

A REDESCRIPTION OF *EUPELOPS TORULOSUS* (C. L. KOCH)
AFTER SPECIMENS FROM THE TYPE-LOCALITY

BY

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Among the adult Pelopsidae described by C. L. KOCH between 1836 and 1841, there is one that enables a rapid identification because of some conspicuous characters, viz., the species described in 1839 as *Pelops torulosus*. KOCH's figure of this *Pelops* shows a very remarkable dorsal sculpture (evidently of the cerotegument) consisting of a system of relatively large craters and ridges. Although a species identified with *Pelops torulosus* has afterwards been described by WILLMANN (1931, p. 187, fig. 336), no mention is made by this author of the sculpture of the cerotegument. A singular reconstruction of the species, apparently based on KOCH's original description only, was published by SELLNICK (1960, p. 49). Obviously the identity of the remarkable species had not yet been established with certainty.

KOCH mentions that *P. torulosus* was collected "in den bayerischen Grenzbergen bei Pleistein in der Oberpfalz". The name of this very small town is now spelled as Pleystein; it is situated in the Oberpfalz (Bavaria) near the Czechoslovak frontier, in a mountainous landscape with extensive forests of spruce-fir. Dr. L. VAN DER HAMMEN visited this region in June 1961 as part of an investigation at Koch's type-localities. His collection from Pleystein consists of three Berlese samples and three tubes with mites collected by beating branches. The material was entrusted to me in order to prepare a redescription of *torulosus*. The sorting of the samples appeared to be rather surprising because of the large number of Pelopsidae. All Berlese samples and one of the tubes contained representatives of the family. The greater part of this material belongs to a species showing a characteristic sculpture of craters and ridges; two different species which lack this type of cerotegument appeared to be represented by a few specimens only. Undoubtedly the common species represents KOCH's *Pelops torulosus*. A survey of the collected material is given in the following short list; the name of each species is followed by the total number of specimens collected and, between brackets, by the

frequency, i.e. the number of samples from which the specimens originate. All species are preliminarily listed as representatives of the genus *Pelops*.

<i>Pelops torulosus</i> C. L. Koch	187 (3)
<i>Pelops acromios</i> (Hermann)	7 (3)
<i>Pelops hirtus</i> Berlese	9 (1)

The material of *torulosus* dealt with here comprises specimens with completely developed cerotegument (corresponding with the specimen figured by KOCH), and a smaller number of lighter coloured specimens in which this cerotegument is nearly lacking. A description of the cerotegument was suggested to me by Dr. VAN DER HAMMEN as one of the main parts of the present study. Although it is well known that recently moulted Pelopsid adults can strongly differ from older specimens by the different degree of development of the cerotegument, hardly any further attention has been paid to its varying aspect. As a rule descriptions are based on "cleaned" specimens, by which treatment an important character gets lost. The misinterpretation of the true *torulosus* has certainly been caused by this incomplete method of study.

In order to check if the true *torulosus* had possibly been described under a different name, "cleaned" specimens were identified with the key published by WILLMANN (1931). To our surprise this key leads without any difficulty to *Pelops duplex* BERLESE. A comparison with the concise original description by BERLESE (1916) points indeed to an identity of *duplex* and *torulosus*. A definite conclusion was enabled by a comparison with material from the type-locality of *Pelops duplex* (Vallombrosa, Italy), kindly put at our disposal by Prof. GRANDJEAN. These specimens (7 adults, of which one recently moulted, collected in May 1934 near Vallombrosa, in moss and litter from a fir-wood) exactly correspond with the material from Pleystein, so that the synonymy is certain.

Recently, some difficulties have arisen concerning the generic name *Pelops*. In order to explain our preliminary choice of the name *Eupelops*, Dr. VAN DER HAMMEN prepared the following nomenclatorial note.

"PETRUNKEVITCH (1955, p. P99) pointed to the fact that the name *Pelops* C. L. KOCH, 1836 is a junior homonym of *Pelops* GISTL, 1834 (Coleoptera). He replaced it therefore by *Phenopelops* which is a nomen novum and consequently has the same type-species as *Pelops*. Unfortunately KOCH's type-designation for *Pelops* appears to be incorrect. The genus *Pelops* was first mentioned by him in 1836 with two species, viz., *occultus* and *tardus*.

In 1842 he designated, however, another species (*Pelops hirsutus* C. L. KOCH, 1841) as type, which designation afterwards has generally been accepted. It is nevertheless clear that one of the two originally included species must be selected as type, i.e. *P. occultus* or *P. tardus*. Because the identity of both species is still uncertain, and because they possibly represent two genera, the decision must, however, be postponed till redescrptions have been prepared. It must be noted here that the generic name *Celaeno* C. L. KOCH, 1836, created for *Pelops* nymphs,

is a junior homonym of *Celaeno* LEACH, 1821 (Mammalia) and is therefore not available.

"BALOGH (1961) pointed to the fact that EWING (1917) created a genus *Eupelops* with *Pelops ureaceus* C. L. KOCH, 1839 as type. According to him *Eupelops* is a senior synonym of *Phenopelops*. Unfortunately the identity of *Pelops ureaceus* is also uncertain, so that consequently the same applies to *Eupelops*. It is nevertheless interesting that KOCH described *P. ureaceus* as a small species collected in meadows, which points to the possibility of its belonging to the group with notogastral hairs lp and h_3 close together. Because *Pelops torulosus* presents a similar disposition of notogastral hairs, the species is preliminarily classified here with *Eupelops*.

"It is evident that the definite nomenclature of the subdivisions of the Pelopsidae is largely dependent on the redescription of KOCH's *Pelops* species. Material for these redescriptions is already present in the rich Regensburg collection of the Rijksmuseum van Natuurlijke Historie at Leiden. It is not impossible that it will appear that the names *Eupelops* and *Phenopelops* can be used for two different genera."

***Eupelops torulosus* (C. L. KOCH, 1839).**

Pelops torulosus C. L. KOCH, 1839, fasc. 30 (13).

Pelops duplex BERLESE, 1916, p. 52; SELLNICK, 1928, p. 5; WILLMANN, 1931, p. 185, fig. 330.

Phenopelops duplex, SELLNICK, 1960, p. 47.

Material. — The present redescription is based on material originating from Pleystein (Oberpfalz), KOCH's type-locality in Bavaria (Germany). The exact localities and the numbers of specimens collected are the following: Fir-wood on Fuchsenberg (altitude about 620 m), June 22, 1961; litter at the foot of spruce-firs (sample 61 R 40): 77 adults. Fir-wood near Wüstenberg (altitude about 630 m), June 23, 1961; litter at the foot of spruce-firs (sample 61 R 41): 76 adults. Fir-wood on Fahrenberg (altitude about 650 m), June 23, 1961; litter and moss at the foot of spruce-firs (sample 61 R 42): 34 adults.

Measurements. — Length of the adult 0.620 — 0.795 mm (average 0.695), breadth 0.500 — 0.670 mm (average 0.557).

Colour. — Recently moulted adults are yellowish brown, with a yellow lenticula. Older adults vary from dark brown to nearly black, with a lighter lenticula and lighter pteromorphae.

Cerotegument. — Older adults are covered with a remarkably sculptured cerotegument which is especially striking on the notogaster, where it consists of a system of craters and ridges. In fact, the craters are formed by ridges that enclose a more or less circular area. At first sight craters and ridges seem to be arranged in a disorderly way. A closer investigation reveals, however, a basic system (fig. 1). As a

rule, corresponding craters and ridges can be found back in all specimens. The apparent disorder is mainly caused by differences in the degree of development of the ridges, which differences can indeed be important. A ridge can be distinctly extending in one specimen, whilst in another specimen it is inconsiderable, so that it is only visible when the light has a special angle of incidence ; sometimes the place of a ridge is even only indicated by two small projections. Another cause



FIG. 1. — *Eupelops torulosus* (C. L. Koch) ; dorsal view of the notogaster (cerotegument layer not removed) ; the drawing has been prepared after a dry specimen, $\times 170$.

of the apparent disorderly arrangement is the considerable variation in the course of the ridges. I stated that specimens can even show an important dissymmetry in the sculpture of the cerotegument.

In a dry condition, the cerotegument looks brown or black because of the colour of the underlying cuticle. Superficial layers and detached fragments are white as a result of refringency. In alcohol, in a slide, it appears that ridges which extend laterally beyond the body have no colour. Cerotegument that is separated by heating with lactic acid, appears to be indeed colourless.

In young adults the cerotegument is hardly developed ; exceptionally some small thin fragments are present. After heating with lactic acid and even after treating with a basic hypochlorite, no layer can be removed. In older adults the complete sculpture appears to be always present, although there can be considerable differences in the development. Among the 187 adult specimens studied by me, only one presents a distinct transition from young adult to older specimen. Apparently



FIG. 2. — *Eupelops torulosus* (C. L. Koch) ; part of the cerotegument, showing a crater, $\times 860$.

the complete layer develops rapidly. The intermediate specimen has very small ridges on a shiny, granular surface ; the ridges and craters, although inconsiderable, present already the same disposition as in a completely developed cerotegument.

The main features of the sculpture are the following. The lenticula is surrounded by an irregularly rounded crater ; this crater is connected posteriorly with two ridges that border a longitudinal groove ; the two ridges join each other and continue further posteriorly as a relatively high crest. Nearly all notogastral hairs are situated in separate craters ; only lp and h_3 are surrounded by a common ridge.

The surface of the ridges presents various degrees of wearing off ; when they are high, they appear to be transversely striate. The areas between the ridges can be filled up with small fragments ; when these areas are clean, it appears that the cerotegument layer of the bottom presents the same vermicular structure as the cuticle. The notogastral hairs pierce through this layer and are often partly covered with an irregular mass of cerotegument.

The cerotegument layer can easily be removed after heating with lactic acid ; it collapses, however, nearly completely after this treatment, so that it is difficult to correlate the observations with those from specimens studied in a dry condition. Because the lactic acid treatment nearly completely loosens the cerotegument, the animal then has the appearance of being wrapped up in a loose skin. This " skin " generally remains sticking to notogastral hairs h_1 , so that removing causes its breaking in two pieces at this point.

As a rule, craters and ridges are distinctly visible in transparent light, but the thin areas between the ridges are often damaged. A high magnification reveals that the structure of the ridges consists of transversely arranged granules (fig. 2) ; the areas between the ridges are irregularly granulate.

Cuticle. — Young adults, and older ones of which the cerotegument has been removed, have a similar cuticular sculpture ; there is only a difference in colour. When observed in a dry condition, the cuticle is shiny and presents a vermicularly arranged granulation which continues on the lenticula. The study in incident light reveals that the granules are the positive element of the sculpture, i.e. the projecting part. In transparent light a vermicular arrangement only is visible ; the granulation appears then to be fine on the lenticula and coarser in the surrounding parts, without sharp limitation of these areas. I observed that in young adults the lenticula is situated in a hollow, whilst in older adults (of which the cerotegument is removed) it is projecting ; I do not know if this difference is a result of the heating with lactic acid.

Prodorsum (fig. 3). — There is a distinct incision at both sides of the rostrum. The rostral hairs are rather long and thin, and pectinate. The lamellar hairs have a similar structure ; they are inserted at the lower surface of the cuspides. The lamellae are connected with each other nearly along the whole length ; only the cuspides are free ; there is no separate translamella. The interlamellar hairs have the characteristic broad "*Pelops*" shape, and are inserted on a chitinous bar that

connects bothridium and lamellae ; proximally, they partly cover the outer border of the lamellae. The sensillus is long and thin ; it is directed obliquely upwards.

The tutorium is a blade that runs from the bothridium to the front. Laterally of it, the podosoma presents a steep declivity with a rather complicated structure, as shown in fig. 3. Pedotectum I is large, and protects trochanter I which is comparatively small ; it has a distinct ridge, posteriorly of which the coxisternal hair $1c$ is inserted.

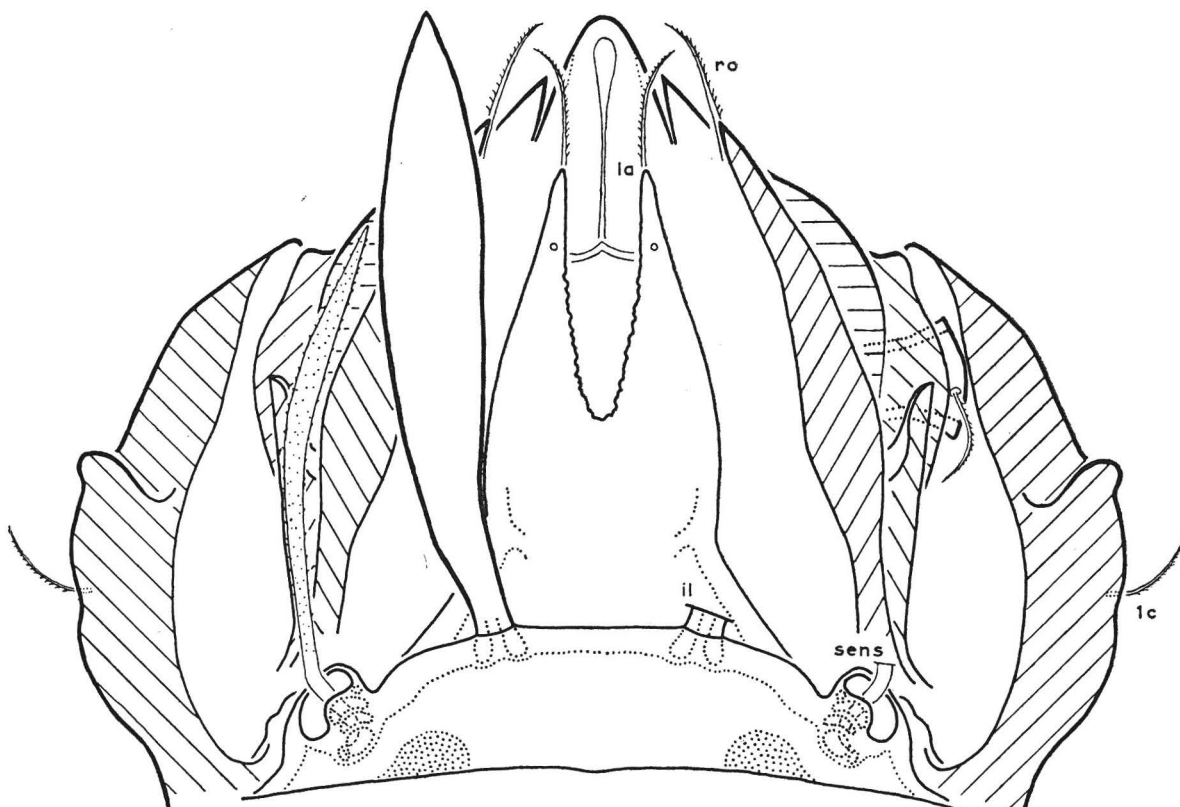


FIG. 3. — *Eupelops torulosus* (C. L. Koch) ; dorsal view of the prodorsum, $\times 430$.

Notogaster (fig. 4). — The anterior border of the notogaster is a trilobate tectum that covers the posterior part of the prodorsum. The pteromorphae have the characteristic “*Pelops*” shape. There are 20 notogastral hairs, indicated here with c_2 , la , lm , lp , h_3 , h_2 , h_3 , ps_1 , ps_2 , ps_3 (according to BERLESE’S notation these are respectively : S_1 , S_2 , I_1 , I_2 , S_3 , S_4 , I_3 , R_3 , R_2 , R_1). The notogastral hairs ps_2 and ps_3 (which are small and smooth) are only distinctly visible in posterior view (fig. 5) ; c_2 is pectinate ; lm , lp , la , and h_3 are slightly serrate ; lp and h_3 are close together. The disposition of the hairs is only slightly variable, just as that of the lyrifissures ; differences (even dissymmetrical ones) mainly occur in the posterior row (ps_1 , ps_2 , ps_3 , ih , ips). The orifice of the latero-abdominal gland is laterally of h_3 . There are 8 porose areas ; A_1 is situated laterally in front of lm ; A_2 is between lp and h_3 ; A_3 is medially of h_3 ; A_4 is laterally of h_1 .

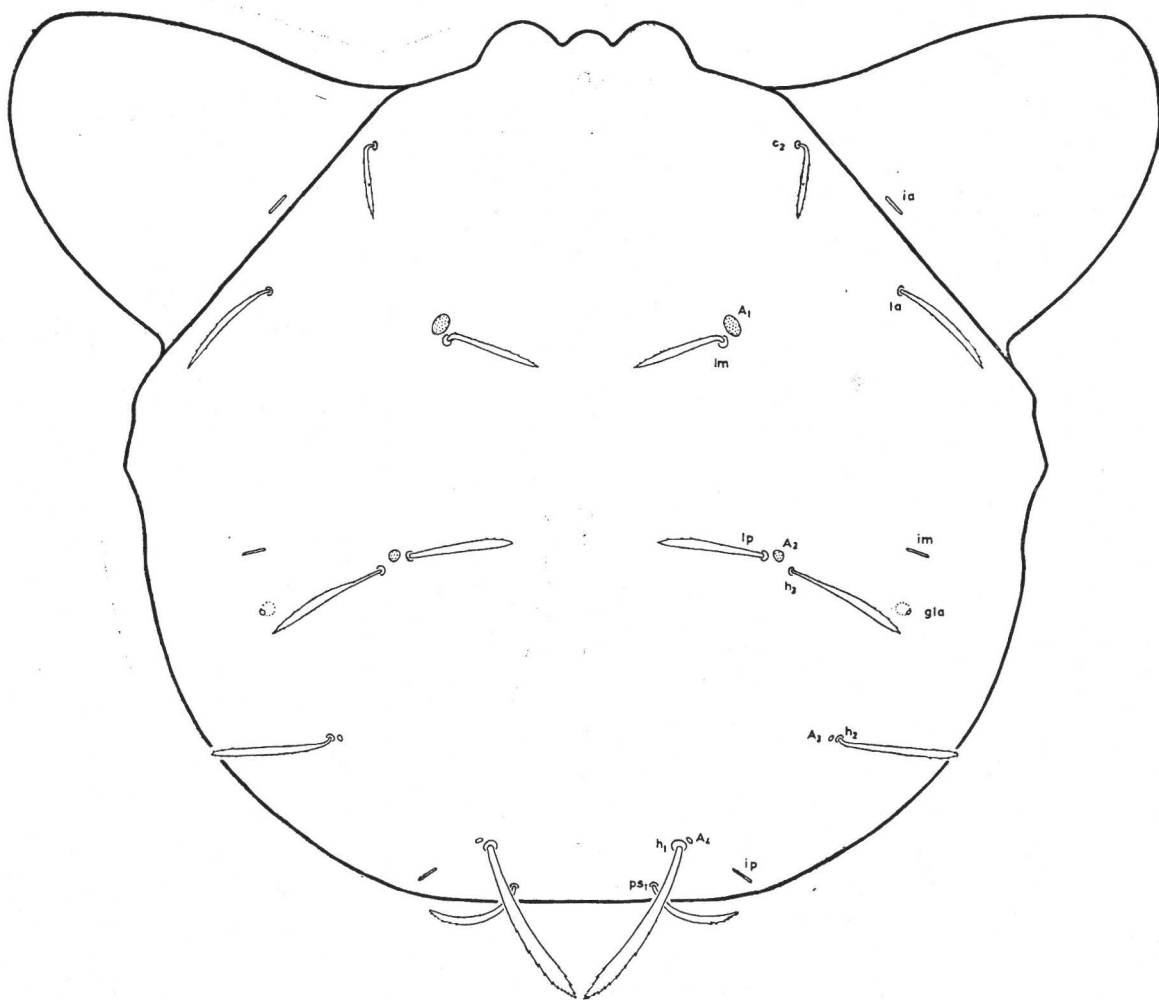


FIG. 4. — *Eupelops torulosus* (C. L. Koch); dorsal view of the notogaster (cerotegument removed), $\times 185$.

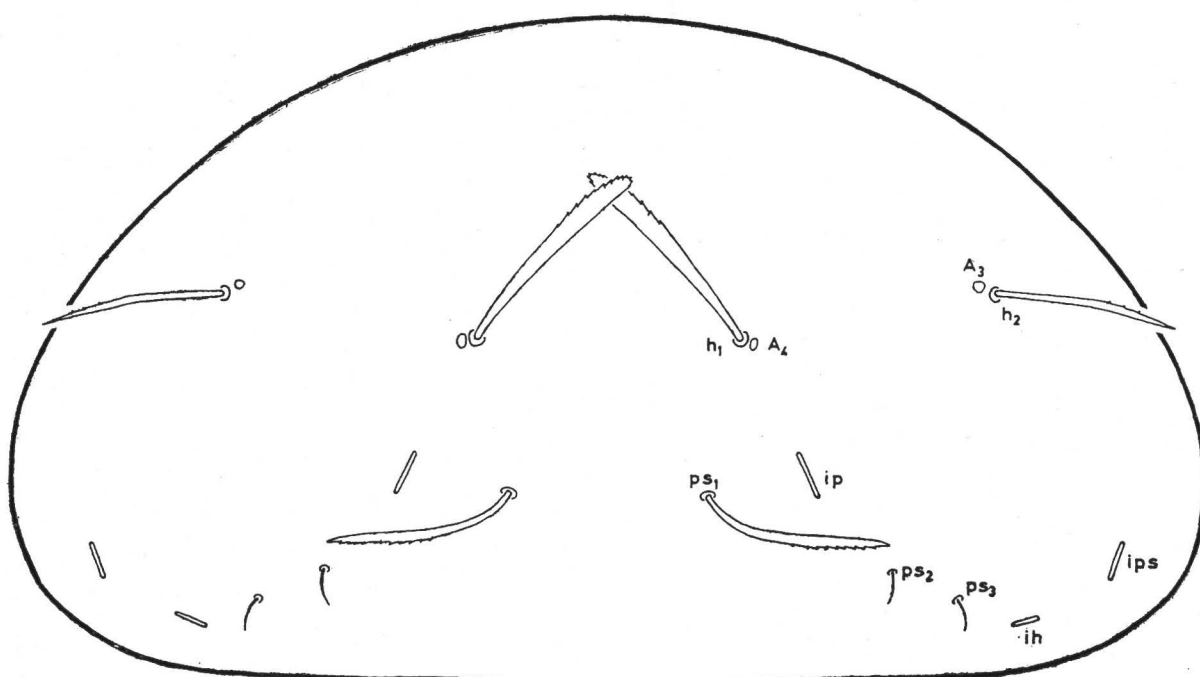


FIG. 5. — *Eupelops torulosus* (C. L. Koch); notogaster seen from behind, $\times 275$.

Nymphs. — The nymphs have not been studied in detail. They belong to the type of "*Pelops*" *plicatus* (C. L. KOCH), characterized by the pair of long, prominent posterior notogastral hairs.

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