

The Proper Zoological Name of the North American White Shrimp

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Abstract

The name *Cancer setiferus* was given to the American white shrimp by Linnaeus in the Twelfth Edition of *Systema Naturae*, 1767. In doing so Linnaeus referred to a figure of Seba (1761), who used the name *Astacus fluviatilis*, *Americanus*, and gave the locality as "in Indiis". This certifies that the shrimp was American and not East Indian as some authors have quibbled. The same name was used in the Gmelin Edition of *Systema* (1790) and by Herbst (1796). Olivier (1811) used *Palaemon setiferus*. Only Herbst listed America alone as the locality and the others listed South America or indicated the American Indies directly or indirectly. Thomas Say (1817) made the first mention of a penaeid shrimp in North America when he described the North American white shrimp as *Penaeus fluviatilis*. His description is valid and it cannot be set aside under the Code. His name was considered to be a synonym of *Penaeus setiferus* because it was thought there was only one Western Atlantic species. When Burkenroad (1936) recognized that there were two species of white shrimp, one in North America and one in South America, he made the mistake of naming the South American shrimp as new and called it *P. schmitti*. Later on (1939) he tried to set up a neotype of *P. setiferus* from north Florida. This neotype designation is completely invalid under the Code. For one thing it is outside of the range of the original *P. setiferus* as designated by previous workers. Secondly, the designation was not made at the time he "revised" the species. Lastly, he never applied to the International Commission for validation of the neotype, as must be done. In a way this is fortunate because his ideas were completely erroneous and would do considerable injustice to Thomas Say. When Dr. L. B. Holthuis learned of this situation, he tried to validate *Penaeus setiferus* for North American white shrimp by setting up Seba's poor figure as a lectotype, with the indefinite locality, America. His lectotype fails to meet seven of the eight requirements for the designation of a lectotype as rigidly set forth by the Code, and his attempts are as invalid as those of Burkenroad to improperly set up a neotype, and actually they are beside the point. Obviously he was trying to manipulate the Rules to bring about usage of a pre-selected name. Seba had collections from both the East and West Indies and it is well-known that Linnaeus used Indies for both localities; but Linnaeus referred to Seba's figure, which is labeled as *Americanus*. Therefore, as the General Secretary of the Linnaean Society of London has stated, "it must be presumed" that the locality of *Cancer setiferus* was West Indian. The Code should be followed and there is no place for equivocation under the circumstances. The name of the South American white shrimp is *Penaeus setiferus* (Linnaeus). The proper name of the North American white shrimp is *Penaeus fluviatilis* Say. This is not a change in name but merely a resurrection of a proper name after a series of errors comparable to many other "changes" of the Latin names of common marine animals that have taken place during the past 40 years.

MY THESIS is a simple one. The original description of *Penaeus setiferus* was given by Linnaeus (1767) and there is a long tradition of taxonomic usage applying this name to the West Indian and South American species. Say (1817)

described the North American species as *Penaeus fluviatilis*, but later workers synonymized the two species and did not recognize their difference until Burkenroad (1936) pointed it out. At that time a proper interpretation of the situation under the Rules, as they existed, would have led to the usage outlined above. However, Burkenroad named the South American species as new and gave it the name *Penaeus schmitti* and it was only three years later (Burkenroad, 1939) that he attempted to give weight to his use of *P. setiferus* for the North American white shrimp. At that time he overlooked part of the literature, made some erroneous statements about part of it, and did not follow the Rules. Lastly, he made some statements about the geographic distribution of the two white shrimp which are now known to be in error. In fact, it was my somewhat idle reading of this garbled account which led to the suspicion that something was badly wrong.

I should like to set forth the facts in chronological order, but that is difficult to adhere to strictly.

Locality of the Type

Volume III of the great Dutch naturalist, Seba (1761), followed the tenth edition of the *Systema Naturae* but the names are not binomial. However, he gave a colored figure of "*Astacus fluviatilis, Americanus*," which Linnaeus (1767) referred to when he described *Cancer setiferus* in the twelfth edition of the *Systema*, and this figure has been accepted as the type by common assent. There is no other indication of the type locality than the name given by Seba. Thus it could have been North or South American, and indeed it could have been from Pacific America, but that question has never been raised and the name *setiferus* has been applied only to Atlantic material.

I pointed out (Gunter, 1962a) that Holland had possessions in the West Indies and South America, but none in North America, during Seba's time and, therefore, it was much more probable that his specimens came from the West Indies or South America than from North America. Holthuis (1962) said, however, that Seba had connections in Virginia and added to his collections from all parts of the world, inferring that Seba's original specimen could have come from North America. But that argument is not very strong because the American colonists were required to trade with the mother country and, furthermore, Virginia is outside the range of the white shrimp except for rare strays.

Thus, although it seems more likely that Seba's specimen came from the West Indies or South America than from North America, there is no specific information in his work and if we had to rely on it alone the question would remain in doubt. Subsequent usage, however, rather strongly confirms the southern origin of Seba's shrimp.

The first work following Seba was Linnaeus (1767), who said, "*Habitat in Indiis*." Insofar as he was referring to *Astacus fluviatilis, Americanus* of Seba, it is almost certain that he was referring to the West Indies. In fact, no serious doubt of this conclusion has ever been raised in the literature and Linnaeus' reference has been uniformly quoted in synonymic lists of *Penaeus setiferus* (Cf. Burkenroad, 1939, and older works). In fact, the same opinion was expressed to me in a letter dated 2 November, 1962, by Dr. Thomas O'Grady, General Secretary of the Linnaean Society of London. I had inquired of him for any manuscript notes of Seba or Linnaeus which might throw light on this question. He pointed out that Linnaeus used "in Indiis" for either the East

or West Indies and went on to say, "Seba made collecting voyages to both the East and West Indies, but as in his work he calls the specimen *americanus* (American river lobster) it must be presumed that it was collected on his West Indies voyage."

Nevertheless, Holthuis (1962) has argued both ways on this question. He said (p. 116) "Linnaeus (1767) gave as the locality '*Habitat in Indiis*,' which evidently is an error as Seba himself reported the species from America." Instead of being an error this is almost certainly a restriction, for the West Indies is part of America, although Holthuis says the idea is far-fetched. The absence of the qualifying "West" is not important here because Linnaeus was referring to an American species, as has always been accepted. It would appear that the far-fetched idea is that of Holthuis.

Then Doctor Holthuis cites a Dutch encyclopedia on the Netherlands West Indies which states that for many years after the discovery of the new world the term West Indies was used for the continents as well as the islands between 10° and 28° N, which would put the North American shrimp within the locale of Linnaeus' shrimp. Here again, the finer details of distribution of the North American white shrimp nullify the argument. Twenty-eight degrees N is south of Cape Canaveral and the Atlantic population of the North American white shrimp has not been recorded in the literature south of 28° N, although I took seventeen specimens in the St. Lucie Estuary, which lies a few miles to the south, during three years of work in that area. The data are not yet printed. These shrimp apparently come from Georgia during the fall and tagged specimens from the area have been recovered in Georgia 260 miles north when they return in the spring (Lindner and Anderson, 1956, map p. 580). The white shrimp is not known from South Florida or the Keys and on the west coast of Florida it is not found again south of the northeastern part of the Gulf. There is a record of one specimen (Boone, 1930) from the southern tip of the Keys, which is in need of verification.

Linnaeus (1790), the Gmelin edition, listed *Cancer setiferus* from South America and India. Herbst (1796) listed it from America only, and Olivier (1811) listed it from South America. The following authors listed *Penaeus setiferus* from South America and the West Indies: H. Milne Edwards (1837), de Saussure (1858), Heller (1865), Bate (1881), and Rathbun (1897 and 1900). The localities are Guadeloupe, Cuba, Rio de Janeiro, Jamaica, and Maceio, Brazil. These workers all had specimens in hand and some of them personally collected them. During the same period only DeKay (1844), Gibbes (1850), Stimpson (1871) and Kingsley (1879) referred to the North American shrimp as *Penaeus setiferus*, and obviously this was because Say's species was improperly synonymized with the original *P. setiferus*. Milne Edwards probably started this tradition of synonymy for, although there is no indication that he ever saw the North American species, he stated that *Penaeus setiferus* was also found on the coast of Florida.

Burkenroad (1939) said that de Saussure was the first person to mention *P. setiferus* from definite localities outside of the continental United States. That statement is incorrect. Milne Edwards had definitely recorded it from Guadeloupe in the French West Indies. Burkenroad ignored the other four references listed above in the 1800s. De Saussure's paper was not a turning point in taxonomy, as I have pointed out before. Actually, there are two classes of published information showing that *Penaeus setiferus* was South American.

The first were the old papers, Linnaeus (1767), Linnaeus (1790), and Olivier (1811), in which the localities were referred to as the Indies, South America and India, and South America. The next may be called the later group, in which it was known that the authors had specimens in hand, and these were Milne Edwards, de Saussure (in part), Heller, Bate, and Rathbun (twice).

Original Description of the North American White Shrimp

In 1817 Thomas Say described *Penaeus fluviatilis* under that name from the southern states and Florida. His description is valid and his work was the first mention of a penaeid shrimp of any kind from North America. Whether or not Say knew or intended to include the northeastern part of the Gulf of Mexico within the designation of Florida is unknown. West Florida extended into Louisiana at that time but the political situation was in a state of flux and Spain formally ceded all claims in 1819. Say first used the generic name introduced by Fabricius for an American shrimp. He did not compare his specimens with the descriptions of the South American shrimp given in various publications listed above and he did not mention Linnaeus for reasons that are unknown. In fact, he did the same thing that Linnaeus did and referred to Seba, whose name is not valid under the Rules. Therefore, *Penaeus fluviatilis* Say is the valid name of the North American white shrimp by original description.

Types, Neotypes, and Lectotypes

Because of Linnaeus' (1767) reference to Seba's figure, that figure has been generally accepted as the type of *Penaeus setiferus* and Holthuis (1962) has termed it the holotype.

Burkenroad (1936) described the South American white shrimp as new and deposited types in the Museum at Rio de Janeiro, Brazil. He compared the northern and southern shrimp but did not discuss taxonomic questions. Some time between 1936 and 1939 (Burkenroad, 1939) he apparently realized that his views were in need of further support. Then he deposited specimens in the U. S. National Museum which he listed as neotypes of *Penaeus setiferus*. These came from Matanzas Inlet, Florida, some fifty miles south of the Georgia line and about 200 miles north of 28° N, the northern limit of the West Indies according to Holthuis. There is no doubt that they are North American white shrimp as he intended them to be. However, his action is doubtful in some ways and invalid in others. It is doubtful because he did not set up the neotypes at the time he first "revised" the species *Penaeus setiferus* by describing *Penaeus schmitti*, as Holthuis has stated. Furthermore, he did not list his remarks as an addendum to the previous "revision." He tried to infer that the specimens of H. Milne Edwards from the island of Guadeloupe might have come from the Rio Guadalupe of Texas. This interpretation is preposterous. Burkenroad passed over the references of Heller, Bate, and two by Rathbun on the specific records of *Penaeus setiferus* from South America and the West Indies. It is apparent that he was trying to show that there were no early references to the southern species as *P. setiferus* and some early references to the North American white shrimp as *Penaeus setiferus*, but there were none before Say, either as *P. setiferus* or any other name.

Burkenroad was also in error on the distribution of the two species. He apparently thought that Rathbun's specimens from Jamaica and de Saussure's specimens from Cuba were the North American species. It is now known that

they are not, and the North American white shrimp has not been reported outside of the littoral waters of North America. Burkenroad's neotype designation was invalid because he cannot demonstrate that it lies within the geographic distribution of the original *Cancer setiferus*, which a long tradition of authors listed as West Indian and South American.

Lastly, authors do not set up neotypes at their own pleasure without having them accepted and validated by the International Commission on Zoological Nomenclature. Furthermore, the Rules said that neotypes are to be selected for resolving complex zoological questions and not taxonomic ones. Zoological questions were not in doubt at that time nor have they been in doubt since. The northern and southern white shrimp are different and disjunct geographically and nobody has questioned it. Careful interpretation of the Rules and the present Code indicates that neotypes of these two species are not necessary and, in fact, it would probably be impossible to have them validated by the International Commission.

Burkenroad (1939) and I (Gunter, 1962a) commented briefly on the inadequacy of Seba's figure and of Linnaeus' description which says "six double clawed feet on both sides." Holthuis (1962) discussed the matter in much greater detail, which seems to be rather pointless unless in an attempt to throw out both the figure and the description, which no one wishes to do. There is, as Burkenroad stated, a long tradition for the use of *setiferus* for the name of an Atlantic American white shrimp. The question is which species.

Holthuis holds that Burkenroad's neotypes for *Cancer setiferus* from Matanzas Inlet, Florida, are valid. Therefore, it seems to be quite unnecessary for him to formally select Seba's figure as a lectotype of *Cancer setiferus*. I have no particular objection, but on the other hand, the Code is rather strict on this matter and there are several reasons why this lectotype selection is invalid. More details are given in Gunter (1962b, p. 119).

Opposite Opinions

Dr. L. B. Holthuis is of the opinion that the locality of Linnaeus' type was America and that when Burkenroad first recognized that the Atlantic American white shrimp are composed of two species he "was perfectly justified to restrict the name *setiferus* to the species he thought best." He also says "When Burkenroad in 1936 discovered the specific distinctness of the northern and southern species, his action to leave the name *setiferus* with the northern species was, from a viewpoint of nomenclatural stability and uniformity, a very laudable one." These statements would be correct were it not for the fact that Thomas Say had validly described the North American white shrimp long before Burkenroad wrote. Additionally, a long tradition of literature, both before and after Say, from 1767 to 1900, had referred to *Penaeus setiferus* as West Indian and South American. Actually, Burkenroad had no choice, although either he did not realize it or did not care. The interpretation put on the matter by Holthuis would ignore a great deal of literature, some of it by the founders of crustacean systematics. If such decisions are to be taken now and in the future, a lot of taxonomic work is being done for naught.

As I have stated before, Burkenroad's neotypes have not been validated and it is highly improbable that they can ever be under the present Code.

Some General Remarks

Doctor Holthuis is of the opinion that some weight should be given to the

retention of *setiferus* for the better known species because of its commercial importance. I inferred before (Gunter, 1962b) that this argument is not pertinent because the opinion the layman has of the scientific names is a poor one at best and the Code rests upon another base. The layman's use of scientific names is also quite scanty. The few laymen and the general biologists who were interested quickly abandoned the use of *Penaeus brasiliensis* for the North American grooved shrimp when Burkenroad substantiated *Penaeus aztecus* Ives and described *Penaeus duorarum*.

Names of quite well known species, some of commercial importance, are being changed all the time and all of us have learned to live with a number of them. The name of the quahog clam, *Venus mercenaria*, has recently become *Mercenaria mercenaria*. The common jellyfish of the Gulf and south Atlantic waters, *Dactylometra*, has recently become *Chrysaora*. Except for a few paleontological diehards, who resent basing the classification of mollusks on soft parts, everybody quickly substituted *Crassostrea* for *Ostrea* for several important commercial species of oysters all over the world.

Systematic carcinology in numbers of workers is still far behind ichthyology and probably there are less people in the field today than were in taxonomic ichthyology in 1920. More people will be added and no doubt there will be considerable overturn in crustacean names as more work is done. I remember well the complaints of the older ichthyologists in the thirties, but the changes have gone on.

The only way that stability in zoological nomenclature can be attained is by rigid interpretation of the Rules with no exceptions. The Code is not to be manipulated to bring about a desired end. Nevertheless, some workers take a cavalier attitude and I have seen the statement, "In this case it is best to follow the Rules." Either we follow the Rules or some day the International Commission will drift into a state of innocuous desuetude and then scientific names will be established through essentially power plays of the most prolific writers or "authorities."

Rigid interpretation of the Rules and the literature shows that the name of the South American white shrimp is *Penaeus setiferus* (Linnaeus). The name of the North American white shrimp is *Penaeus fluviatilis* Say. That is the way the situation rests at present. It can only be changed if the Commission chooses to validate Burkenroad's neotypes of *Cancer setiferus* from Matanzas Inlet, Florida. As I have stated before, I seriously doubt that the Commission can take that step in conformity with the Code.

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Progress on Blue Crab Research in the South Atlantic

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Abstract

Research on blue crab in the South Atlantic was initiated by the Bureau of Commercial Fisheries on a limited scale in 1957. It was not until 1961, however, that money was appropriated specifically for a blue crab program. Prior to the initiation of this study very little was known concerning life history, migration, distribution, racial identity, abundance, recruitment, and general biology of the species in the South Atlantic area.

Population studies in the Neuse River, North Carolina, have investigated methods for estimating the size of crab populations. Tagging of adult crabs in the Newport River, North Carolina, in three estuaries in South Carolina, in the St. Johns River, Florida, and at various coastal locations in North Carolina, South Carolina, and Florida, is providing valuable information on the movements of blue crabs. Present indications are that there is very little migration between estuaries, and the blue crab fishery in a particular estuarine system cannot depend on recruitment from other geographical areas.

Studies of blue crab larvae are being conducted both in the laboratory and in the field. Analysis of plankton collections taken in estuaries and offshore from Florida to North Carolina provides evidence that development through the early life stages may take place at considerable distances offshore. Blue crab larvae have been successfully hatched and reared in the laboratory under various conditions of salinity and temperature. Mortality of the zoeal stages does not appear to be directly associated with either salinity or temperature. Recent work has established that mortality and rate of development of the megalops, that stage just prior to the first crab, are considerably affected by temperature and salinity.

The Blue Crab Fishery

THE BLUE CRAB FISHERY is one of the most valuable fisheries in the United States. It is extensive in terms of landings, number of fishermen, and area fished. From its beginnings in the Chesapeake Bay area more than 80 years ago, it has expanded southward along the Atlantic Coast to Miami, Florida, and along