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TRAITEMENT DES EFFLUENTS
WASTE TREATMENT

Anaerobic digestion of pig manure

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Anaerobic digestion of pig manure leads to waste stabilisation together with energy production while the fertilizing properties of the methanized effluent are preserved.

A trial on anaerobic digestion of untreated pig manure was made according to a conventional method (completely mixed) using a digester of 20 m³. The interest of the procedure was the production of acetic acid due to a prefermentation (micro-aerobiosis). For a 10-day residence time the production of biogas (71-78 p. 100 CH₄) was 237 l per kg dry matter, i.e. 479 l of CH₄ per kg degraded dry matter. The treatment yield was 45 p. 100 COD. Another method based on the up-flow principle was applied. Screened pig manure (630 microns) was used. Using this digester it was possible to obtain the same amount of biogas four times quicker. The treatment yield was improved (65 p. 100 COD). The mean production was 493 l biogas/kg degraded COD. It seems to be possible to apply that procedure to most agricultural wastes.

CONDUITE D'ÉLEVAGE
HERD MANAGEMENT

Animal welfare in intensive husbandry

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One of the main aims of research work in the field of animal welfare is to find objective ways to assess and improve wellbeing in farm animals. Intensive husbandry techniques are threatening welfare because of the pressure exerted by the physical and social environment and the restriction put on the basic species-specific behavioural patterns. Different criteria are available to determine whether such factors are critical. The commercial profit made from animals has little to do with their welfare. The general condition of the animals, i.e. their physical appearance and the absence of any disease or injury, is of great value but its assessment is still a matter of debate. Physiological and behavioural alterations can occur in physically healthy animals and must also be taken into account.

In addition, the preferences of the animals in terms of environmental conditions can be tested by appropriate techniques. Using this whole set of criteria, it is possible to try to improve the wellbeing of animals either by modifying the environment so as to optimize the expression of species-specific behaviour or by decreasing the sensitivity of animals to environmental stresses. Further progress in the field of animal welfare is depending of a better understanding of the relationships of animals with their environment.

Trends of the numerical productivity components in 325 french sow herds from 1972 to 1981

Regional and seasonal variations

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Descriptive analysis of the variation from 1972 to 1981 of five components of the numerical sow productivity (number of born piglets, born alive and weaned per litter, lactation length, weaning-fertilization interval) was made on a total of 299 464 litters born in 325 French production herds subjected to the « National computerized programme for analysis of on-the-farm sow records. Herds were distributed into 4 regional sectors to take into account climatic variations : Brittany, South, Centre, North-East. Then, independently for each region, data were subjected to an analysis of variance including three fixed effects (litter size at 6 levels, year-month of farrowing combination and year-herd combination) and to a random effect (within herd sow) so as to obtain the best estimates of the year effect. Moreover, the effect of the lactation length of order $(n-1)$ on the litter size at birth and the weaning-fertilization interval of order (n) was studied.

In all the regions a decrease of 0.25 unit was observed in the number of piglets born per litter in the summer as compared to the winter months, while the opposite was observed at weaning with an increase of 0.3 unit in litters born in the summer. The weaning-fertilization interval was 3 to 5 days longer according to the region when weaning took place in late spring or early summer.

In Brittany and in the South of France the litter size at birth decreased by about 0.4 unit during the first five years and increased again up to the initial level during the next five years. This variable was steady in the Centre, while it was 0.5 unit lower in the North-East during the same period. Except in the North-East, the litter size at weaning increased regularly in the other three regions from 1975.

This variation may be partly explained by the decrease of about 9 days in the lactation length from 1972 to 1976 in the four regions followed by a decrease of about 3 days from 1977 to 1981. The number of piglets born per litter decreased on an average by 0.2 unit for a 10-day reduction in the duration of the previous lactation. The weaning-fertilization interval decreased by about 3 days except in the North-East. This variation may partly be explained by that of the lactation length.

The numerical sow productivity increased on an average by 0.23 piglet weaned/sow/year from 1972 to 1981 with regional variations ranging from 0.19 to 0.30 piglet/sow/year.

This study showed that the increased sow productivity observed the last ten years was mainly due to the new herd management systems leading to an accelerated rhythm of reproduction. As this situation is now becoming stabilized for biological and economic reasons future advances should be obtained by increasing sow prolificacy and piglet survival rate.