WORKSHOP 9 AQUACULTURE

WS 9.1 | Bottlenecks for aquaculture growth

P Bossier; P Sorgeloos

Lab Aquaculture & Artemia Reference Center, Ghent University, Ghent, Belgium

Aquatic production from fisheries has been stabilizing over the last 10 years. Aquatic production from aquaculture has been growing worldwide for a long time, sometimes close to 10% per year, currently reaching close to 50% of the production through fisheries. It is generally accepted that aquaculture will need to keep growing to meet the growing worldwide demand. There are a couple of features that argues in favor for the stimulation of aquaculture. Most aquatic species have very low feed conversion rate (depending on the species and the way of calculation). Basically FCR is close to that of chicken and lower than for instance for red meat. Also a lot of aquatic production is based on extractive aquaculture systems (mollusks) which extract nutrients and is hence environmentally neutral. Yet aquaculture is also facing a lot of bottlenecks. For aquaculture species higher up in the food chain, marine proteins and lipid are used. Since these sources are limited alternative source will need to be developed to become fully independent from fisheries. In addition the following issues are considered as important research areas: 1) Complete independence from natural stocks through domestication, 2) Improved / more cost-effective seed production, 3) better targeted species selection, 4) Development of more efficient stocks through selective breeding 5) More microbial management for more sustainable production, 6) Better understanding of immune systems in vertebrates and invertebrates, 7) More integrated production systems for plant and animal farming, 8) coastal and off-shore farms of food and energy and finally more attention for integration of restocking activities with fisheries management.

WS 9.2 | Cryopreservation of germ cells for the production of marine species

E Cabrita; S Martinez-Páramo; MT Dinis

Centre of Marine Sciences (CCMAR), University of Algarve, Campus de Gambelas, Faro, Portugal

Germ cell cryopreservation is a safe method to store and preserve genetic material. Cryobanks in aquatic species were developed with different aims, benefiting fish farming, from management of reproduction to genetic selection of sperm from males with high reproductive value. Research has been conducted on the development of protocols for new/problematic species, for commercial species to improve gamete quality during storage or for conservation purposes. Protocols for sperm cryopreservation were successfully developed in fish and bivalve species, although some cell damage has been identified with relevance to oxidative stress. Nutritional supplementation of breeders can play an important role in this regard. The incorporation of antioxidants was proven to be favorable for sperm quality in gilthead seabream and seabass, especially when quality needs to be reinforced to sustain cryopreservation. Another source of cryobanking material is spermatogonial stem cells. Cryopreservation of testicular cells plays an important role in fish reproductive biotechnology. Cryopreserved spermatogonia can be transplanted between close-related species, differentiating into male or female gametes in the host gonads, allowing the preservation of the all genome. Due to this capacity, spermatogonia xenotransplantation is becoming a useful tool to produce surrogated broodstocks, particularly in species difficult to maintain in captivity, with high age at maturation or with reproductive problems as the Senegalese sole. (This work was supported by COST AQUAGAMETE (FA1205), CRIOBIV and REPLING projects (PROMAR).)

WORKSHOP 10 INTERACTIONS NUTRITION-REPRODUCTION IN SMALL RUMINANT SYSTEMS

WS 10.1 | Interactions between nutrition and reproduction in small ruminants

S Chadio

Agricultural University of Athens, Athens, Greece

Nutrition affects all aspects of reproductive process from onset of puberty to gamete development and successful fertilization, embryo survival and the establishment of pregnancy. The well recognized link between energy balance and reproduction is mediated by a plethora of metabolic hormones, metabolites, neuropeptides and growth factors, acting either through modulation of the hypothalamic GnRH neuronal network or through direct effects at the ovarian level. In seasonal breeding animals, like small ruminants nutrition interacts with photoperiodic signals to affect the seasonality of reproduction. There is also strong evidence that nutrition in utero may impact offspring's later reproductive performance and productivity. Specific outcomes depend on the severity, duration and stage of development when nutritional perturbations are imposed, while sex specific effects are also manifested. Mechanisms underlying reproductive programming are yet unclear, but may include epigenetic modulation of critical genes involved in the control of reproductive function. The goal of the workshop is to bring together recent findings on the effects and mechanisms governing the nutrition-reproduction interactions in small ruminants and to interpret them in the context of animal systems sustainability and efficient productivity.

WS 10.2 | Feeding strategies to improve reproductive efficiency in small ruminants

G Zervas

Agricultural University of Athens, Athens, Greece