SCNT Cloning
Animal Breeder's Perspectives

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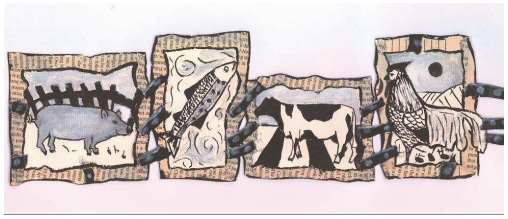

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Association of the European Poultry Breeders

FABRE TP

Farm Animal Breeding is…

a. Select best parents for next generation
   - from genetic diversity of populations
   - production environment, market, economic conditions…
   - **diversity and distinctiveness** of European animal production and the **European landscape and culture**

b. Dissemination of progress => reproduction

Farm Animal Breeding

- Cooperatives and private organisations
  - depending on biology of species
- Majority in Europe
  - ~50% up to > 80%
  - **providing world with breeding stock**
  - **based in Europe /European owned**
- Takes place
  - where the **high level research** is
  - in a **global competitive** market

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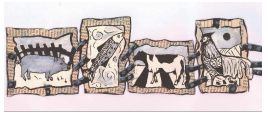

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Animal SCNT Cloning is a

- Technology in development
  - Aware of society concerns:
    - Animal Health and Welfare
    - Genetic Diversity
    - Ethics
      - Choice
      - Slippery Slope Effect

Animal SCNT Cloning

- No practical benefit at the moment
  - not currently applied
  - in regular breeding programmes of production animals in EU
- Important options for the future
  - animal breeding and production take place in a global environment with an increasing role of biotechnologies
  - EU cannot afford to become detached from the further development
  - when animal cloning would be forbidden as technology support tool for animal breeding and production **now**, this will have an important **signal function and serious consequences**
    - Research and innovation
    - Competitiveness animal breeding and production Europe

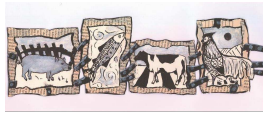
Research and Innovation

- Animal cloning and medical applications
- Novel animal reproduction technologies
- Breeding in general

Not to lose the option to utilize cloning in future if that became appropriate

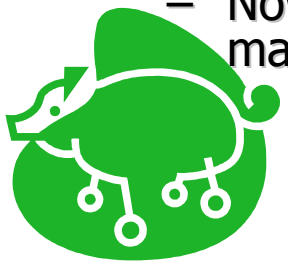
R&D will only continue if the options for the future are open

- No further development
- Also for judging the technology vis-à-vis developments outside Europe




Competitiveness
European farm animal breeding business

- Depending on species and applications, cloning related developments will take place **outside Europe** leading to a severe **competitive disadvantage** of breeding organisations, with spin off consequences for **breeding for quality and diversity production**
- This will happen at the **medium term** (as from 7-10 years from now).
- In practice this would mean that most of the **breeding developments** will take place **outside Europe** (and also the **knowledge center** developments)
  - It will concentrate on the uptake of overseas knowledge, and further developments in quality schemes (an area related to breeding)
  - We foresee problems in diversity developments, and higher cost of animal food production
  - Now breeding is mostly in European hands – the size of the companies makes it easy for investors outside Europe to outcompete them



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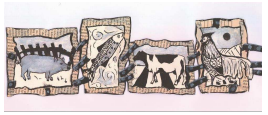

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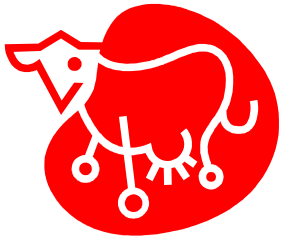
Potential Applications

- Research – improving knowledge of biology
- Insurance – safeguarding valuable animals
- Conservation – increasing animal numbers
- Biosecurity – international trade in genetics
- Dissemination of improved genetics
- Niche roles in breed improvement



As cloning technology has significantly improved during recent years, the global use of SCNT cloning for farm animals may appear earlier than we can foresee now

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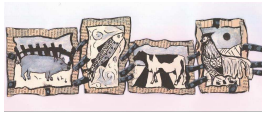

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Animal SCNT Cloning - issues

- Animal Health and Welfare
  - to be improved by research and development
- Biodiversity
  - technology should be part of balanced breeding schemes
- Public opinion
  - important, and therefore should allow public the choice
  - CHOICE works both ways: to use or not use a technology (not restrict choice)

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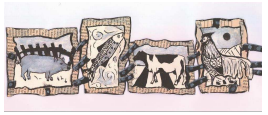

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Traceability of farm animals

- Animals are being followed and registered thoroughly
  - Their movements
  - Their family picture (pedigree)
  - Their health
- Code of Good Practice Code-EFABAR
  - Traceability with individual breeding organisation
  - For transparency
  - Developed as EC project,
  - Society involved in various steps of development
  - In terms of sustainability, balance
  - Use/not use of technology
- Registration database of clones
  - Distinguish clones from progeny (***progeny of clones are not clones***)
  - E.g. there is no evidence that these animals suffer any welfare or health effects from the cloning of previous generations

Conclusions (1)

- No clear safety issues for consumers
- One end of a continuum - no obvious reason to draw the line at SCNT
- Still costly, but may be cost effective in dissemination, conservation, improving biosecurity and as an insurance policy for elite animals
- Unlikely to have wide use in mainstream breeding
- But may make a useful contribution to improving economic and environmental sustainability (and even food quality/safety and animal welfare)

Conclusions (2)

- Most new technologies have problems that can be overcome
- A need for more research on risks and benefits
- Important to distinguish between SCNT clones and their progeny
- How can we best maintain choice?
  - choice for industry to use and choice for consumers with objections to choose against

Thank you for your attention

- European Forum of Farm Animal Breeders
  www.effab.info
- European Association for Animal Production
  www.eaap.org
- European Poultry Breeders
  info@epb-secretariat.eu
- Genesis Faraday
  www.genesis-faraday.org
- Sustainable Farm Animal Breeding and Reproduction Technology Platform
  www.fabretp.org

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