



RESISTANCE OF MULE DUCKS TO SALMONELLA CARRIER-STATE

C. Beaumont¹, N. Sellier¹, P. Velge², P. Menanteau², F. Dubos⁴, H. Chapuis³, C. Marie-Etancelin⁵

¹INRA Unité de Recherches Avicoles, ²INRA Infectiologie Animale et Santé Publique,

³Syndicat des Sélectionneurs Avicoles et Aquacoles Français, 37380 Nouzilly, France, ⁴INRA Unité Expérimentale des Palmipèdes à Foie Gras, 40280 Benquet, France,

⁵INRA Station d'Amélioration Génétique Animale, 31326 Castanet-Tolosan, France

Salmonella may colonize the gastrointestinal tract of most animals, including fowls (Beaumont et al, 2009a) and ducks. They often result in an asymptomatic carrier-state, when animals carry the bacteria without showing any symptoms. These silent carriers may transmit the bacteria to other animals or human beings; indeed poultry products are the main source of human toxi-infections, and contamination of ducks by *Salmonella* may result in severe losses (Barrow et al., 1999). Since there is a partial genetic control of resistance of fowls to *Salmonella* and the *Salmonella* carrier-state (Beaumont et al., 2003), which may contribute to the prevention of this disease in fowl, an initial experiment was conducted in ducks to test the feasibility of such an approach based on genetic resistance in this species. A protocol of experimental inoculation resulting in a carrier-state was induced by orally inoculating female ducks at one day of age with three different doses of the *S. Enteritidis* T51 strain resistant to nalidix acid and kanamycin. A persistent carrier-state was observed in the three cases and a dose of 5x 10⁶ colony forming units (c.f.u.) was chosen for the second experiment.

The second experiment was performed on 550 female mule ducks issued from the experimental design described by Marie-Etancelin and Guy (2008), where females issued from a backcross between a slowly growing common duck and a fast growing Pekin duck were mated to male Muscovy ducks. Ducklings were inoculated as previously described and euthanized four weeks later For determining the number of Salmonella in the caeca. REML methods were used to estimate the heritability of the logarithm of the number of c.f.u. per gram of caeca which was 0.24 ± 0.11. This is close to the heritability estimated on a large number of chickens (Beaumont et al., 2009b), strongly suggesting that this trait could be used efficiently select resistant ducks. Data and DNA samples will be further used for a QTL search.

Keywords: genetic, resistance, duck, Salmonella, carrier-state

BARROW, P., LOVELL, M.A., MURPHY, C.K., PAGE, K., 1999. Salmonella infection in a commercial line of ducks; Experimental studies on virulence, intestinal colonization and immune protection. *Epidemiology and Infection*, 123:121-132

BEAUMONT, C., CHAPUIS, H., PROTAIS, J., SELLIER, N., MENANTEAU, P., FRAVALO, P., VELGE, P., 2009a. Resistance to Salmonella carrier-state: selection may be efficient but response depends on animal's age. *Genetics Research* **91**: 161-169.

BEAUMONT, C., CHAPUIS, H., SELLIER, N., CALENGE, F., ZONGO, P., VELGE, PROTAIS, J., P., 2009b. Selection for increased resistance to Salmonella carrier-state, 6th European Poultry Genetics Symposium, Bedlewo, September 30th- October 2nd.

MARIE-ETANCELIN, C. , GUY, G., 2008. Building of an animal design for QTL detection in common mother mule ducks female,

<http://www.inra.fr/internet/Departements/phase/spip.php?article225&PHPSESSID=bda885e6efbfe04e440239c04e1db692>.