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## **Ethical concerns towards 'foie gras' production – Which contributions of research in France?**

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The practice of force-feeding is a very ancient tradition, originating from Egypt, 2500 years BC. The initial goal was to fatten birds in order to provide energy food for human consumption. Nowadays however, force-feeding has the main objective to produce 'foie gras' (fatty liver), a high quality delicatessen with a strong added value. The practice of force-feeding has long been a matter of debate mainly because the rearing conditions and the overall force-feeding procedure, including intubation, are generally considered to be stressful and/or painful, and would therefore impair the birds welfare. Ethical concerns towards foie gras production have been particularly amplified, at least in France, since in 1998 the Scientific Committee on Animal Health and Animal Welfare (SCAHAW) reported to the European Commission that "*force-feeding is detrimental to the welfare of the birds*". The banning of individual caging of ducks in 2016, replaced by collective housing, was one of the consequences of this debate. Apart from this response to EU regulation on animal housing, scientific projects dedicated to the welfare of ducks and geese for foie gras production have been implemented, some of which being co-funded by the professional sector. A first set of studies published in the early 2000's were dedicated to the exploration of stress and/or pain responses to the force-feeding procedure. The use of current physiological and metabolic indicators of stress responses did not show indication that force-feeding was perceived as an acute or chronic stress. Behavioural studies seemed to confirm these conclusions. In addition, studies on the inflammatory responses of duck crop indicated that force-feeding did not appear as a potent source of nociceptive stimuli from visceral origin, in the absence of injury. Taken together, these results objected to the conclusion of the SCAHAW but they failed to weaken the attacks from Animal Protection group, especially the French branch of L214 called "Stop gavage". More recently, the question of the welfare of ducks during force-feeding has been approached in a more integrated way in a project aiming at the development of a multi-criteria evaluation method. This method should take into account the different components of welfare (feeding, environment, health, behaviour), using simple indicators, in order to be implemented on farm. This would allow to identify and to test progress pathways. A PhD student is currently working on this project. Beside these works on the welfare of ducks during force feeding, research project on the spontaneous liver steatosis have been implemented since 2008 by INRA. The question addressed is to explore the possibility of fattening the liver without force-feeding. So far, we showed that the induction of spontaneous liver steatosis was possible in geese, but not in ducks. By miming the premigratory environmental conditions and manipulating feed nature and availability, we were able to induce a transient hyperphagia associated to liver steatosis. The level of steatosis is lower than that obtained with force-feeding and the individual variability is much higher but current works are undertaken to identify the causes of this variability and to improve the response of the birds.