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NOTES ON THE CHARACTERS AND SYNONYMY OF *PHYSOCYPRIA KLIEI* SCHÄFER, 1934,  
AND *POTAMOCYPRIS UNICAUDATA* SCHÄFER, 1943 (CRUSTACEA, OSTRACODA)

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ABSTRACT

*Physocypria kliei* Schäfer, 1934, was found in water-bodies near Maarssen and Simonshaven (The Netherlands). It can be characterized as an oligohaline species occurring all the year round. The species is new to the Dutch fauna. It is concluded that *Physocypria perlata* Rome, 1943, is a junior synonym of *P. kliei* Schäfer, 1934. *Potamocypris unicaudata* Schäfer, 1943, was collected in a water-body near Rockanje (The Netherlands). Evidence is provided that *Potamocypris vanoyei* De Vos, 1946, is a junior synonym of *P. unicaudata* Schäfer, 1943.

INTRODUCTION

*Physocypria kliei* Schäfer, 1934, was collected from artificially deepened lakes near Maarssen (5 km north of Utrecht) and also from Simonshaven, Voorne (15 km south-west of Rotterdam). The species is new to the Dutch fauna (cf. Drescher, 1976). In a number of publications on

*P. kliei* (cf. Beldescu, 1961; Hiller, 1972; Klie, 1938; Nüchterlein, 1969; Petkovski, 1960) the descriptions of certain morphological features show some discrepancies. The ostracods collected agree also with Rome's description of *Physocypria perlata* Rome, 1943. The only difference between *P. kliei* and *P. perlata* is that the latter has a left valve which is slightly longer than the right valve (Nüchterlein, 1969). After comparison of the literature data with our specimens the question arose whether *P. perlata* should be considered a junior synonym of *P. kliei*.

In another sample from Voorne we collected an ostracod species that matched the description of *Potamocypris unicaudata* Schäfer, 1943, as well as the description of *P. vanoyei* De Vos, 1946. Nüchterlein (1969) considers *P. vanoyei* to be synonymous with *P. unicaudata*, while Du Saar (1967) mentions the similarity of the two species. De Vos's description is rather sketchy which

prevents an accurate comparison. Possibly this accounts for the fact that Löffler (1978) in the second edition of the Limnofauna Europaea still mentions both species. This stimulated us to compare the descriptions of both species in literature with our own specimens. Moreover, we had the opportunity to study two syntypical specimens of *P. vanoyei* in the Zoological Museum at Amsterdam.

For the time being, the collected material is preserved in the Department of Aquatic Ecology, but it will be deposited in the Zoological Museum, Amsterdam.

## RESULTS

### a) *Physocypria kliei* Schäfer, 1934

#### Material.-

We collected 352 specimens of *P. kliei* on 4 and 5 Jan. 1978 in two lakes near Maarssen and in some ditches connected with these lakes (52° 08' N, 05° 02' E). We measured 37, 71 and 74 mg chloride per litre in these water-bodies. In the samples were also present: *Candona candida* (Müller, 1785), *C. compressa* (Koch, 1837), *C. hyalina* Brady & Robertson, 1870, *Cypria ophthalmica* (Jurine, 1820) and *Cypridopsis vidua* (Müller, 1776).

From a sample taken near Simonshaven (51° 49' N, 04° 17' E) on 25 Oct. 1977 we got another 32 specimens of *P. kliei*. This water contained 1235 mg chloride per litre. Other ostracods in this sample were: *Candona neglecta* G.O. Sars, 1887, *Cypria ophthalmica* (Jurine, 1820), *Cypridopsis aculeata* (O.G. Costa, 1852) and *C. newtoni* Brady & Robertson, 1870.

#### Diagnosis.-

Shell: The colour is yellowish brown, slightly transparent, with brownish anterior and posterior margins. This brown colour is possibly due to an accretion of unicellular organisms, although it occurred in all the specimens studied. The shape of the shell of our specimens matches quite well the drawings made by Schäfer (in Klie, 1938) and Petkovski (1960). The ventral margin of the left valve is straight. In a lateral view, however, the margin seems to be a little convex due to a rather strong vault of the shell surface (figs. 1a, b). Like Petkovski

(1960) we found that the posterior and anterior margins of the right valve were knobbed in both sexes. The left valve lacks these little knobs. Schäfer's drawing shows an indistinct row of knobs at the anterior margin of the left valve. Nüchterlein (1969) mentions a wavy denticulation on the anterior margin of the left valve. The shape of the ovary in our specimens is identical with the illustration made by Schäfer.

The first thoracic leg of the female shows a clear vibratory plate with five plumose setae (fig. 1g). This feature has not been mentioned before for *P. kliei*. The observations by Beldescu (1961), Nüchterlein (1969) and Hiller (1972) on the male clasping organs are in close agreement with our findings (figs. 1c, d). Petkovski (1960) gave the first description of the clasping organs and figured the left clasping organ slightly broader and shorter than it is in reality (cf. Beldescu, Nüchterlein, Hiller, and fig. 1c).

The second thoracic leg displays no characteristic features.

The third thoracic leg of our specimens is similar to Petkovski's drawing.

Our observations on the shape of the male copulatory organs are, apart from minor details, in close agreement with the findings concerning *P. kliei* of previous authors. (Schäfer, in Klie, 1938; Petkovski, 1960; Beldescu, 1961; Nüchterlein, 1969; fig. 1 f).

Caudal rami: Our specimens show two separate pilose areas on the dorsal side of the claws (only visible at a high magnification and an adequate exposure; fig. 1e). Klie (1938) considers this feature as typical for the species. Petkovski (1960) observed only the distal pilose area. The dorsal seta on each ramus is hooked (fig. 1e). Our findings are different from those of Schäfer (in Klie, 1938) and Petkovski (1960). The drawings of both these authors show caudal rami with straight dorsal setae. The seta depicted by Beldescu can be considered as intermediate between the condition we observed and the drawing of Petkovski. Nüchterlein found the seta hooked in the same way as we observed.

Comparison with *Physocypria perlata* Rome, 1943.-

The type specimen of *P. perlata* is a female, it was described in 1943. In 1954 Rome published an extended description, this time also of the male. On comparison of these descriptions with our

observations and those of Petkovski and Schäfer on *P. kliei*, there appears to be a remarkable similarity between *P. kliei* and *P. perlata*. As one of the two main differences Rome mentions a characteristically hooked dorsal seta on each caudal ramus of *P. perlata*. However, this feature is also present in *P. kliei*, as described before. Rome mentions a row of little knobs on the posterior margin of the right valve in both sexes of *P. perlata*. The shape of the ovary of *P. perlata* is similar to that drawn by Schäfer for *P. kliei*, and to that observed in our specimens (fig. 1b). The left and the right clasping organs and the copulatory organ of the male *P. perlata* are completely identical with those of *P. kliei* (figs. 1c, d, f). For *P. perlata* Rome mentions a well developed vibratory plate with six plumose setae on the first thoracic leg of the female. As mentioned before we observed in our specimens also a well developed vibratory plate (the finding of five plumose setae is perhaps due to the difficult preparation method). As the second main difference between *P. kliei* and *P. perlata* Rome mentions that the left valve of *P. perlata* is somewhat longer than the right one. With respect to shell sizes we compared the measurements given by various authors and measurements taken from fourteen of our own ostracods. Table I summarizes the results. Four out of ten females measured, showed a left and a right valve of equal size (622  $\mu\text{m}$ ).

We calculated for our specimens a number of ratios for first and second antennae, second and third thoracic leg and the caudal rami in a way comparable to that applied by Nüchterlein (1969: 227). From literature we obtained corresponding values for *P. kliei* and *P. perlata*. If no data were available we tried to determine the ratios by taking the measurements from the drawings published by the author in question. The various ratios of *P. kliei* and *P. perlata* appeared to be in close agreement with each other and also with the ratios calculated from our ostracods.

#### Discussion.-

With respect to *Physocypria kliei* there are small differences in the observations of several investigators. These differences concern the male copulatory organ, the presence or absence of little knobs on the anterior margin of the left valve and the shape of the dorsal setae of

the caudal rami. Obviously *P. kliei* shows some variability in these features. The size of the shell varies within a relatively small range (table I). We observed variability in the length of the left valve, the occurrence of which was already suggested by Nüchterlein (1969: 255). Four out of the ten female ostracods measured by us showed a left and a right valve of equal size. Equal valve size could not be determined in the male specimens.

As distinguishing features between *P. kliei* and *P. perlata* Rome (1943, 1954) explicitly mentions the shape of the dorsal setae of the caudal rami and the greater length of the left valve as compared with the right valve. From what is mentioned above it will be clear that these differences are due to variability within the species. Table I shows that the shell sizes of *P. perlata* fall within the range of those of *P. kliei*. The same holds true for a number of ratios we calculated for antennae, thoracic legs and caudal rami. On account of the findings mentioned above we come to the conclusion that *Physocypria perlata* Rome, 1943, is synonymous with *Physocypria kliei* Schäfer, 1934.

We share Hiller's opinion that *P. kliei* occurs all the year round (Hiller, 1972). Taken into consideration the chloride contents of one of the two places where we collected *P. kliei* (viz. on Voorne), the species cannot be regarded a pure fresh water ostracod (cf. Hiller, 1972). It is probably better to call it an oligohaline species.

#### b) *Potamocypris unicaudata* Schäfer, 1943

##### Material.-

Of this species we obtained 33 specimens, captured 18 Oct. 1977 in a little lake near Rockanje on the island of Voorne (51° 52' N, 04° 04' E). Other species in this sample were: *Candona neglecta* G.O. Sars, 1887, *Cypria ophthalmica* (Jurine, 1820), *Cypridopsis aculeata* (O.G. Costa, 1852) and *C. newtoni* Brady & Robertson, 1870. Samples from the lake contained 1240 mg chloride per litre.

In addition we examined two female syntypes (males are unknown) of *P. vanoyei* De Vos, 1946, in the collection of the Zoological Museum, Amsterdam (ZMA, Catalogue nr.: Ostr. 105.679). Apparently a holotype was not designated.

Diagnosis and comparison.-

Sex: Only females were collected, males are unknown.

Shell: The colour of our specimens is yellowish brown with a slightly transparent shell. Schäfer (1943) describes them as bright gray-green coloured and De Vos (1946) as sand coloured. In our specimens the whole shell surface is covered with hairs. Both valves are very unequal in shape. The right valve is significantly higher than the left one, and is triangular with strongly rounded tips (fig. 2b). The upper part of the dorsal margin of the left valve is straight and forms a distinct angle before it ends up in a rounded posterior tip (fig. 2a). The shape of the right valve of our specimens agrees with the illustration given by Schäfer (1943). The right valves of our specimens are similar in shape to the right valves of the two syntypes of *P. vanoyei* and agree also with the figure given by Schäfer (figs. 2b, d). The shape of the left valves of the syntypes of *P. vanoyei* is intermediate between that of *P. unicaudata* and the left valves of our specimens.

First antennae: Distal segment long and small.

The second antennae in our specimens correspond with the drawing by De Vos. Natatory setae extending beyond the tips of the claws. These setae are characteristically hooked, approximately at one-third of their length. Schäfer and De Vos do not mention this feature. The syntypes of *P. vanoyei*, however, do show this feature. Nüchterlein (1969) mentions the presence of hooked natatory setae in his specimens.

Mandibles and maxillae are without specific features.

The first thoracic leg shows no clear vibratory plate but one big seta. This agrees with the findings of Schäfer and De Vos.

The second thoracic leg has a rather strong claw. According to Schäfer the second thoracic leg in *P. unicaudata* displays no special features. De Vos describes a "sickle shaped strong claw". However, we obtained a different impression after examination of two syntypes of *P. vanoyei*: although the claw is rather strongly curved it is certainly not sickle-shaped (fig. 2e).

Third thoracic leg without any specific features.

The caudal rami consist of a basic part that passes gradually into a long slender seta (fig.

2f). Our findings agree with those of De Vos. Schäfer in his drawings for *P. unicaudata* indicates a distinct demarcation between basic part and seta.

With respect to shell sizes, measurements were carried out on our specimens and on the two syntypes of *P. vanoyei*. These data can be compared with what is found in the literature. Table II summarizes the results. For the two syntypes of *P. vanoyei* and our specimens we also calculated a number of ratios for first antennae, second antennae and caudal rami (cf. Nüchterlein, 1969: 227). We compared these ratios with corresponding values for *P. unicaudata* given by Schäfer (1943) and Nüchterlein (1969). The values for *P. vanoyei*, *P. unicaudata* and our specimens correspond with each other to a greater or lesser extent.

Discussion.-

In her publication De Vos argues that *Potamocypris vanoyei* differs from *P. unicaudata* in the shape of the shell. From fig. 2, table II, and the findings discussed above it will be clear that we could not discover any relevant difference. Another differentiating feature between *P. vanoyei* and *P. unicaudata* could be the sickle-shaped claw on the second thoracic leg (although not explicitly mentioned as such by De Vos). As already mentioned above the description of the second thoracic leg of *P. vanoyei* does not correspond with what we observed in the two syntypes of this species. On account of our findings we are of the opinion that *Potamocypris vanoyei* De Vos, 1946, is a junior synonym of *P. unicaudata* Schäfer, 1943.

In the Netherlands *P. unicaudata* is known from the isle of Ameland, where De Vos collected her specimens, and from Voorne (Du Saar, 1967, and this paper).

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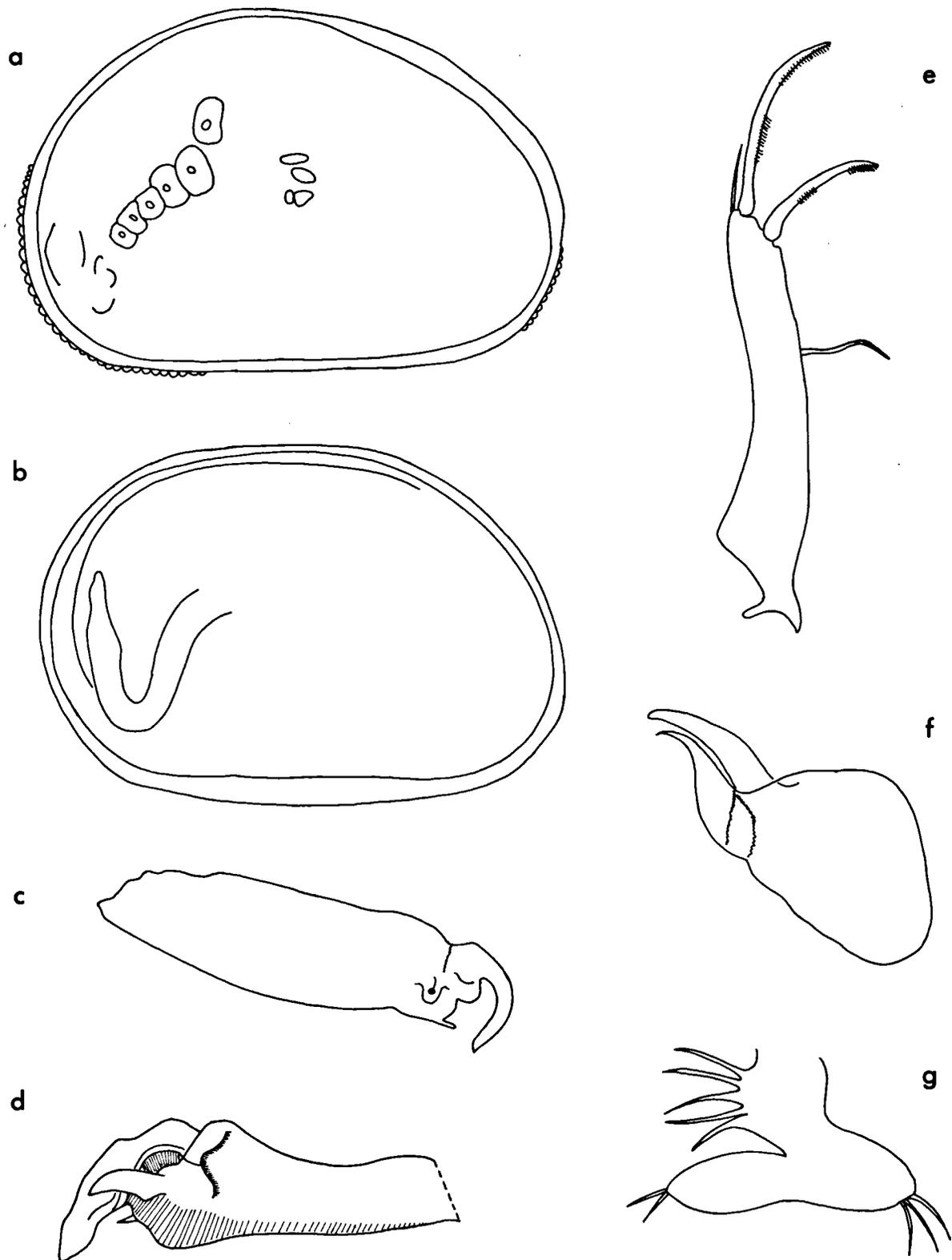


Fig. 1. *Physocypria kliei* Schäfer, 1934. a) female right valve with ovary and main adductor scars, external view; b) female left valve, ovary indicated, internal view; c) left clasp of the male; d) right clasp of the male; e) caudal ramus (female); f) male copulatory organ; g) first thoracic leg with vibratory plate (female).

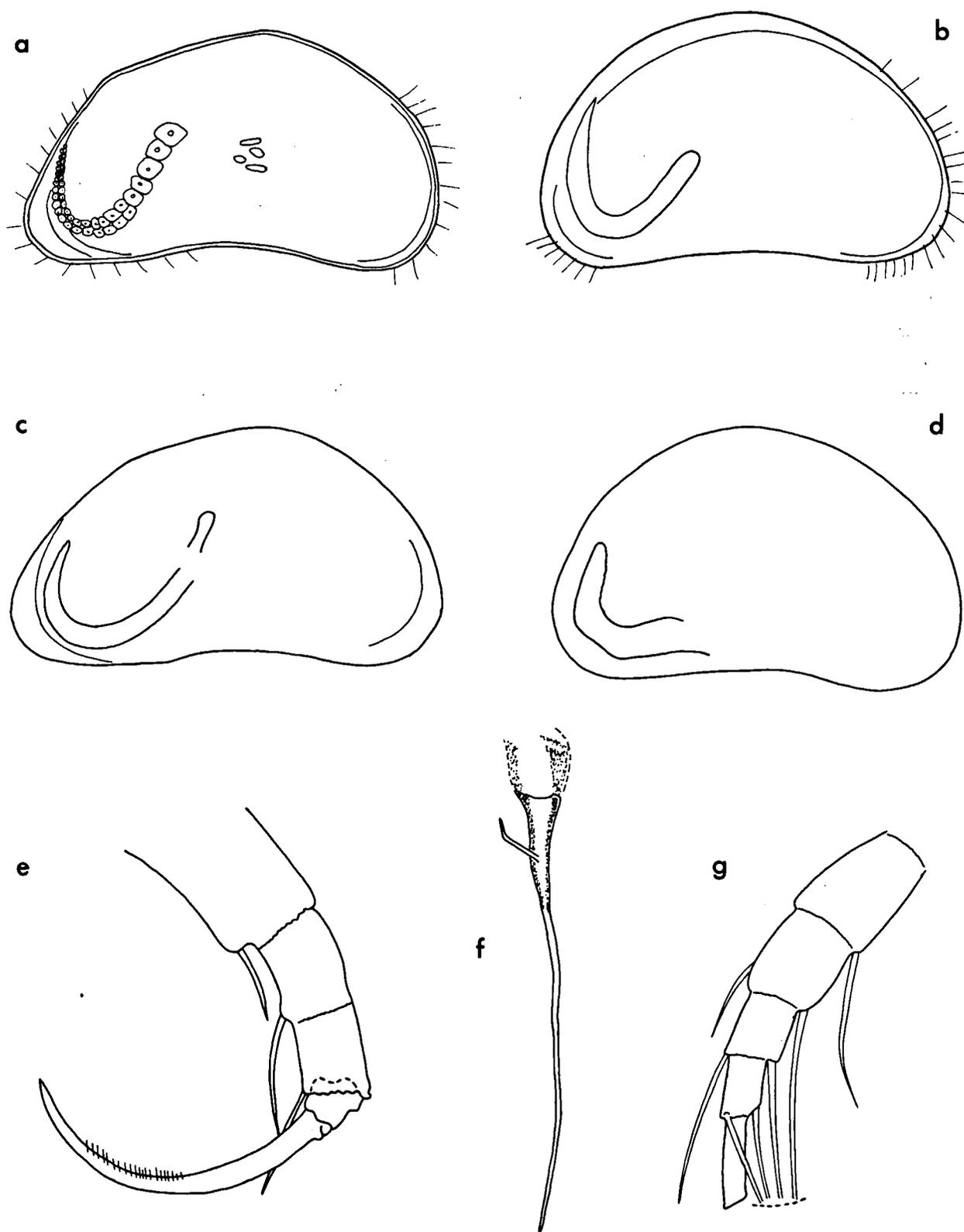


Fig. 2. *Potamocypris unicaudata* Schäfer, 1943, female specimens. a) left valve with ovary and main adductor scars, internal view; b) right valve, ovary indicated, external view; c) left valve, ovary indicated, internal view (syntype *P. vanoyei*); d) right valve, ovary indicated, external view (syntype *P. vanoyei*); e) second thoracic leg (syntype *P. vanoyei*); f) caudal ramus; g) first antenna.

Table I. Shell sizes in  $\mu\text{m}$  of *Physocypria kliei* as recorded in literature, of *P. perlata* as recorded by Rome and of specimens of the present author. Our own data represent the means of 10 females and 4 males. In parentheses: standard deviation. L = length. H = height.

	f e m a l e				m a l e			
	left valve		right valve		left valve		right valve	
	L	H	L	H	L	H	L	H
Klie, 1938	630		630		580		580	
Petkovski, 1960					560	390	540	370
Nüchterlein, 1969	580	400						
Hiller, 1972	610-670	400-435	610-670		570-610	375-400	570-610	
Rome, 1954	600	410	590	370	550	380	530	370
present author	609(13)	417(15)	604(13)	398(8)	567(II)	375(33)	555(8)	368(9)

Table II. Shell sizes in  $\mu\text{m}$  of *P. vanoyei* (based on measurements of two syntypes) and *P. unicaudata* (based on Schäfer and Nüchterlein) and 10 specimens of the present author. In parentheses: standard deviation. L = length. H = height

	left valve		right valve	
	L	H	L	H
Schäfer, 1943	810		810	
Nüchterlein, 1969	790	410	790	445
De Vos 1)	816(4.8)	425(12)	816(8)	481(0)
present author	802(17)	426(15)	712(29)	473(21)

N.B.: Schäfer only mentions the overall length of the valves in situ; length of valves in situ according to Nüchterlein: 820  $\mu\text{m}$ .

1) measured from two syntypes of *P. vanoyei*.

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