

QTL detection for age at puberty and cyclicity resumption in a Holstein x Normande population

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▶ **To cite this version:**

Rachel Lefebvre, Helene H. Larroque, Sarah Barbey, Yves Y. Gallard, J Jacques J. J. Colleau, et al.. QTL detection for age at puberty and cyclicity resumption in a Holstein x Normande population. 63. Annual Meeting of the European Association of Animal Production (EAAP), Aug 2012, Bratislava, Slovakia. 476 p., 10.3920/978-90-8686-761-5 . hal-02745160

HAL Id: hal-02745160
https://hal.inrae.fr/hal-02745160

Submitted on 3 Jun 2020

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Quantification of dangerous gas emissions from pig fattening

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The aim of this study was to quantify emissions and emission factors of ammonia and greenhouse gases from pig fattening reared on the slatted floor during four fattening cycles. For this purpose the gas concentrations, airflow rate, housing and outdoor temperatures were monitored. In the experiment it was detected that both summer batches (batch 1 and 4) as well as autumn-winter batch (batch 2) and spring batch (batch 3) recorded a similar course in the amount of daily gas emissions. In summer batches the increase of daily gas emissions from the beginning to the end of fattening was mostly recorded. Conversely, in autumn-winter and spring batches the decrease of daily gas emissions from the beginning to the end of fattening was especially registered. Differences in daily emission rates of NH_3, CO_2, N_2O and CH_4 were significant between all batches except the batches: summer 1 and autumn-winter; summer 1 and summer 4; summer 1 and spring, summer 1 and summer 4; autumn-winter and spring, autumn-winter and summer 4, respectively. In the case of emitted airflow rate it was registered that differences were significant between all batches except the batches: summer 1 and spring, spring and summer 4. Temperature differences in animal area were also significant between all batches except the batches: summer 1 a summer 4. During all four batches there were produced 836 kg of NH_3, 266 138 kg of CO_2, 68.6 kg of N_2O, 4 176 kg of CH_4 and 431 428 kg of H_2O. The greatest emission rates of NH_3, CO_2 and N_2O were found in autumn-winter batch, CH_4 in summer batch 4, and H_2O in spring batch. The least emission rates of CO_2, CH_4 and H_2O were recorded in summer batch 1, and NH_3 a N_2O in summer batch 4. Calculated emission factors recorded the values 2.1 kg of NH_3, 654 kg of CO_2, 0.17 kg of N_2O, 10.3 kg of CH_4 a 1 073 kg of H_2O per animal and year. It was found that NH_3 emission factor calculated from the practical observations was lower by 0.79 kg per animal and year than assumed emission factor.

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A QTL detection experiment was carried out in 'Le Pin' INRA experimental farm by crossing Holstein and Normande dairy cattle. The design included 1092 F2 as well as 561 'F3' (= F2 dams × F1 sires) females. Blood progesterone was assessed every 10 days until a positive assay, from 230 days old and 20 days post-partum, for 1096 heifers and 1039 primiparous cows respectively. Age at puberty and time between calving and cyclicity resumption were calculated with the date at the first positive assay. Mean age at puberty was 307 days (±51) and mean post-partum cyclicity resumption was 31 days (±12). Phenotypic correlation between both traits was very low (0.02). Heritability estimates were 0.22 for puberty and 0.15 for cyclicity resumption. All animals, including F1 parents and F0 grandparents, were genotyped with the Illumina 54k Beadchip. QTL detection was performed by linkage and linkage disequilibrium analysis (LDLA). For age at puberty, a total of 21 QTL were found on 12 chromosomes (1, 2, 3, 5, 8, 10, 11, 13, 14, 21, 27, 29), with the strongest ones on chromosomes 29 (26 and 44 Mb) and 13 (60 Mb). For time to cyclicity resumption, 14 QTL were found on 7 chromosomes (1, 5, 11, 21, 26, 27, 29), with the strongest ones on chromosomes 21 (26 Mb) and 26 (33 Mb). The latter region contains a gene encoding estradiol dehydrogenase involved in ovarian activity. Only one common region was detected for both traits (chromosome 21 around 26 Mb).

Book of Abstracts of the 63rd Annual Meeting of the European Federation of Animal Science



Book of abstracts No. 18 (2012)
Bratislava, Slovakia
27 - 31 August 2012