

International Embryo Transfer Society

Parent Committee on Companion Animals,
Non-Domestic & Endangered Species

Report from the Annual Open Meeting
12th January 2003

In association with the 29th Annual Conference of the IETS
Aotea Centre, Goodman Fielder Room, Auckland, New Zealand

Report to the IETS Board of Governors

A total of 21 CANDES Parent Committee members were present, representing 9 countries (p. 3; Appendix 1 for agenda). Secretary Pickard read the minutes from the last working meeting that was held on 27 September 2002 at the Henry Doorly Zoo. The Subcommittee Co-Chairmen were then asked to present summaries from their respective meetings the previous two days.

Regulatory Subcommittee (pp. 5-6): Co-Chairmen Crichton and O'Brien reported on the progress of their Subcommittee to compile a country-by-country list of contacts and permit agencies and identifying the processing required for the import and export of biomaterials to and from different countries. Import/export information has been completed and is now available for several countries, including: Australia, Botswana, Canada, China, Hong Kong and Namibia. This information will be posted on the CANDES web page on the new IETS website.

There was a discussion concerning the disinfection of liquid nitrogen vapor (dry) shipping containers. Chairman Loskutoff is investigating this on behalf of the HASAC Regulatory Subcommittee and will have a report in time for the mid-year meetings of both parent committees.

There was a suggestion that the CANDES Regulatory Subcommittee consider addressing issues of transfer agreements, ownership and/or reimbursement for the use of biomaterials and whether they have considered the need to emulate the HASAC "Forms" Subcommittee so that it is possible to keep track of the location and use of biomaterials from CANDES. The question of liability if someone supplies infected semen also needs to be considered. This will be discussed further at the 2003 working meeting.

Health & Safety Subcommittee (pp. 6-9): Co-Chairman Holt reported that the initial volume of the literature search on pathogen and semen interactions has been compiled and distributed to the Subcommittee members. The information will be reviewed in order to identify pathogens that are known to be transmitted via semen as well as to determine where information is lacking and needs to be addressed. It was suggested that a new system for categorizing disease threats (unlike the existing HASAC embryo model) for semen be developed and some examples were proposed (to develop a strategy, guidance will be sought from some of the HASAC founding members). Threat categories can only be allocated to diseases for which known diagnostic tools exist. It was suggested that the Subcommittee find additional members who have expertise in semen and infectious agents (suggestions included Stringfellow, Bielanski, Wrathall and Guerin). The Subcommittee should also seek input from an epidemiologist to objectively assess the relevance of the research. CANDES should propose to the IETS programme chair that a session be held at the next Annual IETS conference (2004) to cover various aspects of semen pathogen interactions. Finally, there was a discussion regarding the HASAC's intention to develop an OIE Appendix for embryos from a wildlife species (specifying wild felids). More research in embryo-pathogen interaction in cervids was especially in need of further consideration because TSE's are becoming a grave concern in N. America.

Plans are in progress to hold a Disease Risk Assessment Workshop in May 2004 in South Africa, co-hosted by the Wildlife Biological Resource Centre (P. Bartels, Director). The goal will be to develop the tools necessary for quantifying the risk of transmitting specific diseases via semen and other

biomaterials. Members of the IETS HASAC and OIE will be invited to participate.

Research Subcommittee (p. 10): Co-Chairman Krisher reported that the collection process was ongoing for standard operating procedures (or protocols) for embryo transfer and related technologies in CANDES. Currently there are approximately 17 submissions that will be posted on the CANDES web page – which may encourage more submissions. Different strategies for obtaining additional protocols were discussed. Taxon leaders are needed for “Birds” and “Marine Mammals”. The Subcommittee considered its future activities, once protocol collation was successfully underway. It concluded that some of its objectives will be to identify priority areas for research, based on areas where technology is lacking. It needs to consider whether this prioritisation should target technologies, taxa or species. It should also incorporate the priorities of the NGO bodies, e.g., IUCN, and tailor its activities to meet the needs of other organisations. This will be an agenda item for discussion at the 2003 working meeting.

Technology Subcommittee (pp. 11-12): Co-Chairman D. Paris led a discussion to clarify the mission statement of this Subcommittee. The following objectives were identified:

- Compile a list of novel technologies for prioritisation
- Function as a referral service for technology training (Spindler)
- Compile information on adaptive technologies for CANDES (consult with Damiani)
- Consider species for technology modifications
- Emphasize methodologies that have universal application
- Discuss “weird and wonderful” reproductive phenomena and strategies found in CANDES (e.g., giant sperm in *Drosophila*) with regular short communications in either in the IETS newsletter or website, and including a system whereby IETS members can submit additional interesting reports.

These objectives will be further discussed, and action plans proposed, at the 2003 working meeting.

CANDES Position Statement on Cloning (pp. 13-15): The draft statement by Damiani (Appendix 2) was discussed and debated. A revised statement was suggested by members of the Research and Technology Subcommittees (p.14) that was not unanimously approved by the Parent Committee for submission to the IETS Board of Governors. The discussion will continue at the 2003 working meeting.

Web Page Development (p. 15): A meeting was scheduled with IETS Governor Richard Fayer-Hosken on 13 January 2003 to discuss the CANDES web page on the IETS website (Appendix 3). Information for the initial posting of the CANDES web page on the test web site was sent to Fayer-Hosken on 4 April 2003. Updated and new information will be posted in March and September each year. Loskutoff will collect any updates and new information and forward those to Fayer-Hosken.

Future Meetings (p. 15): The next working meeting of the IETS CANDES Parent Committee will be held on 3-5 October 2003 at the Henry Doorly Zoo in Omaha, Nebraska, USA. The Director of the Henry Doorly Zoo, Dr. Lee G. Simmons, has generously offered to provide \$10,000 per year in sponsorship to assist CANDES members with expenses related directly to the mid-year working meetings and symposia. Additional methods for fundraising (e.g., sales of educational or promotional materials) will be discussed at the 2003 working meeting.

Action Items for Consideration and Approval by the IETS Board of Governors:

1. Approval of CANDES web page as shown on the test site to be posted on the official IETS website.
2. A letter of thanks from the Board to Dr. Lee Simmons for supporting the IETS and CANDES (?)

Respectfully Submitted,

Naida M. Loskutoff, Chairman of the IETS CANDES Parent Committee

IETS CANDES Parent Committee Members Present

Sunday, 12 January 2003, 08:00 – 10:00 am

Goodman Fielder Room, Aotea Centre, Auckland, New Zealand

Naida Loskutoff (CCR, Henry Doorly Zoo, Omaha, NE): Chairman
Amanda Pickard (Institute of Zoology, London, UK): Secretary
Rebecca Krisher (Purdue University): Research Subcommittee Co-Chairman
Damien Paris (Dept. Zoology, U. Melbourne, VIC, Australia): Technology Subcommittee Co-Chairman
Bill Holt (Institute of Zoology, London, UK): Health & Safety Subcommittee Co-Chairman
Beth Crichton (CCR, Henry Doorly Zoo, NE, USA): Regulatory Subcommittee Co-Chairman
Justine O'Brien (University of Sydney, Australia) Regulatory Subcommittee Co-Chairman

Paul Bartels (WBRC, South Africa)
Jackie Coulon (AICRES, New Orleans, LA, USA)
Eliza Curnow (U. Washington, WA, USA)
Julio de la Fuente (CIT INIA, Depto. De Reproduccion Animal Y Con., Madrid, Spain)
András Dinnyés (Hungarian Academy of Sciences, Budapest, Hungary)
Mikko Jarvinen (U. Kuopio, Institute of Applied Biotechnology, Kuopio, Finland)
Duane Kraemer (Texas A & M University, TX, USA)
Heli Lindeberg (U. Kuopio, Institute of Applied Biotechnology, Kuopio, Finland)
Kari Morfeld (CCR, Henry Doorly Zoo, NE, USA)
Monique Paris (Murdoch Childrens Research Institute, Victoria, Australia)
Earle Pope (AICRES, New Orleans, LA, USA)
Daniel Salamone (U. Buenos Aires, Argentina)
Rebecca Spindler (CRC, National Zoo, DC, USA)
Brad Stroud (Weatherford, TX, USA)

Member Regrets

Mercedes Alvarez	Richard Fayer-Hosken	Karine Onclin
Luis Anel	Robert A. Godke	Katie Pellican
Barry Bavister	Marcelo A. B. V. Guimarães	Irina Polejaeva
Andrzej Bielanski	Rebecca Harris	C. Earle Pope
Charlies Bormann	Paz Herraez	Todd Robeck
Todd Bowsher	Thomas Hildebrandt	Cristina Rodriguez
Enrico Casadei	Weizhi Ji	Terri Roth
Philip Damiani	Brad Lindsey	Mitch Schiewe
Berenice de Avila Rodrigues	Charles Long	Kristin Sieren
John Diehl	R. Luzbel Jebsothn	Laszlo Solti
Robert Duby	Gaia Cecilia Luvoni	Jason Swain
Rachel Durkin	Reuben Mapletoft	William Swanson
Barbara Durrant	Catriona MacCallum	Gabor Vajta
Klaus Eulenberger	Gabriela Mastromonaco	John Verstegen
Diego Ezcurra	Ronaldo Morato	Matthew B. Wheeler
Wenche Farstad	Nei Moreira	

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Minutes from the joint meetings of the Health & Safety and Regulatory Subcommittees
Commencing on 10 January 2003 at 17:00, Aotea Centre, Auckland, New Zealand

Regulatory Subcommittee

Members Present:

Jackie Coulon
Beth Crichton (Subcommittee Co-Chairman)
Justine O'Brien (Subcommittee Co-Chairman)
Amanda Pickard (Recording Secretary)

Import/Export Regulations

The Regulatory Subcommittee is establishing a country-by-country list of contacts and permit agencies and identifying the processing required for the import and export of biomaterials to and from different countries. Import/Export information has been completed and is available for several countries already, including:

Australia,
Botswana,
Canada,
China,
Hong Kong
Namibia

This information will be posted onto the CANDES web page as soon as the new IETS website is launched in 2003.

Disinfection of Dry Shippers

Some government agencies will only allow the import of samples transported in guaranteed sterile or new dry shippers. MVE tanks can be liquid "disinfected" with bleach (although it is not recommended as it may damage the shipper). Taylor Wharton recommends that their tanks should be gamma irradiated for disinfection. It needs to be established how effective this is and whether the radiation penetrates the whole shipper. Irradiation doses need to be calculated, and radiation may not be fully effective against prions. Also, evidence exists that deliberate contamination of dry shippers with BVD is not cured by gamma irradiation. An alternative to using dry shippers is to use nitrogen vapour freezers.

These problems need full investigation as there may be contradictory information being given out by the shipper suppliers. Any process of disinfection needs to be validated by a reputable independent agency. Cold sterilisation might be appropriate, but will not necessarily get rid of prions. Loskutoff is investigating this further on behalf of the IETS HASAC and will share this report with the CANDES Regulatory Subcommittee in time for the 2003 mid-year meeting.

The Regulatory Subcommittee noted that IVF Safe Straws are available, but they are designed for sheep/goat embryos and do not come in the 0.25 ml size. Therefore they are not ideal for all applications, particularly semen storage. The skill of the operator loading the straws can affect the likelihood of contamination occurring. These are also expensive and not practical for use in wildlife species because of the cost.

Transfer Agreements

The Regulatory Subcommittee should consider addressing issues of transfer agreements, ownership and/or reimbursement for the use of biomaterials. This overlaps with WBRC (Paul Bartels, South Africa) programmes and the American Zoo and Aquarium Association (AZA) Biomaterials Banking Advisory Group (BBAG; Cathi Lehn, Chairman). Collaboration with these groups will be essential to minimise the work involved and any conflicts that might arise. Bartels considered that example agreements should be drafted and made available through the Regulatory committee and website.

Sample Tracking

Reuben Mapletoft asked if the CANDES Regulatory Subcommittee has considered the need to emulate the HASAC “Forms” Subcommittee so that it is possible to keep track of the location and use of genetic material in wildlife species. Wenche Farstad mentioned that the Scandinavian countries have extensive experience in the development of such forms for Canid species (to meet with kennel club requirements). The question of liability if someone supplies infected semen also needs to be considered.

Health and Safety Subcommittee

Members Present:

Bill Holt (Subcommittee Co-Chairman)
Naida Loskutoff (Subcommittee Co-Chairman)
Reuben Mapletoft
Kari Morfeld
Amanda Pickard (Recording Secretary)
Earle Pope
Daniel Salamone

Literature Search

A file of literature relating to risks of disease transmission via semen has been compiled. Most of the literature is from recent publications as the abstracts for older literature are not immediately available. This information needs to be reviewed by the H & S Subcommittee members to see where information is lacking and what major issues need to be addressed.

Threat Categories for Semen

The OIE has requested that the IETS put forward a classification of threat categories relating to the risk of disease transmission via semen, similar to that already in place for the processing and use of embryos. The OIE would like to incorporate these classifications into their guideline documents.

In many cases, research needs to be encouraged to evaluate the extent of infection risk via semen. Research into how to overcome the problems associated with using or storing infected semen is also required. Threat categories can only be allocated to diseases for which known diagnostic tools exist, and where these diagnostic tools are also known to work effectively in semen. Example categories might be:

- Category 1: Negligible evidence to show that the pathogen occurs in semen.
- Category 2: Pathogen is present in semen, but no evidence to suggest that transmission occurs as a result of AI/in storage.
- Category 3: Pathogen is present in semen, but can be removed through “a specified semen clean-up procedure”.
- Category 4: Pathogen is present in semen, but cannot be removed and will be transmitted in storage or through AI.

After some discussion, it was concluded that it is not possible to easily categorise semen along the lines of the existing embryo model. However, new or future developments in laboratory technologies may help in achieving this objective. It was considered essential to establish:

- Whether an infectious organism is present in semen (e.g. by sensitive PCR).
- What the minimum infective dose for each pathogen is.
- What the route of infection for each pathogen is.
- How many positive samples need to be detected for an ejaculate to be considered infected.

One strategy might be to insist on the quarantine of donors AND to quarantine recipients at the time AI is performed. However, this might not be practical in the zoo/wildlife community. Serological samples should be taken from donor animals and screened for potential pathogens. If an individual is determined to be sero-positive, then samples ought not to be collected. However if, on occasion, an infection is not considered too serious, the course of action might be to collect the semen but quarantine the recipient and to establish whether it sero-converts.

Further considerations:

- What strategy should be taken if a disease is found to be localised in one or more reproductive organs?
- What do we have to do to make sure that semen is clean?
- What steps do we have to go through to prove it?
- What species are we concerned with, and what diseases relate to them?
- Is any experiment that might be performed flawed?

Four levels of testing will be required to satisfactorily categorise semen:

- Donor infection
- Semen infection
- Recipient infection
- Species infection

In all cases, it is important to be assured that the analytical procedures for testing for pathogens are effective in the tissues or species of interest.

CANDES must inform regulatory bodies that research is ongoing into semen/pathogen interactions, and that new guidelines should become available in the future as to how to handle samples. It should also be kept in mind that attitudes change with time and there is no such thing as zero risk.

As some pathogens represent major concerns to the cattle breeding industry, CANDES may be able to capitalise on the commercial impact of transmitting these pathogens by linking up with organizations such as Certified Semen Services, a wholly owned subsidiary of the National Association of Animal Breeders in the USA, and international standards for semen processing and may be a potential funding source for undertaking research in this area. CSS serologically test bulls, but not semen samples. It should be noted that serology is not accurate (although it is more reliable than it used to be). Money is being lost by the cattle industry because of this.

Most of the literature in this field has been published since 1998. Any older material may be less accurate because of the diagnostic tools used. For livestock there are relatively few direct studies to demonstrate pathogens are present in semen. The H & S Subcommittee should consider whether the literature could be published in a review. It should also seek to find out if there is an expert on semen and infectious agents, and if so, ask them to become involved in the committee. It was agreed to ask David Stringfellow, Andrzej Bielanski and Tony Wrathall for their suggestions. Michel Thibier suggested his successor in his former lab in France – Bernard Guerin.

In order to develop a strategy to achieve the goal of allocating categories to semen risk, the H & S Subcommittee should seek guidance from some of the HASAC founder members. In particular, David Stringfellow may be able to help with experimental design. The committee should also seek input from an epidemiologist to objectively assess the relevance of the research.

CANDES should propose to the IETS programme chair that a session be held at the next Annual IETS conference (2004) to cover various aspects of semen pathogen interactions.

Addendum: Loskutoff has proposed the topic for consideration by the program chairman for the 2005 IETS annual conference, Heiner Niemann.

Disease Risk Assessment Workshop

The next CANDES working meeting should be arranged to coincide with a Disease Risk Assessment workshop for biomaterials, to be organised for later in 2003 (suggested November) in South Africa*. This working meeting will include a whole day for the H & S Subcommittee to review publications referring to pathogens in semen. Various disease risk assessment software packages, e.g. @Risk and Outbreak will be used to model the areas for contamination and provide probability information for the specific risks relating to specific diseases. Current software programmes for animal movement are not suitable for modelling the epidemiological risks for biomaterials. Doug Armstrong (Omaha's Henry Doorly Zoo) has obtained a free copy of the @Risk software as it is expensive business software, and this would be a novel application. It will be used to develop modified programs for animal movement as well as biomaterials transport. Tony Wrathall and Paul Sutmoller wrote a paper modelling FMD risks, which would provide a good introduction to developing this technique (Sutmoller P. and Wrathall A.E. (1997) A quantitative assessment of the risk of transmission of foot-and-mouth disease, bluetongue and vesicular stomatitis by embryo transfer in cattle. *Preventive Veterinary Medicine* **32**: 111-132).

*Addendum: it was later realized that it would be too soon to hold a disease risk assessment workshop in 2003 since it was first necessary to conduct a comprehensive literature review on pathogen and semen interactions. For that reason, a CANDES mid-year working meeting is now planned to be held in 3-5 October 2003 and a disease risk assessment workshop on the transport of biomaterials will be planned for May 2004 in South Africa. The goal will be for the participants of this workshop to have sufficient background information, modelling experience and specific questions identified in order to provide those with an expertise in creating modelling software the details needed to produce a user-friendly software program that can be used for assessing disease risk for the transmission of specific pathogens via semen in specific taxa.

OIE Wildlife Embryo Appendix

Reuben Mapletoft drew to the H & S Subcommittee's attention that the HASAC minutes indicate that the IETS has been asked to develop an OIE Appendix for embryos from a wildlife species (specifying wild felids). He asked whether this should be CANDES' responsibility as HASAC concentrates on livestock embryos. Loskutoff explained that as a member of the HASAC, she had been asked by Michael Thibier (Chairman of the IETS HASAC) and Larry Delver (Chairman of the HASAC Regulatory Subcommittee) to pursue this matter; however, she could not resolve the fact that the current OIE Appendices deal only with *in vivo*-derived embryos and that the vast majority of programs involved with felid assisted reproductive technology focus on *in vitro*-produced embryos. Nevertheless, the HASAC Regulatory Subcommittee assigned the task to Geoff Ryan who mentioned that Margaret Leggoe (Australia) had conducted a disease risk analysis for the importation of felids into Australia based on the criteria used for importing and exporting live animals. There was some concern raised over the fact that this might present unduly restrictive regulatory requirements for felid embryos. However, it was later agreed that at least this provided the first step to establish a new appendix in the OIE Animal Health Code for felid embryos and that the recommendations can be modified in the future as more research is conducted in the area of felid embryo and pathogen interactions.

There presently exists in the OIE Animal Health Code appendices for embryos from camelids and cervids. It was pointed out that camelid embryos are typically collected and transferred as hatched blastocysts; therefore, the recommendations provided in this appendix also follow the same restrictions for moving live animals (when working with embryos which are not zona-intact, there is the need to be confident that the embryo donor is disease free as embryo washing procedures are only effective for zona-intact embryos). There was a suggestion that more research in embryo-pathogen interactions in cervids was especially in need of further consideration because TSE's are becoming a grave concern in North America. Mapletoft commented that he has a graduate student working on elk physiology who may take this forward, but it should be recognised that artificial insemination is still the preferred reproductive technique for farmed cervids. .

Joint meetings of the Technology and Research Subcommittees

Commencing on 11 January 2003, at 17:00, Aotea Centre, Auckland, New Zealand

The joint meeting opened with a summary and update of the previous days Regulatory and Health & Safety Subcommittee meetings and a discussion of the position statement on cloning drafted by Phil Damiani (Co-Chairman of the Technology Subcommittee) on behalf of CANDES.

Research Subcommittee

Members Present:

Beth Crichton
Julio de la Fuente
Wenche Farstad
Bill Holt
Rebecca Krisher (Subcommittee Co-Chairman)
Reuben Mapletoft
Justine O'Brien
Monique Paris
Amanda Pickard (Recording Secretary)

Rebecca Krisher reported that the protocol collection process was ongoing. Letters have been sent out to leaders of specific taxa but feedback is still required. The process has not been as easy as anticipated. Unless researchers have protocols already typed, or printed and updated, they tend to be slow to respond.

The letter that is sent out to researchers asks for their protocols and outlines the details that are required; it also includes two sample protocols by way of example. These are passed on through taxa leaders to people working in the field. It has become apparent that the publication of protocols is a sensitive issue and for many, providing them is not their top priority. An alternative strategy is to identify protocols of interest via the literature, and then contact the people directly, to ask them for more details. The Research Subcommittee needs to ensure that it has supporting data (published or unpublished) to accompany each protocol. It was suggested that more information might be forthcoming if the CANDES website was online, and some information was already posted on it. This may then encourage other researchers to submit their information. In the meantime, it was important to keep contacting people. At present, only approximately 10 protocols have been submitted. It was suggested that the submission of protocols be advertised in the IETS newsletter/on Embryo mail. Protocols submitted for human procedures could be included under primates.

The current emphasis is on protocols for mammalian species, but non-mammalian species are also of interest. George Gee could be asked to collate protocols relevant to birds. We also need to find a new taxon co-ordinator for marine mammals as Sandra Hedges is no longer working in the field.

The Research Subcommittee considered its future activities, once protocol collation was successfully underway. It concluded that some of its objectives will be to identify priority areas for research, based on areas where technology is lacking. It needs to consider whether this prioritisation should target technologies, taxa or species. It should also incorporate the priorities of the NGO bodies, e.g., IUCN, and tailor its activities to meet the needs of other organisations. The members agreed to start thinking about this before the 2003 working meeting in October.

Technology Subcommittee

Members Present:

Paul Bartels
Bob Godke
Naida Loskutoff
Kari Morfeld
Damien Paris (Subcommittee Co-Chairman)
Todd Robeck
Rebecca Spindler

The Technology Subcommittee initially discussed whether it should stand independently, or should be considered a subgroup of the Research Subcommittee, which would place it in a better position to respond to the identified needs of the researchers. If this were favourable, might it be appropriate to rename the collective group the Methodology Subcommittee? This proposal was ultimately rejected. It was considered that the role of the Research Subcommittee should be to validate the relevance and effectiveness of all the different protocols. However, it should not prescribe which protocols should or should not be represented. The Technology Subcommittee was agreed to have a distinct and separate (yet complementary) role to the Research Subcommittee.

Loskutoff suggested that for future meetings, it may be advantageous to continue to hold the Research and Technology Subcommittee meetings jointly – at least for part of the session – to continue to avoid duplication of efforts and to continue to identify areas where they can complement each other (the same is true for the Health & Safety and Regulatory Subcommittees).

Goal 1: Technology for Priority Development in CANDES:

Damien Paris briefly listed some of the nominated technologies for development that were contributed by various members previously: Some technologies were a common priority, e.g.,

- Non-invasive LH/ovulation detection
- Pheromone detection
- Oocyte/ovum preservation
- Room temperature embryo preservation using “embryonic diapause” factors.

Spindler and Bartels suggested that this role should be addressed more appropriately by the Research Subcommittee. Godke highlighted the value of compiling a list of desirable technologies to guide scientists’ research priorities and that this should be a function of the Technology Subcommittee. Damien Paris suggested that he would compile the list of priority technologies and e-mail this to the members of the Technology Subcommittee to prioritise. Spindler suggested that each item on the list should be followed by a brief description for clarification.

Goal 2: Priority List of CANDES Taxa/Species with Poor Captive Reproduction

After some discussion, it was decided by the members present that compiling a list of CANDES with poor captive reproduction was beyond the scope of this Subcommittee and more appropriate for groups such as the AZA Repro SAG, IUCN Specialists Groups or others.

Defining the Purpose of the CANDES Technology Subcommittee

Robeck asked for clarification regarding the purpose of the Technology Subcommittee. Loskutoff explained the need for the CANDES Parent Committee to reflect the increased wildlife interests of the IETS membership. CANDES was modelled on the highly successful IETS HASAC. Her initial concept of a Technology Subcommittee was in adapting existing technology (e.g., used in livestock) to CANDES and to providing the IETS membership with instructions, product availability, contact details or other information that can assist in the application of reproductive technologies to CANDES. Another area of interest would be to identify and provide information on some of the more unique phenomena identified in the reproductive strategies of CANDES (e.g., embryonic diapause) that may provide the impetus for further investigation and, perhaps, the eventual exploitation of the phenomena for technological development and use in practical applications. Loskutoff did, however, mention that the ultimate mission statement and goals of the CANDES Technology Subcommittee should be determined by its membership.

After further discussion, it was agreed by the members present that among the objectives of the Technology Subcommittee are to:

- Compile a list of novel technologies for prioritisation
- Function as a referral service for technology training (Spindler)
- Compile information on adaptive technologies for CANDES (consult with Damiani)
- Consider species for technology modifications
- Emphasize methodologies that have universal application
- Discuss “weird and wonderful” reproductive phenomena and strategies found in CANDES (e.g., giant sperm in *Drosophila*) with regular short communications in either in the IETS newsletter or website, and including a system whereby IETS members can submit additional interesting reports.

The identification of these objectives confirmed the notion in the members present that the Technology Subcommittee did indeed have a unique and important role in the CANDES Parent Committee.

Intellectual Property, Financing and Patent Issues

In the long term, these are inevitable issues for consideration. Damien Paris suggested that the Subcommittee members be mindful of such issues, but that they would not be considered as priorities in the short term. It was also suggested that future meetings of the Technology Subcommittee be “closed” to protect individuals from discussing novel ideas and unpublished data.

Statement of Ethical Practice

This issue was raised at the January 2002 meeting of the CANDES Parent Committee meeting by Wenche Farstad who brought it up for discussion again at this meeting. It was decided not to address this issue at this stage.

Draft CANDES Position Statement on Cloning

The position statement on cloning in CANDES species, which has been drafted by Technology Subcommittee Co-Chairman Damiani (Appendix 2) in response to a request from the

2001-2002 IETS Board was reviewed. Then IETS President Bavister asked CANDES to pursue this following a request for comment on the proposal to clone the Tasmanian tiger. Comments on the first draft written by Phil Damiani have been received from several individuals:

- Dave Wildt (Smithsonian, National Zoo, Washington, DC, USA) and Andy Kouba (Memphis Zoo, TN, USA) raised concern about the nature of the original statement. Loskutoff suggested that these comments were largely due to a misunderstanding of the different goals and objectives of the IETS CANDES committee versus that of the AZA Reproductive Sciences Advisory Group which was also in the process of preparing a position statement on cloning endangered species. Karen Goodrowe and Bill Swanson are drafting a statement on behalf of the AZA group, specifically to address how cloning impacts the conservation of endangered species. The objective of the CANDES statement is to focus on the technology and science issues, as IETS is not a wildlife conservation organisation but a scientific society that focuses on embryo technology, and this should be reflected in the statement.
- Anneke Moresco (U. California at Davis, USA) queried whether the CANDES committee approves the development of techniques that might allow private individuals to recreate their pets rather than develop techniques for increasing genetic diversity in species. This point needs clarification.
- Laslo Solti (Hungary) commented that the statement should encourage research to allow the benefits to be seen in the future, but emphasise that individual, sensationalist achievements should be discouraged.
- Bill Conway (Wildlife Conservation Society, Bronx, NY, USA) urged that the statement not be misinterpreted to imply we are commenting on human cloning.

The IETS Board of Governors has an existing statement in support of nuclear transfer technology for livestock research but not human cloning (see p.15). The CANDES statement should aim to not contradict this, but take a specific position on the use of cloning for CANDES. It was considered that the first draft of the CANDES statement could be misinterpreted to suggest we were in complete support of cloning CANDES (including endangered species conservation), and therefore, the statement should be made more circumstance-specific. It was also suggested that more emphasis could be made of the fact that at its current level of success, cloning is inappropriate for reproducing CANDES, and efforts should be focussed on more routine technology (e.g., AI, ET or IVF) until such time as the success rates are increased.

The Research and Technology Subcommittee members present collectively agreed that the IETS CANDES Parent Committee should not support the propagation of endangered species by cloning at this time. However, the collection and preservation of tissues might be appropriate, with the thought of using these in a future cloning programme. Nevertheless, limited resources should not be wasted on inappropriate technology. It was noted that in some cases, it is possible to generate clones, but not to successfully transfer embryos in the species of interest (e.g., in bongo). Therefore, we should support the development of more basic technologies before advancing to the more demanding procedures. Some also suggested it appropriate to emphasise the potential application of cloning to non-mammalian species, e.g., amphibians.

The position statement needs to clarify that the current technology of reproductive cloning is too inefficient to be utilised for conservation. However, Wenche Farstad suggested that it also needs to acknowledge that therapeutic cloning may be very valuable and close to reality for some species, e.g., dogs. Therefore, it may be appropriate to mention therapeutic cloning separately from reproductive cloning. It might be necessary to highlight, for example,

that the committee approves stem cell research.

The majority of members present voted to accept the basic premise of the first draft of the statement, with some editorial changes. These were suggested as follows, but for further discussion:

IETS CANDES Position Statement on Cloning (revised on 11 January 2003 at the joint meeting of the Research and Technology Subcommittees):

“The Parent Committee on Companion Animals, Non-Domestic and Endangered Species (CANDES) of the International Embryo Transfer Society (IETS) considers that the research and development of technologies known as nuclear transfer or cloning has potential for specific practical applications. At the present time, this committee believes that these procedures are too technically inefficient for most breeding or offspring production objectives. However, nuclear transfer for therapeutic applications (e.g., stem cell research) are encouraged. The committee believes that any application of this technique should be considered in context with the relative success rates of reproductive technologies that are currently more effective and efficient, such as artificial insemination, embryo transfer and cryopreservation. The committee considers that further research and development of this technology should be conducted on the basis of sound scientific principles and with the ethical care and use of CANDES animals, and focus on the development of techniques that have obvious long-term practical application. This technology may be most appropriate in species with a history of cloning success, e.g., amphibians or species closely related to domestic livestock. The collection and storage of material suitable for use in future cloning programmes is strongly encouraged.”

At the open meeting of the CANDES Parent Committee on 12 January 2003, this revised statement was read by Pickard to the members present. It was clearly evident that not everyone was satisfied with this statement as written. Brad Stroud commented that he believed the statement was too conservative. Andras Dinnyes and Daniel Salamone both believed that the efficiency of cloning technology was advancing greatly and that we should not appear to condemn research that may improve cloning applications to CANDES. Duane Kraemer concurred that we should not stress low efficiency as the only reason for not supporting cloning as this will no doubt be overcome. He urged us to consider other cloning issues such as developmental normality of cloned individuals, source and quantity of oocytes, and allogeneic/xenogeneic recipients to carry cloned embryos, etc.

Chairman Loskutoff pointed out that although many of those who did not support the revised statement were, in fact, involved in cloning research – there were two past IETS Presidents present (Stroud and Kraemer) who likewise had problems with the statement as written, and this was mostly based on the fact that a significant proportion of the IETS membership is involved in nuclear transfer technology. She suggested that because the IETS is a scientific society, and not a conservation organization, that the statement be re-worded in such a manner so as to not address the use of cloning for “saving endangered species” but rather focus on the science and technology, which could make it a more positive statement. Another suggestion was that if a consensus could not be reached, that we elect not to formulate a statement specifically addressing CANDES, but rather, propose to use the official IETS position statement on cloning that currently appears on the IETS website (www.iets.org):

“The International Embryo Transfer Society (IETS) encourages and strongly supports freedom to conduct research on animal "cloning" by somatic cell nuclear transfer and related techniques using embryonic, fetal, and adult animal cells. The IETS believes that such research will provide avenues to improved understanding of the genetic regulation of development and should ultimately result in improved health, welfare, and reproductive efficiency of animals.”

The Board of Governors of the IETS, March 22, 1998

The discussion/debate continued for a full hour without resolution. Loskutoff suggested that the issue be placed on the agenda for discussion at the working meeting in October 2003.

CANDES Web Page Development

A meeting was scheduled with IETS Governor Richard Fayer-Hosken on 13 January 2003 at noon to discuss the CANDES web page on the IETS website (Appendix 4). Morfeld was asked to inquire as to the possibility of having a submission site for members to submit new ideas and relevant information. Fayer-Hosken suggested that the web page be updated regularly with new information to maintain interest. Loskutoff suggested that updates and new information be submitted to her in March and September each year which she will forward to Fayer-Hosken and/or the IETS Business Office.

Future Meetings

The AZA Repro SAG and BBAG meetings will be held on 29-31 May 2003, in Tacoma Washington, USA. Although the intention is to hold future CANDES meetings with these groups, it was suggested that CANDES should meet separately in 2003 to focus on issues that need considerable attention, such as the development of the disease risk analysis program for semen.

The next working meeting of the IETS CANDES Parent Committee is scheduled for 3-5 October 2003 at Omaha's Henry Doorly Zoo who will sponsor the venue, catering and some accommodations for participants (please R.S.V.P. and send requests for accommodations as soon as possible to Naida Loskutoff at : NaidaL@omahazoo.com). The Director of the Henry Doorly Zoo, Dr. Lee G. Simmons, has generously pledged \$10,000 per year to the IETS CANDES Parent Committee to assist with expenses needed to hold the mid-year working meetings and symposia. For those members who need financial assistance for travel to attend the working meeting in October 2003, please send a written request to Naida Loskutoff no later than 1 September 2003. Priority will be given to those members who have played more active roles in the IETS and the activities of the CANDES Parent Committee. At the next meeting, fundraising ideas will be discussed, such as the sale of CANDES educational or promotional materials.

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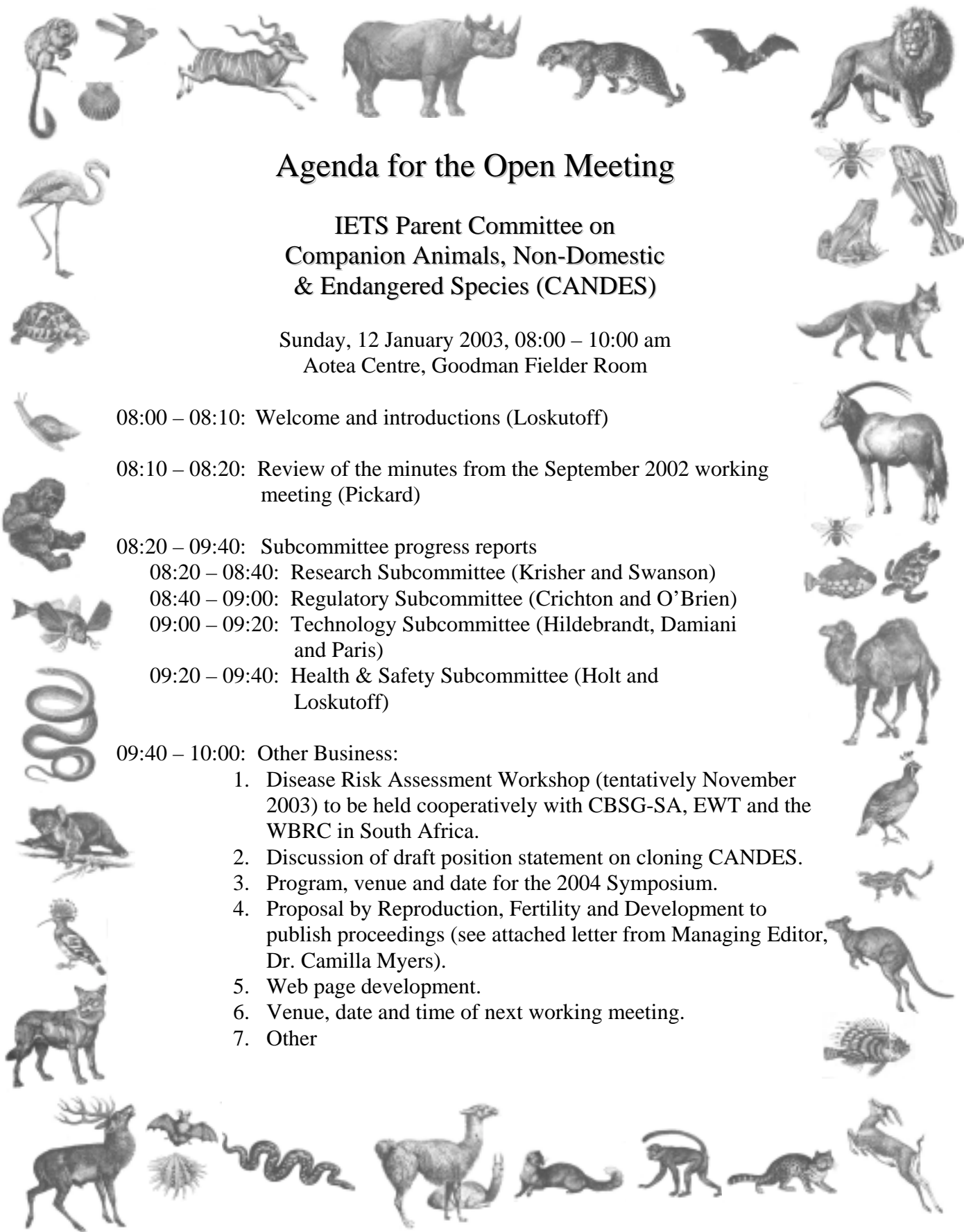
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Appendix 1

Agenda for the Open Meeting

IETS Parent Committee on Companion Animals, Non-Domestic & Endangered Species (CANDES)

Sunday, 12 January 2003, 08:00 – 10:00 am
Aotea Centre, Goodman Fielder Room

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- 08:00 – 08:10: Welcome and introductions (Loskutoff)
- 08:10 – 08:20: Review of the minutes from the September 2002 working meeting (Pickard)
- 08:20 – 09:40: Subcommittee progress reports
- 08:20 – 08:40: Research Subcommittee (Krisher and Swanson)
 - 08:40 – 09:00: Regulatory Subcommittee (Crichton and O'Brien)
 - 09:00 – 09:20: Technology Subcommittee (Hildebrandt, Damiani and Paris)
 - 09:20 – 09:40: Health & Safety Subcommittee (Holt and Loskutoff)
- 09:40 – 10:00: Other Business:
1. Disease Risk Assessment Workshop (tentatively November 2003) to be held cooperatively with CBSG-SA, EWT and the WBRC in South Africa.
 2. Discussion of draft position statement on cloning CANDES.
 3. Program, venue and date for the 2004 Symposium.
 4. Proposal by Reproduction, Fertility and Development to publish proceedings (see attached letter from Managing Editor, Dr. Camilla Myers).
 5. Web page development.
 6. Venue, date and time of next working meeting.
 7. Other

Appendix 2

International Embryo Transfer Society Parent Committee on Companion Animals, Non-Domestic and Endangered Species (CANDES)

Statement regarding the use of nuclear transplantation/transfer (cloning) technologies for the propagation of CANDE species

Original Draft Statement (by Phil Damiani, Co-Chairman of the CANDES Technology Subcommittee):

“The Parent Committee on Companion Animals, Non-Domestic and Endangered Species (CANDES) of the International Embryo Transfer Society IETS CANDES believes that the use of technology know as nuclear transfer/cloning (also known as nuclear transplantation, interspecies nuclear transfer) is a technology that may have a potential application in the propagation of animals represented under CANDES, however, at the present time the Committee members believes this technology is still considered to be technically inefficient to be utilized as a standard assisted reproductive technique. The Committee believes that endorsement and application of this technology at its current state needs to be kept in context with the benefits of other more effective and efficient assisted reproductive technologies, such as artificial insemination, embryo transfer and cryopreservation. The Committee considers that research efforts in the further development of this technology be conducted on the basis of sound scientific principles and with the ethical care and use of CANDES animals.”

Appendix 3

Minutes from the meeting with Dr. Richard Fayrer-Hosken regarding CANDES web page 13 January 2003, 12:00 – 1:00 pm, Goodman Fielder Room, Aotea Centre

IETS Governor Fayrer-Hosken met with several CANDES members to discuss what and how to post CANDES information onto the IETS website.

1. Chairman Loskutoff suggested that it should open with an attractive page showing several photographs of some of the most notable “firsts” in ART applications to CANDES (similar to the photograph collage used for the cover of the January 2002 report). Fayrer-Hosken indicated that jpeg images of 1 M would be the maximum size allowable. Information on the source of the photographs, as well as any pertinent published literature pertaining to the subject of each photograph, will be provided in an attached “photo credit” document.

2. There was a discussion of what information should be accessible to the general public versus IETS membership. It was suggested that the reports from the mid-year working meetings and meetings associated with the IETS annual conferences should be restricted to IETS members, as these often contain contact details of members as well as preliminary discussions of topics that may not be appropriate for general audiences (e.g., position statement on cloning CANDES).

3. Fayrer-Hosken urged that the CANDES web page be updated regularly to uphold interest. Loskutoff suggested that she call for updates quarterly, with March and September deadlines. For the initial posting, Loskutoff suggested that the four subcommittees list their membership and objectives, as well as any information resulting, e.g.,

Research Subcommittee:	standard operating procedures (or protocols*) for a variety of methods useful for ART applications to CANDES;
Regulatory Subcommittee:	templates containing import/export information for biomaterials from CANDES for a diverse array of countries;
Health & Safety Subcommittee:	literature review on semen and pathogen interactions;
Technology Subcommittee:	list of companies or institutions that can provide specialized training or instrumentation for ART applications to CANDES. Perhaps also an interactive site containing some “weird and wonderful bio-phenomena” discovered in CANDES (with a method for users to submit their own findings for future postings).

**It was pointed out later by Geoff Ryan of the IETS HASAC that “protocol” may not be an appropriate choice since in Australia, the word is more commonly associated with politics/treaties.*

Addendum: In March of 2003, it was apparent that there would only be a few documents completed for the initial posting. Since there was a sufficient body of information (subcommittee membership and goals, meeting reports and symposium proceedings) that can be provided to Fayrer-Hosken for the initial posting of the CANDES web page – Loskutoff suggested to the Subcommittee Co-Chairmen that any additional information can be delayed until the September 2003 web page update.

4. There was some discussion of what educational materials may be offered for sale on the CANDES web page. Loskutoff suggested more slide tutorials of ART applications in CANDES – she would address this issue with the Chairman of the IETS Foundation, Steph Dieleman, and the IETS President, Carol Keefer, if this could be possible for raising funds to assist CANDES members with travel expenses to attend the mid-year working meetings.

Loskutoff further suggested that a videotape series be considered that describe and illustrate various ART applications to CANDES (e.g., semen collection by electroejaculation, and laparoscopic oocyte retrieval in large felids, great apes, etc.). However, several members – and especially those from the UK and Australia -- mentioned that this could potentially create backlash from animal rights organizations by showing animals in situations that can be misinterpreted as inappropriate. As a result, the suggestion was tabled.

5. It was further suggested that the CANDES committee consider promotional materials, e.g., a logo followed by membership pins, bumper stickers, shirts, etc. An ad hoc committee will be developed to explore the options.