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Morphological studies on *Tydeidae* (*Actinedida*, *Acari*)

I. Remarks about the segmentation, chaetotaxy and poroidotaxy of idiosoma

[With 4 text-figs]

Morfologiczne studia nad *Tydeidae* (*Actinedida*, *Acari*)

I. Uwagi o segmentacji, chetotaksji i poroidotaksji idiosomy

Abstract. The identity of primitive segments of idiosoma in *Tydeidae* is discussed, i.e. their arrangement and number, as well as the subordination of the definite setae and lyrifissures to the particular segments. The consequence of this discussion is the proposed new nomenclature of setae.

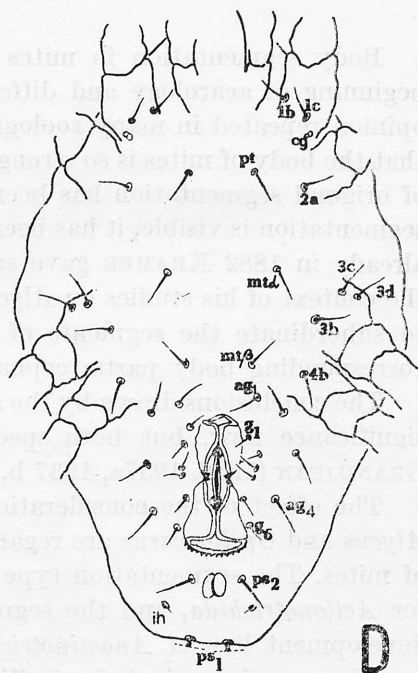
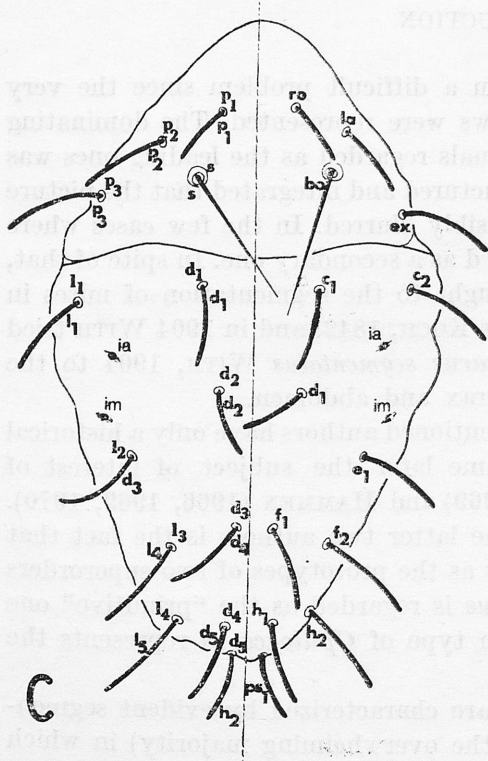
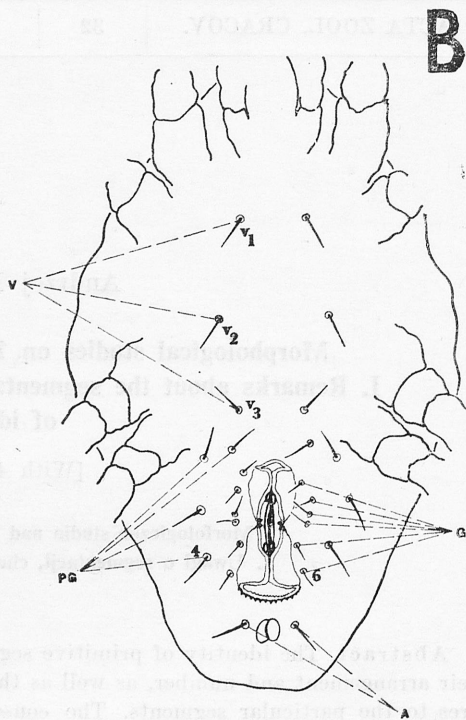
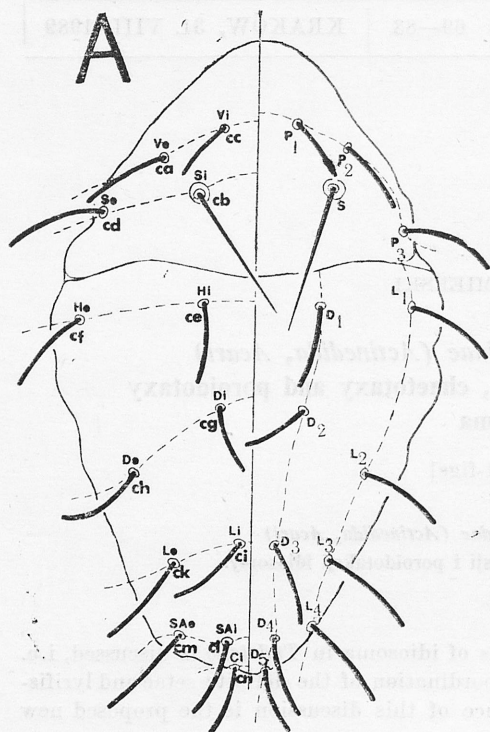
I. INTRODUCTION

Body segmentation in mites has been a difficult problem since the very beginning of acarology and different views were represented. The dominating opinion repeated in many zoological manuals regarded as the leading ones was that the body of mites is so strongly restructured and integrated that the picture of original segmentation has been irreversibly blurred. In the few cases where segmentation is visible, it has been regarded as a secondary one. In spite of that, already in 1882 KRAMER gave some thought to the segmentation of mites in the context of his studies on *Alycus roseus* KOCH, 1842, and in 1904 WITH tried to subordinate the segments of *Opilioacarus segmentatus* WITH, 1904 to the corresponding body parts: cephalon, thorax and abdomen.

The conclusions drawn by the above mentioned authors have only a historical significance now, but both species became later the subject of interest of GRANDJEAN (1936, 1937a, 1937 b, 1939, 1969) and HAMMEN (1966, 1969, 1970).

The effect of the considerations of the latter two authors is the fact that *Alycus* and *Opilioacarus* are regarded now as the prototypes of two superorders of mites. The segmentation type of *Alycus* is regarded as the "primitive" one for *Actionotrichida*, and the segmentation type of *Opilioacarus* represents the development line of *Anactinotrichida*.

Alycus and particularly *Opilioacarus* are characterized by evident segmentation. On the other hand, in mites (in the overwhelming majority) in which



furrows do not separate externally the segments from each other, the segmental distribution of organs (i. e. the distribution of sigilli, glands, lyrifissures and setae of idiosoma in their paleotrichial or ortotrichial state) can suggest metamerism. Sometimes in mites with basical lack of external segmentation the cuticle of some specimens tends to fold and create furrows running across the traces of sigilli — as I have noticed in many species of *Tydeidae*. However, the sigilli themselves are most frequently poorly visible and sigillotaxy has not been elaborated yet.

The chaetotaxy of *Tydeidae* is characterized by the presence of prototrichia (none of the setae are "new-derived", i. e. all are homologous to definite setae of a hypothetical archetype — so there are no neotrichia). *Tydeidae* are not paleotrichial, since not all primitive setae have been preserved (part of them disappeared — merotrichial effect). The major part of setae preserved their original localization in reference to the archetype (ortotrichia), however, the localization of other setae is the effect of migration (simple, i. e. parallel displacement, or disjunction or "bisyntesis"¹ or "anabasis"², and thereby it is in contradiction with orthotrichia. The chaetotaxy most similar to the paleotrichial one (it refers particularly to idiosoma) is visible among all *Tydeidae* in *Australotydeus kirstenae* SPAIN, 1969. Tarsus I in the species of *Meyerella* genus is paleotrichial.

In some part of *Tydeidae*, four pairs of lyrifissures (= cupuli) have been observed, while others have only three pairs.

Observation of thousands of specimens from my own collection originating from different parts of the world during my systematic investigations on *Tydeidae* induced me to formulate some conclusions which will be presented in a series of papers, this being the first one.

II. BODY PARTS, SEGMENTATION AND CHAETOTAXY

Tydeidae have an integrated idiosoma deprived of external segmentation, divided from the dorsal side into two parts (the anterior and the posterior one) by a more or less distinct furrow. Until the revision made by ANDRÉ this furrow

¹ Disappearance of idiosomal setae followed by displacement of the remaining element of the pair to sagittal plane.

² "Migration of either or both proral setae of tarsus to the position of the tectal setae" (after ANDRÉ 1979).

Fig. 1. Symbols of setae and lyrifissures of *Tydeinae* idiosoma according to different authors: A — dorsum; on the left, over the setae — abbreviations of setae names used by THOR (1933); on the left, under the setae — symbols used by GRANDJEAN (1938b); on the right — symbols used by BAKER (1965). B — ventral side; symbols used by BAKER (1965). C — dorsum; on the left, over the setae — symbols used by MARSHALL (1970); on the left, under the setae — symbols used by ANDRÉ (1979—81); on the right — the newly proposed symbols. D — ventral side; the newly proposed symbols

was regarded as a counterpart of the dorso-sejugal furrow dividing proterosoma and hysterosoma. Therefore, in the descriptions of *Tydeidae* the following parts were considered: gnathosoma (chelicerae, palps, hypostome), idiosoma with legs, divided into propodosoma and hysterosoma; the first two pairs of legs belonging to propodosoma and the two other ones connected with hysterosoma.

The consequence of such interpretation of the structure was the view that *Tydeidae* possessed ten segments. This view was expressed by BEKLEMISHEV (1964) who mentioned *Tydeidae* as an example of larval segmentation preserved in adult individuals, basing on conclusions drawn from the work by GRANDJEAN (1937 c).

Assuming the existence of only 10 segments in *Tydeidae*, their segmentation was most probably understood by the authors in the following way: Acron + 4 head segments comprise the proterosoma, all other segments comprise the hysterosoma. Regarding the segments one by one: first is cheliceral, second — pedipalpal segment, third segment with the first pair of walking legs, fourth segment with the second pair of legs (these segments comprise proterosoma, i. e. gnathosoma and propodosoma). Then the fifth segment with the third pair of legs and setae (D_1) and (L_1) according to nomenclature of BAKER (1965). The sixth segment with the last pair of legs and setae (D_2) and (L_2) according to BAKER's nomenclature. The fifth and sixth segments would be metapodosomal ones. The seventh segment with setae (D_3) and (L_3) according to BAKER's nomenclature, the eighth segment with (D_4) and (L_4) according to BAKER, and the ninth segment with (D_5) and (L_5) (if are present), and the tenth anal (pseudanal?) segment with anal setae would create the opisthosoma. Thus the hysterosoma would consists of 5—10 segments.

Basing on GRANDJEAN's works, ANDRÉ (1981a) distinguishes the following parts: gnathosoma = infracapitulum + cheliceral frame, idiosoma = predorsum + opisthosoma.

Such body division must be the consequence of the assumption that *Tydeidae* represent a type of structure with the characteristic dorsal stretch of the former tergites of opisthosoma segments towards the front and the rear, and the dorsal stretch of pronotum (i. e. the dorsal region of prepodial segments) towards the rear, who gived the body part called aspidosoma. The effect is that the dorsal elements of podosoma are totally hidden from the dorsal side (GRANDJEAN 1969, COINEAU 1974), and podosoma in its anterior dorsal part is divided from aspidosoma by an abjugal furrow (abj), and in its posterior dorsal part a disjugal (dsj) furrow divides it from opisthosoma. Both furrows "going upwards" fuse passing into the "das" furrow, i. e. a seam dividing aspidosoma from episthosoma (and not, as it was believed, proterosoma from hysterosoma) (Fig. 2).

In view of such interpretation it becomes clear that the dorsal elements of metapodosoma are hidden, and setae (D_1) and (L_1) belonging already to the segment of opisthosoma.

Thus the original understanding of the prototypical segmentation of *Tydei-*

dae was based on the following premises (symbols of setae acc. to BAKER's nomenclature):

- (D_1) (L_1) and (D_2) (L_2) belong to tergites of the two latter segments of podosoma respectively.
- (L_2) create one row with (D_2) — i. e. they are subordinated to the same segment. The localization of (L_2) in the longitudinal row of dorsal setae in some part of *Tydeidae* is regarded as a secondary one resulting from migration.

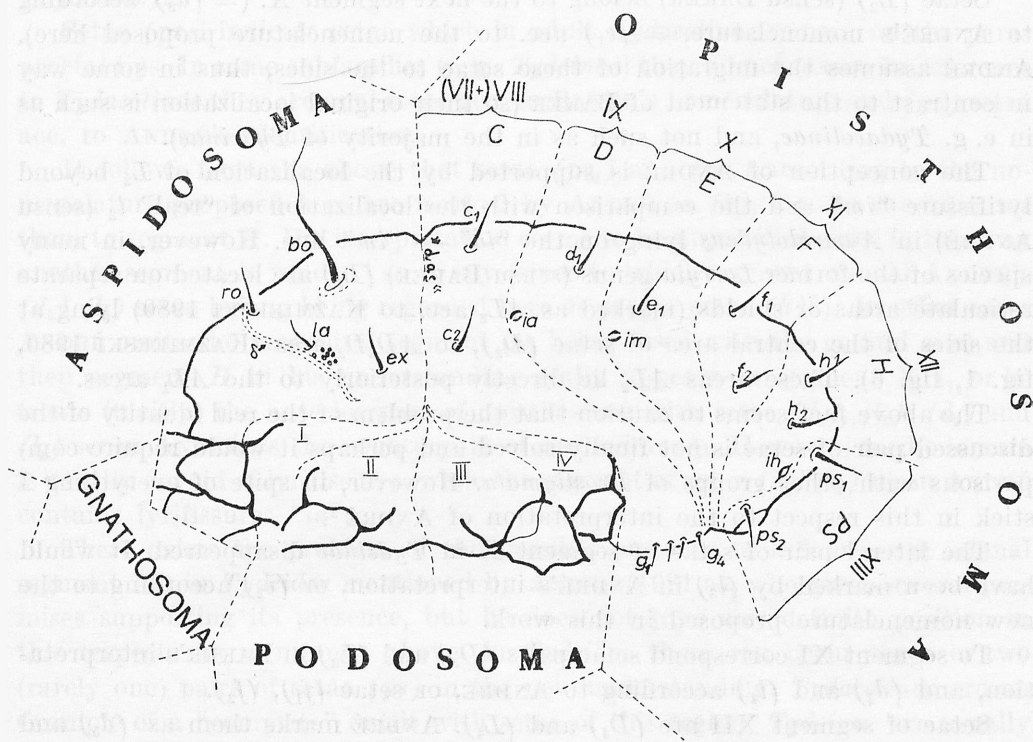


Fig. 2. Diagram showing the newly proposed nomenclature of idiosoma setae following from the presumed primitive segmentation in *Tydeidae* (on the example of trytonymph *Tydeinae*)

That premises regarded now as incorrect ones. Moreover, the problem of the fusion of the reduced praegenital and genital segments into the so called mediodorsum (vide *Alycus*) has been omitted.

On the other hand, according to the presently accepted plan of structure, the setae (D_1) and (L_1) are already opisthosomal ones (see above) and they should be subordinated to mediodorsum, i. e. to the VII and VIII segments (counting from acron towards the rear: I — cheliceral segment, II — palpal segment, III—VI — leg segments). The mediodorsum in some *Tydeidae* (e. g. *Tydaeuolus*) is demarcated with a furrow from the rear as well. This second furrow was marked by GRANDJEAN (1938 b) as "*smd*".

Setae (D_2) belong to segment IX. The proper second (lateral) pair of setae of the same segment (not L_2 sensu BAKER) disappeared in all *Tydeidae* except *Australotydeus kirstenae* SPAIN, 1969 (*Australotydeinae*). It lies in the above mentioned species before the lyrifissure "im" on the "ia" — "im" line. SPAIN (1969) marked it as L_2 (sensu BAKER), however ANDRÉ was right in regarding it as l_2 ¹) (L_2 sensu BAKER \neq l_2 sensu ANDRÉ — see Table), which according to the nomenclature proposed in this paper is seta d_2 — the element of the second pair of segment IX or D .

Setae (L_2) (sensu BAKER) belong to the next segment X. (= (d_3) according to ANDRÉ's nomenclature, = (e_1) acc. to the nomenclature proposed here). ANDRÉ assumes the migration of these setae to the sides, thus in some way in contrast to the statement of BAKER (so their original localization is such as in e. g. *Tydaecolinae*, and not such as in the majority of *Tydeinae*).

The conception of ANDRÉ is supported by the localization of L_2 beyond lyrifissure "im" and the comparison with the localization of "real" l_2 (sensu ANDRÉ) in *Australotydeus* lying on the "ia" — "im" line. However, in many species of the former *Lorryia* genus (sensu BAKER) (L_2) are located on separate reticulate areas or shields (marked as AL_2 acc. to KAŻMIERSKI 1980) lying at the sides of the central area of setae (D_2), so AD_2D_2 area (KAŻMIERSKI 1980, fig. 1, fig. 6). These areas AL_2 lie directly posteriorly to the AL_1 areas.

The above fact seems to caution that the problem of the real identity of the discussed pair of setae is not finally solved and perhaps it would require comparisons with other groups of *Prostigmata*. However, in spite of everything I stick in this respect to the interpretation of ANDRÉ².

The lateral pair of setae of segment X in *Tydeidae* disappeared. It would have been marked by (l_3) in ANDRÉ's interpretation, or (e_2) according to the new nomenclature proposed in this work.

To segment XI correspond setae pairs (D_3) and (L_3) in BAKER's interpretation, and (d_4) and (l_4) according to ANDRÉ, or setae (f_1), (f_2).

Setae of segment XII are (D_4) and (L_4). ANDRÉ marks them as (d_5) and (l_5), while here they are identified as (h_1) and (h_2) respectively, being the setae of segment H (XII).

Segment XIII is a pseudanal segment (PS) (HAMMEN 1970). According to my opinion, segment XIII comprises three pairs of setae: (ps_1), (ps_2), (ps_3) (e. g. *Tydaecolinae*, *Meyerellinae*), two pairs: (ps_1), (ps_2) (e. g. the majority of *Tydeinae*, *Australotydeinae*), or (rarely) there occurs only one pair: (ps_2) [e. g. "*Lorryia*" *evansi* BAKER, 1968, "*Lorryia*" *cooremani* BAKER, 1968, *Idiolorryia*

¹ Setae which in the original description of *Australotydeus kirstenae* were marked by SPAIN as L_3 correspond to setae l_4 in the understanding of ANDRÉ, L_4 means l_5 sensu ANDRÉ, and $L_5 = h_5$ sensu ANDRÉ.

² This problem will be discussed in a paper on idiosoma ornamentation.

macquillani (BAKER, 1968) (BAKER 1968 a), "*Lorryia*" *regia* KUZNETZOV, 1973 (KUZNETZOV 1973)].

Setae (ps_1) are homologous to BAKER's setae (D_5) and ANDRÉ's setae (h_1) in reference to *Tydaecolinae* and *Meyerellinae*, or (h_2) in *Australotydeinae* and *Tydeinae*.

Setae (ps_2) indicate setae (L_5) acc. to BAKER's marking (e. g. *Tydaecolinae* ANDRÉ), or (A) (anal) (e. g. *Tydeinae* ANDRÉ). On the diagram of ANDRÉ (1981 a, fig. 2) they are marked as (h_2) (*Tydaecolinae*, *Meyerellinae*), or as (ps) (*Tydeinae*).

Setae (ps_3) indicate setae which in adult *Tydaecolinae* remain on the paraproctal lips. In some subfamilies (e. g. *Tydeinae*) they do not occur. In reference to *Tydaecolinae* they are anal setae acc. to BAKER's nomenclature and (ps) setae acc. to ANDRÉ's identification.

It follows from the above that setae (ps_1) and (ps_2) according to the nomenclature proposed here are marked by ANDRÉ as (h), i. e. he subordinates them to segment H . His interpretation seems to be unjustified since in this way another segment is "added" so to say (since to which segment should ANDRÉ's (d_5) (l_5) setae belong being regarded here as proper setae (h)?). In other cases ANDRÉ omits the pregenital segment (as being fused with the genital one) and then segment H in his understanding really appears as segment XII, or he treats (tacitly) the anterior part of opisthosoma with setae (d_1), (l_1), (d_2) and (l_2) sensu ANDRÉ as the counterpart of mediodorsum. However, mediodorsum is usually devoid of lyrifissures, while the segment of setae (d_2) (l_2) sensu ANDRÉ contains lyrifissures "ia".

There exists the problem of the possible presence of a fourteenth adanal segment AD in *Tydeidae* mentioned by ANDRÉ (1981 a), who gives several premises supporting its presence, but he does not take any definite position in this respect. As mentioned above, in *Tydeidae* there can occur three or two (rarely one) pairs of setae (ps) in the new understanding. *Tydaecolinae* are an example of a "complete" outfit with setae of this region. *Tydeinae* are usually poorer by one pair of setae. In adult *Tydaecolinae*, setae (ps_3) ((ps) acc. to ANDRÉ and anal setae acc. to BAKER) lie on the paraproctal lips¹ and they usually are smaller and sometimes morphologically different from all other setae of opisthosoma dorsum (not excluding (ps_2) and (ps_1)). Setae (ps_2) and (ps_1) ((h_2) and (h_1) acc. to ANDRÉ, and (L_5) and (D_5) acc. to BAKER) lie beyond the lips and by their form and localization they refer to the setae of opisthosoma dorsum lying before them. It seemed to me that the key to the considerations on the identity of the discussed setae was the investigation of their pre-

¹ The paraproctal lips (paraprocts) themselves define the hipodermal folds surrounding the anal aperture, it is the cuticle of the given segment on which this aperture is found in the given stage. In *Endeostigmata* they simply correspond to the whole segment, in *Tydeidae* they create on them lips sensu stricto or even paraproctal elevations creating paraproctal suckers.

sence, localization and form in the larval stases (if e. g. (ps_3) started appearing from protonymph (N_1) only, it would be obvious that they were not (ps) but (ad)).

The examination of 19 larvae of *Tydaolinae* from my collection (genera: *Microtydeus*, *Tydaeolus*, *Paratydaeolus*) became the source of the following statements and conclusions:

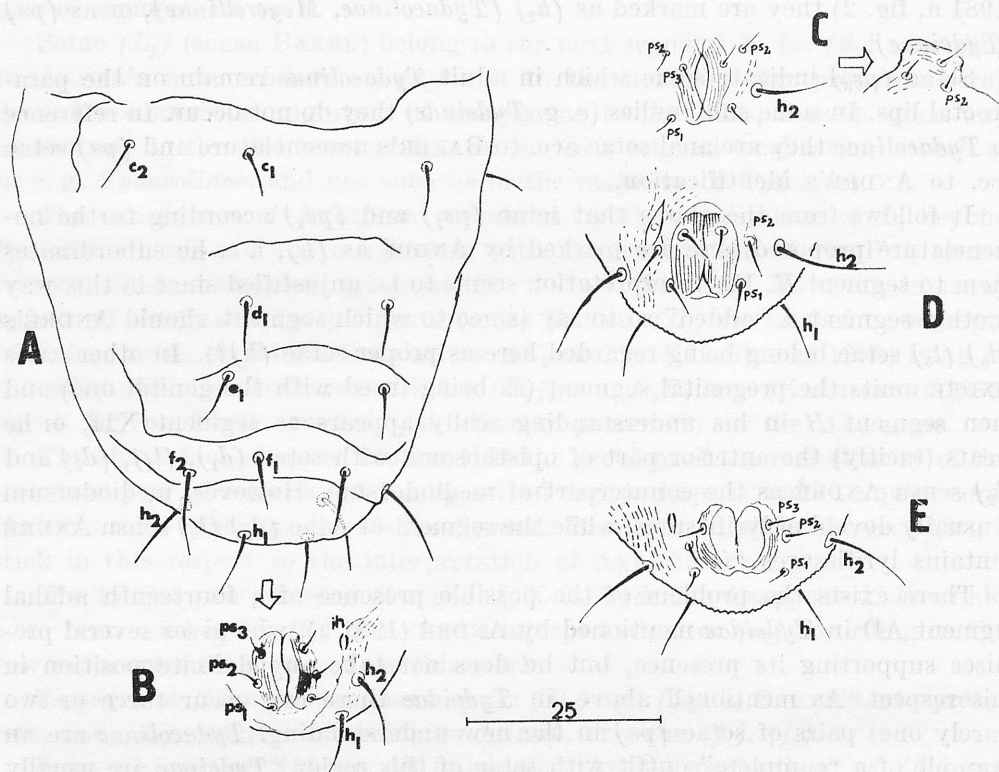


Fig. 3. Larvae of *Tydaolinae*: their pseudanal regions: A — *Microtydeus* sp. "PL-I"; dorsal side of opisthosoma. B — *Microtydeus* sp. "PL-I"; ventral side, pseudanal region. C — *Microtydeus* sp. "CS-I"; pseudanal region. D — *Tydaeolus* sp. "EAK-I"; pseudanal region. E — *Paratydaeolus* sp. "SU-I"; pseudanal region

- all nominal dorsal setae are already in the larvae (confirmation of an already known fact),
- (ps_3) lie on the paraproctal lips (as in all following stases, adultus included),
- (ps_2) and (ps_1) (h_2) and (h_1) acc. to ANDRÉ lie, in contrast to the situation in adultus, in direct proximity of (ps_3), at least right at the lips, less frequently on the lip border or on the lips themselves,
- (ps_2) and (ps_1) are morphologically "sister" setae to (ps_3) (form, size), and they differ from the other dorsal setae of opisthosoma,

— the mutual localization of (*ps*) in relation to each other and to the paraproctal lips differs slightly depending on the species, i. e.: the side setae (*ps*₂) in relation to (*ps*₃) are sometimes moved before the *ps*₃ — *ps*₃ line (theoretically it is beyond the *ps*₃ — *ps*₃ line taking into account that this whole region was originally the terminal one) (fig. 3 C).

The latter statement has no significance for the general conclusion that the chaetotaxy of the pseudanal region in larvae seems to confirm the justness of the new nomenclature.

Furthermore, larva *Microtydeus* sp. "PL-1" (fig. 3A, B), in which not only (*ps*₃) but also (*ps*₂) lie on the lips, and (*ps*₁) lie on their posterior border, reveals external segmentation(!). The furrows in the cuticle divide from each other the segments: *C*, *D*, *E*, *F*, *H* and *PS*. It is even distinctly visible that lyrifissures "*ih*" are connected with the same segment which setae (*h*₁) and (*h*₂) are bound (i. e. setae (*d*₅) and (*l*₅) acc. to ANDRÉ) and not with the "segment" of setae regarded by ANDRÉ as (*h*₁) and (*h*₂).

The situation is clear in larvae of *Tydeinae* (fig. 4 A, B, C, D). In contrast to ANDRÉ's statement (1981 a) I have not found a single case of (*ps*) sensu ANDRÉ lying on the striated on each stase paraproctal lips (I examined several tens of larvae of different genera). On the drawing of GRANDJEAN presenting the larva of "*Retetydeus*" *catenulatus* THOR, 1931 (GRANDJEAN 1938 a), the "anal" setae ("*pu*" acc. to GRANDJEAN 1938 a) lie also beyond the lips. Therefore I regard them homologous with the (*ps*₂) setae. Setae (*D*₅) sensu BAKER, i. e. setae (*h*₂) sensu ANDRÉ are identified by me as (*ps*₁). Similarly as in *Tydaeoilinae*, in the larvae of *Tydeinae* they are always found on the ventral side, very close to the paraproctal lips and setae (*ps*₂), and in reference to size and shape they are identical to (*ps*₂). Only in the following stases they reveal tendencies to moving away from the paraprocts and "anal" setae, frequently occupying a terminal or dorsal position, as well as they often become morphologically similar to the preceding dorsal setae of opisthosoma.

It should be admitted, that *Tydeidae* have no anamorphosis, and the last segment occurring already in the larva is the pseudanal segment *PS*. However, the presence of postpseudanal (= adanal) segment cannot be excluded, but under the condition that we assume its atrichosis. A counterpart of *AD* would be only the paraproctal succers.

The consequence of accepting the new nomenclature of opisthosoma setae differing from the hitherto one and referring to the primitive segmentation would be the application of different names to the setae of prodorsum including also such one which would correspond to the prototype of *Actinotrichida*. Since the time of BAKER's revision (BAKER 1965) the setae of prodorsum in *Tydeidae* were marked: (*S*) = sensillae = sensoric setae, (*P*₁), (*P*₂) and (*P*₃) (*s*), (*p*₁), (*p*₂), (*p*₃) acc. to ANDRÉ).

For the *Actinotrichida* prototype characteristic was the presence of six pairs of setae which GRANDJEAN (1946, 1948) finally marked as (*bo*) — bothridial = pseudostigmal, (*ro*) — rostral, (*le*) or (*la*) — lamellar, (*in*) — inter-

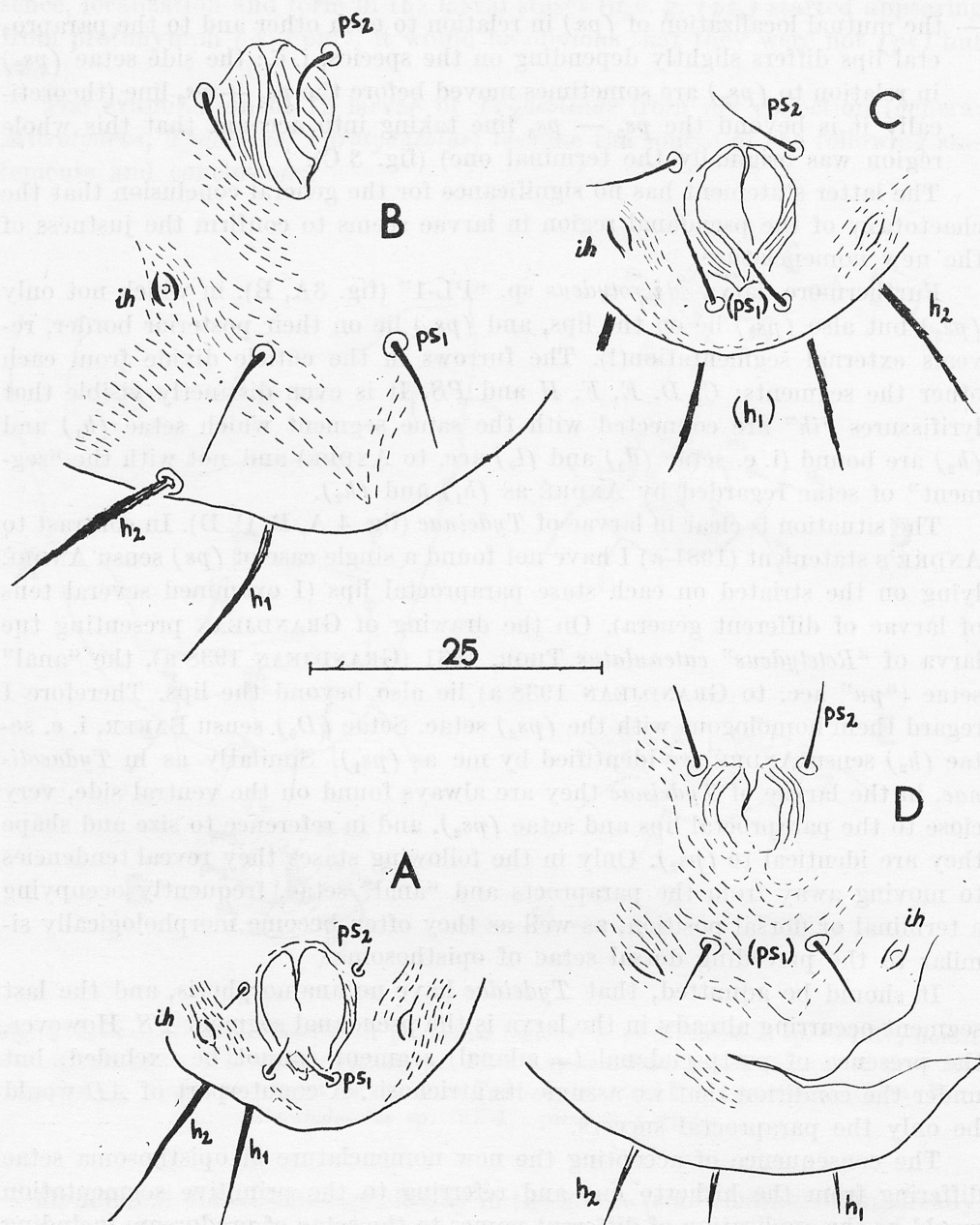


Fig. 4. (A—D). Pseudanal regions of larvae of several new species of *Tydeinae* (description of species in preparation) A — *Tydeus* sp. "H-I"; B — *Tydeus* sp. "HS"; C — *Tydeus* sp. "EAK-II"; D — *Tydeus* sp. "SO"

bothridial, (*xa*) or (*exa*) — exobothridial anterior, (*xp*) or (*exp*) — exobothridial posterior. Setae (*S*) = (*s*) would correspond to bothridial (*bo*) setae. (*P*₁) = (*p*₁) in *Tydeidae* correspond to rostral setae which would be indicated

Nomenclature of idiosoma setae and lyrifissures and hypostomal setae (infracapitulum without considering the setae of palps) used successively by different authors
(Organotaxy of legs and palps — see ANDRÉ, 1979, 1981a, b)

1	2	3	4	5	6	NEW
THOR, 1933	GRANDJEAN, 1938b	BAKER, 1965	MARSHALL, 1970	ANDRÉ, 1979-81	NOMENCLATURE	
			h	sc ₁	sc ₁	INFRACAPITULUM (without palp)
			a	sc ₂	sc ₂	
			or ₁	ad ₁	ad ₁	
			or ₂	ad ₂	ad ₂	
Si	P	P	P	P	P	A
Vi	R	R	R	R	R	S
Ve	O	O	O	O	O	I
Se	D	D	D	D	D	S
	S	S	S	S	S	O
	O	O	O	O	O	H
	M	M	M	M	M	A
	A	A	A	A	A	
Hi	ce	D ₁	d ₁	d ₁	c ₁	
He	cf	L ₁	l ₁	l ₁	c ₂	
Di	cg	D ₂	d ₂	d ₂	d ₁	
				l ₂ ***	d ₂ ***	
De	H	H	H	H	O	O
Li	Y	Y	Y	Y	P	P
Le	S	S	S	S	I	I
SAi	T	T	T	T	S	S
SAe	E	E	E	E	T	T
Ci	R	R	R	R	H	H
	O	O	O	O	O	O
	S	S	S	S	O	O
	O	O	O	O	O	O
	M	M	M	M	O	O
	A	A	A	A	A	A
Ce	cn	D ₅	d ₅	Tydeol. h ₂ Tydaeol. h ₁	ps ₁	
	co	L ₅		Tydaeol. h ₂	Tydaeol. ps ₂	
	cp	A	an	ps	Tydeol. nae: ps ₂ Tydaeol. lineae: ps ₃	
			ia	ia	ia	
			im	im	im	LYRIFISSURES
			ip	ip	ip	
			iop	ih	ih	
			cg		cg	COXAL ORGAN
1a	V ₁	1a	1a	pt		COXOSTERNAL REGION
1b		1b	1b	1b		
1c		1c	1c	1c		
2a	P	P	P	P	P	
3a	O	O	O	O	O	GENITAL
3b	S	S	S	S	S	
3c	O	O	O	O	O	
3d	M	M	M	M	M	
4a	V ₃	4a	4a	mt _β		ADGENITAL
4b		4b	4b	4b		
4c		4c	4c	4c		
(eu-eu ₄ (δδ))	O	O	O	eu-eu ₄ (δδ)	O	EUGENITAL
(ge ₁)	I	G ₁	g ₆	ge ₁	I	GENITAL
(ge ₂)	T	G ₂	g ₅	ge ₂	T	
(ge ₃)	O	G ₃	g ₄	ge ₃	O	
(ge ₄)	S	G ₄	g ₃	ge ₄	S	
(ge ₅)	M	G ₅	g ₂	ge ₅	M	ADGENITAL
(ge ₆)	A	G ₆	g ₁	ge ₆	A	
ag ₁	v	G ₆	g ₁	ge ₆	v	
ag ₂	e	G ₆	g ₁	ge ₆	e	
ag ₃	n	PG ₁	ag ₄	ag ₁	n	ADGENITAL
ag ₄	t	PG ₂	ag ₃	ag ₂	t	(ADGENITAL, idol)
	r	PG ₃	ag ₂	ag ₃	r	(ADGENITAL, idol)
	u				u	
	m				m	

* Si — setae scapulares internae (= „sineshaare”); Vi — s. verticales internae; Ve — s. verticales externae; Se — s. scapulares externae; Hi — s. humerales internae; He — s. humerales externae; Di — s. dorsales internae; De — s. dorsales externae; Li — s. lumbales internae; Le — s. lumbales externae; SAi — s. sacrales internae; SAe — s. sacrales externae; Ci — s. clunales internae; Ce — s. clunales externae

** for *Tydeolus frequens* (GRANDJEAN)

*** only in *Australotydeus kirstenae* (SPAIN) (concerning the subordination of setae symbols in the original description by SPAIN (1969) to ANDRÉ's nomenclature see text)

(pt) — prosternal setae

(mta), (mt_β) — metasternal setae

by the course of the "dehiscence line"¹ in preadult *Tydeidae* both in the situation when the (p_1) (= ro) setae are removed back behind the p_2 — p_2 line or even the s — s line (then the dehiscence line following them has a procurved course — *Pronematinae*, *Tydaeolinae*) as well as in a situation when the position of (p_1) (= ro) is normal (the rest of *Tydeidae* subfamilies — prodorsum "recurved" (ANDRÉ 1981 a)). Also the position of the medial eye in *Triophthydeinae* and *Meyerellinae* in relation to (p_1) would indicate that these setae should be regarded as (ro). Setae (P_2) (p_2) are certainly lamellar setae (la) (eyes lie in their neighbourhood). The localization of setae (P_3) (p_3) in *Tydeidae* (lateral and beyond the eyes) suggests that they should be identified with (exp), although a migration of (exa) cannot be excluded (we know that in the majority of *Actinotrichida* (exp) disappear). It seems unquestionable that (ps_3) are exobotri-dial setae, but there is no certainty (in face of the above) that they are (exp). Therefore they have been given the symbol (ex) (Table).

However, it is a fact that the hitherto used symbols: s , p_1 , p_2 , p_3 were simpler and it is difficult to "give them up".

SCHIESS (1981) has introduced in *Tydeidae* the term "naso" and he uses it in reference to the protrusion contoured by the frontal edge of prodorsum. This interpretation does not seem correct. In *Tydeidae* there is no proper naso, and the region corresponding to naso is between (p_1) (= ro) behind the dehiscence line. The naso would emerge from between the rostral setae.

The table presents the nomenclature of setae and idiosoma lyrifissures of *Tydeidae* used in leading works in different periods successively by THOR (1933), GRANDJEAN (1938 b), BAKER (1965), MARSHALL (1970), ANDRÉ (1979—1981), and the new adaptation of GRANDJEAN symbols used for *Endeostigmata* and *Oribatida* proposed by the present author (see also Fig. 1 referring to *Tydeinae* only).

From now on, in order to avoid misunderstanding, I will use only the new suggested nomenclature (except for some necessary cases). Also from now on I replace the name "prodorsum" by the name "aspidosoma" being a notion more analogical to "opisthosoma".

ANDRÉ believes that the "coxal" setae cannot be distinguished from the "sternal" ones. I do not share his opinion since the course of the ventral striae and sometimes also the folds of cuticle and a comparison with *Endeostigmata* permit to judge that the setae which MARSHALL and ANDRÉ marked as ($1a$) correspond to the setae of prosternum, on the other hand, setae ($3a$) and ($4a$) acc. to MARSHALL's and ANDRÉ's nomenclature can be regarded as homologous with these setae which in other mites lie on the metasternum.

Concluding:

— I accept the following body division: Gnathosoma: chelicerae plus infraca-

¹ δ = "Dehiscence line" = "garland" acc. to MARSHALL (1970) and THOR (1933). This line usually passes through naso, through the middle eye (if such elements occur) and over the bases of (la) and (ro).

pitulum (hypostome + pedipalps), idiosoma: aspidosoma, lower part of podosoma or the epimeral region (= coxisternal region) together with legs, and opisthosoma.

— I assume that *Tydeidae* are 13-segmental.

— I introduce a new nomenclature of setae in consequence of the revision of the identity of segments.

These conclusions results not only from the investigation of all the stases of *Tydeinae* subfamily, representatives being the main part of the family, but primarily from the inspection of larvae of *Tydaeolinae* subfamily which is regarded as an evolutionary older one.

III. POROIDOTAXY

In all subfamilies, except *Pretydeinae* and *Tydeinae*, the opisthosoma is provided with 4 pairs of lyrifissures: “*ia*” from segment *D*, “*im*” from segment *E*, “*ip*” from segment *F*, and “*ih*” (“*iop*” acc. to MARSHALL 1970) from segment *H*. *Pretydeinae* and *Tydeinae* have no “*ip*”.

However, in several new species of *Tydeus* KOCH sensu ANDRÉ, whose descriptions are under preparation, as well as judging from BAKER’s drawing (1968 b) in “*Paralorrygia striata* BAKER, 1968, I have found the localization of the second pair of lyrifissures (“*im*”) behind the setae (e_1). If these lyrifissures correspond to “*im*” (lying before (e_1) in the other *Tydeidae*), then one should assume:

1. migration of “*im*” (posteriorily), or
2. migration of (e_1) (anteriorily), or
3. assume that (e_1) are not (e_1) but (d_2) (= (l_2) sensu ANDRÉ).
4. It can be also assumed that the second pair of lyrifissures does not belong to segment X (*E*), but to segment XI (*F*), and thus they are “*ip*”.
5. An alternative departure point in reference to the first four possibilities in the considerations on the identification of the discussed lyrifissures is the assumption that they are “*im*” which in these several above mentioned species preserved their old localization. Then the localization of “*im*” before the setae of “their” segment regarded as the proper one in *Tydeidae* would be a secondary one.

Solutions 1 and 2 seem at the first glance equally not very probably since usually lyrifissures and setae occupy fixed positions in mutual relation. ANDRÉ (1979) states that lyrifissures seem to be eustatic.

However, the relative localization of setae in species with a second pair of lyrifissures beyond (e_1) is the same as in the remaining species. This fact demands to discard conception 2. On the other hand, one can imagine that “*im*” migrating to the rear substitutes in some way the “*ip*” lyrifissures lost in *Tydeinae*.

I discard solution 3, since d_2 (l_2 acc. to ANDRÉ) is a seta occurring only in *Australotydeus*, an archaic monospecific genus whose chaetotaxy is most similar

to the paleotrichial one among all *Tydeidae*, while *Tydeinae* are most probably the youngest subfamily. Besides, the discussed setae would have to lie on the line connecting "ia" and "im", if they were (d_2) setae. Furthermore, segment *E* would be then without any setae.

Worth consideration is the interpretation 4. It is supported by the presence of "ip" in all *Tydeidae* with the exception of *Tydeinae* and *Pretydeinae*. The consequence of accepting this interpretation would be extension of the diagnosis of *Tydeidae* in reference to poroidotaxy: it is true they have 3 pairs of lyrifissures but next to the set "ia" — "im" — "ih" there can occur the set "ia" — "ip" — "ih". If this interpretation is the right one, maybe that in the future some more detailed studies will show the separateness of the genera of these "Tydeus" which have "ip" instead of "im" since this character seems to have an superspecific nature. (For the time being the latter supposition is supported by the ornament type and the form of dorsal setae of idiosoma — similarly as in all species with the supposed "ip").

Conception 5 is also worth consideration, although not very probably.

Although conception 4 is tempting and effective, the intuition prompts to accept conception 1 using notation instead of designation to mark the second pair of lyrifissures in *Tydeinae* always as "im". Therefore I accept conception 1.

IV. ACKNOWLEDGEMENT

I dedicate this work to memory of my friend Dr Jacek JESIONOWSKI, a young but outstanding Polish zoologist.

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Praca zawiera analizę budowy *Tydeidae* (części ciała i organotaksji) dokonaną w oparciu o rozważania nad segmentacją pierwotną idiosomy roztoczy z tej grupy.

Przeprowadzona została rewizja tożsamości segmentów pierwotnych, tj. ustalenie ich układu i liczby oraz przyporządkowanie określonych szczecin i ly-rifissur odpowiednim segmentom. Nowa koncepcja jest wynikiem zbadania nie tylko wszystkich staz przedstawicieli podrodziny *Tydeinae*, stanowiącej główny trzon rodziny, ale przede wszystkim larw gatunków z podrodziny *Tydaolinae*, uchodzącej za ewolucyjnie starszą. Konsekwencją przeprowadzonej rewizji tożsamości segmentów jest zaproponowanie nomenklatury szczecin odmiennej od dotychczas stosowanych.

Paronychia Bagnall (Oxytelus, Colletes)
główni i grupy *Paronychia* Bagnall (Kawachi, 1965)

Abstract: New localities of three species of the *Paronychia* "flavescens group" are presented. The respective descriptions of these species are supplemented with new details. *Paronychia* Bagnall (Oxytelus, Colletes) (Kawachi, 1965)

Redaktor pracy: prof. dr A. Szeptycki

The following is another of a series of studies the material provided by the expeditions of the Institute of Systematic and Experimental Zoology, Polish Academy of Sciences, to North Korea in 1971, 1972 and 1981.

BAGNALL (1948) submitted a generic division of so-called *Oxytelus* (s. str.) section, which, according to HANNAH (1959) included the "flavescens" and "rufipes group". He distinguished, among others, the genus *Paronychia* BAGN. with the type species *Oxytelus rufipes* POLSKA, 1917. The genus was to include species of small size with PAI of *Oxytelus* — type, with a small (12—18) number of pseudoselli. Its other characters were: antero-dorsal head pseudoselli situated outside the antennal base area, head postero-marginal and lateral thoracic pseudoselli absent, presence of anal spines.

SRICH (1954), in his proposed identification key to the genera of *Oxytelus*, gives two names: *Ramonychia*, or *Paronychia* (BAGN.) in the sense of "rufipes group" (p. 26). *Ramonychia* SRICH, 1954 is thus a junior synonym (ELLIS and BRADSHAW, 1975). SRICH (1954) enumerates key features of *Paronychia* BAGN.: venodes in the PAI "separated" and "whorled" (also in ant. III organ more or less distinctly grooved).

YOSHII (1956) uses the term *Paronychia* BAGN. (as a subgeneric name) in agreement with SRICH's diagnosis. BRADSHAW (1959, 1961) uses the same in his generic identification keys, adding that some with ant. III organ are smooth.

It is my opinion that the typed members of the genus *Paronychia* BAGNALL, 1948 should be maintained in the present state of knowledge. The "flavescens group" should be maintained in the present state of knowledge. The "flavescens group" should be maintained in the present state of knowledge.

