

Abstracts from the 28th Annual Symposium of the European Association for Aquatic Mammals

The following condensed abstracts are from oral and poster presentations given at the 28th annual symposium of the European Association for Aquatic Mammals held in Benidorm Spain from 11 to 15 March 2000. These abstracts were not peer reviewed and were condensed by the Editor, Jeanette Thomas. Abstracts should not be cited without agreement from the authors.

ABSTRACTS OF ORAL PRESENTATIONS:

DIVE INTO EDUCATION. Diane Sweeny, Dolphin Quest, San Diego, CA, USA.

Marine parks offer diverse opportunities for marine and conservation educational experiences. In the United States, marine parks and aquariums serve the general public, schools, teachers, and local communities with a wide variety of educational programs from show presentations to off-site courses and distance learning. This presentation highlighted some of the different types of educational programs currently offered and outlined some manageable strategies for expanding educational efforts at all parks. When we “dive into education” we promote both conservation of marine mammals and expand public support for our facilities.

BIOLOGY, TRAINING, AND WELFARE – THE IMPORTANCE OF INTEGRATING EFFORTS. Kevin A. Barardo and Élio A. Vicente, Zoomarine, Albugeira, Portugal.

Today, all marine parks are involved in education in some way. However, not all have people or space dedicated specifically to educational projects. Sometimes education is handled by biologists, trainers, or even curatorial staff. Regardless of the good intentions and quality of work by these people, their involvement in educational programs never has priority over their basic responsibilities. An ideal setting should have special staff that creates, develops, and implements daily educational projects in an integrated way, combining the expertise of the different personnel (i.e., husbandry, veterinary, research, management and education). The need for good communication among personnel is one of the main issues. Identifying good collaborative projects, evaluating the time and resource requirements of personnel, and coordinating schedules is of paramount importance for successful education projects. With this presentation, we illustrate how Zoomarine personnel manage these aspects for maximum cooperation and benefit to educating the public about marine mammals.

EDUCATING THE EDUCATORS. Kees de Groot, Mundomar, Benidorm, Spain.

Today, people involved with marine parks realize the importance of educational programs. Most parks are actively developing new programs, especially directed to schools. In practice, however, a number of the people involved with these programs are not prepared to cope with the possible negative effects that the presence of school children can have in a park. Schoolteachers and parents may still regard an excursion to a marine park as a day away from school, rather than a didactic activity. Security, cleaning, catering staff, as well as staff in commercial departments, see their day at work as being complicated by the presence of hoards of school children. Trainers may feel that a show is of greater importance, and the educational presentation as an interference with training and entertainment. The management of parks often is not aware that achieving good educational programs costs money. This presentation deals with ways to diminish the negative effects of such school programs and with the necessity to explain to park staff the importance of educational programs.

TRICKS OF THE TRADE – EFFECTIVE TEACHING TECHNIQUES TO USE IN EDUCATION PROGRAMS. Jean Terry, The American School of The Hague, Wassenaar, The Netherlands.

The role of marine parks has changed radically in recent years. Conservation and education play a much greater part in facility functions. Many scientists, trainers, and curators now find themselves in the role of a teacher. However, teaching is one of the most complex, yet important, of human endeavours. Skillful teachers are made, not born. In many parks, students range from infants to senior citizens. Some elements of good teaching are universal. In fact, teaching methods are similar to good animal training techniques. Getting and keeping the student's attention is vital to a good presentation. Although a teacher has little control over an individual's long term discipline, I offer some simple techniques that can help settle a few trouble spots in the marine park classroom.

HOW WE LEARN WHAT WE KNOW – A CRASH COURSE IN TRANSLATING BRAIN RESEARCH INTO EDUCATIONAL PRACTICE. Paul Terry, The American School of The Hague, Wassenaar, The Netherlands.

Until the 1970's, educators depended on past theoretical practice, trial and error experience, and intuition for effective learning. As physiological brain research rapidly progressed, educational psychologists, such as Dr. Patricia Wolf, translated brain research into educational techniques for classroom use. Brain research became an integral part of modern learning theory. New technologies, like MRI and PET scans, allowed researchers to "see" the brain process information. As novel stimuli move from the brain's sensory and short-term memory into long-term memory, information is integrated into learning. Today, terms like declarative and procedural memory, the cocktail party effect, and chunking are part of the language of educators. People involved with improving educational programs at marine parks do not have to be experts in learning theory, but they will benefit from exposure to how brain research can be implemented into their programs. Exciting recent research in this field challenges the dogma that human brains are essentially complete and hardwired in early childhood by the age of ten. Parts of the brain associated with "executive functions", such as planning and self-control, show a prepuberty surge of growth in the brain, continuing through teenage years. Any educator interested in transferring knowledge needs to be aware of these major developmental stages in the human mind.

WHAT KIND OF RESEARCH DO WE NEED? Véronique Servais, Université de Liège, Belgique.

This talk is aimed at specifying questions that a Dolphin Assisted Interaction (DAI) research program should address. Dolphin facilities want to know whether it is worthwhile to engage in DAI programs. Research should not try to answer whether dolphins have a "therapeutic effect" because this is a delusive topic. Rather, research should evaluate the costs and benefits, for all participants (including dolphins, dolphin trainers, parents, and teachers) involved in DAI programs.

DOLPHIN ASSISTED INTERACTION PRACTICES: A SYNTHESIS, UPDATING DAI. Anne-Cécile Groulard, Université de Louvain, Belgique.

In this presentation, we sketch the global picture of the Dolphin Assisted Interaction (DAI) practice. Topics will be structured on three axes: (1) dolphins, (2) assisted, and (3) interactions. In the general context of zootherapy, I mention some hypotheses for the relevance of these interactions. However, in the talk I mostly discuss the practical aspects of using dolphins for such interactions. I emphasize the important role of the trainer since we consider this practice different from a "swim with the dolphin program". I propose the creation of guidelines for DAI through a dedicated research program. Such research should focus on the perceptions of the different participants involved in these encounters.

INTERSPECIFIC INTERACTIONS IN LIGHT OF SPECIFIC NEURAL STRUCTURES.

Marc Gosjean.

In spite of neural differences between humans and animals (especially dolphins), interactions with animals might be significant for some human being. This is a basic assumption of Dolphin Assisted Interaction programs. I believe that, in some way, animals “feel” a person next to them. People have varying expectations or apprehensions before meeting a dolphin. Consequently, we must be prepared to observe that some people do not react to the animals and that animals do not react to some people.

MASKED UNDERWATER AUDIOGRAM OF A PACIFIC WHITE-SIDED DOLPHIN.

Jeanette A. Thomas, Western Illinois University Regional Center, Moline, IL USA and Ken Ramirez, Shedd Aquarium, Chicago, IL USA.

Little is known about abilities of odontocetes to hear in a noisy environment. Using a descending staircase method and go/no-go response, underwater hearing of a female, Pacific white-sided dolphin (*Lagenorhynchus obliquidens*) masked by 2 levels of white noise (30 dB apart) was measured. The same dolphin had an unmasked audiogram conducted earlier (Tremel *et al.*, 1998). Frequencies were tested in octaves between 500 Hz and 64 kHz, with 15 to 30 trials per frequency. Masked thresholds at maximum noise were similar to those on a bottlenose dolphin (Moore and Au, 1982), a beluga (Johnson *et al.*, 1989), and a false killer whale (Thomas *et al.*, 1990). At 8 kHz, masked thresholds were more sensitive than the unmasked threshold, perhaps because masking and pool noise were at similar levels. The highest critical ratio (43) was at 500 Hz and the lowest critical ratio (14) at 8 kHz. Critical ratios at 8 kHz or higher were comparable to other species. However, critical ratios at 500 Hz (43) and at 1 kHz (40), were higher than in the beluga (20 and 18, respectively). The authors are grateful for support by the marine mammal staff at the Shedd Aquarium and financial support by the Office of Naval Research.

ECHOLOCATION SOUNDS OF A YOUNG *PONTOPORIA BLAINVEILLI*: A PARAMETRIC MODELING APPROACH.

C. Kamminga, Delft University of Technology, The Netherlands and L. A. Van Fersen, Mundo Marino, San Clemente del Tuyu, Argentina.

Time and frequency representations of hitherto non-existent wideband acoustic recordings of a young female Franciscana (*Pontoporia blainveilli*) under human care are presented. The recording of this species, which taxonomically is placed in the super family of odontocetes Platanstoidea, presents different sonar clicks from those of the Phocoenidea and the Delphinidae. A cluster representation of the two highest-ranking features of the sonar click, i.e. dominant frequency and either duration or bandwidth illustrates the similarity in acoustic behaviour. This similarity is not only based on the presence of a polycyclic porpoise-like sonar wave shape, but also on the remarkable successful mathematical modeling of the main part of the click using the Gabor model. The applicability of this parametric procedure is addressed by the low time-frequency uncertainty product of the main part of the click. In-depth analysis of the Franciscana sonar click revealed a model representation by only one elementary Gabor signal with a residue as low as 0.3%. Clicks occurring in long-duration trains were extremely narrowband (15–20 kHz) and centered around a dominant frequency of 130 kHz. Click duration ranged from 80–100 sec., including 8 to 10 oscillations. Interclick interval was highly variable, up to 2.5 msec. For taxonomic comparison, the echolocation clicks of the two rivers dolphins, i.e. *Sotalia fluviatilis* and *Inia geoffrensis* were added in the feature mapping. Whistles were not detected for this species.

ERYSIPELAS IN CETACEANS, MORE PARTICULARLY THE HANDLING AND

VACCINATION IN YOUNG *TURSIOPS TRUNCATUS* CALVES. Géraldine Lacave, Marine Mammals Veterinary Services, Brugge, Belgium and Eric Cox, Veterinary Faculty, Merelbeke, Belgium.

A dolphin calf died in 1991 at the Brugge Dolphinarium from *Erysipelas septicemia* at the age of six months. The calf never showed signs of infection until a few hours before her death, having

had a normal respiratory frequency and suckling rate until then. At that time, it was thought that one did not need to vaccinate calves before the age of approximately one year, because the main source of infection for *Erysipelas* was believed to be fish. Following that case, a general study on *Erysipelas* vaccination in dolphins was started in 1992 at the University of Gent in Belgium. For this study, it was empirically decided that the calves would be vaccinated for the first time before the age of six months, preferably between 3 and 4 months. We show preliminary results on eight calves vaccinated that way and the results from a general survey on the occurrence of *Erysipelas* in the last ten years.

THE HUSBANDRY OF PREGNANT BOTTLENOSE DOLPHINS. A BEHAVIOURAL APPROACH. V. Pastore, Università degli Studi De Milano, Milano, Italy, A. Bortolotto, Zonomia, Riccione, Italy, and B. Mercera, Parc Asterix, Plailly, France.

The aim of this presentation was to suggest the use of behavioural observations during pregnancy to help determining the date of delivery, to follow the calf's development, and to monitor incidental modifications of the social relationship within the group after the birth of a calf. The importance of the cooperation among trainers, biologists, and veterinarians was stressed. Three female bottlenose dolphins (*Tursiops truncatus*) were monitored at Parc Asterix, Plailly (France) in 1996 and 1999, respectively. During pregnancy, six hours of observations were carried out to monitor flexion behavior from 0000 to 0600 hr every day until three days after delivery. Furthermore, the mother/calf spatial relationships and the calf's suckling attempts were followed 6 hrs/day for the calf's first two months of life. Generally, the flexion behavior increased one or two days before delivery. At the same time, the food intake decreased and the female showed a few behaviours typically related to late pregnancy (i.e., side breaching and downstroke). This study clearly showed that it is easy to predict the delivery date by means of unintrusive behavioural observations. Additionally, the overlap of the information coming from behavioural observations carried out both by trainers and biologists can result in a better understanding of the social relationship within the group and of their modifications due to the calf's presence.

THE REPRODUCTION PROGRAMME FOR BOTTLENOSE DOLPHINS AT MUNDOMAR. Kees de Groot, Mundomar, Benidorm, Spain.

A video presentation featured the births of two bottlenose dolphins (*Tursiops truncatus*) on October 12 and 13, 1999 at Mundomar. A review of birth preparations, planning, and handling of the public and media were given. Other aspects related to the birth of a dolphin and the combining of dolphin births with the day to day routine in a dolphin show pool were addressed. The planning, however, suddenly changed into panic when the first baby presented its head instead of the tail at birth, and the second pregnant females had her calf one month before expected.

ULTRASOUND IN MARINE MAMMALS AND DEVELOPMENT OF GROWTH CURVES FOR FETAL *TURSIOPS*. Géraldine Lacave, Marine Mammals Veterinary Services, Brugge, Belgium.

The use of ultrasound has spread over the last fifteen years for the medical check-up of marine mammals. It is a wonderful non-invasive diagnostic tool primarily used for monitoring fetal development, but also is helpful for viewing internal organs like liver, kidneys, etc. Ultrasound devices have the advantage of being a light and portable machine that can be used with the voluntary participation of a dolphin. Nowadays, most facilities hosting marine mammals have well-developed husbandry and medical care programs, including desensitization of dolphins to the ultrasound probe. In the facilities at which I consult, ultrasound is part of the monthly check-up and is performed more frequently on females during the summer months or during gestation. Following 16 gestations in those facilities allowed us to develop growth curves based on thoracic and skull diameters from known age fetuses.

BIRTH REPORT OF FOUR BABY DOLPHINS BORN IN THE INSTALLATION OF THE DOLPHINARIUM AQUAPARK OF TENERIFE. José Luis Barbero, José Lara, Marina García, Christina Van Eyll, V. Sergio, H. Angel, and A. Ezequiel, Marineland Tenerife, Tenerife, Spain.

The facilities of the Dolphinarium Aquapark of Tenerife were designed to hold an important group of dolphins and to develop research, educational, and reproduction programs. To develop reproduction programs, we imported six dolphins from the National Aquarium of Cuba (four females and two males). These dolphins, together with three already at our facilities, completed the group for a reproduction program. The transportation of the six Cuban dolphins, the adaptation phases to the facilities and the integration of the two groups developed properly. Four females became pregnant during March/April 1996. The first calf was born on 17 February, the second on 21 February, the third on 28 February, and the fourth on 10 March 1997. Out of the four births, we experienced problems with two. In the first case, one pregnant female (the dominant one) tried to steal a calf from another mother. This problem was quickly solved by rapid action of the team of trainers, changing the mother and her calf into a different pool. The second problem occurred when a mother who previously lost all her calves got very nervous after the birth. She swam very quickly around the pool, not allowing her calf to suckle for more than 48 h, this problem was solved by administering 10 mg of Valium during two days. At present, the four calves are three years old and in perfect condition, bringing our reproduction program to a level of 100% effectiveness.

RESULTS OF AN INTERNATIONAL SURVEY ON MEDICAL TRAINING. Isabelle Brasseur, Marineland Antibes, Antibes, France.

When searching for information on medical behaviour training an obvious disparity comes to light between the lack of literature on this subject and the huge amount of empirical knowledge acquired, over the years, by professionals involved in marine mammal care. The gathering and summarizing of this empirical knowledge would be useful, especially if this information was accessible for reference. With this idea in mind, a questionnaire was sent to 250 facilities all over the world. Seventy-nine percent of the establishments answering the questionnaire used medical training. The main reasons for starting a program of medical training was stated as the desire to reduce stress levels in animals, as well as to create the possibility of carrying out preventive treatment. The survey allowed us to compare the usefulness of basic medical behaviours such as blood sampling, echographic examination, and weighing with that of the more unusual ones such as collecting sperm, milk and eye mucus. From the survey, we could determine what factors influenced the decision of whether or not to train an animal for medical behaviours. The high level of participation in this survey illustrates, yet again, the interest in sharing fundamental knowledge among professionals involved with marine mammal care.

CREATING A COMPUTER SYSTEM FOR MONITORING THE DAILY DATA COLLECTION ON ANIMAL CARE, TRAINING, AND MEDICATION AT SÄRKÄNNIEMI DOLPHINARIUM, FINLAND. Kai Mattsson, Särkänniemi Dolphinarium, Finland.

This paper presents the process and practical function of a computer monitoring system created for Särkänniemi Dolphinarium in March 1998. At that time, our water treatment system was adapted to be monitored by a computer. This raised a discussion among the training staff, of whether it also would be practical to monitor the daily care of our six bottlenose dolphins. A computer system was designed to collect daily data on the animal care, training, and water treatment to a database, which can be retrieved any time. The monitoring system was planned with the help of veterinarians, so that it also would meet the medical care needs for our dolphins. This paper explained some of our experiences in using this system.

ABSTRACTS OF POSTER PRESENTATIONS:

TRADITIONAL ROLES OF WHALES AND DOLPHINS IN FRENCH POLYNESIA.

Cécile Gaspar, Dolphin Quest, Moorea French Polynesia, and A. Tange & Kristi West, Hawaii Institute of Marine Biology, Kaneohe HI USA.

Dolphins and whales represent an important element of French Polynesian culture. Historically, marine mammals in French Polynesia were not simply seen as a food source, but as an integral part of village life. Both dolphins and whales were hunted and eaten, and bones and teeth from these animals used for making traditional crafts and jewellery. Whaling in French Polynesia first was introduced by foreigners, and adopted by local populations in the 1820's. The island of Rurutu in the Austral Islands, south of Tahiti, provides an example of the importance of whale hunting in daily life. During the whaling season until the mid-1900's, one mother and calf humpback whale pair were hunted. The entire harpooning process, notification to villagers of the hunt, and subsequent feasts followed strict traditions. This whale hunt was the most celebrated yearly event in Rurutu, where meat was saved to feed all islanders for two to three years. At Dolphin Quest French Polynesia, educational programs on dolphins and whales are given to local school children. These efforts emphasise the importance of dolphins and whales throughout history and encourage protection and conservation of these animals today.

TRAINING HARBOR SEALS (*PHOCA VITULINA*) FOR ULTRASOUND EXAMINATION.

Christopher Porter, Claudia Gili, Carla Bartolucci, Eugenia Boccardo, Roberto Custureri, Guido Gnone, Lara Papini, and Stefano Pelle, Acquario di Genova, Genova, Italy.

At the Genova Aquarium, since 1998, a research project on ultrasound imaging of the reproductive organs has been carried out on five harbor seals housed in a natural exhibit design. Training voluntary presentation for periodic ultrasound examination of the animals was maintained and strengthened through positive reinforcement. During this study, pregnancy was diagnosed in two out of three females. This poster showed the different steps of the training process and the solution found to individual problems that allowed regularly monitoring of the growth of fetuses up to two weeks before delivery.

EDUCATION INITIATIVES IN A LOW-BUDGET ENVIRONMENT WITH SPECIAL REFERENE TO LINUX. Kevin A. Barardo and Álio A. Vicente, Zoomarine, Guia, Albufeira, Portugal.

Any Education Department faces some lack of resources, either human, financial and/or technical. Today, a computer is a fundamental tool in information technology. Typically, Microsoft Windows is the operating system used, but for those who can not afford a Windows-based computer there always is LINUX?, an emerging operating system that runs on even old computers (down to a 386 processor). Further, LINUX? is free, as well as most of the software for it. Most projects are developed in several stages. The educator's role is to conceive the idea and plan the process. Normally, professional graphic services are used to develop educational materials. In this process, graphic creation, layout design, and printing are the most expensive stages-so why not do them ourselves? We illustrate creative ways of using an inexpensive computer in education and also address the issue of the graphical development of a project up to the point where professional printing can be done. These highlight some of the solutions achieved with time (and work!) at Zoomarine.

AGONISTIC BEHAVIOUR OF MALE HARBOUR SEAL (*PHOCA VITULINA*) IN CAPTIVITY; PRELIMINARY RESULTS. Daniela Corrigan, Università degli Studi di Genova, Acquario di Genova, Italy.

During the breeding season, male harbour seals interact to establish dominance and win the right to approach females. The harbour seal displays mating behaviours in the water, which can

complicate the study of the breeding habits of this species in the wild. The objective of this study was to give a formal description of agnostic behaviour of male harbour seals in captivity. The research was carried on at Genoa Aquarium, which houses six individuals of this species. The exhibit ($15.5 \times 15 \times 3$ m) reproduces a natural rocky coastal habitat. The wall, which faces the visitor corridor, is entirely constituted by a transparent acrylic panel, which allows underwater viewing. Data collection was carried out using both video and acoustic recording techniques. Sounds were recorded by means of a hydrophone and a spherical microphone both connected to a DAT recorder, while video sequences were recorded with a video camera through the acrylic panel and from above the water surface. Video and acoustic signals were integrated in a VHS video-recorder to get a complete recording of the behavioural pattern, with all its aerial and underwater components. Data collection lasted from February to October 1999; 29 hours of recordings were taped in total. More than 10 behavioural patterns were catalogued and presented with drawings, spectrograms, and short literal descriptions. The agnostic behaviour of male harbour seals looks ritualised. The competitors tend to avoid direct fighting with clamorous acoustic displays. Wrestling embraces and struggles also look ritualised and serious injuries are uncommon according to our experience.