African species can be added. For a long time *Crenitis* was considered as a predominantly New World genus. SMETANA (1988) counts 12 species occuring in America north of Mexico. From the *Neotropis* only 2 species are known up to now.

Recently the Eastern Palearctic *Hydrophilidae* were given more attention by Japanese coleopterologists such as MATSUI, NAKANE and SATO. They made known another centre of distribution of that genus. A large material of *Hydrophilidae* from Nepal, taken 1981 and 1984 by I. LOEBL, Geneva and A. SMETANA, Ottawa, also the Swedish South Africa Expediion 1950-1951 (leg. BRINCK-RUDEBECK) and materials collected by Japanese Scientists disclosed some further cryptic species and caused this synopsis of all known species and their distribution pattern, which in the Old World is concentrated at Southeast Asia and South Africa with actually 23 species.

2. Phylogenetic aspects

The interpretation of *C. apicalis* as a *Paracymus* by REITTER (1896) indicates the strong neighbourhood of both genera. Indeed the phylogenetic relations within the *Anacaena*-group are problematic and not quite solved until now. The position of the genus *Crenitis* within the *Anacaenini* shows the following dendrogram 1.

List of characters:

Dendrogram a:

1a Elytra apically seriate or at least subseriate punctate.
1b Elytral punctation crowded, except Crenitis (there at least apically subseriate).
2a Sutural stria absent.
2b Suturai stria present.
3a Prosternum carinate.
3b Prosternum flat.
4a Eyes notably protuberant.
4b Eyes not protuberant.

Dendrogram b:

1a Elytra seriate or at least subseriate.
1b Elytral punctation crowded.
2a Eyes not protuberant.
2b Eyes notable protuberant.
3a Prosternum not carinate.
3b Prosternum carinate.
4a Sutural stria present; hind femora not pubescent.
4b Sutural stria absent; hind femora pubescent basally.

The position of the Australian genus *Anacaena (Paranacaena* BLACKBURN) is at present (HANSEN 1991) somewhat doubtful and object of a current investigation by E. GENTILI. All known species of that taxon are showing a characteristic synapomorphic form of tegmen.

Analogous to other genera of *Hydrophilidae* we can state the following characters being whether plesiomorphic or apomorphic in *Anacaenini:*

Character	**Plesiomorphic**	**Apomorphic**
Head/pronotum	smooth	chagreened
Hind femora	pubescent	glabrous/reduced pub.
Prosternum	not carinate	carinate
Elytral punctation	(sub)seriate	crowded
Eyes	protuberant	flat
Antennae	9-jointed	8-, 7-jointed
Male foreclaws	not dilated	dilated
Maxillary palpus	long	short, truncate
Colour of maxillary palpus	pale	darkened, bicolored
Lateral bead of elytra	wide	narrow
Parameres	apices rounded	apices dentate, truncate
Median lobe of aedeagus	tongue-shaped	narrowed or widened

While *Paracymus* can easily be separated from the couple *Anacaena/Crenitis* by the carinate prosternum, the latter *Adelphotaxa* sometimes show transitional characters. These are in detail and compared with the corresponding characters in *Paracymus, Notohydrus* and *Notionotus* as follows:

	Anacaena	***Crenitis***	***Paracymus***	***Notohydrus***	***Notionotus***
Prosternum carinate	-	-	+	-	+
Hind femora pubescent basally	+/-	+	(+)	-	+	+
Mesosternum with any process	+/-	-	+	-	+
Elytra apically subseriate	-	+	-	+	-
Male foreclaws dilated	+/-	-	+	-	-
Eyes notable protuberant	-	+	-	-	-
Number of antennal joints	7-9	8/9	7-9	8	8
Sutural stria present	+	+	+	+	-

V a r i a b l e characters within the genus *Crenitis* (also in *Anacaena*) are the more or less expanded basal pubescence upon the hind femora, the body-shape from short oval to nearly parallelsided, the number of the antennal joints (8-9), the more or less expanded microsculpture on head and pronotum and the more or less evident anterior emargination of the eyes, the more or less swollen second joint of maxillary palpi, the seriate punctures more or less evident at the apex of elytra.

C o n s t a n t characters of all *Crenitis* are the non-carinate prosternum, the mesosternum without a distinct protuberance, tubercle or lamina (at least a small transverse carinula posteriorly), 5-jointed tarsi with the 2nd joint of hind tarsi shorter than 5th and little longer than 1st,the sutural stria shortened anteriorly, equal foretarsi in both sexes.

So we can conclude, that the tribe *Anacaenini* is characterized by the following apomorphies:
Head and pronotum without regular punctures. 5th ventrit without apical emargination. Pseudepipleura not delimited from epipleura.
Further we can assume, that *Notohydrus* is the most primitive genus of *Anacaenini* and very close to *Crenitis*, while *Anacaena* seems to be paraphyletic and close to the stem group from which *Paracymus* and *Notionotus* (probably monophyletic genera) have evolved (HANSEN in litt.).

Sexual dimorphism in *Crenitis:*

a) Females are evidently larger on the average than males.
b) The last joint of maxillary palpi is symmetrical in females, evidently asymmetrical in males. In some cases the apical darkening of it is a sexual character.

While that difficult phylogenetic and systematic relations between the genera *Crenitis* - *Anacaena* - *Paracymus* should be subject of a separate and thorough investigation, the connections within the genus *Crenitis* are tried to be exposed in the following hypothetic dendrogram 2. Maybe this dendrogram containing only the Old World species is somewhat misleading, but I was not able to attain all New World species for examination to incorporate them in this dendrogram. The New World species all fit in with *Crenitis* s. str.

(Hypothetic dendrogram of the genus *Crenitis* in the Old World)

Character	Plesiomorphic	Apomorphic
1 Body shape	oval	parallelsided
2 Elytral punctation	seriate	crowded
3 Elytral striae	alternating (primary-secondary)	equally
4 Lateral bead of pronotum	with submarginal depression	without depression
5 Parameres	elongate, apically rounded	more differenciate

Character	Plesiomorphic	Apomorphic
6 Parameres	straightened, apically narrowed	shortened
7 Hind femora	pubescent portion long, leaving only apical third glabrous	pubescent portion short, restricted to base or trochanter
8 Lateral bead of elytron	explanate	not explanate
9 Biogeography	palearctic (supposed origin)	ethiopic
10 Tarsi	long and narrow	short and stout
11 Mesosternum	with a small gibbosity	entirely flat
12 Antennae	9-jointed	8-jointed
13 Head and pronotum	with microsculpture	smooth
14 Elytral striae	distinct from base to apex	traceable only at apex
15 Parameres	apically rounded	apically truncate
16 Dorsal surface punctation	moderate, distant	coarse, dense
17 Mesosternum	without any gibbosity	with feeble triangulate gibbosity
18 Color of maxillary palpi	clear	darkened, black
19 Pronotal punctation	effaced	normal
20 Body shape	oval	(sub)globular
21 Tibiae	with normal setae	with striking stiff setae
22 Parameres	apically rounded	apically truncate with sharp spine at inner face
23 Hind femora pubescence	extended or at base	only on trochanter

Conclusion:
Crenitis differs from *Paracymus* by the more or less pubescent basal portion of the hind femora, by the non-carinate prosternum, by the first joint of hind tarsi much shorter than the second one, and by the lack of mesosternal

process. *Crenitis* differs from *Anacaena* by the subseriate apical punctures and the slightly protruding eyes. If the mesosternum is unarmed in *Anacaena* (like in *Crenitis*), then the hind femora are extended pubescent basally. Both genera however are showing transitional characters.

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CHD Coll.F. HEBAUER, Deggendorf, Germany.
CNC Coll. T. NAKANE, Chiba City, Japan.
CPE Coll. A. PUETZ, Eisenhüttenstadt, Germany.
CSN Coll. M. SATO, Nagoya, Japan.
ISB Institut National des Sciences Naturelles, Bruxelles (L. BAERT).
MHG Museum d' Histoire Naturelle, Geneve (I. LÖBL).
MNG Museum der Natur, Gotha (R. BELLSTEDT).
MNS Museum für Naturkunde, Stuttgart (W. SCHAWALLER).
NME Naturkunde-Museum, Erfurt. Germany (M. HARTMANN).
NMT National Science Museum Tokyo, Japan (T. NAKANE).
NMW Naturhistorisches Museum, Wien (M. A. JAECH).
TMB Természettudományi Múzeum, Budapest (O.MERKL, G. SZEL).
ZML Zoologisk Museum, Lund (R. DANIELSSON).

Systematics:

Genus *Crenitis* BEDEL, 1881 - Faune Col. Bass. Seine I:306.
Type species: *Hydrobius punctatostriatus* LETZNER, 1840; fixed by monotypy.

Aparacymus MATSUI & NAKANE, 1985 (Subg. of Anacaena), syn. n
Type species: *Anacaena japonica* SATO.

Fontiscrutor PANDELLE, 1876. Senior synonym! Nomen oblitum.
(Question to Commission on Zool. Nomencl. by M. HANSEN for conservation of *Crenitis.* Case 2925).

Creniphilus G. H. HORN, 1890.

Noxonus A. D'ORCHYMONT, 1925.

subgen. *Acrenitis* MATSUI & NAKANE, 1985 - Rep. Fac. Sci. Kagoshima Univ. (Earth Sci. Biol.) 18:91
Type species: *Crenitis osawai* NAKANE, 1966; fixed by original designation.

3. Check - list of the *Crenitis* - species known up to now and their essential distinguishing characters as far as known:

Abbreviations:
Distribution: wA = West. North America; eA = East. N.America; As = Asia; Afr = Africa Eu = Europe; Cal = California; Cd = Canada; Ch = China; Jp = Japan; Np = Nepal; eSib = eastern Siberia; Pal = Palearctis; S = southern.

Hind femora pubescence: + = well developed reaching more than 1 third of femora; - = reduced to extreme base and/or anterior margin:

Last segment of maxillary palpi: sh = short; md = medium; lg = long; cl = clear; bl = black; br = brown; bc = bicolored.

Species	Distrib.	Long. (mm)	Ant. Jts.	Hd. fem. pubesc.	Chagr. on head/ pron.	Last jnt. max.palp.
OLD WORLD - *Crenitis* :						
1. *C. apicalis* REITTER, 1896	As. or.	3.0-3.3	9	-	+	md /bl
2. *C. calva* n.sp.	SAfr	2.2-2.6	8	-	-	md/br
3. *C. capensis* ORCH., 1942	SAfr	2.1-2.7	8	-	-	md/bl
4. *C. cinnamomea* n.sp.	Afr	2.5	8	+	-	lg/cl
5. *C. cordula* n. sp.	Np.,Ch.	2.7	9	-	+	sh/bl
6. *C. danielssoni* n.sp.	SAfr	2.5-3.0	8	-	-	lg/bl
7. *C. excusa* n. sp.	SAfr	2.2-2.7	8	-	-	md/bc
8 *C. (Acr.) formosana* n.sp.	As.or.	1.7	8	-	-	lg/bc
9. *C. glabricollis* n. sp.	SAfr	2.1-2.3	8	-	-	md/bl
10. *C. hokkaidensis* NAK.,1966	Jp	2.9-3.5	9	-	+	md/bl
11. *C. japonica* NAKANE, 1963	Jp	3.0-3.2	9	-	+	md/bl
12. *C. kanyukovae* SHATR.,1989	eSib	2.3-2.8	9	+	+	md/bl
13. *C.(Acr.) nakanei* n.sp.	eSib	1.7-2.1	8	-	-	lg/bc
14. *C.(Ac.) neglecta* NAK.&MAT.85	Jp	2.4	8	-	-	sh/bl
15. *C. nepalensis* n.sp.	Np	2.5-2.9	9	-	+	sh/br
16. *C. orientalis* SATO, 1979	India	2.5 -2.7	9	-	+	sh/bl
17. *C.(Acr.)osawai* NAK.,1966	Jp	2.0-2.2	8	-	-	md/bl
18. *C.(Acr.) primorica* n.sp.	eSib	1.9-2.0	8	-	-	sh/ bl
19. *C. punctatostriata* LETZ.1840	Pal	3.3 -3.8	8	+	+	lg/ bc

Species	Distrib.	Long. (mm)	Ant. Jts.	Hd. fem. pubesc.	Chagr. on head/ pron.	Last jnt. max.palp.
20. *C. rufula* n. sp.	Np	2.5	9	-	+	sh/cl
21. *C. (Acr.) satoi* n.sp.	Jp	1.7-1.8	8	-	+	md/bl
22. *C. (Acr.) tokarana* NAK., 1966	Jp	2.0-2.1	8	-	-	lg/bc
23. *C. zimmermanni* KNISCH, 1924	SAfr	2.5	9	+	-	lg/bl
NEW WORLD - *Crenitis* :						
1. *C. alticola* (FALL,1924)	Cd	2.3-3.1	8	+	+	md/bc
2. *C. digesta* (LEC.,1855)	C.d,eA	2.7-3.4	9	+		
3. *C. dissimilis* (HORN, 1873)	Cal		9	-		
4. *C. distans* D'ORCH.,1942	Boliv.	2.7	9	-	-	
5. *C. longula* (FALL,1924) comb. n.	?	2.7	9	+	-	
6. C. *maculifrons* BROWN,1940	Cd, wA	2.4-2.7		+	+	
7. C. *malkini* MILLER,1965	Cd,wA	1.7-2.3		+	-	lg/bc
8. C. *monticola* (HORN,1890)	Cd,eA	2.1-3.1	8	+		
9. C. *morata* (HORN, 1890)	Cd,weA	2.8-3.4	9	-	+	md/bl
10. C. *obliqua* D'ORCH.,1921 comb.n.	Boliv.		9	-	-	lg/bc?
11. C. *palpalis* MILL., 1965	Cal.					
12. C. *paradigma* D'ORCH., 1942 (= *paracymoides* ORCH., 1942)	Cd,wA	1.8-2.4	9	-	-	
13. C. *rufiventris* (HORN, 1873)	Cd,wA	2.0-3.0	9	+	-	
14. C.*seriella* (FALL, 1924)	wA?	9				
15. C. *snoqualmie* MILLER, 1965	Cd,wA.	1.9-2.5	+	-		

Adjacent or controversial species:

1. *„Anacaena „ japonica* NAKANE, 1966 - according to SATO (1985) belonging to *Crenitis*.
   „Anacaena" hokkaidensis NAKANE, 1966, - according to SATO (1985) = ssp. of *C. japonica.*

SATO (1985) transferred *Anacaena japonica* to the genus *Crenitis* and synonymized *A. hokkaidensis* with *japonica.* His reasons were the evidence of seriate punctures at sides and apex of elytra more or less evident in both taxa respectively, also the pubescence at hind femora sparsely and reduced to base (like in *C. morata* HORN from North America) and the first joint of hind tarsi much shorter than the second one (in *Crenitis* less shortened).
NAKANE (1985) rejected the transfer and synonymization of both taxa, because on the median area of mesosternum there is present a small gibbosity and because the first joint of hind tarsi is much shorter than the second one (in *Crenitis* less shortened), both reasons for *Anacaena.* The different seriate punctation at the sides and the apex of the elytra is a distinguishing subspecific character.
MATSUI & NAKANE (1985) erected the *Anacaena* subgenus *Aparacymus* with the type species *A. japonica* NAKANE.
Nevertheless NAKANE considers *A. japonica* and *A. hokkaidensis* beeing derivates of *apicalis* REITTER (1986), which in careful examination shows a small mesosternal gibbosity too. But *apicalis* has also been transferred to *Crenitis* once! The general appearance in comparison with many other *Crenitis* and *Anacaena* and the evanescent triangulate gibbosity of the mesosternum, also the nearly wanting pubescence on the hind femora are reasons, which certainly rectify SATO's transfer from *Anacaena* to *Crenitis.* Maybe the problem is to solve only by a phylogenetic analysis of all species of *Anacaenini.* In this revision I can affirm SATO' s decision having transferred *A. japonica* to the genus *Crenitis,* but in contrast to him I consider *hokkaidensis* as a distinct species because of the evident difference in the male genitalia. On the other hand I agree with NAKANE (i. l.), that *C. tokarana* is not a subspecies of *C. osawai.* After dissection of additional material I could find out, that *tokarana* is very close to the new species *C. satoi* comparing the male genitalia, while these structures are quite different from that in *C. osawai.*

2. *Crenitulus suturalis* LEC. = *Anacaena.*

LE CONTE (1866) described his *Limnebius suturalis* from North America; HORN (1873) put it into the genus *Hydrobius* and listed it erraneously to the Canadian fauna (SMETANA 1988); later HORN (1890) and some other authors as WICKHAM (1895) and BLATCHLEY (1910, 1911) considered it as being a *Creniphilus.* WINTERS (1926) erected the genus *Crenituilus* for *suturalis* LEC., finally D'ORCHYMONT (1942) synomymized the genus *Crenitulus* with *Anacaena.*

Key to the Old World species of the genus *Crenitis:*
(A key to the New World species is given by SMETANA (1988, p.79/80).

1 Body shape elongate, nearly parallelsided; black; at least sides of pronotum yellow. Elytra completely seriate punctate. Hind femora without evident pubescence. Size less than 2.4 mm.
Subgen. ***A c r e n i t i s*** (East Palearctic species). ——— **2**

- Body shape usually oval, not parallelsided; when elongate then hind femora with extended pubescence. Size more than 2.5 mm.
C r e n i t i s (s. str.) ——— **8**

2 Sides of pronotum broadly explanate, yellow (Japan).
——— ***neglecta*** **NAKANE & MATSUI**

- Sides of pronotum not explanate, at least flattened ——— **3**

3 Series of elytral punctation alternating regular and irregular.
Size 2.2 mm. Japan. ——— ***nakanei*** **n. sp.**

- Series of elytral punctation not alternating in this manner ——— **4**

4 Pronotum evenly arched, without any depression or additional coarse punctures. Size 1.7 - 2.2 mm ——— **5**

- Pronotum with submarginal depression before hind angles, there with coarser punctures. Size 1.7 - 2.1 mm. -
South-East Siberia (Primorye). ——— ***primorica*** **n. sp.**

5 Parameres short, strongly convex at the outer face, straight at the inner face ——— **6**

- Parameres moderately convex or straightened. ——— **7**

6 Parameres sharply pointed apically. Size 1.7 mm.- Japan. ***satoi*** **n.sp.**

- Parameres not sharply pointed apically. Size 2.0 - 2.2 mm.- Japan, Tokara Islands. ——— ***tokarana*** **NAKANE**

7 Parameres long, straightened, equally narrowed until obtuse rounded tips. Size 1.7 -1.8 mm.- Taiwan. ——— ***formosana*** **n.sp.**

- Parameres slightly convex, broadly rounded apically.
Size 2.0 - 2.2 mm. -Japan. ——— ***osawai*** **NAKANE**

8 Head and pronotum (at least laterally) with microsculpture.
Palearctic species. ——— **9**

- Punctural interspaces on head and pronotum smooth, without microsculpture (*C. zimmermanni* shows here and there traces of chagreen). African species. ——— **17**

9 Pubescent portion of hind femora long, leaving only the apical third of femur glabrous. Elytra laterally narrowly explanate with distinct yellow margin ——— **10**

- Pubescent portion of hind femora short, restricted to base. Antennae 9-jointed ——— **13**

10 Larger species: 2.9-3.8 mm.- ——— **11**

- Smaller species: 2.3 -2.8 mm.- Last joint of maxillary palpi entirely black. Elytra and pronotum with distinct, rather sharply delimited yellow lateral border. - Eastern Siberia, Japan. ——— ***kanyukovae*** **SHATROVSKIY**

11 Antennae 8-jointed. Pronotum with yellow margin. Mesosternum without any gibbosity. Size 3.3 - 3.8 mm (females evident larger than males). - Europe. ——— ***punctatostriata*** **LETZNER**

- Antennae 9-jointed. Entirely black. Mesosternum with small triangulate gibbosity. Size 2.9 - 3.5 mm.- Japan. ——— **12**

12 Serial punctures of elytra evident laterally and apically; fronto-clypeal suture clearly impressed. Parameres widest at apical half. ——— ***japonica*** **NAKANE**

- Serial punctures at elytra only traceable apically and laterally; fronto-clypeal suture evanescent. Parameres widest in basal half. ——— ***hokkaidensis*** **NAKANE**

13 Black species with last joint of maxillary palpi entirely black. Size 2.7 - 3.3 mm. ——— **14**

- Yellow to rufo-testaceous species. Last joint of maxillary palpi at least apically infuscated. Size 2.5 - 2.7 mm ——— **15**

14 Elytral series evident only apically. Microsculpture on pronotum evident only laterally. Sides of pronotum and elytra, also apex of elytra gradually becoming dark reddish. Size 3.0-3.3 mm. Eastern Asia. ——— ***apicalis*** **REITTER**

- Elytral series very distinct from base to apex. Microsculpture covering the whole pronotum. Last joint of maxillary palpi short, truncate. Size 2.7 mm. Nepal, China. ——— ***cordula*** **n.sp.**

15 Head and pronotum black; elytra and sides of pronotum, also maxillary palpi piceous. Last joint of maxillary palpi short,truncate. - Size: 2.3-2.5 mm. Nepal. ——— ***nepalensis*** **n.sp.**

- Surface yellowish brown to red, at least frons and middle of pronotum darkened. Maxillary palpi bicolored. ——— **16**

16 Pronotum shining and smooth between the punctures, only laterally with microsculpture. Frons between the eyes black; pronotum with more or less dark shadows medially. Maxillary palpi short, truncate. Size 2.5 - 2.7 mm.- India (Bhutan). ——— ***orientalis*** **SATO**

\- Pronotum entirely microsculptured, alutaceous. Surface and underside uniform reddish. Last joint of maxillary palpi apically at least slightly infuscated. Size 2.5 mm.- Nepal. ——— ***rufula*** **n.sp.**

17 Uniform rufo-testaceous; elongate. Maxillary palpi much longer than antennae. Tarsi very long and narrow. Serial punctures evident from base to apex of elytra. Size 2.5 mm.- South Africa. ——— ***cinnamomea*** **n.sp.**

\- Head and pronotum black. Sides of pronotum more or less yellowish. Body shape less elongate. Maxillary palpi slightly longer than antennae. ——— **18**

18 Densely pubescent portion of hind femora extended, only about apical third of hind femur glabrous. Antennae 9-jointed. Shape more elongate; dark with rather sharply delimited yellow lateral margin. Elytral series evident nearly from base to apex. ——— ***zimmermanni*** **KNISCH**

\- Densely pubescent portion of hind femora short, restricted to extreme base. Antennae 8-jointed. Shape broader oval, more highly arched. Elytral series more indistinct ——— **19**

19 Whole surface coarsely densely punctate; punctural interstices one or less time diameter of punctural size ——— **20**

\- Pronotum finely and sparsely punctate or totally without recognizable punctation. ——— **21**

20 Hind tarsi very long and thin, of tibia length. Last joint of maxillary palpi not truncate. Pronotum and elytra piceous. Size 2.1-2.7 mm. South Africa. ——— ***capensis*** **D'ORCH.**

\- Hind tarsi shorter, two thirds of tibia length. Last joint of maxillary palpi subcylindrical, truncate. Pronotum and elytra castaneous. Size 2.2-2.7 mm. South Africa (Transvaal). ——— ***excusa*** **n.sp.**

21 Pronotum finely and sparsely punctate ——— **22**

\- Pronotum nearly unpunctate, smooth. Body shape subglobular. Size 2.1 - 2.3 mm.- South Africa. ——— ***glabricollis*** **n.sp.**

22 Body shape larger and broader. Elytral punctation apically slightly effaced. Pronotal punctures sharply impressed, fine. Tibiae fitted with striking stiff setae.

Parameres apically dentate inwards.
Size 2.5 - 3.0 mm. - South Africa. ——— ***danielssoni*** **n.sp.**

- Body shape less large, slightly narrow. Elytral punctation apically coarser, well impressed. Pronotal punctures effaced, very fine. Tibiae with normal setae. Parameres apically rounded.
Size 2.2 - 2.5 mm. - South Africa. ——— ***calva*** **n.sp.**

4. Natural history :

Crenitis, Creniphilus (greek: krene = source; philos = friend) means water beetles inhabiting sources and drains. Indeed, observations of the best known European species of that genus, *Crenitis punctatostriata*, have proved preferences for inundated peat moss *(Sphagnum)*, cold isothermic water, sources and mountain habitats.

Several annotations upon labels of records of *C. nepalensis* are such as „Rockwall behind waterfall". SMETANA (1988) comments some nearctic species as *C. malkini:* „...at margins of fast flowing small creek, crawling on small rocks....below the water level"; *C. rufiventris:* „...from wet moss...edges of springs, creeks"; *C. apicalis:* „stream"; *C. danielssoni:* „wet moss near stream".

The European *C. punctatostriata* can be observed in small spring-waters or peat moss pools of mountainous regions crawling at the underside of water surface with its silvery shining pubescent ventral side upwards.

A few data, indicated upon labels concerning the altitude of places, where Old World records are taken, shall verify the mountainous character of the genus *Crenitis:*

- *C. punctatostriata*	Germany, Bavaria	600 m, 850 m, 1230m
- *C. apicalis*	East Siberia	250 - 350 m
- *C. kanyukovae*	East Siberia	1200 m
- *C. orientalis*	Nepal	2050 m, 2650 m,2700 m, 2800 m
- *C. nepalensis*	Nepal	2600 m, 2800 m, 3000 m, 3300 m
- *C. cordula*	Nepal	3200 m, 3500 m
- *C. rufula*	Nepal	2800 m
- *C. capensis*	South Africa	2800 ft
- *C. excusa*	South Africa	2800 ft
- *C. danielssoni*	South Africa	5400 ft, 6000 ft

Crenitis is the *„Anacaena „* of mountains; it replaces the latter in higher altitudes.
A description and figure of the larva of *Crenitis punctatostriata* LETZN. is given by VAN EMDEN (1932).

1. *Crenitis apicalis* REITTER (Fig.20)

1896 *Paracymus apicalis* REITTER, Wien. Ent. Zeit. XV: 285. (Eastern Siberia).

D i a g n o s i s : Among the Asiatic species this is the largest one (3.1 - 3.5 mm), of *Anacaena*-like habitus with hardly recognizable punctural series on elytra and because of the entirely black surface and the last joint of maxillary palpi not to be confused with other species of that genus. Mesosternum with a feeble triangulate gibbosity at posterior margin like in *C. japonica* and *C. hokkaidensis.*

D e s c r i p t i o n : Body shape regularly oval, highly convex; elytral flanks not seen from below; entirely piceous, only sides of pronotum and elytra narrowly and diffuse reddish. Pronotum with flat depression before hind angles. Head, pronotum and elytra with rather dense and coarse punctation. Head and sides of pronotum chagreened Antennae 9-jointed. Ultimate joint of maxillary palpi slightly asymmetrical, apically rounded and entirely black, the second joint broadened. Mentum shining, flat and meshy rugose between scattered coarser punctures. Apical punctation at elytra hardly subseriate. Densely pubescent portion on hind femora restricted to extreme base and anterior edge. Mesosternum with a feeble gibbosity at the hind margin. Parameres evenly convex, rounded apically.

M a t e r i a l e x a m i n e d : Holotype, male (TMB): „*Paracymus apicalis* RTT." „Transbaikalien, Leder, Reitter"; 3.5 mm.- 5 Paratypes (3.3 mm, 3.2 mm, 3.5 mm, 3.1 mm, 3.3 mm), same data as holotype (TMB).- 1 Paratype, male (NMW) „ *Paracymus apicalis* RTT. n. sp." Transbaikalien, Leder, Reitter.- Rossia or. `92, Primorskiy Kray, Slavianka, Riazanovka, 17.-23.7.1992, 9 ex. leg. D. BOUKAL (NMW).- USSR: Khabarovsk Province SE Boitsovo, 12 km SE Bikin, 26.5.-4.6.1990, 250-350 m, leg. W. SCHAWALLER (NMS, CHD). (Type seen). - Russia Prim. Partizansk distr., Alexeyevsky Khreb; 20 km E Sergeyevka (Forests near Andreyevka river, 400 m, 26.-29.7.1993, PÜTZ & WRASE leg. 23 sp. (CPE).-

2. *Crenitis calva* sp.n. (Fig. 6)

H o l o t y p e (male): South Africa, Cape Prov. Cape Peninsula, Cape Point, Nature Reserve 10.12.1950, No. 79, leg. BRINCK-RUDEBECK, Swedish South Africa Expedition 1950-1951 (ZML).
P a r a t y p e s : 1 female: same data; 2.5 mm (ZML); 1 female: South Africa, Cape Prov. Kleinmoud 20.12.1950, No. 89, leg. BRINCK-RUDEBECK (Swed. South Africa Expedition 1950-1951), 2.6 mm (CHD).

D i a g n o s i s : This species is to separate from the near allied sympatric *C. capensis* by the globular body shape, the punctation of pronotum much

finer, more superficial and distant in contrast to the elytral punctation. The size is in general smaller than in *C. capensis*. The aedeagophore is quite different.

D e s c r i p t i o n : Length: 2.2 mm. Width: 1.25 mm.- Body shape short and subglobular. Head black; pronotum, elytra, legs and mouthparts castaneous. Sides of pronotum yellowish, transparent at hind angles; sides and apex of elytra diffusely paler. Last joint of maxillary palpi subcylindrical, elongate, apically simply narrowed, entirely maroon. Antennae 8-jointed. Punctation on pronotum very fine and scattered, superficial. Subseriate punctures of elytra only distinct near sutural strip and laterally. Head and pronotum without any chagreen. Pronotum with an indistinct sublateral depression. Mentum coarsely punctate. Prosternum and mesosternum without any gibbosity. Densely pubescent portion of hind femora restricted to extreme base. Tarsi long and narrow, nearly as long as tibia. Median lobe of aedeagus tongue-shaped, medially strongly widened, basally and apically strongly narrowed, terminally pointed; parameres apically widened, with tooth at inner face.

3. *Crenitis capensis* D'ORCHYMONT comb. n. (Fig.7)

1941 *Crenophilus capensis* D'ORCHYMONT,
Mem. Mus. roy. Hist. nat. Belg. 2 (24): 32.

D i a g n o s i s : This species, described after a single female, is very close to *C. excusa* in surface sculpture and male genitalia, but to separate from the latter by the last joint of maxillary palpi clearly asymmetrical in male and pointed apically, also by the hind tarsi very narrow and of about the same length as tibia (in *excusa* only two thirds of tibia length), by the colour of pronotum and elytra black to piceous, not castaneous (in mature condition). The other allied sympatric species *(danielssoni, glabricollis)* are fitted with fine pronotal punctation, much finer and sparser than elytral punctation.

D e s c r i p t i o n : Length: 2.1 - 2.7 mm. Width: 1.25 - 1.5 mm.- Body shape oval, convex. Head entirely black. Pronotum black on disc, sides narrowly yellow, hind angles transparent, without any depression; elytra piceous, laterally and apically diffusely broadly yellowish. Whole surface equally coarsely and densely punctate; punctural interstices about of punctural size, shining, without any chagreen on head and pronotum. Antennae 8-jointed. Last joint of maxillary palpi clearly asymmetrical at least in male, apically rounded to pointed, not truncate, entirely black. Prosternum and mesosternum without any gibbosity. Hind tarsi very long and thin, nearly of tibia length; densely pubescent portion of hind femora short, restricted to extreme base. Parameres extremely broad, apically rounded, median lobe narrow.

M a t e r i a l e x a m i n e d : South Africa: Cape Prov.,Cape Town, Table Mnt. Alt. 2800 ft., 15.12.1950, No. 83. leg. BRINCK-RUDEBECK (ZML, CHD);

South Africa, 5 mls. SW Villiersdorp, 11.2.1951, No. 174, leg. BRINCK-RUDEBECK (ZML). (Type not seen).

4. *Crenitis cinnamomea* sp.n. (Fig. 8, 25)

H o l o t y p e (male): „South Africa, Transvaal, Pretoria" (CHD);
P a r a t y p e s: 2 females, same data (CHD).

D i a g n o s i s : Not to confuse with any other species by the elongate body shape, the entirely red colour, the unusual long maxillary palpi and the dense pubescence on hind femora covering about two thirds of femur.

D e s c r i p t i o n : Length: 2.8 mm. Width: 1.5 mm.- Body elongate, shape moderately convex. Entirely rufo-testaceous. Sides of pronotum transparent; submarginally explanate. Surface uniformely moderately strongly and densely punctate, smooth. Elytral punctation evidently seriate from base to apex. Serial intervals with 1-2 less strong series of punctures. Maxillary palpi rather long, last joint elongate, asymmetrical, a little darker red than penultimate. Antennae 9-jointed. Prosternum and mesosternum without gibbosity. Tarsi slender, nearly as long as tibia. Densely pubescent portion of hind femora long, covering about two thirds of femur. Mentum finely punctate, smooth. Aed.: Parameres much shorter than phallobasis, strongly convex at outer face, straight at inner face, sharply pointed apically.

5. *Crenitis cordula* sp.n. (Fig.19)

H o l o t y p e (male): Nepal (Prov. Bagmati). Mere Dara, 3200 m, 8.4.1981, leg. LÖBL & SMETANA (MNG).
P a r a t y p e s : Nepal (Prov. Bagmati) Ridge betw. Mere Dara and Thare Pati, 3500 m, 9.4.1981, 1 male, 1 female leg. LÖBL & SMETANA (MNG, CHD); Nepal (Prov. Bagmati) Mere Dara, 3200 m, 8.4.1981, leg. LÖBL & SMETANA (MNG).- China-Yunnan, 50 km N Lijiang, Yulongshan Nat. Res., 24.-29.6.1993, 1 female leg. E. JENDEK & O. SAUSE (NMW).

D i a g n o s i s : Easily to recognize by the totally black and flattened body with narrowly explanate elytra and strongly chagreened head and pronotum.

D e s c r i p t i o n : Length: 3.2 mm. Width: 1.8 mm.- Body oval, shape moderately convex, apically and laterally flattened, entirely black, smooth. Elytral flanks narrowly explanate. Head andpronotum heavy microsculptured, alutaceous. Pronotum slightly impressed before hind angles, sometimes with additional subbasal foveae. Whole surface moderately strongly and densely punctate. Punctural interstices on elytra about diameter of punctural size. Coarser serial punctures evident and strictly seriate from base to apex,

including two to three series of coarse and less regular punctural rows. Antennae 9-jointed. Maxillary palpi entirely black, last joint broad, nearly symmetrical in both sexes, truncate. Prosternum without gibbosity, mesosternum fitted with a median transverse ridge. Tarsi slender, two thirds of tibia length. Densely pubescent portion of hind femora short, restricted to base and anterior edge. Surface of hind femur with coarse setigerous pores, punctural interstices oblique rugose. Mentum barely chagreened, without punctures. Aed.: Parameres evenly convex at outer face, truncate.

6. *Crenitis danielssoni* sp.n. (Fig.10)

H o l o t y p e (male): South Africa: Cape Prov., Swartbergpas Platberg. Alt.: ab. 5000 ft, 6.1.1951, No. 120. Swed. South Africa Expedition 1950-1951. BRINCK-RUDEBECK (ZML).

P a r a t y p e s : 18 specimens (same data, ZML, CHD).- South Afr.: Cape Prov., Cape Town, Table Mnt. 22.10.1950, No. 13, 14 specimens, BRINCK-RUDEBECK (ZML, CHD).- South Africa: Cape Prov. Outeniqua Mnts. Montagu Pass, 28.2.1951, No. 187 (ZML).- South Africa: Cape Prov. Outeniqua Mnts. Prince Alfred's Pass, 18.1.1951 No. 153, 1 sp. BRINCK-RUDEBECK (ZML).- South Africa: Cape Prov. Cape Town, Table Mnt. Blinkwater, 4.11.1950, No. 23, 6 sp. BRINCK-RUDEBECK (ZML).- South Africa: Natal, Royal National Park, Gudu Falls, No. 260, 4.4.1951, 4 sp. BRINCK-RUDEBECK (ZML, CHD).- South Africa: Basutoland, Makheke Mnts. 10 mls. ENE Mokhotlong 8500 ft., 7.4.1951, No. 267, 2 sp. BRINCK-RUDEBECK (ZML).- SAfrica Cape Prov. Cedarberg 2.-4.4.1993, fc. ARNDT (1 male, NME)

D i a g n o s i s : By the finer punctation of pronotum very close to *C. calva,* but to distinguish from the latter by the larger size and broader, less globular body shape, by the elytral punctation apically more effaced, not becoming coarser than on disc, also by the spines of tibiae strikingly sticking out.

D e s c r i p t i o n : Length: 2.6 mm. Width: 1.4 mm.- Body shape broad oval, moderately convex. Head entirely black. Pronotum and elytra castaneous to piceous on disc, broadly yellowish at sides, transparent at hind angles of pronotum.; antero-lateral with a very flat depression. Punctation of head and pronotum finer and sparser than of elytra, but well impressed, without chagreen. Mentum smooth between fine and well impressed punctation. Punctural interstices on elytral disc about one to two times diameter of punctural size; punctures moderately strong, apically on no account coarser,subseriate laterally and near suture. Last joint of maxillary palpi long, slightly asymmetrical in male, truncate, piceous. Antennae 8-jointed. Prosternum and mesosternum without any gibbosity. Epipleura of elytra strongly oblique. Legs brown. Hind tarsi about two thirds of tibia length;

densely pubescent portion of hind femora short, restricted to extreme base. Tibiae with striking stiff setae. Aed.: Median lobe widest at base, evenly attenuated to pointed apex; parameres evenly convex at outer face, concave at inner face, broadly rounded apically.

Derivatio nominis: This species is dedicated Dr. ROY DANIELSSON, Museum Lund, Sweden, who made available the whole output of the Swedish South Africa Expedition 1950-1951 for examination.

7. *Crenitis excusa* sp.n. (Fig.9)

H o l o t y p u s (male): South Africa. Transvaal, Blouberg 10.1.1955, leg. BRINCK - RUDEBECK (ZML).
P a r a t y p e s : 1 male, 4 females (same data), ZML, CHD. Size: 2.2 - 2.7 mm.

D i a g n o s i s : Extremely close to *C. capensis* by the entirely coarse and dense punctation of whole surface, but different from it by the form of the last joint of maxillary palpi subcylindrical, truncate, by the shorter hind tarsi, only two thirds of tibia length and by the colour of pronotum and elytra castaneous, not black, also different from *capensis* by a narrow unpunctured median line on pronotal disc. The male genitalia of *C. capensis* are not to confuse with any other species. From the other allied sympatric species as *C. danielssoni* and *C. glabricollis* it is to separate by the coarse punctation of head and pronotum.

D e s c r i p t i o n : Length: 2.5mm. Width: 1.3 mm.- Body shape oval, highly convex. Head entirely black. Pronotum and elytra castaneous, laterally and apically diffusely yellowish, without any depression. Whole surface equally coarsely and densely punctate. Punctural interstices mostly less diameter than punctural size, smooth and without any chagreen between punctures on head and pronotum. Antennae 8-jointed. Last joint of maxillary palpi subcylindrical, truncate and darkened. Mentum rugosely punctured. Prosternum and mesosternum without gibbosity. Hind tarsi about two thirds of tibia length. Densely pubescent portion of hind femora short, restricted to extreme base. Aed.: Median lobe attenuated from base to apex, there arrowhead-shaped; parameres evenly convex at outer face, concave at inner face, apically broadly rounded.

8. *Crenitis formosana* sp.n. (Fig. 15, 24)

H o l o t y p e (male): TAIWAN: Taoyuan Hsien, Shao-Wulai, 30.3.1991, leg. M. L, JANG 2.0 mm. Naturhistorisches Museum, Wien.
P a r a t y p e s : 6 females, 10 males (same data) in NMW, CHD.-TAIWAN : 29 .3.1991, Ilan Hsien, Chiduan-Shuling, leg. M. L. JENG (NMT). wan:

Hsichu Hsien, Daping, 23.8.1991, leg. M. L. JANG (NMW, CHD),- Korea: 1 male, 1 female, leg. MATSUI (NMW).

D i a g n o s i s : *C. formosana* belongs to the very difficult *osawai*-complex and is of the same small size and also of the same shape as *C. satoi*. *C. osawai* of the same shape is a little larger. *C. formosana* is to separate from both next allied only by the male genitalia with long and narrow parameres.

D e s c r i p t i o n : Length: 1.7 mm. Width: 0.9 mm.- Body elongate, shape parallelsided, cylindrically arched. Entirely black, shining, without chagreen on head and pronotum. Sides of pronotum and elytra narrowly paler. Head coarsely, moderately densely punctate; frontal suture weakly impressed. Maxillary palpi rather short and stout, last joint apically rounded and darkened. Antennae 8-jointed. Pronotum evenly arched, without any depressions, uniformely moderately coarsely and densely punctate, interstices smooth. Elytral punctation coarsely densely, almost regularly seriate, vagely striate. Hind femora glabrous, except traces of pubescence near base. Parameres of male genitalia elongate and narrow, evenly narrowed to apically rounded tips.

9. *Crenitis glabricollis* sp.n. (Fig. 5)

H o l o t y p e (male): South Africa, Cape Prov. Maanschijnkop, 7 miles E Hermanus 21.12.1950, No. 93, Swed. South Africa Exped. 1950-1951, leg. BRINCK-RUDEBECK (ZML);
P a r a t y p e s : 1 female (mesocerci seen!), same data, 2.25 x 1.4 mm (CHD).

D i a g n o s i s : This is the only known species with nearly unpunctate pronotum and therefore not to confuse with any other species of the genus. The male genitalia are very characteristic.

D e s c r i p t i o n : Length: 2.1 mm. Width: 1.2 mm.- Body shape subglobular. Head entirely black; disc of pronotum and elytra piceous; sides of pronotum and elytral apex broadly yellowish, smooth, without any chagreen or depression. Head very fine and distantly punctate; pronotum nearly unpunctate. Elytral punctation moderately coarse, apically nearly effaced; punctural interstices about three times diameter of punctural size. Subseriate punctures at least near suture slightly recognizable. Antennae 8-jointed. Last joint of maxillary palpi rather long, apically rounded, entirely piceous. Prosternum and mesosternum without gibbosity. Densely pubescent portion of hind femora short, restricted to extreme base. Hind tarsi about two thirds of tibia length. Tibiae fitted with stiff and strong setae. Aed.: Median lobe broadly tongue-shaped, narrowed apically and basally; parameres widened and obliquely truncate.

densely pubescent portion of hind femora short, restricted to extreme base. Tibiae with striking stiff setae. Aed.: Median lobe widest at base, evenly attenuated to pointed apex; parameres evenly convex at outer face, concave at inner face, broadly rounded apically.

Derivatio nominis: This species is dedicated Dr. ROY DANIELSSON, Museum Lund, Sweden, who made available the whole output of the Swedish South Africa Expedition 1950-1951 for examination.

7. *Crenitis excusa* sp.n. (Fig.9)

H o l o t y p u s (male): South Africa. Transvaal, Blouberg 10.1.1955, leg. BRINCK - RUDEBECK (ZML).
P a r a t y p e s : 1 male, 4 females (same data), ZML, CHD. Size: 2.2 - 2.7 mm.

D i a g n o s i s : Extremely close to *C. capensis* by the entirely coarse and dense punctation of whole surface, but different from it by the form of the last joint of maxillary palpi subcylindrical, truncate, by the shorter hind tarsi, only two thirds of tibia length and by the colour of pronotum and elytra castaneous, not black, also different from *capensis* by a narrow unpunctured median line on pronotal disc. The male genitalia of *C. capensis* are not to confuse with any other species. From the other allied sympatric species as *C. danielssoni* and *C. glabricollis* it is to separate by the coarse punctation of head and pronotum.

D e s c r i p t i o n : Length: 2.5mm. Width: 1.3 mm.- Body shape oval, highly convex. Head entirely black. Pronotum and elytra castaneous, laterally and apically diffusely yellowish, without any depression. Whole surface equally coarsely and densely punctate. Punctural interstices mostly less diameter than punctural size, smooth and without any chagreen between punctures on head and pronotum. Antennae 8-jointed. Last joint of maxillary palpi subcylindrical, truncate and darkened. Mentum rugosely punctured. Prosternum and mesosternum without gibbosity. Hind tarsi about two thirds of tibia length. Densely pubescent portion of hind femora short, restricted to extreme base. Aed.: Median lobe attenuated from base to apex, there arrowhead-shaped; parameres evenly convex at outer face, concave at inner face, apically broadly rounded.

8. *Crenitis formosana* sp.n. (Fig. 15, 24)

H o l o t y p e (male): TAIWAN: Taoyuan Hsien, Shao-Wulai, 30.3.1991, leg. M. L, JANG 2.0 mm. Naturhistorisches Museum, Wien.
P a r a t y p e s : 6 females, 10 males (same data) in NMW, CHD.-TAIWAN : 29 .3.1991, Ilan Hsien, Chiduan-Shuling, leg. M. L. JENG (NMT). wan:

on elytra about one time diameter, on pronotum about two times diameter of punctural size. Head and sides of pronotum extended chagreened. Hind angles of pronotum diffusely reddish, with a very flat, strongly chagreened submarginal depression. Antennae 9- jointed. Mentum smooth between scattered punctures. Prosternum without carina; mesosternum with a feeble triangulate gibbosity. Apical third of elytra distinctly seriate punctate, regularly with alternating series. Hind femora without distinct pubescence; traces only at extreme base and anterior margin of femur; basal half with scattered long hairs. Parameres broad, apically shortly narrowed and rounded.

Material examined:
JAPAN: Akigami Hida,30.4.1967, leg. et det. M. SATO, (CSN, CHD).

12. *Crenitis kanyukovae* SHATROVSKIY (Figs.2, 31)

1989 *Crenitis kanyukovae* SHATROVSKIY, *Hydraenidae, Hydrophilidae.* In LERA, P. A.: Opredelitel' nasekomykh Dal' nego Vostoka SSSR v shesti tomakh, Vol. 3. Zhestkokrylye, ili zhuki (part 1) p. 289.- Leningrad.

Diagnosis: Besides the European *C. punctatostriata* LETZN. this is the only palearctic species with extended densely pubescent hind femora. The elongate body shape with explanate yellow sides of pronotum and elytra and the heavy chagreened head and pronotum makes it easily recognizable.

Description: Length: 2.3 - 2.8 mm. Width: 1.4 - 1.5 mm.- Body shape oblong oval, weakly convex. Black. Sides of pronotum and elytra broadly explanate, bright yellow. Head and sides of pronotum microsculptured. Antennae 9-jointed. Last joint of maxillary palpi long and entirely black. Punctation on head and pronotum less coarse and less dense than on elytra. Punctural interstices on elytra less than one diameter of punctural size, smooth. Punctural series evident from base to apex. Prosternum and mesosternum without gibbosity. Densely pubescent portion of hind femora long, extending over two thirds of femur. Hind tarsi long, about two thirds of tibia length.

Material examined: UdSSR, Primorskij Kraj, Livagijskij b. Anisomovska, 1200 m, 24.-25.7.1990, leg. A. PÜTZ (CPE, CHD).- UdSSR, Primorskij Kraj, Baranovskij, 31.7.1990, leg. A. PÜTZ (CPE, CHD).- Ussuri country m. Tigrovyj, 20.-27.7.1990 and 19.-21.8.02, leg. D. BOUKAL (NMW).- (Type not seen).

13. *Crenitis (Acrenitis) nakanei* sp.n. (Fig. 14, 29)

H o l o t y p e (male): Japan: Kurokawa, Ehime Pref., 25.7.1958, K. KUMATA leg. (NMT).
P a r a t y p e s: 1 female (same data, CHD).

D i a g n o s i s : *C. nakanei* is the next allied to *C. neglecta* NAK., both species showing alternating elytral series of punctures, but in contrast to *C. neglecta* the pronotum sides of *C. nakanei* are not deeply explanated, not bright yellow, especially at fore angles, but evenly flattened with diffuse dirty yellow sides. The pronotum is not distinct bisinuate anteriorly as in *C. neglecta.*

D e s c r i p t i o n : Length: 2.2 mm. Width: 1.1 mm.- Body shape elongate-parallelsided, weakly convex. Black, except eyes, mouthparts, legs and sides of pronotum diffusely reddish. Head, with only medially impressed Y-suture, like pronotal disc moderately strongly punctate. Antennae 8- jointed. Last joint of maxillary palpi long, nearly symmetrical, apically weakly pointed, not truncate, entirely piceous (except extreme base). Mentum alutaceous (like underside). Pronotum weakly convex, sides rather flat, but not distinctly explanated, diffusely rufo-testaceous, with much coarser punctures than on disc; slightly and broadly impressed before hind angles and narrowly behind fore angles; both depressions with coarse punctures and weak chagreen. Two converging rows of coarse punctures, beginning antero-lateral and ending on disc. Elytral series not quite regular and uniform, alternating with rows of less coarse punctures. Sutural stria apically very deep and wide, evanescent in anterior third. Prosternum and mesosternum without any gibbosity. Hind femora glabrous, except traces of pubescence at extreme base. Aedeagus long; median lobe evenly narrowed from base to apex, there slender with rounded tip. Parameres shortly narrowed in apical third to rounded tips.

Derivatio nominis: This species is dedicated Prof. Dr. T. NAKANE from the National Science Museum, Tokyo, who described the first *Crenitis* of Japan.

14. *Crenitis (Acrenitis) neglecta* NAKANE & MATSUI (Fig. 16, 30)

1985 *Crenitis (Acrenitis) neglectus* NAKANE & MATSUI.-
Rep. Fac. Sci. Kagoshima Univ. (Earth Sci. & Biol.),
No. 18: 89-95.

D i a g n o s i s : The only species to confuse with *C. neglecta* might be *C. nakanei* of similar size, oblong oval body shape and alternating elytral series, but in contrast to the latter, *C. neglecta* shows broadly explanated yellow sides of the pronotum, also depressed elytra along their margin and blackish maxillary palpi.

Description: Length: 2.4 mm. Width: 1.1 mm.- Body shape oblong oval, rather weakly convex. Black, with lateral margins of pronotum pale yellow. Antennae 8-jointed. Maxillary palpi blackish, rather short and stout; terminal joint subcylindrical. Pronotum strongly transverse, lateral margins explanate, especially behind; disc rather gibbous, strongly and not closely punctate. Head and pronotum without chagreen. Anterior margin of pronotum evidently bisinuate. Elytra moderately convex, strongly seriate with alternating rows of punctures, vagely striate. Hind femora sparsely and finely punctured, not pubescent, only with setigerous pores. The first joint of hind tarsi nearly as long as the second. Aedeagus: Parameres strongly narrowed in apical half, with rounded tips; median lobe narrow tongue-shaped.

Material examined:
Holotype (female),Japan: Minamizawa, Nagano Pref., Honshu, 1.8.1956, Y. HAYASHI leg., 2.2 mm, (NMT).- Japan: Hinata, Shizuoka Pref. 26.7.1990, H. ISHIKAWA leg. (CSN, CHD).

15. *Crenitis nepalensis* sp.n. (Fig. 17, 26)

Holotype: (male) Nepal (Prov. Bagmati), Pokhare NE Barahbise, 2800 m, 2.5.1981; leg. LÖBL & SMETANA (MNG).
Paratypes: 30 ex. (males &females; same data, MNG, CHD); Nepal (Prov. Bagmati), Yardang Ridge NE Barahbise, 3250 m, 5.5.1981, 2 ex. leg. LÖBL & SMETANA (MNG); Nepal: KOSI Crete S. Mangsingma, 2800 m, 7.4.1981, 2 ex. leg. LÖBL & SMETANA (MNG); Nepal (Prov. Bagmati) Burlang Bhaniyang 2600 m, 5.4.1981, 2 ex. leg. LÖBL & SMETANA (MNG); Nepal (Prov. Bagmati) below Thare Pati, 3300 m, 10.4.1981, 2 ex. leg. LÖBL & SMETANA (MNG).

Diagnosis: Differing from the next allied and sympatric *C. orientalis* by the dark colour of the whole surface and mainly by the male genitalia with a basally not broadened median lobe and knife-shaped parameres apically dentate.

Description: Length 2.25 mm. Width: 1.25 mm.- Body shape oval, highly arched. Head and pronotum piceous, elytra castaneous, smooth. Sides of pronotum and elytra slightly diffuse paler; pronotum with a broad submarginal depression. Antennae, palpi and legs rufo-testaceous. Last joint of maxillary palpi entirely castaneous, truncate. Antennae 9- jointed. Whole surface strongly and rather densely punctured; punctural interstices about diameter or less of punctural size. Head entirely microsculptured, pronotum only laterally so. Elytral punctation evidently seriate from base to apex. Elytral epipleura strongly oblique. Prosternum without gibbosity; mesosternum with

a median transverse ridge. Densely pubescent portion on hind femora restricted to extreme base (trochanter), there nearly wanted. Large setigerous punctures covering the whole surface of the hind femur, oblique rugose between. Tarsi about two thirds length of tibiae. Mentum uneven, rugously punctured. Aedeagus: Median lobe strongly narrowed from base to apex, there arrow-head-like pointed; parameres nearly parallelsided, rounded terminally-externally, with a little tooth at inner face.

16. *Crenitis orientalis* SATO (Fig.18)

1979 *Crenitis orientalis* SATO, Ent. basiliensia 4:54

D i a g n o s i s : This species is the next allied to *C. nepalensis*, which in contrast shows a black head and disc of pronotum, also the last joint of maxillary palpi shorter and stouter truncate. The male genitalia are different in the median lobe, narrow from base to apex in orientalis, suddenly wided basally in nepalensis, apically rounded in orientalis, knife-shaped and apically dentate in nepalensis. *C. orientalis* is larger than *nepalensis* on an average.

D e s c r i p t i o n : Length: 2.5 - 2.7 mm. Width: 1.5 - 1.7 mm.- Body shape oval, strongly convex; elytral sides laterally paler, not seen from below. Entirely rufo -testaceous; frons between the eyes and disc of pronotum vaguely infuscated. Punctation of whole surface moderately coarse and dense, laterally and apically much coarser. Head and sides of pronotum sligthly chagreened. Pronotum with a broad and strongly chagreened depression before hind angles; sometimes with two subbasal foveae. Prosternum without gibbosity, mesosternum with a low transverse ridge. Punctation of elytra subseriate from base to apex, near sutural striae and apex vaguely striate. Maxillary palpi short, last joint subcylindrical, apically infuscated and truncate. Mentum even, shining, finely punctate. Densely pubescent portion of hind femora restricted to base (trochanter). Tarsi slender, about two thirds length of tibia. Median lobe of aedeagus through narrow, apically pointed, as long as the parameres; these straight at inner face, convex at outer face, narrowed and broadly rounded terminally.

M a t e r i a l e x a m i n e d : Paratype:Tarke, 2700 m, 22 km v. Timphu, 30.6.1972. Nat. Hist. Mus. Basel (Bhutan Expedition 1972) (NMG).- Nepal (Prov. Bagmati) Pokhare NE Barahbise 2800 m, 2.5.1981, leg. LÖBL & SMETANA; same locality 3.5. 1981 (MHG, CHD).- E Nepal: KOSI Foret S. Mangsingma 2200 m, 11.4.1984, leg. LÖBL& SMETANA (MHG, CHD).- Nepal, Tarke Ghyang 2650 m, 19.4.1981, leg. LÖBL & SMETANA (MHG, CHD).- Nepal, Bagmati, Malemchi, 2800 m, 14.4.1981, leg. LÖBL & SMETANA (MHG, CHD).- E-Nepal, Arun Valley, Chichila- Mure, 2050 m, 7.6.1992, leg. J. & J. Probst (NMW).-(Type seen).

17. *Crenitis (Acrenitis) osawai* NAKANE (Figs. 21, 28)

1963 *Agraphydrus narusei*: NAKANE,
Icon. Ins. Jap. col. nat. ed. 2: 66. pl. 33; fig.13.
1966 *Crenitis osawai* NAKANE, Fragm. Coleopt. (14): 56. (Honshu).
1966 ssp. *tokaranus* NAKANE, l. c. (Tokara Is., Nakanoshima Is.).

D i a g n o s i s : This difficult species is to separate from *C. formosana, C. satoi* and *C. tokarana* with certainty only by the male genitalia, though *C. satoi* and *C. formosana* are smaller on an average (1.7 - 1.8 mm) than *C. osawai* and *C. tokarana* (2.0 - 2.3 mm).

D e s c r i p t i o n : Length: 2.1 - 2.3 mm.- Width: 0.9 mm.- Black to piceous; lateral margins of pronotum and elytra, elytral epipleura, mouth parts, palpi, legs and antennae yellowish brown. Oblong oval, weakly convex. Antennae 8-jointed. Terminal joint of maxillary palpi rather long, black. Pronotum strongly transverse, evenly arched and without any depression or explanation. Elytra moderately convex, rather closely strongly and subseriately punctate, each with a sutural stria, deeply impressed posteriorly, evanescent anteriorly. Prosternum and metasternum without any gibbosity. Hind femora without pubescence, except the hairs arising from the punctures. Aedeagus: Median lobe nearly parallelsided, rounded apically; parameres broad, narrowed in apical third at outer face, straight at inner face until apex.

M a t e r i a l e x a m i n e d:
Holotype (male): Japan: Kawayu, S. Kii, Wakayama Pref., Honshu, 24.7.1946, S. OSAWA leg. (NMT).- Japan: Befu-Keikoku, Monobe V., Kouchi Pref., 5.8.1991, E. MATSUI leg., 1 female (CNC).- Taiwan: Fuyuan, Hwalien Hsin, 9.-11. 5.1972, M. SAKAI leg. 1 female (CHD).

18. *Crenitis (Acrenitis) primorica* sp.n. (Fig. 11, 27)

1989 *Crenitis osawai;* SHATROVSKIY,
A. G., *Hydraenidae, Hydrophilidae* (p.260-293).
In: LERA, P. A.: Opredelitel' nasekomykh Dal' nego Vostoka SSSR v shesti tomakh. Vol. 3. Zhestkokrylye, ili zhuki (part 1).- Leningrad.

H o l o t y p e (male): ROSSIA OR. Primorskiy Kraj, Tigrovy, 19.-21.7.1992, leg. D. BOUKAL; 2.0 mm.- Naturhistorisches Museum Wien.
P a r a t y p e s : 6 female, 6 male (same data) in NMW and CHD.- UdSSR: Primorskij Kraj, Ussurijskij Sapovednik Kamenuschka 22. 7.1990 and 18.7.1990 leg. A. PÜTZ (CPE, CHD.- Ussuri - country, Tigrovyi, 20.-27.7.1990, 2 sp. leg. D. BOUKAL (NMW).

D i a g n o s i s : *C. primorica* is close to *C. osawai, C. formosana* and *C. satoi*, but different from these by the presence of a distinct coarser punctate depression before hind angles of pronotum and mainly by the male genitalia. Not seen from Japan untill now.

D e s c r i p t i o n : Length: 1.9 - 2.0 mm. Width: 0.8 mm.- Body shape elongate, nearly parallelsided. Surface entirely black, shining. Legs, mouthparts and antennae rufo-testaceous. Margins of pronotum and elytra narrowly paler. Last joint of maxillary palpi rather long, sligthly asymmetrical (male), apically a little truncate, black. Sutural striae on head evanescent. Head and pronotum rather coarsely densely punctate, interstices smooth, without any chagreen. Pronotum evenly arched, not explanate, but with a flat coarser punctate depression before hind angles. Elytral punctation coarsely densely as on pronotum, almost regularly seriate, vagely striate. Prosternum and mesosternum without gibbosity. Elytral epipleura flat, horizontal, dark piceous. Hind femora glabrous, except traces of pubescence at extreme base. Parameres evenly rounded externally, concave at inner face, rounded apically.

19. *Crenitis punctatostriata* LETZNER (Fig.1)

1840 *Hydrobius punctatostriatus*
LETZNER, Arb. schles. Ges. vaterl. Kult. p. 81.

D i a g n o s i s : The only European and Westpalearctic species is characterized by its large size, 8-jointed antennae, bicolored last joint of maxillary palpi, apically deeply impressed punctural series and narrowly explanate elytra, also by the extended pubescence of hind femora.

D e s c r i p t i o n : Length: 3.0 mm (male) - 4.0 mm (female). Width: 1.8 - 2.0 mm.- Body shape oblong oval, rather convex. Piceous to castaneous, margins pronotum, sides and apex of elytra yellow, slightly explanate. Legs, mouthparts, basal joints of antennae and palpi yellowish; femora basally black. Antennae 8-jointed. Last joint of maxillary palpi bicolored, long and asymmetrical in both sexes. Whole surface moderately strongly but rather densely punctate, shining. Head and sides of pronotum with chagreen. Elytra apically subseriately punctate, near sutural stria deeply striate. Densely pubescent portion of hind femora long, leaving only about apical third of femur glabrous. Aedeagus: Median lobe narrow, parallelsided; parameres long, gradually narrowed from base to apex, tips rounded.

M a t e r i a l e x a m i n e d: **Germany:** Bavarian Forest, Deggendorf - Rusel, 830 m, 13°04' E/48°52,5' N; source-pool, 9.7.1974, 29.6.1977 ; Innernzell, Mitternacher Ohe, 450 m, small creek 2.8.1978; Bischofsmais 1020 m, 13°02'

E/48°55' N; peat moss; 1975; Kl. Spitzberg 1230 m, 13°29' E/ 48°57'N; 9.8.1993 numerous, (all leg. F. HEBAUER, CHD).- „Holstein", WROHE, 7.5.1963 (CHD). Thuringia: Thüring. Wald, Schmücke, 2.7.1922, W. LIEBMANN, Arnstadt (NMW).-Suchten, coll. LIEBMANN (NMW).- Oberfranken: Wunsiedel, Zeidelmoos, 12.6.1975, H. MÜHLE leg. (NMW).-
Austria: Gurktaler Alp, 24.-30.6.1958, R. BUDBERG leg. (NMW).- Speikkofel, Carinthia, St. Lorenzen, 26.9.1958 (NMW).-
Poland: Schlesien, Heinrichsau, v. BODEMEYER leg. (NMW).- Altvater, K. HÄNEL leg. (NMW).-
Czechia: SBöhmen, 15 km SE Kaplice, 14.6.1992, M. JÄCH leg. (NMW).-
Slovakia: Paskau, Mähren (NMW).- (Type not seen).

B i o l o g y : In German localities *C. punctatostriata* is regularly associated with *Hydroporus ferrugineus*, *Agabus guttatus* and *Agabus congener,* sometimes with *Hydroporus tristis* and *H. memnonius.*

20. *Crenitis rufula* sp.n.

H o l o t y p e (female, unicum) : E. Nepal: KOSI, Val. Juduwa Kola, 2800 m, 15.4.1984, leg. LÖBL & SMETANA (MNG).

D i a g n o s i s : Though no male is known up to now, this species is easily to recognize by the unicolored red body and the strongly alutaceous surface of head and whole pronotum.

D e s c r i p t i o n : Length: 2.6 mm. Width: 1.4 mm.- Body shape rather short oval, highly convex. Uniformly rufo-testaceous. Head and whole pronotum strongly chagreened; pronotal sides with a flat depression before hind angles. Prosternum without any gibbosity; mesosternum with a low transverse ridge. Elytral punctation much coarser and denser than on head and pronotum, subseriately arranged, not impressed in furrows. Punctural interstices less than diameter of punctures, smooth. Last joint of maxillary palpi cylindrical-symmetrical, apically rounded and slightly infuscated. Mentum uneven and finely rugose. Hind femora with setigerous pores in basal half, slightly oblique rugose in apical half, pubescent portion reduced to extreme base, there nearly wanted. Hind tarsi short, a little more than half length of tibia. Antennae 9-jointed.

21. *Crenitis (Acrenitis) satoi* sp.n. (Figs.13, 23, 32)

H o l o t y p e (male): TAIWAN, Ilan Hsien, Chiduan-Shuling, 29.3.1991 (58), leg. M. L. JANG.- 1.9 mm.- Naturhistorisches Museum, Wien.
P a r a t y p e s : 3 female, 9 male (same ddata) in NMW and CHD. - Japan Hokkaido, Jozankei, 19.7.1976, M. SATO leg. (NMT,NMT, CHD).- Japan:

Sabi-gawa, Ohtawara, Tochigi Pref., 26.6.1988, S. OHMOMO leg. 2 sp. with smooth pronotum (NMT, CHD).- Japan: Hokkaido, Pirika-Onsen, 2.8.1990, M. SATO leg. 1 male (CHD).- Taiwan: Fuyuan, Hwalien Hsien, 9.-11.5.1972. M. SAKAI leg. 2 sp. with chagreened pronotum (NMT).

D i a g n o s i s : Next *C. formosana* the smallest species of the genus (1.7 mm), to separate from the latter only by the male genitalia with short and acutely pointed parameres in *C. satoi* and long attenuated slender parameres in *C. formosana*. From *C. tokarana* it is to distinguish by the smaller size and the though very similar but apically not sharply pointed parameres.

D e s c r i p t i o n : Length: 1.7 -1.8 mm. Width: 0.8 mm.- Body shape elongate, parallelsided, cylindrical arched. Entirely black, shining. Legs, mouthparts and antennae brown. Last joint of maxillary palpi elongate, slightly asymmetrical (male) or quite symmetrical (female), basally brown, apically piceous. Antennae 8-jointed. Mentum like the whole underside alutaceous. Epipleura of elytra yellow, nearly horizontal. Prosternum and mesosternum without any gibbosity. Head rather coarsely punctate, forehead less densely than frons. Frontal suture weakly impressed. Pronotum evenly arched, without any submarginal depression or excavation, uniformly densely and rather coarsely punctate, usually without chagreen, but sometimes entirely chagreened. Elytra strongly seriate punctate; punctures of the same size as on pronotum. Sutural stria striking posteriorly, evanescent in anterior third. Hind femora glabrous, except traces of pubescence at extreme base and setigerous pores. Aedeagus: Parameres very short, strongly convex externally, slightly concave at inner face, apically sharply pointed.

Derivatio nominis: This nice species is dedicated Prof. D. M. SATO, Nagoya, who kindly supported this revision.

22. *Crenitis (Acrenitis) tokarana* NAKANE stat. n. (Fig. 12)

1966 *Crenitis osawai tokaranus* NAKANE.-Fragm. Col.14: 56

D i a g n o s i s : Very close to *C. satoi*, a little less to *C. osawai*. To distinguish from C. satoi by the little larger size, but mainly by the male genitalia with parameres of the same type, but not sharply pointed apically. From *C. osawai* it can be separated only by the totally different aedeagus. Perhaps an endemit of the Tokara Islands.

D e s c r i p t i o n : Length: 2.1 mm. Width: 0.9 mm.- Mostly identical with *C. satoi* and *C. osawai*, but the punctation on head and pronotum is somewhat finer, the frontal suture of head indistinctly impressed and the upper surface a little more convex and more shining than in *C. osawai*. Aedeagus: Parameres short, strongly convex laterally, almost straight at inner face, tips rounded.

M a t e r i a l e x a m i n e d : Japan: Nakayama, Kashima V., Shimokoashiki Is., 4.7.1988, E. MATSUI leg. (CSN, CHD).- Tokara Islands: Nakanoshima, 8.6.1953, S. UENO leg. (2 paratypes, CNC).-

23 . *Crenitis zimmermanni* KNISCH

1924 *Crenitis Zimmermanni* KNISCH, Wien. Ent. Ztg., t. 41. p.19
1925 *Noxonus zimmermanni;* D'ORCHYMONT,
Bull. Ann. Soc. Ent. Belg. 65:164-165.

D i a g n o s i s : Among the African species except of *C. cinnamomea*, it is the only one with densely pubescent hind femora extended two thirds of length. From the latter distinguished by a black head and pronotal disc, also by the last joint of maxillary palpi entirely black.

D e s c r i p t i o n : Length: 2.1- 2.5 mm. Width: 1.4 mm.- Body shape oblong oval, convex; elytral flanks not seen from below. Head and pronotal disc black, elytra and pronotal margins yellowish-brown, shining. Pronotum with extended submarginal depression. Whole surface moderately strongly and densely punctate. Head and pronotum without chagreen. Elytral punctation nearly regularly seriate, not striate. Last joint of maxillary palpi long, entirely black. Antennae 9-jointed. Prosternum and mesosternum without any gibbosity. Densely pubescent portion of hind femora long, leaving only about the apical third of femur glabrous. Legs of dirty yellow colour. Tarsi very long and slender, about as long as tibia.

M a t e r i a l e x a m i n e d : S. Africa, Cape Prov. Steenbras, Dam area, 10 miles WSW Grabouw. 8.7.1951, No. 354 (Swed. S. Afr. Exped. 1950-1951), leg. BRINCK-RUDEBECK. (Type not seen).

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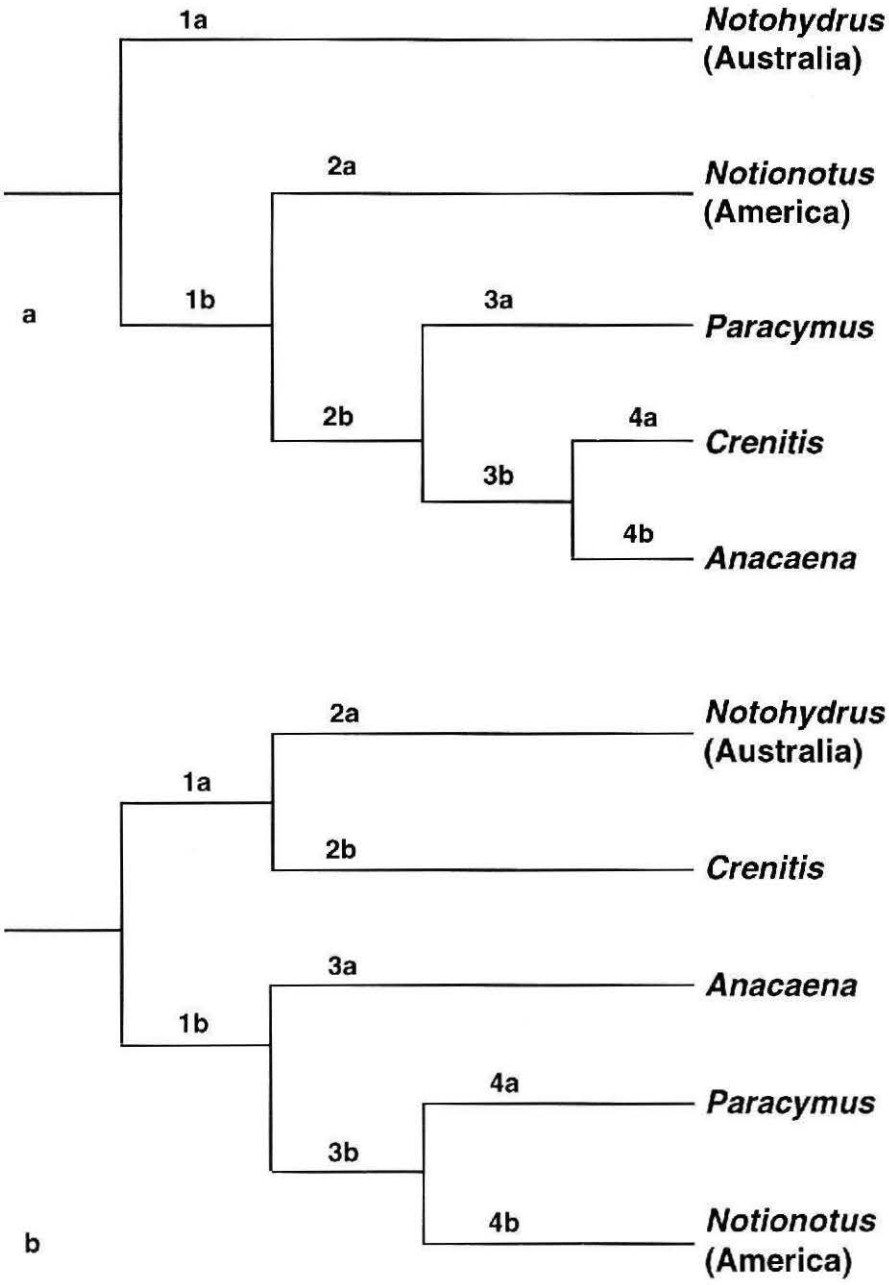
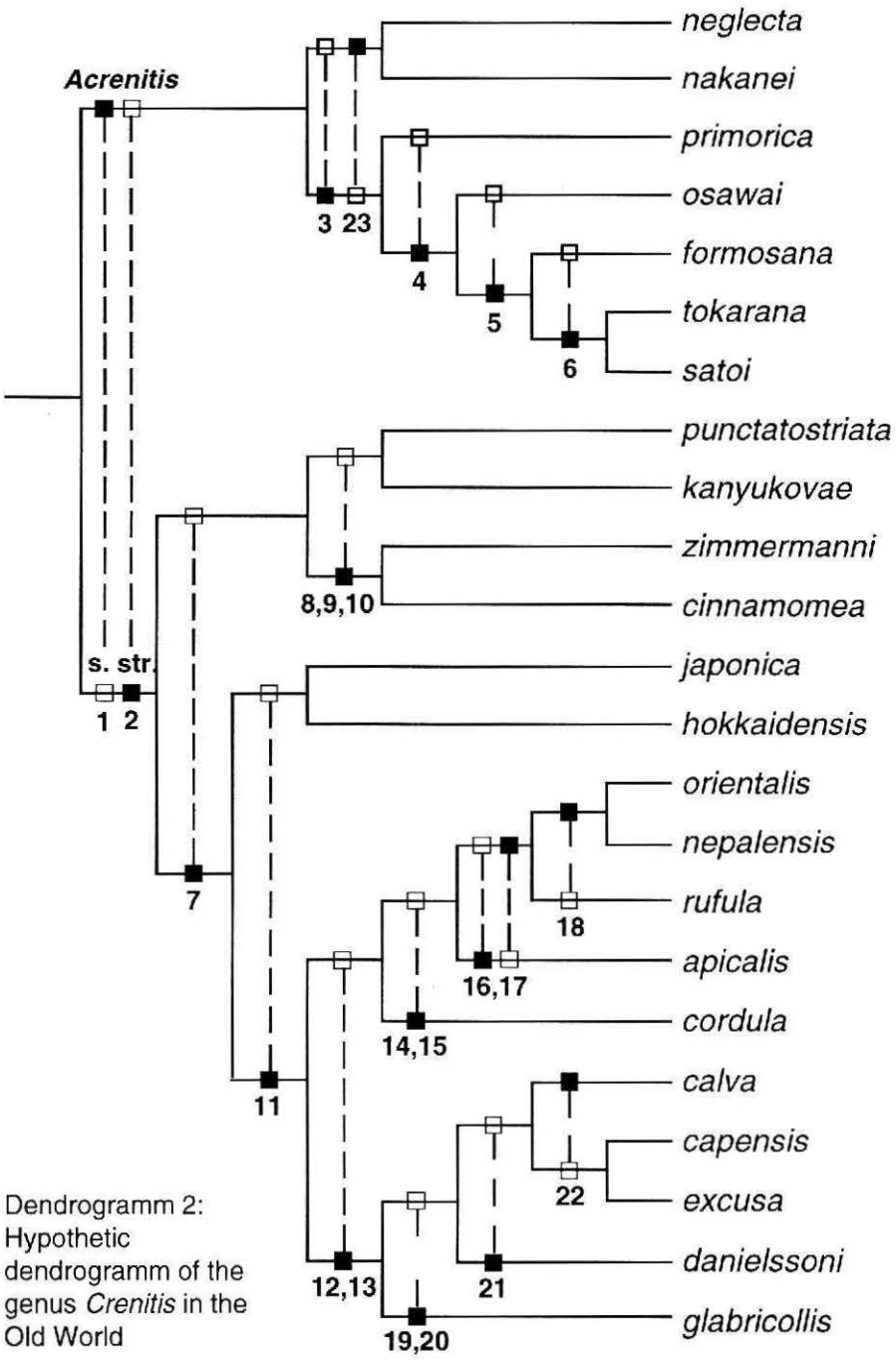
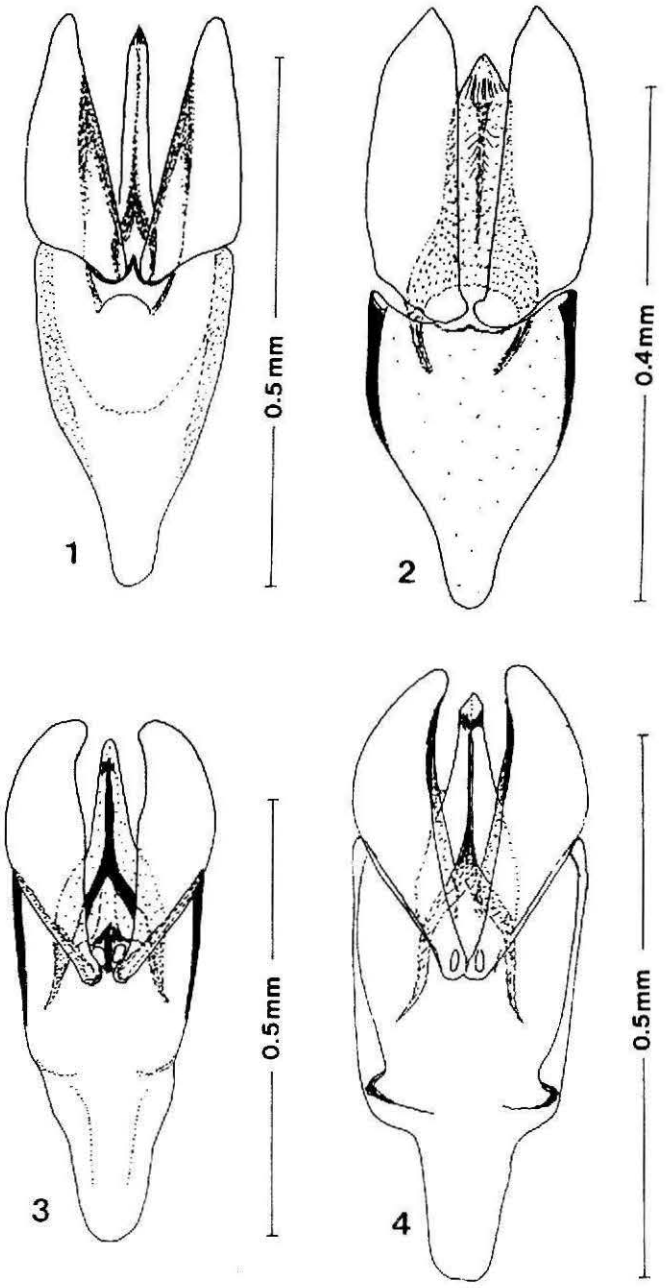


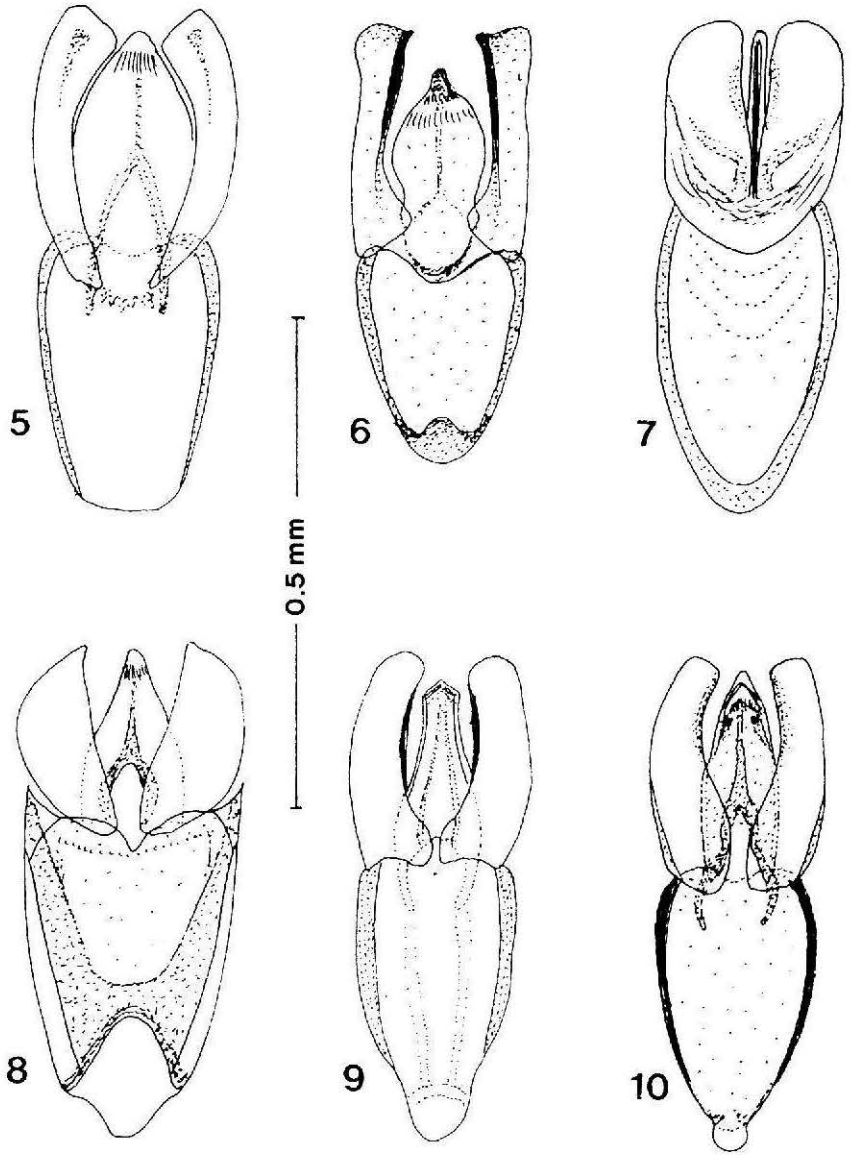
Dendrogram 1: Two alternative cladograms for the phylogenetic position of the genus *Crenitis* BEDEL.



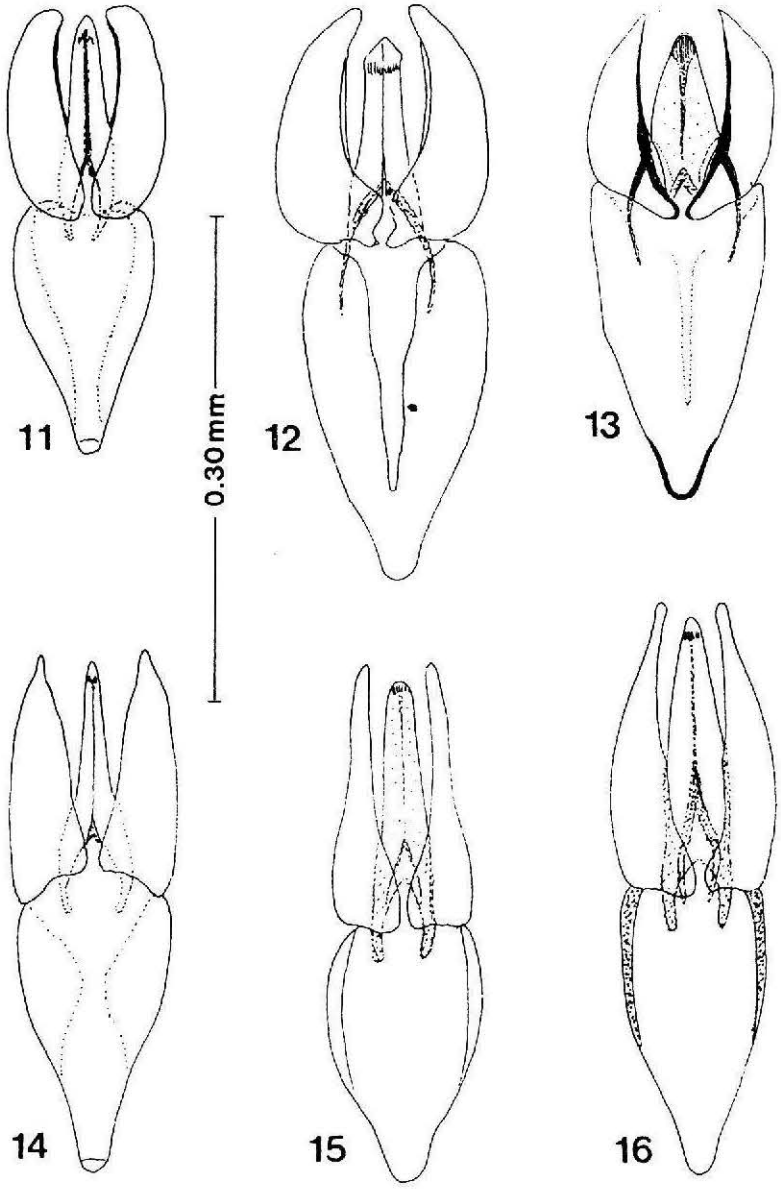
Dendrogramm 2: Hypothetic dendrogramm of the genus *Crenitis* in the Old World



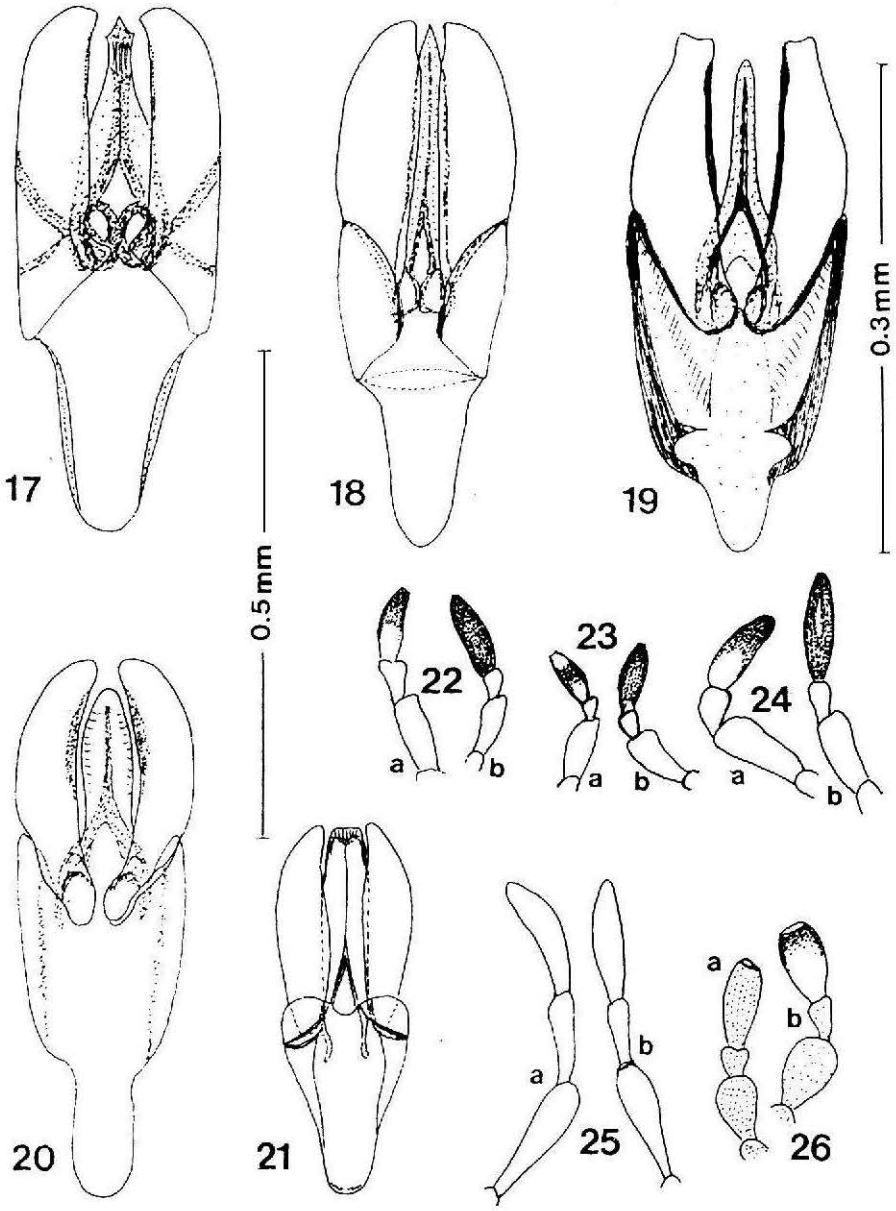
Figs. 1 - 4: Aedeagus: 1) *Crenitis punctatostriata*, 2) *C. kanyukovae*, 3) *C. japonica*, 4) *C. hokkaidensis*.



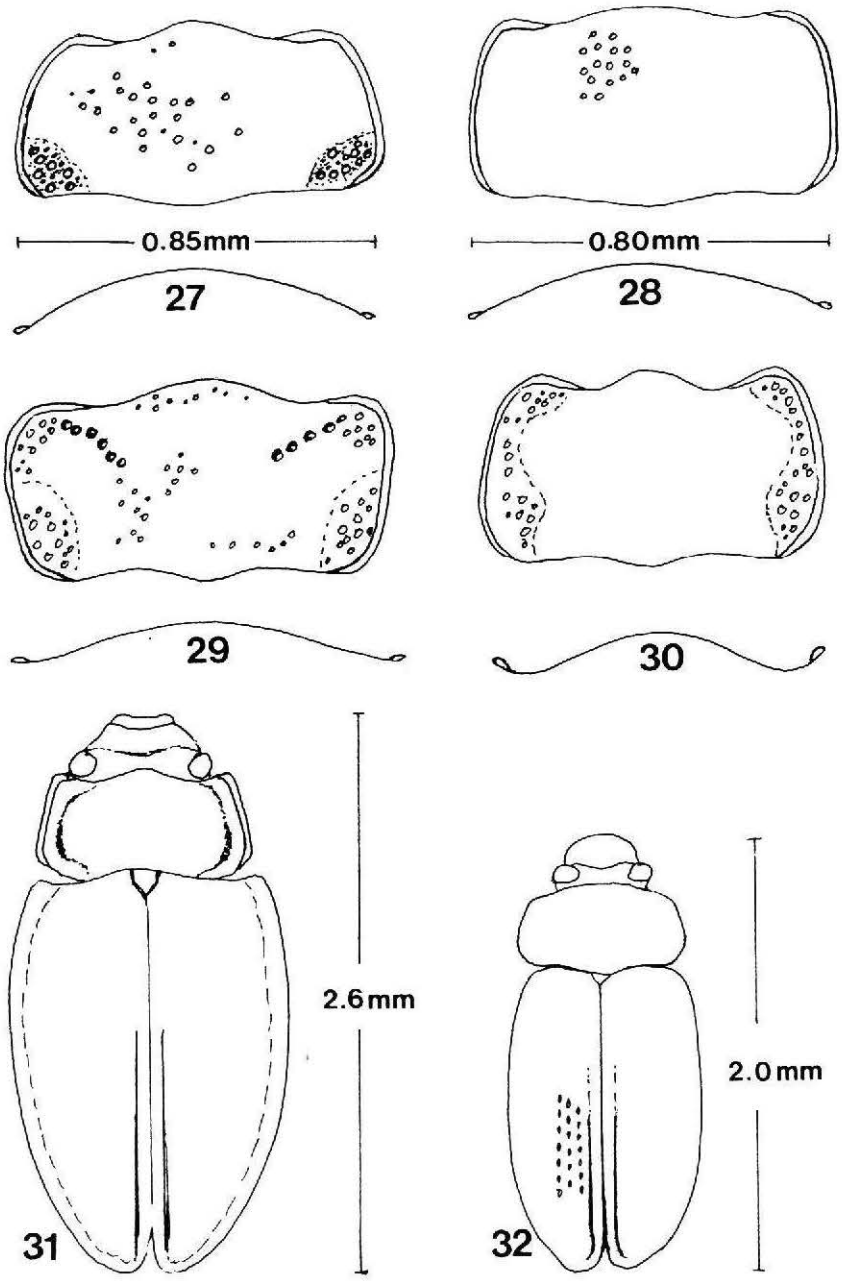
Figs. 5 - 10: Aedeagus: 5) *Crenitis glabricollis*, 6) *C. calva*, 7) *C. capensis*, 8) *C. cinnamomea*, 9) *C. excusa*, 10) *C. danielssoni*.



Figs. 11 -16: Aedeagus: 11) *Crenitis primorica,* 12) *C. tokarana,* 13) *C. satoi,* 14) *C: nakanei,* 15) *C, formosana,* 16) *C. neglecta.*



Figs. 17 - 21: Aedeagus: 17) *Crenitis nepalensis,* 18) *C. orientalis,* 19) *C. cordula,* 20) *C. apicalis,* 21) *C. osawai (holotype).*
Figs. 22 - 26: Typical forms of maxillary palpi (a = male, b = female): 22) *Crenitis nakanei,* 23) *C. satoi,* 24) *C. formosana,* 25) *C. cinnamomea,* 26) *C. nepalensis*



Figs. 27 - 30: Pronotum: 27) *Crenitis primorica*, 28) *C. osawai*, 29) *C. nakanei*, 30) *C. neglecta*.
Figs. 31 - 32: Habitus: 31) *C. kanyukovae*, 32) *C. satoi*.