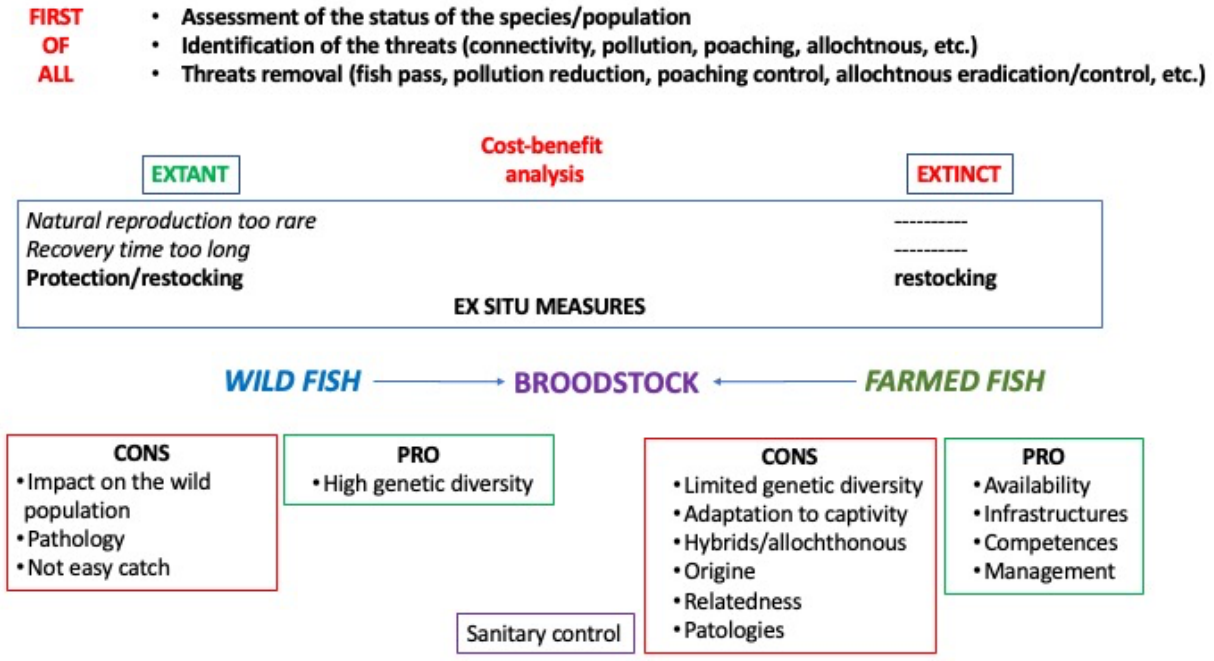
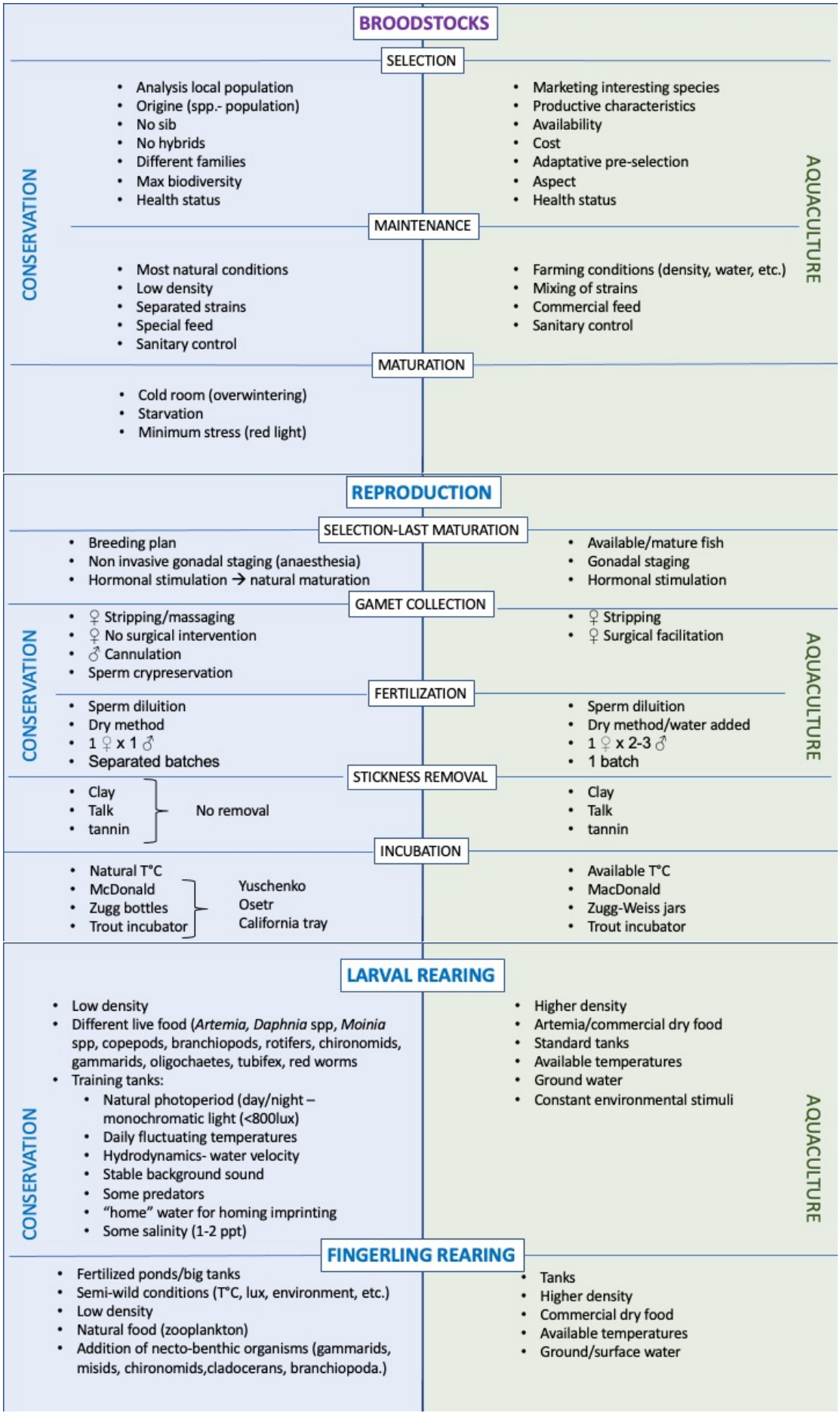
ROUND TABLE DISCUSSION

At the end of the session, the participants, conservationists and farmers, participated in a discussion concerning the possible interest of breeders to participate in the sturgeons conservation actions, which are the common activities also in the methodologies used and which differ, so as to require a completely different approach in the aquaculture for conservation, with obvious greater commitments of structures, of time and money, as well as the need to learn particular techniques that are not normally used in commercial aquaculture.

In addition to the invited experts, the round table was also attended by several participants in the session, and the discussion lasted over one hour and half, with active participations of several farmers.

To analyze and discuss in detail the specific different actions required in aquaculture for conservation compared to commercial aquaculture, at the beginning of the discussion some slides have been presented which highlight the differences for each phase of the process, from broodstocks choice to the production of subject to be released.




BROODSTOCKS
SELECTION
CONSERVATION
Analysis local population
Origine (spp.- population)
No sib
No hybrids
Different families
Max biodiversity
Health status
AQUACULTURE
Marketing interesting species
Productive characteristics
Availability
Cost
Adaptative pre-selection
Aspect
Health status
MAINTENANCE
Most natural conditions
Low density
Separated strains
Special feed
Sanitary control
Farming conditions (density, water, etc.)
Mixing of strains
Commercial feed
Sanitary control
MATURATION
Cold room (overwintering)
Starvation
Minimum stress (red light)
REPRODUCTION
SELECTION-LAST MATURATION
Breeding plan
Non invasive gonadal staging (anaesthesia)
Hormonal stimulation → natural maturation
Available/mature fish
Gonadal staging
Hormonal stimulation
GAMET COLLECTION
♀ Stripping/massaging
♀ No surgical intervention
♂ Cannulation
Sperm crypreservation
♀ Stripping
♀ Surgical facilitation
FERTILIZATION
Sperm diluition
Dry method
1 ♀ x 1 ♂
Separated batches
Sperm diluition
Dry method/water added
1 ♀ x 2-3 ♂
1 batch
STICKNESS REMOVAL
Clay
Talk
tannin
No removal
Clay
Talk
tannin
INCUBATION
Natural T°C
McDonald
Zugg bottles
Trout incubator
Yuschenko
Osetr
California tray
Available T°C
MacDonald
Zugg-Weiss jars
Trout incubator
LARVAL REARING
Low density
Different live food (Artemia, Daphnia spp, Moinia spp, copepods, branchiopods, rotifers, chironomids, gammarids, oligochaetes, tubifex, red worms
Training tanks:
Natural photoperiod (day/night – monochromatic light (<800lux)
Daily fluctuating temperatures
Hydrodynamics- water velocity
Stable background sound
Some predators
"home" water for homing imprinting
Some salinity (1-2 ppt)
Higher density
Artemia/commercial dry food
Standard tanks
Available temperatures
Ground water
Constant environmental stimuli
FINGERLING REARING
Fertilized ponds/big tanks
Semi-wild conditions (T°C, lux, environment, etc.)
Low density
Natural food (zooplankton)
Addition of necto-benthic organisms (gammarids, misids, chironomids,cladocerans, branchiopoda.)
Tanks
Higher density
Commercial dry food
Available temperatures
Ground/surface water

ROUND TABLE MINUTE

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The scope of the round table was to discuss cooperation possibilities between the private aquaculture sector and sturgeon conservation projects, given the different approaches and different primary interests of aquaculture for conservation and commercial aquaculture.

Based on a list of different purposes and operations that characterize respectively the commercial aquaculture and that for the conservation presented as a basis for the discussion (see above), in addition to the presentations made in the session dedicated to the conservation of sturgeons, the following topics have been discussed.

Listing of further 4 sturgeon species under the US Endangered Species Act: Reference to the previous presentation regarding also the ESA listing was given. There was a discussion about which actions and arguments could be provided to avoid this listing. It was finally concluded that the listing itself cannot be prevented through arguments, which have been abundantly provided both by WSCS and several aquaculture associations, and the current US law cannot be changed through initiatives from this group. Legal procedures are in preparation. Perhaps it is possible to open a new procedure to request delisting.

It was also underlined that the US has not implemented the necessary steps to implement CITES labelling requirements for domestic trade.

Cooperation between Aquaculture producers and conservation:

On a general level the idea was raised that general and applied recommendations should be developed on how aquaculture for sturgeon can support conservation. This could then be developed into the development of an action plan.

This should include the development of a gene bank for different sturgeon species. It was discussed whether this can be a common living gene bank on European/Eurasian level, where all sturgeon range states come together in a common approach as it is done with gene banks for plants or whether a more local or basin wide approach might be more feasible and appropriate.

Securing the genetic variability in sturgeon stocks (captive and wild) is a common interest for conservation and the aquaculture sector. It was thus confirmed by the participants that this could be a win-win situation for all involved. It was also noted that there is an urgency to start this ASAP and that for some species may even be the last minute.

For conservation purposes the genetic diversity within a species is extremely important but in the establishment of breeding plans the first important factors that must be considered are:

- the purity of the breeders in relation to the species they belong to, (sometimes compromised by the inaccurate production and management of interspecific hybrids in aquaculture);
- the geographic origin, which must respect the natural pattern of genetic distribution.

Once it is ascertained that the breeders belong to the correct conservation units then the degree of diversity and the relatedness should be considered. In order to develop genetic procedures for purity assessment and geographical allocation it is necessary do have reliable reference samples-

A survey of all animals in captivity with supposed wild origin or F1 should be conducted, this would allow to create a meta-broodstock across different facilities. The breeding would then need to follow a broodbook. In Italy there is currently some limited money available to start this on the Adriatic sturgeon and on the Beluga reared in Italian farms.

In France research and production are strictly separated until now, despite interest from the aquaculture producers to be involved in conservation programs.

The opportunity of presenting a common project among different actors from conservation (WSCS, WWF), aquaculture operators and scientists was discussed and seen as an interesting possibility to be submitted for EU funding. FAO might also be an interesting partner and could be interested in providing seed money for concept development. Joint projects between public and private actors as well as conservation organisations may represent a strong partnership.

It was noted that breeding and rearing fish for conservation purposes need to follow protocols and involves additional measures and activities as for the economic production. This may require new investments or additional resources from the producers. The question was raised who would compensate them for this. One Italian farm is already engaged in such work for years, frequently covering additional costs through own means.

The possibility of engaging private investors that are interested in projects with conservation impact was raised but there were some doubts how such investors would need to be paid back with a return for their investments. Green visibility is an option, and other better marketing opportunities for sturgeon farmers that engage in conservation actions was also raised as an option.

It was also noted that the producers should be encouraged to raise pure species and not breed hybrids.

The possibilities for producers to be engaged in conservation breeding depends not only on the broodstock they have available, but also on the location of the farm. Ideally the proximity to the target river would be required to imprint homing for spawning behaviour, but alternative strategies might be identified. Mobile hatchery containers close to spawning locations could be one option to consider.

It has been presented that there are many other factors that should be taken into account when rearing young fish for releases to enhance their fitness for survival. The list of factors represents an ideal scenario, not all will be possible to be implemented under all settings.

Having a clear idea of what are the conservation units to be separately managed through a dedicated international project aimed at:

- Identification and genetic characterization of individuals of certain geographical origin
- Development of analytical protocols for the allocation of breeders to the correct conservation unit.
- Survey of captive animals and establishment of meta-broodstocks for the different conservation units

For species for which a single conservation unit is known, such as, for example, the Adriatic sturgeon, the European sturgeon, the Dabry sturgeon or the Chinese sturgeon, only purity and relatedness assessment are needed.