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## The problem of *Salentinella angelieri* Del.-Deb. and Ruffo 1952 and its subspecies. (Contribution to the Knowledge of the Amphipoda 109).

### ABSTRACT

The problem of *Salentinella angelieri* Del.-Deb. and Ruffo 1952 and related subspecies is studied and discussed. Variability and value of morphologic characters of these taxons are analysed.

*Salentinella angelieri balcanica* (S. Kar. 1953) known from Yugoslavia and Italy, *S. angelieri pisana* Ruffo 1953, *S. franciscolori* Ruffo 1953 and *S. denticulata* Basch. 1952, all from Italy, are removed to *Salentinella angelieri* as synonyms.

*Salentinella* sp. from Majorca Island, mentioned by Dancau 1973 belongs probably to *S. angelieri*.

### INTRODUCTION

After discovering of first member of the genus *Salentinella* by Ruffo in 1947, *S. gracillima* Ruffo, several members of this genus were discovered and described from the bassin of the Mediterranean Sea.

But, comtemporarily with the increase number of discovered species and subspecies of this genus, the taxonomic position of many of these taxons were less and less distinct, and the revision of genus *Salentinella* was evidently urgent.

During my work on the completion of the fauna of Amphipoda from Italy, one of the largest problems was the problem of genus *Salentinella* represented recently in Italy by 5 species and subspecies (*gracillima*, *angelieri*, *pisana*, *franciscoi*, *balcanica*).

For this reason, I tried to resolve this problem based on material in hands. Thanks to prof. Dr. G. Pesce from the University of L'Aquila, Italy, who sent me several samples of *Salentinella* from Italy and Greece, I had a possibility to study this problem.

Acknowledgments: I am thankful to prof. Dr. Giuseppe L. Pesce from the University of L'Aquila, Italy for the loan of part of material used in this study as well as for the loan of informations and copy of his paper in press regarding new records of genus *Salentinella* in Italy and Greece.

#### THE PROBLEM OF SALENTINELLA ANGELIERI

Delamare-Deboutteville and Ruffo described (1952) a new species, *Salentinella angelieri* from torrent Casaluna on Corsica Island (France).

Almost contemporarily, without the knowledge of existing of *S. angelieri*, S. Karaman described (1953) *S. gracillima balcanica* from the subterranean waters in Dubrovnik and cave Šipun in Cavtat (Yugoslavia). G. Karaman later (1967) redescribed this subspecies removing it to the species *S. angelieri* as a valid subspecies.

S. Baschieri described (1952) a new species *Salentinella denticulata* n. sp. from cave Grotta di Punta degli Stretti (Mt. Argentario, Italy).

Ruffo described (1953) *Salentinella angelieri pisana* n. ssp. from the caves in Toscana (Mti. Pisani, Italy) and *Salentinella franciscoi* n. sp. from the cave Grotta dell'Orso o del Poggio in Ponte di Nava (Piemonte, Italy), mentioning *S. angelieri angelieri* from southern Greece.

Ruffo mentioned (1953b, 1960) the presence of *S. angelieri* on Balearic Islands (Majorca, Minorca) and Sardegna Island.

Later, several new species and subspecies were described from France: *S. gineti* Balazuc 1957, *S. delamarei* Coineau 1962, *S. petiti* Coineau 1963, *S. prognatha* Barbe 1963, *S. major* Barbe 1965, *S. lescheriae* Coineau 1968, *S. juberthiae* Coineau 1968 and *S. delamarei macrocheles* Coineau 1968.

All species from France differs remarkably from species known in Italy. But, our study deals with the *Salentinella angelieri*-group of taxons known prevalently from Italy, Yugoslavia and Greece.

All members of *Salentinella angelieri*-group were described based on the shape of gnathopods 1-2, length of inner ramus of

uropod 3 and the armature of telson. Unfortunately, the sexual dimorphism was not discovered until 1968, so that the differences in the shape of gnathopods between both sexes (males and females) of one species were considered as a valid taxonomic character to separate different sexes of one species into different distinct species.

Sexual dimorphism regarding antenna 1 and gnathopods 1-2 in several species from France was mentioned for the first time by Coineau in 1968.

Dancau observed (1973) sexual dimorphism in *Salentinella* sp. (= ? *angelieri*) from Majorca Island regarding antenna 1 and gnathopods.

Pesce recently (1979, in press) observed sexual differences in *S. angelieri* from Italy.

During our visit to cave Šipun in Cavtat, many females and 2 males of *S. angelieri balcanica* were collected. The sexual differences between males and females of this species were similar to these of *S. angelieri angelieri*. That induced us to analyse the taxonomic characteristics of *S. angelieri*-group of taxons based on the samples from Greece, Yugoslavia and Italy in our hands.

*Salentinella angelieri angelieri* Del. -Deb. and Ruffo 1952 is characterized (sensu auctorum) by short inner ramus of uropod 3 reaching  $1/3$  (36.6%) of outer ramus, by gnathopods 1-2 with narrow elongated articles 5-6 in females, and by stouter, nearly pyriform article 6 of gnathopod 1 in males; distal tip of lobes of telson is provided with one short spine; presence of pair of long sensitive plumose setae implanted below the tip of telson-lobes on  $1/4$  of telson-length. Dactyl of pereopod 5 (not pereopod 7) is slightly shorter than article 6.

*Salentinella angelieri pisana* Ruffo 1953 was described from several caves of Monti Pisani (Italy). This subspecies is very similar to *S. angelieri*, but differing from later (according Ruffo 1953) only by shape of gnathopod 1-2: article 6 (propod) of gnathopod 1 is pyriform in *pisana*, compared to narrow, elongated article 6 in *angelieri* (female).

Evidently, figured and described specimens of *pisana* represent the males of *S. ang. angelieri* (males of *angelieri* were unknown in that time).

*Salentinella angelieri balcanica* S. Karaman 1953 was described from the subterranean waters of Dubrovnik (Gruž) and from cave Šipun in Cavtat, Yugoslavia. This subspecies is (sensu auctorum) very similar to *S. angelieri angelieri*, but differing from later by: slightly longer inner ramus of uropod 3 reaching  $1/2$  of outer ramus, by distal tip of telson-lobes provided with one short seta

instead spine and by rather lower position of implanted pair of long plumose setae on telson-lobes (1/3 below the tip of telson).

Detailed study of specimens of *S. angelieri balcanica* from Cavtat and these from several localities in Italy (Marche, Rieti, Chieti, etc.) and Greece showed interesting conclusions:

— The males of Cavtat and these from Italy have, article 6 of gnathopod 1 in males nearly pyriform, like that of *S. angelieri* and *pisana*, Article 6 of gnathopod 2 in males slightly larger than that in females, like in *angelieri* and *pisana*.

— The gnathopods 1-2 in females of Cavtat are narrow, like these in *angelieri*.

— Length of uropod 3: it is very variable (see Pl. I.) The specimens from Cavtat are with inner ramus of uropod 3 reaching 46.6% to 58.6% of outer ramus. Specimens from Rieti, Italy, are with inner ramus of uropod 3 reaching only 40% of outer ramus (telson with distal setae); specimens from Marche (Morrovalle) and from Greece are with inner ramus of uropod 3 reaching 41.6 to 43.2% of outer ramus (telson with distal setae). Inner ramus of uropod 3 of *S. angelieri angelieri* from type-locality reaching 36.6% of outer ramus (telson with distal spine). and specimens from Toscana (Italy, = *denticulata*) have inner ramus reaching 40.2% of outer ramus (telson with spine).

Evidently, as it is presented on Pl. I, the length of inner ramus of uropod 3 is very variable, reaching continuously from 36.6% to 58.6% of outer ramus, and it is not usefull to separate different taxons to each other.

— Armature of telson: lobes of telson in *S. angelieri angelieri* are provided with one small distal spine; lobes of telson in specimens of *S. a. balcanica* from type-locality (Cavtat), from many places in Italy and Greece are provided with distal seta.

But, detailed study of the population from Cavtat as well as the population from Chieti (Italy) showed the existence of specimens with distal seta or with distal spine on lobes of telson (see fig. II, 4, 7).

— The pair of long plumose sensitive setae in specimens from Cavtat are implanted on each telson-lobe nearly on 1/3 to 1/4 below the tip of telson. The similar variability was observed in populations from Italy (*«denticulata»*), Morrovalle, Chieti, Greece etc. This character has not any taxonomic value for distingue different taxons of *S. angelieri*.

— Antenna 1: armature and shape of first article of main flagellum in *angelieri* and *balcanica* differ in males and females. First flagellar article of antenna 1 in males is provided with 4-8 aesthe-

tascs (10 in specimens from Majorca), that in females with 1-3 aesthetascs (4-5 in specimens from Majorca).

The specimens from Cavtat (males) has first article of antenna 1 short or elongated (figs. II, 1, 8), males from Italian localities always elongated (sometimes very little). Based on this character it was not possible to separate Yugoslav specimens from other Italian specimens belonging to »*balcanica*« or »*angelieri angelieri*«.

Our intention to take *angelieri* and *balcanica* as two distinct different subspecies was without success, because of finding the transitive specimens between both taxons in populations of Cavtat and Chieti (specimens with telson provided with spines like *angelieri*, but with long inner ramus like *balcanica* on one hand, and the absence of any other differences between *angelieri* and *balcanica* on other hand). That indicated that the both taxons, *angelieri* and *balcanica* are identical to each other and that *balcanica* must be considered a synonym of *S.angelieri*. Also, the absence of different geographical area of distribution of both taxons support that our opinion: *balcanica* was found in Italy, Yugoslavia, Greece, like *angelieri* also, but never in mixed populations where the both taxons should be distinguishing to each other.

No	Localities	Inner ramus of U3 percentage	distal armature of telson
1	Corsica, Poulles (= <i>angelieri</i> typ. loc.)	36.6	spine
2	Toscana, M. Argentario (= <i>denticulata</i> )	40.2	spine
3	Rieti, Italy	40.3	seta
4	Majorca island, Spain (= <i>Salentinella</i> sp.)	41.4	spine
5	Morrovalle (Marche, Italy)	41.6	seta
6	"	43.2	seta
7	"	46.8	seta
8	Cavtat-Sipun cave (= <i>balcanica</i> typ. loc.)	46.7	seta
9	"	48.6	seta
10	"	51.0	spine
11	"	52.2	seta
12	"	52.7	seta
13	"	54.0	spine
14	"	54.7	seta
15	"	58.6	seta
16	Abruzzo, Chieti (Crivella-Vasto, Italy)	48.1	seta
17	"	49.3	spine
18	"	50.2	seta
19	"	51.3	spine
20	"	52.0	seta
21	Ponte di Nava, Italy (= <i>franciscolor</i> )	50.0	spine

Pl. 1. Length of inner ramus of uropod 3 in percentage to the length of outer ramus in *Salentinella angelieri* D. Deb. & Ruffo 1952.

*Salentinella denticulata* Baschieri 1952 described from Monte Argentario (Italy) is characterized by short inner ramus of uropod 3 reaching 40.2% of outer ramus, by presence of short distal spine on telson-lobes. The pair of long plumose setae are implanted nearly 30% bellow the tip of lobes. (like that in *balcanica*).

Ruffo already suggested (1953) that *denticulata* may be identical with *S. angelieri*, and our analysis support that his suggestion, because no any other distinct character is known, usefull to separate *S. denticulata* from *S. angelieri*. *S. denticulata* was described based on females only.

Dancau discovered and described (1973) *Salentinella* sp. from several caves on Majorca Island. These specimens are with combined characters of *angelieri* and *balcanica*: lobes of telson with distal spine and pair of plumose setae implanted just bellow the tip of telson (1/4) like that in *angelieri*; but inner ramus of uropod 3 is longer, reaching 41.4% of outer ramus, like that in *balcanica*.

First article of main flagellum of antenna 1 with slightly elevated number of aesthetascs (10 in males, 4-5 in females). Dancau mentioned that uropods 1-2 like these in *S. gracillima*, but on the figures inner ramus of uropods 1-2 is almost serrate (?) in distal part (error?), (*gracillima* is without serrate inner ramus of uropods 1-2). If uropods 1-2 are nearly similar to *gracillima*, than this specimens from Majorca belonga to *S. angelieri*; if not, it can be considered as a distinct species.

Ruffo described (1953) *Salentinella franciscoi* from the cave Grotta dell'Orso o del Poggio, Piemonte (Italy). This species was described based on males (unknown in *angelieri* in that time), and it possess the combined characters of *angelieri* and *balcanica*: telson with distal spine like *angelieri*; inner ramus of uropod 3 reaching 50% of outer one, like *balcanica*. Dactyl of gnathopods 1-2 and of pereopods 5-7 is slightly elongated, but it was observed similar elongated dactyl also in some specimens of some other parts of Italy belonging to «*balcanicus*» (Morrovalle, fig. VI, 4; VII, 5). For this reason we removed *franciscoi* to *angelieri* as synonym.

#### SALENTINELLA ANGELIERI Del.-Deb. and Ruffo

figs. I-VII

*Salentinella Angelieri* Del. -Deboutteville and Ruffo 1952:1, fig. 5-9; Ruffo 1953:60, fig. IV, 7-8, V, 2, 5.

*Salentinella angelieri* Ruffo 1953b:27; Balazuc 1954:183, fig. 3n; Del. Debutteville and Ruffo 1954:139, fig. 1-2; Ruffo 1960:171; Pesce 1979:3.

*Salentinella gracillima balcanica* Karaman, S. 1953:140.

*Salentinella angelieri balcanica* Karaman, G. 1967:2, fig. 1-15;

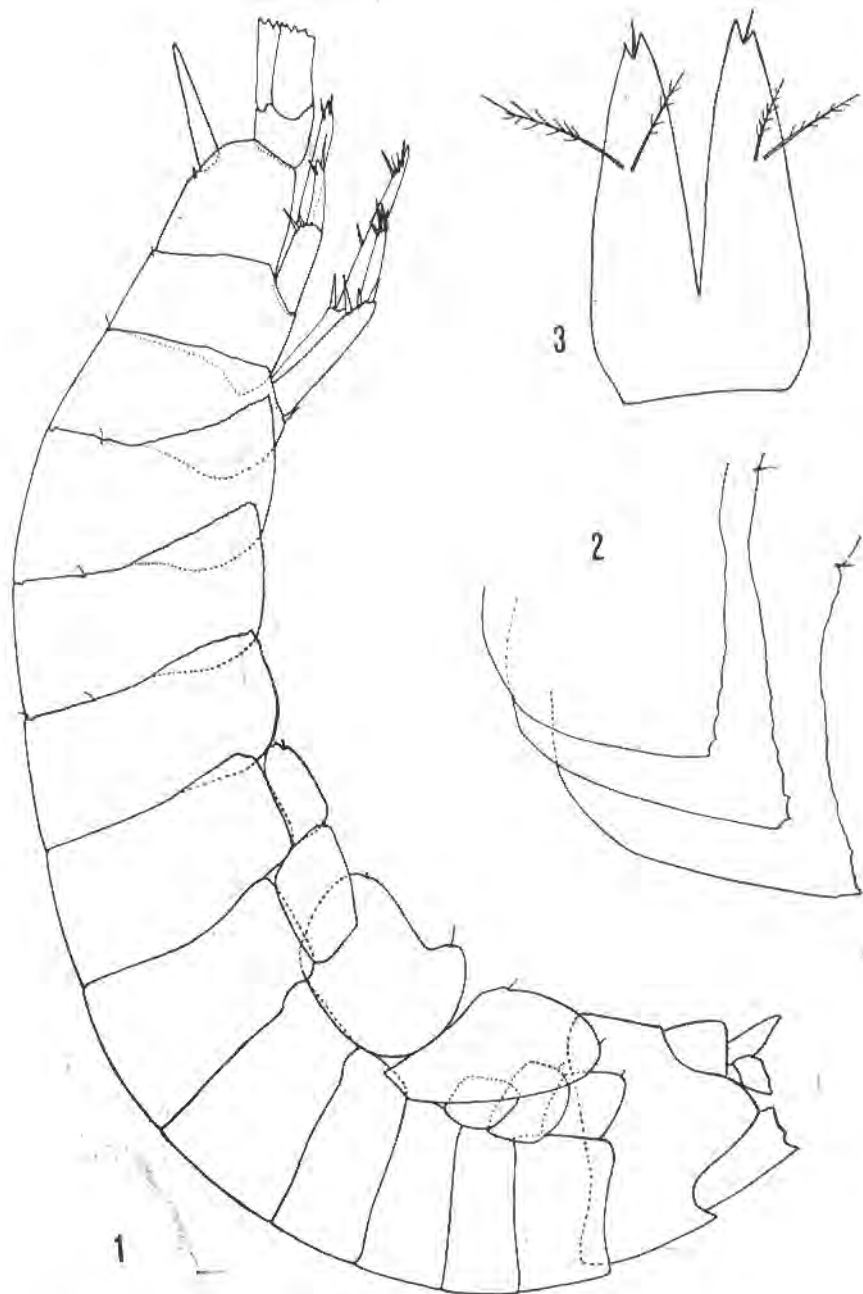


Fig. I. *Salentinella angelieri* Del. — Deb. et Ruffo, Cavtat, male 1.7 mm : 1 = body, lateral view; 2 = epimeral plates; 3 = telson.

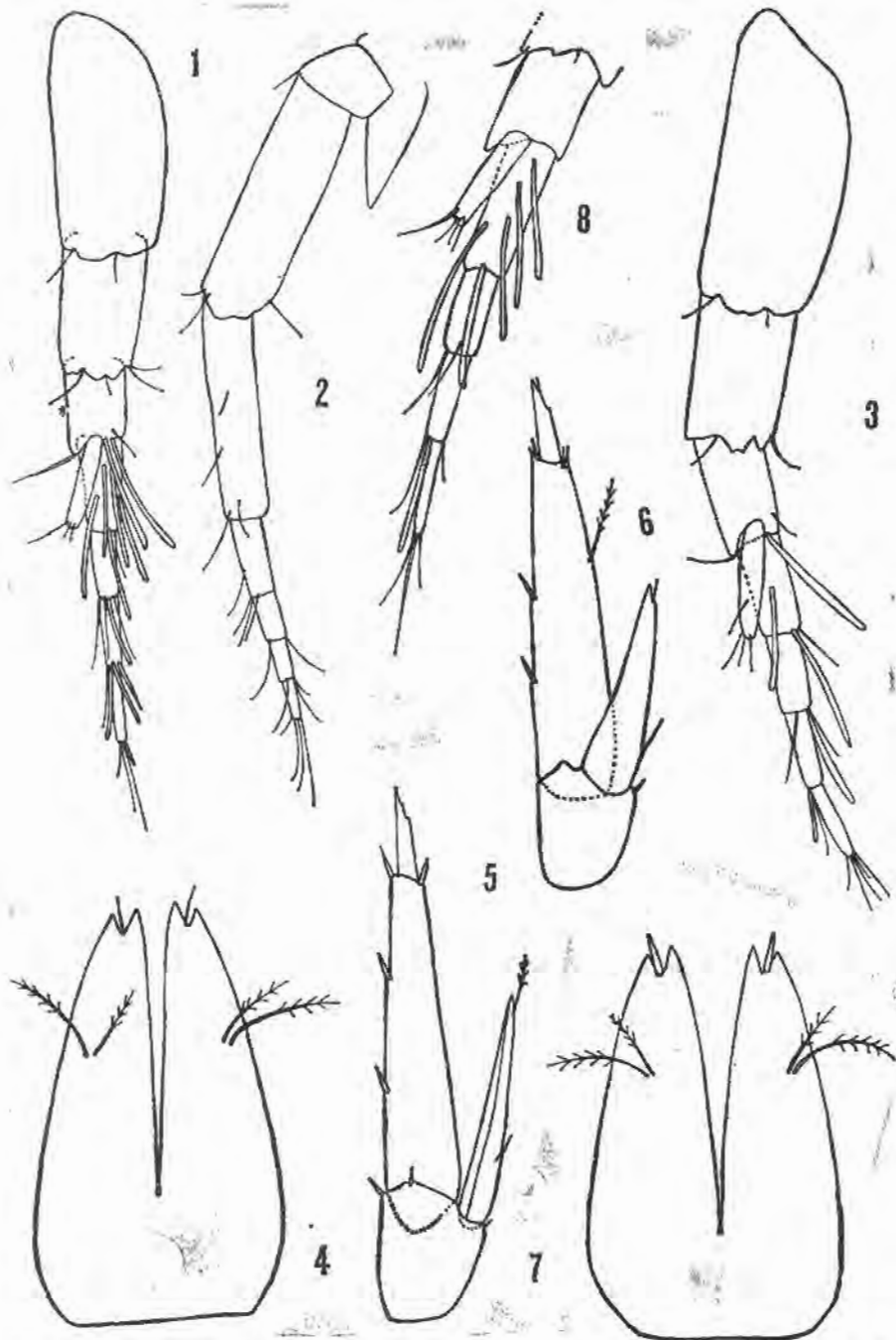


Fig. II. *Salentinella angelieri* Del. —Deb. et Ruffo, Cavtat, male 1.7 mm : 1 = antenna 1; 2 = antenna 2; 3 = antenna 1, female 1.65 mm; 4 = telson, female 1.65 mm; 5 = uropod 3, female 1.6 mm; 6 = uropod 3, female 1.68 mm; 7 = telson, female 1.68 mm; 8 = antenna 1, male 1.6 mm.





Fig. III. *Salentinella angelieri* Del. —Deb. et Ruffo, Cavtat, male 1.7 mm : 1 = gnathopod 1; 2 = uropod 3; 3 = gnathopod 1, female 1.65 mm.

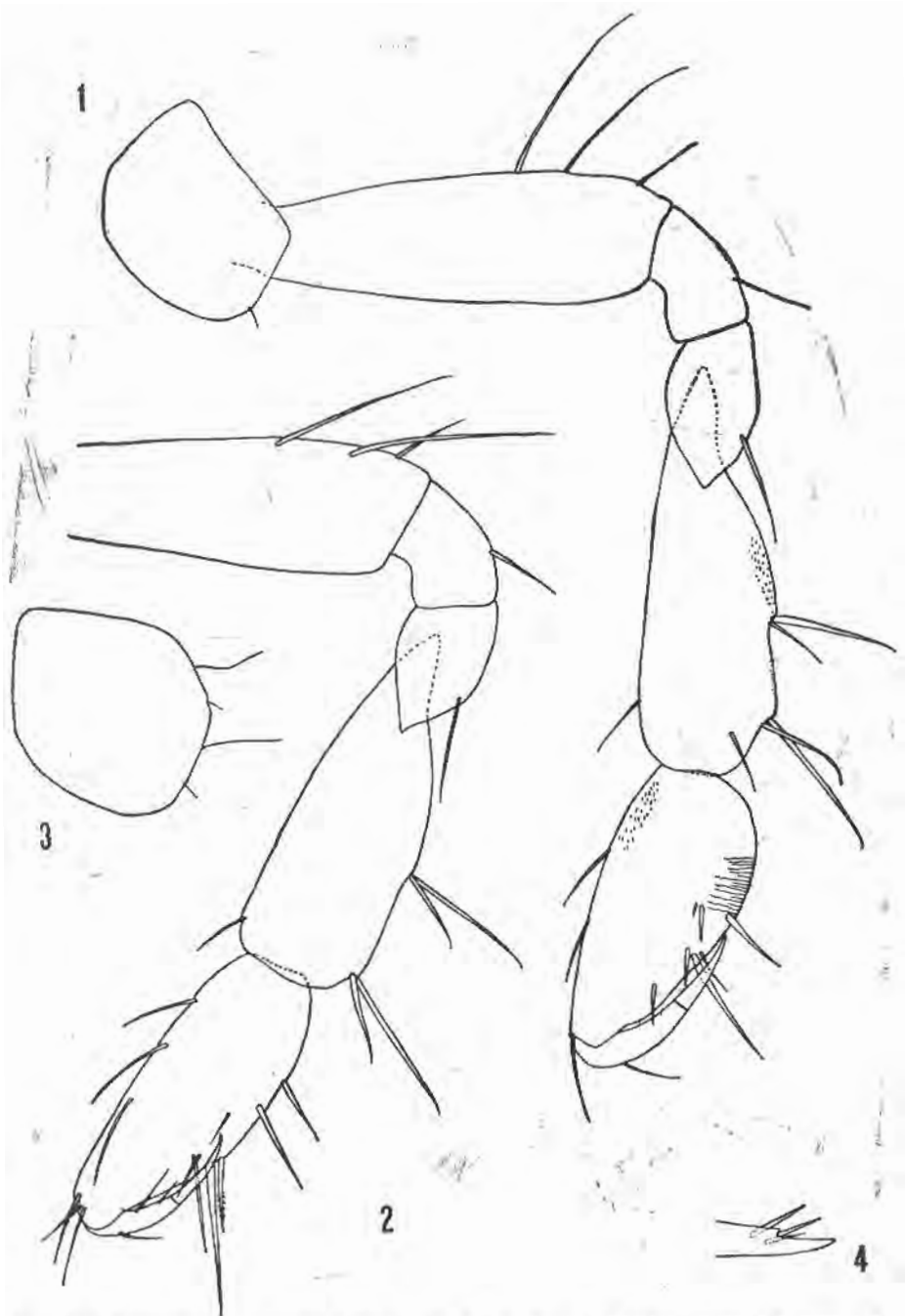


Fig. IV. *Salentineta angelieri* Del. —Deb. et Ruffo, Cavtat, male 1.7 mm : 1 = gnathopod 2; 2-3 = gnathopod 2, female 1.65 mm; 4 = distal tip of inner ramus of uropod 2, male 1.7 mm.

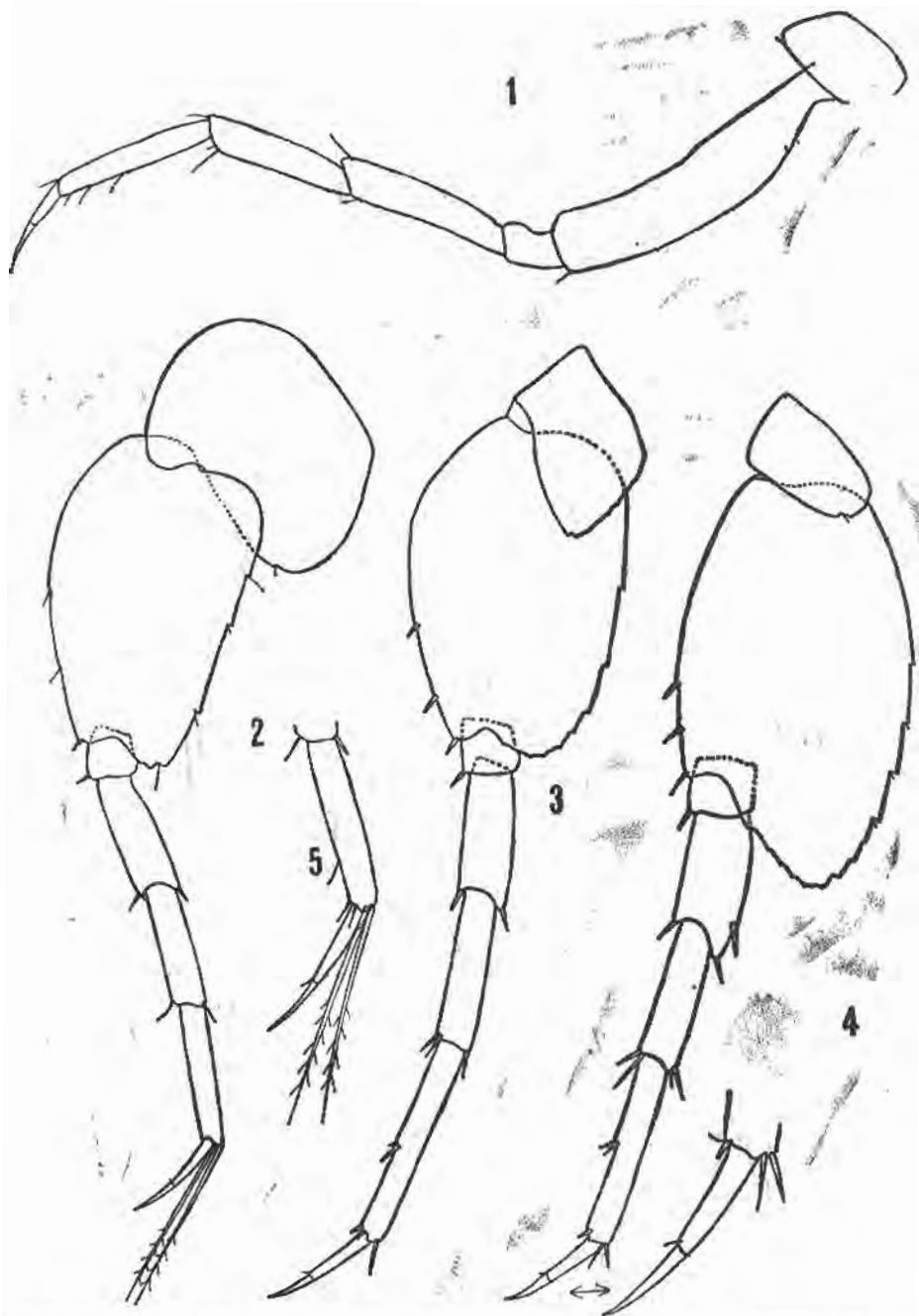


Fig. V. *Salentinella angelieri* Del. —Deb. Ruffo, Cavtat male 1.7 mm : 1 = pereopod 3; 2 = pereopod 5; 3 = pereopod 6; 4 = pereopod 7; 5 = dactyl of pereopod 5, female 1.6 mm.

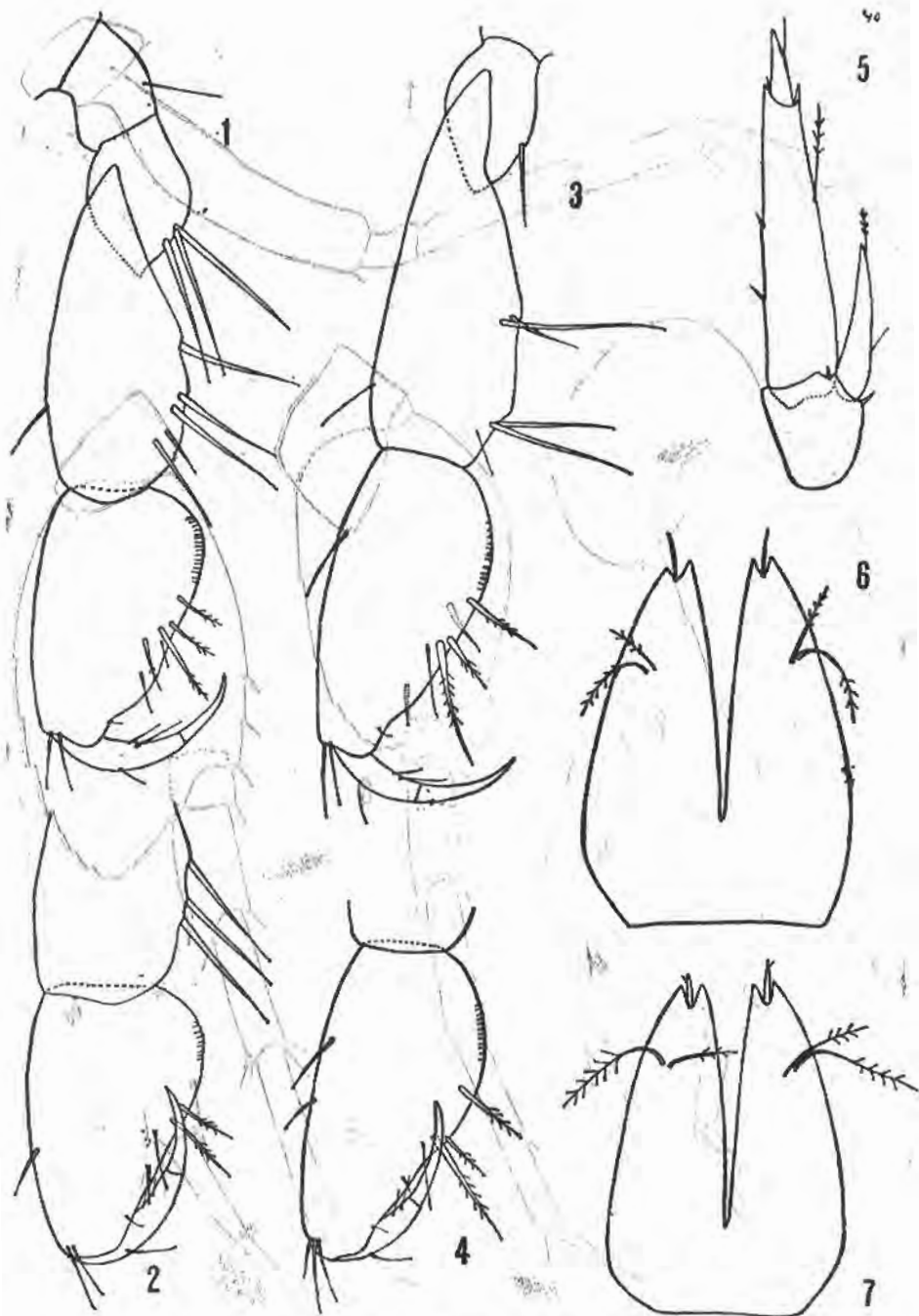


Fig. VI. *Salentinella angelieri* Del. —Deb. et Ruffo, Morrovalle : 1 = gnathopod 1, male 1.78 mm; 2 = gnathopod 1, male 1.7 mm; 3 = gnathopod 2, male 1.78 mm; 4 = gnathopod 2, male 1.7 mm; 5 = uropod 3, female 1.65 mm; 6 = telson, female 1.6 mm, Rieti; 7 = telson, female 1.6 mm, Chieti.

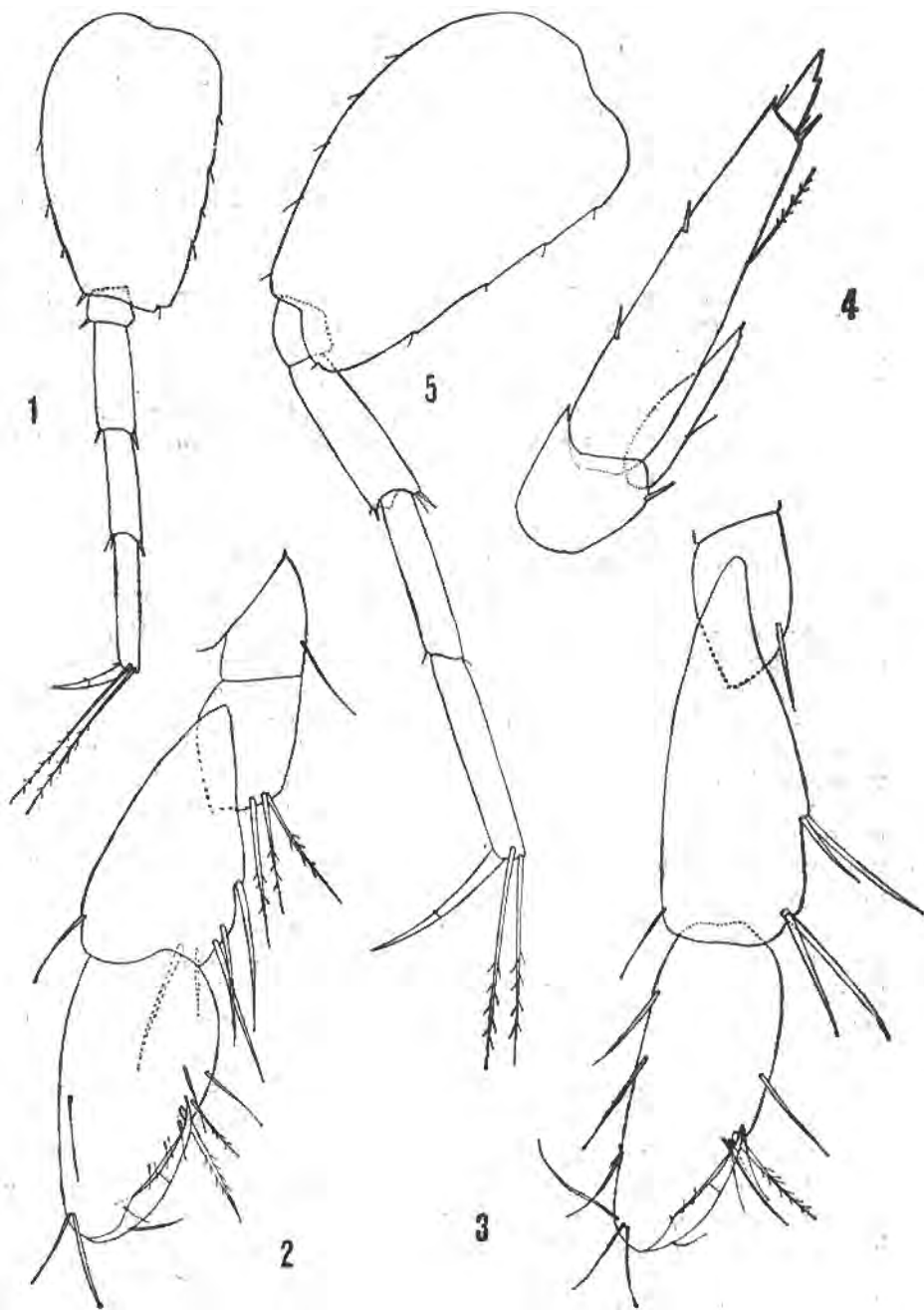


Fig. VII. *Salentinella angelieri* Del. —Deb. et Ruffo, Rieti, female 1.6 mm ;  
 1 = pereopod 5; 2 = gnathopod 1; 3 = gnathopod 2; 4 = unopod 3; 5 =  
 pereopod 5, male 1.78 mm, Morrovalle.

Karaman, G. 1974:29; Sket 1969:148; Pesce 1979:5.  
*Salentinella Angelieri pisana* Ruffo 1953:60, fig. IV, 5-6.  
*Salentinella denticulata* Baschieri 1952:4, fig. 1-10; Ruffo  
1953:59, fig. III, 2.

*Gammarus* sp. Chevreux 1909:32.

*Salentinella Franciscocoli* Ruffo 1953:62, fig. IV, 3-4, V, 3, 6, 8.

*Salentinella franciscocoli* Ruffo 1953b:27.

?*Salentinella* sp. Dancau 1973:225, fig. 1-4.

**Description:** Male: Body-length up to 1.9 mm. Body stout, laterally compressed, smooth, but metasomsegments and urosomites 1-2 each with one dorsolateral small seta; urosomite 3 with one dorsolateral spine on each side (fig. I, 1). Coxae 1-3 small, progressively smaller towards coxa 3 (fig. I, 1). Coxa 4 very large, dilated distally, coxa 5 almost as long as coxa 4, bilobe; coxae 6-7 small (fig. I, 1).

Head slightly longer than first thoracal segment, with distinct rostrum, lateral cephalic lobes subacute or subrounded, strongly produced forward, almost reaching tip of first peduncular article of antenna 1 (fig. I, 1). Eyes absent, ventroanterior sinus present.

Antenna 1 short and stout, much shorter than half of body: peduncular articles 1-3 progressively shorter, poorly setose (fig. II, 1); main flagellum consisting of 4, rather only 3 articles: first article usually elongated, up to twice longer than each of other 3 articles, but often only poorly longer than other articles or as long as other flagellar articles (fig. II, 1, 8). Probably first flagellar article represents fused two articles together as mentioned already Ruffo 1953 for *franciscocoli*. First article bearing 4-8 aesthetascs in specimens of Italy and Yugoslavia, up to 10 in specimens of Majorca; other flagellar articles with 1-2 aesthetascs each.

Accessory flagellum short, 1-segmented, reaching the tip of first flagellar article (in non produced flagellar article 1 of main flagellum) or reaching only 1/2 to 4/5 of first article of main flagellum (in produced flagellar article 1 of main flagellum). (fig. II, 1, 8).

Antenna 2: ped. article 3 short, ped. articles 4-5 nearly subequal, poorly setose; flagellum consisting of 4-5 segments (fig. II, 2).

Mouthparts: labrum entire, labium without inner lobes. Maxilla 1: inner lobe provided with 2 plumose setae; outer lobe with 9 spines bearing several lateral teeth each; palp 2-segmented, left and right palp asymmetric to each other (right palp stronger than left one). Maxilla 2 with narrow lobes, inner lobe without dorsal oblique row of setae. Maxilliped: inner lobe with 2 strong distal spines, outer lobe with a row of lateral spines, palp 4-segmented, relatively narrow.

Mandible with molar triturative, incisor toothed, palp 3-segmented, palp segment 2 with 3-5 distal setae, palp segment 3 shorter than 2, bearing a row of lateral setae and 2 dorsal setae.

Gnathopod 1: segment 2 inflated, bearing 3-4 setae at posterior margin and 2-3 setae at anterior margin, segments 3-4 short; segment 5 poorly longer than segment 6; segment 6 pyriform, with diameter longer than that of segment 5, palm reaching or hardly exceeding half of posterior margin of segment 6, without median and corner palmar spines (fig. III, 1; VI, 1, 2); dactyl recurved, reaching or slightly exceeding half of posterior margin of segment 6 and with one seta on outer margin.

Gnathopod 2 is slightly longer and narrower than gnathopod 1. Segment 2 long, almost non inflated, with 3-4 setae at posterior margin and without setae at anterior margin; segment 5 distinctly longer than segment 6, with 2 groups of setae at posterior margin; segment 6 ovoid to poorly pyriform, with diameter poorly longer than that of segment 5; palm slightly exceeding half of posterior margin of segment 6, without median and corner spines. Dactyl slender, slightly exceeding half of posterior margin of segment 6, bearing 1-2 setae along inferior margin and one seta on outer margin (fig. IV, 1; VI, 3, 4).

Pereopods 3-4 slender, subequal, poorly setose: segment 2 non inflated, linear, segments 4-5 combined not shorter than segment 2; segment 6 slightly longer than segment 5, dactyl distinctly shorter than segment 6, with nail longer than the remaining part of, dactyl (fig. V, 1).

Pereopods 5-7 relatively short, with dilated segment 2 and narrow segments 3-6. Pereopod 5: segment 2 tapering distally, with distinct ventroposterior lobe well developed. Segment 6 slightly longer than 5, bearing 2 long plumose distal setae, much longer than dactyl; dactyl long and slender, reaching  $2/3$  to  $7/8$  of segment 6 (fig. V, 2, 5; VII, 1, 5).

Pereopod 6: segment 2 ovoid, with ventroposterior lobe not or hardly reaching the tip of segment 3 (fig. V, 3), dactyl shorter than segment 6, segment 6 without distal long plumose setae.

Pereopod 7: segment 2 ovoid, with long ventroposterior lobe much exceeding tip of segment 3 (fig. V, 4). Segment 4 poorly inflated and produced distally, dactyl distinctly shorter than segment 6.

Pleopods with 2 retinacula each. Epimeral plates 1-3 with pointed ventroposterior corner and with more or less crenellated posterior margin; ventral margin of all epimeral plates smooth, without setae or spines (fig. I, 2).

Uropods 1-2 well developed. Uropod 1: peduncle without ventrofacial spine; inner ramus nearly 30-37 percent longer than outer one, both rami with bunch of subdistal spines, distal spines absent (fig. I, 1).

Uropod 2: peduncle shorter than inner ramus; outer ramus almost twice shorter than inner one, both rami with bunch of subdistal spines only (fig. IV, 4).

Uropod 3 moderately long, remarkably exceeding tip of uropods 1-2, with short peduncle (fig. III, 2). Outer ramus 2-segmented, second segment reaching 1/3 to 1/4 of first segment and bearing 1-2 subdistal setae, usually plumose. First segment with 3 single spines along outer margin and with 0-3 plumose setae along inner margin. Inner ramus lanceolate, reaching 36.6 to 58.6 % of outer ramus and provided with 0-1 subdistal short seta and with 0-2 lateral setae (fig. III, 2).

Telson long, much exceeding tip of peduncle of uropod 3, incised almost 3/4 of telson-length (fig. I, 3); each lobe much longer than broad, incised distally, provided with one short distal seta or spine, like these in females (fig. I, 3, II, 4, 7, VI, 6, 7). A pair of long plumose sensitive setae attached nearly on 2/3 to 3/4 of telson-length below tip of lobes.

Female: Almost all body-parts like these in males except antenna 1 and gnathopods 1-2.

Antenna 1: peduncular segments 1-3 progressively shorter. Main flagellum 4-segmented, segments subequal in length, first flagellar segment usually not elongated, bearing 1-3 aesthetascs, rarely 5 aesthetascs (Majorca) (fig. II, 3). Accessory flagellum 1-segmented, like that in males, reaching tip of first flagellar segment.

Gnathopod 1: segment 2 inflated, bearing usually 3 setae at posterior margin and 2 setae at anterior margin. Segment 5 nearly as long and as broad as segment 6 (fig. III, 3). Segment 6 ovoid, with palm convex, finely crenellated, reaching nearly half of posterior margin of article 6, without median and corner palmar spines and one seta on outer margin of segment 6, bearing 1-2 setae at inferior margin and one seta on outer margin.

Gnathopod 2: segment 2 slender and long, like that in males, bearing 2-3 setae along posterior margin and without setae at anterior margin (fig. IV, 2-3, VII, 3). Segments 5 and 6 longer and more slender than these in males: segment 5 distinctly longer than segment 6, diameter of segment 5 slightly longer than diameter of segment 6. Segment 6 ovoid, with palm convex, finely crenellated, reaching nearly half of posterior margin of segment 6, without median and corner spines; dactyl nearly reaching half length of segment 6 (fig. VII, 3).



Inner ramus of uropod 3 is variable like that in males, shorter to longer than half of outer ramus (fig. II, 5, 6; VI, 5; VII, 4).

Telson like these in males, with distal spine or seta on each lobe (fig. II, 4, 7; VI, 6, 7).

Variability. The number of aesthetascs on first segment of main flagellum in males is rather variable within one population as well as within different populations. The populations from Italy are with produced first segment of main flagellum in males. The populations from Yugoslavia are with or without produced that first segment.

Lobes of telson are with spine on distal tip of each lobe in many populations from Italy and Greece, but some populations from Italy are with seta on telson; in some populations there are the specimens with seta and the specimens with spine (population from Cavtat, from Chieti).

The length of inner ramus of uropod 3 is very variable also within one population (see Pl. I) as well as between different populations from Yugoslavia, Italy and Greece.

Coxal plates are often undistinctly crenellated. Lobes of telson are often with 1-2 dorsal very small setae (Baschieri mentioned these setae also).

Dactyl of pereopod 5 is very variable within one population as well as between different populations; it never reaching the length of segment 6, but it reaching  $2/3$  (Rieti), to  $7/8$  (Morrovalle) of segment 6 (in franciscoloi dactyl also not reaching length of segment 6 on presented figure).

The pair of long plumose setae can be implanted higher or lower along lobe of telson.

The plumose setae on rami of uropod 3 as well as simple subdistal setae on inner and outer ramus are often broken so that seems that these setae are absent.

The shape of segment 6 of gnathopods 1-2 in males is rather variable; palm of gnathopod 1 can be convex or straight. Dactyl of gnathopods 1-2 can be slightly longer or shorter, reaching or slightly exceeding half of posterior margin of segment 6.

Material examined: Yugoslavia: -several samples from cave Šipun in Cavtat consisting of many specimens accompanied by *Hadzia fragilis* S. Kar. and *Niphargus salonitanus* S. Kar. (Karaman Coll.).

— Dubrovnik (Gruž), subterranean water, 2 spec. (S. Karaman leg). Italy: Marche: Civitanova; Trodica Macerata, fresh water well (Ma 35); Morrovalle (Ma 38);

Valdaso-Pedaso (Ascoli Piceno, slightly brackish water) (Ma 22); all Pesce leg.

Greece: Zante Island (road Zakinto-Keri, freshwater). Pesce leg.

Loc. typ.: subterranean waters of torrent Casaluna, Corsica Is.

Localities cited:

FRANCE: Corsica Island (Casaluna torrent), (Del. -Deboutteville and Ruffo 1952);

SPAIN: Baleares: Minorca Island: Cova San Aygo near Ciudadela (Ruffo 1960); Majorca Island: cave Cuevas del Drach (Chevreux 1909, Dancau 1973); Cuevas del Pirata; Cuevas del Puente; Cuevas dels Hams (Dancau 1973 sub *Salentinella* sp.).

ITALY: cave Punta degli Stretti (Mt. Argentario) (Baschieri 1952 sub *S. denticulata*);? cave near Roma (Lazio) (Ruffo 1953a); cave Grotta dell'«Orso o del Poggio (Ponte di Nava, Piemonte) (Ruffo 1953 sub *S. franciscolori*);

Toscana: Monti Pisani: Grotta a pozzo del Paduletto, Serchio; cave La Cantinaccia, Serchio; cave Grotta inferiore del Leone, Agnano Pisano; Grotta del Leone, A. Pisano; Buca Seconda della Cava della Croce di Agnano (Ruffo 1953 sub *S. a. pisana*);

Sardegna: Grotta di Nettuno; Foiba della Dragonara (Ruffo 1960); several localities in central Italy and Greece (Pesce 1979, in press).

YUGOSLAVIA: Šipun cave in Cavtat; subterranean waters in Dubrovnik (Gruž) (Karaman, S. 1953, Karaman, G. 1967, 1974 sub *S. a. balcanica*); Bikovića near Pirovac; Karin;? Čapljina (Sket 1969 sub *S. a. balcanica*).

GREECE: Pelopones: Aréopolis, Grotte Velychada; Selenitsa (N. of Areopolis, Grotte de Saint Thomas) (Ruffo 1953 sub *S. angelieri*).

Remarks and affinities. *S. angelieri* is one very variable species forming micropopulations sometimes different to each other but not creating a distinct subspecies or species. This species living in the brackish waters or freshwaters along the coasts of the Mediterranean Sea including the mediterranean islands.

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PROBLEM SALENTINELLA ANGELIERI DEL.—DEB. AND  
RUFFO 1952 I NJENIH PODVRSTA  
(109. PRILOG POZNAVANJU AMPHIPODA)

Re z i m e

U radu je studiran problem taksonomije vrste *Amphipoda* iz podzemnih voda Jugoslavije, Italije i Grčke, *Salentinella angelieri* Del.-Deb. i Ruffo 1952.

Vrstu *Salentinella angelieri* su opisali D. Deboutteville i Ruffo 1952 godine iz podzemnih voda potoka Casaluna na otoku Korzici.

S. Karaman je opisao 1953 godine vrstu *Salentinella gracillima balcanica* iz podzemnih voda Dubrovnika i špilje Šipun u Cavtatu. Kasnije je G. Karaman (1967) ovu podvrstu prebacio u vrstu *S. angelieri* kao dobru podvrstu.

S. Baschieri je opisao 1952 godine novu vrstu iz špilje Grotta di Punta degli Stretti (Italija). *Salentinella denticulata*.

Ruffo je opisao 1953 godine novu podvrstu *Salentinella angelieri* pisana iz Toskane (Italija) i vrstu *Salentinella franciscoloi* iz Piemonta, Italija, navodeći vrstu *S. ang. angelieri* i za južnu Grčku. Nešto kasnije je Ruffo (1960) našao *S. angelieri* na Balearima i Sardiniji.

Dancau je opisao 1973 godine seksualne razlike između mužjaka i ženki vrste *Salentinella* sp. sa otoka Majorca ne uspjevši odrediti tačno o kojoj se vrsti radi. Napokon, Pesce je 1979 godine naveo da postoje seksualne razlike između mužjaka i ženki vrste *S. angelieri* iz Italije.

Na osnovu dosta bogatog materijala ove vrste iz Jugoslavije, Italije i Grčke, utvrđen je veliki varijabilitet ove vrste i pokazano je da su podvrste *S. angelieri* pisana, *S. angelieri balcanica*, vrsta *S. franciscoloi* iz Italije i vjerovatno *S. species* sa Majorke ustvari pripadnici jedne iste vrste i podvrste, *Salentinella angelieri*.