

Glossary for anatomical terms of Asellota

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This glossary contains definitions of morphological terms originally used by Wilson (1985; 1989) with an emphasis on the family Munnopsidae in the asellotan superfamily Janiroidea and Wilson (1997) (more generally for Crustacea and Isopoda). Kensley & Schotte (1989) also provide a glossary for terms used in isopod systematics. Terminology of Hessler (1970), Wolff (1962) and homologies established in Wilson (2009) and Riehl and Wilson (in press) are employed throughout.

Aesthetasc. A long, tubular sensory seta having thin cuticle, found on the antennula. Aesthetascs may have a chemosensory function, because males generally have many more than females.

Ambulosome. The anterior part of the thorax (tagma) of munnopsid isopods that bears the walking legs. It consists of pereonites 1-4.

Ambulosomite. A body segment of the ambulosome.

Annulus (plural annuli). A distal segment of the either the antenna or antennula, generally tubular in form.

Antenna (synonym, second antenna). The second, paired, cephalic appendage. It consists of four short, robust, proximal segments, two long, intermediate segments, and a series of tapering annuli, called the flagellum. The podomeric articles, using the terminology of Hansen (1893) The third basal segment bears a smaller, lateral appendage called the scale that is homologous to the exopod in other Crustacea.

Antennula (synonyms first antenna, antennule). The first paired cephalic appendage. In most janiroidean isopods, it consists of a robust basal segment, two segments of intermediate thickness, and distal annular segments of varying lengths. The distal segments bear aesthetascs of varying number. The third article bears a rudimentary flagellum in some isopods, identifying this podomere as the basis; the first two articles, therefore are the precoxa and coxa, respectively, using terminology established by Hansen (1893). Owing to the extreme variability in segmental counts and form, the distinction between podomeres and flagellum is unclear, so articular counts are usually best made starting at the base.

Appendix Masculina. An alternative name for a stylet-like copulatory structure on the male pleopod II. This structure is not homologous to similarly named structures found in non-isopod Eumalacostraca.

Article. A segment of any limb, but usually applied to the antennula or antenna.

Articular Plate. A small triangular plate on the posterior distal margin of the propodus of the walking legs. It encloses the posterior articular condyle of the dactylus.

Basis (plural Bases). The second segment of a thoracic limb. See pereopod. Also the third article of the antennula or antenna (NB: if the precoxal article 1 is not expressed, the antennal basis will be the second apparent article).

Biarticulate. Consisting of two articles or segments.

Bifid. A structure with two distal tips, as in unequally bifid seta.

Biramous. Having two branches, a typical condition for most primitive crustacean appendages.

Brooding Female. An adult female with fully-extended oostegites on the coxae. In most deep-sea samples, the developing embryos are lost during sample processing, so it is generally not possible to tell whether the female was in fact brooding embryos, or the young were released before sampling.

Carpus. The fifth segment of a thoracic limb. See pereopod. Also the sixth article of the antennula or antenna (NB: if the antenna precoxal article 1 is not expressed, the carpus will be the fifth apparent article).

Cephalic Dorsal Length. The length of the cephalon measured in a straight line along the dorsal midline from the posterior edge to the anterior vertex or rostrum, depending on which is present.

Cephalon. The head, or anteriormost body unit. In isopods, the cephalon bears the eyes, mouth, antennulae, antennae, and 4 pairs of mouthparts (mandibles, maxillulae, maxillae, and maxillipeds).

Chaetotaxy. The form, number, and shapes of the setae.

Circumgnathal. Around the biting or grinding surface, as in circumgnathal denticles.

Claw, Dactylar. A modified seta found on the distal segment of the walking legs that is heavily sclerotized and has a sharp tip.

Clypeus. An unpaired dorsal unit of the cephalon bearing the labrum medially and the mandibular fossae laterally and ventrally. The fossae articulate with the dorsal condyle of the mandibles.

Condyle. In general, the condyle may be any articular projection of any limb that allows rotation of the distal article around its axis. For mandibles, it is a heavily sclerotized projection that articulates with the head in the clypeal fossa on the dorsal side, and posteriorly with the head.

Copulatory Male. A fully adult male in the asellote isopod superfamily Janiroidea identified by having a sperm tube of the second pleopod's stylet that is open at its sharp distal tip. In some specimens at this terminal stage, the vas deferens connecting to the penile papilla is visible through the cuticle.

Coupling Hooks (synonym Receptaculi). Modified setae on the medial margin of the maxilliped's basal endite that have bulbous recurved and denticulate tips. They couple with their paired counterparts so that both maxillipeds can act as a single unit.

Coxa. The first or basal segment of a thoracic appendage. See pereopod.

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Cuspate (synonym cuspidate). Having a sclerotized surface or margin with one or more rounded projections.

Cuticular Combs. Tiny arc shaped or linear groups of cuticular spines, most easily seen on the distal parts of the mandibular palp, but may occur elsewhere on the cephalic appendages.

Cuticular Organ. The paired female copulatory organ found only in *Asellota* that opens ventrally in or near the oopore, or in various places on pereonite 5: anterodorsally, laterally in or near the articular membrane separating pereonites 4 and 5, anteroventrally, or laterally at the tergal margin. The opening is difficult to see in untreated specimens, so clearing using lactic acid or turpeneol may be necessary. Macerating specimens in potassium hydroxide is the easiest way to find this organ, but the surrounding tissues and the oviduct are lost.

Cuticular. Of the cuticle.

Dactylus. The seventh or distal segment of a thoracic appendage, bearing one or more distal claws. See pereopod.

Denticle. A short, pointed, tooth-like projection of the cuticle.

Denticulate. Having denticles.

Dorsal Orifice. The distal opening of the sperm tube in the janiroidean male first pleopod.

Dorsum (plural Dorsa). The dorsal surface of a body segment.

Endopod. The medial or interior ramus of a crustacean appendage. In the Isopoda, another name for a thoracic appendage (exclusive of the coxa and basis), although more typically applied to inner ramus of a pleopod or a uropod.

Epimere. A lateral fold of a somite's integument dorsal to the limbs. Sometimes called the pleurite or tergal fold.

Epipod. Laterally directed lobe (exite) of the basal segment (coxa) of the maxilliped.

Exopod. The lateral or exterior ramus of a crustacean basis. In the Isopoda, applied to the outer ramus of a pleopod or a uropod.

Facies. An appearance or similarity, as in "Ilyarachnoid Facies" (Wilson, 1985) or "caridoid facies" (Hessler, 1983).

Flagellum (plural flagella). The long, tapering distal part of either the antennula or antenna, generally made of many annuli, and corresponding to the malacostracan propodus and dactylus, but without intrinsic musculature, so are not podomeres.

Foliaceous. Leaf-like.

Foregut (synonym Stomodeum). The crop-like anterior portion of the gut that is lined with cuticle and has openings to the lateral digestive caeca and the posterior midgut.

Fossa. A ventral trough in the clypeus into which the mandible's condyle articulates.

Fossosome. Anterior pereonites 1-3 that are robust and integrated into a single unit having reduced expression of the intersegmental margins. The associated limbs are robust, with multiple rows of robust setae, and are assumed to be fossorial in function.

Frons. The anterior part of the cephalon bearing the clypeus and lying between the antennulae and antennae and below the rostrum or vertex.

Frontal Arch. A thickening of the cephalic frons that provides a strengthened arch between the fossal regions of the clypeus on either side of the frons. Generally associated with enlarged and heavily sclerotized mandibles.

Geniculate. Knee-like, or displaying an acute angle between two or three segments. As in geniculate segments 2 and 3 of the antennula, or antennal articles 3-5 in Joeropsididae.

Gnathal. Of the biting or grinding surface on the mandible.

Gnathopod. First or second pereopod differing in function and appearance to following pereopods, usually chelate or subchelate and used for manipulation of food.

Gravid. Bearing fully formed ova or embryos in the ovary. This is the condition of fully mature preparatory females.

Habitus. Appearance of the whole animal, usually in dorsal or lateral view.

Hindgut (synonym Proctodeum). The posterior portion of the gut connected to the anus and lined with cuticle.

Incisor Process. The distal biting part of the mandible that typically bears one or more pointed cusps. On its medial side, it bears the spine row.

Indurate. Heavily sclerotized or calcified, and often rough.

Instar. A discrete stage in a growth series, delimited by successive moulting.

Interantennular. Between the antennae.

Ischium (plural Ischia). The third segment of a thoracic appendage. See pereopod. Also the fourth article of the antennula or antenna (NB: if the precoxal article 1 is not expressed, the antennal basis will be the third apparent article).

Labrum. An unpaired, flat segment of the cephalon that articulates with the clypeus, and anteriorly covers the mandibles.

Lacinia Mobilis (or Lacinia). An enlarged, nearly articulated spine of the mandible's spine row that is adjacent to the incisor process. It is found on both mandibles but in distinctly different expression. On the right mandible, the lacinia mobilis is a large spine similar in shape to the more posterior members of the spine row. Richter et al. (2005)

Lamella. A broad flattened appendage.

Locking Folds, Dorsal. Paired projections of the male first pleopods' dorsal cuticle. They form a seat for the medial edge of the second pleopods, allowing both pairs of pleopods to function together as an operculum,

Manca. One of the first three stages or instars of an isopod's postmarsupial life cycle, wherein the seventh pereopod is absent or rudimentary. In some Asellota and other

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isopods (e.g., Gnathiidae; some Anthuridea), this condition is retained in the adult, so the manca stage cannot be identified using these criteria. In such species, other secondary sexual features should be sought, such as oostegites, mature male pleopods or antennular development.

Mandible. The third cephalic appendage, and first mouthpart appendage of isopods. It generally has a lateral three-articled palp and is made up of the following functional regions: incisor process, spine row, molar process, dorsal condyle, and posterior articulation.

Marsupium. A ventral pereonal enclosure on females for developing embryos. It is composed of oostegites projecting medially from the coxae of the pereopods. The oostegites have varying segmental expression across the isopods, but occur on thoracosomites 1-5 in the Asellota, but more typically 2-5 in most species.

Maxilla (plural Maxillae, synonym Second Maxilla). The third paired mouth part and fifth cephalic appendage. In the Janiroidea (Asellota: Isopoda), it consists of a basal segment bearing three setose lobes. The medial lobe is the protopod with often complex setation, and the lateral 2 lobes are endites generally of similar chaetotaxy, consisting of elongate bidenticulate setae.

Maxilliped. Paired appendage on the posterior and ventral edge of the cephalon. Actually it is the first thoracic appendage, but its body somite is fused into the cephalon, and it is modified for feeding. It consists of the following functional parts: coxa, basis bearing a flattened and setose endite, palp with 5 segments (ischium, merus, carpus, propodus, dactylus), and epipod attached laterally to the coxa.

Maxillula (plural Maxillulae, synonyms Maxillule, Second Maxilla). The second mouth part and fifth cephalic appendage. In the Janiroidea, it consists of two setose lobes: a large outer lobe armed with robust, tooth-like setae, and a smaller inner lobe with small setae. Primitively, the inner endite has a row of large pappose setae, although these are reduced considerably in the Asellota.

Merus (plural Meri). The fourth segment of a thoracic appendage. See pereopod. In the antenna, the merus corresponds to podomeric article 5 in those taxa where the precoxa is expressed.

Midgut. The central region of the crustacean gut. Unlike the fore and hind gut, this region lacks cuticle.

Molar Process. A medial process of the mandible. Primitively, it has a broad, distal, triturating surface with circumgnathal denticles, a posterior row of broad, setulate spines, and sensory pores on the distal surface.

Natapod. A natatory pereopod of the Munnopsidae, pereopods V-VII.

Natasome. The often posteriorly streamlined body section of the Munnopsidae consisting of the body segments: heavily muscularised pereonites 5-7, and the pleotelson.

Natasomite. A pereonite of the natasome.

Oopore. A paired female opening in the ventral cuticle of pereonite 5, through which the fertilised ova are released via the oviduct into the marsupium.

Oostegites. Lamellar lobes of cuticle extending medially from the coxa of an adult female isopod. They may be seen in two ontogenetic forms: developing oostegites are small fat lobes that do not cross the ventral midline; oostegites of the brooding female are broad, long lamellae that overlap on the ventral midline, forming a marsupium for the developing embryos. The oostegites have varying segmental expression across the isopods, but may occur on thoracosomites 1-5 in the Asellota, but more typically 2-5 in most species.

Operculum/Opercular. A covering/forming a covering. For female janiroidean Asellota, the operculum equates to a plate over the branchial chamber of the abdomen consisting of the fused second pleopods (the first pleopods are absent in these isopods).

Oviduct. An often complex female organ connecting the ovaries to the oopores. In the Asellota, it consists of the following functional subsections: outer tissues surrounding internal parts; spermatheca, which may or may not be covered with cuticle; and cuticular organ, an often complex cuticular tube that opens either near or in the oopore or in various places on pereonite 5. (see also terms spermatheca and cuticular organ).

Ovigerous. Bearing developing embryos in the marsupium. (See also gravid).

Palp. A lateral appendage of the mandible or the maxilliped.

Paragnaths (synonyms Paragnathae or Lower Lips or Hypostome). A pair of ventral projections of the cephalic cuticle just posterior and medial to the mandibles. It consists of two pairs of lobes, a broad lamellar outer pair with hair-like spinules on their inner margins and a thick inner pair covered with many hair-like spinules.

Paucisetose. Having few setae.

Penile Papillae (synonym Penes). Male cuticular projections on the posterior and medial margin of the seventh pereonite. They contain the openings of the vasa deferentia.

Pereon (alternative spelling: Pereion). Thoracic segments 2-8 bearing the locomotory appendages, or pereopods. (Thoracic segment 1 is part of the cephalon and bears the maxilliped).

Pereonite (alternative spelling: Pereionite). A segment of the pereon, equivalent to malacostracan thoracosomites 2 – 8.

Pereopod (alternative spelling: Pereiopod). One of the seven pereonal appendages. Consists of the following segments: coxa, basis, ischium, merus, carpus, propodus, dactylus. The coxa of adult female bears oostegites. The distal five podomeres are homologous with the endopod of the more primitive biramous thoracic limb of other Crustacea.

Pleonite. A segment of the abdomen. Primitively, Malacostraca have six free pleonites and a telson; in isopods, the sixth pleonite is fused to the telson to form a 'pleotelson'.

Pleopod. One of the first five paired, biramous, ventral limbs of the pleotelson. In unmodified form, it consists of a basal segment, the protopod, and two distal rami, the endopod and the exopod. The rami may be biarticulate. Female Asellota lack the first pleopods. In male Asellota, the first pleopods are present only as uniramous structures (fused into a single elongate plate in the superfamily Janiroidea). The rami of the male

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second pleopod are modified as copulatory structures. Pleopods III-V have thin cuticle and function as gills (branchiae).

Pleopodal Cavity. The deeply concave ventral surface of the pleotelson that encloses the pleopods dorsally and laterally. Because the more posterior pleopods function as gills it is sometimes called the branchial cavity.

Pleotelson. Compound segment resulting from fusion of the sixth pleonite with the telson.

Podomere. A segment of a crustacean appendage that has intrinsic musculature. In the antenna, the podomeres (sometimes erroneously called “peduncle”) consist of the first 6 articles.

Preanal Ridge. A raised transverse ridge on the ventral surface of the pleotelson situated between the pleopodal (or branchial) cavity and the anus. In some Munnopsidae, this ridge becomes large and protrudes ventrally as a plate.

Prehensile. A limb that can grasp between two opposing adjacent podomeres, length of the distal segment may be subequal to or longer than proximal segment. The distal limb may rotate fully within an arc of 180 degrees, or may be limited by spines or robust setae on the proximal segment. Plesiomorphically, the prehensile condition includes only a robust propodus and a thinner dactylus. In the janiroideans, carpus, propodus and dactylus may be employed in grasping, which contributes to the diversity of the first pereopods in this superfamily.

Preparatory Female. An adult female that has developing oostegites, and often has fully gravid ovaries.

Propodus. The sixth segment of a thoracic appendage. See pereopod.

Protopod. The basal segment of the pleopods and the uropods. It consists of the fused coxa and basis of the crustacean limb, and may include the precoxa.

Pseudorostrum. A projection from the frons or frontal surface of the head, found in the Joeropsididae and the Stenetriidae. The pseudorostrum is distinctly separated from the dorsal surface of the head by a suture on the anterodorsal margin.

Quadrangular. Having a truncate distal margin at approximately right angles to the lateral sides.

Ramus (plural Rami). A branch of an appendage.

Recurved. Curved back on itself; perhaps hook-like.

Rostrum. A projection of the cephalic frons that may also include the dorsal surface of the cephalon.

Sclerotized. With thick and sometimes calcified cuticle.

Sensilla. A modified seta such as that found on the dactylus of the pereopods. It is similar to an aesthetasc, but has a heavier cuticle that may be covered with many tiny lobes (often only visible in a scanning electron micrograph). On the dactylus, sensillae occur between the dorsal and ventral claws, and on the anterior side of the dactylus (opposite to the propodal articular plate). This term may also be used for the sensory structure on sensillate setae.

Sensory Pore, Mandibular Molar. A small pit in the distal surface of the mandible's molar process that can be seen to connect internally to a nerve process.

Serrate. Having a row of short tooth-like denticles.

Seta (plural Setae). A cuticular process that is clearly articulated with the basal cuticle. This structure comes in many forms. The literature may refer to heavily sclerotized setae as "spines", even though they have smaller counterparts of the same form named "setae". "Spinose seta" or "spine-like seta" is more accurate.

Seta, Broom (synonym: penicillate seta). A sensory seta that has a distinct articulated pedestal, and two distal rows of long, extremely thin setules. It may be found on the antennulae or any of the pereopods.

Seta, Cleaning. An unusual multisetulate seta occurring in a curved row on the distal segment of the mandibular palp that are used to clean the antennae or antennulae.

Seta, Denticulate. A generally robust seta with either a row of denticles or a group of distal denticles.

Seta, Fan. A specialised seta on the distal tip of the maxilliped's endite. It is made of thin, hyaline cuticle (difficult to see) and is usually broad with many laterally pointed lobes. The fan setae may have two distinct types: a medial, more heavily sclerotized seta with fewer lobes, generally found on the distomedial corner of the maxillipedal endite; and a thin lamellar form placed in a row just proximal to the distal edge of the endite.

Seta, Hemiplumose. A modified form of the plumose seta in which setules are found in a row on only one side.

Seta, Pappose. A large seta with many fine setules in a curving row spiraling around the shaft so that the seta is surrounded by a layer of fine hairs.

Seta, Pedestal. A spine-like seta that is raised above the dorsal surface of the body by a pedestal-like outpocketing of the cuticle.

Seta, Plumose. A feather-like seta that has two dense rows of thin, long setules beginning at near the base of the seta and continuing to the tip. Plumose setae may vary considerably in the extent of the setules along the shaft.

Seta, Sensillate (synonym Unequally Bifid Seta). A seta that is often robust spine-like and has a smaller thin sensillum proximal to its tip. The hair can be seen to have a nerve extending into the cuticle.

Seta, Setulate. A seta with one or more rows of setules. This form is different from plumose or hemiplumose setae in that the row is limited to a section of the shaft, and does not extend from base to tip.

Seta, Unequally Bifid (synonym Sensillate Seta). A robust seta that is often spine-like and has a smaller thin sensillum proximal to its tip; see also Hessler (1970). The hair can be seen to have a nerve extending into the cuticle.

Seta, Whip. Similar to the unequally bifid seta, except that it is generally more slender, and the sensillum is on the distal tip and is long and curved.

Setule. A spine on a seta.

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Sperm Tube. A structure found only in male janiroidean Asellota. In two forms: (1) A cuticular tube in the stylet (distal segment of the endopod or appendix masculina) of the male second pleopod, consisting of a ventral opening to a rounded chamber in the centre of the stylet and a confluent tube to the tip of the stylet. (2) A cuticular tube formed by the medial fusion of the male first pleopods, consisting of a funnel-like proximal opening often covering the penile papillae and a confluent tube to a dorsal orifice roughly one quarter the length of the pleopods from their tips. During copulation, both tubes form a single channel from the penile papillae to the female's cuticular organ.

Spermatheca. A sperm reservoir inside or adjacent to the female oviduct with an opening to the cuticular organ. In females that have mated recently, the spermatheca may be seen to contain refractive and sinuous sperm packets.

Spine Row, Mandibular. A row of spines on the medial side of the mandible's incisor process. The lacinia mobilis on the left mandible is actually an enlarged member of the spine row.

Spine. A pointed outpocketing of the cuticle that is confluent with the cuticle at its base (not articulated), see also **seta**.

Statocyst. Small saclike sensory organ, usually containing a granule(s), used to indicate to the animal its orientation. Independently evolved statocysts occur in the pleotelson of Anthurideans and Macrostylidae (Janiroidea, Asellota).

Sternite. The ventral surface of a thoracic body segment, or a segment of the sternum.

Stylet, Male Pleopod II Endopod (synonym Appendix Masculina). A stylet-like copulatory structure on the male pleopod II, furnished with grooves or tubes to convey sperm packets to copulatory structures on the female. This structure is not homologous to similarly named structures found in other Eumalacostraca.

Subchelate. Having the functional ability to grasp by folding together two adjacent podomeres of a limb. These are referred to as opposing segments.

Support Ridge, Posterior Mandibular. A cuticular ridge on the body of the mandible that is a continuation of the dorsal condyle, but does not articulate with the fossa in the clypeus. Seen in isopods with especially robust mandibles, but not to be confused with the more robust pseudorostrum.

Supraclypeal. The area of the frons or head frontal surface above the clypeus.

Sympod (synonym Protopod). A appendage segment made of the fused basis and coxa.

Tagmosis. Organization of the body into integrated units of several segments. The fundamental form of the janiroidean isopod consists of the head (cephalon and thoracosomite 1), the pereon bearing walking legs (pereopods), and the pleon bearing the pleopods and the uropods. The pereon of a janiroidean is further divided into anterior pereonites 1-4 and posterior pereonites 5-7. Some families such as the Macrostylidae may have a highly integrated pereonites 1-3 (the fossosome), with pereonite 4 being not clearly grouped with the anterior or posterior pereonites. Another form is the integration of the posterior pereonites and the pleon into the natasome, a synapomorphy of the Munnopsidae.

Telson. The terminal segment of a crustacean's body, bearing the anus. In isopods, the telson is fused to the anterior pleonite(s) to form the pleotelson.

Tergite. The dorsal surface of a body segment, that may or may not project laterally. Tergites and coxal plates are not distinct in those taxa where the coxal articulation is not expressed (e.g., Oniscidea; Microcerberidea).

Thoracic. Of post-cephalic segments 1 through 8.

Tridentate. With three denticles.

Triturating Surface. The truncate distal surface of the mandible's molar process that opposes the same surface on its counterpart.

Unguis (synonym Claw). A robust, generally curved modified seta on the tip of the dactylus.

Uniarticulate. A limb or limb segment consisting of only a single segment.

Uniramous. A limb consisting only of a single branch.

Uropod. The terminal appendage of the body, belonging to the sixth pleonite. It consists of a basal segment, the protopod, and primitively in isopods with two uniarticulate rami, a larger endopod and a smaller exopod.

Vas Deferens. Male duct from the testis to the penile papilla (penes) for the passage of sperm.

Venter. The ventral or sternal side of the body.

Vertex. The anterior and medial margin of the cephalic dorsal surface.

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Literature Cited

- Hansen, H. J. 1893. Zur Morphologie der Gliedmassen und Mundtheile bei Crustaceen und Insekten. *Zoologischer Anzeiger*, 16:193–212.
- Hessler, R. R. 1970. The Desmosomatidae (Isopoda, Asellota) of the Gay Head-Bermuda Transect. *Bulletin of the Scripps Institution of Oceanography* 15:1-185.
- Hessler, R. R. 1983. A defense of the caridoid facies; wherein the early evolution of the Eumalacostraca is discussed. pp. 145-164 in F. R. Schram (ed.), *Crustacean Phylogeny (Crustacean Issues 1)*. A.A. Balkema, Rotterdam.
- Kensley, B. and M. Schotte. 1989. *Guide to the Marine Isopod Crustaceans of the Caribbean*. Washington, D.C. & London, Smithsonian Institution Press.
- Richter, S., G. D. Edgecombe, G.D.F. Wilson. 2002. The lacinia mobilis and similar structures - a valuable character in arthropod phylogenetics? *Zoologischer Anzeiger* 241:339-361.
- Riehl, T., G.D.F. Wilson, M.V. Malyutina. (in press). Urstylidae – A new family of abyssal isopods (Crustacea: Asellota) and its phylogenetic implications. *Zoological Journal of the Linnean Society*.
- Wilson, G. D. F. 1985. The systematic position of the ilyarachnoid Eurycopidae (Crustacea, Isopoda, Asellota). Ph.D. University of California, San Diego, La Jolla.
- Wilson, G. D. F. 1989. A systematic revision of the deep-sea subfamily Lipomerinae of the isopod crustacean family Munnopsidae. *Bulletin of the Scripps Institution of Oceanography* 27:1-138.
- Wilson, G. D. F. 1997. The Suborder Asellota. Taxonomic atlas of the benthic fauna of the Santa Maria Basin and western Santa Barbara Channel. R. Wetzer, R. Brusca and G. D. F. Wilson. Santa Barbara, California, USA, Santa Barbara Museum of Natural History. *The Crustacea Part 2. The Isopoda, Cumacea and Tanaidacea*: 59-109.
- Wilson, G. D. F. 2009. The phylogenetic position of the Isopoda in the Peracarida (Crustacea: Malacostraca). *Arthropod Systematics & Phylogeny* 67:159 – 198.
- Wilson, G. D. F. 1994. A phylogenetic analysis of the isopod family Janiridae (Crustacea). *Invertebrate Taxonomy* 8:749-766.
- Wilson, G. D. F. and J.-W. Wägele. 1994. A systematic review of the family Janiridae (Crustacea: Isopoda: Asellota). *Invertebrate Taxonomy* 8:683-747.
- Wolff, T. 1962. The systematics and biology of bathyal and abyssal Isopoda Asellota. *Galathea Report* 6:1-320.