

## Michel Bhaud (1940 – 2012) obituary

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It was with great sadness that we learned of the death of Professor Michael Bhaud on May 8 2012, when he was only 72 years old.

Michel Bhaud was born the 30th of July 1940 in Vebret, a small village shadowed by the basaltic plateau of Chastel-Marlhac, in Cantal (Auvergne, France). He studied in Caen, obtained a DEA in Biological Oceanography in Paris (1964), and became Doctor in Natural Sciences in 1971. His Doctoral Thesis was directed by Professor Pierre Drach, having as a member of the jury a Professor already well-known as a polychaetologist: Lucien Laubier.

Michel entered the CNRS in October 1966 as “Stagiaire de Recherche” and soon moved to “Attaché de Recherche” (1968) and “Chargé de Recherche” (1973). He was then Maître-Assistant at the University of Paris VI (1973-1976) and finally became “Maître de Conference” since 1980. In 1975 he received the bronze medal of the CNRS.

Michel was also lucky with his military service, which he was able to undertake within the framework of a technical cooperation in the ORSTOM Oceanographic Centre at Nosy-Be (Madagascar), from February 1967 to May 1968. His time spent at Nosy-Be, as was always the case with the various challenges and opportunities he faced, resulted in scientific papers, in this case an important series of papers on larval biology (e.g. Bhaud, 1969a, Bhaud, 1969b, Bhaud, 1972b).

Being as active in teaching activities as in research, Michel participated in all levels of student training, including practical lessons during the annual visits to the OOB by the 3rd cycle students of the University of Paris, in addition to the supervision of numerous pre- and post-doctoral students, all of whom successfully gained their theses and proceeded to post-doc projects. Many now occupy senior positions in laboratories in France and around Europe. All (Daniel Martin included) were infected by his love of nature, its creatures, and the science that tries to describe them. His enthusiasm was contagious and he has been a guide for their studies from the moment their collaborations began during their ‘stages’ in the



Meeting of the INTAS project on the sibling species problem held in Ravenna (1999): 1. Michel Bhaud; 2. Phyllis Knight-Jones; 2. Vladislav Khlevovitch; 4. Marco Abbiati; 5. Daniel Martin; 6. Temir Britayev (Absent: Alexander Rzhavsky).

OOB, where all frequently enjoyed the interesting conversations at the social and scientific parties that Michel kindly offered at his beautiful house in Mas Parer, a small village half way from Banyuls-sur-mer to the Col de Banyuls, half way from the sea to the Pyrenees.

Michel has been an important mentor, a good friend, an exemplary person, and an excellent scientist influencing for the better all who worked with him. To typify these experiences, following Daniel Martin's first ‘stage’ in Banyuls in 1994, they established a continuous collaboration that resulted in a long-lasting friendship, but also in the publication of scientific papers on several of Michel's preferred topics, from larval biology and recruitment to the life cycle of *Eupolymnia*

*nebulosa* and the taxonomy and ecology of Chaetopteridae and Oweniidae (Arnoux et al., 1995, Bhaud et al., 1995a, Bhaud et al., 2006, Bhaud et al., 2003, Cha et al., 1997, Martin et al., 1996, Martin et al., 1998, Martin et al., 2008, Martin et al., 2006, Martin et al., 2000). They also collaborated in several joint projects. Among them, a French/Spanish INTEREG project and an INTAS project on the sibling species problem deserve special mention. The international reputation and prestige of Michel resulted in ongoing collaboration between DM and other well-recognised scientists working on marine ecology and polychaetes; these included Vladislav Khlebovich, Marco Abbiati, Phyllis Knight-Jones and Temir Britayev (Fig. 1). No doubt many others would be able to recount similar influences, resulting in new insights and new research directions typified by Daniel Martin's current interest in the *Haplosyllis spongicola* complex.

Michel's vast experience and knowledge enabled him to play an active role in the governance, planning and supervision of National and International research programmes. His role in the French National Research Program on the Determinism of the Recruitment (PNDR) has to be highlighted in particular; this was led by Michel for several years and gave rise to a series of internationally important studies on recruitment and larval biology and ecology that were revolutionary and will always remain a matter of discussion.

Michel's work at the Laboratoire Arago of the OOB, began at the time when Professor Drach was appointed Director (1965 à 1976). Soon he joined the Plankton Team, where he was in charge of the study of the polychaete larvae (always encouraged by Lucien Laubier). According to his own words: "Malgré les travaux de THORSON, tout reste à faire en Méditerranée. Alors commence le lent travail d'identification par élevages après la pêche en mer où ma présence est constante." Since then, he intensively worked on the study of polychaete larvae, taking many different approaches: taxonomic identifications, faunistics, dispersal, biogeography, settlement, feeding modes, swimming behaviour, and so on (e.g. Arnoux et al., 1995, Bhaud, 1966a, Bhaud, 1966b, Bhaud, 1967a, Bhaud, 1972c, Bhaud, 1974d, Bhaud, 1983d, Bhaud, 1986, Bhaud, 1988c, Bhaud, 1989, Bhaud, 1990a, Bhaud, 1991, Bhaud, 1993b, Bhaud, 1998c, Bhaud, 2003, Bhaud & Cazaux, 1982, Bhaud & Cazaux, 1987, Bhaud & Cazaux, 1990, Bhaud et al., 1990, Bhaud et al., 1994a, Bhaud et al., 1995a, Bhaud et al., 1995b, Bhaud & Duchêne, 1989, Bhaud & Duchêne, 1996, Bhaud & Fernandez-Alamo, 2000, Bhaud & Grémare, 1988, Bhaud et al., 1999, Bhaud & Fernández-Alamo, 2001, Duchêne et al., 1992, Marcano & Bhaud, 1995, Nozais et al., 1997).

After several years focusing on plankton, Michel started to enlarge his scientific interests to the benthic domain, studying the energetic links between ecosystems and the energy flows at the individual level, which at that time corresponded to a particular component of the studies conducted by the research group on "Structure and Functioning of the Benthic Ecosystem" at the Laboratory Arago. Accordingly, Michel argued that "Cette modification progressive de l'orientation des recherches permet, en dépassant les questions liées à une unité zoologique particulière, un regroupement des différents sujets autour d'un thème lié au fonctionnement des écosystèmes

et à leurs relations." (e.g. Bhaud, 1988b, Bhaud et al., 1995b, Cha et al., 1997, Martin et al., 1998, Martin et al., 2000).

The focus on benthos and the combined interest on the factors affecting larval dispersal and the distribution of the adult populations also led Michel to pay attention to taxonomic problems and so he became one of the best representatives of a remarkable generation of French polychaete taxonomists. For instance, his work on Chaetopteridae (e.g. Bhaud, 1966a, Bhaud, 1969d, Bhaud, 1969f, Bhaud, 1972a, Bhaud, 1975e, Bhaud, 1977b, Bhaud, 1978, Bhaud, 1998b, Bhaud, 2003, Bhaud, 2005, Bhaud & Fernandez-Alamo, 2000, Bhaud et al., 2002a, Bhaud et al., 2006, Bhaud et al., 1994c, Bhaud et al., 2003, Bhaud & Petti, 2001, Bhaud et al., 2002b, Martin et al., 2008, Nishi & Bhaud, 2000, Nishi et al., 2004b, Nishi et al., 1999) and Oweniidae (e.g. Koh & Bhaud, 2001, Koh & Bhaud, 2003, Koh et al., 2003, Martin et al., 2006, Pinedo et al., 2000) are still matter of reference.

In addition to the more than 120 scientific papers he wrote during his prolific scientific life (see a complete reference list at the end of this text), Michel was very active in many other aspects of scientific life. For instance, since the first one in Sydney, where he presented a paper on the oocytes of *Sabellaria alveolata* (Bhaud et al., 1984), his presence and talks in the different Polychaete Conferences (and also his participation in social events) will always be within the best souvenirs of most of us (Figure 2). He also participated in and presented papers at many of the meetings of the International Society for Invertebrate Reproduction for instance those held in UK, France (Lille), Japan, and Dublin and at international meetings relating to aquaculture and fisheries. In this way he ensured that polychaete research was well represented at important scientific meetings with a broader taxonomic remit. As global concerns about climate change began to emerge, he soon realised the significance of his work on polychaete reproduction and larval development in this important context and took part in international meetings to consider what the ecological consequences of climate change might be (Bhaud et al. 1994b). It was characteristic of Michel, throughout his publishing career, that he thought deeply about the wider significance of his work and many of his papers are fine examples of scientific philosophy and thought.

It is testimony to the character of Michel that, from the many international collaborations that characterised his long and active career, grew many personal friendships as both authors can testify. As a polychaete biologist, Peter Olive shared many of the Michel's interests especially those in different aspects of reproductive biology. Michel's publications on the timing of polychaete larval appearance in different biogeographical regions (e.g. Bhaud 1972c, 1988, 1991, 1998; Bhaud and Duchêne 1989, 1996; Bhaud et al. 1990, 1992, 1995; Bhaud and Fernández-Álamo, 2000) strongly influenced much of the work done at Newcastle University and served as a key starting point for taught courses on reproduction and seasonality for honours Zoology and Marine Biology students at Newcastle University. The mechanisms by which polychaetes, and other marine organisms, transduce environmental signals, the so called *proximate factors* determining the timing of breeding and the *ultimate factors*

through which an adaptive advantage is gained, has long interested marine biologists and the work of Michel is central to this problem. Michel understood the important distinction between these two aspects and, with his students and international collaborators, he contributed extensively to this important field of study, requiring, as it does skills in both field ecology and experimental, laboratory based, investigation (Bhaud 1982a,b,c; Bhaud and Cha, 1992; Bhaud et al 1994b; Cha et al, 1997; Martin et al. 1998). These studies will continue to inform current interest in the molecular biology of environmental signal transduction and biorhythmicity in marine organisms and continue to have importance in relation to climate change.

Michel was, throughout his research career, a natural collaborator, forging links around the world. He became involved with international training programmes and contributed much to the development of a new generation of researchers who would share his enthusiasm and who benefited from his unmatched experience and knowledge of polychaete larval biology. As an example, he participated as a lecturer in the first advanced polychaete training workshop organised by Maria Gambi at the Stazione Zoologica di Napoli's ecology laboratory on the Island of Ischia. Here, experienced teachers and researchers were joined by the vanguard of younger scientists working at the cutting edge of the latest taxonomic procedures to teach an international group of polychaete researchers at early stages in their careers. Michel's enthusiastic teaching in this milieu will have done much to cement the interest of those who attended many of whom are now among today's leading polychaete biologists and taxonomists.

Michel's involvement in research, graduate student development and training, and international scientific enterprises stimulated cross national collaboration in many different ways. He encouraged his overseas collaborators to become involved in the examination of PhD theses in the French way, and several of his overseas collaborators were invited to participate at a 'soutenance'. This was sometimes a linguistic challenge for English speaking members (Peter Olive included), but was always a pleasure and an honour. Most importantly it led to opportunities to discuss areas of mutual scientific interest and to forge further research collaborations. He also encouraged participation of overseas observers in the governance of those French National research programmes in which he was involved. Through this an avenue was opened for rapid the exchange of ideas between national programmes in different countries not otherwise formally linked. As an example, links developed between the CNRS PNDR programme alluded to above, and the UK NERC programme on Developmental Ecology of Marine Animals (DEMA) (see Atkinson and Thorndyke eds., 2001) being supported at the same time.

It was inevitable given the generous nature of Michel, that these collaborations lead to close personal friendships, and the authors of this appreciation make no apology for drawing on their own personal experiences in the knowledge that similar experiences will have been enjoyed by many others.



Michel Bhaud: A. with Wynn Knight-Jones at the 1<sup>st</sup> Polychaete conference in Sydney. B. at the 3<sup>rd</sup> Polychaete Conference in Long Beach. C. with Tomoyuki Miura, María Ana Fernández-Álamo, Madame Dauvin and Jean-Claude Dauvin at the 8<sup>th</sup> Polychaete Conference in Madrid.

Michel and his wife Yvonne, also a CNRS researcher at the OOB, had a daughter, Katy, and a son, Manu, and four grandchildren. An international exchange of teenage children between Michel's family and Peter Olive (to learn the language) as planned and instigated by Michel, was followed by family vacations at Banyuls-sur-mer for some 13 years. The hospitality extended by Michel and Yvonne, frequently involved an invitation to stay in their delightful house and always generously hospitality on the terrace of Mas Parer. Those memories of good companionship on the terrace overlooking the valley remain priceless and the friendships that developed between the young people at Banyuls and the visitors from England have endured to this day and are an unseen tribute to the generosity of spirit of Michel, his wife Yvonne and their children.

After a long and productive scientific life in which Michel always remained an important scientific guide and mentor as well as a kind and supportive person and friend, he retired in 2005, when he left the OOB. Sometime later, he courageously underwent a triple bypass operation, after which Michel lived at his beloved Massif Central, always devoted to his family and, particularly, to his grandchildren but also characteristically involved in local affairs.

Michel Bhaud has been one of the most important influences in our scientific careers and we feel that his abiding footprint will long remain with the entire polychaete community. For those who knew him at a personal level, his kindness and friendship will equally last forever. In presenting this appreciation of his scientific career we also hope to express our sympathy for his family, and for friends who survive him.

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