

## The genus *Nidularia* TARGIONI-TOZZETTI, 1869 (Homoptera, Coccinea)

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(Mit 3 Textabbildungen)

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### Zusammenfassung

Im ersten Teil der vorliegenden Arbeit werden die Verwandtschaftsverhältnisse der Gattung *Nidularia* TARGIONI-TOZZETTI, 1869, zu verschiedenen Gattungen und Familien der Coccinea untersucht. Der zweite Teil bringt eine ausführliche Wiederbeschreibung des adulten Weibchens und des ersten Larvenstadiums von *Nidularia pulvinata* (PLANCHON, 1864), der Genustype von *Nidularia*. Zugrundegelegt sind der Beschreibung Original-Exemplare der Sammlung SIGNORET.

### Summary

In the first part of the present paper the affinities of the genus *Nidularia* TARGIONI-TOZZETTI, 1869, to various genera and families of the Coccinea are studied. The second part deals with the detailed redescription of the adult female and the first larval stage of *Nidularia pulvinata* (PLANCHON, 1864), the genus type of *Nidularia*. The description is based on the original specimens of the Collection SIGNORET.

### Streszczenie

W pierwszej części pracy badano stosunek pokrewieństwa pomiędzy rodzajem *Nidularia* TARGIONI-TOZZETTI, 1869, a różnymi rodzajami i rodzinami Coccinea. W drugiej części podano szczegółowy ponowny opis dorosłych samic i pierwszego stadium larwalnego *Nidularia pulvinata* (PLANCHON, 1864), gatunku typowego *Nidularia*. Jako podstawa do opisu posłużyły oryginalne egzemplarze ze zbioru SIGNORETA.

The discussion on the taxonomic and nomenclatural status of *Nidularia* has been lasting for dozens of years. *Eriococcus*, *Gossyparia*, *Rhizococcus*, *Atriplicia*, *Pedronia*, *Scutare*, *Uhleria*, *Acanthococcus*, *Pedrococcus*, *Spinococcus*, *Querceticoccus*, *Talla* and *Kermes* have been involved with this genus in various combinations and synonyms (for details see HOY 1963). Commenting upon the records of SIGNORET (1875), MARCHAL (1908), BALACHOWSKY (1937) and GOMEZ-MENOR (1937), FERRIS (1957) stated: "Concerning this genus there is at present information of but the slightest value" and "neither of which

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tell us what we need to know". HOY (1963) concluded: "The status of this genus will remain uncertain until an adequate description is available".

In the present paper the type species of the genus — *Nidularia pulvinata* (PLANCHON) — is redescribed. The description is based on original specimens of SIGNORET made available by Dr. A. KALTENBACH (Naturhistorisches Museum, Vienna). I am very grateful for his kind assistance.

### *Nidularia* TARGIONI-TOZZETTI

*Nidularia* TARGIONI-TOZZETTI, 1869: 727; SIGNORET 1875: 17; HOY 1963: 171; MORRISON & MORRISON 1966: 134;

*Querceticoccus* LINDINGER, 1933: 117 (substitution). For further synonyms and records see HOY, 1963.

Type species: *Coccus pulvinatus* PLANCHON, 1864, by subsequent restriction of SIGNORET, 1875.

Diagnosis: Adult female. Labium large, conical, clearly 3-segmented, with 2, 1 and 4 pairs of setae on respective segments. Antennae vestigial, legs absent. Spiracles with groups of quinquelocular pores at opening. Posterior abdominal segments markedly modified — anal lobes absent, anal ring complete, circular, broad, cellular, with 6 short setae, translocated on ventral face, far from posterior body end. Dorsal surface with tubercles in regular rows in young specimens; devoid of any dermal structures except microtubular ducts and usual tubular ducts, the latter confined to small area on posterior body end. Ventral face with sparse, small, marginal, submarginal and medial setae; quinquelocular and multilocular pores, very abundant tubular ducts, ventral microducts (cruciform pores?) and dorsal microducts, the latter distributed on margin, distal to row of setae. Young specimens subcircular, flattened dorso-ventrally; egg-laying females irregularly ovoid. Dorsal surface with "waxy or lac" covering. Ovisac felted, formed ventrally and marginally. On *Quercus* in Mediterranean region.

Two species are currently included in the genus: *N. pulvinata* (PLANCHON) and *N. balachowskii* BODENHEIMER (the latter not examined in this course).

Affinities: TARGIONI-TOZZETTI (1869) placed the genus within the Lécanites (= Coccidae). SIGNORET (1875) suggested that this designation was based on the fact that TARGIONI-TOZZETTI had not known *Nidularia pulvinata* in nature, and transferred it, as monotypic, to the Acanthococcites (= Eriococcidae). This designation has been accepted, although with some reservation, by BORCHSENIUS (1949), FERRIS (1957) and HOY (1963). According to MORRISON & MORRISON (1966) *Nidularia* "can assign close to *Kermes*".

On the basis of the present findings this genus belongs definitely to the Eriococcidae family group as understood by KOTEJA (1974), as it has a distinctly 3-segmented labium with no more than 7 pairs of setae on apical segment (total number less than 11 pairs). Among the numerous families of this group, only Kermesidae can be considered as potential relatives of the genus in question.

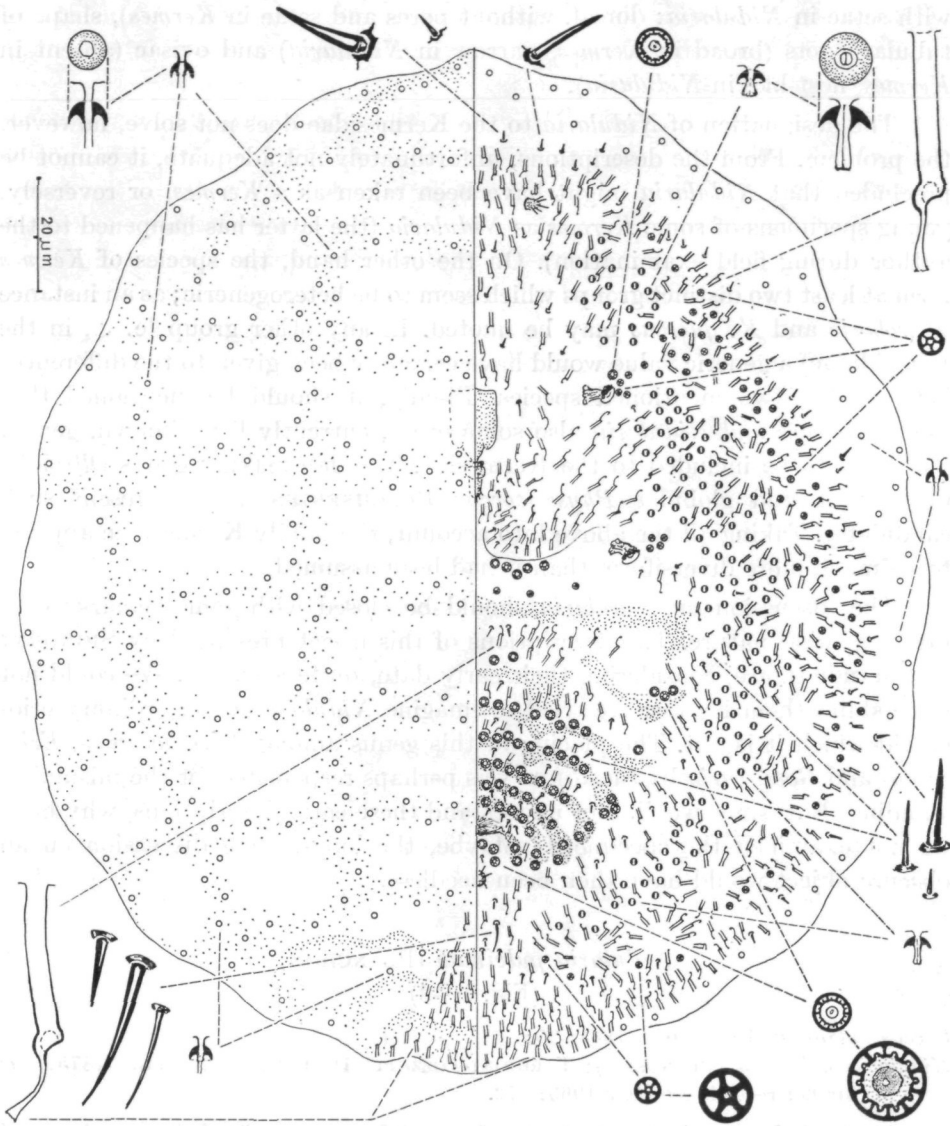


Fig. 1. *Nidularia pulvinata* (PLANCHON), adult female, young specimen

*Nidularia* shares with *Kermes* the identical mouthparts, structure of dorsal microducts, differentiation of sessile pores into distinct quinquelocular and multilocular types, arrangement of tubular ducts in a wide ventral sub-marginal band, marked reduction of antennae and legs (the latter absent in *Nidularia* and some *Kermes*), tuberculate dorsal surface in young females *Nidularia* and some *Kermes*, ventral position of anal ring in first stage larva, numerous simple eyes and structure of genitalia in male. The two genera may be distinguished by the position and structure of anal ring (ventral, cellular,

with setae in *Nidularia*; dorsal, without pores and setae in *Kermes*), shape of tubular ducts (broad in *Kermes*, narrow in *Nidularia*) and ovisac (absent in *Kermes*, nest-like in *Nidularia*).

The designation of *Nidularia* to the Kermesidae does not solve, however, the problem. From the descriptions, unfortunately not adequate, it cannot be precluded that *Nidularia* might have been taken as a *Kermes*, or reversely, young specimens of some *Kermes* as *Nidularia* (the latter has happened to the author during field examination). On the other hand, the species of *Kermes* form at least two distinct groups which seem to be heterogeneric; as an instance *K. roboris* and *K. quercus* may be quoted. In any other group (e. g., in the Diaspididae) a generic value would have certainly been given to the differences between the two mentioned species. Finally, it should be mentioned that beside *Kermes* and *Nidularia* also some other, currently little known, genera will have to be included to the Kermesidae. The gall-making genus *Olliffiella* COCKERELL and globular *Physericoccus* BORCHSENIUS may represent such candidates. Taking all the above into account, the family Kermesidae appears to be much more diversiform than it had been assumed.

The discussion on *Nidularia* should be closed with some remarks of a rather general nature. The descriptions of this insect presented by SIGNORET and MARCHAL are, considering their early date, quite accurate. We could not understand them because we tried to imagine *Nidularia* as an ordinary erio-coccid which it is not. The placing of this genus among *Acanthococcus*, *Eriococcus* and *Gossyparia* by SIGNORET was perhaps responsible for the misunderstanding. But, since we did not understand these early descriptions, why have we not examined the specimens? Maybe, the long-lasting discussion on an obscure object would have then been needless.

*Nidularia pulvinata* (PLANCHON)

(Fig. 1—3)

*Coccus pulvinatus* PLANCHON, 1864: 25;

*Nidularia pulvinata* (PLANCHON); TARGIONI-TOZZETTI 1869: 727; SIGNORET 1875: 17;  
for further records see HOY 1963: 172.

Material studied: 10 dry and 10 slide mounted adult females and 2 first stage larvae before hatching, labelled "*Nidularia pulvinata* PLANCHON, *Quercus ilex* L., Cannes, Gall. merid., det. SIGNORET", preserved in the Naturhistorisches Museum, Vienna.

Adult female: External appearance. Young specimens broadly oval, nearly circular, flat ventrally, slightly convex dorsally; with characteristic dorsal tubercles, arranged in regular rows, about 5 tubercles on each segment (some tubercles doubled) (SIGNORET, 1875, Pt. 2, Fig. 1); "jaune rougeâtre ou olivâtre un peu marbrée" (MARCHAL 1908: 260). During oviposition females become irregularly ovoid (depending on the place on which they are sitting), with the derm to which the mouth parts are attached extended into a beak-like

projektion (Fig. 3). Young specimens covered with a fragile layer of wax or lac. During the rapid growth the layer springs into pieces and the females produce ventrally and laterally a nest-like ovisac which resembles the conditions in *Gossyparia spuria* (SIGNORET 1875; MARCHAL 1908: 260).

Mounted specimens (Fig. 1). Cuticle very thick but absorbing little stain; dilaminated at all surface (preparation artefact); outer layer thin, membranous,

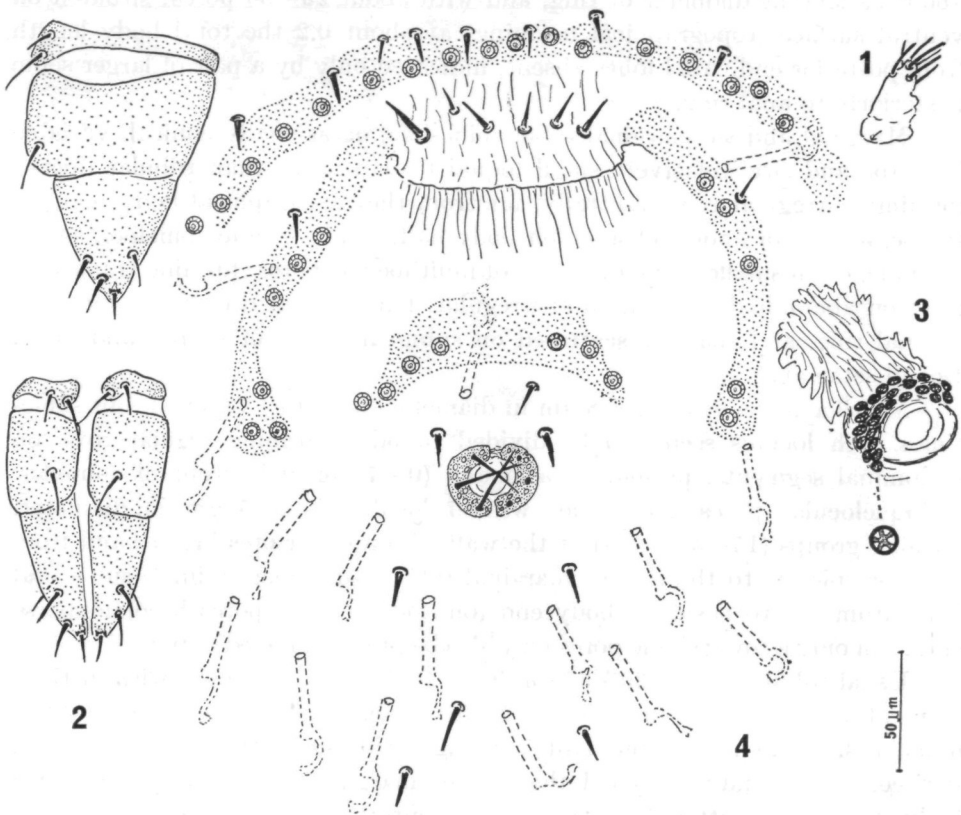


Fig. 2. *Nidularia pulvinata* (PLANCHON), adult female; 1 — anterior and lateral views of labium, 2 — antenna, 3 — posterior spiracle, 4 — anal region

bearing setae and cuticular structures of glands; inner layer thick, structurless. Largest available specimens about 4.5 mm long, 3 mm wide.

Eyes poorly developed, situated ventrally, at about the level of antennae. Antennae (Fig. 2: 2) vestigial, not segmented (according to MARCHAL 3-segmented), 30—36  $\mu\text{m}$  long, with 9—11 setae. Legs entirely absent, except minute projections smaller than tubular ducts observed in some specimens which may represent rudimentary legs. Clypeolabral shield subrectangular, about 150  $\mu\text{m}$  long, 100  $\mu\text{m}$  wide, without clypeal setae, but with a pair of labral setae. Labium (Fig. 2: 1) about 120  $\mu\text{m}$  long, 80  $\mu\text{m}$  wide, attached half way between anterior and posterior spiracles (young specimens considered); 3-segmented; basal segment

well developed, with 2 pairs of setae; medial segment cylindrical, with 1 pair of setae; apical segment conical, with 4 pairs of setae, including apical, subapical, anterior and posterior setae. Spiracles (Fig. 2: 3) relatively small, peritreme 26–36  $\mu\text{m}$  in diameter, with a group of 15–35 quinquelocular pores at the wall of spiracular opening. Anal ring (Fig. 2: 4) complete, broad, circular, about 30  $\mu\text{m}$  in diameter, with 6 setae (8 according to MARCHAL, 1908), about as long as diameter of ring, and with about 25–30 pores; situated on ventral surface (topographical meaning) at about 0.2 the total body length from posterior end. Anal lobes absent, indicated only by a pair of larger setae posteriorly to anal ring.

Marginal and submarginal setae spine-like, occasionally conical, variable in shape and size, relatively small (equal to or shorter than tubular ducts), forming 2 irregular rows ventrally, far from the topographical body margin; sparse, a total of about 30 setae on body half. Ventral setae spinelike, small, variable, often smaller than diameter of multilocular pores; forming transverse rows on abdominal segments and irregular, longitudinal rows from antennae to anal ring, and sparsely scattered on submedial area of thorax and head. Dorsal setae absent.

Multilocular pores about 8  $\mu\text{m}$  in diameter, with 10–12 loculi, but sometimes each loculus seems to be divided radially; forming regular rows on abdominal segments, present occasionally (0–7 pores) in front of spiracles. Quinquelocular pores (sometimes with 7 loculi) about 5  $\mu\text{m}$  in diameter, forming groups (15–35 pores) at the wall of spiracular opening, a band from anterior spiracle to the row of marginal setae and a longitudinal, sublateral band from eye to posterior body end (on abdomen the pores become sparse and form only a row); single pores may also be present on medial part of thorax.

Usual tubular ducts, 30–35  $\mu\text{m}$  long, 4–5  $\mu\text{m}$  in diameter, with distinct filament about 12  $\mu\text{m}$  long; inner orifice strongly sclerotized, cup a little broader than tube; very abundant, forming a wide sublateral band on ventral surface, not extending beyond the row of marginal setae (except posterior body end) and scattered on remaining ventral surface; on dorsal surface ducts form a triangular, medial cluster on 3–4 posterior segments.

Dorsal microducts consist of an outer tube and a strongly sclerotized knob, about 4  $\mu\text{m}$  in diameter, from the center of which a membranous, open tube extends somewhat further. The ducts are regularly distributed on dorsal surface (in grooves between tubercles) and scattered on ventral margin (topographically) outside the row of marginal setae. They are similar to those described in *Kermes* (FERRIS 1955) and may be homologous with the eriococcid dorsal microducts.

The structure of the ventral microducts is similar to the above described but differs as follows: the outer tube is much shorter, the diameter of knob is larger (about 5  $\mu\text{m}$ ), the inner tube seems to be divided longitudinally into two parts and closed at the end. The ducts form a wide band from antenna to anal ring; the band is interrupted near anterior spiracle where quinquelocular pores

occur. From the distribution, and to some degree from the structure, it seems to be likely that they are homologous with the eriococcid cruciform pores.

First stage larva (description based on embryo)

Body elongate-oval. Antenna 6-segmented, with following setae: 3 on I, 2 on II, 1 on III, 1 fleshy seta on IV, 1 fleshy and 4 hair-like setae on V, 9 fleshy setae on VI; longest setae on segment VI shorter than segment. Mouth parts very large, of identical structure as in female. Tarsus (without claw) twice the length of tibia; claw without a denticle; all digitules dilated apically; coxa with 4 apical setae, trochanter with 2, femur with 5, tibia with 4, tarsus with

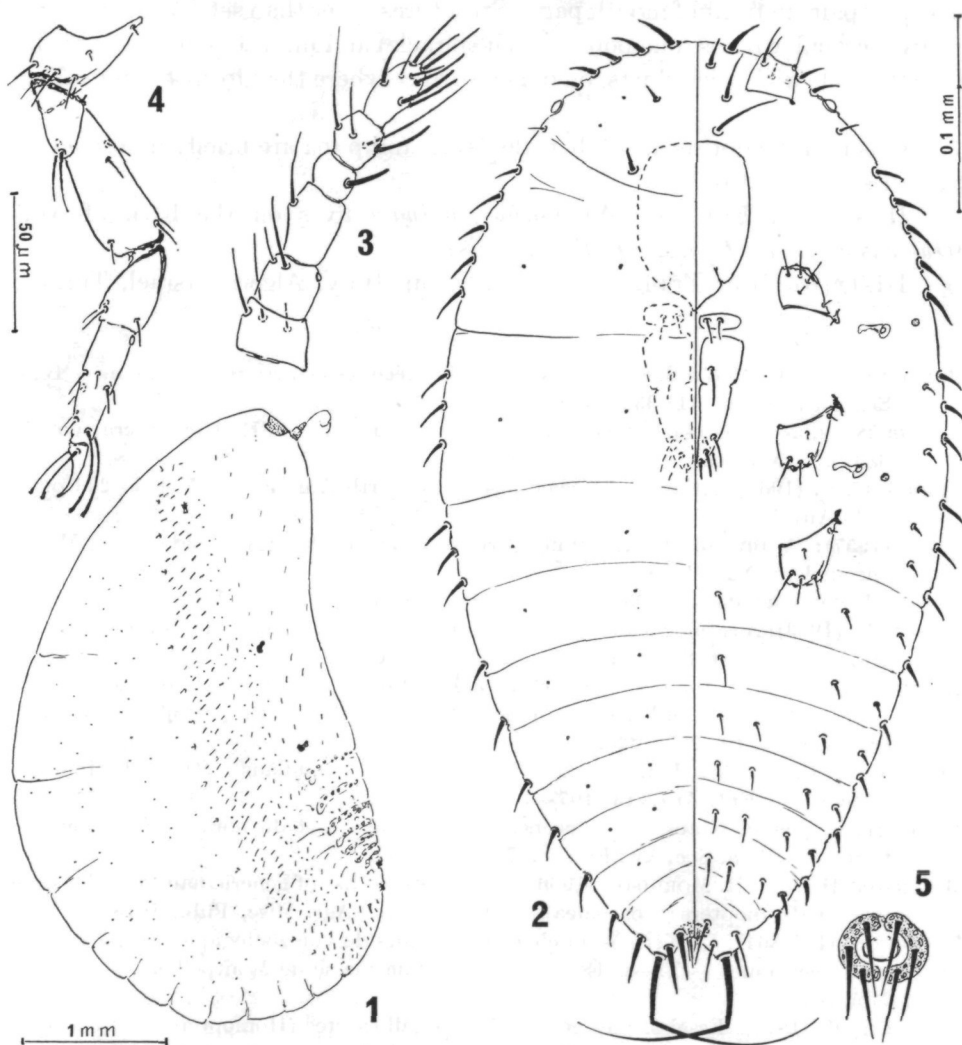


Fig. 3. *Nidularia pulvinata* (PLANCHON); 1 — egg-laying female, lateral view, 2—5 — first instar larva (reconstruction from embryo), 2 — dorsal and ventral views, 3 — antenna, 4 — anterior leg, 5 — anal ring

7 setae. Anal ring round, cellular, with 6 setae. Anal lobes developed, with long apical seta, 3 strong, conical dorsal and 3 hair-like ventral setae.

Marginal setae spine like but with somewhat hair-like pointed apex, forming a clear row, in following number: 5 setae from front to eye, 6 setae from eye to anterior spiracle, 3 setae between anterior and posterior spiracles, 9 setae from posterior spiracle to anal lobe. Submarginal setae of similar structure, but smaller: 1 on head, 5 on thorax and 1 on each abdominal segment. A row of minute setae is situated more medially on abdomen. Midventral setae present between antennae and clypeus (2 pairs) and on abdomen (1 pair on 2 anterior and 2 pairs on 4 posterior segments. Dorsal surface devoid of setae except 2 pairs in front of mouth parts. Structures other than setae are represented by spiracular pores (one pore at each spiracle) and minute pores, supposedly homologous with microducts, on dorsal surface where they form 4 longitudinal rows.

Other stages not seen. Adult male, larva and pupa are briefly described by SIGNORET (1875: 19).

Host and habitat: *Nidularia pulvinata* lives on the bark of oaks (*Quercus coccifera*, *Q. ilex*, *Q. ithaburensis*).

Distribution: France, Portugal, Spain, Italy, Algeria, Israel, Turkey.

#### References

- BALACHOWSKY, A. (1937): Sur quelques cochenilles récoltées au cours d'Avignon. — Bull. Soc. ent. France, **41**: 339—340.
- BORCHSENIUS, N. S. (1949): Pseudococcidae. — In: Fauna SSSR, Homoptera, vol. 7: 383 p. — Moskva.
- FERRIS, G. F. (1955): Atlas of the scale insects of North America. — Vol. 7: 233 p. — Palo Alto.
- (1957): A review of the family Eriococcidae (Insecta: Coccoidea). — Microentomology, **22**: 81—89.
- GOMEZ-MENOR ORTEGA, J. (1937): Cócidos de España. — 42 p. — Madrid.
- HOY, J. M. (1963): A catalogue of the Eriococcidae (Homoptera: Coccoidea) of the world. — N. Zealand Dept. Sci. Industr. Res. Bull., **150**: 1—260.
- KOTEJA, J. (1974): On the phylogeny and classification of the scale insects (Homoptera, Coccinea) (discussion based on the morphology of the mouth parts). — Acta zool. cracoviensia, **19**: 267—325.
- LINDINGER, L. (1933): Beiträge zur Kenntnis der Schildläuse (Homipt.-Homopt. Coccid.). — Ent. Anz., **13**: 107—108.
- MARCHAL, P. (1908): Notes sur les cochenilles de l'Europe et du nord de l'Afrique (1re partie). — Ann. Soc. ent. France., **77**: 223—309.
- MORRISON, H. & E. R. MORRISON (1966): An annotated list of generic names of the scale insects (Homoptera: Coccoidea). — U. S. Dept. Agr. Misc. Pub., **1015**: 1—206.
- PLANCHON, G. (1864): Le Kermès du chêne aux points de vue zoologique, commercial et pharmaceutique. — Thesis École Supér. de Pharmacie de Montpellier. — 47 p. — Montpellier.
- SIGNORET, V. (1875): Essai sur les cochenilles ou gallinsectes (Homoptères — Coccides), 14e partie. — Ann. Soc. ent. France., (ser. 5) **5**: 15—40.
- TARGIONI-TOZZETTI, A. (1869): Introduzione alla seconda memoria per gli studi sulle cocciniglie, e catalogo dei generi e delle specie della famiglia dei coccidi. — Atti Soc. ital. Sci. nat., **11**: 694—738.



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